
I hereby give notice that a hearing by commissioners will be held on:

Date: Monday 27 to Thursday 30 May and
Tuesday 4 to Friday 7 June 2024
(Note: not all days may be required)
Time: 9.30am
Meeting Room: Council Chamber
Venue: Level 1, West Annex,
31-33 Manukau Station Road, Manukau

NOTIFICATION MATERIAL

TWO NOTICES OF REQUIREMENT FOR THE TAKAANINI LEVEL CROSSING PROJECT AND FOUR NOTICES OF REQUIREMENT FOR THE SOUTH FREQUENT TRANSIT NETWORK (FTN) PROJECT

NOR 2 GREAT SOUTH ROAD FTN – DRURY SECTION

VOLUME ONE

TE TUPU NGATAHI - SUPPORTING GROWTH ALLIANCE

Note: The reports contained within this document are for consideration and should not be construed as a decision of Council. Should commissioners require further information relating to any reports, please contact the hearings advisor.

COMMISSIONERS

**Chairperson
Commissioners**

**Dave Serjeant
Nigel Mark-Brown
Basil Morrison**

Bevan Donovan
KAITOHUTOHU WHAKAWĀTANGA
HEARINGS ADVISOR
Telephone: 09 890 8056 or 021 325 837
Email: bevan.donovan@aucklandcouncil.govt.nz
Website: www.aucklandcouncil.govt.nz

SIX NOTIFIED NOTICES OF REQUIREMENT TO THE AUCKLAND COUNCIL UNITARY PLAN BY TE TUPU NGATAHI - SUPPORTING GROWTH ALLIANCE

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Auckland Unitary Plan

Notice of Requirement for a designation for upgrades to Great South Road between Waihoehoe Road and the State Highway 1 Drury Interchange to provide a multi-modal transport corridor that will accommodate general traffic lanes, active mode facilities (i.e. walking and cycling facilities), intersection upgrades, replacement of the existing Hingaia Stream bridge and stormwater management.

Notice of Requirement - South Frequent Transit Network: Great South Road Upgrade (Drury section) (NoR 2) Auckland Transport

Auckland Council has received a notice of a requirement for a designation from Auckland Transport as the Requiring Authority, for public work.

The requirement will enable corridor widening, intersection upgrades, bridge upgrade, environmental mitigation, temporary construction areas, ancillary structures and other activities required to enable the urbanisation of the Drury section of Great South Road.

This will enable the Requiring Authority to:

Provide for an upgraded multi-modal transport corridor in Drury that:

- Improves connectivity and access to economic and social opportunities;
- Improves safety;
- Improves efficiency, resilience and reliability;
- Integrates with and supports existing development and planned urban growth;
- Integrates with and supports the existing and future transport network; and
- Improves travel choice and contributes to mode share shift.

The site to which the requirement applies is as follows: properties on Great South Road between Waihoehoe Road and SH1 (Refer to Attachment A and B of Form 18).

Viewing the notice of requirement

The explanation of the notice of requirement can be found on our web site <https://www.aucklandcouncil.govt.nz/nor>. If you don't have access to a computer, please visit your local library or service centre and they will help you view the notice of requirement on our website.

If you have any questions about the notice of requirement, please contact: Unitary Plan at unitaryplan@aucklandcouncil.govt.nz or on 09 365 3786.

Making a submission on the notice of requirement

Any person or organisation may make a submission on the notice of requirement, but a person who is a trade competitor of the requiring authority may do so only if that person is directly affected by an effect of the activity to which the requirement relates that –

- (a) Adversely affects the environment; and
- (b) Does not relate to trade competition or the effects of trade competition.

You may make a submission by sending a written or electronic form to Auckland Council at:

- Auckland Council, Unitary Plan Private Bag 92300, Auckland 1142, Attention: Planning Technician, or
- By using the online form on the Auckland Council website at <https://www.aucklandcouncil.govt.nz/nor>, or
- By email to: unitaryplan@aucklandcouncil.govt.nz ;or
- Lodging your submission in person at Auckland Council, Libraries or offices.

Submissions close at midnight on 14 December 2023.

You must serve a copy of your submission on Auckland Transport, whose address for service is

submissions@supportinggrowth.nz or

Auckland Transport, Level 5, 203 Queen Street, Auckland 1010

as soon as reasonably practicable after serving your submission on Auckland Council.

John Duguid

Manager – Plans & Places

Notification date: 16 November 2023

13 October 2023

Te Tupu Ngātahi
Supporting Growth
PO Box 105218
Auckland 1143

Auckland Council
C/o Joy LaNauze
Planning Central/South – Plans and Places

Dear Joy

Re: SOUTH FREQUENT TRANSIT NETWORK NOTICES OF REQUIREMENT

This letter is to advise that Auckland Transport gives notices of requirement for four new designations as part of the proposed South Frequent Transit Network Project.

The lodgement documents have been prepared together as one package and are in four volumes as follows:

- Volume 1: Form 18 for each of the four notices
- Volume 2: Assessment of Effects on the Environment
- Volume 3: General Arrangement Layout Plans
- Volume 4: Supporting Technical Assessments

These have been emailed to you via file transfer links.

Please contact me in the first instance if there are any queries.

Yours sincerely

Liam Winter
South Frequent Transit Network – Planning Lead
Te Tupu Ngātahi Supporting Growth Alliance

FORM 18

NOTICE OF REQUIREMENT FOR DESIGNATION OF LAND UNDER s168(2) OF THE RESOURCE MANAGEMENT ACT 1991

TO: Auckland Council

FROM: Auckland Transport

Auckland Transport as a Requiring Authority under section 167 of the Resource Management Act 1991 (RMA) gives its notice of its requirement for a designation for a public work, being the construction, operation, and maintenance of upgrades to Great South Road between Waihoehoe Road and the State Highway 1 Drury Interchange, to accommodate general traffic lanes, walking and cycling lanes, as well as all associated works.

SUMMARY

The Notice of Requirement (**NoR**) is the second of four NoRs required by Auckland Transport to enable the South Frequent Transit Network (**South FTN**) and is known as NoR 2. The South FTN is one of the transport works packages proposed for South Auckland as part of the Te Tupu Ngātahi Supporting Growth (**Te Tupu Ngātahi**) programme which is a collaboration between Auckland Transport and Waka Kotahi NZ Transport Agency (**Waka Kotahi**).

The South FTN seeks to expand the reach of frequent public transport between Manukau and Drury and complement the rail network; as well as provide safe and attractive active mode facilities. In doing so, the South FTN will alleviate existing transport network deficiencies, increase accessibility, provide transport choice, and encourage mode shift to sustainable transport modes as the population of South Auckland continues to grow.

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:

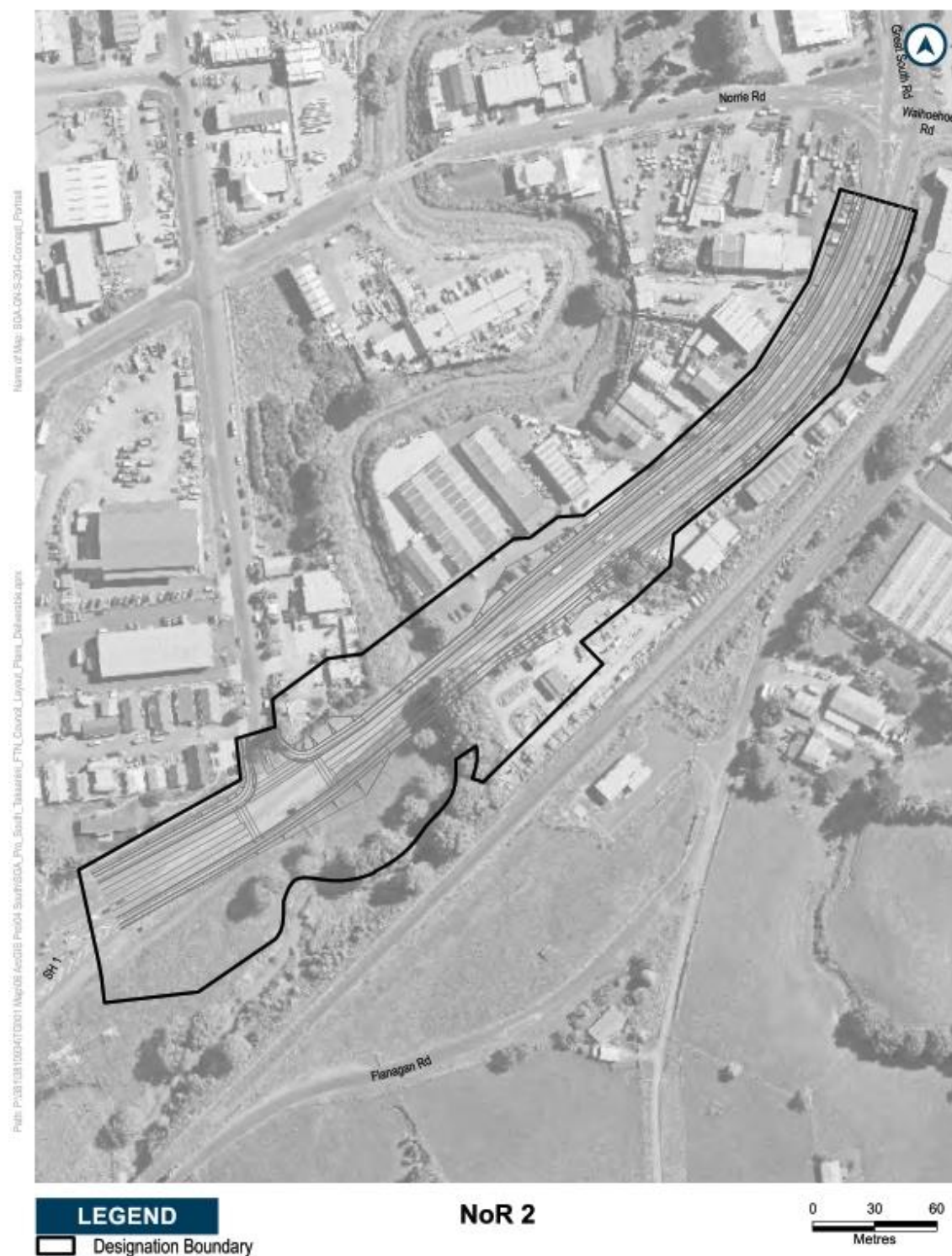
- Operation of high-quality FTN¹ bus services along Great South Road between Manukau and Drury (the Great South Road FTN route);
- Operation of high-quality FTN bus services along existing roads between Manurewa, Takaanini, and Papakura (the Takaanini FTN route); and

¹ FTN services are defined in AT's Regional Public Transport Plan (RTP) as bus routes operating at least every 15 minutes between 7am-7pm, 7 days-a-week, often supported by priority measures such as bus or transit lanes.

- Urbanisation of adjoining key connections to FTN routes – Popes Road West, and the Drury section of Great South Road between Waihoehoe Road and State Highway 1 (SH1).

NoR 2 is for a portion of works required to enable the South FTN – specifically, the construction, operation, and maintenance of upgrades to Great South Road between Waihoehoe Road and SH1 to accommodate general traffic lanes, walking and cycling facilities, as well as all associated works.

The extent of NoR 2 and the proposed designation boundaries is outlined below.





The purpose of NoR 2 is consistent with the activities outlined above. In general terms, the activities to be enabled by the designation include corridor widening, intersection upgrades, bridge upgrades, environmental mitigation, temporary construction areas, ancillary structures and other activities required to enable the urbanisation of the Drury section of Great South.

The project objective for NoR 2 is:

Provide for an upgraded multi-modal transport corridor in Drury that:

- Improves connectivity and access to economic and social opportunities;
- Improves safety;
- Improves efficiency, resilience and reliability;
- Integrates with and supports existing development and planned urban growth;
- Integrates with and supports the existing and future transport network; and
- Improves travel choice and contributes to mode share shift.

As an approved Requiring Authority under section 176 of the RMA, by virtue of section 47(1) of the Local Government (Auckland Council) Act 2009, Auckland Transport may designate to construct, operate and maintain any roads and ancillary activities that form part of the Auckland Transport system.

THE SITE TO WHICH THE REQUIREMENT APPLIES IS AS FOLLOWS:

The proposed area of NoR 2 is shown on the Designation Plans included in **Attachment A** of this Notice. The land directly affected by NoR 2 is identified in the Schedule of Directly Affected Properties included in **Attachment B** of this notice.

THE NATURE OF THE PROPOSED WORKS IS:

The proposed work is for the construction, operation, and maintenance of upgrades to Great South Road between Waihoehoe Road and SH1 in Drury to enable its urbanisation. The nature of the work is described in detail in *Section 3:2: Project Description* and *Section 9.2: Construction methodology* of the accompanying Assessment of Effects on the Environment (**AEE**). However, in summary, the proposed works include:

- An upgrade of Great South Road to accommodate general traffic lanes and walking and cycling facilities;
- Associated works including intersections, bridges, embankments, retaining walls, culverts, and stormwater management systems;
- Reconfiguration of local roads, where the proposed work intersects with local roads; and
- Construction activities including vegetation removal, establishment of construction areas and the regrading of driveways.

THE NATURE OF THE PROPOSED CONDITIONS THAT WOULD APPLY ARE:

The proposed conditions that will apply to the work are included in **Attachment C** of this Notice.



THE EFFECTS THAT THE PROPOSED WORK WILL HAVE ON THE ENVIRONMENT, AND THE WAYS IN WHICH ANY ADVERSE EFFECTS WILL BE MITIGATED:

The AEE contains a detailed description of the existing and likely future environment (Section 9.7), an assessment of the effects on the environment from the proposed designation works and the proposed measures to avoid, remedy or mitigate the adverse effects of those works (Section 10) which include design and condition requirements.

Positive Effects

The works enabled by NoR 2 will contribute to positive effects that are elaborated on in Section 10 of the AEE. However, in summary, the works will:

- Provide better access to economic and social opportunities, enable mode shift, greater travel choice and connectivity by:
 - Urbanising a portion of Great South Road that forms a key connection within the transport network;
 - Providing improved and safe walking cycling facilities in the network; and
 - Enabling transport infrastructure upgrades that integrate with and provide access to existing and future public transport networks, existing development, and planned growth in South Auckland.
- Contribute towards a reduction in deaths and serious injuries by:
 - Providing safe and separated active mode facilities in the network;
 - Improved road crossing facilities; and
 - Improving driver and pedestrian safety by converting a priority-controlled intersection to signals.
- Improve the resilience of the transport network and community by:
 - Urbanising a key section of Great South Road to support its role in the transport network, improve capacity and accommodate the anticipated future multi-modal movements;
 - Upgrading the Hingaia Stream bridge to accommodate the 1 in 100-year flood event, minimising the likelihood of traffic disruptions in the event of flooding.
- Improve neighbourhood character and streetscape amenity with upgraded corridor infrastructure and increased canopy cover through the provision of street trees and vegetation within and adjacent to the Project corridor.
- Support opportunities for higher density urban development around future rapid transit stations such as Drury Station;
- Provide opportunities to enhance the character and identity of the neighbourhood through future design and partnership with Manawhenua.
- Provide for the inclusion of green stormwater infrastructure such as planted stormwater wetlands and raingardens.

Adverse Effects

There will be a range of potential adverse effects during the construction and operational phases of the works enabled by NoR 2, which are assessed in the following sections of the AEE:



- Transport (Section 10.2 of the AEE);
- Landscape (Section 10.3 of the AEE);
- Noise and Vibration (Section 10.4 of the AEE);
- Arboriculture (Section 10.5 of the AEE);
- Terrestrial ecology (Section 10.6 of the AEE);
- Flooding (Section 10.7 of the AEE);
- Social (Section 10.8 of the AEE);
- Archaeological and built heritage (Section 10.9 of the AEE);
- Property (Section 10.10 of the AEE); and
- Network Utilities (Section 10.11 of the AEE).

The AEE draws on information provided in the Technical Assessment Reports (contained in Volume 4 of the AEE) to assess and provide recommended mitigation measures as appropriate.

An urban design evaluation is also included in Volume 4 of the AEE to provide urban design commentary on the concept design of the proposed South FTN Project.

ALTERNATIVE SITES, ROUTES, AND METHODS HAVE BEEN CONSIDERED TO THE FOLLOWING EXTENT:

A range of alternatives have been investigated for achieving the Project objective including locations, form and function and extent of works.

The assessment of alternatives process has generally followed a long list to short list through to recommended option process. The long list options start at the broadest feasible area and progressively narrow down the area to a single preferred route, form and function and extent of works.

The process by which Auckland Transport considered alternative sites, routes and methods for NoR 2 is detailed in *Appendix A: Assessment of Alternatives* of the AEE and summarised in *Section 6: Assessment of Alternatives* of the AEE. The development of NoR 2 was based on a comprehensive and robust optioneering process taking into account Manawhenua, stakeholder and landowner feedback along with specialist assessment inputs.

THE PROPOSED WORK AND DESIGNATION ARE REASONABLY NECESSARY FOR ACHIEVING THE OBJECTIVES OF THE REQUIRING AUTHORITY:

The work and designation are reasonably necessary to meet the objectives of Auckland Transport. Refer to *Section 7: Whether the work and designation are reasonably necessary for achieving the objectives* and *Section 11: Statutory Assessment* of the AEE to see the specific assessment of the works against the Project objective and against the relevant statutory criteria.

Auckland Transport's purpose under section 39 of the Local Government (Auckland Council) Act 2009 (**LGA**) is "to contribute to an effective, efficient, and safe Auckland land transport system in the public interest". NoR 2 will assist Auckland Transport in meeting this objective.

The Auckland Transport project objective for NoR 2 is set out below:



Provide for an upgraded multi-modal transport corridor in Drury that:

- Improves connectivity and access to economic and social opportunities;
- Improves safety;
- Improves efficiency, resilience and reliability;
- Integrates with and supports existing development and planned urban growth;
- Integrates with and supports the existing and future transport network; and
- Improves travel choice and contributes to mode share shift.

NoR 2 is reasonably necessary for achieving the project objective because it will:

- Provide for transport improvements that help respond to the existing deficiencies of the transport network such as lack of high-quality public transport and safe active mode facilities and directly provides for the outcomes sought by the project objective. Failure to address these deficiencies will result in continued car dependence, congestion, poor public transport accessibility, lack of travel choice, elevated safety risks and increased transport emissions. Without intervention, these deficiencies will be exacerbated by planned growth and increased travel demand. The existing road network in the Project area cannot achieve the Project objective (Section 3.1 and Section 10.2 of the AEE);
- Provide for necessary urbanisation of a key connection that will support safe, efficient, reliable, and integrated operation of the transport network for all users. This contributes towards greater travel choice for accessing opportunities and mode share shift (Section 3.1, Section 10.2 and Section 10.8 of the AEE);
- Provide for improved and safe walking and cycling facilities in the network which are aligned with Auckland Transport's Vision Zero Strategy which aims for no deaths or serious injuries on the transport system by 2050 (Section 10.2 of the AEE);
- Enable work that reduces the conflicts between vehicles, walking and cycling (Section 10.2 of the AEE);
- Enable work that manages the risk of the transport network being disrupted by flood hazards (Section 10.2 and Section 10.7 of the AEE); and
- Improve environmental and cultural outcomes (i.e., increased vegetation and green infrastructure) (Section 10.7 and Section 10.8 of the AEE).

The proposed designation is reasonably necessary as it identifies and protects land required for the proposed designation works and will enable Auckland Transport to carry out the proposed work in due course enabling the South FTN Project outcomes.

THE FOLLOWING RESOURCE CONSENTS ARE NEEDED FOR THE PROPOSED ACTIVITY AND HAVE NOT BEEN APPLIED FOR:

NoR 2 may require resource consents for a number of activities to enable the proposed work. The resource consents are not sought at this time and will be sought when detailed design is complete and closer to the time of construction. The future resource consents likely to be required for NoR 2 are summarised below.

- Resource consents for the disturbance of contaminated, or potentially contaminated land under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011;



- Resource consents for specified infrastructure works within rivers, streams and natural wetlands under the Resource Management (National Environmental Standards for Freshwater) Regulations 2020;
- Resource consents for the following activities under the Auckland Unitary Plan: Operative in part:
 - Bulk earthworks and associated discharge of sediment;
 - Vegetation removal;
 - Stormwater discharge to land or water;
 - Discharge of contaminants to land;
 - Activities (including structures and associated works) in, on, under or over the bed of rivers, streams, wetlands;
 - Water take, use and diversion; and
 - Temporary construction works.
- At this stage, no relocation of Transpower's pylons or transmission lines is anticipated and therefore no resource consents will be required under the Resource Management (National Environmental Standards for Electricity Transmission Activities) Regulations 2009.

THE FOLLOWING CONSULTATION HAS BEEN UNDERTAKEN WITH PARTIES THAT ARE LIKELY TO BE AFFECTED:

Consultation and engagement is ongoing with various parties who are directly affected by or have an interest in the overall Project including Manawhenua, property owners and occupiers, Auckland Council, Local Boards, Waka Kotahi, KiwiRail, Eke Panuku Development Auckland, Kāinga Ora, network utility operators, emergency services, business and community representative groups and the wider community. Engagement activities included community meetings and open days, phone calls, face to face meetings, workshops, presentations, hui, newsletters, and online information.

The consultation undertaken is detailed in *Section 4: Engagement* of the AEE.

EXTENDED LAPSE PERIOD PROPOSED:

Pursuant to section 184(1)(c) of the RMA, a lapse period of 10 years is required for the implementation of the proposed designation. This will ensure protection of the land required for the works from inappropriate development until the works can commence when funding is allocated.

INFORMATION REQUIRED TO BE INCLUDED IN THIS NOTICE BY THE AUCKLAND UNITARY PLAN OR ANY REGULATION MADE UNDER THE RESOURCE MANAGEMENT ACT 1991:

Auckland Transport attaches the following information required to be included in this notice by the Auckland Unitary Plan, or any regulations made under the Resource Management Act 1991:

- Volume 2: Assessment of Effects on the Environment;
- Volume 3: General Arrangement Plans; and
- Volume 4: Supporting Technical Assessment Reports.



A handwritten signature in blue ink, appearing to read 'Nesh Pillay', is positioned above the text 'Signed on behalf of Auckland Transport'.

Signed on behalf of Auckland Transport

Nesh Pillay

Planning and Acquisition Manager pursuant to authority delegated by Auckland Transport

Dated: 11/10/2023

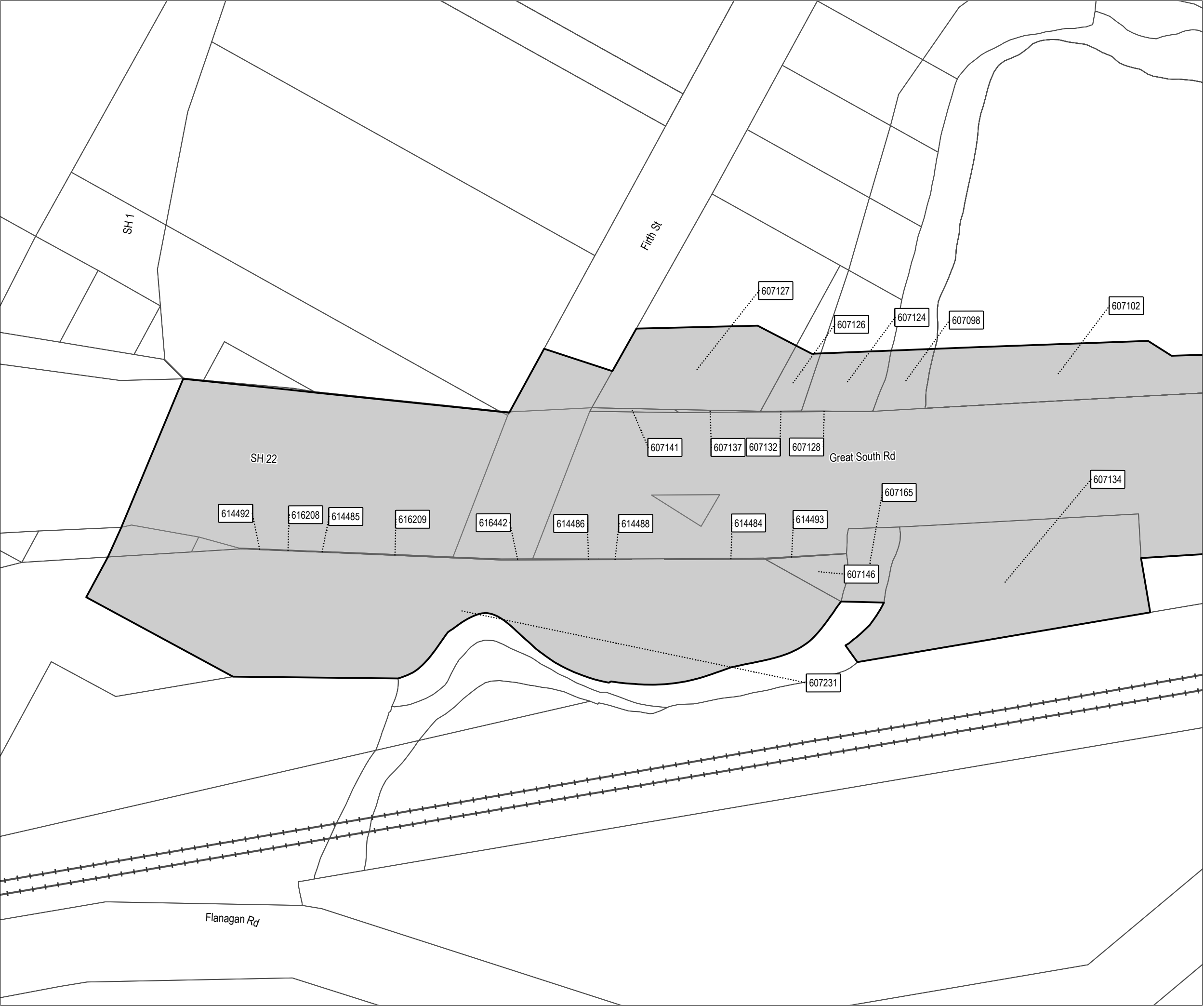
Attachment A – Designation Plans

Attachment B – Schedule of Directly Affected Properties

Attachment C – Proposed Conditions for the Designation

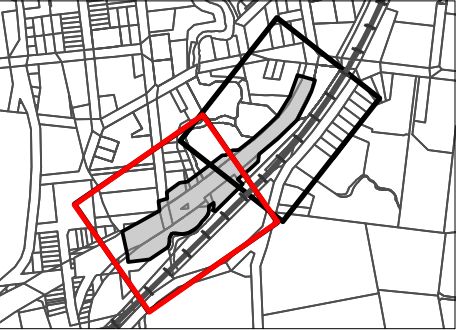


Attachment A – Designation Plans



Designation Plan
Land to be Designated for
Great South Road Upgrade
Drury Section

- Legend**
- Proposed Designation
 - Parcel Boundary
 - Property ID
 - Railway Line



This map contains data derived in part or wholly from sources other than those party to the Supporting Growth Alliance, and therefore, no representations or warranties are made by those party to the Supporting Growth Alliance as to the accuracy or completeness of this information.

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Revision	Author	Verified	Approved	Date
1	RR9	BAP	LW	22/09/2023



Client:
Auckland Transport / Waka Kotahi

Discipline:
GIS

Project:
Takaanini FTN Projects

Drawing No:
SGA-PA-FTN-010
Sheet No : 1 of 2





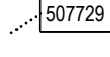

New Zealand Government

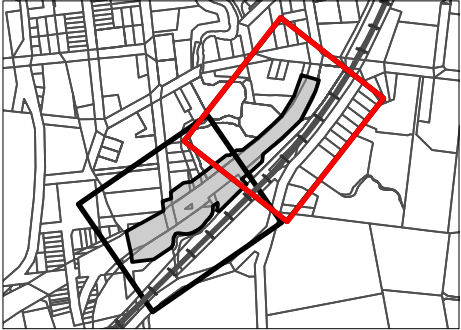


Designation Plan

Land to be Designated for
Great South Road Upgrade
Drury Section

Legend

-  Proposed Designation
-  Parcel Boundary
-  507729 Property ID
-  Railway Line

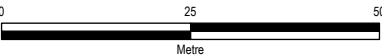


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1	RR9	BAP	LW	22/09/2023



Client:
Auckland Transport / Waka Kotahi

Discipline:
GIS

Project:
Takaanini FTN Projects

Drawing No:
SGA-PA-FTN-010
Sheet No : 2 of 2





Attachment B – Schedule of Directly Affected Properties

Property ID	Address	Title Number	Legal Description	Approx Land to be designated (m ²)	Sheet No
607124	279 Great South Road	<Null>	Part Lot 6 DP 77604	322	1
607128	<Null>	<Null>	Part Lot 35 Sec 6 PSH OF Opaheke	3	1
607141	<Null>	<Null>	Part Lot 32 Sec 6 PSH OF Opaheke	22	1
614492	<Null>	<Null>	Part Lot 55 Sec 7 DEEDS 35	2	1
616442	<Null>	<Null>	Part Lot 51 Sec 7 DEEDS 35	10	1
607132	<Null>	<Null>	Part Lot 33 Sec 6 PSH OF Opaheke	3	1
607231	10R Karaka Road	<Null>	Section 1 SO 65144	5601	1
614493	<Null>	<Null>	Part Lot 34 Sec 7 DEEDS 35	5	1
614486	<Null>	<Null>	Part Lot 52 Sec 7 DEEDS 35	2	1
607137	<Null>	<Null>	Part Lot 31 Sec 6 PSH OF Opaheke	13	1
607146	<Null>	<Null>	Part Allot 34 Sec 6 PSH OF Opaheke	153	1
614484	<Null>	<Null>	Part Lot 269 Sec 7 DEEDS 35	8	1
614485	<Null>	<Null>	Part Lot 49 Sec 7 DEEDS 35	2	1
616208	<Null>	<Null>	Part Lot 54 Sec 7 DEEDS 35	3	1
614488	<Null>	<Null>	Part Lot 269 Sec 7 PSH OF Opaheke	3	1
616209	<Null>	<Null>	Part Lot 50 Sec 7 DEEDS 35	10	1
607102	275 Great South Road	NA129D/315	Lot 1 DP 62849	1387	1
607102	271 Great South Road	NA129D/316	Lot 1 DP 62849	1387	1
607102	267 Great South Road	NA129D/317	Lot 1 DP 62849	1387	1
607102	263 Great South Road	NA129D/318	Lot 1 DP 62849	1387	1
607102	263-275 Great South Road	NA129D/319	Lot 1 DP 62849	1387	1
607127	1 Firth Street	NA33D/1321	Part Lot 5 DP 77604	1024	1
607134	280 Great South Road	384975	Lot 1 DP 396575	2280	1



607126	291 Great South Road	NA33D/1322	Part Lot 6 DP 77604	157	1
607165	<Null>	<Null>	10R Karaka Road	260	1
607098	<Null>	<Null>	<Null>	204	1
607073	257 Great South Road	NA88B/843	Lot 1 DP 148749	195	2
607073	257-261 Great South Road	NA88B/844	Lot 1 DP 148749	195	2
607073	1/257 Great South Road	NA88C/269	Lot 1 DP 148749	195	2
607096	2/260 Great South Road	NA52B/755	Allot 394 PSH OF Opaheke	706	2
607096	250 Great South Road	980388	Allot 394 PSH OF Opaheke	706	2
607096	1/260 Great South Road	980387	Allot 394 PSH OF Opaheke	706	2
607028	1/236 Great South Road	NA136A/318	Lot 1 DP 205378	195	2
607028	2/236 Great South Road	NA136A/319	Lot 1 DP 205378	195	2
607028	3/236 Great South Road	NA136A/320	Lot 1 DP 205378	195	2
607028	4/236 Great South Road	NA136A/321	Lot 1 DP 205378	195	2
607028	5/236 Great South Road	NA136A/322	Lot 1 DP 205378	195	2
607028	6/236 Great South Road	NA136A/323	Lot 1 DP 205378	195	2
607028	7/236 Great South Road	NA136A/324	Lot 1 DP 205378	195	2
607028	8/236 Great South Road	NA136A/325	Lot 1 DP 205378	195	2
607028	9/236 Great South Road	NA136A/326	Lot 1 DP 205378	195	2
607028	10/236 Great South Road	NA136A/327	Lot 1 DP 205378	195	2
607028	11/236 Great South Road	NA136A/328	Lot 1 DP 205378	195	2
607028	236 Great South Road	NA136A/329	Lot 1 DP 205378	195	2
607017	251 Great South Road	518013	Lot 1 DP 430342	410	2
607053	255 Great South Road	518014	Lot 2 DP 430342	277	2
607009	<Null>	NA224/11	Part Allot 34 PSH OF Opaheke	39	2



Attachment C – Proposed Conditions for the Designation

NOTICES OF REQUIREMENT FOR THE SOUTH FREQUENT TRANSIT NETWORK PROJECT (NoRs 1 to 4)

Abbreviations and definitions

Acronym/Term	Definition
Activity sensitive to noise	Any dwelling, visitor accommodation, boarding house, marae, papakāinga, integrated residential development, retirement village, supported residential care, care centre, lecture theatre in a tertiary education facility, classroom in an education facility and healthcare facility with an overnight stay facility.
AUP	Auckland Unitary Plan.
BPO or Best Practicable Option	Has the same meaning as in section 2 of the RMA 1991.
CEMP	Construction Environmental Management Plan
Certification of material changes to management plans and CNVMP Schedules	Confirmation from the Manager that a material change to a plan or CNVMP Schedule has been prepared in accordance with the condition to which it relates. A material change to a management plan or CNVMP Schedule shall be deemed certified: (a) where the Requiring Authority has received written confirmation from Council that the material change to the management plan is certified; (b) ten working days from the submission of the material change to the management plan where no written confirmation of certification has been received; or (c) five working days from the submission of the material change to a CNVMP Schedule where no written confirmation of certification has been received.
CNVMP	Construction Noise and Vibration Management Plan
CNVMP Schedule or Schedule	A schedule to the CNVMP
Completion of Construction	When construction of the Project (or part of the Project) is complete and it is available for use.
Confirmed Lizard Management Plan Areas	Areas recorded in the Identified Native Lizard Habitat Areas Schedule where the ecological values and effects have been confirmed through the ecological survey under Condition 25.
Construction Works	Activities undertaken to construct the Project excluding Enabling Works
Council	Auckland Council
CTMP	Construction Traffic Management Plan
Developer	Any legal entity that intends to master plan or develop land adjacent to the designation
Development Agency	Public entities involved in development projects
EIANZ Guidelines	Ecological Impact Assessment: EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems, second edition, dated May 2018.
Enabling works	Includes, but is not limited to, the following and similar activities: (a) geotechnical investigations (including trial embankments) (b) archaeological site investigations (c) formation of access for geotechnical investigations (d) establishment of site yards, site entrances and fencing

Acronym/Term	Definition
	(e) constructing and sealing site access roads (f) demolition or removal of buildings and structures (g) relocation of services (h) establishment of mitigation measures (such as erosion and sediment control measures, temporary noise walls, earth bunds and planting)
HHMP	Historic Heritage Management Plan
HNZPT	Heritage New Zealand Pouhere Taonga.
HNZPTA	Heritage New Zealand Pouhere Taonga Act 2014
Identified Native Lizard Habitat Area	Means an area or areas of features of ecological value where the Project ecologist has identified that the project will potentially have a moderate or greater level of ecological effect on native lizards, prior to implementation of impact management measures, as determined in accordance with the EIANZ guidelines.
LMP	Lizard Management Plan
Manager	The Manager – Resource Consents of the Auckland Council, or authorised delegate.
Mana Whenua	Mana Whenua as referred to in the conditions are considered to be the following (in no particular order), who at the time of Notice of Requirement expressed a desire to be involved in the Project: <ul style="list-style-type: none"> • Te Ākitai Waiohūa; • Ngai Tai ki Tāmaki • Ngaati Te Ata Waiohūa; • Ngaati Whanaunga; • Ngāti Tamaoho; • Ngāti Paoa Trust Board; • Te Ahiwaru Waiohūa; • Ngāti Tamaterā; • Ngāti Maru; Note: other iwi not identified above may have an interest in the Project and should be consulted
Network Utility Operator	Has the same meaning as set out in section 166 of the RMA.
NUMP	Network Utilities Management Plan
NOR	Notice of Requirement
NZAA	New Zealand Archaeological Association
OSMP	Open Space Management Plan
Outline Plan	An outline plan prepared in accordance with section 176A of the RMA.
Project Liaison Person	The person or persons appointed for the duration of the Project's Construction Works to be the main point of contact for persons wanting information about the Project or affected by the Construction Works.

Acronym/Term	Definition
Protected Premises and Facilities (PPF)	Protected Premises and Facilities as defined in New Zealand Standard NZS 6806:2010: <i>Acoustics – Road-traffic noise – New and altered roads</i> .
Requiring Authority	Has the same meaning as section 166 of the RMA and, for this Designation is Auckland Transport.
RMA	Resource Management Act (1991)
SCEMP	Stakeholder Communication and Engagement Management Plan
Stage of Work	Any physical works that require the development of an Outline Plan.
Start of Construction	The time when Construction Works (excluding Enabling Works) start.
Suitably Qualified Person	A person (or persons) who can provide sufficient evidence to demonstrate their suitability, experience and competence in the relevant field of expertise.
ULDMP	Urban and Landscape Design Management Plan

NoR No.	No.	Condition
General Conditions		
NoRs 1,2,3 and 4	1.	Activity in General Accordance with Plans and Information <p>(a) Except as provided for in the conditions below, and subject to final design and Outline Plan(s), works within the designation shall be undertaken in general accordance with the following in Schedule 1:</p> <ul style="list-style-type: none"> (i) the Project Description; and (ii) Concept Plans. <p>(b) Where there is inconsistency between:</p> <ul style="list-style-type: none"> (i) the Project Description and Concept Plans in condition 1(a) above and the requirements of the following conditions, the conditions shall prevail; (ii) the Project Description and Concept Plans in condition 1(a) above and the management plans under the conditions of the designation, the requirements of the management plans shall prevail.
NoRs 1,2,3 and 4	2.	Project Information <p>(a) A project website, or equivalent virtual information source, shall be established within 12 months of the date on which this designation is included in the AUP. All directly affected owners and occupiers shall be notified in writing once the website or equivalent information source has been established. The project website or virtual information source shall include these conditions and shall provide information on:</p> <ul style="list-style-type: none"> (i) the status of the Project; (ii) anticipated construction timeframes; (iii) contact details for enquiries; (iv) the implications of the designation for landowners, occupiers, and business owners and operators within the designation, and where they can receive additional advice; (v) a subscription service to enable receipt of project updates by email; and (vi) when and how to apply for consent for works in the designation under s176(1)(b) of the RMA. <p>(b) At the start of detailed design for a Stage of Work, the project website or virtual information source shall be updated to provide information on the likely date for Start of Construction, and any staging of works.</p>
NoRs 1,2,3 and 4	3.	Land Use Integration Process <p>The Requiring Authority shall set up a Land use Integration Process for the period between confirmation of the designation and the Start of Construction. The purpose of this process is to encourage and facilitate the integration of master planning and land use development activity on land directly affected or adjacent to the designation. To achieve this purpose:</p> <ul style="list-style-type: none"> (a) Within twelve (12) months of the date on which this designation is included in the AUP, the Requiring Authority shall include the contact details of a nominated contact on the project website (or equivalent information source) required to be established by Condition (2)(a)(iii). (b) The nominated contact shall be the main point of contact for a Developer or Development Agency wanting to work with the Requiring Authority to integrate their development plans or master planning with the designation. (c) At any time prior to the Start of Construction, the nominated contact will be available to engage with a Developer or Development Agency for the purpose of: <ul style="list-style-type: none"> (i) responding to requests made to the Requiring Authority for information regarding design details that could assist with land use integration; and

NoR No.	No.	Condition
		<ul style="list-style-type: none"> (ii) receiving information from a Developer or Development Agency regarding master planning or land development details that could assist with land use integration. (d) Information requested or provided under Condition 3(c) above may include but not be limited to the following matters: <ul style="list-style-type: none"> (i) design details including but not limited to: <ul style="list-style-type: none"> A. boundary treatment (e.g. the use of retaining walls or batter slopes); B. the horizontal and vertical alignment of the road (levels); C. potential locations for mid-block crossings; D. integration of stormwater infrastructure; and E. how to access traffic noise modelling contours to inform adjacent development. (ii) a process for the Requiring Authority to undertake a technical review of or provide comments on any master planning or development proposal advanced by the Developer or Development Agency as it relates to integration with the Project; (iii) details of how to apply for written consent from the Requiring Authority for any development proposal that relates to land is within the designation under section 176(1)(b) of the RMA; and (e) Where information is requested from the Requiring Authority and is available, the nominated contact shall provide the information unless there are reasonable grounds for not providing it. (f) The nominated contact shall maintain a record of the engagement between the Requiring Authority and Developers and Development Agencies for the period following the date in which this designation is included in the AUP through to the Start of Construction for a Stage of Work. The record shall include: <ul style="list-style-type: none"> (i) details of any requests made to the Requiring Authority that could influence detailed design, the results of any engagement and, where such requests that could influence detailed design are declined, the reasons why the requiring authority has declined the requests; and (ii) details of any requests to co-ordinate the forward work programme, where appropriate, with Development Agencies and Network Utility Operators. (g) The record shall be submitted to Council for information ten working days prior to the Start of Construction for a Stage of Work
NoRs 1,2,3 and 4	4.	Designation Review <ul style="list-style-type: none"> (a) The Requiring Authority shall within 6 months of Completion of Construction or as soon as otherwise practicable: <ul style="list-style-type: none"> (i) review the extent of the designation to identify any areas of designated land that it no longer requires for the on-going operation, maintenance or mitigation of effects of the Project; and (ii) give notice to Auckland Council in accordance with section 182 of the RMA for the removal of those parts of the designation identified above.
NoR 1, NoR 3, NoR 4	5.	Lapse <ul style="list-style-type: none"> (a) In accordance with section 184(1)(c) of the RMA, this designation shall lapse if not given effect to within 15 years from the date on which it is included in the AUP.
NoR 2	5.	Lapse <ul style="list-style-type: none"> (a) In accordance with section 184(1)(c) of the RMA, this designation shall lapse if not given effect to within 10 years from the date on which it is included in the AUP.

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NoRs 1,2,3 and 4	6.	Network Utility Operators (Section 176 Approval) (a) Prior to the start of Construction Works, Network Utility Operators with existing infrastructure located within the designation will not require written consent under section 176 of the RMA for the following activities: (i) operation, maintenance and urgent repair works; (ii) minor renewal works to existing network utilities necessary for the on-going provision or security of supply of network utility operations; (iii) minor works such as new service connections; and (iv) the upgrade and replacement of existing network utilities in the same location with the same or similar effects as the existing utility. To the extent that a record of written approval is required for the activities listed above, this condition shall constitute written approval.
	Pre-construction Conditions	
NoRs 1,2,3 and 4	7.	Outline Plan (a) An Outline Plan (or Plans) shall be prepared in accordance with section 176A of the RMA. (b) Outline Plans (or Plan) may be submitted in parts or in stages to address particular activities (e.g. design or construction aspects), or a Stage of Work of the Project. (c) Outline Plans shall include any management plan or plans that are relevant to the management of effects of those activities or Stage of Work, which may include: (i) Construction Environmental Management Plan; (ii) Construction Traffic Management Plan; (iii) Construction Noise and Vibration Management Plan; (iv) Urban and Landscape Design Management Plan; (v) Historic Heritage Management Plan; (vi) Ecological Management Plan; (vii) Tree Management Plan; (viii) Network Utilities Management Plan; and (ix) Open Space Management Plan.
	8.	Management Plans (a) Any management plan shall: (i) Be prepared and implemented in accordance with the relevant management plan condition; (ii) Be prepared by a Suitably Qualified Person(s); (iii) Include sufficient detail relating to the management of effects associated with the relevant activities and/or Stage of Work to which it relates. (iv) Summarise comments received from Mana Whenua and other stakeholders as required by the relevant management plan condition, along with a summary of where comments have: a. Been incorporated; and b. Where not incorporated, the reasons why. (v) Be submitted as part of an Outline Plan pursuant to s176A of the RMA, with the exception of SCEMPs and CNVMP Schedules.

NoR No.	No.	Condition
		<p>(vi) Once finalised, uploaded to the Project website or equivalent virtual information source.</p> <p>(b) Any management plan developed in accordance with Condition 8 may:</p> <p>(i) Be submitted in parts or in stages to address particular activities (e.g. design or construction aspects) a Stage of Work of the Project, or to address specific activities authorised by the designation.</p> <p>(ii) Except for material changes, be amended to reflect any changes in design, construction methods or management of effects without further process.</p> <p>(iii) If there is a material change required to a management plan which has been submitted with an Outline Plan, the revised part of the plan shall be submitted to the Council as an update to the Outline Plan or for Certification as soon as practicable following identification of the need for a revision;</p> <p>(c) Any material changes to the SCEMPs are to be submitted to the Council for information.</p>
NoRs 1,2,3 and 4	9.	<p>Stakeholder Communication and Engagement Management Plan (SCEMP)</p> <p>(a) A SCEMP shall be prepared in consultation with stakeholders, community groups and organisations.</p> <p>(b) The objective of the SCEMP is to identify how the public and stakeholders (including directly affected and adjacent owners and occupiers of land) will be engaged with prior to and throughout the Construction Works. To achieve the objective, of the SCEMP:</p> <p>(i) At least 18 months prior to any Outline Plan being submitted for Construction of a Stage of Work, the Requiring Authority shall identify:</p> <p>A. The properties whose owners will be engaged with;</p> <p>B. A list of key stakeholders, community groups, organisations and businesses who will be engaged with;</p> <p>C. Methods and timing to engage with landowners and occupiers whose access is directly affected.</p> <p>(ii) The SCEMP shall include:</p> <p>A. Details of (b)(i)A to C;</p> <p>B. the contact details for the Project Liaison Person. These details shall be on the Project website, or equivalent virtual information source, and prominently displayed at the main entrance(s) to the site(s);</p> <p>C. the procedures for ensuring that there is a contact person available for the duration of Construction Works, for public enquiries or complaints about the Construction Works;</p> <p>D. methods for engaging with Mana Whenua, to be developed in consultation with Mana Whenua;</p> <p>E. methods to communicate key project milestones and the proposed hours of construction activities including outside of normal working hours and on weekends and public holidays, to the parties identified in (b)(i)A and C above; and</p> <p>F. linkages and cross-references to communication and engagement methods set out in other conditions and management plans where relevant.</p> <p>(c) Any SCEMP prepared for a Stage of Work shall be submitted to Council for information ten working days prior to the Start of Construction for a Stage of Work.</p>

NoR No.	No.	Condition
NoRs 1,2,3 and 4	10.	Cultural Advisory Report <p>(a) At least six (6) months prior to the start of detailed design for a Stage of Work, Mana Whenua shall be invited to prepare a Cultural Advisory Report for the Project. The objective of the Cultural Advisory Report is to assist in understanding and identifying Ngā Taonga Tuku Iho ('treasures handed down by our ancestors') affected by the Project, to inform their management and protection. To achieve the objective, the Requiring Authority shall invite Mana Whenua to prepare a Cultural Advisory Report that:</p> <ul style="list-style-type: none"> (i) Identifies the cultural sites, landscapes and values that have the potential to be affected by the construction and operation of the Project; (ii) Sets out the desired outcomes for management of potential effects on cultural sites, landscapes and values; (iii) Identifies traditional cultural practices within the area that may be impacted by the Project; (iv) Identifies opportunities for restoration and enhancement of identified cultural sites, landscapes and values within the Project area; (v) Taking into account the outcomes of (i) to (iv) above, identify cultural matters and principles that should be considered in the development of the Urban and Landscape Design Management Plan referred to in Condition 12, Historic Heritage Management Plan referred to in Condition 24 and the Cultural Monitoring Plan referred to in Condition 18. (vi) Identifies and (if possible) nominates traditional names along the Project alignment. Noting there may be formal statutory processes outside the project required in any decision-making. <p>(b) The desired outcomes for management of potential effects on cultural sites, landscapes and values identified in the Cultural Advisory Report shall be discussed with Mana Whenua and those outcomes reflected in the relevant management plans where practicable.</p> <p>(c) Conditions 10(a) and (b) above will cease to apply if:</p> <ul style="list-style-type: none"> (i) Mana Whenua have been invited to prepare a Cultural Advisory Report by a date at least 6 months prior to start of Construction Works; and (ii) Mana Whenua have not provided a Cultural Advisory Report within six months prior to start of Construction Works.
	11.	Mana Whenua Kaitiaki Forum <p>(a) At least twelve (12) months prior to the start of detailed design for a Stage of Work, the Requiring Authority shall invite Mana Whenua to establish a Mana Whenua Kaitiaki Forum. The objective of the Mana Whenua Kaitiaki Forum is to provide a forum for Mana Whenua to participate as partners in all phases of the Project. To achieve the objective, the Mana Whenua Kaitiaki Forum shall address (as a minimum) the following matters:</p> <ul style="list-style-type: none"> (i) how Mana Whenua will provide input into the design of the Project. For example: <ul style="list-style-type: none"> A. how Mana Whenua values and narrative are incorporated through the form of the Project and associated structures; B. how pou, art, sculptures, mahi toi or any other features located on land within or adjoining the Project will be provided in a manner that represents the Māori history of the area and promotes a distinctiveness or sense of place.

NoR No.	No.	Condition
		<ul style="list-style-type: none"> (ii) how Mana Whenua will be engaged in the preparation of management plans and future consenting processes; (iii) how mātauranga Māori and tikanga Māori will be recognised in all phases of the Project; (iv) where opportunities for Mana Whenua to participate in engagement with local communities, business associations, social institutions and community groups will be provided; (v) where opportunities for Mana Whenua to support the physical, mental, social and economic wellbeing for iwi and the local community will be provided through the Project. This could include: <ul style="list-style-type: none"> A. planting supplied through Mana Whenua and community based nurseries; B. local schools being involved in planting; and C. scholarships, cadetships and job creation. (vi) The Requiring Authority shall provide reasonable resourcing, technical and administrative support for Mana Whenua including organising meetings at a local venue and the taking and dissemination of meeting minutes; (vii) The frequency of meetings shall be agreed between the Requiring Authority and Mana Whenua; and (viii) prior to the Start of Construction, the Requiring Authority shall produce a record of the Mana Whenua Kaitiaki Forum. The record of the Mana Whenua Kaitiaki Forum shall be provided to Mana Whenua and shall include (but not be limited to): <ul style="list-style-type: none"> A. details of how Mana Whenua have participated as partners in the Project; B. details of how the matters set out in (a) will be incorporated into the Project; C. how the objective of the Mana Whenua Kaitiaki Forum has been and will continue to be met; and D. details of how comments from Mana Whenua have been incorporated into the Project and where not incorporated, the reasons why. (b) Mana Whenua shall be invited to identify and (if possible) nominate traditional names across the Project such as bridge structures. Noting there may be formal statutory processes outside the project required in any decision making. (c) The Mana Whenua Kaitiaki Forum shall continue to meet for at least six months following Completion of Construction or as agreed with Mana Whenua.
NoRs 1,2,3 and 4	12.	Urban and Landscape Design Management Plan (ULDMP) <ul style="list-style-type: none"> (a) A ULDMP shall be prepared prior to the Start of Construction for a Stage of Work. (b) The objective of the ULDMP(s) is to: <ul style="list-style-type: none"> (i) Enable integration of the Project's permanent works into the surrounding landscape and urban context; and (ii) Ensure that the Project manages potential adverse landscape and visual effects as far as practicable and contributes to a quality urban environment. (c) Mana Whenua shall be invited to participate in the development of the ULDMP(s) to provide input into relevant cultural landscape and design matters including how desired outcomes for management of potential effects on cultural sites, landscapes and values identified and discussed in accordance with the Cultural Advisory Report (Condition 10) and/or through the Mana Whenua Kaitiaki Forum (Condition 11) may be reflected in the ULDMP.

NoR No.	No.	Condition
		<p>(d) Key stakeholders identified through Condition 9(b)(i)B shall be invited to participate in the development of the ULDMP at least six (6) months prior to the start of detailed design for a Stage of Work.</p> <p>(e) The ULDMP shall be prepared in general accordance with:</p> <ul style="list-style-type: none"> (i) Auckland Transport's Urban Roads and Streets Design Guide; (ii) Waka Kotahi Urban Design Guidelines: Bridging the Gap (2013) or any subsequent updated version; (iii) Waka Kotahi Landscape Guidelines (2013) or any subsequent updated version; (iv) Waka Kotahi P39 Standard Specification for Highway Landscape Treatments (2013) or any subsequent updated version; and (v) Auckland's Urban Ngahere (Forest) Strategy or any subsequent updated version. <p>(f) To achieve the objective, the ULDMP(s) shall provide details of how the project:</p> <ul style="list-style-type: none"> (i) Is designed to integrate with the adjacent urban (or proposed urban) and landscape context, including the surrounding existing or proposed topography, urban environment (i.e. centres and density of built form), natural environment, landscape character and open space zones; (ii) Provides appropriate walking and cycling connectivity to, and interfaces with, existing or proposed adjacent land uses, public transport infrastructure and walking and cycling connections; (iii) Promotes inclusive access (where appropriate); and (iv) Promotes a sense of personal safety by aligning with best practice guidelines, such as: <ul style="list-style-type: none"> a. Crime Prevention Through Environmental Design (CPTED) principles; b. Safety in Design (SID) requirements; and c. Maintenance in Design (MID) requirements and anti-vandalism/anti-graffiti measures. (v) has responded to matters identified through the Land Use Integration Process (Condition 3) <p>(g) The ULDMP(s) shall include:</p> <ul style="list-style-type: none"> (i) A concept plan – which depicts the overall landscape and urban design concept, and explain the rationale for the landscape and urban design proposals; (ii) Developed design concepts, including principles for walking and cycling facilities and public transport; and (iii) Landscape and urban design details – that cover the following: <ul style="list-style-type: none"> a. Road design – elements such as intersection form, carriageway gradient and associated earthworks contouring including cut and fill batters and the interface with adjacent land uses and existing roads (including slip lanes), benching, spoil disposal sites, median width and treatment, roadside width and treatment; b. Roadside elements – such as lighting, fencing, wayfinding and signage; c. architectural and landscape treatment of all major structures, including bridges and retaining walls; d. Architectural and landscape treatment of noise barriers; e. Landscape treatment of permanent stormwater control wetlands and swales; f. Integration of passenger transport; g. Pedestrian and cycle facilities including paths, road crossings and dedicated pedestrian/ cycle bridges or underpasses;

NoR No.	No.	Condition
		<ul style="list-style-type: none"> h. Historic heritage places with reference to the HHMP (Condition 24); and i. Re-instatement of construction and site compound areas, driveways, accessways and fences. <p>(h) The ULDMP shall also include the following planting details and maintenance requirements:</p> <ul style="list-style-type: none"> (i) planting design details including: <ul style="list-style-type: none"> a. Identification of existing trees and vegetation that will be retained with reference to the Tree Management Plan. Where practicable, mature trees and native vegetation should be retained; b. Street trees, shrubs and ground cover suitable for the location; c. treatment of fill slopes to integrate with adjacent land use, streams, Riparian margins and open space zones; d. planting of stormwater wetlands; e. Identification of vegetation to be retained and any planting requirements under the Tree Management Plan (Condition 27); f. Integration of any planting requirements required by conditions of any resource consents for the project; and g. Re-instatement planting of construction and site compound areas as appropriate. (ii) A planting programme including the staging of planting in relation to the construction programme which shall, as far as practicable, include provision for planting within each planting season following completion of works in each Stage of Work; and (iii) Detailed specifications relating to the following: <ul style="list-style-type: none"> a. Weed control and clearance; b. Pest animal management (to support plant establishment); c. Ground preparation (top soiling and decompaction); d. Mulching; and e. Plant sourcing and planting, including hydroseeding and grassing, and use of eco-sourced species. <p>Advice Note:</p> <p><i>This designation is for the purpose of construction, operation and maintenance of an arterial transport corridor and it is not for the specific purpose of “road widening”. Therefore, it is not intended that the front yard definition in the Auckland Unitary Plan which applies a set back from a designation for road widening purposes applies to this designation. A set back is not required to manage effects between the designation boundary and any proposed adjacent sites or lots.</i></p>
NoR 1 and NoR 3	13.	<p>Open Space Management Plan (OSMP)</p> <ul style="list-style-type: none"> (a) An OSMP shall be prepared prior to the Start of Construction for a Stage of Work for the open spaces listed in <i>Schedule 5</i>; (b) Auckland Council Parks shall be invited to participate in the development of the OSMP at least six (6) months prior to the start of detailed design for a Stage of Work. (c) The objective of the OSMP is to minimise as far as practicable adverse effects on the recreation amenity of the open spaces listed in <i>Schedule 5</i> resulting from the Project. To achieve the objective, the OSMP shall include details of: <ul style="list-style-type: none"> (i) how the ongoing operation of and access (including walking and cycling) to those open spaces during construction will be maintained in accordance with the Construction Traffic Management Plan (Condition 19):

NoR No.	No.	Condition
		(ii) opportunities to coordinate the forward work programme for those open spaces where appropriate with Auckland Council Parks; (iii) measures to reasonably maintain the existing level of service of the affected open space; and (iv) how comments from Auckland Council Parks have been incorporated in the OSMP, and where comments have not been incorporated, the reasons why.
Specific Outline Plan Requirements		
NoRs 1,2,3 and 4		Flood Hazard For the purpose of Condition : <ul style="list-style-type: none"> (a) ARI – means Average Recurrence Interval (b) AEP – means Annual Exceedance Probability (c) Existing authorised habitable floor – means the floor level of any room (floor) in a residential building which is authorised and exists at the time the outline plan is submitted, excluding a laundry, bathroom, toilet or any room used solely as an entrance hall, passageway or garage. (d) Flood prone area – means a potential ponding area that relies on a single culvert for drainage and does not have an overland flow path. (e) 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. (f) Pre-Project development – means existing site condition prior to the Project (including existing buildings and roadways). (g) Post-Project development – means site condition after the Project has been completed (including existing and new buildings and roadways).
NoRs 1,2,3 and 4	14.	Flood Hazard <ul style="list-style-type: none"> (a) The Project shall be designed to achieve the following flood risk outcomes: <ul style="list-style-type: none"> (i) no increase in flood levels in a 1% AEP event for existing authorised habitable floors that are already subject to flooding or have a freeboard less than 150mm; (ii) no more than a 10% reduction in freeboard in a 1% AEP event for existing authorised habitable floors with a freeboard over 150mm; (iii) no increase in 1% AEP flood levels for existing authorised community, commercial, industrial and network utility building floors that are already subject to flooding; (iv) no more than a 10% reduction in freeboard in a 1% AEP event for existing authorised community, commercial, industrial and network utility building floors; (v) 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 dwelling; and (vi) no new flood prone areas; and (vii) 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

NoR No.	No.	Condition
		<p>time the Outline Plan is submitted. The assessment shall be undertaken for the 1% AEP rainfall event.</p> <p>(b) Compliance with this condition shall be demonstrated in the Outline Plan, which shall include flood modelling of the pre-Project and post-Project 100 year ARI flood levels (for Maximum Probable Development land use and including climate change).</p> <p>(c) Where the above outcomes can be achieved through alternative measures outside of the designation such as flood stop banks, flood walls, raising existing authorised habitable floor level and new overland flow paths or varied through agreement with the relevant landowner, the Outline Plan shall include confirmation that any necessary landowner and statutory approvals have been obtained for that work or alternative outcome.</p>
NoRs 1,2,3 and 4	15.	<p>Existing property access</p> <p>Prior to submission of the Outline Plan, consultation shall be undertaken with landowners whose vehicle access to their property will be altered by the project. The Outline Plan shall demonstrate how safe reconfigured or alternate access will be provided, unless otherwise agreed with the landowner.</p>
Construction Conditions		
NoRs 1,2,3 and 4	16.	<p>Construction Environmental Management Plan (CEMP)</p> <p>(a) A CEMP shall be prepared prior to the Start of Construction for a Stage of Work. The objective of the CEMP is to set out the management procedures and construction methods to be undertaken to, avoid, remedy or mitigate any adverse effects associated with Construction Works as far as practicable. To achieve the objective, the CEMP shall include:</p> <ul style="list-style-type: none"> (i) the roles and responsibilities of staff and contractors; (ii) details of the site or project manager and the Project Liaison Person, including their contact details (phone and email address); (iii) the Construction Works programmes and the staging approach, and the proposed hours of work; (iv) details of the proposed construction yards including temporary screening when adjacent to residential areas, locations of refuelling activities and construction lighting; (v) methods for controlling dust and the removal of debris and demolition of construction materials from public roads or places; (vi) methods for providing for the health and safety of the general public; (vii) measures to mitigate flood hazard effects such as siting stockpiles out of floodplains, minimising obstruction to flood flows, actions to respond to warnings of heavy rain; (viii) procedures for incident management; (ix) procedures for the refuelling and maintenance of plant and equipment to avoid discharges of fuels or lubricants to Watercourses; (x) measures to address the storage of fuels, lubricants, hazardous and/or dangerous materials, along with contingency procedures to address emergency spill response(s) and clean up; (xi) procedures for responding to complaints about Construction Works; and (xii) methods for amending and updating the CEMP as required.
NoRs 1,2,3 and 4	17.	<p>Complaints Register</p>

NoR No.	No.	Condition
		<p>(a) At all times during Construction Works, a record of any complaints received about the Construction Works shall be maintained. The record shall include:</p> <ul style="list-style-type: none"> (i) The date, time and nature of the complaint; (ii) The name, phone number and address of the complainant (unless the complainant wishes to remain anonymous); (iii) Measures taken to respond to the complaint (including a record of the response provided to the complainant) or confirmation of no action if deemed appropriate; (iv) The outcome of the investigation into the complaint; (v) Any other activities in the area, unrelated to the Project that may have contributed to the complaint, such as non-project construction, fires, traffic accidents or unusually dusty conditions generally. <p>(b) A copy of the Complaints Register required by this condition shall be made available to the Manager upon request as soon as practicable after the request is made.</p>
NoRs 1,2,3 and 4	18.	<p>Cultural Monitoring Plan</p> <p>(a) Prior to the start of Construction Works, a Cultural Monitoring Plan shall be prepared by a Suitably Qualified Person(s) identified in collaboration with Mana Whenua. The objective of the Cultural Monitoring Plan is to identify methods for undertaking cultural monitoring to assist with management of any cultural effects during Construction works. The Cultural Monitoring Plan shall include:</p> <ul style="list-style-type: none"> (i) Requirements for formal dedication or cultural interpretation to be undertaken prior to start of Construction Works in areas identified as having significance to Mana Whenua; (ii) Requirements and protocols for cultural inductions for contractors and subcontractors; (iii) Identification of activities, sites and areas where cultural monitoring is required during particular Construction Works; (iv) Identification of personnel to undertake cultural monitoring, including any geographic definition of their responsibilities; and (v) Details of personnel to assist with management of any cultural effects identified during cultural monitoring, including implementation of the Accidental Discovery Protocol <p>(b) If Enabling Works involving soil disturbance are undertaken prior to the start of Construction Works, an Enabling Works Cultural Monitoring Plan shall be prepared by a Suitably Qualified Person identified in collaboration with Mana Whenua. This plan may be prepared as a standalone Enabling Works Cultural Monitoring Plan or be included in the main Construction Works Cultural Monitoring Plan.</p> <p>Advice Note: Where appropriate, the Cultural Monitoring Plan shall align with the requirements of other conditions of the designation and resource consents for the Project which require monitoring during Construction Works.</p>
NoRs 1,2,3 and 4	19.	<p>Construction Traffic Management Plan (CTMP)</p> <p>(a) A CTMP shall be prepared prior to the Start of Construction for a Stage of Work. The objective of the CTMP is to avoid, remedy or mitigate, as far as practicable, adverse construction traffic effects. To achieve this objective, the CTMP shall include:</p> <ul style="list-style-type: none"> (i) methods to manage the effects of temporary traffic management activities on traffic;

NoR No.	No.	Condition																																		
		<div><div>(ii)</div><div>measures to ensure the safety of all transport users;</div></div> <div><div>(iii)</div><div>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;</div></div> <div><div>(iv)</div><div>site access routes and access points for heavy vehicles, the size and location of parking areas for plant, construction vehicles and the vehicles of workers and visitors;</div></div> <div><div>(v)</div><div>identification of detour routes and other methods to ensure the safe management and maintenance of traffic flows, including pedestrians and cyclists;</div></div> <div><div>(vi)</div><div>methods to maintain access to property and/or private roads where practicable, or to provide alternative access arrangements when it will not be;</div></div> <div><div>(vii)</div><div>the management approach to loads on heavy 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;</div></div> <div><div>(viii)</div><div>methods that will be undertaken to communicate traffic management measures to affected road users (e.g. residents/public/stakeholders/emergency services);</div></div> <div><div>(ix)</div><div>Auditing, monitoring and reporting requirements relating to traffic management activities shall be undertaken in accordance with the New Zealand Guide to Temporary Traffic Management or any subsequent version;</div></div> <div><div>(x)</div><div>details of minimum network performance parameters during the construction phase, including any measures to monitor compliance with the performance parameters; and</div></div> <div><div>(xi)</div><div>details of any measures proposed to be implemented in the event of thresholds identified in (ix) being exceeded.</div></div>																																		
NoRs 1,2,3 and 4	20.	<div><div>Construction Noise Standards</div><div>(a) Construction noise shall be measured and assessed in accordance with NZS6803:1999 Acoustics – Construction Noise and shall comply with the noise standards set out in the following table as far as practicable:</div><div>Table 20.1: Construction noise standards</div><table><tr><th>Day of week</th><th>Time period</th><th>L_{Aeq}(15min)</th><th>L_{AFmax}</th></tr><tr><td colspan="4">Occupied activity sensitive to noise</td></tr><tr><td rowspan="4">Weekday</td><td>0630h - 0730h</td><td>55 dB</td><td>75 dB</td></tr><tr><td>0730h - 1800h</td><td>70 dB</td><td>85 dB</td></tr><tr><td>1800h - 2000h</td><td>65 dB</td><td>80 dB</td></tr><tr><td>2000h - 0630h</td><td>45 dB</td><td>75 dB</td></tr><tr><td rowspan="4">Saturday</td><td>0630h - 0730h</td><td>55 dB</td><td>75 dB</td></tr><tr><td>0730h - 1800h</td><td>70 dB</td><td>85 dB</td></tr><tr><td>1800h - 2000h</td><td>45 dB</td><td>75 dB</td></tr><tr><td>2000h - 0630h</td><td>45 dB</td><td>75 dB</td></tr></table></div>	Day of week	Time period	L _{Aeq} (15min)	L _{AFmax}	Occupied activity sensitive to noise				Weekday	0630h - 0730h	55 dB	75 dB	0730h - 1800h	70 dB	85 dB	1800h - 2000h	65 dB	80 dB	2000h - 0630h	45 dB	75 dB	Saturday	0630h - 0730h	55 dB	75 dB	0730h - 1800h	70 dB	85 dB	1800h - 2000h	45 dB	75 dB	2000h - 0630h	45 dB	75 dB
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NoR No.	No.	Condition																			
		<table><tr><td>Sunday and Public Holidays</td><td>0630h - 0730h 0730h - 1800h 1800h - 2000h 2000h - 0630h</td><td>45 dB 55 dB 45 dB 45 dB</td><td>75 dB 85 dB 75 dB 75 dB</td></tr><tr><td colspan="4">Other occupied buildings</td></tr><tr><td>All</td><td>0730h – 1800h 1800h – 0730h</td><td>70 dB 75 dB</td><td></td></tr></table> <p>(b) Where compliance with the noise standards set out in Table 20.1 is not practicable, the methodology in Condition 23 shall apply.</p>	Sunday and Public Holidays	0630h - 0730h 0730h - 1800h 1800h - 2000h 2000h - 0630h	45 dB 55 dB 45 dB 45 dB	75 dB 85 dB 75 dB 75 dB	Other occupied buildings				All	0730h – 1800h 1800h – 0730h	70 dB 75 dB								
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Other occupied buildings																					
All	0730h – 1800h 1800h – 0730h	70 dB 75 dB																			
NoRs 1,2,3 and 4	21.	<p>Construction Vibration Standards</p> <p>(a) Construction vibration shall be measured in accordance with ISO 4866:2010 Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures and shall comply with the vibration standards set out in the following table as far as practicable.</p> <p>Table 21.1 Construction vibration criteria</p> <table><tr><th>Receiver</th><th>Details</th><th>Category A</th><th>Category B</th></tr><tr><td rowspan="2">Occupied Activities sensitive to noise</td><td>Night-time 2000h - 0630h</td><td>0.3mm/s ppv</td><td>2mm/s ppv</td></tr><tr><td>Daytime 0630h - 2000h</td><td>2mm/s ppv</td><td>5mm/s ppv</td></tr><tr><td>Other occupied buildings</td><td>Daytime 0630h - 2000h</td><td>2mm/s ppv</td><td>5mm/s ppv</td></tr><tr><td>All other buildings</td><td>At all other times</td><td colspan="2">Tables 1 and 3 of DIN4150-3:1999</td></tr></table> <p><i>*Category A criteria adopted from Rule E25.6.30.1 of the AUP</i></p> <p><i>**Category B criteria based on DIN 4150-3:1999 building damage criteria for daytime</i></p> <p>(b) Where compliance with the vibration standards set out in Table 21.1 is not practicable, the methodology in Condition 23 shall apply</p>	Receiver	Details	Category A	Category B	Occupied Activities sensitive to noise	Night-time 2000h - 0630h	0.3mm/s ppv	2mm/s ppv	Daytime 0630h - 2000h	2mm/s ppv	5mm/s ppv	Other occupied buildings	Daytime 0630h - 2000h	2mm/s ppv	5mm/s ppv	All other buildings	At all other times	Tables 1 and 3 of DIN4150-3:1999	
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NoRs 1,2,3 and 4	22.	<p>Construction Noise and Vibration Management Plan (CNVMP)</p> <p>(a) A CNVMP shall be prepared by a Suitably Qualified and Experienced Person prior to the Start of Construction for a Stage of Work.</p> <p>(b) A CNVMP shall be implemented during the Stage of Work to which it relates.</p> <p>(c) The objective of the CNVMP is to provide a framework for the development and implementation of the Best Practicable Option for the management of construction noise and vibration effects to achieve the construction noise and vibration standards set out in Conditions 20 and 21 to the extent practicable. To achieve this objective, the CNVMP shall be prepared in accordance with Annex E2 of the New Zealand Standard NZS6803:1999 'Acoustics – Construction Noise' (NZS6803:1999) and shall as a minimum, address the following:</p> <ul style="list-style-type: none">(i) Description of the works and anticipated equipment/processes;(ii) Hours of operation, including times and days when construction activities would occur;(iii) The construction noise and vibration standards for the project;(iv) Identification of receivers where noise and vibration standards apply;																			

NoR No.	No.	Condition
		<ul style="list-style-type: none"> (v) A hierarchy of management and mitigation options, including any requirements to limit night works and works during other sensitive times, including Sundays and public holidays as far practicable; (vi) Methods and frequency for monitoring and reporting on construction noise and vibration; (vii) Procedures for communication and engagement with nearby residents and stakeholders, including notification of proposed construction activities, the period of construction activities, and management of noise and vibration complaints. (viii) Contact details of the Project Liaison Person; (ix) Procedures for the regular training of the operators of construction equipment to minimise noise and vibration as well as expected construction site behaviours for all workers; (x) Procedures and requirements for the preparation of a Schedule to the CNVMP (Schedule) for those areas where compliance with the noise Condition 20 and/or vibration standards Condition 21 Category B will not be practicable; (xi) Identification of trigger levels for undertaking building condition surveys, which shall be Category B day time levels; (xii) Procedures and trigger levels for undertaking building condition surveys before and after works to determine whether any cosmetic or structural damage has occurred as a result of construction vibration. (xiii) Methodology and programme of desktop and field audits and inspections to be undertaken to ensure that CNVMP, Schedules and the best practicable option for management of effects are being implemented. (xiv) Requirements for review and update of the CNVMP
NoRs 1,2,3 and 4	23.	<p>Schedule to a CNVMP</p> <ul style="list-style-type: none"> (a) A Schedule to the CNVMP (Schedule) shall be prepared prior to the start of the construction to which it relates by a Suitably Qualified Person, in consultation with the owners and occupiers of sites subject to the Schedule, when: <ul style="list-style-type: none"> (i) Construction noise is either predicted or measured to exceed the noise standards in Condition 20, except where the exceedance of the L_{Aeq} criteria is no greater than 5 decibels and does not exceed: <ul style="list-style-type: none"> a. 0630 – 2000: 2 period of up to 2 consecutive weeks in any 2 months, or b. 2000 - 0630: 1 period of up to 2 consecutive nights in any 10 days. (ii) Construction vibration is either predicted or measured to exceed the Category B standard at the receivers in Condition 21. (b) The objective of the Schedule is to set out the Best Practicable Option measures to manage noise and/or vibration effects of the construction activity beyond those measures set out in the CNVMP. The Schedule shall include details such as: <ul style="list-style-type: none"> (i) Construction activity location, start and finish dates; (ii) The nearest neighbours to the construction activity; (iii) The predicted noise and/or vibration level for all receivers where the levels are predicted or measured to exceed the applicable standards and predicted duration of the exceedance; (iv) for works proposed between 2000h and 0630h, the reasons why the proposed works must be undertaken during these hours and why they cannot be practicably undertaken during the daytime; (v) The proposed mitigation options that have been selected, and the options that have been discounted as being impracticable and the reasons why;

NoR No.	No.	Condition
		<p>(vi) The consultation undertaken with owners and occupiers of sites subject to the Schedule, and how consultation has and has not been taken into account; and</p> <p>(vii) Location, times and types of monitoring;</p> <p>(c) The Schedule shall be submitted to the Manager for certification at least 5 working days (except in unforeseen circumstances) in advance of Construction Works that are covered by the scope of the Schedule and shall form part of the CNVMP.</p> <p>(d) Where material changes are made to a Schedule required by this condition, the Requiring Authority shall consult the owners and/or occupiers of sites subject to the Schedule prior to submitting the amended Schedule to the Manager for certification in accordance with (c) above. The amended Schedule shall document the consultation undertaken with those owners and occupiers, and how consultation outcomes have and have not been taken into account.</p>
NoRs 1,2,3 and 4	24.	<p>Historic Heritage Management Plan (HHMP)</p> <p>(a) A HHMP shall be prepared in consultation with Council, HNZPT and Mana Whenua prior to the Start of Construction for a Stage of Work.</p> <p>(b) The objective of the HHMP is to protect historic heritage and to remedy and mitigate any residual effects as far as practicable. To achieve the objective, the HHMP shall identify:</p> <ul style="list-style-type: none"> (i) Any adverse direct and indirect effects on historic heritage sites and measures to appropriately avoid, remedy or mitigate any such effects, including a tabulated summary of these effects and measures; (ii) Methods for the identification and assessment of potential historic heritage places within the Designation to inform detailed design; (iii) Known historic heritage places and potential archaeological sites within the Designation, including identifying any archaeological sites for which an Archaeological Authority under the HNZPTA will be sought or has been granted; (iv) Any unrecorded archaeological sites or post-1900 heritage sites within the Designation, which shall also be documented and recorded; (v) Roles, responsibilities and contact details of Project personnel, Council and HNZPT representatives, Mana Whenua representatives, and relevant agencies involved with heritage and archaeological matters including surveys, monitoring of Construction Works, compliance with AUP accidental discovery rule, and monitoring of conditions; (vi) Specific areas to be investigated, monitored and recorded to the extent these are directly affected by the Project; (vii) The proposed methodology for investigating and recording post-1900 historic heritage sites (including buildings) that need to be destroyed, demolished or relocated, including details of their condition, measures to mitigate any adverse effects and timeframe for implementing the proposed methodology, in accordance with the HNZPT Archaeological Guidelines Series No.1: Investigation and Recording of Buildings and Standing Structures (November 2018, or any subsequent version); (viii) Methods to acknowledge cultural values identified through the Mana Whenua Kaitiaki Forum (Condition 11) and Urban and Landscape Design Management Plan (Condition 12) where archaeological sites also involve ngā taonga tuku

NoR No.	No.	Condition
		<p>iho (treasures handed down by our ancestors) and where feasible and practicable to do so;</p> <p>(ix) Methods for avoiding, remedying or mitigation adverse effects on historic heritage places and sites within the Designation during Construction Works as far as practicable. These methods shall include, but are not limited to:</p> <ol style="list-style-type: none"> security fencing or hoardings around historic heritage places to protect them from damage during construction or unauthorised access; measures to mitigate adverse effects on historic heritage sites that achieve positive historic heritage outcomes such as increased public awareness and interpretation signage; and Training requirements and inductions for contractors and subcontractors on historic heritage places within the Designation, legal obligations relating to accidental and/or unexpected discoveries, the AUP Accidental Discovery Rule (E11.6.1). The training shall be undertaken prior to the Start of Construction, under the guidance of a Suitably Qualified Person and Mana Whenua representatives (to the extent the training relates to cultural values identified under Condition 18). <p>(c) Electronic copies of all historic heritage reports relating to historic heritage investigations (evaluation, excavation and monitoring), shall be submitted to the Manager within 12 months of completion.</p> <p>Accidental Discoveries</p> <p>Advice Note:</p> <p><i>The requirements for accidental discoveries of heritage items are set out in Rule E11.6.1 of the AUP</i></p>
NoRs 1,2,3 and 4	25.	<p>Pre-Construction Lizard Survey</p> <p>(a) At the start of detailed design for a Stage of Work, an updated survey of native lizards and their habitat in the locations shown in <i>Schedule 2: Identified Native Lizard Habitat Areas</i> shall be undertaken. The purpose of the survey is to:</p> <ol style="list-style-type: none"> Confirm whether the native lizards of value within the locations shown in Schedule 2 are still present; Confirm whether the project will or may have a moderate or greater level of ecological effect on native lizards of value in those locations, prior to implementation of impact management measures, as determined in accordance with the EIANZ guidelines. <p>(b) If the survey confirms the presence of native lizards of value in accordance with condition 25(a)(i) and that effects are likely in accordance with condition 25(a)(ii) then a Lizard Management Plan (or Plans) shall be prepared in accordance with Condition 26 for these areas (Confirmed Lizard Management Plan Areas).</p>
NoRs 1,2,3 and 4	26.	<p>Lizard Management Plan (LMP)</p> <p>(a) A LMP shall be prepared for any Confirmed Lizard Management Plan Areas (in accordance with Condition 25) prior to the Start of Construction for a Stage of Work. The objective of the LMP is to minimise effects of the Project on native lizards of value in Confirmed Lizard Management Plan Areas as far as practicable. The LMP shall set out the methods that will be used to achieve the objective which may include:</p> <ol style="list-style-type: none"> A description of the methodology and timing for survey, trapping and relocation of native lizards rescued; A description of the relocation site(s), including:

NoR No.	No.	Condition
		<ul style="list-style-type: none"> a. Any measures to ensure the relocation site is suitable protected and remains viable (e.g. covenants, consent notices etc.); b. Any measures to ensure the relocation site is suitably managed to ensure appropriate habitat for native lizards (e.g. provision of additional refugia, weed and pest management); and (iii) Any proposed monitoring of relocation sites if necessary to evaluate translocation success. <p>(b) The LMP shall be consistent with any native lizard management measures to be undertaken in compliance with conditions of any regional resource consents granted for the Project.</p> <p>Advice Note:</p> <p><i>Depending on the potential effects of the Project, the regional consents for the Project may include the following monitoring and management plans:</i></p> <ul style="list-style-type: none"> (i) Stream and/or wetland restoration plans; (ii) Vegetation restoration plans; and (iii) Fauna management plans (eg avifauna, bats).
NoRs 1,2,3 and 4	27.	<p>Tree Management Plan</p> <ul style="list-style-type: none"> (a) Prior to the Start of Construction for a Stage of Work, a Tree Management Plan shall be prepared. The objective of the Tree Management Plan is to avoid, remedy or mitigate effects of construction activities on trees identified in Schedule 3. (b) The Tree Management Plan shall: <ul style="list-style-type: none"> (i) confirm that the trees listed in Schedule 3 still exist; and (ii) demonstrate how the design and location of project works has avoided, remedied or mitigated any effects on any tree listed in Schedule 3. This may include: <ul style="list-style-type: none"> a. planting to replace trees that require removal (with reference to the ULDMP planting design details in Condition 12); b. tree protection zones and tree protection measures such as protective fencing, ground protection and physical protection of roots, trunks and branches; and c. methods for work within the rootzone of trees that are to be retained in line with accepted arboricultural standards. (iii) demonstrate how the tree management measures (outlined in a – c above) are consistent with conditions of any resource consents granted for the project in relation to managing construction effects on trees.
NoRs 1,2,3 and 4	28.	<p>Network Utility Management Plan (NUMP)</p> <ul style="list-style-type: none"> (a) A NUMP shall be prepared prior to the Start of Construction for a Stage of Work. (b) The objective of the NUMP is to set out a framework for protecting, relocating and working in proximity to existing network utilities. The NUMP shall include methods to: <ul style="list-style-type: none"> (i) Provide access for maintenance at all reasonable times, or emergency works at all times during construction activities; (ii) Protect and where necessary, relocate existing network utilities; (iii) Manage the effects of dust and any other material potentially resulting from construction activities and able to cause material damage, beyond normal wear and tear to overhead transmission lines in the Project area; (iv) Demonstrate compliance with relevant standards and Codes of Practice including, where relevant, the NZECP 34:2001 New Zealand Electrical Code of Practice for

NoR No.	No.	Condition
		<p>Electrical Safe Distances 2001; AS/NZS 4853:2012 Electrical hazards on Metallic Pipelines;</p> <p>(c) The NUMP shall be prepared in consultation with the relevant Network Utility Operator(s) who have existing assets that are directly affected by the Project.</p> <p>(d) The development of the NUMP shall consider opportunities to coordinate future work programmes with other Network Utility Operator(s) where practicable.</p> <p>(e) The NUMP shall describe how any comments from the Network Utility Operator in relation to its assets have been addressed.</p> <p>(f) Any comments received from the Network Utility Operator shall be considered when finalising the NUMP.</p> <p>(g) Any amendments to the NUMP related to the assets of a Network Utility Operator shall be prepared in consultation with that asset owner.</p>
Operational Conditions		
NoRs 1,2,3 and 4	29.	<p>Low Noise Road Surface</p> <p>(a) Asphaltic concrete surfacing (or equivalent low noise road surface) shall be implemented within 12 months of Completion of Construction of the project.</p> <p>(b) Any future resurfacing works of the Project shall be undertaken in accordance with the Auckland Transport Reseal Guidelines, Asset Management and Systems 2013 and asphaltic concrete surfacing (or equivalent low noise road surface) shall be implemented where:</p> <ul style="list-style-type: none"> (i) The volume of traffic exceeds 10,000 vehicles per day; or (ii) The road is subject to high wear and tear (such as cul de sac heads, roundabouts and main road intersections); or (iii) It is in an industrial or commercial area where there is a high concentration of truck traffic; or (iv) It is subject to high usage by pedestrians, such as town centres, hospitals, shopping centres and schools. <p>(c) Prior to commencing any future resurfacing works, the Requiring Authority shall advise the Manager if any of the triggers in Condition 29(c)(i) – (iv) are not met by the road or a section of it and therefore where the application of asphaltic concrete surfacing (or equivalent low noise road surface) is no longer required on the road or a section of it. Such advice shall also indicate when any resealing is to occur.</p>
NoRs 1,2,3 and 4		<p>Traffic Noise</p> <p>(a) For the purposes of Conditions 30 to 41:</p> <p>(b) Building-Modification Mitigation – has the same meaning as in NZS 6806;</p> <p>(c) Design year has the same meaning as in NZS 6806;</p> <p>(d) Detailed Mitigation Options – means the fully detailed design of the Selected Mitigation Options, with all practical issues addressed;</p> <p>(e) Habitable Space – has the same meaning as in NZS 6806;</p> <p>(f) Identified Noise Criteria Category – means the Noise Criteria Category for a PPF identified in <i>Schedule 4: Identified PPFs Noise Criteria Categories</i>;</p> <p>(g) Mitigation – has the same meaning as in NZS 6806:2010 Acoustics – Road-traffic noise – New and altered roads;</p> <p>(h) Noise Criteria Categories – means the groups of preference for sound levels established in accordance with NZS 6806 when determining the Best Practicable Option for noise mitigation (i.e. Categories A, B and C);</p>

NoR No.	No.	Condition
		<p>(i) NZS 6806 – means New Zealand Standard NZS 6806:2010 Acoustics – Road-traffic noise – New and altered roads;</p> <p>(j) Protected Premises and Facilities (PPFs) – means only the premises and facilities identified in green, orange or red in <i>Schedule 4: PPFs Noise Criteria Categories</i>;</p> <p>(k) Selected Mitigation Options – means the preferred mitigation option resulting from a Best Practicable Option assessment undertaken in accordance with NZS 6806 taking into account any low noise road surface to be implemented in accordance with Condition 29; and</p> <p>(l) Structural Mitigation – has the same meaning as in NZS 6806.</p>
NoRs 1,2,3 and 4	30.	<p>The Noise Criteria Categories identified in <i>Schedule 4: PPFs Noise Criteria Categories</i> at each of the PPFs shall be achieved where practicable and subject to Conditions 30 to 41 (all traffic noise conditions).</p> <p>The Noise Criteria Categories do not need to be complied with at a PPF where:</p> <p>(a) The PPF no longer exists; or</p> <p>(b) Agreement of the landowner has been obtained confirming that the Noise Criteria Category does not need to be met.</p> <p>Achievement of the Noise Criteria Categories for PPFs shall be by reference to a traffic forecast for a high growth scenario in a design year at least 10 years after the programmed opening of the Project.</p>
NoRs 1,2,3 and 4	31.	<p>As part of the detailed design of the Project, a Suitably Qualified Person shall determine the Selected Mitigation Options for the PPFs identified on <i>Schedule 4: PPFs Noise Criteria Categories</i>.</p> <p>For the avoidance of doubt, the low noise road surface implemented in accordance with Condition 29 may be (or be part of) the Selected Mitigation Option(s).</p>
NoRs 1,2,3 and 4	32.	<p>Prior to construction of the Project, a Suitably Qualified Person shall develop the Detailed Mitigation Options for the PPFs identified in <i>Schedule 4 PPFs Noise Criteria Categories</i>, taking into account the Selected Mitigation Options.</p>
NoRs 1,2,3 and 4	33.	<p>If the Detailed Mitigation Options would result in the Identified Noise Criteria Category changing to a less stringent Category, e.g. from Category A to B or Category B to C, at any relevant PPF, a Suitably Qualified Person shall provide confirmation to the Manager that the Detailed Mitigation Option would be consistent with adopting the Best Practicable Option in accordance with NZS 6806 prior to implementation.</p>
NoRs 1,2,3 and 4	34.	<p>The Detailed Mitigation Options shall be implemented prior to completion of construction of the Project, with the exception of any low-noise road surfaces, which shall be implemented within twelve months of completion of construction.</p>
NoRs 1,2,3 and 4	35.	<p>Prior to the Start of Construction, a Suitably Qualified Person shall identify those PPFs which, following implementation of all the Detailed Mitigation Options, will not be Noise Criteria Categories A or B and where Building-Modification Mitigation might be required to achieve 40 dB L_{Aeq}(24h) inside Habitable Spaces ('Category C Buildings').</p>
NoRs 1,2,3 and 4	36.	<p>Prior to the Start of Construction in the vicinity of each Category C Building, the Requiring Authority shall write to the owner of the Category C Building requesting entry to assess the noise reduction performance of the existing building envelope. If the building owner agrees to entry within three months of the date of the Requiring Authority's letter, the Requiring Authority shall instruct a Suitably Qualified Person to visit the building and assess the noise reduction performance of the existing building envelope.</p>
NoRs 1,2,3 and 4	37.	<p>For each Category C Building identified, the Requiring Authority is deemed to have complied with Condition 36 above if:</p>

NoR No.	No.	Condition
		<p>(a) The Requiring Authority's Suitably Qualified Person has visited the building and assessed the noise reduction performance of the building envelope; or</p> <p>(b) The building owner agreed to entry, but the Requiring Authority could not gain entry for some reason (such as entry denied by a tenant); or</p> <p>(c) The building owner did not agree to entry within three months of the date of the Requiring Authority's letter sent in accordance with Condition 36 above (including where the owner did not respond within that period); or</p> <p>(d) The building owner cannot, after reasonable enquiry, be found prior to completion of construction of the Project.</p> <p>If any of (b) to (d) above apply to a Category C Building, the Requiring Authority is not required to implement Building-Modification Mitigation to that building.</p>
NoRs 1,2,3 and 4	38.	<p>Subject to Condition 37 above, within six months of the assessment undertaken in accordance with Conditions 36 and 37, the Requiring Authority shall write to the owner of each Category C Building advising:</p> <p>(a) If Building-Modification Mitigation is required to achieve 40 dB LAeq(24h) inside habitable spaces; and</p> <p>(b) The options available for Building-Modification Mitigation to the building, if required; and</p> <p>(c) That the owner has three months to decide whether to accept Building-Modification Mitigation to the building and to advise which option for Building-Modification Mitigation the owner prefers, if the Requiring Authority has advised that more than one option is available.</p>
NoRs 1,2,3 and 4	39.	<p>Once an agreement on Building-Modification Mitigation is reached between the Requiring Authority and the owner of a Category C Building, the mitigation shall be implemented, including any third party authorisations required, in a reasonable and practical timeframe agreed between the Requiring Authority and the owner.</p>
NoRs 1,2,3 and 4	40.	<p>Subject to Condition 37, where Building-Modification Mitigation is required, the Requiring Authority is deemed to have complied with Condition 39 if:</p> <p>(a) The Requiring Authority has completed Building Modification Mitigation to the building; or</p> <p>(b) An alternative agreement for mitigation is reached between the Requiring Authority and the building owner; or</p> <p>(c) The building owner did not accept the Requiring Authority's offer to implement Building-Modification Mitigation within three months of the date of the Requiring Authority's letter sent in accordance with Condition 37 (including where the owner did not respond within that period); or</p> <p>(d) The building owner cannot, after reasonable enquiry, be found prior to completion of construction of the Project.</p>
NoRs 1,2,3 and 4	41.	<p>The Detailed Mitigation Options shall be maintained so they retain their noise reduction performance as far as practicable</p>

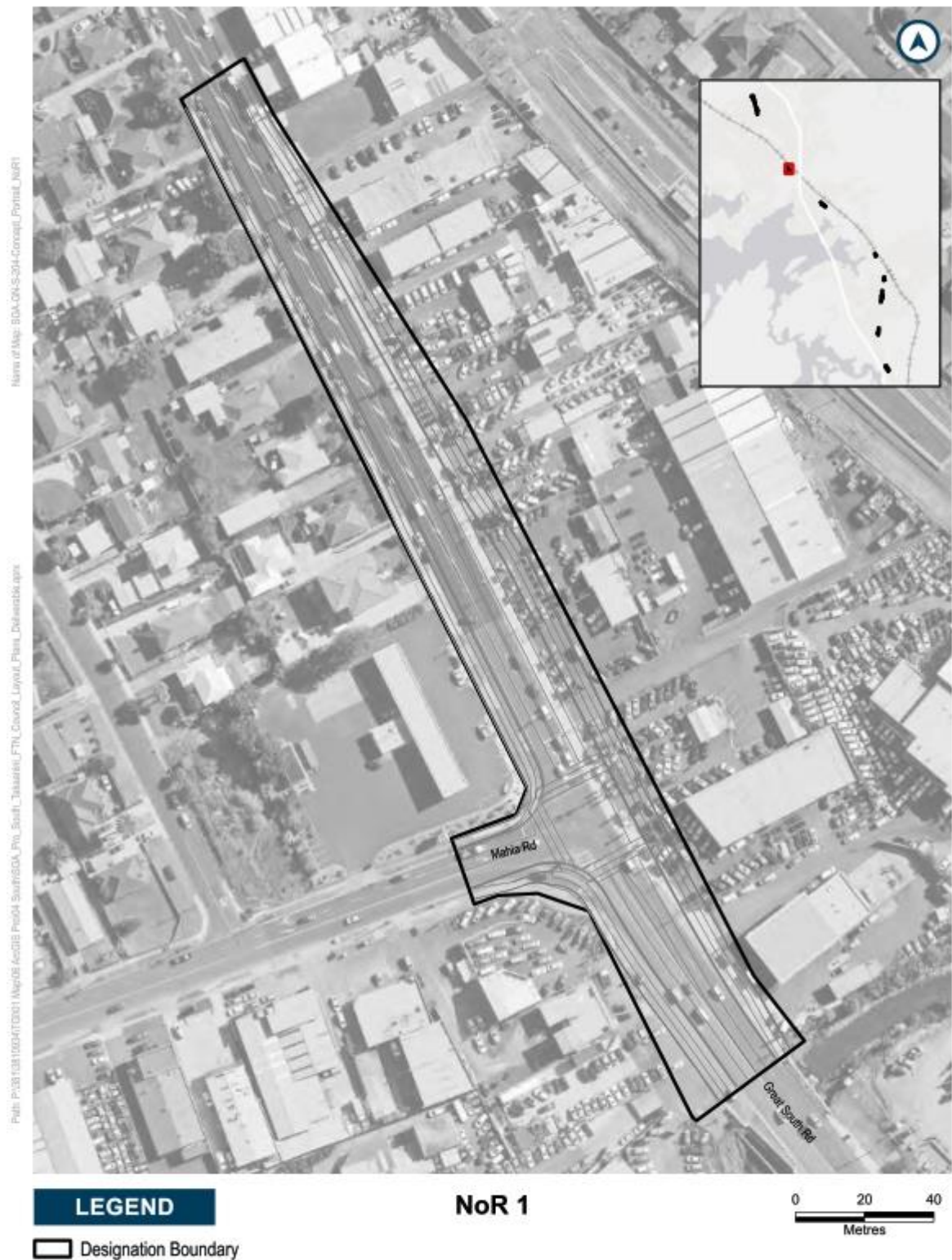
Schedule 1: General accordance plans and information

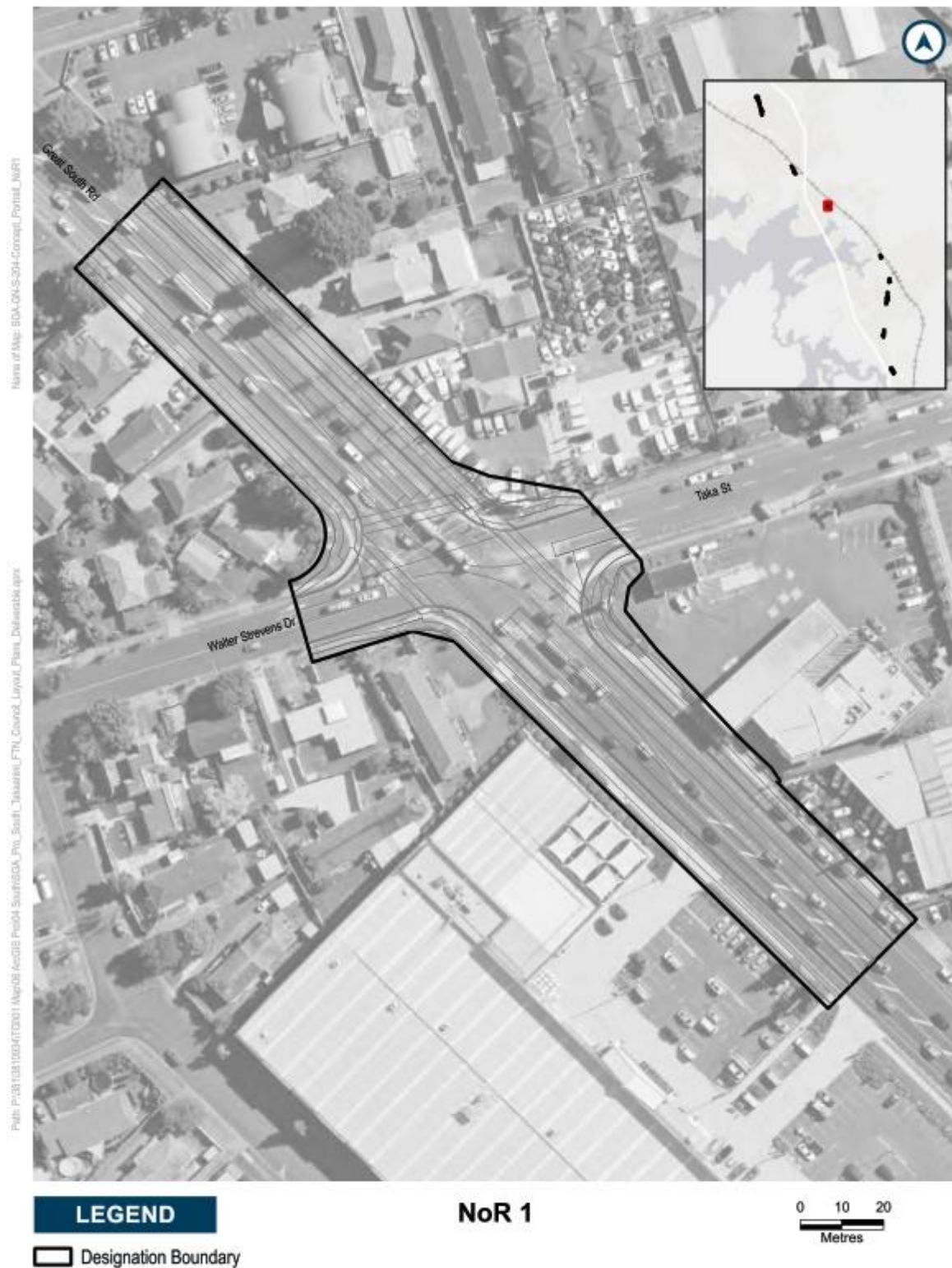
NoR 1

The proposed work is for the construction, operation, maintenance of upgrades to Great South Road between Manukau and Drury. The proposed work is shown in the following Concept Plans and includes:

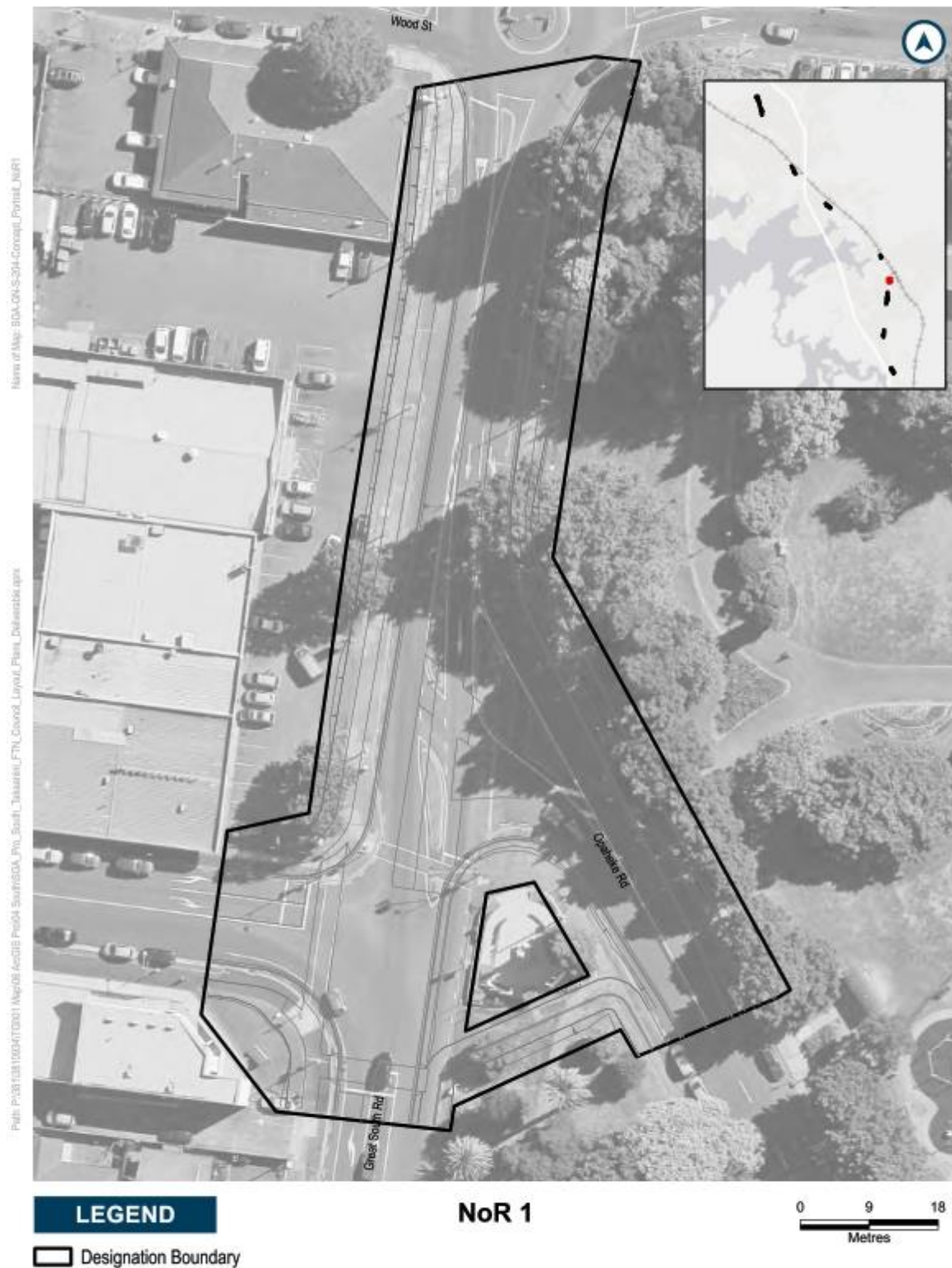
- a) Upgrades to Great South Road to accommodate bus priority measures, general traffic lanes, and walking and cycling facilities in eight locations;
- b) Associated works including intersections, bridges, embankments, retaining walls, culverts, and stormwater management systems;
- c) Reconfiguration of local roads, where the proposed work intersects with local roads; and
- d) Construction activities including vegetation removal, establishment of construction areas and the regrading of driveways.

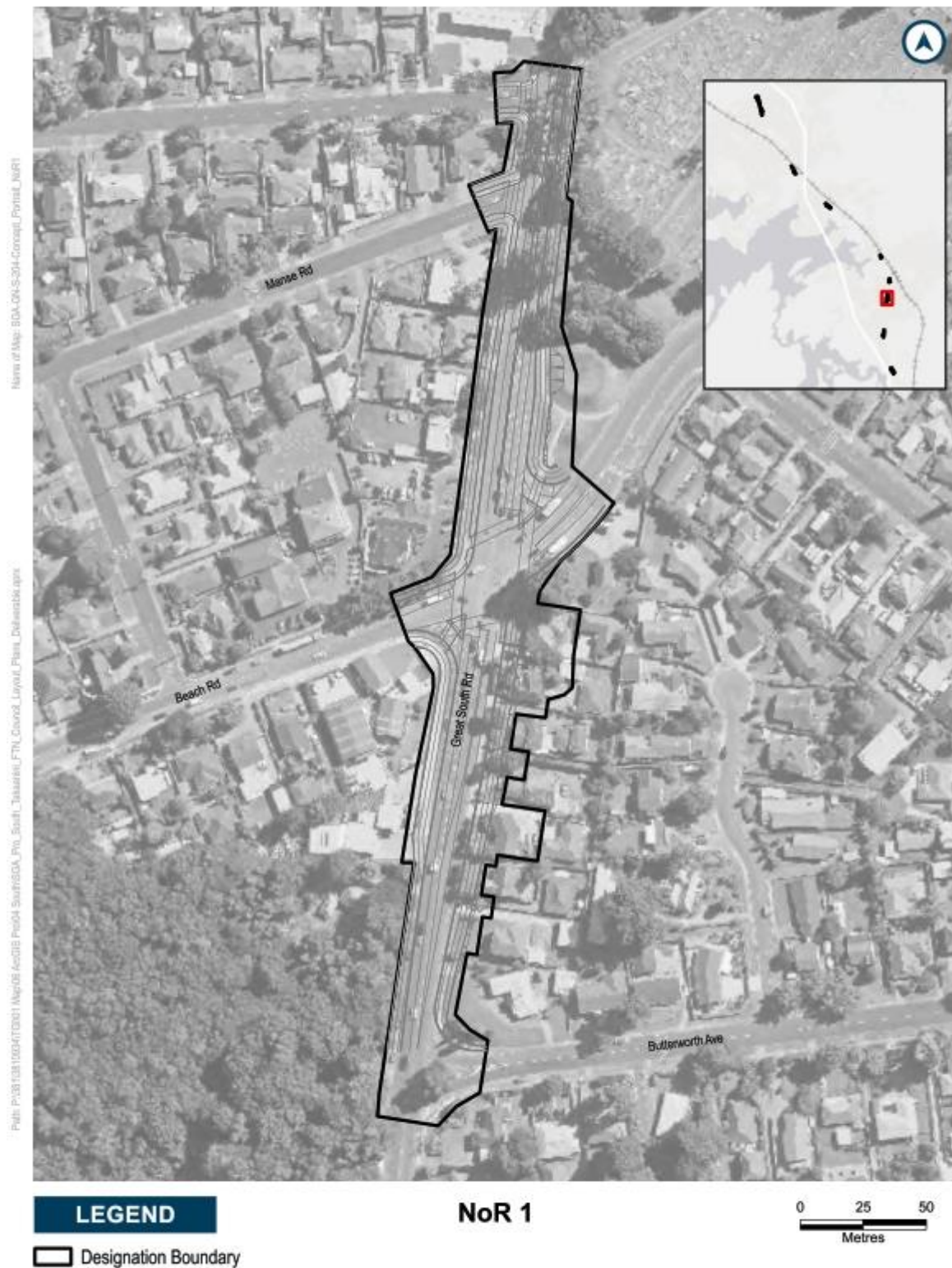
Concept Plans:

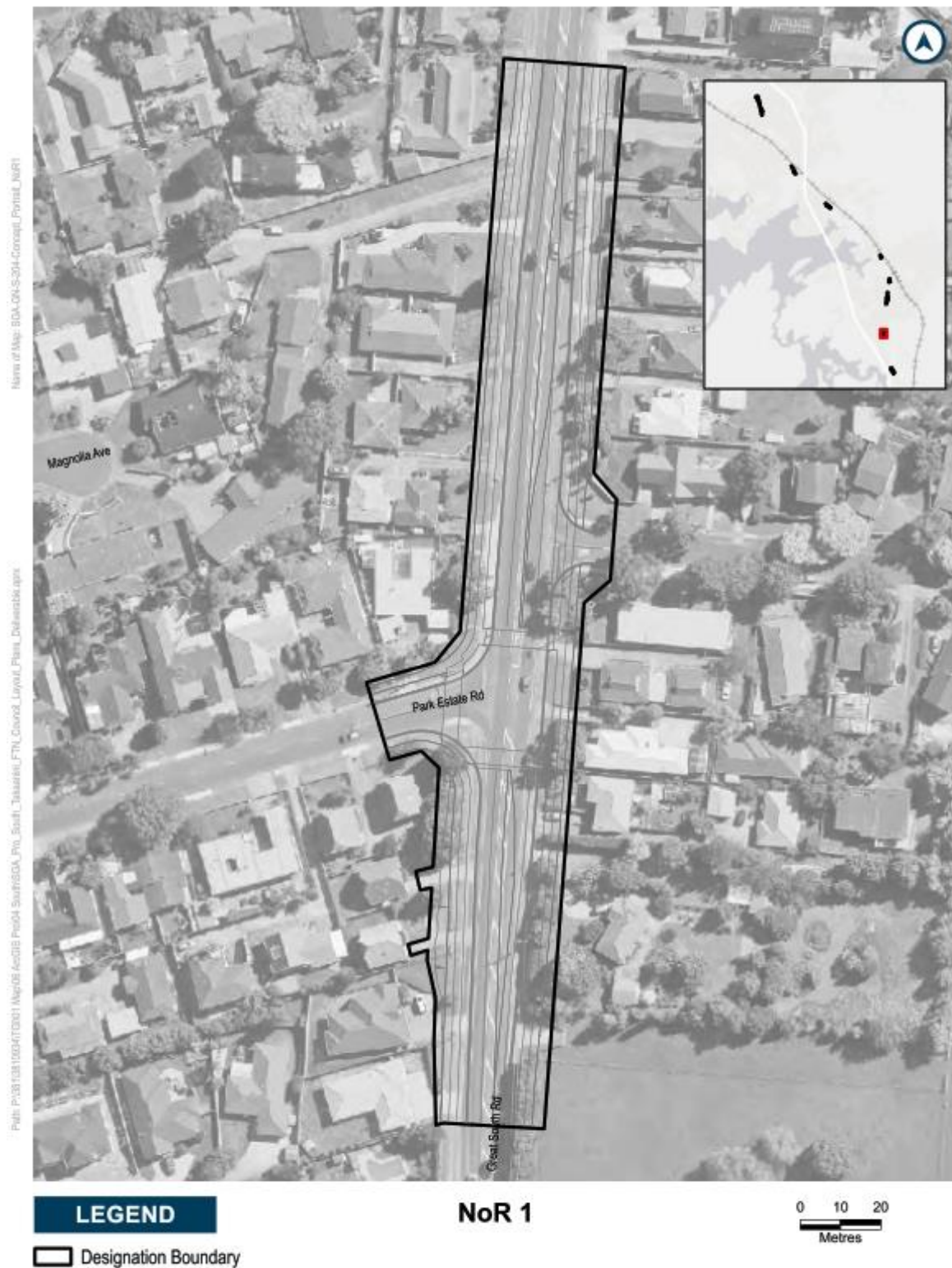


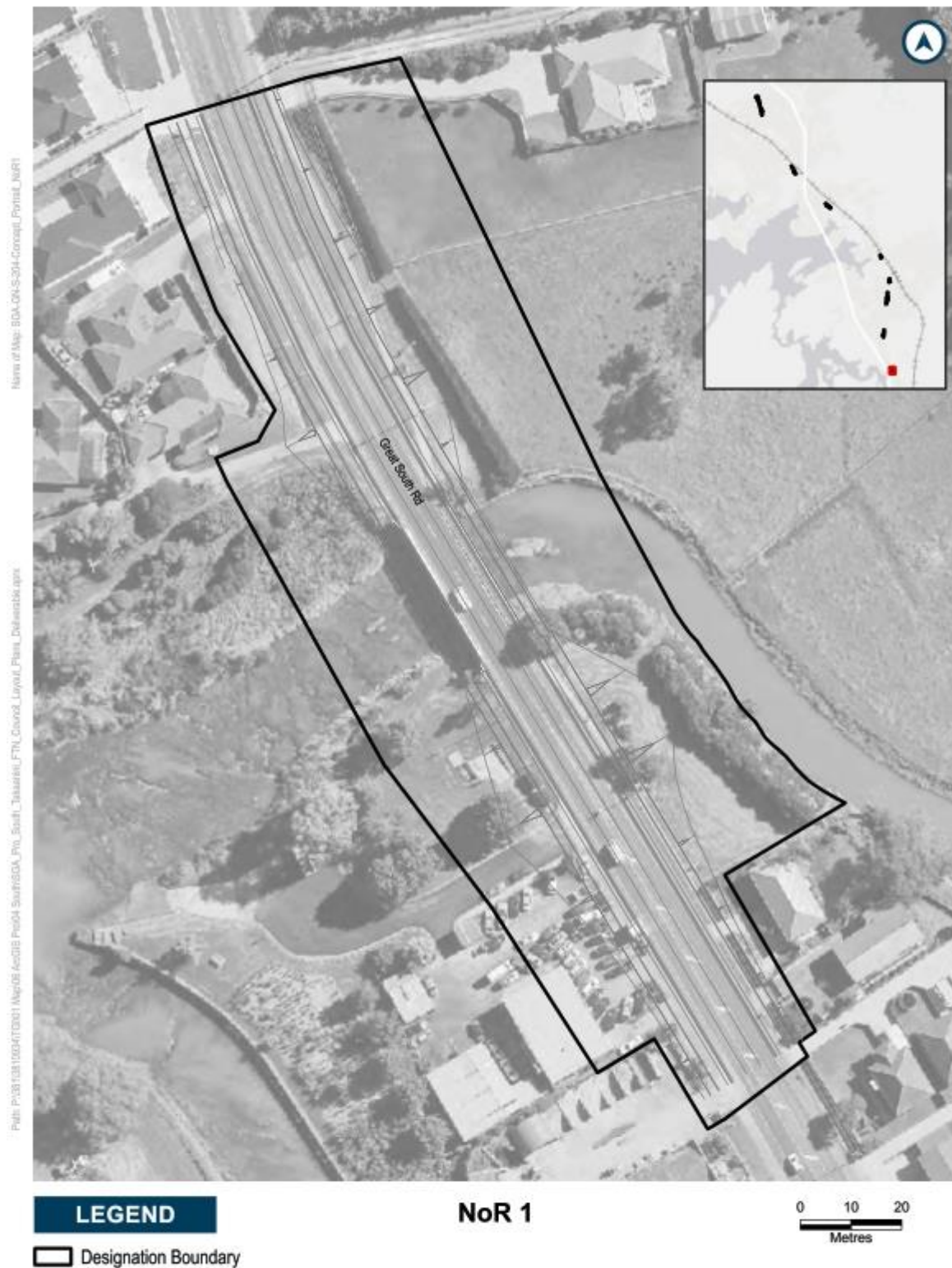










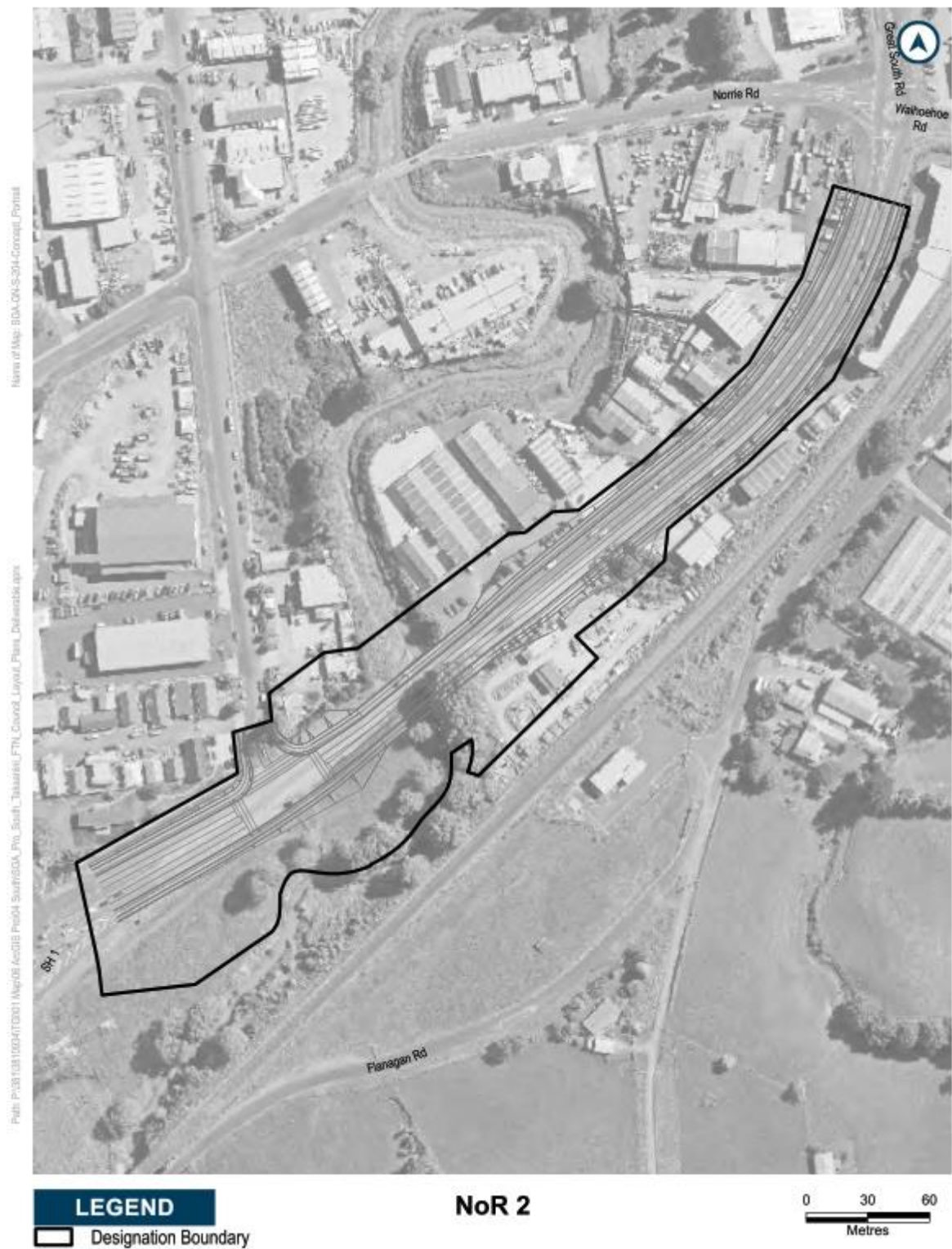


NoR 2

The proposed work is for the construction, operation, and maintenance of upgrades to Great South Road between Waihoehoe Road and the State Highway 1 Drury Interchange. The proposed work is shown in the following Concept Plan and includes:

- a) An upgrade of Great South Road to accommodate general traffic lanes and walking and cycling facilities;
- b) Associated works including intersections, bridges, embankments, retaining walls, culverts, and stormwater management systems;
- c) Reconfiguration of local roads, where the proposed work intersects with local roads; and
- d) Construction activities including vegetation removal, establishment of construction areas and the regrading of driveways.

Concept Plan:



NoR 3

The proposed work is for the construction, operation, and maintenance of upgrades to Weymouth and Alfriston Roads between Selwyn Road and Saralee Drive; and to Great South Road between Halver Road and Myers Road. The proposed work is shown in the following Concept Plan and includes:

- a) Upgrades to Weymouth Road, Alfriston Road, and Great South Road accommodate bus priority measures, general traffic lanes and walking and cycling facilities;
- b) Associated works including intersections, bridges, embankments, retaining walls, culverts, and stormwater management systems;
- c) Reconfiguration of local roads, where the proposed work intersects with local roads; and
- d) Construction activities including vegetation removal, establishment of construction areas and the regrading of driveways.

Concept Plan:



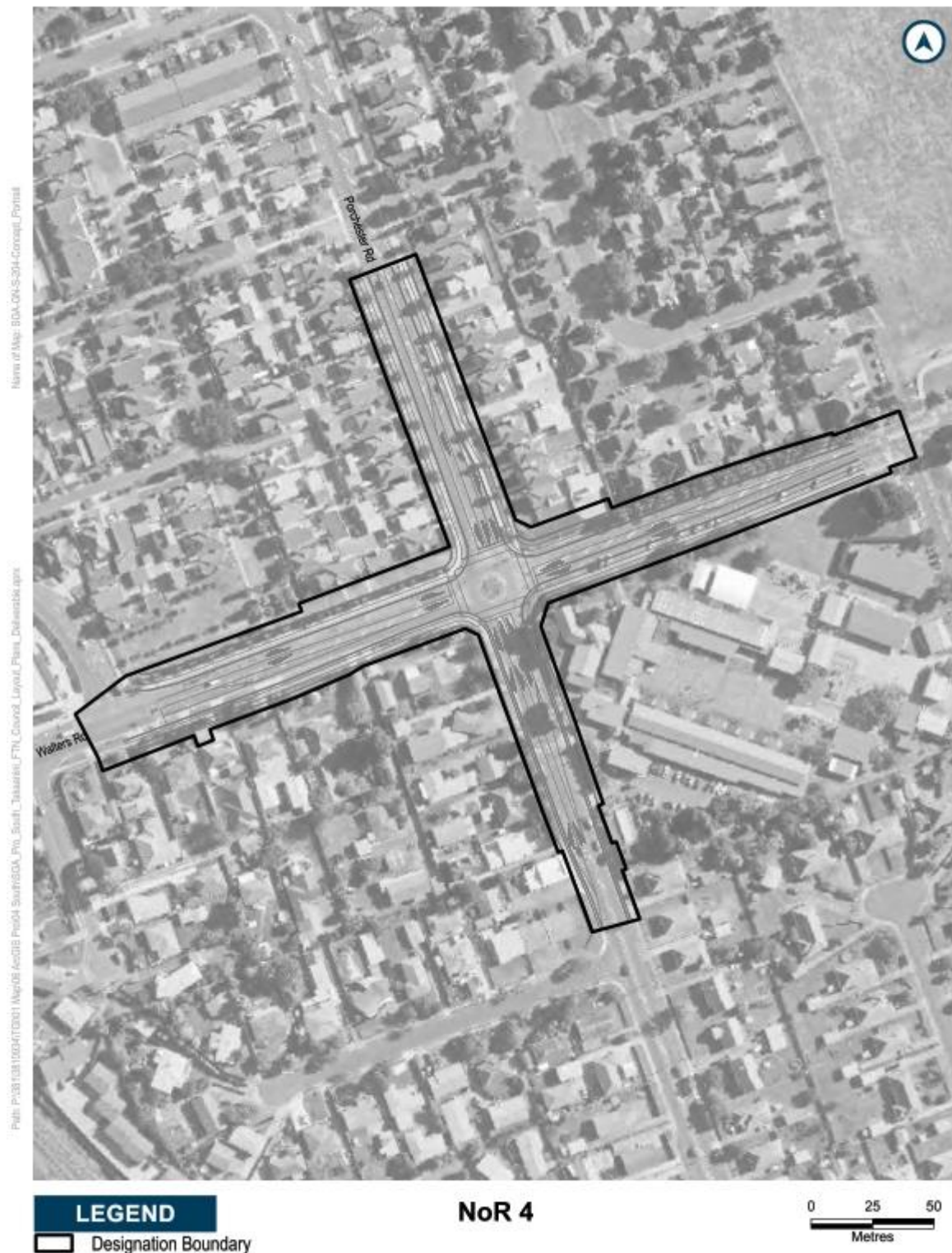
NoR 4

The proposed work is for the construction, operation, and maintenance of upgrades to Porchester Road between Alfriston Road and Walters Road; and to Popes Road between Takanini School Road and east of Porchester Road. The proposed work is shown in the following Concept Plans and includes:

- a) Upgrades of Porchester Road and Popes Road to accommodate general traffic lanes and walking and cycling facilities;
- b) Associated works including intersections, bridges, embankments, retaining walls, culverts, and stormwater management systems;
- c) Reconfiguration of local roads, where the proposed work intersects with local roads; and
- d) Construction activities including vegetation removal, establishment of construction areas and the regrading of driveways.

Concept Plans:





Schedule 2: Identified Native Lizard Habitat Areas

NoR 1

Pre-construction native lizard survey area

Tree No.	Vegetation Type	Tree Species
107	Group of Trees	Ake Ake, Karo
108	Group of Trees	Putaputāwētā, Karamu, Tī Kōuka, Kahikatea, Kānuka, Mānuka, Karo, Kowhai
113	Group of Trees	Tī Kōuka, Mānuka



LEGEND

□ Designation Boundary • Tree/Group of Trees

0 10 20
Metres

NoR 2**Pre-construction native lizard survey locations**

Tree No.	Vegetation Type	Species
115	Group of Trees	Willow
116	Group of Trees	Willow



LEGEND

□ Designation Boundary • Tree/Group of Trees

0 30 60
Metres

NoR 3

Pre-construction native lizard survey locations

Tree No.	Vegetation Type	Species
38	Group of Trees	Karamu, Māpou
39	Group of Trees	Karamu, Gum
41	Group of Trees	Karamu, English Oak
48	Group of Trees	Ti Kōuka



Schedule 3: Trees to be included in the Tree Management Plan

NoR 1

Tree No.	Vegetation Type	Protection	Species
1	Single Tree	Road Reserve	Queen Palm
2	Single Tree	Road Reserve	Queen Palm
3	Single Tree	Road Reserve	Totara
4	Single Tree	Road Reserve	Queen Palm
5	Single Tree	Road Reserve	Queen Palm
6	Group of Trees	Open Space	Karaka, Rimu, Pōhutukawa, Tōtara, Monkey apple
7	Single Tree	Road Reserve	Queen Palm
8	Single Tree	Road Reserve	Queen Palm
9	Group of Trees	Road Reserve	Melia, Tarata
10	Single Tree	Road Reserve	Queen Palm
11	Single Tree	Road Reserve	Queen Palm
12	Single Tree	Road Reserve	Queen Palm
13	Single Tree	Road Reserve	Pōhutukawa
14	Single Tree	Road Reserve	Queen Palm
15	Single Tree	Road Reserve	Queen Palm
16	Group of Trees	Road Reserve	Queen Palm
17	Single Tree	Notable Tree	Norfolk Island pine
54	Group of Trees	Road Reserve	Queen Palm
55	Group of Trees	Road Reserve	Italian Alder
56	Single Tree	Road Reserve	Alder
57	Single Tree	Road Reserve	Tulip Tree
58	Single Tree	Open Space	Tulip Tree
59	Group of Trees	Road Reserve	Italian Alder
60	Group of Trees	Road Reserve	Italian Alder
68	Group of Trees	Open Spaces	Ti Kōuka, Blue Arizona Cypress, Rhododendron
69	Group of Trees	Open Spaces	Kauri, Tītoki, Karaka, Kahikatea, Rimu, European Beech, Kapuku, Tōtara
70	Group of Trees	Notable Tree	Ti Kōuka, English Oak
71	Group of Trees	Open Space	Kauri, Tītoki, Rimu, Tōtara
72	Group of Trees	Open Space	Tōtara
73	Single Tree	Open Space	Weeping Elm
74	Group of Trees	Open Space	European Beech, Phoenix Palm
75	Group of Trees	Road Reserve	Tulip Tree
76	Single Tree	Road Reserve	Tulip Tree
77	Single Tree	Road Reserve	European Lime
78	Single Tree	Open Space	Italian Cypress

Tree No.	Vegetation Type	Protection	Species
79	Group of Trees	Open Space and Notable Tree	Red Flowering Gum
80	Group of Trees	Notable Tree	Tōtara
81	Single Tree	Notable Tree	Gum
82	Group of Trees	Open Space	Kauri, Karamu, Tarata, Tōtara, Houpara
83	Single Tree	Notable Tree	Phoenix Palm
85	Group of Trees	Road Reserve	Kauri, Cherry, Pūriri
86	Single Tree	Notable Tree	Miro
87	Single Tree	Notable Tree	Rimu
88	Single Tree	Open Space	Pūriri
89	Single Tree	Open Space	Pōhutukawa
90	Single Tree	Open Space	Pōhutukawa
91	Single Tree	Open Space	Kauri
92	Group of Trees	Open Space	Karaka, Kahikatea, Kohekohe, Pōhutukawa
93	Group of Trees	Open Space	Kauri, Tītoki, Karaka, Kahikatea, Pōhutukawa, Mapou, Tōtara
94	Group of Trees	Open Space	Macadamia, Pōhutukawa, Avocado
95	Group of Trees	Notable Tree	Tōtara
96	Group of Trees	Road Reserve	Tarata, Kōhūhū, Tōtara
97	Group of Trees	Road Reserve	Red Robin, Horoeke, Pūriri
99	Single Tree	Road Reserve	Pōhutukawa
100	Group of Trees	Road Reserve	Wonder Tree
101	Group of Trees	Road Reserve	Ti Kōuka, Kōhūhū, Yucca
102	Single Tree	Road Reserve	Bottlebrush
103	Single Tree	Road Reserve	Rimu
104	Single Tree	Road Reserve	Camphor Laurel
106	Group of Trees	Road Reserve	Copper Sheen
107	Group of Trees	Road Reserve	Ake Ake, Karo
108	Group of Trees	Road Reserve	Putaputāwētā, Karamu, Ti Kōuka, Kahikatea, Kānuka, Mānuka, Karo, Kowhai
109	Single Tree	Road Reserve	American Sweet Gum
110	Single Tree	Road Reserve	American Sweet Gum
111	Single Tree	Road Reserve	American Sweet Gum
112	Group of Trees	Road Reserve	Mānuka, Karo
113	Group of Trees	Road Reserve	Ti Kōuka, Mānuka





LEGEND

□ Designation Boundary • Tree/Group of Trees

0 10 20
Metres



LEGEND

□ Designation Boundary • Tree/Group of Trees

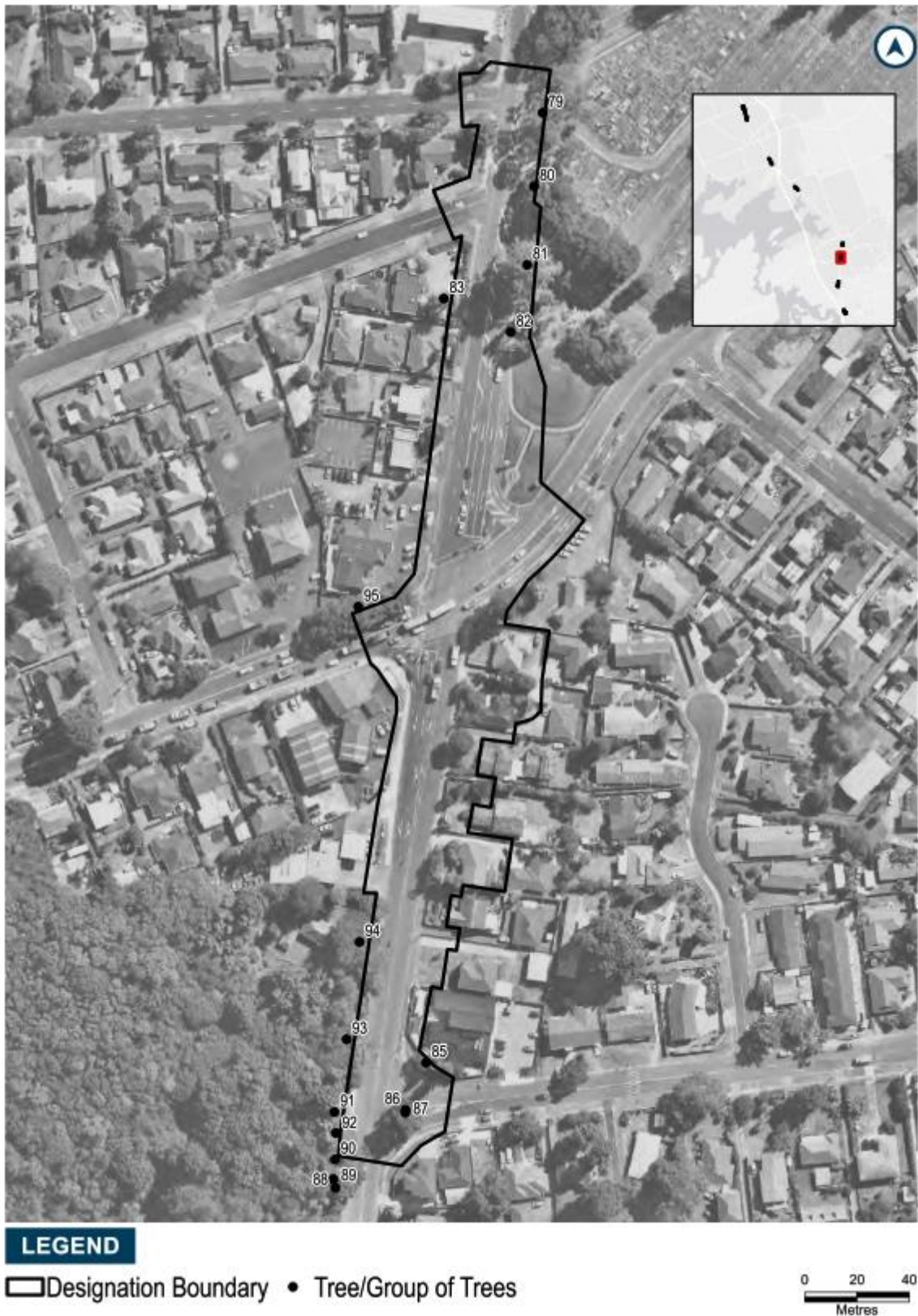
0 10 20
Metres



LEGEND

□ Designation Boundary • Tree/Group of Trees

0 8 16
Metres





LEGEND

□ Designation Boundary • Tree/Group of Trees

0 10 20
Metres



LEGEND

□ Designation Boundary • Tree/Group of Trees

0 10 20
Metres

NoR 2

Tree No.	Vegetation Type	Protection	Species
115	Group of Trees	Open Space	Willow
116	Group of Trees	Road Reserve	Willow



NoR 3

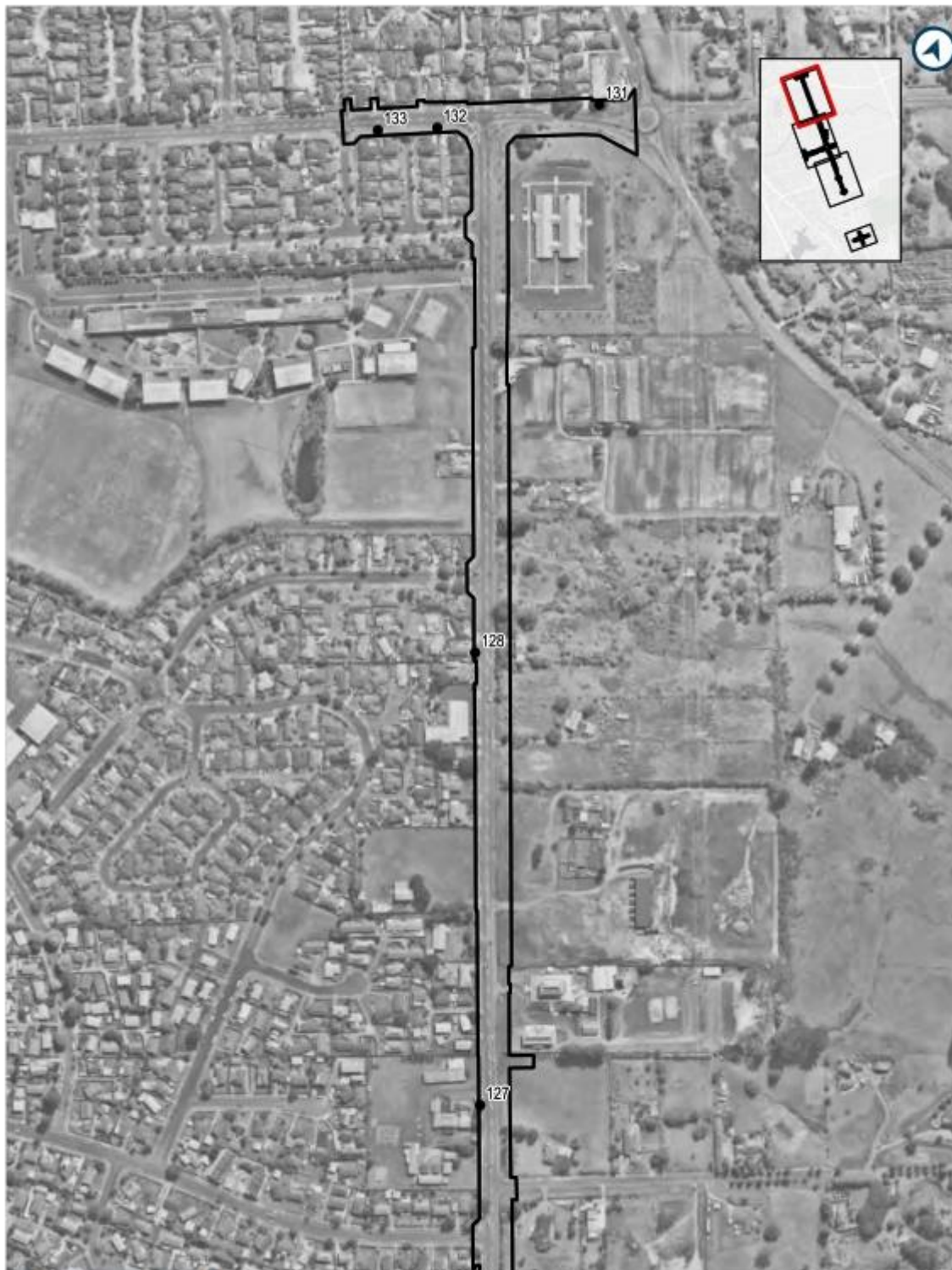
Tree No.	Vegetation Type	Protection	Species
18	Group of Trees	Road Reserve	Pin Oak
19	Group of Trees	Road Reserve	Water Gum, Yucca
20	Single Tree	Road Reserve	Water Gum
21	Group of Trees	Road Reserve	Water Gum
22	Single Tree	Road Reserve	Water Gum
24	Group of Trees	Road Reserve	Water Gum
25	Single Tree	Road Reserve	Water Gum
27	Single Tree	Road Reserve	Totara
28	Single Tree	Road Reserve	Pūriri
29	Single Tree	Road Reserve	Water Gum
30	Single Tree	Road Reserve	Water Gum

Tree No.	Vegetation Type	Protection	Species
31	Single Tree	Road Reserve	Water Gum
32	Single Tree	Road Reserve	Water Gum
33	Single Tree	Road Reserve	Water Gum
34	Group of Trees	Road Reserve	Tī Kōuka, Monterey Cypress, Gum, Māpou, Tōtara, Queen Palm
35	Single Tree	Road Reserve	Water Gum
36	Single Tree	Road Reserve	Water Gum
38	Group of Trees	Road Reserve	Karamu, Māpou
39	Group of Trees	Road Reserve	Karamu, Gum
41	Group of Trees	Road Reserve	Karamu, English Oak
42	Single Tree	Road Reserve	Pōhutukawa
43	Group of Trees	Open Space	Pōhutukawa, Tōtara, Kowhai
44	Single Tree	Road Reserve	Pōhutukawa
45	Single Tree	Road Reserve	Pōhutukawa
46	Single Tree	Road Reserve	Pōhutukawa
47	Single Tree	Road Reserve	Pōhutukawa
48	Group of Trees	Open Space	Tī Kōuka
49	Group of Trees	Road Reserve	Tōtara
51	Single Tree	Open Space	Tōtara
52	Group of Trees	Open Space	Camphor Laurel, Tī Kōuka, Hibiscus, Kānuka, Kawaka, Māpou, London Plane, Black Poplar, English Oak
53	Group of Trees	Road Reserve	Pōhutukawa



NoR 4

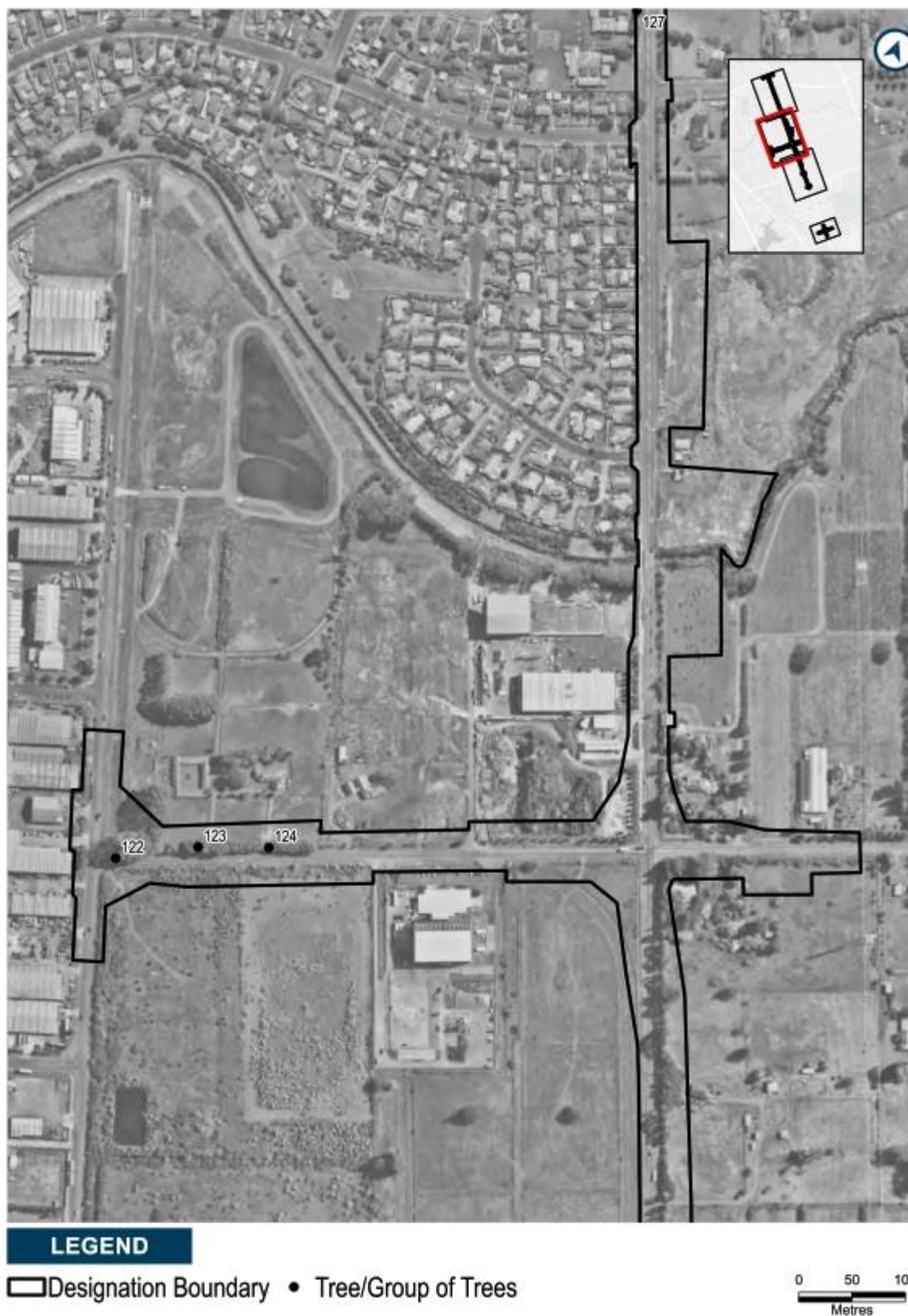
Tree No.	Vegetation Type	Protection	Species
61	Group of Trees	Road Reserve	American sweet gum
62	Group of Trees	Road Reserve	American sweet gum
64	Group of Trees	Road Reserve	American sweet gum
65	Single Tree	Road Reserve	Golden Elm
117	Single Tree	Road Reserve	Pin Oak
118	Single Tree	Road Reserve	Willow
119	Single Tree	Road Reserve	Pin Oak
120	Single Tree	Road Reserve	Willow
121	Single Tree	Road Reserve	Japanese Cedar
122	Group of Trees	Road Reserve	Black Poplar
123	Group of Trees	Road Reserve	Willow
124	Group of Trees	Road Reserve	Willow
127	Single Tree	Road Reserve	Norfolk Island Pine
128	Group of Trees	Road Reserve	Pōhutukawa
131	Group of Trees	Road Reserve	Black Locust
132	Single Tree	Road Reserve	Pōhutukawa
133	Single Tree	Road Reserve	Pōhutukawa

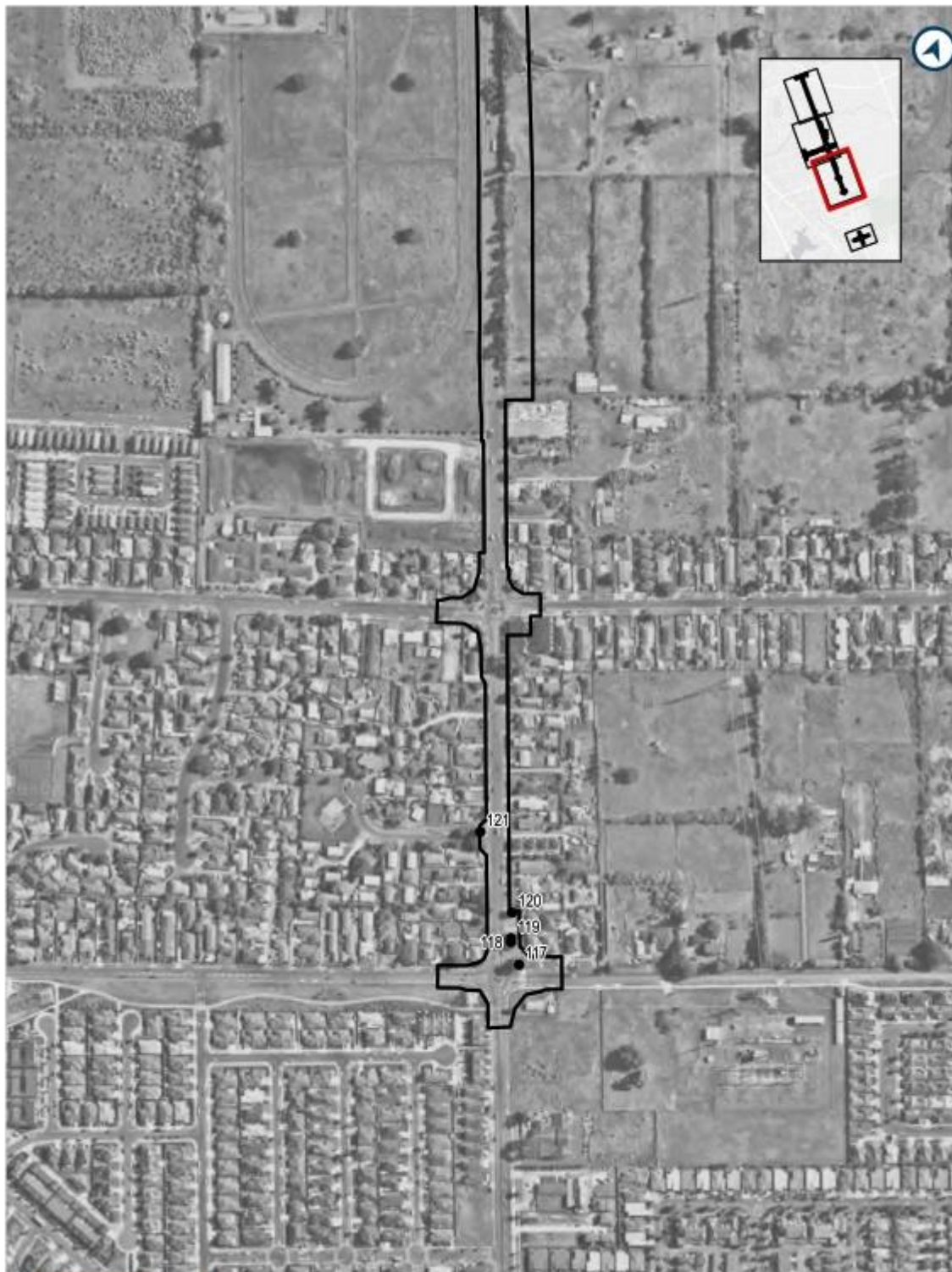


LEGEND

□ Designation Boundary • Tree/Group of Trees

0 50 100
Metres





LEGEND

□ Designation Boundary • Tree/Group of Trees

0 50 100
Metres



LEGEND

□ Designation Boundary • Tree/Group of Trees

0 40 80
Metres

Schedule 4: Identified PPFs noise criteria categories

NoR 1

NoR 1-A-B		
Address	New or Altered Road	Noise Criteria Category
44A Great South Road, Manurewa	Altered	Category C
46A Great South Road, Manurewa	Altered	Category C
1/42 Great South Road, Manurewa	Altered	Category C
1-16/38 Great South Road, Manurewa	Altered	Category B
1/55 Great South Road, Manurewa	Altered	Category B
50 Great South Road, Manurewa	Altered	Category B
33 Great South Road, Manurewa	Altered	Category B
43A Great South Road, Manurewa	Altered	Category B
69A Great South Road, Manurewa	Altered	Category B
1/52 Great South Road, Manurewa	Altered	Category B
1/34 Great South Road, Manurewa	Altered	Category B
1-2/61 Great South Road, Manurewa	Altered	Category B
1/48 Great South Road, Manurewa	Altered	Category B
35 Great South Road, Manurewa	Altered	Category B
1/54 Great South Road, Manurewa	Altered	Category B
24 Great South Road, Manurewa	Altered	Category A
74 Great South Road, Manurewa	Altered	Category A
1-2/45 Great South Road, Manurewa	Altered	Category A
3/61 Great South Road, Manurewa	Altered	Category A
6/34 Great South Road, Manurewa	Altered	Category A
1 Grande Vue Road, Hillpark	Altered	Category A
82 Great South Road, Manurewa	Altered	Category A
20 Great South Road, Manurewa	Altered	Category A
1-2/78A Great South Road, Manurewa	Altered	Category A
14 Great South Road, Manurewa	Altered	Category A
66 Great South Road, Manurewa	Altered	Category A
32 Great South Road, Manurewa	Altered	Category A
18 Great South Road, Manurewa	Altered	Category A
1-4/1A Halsey Road, Manurewa	Altered	Category A
1/53 Great South Road, Manurewa	Altered	Category A
10 Great South Road, Manurewa	Altered	Category A
1/49 Great South Road, Manurewa	Altered	Category A

63 Great South Road, Manurewa	Altered	Category A
31 Great South Road, Manurewa	Altered	Category A
3-4/79 Great South Road, Manurewa	Altered	Category A
51A Great South Road, Manurewa	Altered	Category A
1/40 Great South Road, Manurewa	Altered	Category A
25 Great South Road, Manurewa	Altered	Category A
22 Great South Road, Manurewa	Altered	Category A
1-2/79 Great South Road, Manurewa	Altered	Category A
1/72 Great South Road, Manurewa	Altered	Category A
67 Great South Road, Manurewa	Altered	Category A
2/70 Great South Road, Manurewa	Altered	Category A
23 Great South Road, Manurewa	Altered	Category A
1-2/47 Great South Road, Manurewa	Altered	Category A
36A Great South Road, Manurewa	Altered	Category A
12 Great South Road, Manurewa	Altered	Category A
1/65 Great South Road, Manurewa	Altered	Category A
16 Great South Road, Manurewa	Altered	Category A
29 Great South Road, Manurewa	Altered	Category A
5-6/79 Great South Road, Manurewa	Altered	Category A
41 Great South Road, Manurewa	Altered	Category A
86 Great South Road, Manurewa	Altered	Category A
2/34 Great South Road, Manurewa	Altered	Category A
46B Great South Road, Manurewa	Altered	Category A
57 Great South Road, Manurewa	Altered	Category A
1/59 Great South Road, Manurewa	Altered	Category A
1/37 Great South Road, Manurewa	Altered	Category A
75 Great South Road, Manurewa	Altered	Category A
73 Great South Road, Manurewa	Altered	Category A
1A Grande Vue Road, Hillpark	Altered	Category A
74A Great South Road, Manurewa	Altered	Category A
2/54 Great South Road, Manurewa	Altered	Category A
44B Great South Road, Manurewa	Altered	Category A
2/42 Great South Road, Manurewa	Altered	Category A
43B Great South Road, Manurewa	Altered	Category A
39 Great South Road, Manurewa	Altered	Category A
81 Great South Road, Manurewa	Altered	Category A
2/52 Great South Road, Manurewa	Altered	Category A
88 Great South Road, Manurewa	Altered	Category A

3/54 Great South Road, Manurewa	Altered	Category A
6/61 Great South Road, Manurewa	Altered	Category A
1-5/83 Great South Road, Manurewa	Altered	Category A
71 Great South Road, Manurewa	Altered	Category A
1-2/35 Great South Road, Manurewa	Altered	Category A
50A Great South Road, Manurewa	Altered	Category A
2/16 Great South Road, Manurewa	Altered	Category A
1/90 Great South Road, Manurewa	Altered	Category A
1-2/3A Grande Vue Road, Hillpark	Altered	Category A
69B Great South Road, Manurewa	Altered	Category A
1/87 Great South Road, Manurewa	Altered	Category A
3/70 Great South Road, Manurewa	Altered	Category A
4-5/61 Great South Road, Manurewa	Altered	Category A
46C Great South Road, Manurewa	Altered	Category A
3 Grande Vue Road, Hillpark	Altered	Category A
2/53 Great South Road, Manurewa	Altered	Category A
2/49 Great South Road, Manurewa	Altered	Category A
4A Halsey Road, Manurewa	Altered	Category A
6 Orams Road, Manurewa	Altered	Category A
5-8/1A Halsey Road, Manurewa	Altered	Category A
56 Great South Road, Manurewa	Altered	Category A
51B Great South Road, Manurewa	Altered	Category A
1 Browns Road, Manurewa	Altered	Category A
44C Great South Road, Manurewa	Altered	Category A
41A Great South Road, Manurewa	Altered	Category A
2/55 Great South Road, Manurewa	Altered	Category A
6A Orams Road, Manurewa	Altered	Category A
2/48 Great South Road, Manurewa	Altered	Category A
1/45A Great South Road, Manurewa	Altered	Category A
26 Great South Road, Manurewa	Altered	Category A
1-3/2 Browns Road, Manurewa	Altered	Category A
22A Great South Road, Manurewa	Altered	Category A
82A Great South Road, Manurewa	Altered	Category A
3/42 Great South Road, Manurewa	Altered	Category A
5 Grande Vue Road, Hillpark	Altered	Category A
1-3/7 Grande Vue Road, Hillpark	Altered	Category A
3/55 Great South Road, Manurewa	Altered	Category A
47A Great South Road, Manurewa	Altered	Category A

46D Great South Road, Manurewa	Altered	Category A
32A Great South Road, Manurewa	Altered	Category A
26B Great South Road, Manurewa	Altered	Category A
3/52 Great South Road, Manurewa	Altered	Category A
3/34 Great South Road, Manurewa	Altered	Category A
1A Orams Road, Hillpark	Altered	Category A
3-4/3A Grande Vue Road, Hillpark	Altered	Category A
50B Great South Road, Manurewa	Altered	Category A
1/78 Great South Road, Manurewa	Altered	Category A
69C Great South Road, Manurewa	Altered	Category A
6 Great South Road, Manurewa	Altered	Category A
44D Great South Road, Manurewa	Altered	Category A
3/48 Great South Road, Manurewa	Altered	Category A
4/52 Great South Road, Manurewa	Altered	Category A
2/65 Great South Road, Manurewa	Altered	Category A
5/34 Great South Road, Manurewa	Altered	Category A
84A Great South Road, Manurewa	Altered	Category A
2/45A Great South Road, Manurewa	Altered	Category A
63B Great South Road, Manurewa	Altered	Category A
2/90 Great South Road, Manurewa	Altered	Category A
2/92A Great South Road, Manurewa	Altered	Category A
1/67 Great South Road, Manurewa	Altered	Category A
7 Sime Road, Hillpark	Altered	Category A
25A Great South Road, Manurewa	Altered	Category A
44E Great South Road, Manurewa	Altered	Category A
1/14 Great South Road, Manurewa	Altered	Category A
1-2/5 Great South Road, Manurewa	Altered	Category A
6 Sime Road, Hillpark	Altered	Category A
23A Great South Road, Manurewa	Altered	Category A
30 Great South Road, Manurewa	Altered	Category A
28 Great South Road, Manurewa	Altered	Category A
2/78 Great South Road, Manurewa	Altered	Category A
51C Great South Road, Manurewa	Altered	Category A
75A Great South Road, Manurewa	Altered	Category A
46E Great South Road, Manurewa	Altered	Category A
2/37 Great South Road, Manurewa	Altered	Category A
1-2/3 Browns Road, Manurewa	Altered	Category A
43C Great South Road, Manurewa	Altered	Category A

1-2/7 Great South Road, Manurewa	Altered	Category A
3/40 Great South Road, Manurewa	Altered	Category A
14 Brouder Place, Hillpark	Altered	Category A
2/72 Great South Road, Manurewa	Altered	Category A
4/42 Great South Road, Manurewa	Altered	Category A
16 Tampin Road, Hillpark	Altered	Category A
27 Great South Road, Manurewa	Altered	Category A
3/78 Great South Road, Manurewa	Altered	Category A
26A Great South Road, Manurewa	Altered	Category A
16 Brouder Place, Hillpark	Altered	Category A
76A Great South Road, Manurewa	Altered	Category A
1/49A Great South Road, Manurewa	Altered	Category A
69D Great South Road, Manurewa	Altered	Category A
1/47A Great South Road, Manurewa	Altered	Category A
7-8/61 Great South Road, Manurewa	Altered	Category A
36 Great South Road, Manurewa	Altered	Category A
9/61 Great South Road, Manurewa	Altered	Category A
1/6 Halsey Road, Manurewa	Altered	Category A
53A Great South Road, Manurewa	Altered	Category A
3/45A Great South Road, Manurewa	Altered	Category A
76B Great South Road, Manurewa	Altered	Category A
4/34 Great South Road, Manurewa	Altered	Category A
5 Sime Road, Hillpark	Altered	Category A
2-3/59 Great South Road, Manurewa	Altered	Category A
4-6/2 Browns Road, Manurewa	Altered	Category A
3/1 Halsey Road, Manurewa	Altered	Category A
63A Great South Road, Manurewa	Altered	Category A
5B Browns Road, Manurewa	Altered	Category A
33A Great South Road, Manurewa	Altered	Category A
1-2/1 Great South Road, Manurewa	Altered	Category A
51 Great South Road, Manurewa	Altered	Category A
4/45A Great South Road, Manurewa	Altered	Category A
1-2/93 Great South Road, Manurewa	Altered	Category A
3C Orams Road, Hillpark	Altered	Category A
2-4/47A Great South Road, Manurewa	Altered	Category A
3B Orams Road, Hillpark	Altered	Category A
76 Great South Road, Manurewa	Altered	Category A
43D Great South Road, Manurewa	Altered	Category A

1/55A Great South Road, Manurewa	Altered	Category A
1/84A Great South Road, Manurewa	Altered	Category A
3/137 Maich Road, Manurewa	Altered	Category A
26 Tampin Road, Hillpark	Altered	Category A
5/3A Grande Vue Road, Hillpark	Altered	Category A
69E Great South Road, Manurewa	Altered	Category A
1/94 Great South Road, Manurewa	Altered	Category A
1/3 Halsey Road, Manurewa	Altered	Category A
18 Brouder Place, Hillpark	Altered	Category A
2/1 Halsey Road, Manurewa	Altered	Category A
2/49A Great South Road, Manurewa	Altered	Category A
41B Great South Road, Manurewa	Altered	Category A
1/1 Halsey Road, Manurewa	Altered	Category A
71B Great South Road, Manurewa	Altered	Category A
22 Tampin Road, Hillpark	Altered	Category A
43E Great South Road, Manurewa	Altered	Category A
5A Grande Vue Road, Hillpark	Altered	Category A
1-2/3 Great South Road, Manurewa	Altered	Category A
59A Great South Road, Manurewa	Altered	Category A
4 Sime Road, Hillpark	Altered	Category A
30 Tampin Road, Hillpark	Altered	Category A
2/55A Great South Road, Manurewa	Altered	Category A
2/25A Great South Road, Manurewa	Altered	Category A
3A Orams Road, Hillpark	Altered	Category A
1/5 Halsey Road, Manurewa	Altered	Category A
4B Halsey Road, Manurewa	Altered	Category A
71C Great South Road, Manurewa	Altered	Category A
2/53A Great South Road, Manurewa	Altered	Category A
2/3 Halsey Road, Manurewa	Altered	Category A
12 Brouder Place, Hillpark	Altered	Category A
8 Halsey Road, Manurewa	Altered	Category A
80 Great South Road, Manurewa	Altered	Category A
3/84C Great South Road, Manurewa	Altered	Category A
71A Great South Road, Manurewa	Altered	Category A
3 Sime Road, Hillpark	Altered	Category A
4C Halsey Road, Manurewa	Altered	Category A
2/87 Great South Road, Manurewa	Altered	Category A
27A Great South Road, Manurewa	Altered	Category A

91 Great South Road, Manurewa	Altered	Category A
2/41A Great South Road, Manurewa	Altered	Category A
1-4/4A Browns Road, Manurewa	Altered	Category A
92 Great South Road, Manurewa	Altered	Category A
3/5 Halsey Road, Manurewa	Altered	Category A
141B Maich Road, Manurewa	Altered	Category A
4 Browns Road, Manurewa	Altered	Category A
3/145 Maich Road, Manurewa	Altered	Category A
8 Orams Road, Hillpark	Altered	Category A
141A Maich Road, Manurewa	Altered	Category A
81A Great South Road, Manurewa	Altered	Category A
2/5 Halsey Road, Manurewa	Altered	Category A
3D Orams Road, Hillpark	Altered	Category A
1/84 Great South Road, Manurewa	Altered	Category A
2/6 Halsey Road, Manurewa	Altered	Category A
9 Grande Vue Road, Hillpark	Altered	Category A
1/89 Great South Road, Manurewa	Altered	Category A
3 Orams Road, Hillpark	Altered	Category A
1-2/7 Halsey Road, Manurewa	Altered	Category A
2/8 Halsey Road, Manurewa	Altered	Category A
3/87 Great South Road, Manurewa	Altered	Category A
2/89 Great South Road, Manurewa	Altered	Category A
1/75 Maich Road, Manurewa	Altered	Category A
5 Orams Road, Hillpark	Altered	Category A
3/89 Great South Road, Manurewa	Altered	Category A
4/87 Great South Road, Manurewa	Altered	Category A
92B Great South Road, Manurewa	Altered	Category A
1-2/3 Costar Place, Wiri	Altered	Category A
3/7 Halsey Road, Manurewa	Altered	Category A
1-3/6 Browns Road, Manurewa	Altered	Category A
85 Great South Road, Manurewa	Altered	Category A
2/94 Great South Road, Manurewa	Altered	Category A
3/90 Great South Road, Manurewa	Altered	Category A
1/91A Great South Road, Manurewa	Altered	Category A
2/91A Great South Road, Manurewa	Altered	Category A
94A Great South Road, Manurewa	Altered	Category A
4 Great South Road, Manurewa	Altered	Category A
8A Orams Road, Hillpark	Altered	Category A

96A Great South Road, Manurewa	Altered	Category A
NoR 1-C		
Address	New or Altered Road	Noise Criteria Category
315 Great South Road, Manurewa	Altered	Category B
313 Great South Road, Manurewa	Altered	Category B
307A Great South Road, Manurewa	Altered	Category B
1/305 Great South Road, Manurewa	Altered	Category A
301 Great South Road, Manurewa	Altered	Category A
1/299 Great South Road, Manurewa	Altered	Category A
1/297 Great South Road, Manurewa	Altered	Category A
307 Great South Road, Manurewa	Altered	Category A
1-3/295 Great South Road, Manurewa	Altered	Category A
1-3/293 Great South Road, Manurewa	Altered	Category A
1-2/291 Great South Road, Manurewa	Altered	Category A
2/305 Great South Road, Manurewa	Altered	Category A
289 Great South Road, Manurewa	Altered	Category A
1/301 Great South Road, Manurewa	Altered	Category A
313A Great South Road, Manurewa	Altered	Category A
122 Beaumonts Way, Manurewa	Altered	Category A
2/299 Great South Road, Manurewa	Altered	Category A
35B Ferguson Street, Manurewa East	Altered	Category A
114A Beaumonts Way, Manurewa	Altered	Category A
112 Beaumonts Way, Manurewa	Altered	Category A
33B Ferguson Street, Manurewa East	Altered	Category A
120 Beaumonts Way, Manurewa	Altered	Category A
118 Beaumonts Way, Manurewa	Altered	Category A
110 Beaumonts Way, Manurewa	Altered	Category A
114 Beaumonts Way, Manurewa	Altered	Category A
2/116 Beaumonts Way, Manurewa	Altered	Category A
108 Beaumonts Way, Manurewa	Altered	Category A
106 Beaumonts Way, Manurewa	Altered	Category A
2/297 Great South Road, Manurewa	Altered	Category A
1/116 Beaumonts Way, Manurewa	Altered	Category A
104 Beaumonts Way, Manurewa	Altered	Category A
102 Beaumonts Way, Manurewa	Altered	Category A
100 Beaumonts Way, Manurewa	Altered	Category A
2/98 Beaumonts Way, Manurewa	Altered	Category A

96A Beaumonts Way, Manurewa	Altered	Category A
1/98 Beaumonts Way, Manurewa	Altered	Category A
25 Ferguson Street, Manurewa East	Altered	Category A
96 Beaumonts Way, Manurewa	Altered	Category A
4/291 Great South Road, Manurewa	Altered	Category A
NoR 1-D		
Address	New or Altered Road	Noise Criteria Category
1-2/2 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category B
159 Great South Road, Takanini	Altered	Category A
160A Great South Road, Takanini	Altered	Category A
1 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category A
155 Great South Road, Takanini	Altered	Category A
157 Great South Road, Takanini	Altered	Category A
162 Great South Road, Takanini	Altered	Category A
4 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category A
8 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category A
2/6 Taka Street, Takanini	Altered	Category A
3 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category A
3-4/6 Taka Street, Takanini	Altered	Category A
1/6 Taka Street, Takanini	Altered	Category A
1-2/10 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category A
1/10 Taka Street, Takanini	Altered	Category A
9 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category A
144 Great South Road, Takanini	Altered	Category A
5-6/7 Maru Road, Takanini	Altered	Category A
1-2/6 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category A
144B Great South Road, Takanini	Altered	Category A
1-4/5 Maru Road, Takanini	Altered	Category A
1-2/5 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category A
5-6/9 Maru Road, Takanini	Altered	Category A
1-2/12 Taka Street, Takanini	Altered	Category A
9-11 Taka Street, Takanini	Altered	Category A

11 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category A
12 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category A
144A Great South Road, Takanini	Altered	Category A
5-6/6 Taka Street, Takanini	Altered	Category A
3 Maru Road, Takanini	Altered	Category A
11A Maru Road, Takanini	Altered	Category A
7-8/6 Taka Street, Takanini	Altered	Category A
3-4/7 Maru Road, Takanini	Altered	Category A
1-2/27 Waimana Road, Conifer Grove, Takanini	Altered	Category A
7 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category A
1-2/7 Maru Road, Takanini	Altered	Category A
3-4/9 Maru Road, Takanini	Altered	Category A
1-2/25 Waimana Road, Conifer Grove, Takanini	Altered	Category A
3/10 Taka Street, Takanini	Altered	Category A
2/10 Taka Street, Takanini	Altered	Category A
7A Takanini Road, Takanini	Altered	Category A
3/12 Taka Street, Takanini	Altered	Category A
1/6 Maru Road, Takanini	Altered	Category A
2-3/6 Maru Road, Takanini	Altered	Category A
2/32 Waimana Road, Conifer Grove, Takanini	Altered	Category A
1/32 Waimana Road, Conifer Grove, Takanini	Altered	Category A
1 Kirrama Place, Conifer Grove, Takanini	Altered	Category A
1-2/13 Walter Strevens Drive, Conifer Grove, Takanini	Altered	Category A
8 Maru Road, Takanini	Altered	Category A
1/10 Maru Road, Takanini	Altered	Category A
9A Takanini Road, Takanini	Altered	Category A
144C Great South Road, Takanini	Altered	Category A
NoR 1-E		
Address	New or Altered Road	Noise Criteria Category
6-8 Coles Crescent, Papakura	Altered	Category A
1 Coles Crescent, Papakura	Altered	Category A
4/30 Coles Crescent, Papakura	Altered	Category A
6 Coles Crescent, Papakura	Altered	Category A
3/30 Coles Crescent, Papakura	Altered	Category A

26B Coles Crescent, Papakura	Altered	Category A
1-6/18 Coles Crescent, Papakura	Altered	Category A
4/32 Coles Crescent, Papakura	Altered	Category A
3/34 Coles Crescent, Papakura	Altered	Category A
3-3A Coles Crescent, Papakura	Altered	Category A
3/32 Coles Crescent, Papakura	Altered	Category A
11 Coles Crescent, Papakura	Altered	Category A
9 Coles Crescent, Papakura	Altered	Category A
7 Coles Crescent, Papakura	Altered	Category A
5-5A Coles Crescent, Papakura	Altered	Category A
63 Great South Road, Papakura	Altered	Category A
5B Coles Crescent, Papakura	Altered	Category A
3B Coles Crescent, Papakura	Altered	Category A
NoR 1-F		
Address	New or Altered Road	Noise Criteria Category
1 Opaheke Road, Papakura	Altered	Category A
1/327 Great South Road, Papakura	Altered	Category A
280A/B Great South Road, Papakura	Altered	Category A
1-3/3 Opaheke Road, Papakura	Altered	Category A
6/327 Great South Road, Papakura	Altered	Category A
284 Great South Road, Papakura	Altered	Category A
331 Great South Road, Papakura	Altered	Category A
4-5/3 Opaheke Road, Papakura	Altered	Category A
1/5 Opaheke Road, Papakura	Altered	Category A
2/327 Great South Road, Papakura	Altered	Category A
329 Great South Road, Papakura	Altered	Category A
14-27/52 East Street, Papakura	Altered	Category A
1/7 Opaheke Road, Papakura	Altered	Category A
1-13/52 East Street, Papakura	Altered	Category A
3/327 Great South Road, Papakura	Altered	Category A
51 Wood Street, Papakura	Altered	Category A
5/327 Great South Road, Papakura	Altered	Category A
329A Great South Road, Papakura	Altered	Category A
2/54 East Street, Papakura	Altered	Category A
331A Great South Road, Papakura	Altered	Category A
1-3/56 East Street, Papakura	Altered	Category A
1/54 East Street, Papakura	Altered	Category A

1/1 Nelson Street, Papakura	Altered	Category A
286 Great South Road, Papakura	Altered	Category A
1A Nelson Street, Papakura	Altered	Category A
2-3/5 Opaheke Road, Papakura	Altered	Category A
333 Great South Road, Papakura	Altered	Category A
2-3/7 Opaheke Road, Papakura	Altered	Category A
1-2/288 Great South Road, Papakura	Altered	Category A
NoR 1-G		
Address	New or Altered Road	Noise Criteria Category
1/332 Great South Road, Ōpaheke, Papakura	Altered	Category A
336 Great South Road, Ōpaheke, Papakura	Altered	Category A
357 Great South Road, Ōpaheke, Papakura	Altered	Category A
361 Great South Road, Ōpaheke, Papakura	Altered	Category A
1/326 Great South Road, Ōpaheke, Papakura	Altered	Category A
328 Great South Road, Ōpaheke, Papakura	Altered	Category A
320 Great South Road, Ōpaheke, Papakura	Altered	Category A
377 Great South Road, Ōpaheke, Papakura	Altered	Category A
1/359 Great South Road, Ōpaheke, Papakura	Altered	Category A
322A Great South Road, Ōpaheke, Papakura	Altered	Category A
334 Great South Road, Ōpaheke, Papakura	Altered	Category A
1/1 Manse Road, Pahurehure, Papakura	Altered	Category A
1 Butterworth Avenue, Ōpaheke, Papakura	Altered	Category A
2/326 Great South Road, Ōpaheke, Papakura	Altered	Category A
338 Great South Road, Ōpaheke, Papakura	Altered	Category A
330A Great South Road, Ōpaheke, Papakura	Altered	Category A
2/324 Great South Road, Ōpaheke, Papakura	Altered	Category A
2/3 Liverpool Street, Papakura	Altered	Category A
2/332 Great South Road, Ōpaheke, Papakura	Altered	Category A
18 McCall Place, Ōpaheke, Papakura	Altered	Category A
4 McCall Place, Ōpaheke, Papakura	Altered	Category A
4-4A Butterworth Avenue, Ōpaheke, Papakura	Altered	Category A
3 Butterworth Avenue, Ōpaheke, Papakura	Altered	Category A
1/3 Liverpool Street, Papakura	Altered	Category A
340 Great South Road, Ōpaheke, Papakura	Altered	Category A
5A Liverpool Street, Papakura	Altered	Category A
5 Beach Road, Pahurehure, Papakura	Altered	Category A
2/4 Beach Road, Pahurehure, Papakura	Altered	Category A

6 McCall Place, Ōpaheke, Papakura	Altered	Category A
2/1 Manse Road, Pahurehure, Papakura	Altered	Category A
4 Clark Road, Pahurehure, Papakura	Altered	Category A
1/4 Beach Road, Pahurehure, Papakura	Altered	Category A
7A Liverpool Street, Papakura	Altered	Category A
10 McCall Place, Ōpaheke, Papakura	Altered	Category A
12 McCall Place, Ōpaheke, Papakura	Altered	Category A
16 McCall Place, Ōpaheke, Papakura	Altered	Category A
8 McCall Place, Ōpaheke, Papakura	Altered	Category A
14 McCall Place, Ōpaheke, Papakura	Altered	Category A
7 Beach Road, Pahurehure, Papakura	Altered	Category A
5 Settlement Road, Papakura	Altered	Category A
2/359 Great South Road, Ōpaheke, Papakura	Altered	Category A
357A Great South Road, Ōpaheke, Papakura	Altered	Category A
2/355 Great South Road, Ōpaheke, Papakura	Altered	Category A
8B Beach Road, Pahurehure, Papakura	Altered	Category A
2/10 Beach Road, Pahurehure, Papakura	Altered	Category A
346A Great South Road, Ōpaheke, Papakura	Altered	Category A
6 Beach Road, Pahurehure, Papakura	Altered	Category A
2A Manse Road, Pahurehure, Papakura	Altered	Category A
6 Butterworth Avenue, Ōpaheke, Papakura	Altered	Category A
7A Butterworth Avenue, Ōpaheke, Papakura	Altered	Category A
8A Beach Road, Pahurehure, Papakura	Altered	Category A
2/9 Liverpool Street, Papakura	Altered	Category A
1/1 Clark Road, Pahurehure, Papakura	Altered	Category A
357B Great South Road, Ōpaheke, Papakura	Altered	Category A
2/6 Clark Road, Pahurehure, Papakura	Altered	Category A
3B Butterworth Avenue, Ōpaheke, Papakura	Altered	Category A
20 McCall Place, Ōpaheke, Papakura	Altered	Category A
2 Manse Road, Pahurehure, Papakura	Altered	Category A
5 Liverpool Street, Papakura	Altered	Category A
2/1 Clark Road, Pahurehure, Papakura	Altered	Category A
1-2/4 Liverpool Street, Papakura	Altered	Category A
9 Butterworth Avenue, Ōpaheke, Papakura	Altered	Category A
11A Liverpool Street, Papakura	Altered	Category A
15 McCall Place, Ōpaheke, Papakura	Altered	Category A
7 Liverpool Street, Papakura	Altered	Category A
1/1A Clark Road, Pahurehure, Papakura	Altered	Category A

6 Manse Road, Pahurehure, Papakura	Altered	Category A
4A Clark Road, Pahurehure, Papakura	Altered	Category A
7B Argyle Avenue, Pahurehure, Papakura	Altered	Category A
5 Argyle Avenue, Pahurehure, Papakura	Altered	Category A
1/9 Liverpool Street, Papakura	Altered	Category A
3A Butterworth Avenue, Ōpaheke, Papakura	Altered	Category A
4 Manse Road, Pahurehure, Papakura	Altered	Category A
11 Liverpool Street, Papakura	Altered	Category A
2/3 Clark Road, Pahurehure, Papakura	Altered	Category A
1/6 Clark Road, Pahurehure, Papakura	Altered	Category A
2/3 Argyle Avenue, Pahurehure, Papakura	Altered	Category A
346 Great South Road, Ōpaheke, Papakura	Altered	Category A
8 Butterworth Avenue, Ōpaheke, Papakura	Altered	Category A
2A South Street, Papakura	Altered	Category A
5A Argyle Avenue, Pahurehure, Papakura	Altered	Category A
7A Argyle Avenue, Pahurehure, Papakura	Altered	Category A
1/10 Beach Road, Pahurehure, Papakura	Altered	Category A
2 South Street, Papakura	Altered	Category A
342 Great South Road, Ōpaheke, Papakura	Altered	Category A
2/1A Clark Road, Pahurehure, Papakura	Altered	Category A
9 Manse Road, Pahurehure, Papakura	Altered	Category A
1/3 Argyle Avenue, Pahurehure, Papakura	Altered	Category A
1 Argyle Avenue, Pahurehure, Papakura	Altered	Category A
1/3 Clark Road, Pahurehure, Papakura	Altered	Category A
2/4 South Street, Papakura	Altered	Category A
NoR 1-H		
Address	New or Altered Road	Noise Criteria Category
466 Great South Road, Ōpaheke, Papakura	Altered	Category B
1/468 Great South Road, Ōpaheke, Papakura	Altered	Category B
1 Park Estate Road, Rosehill, Papakura	Altered	Category B
3-4/464 Great South Road, Ōpaheke, Papakura	Altered	Category B
1/2 Park Estate Road, Rosehill, Papakura	Altered	Category B
1-2/465 Great South Road, Ōpaheke, Papakura	Altered	Category A
2/469 Great South Road, Ōpaheke, Papakura	Altered	Category A
1-2/461 Great South Road, Ōpaheke, Papakura	Altered	Category A

463A/B Great South Road, Ōpaheke, Papakura	Altered	Category A
459 Great South Road, Ōpaheke, Papakura	Altered	Category A
469 Great South Road, Ōpaheke, Papakura	Altered	Category A
471 Great South Road, Ōpaheke, Papakura	Altered	Category A
1-2/462 Great South Road, Ōpaheke, Papakura	Altered	Category A
470 Great South Road, Ōpaheke, Papakura	Altered	Category A
453 Great South Road, Ōpaheke, Papakura	Altered	Category A
1-2/3 Park Estate Road, Rosehill, Papakura	Altered	Category A
1/450 Great South Road, Ōpaheke, Papakura	Altered	Category A
473 Great South Road, Ōpaheke, Papakura	Altered	Category A
452 Great South Road, Ōpaheke, Papakura	Altered	Category A
456 Great South Road, Ōpaheke, Papakura	Altered	Category A
1/458 Great South Road, Ōpaheke, Papakura	Altered	Category A
1/446 Great South Road, Ōpaheke, Papakura	Altered	Category A
1/454 Great South Road, Ōpaheke, Papakura	Altered	Category A
2/451 Great South Road, Ōpaheke, Papakura	Altered	Category A
1/444 Great South Road, Ōpaheke, Papakura	Altered	Category A
448 Great South Road, Ōpaheke, Papakura	Altered	Category A
2/2 Park Estate Road, Rosehill, Papakura	Altered	Category A
1 Parkhaven Drive, Rosehill, Papakura	Altered	Category A
5 Park Estate Road, Rosehill, Papakura	Altered	Category A
6 Park Estate Road, Rosehill, Papakura	Altered	Category A
1/442A Great South Road, Ōpaheke, Papakura	Altered	Category A
7 Park Estate Road, Rosehill, Papakura	Altered	Category A
1 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
4 Beverage Place, Rosehill, Papakura	Altered	Category A
2/446 Great South Road, Ōpaheke, Papakura	Altered	Category A
1 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
4 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
2 Beverage Place, Rosehill, Papakura	Altered	Category A
1/438 Great South Road, Ōpaheke, Papakura	Altered	Category A
2/468 Great South Road, Ōpaheke, Papakura	Altered	Category A
1/4 Park Estate Road, Rosehill, Papakura	Altered	Category A
440 Great South Road, Ōpaheke, Papakura	Altered	Category A
2/458 Great South Road, Ōpaheke, Papakura	Altered	Category A
1/436 Great South Road, Ōpaheke, Papakura	Altered	Category A

9 Park Estate Road, Rosehill, Papakura	Altered	Category A
28 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
2/450 Great South Road, Ōpaheke, Papakura	Altered	Category A
466A Great South Road, Ōpaheke, Papakura	Altered	Category A
8 Park Estate Road, Rosehill, Papakura	Altered	Category A
2/444 Great South Road, Ōpaheke, Papakura	Altered	Category A
2/454 Great South Road, Ōpaheke, Papakura	Altered	Category A
1-2/457 Great South Road, Ōpaheke, Papakura	Altered	Category A
3 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
452A Great South Road, Ōpaheke, Papakura	Altered	Category A
1/455 Great South Road, Ōpaheke, Papakura	Altered	Category A
4 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
11 Park Estate Road, Rosehill, Papakura	Altered	Category A
1-2/10 Park Estate Road, Rosehill, Papakura	Altered	Category A
20 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
26 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
14 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
2/442A Great South Road, Ōpaheke, Papakura	Altered	Category A
6 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
3 Parkhaven Drive, Rosehill, Papakura	Altered	Category A
8 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
5 Parkhaven Drive, Rosehill, Papakura	Altered	Category A
12 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
5 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
3 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
24 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
13 Park Estate Road, Rosehill, Papakura	Altered	Category A
2/455 Great South Road, Ōpaheke, Papakura	Altered	Category A
2/4 Park Estate Road, Rosehill, Papakura	Altered	Category A
37 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
6 Beverage Place, Rosehill, Papakura	Altered	Category A
6 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
7 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
22 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
10 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
442 Great South Road, Ōpaheke, Papakura	Altered	Category A
8 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A

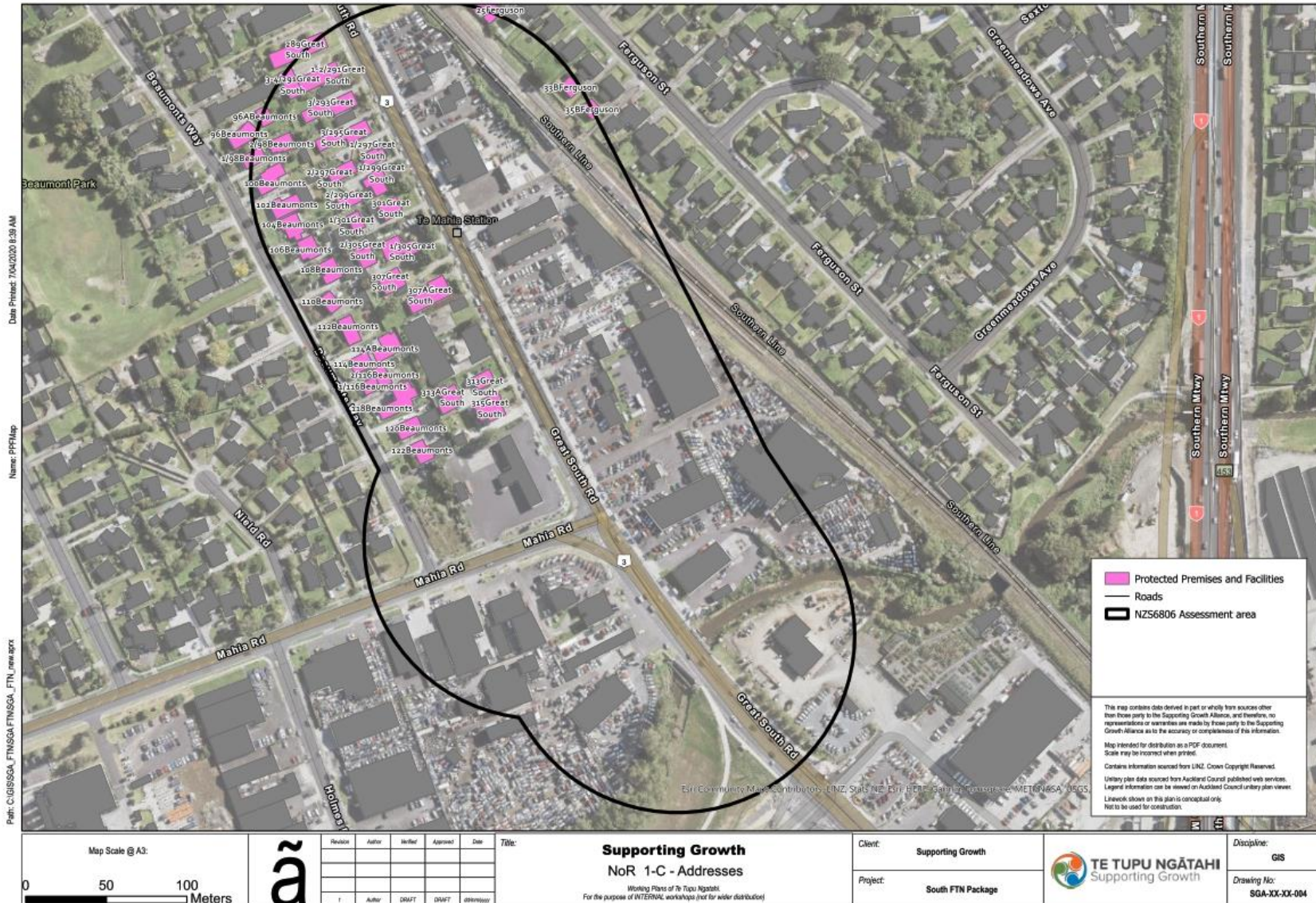
10 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
2/12 Park Estate Road, Rosehill, Papakura	Altered	Category A
1 Beverage Place, Rosehill, Papakura	Altered	Category A
7 Parkhaven Drive, Rosehill, Papakura	Altered	Category A
13 Parkhaven Drive, Rosehill, Papakura	Altered	Category A
12 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
35 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
1/12 Park Estate Road, Rosehill, Papakura	Altered	Category A
35A Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
16 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
5 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
7 Magnolia Avenue, Ōpaheke, Papakura	Altered	Category A
440B Great South Road, Ōpaheke, Papakura	Altered	Category A
26 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
14 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
24 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
445A Great South Road, Ōpaheke, Papakura	Altered	Category A
2/438 Great South Road, Ōpaheke, Papakura	Altered	Category A
9 Parkhaven Drive, Rosehill, Papakura	Altered	Category A
447 Great South Road, Ōpaheke, Papakura	Altered	Category A
15 Parkhaven Drive, Rosehill, Papakura	Altered	Category A
2/436 Great South Road, Ōpaheke, Papakura	Altered	Category A
18 Coulthard Terrace, Ōpaheke, Papakura	Altered	Category A
2/445 Great South Road, Ōpaheke, Papakura	Altered	Category A
434 Great South Road, Ōpaheke, Papakura	Altered	Category A
NoR 1 Slippery Creek Bridge		
Address	New or Altered Road	Noise Criteria Category
134 Great South Road, Drury	Altered	Category A
595 Great South Road, Rosehill, Papakura	Altered	Category A
593 Great South Road, Rosehill, Papakura	Altered	Category A
589E Great South Road, Rosehill, Papakura	Altered	Category A
589B Great South Road, Rosehill, Papakura	Altered	Category A
136 Great South Road, Drury	Altered	Category A
591 Great South Road, Rosehill, Papakura	Altered	Category A
600 Great South Road, Rosehill, Papakura	Altered	Category A
589A Great South Road, Rosehill, Papakura	Altered	Category A
134A Great South Road, Drury	Altered	Category A

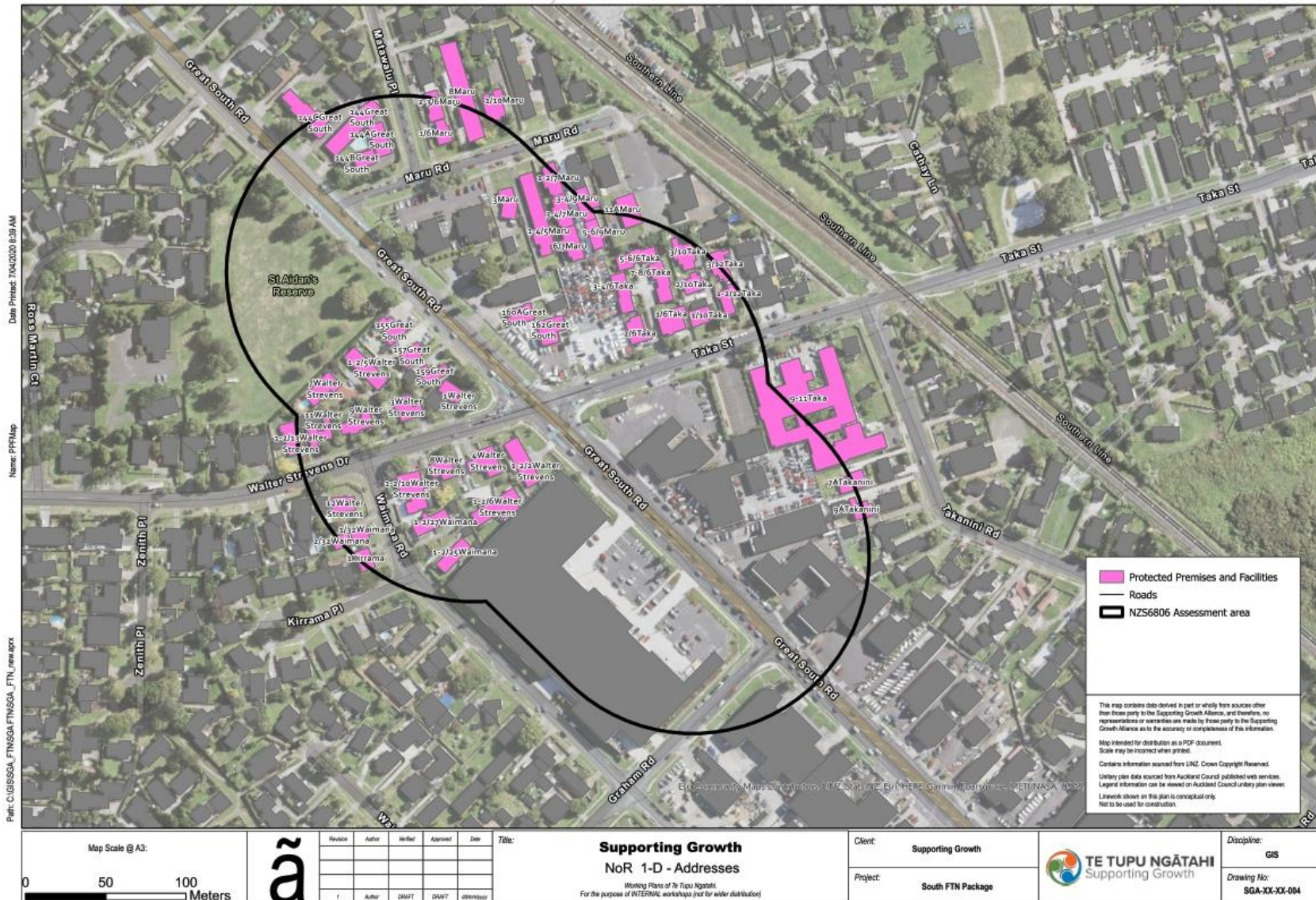
138A Great South Road, Drury	Altered	Category A
589 Great South Road, Rosehill, Papakura	Altered	Category A
597 Great South Road, Rosehill, Papakura	Altered	Category A
585 Great South Road, Rosehill, Papakura	Altered	Category A
136A Great South Road, Drury	Altered	Category A
587 Great South Road, Rosehill, Papakura	Altered	Category A
147 Great South Road, Drury	Altered	Category A
1/2 Miro Street, Drury	Altered	Category A
149 Great South Road, Drury	Altered	Category A
2/2 Miro Street, Drury	Altered	Category A
136B Great South Road, Drury	Altered	Category A
589D Great South Road, Rosehill, Papakura	Altered	Category A
1/140 Great South Road, Drury	Altered	Category A
138C Great South Road, Drury	Altered	Category A
589C Great South Road, Rosehill, Papakura	Altered	Category A
3/140 Great South Road, Drury	Altered	Category A
30 Kilmacrennan Drive, Rosehill, Papakura	Altered	Category A
28 Kilmacrennan Drive, Rosehill, Papakura	Altered	Category A
2/140 Great South Road, Drury	Altered	Category A
138B Great South Road, Drury	Altered	Category A
4 Miro Street, Drury	Altered	Category A
26 Kilmacrennan Drive, Rosehill, Papakura	Altered	Category A
1-2/6 Miro Street, Drury	Altered	Category A

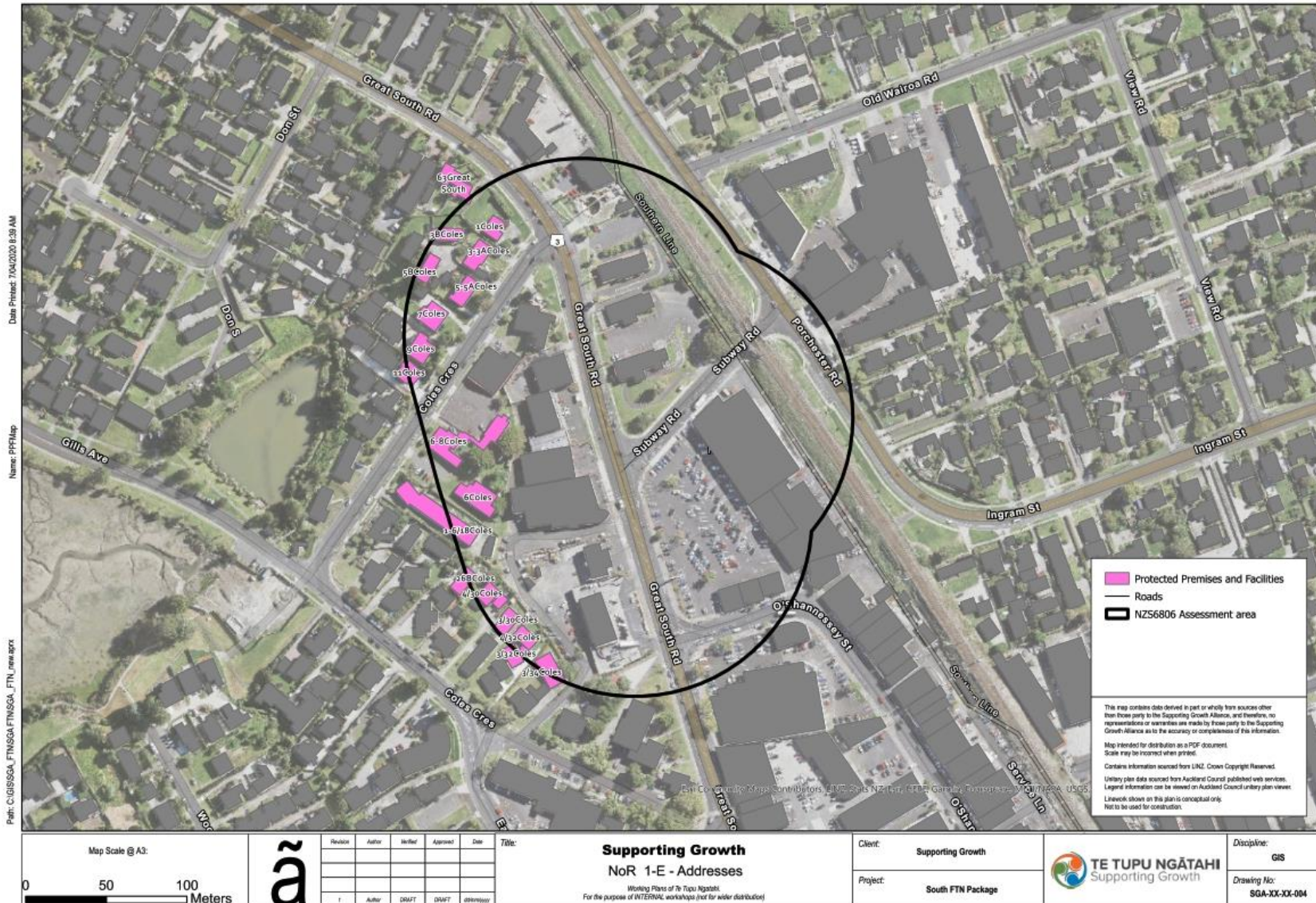
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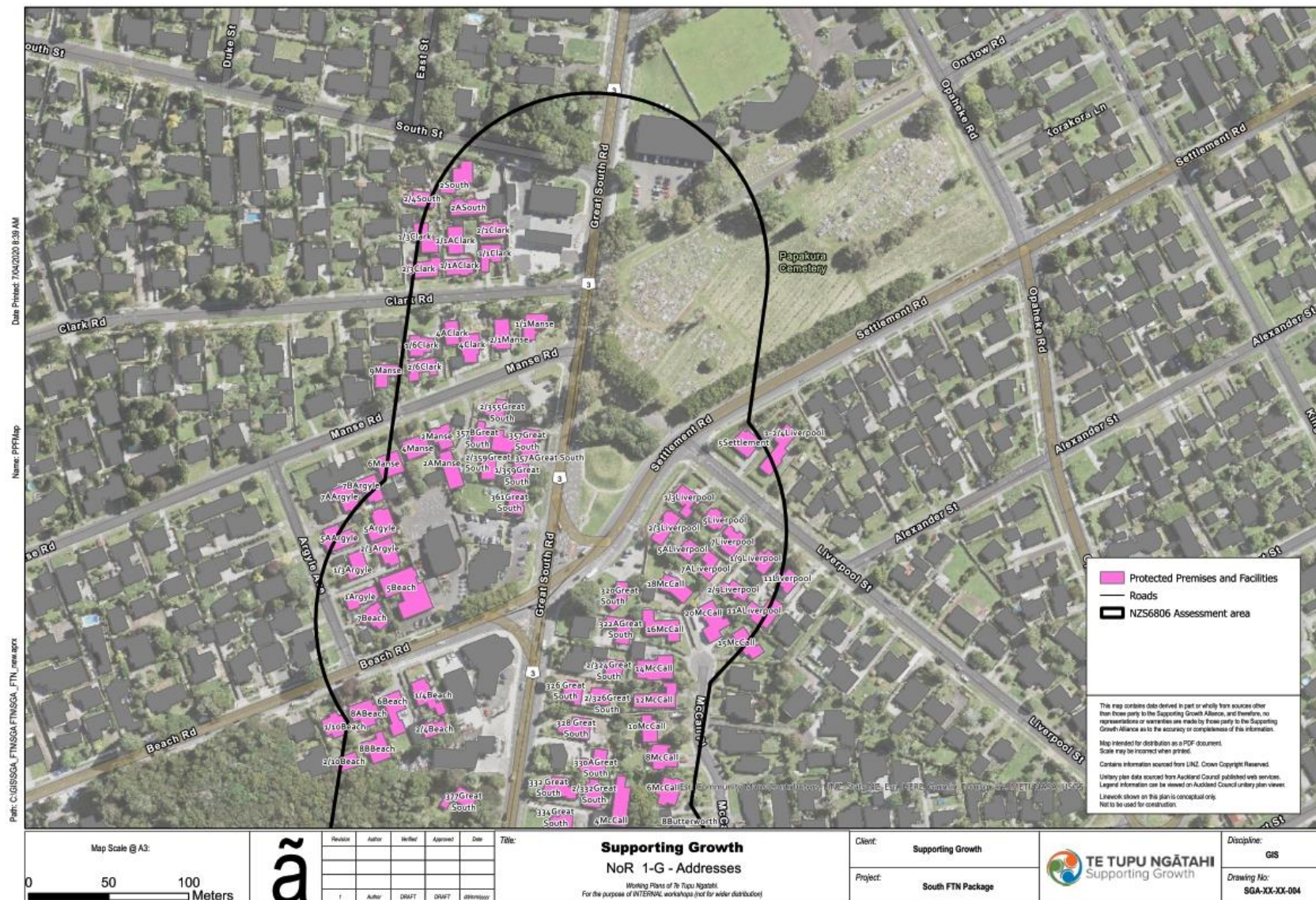


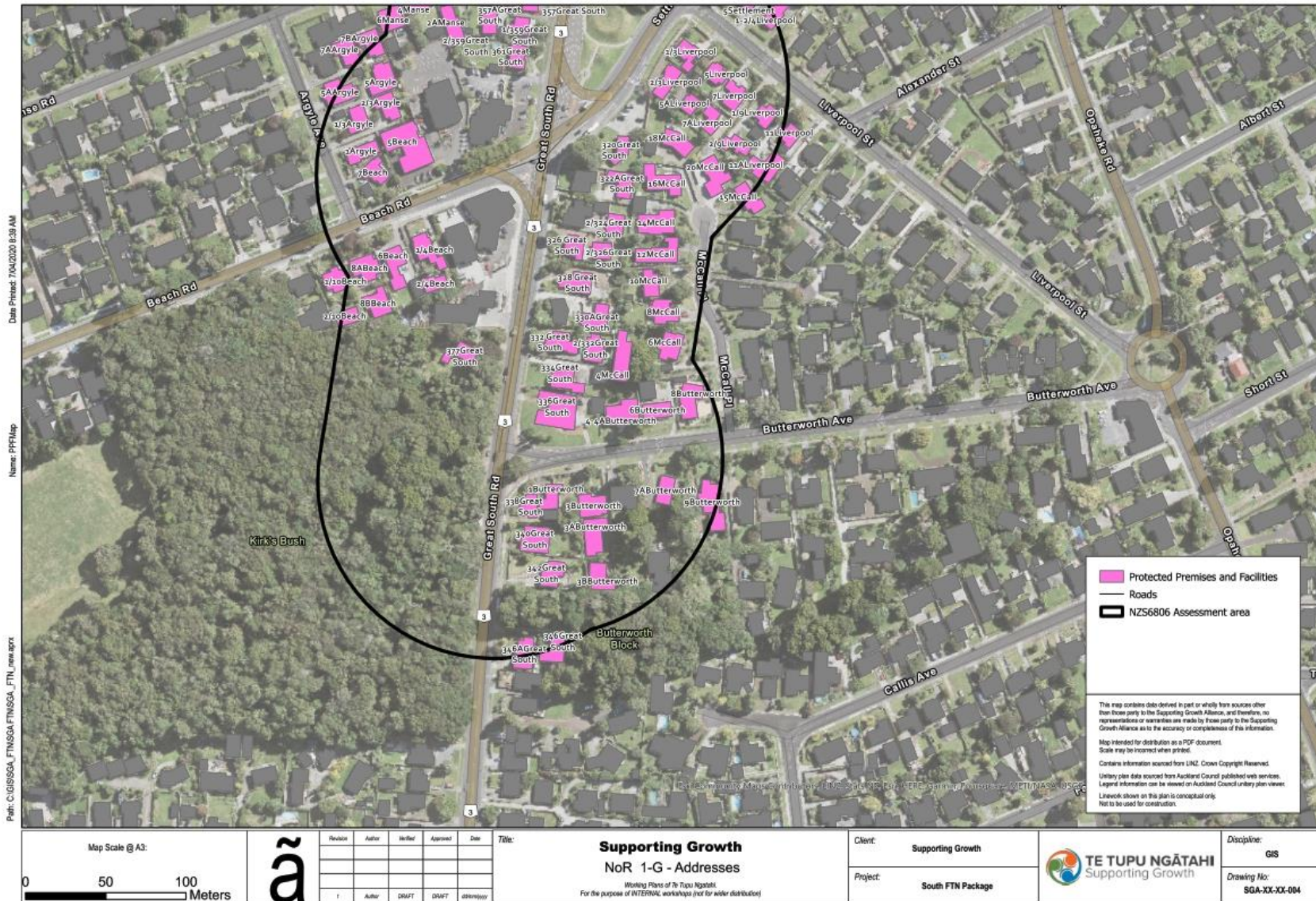




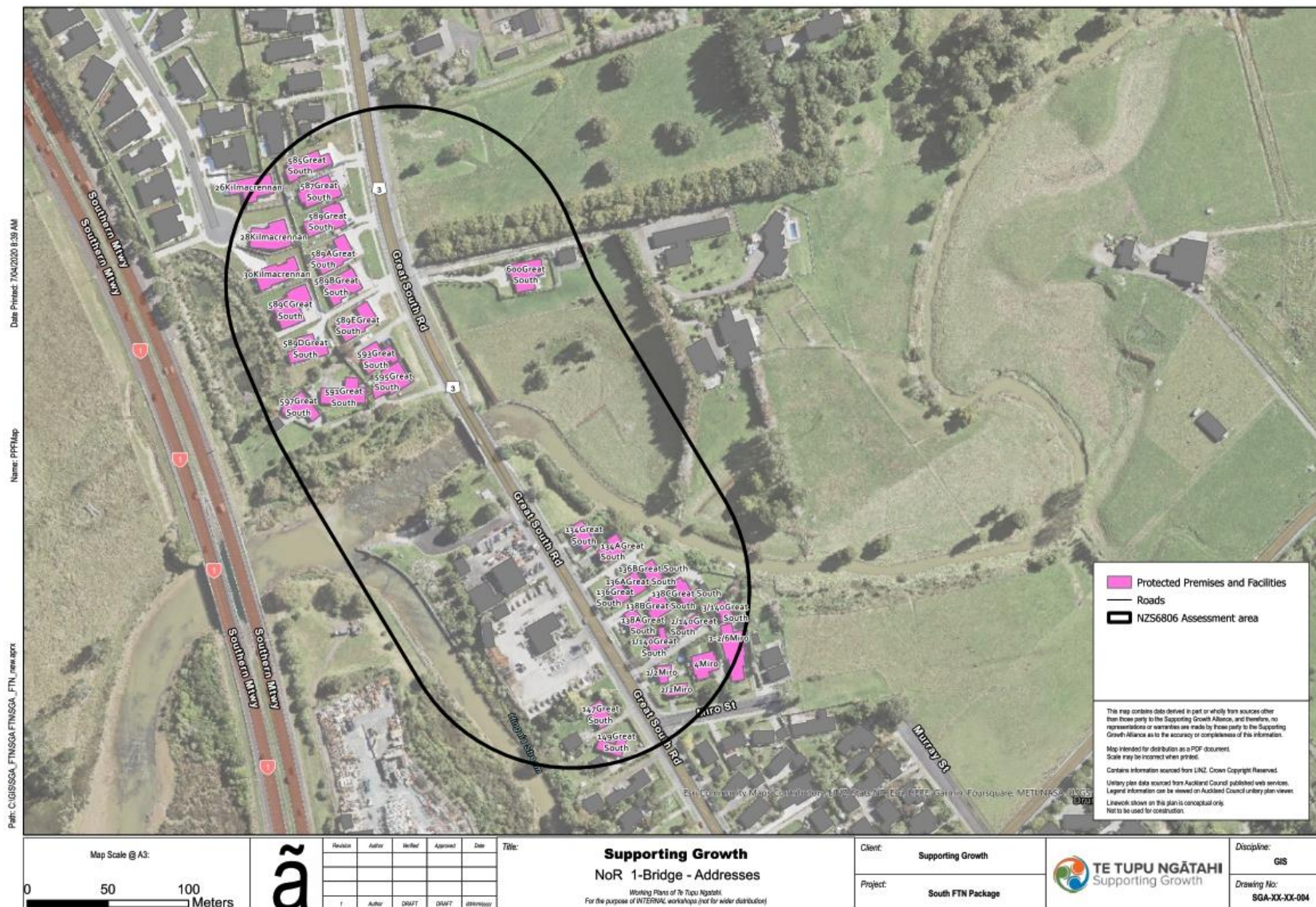












NoR 2

Address	New or Altered Road	Noise Criteria Category
108 Flanagan Road, Drury	Altered	Category A
64 Flanagan Road, Drury	Altered	Category A
32 Flanagan Road, Drury	Altered	Category A
36 Flanagan Road, Drury	Altered	Category A
28 Flanagan Road, Drury	Altered	Category A
24 Flanagan Road, Drury	Altered	Category A
22 Flanagan Road, Drury	Altered	Category A
20 Flanagan Road, Drury	Altered	Category A
37 Waihoehoe Road, Drury	Altered	Category A
8 Flanagan Road, Drury	Altered	Category A
35 Waihoehoe Road, Drury	Altered	Category A
16 Flanagan Road, Drury	Altered	Category A
31 Waihoehoe Road, Drury	Altered	Category A
4 Flanagan Road, Drury	Altered	Category A
16 Waihoehoe Road, Drury	Altered	Category A
18 Waihoehoe Road, Drury	Altered	Category A
18A Waihoehoe Road, Drury	Altered	Category A
18B Waihoehoe Road, Drury	Altered	Category A

NoR 2 PPF Location Plans:





NoR 3

Address	New or Altered Road	Noise Criteria Category
250 Great South Road, Manurewa	Altered	Category C
250A Great South Road, Manurewa	Altered	Category C
1/254 Great South Road, Manurewa	Altered	Category B
1/256 Great South Road, Manurewa	Altered	Category B
1-3/245 Great South Road, Manurewa	Altered	Category B
240 Great South Road, Manurewa	Altered	Category B
1/124 Alfriston Road, Manurewa	Altered	Category B
137 Alfriston Road, Manurewa	Altered	Category B
116 Alfriston Road, Manurewa	Altered	Category B
1/28 Alfriston Road, Manurewa East	Altered	Category B
131A Alfriston Road, Manurewa	Altered	Category B
128 Alfriston Road, Manurewa	Altered	Category B
1/72 Alfriston Road, Manurewa East	Altered	Category B
246 Great South Road, Manurewa	Altered	Category B
122A Alfriston Road, Manurewa	Altered	Category B
1/66 Alfriston Road, Manurewa East	Altered	Category B
2/26 Alfriston Road, Manurewa East	Altered	Category B
217 Great South Road, Manurewa	Altered	Category B
215 Great South Road, Manurewa	Altered	Category B
112 Alfriston Road, Manurewa	Altered	Category B
22 Weymouth Road, Manurewa	Altered	Category B
219 Great South Road, Manurewa	Altered	Category B
130 Alfriston Road, Manurewa	Altered	Category B
106 Alfriston Road, Manurewa	Altered	Category B
1/252 Great South Road, Manurewa	Altered	Category B
1/20 Weymouth Road, Manurewa	Altered	Category B
2A-C Fleming Street, Manurewa East	Altered	Category B
100 Alfriston Road, Manurewa	Altered	Category B
143 Alfriston Road, Manurewa	Altered	Category B
1-3/78 Alfriston Road, Manurewa East	Altered	Category B
135 Alfriston Road, Manurewa	Altered	Category B
141B Alfriston Road, Manurewa	Altered	Category B
1/24 Weymouth Road, Manurewa	Altered	Category B
141E Alfriston Road, Manurewa	Altered	Category B
20A Alfriston Road, Manurewa East	Altered	Category B
141C Alfriston Road, Manurewa	Altered	Category B

Address	New or Altered Road	Noise Criteria Category
221 Great South Road, Manurewa	Altered	Category B
49 Alfriston Road, Manurewa East	Altered	Category B
45 Alfriston Road, Manurewa East	Altered	Category B
2/32 Alfriston Road, Manurewa East	Altered	Category B
141D Alfriston Road, Manurewa	Altered	Category B
60 Claude Road, Manurewa East	Altered	Category A
1/24 Alfriston Road, Manurewa East	Altered	Category A
1/57 Alfriston Road, Manurewa East	Altered	Category A
1/15 Alfriston Road, Manurewa East	Altered	Category A
16 Alfriston Road, Manurewa East	Altered	Category A
141F Alfriston Road, Manurewa	Altered	Category A
233 Great South Road, Manurewa	Altered	Category A
26 Weymouth Road, Manurewa	Altered	Category A
80 Alfriston Road, Manurewa East	Altered	Category A
122H Alfriston Road, Manurewa	Altered	Category A
68 Alfriston Road, Manurewa East	Altered	Category A
42A Alfriston Road, Manurewa East	Altered	Category A
49 Claude Road, Hillpark	Altered	Category A
2/110 Alfriston Road, Manurewa	Altered	Category A
40A Alfriston Road, Manurewa East	Altered	Category A
22/110 Alfriston Road, Manurewa	Altered	Category A
139 Alfriston Road, Manurewa	Altered	Category A
1/258 Great South Road, Manurewa	Altered	Category A
1-8/261 Great South Road, Manurewa	Altered	Category A
34 Alfriston Road, Manurewa East	Altered	Category A
229 Great South Road, Manurewa	Altered	Category A
18A Weymouth Road, Manurewa	Altered	Category A
133 Alfriston Road, Manurewa	Altered	Category A
260 Great South Road, Manurewa	Altered	Category A
1/55 Alfriston Road, Manurewa East	Altered	Category A
64 Alfriston Road, Manurewa East	Altered	Category A
36 Alfriston Road, Manurewa East	Altered	Category A
120 Alfriston Road, Manurewa	Altered	Category A
1/262 Great South Road, Manurewa	Altered	Category A
47 Alfriston Road, Manurewa East	Altered	Category A
1/63 Alfriston Road, Manurewa East	Altered	Category A
129 Alfriston Road, Manurewa	Altered	Category A
1/71 Alfriston Road, Manurewa East	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
132 Alfriston Road, Manurewa	Altered	Category A
52A Alfriston Road, Manurewa East	Altered	Category A
30B Alfriston Road, Manurewa East	Altered	Category A
38A Alfriston Road, Manurewa East	Altered	Category A
5/15 Alfriston Road, Manurewa East	Altered	Category A
65 Alfriston Road, Manurewa East	Altered	Category A
61 Alfriston Road, Manurewa East	Altered	Category A
52 Alfriston Road, Manurewa East	Altered	Category A
62 Alfriston Road, Manurewa East	Altered	Category A
25A Alfriston Road, Manurewa East	Altered	Category A
223 Great South Road, Manurewa	Altered	Category A
2/84 Alfriston Road, Manurewa East	Altered	Category A
143A Alfriston Road, Manurewa	Altered	Category A
60A Alfriston Road, Manurewa East	Altered	Category A
1A Scotts Road, Manurewa East	Altered	Category A
70A Alfriston Road, Manurewa East	Altered	Category A
2/79 Alfriston Road, Manurewa East	Altered	Category A
39 Alfriston Road, Manurewa East	Altered	Category A
27A Alfriston Road, Manurewa East	Altered	Category A
56 Claude Road, Hillpark	Altered	Category A
2/72 Alfriston Road, Manurewa East	Altered	Category A
235 Great South Road, Manurewa	Altered	Category A
59B Alfriston Road, Manurewa East	Altered	Category A
37 Alfriston Road, Manurewa East	Altered	Category A
1 Scotts Road, Manurewa East	Altered	Category A
33 Alfriston Road, Manurewa East	Altered	Category A
67 Alfriston Road, Manurewa East	Altered	Category A
134 Alfriston Road, Manurewa	Altered	Category A
2/86 Alfriston Road, Manurewa East	Altered	Category A
1/51 Alfriston Road, Manurewa East	Altered	Category A
2/243 Great South Road, Manurewa	Altered	Category A
41 Alfriston Road, Manurewa East	Altered	Category A
1/240 Great South Road, Manurewa	Altered	Category A
237A Great South Road, Manurewa	Altered	Category A
266 Great South Road, Manurewa	Altered	Category A
2/19 Alfriston Road, Manurewa East	Altered	Category A
2/241 Great South Road, Manurewa	Altered	Category A
259 Great South Road, Manurewa	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
1-2/54 Claude Road, Hillpark	Altered	Category A
2/71 Alfriston Road, Manurewa East	Altered	Category A
2-3/66 Alfriston Road, Manurewa East	Altered	Category A
92A Alfriston Road, Manurewa	Altered	Category A
2/15 Alfriston Road, Manurewa East	Altered	Category A
263 Great South Road, Manurewa	Altered	Category A
47 Claude Road, Hillpark	Altered	Category A
11 Alfriston Road, Manurewa East	Altered	Category A
45 Claude Road, Hillpark	Altered	Category A
88 Alfriston Road, Manurewa East	Altered	Category A
268A Great South Road, Manurewa	Altered	Category A
2/28 Alfriston Road, Manurewa East	Altered	Category A
2/124 Alfriston Road, Manurewa	Altered	Category A
1/26 Alfriston Road, Manurewa East	Altered	Category A
2 Beaumonts Way, Manurewa	Altered	Category A
3-7/72 Alfriston Road, Manurewa East	Altered	Category A
2 Saralee Drive, Manurewa	Altered	Category A
102 Alfriston Road, Manurewa	Altered	Category A
2/24 Alfriston Road, Manurewa East	Altered	Category A
5 Scotts Road, Manurewa East	Altered	Category A
8F Scotts Road, Manurewa East	Altered	Category A
29 Index Place, Manurewa	Altered	Category A
265 Great South Road, Manurewa	Altered	Category A
88 Magic Way, Randwick Park	Altered	Category A
8 Weymouth Road, Manurewa	Altered	Category A
3/243 Great South Road, Manurewa	Altered	Category A
3/32 Alfriston Road, Manurewa East	Altered	Category A
1/18A Weymouth Road, Manurewa	Altered	Category A
2/249 Great South Road, Manurewa	Altered	Category A
22A Saralee Drive, Manurewa	Altered	Category A
1 Beaumonts Way, Manurewa	Altered	Category A
21A/B Selwyn Road, Manurewa	Altered	Category A
8 Scotts Road, Manurewa East	Altered	Category A
20B Alfriston Road, Manurewa East	Altered	Category A
1/16 McAnnalley Street, Manurewa East	Altered	Category A
143B Alfriston Road, Manurewa	Altered	Category A
2/251 Great South Road, Manurewa	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
17 Selwyn Road, Manurewa	Altered	Category A
122G Alfriston Road, Manurewa	Altered	Category A
3/81 Alfriston Road, Manurewa East	Altered	Category A
122B Alfriston Road, Manurewa	Altered	Category A
2 Brough Road, Manurewa East	Altered	Category A
143D Alfriston Road, Manurewa	Altered	Category A
48 Beaumonts Way, Manurewa	Altered	Category A
90A Alfriston Road, Manurewa East	Altered	Category A
1/21 Weymouth Road, Manurewa	Altered	Category A
1/2 Woodside Road, Manurewa	Altered	Category A
23B Weymouth Road, Manurewa	Altered	Category A
2/18A Weymouth Road, Manurewa	Altered	Category A
2/256 Great South Road, Manurewa	Altered	Category A
116A Alfriston Road, Manurewa	Altered	Category A
59 Magic Way, Randwick Park	Altered	Category A
4 Beaumonts Way, Manurewa	Altered	Category A
1/13 Selwyn Road, Manurewa	Altered	Category A
25B Alfriston Road, Manurewa East	Altered	Category A
3 Scotts Road, Manurewa East	Altered	Category A
32 Skelton Avenue, Randwick Park	Altered	Category A
8-9/72 Alfriston Road, Manurewa East	Altered	Category A
46 Beaumonts Way, Manurewa	Altered	Category A
6 Skelton Avenue, Randwick Park	Altered	Category A
213 Great South Road, Manurewa	Altered	Category A
54 Beaumonts Way, Manurewa	Altered	Category A
4/81 Alfriston Road, Manurewa East	Altered	Category A
3/28 Alfriston Road, Manurewa East	Altered	Category A
52 Beaumonts Way, Manurewa	Altered	Category A
31 Index Place, Manurewa	Altered	Category A
252B Great South Road, Manurewa	Altered	Category A
35A Alfriston Road, Manurewa East	Altered	Category A
2/21 Weymouth Road, Manurewa	Altered	Category A
3 Beaumonts Way, Manurewa	Altered	Category A
50 Beaumonts Way, Manurewa	Altered	Category A
2/239 Great South Road, Manurewa	Altered	Category A
3/110 Alfriston Road, Manurewa	Altered	Category A
2/2 Woodside Road, Manurewa	Altered	Category A
2-3/254 Great South Road, Manurewa	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
2/51 Alfriston Road, Manurewa East	Altered	Category A
7 Scotts Road, Manurewa East	Altered	Category A
4/110 Alfriston Road, Manurewa	Altered	Category A
3 Brough Road, Manurewa East	Altered	Category A
2/258 Great South Road, Manurewa	Altered	Category A
2/1A Woodside Road, Manurewa	Altered	Category A
1/239 Great South Road, Manurewa	Altered	Category A
17A Selwyn Road, Manurewa	Altered	Category A
5 Beaumonts Way, Manurewa	Altered	Category A
3/24 Alfriston Road, Manurewa East	Altered	Category A
16 McAnnalley Street, Manurewa East	Altered	Category A
5/81 Alfriston Road, Manurewa East	Altered	Category A
2/262 Great South Road, Manurewa	Altered	Category A
1-2/219A Great South Road, Manurewa	Altered	Category A
94 Alfriston Road, Manurewa	Altered	Category A
4/15 Alfriston Road, Manurewa East	Altered	Category A
1/124A Alfriston Road, Manurewa	Altered	Category A
52 Claude Road, Hillpark	Altered	Category A
3/241 Great South Road, Manurewa	Altered	Category A
4/28 Alfriston Road, Manurewa East	Altered	Category A
21/110 Alfriston Road, Manurewa	Altered	Category A
2/20 Weymouth Road, Manurewa	Altered	Category A
1 Brough Road, Manurewa East	Altered	Category A
2/55 Alfriston Road, Manurewa East	Altered	Category A
4/243 Great South Road, Manurewa	Altered	Category A
4/32 Alfriston Road, Manurewa East	Altered	Category A
4/239 Great South Road, Manurewa	Altered	Category A
8E Scotts Road, Manurewa East	Altered	Category A
1-2/32 Weymouth Road, Manurewa	Altered	Category A
56 Alfriston Road, Manurewa East	Altered	Category A
131 Alfriston Road, Manurewa	Altered	Category A
6A Skelton Avenue, Randwick Park	Altered	Category A
3/19 Alfriston Road, Manurewa East	Altered	Category A
22 Saralee Drive, Manurewa	Altered	Category A
10-13/72 Alfriston Road, Manurewa East	Altered	Category A
28-30 Weymouth Road, Manurewa	Altered	Category A
4 Woodside Road, Manurewa	Altered	Category A
7 Brough Road, Manurewa East	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
57 Magic Way, Randwick Park	Altered	Category A
1/14A Alfriston Road, Manurewa East	Altered	Category A
5/110 Alfriston Road, Manurewa	Altered	Category A
35 Alfriston Road, Manurewa East	Altered	Category A
4 Brough Road, Manurewa East	Altered	Category A
61C Alfriston Road, Manurewa East	Altered	Category A
122F Alfriston Road, Manurewa	Altered	Category A
1 Woodside Road, Manurewa	Altered	Category A
94A Alfriston Road, Manurewa	Altered	Category A
1/52 Claude Road, Hillpark	Altered	Category A
4/54 Claude Road, Hillpark	Altered	Category A
27B Alfriston Road, Manurewa East	Altered	Category A
3B Woodside Road, Manurewa	Altered	Category A
4/20 Weymouth Road, Manurewa	Altered	Category A
18A Saralee Drive, Manurewa	Altered	Category A
3/239 Great South Road, Manurewa	Altered	Category A
48 Claude Road, Hillpark	Altered	Category A
1/39 Claude Road, Hillpark	Altered	Category A
3/15 Alfriston Road, Manurewa East	Altered	Category A
33 Index Place, Manurewa	Altered	Category A
8D Scotts Road, Manurewa East	Altered	Category A
21 Alfriston Road, Manurewa East	Altered	Category A
5A Woodside Road, Manurewa	Altered	Category A
60B Alfriston Road, Manurewa East	Altered	Category A
3 Shifnal Drive, Randwick Park	Altered	Category A
2/124A Alfriston Road, Manurewa	Altered	Category A
6/110 Alfriston Road, Manurewa	Altered	Category A
11 Selwyn Road, Manurewa	Altered	Category A
1A Beaumonts Way, Manurewa	Altered	Category A
1-5/7 Woodside Road, Manurewa	Altered	Category A
5A Scotts Road, Manurewa East	Altered	Category A
3/20 Weymouth Road, Manurewa	Altered	Category A
56B Claude Road, Hillpark	Altered	Category A
18 McAnnalley Street, Manurewa East	Altered	Category A
30A Saralee Drive, Manurewa	Altered	Category A
5/54 Claude Road, Hillpark	Altered	Category A
45A Alfriston Road, Manurewa East	Altered	Category A
2/41 Alfriston Road, Manurewa East	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
2/24 Weymouth Road, Manurewa	Altered	Category A
1/9 Scotts Road, Manurewa East	Altered	Category A
86 Magic Way, Randwick Park	Altered	Category A
5 Brough Road, Manurewa East	Altered	Category A
30C/D Alfriston Road, Manurewa East	Altered	Category A
1/39 Alfriston Road, Manurewa East	Altered	Category A
1/6 Woodside Road, Manurewa	Altered	Category A
4/24 Alfriston Road, Manurewa East	Altered	Category A
1/1A Woodside Road, Manurewa	Altered	Category A
14-17/72 Alfriston Road, Manurewa East	Altered	Category A
30 Skelton Avenue, Randwick Park	Altered	Category A
2/57 Alfriston Road, Manurewa East	Altered	Category A
59A Alfriston Road, Manurewa East	Altered	Category A
46A Claude Road, Hillpark	Altered	Category A
22 Skelton Avenue, Randwick Park	Altered	Category A
3/51 Alfriston Road, Manurewa East	Altered	Category A
3/262 Great South Road, Manurewa	Altered	Category A
70C Alfriston Road, Manurewa East	Altered	Category A
20/110 Alfriston Road, Manurewa	Altered	Category A
33A Alfriston Road, Manurewa East	Altered	Category A
4/6 Woodside Road, Manurewa	Altered	Category A
98 Alfriston Road, Manurewa	Altered	Category A
54A Alfriston Road, Manurewa East	Altered	Category A
2-3/63 Alfriston Road, Manurewa East	Altered	Category A
59 Alfriston Road, Manurewa East	Altered	Category A
3/256 Great South Road, Manurewa	Altered	Category A
5/32 Alfriston Road, Manurewa East	Altered	Category A
1/5 Woodside Road, Manurewa	Altered	Category A
4/262 Great South Road, Manurewa	Altered	Category A
1/35 Claude Road, Hillpark	Altered	Category A
96 Alfriston Road, Manurewa	Altered	Category A
5 Shifnal Drive, Randwick Park	Altered	Category A
2/1 Scotts Road, Manurewa East	Altered	Category A
6 Brough Road, Manurewa East	Altered	Category A
3/252 Great South Road, Manurewa	Altered	Category A
8 Rogers Road, Manurewa	Altered	Category A
4 Skelton Avenue, Randwick Park	Altered	Category A
122C Alfriston Road, Manurewa	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
6-8/7 Woodside Road, Manurewa	Altered	Category A
143C Alfriston Road, Manurewa	Altered	Category A
70D Alfriston Road, Manurewa East	Altered	Category A
66 Saralee Drive, Manurewa	Altered	Category A
43 Claude Road, Hillpark	Altered	Category A
45A Claude Road, Hillpark	Altered	Category A
56A Claude Road, Hillpark	Altered	Category A
6 Sonterra Close, Randwick Park	Altered	Category A
2 Villino Place, Randwick Park	Altered	Category A
1/12 Skelton Avenue, Randwick Park	Altered	Category A
26A/B Hyde Street, Manurewa East	Altered	Category A
6 Hyde Street, Manurewa East	Altered	Category A
41 Claude Road, Hillpark	Altered	Category A
1-3/5 Beaumonts Way, Manurewa	Altered	Category A
1/62A Alfriston Road, Manurewa East	Altered	Category A
34 Saralee Drive, Manurewa	Altered	Category A
114A Alfriston Road, Manurewa	Altered	Category A
7 McAnnalley Street, Manurewa East	Altered	Category A
24 Hyde Street, Manurewa East	Altered	Category A
30 Saralee Drive, Manurewa	Altered	Category A
4 Sonterra Close, Randwick Park	Altered	Category A
35 Index Place, Manurewa	Altered	Category A
1/68A Alfriston Road, Manurewa East	Altered	Category A
122E Alfriston Road, Manurewa	Altered	Category A
3 Woodside Road, Manurewa	Altered	Category A
6 Camberley Court, Manurewa East	Altered	Category A
3/21 Weymouth Road, Manurewa	Altered	Category A
52 Saralee Drive, Manurewa	Altered	Category A
3/258 Great South Road, Manurewa	Altered	Category A
4 Rogers Road, Manurewa	Altered	Category A
8B Scotts Road, Manurewa East	Altered	Category A
2 Hyde Street, Manurewa East	Altered	Category A
3/6 Woodside Road, Manurewa	Altered	Category A
2/14A Alfriston Road, Manurewa East	Altered	Category A
1 Rogers Road, Manurewa	Altered	Category A
8C Scotts Road, Manurewa East	Altered	Category A
70B Alfriston Road, Manurewa East	Altered	Category A
18 Saralee Drive, Manurewa	Altered	Category A

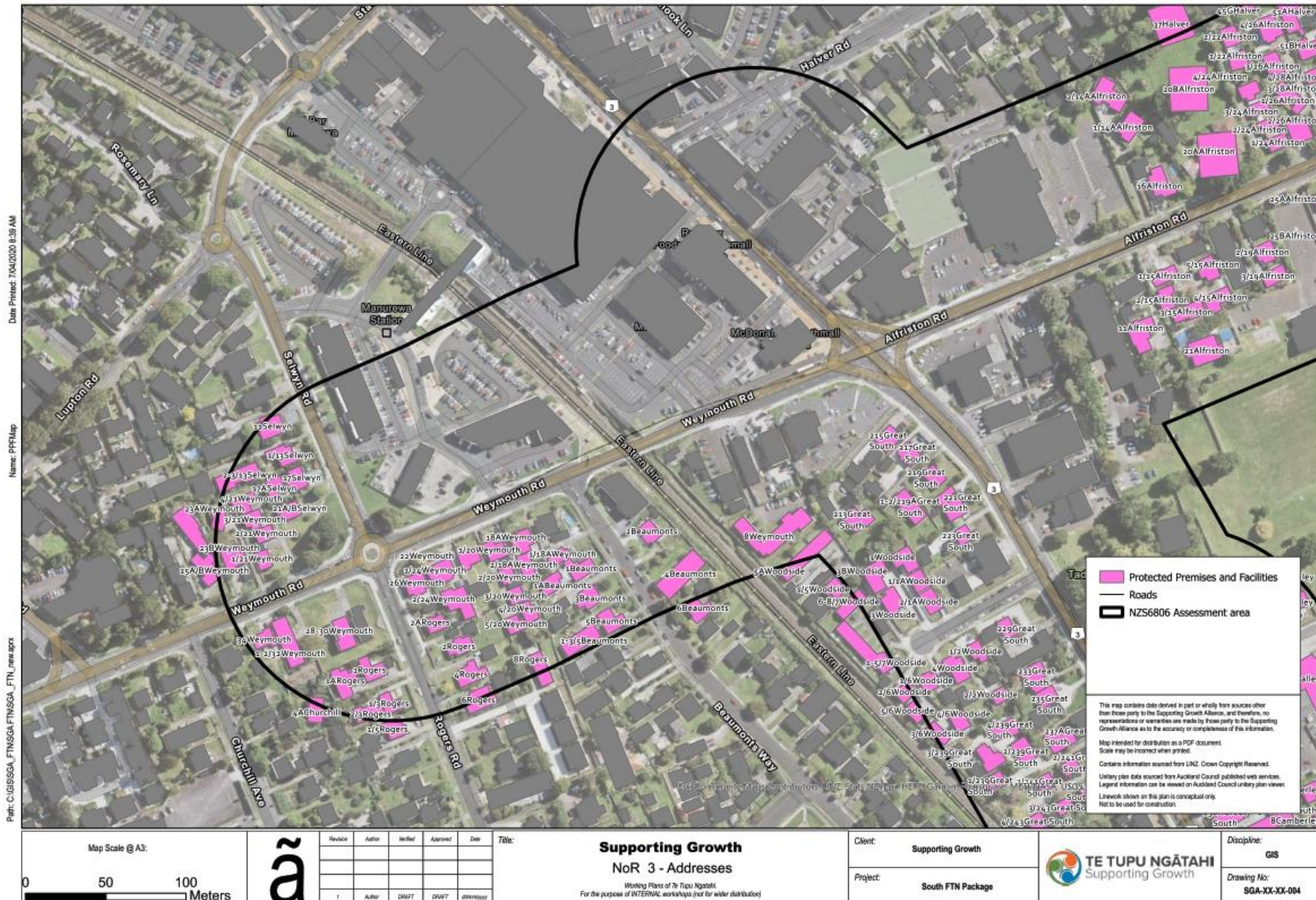
Address	New or Altered Road	Noise Criteria Category
2/10 Scotts Road, Manurewa East	Altered	Category A
22 McAnnalley Street, Manurewa East	Altered	Category A
114 Alfriston Road, Manurewa	Altered	Category A
1 Fleming Street, Manurewa East	Altered	Category A
2/68A Alfriston Road, Manurewa East	Altered	Category A
65A Alfriston Road, Manurewa East	Altered	Category A
20 McAnnalley Street, Manurewa East	Altered	Category A
10 Scotts Road, Manurewa East	Altered	Category A
36 Skelton Avenue, Randwick Park	Altered	Category A
20A Lincoln Road, Manurewa East	Altered	Category A
18 Hyde Street, Manurewa East	Altered	Category A
20 Hyde Street, Manurewa East	Altered	Category A
6 Beaumonts Way, Manurewa	Altered	Category A
5/6 Woodside Road, Manurewa	Altered	Category A
32A Alfriston Road, Manurewa East	Altered	Category A
19/110 Alfriston Road, Manurewa	Altered	Category A
24A McAnnalley Street, Manurewa East	Altered	Category A
8A Scotts Road, Manurewa East	Altered	Category A
2/12 Skelton Avenue, Randwick Park	Altered	Category A
10A Lincoln Road, Manurewa East	Altered	Category A
9 Shifnal Drive, Randwick Park	Altered	Category A
61A Alfriston Road, Manurewa East	Altered	Category A
20 Lincoln Road, Manurewa East	Altered	Category A
4-5/66 Alfriston Road, Manurewa East	Altered	Category A
3 Fleming Street, Manurewa East	Altered	Category A
2 Skelton Avenue, Randwick Park	Altered	Category A
4/9 Scotts Road, Manurewa East	Altered	Category A
16 Hyde Street, Manurewa East	Altered	Category A
24 Skelton Avenue, Randwick Park	Altered	Category A
2A Rogers Road, Manurewa	Altered	Category A
61B Alfriston Road, Manurewa East	Altered	Category A
2 Sonterra Close, Randwick Park	Altered	Category A
3/9 Scotts Road, Manurewa East	Altered	Category A
18 Lincoln Road, Manurewa East	Altered	Category A
12 Sonterra Close, Randwick Park	Altered	Category A
1/10 Scotts Road, Manurewa East	Altered	Category A
53B Halver Road, Hillpark	Altered	Category A
2 Rogers Road, Manurewa	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
37 Claude Road, Hillpark	Altered	Category A
50 Claude Road, Hillpark	Altered	Category A
3/54 Claude Road, Hillpark	Altered	Category A
51B Halver Road, Hillpark	Altered	Category A
10 Sonterra Close, Randwick Park	Altered	Category A
34 Skelton Avenue, Randwick Park	Altered	Category A
18/110 Alfriston Road, Manurewa	Altered	Category A
10 Lincoln Road, Manurewa East	Altered	Category A
24 McAnnalley Street, Manurewa East	Altered	Category A
2/62A Alfriston Road, Manurewa East	Altered	Category A
5/20 Weymouth Road, Manurewa	Altered	Category A
50 Saralee Drive, Manurewa	Altered	Category A
20 Skelton Avenue, Randwick Park	Altered	Category A
3 Sonterra Close, Randwick Park	Altered	Category A
8 Sonterra Close, Randwick Park	Altered	Category A
3A Fleming Street, Manurewa East	Altered	Category A
122D Alfriston Road, Manurewa	Altered	Category A
2/6 Woodside Road, Manurewa	Altered	Category A
12 Saralee Drive, Manurewa	Altered	Category A
2/39 Claude Road, Hillpark	Altered	Category A
10 Hyde Street, Manurewa East	Altered	Category A
37 Halver Road, Hillpark	Altered	Category A
34A Alfriston Road, Manurewa East	Altered	Category A
7 Camberley Court, Manurewa East	Altered	Category A
14A Saralee Drive, Manurewa	Altered	Category A
4/26 Alfriston Road, Manurewa East	Altered	Category A
1/22 Alfriston Road, Manurewa East	Altered	Category A
8 Hyde Street, Manurewa East	Altered	Category A
22 Hyde Street, Manurewa East	Altered	Category A
1 Sonterra Close, Randwick Park	Altered	Category A
13 Scotts Road, Manurewa East	Altered	Category A
12 Hyde Street, Manurewa East	Altered	Category A
8 Camberley Court, Manurewa East	Altered	Category A
64 Saralee Drive, Manurewa	Altered	Category A
5 Camberley Court, Manurewa East	Altered	Category A
14 Hyde Street, Manurewa East	Altered	Category A
1/3 Rogers Road, Manurewa	Altered	Category A
4 Camberley Court, Manurewa East	Altered	Category A

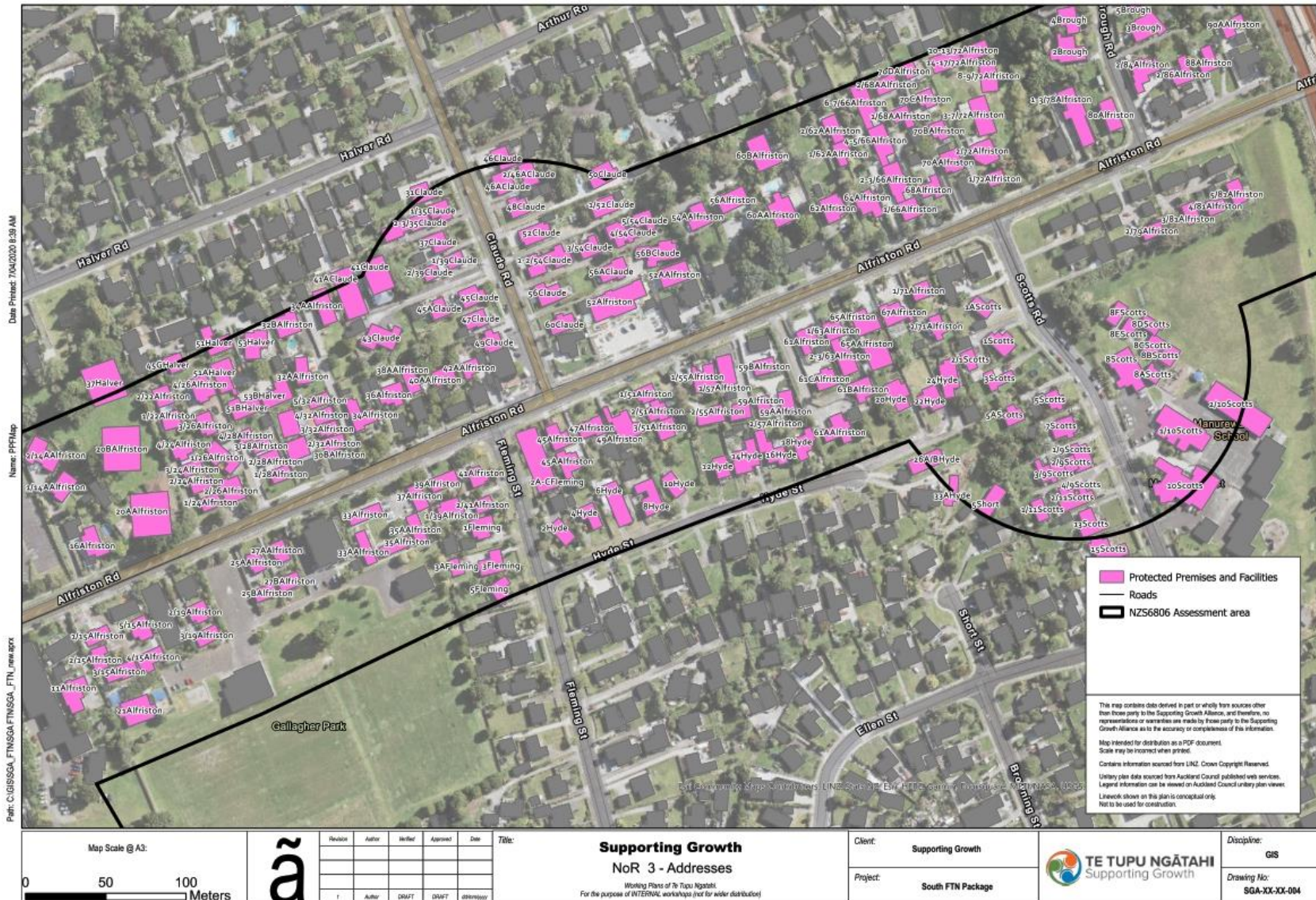
Address	New or Altered Road	Noise Criteria Category
32B Alfriston Road, Manurewa East	Altered	Category A
264A/B Great South Road, Manurewa	Altered	Category A
6-7/66 Alfriston Road, Manurewa East	Altered	Category A
5 Sonterra Close, Randwick Park	Altered	Category A
4 Hyde Street, Manurewa East	Altered	Category A
53 Halver Road, Hillpark	Altered	Category A
2/11 Scotts Road, Manurewa East	Altered	Category A
5 Fleming Street, Manurewa East	Altered	Category A
3/26 Alfriston Road, Manurewa East	Altered	Category A
28 Skelton Avenue, Randwick Park	Altered	Category A
10 Skelton Avenue, Randwick Park	Altered	Category A
41A Claude Road, Hillpark	Altered	Category A
268B Great South Road, Manurewa	Altered	Category A
14 Saralee Drive, Manurewa	Altered	Category A
8 Skelton Avenue, Randwick Park	Altered	Category A
18 Skelton Avenue, Randwick Park	Altered	Category A
7 Sonterra Close, Randwick Park	Altered	Category A
26 Skelton Avenue, Randwick Park	Altered	Category A
1/11 Scotts Road, Manurewa East	Altered	Category A
4/21 Weymouth Road, Manurewa	Altered	Category A
1A Rogers Road, Manurewa	Altered	Category A
264 Great South Road, Manurewa	Altered	Category A
36 Saralee Drive, Manurewa	Altered	Category A
33A Hyde Street, Manurewa East	Altered	Category A
6 Rogers Road, Manurewa	Altered	Category A
16 Skelton Avenue, Randwick Park	Altered	Category A
2-3/35 Claude Road, Hillpark	Altered	Category A
31 Claude Road, Hillpark	Altered	Category A
2-3/13 Selwyn Road, Manurewa	Altered	Category A
2/46A Claude Road, Hillpark	Altered	Category A
270 Great South Road, Manurewa	Altered	Category A
46 Claude Road, Hillpark	Altered	Category A
51A Halver Road, Hillpark	Altered	Category A
272 Great South Road, Manurewa	Altered	Category A
2/22 Alfriston Road, Manurewa East	Altered	Category A
14 Sonterra Close, Randwick Park	Altered	Category A
10 Saralee Drive, Manurewa	Altered	Category A
2/9 Scotts Road, Manurewa East	Altered	Category A

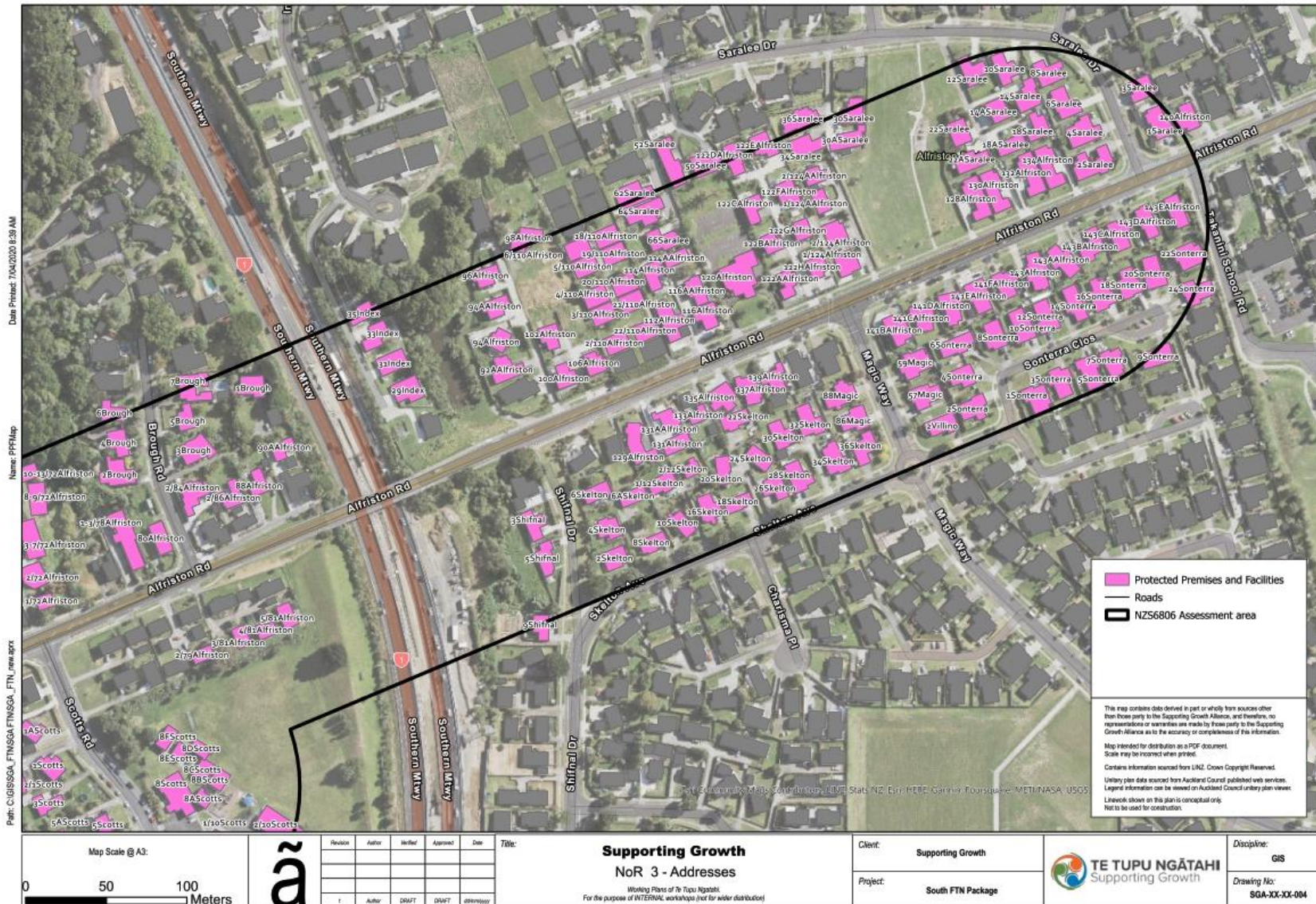
Address	New or Altered Road	Noise Criteria Category
1 Saralee Drive, Manurewa	Altered	Category A
4 Saralee Drive, Manurewa	Altered	Category A
51 Halver Road, Hillpark	Altered	Category A
8D Lincoln Road, Manurewa East	Altered	Category A
2/3 Rogers Road, Manurewa	Altered	Category A
5 Short Street, Manurewa East	Altered	Category A
13 McAnnalley Street, Manurewa East	Altered	Category A
6 Saralee Drive, Manurewa	Altered	Category A
9 Sonterra Close, Randwick Park	Altered	Category A
45G Halver Road, Manurewa East	Altered	Category A
34 Weymouth Road, Manurewa	Altered	Category A
1/5 Rogers Road, Manurewa	Altered	Category A
23A Weymouth Road, Manurewa	Altered	Category A
16 Sonterra Close, Randwick Park	Altered	Category A
24 Sonterra Close, Randwick Park	Altered	Category A
8 Saralee Drive, Manurewa	Altered	Category A
18 Sonterra Close, Randwick Park	Altered	Category A
20 Sonterra Close, Randwick Park	Altered	Category A
3 Saralee Drive, Manurewa	Altered	Category A
1-2/2 Myers Road, Manurewa East	Altered	Category A
22 Sonterra Close, Randwick Park	Altered	Category A
4A Churchill Avenue, Manurewa	Altered	Category A
62 Saralee Drive, Manurewa	Altered	Category A
15 Scotts Road, Manurewa East	Altered	Category A
140 Alfriston Road, Manurewa	Altered	Category A
143E Alfriston Road, Manurewa	Altered	Category A
25A/B Weymouth Road, Manurewa	Altered	Category A

NoR 3 PPF Location Plans:









NoR 4

Address	New or Altered Road	Noise Criteria Category
7 Giani Court, Manurewa	Altered	Category C
8 Giani Court, Manurewa	Altered	Category C
222 Alfriston Road, Manurewa	Altered	Category C
216 Alfriston Road, Manurewa	Altered	Category C
9-15 Whakarato Way, Takanini	Altered	Category C
224 Alfriston Road, Alfriston	Altered	Category C
214 Alfriston Road, Manurewa	Altered	Category C
7 Sarteano Drive, Manurewa	Altered	Category C
206 Alfriston Road, Manurewa	Altered	Category C
200 Alfriston Road, Manurewa	Altered	Category B
208 Alfriston Road, Manurewa	Altered	Category B
1/263 Porchester Road, Takanini	Altered	Category B
261 Porchester Road, Takanini	Altered	Category B
2 Berwyn Avenue, Takanini	Altered	Category B
295B Porchester Road, Takanini	Altered	Category B
234 Alfriston Road, Alfriston	Altered	Category B
31 Calumet Way, Takanini	Altered	Category B
1-2/299 Porchester Road, Takanini	Altered	Category B
5 Sarteano Drive, Manurewa	Altered	Category B
164A Porchester Road, Papakura	Altered	Category B
238 Alfriston Road, Alfriston	Altered	Category B
2 Bruce Pulman Drive, Takanini	Altered	Category B
526 Porchester Road, Randwick Park	Altered	Category B
446 Porchester Road, Randwick Park	Altered	Category B
17 Sheriff Place, Randwick Park	Altered	Category B
3 Sarteano Drive, Manurewa	Altered	Category B
506 Porchester Road, Randwick Park	Altered	Category B
49 Walters Road, Papakura	Altered	Category B
13 Sheriff Place, Randwick Park	Altered	Category B
1/480 Porchester Road, Randwick Park	Altered	Category B
448 Porchester Road, Randwick Park	Altered	Category B
15 Sheriff Place, Randwick Park	Altered	Category B
1/482 Porchester Road, Randwick Park	Altered	Category B
1/258 Porchester Road, Takanini	Altered	Category B
160 Manuroa Road, Takanini	Altered	Category B
3 Sheriff Place, Randwick Park	Altered	Category B

Address	New or Altered Road	Noise Criteria Category
1-2/286 Porchester Road, Takanini	Altered	Category B
3/286 Porchester Road, Takanini	Altered	Category B
33 Calumet Way, Takanini	Altered	Category B
11 Sheriff Place, Randwick Park	Altered	Category B
168 Porchester Road, Takanini	Altered	Category B
2 Ricardo Court, Manurewa	Altered	Category B
170 Porchester Road, Takanini	Altered	Category B
460 Porchester Road, Randwick Park	Altered	Category B
1 Sarteano Drive, Manurewa	Altered	Category B
472 Porchester Road, Randwick Park	Altered	Category B
2B Sheriff Place, Randwick Park	Altered	Category B
508 Porchester Road, Randwick Park	Altered	Category B
438 Porchester Road, Randwick Park	Altered	Category B
430 Porchester Road, Randwick Park	Altered	Category B
1/281 Porchester Road, Takanini	Altered	Category B
454 Porchester Road, Randwick Park	Altered	Category B
440 Porchester Road, Randwick Park	Altered	Category B
391 Porchester Road, Randwick Park	Altered	Category B
2 Sarteano Drive, Manurewa	Altered	Category B
114 Riverton Drive, Randwick Park	Altered	Category B
172 Porchester Road, Takanini	Altered	Category B
1/277 Porchester Road, Takanini	Altered	Category B
37 Calumet Way, Takanini	Altered	Category B
174 Porchester Road, Takanini	Altered	Category B
432 Porchester Road, Randwick Park	Altered	Category B
129 Riverton Drive, Randwick Park	Altered	Category B
1/474 Porchester Road, Randwick Park	Altered	Category B
49A Walters Road, Papakura	Altered	Category B
1/274 Porchester Road, Takanini	Altered	Category B
1 Sheriff Place, Randwick Park	Altered	Category B
273 Porchester Road, Takanini	Altered	Category B
1/160 Porchester Road, Papakura	Altered	Category B
39 Calumet Way, Takanini	Altered	Category B
494 Porchester Road, Randwick Park	Altered	Category B
56 Airfield Road, Takanini	Altered	Category B
305 Porchester Road, Takanini	Altered	Category B
2A Sheriff Place, Randwick Park	Altered	Category B
176 Porchester Road, Takanini	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
498 Porchester Road, Randwick Park	Altered	Category A
35 Calumet Way, Takanini	Altered	Category A
487 Porchester Road, Randwick Park	Altered	Category A
456 Porchester Road, Randwick Park	Altered	Category A
245 Porchester Road, Takanini	Altered	Category A
1-2/162 Porchester Road, Papakura	Altered	Category A
279 Porchester Road, Takanini	Altered	Category A
1/133 Manuroa Road, Takanini	Altered	Category A
158 Manuroa Road, Takanini	Altered	Category A
2 Sheriff Place, Randwick Park	Altered	Category A
182 Porchester Road, Takanini	Altered	Category A
180 Porchester Road, Takanini	Altered	Category A
178 Porchester Road, Takanini	Altered	Category A
141 Porchester Road, Papakura	Altered	Category A
70 Walters Road, Takanini	Altered	Category A
307-309 Porchester Road, Takanini	Altered	Category A
166A Porchester Road, Papakura	Altered	Category A
2-12 Whakarato Way, Takanini	Altered	Category A
51 Popes Road, Takanini	Altered	Category A
496 Porchester Road, Randwick Park	Altered	Category A
56A Airfield Road, Takanini	Altered	Category A
269 Porchester Road, Takanini	Altered	Category A
15A Phar Lap Crescent, Takanini	Altered	Category A
186 Porchester Road, Takanini	Altered	Category A
166B Porchester Road, Papakura	Altered	Category A
184 Porchester Road, Takanini	Altered	Category A
252A-D Porchester Road, Takanini	Altered	Category A
1-3/150 Porchester Road, Papakura	Altered	Category A
272 Porchester Road, Takanini	Altered	Category A
58 Airfield Road, Takanini	Altered	Category A
255 Porchester Road, Takanini	Altered	Category A
284 Porchester Road, Takanini	Altered	Category A
149 Porchester Road, Takanini	Altered	Category A
2/133 Manuroa Road, Takanini	Altered	Category A
271 Porchester Road, Takanini	Altered	Category A
15 Phar Lap Crescent, Takanini	Altered	Category A
257 Porchester Road, Takanini	Altered	Category A
301 Porchester Road, Takanini	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
423 Porchester Road, Randwick Park	Altered	Category A
267 Porchester Road, Takanini	Altered	Category A
4 Berwyn Avenue, Takanini	Altered	Category A
151 Porchester Road, Takanini	Altered	Category A
458 Porchester Road, Randwick Park	Altered	Category A
260 Porchester Road, Takanini	Altered	Category A
52 Popes Road, Takanini	Altered	Category A
1/268 Porchester Road, Takanini	Altered	Category A
270 Porchester Road, Takanini	Altered	Category A
297A Porchester Road, Takanini	Altered	Category A
145 Porchester Road, Takanini	Altered	Category A
266 Porchester Road, Takanini	Altered	Category A
135 Hyperion Drive, Randwick Park	Altered	Category A
155 Porchester Road, Takanini	Altered	Category A
70A Walters Road, Takanini	Altered	Category A
510 Porchester Road, Randwick Park	Altered	Category A
259 Porchester Road, Takanini	Altered	Category A
147 Porchester Road, Takanini	Altered	Category A
279E Porchester Road, Takanini	Altered	Category A
504 Porchester Road, Randwick Park	Altered	Category A
13 Zoe Court, Manurewa	Altered	Category A
188 Porchester Road, Takanini	Altered	Category A
333 Porchester Road, Takanini	Altered	Category A
511 Porchester Road, Randwick Park	Altered	Category A
2/460 Porchester Road, Randwick Park	Altered	Category A
131 Manuroa Road, Takanini	Altered	Category A
262 Porchester Road, Takanini	Altered	Category A
37 Walters Road, Takanini	Altered	Category A
139A Porchester Road, Papakura	Altered	Category A
157 Porchester Road, Takanini	Altered	Category A
226 Alfriston Road, Alfriston	Altered	Category A
60 Airfield Road, Takanini	Altered	Category A
503 Porchester Road, Randwick Park	Altered	Category A
153 Porchester Road, Takanini	Altered	Category A
1/256 Porchester Road, Takanini	Altered	Category A
35 Walters Road, Takanini	Altered	Category A
54 Airfield Road, Takanini	Altered	Category A
159 Porchester Road, Takanini	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
67 Stratford Road, Manurewa	Altered	Category A
158 Porchester Road, Papakura	Altered	Category A
1 Ricardo Court, Manurewa	Altered	Category A
11 Zoe Court, Manurewa	Altered	Category A
41 Walters Road, Takanini	Altered	Category A
484 Porchester Road, Randwick Park	Altered	Category A
39 Walters Road, Takanini	Altered	Category A
64A Popes Road, Takanini	Altered	Category A
1/460 Porchester Road, Randwick Park	Altered	Category A
190 Porchester Road, Takanini	Altered	Category A
2 Taipan Place, Randwick Park	Altered	Category A
52 Airfield Road, Takanini	Altered	Category A
156 Manuroa Road, Takanini	Altered	Category A
139 Porchester Road, Papakura	Altered	Category A
129 Manuroa Road, Takanini	Altered	Category A
7/460 Porchester Road, Randwick Park	Altered	Category A
3 Arion Road, Takanini	Altered	Category A
8A Berwyn Avenue, Takanini	Altered	Category A
49C Walters Road, Papakura	Altered	Category A
6 Berwyn Avenue, Takanini	Altered	Category A
4 Bruce Pulman Drive, Takanini	Altered	Category A
64 Airfield Road, Takanini	Altered	Category A
228 Alfriston Road, Alfriston	Altered	Category A
65A Stratford Road, Manurewa	Altered	Category A
112 Riverton Drive, Randwick Park	Altered	Category A
2/550S Porchester Road, Randwick Park	Altered	Category A
1/2 Glenburn Place, Papakura	Altered	Category A
463-471 Porchester Road, Randwick Park	Altered	Category A
3 Sires Parkway, Takanini	Altered	Category A
3/460 Porchester Road, Randwick Park	Altered	Category A
133A Manuroa Road, Takanini	Altered	Category A
295C Porchester Road, Takanini	Altered	Category A
33 Walters Road, Takanini	Altered	Category A
13 Phar Lap Crescent, Takanini	Altered	Category A
250A-E Porchester Road, Takanini	Altered	Category A
4 Sarteano Drive, Manurewa	Altered	Category A
154 Manuroa Road, Takanini	Altered	Category A
2/482 Porchester Road, Randwick Park	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
29 Calumet Way, Takanini	Altered	Category A
156A Manuroa Road, Takanini	Altered	Category A
17 Phar Lap Crescent, Takanini	Altered	Category A
2A Popes Road, Takanini	Altered	Category A
236 Alfriston Road, Alfriston	Altered	Category A
311 Porchester Road, Takanini	Altered	Category A
479 Porchester Road, Randwick Park	Altered	Category A
18 Amarillo Place, Manurewa	Altered	Category A
28-34 Biplane Street, Takanini	Altered	Category A
164B Porchester Road, Papakura	Altered	Category A
28 Amarillo Place, Manurewa	Altered	Category A
2C Sheriff Place, Randwick Park	Altered	Category A
1 Giani Court, Manurewa	Altered	Category A
5 Giani Court, Manurewa	Altered	Category A
8 Berwyn Avenue, Takanini	Altered	Category A
127 Riverton Drive, Randwick Park	Altered	Category A
26 Amarillo Place, Manurewa	Altered	Category A
6 Giani Court, Manurewa	Altered	Category A
1A Berwyn Avenue, Takanini	Altered	Category A
438A Porchester Road, Randwick Park	Altered	Category A
1/490 Porchester Road, Randwick Park	Altered	Category A
170 Alfriston Road, Manurewa	Altered	Category A
127 Manuroa Road, Takanini	Altered	Category A
289 Porchester Road, Takanini	Altered	Category A
210 Alfriston Road, Manurewa	Altered	Category A
66 Airfield Road, Takanini	Altered	Category A
2/263 Porchester Road, Takanini	Altered	Category A
1 Senator Drive, Manurewa	Altered	Category A
152 Manuroa Road, Takanini	Altered	Category A
125A-F Manuroa Road, Takanini	Altered	Category A
192 Porchester Road, Takanini	Altered	Category A
6 Sarteano Drive, Manurewa	Altered	Category A
26 Biplane Street, Takanini	Altered	Category A
12 Nerissa Place, Randwick Park	Altered	Category A
2 Popes Road, Takanini	Altered	Category A
110 Hyperion Drive, Randwick Park	Altered	Category A
4/460 Porchester Road, Randwick Park	Altered	Category A
2/154 Manuroa Road, Takanini	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
1-2/3 Berwyn Avenue, Takanini	Altered	Category A
5/460 Porchester Road, Randwick Park	Altered	Category A
2/274 Porchester Road, Takanini	Altered	Category A
135 Porchester Road, Papakura	Altered	Category A
73 Popes Road, Takanini	Altered	Category A
110 Riverton Drive, Randwick Park	Altered	Category A
194 Porchester Road, Takanini	Altered	Category A
1/50 Airfield Road, Takanini	Altered	Category A
301A Porchester Road, Takanini	Altered	Category A
19 Phar Lap Crescent, Takanini	Altered	Category A
123 Riverton Drive, Randwick Park	Altered	Category A
3 Ricardo Court, Manurewa	Altered	Category A
3 Giani Court, Manurewa	Altered	Category A
2/474 Porchester Road, Randwick Park	Altered	Category A
4 Sires Parkway, Takanini	Altered	Category A
4B Berwyn Avenue, Takanini	Altered	Category A
140 Porchester Road, Papakura	Altered	Category A
29 Foxlaw Street, Randwick Park	Altered	Category A
3 Taipan Place, Randwick Park	Altered	Category A
5 Sheriff Place, Randwick Park	Altered	Category A
19B Phar Lap Crescent, Takanini	Altered	Category A
4A Berwyn Avenue, Takanini	Altered	Category A
212 Alfriston Road, Manurewa	Altered	Category A
6 Sheriff Place, Randwick Park	Altered	Category A
297B Porchester Road, Takanini	Altered	Category A
165 Porchester Road, Takanini	Altered	Category A
169 Alfriston Road, Manurewa	Altered	Category A
196 Porchester Road, Takanini	Altered	Category A
2/156 Porchester Road, Papakura	Altered	Category A
8B Berwyn Avenue, Takanini	Altered	Category A
14A Berwyn Avenue, Takanini	Altered	Category A
202 Alfriston Road, Manurewa	Altered	Category A
8 Sarteano Drive, Manurewa	Altered	Category A
125 Riverton Drive, Randwick Park	Altered	Category A
150 Manuroa Road, Takanini	Altered	Category A
2/480 Porchester Road, Randwick Park	Altered	Category A
167 Alfriston Road, Manurewa	Altered	Category A
4 Sheriff Place, Randwick Park	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
204 Alfriston Road, Manurewa	Altered	Category A
4 Giani Court, Manurewa	Altered	Category A
150A Manuroa Road, Takanini	Altered	Category A
15 Zoe Court, Manurewa	Altered	Category A
6A Sheriff Place, Randwick Park	Altered	Category A
133 Hyperion Drive, Randwick Park	Altered	Category A
41 Calumet Way, Takanini	Altered	Category A
1/478 Porchester Road, Randwick Park	Altered	Category A
1/5 Berwyn Avenue, Takanini	Altered	Category A
21 Phar Lap Crescent, Takanini	Altered	Category A
3/263 Porchester Road, Takanini	Altered	Category A
4 Ricardo Court, Manurewa	Altered	Category A
151A Porchester Road, Takanini	Altered	Category A
4A Sheriff Place, Randwick Park	Altered	Category A
149A Porchester Road, Takanini	Altered	Category A
198 Porchester Road, Takanini	Altered	Category A
10 Sarteano Drive, Manurewa	Altered	Category A
10 Amarillo Place, Manurewa	Altered	Category A
167 Porchester Road, Takanini	Altered	Category A
65 Stratford Road, Manurewa	Altered	Category A
11 Civita Court, Manurewa	Altered	Category A
1/282 Porchester Road, Takanini	Altered	Category A
8/460 Porchester Road, Randwick Park	Altered	Category A
6 Bruce Pulman Drive, Takanini	Altered	Category A
6 Abilene Place, Manurewa	Altered	Category A
281 Porchester Road, Takanini	Altered	Category A
12 Berwyn Avenue, Takanini	Altered	Category A
148A Manuroa Road, Takanini	Altered	Category A
2 Giani Court, Manurewa	Altered	Category A
230 Alfriston Road, Alfriston	Altered	Category A
19 Sheriff Place, Randwick Park	Altered	Category A
108 Hyperion Drive, Randwick Park	Altered	Category A
133 Porchester Road, Papakura	Altered	Category A
1-2/14 Nerissa Place, Randwick Park	Altered	Category A
48 Airfield Road, Takanini	Altered	Category A
248D Porchester Road, Takanini	Altered	Category A
2/258 Porchester Road, Takanini	Altered	Category A
11 Phar Lap Crescent, Takanini	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
2-14 Windfola Parkway, Takanini	Altered	Category A
434 Porchester Road, Randwick Park	Altered	Category A
2/282 Porchester Road, Takanini	Altered	Category A
131 Porchester Road, Papakura	Altered	Category A
2/2 Glenburn Place, Papakura	Altered	Category A
9 Abilene Place, Manurewa	Altered	Category A
137 Porchester Road, Papakura	Altered	Category A
248C Porchester Road, Takanini	Altered	Category A
10 Abilene Place, Manurewa	Altered	Category A
56B Airfield Road, Takanini	Altered	Category A
121 Riverton Drive, Randwick Park	Altered	Category A
239A Porchester Road, Takanini	Altered	Category A
1/46 Airfield Road, Takanini	Altered	Category A
131 Hyperion Drive, Randwick Park	Altered	Category A
169 Porchester Road, Takanini	Altered	Category A
31 Walters Road, Takanini	Altered	Category A
25 Calumet Way, Takanini	Altered	Category A
49B Walters Road, Papakura	Altered	Category A
115 Riverton Drive, Randwick Park	Altered	Category A
108 Riverton Drive, Randwick Park	Altered	Category A
20 Biplane Street, Takanini	Altered	Category A
303 Porchester Road, Takanini	Altered	Category A
248B Porchester Road, Takanini	Altered	Category A
23 Phar Lap Crescent, Takanini	Altered	Category A
47 Foxlaw Street, Randwick Park	Altered	Category A
121 Manuroa Road, Takanini	Altered	Category A
17 Zoe Court, Manurewa	Altered	Category A
27 Calumet Way, Takanini	Altered	Category A
1/476 Porchester Road, Randwick Park	Altered	Category A
171 Porchester Road, Takanini	Altered	Category A
64 Popes Road, Takanini	Altered	Category A
9 Sheriff Place, Randwick Park	Altered	Category A
4/263 Porchester Road, Takanini	Altered	Category A
23 Calumet Way, Takanini	Altered	Category A
490 Porchester Road, Randwick Park	Altered	Category A
27 Walters Road, Takanini	Altered	Category A
1/6 Berwyn Avenue, Takanini	Altered	Category A
1/1 Clarice Place, Takanini	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
5 Ricardo Court, Manurewa	Altered	Category A
8 Abilene Place, Manurewa	Altered	Category A
52A Airfield Road, Takanini	Altered	Category A
428 Porchester Road, Randwick Park	Altered	Category A
1-2/7 Berwyn Avenue, Takanini	Altered	Category A
5 Arion Road, Takanini	Altered	Category A
7 Sheriff Place, Randwick Park	Altered	Category A
6 Ricardo Court, Manurewa	Altered	Category A
63B Stratford Road, Manurewa	Altered	Category A
2/268 Porchester Road, Takanini	Altered	Category A
279A Porchester Road, Takanini	Altered	Category A
259A Porchester Road, Takanini	Altered	Category A
19 Zoe Court, Manurewa	Altered	Category A
2A Clarice Place, Takanini	Altered	Category A
200 Porchester Road, Takanini	Altered	Category A
45 Foxlaw Street, Randwick Park	Altered	Category A
248A Porchester Road, Takanini	Altered	Category A
6/460 Porchester Road, Randwick Park	Altered	Category A
106 Hyperion Drive, Randwick Park	Altered	Category A
173 Porchester Road, Takanini	Altered	Category A
43 Calumet Way, Takanini	Altered	Category A
9 Phar Lap Crescent, Takanini	Altered	Category A
43 Walters Road, Takanini	Altered	Category A
436 Porchester Road, Randwick Park	Altered	Category A
158A Porchester Road, Papakura	Altered	Category A
130 Porchester Road, Papakura	Altered	Category A
2/160 Porchester Road, Papakura	Altered	Category A
4B Sheriff Place, Randwick Park	Altered	Category A
14E Berwyn Avenue, Takanini	Altered	Category A
12 Abilene Place, Manurewa	Altered	Category A
478 Porchester Road, Randwick Park	Altered	Category A
16 Amarillo Place, Manurewa	Altered	Category A
263A Porchester Road, Takanini	Altered	Category A
271A Porchester Road, Takanini	Altered	Category A
117 Riverton Drive, Randwick Park	Altered	Category A
18 Biplane Street, Takanini	Altered	Category A
23A Phar Lap Crescent, Takanini	Altered	Category A
14D Berwyn Avenue, Takanini	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
6B Sheriff Place, Randwick Park	Altered	Category A
60A Airfield Road, Takanini	Altered	Category A
2 Clarice Place, Takanini	Altered	Category A
279D Porchester Road, Takanini	Altered	Category A
42A Airfield Road, Takanini	Altered	Category A
19 Calumet Way, Takanini	Altered	Category A
297C Porchester Road, Takanini	Altered	Category A
76 Popes Road, Takanini	Altered	Category A
78 Popes Road, Takanini	Altered	Category A
2/256 Porchester Road, Takanini	Altered	Category A
29A Phar Lap Crescent, Takanini	Altered	Category A
19A Phar Lap Crescent, Takanini	Altered	Category A
2/277 Porchester Road, Takanini	Altered	Category A
106 Riverton Drive, Randwick Park	Altered	Category A
62 Airfield Road, Takanini	Altered	Category A
27 Foxlaw Street, Randwick Park	Altered	Category A
1/276 Porchester Road, Takanini	Altered	Category A
476 Porchester Road, Randwick Park	Altered	Category A
21 Sheriff Place, Randwick Park	Altered	Category A
2/280 Porchester Road, Takanini	Altered	Category A
7 Abilene Place, Manurewa	Altered	Category A
7 Ricardo Court, Manurewa	Altered	Category A
444 Porchester Road, Randwick Park	Altered	Category A
2/260 Porchester Road, Takanini	Altered	Category A
8 Bruce Pulman Drive, Takanini	Altered	Category A
24 Amarillo Place, Manurewa	Altered	Category A
4C Sheriff Place, Randwick Park	Altered	Category A
25 Phar Lap Crescent, Takanini	Altered	Category A
8 Amarillo Place, Manurewa	Altered	Category A
11A/B Dittmer Place, Papakura	Altered	Category A
8 Ricardo Court, Manurewa	Altered	Category A
4 Abilene Place, Manurewa	Altered	Category A
7 Phar Lap Crescent, Takanini	Altered	Category A
1/280 Porchester Road, Takanini	Altered	Category A
21 Zoe Court, Manurewa	Altered	Category A
13-17 Biplane Street, Takanini	Altered	Category A
265 Porchester Road, Takanini	Altered	Category A
129 Hyperion Drive, Randwick Park	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
5 Abilene Place, Manurewa	Altered	Category A
68 Airfield Road, Takanini	Altered	Category A
279C Porchester Road, Takanini	Altered	Category A
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25 Sheriff Place, Randwick Park	Altered	Category A
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248E Porchester Road, Takanini	Altered	Category A
14 Amarillo Place, Manurewa	Altered	Category A
3/258 Porchester Road, Takanini	Altered	Category A
119 Riverton Drive, Randwick Park	Altered	Category A
33A Walters Road, Takanini	Altered	Category A
104 Hyperion Drive, Randwick Park	Altered	Category A
442 Porchester Road, Randwick Park	Altered	Category A
4 Clarice Place, Takanini	Altered	Category A
16 Nerissa Place, Randwick Park	Altered	Category A
1/278 Porchester Road, Takanini	Altered	Category A
63A Stratford Road, Manurewa	Altered	Category A
13B Clarice Place, Takanini	Altered	Category A
12 Sarteano Drive, Manurewa	Altered	Category A
127 Hyperion Drive, Randwick Park	Altered	Category A
17 Calumet Way, Takanini	Altered	Category A
452 Porchester Road, Randwick Park	Altered	Category A
148 Manuroa Road, Takanini	Altered	Category A
27 Sheriff Place, Randwick Park	Altered	Category A
450 Porchester Road, Randwick Park	Altered	Category A
31 Foxlaw Street, Randwick Park	Altered	Category A
273A Porchester Road, Takanini	Altered	Category A
35 Foxlaw Street, Randwick Park	Altered	Category A
23 Sheriff Place, Randwick Park	Altered	Category A
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23 Walters Road, Takanini	Altered	Category A
37A Walters Road, Takanini	Altered	Category A
1/4 Glenburn Place, Papakura	Altered	Category A
21A Phar Lap Crescent, Takanini	Altered	Category A
20 Amarillo Place, Manurewa	Altered	Category A
44 Airfield Road, Takanini	Altered	Category A
24 Calumet Way, Takanini	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
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12 Amarillo Place, Manurewa	Altered	Category A
2/1 Clarice Place, Takanini	Altered	Category A
31A Phar Lap Crescent, Takanini	Altered	Category A
17A Nerissa Place, Randwick Park	Altered	Category A
25 Foxlaw Street, Randwick Park	Altered	Category A
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49 Sheriff Place, Randwick Park	Altered	Category A
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5 Phar Lap Crescent, Takanini	Altered	Category A
3 Phar Lap Crescent, Takanini	Altered	Category A
3 Clarice Place, Takanini	Altered	Category A
7 Arion Road, Takanini	Altered	Category A
35 Sheriff Place, Randwick Park	Altered	Category A
33A Phar Lap Crescent, Takanini	Altered	Category A
2/276 Porchester Road, Takanini	Altered	Category A
76 Airfield Road, Takanini	Altered	Category A
2/278 Porchester Road, Takanini	Altered	Category A
2/2 Clarice Place, Takanini	Altered	Category A
47 Sheriff Place, Randwick Park	Altered	Category A
9 Zoe Court, Manurewa	Altered	Category A
19 Yatterina Avenue, Takanini	Altered	Category A
8 Sheriff Place, Randwick Park	Altered	Category A
51 Foxlaw Street, Randwick Park	Altered	Category A
6 Amarillo Place, Manurewa	Altered	Category A
63C Stratford Road, Manurewa	Altered	Category A
29 Sheriff Place, Randwick Park	Altered	Category A
7 Zoe Court, Manurewa	Altered	Category A
10A/B Dittmer Place, Papakura	Altered	Category A
1/140 Manuroa Road, Takanini	Altered	Category A
4 Amarillo Place, Manurewa	Altered	Category A
11B Clarice Place, Takanini	Altered	Category A
10 Berwyn Avenue, Takanini	Altered	Category A
53 Foxlaw Street, Randwick Park	Altered	Category A
49D Walters Road, Papakura	Altered	Category A
74 Airfield Road, Takanini	Altered	Category A

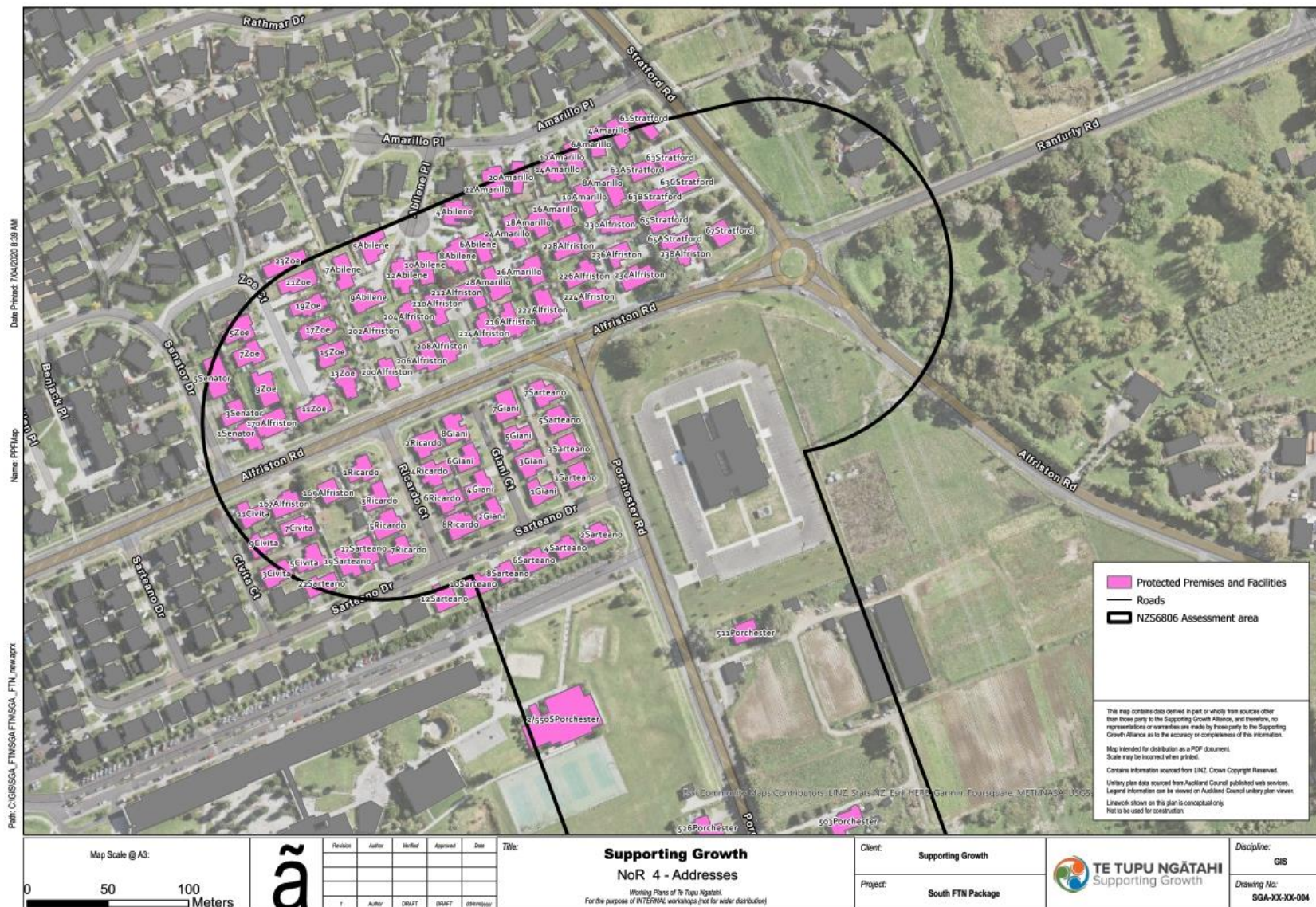
Address	New or Altered Road	Noise Criteria Category
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25A Phar Lap Crescent, Takanini	Altered	Category A
15 Nerissa Place, Randwick Park	Altered	Category A
23 Zoe Court, Manurewa	Altered	Category A
1-2/9 Berwyn Avenue, Takanini	Altered	Category A
16B Nerissa Place, Randwick Park	Altered	Category A
123 Manuroa Road, Takanini	Altered	Category A
5 Zoe Court, Manurewa	Altered	Category A
20 Calumet Way, Takanini	Altered	Category A
29 Phar Lap Crescent, Takanini	Altered	Category A
15A Nerissa Place, Randwick Park	Altered	Category A
49F Walters Road, Papakura	Altered	Category A
2/5 Berwyn Avenue, Takanini	Altered	Category A
113 Riverton Drive, Randwick Park	Altered	Category A
9 Glenburn Place, Papakura	Altered	Category A
1-2/13 Nerissa Place, Randwick Park	Altered	Category A
8A Sheriff Place, Randwick Park	Altered	Category A
7 Clarice Place, Takanini	Altered	Category A
13 Calumet Way, Takanini	Altered	Category A
12 Dittmer Place, Papakura	Altered	Category A
45 Sheriff Place, Randwick Park	Altered	Category A
43 Foxlaw Street, Randwick Park	Altered	Category A
2/4 Clarice Place, Takanini	Altered	Category A
41 Foxlaw Street, Randwick Park	Altered	Category A
10 Bruce Pulman Drive, Takanini	Altered	Category A
37 Sheriff Place, Randwick Park	Altered	Category A
11 Calumet Way, Takanini	Altered	Category A
9 Clarice Place, Takanini	Altered	Category A
15 Calumet Way, Takanini	Altered	Category A
17 Nerissa Place, Randwick Park	Altered	Category A
51 Sheriff Place, Randwick Park	Altered	Category A
1/6 Glenburn Place, Papakura	Altered	Category A
10 Nerissa Place, Randwick Park	Altered	Category A
67 Sheriff Place, Randwick Park	Altered	Category A
2/5 Clarice Place, Takanini	Altered	Category A
11A Clarice Place, Takanini	Altered	Category A
6A Braeburn Place, Takanini	Altered	Category A

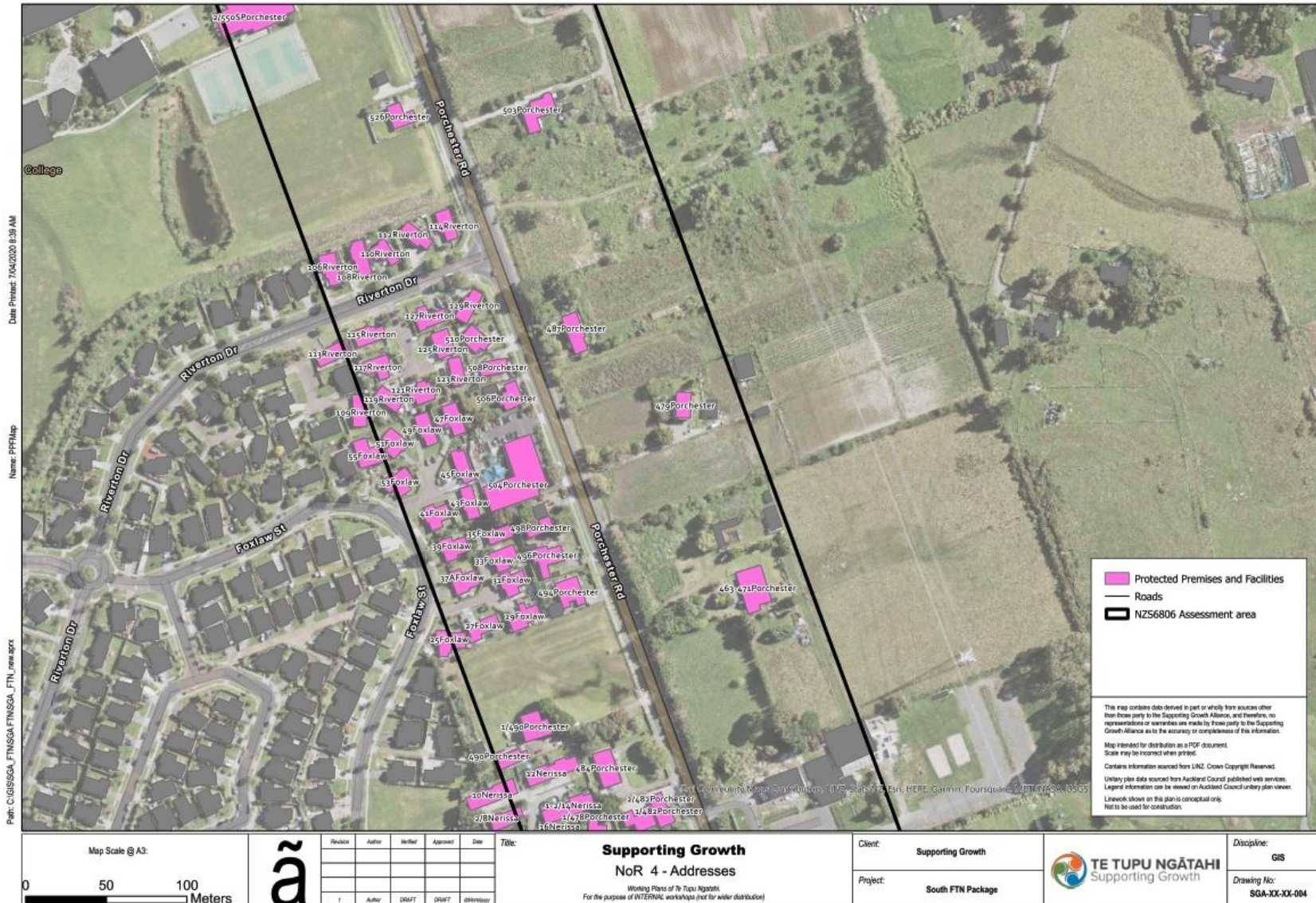
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24 Biplane Street, Takanini	Altered	Category A
2/8 Nerissa Place, Randwick Park	Altered	Category A
37A Phar Lap Crescent, Takanini	Altered	Category A
39 Foxlaw Street, Randwick Park	Altered	Category A
53 Sheriff Place, Randwick Park	Altered	Category A
69 Sheriff Place, Randwick Park	Altered	Category A
71 Sheriff Place, Randwick Park	Altered	Category A
18 Calumet Way, Takanini	Altered	Category A
2-3/46 Airfield Road, Takanini	Altered	Category A
4 Braeburn Place, Takanini	Altered	Category A
1/5 Clarice Place, Takanini	Altered	Category A
12A Berwyn Avenue, Takanini	Altered	Category A
17 Yatterina Avenue, Takanini	Altered	Category A
14 Phar Lap Crescent, Takanini	Altered	Category A
37A Foxlaw Street, Randwick Park	Altered	Category A
121A Manuroa Road, Takanini	Altered	Category A
5 Civita Court, Manurewa	Altered	Category A
17 Sarteano Drive, Manurewa	Altered	Category A
18 Yatterina Avenue, Takanini	Altered	Category A
22 Calumet Way, Takanini	Altered	Category A
21 Sarteano Drive, Manurewa	Altered	Category A
61 Stratford Road, Manurewa	Altered	Category A
31 Phar Lap Crescent, Takanini	Altered	Category A
8 Clarice Place, Takanini	Altered	Category A
19 Sarteano Drive, Manurewa	Altered	Category A
7 Glenburn Place, Papakura	Altered	Category A
73 Sheriff Place, Randwick Park	Altered	Category A
6 Clarice Place, Takanini	Altered	Category A
55 Foxlaw Street, Randwick Park	Altered	Category A
11 Biplane Street, Takanini	Altered	Category A
3A Glenburn Place, Papakura	Altered	Category A
16 Phar Lap Crescent, Takanini	Altered	Category A
5 Glenburn Place, Papakura	Altered	Category A
35A Phar Lap Crescent, Takanini	Altered	Category A
33 Phar Lap Crescent, Takanini	Altered	Category A
2/8 Clarice Place, Takanini	Altered	Category A

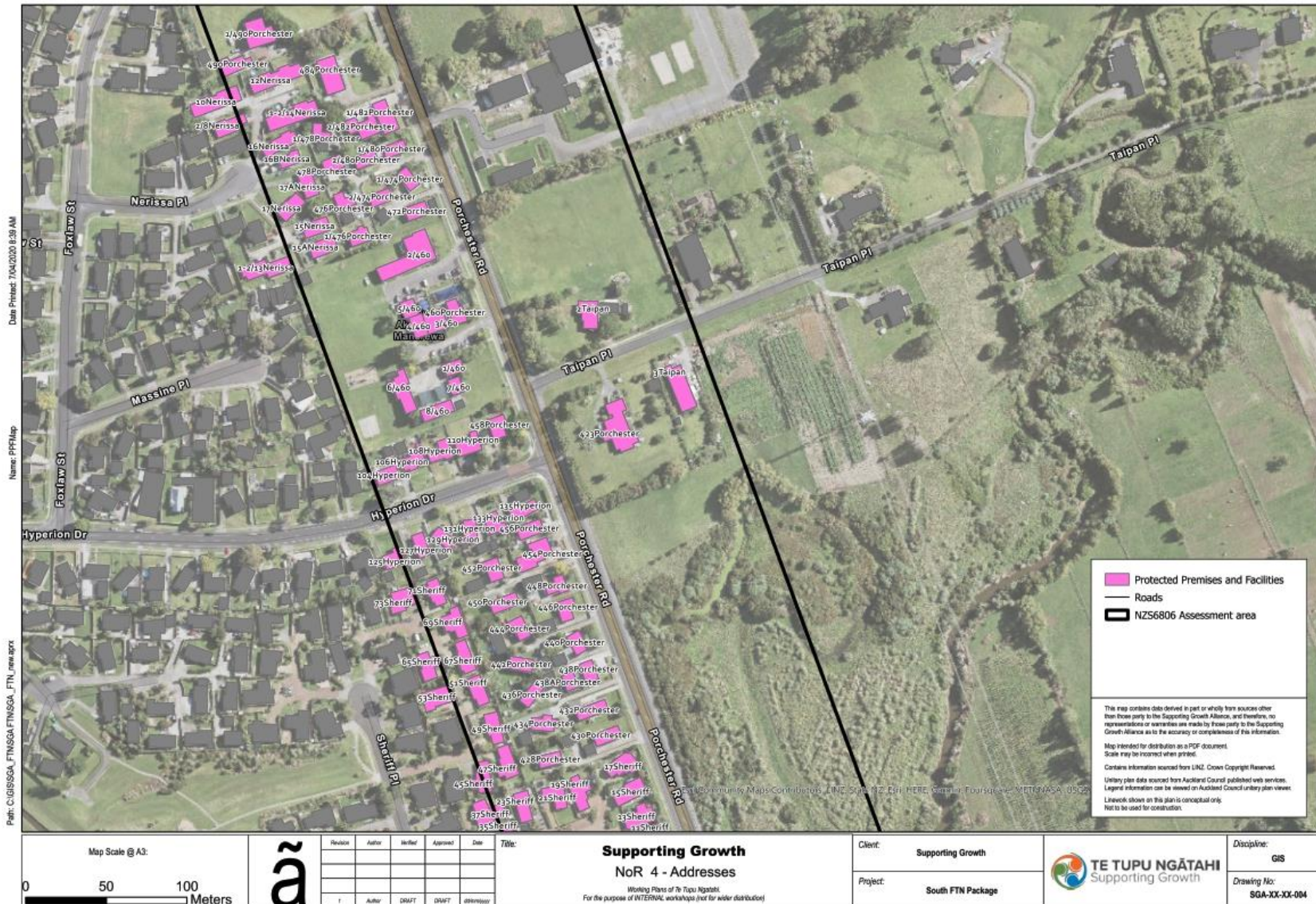
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4 Phar Lap Crescent, Takanini	Altered	Category A
7 Civita Court, Manurewa	Altered	Category A
3 Glenburn Place, Papakura	Altered	Category A
125 Hyperion Drive, Randwick Park	Altered	Category A
63 Stratford Road, Manurewa	Altered	Category A
12 Phar Lap Crescent, Takanini	Altered	Category A
22 Biplane Street, Takanini	Altered	Category A
18 Phar Lap Crescent, Takanini	Altered	Category A
14C Berwyn Avenue, Takanini	Altered	Category A
2 Braeburn Place, Takanini	Altered	Category A
15 Yatterina Avenue, Takanini	Altered	Category A
6 Braeburn Place, Takanini	Altered	Category A
7 Sires Parkway, Takanini	Altered	Category A
10 Phar Lap Crescent, Takanini	Altered	Category A
8 Dittmer Place, Papakura	Altered	Category A
35 Phar Lap Crescent, Takanini	Altered	Category A
44A Airfield Road, Takanini	Altered	Category A
10 Braeburn Place, Takanini	Altered	Category A
39A Phar Lap Crescent, Takanini	Altered	Category A
3 Senator Drive, Manurewa	Altered	Category A
9 Biplane Street, Takanini	Altered	Category A
9 Civita Court, Manurewa	Altered	Category A
1/8 Glenburn Place, Papakura	Altered	Category A
41 Phar Lap Crescent, Takanini	Altered	Category A
20 Phar Lap Crescent, Takanini	Altered	Category A
3 Civita Court, Manurewa	Altered	Category A
14B Berwyn Avenue, Takanini	Altered	Category A
8 Braeburn Place, Takanini	Altered	Category A
16 Biplane Street, Takanini	Altered	Category A
6 Dittmer Place, Papakura	Altered	Category A
13 Yatterina Avenue, Takanini	Altered	Category A
132 Porchester Road, Papakura	Altered	Category A
37 Phar Lap Crescent, Takanini	Altered	Category A
42 Airfield Road, Takanini	Altered	Category A
6 Phar Lap Crescent, Takanini	Altered	Category A
43 Phar Lap Crescent, Takanini	Altered	Category A
12 Biplane Street, Takanini	Altered	Category A

Address	New or Altered Road	Noise Criteria Category
140G Porchester Road, Papakura 2110	Altered	Category A
39 Phar Lap Crescent, Takanini	Altered	Category A
14 Bruce Pulman Drive, Takanini	Altered	Category A
5 Senator Drive, Manurewa	Altered	Category A
2/4 Glenburn Place, Papakura	Altered	Category A
2/6 Glenburn Place, Papakura	Altered	Category A
8 Phar Lap Crescent, Takanini	Altered	Category A
43A Phar Lap Crescent, Takanini	Altered	Category A
1/20 Tironui Station Road East, Papakura	Altered	Category A
1/3 Braeburn Place, Takanini	Altered	Category A
5 Sires Parkway, Takanini	Altered	Category A
5 Braeburn Place, Takanini	Altered	Category A
47A Phar Lap Crescent, Takanini	Altered	Category A
36 Airfield Road, Takanini	Altered	Category A
2/20 Tironui Station Road East, Papakura	Altered	Category A
130A Porchester Road, Papakura	Altered	Category A
45A Phar Lap Crescent, Takanini	Altered	Category A
9 Calumet Way, Takanini	Altered	Category A
45 Phar Lap Crescent, Takanini	Altered	Category A
127-129 Porchester Road, Papakura	Altered	Category A
49 Phar Lap Crescent, Takanini	Altered	Category A
49A Phar Lap Crescent, Takanini	Altered	Category A
47 Phar Lap Crescent, Takanini	Altered	Category A
7 Calumet Way, Takanini	Altered	Category A
51 Phar Lap Crescent, Takanini	Altered	Category A
51A Phar Lap Crescent, Takanini	Altered	Category A
21 Walters Road, Takanini	Altered	Category A
128 Porchester Road, Papakura	Altered	Category A

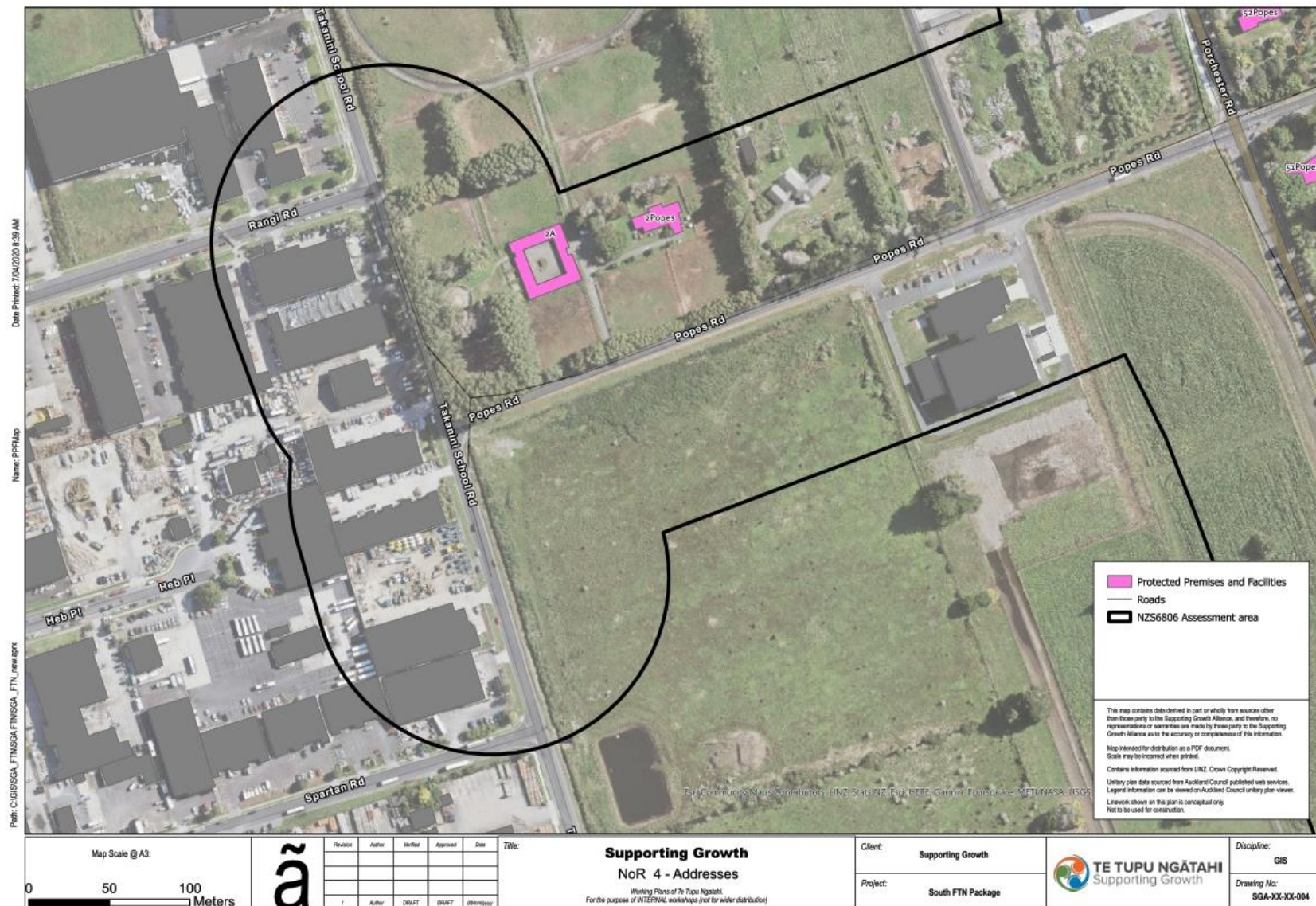
NoR 4 PPF Location Plans:





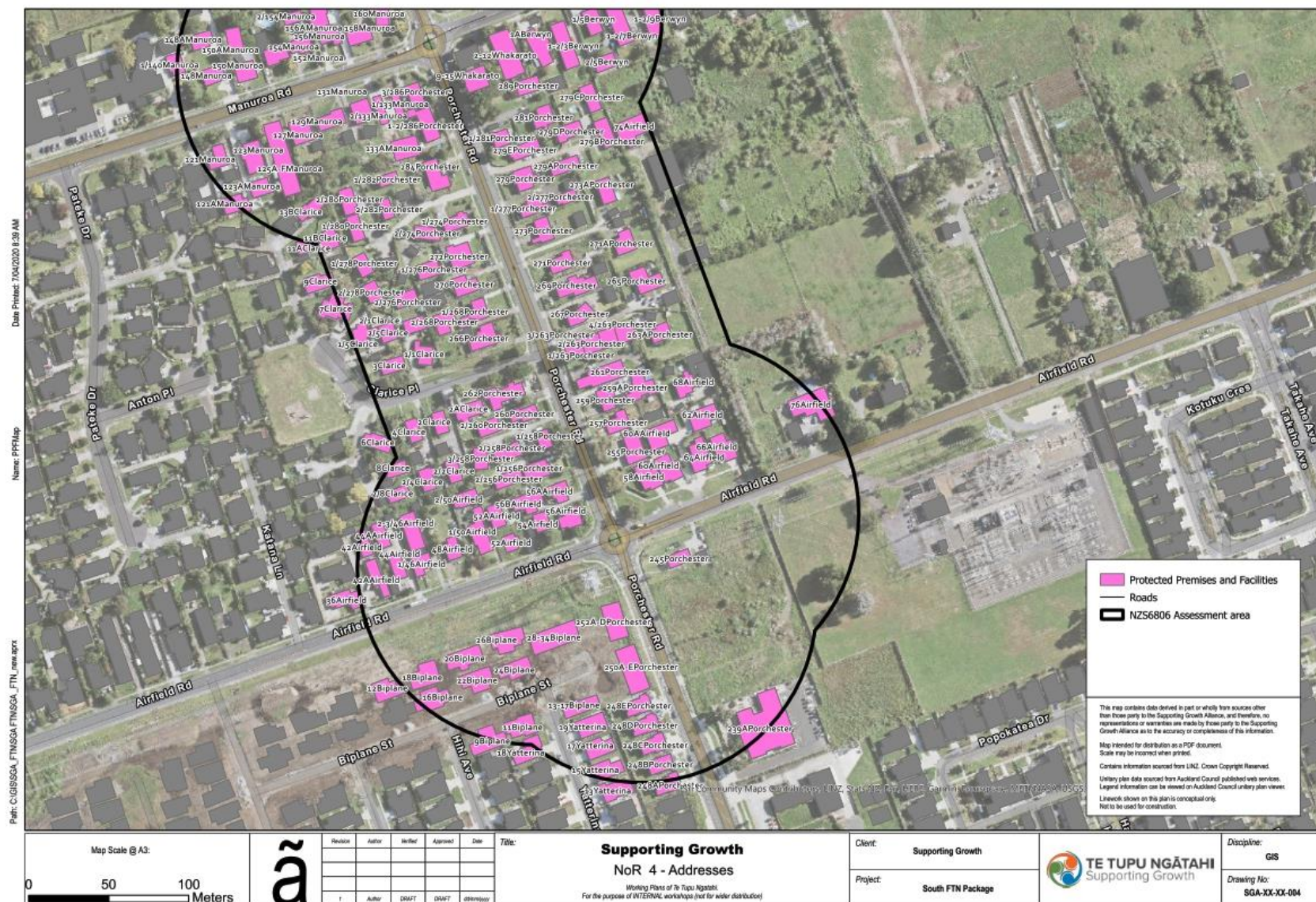


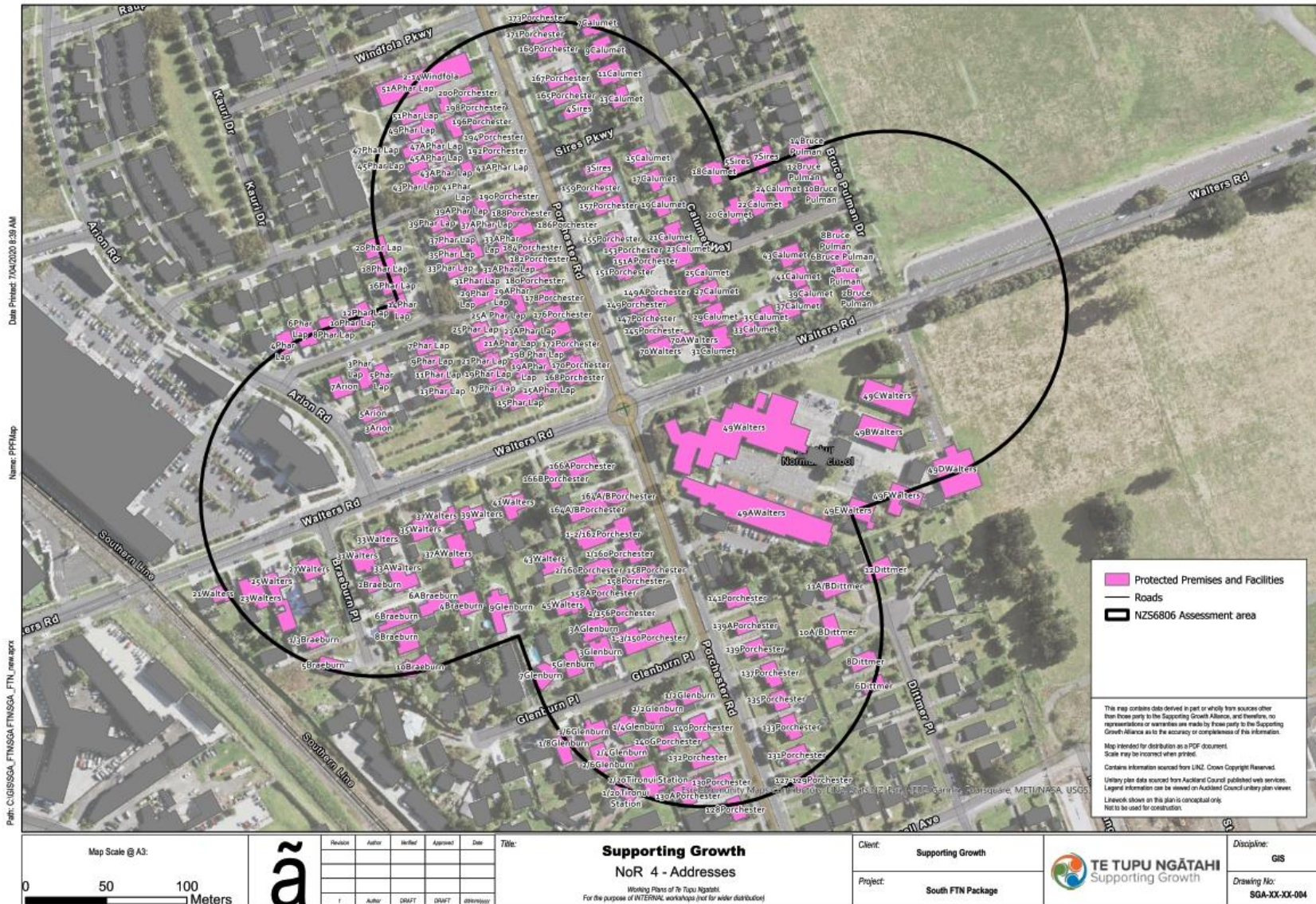












Schedule 5: Open spaces to be included in the Open Space Management Plan

NoR 1

Open Space Name	Address	Legal description
Anderson Park	58R Great South Road Manurewa Auckland 2102	Lot 8 DP 12984

NoR 2

No open spaces to be included

NoR 3

Open Space Name	Address	Legal description
Tadmore Park	238R Great South Road Manurewa Auckland 2102	LOT 2 DP 49948, LOT 3 DP 49948
Gallaher Park	21R Alfriston Road Manurewa Auckland 2102	LOT 4 DP 46314, LOT 5 DP 46314
Alfriston Park	26R Saralee Drive Manurewa Auckland 2105	LOT 76 DP 203181

NoR 4

No open spaces to be included

VOLUME 2

South Frequent Transit Network

Assessment of Effects on the Environment

October 2023

Version 1.0

Document Status

Responsibility	Name
Author	Liam Winter, James Gibson, Daly Williams, George van Pelt, Adriene Grafia
Reviewer	Tracey Grant
Approver	Vanessa Evitt

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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Appendices

Appendix A – Assessment of Alternatives

Appendix B – CVA (partially redacted)

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 (defined¹ 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)*.

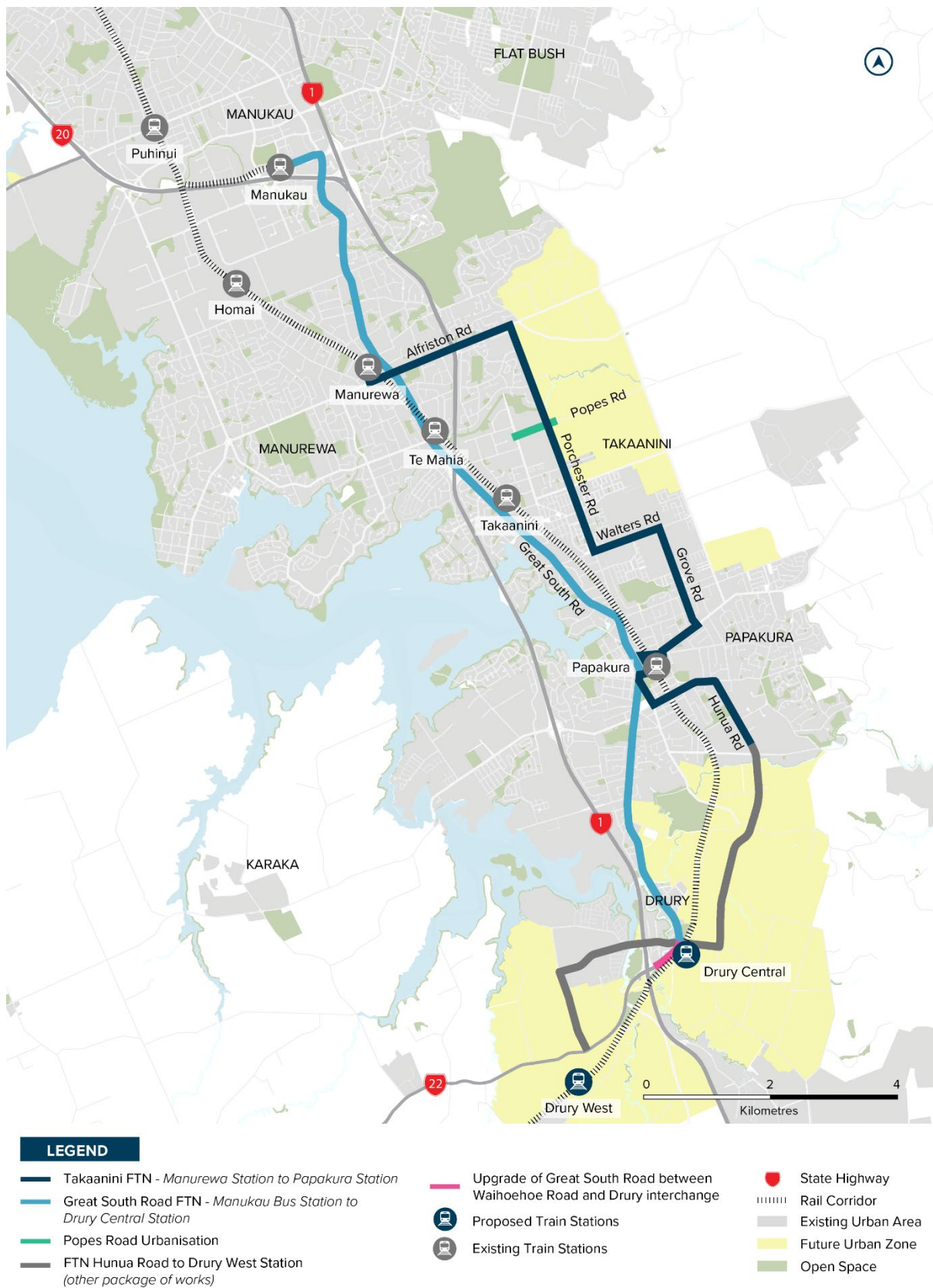


Figure 1-1: South FTN – full network extent



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	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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.

SOUTH INDICATIVE STRATEGIC TRANSPORT NETWORK

JULY 2019

Projects described in these maps have been identified by indicative business cases and will require further technical investigation, engagement with communities and landowners and statutory approvals before their final detail, location or land requirement is confirmed. They are also yet to be prioritised for funding for delivery over the next 10-30 years.

RAIL CORRIDOR UPGRADE

- 1 Rail upgrade from Papakura to Pukekohe
- 2 Closure of Manurewa Road and Spartan Road rail crossings to vehicles
- 3 New grade separated rail crossings at Taka Street and Walters Road
- 4 New train station – Drury Central
- 5 New train station – Drury West
- 6 New train station – Paerata

NEW OR IMPROVED PUBLIC TRANSPORT CORRIDOR

- 7 Frequent Transit Networks (FTNs) routes using SH1 and arterial roads to connect to town centres, and the major centres of Papakura, Drury and Manukau

NEW WALKING AND CYCLING CORRIDOR

- 8 Strategic walking and cycling corridor to connect to SH1 Strategic Cycleway

NEW OR IMPROVED TRANSPORT CORRIDOR

- 9 Mill Road Corridor including northern connections
- 10 Additional long term upgrades to SH1 between Manukau and Takaanini
- 11 Upgrade Mahia Road and Popes Road (including a new grade separated rail and SH1 crossing)
- 12 Upgrade Opāheke Road and Ponga Road
- 13 New arterial between Papakura industrial area, to Waihoehoe Road
- 14 Upgrade Jesmond Road, Bremner Road and Waihoehoe Road
- 15 Upgrade Drury West section of SH22
- 16 Connections from SH22 to the Pukekohe Expressway
- 17 New Pukekohe Expressway connecting Pukekohe to SH1
- 18 Pukekohe Ring Road
- 19 Upgrade Mill Road between Harrisville Road intersection and the Bombay interchange

SAFETY IMPROVEMENTS

- 20 Safety improvements to Aitken Road, Brookby Road, Papakura-Clevedon Road, Hingaia Road, Hunua Road, Linwood Road, Walters Road, Blackbridge Road, Glenbrook Road, Kingseat Road, McKenzie Road, Ostrich/Woodhouse Road, Pukekohe East Road, Logan Road, Waiuku Road and Buckland Road.

OTHER PRIORITY PROJECTS

- 21 Rail electrification from Papakura to Pukekohe
- 22 SH1 Papakura to Bombay Project
- 23 Safe Networks Programme: SH22 Safety Improvements



New Zealand Government

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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• Public transport will experience poor reliability as demand grows if investment is not made in the transport network.
Problem Statement 4: Climate Change	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • A lack of dedicated active mode facilities along Popes Road will result in more private vehicle trips as growth occurs.
Problem Statement 5: Safety	<ul style="list-style-type: none"> • 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

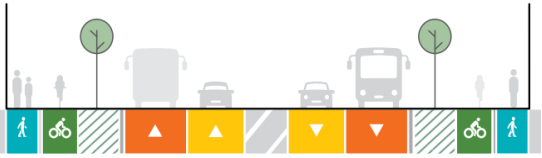

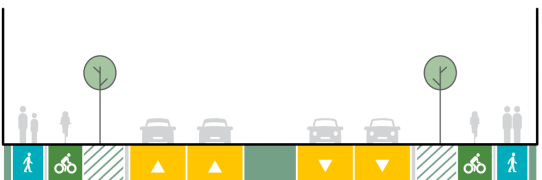
3.2.1 General Overview

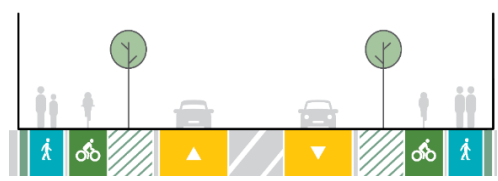
As noted at Section 1.2, some of the proposed upgrades do not require third-party land and therefore do not fall within the proposed NoRs. The South FTN as a whole proposes:

- **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: <ul style="list-style-type: none"> • 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.

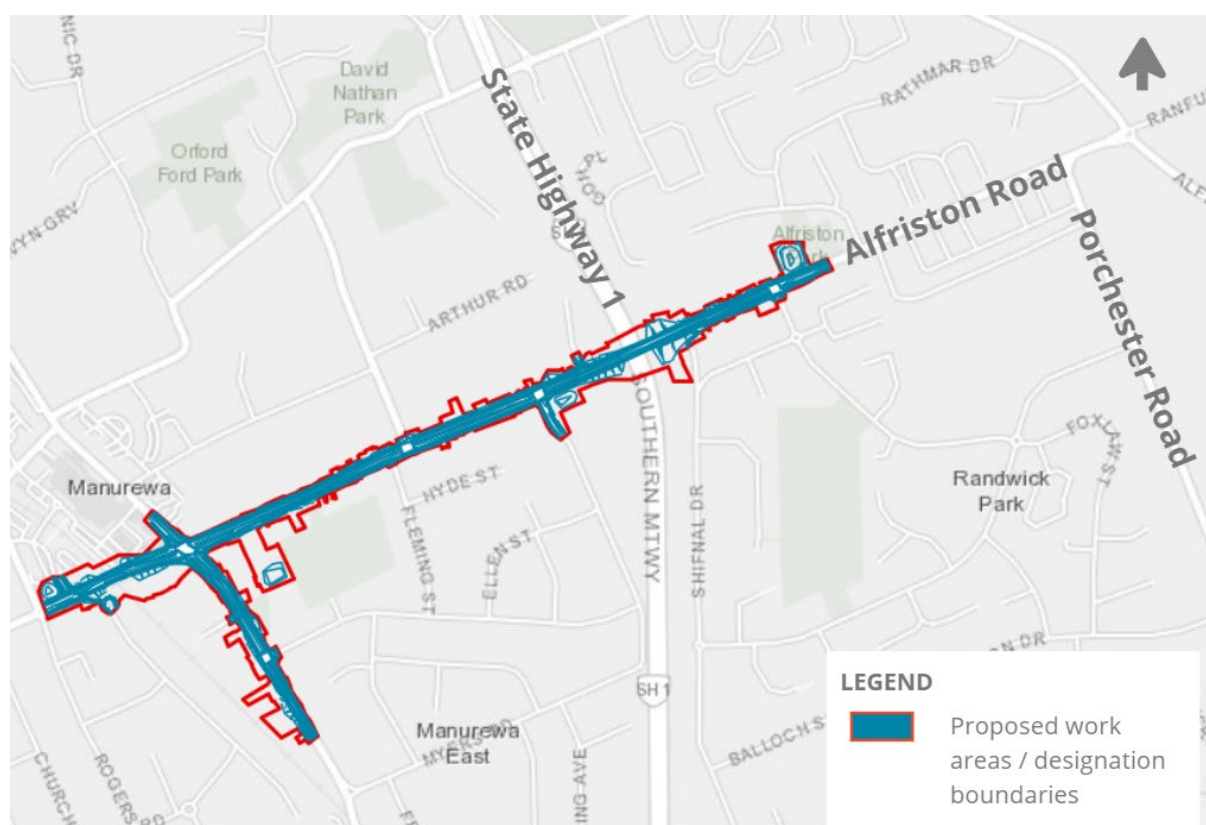


Figure 3-4: Extent of NoR 3 – Takaanini FTN – Weymouth, Alfriston and Great South Road Upgrades

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 Drury² 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.	<p>between Manukau and Drury that:</p> <p>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.</p>	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.

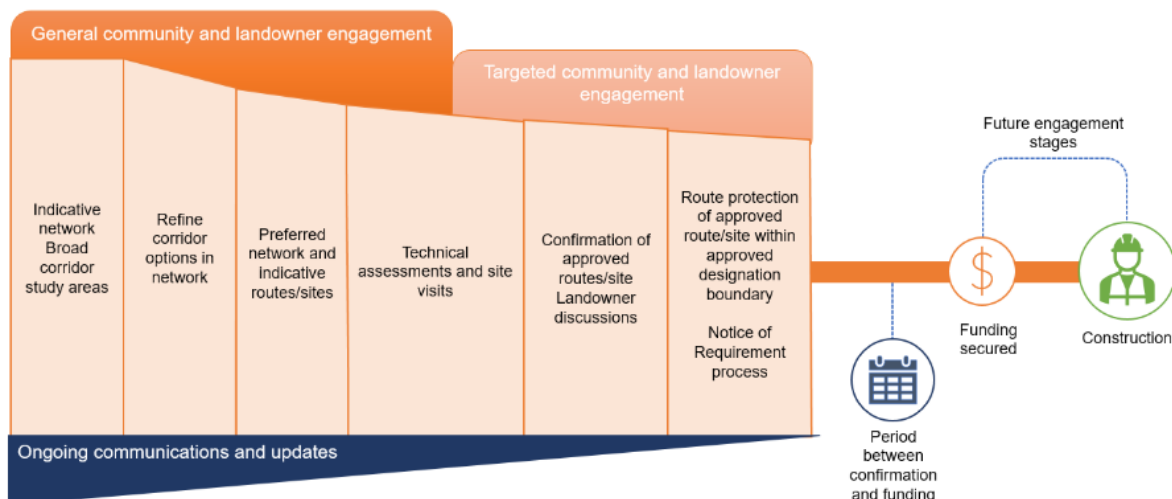


Figure 4-1: Te Tupu Ngātahi consultation and engagement phases

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.

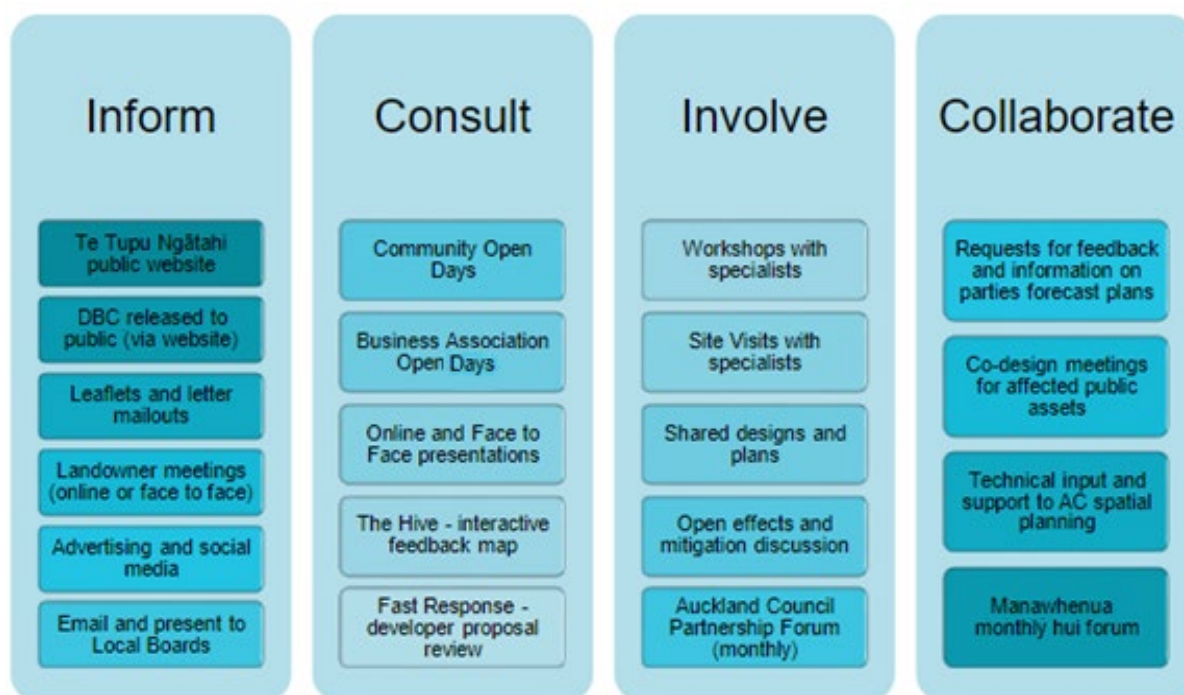


Figure 4-2: Spectrum of engagement tools and methods used by Te Tupu Ngātahi

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 - Waiohūa);
- 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 Waiohūa Iwi Authority (Te Ākitai Waiohūa);
- Te Ara Rangatu o Te Iwi o Ngāti Te Ata Waiohūa;
- 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	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Otara-Papatoetoe • Manurewa • Papakura • Franklin 	<ul style="list-style-type: none"> • Memos – various memos distributed to elected members of the four applicable 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. <p>In general, there was overall support from elected members.</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Manukau • Manurewa • Takaanini • Papakura • Pukekohe 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	Section of the AEE where the matter is primarily addressed
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-	
<i>Whether particular regard has been had of any relevant provision of:</i> 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
<i>Whether adequate consideration has been given to alternative sites, routes or methods of undertaking the work if:</i> 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.
<i>Whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought</i> ⁵	Refer to Section 7
<i>Any other matter the territorial authority considers reasonably necessary in order to make a recommendation on the requirement</i> 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.

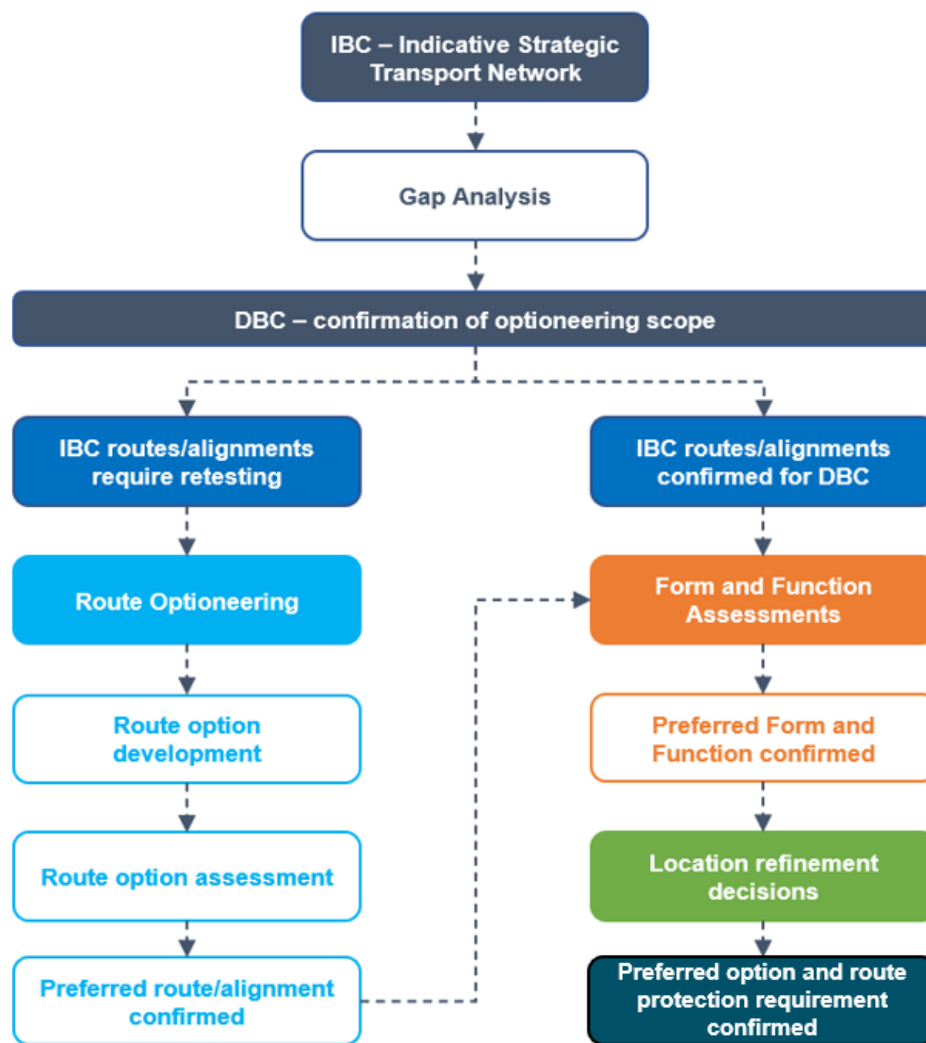


Figure 6-1: DBC optioneering process

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 ⁷that:

- 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 are 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 Ecology⁸;
- 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.

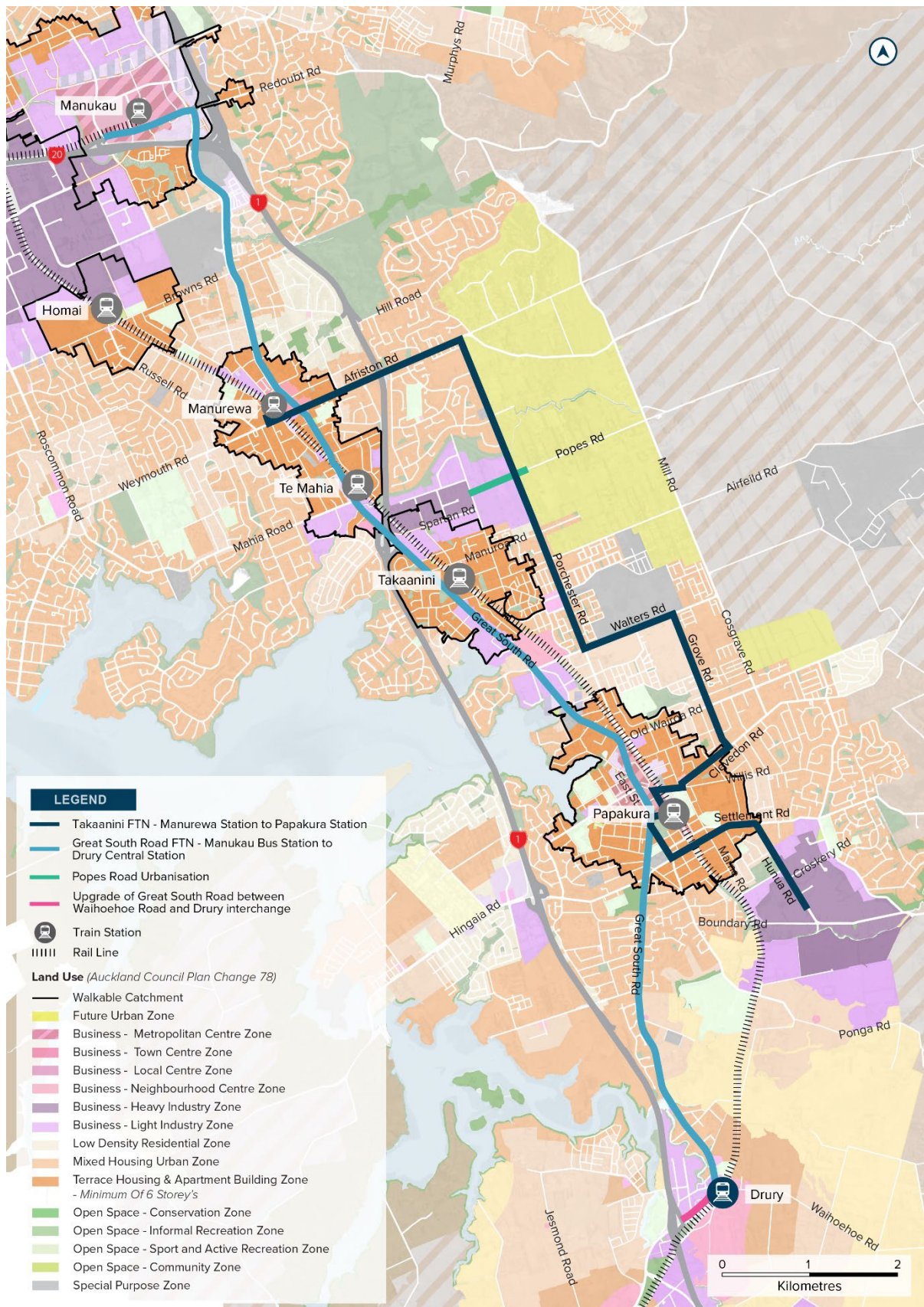


Figure 9-1: Application of the NPS:UD in the context of the Project

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.

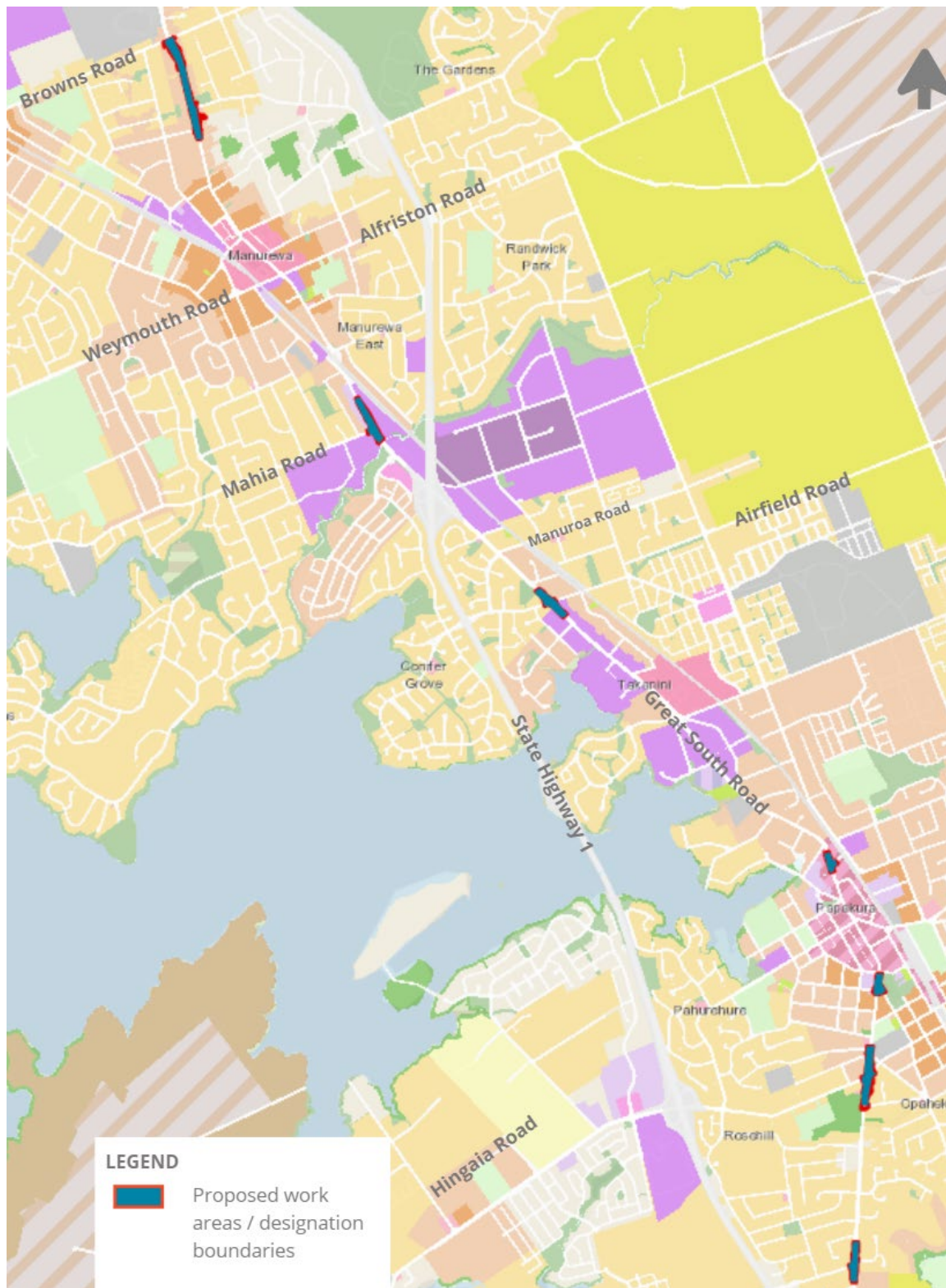















Figure 9-2: Current zoning surrounding NoR 1

Table 9-3: NoR 1 receiving environment

Features	Description
Current land use	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Otūwairoa / Slippery Creek
Significant Ecological Areas	<ul style="list-style-type: none"> Kirks Bush, SEA_T_5248, Terrestrial SEA_T_4362, Terrestrial
Historic heritage and archaeological values	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Gatland Road Precinct Gatland and Great South Road Precinct
Areas of cultural value	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Notable Trees Overlay <u>Within designation boundary</u> <ul style="list-style-type: none"> 2189, Gum, Verified position of tree <u>Root zone of tree(s) may be within the designation boundary</u> <ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Town and Country Veterinary Services
Watercourses	<ul style="list-style-type: none"> Hingaia Stream
Significant Ecological Areas	<ul style="list-style-type: none"> None
Historic heritage and archaeological values	<ul style="list-style-type: none"> None Refer to Section 10.9 for further discussion

Features	Description
Precincts	<ul style="list-style-type: none"> Drury Centre sub-precinct A
Areas of cultural value	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> National Grid Corridor Overlay - National Grid Yard Uncompromised National Grid Corridor Overlay - National Grid Subdivision Corridor
Other non-statutory features	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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.

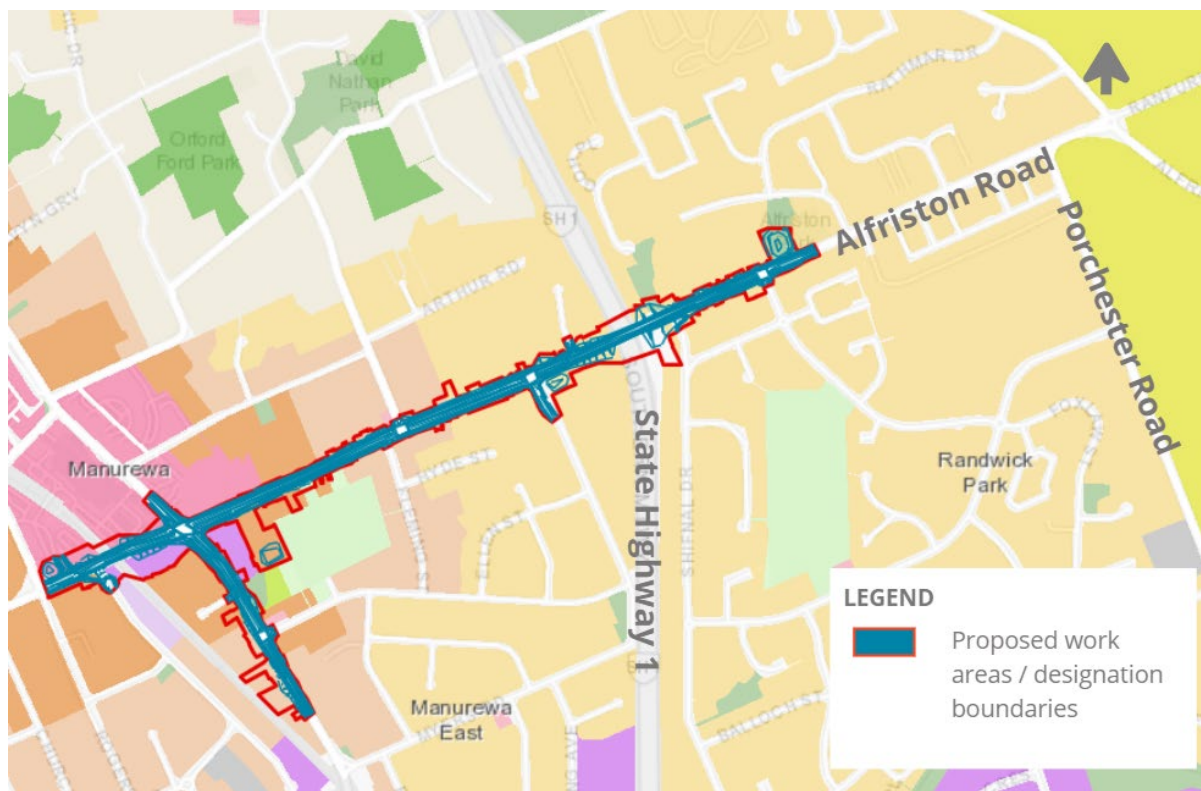










Figure 9-4: Current zoning surrounding NoR 3

Table 9-5: NoR 3 receiving environment

Features	Description
Current land use	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Several piped tributaries of Papakura Stream
Significant Ecological Areas	<ul style="list-style-type: none"> None
Historic heritage and archaeological values	<ul style="list-style-type: none"> Manurewa Railway Station (R11/3477 NZAA) Refer to Section 10.9 for further discussion
Precincts	<ul style="list-style-type: none"> None
Areas of cultural value	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Notable Trees Overlay <u>Within designation boundary</u> <ul style="list-style-type: none"> 1471, Norfolk Island Pine, Unverified position of tree (<i>Noted - removed as part of Plan Change 83: Additions and amendments to Schedule 10 Notable Trees Schedule</i>)
	<ul style="list-style-type: none"> National Grid Corridor Overlay – National Grid Yard Uncompromised National Grid Corridor Overlay – National Grid Subdivision Corridor
	<ul style="list-style-type: none"> High-Use Aquifer Management Areas Overlay [rp] - Clevedon West Waitemata Aquifer
Other non statutory features	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Manurewa Samoan Methodist Church BestStart Porchester Road Porchester Islamic Centre

Features	Description
	<ul style="list-style-type: none"> The Church of Jesus Christ of Latter-day Saints Te Kura Akonga O Manurew Cambodian Temple Takanini (Wat Khemeraphiratam) PlaceMakers Takanini
Watercourses	<ul style="list-style-type: none"> Papakura Stream
Significant Ecological Areas	<ul style="list-style-type: none"> None
Historic heritage and archaeological values	<ul style="list-style-type: none"> Gorrie McInnes Homestead (R11/2077 NZAA) John de Carteret Flax Mill (R11/2078 NZAA) Refer to Section 10.9 for further discussion
Precincts	<ul style="list-style-type: none"> Takaanini sub-precinct A, Precinct Takaanini sub-precinct C, Precinct
Areas of cultural value	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 200 Ardmore Airport purposes (Ardmore Airport Ltd) 1102 Obstacle Limitation, Runway Protection and Ground Light Restriction (Auckland International Airport Ltd)
Overlays	<ul style="list-style-type: none"> National Grid Corridor Overlay – National Grid Yard Uncompromised National Grid Corridor Overlay – National Grid Subdivision Corridor
	<ul style="list-style-type: none"> High-Use Aquifer Management Areas Overlay [rp] – Clevedon West Waitemata Aquifer High-Use Stream Management Areas Overlay [rp]
Other non-statutory features	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 signalling 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)
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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 remain 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 intensify 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 LAeq(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.

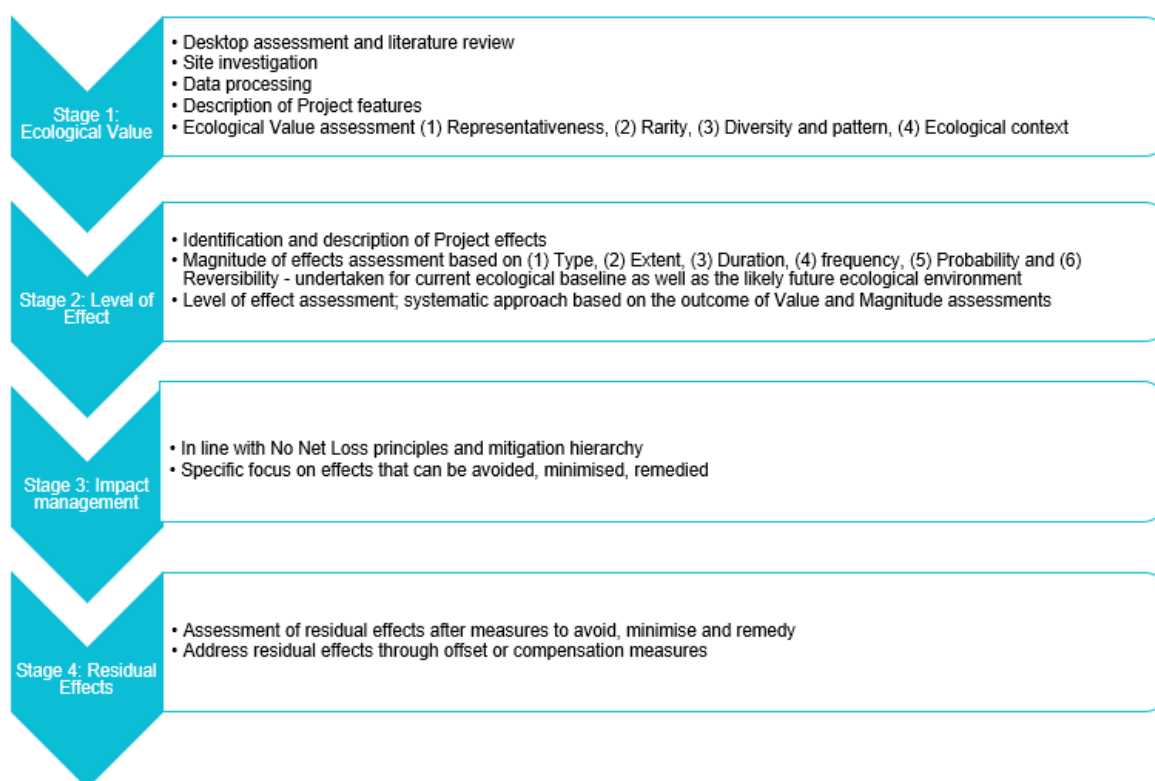


Figure 10-1: Ecological assessment approach

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 vegetation¹², 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 (2.1° and 3.8 ° 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 minimise 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 3.8° 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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, ULDM, 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 ULDM 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 ULDM, 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/Rārangī 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.
	257 Great South Road		Bungalow	Building avoided, possible effects to context / frontage.
NoR 2 (Great South Road Upgrade (Drury Section))				
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	<ul style="list-style-type: none">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	<ul style="list-style-type: none">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	<ul style="list-style-type: none"> 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	-	<ul style="list-style-type: none"> 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	-	<ul style="list-style-type: none"> 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 Ngātahī, 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 Waiohū, Ngāti Tamaoho and Te Ākitai Waiohū.

At the time of finalising this AEE:

- Ngaati Te Ata Waiohū 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 Waiohū 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 Waiohū 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	<ul style="list-style-type: none"> Construction Traffic Management Plan Stakeholder Communication and Engagement Management Plan Existing Property Access
Landscape and Visual	<ul style="list-style-type: none"> Construction Environmental Management Plan Urban and Landscape Design Management Plan Land Use Integration Process Open Space Management Plan
Noise and vibration	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Tree Management Plan Urban and Landscape Design Management Plan
Terrestrial ecology	<ul style="list-style-type: none"> Pre-Construction Native Lizard Survey Lizard Management Plan
Flooding	<ul style="list-style-type: none"> Construction Environmental Management Plan Flood Hazard
Social	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Historic Heritage Management Plan
Network utilities	<ul style="list-style-type: none"> Network Utilities Management Plan

Matter	Condition
Cultural	<ul style="list-style-type: none"> • 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)	<p>The following NPS's are considered relevant to the Project:</p> <ul style="list-style-type: none">• 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	<p>The Auckland Regional Policy Statement (RPS), contained in Chapter B of the AUP:OP, is relevant to this application. In particular:</p> <ul style="list-style-type: none"> • 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	<p>The following district plan provisions in the AUP:OP are considered relevant to this application:</p> <ul style="list-style-type: none"> • Chapter D – Overlays <ul style="list-style-type: none"> • D1 – High Use Aquifer Management Areas • D9 – Significant Ecological Areas • D13 – Notable Trees • D17 – Historic Heritage • D26 – National Grid Corridor • Chapter E – Auckland-Wide <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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
		<p>E26.2.2(7); E26.2.2(14), E26.2.2(15)</p> <p>E25.2(1), E25.2(4), E25.3(2), E25.3(11)</p> <p>E12.2(1), E12.3(1), E12.3(3), E12.3(4), E12.3(5), E12.3(6)</p>	<p>Assessment</p> <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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 109m² 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
			<ul style="list-style-type: none"> 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	<p>Summary of relevant objectives and policies</p> <ul style="list-style-type: none"> 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. <p>Assessment</p> <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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
			<p>promote greater accessibility and mobility by public transport, walking, and cycling; and contributes to mode shift, greater travel choice, and reductions in transport emissions.</p> <ul style="list-style-type: none"> • 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	<p>Summary of relevant objectives and policies</p> <ul style="list-style-type: none"> 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. <p>Assessment</p> <ul style="list-style-type: none"> 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
			<ul style="list-style-type: none"> • Terrestrial Ecology – The Project has avoided any effects on SEAs, noting that the 109m² 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)	<p>Summary of relevant objectives and policies</p> <ul style="list-style-type: none"> • 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. <p>Assessment</p> <ul style="list-style-type: none"> • 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)	<p>Summary of relevant objectives and policies</p> <ul style="list-style-type: none"> 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. <p>Assessment</p> <ul style="list-style-type: none"> 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
			<p>Acknowledgement Area. As noted at Section 4.3 of the AEE, Ngāti Tamaoho have been engaged as partners throughout the development of the Project.</p> <ul style="list-style-type: none"> 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	<p>Summary of relevant objectives and policies</p> <ul style="list-style-type: none"> 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. <p>Assessment</p> <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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
<p>Government Policy Statement (GPS) on Land Transport for 2021/22-2030/31¹⁴</p> <ul style="list-style-type: none"> • 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.
<p>Climate Change Response Act 2002 and Emissions Reduction Plan (ERP) 2022</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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
<p>Auckland Plan 2050</p> <ul style="list-style-type: none"> • 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	<p>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.</p> <p>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.</p>
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	<p>The Project does not impact on any areas of significant indigenous vegetation beyond a 109m² extent of the Kirks Bush SEA which is already within road reserve. No further SNAs have been identified in the ecological assessment.</p> <p>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.</p>
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	<p>As noted in Section 4.3, Manawhenua have been actively involved in a partnership capacity throughout the development of the Project.</p> <p>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.</p> <p>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.</p> <p>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</p>

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	<p>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.</p> <p>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.</p>

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

Appendix A

Assessment of Alternatives

VOLUME 2

South Frequent Transit Network Appendix A

October 2023

Version 1

Document Status

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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
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan – Operative in Part
CFAF	Corridor Form Assessment Framework
DBC	Detailed Business Case
EAST	Early Assessment Sifting Tool
ERP	Emissions Reduction Plan
FDS	Future Development Strategy
FTN	Frequent Transit Network
IBC	Indicative Business Case
GPS	Government Policy Statement on Land Transport
ISTN	Indicative Strategic Transport Network
LOS	Level of Service
MCA	Multi-criteria analysis
MDRS	Medium Density Residential Standards
NIMT	Trunk railway line
NoR	Notice of Requirement
NPS-FM	National Policy Statement on Freshwater Management
NPS-IB	National Policy Statement on Indigenous Biodiversity
NPS-UD	National Policy Statement on Urban Development
NZUP	NZ Upgrade Programme
P2D	Papakura-to-Drury
PBC	Programme Business Case
PC78	Plan Change 78

Acronym/Term	Description
RMA	Resource Management Act 1991
RASF	Roads and Streets Framework
SH1	State Highway 1
South FTN	South Frequent Transit Network
SME	Subject Matter Experts
SSBC	Single-Stage Business Case
Te Tupu Ngātahi	Te Tupu Ngātahi Supporting Growth
TFUG	Transport for Future Urban Growth (PBC)
VKT	Vehicle Kilometres Travelled
Waka Kotahi	Waka Kotahi NZ Transport Agency

1 Introduction

1.1 Purpose of this report

This assessment of alternatives report has been prepared by Te Tupu Ngātahi Supporting Growth (**Te Tupu Ngātahi**)¹, 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. Auckland Transport (**AT**) is the Requiring Authority for the NoRs under the Resource Management Act 1991 (**RMA**).

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**)² bus services 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
- Upgrade of adjoining **Key Connections** to the FTN – Popes Road, and the Drury section of Great South Road between Waihoehoe Road and State Highway 1 (**SH1**).

Collectively, this transport package is referred to as the South FTN. The total extent of the South FTN network is shown in Figure 1-1.

Section 171(1)(b) of the RMA requires that when making a recommendation on an NoR, a territorial authority shall consider whether adequate consideration has been given to alternative sites, routes, and methods 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 a significant adverse effect on the environment. There are several principles for a requiring authority to apply and adhere to when undertaking an assessment of alternatives. 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 South FTN and as such is required to give adequate consideration to alternative sites, routes, and methods. The purpose of this report is to document the consideration given to alternative sites, routes, and methods for the South FTN.

1.2 The South FTN network

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,

¹ Te Tupu Ngātahi is a collaboration between Auckland Transport (**AT**) and Waka Kotahi NZ Transport Agency (**Waka Kotahi**) to investigate, plan, and undertake route protection for the strategic transport networks needed to support Auckland's growth over the next 30 years.

² FTN services are defined in AT's Regional Public Transport Plan (RPTP) as bus routes operating at least every 15 minutes between 7am-7pm, 7 days-a-week, often supported by priority measures such as bus or transit lanes.

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.

Of the full South FTN network extent shown in Figure 1-1, only a portion falls within the proposed NoRs (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.

1.3 The NoRs – proposed spatial extent

For clarity, it is noted that not all of the optioneering documented in this report has resulted in proposed transport upgrades which require additional land take. This is because the proposed corridor upgrades can be undertaken within the existing road reserve controlled by the Requiring Authority, AT. Accordingly, some of the alternatives/options assessment outlined in this report covers options which will assist to deliver the South FTN network, but do not require NoRs and have not been included in the NoRs now proposed to enable the South FTN. These instances are documented where relevant in the report.

Consequently, only a portion of the full South FTN network extent (shown in Figure 1-1) falls within the NoRs (see Figure 1-2).

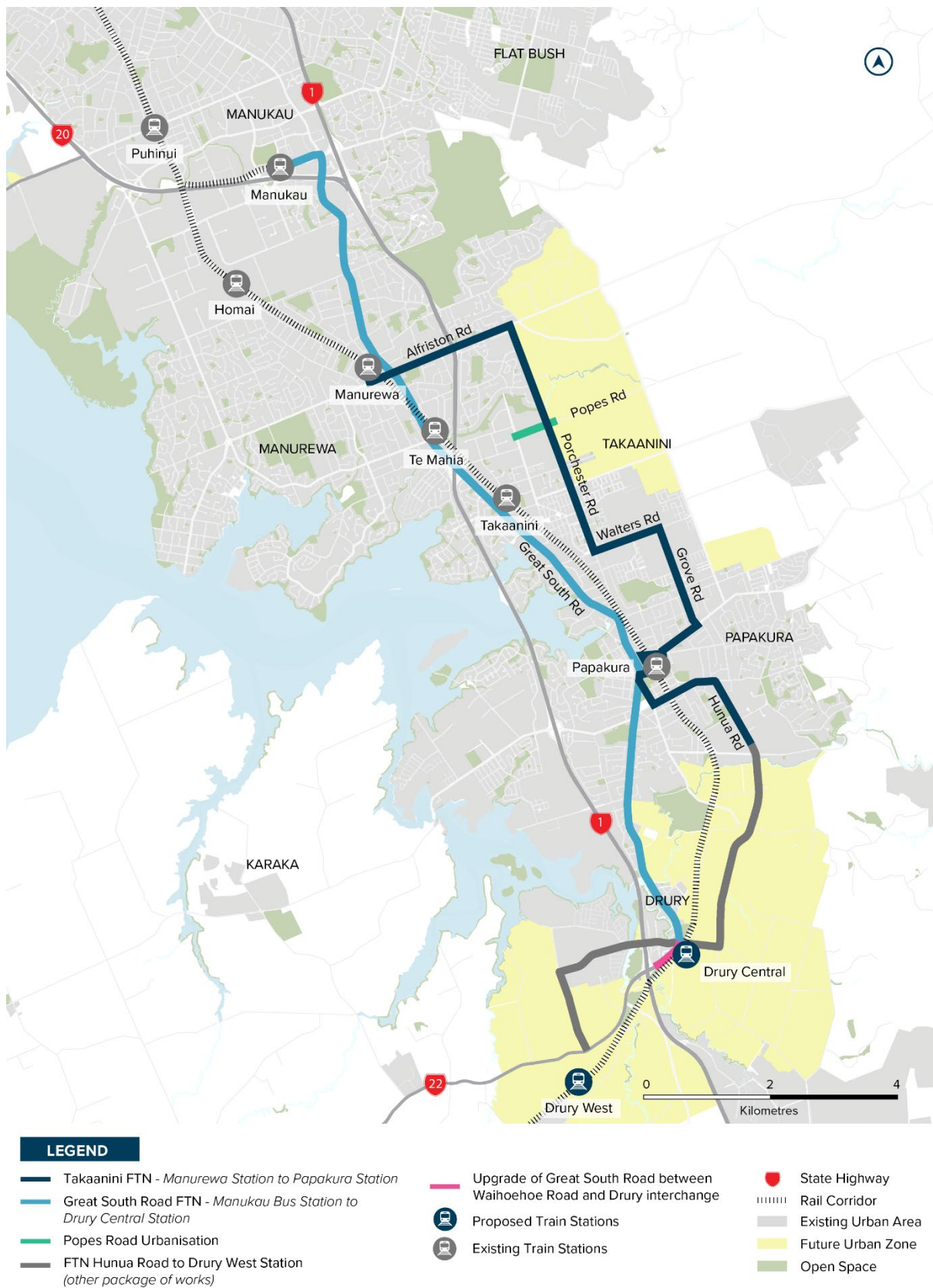


Figure 1-1: South FTN extent



Figure 1-2: South FTN - NoR extents

1.4 Report structure

This report is divided into two key parts (Parts A and B) to separate out optioneering considerations that are relevant to the whole of the South FTN (Part A) from the optioneering considerations relevant to each of the constituent routes/connections. Each part in turn comprises sections outlining the relevant optioneering processes. This structure is summarised at Table 1-1 below.

Table 1-1: South FTN Alternatives Assessment – report structure

Part	Section	Matters covered
Part A – Whole-of-South FTN considerations	2	Business case context
		Gap analysis – South Indicative Business Case (IBC) to South FTN Detailed Business Case (DBC)
	3	General methodology
Part B– Assessment of Alternatives	4	Great South FTN
	5	Takaanini FTN
	6	Key Connections
	7	Alternative statutory methods
	8	Conclusion

PART A: WHOLE-OF-SOUTH FTN CONSIDERATIONS

2 Previous business case process

2.1 Summary of the business case process

Te Tupu Ngātahi was formed to investigate, plan, and undertake route protection for the strategic transport networks needed to support growth in Auckland over the next 30 years. These networks are developed through a business case process, and route protection is generally secured subsequently through designations under the RMA. The South FTN is one of the projects identified by Te Tupu Ngātahi through the business case process. The alternatives assessment for the South FTN documented in this report was undertaken initially as part of the business case process.

The business case process for Te Tupu Ngātahi is iterative, and has comprised:

- A Programme Business Case (**PBC**) was completed in 2016 and identified a high-level preferred transport network across all of Auckland's growth areas;
- Four Indicative Business Cases (**IBC**) were completed in 2019 (for the Warkworth, Northern, North-Western, and the Southern growth areas), each identifying an Indicative Strategic Transport Network (**ISTN**) for each sub-region; and
- A total of nine Detailed Business Cases (**DBC**) each covering a package of projects derived from the wider ISTN. One DBC specifically covered the South FTN (see Figure 1-1).

The analysis in each successive business case becomes more detailed and spatially focused, with each building on the last. The initial focus at the PBC and IBC stage is on identifying networks at a regional and sub-regional level. The focus subsequently localises to a project-specific level of analysis at the DBC stage. The optioneering process for the South FTN documented in this report is therefore largely derived from the South FTN DBC options assessment, which in turn used earlier IBC analysis and the ISTN as a starting point.

As shown in Figure 2-1, the South FTN DBC was undertaken in parallel with other DBCs progressing other parts of the ISTN – in particular, the Takaanini Level Crossings (**TLC**) DBC. Because both the TLC and South FTN considered east-west crossings of the North Island Main Trunk (**NIMT**) railway, some aspects of early optioneering were undertaken concurrently between the two projects. This is noted where relevant in this report.

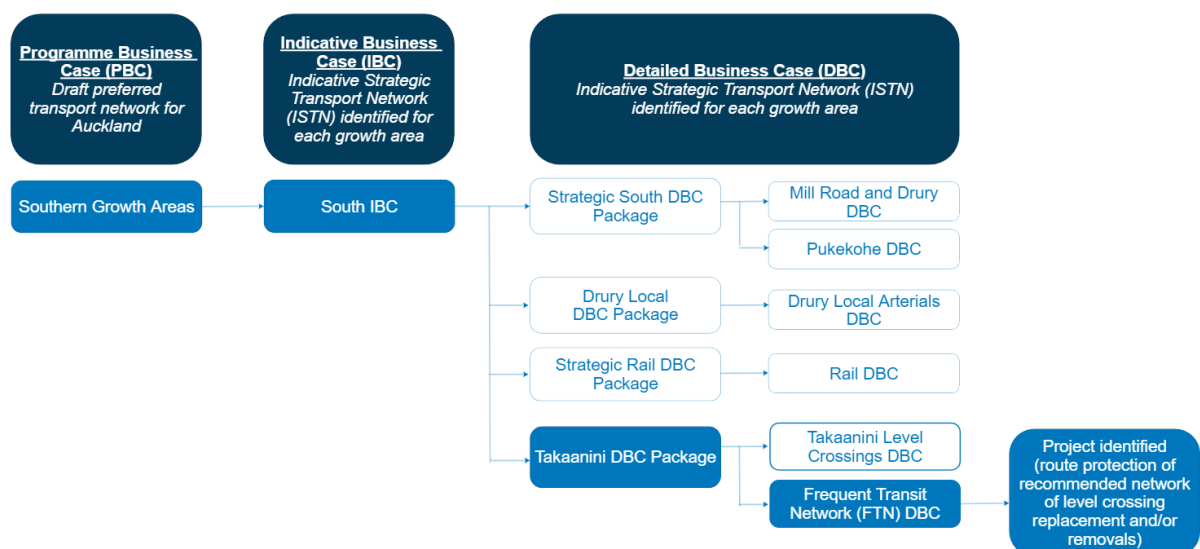


Figure 2-1: Business case process leading to the identification of the South FTN

2.2 Relevant recommendations of the South IBC

As noted above, the ISTN identified through the South IBC was the starting point for further option assessment through DBCs. The South IBC was itself the subject of an extensive optioneering process in 2018-2019. The initial IBC option longlist comprised some 484 network and corridor options for transport interventions for the entire southern growth area. This was narrowed down to an amalgamated longlist of 151 options following a screening process, which were sorted according to relevant modes/intervention categories for shortlisting and assessment through Multi-Criteria Assessments (MCA). The relevant assessments to the South FTN are summarised below.

2.2.1 Mass transit option grouping

The 'strategic connections' shortlist included 'Mass Transit – Bus' options, intended to "provide access to and from areas not well serviced by the rail corridor... improve connecting public transport services to support rail... [and] provide high quality public transport directly into new urban areas".³

Following multiple multi-criteria assessments, the following four FTN options were identified as part of the recommendations of the IBC, and included in the ISTN (see Figure 2-2):

- **Option MT3C** – FTN on Great South Road from Drury to Manukau;
- **Option MT4I** – FTN between Drury and Takaanini via Jesmond Road, Bremner Road, Waihoehoe Road, the proposed Ōpāheke North-South Arterial, Porchester Road, Popes Road, Rangi Road (subsequently crossing SH1 and the NIMT to join option MT3C on Great South Road);
- **Option MT4K** – FTN between Drury and Puhinui via SH1 bus shoulders, Mahia Road, and Roscommon Road; and
- **Option MT4L** – Express bus transit between Drury and Manukau via SH1 bus shoulders, Orams Road, and Druces Road.

³ South IBC Appendix B – Options Assessment Report, p. 223.

2.2.2 Other option groupings

In addition to these FTN options, the IBC shortlist also included option groupings for 'Drury-Ōpāheke eastern arterials' (see Figure 2-3), and 'Takaanini East-West Crossings' (see Figure 2-4). A number of options from these shortlist groupings interact with the FTN options and were included in the ISTN, most relevantly including:

- **Option AR10** – comprising the proposed Ōpāheke North-South arterial (forming part of FTN option MT4I noted above), and the urbanisation of Hunua Road and Croskery Road (see Figure 2-3); and
- **Option EW9B** – comprising a series of east-west connections in the Takaanini area with grade-separated rail crossing. This option included an east-west corridor comprising a viaduct over SH1 and the NIMT connecting Rangi Road to Mahia Road, and urbanisation of Rangi Road and Popes Road (see Figure 2-4). This route forms part of option MT4I.

Each of the options listed above were included in the ISTN (see Figure 2-5), and thus formed the starting point for the South FTN DBC.

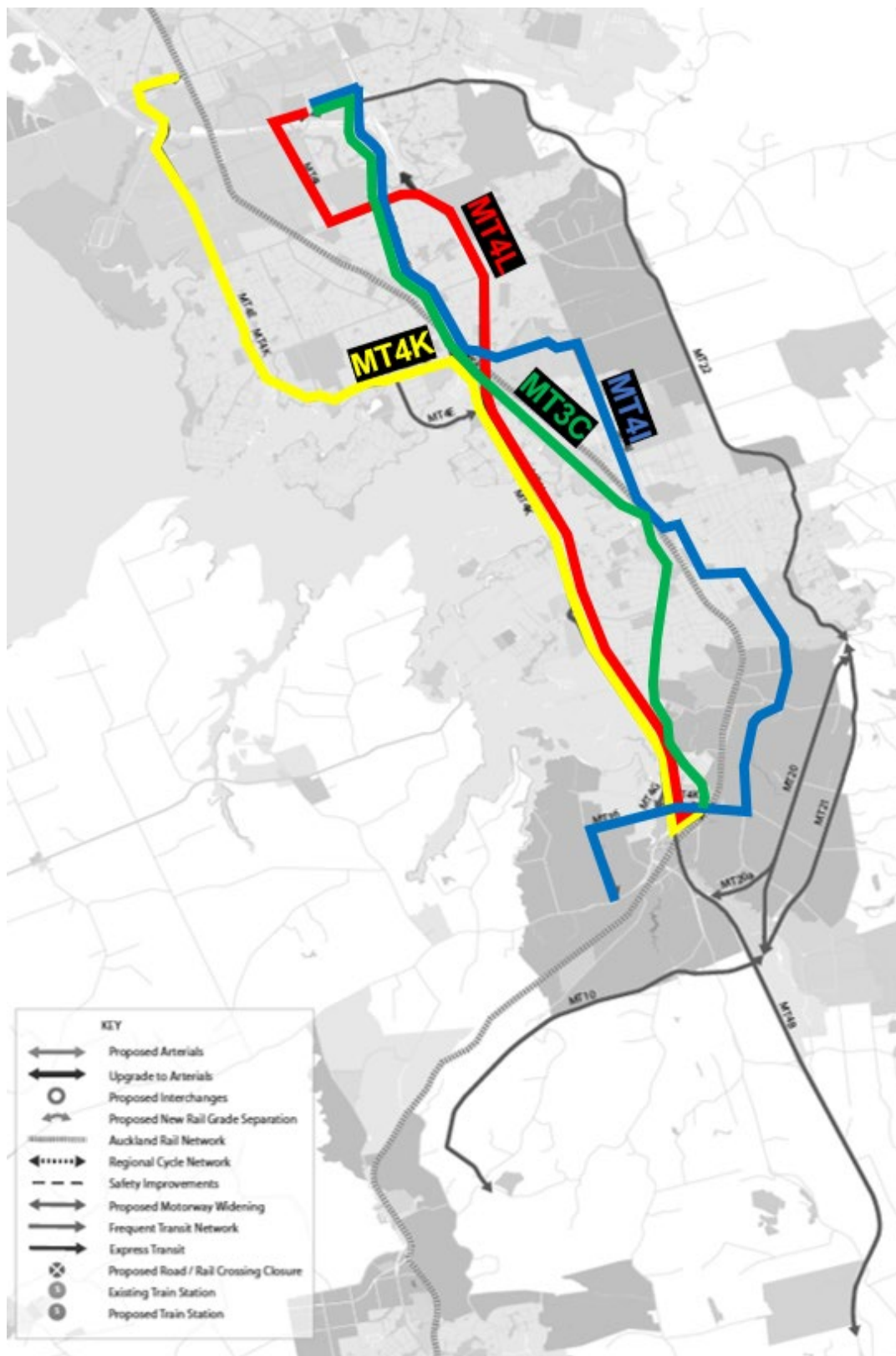


Figure 2-2: FTN options included in the ISTN – MT3C, MT4I, MT4K, and MT4L. Other FTN routing options which were discarded at the IBC shortlisting stage are shown in grey.

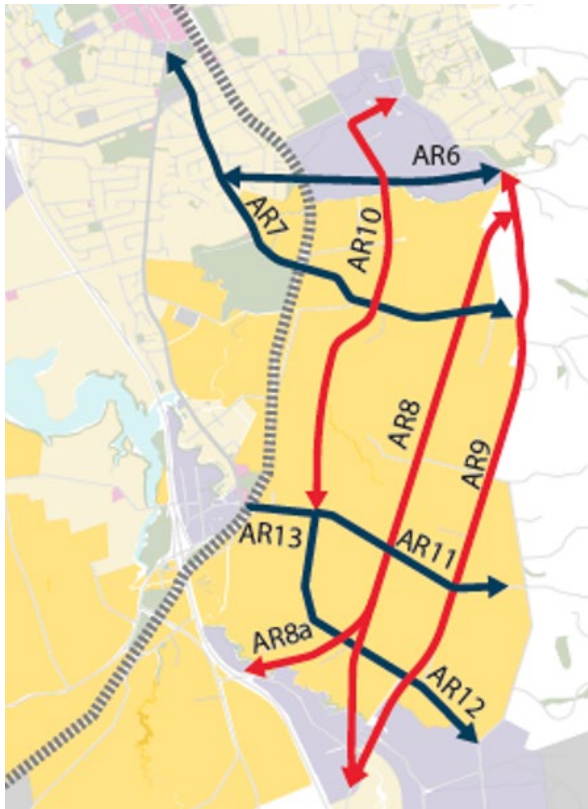


Figure 2-3 Shortlisted IBC options for Drury-Ōpāheke eastern arterial options – note option AR10 (included in the ISTN) which includes the Ōpāheke North-South arterial, the urbanisation of Hunua Road, and Croskery Road which forms part of FTN option

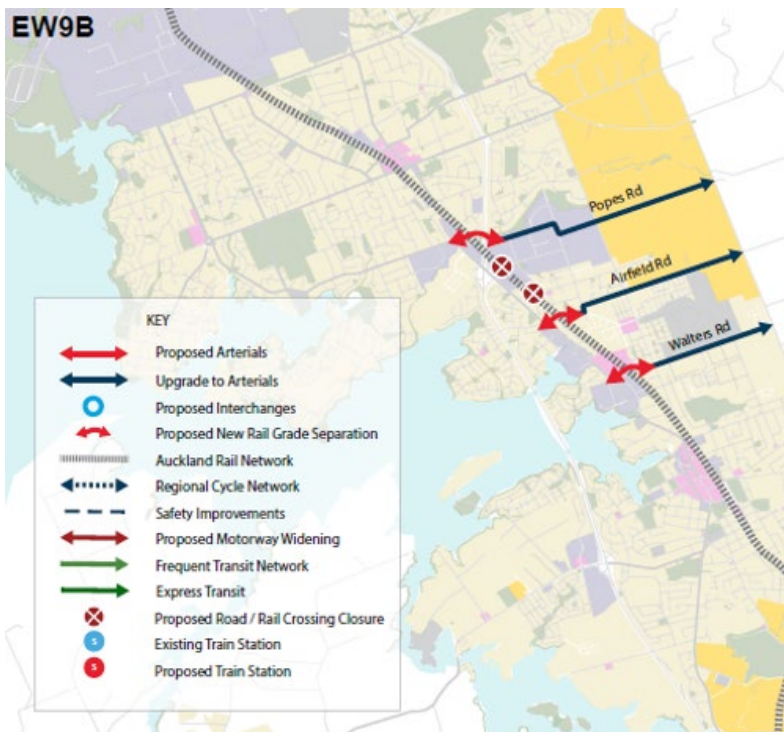


Figure 2-4: Preferred IBC option for Takaanini east-west crossings as included in the ISTN, including the northernmost corridor encompassing a Rangī Road viaduct, and upgrades to Rangī Road and Popes Road

SOUTH INDICATIVE STRATEGIC TRANSPORT NETWORK

JULY 2019

Projects described in these maps have been identified by indicative business cases and will require further technical investigation, engagement with communities and landowners and statutory approvals before their final detail, location or land requirement is confirmed. They are also yet to be prioritised for funding for delivery over the next 10-30 years.

RAIL CORRIDOR UPGRADE

- 1 Rail upgrade from Papakura to Pukekohe
- 2 Closure of Manurewa Road and Spartan Road rail crossings to vehicles
- 3 New grade separated rail crossings at Taka Street and Walters Road
- 4 New train station – Drury Central
- 5 New train station – Drury West
- 6 New train station – Paerata

NEW OR IMPROVED PUBLIC TRANSPORT CORRIDOR

- 7 Frequent Transit Networks (FTNs) routes using SH1 and arterial roads to connect to town centres, and the major centres of Papakura, Drury and Manukau

NEW WALKING AND CYCLING CORRIDOR

- 8 Strategic walking and cycling corridor to connect to SH1 Strategic Cycleway

NEW OR IMPROVED TRANSPORT CORRIDOR

- 9 Mill Road Corridor including northern connections
- 10 Additional long term upgrades to SH1 between Manukau and Takaanini
- 11 Upgrade Mahia Road and Popes Road (including a new grade separated rail and SH1 crossing)
- 12 Upgrade Opāheke Road and Ponga Road
- 13 New arterial between Papakura industrial area, to Waihoehoe Road
- 14 Upgrade Jesmond Road, Bremner Road and Waihoehoe Road
- 15 Upgrade Drury West section of SH22
- 16 Connections from SH22 to the Pukekohe Expressway
- 17 New Pukekohe Expressway connecting Pukekohe to SH1
- 18 Pukekohe Ring Road
- 19 Upgrade Mill Road between Harrisville Road intersection and the Bombay interchange

SAFETY IMPROVEMENTS

- 20 Safety improvements to Alfriston Road, Brookby Road, Papakura-Clevedon Road, Hingaia Road, Hunua Road, Linwood Road, Walters Road, Blackbridge Road, Glenbrook Road, Kingseat Road, McKenzie Road, Ostrich/Woodhouse Road, Pukekohe East Road, Logan Road, Waiuku Road and Buckland Road.

OTHER PRIORITY PROJECTS

- 21 Rail electrification from Papakura to Pukekohe
- 22 SH1 Papakura to Bombay Project
- 23 Safe Networks Programme: SH22 Safety Improvements

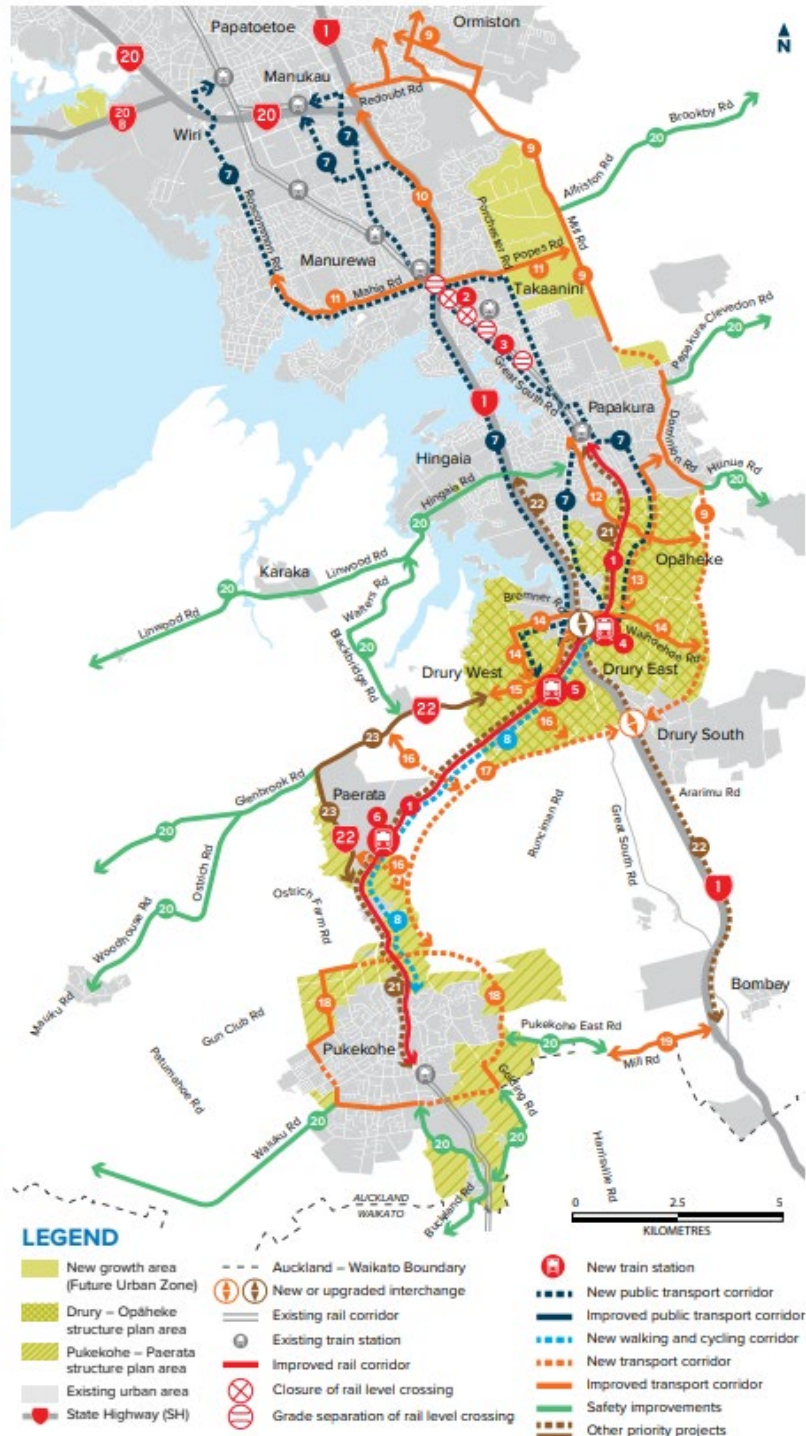


Figure 2-5: South Indicative Strategic Transport Network – note the four FTN routes identified in the IBC shown in dark blue annotated as ‘7’ and the east-west crossing including the Rangi Road viaduct shown in orange annotated as ‘11’

2.3 Gap analysis – IBC to DBC

At the outset of the South FTN DBC, a gap analysis was undertaken to capture changes in the strategic context that have occurred since the completion of the South IBC; and test the IBC assessment and conclusions in the context of new information. This process recognises that the IBC was completed in 2019, that changes in the context for the South FTN have occurred in the intervening period; and that such changes could change the scope of optioneering required for the DBC and/or the merits of conclusions in the IBC.

The key contextual changes that are directly relevant to the scope and merits of options for the South FTN are summarised in Table 2-1 below.

Table 2-1: Key contextual changes since the South IBC pertinent to the South FTN

Change	Explanation / relevance to South FTN optioneering
Changes to related transport projects	
Decision to progress the southern portion of IBC option MT4I as part of the Drury Arterials Package	<p>The portion of IBC FTN route option MT4I between Drury and Papakura is proposed to utilise Jesmond Road, Bremner Road, Waihoehoe Road, a new Ōpāheke north-south arterial road, and Hunua Road. This part of the route follows IBC option AR10 shown above.</p> <p>With the exception of Croskery Road, these corridors have subsequently been progressed as part of the Drury Arterials DBC by Te Tupu Ngātahi, and are now designated. Accordingly, this section of the corridor is out of scope with no further optioneering required (apart from Croskery Road which is now in the scope of the South FTN DBC).</p>
Decision to progress SH1 shoulder lanes as part of the Waka Kotahi Papakura-to-Drury (P2D) Project.	<p>Two of the FTN route options identified in the IBC (options MT4K and MT4L) utilise sections of SH1 between Drury and Manukau. The shoulder lanes necessary to support such services now fall within the scope of Waka Kotahi's P2D Project, and accordingly are now outside the scope of the South FTN. Accordingly, no further optioneering has taken place progressing options utilising SH1.</p> <p>It is noted that these options also utilised a section of Great South Road east of the Drury Interchange. The decision to discard these options results in the need to examine this section of Great South Road separately (see Section 6 of this report).</p>
Decision to progress Mahia and Roscommon Road corridors separately from South FTN DBC.	<p>One of the FTN route options identified in the IBC (option MT4K) utilises the Mahia and Roscommon Road corridors. These two corridors are now being progressed as part of a separate project by AT, and funding was secured to run a new FTN route along these corridors as part of Auckland Council's 2022-23 Annual Budget.</p> <p>Moreover, an FTN connection from Mahia/Roscommon to Puhinui Station as envisaged in option MT4K was confirmed to no longer be supported by AT subject matter experts (SME).</p> <p>Accordingly, no further optioneering has taken place progressing options utilising Mahia and Roscommon Roads.</p>
Progress on Single-Stage Business Cases (SSBC) for shorter-term interventions on Great South Road	<p>Great South Road north of Papakura was a part of the Connected Communities programme of business cases to identify shorter-term bus, active mode, and safety improvements. Part of this extent overlaps with the option MT3C identified in the South IBC which proposed a longer-term FTN along Great South Road between Manukau and Drury. Accordingly, the South FTN DBC has given due consideration to these SSBCs to ensure alignment between the proposed short and long-term interventions along Great South Road.</p>

Change	Explanation / relevance to South FTN optioneering
Decision to re-scope Mill Road under the NZ Upgrade Programme (NZUP)	<p>The Mill Road Project was proposed as a four-lane strategic corridor between Manukau and Drury in the South IBC. It has subsequently been rescope as a two-lane corridor focused on safety improvements at its northern end by 2028, with the remainder of the corridor to be route protected subsequently.</p> <p>The relevance of this is that two perpendicular east-west corridors – Popes Road and Croskery Road – still likely have strategic significance as connections to Mill Road. These are now included in the South FTN DBC as complementary (non-FTN) corridors (see Section 6 of this report).</p>
Decision to implement NZUP Drury package	<p>In addition to the P2D Project, two projects identified in the South IBC – the Drury Central Station and the urbanisation of Waihoehoe Road – have since been designated/consented (in the case of Drury Central) and designated (in the case of Waihoehoe Road), and funded under NZUP with a view towards implementation by 2025. This has left an adjoining short section of Great South Road in Drury in need of corresponding planning for urbanisation to ensure that the projects form a cohesive whole. This section of Great South Road is now in the scope of the South FTN DBC as a complementary (non-FTN) corridor.</p>
Growth and Land Use	
Legislation and policy directing councils to enable increased housing supply	<p>The National Policy Statement on Urban Development (NPS-UD) and the Medium Density Residential Standards (MDRS) (legislated through the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021 set clear direction for councils to enable increased housing supply in high-growth areas. Auckland Council's response came in the form of Plan Change 78 (PC78) which was notified in August 2022.</p> <p>These changes signal that growth in South Auckland will continue to be provided for, which in turn will result in travel demands necessitating multi-modal transport improvements such as the South FTN.</p>
Updates to Auckland Forecasting Centre (AFC) growth scenarios	<p>The DBC considers changes in land use assumptions, and utilises the most current land use assumptions available from the AFC. Since the completion of the IBC, there have been updates to growth scenarios used in Auckland which are reflected in this DBC. Scenario I11.6 has been used in this DBC which is consistent with current regional models, and no significant changes have been identified in comparison with the previous version I11.4 which was used in the IBC.</p>
Private Plan Changes	<p>Since the IBC, Plan Changes 52 and 58 have been approved along Great South Road in the Ōpāheke area; and Plan Change 67 has also upzoned parts of the Hingaia Peninsula. Recently approved plan Changes 48, 49, 50, 51, and 61 in the Drury area will enable significant urbanisation at the southern end of South FTN extent. Moreover, the Project Team is aware that pre-lodgement discussions are underway for large Plan Changes in the Alfriston and Ardmore areas.</p> <p>These Plan Changes signal that growth in South FTN project area is continuing to be planned and provided for, which in turn will result in travel demands necessitating multi-modal transport improvements such as the South FTN.</p>
Transport and Climate Change legislation and policy	
Government Policy Statement on Land Transport (GPS) 2021 (and indicative GPS 2024)	<p>The current GPS signals greater focus on projects that provide for better travel options/mode shift to sustainable modes, and contribute to a low-carbon transport system that supports emissions reduction. This direction is further strengthened in the indicative 2024 GPS which elevates emissions reduction to being the overarching focus for transport investment. The South FTN is well-aligned with these directives.</p>

Change	Explanation / relevance to South FTN optioneering
Passage of the Zero Carbon Act and associated long-term target and Emissions Reduction Plans (ERP)(and parallel amendments to the RMA)	<p>The Climate Change Response (Zero Carbon) Amendment Act 2019 set in place a framework for emissions reduction comprising a long-term target of net-zero greenhouse gas emissions by 2050, and a system of quinquennial emissions budgets and ERPs as 'stepping stones' to the long-term target. The first ERP, published in 2022, sets a target of reducing vehicle kilometres travelled (VKT) by 20 percent by 2035 through providing better travel options. The South FTN is well-aligned with this objective.</p> <p>In parallel, sections 70A and 104E of the RMA have been amended to enable the consideration of greenhouse gas emissions on climate change in both plan-making and consenting decisions. Furthermore, sections 61, 66, and 74 of the RMA have been amended to require that local authorities must have regard to ERPs and national adaptation plans when making and amending regional policy statements, regional plans, and district plans.</p> <p>Finally, the NPS-UD set under the RMA sets an objective that New Zealand's urban environments support reductions in greenhouse gas emissions; and a related policy requiring planning decisions to contribute to well-functioning urban environments, which urban environments which support reductions in greenhouse gas emissions.</p> <p>All of the above considerations place an increased onus for transport projects to demonstrate how they contribute to greenhouse gas emissions reduction.</p>
Changes in environmental planning context	
New NPS for Freshwater Management and Indigenous Biodiversity	In addition to the NPS-UD discussed above, new NPS's on Freshwater Management (NPS-FM) and Indigenous Biodiversity (NPS-IB) have come into effect since the completion of the IBC. The Project Team have considered the implications of these in the process of developing and assessing options to the extent relevant (noting that the NPS-IB has only come into effect recently).
Updated flooding data from Auckland Council Healthy Waters	Flooding data from Auckland Council Healthy Waters has been updated since the IBC. This has informed the development and assessment of DBC options.

The contextual changes summarised in Table 2-1 have directly informed the scope of the South FTN and the optioneering documented in this report. In particular:

- Changes to related projects have resulted in a reduced scope of optioneering to be taken forward in the DBC compared with the FTN options identified in the IBC. The four FTN routes identified in the IBC are now reduced to two routes as a result of decisions to remove SH1, Mahia Road, and Roscommon Road from the scope (see Figure 2-6);
- Some sections of the remaining routes have already been designated as part of the Drury Arterials package⁴ (i.e. the Ōpāheke North-South Arterial between Papakura and Drury). However, this package omitted adjoining sections of Hunua Road and Croskery Road, which are now part of the South FTN DBC (see Figure 2-6);
- Changes to land use, transport, and climate change legislation and policy are strongly aligned with the South FTN, and provide strong justification to proceed with further investigation of options for the remaining FTN options; and
- Decisions on the scope of NZUP projects, in particular Mill Road and the Drury package, have informed the need to include complementary corridors (Popes Road and Great South Road at Drury) in the South FTN DBC scope.

⁴ Also a project within Te Tupu Ngātahi.

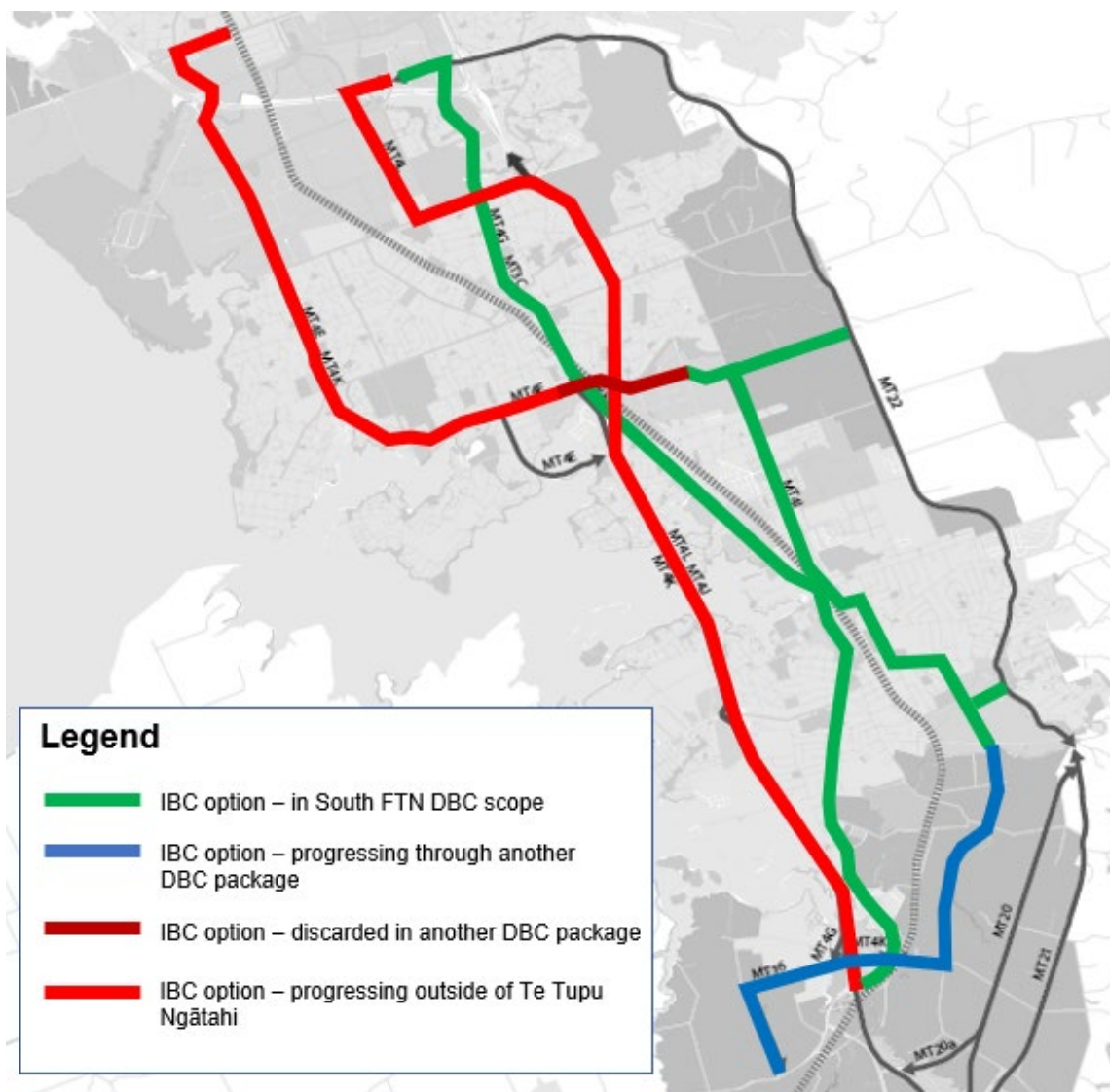


Figure 2-6: Status of IBC FTN options at the commencement of the South FTN DBC process (N.B. Alignments through DBC process evolved as outlined later in this report).

3 General methodology

3.1 Process summary

The optioneering process applied to each of the South FTN corridors is shown in Figure 3-1. In essence, the process can be split into the following deductive steps:

- Steps to identify the preferred **routes** for the South FTN
- Steps to identify the preferred **form and function** for each part of the South FTN 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.

The process is described in greater detail below.

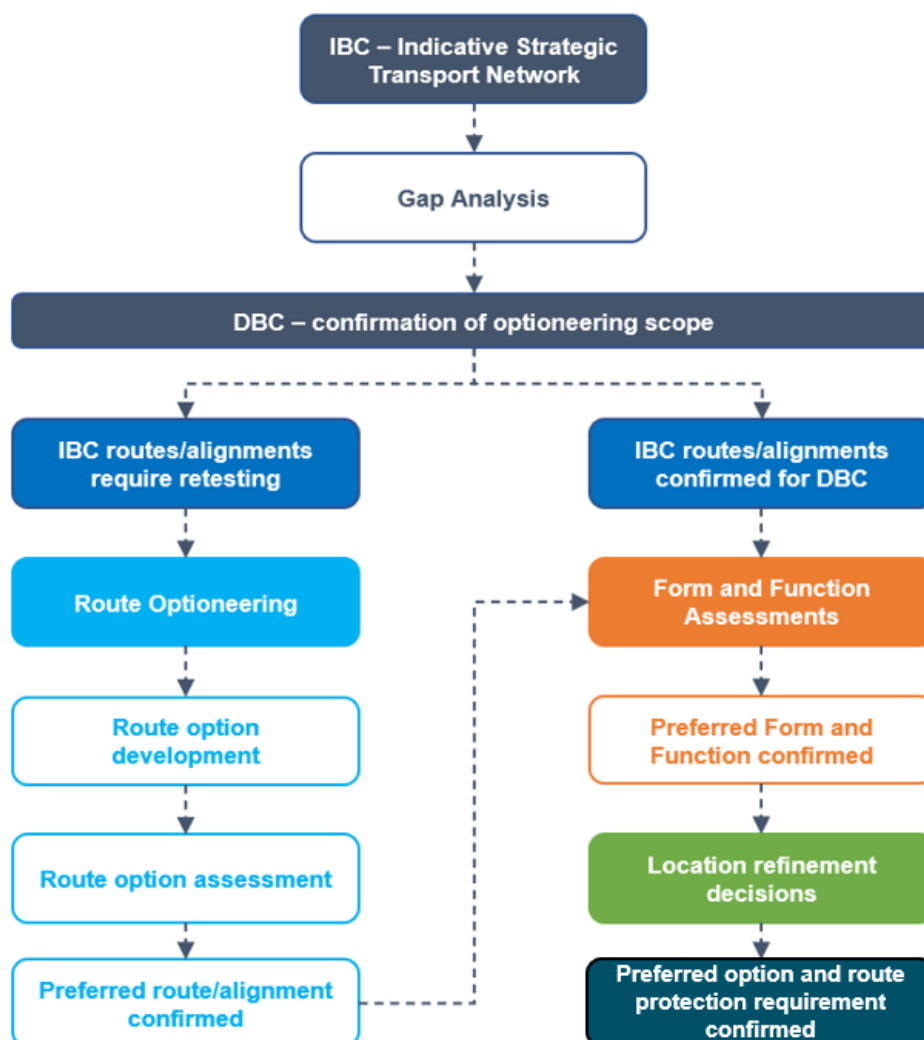


Figure 3-1: DBC optioneering process

3.1.1 Gap analysis and confirmation of DBC optioneering scope

As summarised in Section 2, the South IBC recommended several FTN corridors and related arterial roads for inclusion in the ISTN. The South FTN DBC advances this subset of projects from the ISTN, and therefore uses the ISTN as a starting point for further optioneering.

The first optioneering stage is a gap analysis which captures the contextual changes that have occurred between the IBC and DBC processes. As noted in Section 2.3, this process recognises that the IBC was completed in 2019, that changes in the project context have occurred in the intervening period; and that such changes could change the scope of optioneering required for the DBC and/or the merits of conclusions in the IBC.

The contextual changes identified in the gap analysis that are pertinent to optioneering for the whole South FTN re summarised in Section 2.3 of this report. The localised optioneering for each part of the South FTN (in Part B of this report) identifies which changes from this wider summary are of particular relevance to the route or section in question.

The key aim of the gap analysis process is to confirm the necessary scope of optioneering for the DBC. In the case of the South FTN, the key scoping matter to be determined at the outset is whether or not the IBC route/alignment in question needs to be retested in light of contextual changes. This can include the identification of new options beyond the scope of previously assessed options; and retesting of previously discarded options.

Where retesting is needed, a process of further route optioneering is initiated. Where retesting is not needed, the step is omitted, and the IBC route is validated and taken forward as the basis for subsequent form and function assessment and location refinement.

3.1.2 Route optioneering

Where retesting of an IBC route option is needed, a process of further route optioneering is undertaken. This includes both the development of options to meet the DBC investment objectives, and the assessment of those options. As noted above, where the IBC route is validated through the gap analysis process, this step of further route optioneering is not undertaken.

Option Development

The purpose of option development is to ensure that an appropriate range of routes/alignments to meet the DBC investment objectives are identified for assessment. Inputs to option development included the use of Waka Kotahi's Early Assessment Sifting Tool (**EAST**), consideration of bus routing options provided by AT Metro in Remix software, as well as desktop assessment and constraints analysis.

Option Assessment

The MCA Framework developed for Te Tupu Ngātahi was the primary method used to assess route options where this level of assessment was necessary. This process required all options in a group of options to be scored by relevant SMEs against the DBC investment objectives, and a set of MCA criteria (see Table 3-1). This assessment used an eleven-point scoring scale (see Table 3-2), and also required the experts to provide commentary and rationale for their scores.

Table 3-1: Te Tupu Ngātahi MCA Framework

MCA topic	No.	Criterion	Measure
Investment Objectives			Refer to Appendix A for the DBC investment objectives for South FTN and Key Connections.
Heritage	1a	Heritage	See MCA Framework appendix (Appendix A) for detailed explanation of measures for each criterion.
	1b	Manawhenua ⁵	
Socio-economic impacts	2a	Land use futures	
	2b	Urban design	
	2c	Land requirement	
	2d	Social cohesion	
	2e	Human health and wellbeing	
Natural Environment	3a	Landscape and Visual	
	3b	Stormwater	
	3c	Ecology	
	3d	Natural Hazards	
Transport	4a	Transport System Integration	
	4b	User Safety	
Construction Impacts	5a	Construction impacts on utilities / infrastructure	
	5b	Construction Disruption	
	6	Construction costs / risk / value capture	
Non-Scored Criteria		Stakeholder / Project Partner feedback	
		Policy Analysis	
		Indicative costs	
		Manawhenua	

Table 3-2: MCA Scoring Scale

	-5	-4	-3	-2	-1	0	1	2	3	4	5
Type	Adverse					Neutral	Positive				
Magnitude	HighLow						LowHigh				
Significance	RegionalLocal						LocalRegional				
Extent	SubstantialLow						LowSubstantial				
Duration	>20 years<1 year						<1 year>20 years				

In identifying a preferred route/alignment option, aggregate scoring or weighting of MCA criteria were not produced. This ensured that preferred options were reached through balanced consideration of all

⁵ Note Manawhenua did not wish to score this criterion numerically, and accordingly it was excluded from scoring.

criteria, and that the MCA would not prejudice further feedback received through the engagement process from Project partners, stakeholders, and the public which also informed option assessment.

3.1.3 Form and Function assessment

Following the identification of a preferred route for each part of the South FTN the preferred form and function of the proposed transport upgrade/corridor was then identified to determine its physical extent. The assessment informing the physical extent was divided into corridors (i.e. midblocks), and intersections using the following processes described in the following sections.

These assessment tools discussed below are designed to enable project teams to select appropriate form and function options from a set of modular concept designs developed at a Programme-wide level for both midblock cross-sections and intersection forms. This approach is undertaken on the basis that it provides for a suitable level of detail for route protection and design efficiency, whilst allowing for future design flexibility and changes at the time of implementation. However, in case of the South FTN, the process of defining a preferred form and function has required some refinement and further development of the modular designs to account for local contextual constraints, and the wide range of present-day (i.e. existing urban) road configuration starting points. These are documented where relevant in Part B of this report.

As part of the below processes, the preferred form and function options were also the subject of consultation and endorsement by owner organisation SMEs.

3.1.3.1 Corridor Form and Function (CFAF) process

The CFAF process has been established by Te Tupu Ngātahi to provide a consistent methodology to define the form and functional requirements for transport corridors, and ensure that all modes are considered. It is based on the AT Roads and Streets Framework (**RASF**) guidance which considers a combination of both ‘movement’ and ‘place’ significance on the individual setting:

- **Place factors** consider the existing land use, future land use plans and trip generators present in the catchment area. It also includes an assessment of the future density of residential, industrial, or mixed land use and local/regional trip attraction areas e.g. metro stations, schools, hospitals; and
- **Movement factors** consider the hierarchy of the corridor in the regional road network public transport network, strategic freight network), modal priorities for the corridor and existing and future traffic volumes to determine the future typology and recommendations for a corridor function. Movement is considered at both local and network levels to ensure that duplication of facilities is avoided, and the corridors have targeted modal functions.

In practice, the process systematically considers a range of transport inputs denoting the ‘movement’ significance for each transport mode (e.g. predicted future traffic volumes, bus network planning and predicted bus volumes, and status as freight or active mode routes); and factors denoting the ‘place’ significance such as adjoining land use. The typical output of the process is the identification of a suitable midblock cross-section from a suite of modular concept designs. The cross-section forms the basis for route protection for the corridors.

3.1.3.2 Intersection Assessment process

In parallel to the CFAF process, an intersection assessment process is undertaken to identify which intersections along each route require upgrades, which indicative intersection controls are to be applied where upgrades are required, and the resultant footprint implications.

For the purposes of the intersection assessment the following factors are considered:

- Safety;
- Transport network function (movement) and land use function (place);
- Form and Level of Service (**LOS**) / Quality of service required for different modes;
- Land use integration;
- Site specific constraints;
- Urban form;
- Design constraints;
- Roundabout vs signals guidance;
- Network staging and route protecting;
- Future land use assumptions; and
- Future transport network assumptions.

For each intersection control chosen, design features were also considered to ensure that the intersection meets the needs of different users safely and effectively, and responds to the site-specific factors. The guidance adopts a 'Safe System' approach and recommends roundabouts as the first choice for at-grade intersections due to the safety benefits for vehicular traffic resulting from slowing down through traffic and reducing the number of conflict points. However, where roundabouts are not considered appropriate (for example due to engineering constraints, bus priority implications, existing lane layouts, or land use implications) signalised intersections were then considered.

In identifying which intersections require upgrades as part of the Project, a filtering process was applied which selected intersections based on the following considerations:

- Whether an intersection upgrade would provide for more efficient and reliable bus services – reducing the number of intersections that cause disruption to bus through movement. As part of this, spacing between proposed signalised intersections was considered;
- Whether an intersection upgrade would provide safe crossing points for pedestrians and cyclists to access the public transport network and connect to amenities based on walking catchments;
- Whether there were any site-specific safety concerns such as poor visibility, horizontal/vertical grade issues, and existing uncontrolled intersections at crossroads;
- Side road factors – i.e. the traffic volumes, complexity, status within the road hierarchy; and whether the side road provides access to key destinations such as schools, rapid transit stations, or the wider strategic road network; and
- T-intersections with local roads are generally priority controlled now, and it has been assumed that they will remain priority-controlled in the future.

Following this filtering process, 37 intersections were identified within the extents of the South FTN corridors which are further discussed in Part B of this report. Intersections with local roads are generally priority-controlled and are assumed they will remain priority-controlled in the future.

SIDRA modelling was undertaken to assess the impacts of the intersection form on the wider network. It should be noted that in some cases modelling constraints resulted in limited turning volumes. In these cases, high level assumptions on likely turning movements were utilised.

3.1.4 Location refinement

Following the identification of a preferred form and function for each part of the South FTN, the final step of the optioneering process was to identify and refine alignment and footprint for each part of South FTN. 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;⁶ and
- If required:
 - 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 South FTN.

3.1.5 Identification of preferred option

Following the above location refinement considerations, the emerging preferred option 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 (see Section 3.2 below). The relevant details of the design process are further discussed in Part B of report to the extent necessary to document optioneering.

3.1.6 Finalising the route protection requirement

Following the above documented optioneering process, the spatial requirements for route protection were identified in a concept design relative to the existing corridor road extent and identified constraints. As noted above at Section 3.1.5, the variability in existing corridor conditions and range of constraints identified was such that the concept design phase was iterative.

The final consideration in the alternatives assessment was whether there is a clear case to proceed with route protection (via designation or alternative method – see Section 7) now. This qualitative assessment considered a range of factors which inform the strategic context for route protection in each part of the South FTN. These are listed in Table 3-3 below.

Finally, where a route protection requirement was confirmed through this assessment and new designation was identified as the preferred route protection mechanism (see Section 7 of this report), the proposed packaging of NoRs is finalised. The rationale for packaging decisions is documented where relevant in this report.

⁶ These were the subject of analysis reconciling of a number of expert and technical inputs, and in the first instance included matters identified in Part 2 of the RMA, matters for which RMA policy documents direct avoidance, and provisions cascading from those policies (e.g. AUP:OP overlays).

Table 3-3: Factors determining the strategic merit of route protection

Factor	Explanation
Transport / urban form benefits of route protection	<ul style="list-style-type: none"> The benefits of route protection from a transport and urban form perspective will vary – the greater these benefits, the stronger the case for route protection (and vice versa).
Scale / cost of route protection	<ul style="list-style-type: none"> The third-party land requirements associated with the preferred option vary by location – the greater the scale/cost of the requirements relative to the transport/urban form benefits, the weaker the case for route protection (and vice versa).
Route protection benefit / development pressure	<ul style="list-style-type: none"> Conventionally, route protection is proposed to ensure that no development precluding/hindering the proposed works can proceed, and the South FTN is located in a largely urbanised context. However, the zoning applying to South FTN project area (particularly under PC78) allows for a higher intensity of development than exists in many locations. Accordingly, there is still an opportunity to route protect and future-proof for the transport demands resulting from this intensification (particularly where existing development does not represent highest and best use of land). Conversely, where current development opportunities have been realised land use change may be more stable.
Interdependent projects	<ul style="list-style-type: none"> The South FTN interfaces other planned transport corridors. Concurrent planning activities can strengthen the case for route protection given the opportunity to integrate plans and future-proof for an integrated network. Conversely, insufficient information on interfacing projects may present risks/difficulties for making sound route protection decisions.
Likelihood of future funding prioritisation + land use certainty	<ul style="list-style-type: none"> While route protection is premised on the likelihood of long-term implementation, the case for route protection is strengthened where there is a likelihood of future funding prioritisation. The case for route protection is similarly strengthened with greater certainty that future land use will continue to necessitate South FTN.

3.2 Stormwater infrastructure design and management approach

As part of route protection, the South FTN is required to identify and appropriately protect the land necessary to enable the future construction, operation, and maintenance of required transport corridors/infrastructure. The design has therefore considered the appropriate stormwater management methods to meet likely catchment needs and achieve the future regulatory requirements.

The type and location of stormwater infrastructure was based on a stormwater philosophy developed for South FTN and Te Tupu Ngātahi broadly which seeks to achieve the following objectives:

- Provide stormwater treatment and retention/detention for new impervious surfaces;
- Re-use and re-purpose existing infrastructure where possible;
- Enhance with green infrastructure and incorporate with urban design; and
- Provide treatment of existing surfaces where possible, including where existing runoff mixes with new prioritising high loading areas such as intersections.

It is noted that this approach sets out the overarching stormwater management philosophy and rationale for proposed stormwater management treatment across the South FTN project areas in the context of relevant stormwater related statutory requirements. This approach will be further refined through future consenting and the detailed design process. The process for identifying stormwater treatment form and function is summarised in Figure 3-2.

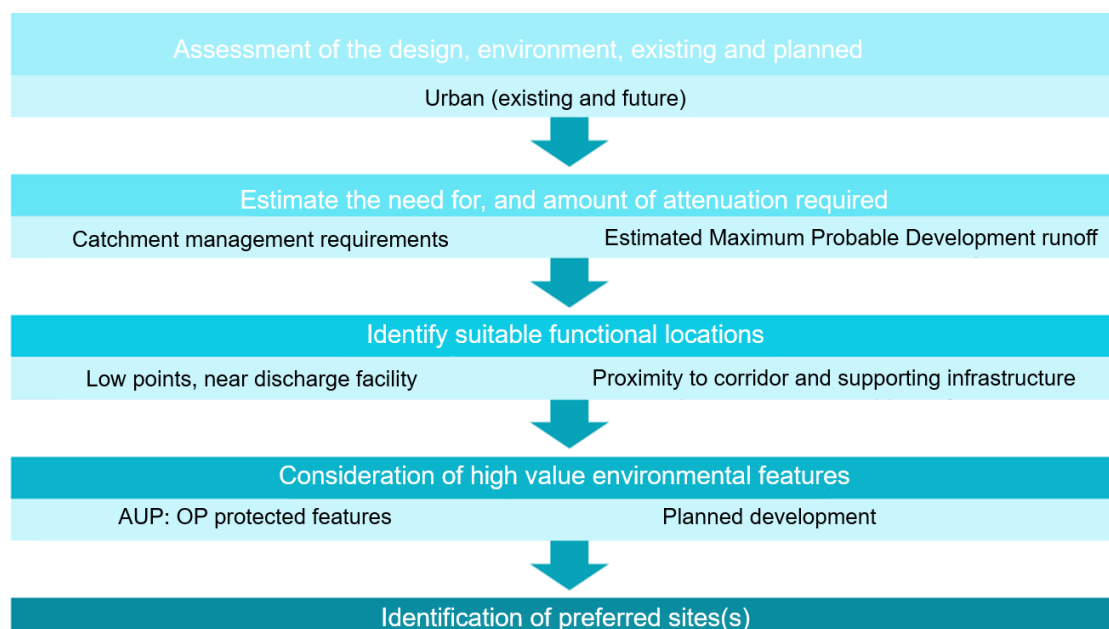


Figure 3-2: Stormwater infrastructure design and location approach

The type of stormwater management device in turn was identified based on a generic design framework which considered:

- The surrounding existing and planned land-use;
- Form of the transport route;
- Road hierarchy; and
- How connectivity to adjacent properties would be provided.

This approach is summarised in Table 3-4 below.

Table 3-4: Stormwater System Design Approach

Design Environment	Stormwater Management Functions			
	Conveyance	Treatment	Retention	Detention (Attenuation)
Existing Urban –within existing road reserve	Pits and pipes	Discharge across berm	Raingarden	Wetland / pond
Existing Urban – road widening	Pits and pipes	Raingardens or treatment wetland / pond, or as a lesser preference, proprietary treatment devices	Raingarden	Wetland / pond

The above approaches have been adapted into the process illustrated at Figure 3-3, which sets out how the specific stormwater management devices identified the context of the South FTN are

selected. This process demonstrates that the selection of stormwater management devices is the subject of a deductive process which considers:

- Whether stormwater management devices are required having regard to the AUP:OP and Auckland Council's GD01⁷ guidelines. Under these regulations, stormwater management devices are required for high-use roads, contaminant-generating carparks, works areas involving new pavement areas of >5,000m², or works within Stormwater Management Area Flow (**SMAF**) areas;
- Where stormwater devices are required, the type of device is then chosen. This is chosen based on the location of works within the catchment, the existing performance of the stormwater network, and consequently what the functional requirements of the device are (i.e. treatment, attenuation/detention, conveyance – see Table 3-4); and
- The scale of property impact associated with the stormwater management device is also considered. While wetlands have the benefit of providing for both stormwater detention/attenuation and stormwater treatment, they also have the most significant land requirement. Opportunities to provide for at-source treatment (i.e. raingardens, swales) are therefore considered where these devices can provide for the stormwater management functions needed where impact on existing built form is prioritised.

Once the type of stormwater management device for the works was chosen, the location and sizing of the devices was identified. It is noted that:

- The location of wetlands is generally chosen based on low points within the catchment traversed by the works, while the location of at-source treatment devices (i.e. raingardens, swales) are located within the road corridor;
- Where wetlands were identified as a requirement, an additional consideration to low points in the catchment was the ability to utilise land already required for a transport purpose to rationalise the property requirements of South FTN as a whole;
- Wetland sizing was based on the following assumptions (see Figure 3-3):
 - 10% of catchment area where 100-year attenuation is needed;
 - 6% of total catchment where 10-year attenuation is required; and
 - 3% of total catchment if water quality treatment and detention is needed.

Finally, it is noted that in locations in which the proposed transport upgrades do not require stormwater treatment (for example where works do not trigger the need for treatment at >5,000m² new impervious area), or where a suitable existing stormwater management system is available, new stormwater management devices are generally not proposed on the basis that no additional stormwater management capacity is considered necessary. The calculations underpinning these assumptions were made on a localised section-by-section basis (based on the corridor segmentation set out at Section 3.3 below).

⁷ *Stormwater Management Devices in the Auckland Region* – Guideline Document 2017/001 Incorporating Amendment 2. Auckland Council, 2017.

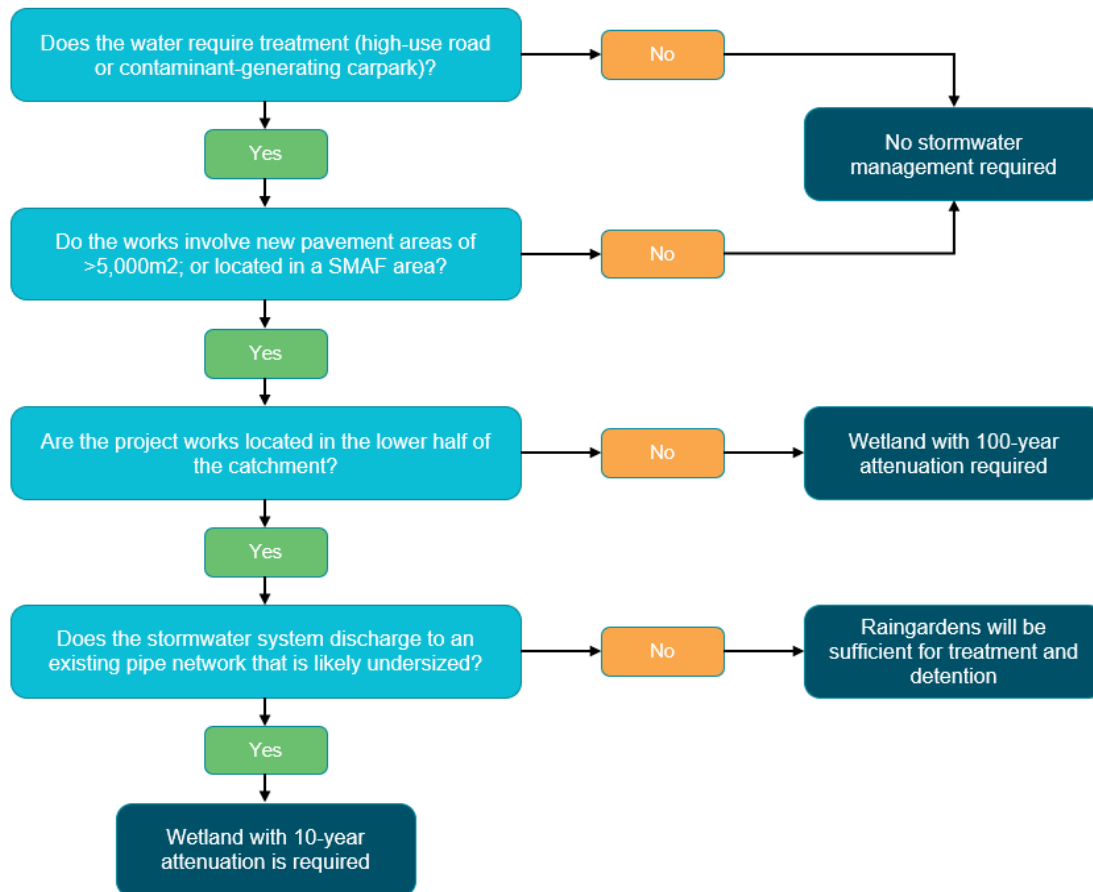


Figure 3-3: Process of identifying stormwater management devices for the South FTN

3.3 Corridor Segmentation

To apply the above optioneering process on a localised basis, South FTN corridors have been divided into sections as shown in Table 3-5 and Figure 3-4. Localised optioneering was necessary given the significant contextual differences that exist over the study area. Segmentation sought to break the corridor into manageable areas for further localised assessment and documentation, and took account of a number of factors including areas of similar land use along the corridor, as well as the location of interfacing railway stations. The various sections are referred to throughout the remainder of this report as necessary. Segmentation is summarised in Table 3-5 for ease of report navigation.

It is noted that the segmentation outlined in Table 3-5 was not able to be undertaken until **after** routes were confirmed in cases where further route optioneering was required (see Section 3.1.2 above).

Table 3-5: Corridor Sections

Report reference	Route	Section	Extent	Length
Part B Section 4	Great South Road FTN	1a	Manukau Station Road (Davies Avenue to Great South Road)	4.8km
		1b	Great South Road (Manukau Station Road to Browns Road)	

Report reference	Route	Section	Extent	Length
		1c	Great South Road (Browns Road to Northcrest Way)	
		2	Great South Road (Weymouth Road to Mahia Road)	1.0km
		3	Great South Road (Mahia Road to Takaanini Station)	1.6km
		4	Great South Road (Takaanini Station to Subway Road)	3.6km
		5	Great South Road (Wellington Street to Waihoehoe Road)	4.5km
Part B Section 5	Takaanini FTN	6	Weymouth Road and Alfriston Road (Selwyn Road to Porchester Road)	2.3km
		7	Porchester Road (Alfriston Road to Airfield Road)	3.8km
		8	Porchester Road, Walters Road, Grove Road, Clevedon Road, Railway Street	5.4km
		9	Wood Street, Ōpāheke Road, Settlement Road, Hunua Road	2.5km
Part B Section 6	Key Connections	Popes Road (Takanini School Road to Mill Road)		2.2km
		Great South Road (Waihoehoe Road to SH1)		0.5km

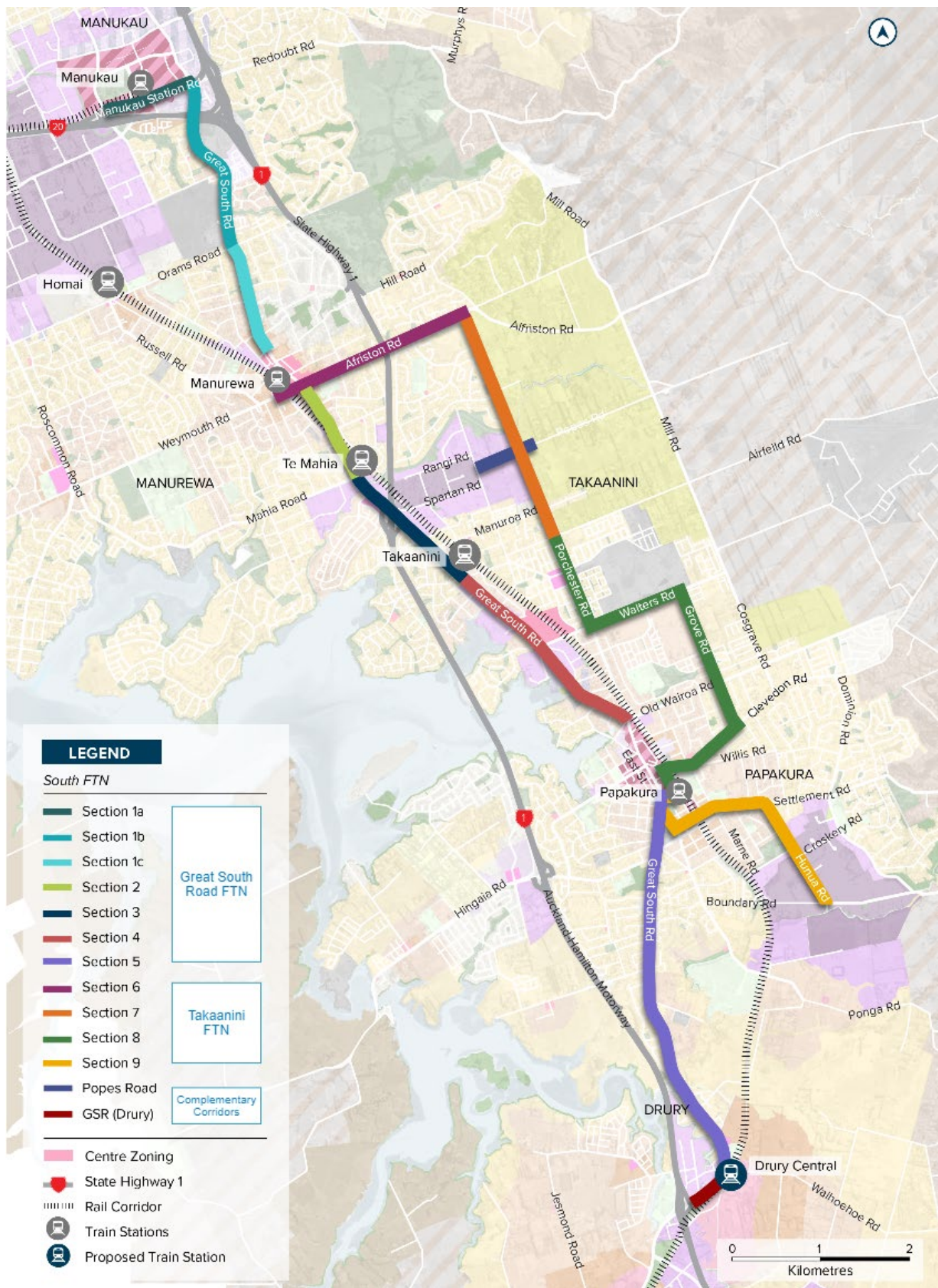


Figure 3-4: South FTN Corridor Segmentation

PART B: ASSESSMENT OF ALTERNATIVES

4 Great South Road FTN Upgrade

4.1 Gap analysis and confirmation of optioneering scope

As noted in Section 2.2, the ISTN included an FTN route on Great South Road between Drury and Manukau (referred to in the IBC as option MT3C as shown at Figure 2-2). This route was the starting point for DBC optioneering on the Great South Road FTN route. The methodology outlined in Section 3 requires the implications of new information identified in the gap analysis to be considered with a view to establishing the necessary scope of further optioneering in the DBC.

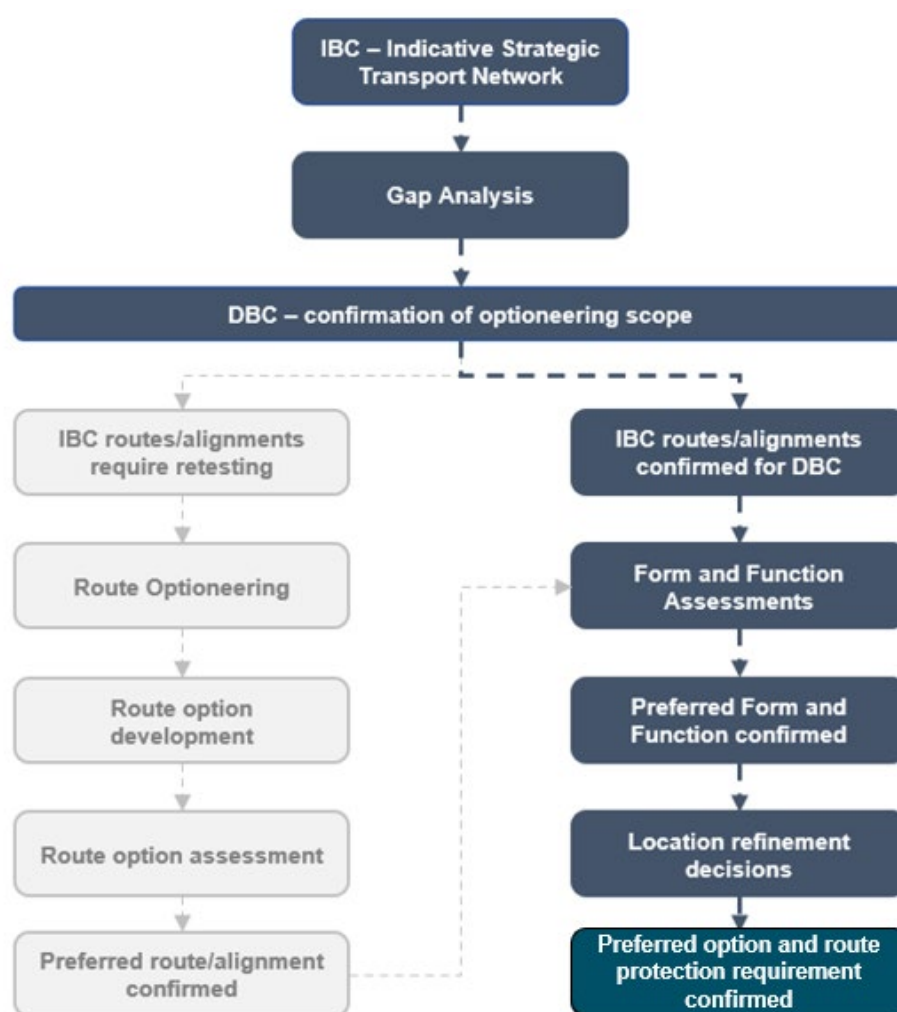


Figure 4-1: Optioneering process adapted for the Great South Road FTN. Note omission of the route optioneering process steps.

In making this determination, the following conclusions on the Great South Road FTN were reached through the gap analysis process (summarised in Section 2.3):

- None of the related transport projects outlined in 2.1 are a substitute for a Great South Road FTN. Therefore, the various changes to and decisions on these projects that have occurred since 2019 do not weaken the case for a Great South Road FTN. The closest related project identified are the Connected Communities SSBCs for Great South Road north of Papakura, which are not a substitute for the longer-term interventions extending south to Drury envisaged in the South IBC and this DBC. Changes to and decisions on the remaining projects do not weaken the case for a Great South Road FTN, and in some cases (e.g. Mill Road rescoping) arguably strengthen it;
- Legislative and policy direction to enable increased housing supply, updates to AFC growth scenarios, and Private Plan Changes all signal that the areas on and around Great South Road between Manukau and Drury will continue to experience urban growth and increased demand on the transport network. PC78 proposes to enable significant growth in this area over and above the currently operative provisions of the AUP:OP; and recently approved plan changes 52 and 58 (in Ōpāheke), 67 (in Hingaia); and 48, 59, 50, 51, and 61 (in Drury) all signal continued growth in travel demand on Great South Road;
- The type of multi-modal interventions envisaged for Great South Road – namely enhanced FTN bus services and active mode improvements – are consistent with the transport and climate change legislation and policy directives outlined in Table 2-1;
- In addition to the above, Great South Road remains a strategically significant north-south arterial route for all transport modes given the lack of alternative routes in the network. This is reflected in AT's Future Connect classifications, and AT Metro's future network planning. While additional north-south connections and network improvements are planned to increase network capacity and resilience, none are considered a direct substitute or replacement for Great South Road; and
- The road already exists, and any parallel corridors will not be functionally equivalent.

For the above reasons, there was not considered to be any reason to further retest the route for the Great South Road FTN – accordingly IBC option MT3C was validated and confirmed as the route and extent in the DBC for the Great South Road FTN. The route optioneering process step was therefore omitted, and the corridor proceeded directly to the form and function assessment and location refinement (see Figure 4-1).

At this point, the Great South Road FTN route was divided into five sections as outlined in Section 3.3 to allow for localised form and function assessment and location refinement optioneering.

4.2 Form and Function

4.2.1 Corridor Form and Function

As noted in Section 3.1.3.1 of the general methodology, the CFAF process, as developed and applied at the Programme-wide level, is intended to use land use and transport planning inputs to define functional requirements for the corridor in question, and identify a suitable midblock cross-section from a set of modular concept designs. This approach is taken on the basis that it provides for a suitable level of detail for route protection and design efficiency, whilst allowing for future design changes and flexibility at the time of implementation.

In the case of the Great South Road FTN, the initial output of the CFAF process was the application of a four-lane FTN arterial cross-section to the entire length of the route (see Figure 4-2). This

conceptual design incorporates one general traffic lane and one bus lane per direction, separated active mode facilities in each direction, and space for berms and a central median (see Figure 4-2). This cross-section was initially applied, with care taken to use the location refinement principles outlined in Section 3.1.4 where third-party land was identified as being needed.






Figure 4-2: Four-lane FTN arterial cross-section

This initial approach was ultimately not followed for the Great South Road FTN for several reasons as follows:

- Significant third-party land requirements along the corridor, with over 1,300 properties directly affected along its 15.5km length. This significant property requirement in large part resulted in high costs and effects not justified by South FTN's level of strategic benefit;
- The application of a generic cross-section did not account for local contextual constraints, and the wide range of present-day road configurations along Great South Road – in short, some sections have the necessary width already, while others require significant third-party land;
- The application of a generic cross-section also triggers land requirements even where third-party land is not required to meet the desired transport functions – for instance where reconfiguration of the corridor layout requires additional stormwater treatment not otherwise required. This was a significant contributor to the third-party land requirements for the generic cross section; and
- The nature of transport demands is relatively tidal in a number of sections of the corridor, meaning that there are opportunities to meet the investment objectives with a less impactful cross-section configuration (e.g. northbound bus lane only).

Given the above issues, a bespoke reassessment of the required form and function for each section of the Great South Road corridor was undertaken on a section-by-section basis to confirm the preferred physical form of the section to be taken forward to the location refinement stage. Several approaches were considered in this process as summarised in Table 4-1. Examples of a cross-section representing each approach are shown in the table.

Table 4-1: Approaches considered in form and function reassessment

Premise	Approach	
Fit within (or largely within) existing road reserve and retain existing kerblines	A	<p>Prioritise a transport mode (e.g. full bus lanes or active mode improvements but not both).</p> 
	B	<p>Remove an element from cross-section (e.g. bus lanes in one direction only)</p> 
	C	<p>Existing road reserve already sufficient to accommodate all desired cross-section elements (variable).</p>
Full road space reallocation and/or road widening	D	<p>Apply full four-lane FTN arterial cross-section (>26.5m width).</p> 

The results of this reassessment are summarised in Table 4-2 below. It is noted that the applicability of the various approaches differs according to the different circumstances along the corridor, and accordingly, that not every approach is compared in every section.

Table 4-2: Summary of preferred form and function approaches

Section	Existing width	Approaches considered				Key reasons for preferred approach
		A	B	C	D	
1a	>30m	N/A	N/A	Preferred	Not progressed	<ul style="list-style-type: none"> Existing road width sufficient – no/minimal third-party land requirements. Avoids property impacts associated with Approach D (e.g. stormwater treatment). Achieves desired level of service for public transport, and maintains/improves level of service for active modes.
1b	>30m	N/A	N/A	Preferred	Not progressed	
1c	20m	Not progressed	Preferred	N/A	Not progressed	<ul style="list-style-type: none"> Achieves a northbound bus lane which is the direction of highest anticipated travel demand. Ensures separated facilities for active modes. Lesser third-party land requirement than other approaches.
2	20m	Not progressed	Preferred	N/A	Not progressed	
3	30m	N/A	N/A	Preferred	Not progressed	<ul style="list-style-type: none"> Note some variation within section 4 – hence both approach B and C preferred. Existing road width sufficient – no/minimal third-party land requirements. Achieves desired level of service for public transport, and maintains/improves level of service for active modes.
4	20-30m	N/A	Preferred	Preferred	Not progressed	
5	<27m	Not progressed	Preferred	N/A	Not progressed	<ul style="list-style-type: none"> Achieves a northbound bus lane which is the direction of highest anticipated travel demand. Ensures separated facilities for active modes. Lesser third-party land requirement than other approaches.

4.2.2 Intersection Assessment

As noted in Section 3.1.3.2 of the general methodology, an intersection assessment process was undertaken in parallel to the CFAF to identify which intersections required upgrades, the indicative intersection controls in these locations, and the resultant footprint implications. Similarly, to the CFAF process, the approach developed and applied across the programme for the intersection assessment was to use land use and transport planning inputs to define functional requirements for the corridor in question, and identify a suitable intersection layout from a set of modular intersection designs.

The intersection filtering process identified sixteen intersections requiring interventions along the Great South Road FTN route between Manukau and Drury. These were identified based on the considerations listed in Section 3.1.3.2 of the general methodology and are listed in Table 4-3.

As noted in Section 3.1.3.2, the intersection form at each site was identified based on a range of factors including safety, operational efficiency, urban design/land use integration, public transport operations, engineering and environmental constraints, property constraints, and other site-specific factors. While roundabouts are the typical first choice for at-grade intersections recommended in 'Safe System' guidance, it is recommended that the majority of intersections along the Great South Road FTN route are signalised. The key reasons for the adoption of signals in these locations are:

- Complex existing intersections with multi-lane approaches;
- A highly urbanised context with limited space available without significant property impacts;
- Very high vehicular traffic volumes; and
- Strategic walking and cycling network functions and a need to allow for safe crossing facilities in the context of high traffic volumes.

Table 4-3 summarises the forms identified for key intersections following this assessment, along with key location-specific considerations informing the proposed form (in addition to the above noted considerations).

Table 4-3: Proposed intersection forms resulting from intersection assessment

Corridor section	Intersection	Key transport planning considerations	Existing form	Proposed form
1b	Great South Road / Manukau Station Road / Redoubt Road	Key arterials intersecting, SH1 access	Signals	Signals
	Great South Road / SH1 offramp	SH1 access	Signals	Signals
	Great South Road / Kerrs Road / Pacific Events Centre Drive	Key arterials intersecting	Signals	Signals
	Great South Road / Browns Road / Orams Road	Key arterials intersecting	Signals	Signals
1c	Great South Road / Grand Vue Road	SH1 access, safety concerns for rat-running	Priority (stop)	Signals
	Great South Road / Hill Road / Station Road	SH1 access	Signals	Signals

Corridor section	Intersection	Key transport planning considerations	Existing form	Proposed form
2	Great South Road / Weymouth Road / Alfriston Road	Key FTN routes and arterials intersecting	Signals	Signals
	Great South Road / McAnnalley Street	Alternative to Myers Rd (due to significant engineering constraint)	Priority (stop)	Signals
	Great South Road / Mahia Road	Key arterials intersecting	Signals	Signals
4	Great South Road / Taka Street	Key arterials intersecting	Signals	Signals
	Great South Road / Walters Road	Key arterials intersecting, safety concerns	Dual lane roundabout	Dual-lane roundabout
	Great South Road / Subway Road	Key arterials intersecting, 11,000 vpd (current)	Signals	Signals
5	Great South Road / Wellington Street	General traffic/ freight bypass route via Wellington St	Signals	Signals
	Great South Road / Beach Road	Key arterials intersecting, key E-W connection	Signals	Signals
	Great South Road / Rosehill Drive	Rosehill Dr is part of the future indicative bus network	Priority (stop)	Signals
	Great South Road / Park Estate Road	Links to a motorway crossing and Hingaia 1 development area	Priority (stop)	Signals

4.3 Location refinement

As noted in Section 3.1.4 of the general methodology, a process of reconciling expert and technical inputs in a workshop setting applied to decisions on the location of any road widening and realignment (i.e. third-party land requirements) to accommodate the preferred form and function along the preferred routes.

Table 4-4 sets out the key matters identified for each section which have informed the extent and location of third-party land requirements to enable South FTN. These generally emphasise where environmental features and/or identified constraints constitute differentiators that informed any justify variation to a standardised cross section taking into account relative costs and benefits in an urban context.

Table 4-4: Key differentiating features/constraints informing application of location refinement principles

Section (as shown in Figure 3-4)	Third-party land requirement?	Key differentiating features/constraints informing application of location refinement principles
1a	None	N/A

Section (as shown in Figure 3-4)	Third-party land requirement?	Key differentiating features/constraints informing application of location refinement principles
1b	None	N/A
1c	Moderate	<ul style="list-style-type: none"> Preference to avoid or reduce impacts on Sikh Temple (east side, chainage 3950), Presbyterian Church (east side, chainage 4300), historic heritage place at Cenotaph Park (east side, chainage 4450), scheduled military milepost (east side, chainage 3800), notable tree (east side, chainage 3800) and a Rest Home (west side, chainage 3280). Several new-build medium-density multi-unit residential developments on both sides. Each presents a challenge in terms of avoidance of impact (i.e. the ability to maintain a 1.5m front yard in the first instance), and/or boundary setting where the street frontage unit will need to be acquired.
2	High	<ul style="list-style-type: none"> Lack of clear differentiating factors.
3	Low	<ul style="list-style-type: none"> Lack of clear differentiating factors.
4	Low	<ul style="list-style-type: none"> Preference to avoid or reduce impacts on notable trees (east side, chainage 9600 and 10000; and west side at chainage 10200), significant ecological area (SEA) to the west of the Longford Park esplanade reserve and Awhinatia Health centre (west side, chainage 9600), fire station (east side, chainage 10100), historic heritage buildings (churches) at chainage 10200-10500 (west side). Several new-build medium-density multi-unit residential developments on both sides. Each presents a challenge in terms of avoidance of impact (i.e. the ability to maintain a 1.5m front yard in the first instance), and/or boundary setting where street frontage units will need to be acquired. Large industrial premises including a Fonterra distribution facility (west side, chainage 8200).
5	Moderate	<ul style="list-style-type: none"> Desire to avoid or reduce impacts on historic heritage feature (War Memorial) at the corner of Ōpāheke Road and Great South Road (east side), Papakura Cemetery (east side, chainage 11400-11700), SEAs (bush areas on both sides of road at chainage 12000), notable trees at chainage 12300-12500 (east side), Drury Presbyterian Cemetery (west side, chainage 15100), Drury School (east side, chainage 15000). Plan Changes 52 and 58 and associated frontage controls on the eastern side (between Park Estate Road and Parkhaven Drive). Effects on Otūwairoa / Slippery Creek to be considered.

4.4 Preferred Option (NoR 1)

4.4.1 Summary

Following the application of the above process and principles, a preferred option for the Great South Road FTN was identified. The form and function of the preferred option for the entire Great South Road FTN is shown conceptually in Figure 4-3, and includes:

- Provision for bus lanes in both directions to the north of Browns Road, and between Mahia Road and Tironui Road;
- Provision for bus lanes in one direction (northbound) between Browns Road and Mahia Road; and south of Tironui Road (excluding centres);
- Improved active mode (walking and cycling) facilities for the full route extent; and
- 16 intersection upgrades.

The proposed alignment and extent are shown in the General Arrangement drawings in Volume 3 of the application.

4.4.2 Design Considerations

The key considerations and assumptions applied in developing the concept design arising from the preferred option are summarised in Section 9 of the Assessment of Effects on the Environment (AEE).

It is noted for completeness that the approach to stormwater management devices was subject to an assessment of alternatives. Following the process set out in Section 3.2 of this report, localised raingardens within the road corridor have been identified as the preferred stormwater management device for the Great South Road. The need for raingardens relates specifically to the localised parts of the Great South Road corridor triggering the need for new stormwater management devices following the process set out in Section 3.2, which in turn generally correspond to areas where additional land (and therefore increased impervious area) are required (i.e. within the proposed NoR – see below).

4.4.3 Route protection requirements for the preferred option (NoR 1)

Most of the preferred option for the Great South Road FTN is able to be accommodated within the existing road reserve along Great South Road. Route protection via the current package of NoRs is only required for the parts of the preferred option requiring third-party land, and the remainder of the transport upgrades comprising the preferred option are assumed to be either permitted activities or readily consentable in the future.

The land required for intersection upgrades to enable the Great South Road FTN upgrade to comprise of eight separate sections centred on intersections along the route. These eight sections are packaged within a single NoR referred to within the proposed package of NoRs as **NoR 1**.

In assessing the strategic merit of proceeding with route protection, a qualitative assessment considering the range of factors set out in Table 3-3 was carried out. In short, the eight sections comprising NoR 1 were recommended for route protection because:

- The Great South Road FTN transport upgrades were assessed as providing high transport benefits. The proposed upgrades in the eight locations enable significant improvements to the performance of public transport, and the safety and attractiveness of active modes, along Great South Road;
- Great South Road is a strategically significant north-south arterial route and has no equivalent parallel route. Accordingly, there is a high reliance on the route today, and it will need to accommodate continued increases in transport demands resulting from planned growth. The proposed upgrades in the eight locations will ensure that the road is appropriately future-proofed to efficiently serve the demands associated with planned growth;

- The scale of property requirements and associated costs associated with route protection were assessed as moderate relative to the above benefits. NoR 1 directly affects some 170 properties, with the vast majority of these only partially or temporarily affected; and
- While the Great South Road FTN traverses mostly urbanised areas, there is still a route protection benefit to be derived from future-proofing transport upgrades to provide for the urban intensification enabled by the AUP:OP.



Figure 4-3: Great South Road FTN recommended option

5 Takaanini FTN

5.1 Gap analysis and confirmation of optioneering scope

As noted in Section 2.2, the ISTN included an FTN route between Drury and Takaanini serving existing urban and FUZ areas generally east of SH1 and the NIMT, before connecting to Great South Road to the west of SH1 and the NIMT (referred to in the IBC as option MT3C; which also included sections of options EW9B and AR10 as shown at Figure 2-2, Figure 2-3, Figure 2-4). This route was the starting point for DBC optioneering on the Takaanini FTN route. The methodology outlined in Section 3 requires the implications of new information identified in the gap analysis to be considered with a view towards establishing the necessary scope of further optioneering in the DBC.

In making this determination, the following conclusions on the Takaanini FTN were reached through the gap analysis process (summarised in Section 2.3):

- A number of factors identified in the gap analysis have prompted a retesting of the Rangi Road Viaduct assumed as part of IBC option MT4I (and the associated sections of options MT4K and EW9B). Given that the Rangi Road Viaduct also formed part of the ISTN for Takaanini level crossing removal, these matters were considered concurrently as part of optioneering for both the TLC and South FTN DBCs. The key factors prompting this retesting included:
 - The high likely cost, complexity, and levels of embodied carbon likely associated with the Rangi Road Viaduct relative to other options for providing an east-west connection (noting that the Viaduct would be over 500m long, and would traverse SH1, the NIMT, the Papakura Stream, and Transpower's electricity transmission corridor). The embodied carbon issue was of particular relevance given the recently increased emphasis in legislation and policy (see Table 2-1) on greenhouse gas emissions reduction, which includes embodied carbon from transport infrastructure assets; and
 - The confirmation by AT SMEs that the routing option along Mahia and Roscommon Road to Puhinui Station (part of option MT4K) was no longer supported as part of the FTN scope. This affects the logic underpinning the need for a Rangi Road Viaduct in terms of connections from the west (see Figure 2-2).
- The decision to progress IBC option AR10 (and by extension the southern portion of option MT4I) as part of the Drury Arterials package means that optioneering and route protection for this section is already complete. Accordingly, this section of the corridor is now out of scope with no further optioneering needed. The southern end of the Takaanini FTN can connect to the already designated Ōpāheke North-South Arterial at the intersection of Boundary and Hunua Roads to complete the route envisaged in the IBC;
- Legislative and policy direction to enable increased housing supply, updates to AFC growth scenarios, and Private Plan Changes all signal that most areas around the Takaanini FTN Project area will continue to experience urban growth and place increased demand on the transport network. A small proportion of this increased demand in the very long term may be reduced if the removal of the Takaanini Future Urban Zone (**FUZ**) is confirmed as a result of Auckland Council's Future Development Strategy (**FDS**); and
- The type of multi-modal interventions envisaged for the Takaanini FTN – namely FTN bus services and active mode improvements – are consistent with the transport and climate change legislation and policy directives outlined in Table 2-1.

In light of the above, there remains a strong case for the Takaanini FTN but a clear need to further retest the route and extent of the corridor. Accordingly, the route optioneering step was required to confirm a route and extent for the Takaanini FTN prior to proceeding to the form and function assessment and option refinement (see Figure 5-1).

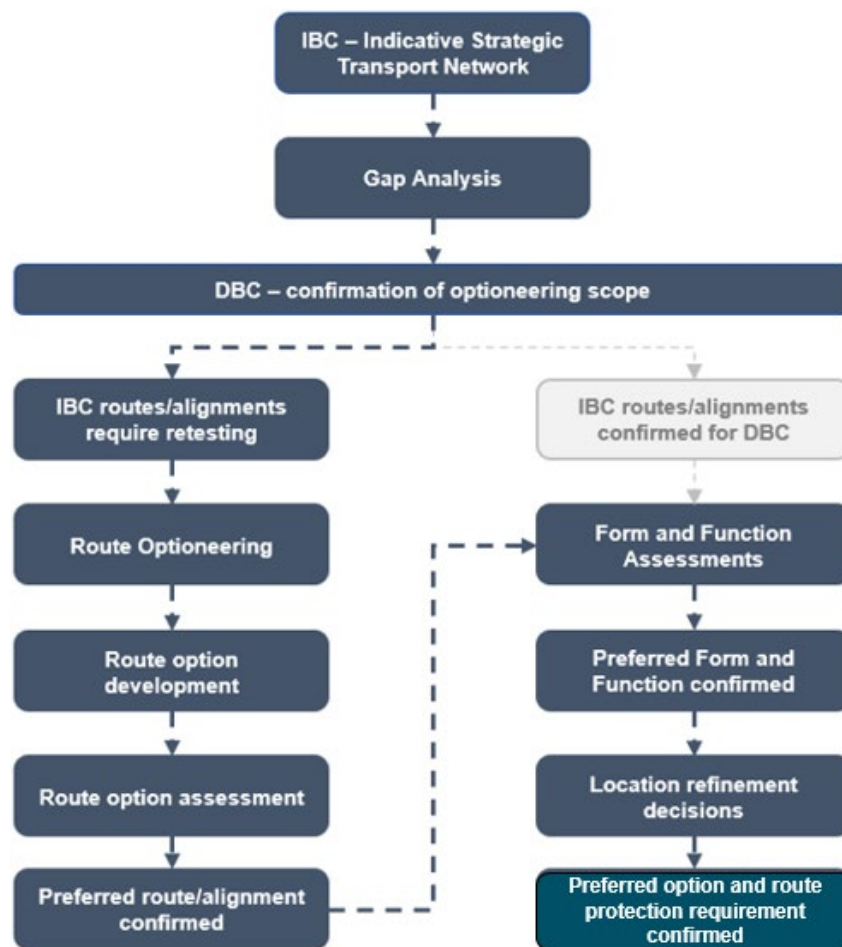


Figure 5-1: Optioneering process adapted for the Takaanini FTN

5.2 Route optioneering

5.2.1 Route option development

5.2.1.1 Longlist screening

As outlined in Section 3.1.2, the EAST tool from Waka Kotahi was used to undertake an initial screening of route options. This process identified a longlist of eighteen options for different sections of the route with the intent of identifying a shortlist for assessment through an MCA process. The options in this instance comprise sections of a route with a view towards different sections being ‘mixed and matched’ to form a preferred route. The longlisted options can be divided into the following three categories:

- **North-south route sections** to provide connectivity generally between Manurewa and Papakura to the east of the NIMT and SH1 (noting that the need to proceed further south of Papakura as originally envisaged in IBC option MT3C has been negated by the Drury Arterials DBC). It is noted

that option MT3C used Porchester Road, Ingram Street, Priclor Street, Marne Road, and Settlement Road as its north-south route in this area;

- **East-west route sections** to provide connectivity from the areas served by north-south route sections to the east of the NIMT and SH1, and areas to the west. It is noted that option MT3C used Popes Road and Rangī Road as its east-west connection connecting Porchester and Great South Roads. As noted above, the decision to discount the Rangī Road Viaduct from the TLC DBC means that this route is no longer possible, and an alternative east-west route is required; and
- **Route sections from AT Metro Remix files** – these were included to ensure all possible combinations of routes under consideration by AT Metro transport planners in this area were considered as options for FTN routing.

The eighteen longlisted options are shown in Figure 5-2, and the results of the EAST assessment are summarised in Table 5-1.

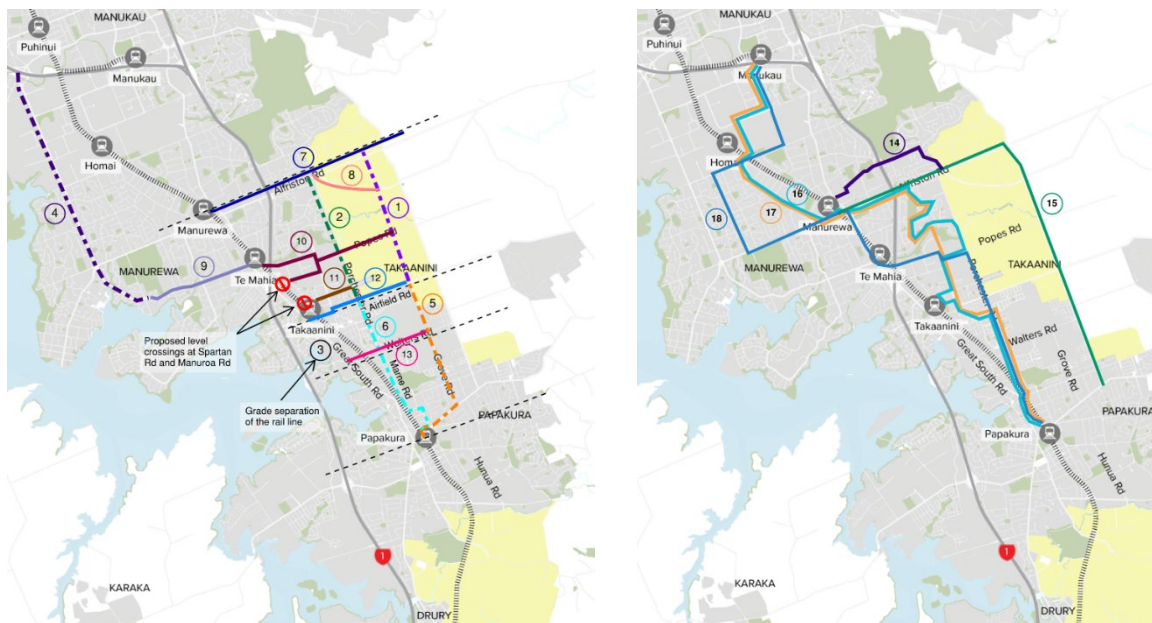


Figure 5-2: North-south and east-west route sections (left) and route sections from AT Metro remix files (right)

Table 5-1: Summary of longlist EAST assessment

No.	Option	Progress to shortlist?	Comment
North-South Route Sections (north of Airfield Road)			
1	Wastney Road / new road between Alfriston and Airfield Roads	Yes	North-south option through FUZ, new section of road needed.
2	Porchester Road between Alfriston and Airfield Roads	Yes	North-south option using existing roads, bisects existing urban area to west and FUZ to east.
3	Grade-separation of the NIMT between Alfriston and Walters Roads	No	Option does not address investment objectives as it competes with rail.

No.	Option	Progress to shortlist?	Comment
4	Roscommon Road	No	Option is being progressed separately by AT and provides no connectivity east of NIMT/SH1.
North-South Route Sections (south of Airfield Road)			
5	New road (continuing option 1) / Grove Road between Airfield Road and Papakura	Yes	North-south option through FUZ, new section of road needed.
6	Porchester Road and Marne Road between Airfield Road and Papakura (continuing option 2)	Yes	North-south option using existing roads.
East-West Route Sections (north of Airfield Road)			
7	Alfriston Road and Ranfurly Road east of Manurewa	Yes	East-west routes linking Takaanini FUZ and Manurewa Station / Great South Road.
8	Alfriston Road between Manurewa and Wastney / new road (adjoins option 1)	Yes	
9	Mahia Road west of Great South Road (adjoins option 10)	No	Option being progressed separately by AT (as noted in section 2).
10	Rangi Road and Popes Road between Great South Road and new road (adjoins option 1)	Yes	Option includes Rangi Road Viaduct (noting clear need to re-test this option was identified through gap analysis – see section 2).
11	Manuroa Road and Station Road east of Takaanini Station	Yes	Provides a link from Takaanini FUZ to Takaanini Station and Great South Road.
12	Airfield Road and Taka Street between Great South Road and new road (adjoins option 5)	Yes	
East-West Route Sections (south of Airfield Road)			
13	Walters Road between Great South Road and Grove Road	Yes	AT SMEs have identified this as a key east-west connection, providing access to Bruce Pulman Park.
AT Metro Remix Route Sections			
14	Alternative east-west connection via Hill Road	No	A less direct alternative to the Alfriston Road options.
15	Alternative north-south and east-west connections via Mill Road and Alfriston Road	No	Mill Road addressed in separate project.
16	Manukau Station to Papakura Station via Russell Road, Magic Way, and Porchester Road	No	Each of these options includes collector roads and will result in a circuitous route.
17	Manukau Station to Papakura Station via Russell Road, Takanini School Road, and Porchester Road	No	
18	Manukau Station to Papakura Station via Druces Road, Browns Road, Rowandale Avenue, Weymouth Road, Great South Road, Rangi Road, Popes Road, and Porchester Road.	No	

For the reasons outlined in the above summarised EAST assessment, the longlist of eighteen route sections was rationalised to a shortlist of ten route sections for shortlist MCA assessment.

5.2.1.2 Shortlisted options

The ten options identified from the EAST assessment for shortlist assessment were split into two option groupings for assessment – north-south options and east-west options. These are summarised below.

North-South Options

The EAST assessment identified four north-south options. Two options north of Airfield Road and two options south of Airfield Road. These are referred to as follows (see Figure 5-3).

- **Option 1.1** – Porchester and Marne Road between Airfield Road and Papakura (referred to in the EAST assessment as option 6);
- **Option 1.2** – Porchester Road between Alfriston Road and Airfield Road (referred to in the EAST assessment as option 2);
- **Option 2.1** – New Road / Grove Road between Airfield Road and Papakura (referred to in the EAST assessment as option 5); and
- **Option 2.2** – Wastney Road / New Road between Alfriston and Airfield Roads (referred to in the EAST assessment as option 1).



Figure 5-3: North - South shortlisted options

East-West Options

The six east-west options from the EAST assessment were split out into a shortlist of six sub-options north of Manuroa Road (see Figure 5-4) and five south of (and including) Manuroa Road (see Figure 5-5) to allow for more localised assessment:

Shortlisted options north of Manuroa Road were:

- **Options 1.1, 1.2, and 1.3** (derived from Options 7 and 8 from the EAST assessment) – respectively comprising:
 - Alfriston Road between Manurewa and Porchester Road;
 - Alfriston/Ranfurly Roads from Porchester Road to Wastney Road; and
 - Alfriston Road from Ranfurly Road to Wastney Road.
- **Options 2.1, 2.2, and 2.3** (derived from Option 10 in the EAST assessment) – respectively comprising:
 - Rangi Road between Great South Road and Porchester Road via the Rangi Road Viaduct;
 - Spartan Road and Popes Road between Great South Road and Porchester Road; and
 - Popes Road between Porchester Road and New Road (see north-south Option 2.2).

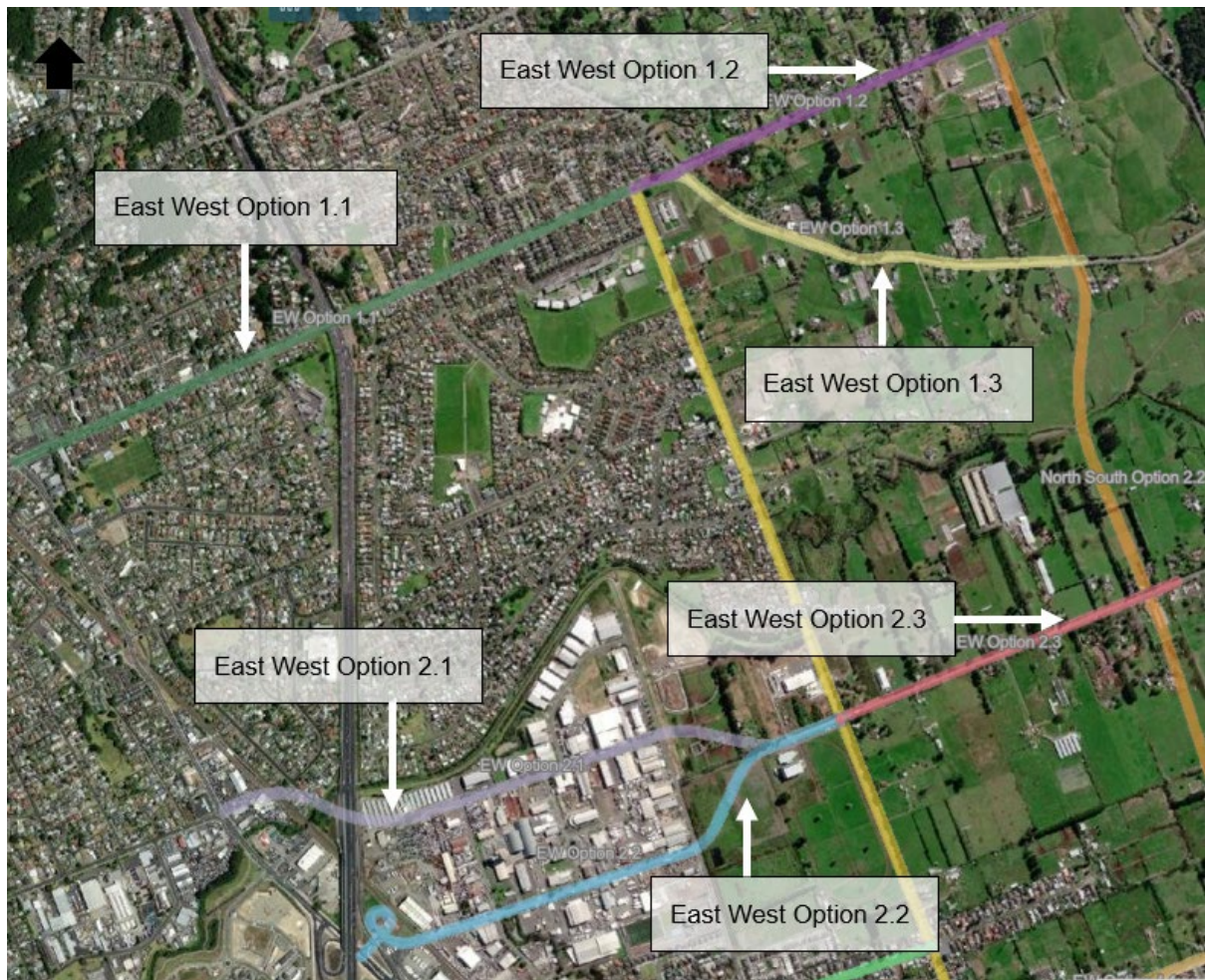


Figure 5-4: East-west shortlisted options north of Manuroa Road

Shortlisted options south of (and including) Manuroa Road were:

- **Option 3** (referred to in the EAST assessment as Option 11) – Manuroa Road and Station Road east of Takaanini Station.
- **Options 4.1 and 4.2** (derived from Option 12 in the EAST assessment) – respectively comprising:
 - Airfield Road between Porchester Road and New Road (see north-south Options 2.1 and 2.2); and
 - Taka Street and Airfield Road between Great South Road and Porchester Road.
- **Options 5.1 and 5.2** (derived from Option 13 in the EAST assessment) – respectively comprising:
 - Walters Road between Porchester Road and Grove Road; and
 - Walters Road west of Porchester Road.



Figure 5-5: East-west shortlisted options south of (and including) Manuroa Road

5.2.2 Options assessment

5.2.2.1 North-South options

Initial MCA Assessment

The shortlisted north-south options were assessed using MCA Framework for Te Tupu Ngātahi described in Section 3.1.2. The assessment scoring is summarised in Table 5-2 below.

Table 5-2: Summary of initial north-south route option MCA assessment

Criteria	Scoring			
	South of Airfield Road		North of Airfield Road	
	Option 1.1	Option 2.1	Option 1.2	Option 2.2
IO 1: Access	2	1	3	4
IO 2: Integration	1	-1	3	4
IO 3: Travel choice and climate change	2	1	3	4

Criteria	Scoring			
	South of Airfield Road		North of Airfield Road	
	Option 1.1	Option 2.1	Option 1.2	Option 2.2
Historic Heritage	-2	-2	-2	-2
Land Use Futures	3	-1	3	2
Urban Design	1	-3	2	2
Land Requirement	-4	-4	-3	-1
Social Cohesion	4	-1	3	2
Human Health and Wellbeing	-2	-2	-2	-1
Landscape / Visual	0	0	-1	-1
Stormwater	-1	-2	-1	-4
Ecology	-1	-2	-4	-4
Natural Hazards	-4	-3	-2	-3
Transport System Integration	3	1	3	3
User Safety	1	-3	1	2
Construction Impact	-2	-1	-1	-1
Construction Disruption	-2	-2	-2	-1
Construction costs/risks	-2	-3	-2	-3

The key outcomes from this assessment for options to the north of Airfield Road are that:

- **Option 1.2** performs well against the investment objectives although not as favourably as Option 2.2 given that Option 2.2 will better support growth in the Takaanini FUZ. It scores as highly adverse for ecology based on an assumed widening and potential impact on high value wetlands. However, route refinement will likely improve the score and is preferred over Option 2.2 given that it is existing infrastructure; and
- **Option 2.2** performs the best against the investment objectives. However, it scores highly adverse for stormwater and ecology as it is a new road to be built on peat soils which will be challenging from a stormwater perspective and will impact low-to-high value wetlands in the area. In addition, the uncertainty of the Takaanini FUZ means there is uncertainty in the expected catchment for this route.

For options to the south of Airfield Road:

- **Option 1.1** scores favourably against the investment objectives given that it services an existing residential catchment. It scores highly favourably against social cohesion as it will provide and improve connectivity between areas anticipating intensified residential development to community facilities. However, the option was assessed as highly adverse for natural hazards due to likely settlement of existing properties as a result of earthworks and underlying soil conditions; and
- **Option 2.1** scores poorly against investment objective 2 as the proposed alignment runs through the existing Bruce Pulman Park. This will have a negative impact as it does not integrate or align with the intended land use. It also scores moderately adverse against urban design as it will cause severance to the Bruce Pulman Park and the Holy Trinity Catholic Primary School.
- The negative scoring for **Option 2.1** was largely attributed to the option cutting through Bruce Pulman Park. Feedback from specialists indicated the scoring would change if the assessment only considered the corridor up to Walters Road to avoid severing the park. Accordingly, the team considered a modified option should be assessed to fairly ascertain the preferred option.

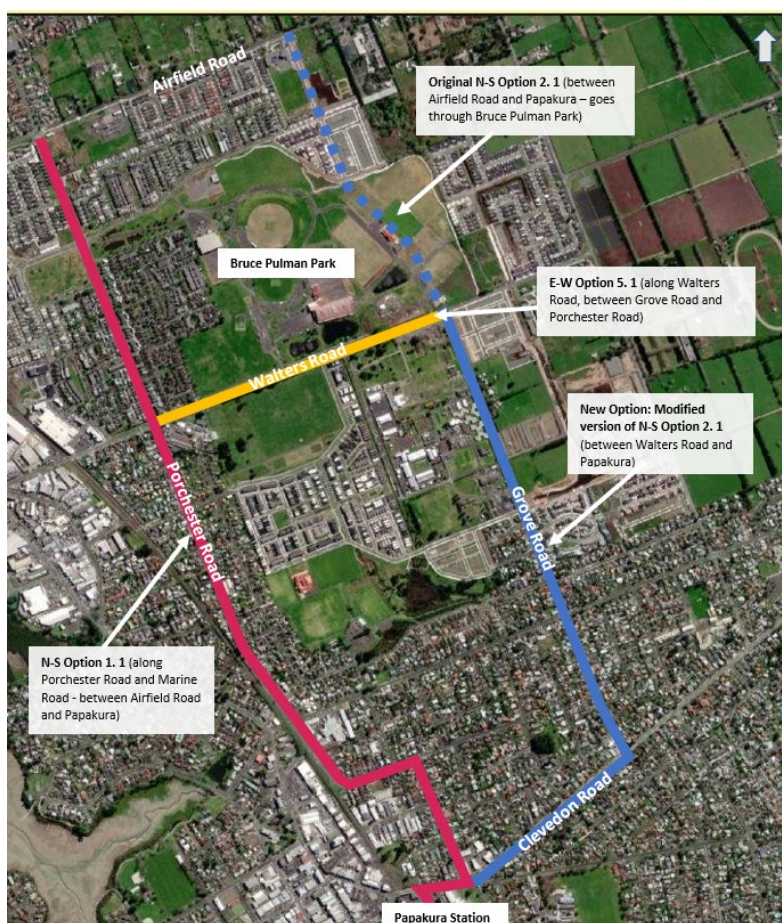


Figure 5-6: Modified Option 2.1, utilising Porchester Road north of Walters Road, Grove Road south of Walters Road, and Walters Road itself to connect them

Further North-South Assessment (south of Airfield Road)

Figure 5-6 shows the modified iteration of Option 2.1 south of Airfield Road for further assessment. This option utilises Porchester Road north of Walters Road (i.e. part of Option 1.1) to avoid impacts on Bruce Pulman Park, before turning east-west along Walters Road to connect with Grove Road and Clevedon Road (i.e. part of Option 2.1) to connect to Papakura.

The modified Option 2.1 was then tested against Option 1.1 using the MCA Framework. This assessment is summarised in Table 5-3 below.

Table 5-3: Summary of further north-south route option MCA assessment

Criteria	Scoring	
	Option 1.1	Modified Option 2.1
IO 1: Access	2	3
IO 2: Integration	1	2
IO 3: Travel choice and climate change	2	3
Historic Heritage	-2	-2
Land Use Futures	2	1
Urban Design	1	0
Social Cohesion	3	2
Human Health and Wellbeing	-2	-2
Landscape / Visual	0	1
Stormwater	-1	-2
Ecology	-1	-1
Natural Hazards	-4	-3
Transport System Integration	2	3
User Safety	1	2
Construction Impact	-2	-1
Construction Disruption	-2	-2
Construction costs/risks	-2	-3

The key outcomes from this assessment are that:

- **The modified Option 2.1** scores more favourably against the investment objectives and transport criteria than Option 1.1 as the option will provide existing residential areas to the east of the NIMT with high quality public transport which it currently lacks; and
- As noted in the initial assessment, **Option 1.1** was assessed as highly adverse against natural hazards due to likely settlement of existing properties as a result of earthworks and underlying soil conditions.

Accordingly, the modified Option 2.1 is the preferred route option south of Airfield Road.

South of Papakura

The above assessment identifies a preferred north-south route as far south as its connection with the Papakura metropolitan centre via Clevedon Road. Given that the intent of the Takaanini FTN (as envisaged in IBC option MT4I) is to ultimately connect with the Ōpāheke North-South Arterial (already route protected as part of the Drury Arterials package) at the intersection of Hunua and Boundary Roads, all routing options were assumed to end on Hunua Road. This means that the only routing matter to consider is how to get from Clevedon Road to the intersection of Hunua and Boundary Roads.

The Project Team identified four possible routes to connect these points (see Figure 5-7):

- **Option 1 – IBC route:** Follows Marne Road and Settlement Road;
- **Option 2 – Ron Keat:** Follows Ron Keat Drive, Onslow Road, Marne Road and Settlement Road;
- **Option 3 – Onslow:** Follows Railway Street West, Onslow Road, Marne Road and Settlement Road; and
- **Option 4 – Settlement:** Follows Railway Street West, Wood Street, Great South Road, Ōpāheke Road and Settlement Road.

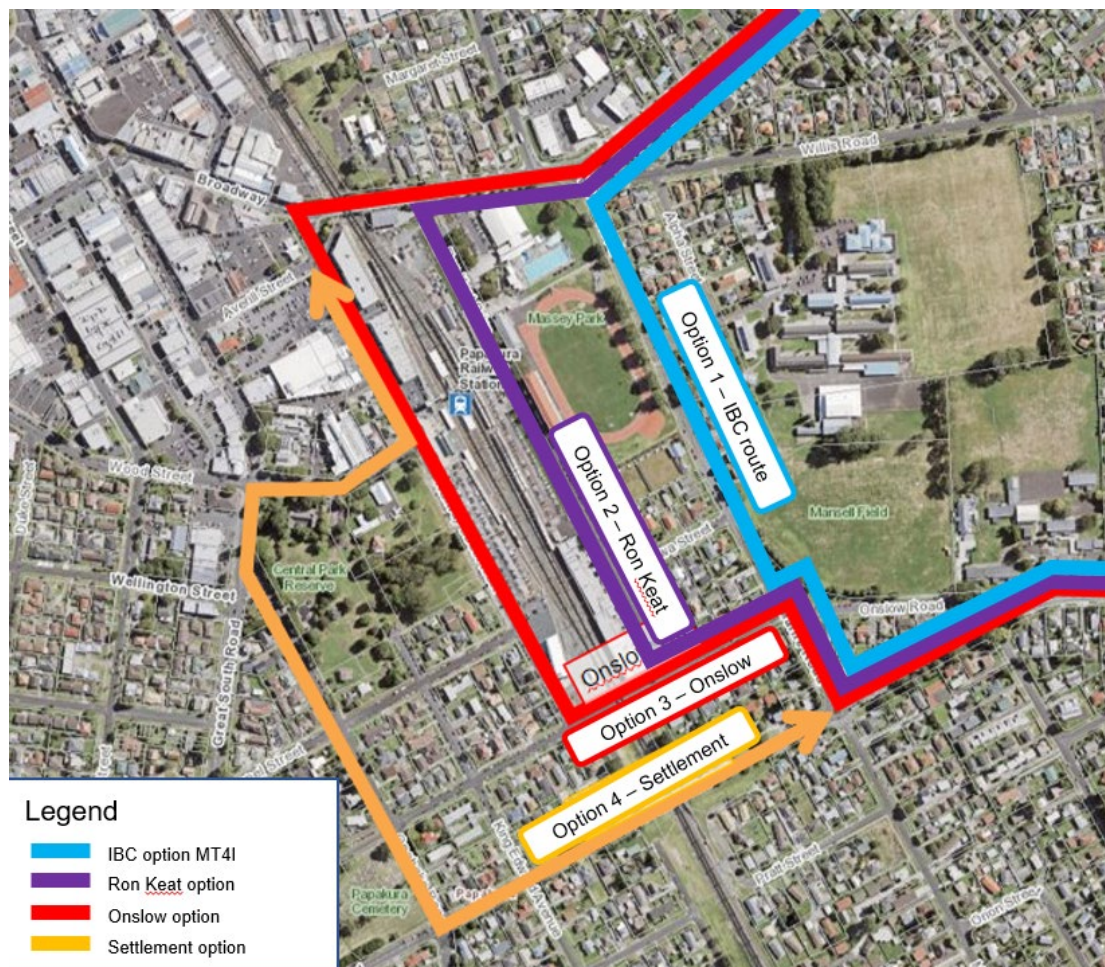


Figure 5-7: Options for connecting Clevedon Road with Hunua Road

A preferred option was identified in consultation with AT, following the option 4 route (as shown in Figure 5-9). There were a number of reasons why this option was preferred as follows:

- AT considered it was an important functional requirement that the route provide a direct interchange with the Papakura train station, and that the route cross the NIMT to directly serve the Papakura metropolitan centre on the west side of the rail tracks. This ruled out Options 1 (the IBC route) and Option 2 (Ron Keat Drive) (see Figure 5-7);
- There is one road-over-rail crossing to the north of the station (Clevedon Road), which is the logical point to cross the tracks (given that the route already follows Clevedon Road);
- The Settlement Road routing option (Option 4 – see Figure 5-7) was preferred to cross the tracks to the south of the station as possible future rationalisation of the Onslow and Settlement Road crossings has been indicated as a possibility as part of the future four-tracking of the NIMT (both existing crossings would need to be rebuilt to accommodate additional tracks). In this eventuality it was considered more likely that Settlement Road crossing remains, and that Onslow Road is closed given it is the more strategically significant east-west route for general traffic and freight (as indicated in AT's Future Connect portal);
- The Option 4 routing also utilised intersection widening designations already secured as part of the Drury Arterials Network (e.g. at the corner of Ōpāheke Road and Settlement Road), ensuring future land take efficiencies; and
- Given the earlier noted assumption of a connection at the intersection of Boundary and Hunua Roads, all four options followed Settlement and Hunua Roads.

Preferred North-South Route Option

The above assessment has indicated that:

- **Option 1.2 (Porchester Road)** is the preferred north-south route option to the north of Airfield Road;
- **Modified Option 2.1** (comprising a section of Option 1.1 (Porchester Road), Walters Road, and Grove Road) is the preferred north-south route option to the south of Airfield Road to Papakura; and
- **Option 4 (Settlement)** is the preferred route option between Papakura and the intersection of Hunua and Boundary Roads which follows Railway Street West, Wood Street, Great South Road, Ōpāheke Road, Settlement Road, and Hunua Road.

This preferred route option is shown in Figure 5-9 below.



Figure 5-8: Preferred North-South route option

5.2.2.2 East-West options

Implications of the North-South Assessment

The north-south and east-west route option assessments were undertaken sequentially, meaning that the outcomes of the north-south assessment influenced the scope of optioneering and outcomes undertaken for east-west route options. In particular:

- The preference for Porchester Road as a north-south route north of Walters Road (over a new alignment further to the east) has meant that east-west options further to the east of Porchester Road outlined in Section 5.2.1.2 can be discarded without further assessment as part of the FTN route (because the remaining east-west options were premised on connecting with a north-south alignment further to the east). This removed the need to assess Options 1.2, 1.3, 2.3, and 4.1; all of which were premised on connecting with a new north-south alignment further to the east of Porchester Road; and
- The inclusion of Walters Road as part of the preferred north-south route means that one of the east-west options (Option 5.1, see Figure 5-8) is already included as part of the preferred route.

Given the above, the eleven east-west options shortlisted in Section 5.2.1.2 were reduced to six for the purposes of MCA assessment as follows:

- **Option 1.1** – Alfriston Road between Manurewa and Porchester Road;
- **Option 2.1** – Rangī Road and Popes Road (via Rangī Road Viaduct);
- **Option 2.2** – Spartan Road and Popes Road between Great South Road and Porchester Road;
- **Option 3** – Manuroa Road and Station Road east of Takaanini Station;
- **Option 4.2** – Taka Street and Airfield Road between Great South Road and Porchester Road; and
- **Option 5.2** – Walters Road west of Porchester Road.

MCA Assessment

The shortlisted east-west options were assessed using the MCA Framework for Te Tupu Ngātahi described in Section 3.1.2. The assessment scoring is summarised in Table 5-4 below.

Table 5-4: Summary of east-west route option MCA assessment

Criteria	Scoring					
	Option 1.1	Option 2.1	Option 2.2	Option 3	Option 4.2	Option 5.2
IO 1: Access	3	1	1	2	2	1
IO 2: Integration	2	0	1	2	2	0
IO 3: Travel choice and climate change	2	1	1	2	2	1
Historic Heritage	-1	-2	-1	-1	-1	-1
Land Use Futures	2	1	2	2	2	2
Urban Design	1	-3	1	-1	-1	0

Criteria	Scoring					
	Option 1.1	Option 2.1	Option 2.2	Option 3	Option 4.2	Option 5.2
Land Requirement	-4	-2	-1	-4	-1	-1
Social Cohesion	3	2	2	3	3	3
Human Health and Wellbeing	-2	-1	-1	-2	-2	0
Landscape / Visual	0	-3	0	0	0	0
Stormwater	-1	-3	-2	-1	-1	-1
Ecology	-3	-3	-4	-1	-1	-1
Natural Hazards	-1	-3	-3	-4	-4	-4
Transport System Integration	4	4	-3	2	2	1
User Safety	1	1	-3	2	2	1
Construction Impact	-1	-2	-1	-1	-1	-1
Construction Disruption	-2	-3	-2	-2	-2	-2
Construction costs/risks	-1	-4	-3	-3	-3	-3

The key findings of the assessment were as follows:

- **Option 1.1** performs the best against the investment objectives, land use futures and transport system integration as it will provide for the existing residential community and integrate well with the existing environment. However, it was assessed as highly adverse for land requirement given the established residential community;
- **Option 2.2** (which included the Rangi Road Viaduct) was not preferred given the significant adverse effects associated with a large 500m viaduct traversing SH1, the NIMT, the Papakura Stream, and Transpower's electricity corridor – these are reflected in the urban design, landscape and visual, stormwater, ecology, natural hazards, and construction disruption criteria. Moreover, the high cost, complexity, and high levels of embodied carbon associated with the option are reflected in the scoring for construction costs/risks;
- **Option 2.2** is anticipated to only have low positive benefits against the investment objectives given the industrial land use, meaning that catchment is limited. The option was assessed as highly adverse against ecology due to the potential impact on mature exotic and native trees as well as floodplains assessed as having moderate value;
- **Option 3** scores similarly to Option 1.1 in terms of investment objectives with the exception of Investment Objective 1 as it is anticipated to have a smaller catchment, and accordingly benefitting fewer people. Similar to Option 1.1, significant land requirements were anticipated, hence the low

score. Option also assessed as highly adverse for natural hazards due to the soft soil conditions resulting in the risk of settlement and groundwater management required;

- **Option 4.2** scores similarly to Option 3 with respect to investment objectives and for similar reasons. Likewise, it scores highly adverse for natural hazards due to ground conditions and the associated risks; and
- **Option 5.2** was assessed as having low positive benefits in respect of the investment objectives. However, it was assessed as highly adverse against natural hazards due to the soft soil conditions and its associated risks.

The assessment has identified **Option 1.1 (Alfriston Road)** as a preferred east-west route option as it best responds to the investment objectives by providing an east-west connection through to the Manurewa Station. Further, it is not anticipated to have the high adverse impacts on the natural environment as some of the other options, despite some of these options scoring similarly to Option 1.1 in terms of the investment objectives. **Option 5.1 (Walters Road)** is also an east-west connection forming part of the preferred option given it was already identified in the north-south route option assessment (see Section 5.2.2.1).

Decision to discount the Rangi Road Viaduct

A corollary of the above assessment is a decision to discount the Rangi Road Viaduct (part of Option 2.2) from further consideration. As noted above, the option was discounted due to high costs, high complexity, high environmental effects, and high levels of embodied carbon – all stemming from the inherent scale and complexity associated with a >500m viaduct traversing SH1, the NIMT, the Papakura Stream, and Transpower's electricity transmission corridor.

Given that the Rangi Road Viaduct formed part of the ISTN network for both Takaanini level crossing removal and the South FTN, this optioneering was undertaken concurrently between the TLC and South FTN DBCs. Accordingly, the Rangi Road Viaduct has been discounted as an option under both DBCs. This confirms that the ISTN options MT4I (and associated options MT4K and EW9B) will not be progressed in the form originally envisaged in the South IBC.

5.2.3 Preferred route

From the assessments summarised above (Sections 5.2.2.1 and 5.2.2.2), the preferred options for both north-south and east-west sections of the Takaanini FTN route were assembled into a single preferred option for the route as a whole. This is shown in Figure 5-9 below and forms the basis of all subsequent form and function and location refinement assessment.

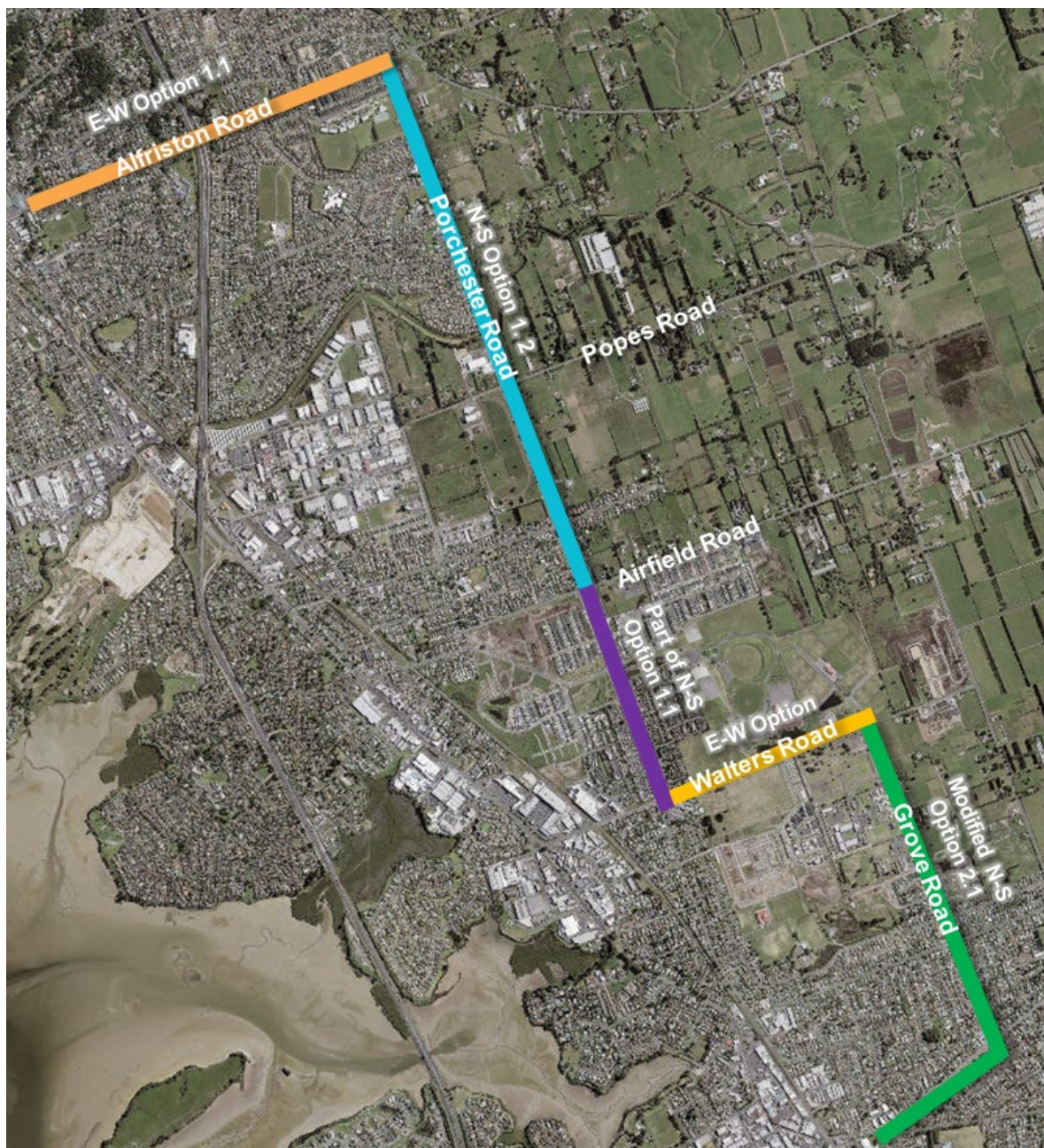


Figure 5-9: Preferred route for the Takaanini FTN

5.3 Form and function

5.3.1 Corridor Form and Function

As noted in Section 3.1.3 of the general methodology, the CFAF process as developed and applied at the Programme-wide level is intended to use land use and transport planning inputs to define functional requirements for the corridor in question, and identify a suitable midblock cross-section from a set of modular concept designs. This approach is taken on the basis that it provides for a suitable level of detail for route protection and design efficiency, whilst allowing for future design changes and flexibility at the time of implementation.

In the case of the Takaanini FTN, the outputs of the CFAF process was the application of:

- **A four-lane FTN arterial** cross-section to Alfriston Road (Section 6, refer to Figure 5-10 above), incorporating one general traffic lane and one bus lane per direction, separated active mode facilities in each direction, and space for berms and a median (see Figure 5-10); and
- **A two-lane FTN arterial** cross-section for the remainder of the route (Sections 7-9, refer to Figure 5-11 above) incorporating separated walking and cycling facilities (see Figure 5-11). No bus lanes are proposed for these sections of the route given the lower expected bus and general traffic volumes.

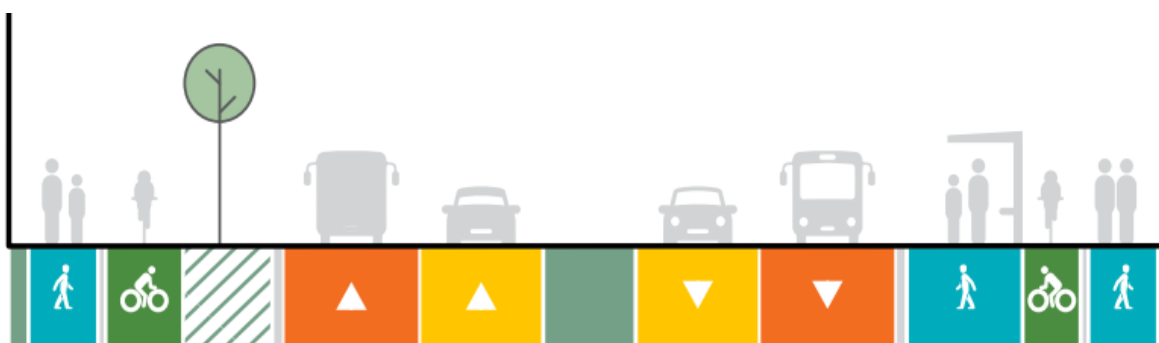


Figure 5-10: Four-lane FTN arterial as proposed for Alfriston Road (section 6 of the Takaanini FTN)



Figure 5-11: Two-lane FTN arterial as proposed for section 7-9 of the Takaanini FTN

Retesting of Alfriston Road

As was the case for sections of the Great South Road FTN, a reassessment of the Alfriston Road form and function was undertaken given the considerable third-party land/property cost implications of applying the four-lane FTN arterial as shown in Figure 5-10. This included assessment of a similar range of form and function approaches considered for the Great South Road FTN, including:

- Prioritisation of a transport mode (e.g. full bus lanes or active mode improvements but not both);
- Removal of an element from the cross-section (e.g. bus lanes in one direction only); or
- Full road space reallocation and/or road widening through applying the full four-lane FTN arterial cross-section shown in Figure 5-10.

Following this assessment, it was concluded that the four-lane FTN arterial cross-section remained the preferred form and function option for the Alfriston Road corridor west of Magic Way; with the

section to the east of Magic Way requiring eastbound bus lanes only. The reasons for generally retaining the four-lane FTN arterial cross-section, in spite of its third-party land requirements, are as follows:

- Lack of other east-west connections in the transport network which places significant demands on the Alfriston Road corridor for all modes;
- Significant predicted future bus volumes, with up to 26 buses per hour anticipated;
- The need to replace the SH1 and NIMT overbridges irrespective of corridor width;
- Poor outcomes for all transport modes and urban form without additional widening; and
- Inability to avoid significant property impacts with compromised solutions given the nature of land use along the corridor.

5.3.2 Intersection Assessment

As noted in Section 3.1.3.2 of the general methodology, an intersection assessment process was undertaken in parallel to the CFAF to identify which intersections required upgrades, the indicative intersection controls in these locations, and the resultant footprint implications. Similarly to the CFAF process, the approach developed and applied across the programme for the intersection assessment is to use land use and transport planning inputs to define functional requirements for the corridor in question, and identify a suitable intersection layout from a set of modular intersection designs.

The intersection filtering process identified twenty intersections requiring interventions along the Takaanini Road FTN route between Manukau and Drury. These were identified based on the considerations listed in Section 3.1.3.2 of the general methodology and are listed in Table 5-5 below.

As noted in Section 3.1.3.2, the intersection form at each site was identified based on a range of factors including safety, operational efficiency, urban design/land use integration, public transport operations, engineering and environmental constraints, property constraints, and other site-specific factors. While roundabouts are the typical first choice for at-grade intersections recommended in 'Safe System' guidance, it is recommended that the majority of intersections along the Alfriston Road section of the route are signalised for the following reasons:

- Complex existing intersections with multi-lane approaches; and
- A highly urbanised context with limited space available without significant property impacts.

The majority of the remainder of the route has a two-lane midblock (see Section 5.3.1 above). Accordingly, following the methodology outlined in Section 3.1.3.2 has resulted in the identification of single-lane roundabouts as the preferred intersection form in the majority of cases. The exceptions are where signals have been recommended due to:

- Proximity of schools in some cases and the resultant need for safer crossing movements;
- The need to enable efficient turning movements for FTN buses; or
- Engineering constraints in the case of the Hunua/Croskery Road intersection.

Table 5-5 summarises the forms identified for key intersections following this assessment, along with key location-specific considerations informing the proposed form (in addition to the above noted considerations).

Table 5-5: Proposed intersection forms resulting from intersection assessment

Corridor section	Intersection	Key transport planning considerations	Existing form	Proposed form
6	Weymouth Road / Manurewa Bus Interchange	Key bus movement out of interchange	Priority (stop)	Signals
	Alfriston Road / Claude Road	SH1 access, 12,000 vpd (current daily volume)	Signals	Signals
	Alfriston Road / Scotts Road	Reconfigured and assessed due to the construction of the SH1 bridge	Priority (stop)	Signals
	Alfriston Road / Magic Way	Part of the future indicative bus network (buses turn into Magic Way)	Signals	Signals
	Alfriston Road / Porchester Road	Key arterials intersecting, buses turn right	Signals	Signals
7	Porchester Road / Popes Road	Key E-W connection to Mill Road/ Takaanini industrial area	Priority (stop)	Dual-lane roundabout
	Porchester Road / Manuroa Road	SB buses expected to turn onto Manuroa Rd to tie into Takaanini Station	Single lane roundabout	Single-lane roundabout
	Porchester Road / Airfield Road	Key arterials intersecting. Key E-W connection to Ardmore/ Clevedon	Single lane roundabout	Single-lane roundabout
8	Porchester Road / Kauri Heart Avenue	SB buses expected to turn right out of Kauri Heart Ave after looping into the Station.	Signals	Signals
	Porchester Road / Walters Road	Key arterials intersecting, buses turning	Single lane roundabout	Signals
	Walters Road / Grove Road	Buses turning	Priority (give way)	Signals
	Grove Road / Old Wairoa Road	Safety concerns at current priority-controlled cross-roads	Priority (stop)	Single-lane roundabout
	Grove Road / Clevedon Road	Buses turning	Priority (stop)	Single-lane roundabout
	Clevedon Road / Marne Road / Willis Road	Key arterials intersecting, key E-W connection	Single lane roundabout	Single-lane roundabout
	Clevedon Road / Broadway	Buses turning	Signals	As existing
9	Great South Road / Ōpāheke Road	Buses turning	Priority (stop)	As existing
	Ōpāheke Road / Settlement Road	Buses turning	Signals	Single-lane roundabout
	Settlement Road / Marne Road	Safety concern (cross-roads), 13,000 vpd on Marne secondary arterial (current)	Single lane roundabout	Single-lane roundabout

Corridor section	Intersection	Key transport planning considerations	Existing form	Proposed form
	Settlement Road / Hunua Road	Buses turning	Priority (give way)	Single-lane roundabout
	Hunua Road / Croskery Road	Part of the urbanisation of Croskery Road	Priority (give way)	Signals

5.4 Location refinement

As noted in Section 3.1.4 of the general methodology, a process of reconciling expert and technical inputs in a workshop setting applied to decisions on the location of any road widening and realignment (i.e. third-party land requirements) to accommodate the preferred form and function along the preferred routes.

Table 5-6 sets out the key matters identified for each section which have informed the extent and location of third-party land requirements. These generally emphasise where environmental features and identified constraints constitute clear 'differentiators'.

Table 5-6: Key differentiating features/constraints informing application of location refinement

Section (as shown in Figure 3-4)	Third-party land requirement?	Key differentiating features/constraints informing application of location refinement principles
6	High	<ul style="list-style-type: none"> Preference to avoid or reduce impacts on Church (north side, chainage 350), Cosmopolitan Club (north side, chainage 430), Housing for Elderly complex (south side, chainage 660), and Transpower pylon (north side, chainage 1400). Numerous residential new builds including large apartment complex (north side, chainage 560). Each presents a challenge in terms of avoidance of impact (i.e. the ability to maintain a 1.5m front yard in the first instance), and/or boundary setting where street frontage units will need to be acquired. The need to replace both SH1 and NIMT bridges to provide sufficient road width drive significant property requirements
7	Moderate	<ul style="list-style-type: none"> General preference for any widening to be to the east given that land to the east of Porchester Road is zoned FUZ, while land to the west is already urbanised. Notwithstanding a general preference to widen into FUZ, there is also numerous reasons to avoid the need to replace existing local network stormwater conveyance channels / table drains on the east side of Porchester Road – this is to: (a) avoid the need for extensive piping and/or wider and shallower replacement channels requiring additional land not otherwise required; and (b) avoid choosing an inappropriate conveyance device for the road prior to Auckland Council Healthy Waters confirming the urbanisation strategy for the wider Papakura Stream catchment. This has resulted in a preference to deviate Porchester slightly (<20m) westwards in this location, which has resulted in an offset in the upgrade of Popes / Porchester Road intersection.

Section (as shown in Figure 3-4)	Third-party land requirement?	Key differentiating features/constraints informing application of location refinement principles
		<ul style="list-style-type: none"> • Preference to avoid or reduce impacts on churches/temples (east side, chainage 0-900), Alfriston College (west side, chainage 200), potential large wetland between Taipan Place and Papakura Stream (east side, chainage 1200). • Medium density residential new build at intersection of Porchester Road / Manuroa Road / Berwyn Road – presents a challenge in terms of avoidance (i.e. the ability to maintain a 1.5m front yard in the first instance), and/or boundary setting where street frontage units will need to be acquired.
8	Moderate	<ul style="list-style-type: none"> • Transpower pylon on corner of Porchester and Airfield Roads. • Medium density residential new build at intersection of Walters Road / Grove Road – presents a challenge in terms of avoidance (i.e. the ability to maintain a 1.5m front yard in the first instance), and/or boundary setting where street frontage units will need to be acquired.
9	Moderate	<ul style="list-style-type: none"> • Preference to avoid or reduce impacts on historic heritage features (Papakura Old Central School and War Memorial), Papakura Cemetery, and notable tree in road reserve near Settlement Road rail bridge. • Medium density residential new build at intersection of Settlement Road and Marne Road – presents a challenge in terms of avoidance (i.e. the ability to maintain a 1.5m front yard in the first instance), and/or boundary setting where street frontage units will need to be acquired.

5.5 Preferred option (NoR 3 and NoR 4)

5.5.1 Summary

Following the application of the above principles and process, a preferred option for the Takaanini FTN was identified. The form and function of the preferred option is shown conceptually in Figure 5-12) and includes:

- Provision for bus lanes in both directions along Weymouth and Alfriston Roads between Selwyn Road and Magic Way;
- Improved active mode (walking and cycling) facilities for the full route extent; and
- 20 intersection upgrades.

There are continuous road widening requirements for the Takaanini FTN along the Weymouth Road, Alfriston Road, and Porchester Road to accommodate the proposed form and function. The preferred location of widening varies as follows:

- In the case of Weymouth and Alfriston Roads, the differentiating features and constraints along these routes (see Table 5-6) did not identify a clearly preferred side of the road for widening. Accordingly, widening is proposed on both sides with minor localised variations in alignment to avoid constraints and properties where practicable; and

- In the case of Porchester Road, a general preference was identified to widen to the east given that land to the east of Porchester Road is zoned FUZ while land to the west is already urbanised. The exception to this preference was where avoidance of existing stormwater conveyance channels was sought in the vicinity of Popes Road (see Table 5-6). This has resulted in a localised westward deviation (<20m) of Porchester Road at the Popes Road intersection.

The proposed alignment and extent are shown in the General Arrangement drawings in Volume 3 of the application.

5.5.2 Design Considerations

The key considerations and assumptions applied in developing the concept design arising from the preferred option are summarised in Section 9 of the AEE.

It is noted for completeness that the approach to stormwater management devices was subject to an assessment of alternatives. Following the process set out in Section 3.2 of this report, stormwater wetlands have been identified as part of the concept design as the preferred stormwater management device. Six wetlands are proposed as follows:

- Corner of Weymouth Road and Selwyn Road;
- Adjacent to Tadmore Park and Gallaher Park;
- Corner of Alfriston Road and Scotts Road;
- Alfriston Park;
- East of Porchester Road, north of the Papakura Stream; and
- East of Porchester Road, south of the Papakura Stream.

The size and location of each of these wetlands was identified based on the process set out in Section 3.2 of this report.

It is noted for completeness that raingardens were considered for the Weymouth-Alfriston Road corridor. These were not preferred on the basis that:

- Raingardens would not provide the necessary stormwater functions required for the corridor (see Section 3.2); and
- The additional road widening required to accommodate raingardens in this corridor context would increase rather than reduce the property requirements compared with the preferred wetlands.

5.5.3 Route protection requirements of the preferred option (NoRs 3 / 4)

The sections of the Takaanini FTN which utilise Weymouth Road, Alfriston Road, and Porchester Road generally require continuous road widening and additional land take to provide for the necessary form and function of the transport upgrades as defined in Section 5.5.1 above (i.e. along Weymouth Road and Alfriston Road between Selwyn Road and Magic Way; and along Porchester Road between Alfriston Road and Walters Road). These requirements are proposed to be packaged in two NoRs as follows:

- The Weymouth and Alfriston Road extents are proposed to be packaged within the NoR referred to as **NoR 3**; and
- The Porchester Road extent is proposed to be packaged within the NoR referred to as **NoR 4**.

The remainder of the preferred option to the south of Airfield Road can largely be accommodated within the existing road reserve, with third-party land requirements limited to isolated requirements for intersections along the route listed in Section 5.3.2 above.

Route protection is only required for the parts of the preferred option requiring third-party land, and the remainder of the transport upgrades comprising the preferred option are assumed to be either permitted activities or readily consentable.

In assessing the strategic merit of proceeding with route protection for NoR 3, a qualitative assessment considering the range of factors set out in Table 3-3 was carried out. This assessment noted the following:

- The Weymouth and Alfriston Road upgrades were assessed as providing high transport benefits, in particular provision for bus lanes in both directions which will enable significant improvements in the performance of public transport, and upgraded active mode facilities which will increase the safety and attractiveness of walking and cycling;
- The Weymouth and Alfriston Road corridor is a strategically significant east-west route and has no equivalent parallel route. Accordingly, there is a high reliance on the route today, and it will need to accommodate continued increases in transport demands resulting from planned growth. The proposed upgrades will ensure that the road is appropriately future proofed to efficiently serve the demands associated with planned growth;
- While the scale of property requirements and associated costs associated with route protection were assessed as significant (noting that over 400 properties are directly affected), the above noted benefits were considered to justify these effects and costs;
- While these parts of the Takaanini FTN traverse mostly urbanised areas in Manurewa, there remains a route protection benefit to be derived from future-proofing transport upgrades to provide for the urban intensification enabled by the AUP:OP; and
- Route protection presents an opportunity to provide for integration of bridge upgrades with other interdependent projects – e.g. integration of Weymouth Road bridge upgrade with future four-tracking of the NIMT.

The same assessment was undertaken for NoR 4, and noted that:

- The Porchester Road upgrade was assessed as providing high transport benefits, in particular upgraded active mode facilities which will increase the safety and attractiveness of walking and cycling;
- The scale of property requirements and associated costs associated with route protection are moderate relative to the benefits of the project given that the majority of the corridor widening is proposed to be undertaken on the eastern side of Porchester Road which is not urbanised; and
- Clear opportunity to achieve route protection given that the eastern side of the Porchester Road corridor is not urbanised.

For completeness, it is noted that the potential third-party land requirement for an approximately 7km extent at the southern end of the Takaanini FTN (sections 8 and 9 as documented in this report) is **not proposed** to be route protected as part of the current application, and in effect is deferred to future designation processes. As part of this strategic merits assessment, it was considered that 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.



Figure 5-12: Takaanini FTN preferred option

6 Key Connections

6.1 Gap analysis and confirmation of optioneering scope

As noted in Section 2.3, each of the adjoining **Key Connections** originates from options identified as part of the ISTN through the IBC process; and have fallen into the scope of the South FTN DBC as a result of circumstances summarised in the gap analysis (see Section 2.3).

These are outlined in Table 6-1 below.

Table 6-1: Origins of the complementary corridors and why they are in Project scope

Corridor	IBC option	Reasons for inclusion in Project scope
Popes Road	Formed part of option EW9B which comprised east-west connections in the Takaanini area (see Figure 2-4).	<ul style="list-style-type: none"> The decision to discount the Rangi Road Viaduct as part of the Takaanini FTN meant that option EW9B (and indeed option MT4L) was not possible in the form envisaged in the IBC. However, this decision only applied to the Rangi Road Viaduct, not to the wider east-west corridor including Popes Road. Popes Road still likely has strategic significance as a future east-west connection between the north-south route formed by the Takaanini FTN and the future Mill Road corridor (and indeed further west via the TLC crossings).
Great South Road (Drury)	Formed the southernmost part of options MT4K and MT4L (SH1 FTN options), forming the connection between the SH1 Drury Interchange and Drury Central Station (see Figure 2-2).	<ul style="list-style-type: none"> As noted in Section 2.3, options MT4K and MT4L have not been taken forward into a DBC by Te Tupu Ngātahi, meaning that the upgrade of this section of Great South Road has not been provided for. The designation/consenting and funding of the Drury Central Station and Waihoehoe Road urbanisation through NZUP have left this section of Great South Road requiring corresponding planning for urbanisation to ensure that the projects form a cohesive whole.

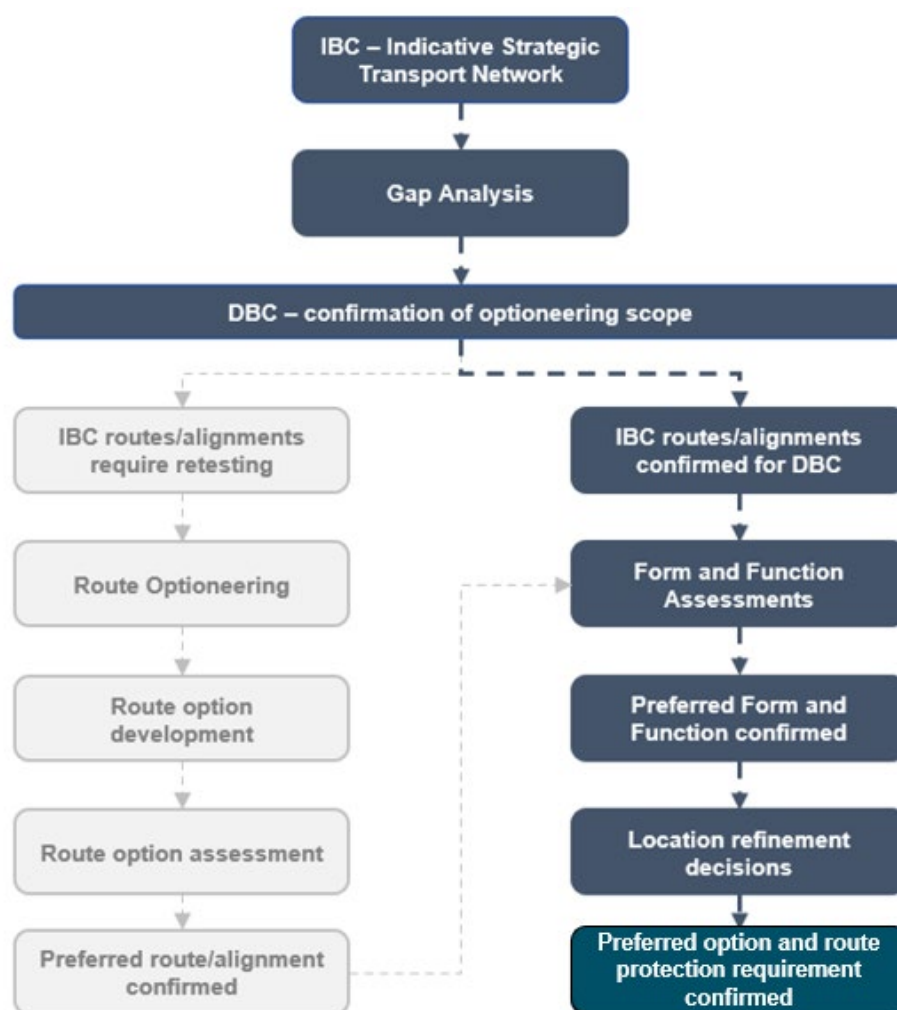


Figure 6-1: Optioneering process adapted for Popes Road and Great South Road (Drury). Note omission of the route optioneering steps.

The methodology outlined in Section 3 requires the implications of new information identified in the gap analysis to be considered with a view towards establishing the necessary scope of further optioneering in the DBC. In making this determination, the following conclusions were reached through the gap analysis on the three complementary corridors:

- The reasoning set out in Table 6-1 for each of the corridors identifies that each of the three corridors remains strategically important in the context of the wider network as it is now planned;
- Legislative and policy direction to enable increased housing supply, updates to AFC growth scenarios, and Private Plan Changes all signal that the areas around the Takaanini FTN Project area will continue to experience urban growth and increased demand on the transport network;
- The types of multi-modal interventions, namely active mode facilities, envisaged along the corridors are entirely consistent with the transport and climate change legislation policy directives outlined in Table 6-1; and
- Both corridors already exist. Given that FTN services are not proposed along these routes, there is no need to consider bus routing implications as was the case for the Takaanini FTN.

For the above reasons, there was not considered to be any reason initially to further retest the routes for Popes Road and Great South Road in Drury. Accordingly, the route optioneering process step was

omitted, and the corridors proceeded directly to form and function assessment and location refinement (see Figure 6-1).

6.1.1 Implications of the draft Future Development Strategy – April 2023

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. This area was identified as an area for long-term urbanisation under the Council's FULSS, and remains zoned FUZ in the AUP:OP. Given the timing of the draft FDS, it was not considered during the gap analysis undertaken at the outset of South FTN, and the initial options assessment proceeded on the assumption that the FUZ would remain.

However, the Project Team recognised that the outcome of the final FDS could have a material impact on the option assessment process. While the ultimate zoning outcome is subject to a future plan change process, the draft FDS signalled a clear policy shift for the area. Consequently, the Project Team considered that the required form and function for the eastern end of Popes Road (Popes Road East) would fundamentally change in the event that the removal of the Takaanini FUZ were to be altered via the final FDS. The FDS recommendations are of particular relevance to Popes Road East, because the corridor traverses the Takaanini FUZ, and the need for a road upgrade is premised on the need to provide for future urbanisation. Accordingly, while the initial assessment assessed Popes Road East as a future urban arterial road, it was acknowledged that the required form and function would need to be revisited and change in the event that the proposed removal of the Takaanini FUZ remained part of the FDS. In this event, the Project Team considered it unlikely that Popes Road East traversing the current FUZ would require widening to enable urbanisation. The western section of Popes Road (Popes Road West) would remain in scope given that part of the corridor already traverses live-zoned land. It was noted that this assessment would need to be revisited when the final FDS is released.

At the time at the time of finalising this assessment in October 2023 for a final AT decision, the Council officers' recommendation on the final FDS was released. This required a reassessment of the merits of the inclusion of Popes Road for route protection to be undertaken. This is addressed at Section 6.4 below.

6.2 Form and Function

6.2.1 Corridor Form and Function

As noted in Section 3.1.3.1 of the general methodology, the CFAF process as developed and applied at the Programme-wide level is intended to use land use and transport planning inputs to define functional requirements for the corridor in question, and identify a suitable midblock cross-section from a set of modular concept designs. This approach is taken on the basis that it provides for a suitable level of detail for route protection and design efficiency, whilst allowing for future design changes and flexibility at the time of implementation.

In the case of the adjoining Key Connections for the South FTN, the outputs of the CFAF process were the application of:

- **A two-lane arterial** cross-section for Popes Road incorporating separated walking and cycling facilities (see Figure 6-2). No bus lanes are proposed for this corridor as it is not proposed as FTN bus routes; and
- **A four-lane arterial** cross-section for Great South Road (Drury) incorporating two general traffic lanes per direction, separated active mode facilities in each direction, and space for berms and a median (see Figure 6-3). No bus lanes are proposed for this part of the corridor as it is not proposed as an FTN bus route. However, bus lanes are not precluded.



Figure 6-2: Two-lane arterial as proposed for Popes Road (indicative only).

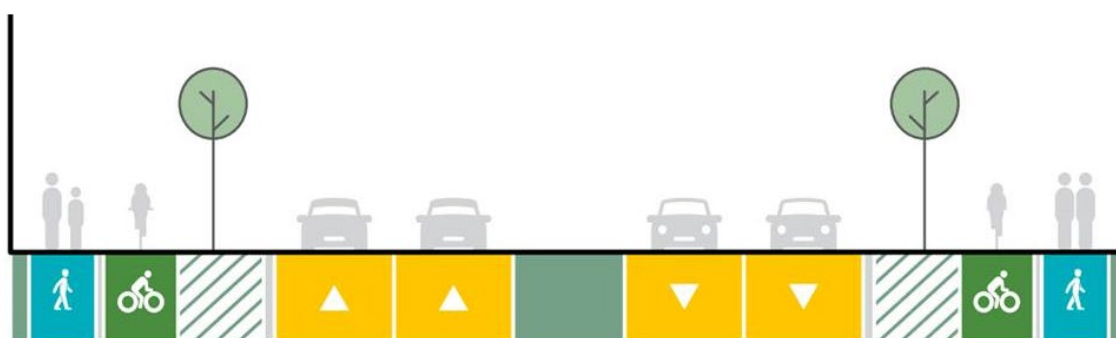


Figure 6-3: Four-lane arterial as proposed for Great South Road (Drury).

6.2.2 Intersection Assessment

As noted in Section 3.1.3.2 of the general methodology, an intersection assessment process is undertaken in parallel to the CFAF to identify the indicative controls required at key intersections, and the resultant footprint implications. Similarly, to the CFAF process, the approach developed and applied across the programme for the intersection assessment is to use land use and transport planning inputs to define functional requirements for the corridor in question, and identify a suitable intersection layout from a set of modular intersection designs.

In the case of the Key Connections, standalone intersection assessment was only undertaken for the intersection of Popes Road and Takanini School Road, where a single-lane roundabout is proposed (see Table 6-2).

All other intersections along the two corridors were either:

- Already addressed as part of intersection assessment for the Great South Road or Takaanini FTN (given that the corridors intersect in some cases);

- Already assessed as part of another Te Tupu Ngātahi project; or
- Anticipated to be assessed as part of a future project scope.

The circumstances pertaining to each intersection along the subject corridors is summarised in Table 6-2, along with key location-specific considerations informing the proposed form (in addition to the above noted considerations).

Table 6-2: Key Connections – intersections

Corridor	Intersection	Key transport planning considerations	Existing form	Proposed form
Popes Road	Popes Road / Takanini School Road	Freight expected to turn into the Takaanini industrial area	Priority (give way)	Single-lane roundabout
	Porchester Road / Popes Road	Key E-W connection to Mill Road/ Takaanini industrial area	Priority (stop)	Dual-lane roundabout (note addressed as part of Takaanini FTN, see Table 4-3).
	Porchester Road / Mill Road	TBC – Assumed to fall within future Mill Road project scope. Existing form is priority (stop).		
Great South Road (Drury)	Great South Road / Waihoehoe Road	Addressed via tie-in to signals proposed as part of the Drury Arterials package and to be implemented through NZUP (see Table 6-1).		
	Great South Road / Firth Street	Need for right-turn bay into Firth Street	Priority (stop)	Signals
	Great South Road / SH1 Interchange	Addressed via tie-in to Waka Kotahi Papakura-to-Drury (Stage 1B1) Project.		

6.3 Location Refinement

As noted in Section 3.1.4 of the general methodology, a process of reconciling expert and technical inputs in a workshop setting applied to decisions on the location of any road widening and realignment (i.e. third-party land requirements) to accommodate the preferred form and function along the preferred routes.

Table 6-3 sets out the key matters identified for each section which have informed the extent and location of third-party land requirements. These generally emphasise where environmental features and identified constraints constitute clear ‘differentiators’.

Table 6-3: Key differentiating features/constraints informing application of location refinement

Corridor (as shown in Figure 3-4)	Third-party land requirement?	Key differentiating features/constraints informing application of location refinement principles
Popes Road	Low	<ul style="list-style-type: none"> • Stormwater conveyance channel on the south side of the road east of Porchester Road to be retained – this is to: (a) avoid the need for extensive piping and/or wider and shallower replacement channels requiring additional land not otherwise required; and (b) avoid choosing an inappropriate conveyance device for the road prior to Auckland Council Healthy Waters

Corridor (as shown in Figure 3-4)	Third-party land requirement?	Key differentiating features/constraints informing application of location refinement principles
		<p>confirming the urbanisation strategy for the wider Papakura Stream catchment. This constraint pushes widening northwards.</p> <ul style="list-style-type: none"> • Desire to reduce impacts on existing Spark Data Centre site (south side, chainage 300) if practicable given sensitivity of communications infrastructure. • Otherwise – a lack of clear differentiating factors.
Great South Road (Drury)	Moderate	<ul style="list-style-type: none"> • The need to integrate with adjoining projects – Waihoehoe Road urbanisation to the north, Drury Central Station to the east, and SH1 Papakura-to-Drury (Drury Interchange) to the south. • Desire to avoid/reduce impacts on Hingaia Stream where bridge replacement is required. • Desire to avoid/reduce impacts on Watercare's Waikato No.1 Watermain on the east side of the road. • Approaches to Hingaia Stream bridge need to be raised for flood immunity.

6.4 Final Future Development Strategy implications

At the time at the time of finalising this assessment, the Council officers' recommendation on the final FDS had just been released. The officers' recommendation remains that the Takaanini FUZ should be removed. This affects the continued validity of route protection for the upgrade of Popes Road East.

While noting that the officers' recommendation is yet to be endorsed by the Auckland Council Planning Committee at the time of writing, the Project Team, in consultation with AT, has taken the officers' recommendation as the most recent indication of the likely final FDS position. The implications were considered, and the following conclusions were reached:

- There is no need to revisit any earlier route optioneering assessment because Popes Road was selected largely because it is an existing route. The FDS does not change this; and
- The primary functional requirement for upgrades along Popes Road to the east of Porchester Road was to provide for urbanisation (i.e. corridor widening to enable walking and cycling upgrades). This urbanisation is no longer supported by the most recent policy direction as set out in the FDS reporting and evidence evaluation.

On this basis, the proposed upgrade of Popes Road to the east of Porchester Road plus land requirement that had been identified and assessed in the options assessment to date cannot be reasonably justified. Accordingly, the scope extent of the preferred option has been reduced to **remove Popes Road East** beyond the intersection of Popes and Porchester Roads and associated tie-ins. The proposed NoR 4 scope reduction was confirmed by AT prior to lodgement.

The western portion of the Popes Road upgrade is proposed to be retained given that the area is live-zoned. The upgrade is henceforth referred to as **Popes Road West**.

6.5 Preferred option (NoRs 2 and 4)

6.5.1 Summary

Following the application of the above process, preferred options for the Key Connections – Popes Road West and Great South Road (Drury) – were identified. The form and function of the preferred options are shown conceptually at Figure 6-4 and Figure 6-5, and include:

- **Popes Road West** – provision for an urban two-lane cross-section with walking and cycling facilities between Takanini School Road and Porchester Road only, and upgrades of the intersections with Takanini School Road and Porchester Road; and
- **Great South Road (Drury)** – provision for an urban four-lane cross-section with walking and cycling facilities between the SH1 Drury Interchange and Waihoehoe Road, with provision for the upgrade of the Firth Street intersection.

The preferred options for both routes require continuous road widening. The preferred location for widening varies as follows:

- In the case of Popes Road West, the general preference was to widen to the north to minimise impact on the Spark Data Centre (see Table 6-3); and
- In the case of Great South Road (Drury), the differentiating features and constraints along these routes (see Table 5-6) did not identify a clearly preferred side of the road for widening.

Accordingly, widening is proposed on both sides with best endeavors to avoid constraints and properties where practicable.

The proposed alignment and extent are shown in the General Arrangement drawings in Volume 3 of the application.

6.5.2 Design Considerations

The key considerations and assumptions applied in developing the concept design arising from the preferred option are summarised in Section 9 of the AEE.

It is noted for completeness that the approach to stormwater management devices was subject to an assessment of alternatives. Following the process set out in Section 3.2 of this report, the following devices have been identified:

- For Popes Road West, swales within the road corridor have been identified as part of the concept design as an at-source treatment device. Stormwater is then proposed to be conveyed via conveyance channels to the stormwater wetland to the east of Porchester Road / south of the Papakura Stream identified as part of the Takaanini FTN (see Section 5.5 above) and discharged to the Papakura Stream; and
- For Great South Road (Drury), localised raingardens within the road corridor have been identified as the preferred stormwater management device.

6.5.3 Route protection requirements of the preferred option (NoRs 2 and 4)

Both of the Key Connections require continuous road widening / third-party land. Accordingly, the route protection requirements are contiguous along both routes and require additional land take to provide for the necessary form and function of the transport upgrades as defined in Section 6.5.1 above. These requirements are proposed to be packaged in two NoRs as follows:

- The Great South Road (Drury) is proposed to be packaged within the NoR referred to as **NoR 2**; and
- The Popes Road West extent is proposed to be packaged within the NoR referred to as **NoR 4** (along with the Porchester Road upgrade proposed as part of the Takaanini FTN).

In assessing the strategic merit of proceeding with route protection for NoR 2, a qualitative assessment considering the range of factors set out in Table 3-3 was carried out. This assessment noted the following:

- The Great South Road (Drury) upgrade was assessed as providing a high transport benefit, in particular the provision for upgraded active mode facilities which will increase the safety and attractiveness of walking and cycling, and additional traffic lanes which will improve access to SH1;
- Route protection for the Great South Road (Drury) upgrade was identified as an opportunity to achieve an integrated, well-functioning multi-modal outcome which integrates three adjoining interdependent projects – the Drury Train Station, the SH1 Drury Interchange, and the urbanisation of Waihoehoe Road. It was also identified as an opportunity to future-proof for an upgraded bridge over the Hingaia Stream which is located within a known floodplain;
- The Great South Road (Drury) upgrade has partial effects only on 47 directly affected properties, which is a level of impact considered proportional to the transport benefit enabled through route protection; and
- While the Great South Road (Drury) corridor traverses areas of commercial and light industrial peri-urbanisation, there remains a route protection benefit to be derived from future-proofing transport upgrades to provide for the urban intensification enabled by the AUP:OP.

The same assessment was undertaken for NoR 4, and noted that:

- The Popes Road West upgrade was assessed as providing high transport benefits, in particular upgrades to active mode facilities which will increase the safety and attractiveness of walking and cycling, and provision for an urbanised corridor through the live-zoned extent of Popes Road; and
- The scale of property requirements and associated costs associated with route protection are moderate given that much of the area is yet to be urbanised/subdivided, and that all property requirements are partial only.

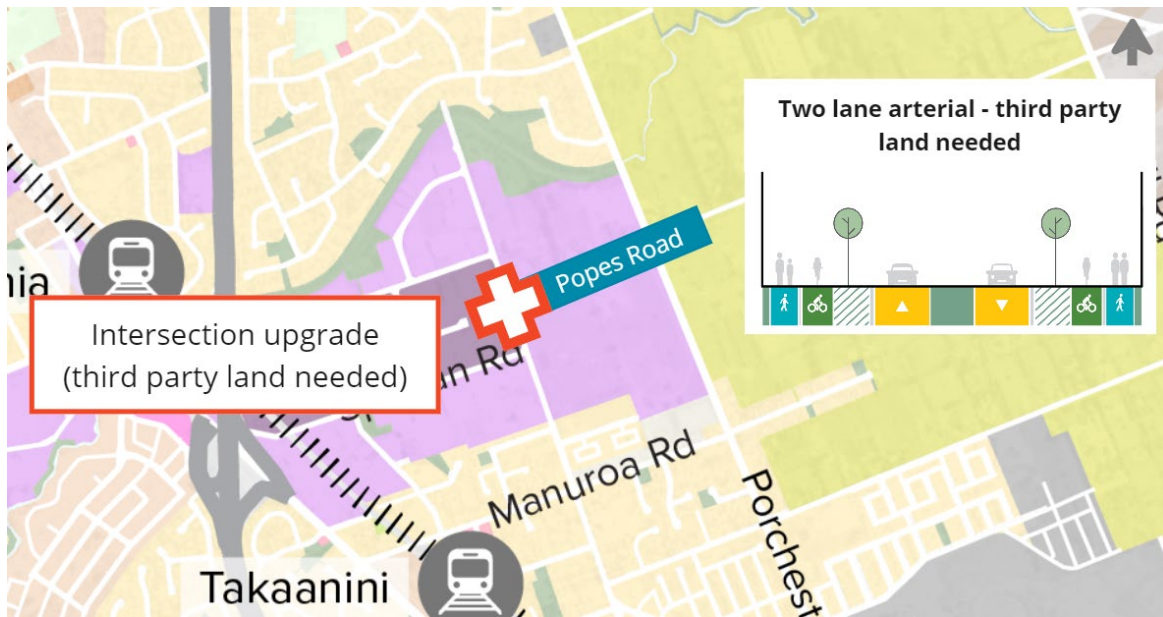


Figure 6-4: Popes Road preferred option

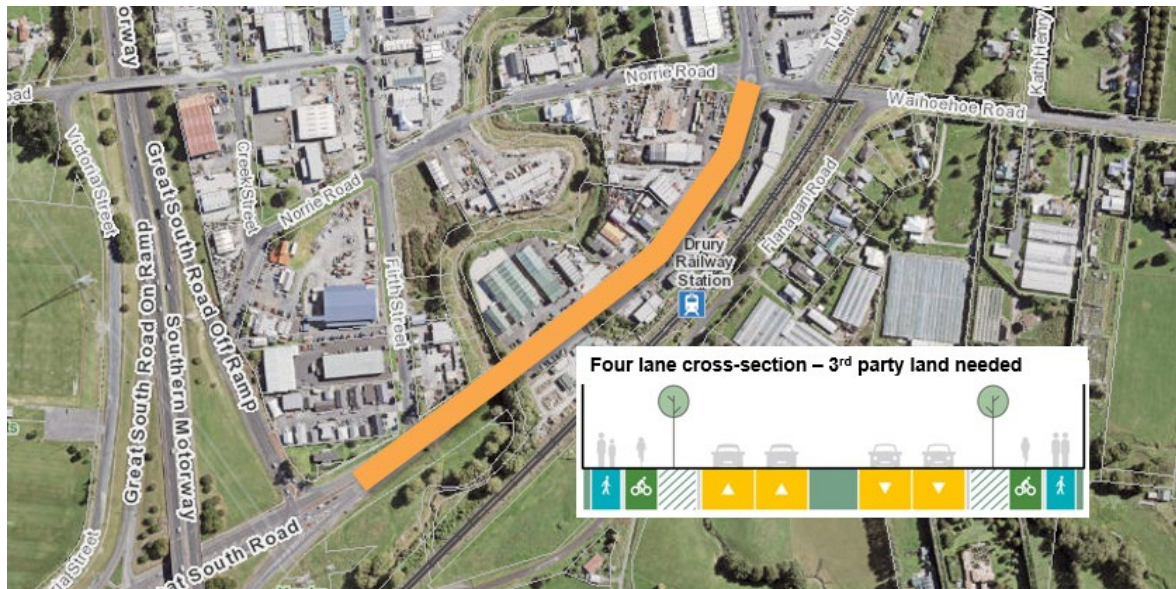


Figure 6-5: Great South Road (Drury) preferred option

7 Consideration of alternative statutory methods

As part of the consideration of alternatives, the alternative statutory methods to enable route protection and future implementation of South FTN have been assessed in accordance with section 171(1)(b) of the RMA. Methods were considered in light of a range of contextual elements including project strategic importance, project urgency/timing, and project complexity risk profile. The methods considered included:

- Designations;
- Resource consents;
- Structure Planning and Plan Changes
- Landowner/developer negotiations; and
- Traditional property acquisition.

The assessed strengths and weaknesses of these statutory methods in the context of the South FTN are summarised in Table 7-1 below.

For clarity, it is reiterated that not all the optioneering documented in this report has resulted in proposed transport upgrades which require additional land take to provide for the proposed transport upgrades. Accordingly, the assessment of alternative statutory methods is relevant only to the parts of the South FTN for which NoRs have been lodged.

Table 7-1: Strengths and weaknesses of statutory methods in the South FTN context

Method	Summary of strengths and weaknesses in the TLC context
Designations	<ul style="list-style-type: none"> • Prevents development that would prevent/hinder the proposed works within the designation boundaries. • Negates need for land use consents to implement works otherwise authorised by section 9(3) of the RMA – however regional consents need to be applied for separately. • Has interim effect from the time of lodgement. • Can provide for long-term route protection through extended lapse periods. • Can maintain design flexibility – less detail may be provided at lodgement, and further detail to be provided to the territorial authority subsequently at the Outline Plan stage prior to construction. • Provides certainty to affected landowners and the ability to request early buy-out from the requiring authority. • Does not require all land needed for South FTN to be purchased prior to lodgement (unless early buy-out is requested and approved) – property costs can be spread over period between NoR lodgement and the implementation of the work. • Additional areas required for construction can be rolled-back after works are completed. • Requiring authority retains decision making power. • High level of information required to support. • Exposure to contingent liability, and ultimately requires requiring authority to purchase land within footprint under the Public Works Act 1981 (PWA) – i.e. designation does not resolve property acquisition aspects of route protection. • Planning ‘blight’ – affected property owners may be unwilling or unable to maintain or develop properties when designated.
Resource Consents	<ul style="list-style-type: none"> • Resource consents do not prevent development that would otherwise prevent/hinder the proposed works – not a ‘route protection’ mechanism. In lieu of a route protection mechanism, all land needed for the project would need to be purchased before lodgement (see ‘Traditional Property Acquisition’ below). • Land use consents under section 9(3) of the RMA would need to be sought individually and not aggregated in the form of a designation. • Unable to utilise Outline Plan process – less design flexibility than a designation.

Method	Summary of strengths and weaknesses in the TLC context
	<ul style="list-style-type: none"> Notwithstanding the above, resource consents may be required for works within the existing road corridor that do not require third-party land.
Structure Planning / Plan Changes	<ul style="list-style-type: none"> Mechanisms within Structure Plans and Plan Change Precincts such as indicative roads and frontage setbacks have historically functioned as alternative route protection measures in lieu of designations. However, these mechanisms provide weaker protection from precluding development than designations, and do not specifically authorise the works – accordingly resource consents would ultimately be needed to authorise works, at which time all land needed for the project would need to be purchased (see ‘Traditional Property Acquisition’ below). Road frontage setbacks through Plan Changes have been incorporated into Plan Changes 52 and 58 on Great South Road Ōpāheke (within Section 4 as assessed in this report). However, these types of mechanisms are unlikely to be practical at a Project-wide level given the scale of South FTN and level of land ownership fragmentation. Some activities required for the works are enabled under the Strategic Transport Corridor Zone and within roads under the E26 Infrastructure provisions of the AUP:OP. However, given that much of the land required for South FTN is subject to other zoning and existing land uses, a Plan Change would be required. This would be less practical than simply lodging a NoR, and would require earlier land purchase (see ‘Traditional Property Acquisition’ below).
Landowner / Developer Negotiation	<ul style="list-style-type: none"> While alternative route protection mechanisms can be negotiated with landowners and developers (as above), ownership within the South FTN project area is fragmented – approximately 450 properties are either partially or fully required for South FTN. Negotiations requiring the concurrent agreement of this number of parties would likely be impractical. Road frontage setbacks through Plan Changes have been incorporated into Plan Changes 52 and 58 on Great South Road Ōpāheke (within Section 4 as assessed in this report). However, these types of mechanisms are unlikely to be practical at a Project-wide level given the scale of South FTN and level of land ownership fragmentation. As above – alternative route protection mechanisms provide weaker protection from precluding development than designations, and do not specifically authorise the works. Accordingly, resource consents would ultimately be needed to authorise works, at which time all land needed for the project would need to be purchased (see ‘Traditional Property Acquisition’ below).
Traditional Property Acquisition	<ul style="list-style-type: none"> Not considered appropriate because property is typically purchased closer to construction when more detailed design is available – full property costs incurred immediately for a project that may not be implemented for a long period of time. Purchasing land ahead of detailed design may result in too much or too little land being acquired with little flexibility between permanent and temporary requirements. Would need to be accompanied by resource consents to authorise works.

Having considered the relative strengths and weaknesses of the various route protection mechanisms outlined in Table 7-1, designations were identified as the preferred route protection method for South FTN, with AT as the Requiring Authority. Designations were considered the most logical and effective method to protect the route in an evolving environment because they:

- Provide certainty to all parties including the community, affected landowners, and developers;
- Are a well-recognised and understood tool for route protection which links with future land acquisition processes through the PWA;
- Maximises flexibility for future implementation – provides for 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;

- Will continually provide for ongoing future operation and maintenance requirements as well as construction works;
- 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; and
- Provides protection of the land from development that would prevent / hinder South FTN from the time of lodgement. This is particularly relevant in the Takaanini context which is already experiencing significant intensification.

It is concluded that adequate consideration has been given to alternative statutory methods and that route protection in the form of designations would be progressed for the South FTN.

8 Conclusion

Following the optioneering and refinement process set out above, the final recommended Project that would be taken forward for route protection (i.e., the scope of the AEE) is summarised in Table 8-1. The parts of South FTN requiring route protection are provided for through four NoRs as shown in Figure 8-1.

Te Tupu Ngātahi, on behalf of AT, adopted a systematic approach to considering alternative routes and statutory methods for undertaking the alternatives assessment to the NoRs required to enable the South FTN.

The consideration of alternatives methodology adopted meets the statutory requirements set out in section 171(1)(b) if the RMA.

Table 8-1: Final recommended network

Notice	Corridor	Scope / Description
NoR 1	Great South Road FTN Upgrade	<ul style="list-style-type: none"> Road upgrades and transport upgrades providing for the Great South Road FTN route along Great South Road between Manukau and Drury. NoR comprises eight 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)	<ul style="list-style-type: none"> 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 Road, Alfriston Road and Great South Road Upgrades	<ul style="list-style-type: none"> 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 NIMT and Alfriston Road over SH1, and stormwater management devices.
NoR 4	Takaanini FTN – Porchester Road Upgrade and Popes Road Upgrades	<ul style="list-style-type: none"> 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.



Figure 8-1: Recommended Project for route protection (as assessed in the AEE)

Appendix A: MCA Framework

Well being	MCA topic	#	Criteria	Measure
DBC Investment Objectives	DBC Investment Objectives	South FTN Routes		I.O 1 – Access – Enable access to economic and social opportunities by providing high quality public transport between Drury and Manukau that integrates with the rail network;
				I.O 2 – Integration – Support planned growth by integrating with the existing transport system, land use and the planned public transport network; and
				I.O 3 – Travel choice and climate change – Support growth and mode share shift towards low carbon transport modes.
		Key Connections		I.O 1 – Access – Improve access to economic and social opportunities by providing and integrated multi-modal corridors;
				I.O 2 – Integration – Provide corridor protection to support planned growth and flexibility enable future land use and transport integration;
				I.O 3 – Travel choice – Enable transformational mode share in Takaanini by providing a high quality, low carbon transport network; and
				I.O 4 – Safety – Provide improvements on the corridors that contributes to a transport network that is free from deaths and serious injuries.
Cultural	Heritage	1a	Heritage	<p><i>Extent of effects on:</i></p> <p><i>Sites and places of valued heritage buildings, trees (with heritage value) and places.</i></p> <p><i>Sites and places of archaeological value.</i></p> <p><i>Sites and places of European cultural heritage value</i></p> <p><i>Sites and places of significance to Manawhenua</i></p>
Social	Socio-economic impacts	2a	Land use futures	<p><i>To what extent will the option impact on the future development of land (within the corridor, adjacent to it and impacted by it – i.e. consider all 3 scales), in relation to:</i></p> <p><i>Underlying existing urban structure (block and street pattern)</i></p> <p><i>Integration with the future landuse scenario (aligning housing delivery with infrastructure delivery)</i></p> <p><i>Size and shape of potential development parcels to enable appropriate building typologies</i></p> <p><i>Ability to consolidate residual land</i></p> <p><i>Access that does not prevent neighbouring development</i></p>

Well being	MCA topic	#	Criteria	Measure
		2b	Urban design	<p><i>To what extent does the option support a quality urban environment (both current and future planned state)? particularly relating to:</i></p> <p><i>Context and planned place making considerations</i></p> <p><i>An inviting, pleasant and high amenity public realm</i></p> <p><i>Open space integration</i></p> <p><i>Active interface between public and private realm</i></p> <p><i>Scale of long term impact on the amenity and character of the surrounding environment.</i></p>
		2c	Land requirement	<p><i>Scale of public / private land (m² / number of properties / special status of impacted property) required to deliver the option.</i></p>
		2d	Social cohesion	<p><i>Impact on connectivity/accessibility for the existing urban areas including access to:</i></p> <p><i>Employment</i></p> <p><i>Other communities or within the same community</i></p> <p><i>Shops/services/other community and cultural facilities/'attractors'</i></p> <p><i>Severance of the existing community (including consented)</i></p> <p><i>Scale of effect on existing community facilities and open space</i></p> <p><i>Public access to the coast, rivers and lakes</i></p>
		2e	Human Health and Wellbeing	<p><i>Will the option potentially affect any sensitive land uses nearby or consented (adjacent residential, childcare centres, hospitals, rest homes, marae and schools)? particularly relating to:</i></p> <p><i>Air Quality</i></p> <p><i>Contaminated Land</i></p> <p><i>Noise and Vibration</i></p>

Well being	MCA topic	#	Criteria	Measure
Environmental	Natural Environment	3a	Landscape/visual	<p><i>Will the option have visual effects?</i></p> <p><i>Extent of effects on:</i></p> <p><i>The natural landscape and features such as streams, coastal edges, natural vegetation and underlying topography – acknowledging planned changes to area in light of urban land use/zoning</i></p> <p><i>Natural character and outstanding natural features/landscapes including geological features (mapped and protected features)</i></p>
		3b	Stormwater	<p><i>Impact of operational stormwater (both quantity and quality) on the receiving environment, including:</i></p> <p><i>Potential flooding effects of the option within the catchment</i></p> <p><i>Extent and consequences of likely mitigation measures</i></p>
		3c	Ecology	<p><i>Extent of effects on:</i></p> <p><i>Significant indigenous flora;</i></p> <p><i>Significant habitats of indigenous fauna;</i></p> <p><i>Indigenous biodiversity;</i></p> <p><i>Stream/waterway ecology</i></p> <p><i>Coastal environment (e.g. CMA)</i></p>
		3d	Natural Hazards	<p><i>Extent of effect on adverse geology; steep slopes; seismic impacts; other resilience risks (low level infrastructure near coastlines, inundation areas)</i></p>
	Transport	4a	Transport system integration	<p><i>The extent to which the option achieves the following:</i></p> <p><i>Integration with wider network and between modes</i></p> <p><i>Resilience to operational incidents or short term life-line access disruption</i></p> <p><i>Reduces the need to travel increase access to non-car choices</i></p>
Economic		4b	User Safety	<p><i>Extent of safety effects on all transport users, including:</i></p> <p><i>People in public transport</i></p> <p><i>People walking or cycling</i></p> <p><i>People in private vehicles</i></p>

Well being	MCA topic	#	Criteria	Measure
	Construction impacts	5a	Construction impacts on utilities/infrastructure	<i>Requirements for relocation/design of existing infrastructure, including</i> <i>Consideration of safety impacts</i> <i>Risk of continuity of service over construction</i> <i>Engagement with utility providers</i> <i>Opportunities for integration with other bulk infrastructure</i>
		5b	Construction Disruption	<i>Construction impacts on people and businesses regarding:</i> <i>Traffic & noise</i> <i>Earthworks related effects including dust</i> <i>Quality of life and amenity</i> <i>Economic impacts on businesses/community/town centres</i>
	Cost & Construction Risk	6a	Construction costs and risk	<i>Assessed cost for construction of options including:</i> <i>Complexity and risk in construction (including consideration of constructability)</i> <i>Complexity in programme</i> <i>Cost and complexity of safely undertaking works (including works on contaminated land)</i>

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LEGEND GENERAL

- CONTROL LINE AND CHAINAGE
- EXISTING PROPERTY BOUNDARY
- EXISTING DESIGNATION BOUNDARY
- PROPOSED DESIGNATION BOUNDARY
- PROPOSED ROAD CORRIDOR
- PROPOSED FOOTPATH
- PROPOSED CYCLEWAY
- PROPOSED BERM
- PROPOSED FLUSH MEDIAN *
- FILL BATTER
- CUT BATTER

- NOTABLE TREE
- PROPOSED RETAINING WALL
- PROPOSED BRIDGE
- SIGNIFICANT ECOLOGICAL AREA (SEA)
- HISTORIC HERITAGE
- RIVERS & PERMANENT STREAMS

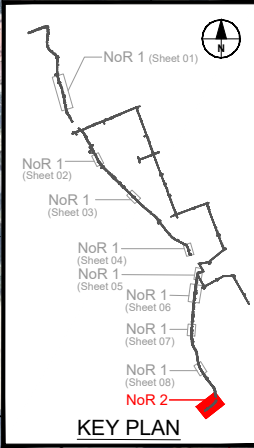
LEGEND STORMWATER

- PROPOSED STORMWATER CULVERT

LEGEND EXISTING UTILITIES

- TRANSPOWER PYLON
- TRANSPOWER OVERHEAD LINES
- WASTEWATER
- COUNTIES POWER MEDIUM VOLTAGE CABLE

* WHERE MEDIANS INDICATED ON ARTERIAL ROAD, THESE ARE ASSUMED TO BE FLUSH MEDIANS. HOWEVER, THE ROAD CONTROLLING AUTHORITY WOULD RETAIN THEIR EXISTING RIGHT TO CONSIDER OTHER TREATMENTS e.g. SOLID MEDIANS OR ISLANDS TO ADDRESS SPECIFIC SAFETY ISSUES ON A CASE TO CASE BASIS.



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SOUTH FTN - GREAT SOUTH ROAD FTN UPGRADE (DRURY SECTION)
GENERAL ARRANGEMENT LAYOUT PLAN - NoR 2

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South Frequent Transit Network Assessment of Arboricultural Effects

October 2023

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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
AS4970-2009	Australian Standard 4970-2009 Protection of Trees on Development Sites
AT	Auckland Transport
AUP:OP	The Auckland Unitary Plan: Operative in Part
FTN	Frequent Transit Network
FUZ	Future Urban Zone
GIS	Geographic Information System
MDRS	Medium Density Residential Standards
NIMT	North Island Main Trunk
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 Road, Alfriston Road, and Great South Road Upgrades
NoR 4	Notice of Requirement 4: Takaanini FTN – Porchester Road and Popes Road Upgrades
NPS-UD	National Policy Statement on Urban Development
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).
RMA	Resource Management Act 1991
SH1	State Highway 1
South FTN	South Frequent Transit Network
Te Tupu Ngātahi	Te Tupu Ngātahi Supporting Growth
TMP	Tree Management Plan

Acronym/Term	Description
TOA	Tree Owner Approval
TPZ	Tree Protection Zone, as defined in AS4970-2009
UDLMP	Urban Design and Landscape Design Management Plan

Executive Summary

This This Assessment of Arboricultural Effects report (**Report**) has been prepared following site visits that were undertaken for the collection of suitable data to inform an Assessment of Arboricultural Effects for four Notices of Requirement (**NoR**) for the South Frequent Transit Network (**South FTN**). An arboricultural survey of trees within and immediately adjacent to the four NoR boundaries has been conducted. The trees and tree groups have been recorded in a schedule (Appendix A) and plotted on plans overlaid with aerial photographs (Appendix B).

In summary, sixty-four (64) individual trees and fifty-seven (57) groups of trees containing more than 500 total trees that are subject to Auckland Unitary Plan: Operative in Part (**AUP:OP**) District Plan controls are identified within or adjacent to the NoR boundaries for this Project. Of these trees identified, the Project is likely to require removal of 40 groups of trees containing approximately over 390 trees and approximately 49 individual trees that would trigger reason for consent under the District Plan provisions for their removal. A breakdown of the impacted trees is shown below.

Number of trees and potential impact	NoR reference				
	NoR 1	NoR 2	NoR 3	NoR 4	All NoRs
Individual Trees					
<i>Total number of individual trees (within road reserve, open space zones or Notable Trees overlay)</i>	36	0	18	10	64
<i>Total number of individual trees with works within the Tree Protection Zone* (within road reserve, open space zones or Notable Trees overlay)</i>	11	0	0	1	12
<i>Total number of individual trees for removal* (within road reserve, open space zones or Notable Trees overlay)</i>	23	0	18	8	49
Groups of Trees					
<i>Total number of groups of trees (within road reserve, open space zones or Notable Trees overlay)</i>	33	2	14	8	57
<i>Total number of groups of trees with works within the Tree Protection Zone* (within road reserve, open</i>	14	0	0	0	14

Number of trees and potential impact	NoR reference				
	NoR 1	NoR 2	NoR 3	NoR 4	All NoRs
<i>space zones or Notable Trees overlay)</i>					
<i>Total number of groups of trees for removal* (within road reserve, open space zones or Notable Trees overlay)</i>	17	2	13	8	40

** Note: excluding pest plant species within the road reserve, pest plant species within open space zones that are less than 4m in height or 400mm in girth, or those trees that are less than 4m in height or 400mm in girth within the road reserve or open space zones (as removal of these trees are a Permitted activity under the AUP:OP).*

Tree removal will result in adverse effects that are proportionate to the size and number of trees that are removed, due to the loss of tree canopy cover and the associated ecosystem services benefits. Ecosystem services provided by trees include stormwater attenuation, pollutant adsorption, shade and shelter, and temperature regulation. Trees also provide amenity benefits, cultural and community benefits and support healthy human well-being.

Where trees are unavoidably impacted by the Project and require removal, mitigation measures commensurate with the anticipated effects on the environment must be implemented, with the aim of avoiding, remedying, and mitigating the adverse effects arising from the loss of the trees and associated benefits. It is recommended that a Tree Management Plan (**TMP**) be developed where constructed work impacts on trees and groups of trees that are protected under the District Plan provisions. Replacement planting protocols are proposed to be developed further as part of the TMP where protected trees are to be removed and to guide arboricultural matters during the final design and construction process.

The TMP for each portion of the Project must also 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.

Opportunities for replanting within the berms of the proposed cross section and land that may no longer be required post-construction provides mitigation of effects arising from tree removal associated with the Project. 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.

Overall, the effects on trees protected by the District Plan provisions will be mitigated by replacement planting within the corridors and/or on adjacent land within the designation boundaries.

Summary of Assessment of Effects and Recommendations

Summary of Assessment of Effects and Recommendations

Effect	Assessment	Recommendation
Construction		
Tree removal to enable the Project	Potentially significant adverse effects in some areas due to the loss of the benefits that existing trees provide.	<p>A verification assessment at the time of implementation is recommended to ensure there has been no material change in conditions. Any additional future tree removal, tree planting or mass planted vegetation should be assessed at that time. This Report provides a baseline survey.</p> <p>Development of a tree management plan to guide arboricultural matters through the detailed design and construction phases of the Project.</p> <p>The tree management plan will be the mechanism for determining how the Project can avoid, remedy, or mitigate effects on protected trees. This could include identifying opportunities for retaining protected trees and replacement tree planting standards for inclusion within the UDLMP.</p> <p>Replacement tree planting must aim to remediate the loss of ecosystem services provided by existing trees that are required to be removed. The specific tree locations and/or tree species of replacement planting is to be reviewed and input provided in order to achieve the best outcome in the long term.</p>
Tree alteration	Adverse effects on the health, condition and / or stability of trees that are maintained within and adjacent to construction areas	<p>Development of a tree management plan to guide arboricultural matters through the detailed design and construction phases of the Project.</p> <p>The tree management plan will set out tree protection measures that must be implemented during construction to avoid or minimise adverse effects on trees that are to be retained.</p>
Operation		
None	Once the road network upgrade has been completed, no further effects on trees are anticipated. 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.	Nil

1 Introduction

1.1 Purpose and scope of this Report

This Report has been prepared to inform the Assessment of Effects on the Environment (**AEE**) for the Notice of Requirement (**NoR**) being sought by Auckland Transport (**AT**) for the South Frequent Transit Network (**South FTN**) under the Resource Management Act 1991 (**RMA**). Four NoRs are proposed to authorise transport upgrades along key sections of roads which fall within the South FTN. The transport upgrades authorised by the NoRs are referred to in this Report as the **Project**.

Specifically, this Report considers the actual and potential effects associated with the construction and operation of the Project on the existing and likely future environment as it relates to Assessment of Arboricultural effects and recommends measures that may be implemented to avoid, remedy and/or mitigate these effects.

This Report should be read alongside the AEE, which contains further details on the history and context of the Project. The AEE also contains a detailed description of works to be authorised within the NoR, and the typical construction methodologies that will be used to implement this work. These have been reviewed by the author of this Report and have been considered as part of this assessment of Assessment of Arboricultural effects. As such, they are not repeated here. Where a description of an activity is necessary to understand the potential effects, it has been included in this Report for clarity.

1.2 Report Structure

In order to provide a clear assessment of the NoRs, this Report follows as appropriate, the structure set out in the AEE. This Report contains an assessment of the actual and potential effects of the Project as a whole (the four NoRs) / localised areas within the wider extent. Where appropriate, measures to avoid, remedy or mitigate effects are recommended. The sections of this Report are arranged accordingly. Table 1-1 below provides an overview of the report structure and where the description of effects can be found in this Report.

The Report follows a nested structure:

- Part A covers assessment of the Project as a whole; and
- Part B covers assessment of each of the four proposed NoRs.

Table 1-1: Report Structure

Report Part #	Report Section #	Extent Assessed (Route and/or NoR)
A	4	Whole of Project
B	5.1	NoR 1 – Great South Road FTN Upgrade
	5.2	NoR 2 – Great South Road Upgrade (Drury section)
	5.3	NoR 3 – Takaanini FTN – Weymouth Road, Alfriston Road, and Great South Road Upgrades
	5.4	NoR 4 – Takaanini FTN – Porchester Road and Popes Road Upgrades

2 Project Description

2.1 Context – South FTN

As described further in the AEE, the South FTN is one of the transport works packages proposed for South Auckland between Manukau and Drury as part of Te Tupu Ngātahi Supporting Growth (**Te Tupu Ngātahi**) programme.¹ The South FTN is in turn part of a wider planned multi-modal transport network intended to support growth and enable mode shift in South Auckland.

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 FTN² bus services 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
- Urbanisation of adjoining key connections to FTN routes – Popes Road West, 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 2-1.

2.2 The NoRs – proposed spatial extent

Of the full South FTN network extent shown in Figure 2-1, only a portion falls within the NoRs/Project (see Figure 2-2). 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.³

Accordingly, this assessment is focussed on the activities proposed to be authorised by the four NoRs. 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 2-1, and the extents are shown in Figure 2-2.

Further detail on the proposed activities and works in each NoR are provided in the AEE.

Table 2-1: South FTN – Summary of NoRs

NoR reference	Project component	Description
NoR 1	Great South Road FTN Upgrade	<ul style="list-style-type: none"> • 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 2-1) providing for bus priority measures, walking and cycling facilities, key

¹ The Programme is a collaboration between Auckland Transport (**AT**) and Waka Kotahi NZ Transport Agency (**Waka Kotahi**) to investigate, plan, and undertake route protection for the strategic transport networks needed to support Auckland's growth over the next 30 years.

² FTN services are defined in AT's Regional Public Transport Plan (RPTP) as bus routes operating at least every 15 minutes between 7am-7pm, 7 days-a-week, often supported by priority measures such as bus or transit lanes.

³ 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.

NoR reference	Project component	Description
		intersection upgrades, replacement of the existing Otūwairoa / Slippery Creek bridge, and stormwater management devices.
NoR 2	Great South Road Upgrade (Drury section)	<ul style="list-style-type: none"> 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	Weymouth Road, Alfriston Road, and Great South Road Upgrades	<ul style="list-style-type: none"> 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 and Popes Road Upgrades	<ul style="list-style-type: none"> 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 Takaanini 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.

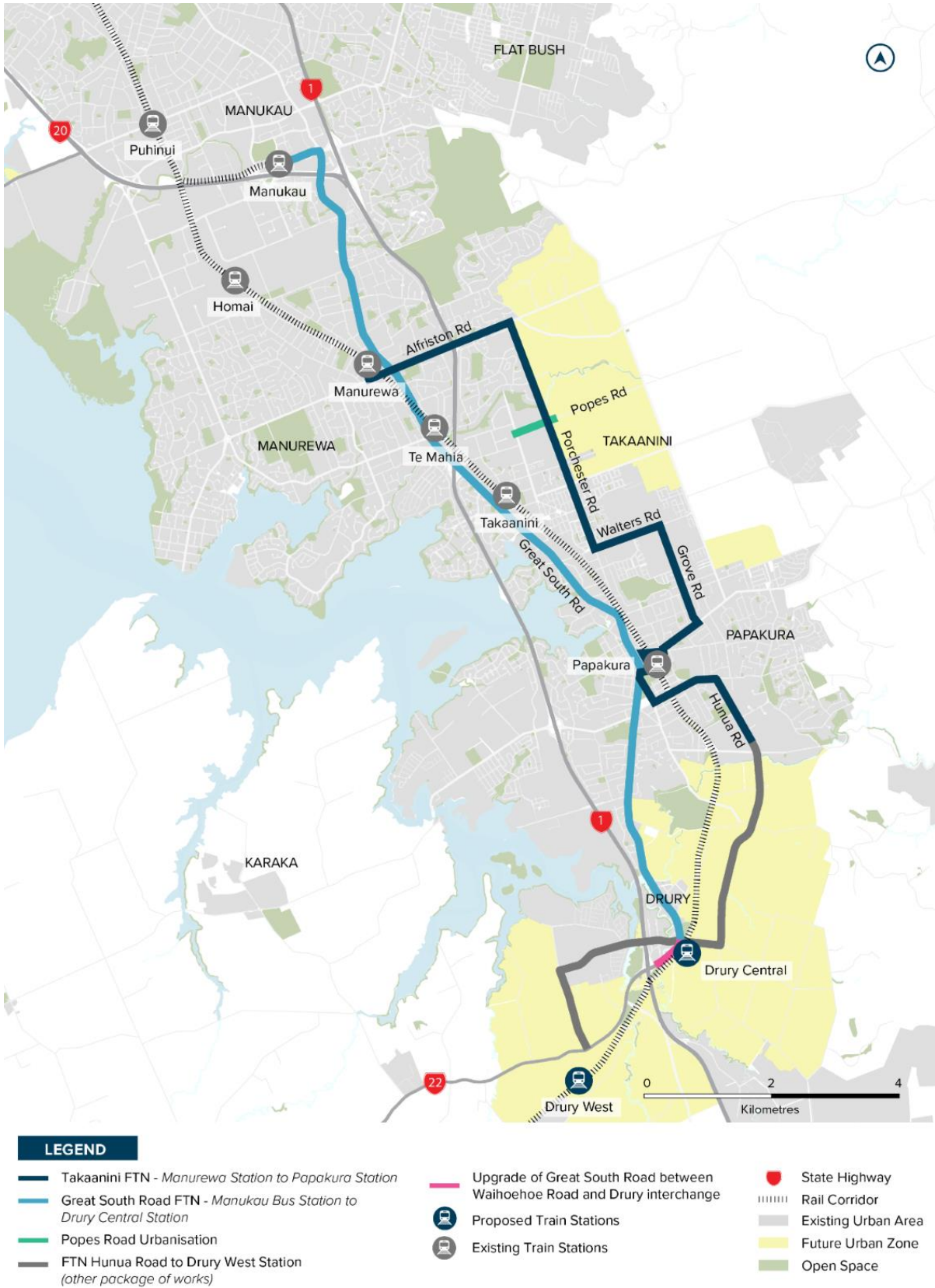


Figure 2-1: South FTN – overall Project extent



Figure 2-2: South FTN – proposed NoRs

3 Assessment methodology and parameters

3.1 Preparation for this Report

I attended a tour of the South FTN extent of works with the Project team and other technical experts on 17 July 2023 to review the locations of the proposed NoRs, during which I gained an overview of the Project and the potential impacts on trees along the route.

I conducted an arboricultural survey within the proposed NoR boundaries of the Project to record details of all pertinent trees within and adjacent to the NoR boundaries between 25 and 29 July 2023.

3.2 Methodology

I undertook the arboricultural survey in a standard arboricultural manner, to record details of all relevant trees that may be affected by the NoRs. This involved traversing the length of each NoR and visually assessing each tree or tree groups and taking measurements and photographs. Tree data was recorded on a mobile phone with a data logging application with georeferencing capabilities. The tree data was then uploaded to a Geographic Information System (**GIS**) canvas to enable mapping and further assessment of the trees in relation to NoR boundaries and the anticipated work within them.

Tree data recording included:

- Assigning a sequential number to each tree or tree group;
- Plotting the location of the tree based on geolocation and aerial photographs;
- Recording tree ownership;
- Identifying the number of trees in tree groups, or if a solitary tree;
- Recording tree species;
- Recording estimated tree height and crown spread;
- Measuring or estimating tree trunk diameter at standard height (1.4 m above the ground, or as per AS4970-2009);
- Identifying age class;
- Noting any tree structural, health, form or condition anomalies; and
- Adding general comments that may inform the assessment of effects.

Trees that may be subject to AUP:OP District Plan provisions (e.g., if scheduled (i.e., within the Notable Tree Overlay), within the road reserve or open space zones) were recorded. Where tree locations could be accurately determined to allow ownership to be confirmed, the protection status of each tree or tree group was determined. Where a tree / tree group could be subject to AUP:OP protection but ownership cannot be confirmed until a cadastral survey is undertaken (e.g., on the boundary of road reserve and private property), this was noted (refer to Appendix A) and the location that afforded the most stringent protection (e.g., road reserve/open space) was adopted for the purposes of assessment. While considered in the AUP:OP provisions, it is noted that the removal of trees in the following circumstances are Permitted activities and mitigation for their removal is not required:

- Trees in roads that are a pest species (Table E26.4.3.1 (A82), refer to Table 3-1 below);

- Trees in open space zones that are pest species and less than 4m in height and less than 400mm in girth (Table E26.4.3.1 (A82), refer to Table 3-1 below); and
- Trees in roads or in open space zones that are less than 4m in height and/or less than 400mm in girth (Table E26.4.3.1 (A91), refer to Table 3-1 below).

Those trees protected⁴ through District Plan provisions are discussed in this Report in terms of an assessment of effects and potential mitigation measures to address these effects.

For individually recorded trees, tree trunk diameter records were used to calculate the tree protection zone (**TPZ**) according to AS4970-2009. These were plotted on the GIS canvas. For tree groups, the approximate extent of the combined crown of the group was plotted based on aerial photographs. The TPZ was used instead of the 'Protected Rootzone' as defined by the AUP:OP, because the TPZ based on trunk diameter gives a more accurate representation of the likely spread of roots than dimensions based on crown spread. The Auckland Council Community Facilities Urban Forest Specialist Team specify consideration of TPZ encroachment when considering tree owner approval (**TOA**) applications. The Auckland Council Community Facilities Urban Forest Specialist Team are delegated 'owner' of the majority of the trees identified within the NoR boundaries.

3.3 Statutory context

3.3.1 Notice of Requirement – District Plan requirements

This assessment has been prepared to support the AEE and NoR process. If confirmed, the designations will authorise the District Plan land use components of the Project. Accordingly, when assessing the actual or potential effects on the environment of allowing the requirement in terms of section 171 of the RMA, this assessment has been limited to matters that would trigger a District Plan consent requirement. Where regional consenting requirements are triggered, these will not be authorised by the designation, and will require further regional consents. As such, a detailed assessment of Regional Plan matters is not proposed to be undertaken as part of this NoR phase.

In order to demonstrate the split between Regional and District Plan matters, trees subject to controls (under the District provisions of the AUP:OP) have been listed in the table and plotted on site plans in the Appendices of this Report (refer to Appendix A and Appendix B). The tables and site plans assist to identify the trees that would trigger consent under the District provisions of the AUP:OP and the potential arboricultural effects of the construction of the Project.

Table 3-1 below sets out the relevant rules and provisions for the Project under the Regional Plan and District Plan jurisdiction of the AUP:OP.

Table 3-1: Rules and provisions relevant for the Project under the Regional Plan (RP) and District Plan (DP) (tree-related provisions)

AUP:OP jurisdiction	Reference	Rule	Where rule applies	Activity status
RP	E26.3.3.1 (A76)	Vegetation alteration or removal that complies with Standards E26.3.5.1 to E26.3.5.4	Rural zones, coastal areas and riparian	Permitted activity

⁴ Protected trees in the context of this Report refers to trees that would trigger resource consent to remove them.

AUP:OP jurisdiction	Reference	Rule	Where rule applies	Activity status
			areas and SEA overlays	
RP	E26.3.3.1 (A77)	Vegetation alteration or removal that does not comply with Standards E26.3.5.1 to E26.3.5.4	Rural zones, coastal areas and riparian areas and SEA overlays	Restricted Discretionary activity
RP	E26.3.3.1 (A78)	Vegetation alteration or removal not otherwise provided for	Rural zones, coastal areas and riparian areas and SEA overlays	Discretionary activity
DP	E26.4.3 Activity Table	All activities (must) obtain the approval of the Tree Asset Manager	Trees in roads and on open space zones	Mandatory requirement
DP	E26.4.3.1 (A82)	Pest Plant removal	Trees in roads	Permitted Activity
		Pest Plant removal of any tree less than 4m in height and less than 400mm in girth	Trees on open space zones	Permitted Activity
DP	E26.4.3.1 (A83)	Tree trimming or alteration	Trees in roads and on open space zones and the Notable Tree overlay	Permitted Activity
DP	E26.4.3.1 (A84)	Tree trimming or alteration that does not comply with Standard E26.4.5.1 (Trees in streets and open space zones) or Standard E.26.4.5.3 (Notable Trees)	Trees in roads and on open space zones and the Notable Tree overlay	Restricted Discretionary Activity
DP	E26.4.3.1 (A87)	Works within the protected root zone that comply with Standard E26.4.5.2	Trees in roads and on open space zones	Permitted Activity
DP	E26.4.3.1 (A88)	Works within the protected root zone not otherwise provided for	Trees in roads and on open space zones and the Notable Tree overlay	Restricted Discretionary Activity
DP	E26.4.3.1 (A89)	Tree removal of Notable Trees	Notable Tree overlay	Discretionary

AUP:OP jurisdiction	Reference	Rule	Where rule applies	Activity status
DP	E26.4.3.1 (A90)	Tree trimming, alteration or removal on roads adjoining rural zones and on roads adjoining the Future Urban Zone	Trees in Roads	Permitted Activity
DP	E26.4.3.1 (A91)	Tree alteration or removal of any tree less than 4m in height and/or less than 400mm in girth	Trees in roads and on open space zones	Permitted Activity
DP	E26.4.3.1 (A92)	Tree alteration or removal of any tree greater than 4m in height and/or greater than 400mm in girth	Trees in roads and on open space zones	Restricted Discretionary Activity
DP	E26.4.3.1 (A93)	Tree trimming, alteration or removal not otherwise provided for	Trees in roads and on open space zones and the Notable Tree overlay	Discretionary Activity

3.3.2 Existing and future environment

The existing and anticipated future environment is further discussed in the accompanying AEE. In summary, the implementation timeframe for the Project has yet to be confirmed but is likely to be in approximately 10-15 years' time subject to funding availability. The assessment considers the effects of the Project at both the existing environment (as it exists today) and the likely future (planned) environment which consider potential urban development and intensification sought under PC78.

The Project will be constructed and will operate in the existing urban environment or planned environment (i.e. what can be built under the existing Auckland Unitary Plan: Operative in Part (AUP:OP) live zones):

- Existing environment:** The corridors are situated primarily within existing urban areas with live zoning including residential, commercial, and open space zones. There is some Future Urban Zone land in the wider area to the northeast/east. The existing activities within the area are generally reflective of the existing underlying zoning.
- Planned environment:** The planned environment is anticipated to remain urban and comprised of similar activities as the existing environment. The density of residential development is however anticipated to change and increase in future. In particular, this includes in the residential zones around Te Mahia and Takaanini stations, in line with the implementation of the National Policy Statement on Urban Development (NPS-UD) in the AUP:OP. The remaining residential areas will experience an uplift of density through the implementation of the Medium Density Residential Standards (MDRS) through the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021. Plan Change 78 (notified at the time of assessment) seeks to give effect to the NPS-UD and incorporate the MDRS into residential zoning. It is noted that there are some areas of existing

residential zoned land (particularly east of the NIMT) that have recently been intensified (i.e., new builds), as such are unlikely to change in the near future.

The likelihood and magnitude of land use change regarding the land use planning context has been identified in Table 3-2 below. This has been used to inform the assumptions made on the likely future environment.

Table 3-2: South FTN – existing and future environment

Table 3-2: South FTN – existing and future environment	Current AUP:OP Zoning	Likelihood of Change for the environment ⁵	Magnitude of potential change	Likely Receiving Environment ⁶
Residential ⁷	Residential (Mixed Housing Suburban)	Low - Moderate ⁸	Low - Moderate	Residential
	Residential (Mixed Housing Urban)	Low - Moderate ⁹	Low - Moderate	Residential
	Residential (Mixed Housing Suburban and Urban) around train stations	Moderate	Moderate - High	Residential and Commercial/Retail ¹⁰
Business	Business (Heavy Industry)	Low	Low	Business (Industrial)
	Business (Light Industry)	Low	Low	Business (Industrial)
	Business (Neighbourhood Centre)	Low	Low	Business (Neighbourhood Centre)
	Business (Town Centre)	Low	Low	Business (Town Centre)
Open Space	Informal Recreation	Low	Low	Informal Recreation
	Community	Low	Low	Community
Greenfield areas	Future Urban	Low - Moderate	High	Urban

The future environment as it relates to protected trees in roads, open space zones, or scheduled trees is unlikely to change, except where consented development related tree removal occurs on an *ad hoc* basis.

The future environment as it relates to protected trees on rural land or Future Urban Zone (**FUZ**) land is likely to change substantially as the land undergoes zoning changes in preparation for urbanisation. The protection status of trees on rural or FUZ land under the AUP:OP Regional Plan settings will be

⁵ Based on AUP:OP zoning/policy direction.

⁶ Based on AUP:OP zoning/policy direction.

⁷ Based on the NPS-UD and MDRS, these residential areas are likely to experience increased density.

⁸ There are areas of existing Residential Zone land that has recently been intensified (i.e. new build developments), as such is unlikely to change in the near future.

⁹ There are areas of existing Residential Zone land that has recently been intensified (i.e. new build developments), as such is unlikely to change in the near future.

¹⁰ Note that much of the commercial operations between Manuia Road and Taka Street occur on residentially zoned land.

lifted if / when the zoning changes to an urban zone. Conversely, trees in the road reserve adjacent to the FUZ zone will become protected according to activity Table E26.4.3.1 when the zoning changes to a zone other than a rural zone.

4 PART A: PROJECT-WIDE ASSESSMENT

This section assesses common or general arboricultural matters across the entire Project. This section also recommends measures to avoid, remedy, or mitigate actual or potential adverse effects identified as a result of the Project as a whole. NoR-specific matters or more localised matters are further discussed in Part B of this Report.

4.1 Positive effects

In many locations within the assessment area, tree canopy cover is sparse, or comprised of poor-quality trees. 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. It also holds the potential to improve existing street environment amenity.

The Auckland Council Urban Ngahere Strategy¹¹ identifies that South Auckland in general has the lowest tree canopy cover in Auckland's urban areas. The Project creates an opportunity to increase tree canopy cover in the public realm through tree planting in the road reserve. There may also be opportunities for replanting on land within the designation boundaries that may no longer be needed post-construction of the works.

Much of the existing road reserve of Great South Road, Alfriston Road and Porchester Road contains grass berms with no trees, or sporadic past tree planting. Popes Road contains no standout trees in the road reserve, with aging shelterbelts along property boundaries in many locations. Porchester Road and Popes Road also contain large amounts of undesirable plant species, including pest plants. The proposed road upgrades include provision for berms between transport modes (refer to the indicative cross sections in the AEE), which anticipate planting with street trees as part of the corridor improvements. Good quality street trees, established in correctly constructed planter pits, can create an improved environment through greater tree canopy cover in the long term.

4.2 Adverse construction effects

Tree removal will be necessary to enable construction of the transport corridors, through either widening of the carriageway into grass berms, or construction of active mode transport routes. The scale of arboricultural effects related to tree removal is directly correlated to the number and size of trees that must be removed. Arboricultural effects from tree removal are closely tied to the benefits that the trees provide, such as amenity value, and wider ecosystem services that trees supply such as shade, local avian habitat and amelioration of stormwater in urban environments. Ecosystem services are defined as the direct and indirect contributions of ecosystems to human well-being. For example stormwater attenuation, pollutant adsorption and regulating temperatures in urban centres. The social, health and amenity benefits of trees also make important contributions to the quality of life in built environments.

In some situations, construction may impact on trees that are ear-marked for retention within the road corridor. Impacts on trees can be a direct result of physical damage to crown and roots or indirect result of alteration to the growing conditions that the tree experiences. The scale of these

¹¹ Auckland Council (2019). Auckland's Urban Ngahere (Forest) Strategy.

arboricultural effects can range from negligible (e.g., loss of small diameter roots, minor trimming causing small and or short-term deficit) to significant (e.g., major root loss or alteration to growing environment causing major deficit, resulting in health decline, tree instability or death). In many cases these effects can be avoided through implementation of tree protection measures or minimised by ensuring arboricultural supervision and treatments. In all cases the design and construction methodology for the road corridor upgrades must include arboricultural input to allow existing trees to be adequately accommodated, where possible, and for the scale of construction related effects to be minimised.

4.3 Recommended measures to avoid, remedy, or mitigate construction effects

All extant trees should be considered during the design and development of construction methodologies for road and active mode corridor upgrades, prior to the final designs of each portion of the Project being completed.

Removal of trees should be avoided wherever it is possible to safely accommodate them within the new road layout. Future detailed design stages should identify if there are any further opportunities to enable existing trees to remain, minimise alteration to them and their growing environment. Where possible, final construction methodology and works should be refined and modified accordingly. Opportunities to further reduce impact at detailed design stages may include for example localised realignment of works, reduction in pavement widths and/or construction of tree root bridging structures to minimise excavation in tree root protection zones.

Where protected trees cannot be accommodated, tree transplanting/relocation within the transport corridor or in locations that may no longer be required post-construction should be considered where reasonably feasible for trees that are of high value, good quality, and present benefits from their transplantation. For trees with this potential, transplantation viability (e.g., suitability, constraints, feasibility, and cost / benefit factors) should be considered as part of the TMP.

Where trees cannot be accommodated and transplantation is not a viable option, replacement planting must be carried out to remediate the effects from the loss of arboricultural value. Mitigation measures are recommended to take an outcomes-based approach that considers overall improvements to landscape systems and processes, natural character, and visual amenity. The environmental values of trees that must be removed must be evaluated and the replanting designed to replicate the benefits that the extant trees provide. Replacement planting protocols should be developed further as part of the TMP where protected trees are to be removed.

Planting of trees should also be considered as part of the Urban and Landscape Design Management Plan (**UDLMP**), which includes preparation of landscape plans for the Project. Tree planting may also be integrated with stormwater management systems, where green infrastructure such as planted swales, rain gardens or stormwater ponds are included in the design.

Arboricultural input into the development of the final design and construction methodologies for road corridor upgrade works is a crucial factor affecting the outcome in terms of the adverse effects on trees. Arboricultural input should be in the form of detailed design input, specification of tree-friendly construction methodologies, and development of a TMP.

All decisions relating to trees that are affected within the road corridor should be informed by a TMP that is devised during the detailed design stage of the Project to guide arboricultural management of tree matters.

4.4 Adverse operational effects

Once the road network upgrade 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.

4.5 Recommended measures to avoid, remedy, or mitigate operational effects

Nil

4.6 Summary of Project-Wide effects

Tree removal may substantially alter the environment in some locations, where trees are positioned within the road reserve, potentially resulting in significant adverse effects. Tree removal must be avoided, remediated, or mitigated through implementation of a tree management plan.

Tree alteration, including pruning and works within the root zone has the potential to cause adverse effects on trees that are retained. These effects must be avoided or minimised through implementation of tree protection measures as part of a tree management plan.

In all cases, arboricultural input into the development of the final design and construction methodologies for road corridor upgrade works is a crucial factor affecting the outcome in terms of the adverse effects on trees.

5 PART B: NOR LEVEL ASSESSMENT

5.1 NoR 1 – Great South Road FTN Upgrade

As outlined in the Project description (see Section 2), NoR 1 comprises a range of interventions providing for the Great South Road FTN route along Great South Road between Manukau and Drury. These include eight intersection upgrades, and the replacement of the Otūwairoa / Slippery Creek bridge. The wider corridor will provide for either three or four lanes in the midblock including bus lanes in one or both directions, and active mode facilities.

5.1.1 Positive effects

Scope for tree planting is available within the proposed designation boundaries along Great South Road and around the intersections. This includes berms, land that may no longer be required post-construction (i.e., land temporarily used as construction yards) and within open space zones. Opportunities for planting of trees could also form part of intersection markings, traffic calming measures and landmarks. The improvements in tree coverage and quality (i.e., native species) anticipated from works within NoR 1 can lead to a range of positive effects as discussed in Section 4.1 above.

5.1.2 Adverse construction effects

5.1.2.1 Great South Road / Browns Road / Orams Road

The southern approach to the intersection of Great South Road and Browns Road includes 17 trees or tree groups within or immediately adjacent to the NoR boundary. The potentially affected protected trees include:

- 13 street trees (Trees 1-5, 7-8, 10-15);
- 1 scheduled Norfolk Island pine tree (Tree 17);
- 2 street tree groups (Tree Group 9 and 16); and
- 1 tree group within Anderson Park which is an open space zone (Tree Group 6).

Street trees are represented by 13 mature queen palms (*Syagrus romanzoffiana*) planted in roadside berms. Although these are somewhat sporadically located along Great South Road, the queen palms have reached dimensions (up to approximately 9 metres) that create a highly visible, partial 'tree avenue' feature along the road reserve. Removal of these palms would result in loss of the amenity benefits they provide. Transplantation may be a viable option, as palms generally make easy transplant candidates.

A significant group (Group 6) of mostly native trees is within Anderson Park, at the corner of Grand Vue Road and Great South Road. The group contains pōhutukawa (*Metrosideros excelsa*), tōtara (*Podocarpus totara*) and karaka (*Corynocarpus laevigatus*) that form a continuous canopy along the frontage of Anderson Park on Great South Road. These are mature trees with substantial value and any tree removal here could have significant adverse environmental effects. The design avoids removal of trees and any works associated with upgrading facilities within the TPZ should be accordance with arboriculture best practice to minimise adverse effects on these trees.

Tree 17, one scheduled Norfolk Island pine (*Araucaria heterophylla*) at 18 Great South Road is located outside of the NoR boundary but has a TPZ that extends into the designation. Adverse effects on the health and stability of this tree could occur if uncontrolled work occurs within the TPZ. The design and construction methodology must be confirmed with arboricultural input and in accordance with the tree management plan process to minimise adverse effects on this tree.

One tōtara (Tree 3) and one pōhutukawa (Tree 13) are mature specimens with uncertain ownership that contribute to the existing environment, as good quality native trees that are highly visible to road users. One mixed tree group (Group 9) also appears to be within or partially within the road reserve. Effects on these trees must be considered during planning and implementation of the road corridor upgrade works.

5.1.2.2 Great South Road / Mahia Road

Two queen palms (Group 54) are recorded in the NoR boundaries at the northern approach to Mahia Road, where they continue the theme of street tree planting with more of the same species to the north (outside of the proposed designation). Removal of these mature palms would not create significant adverse effects in the overall context of the Project in this location, except minor loss of amenity value.

5.1.2.3 Great South Road / Taka Street / Walter Strevens Drive

Nine trees identified within the road reserve of Great South Road provide some tree canopy cover and associated benefits in the areas approaching the Taka Street and Walter Strevens Drive intersection. These trees are seven alder (*Alnus sp.* or *alnus cordata*) (Tree 56 and Groups 55, 59 and 60) and two stand-alone tulip trees (*Liriodendron tulipifera* – Trees 57 & 58). These trees are good quality specimens that provide amenity benefits in this predominantly commercial / industrial area. Removal of these established protected trees, would result in loss of the ecosystem services that the trees provide, including the amenity values provided by the trees.

5.1.2.4 Great South Road / Subway Road

No trees are identified within the NoR boundary. Scheduled trees at 67 Great South Road and in the road reserve of Subway Road are outside of the NoR boundary and are unlikely to be affected by works.

5.1.2.5 Great South Road / Wellington Street

The public open space at 57R Wood Street contains a significant tree resource, including groups (Groups 68 - 72) of mature native trees and exotic amenity trees. Group 70 contains a scheduled oak (*Quercus sp.*) tree and four mature tī kōuka (*Cordyline australis*). The oak is listed in Schedule 10 - Notable Trees Schedule of the AUP:OP, as ID2188 Oak (Memorial). Trees that are greater than 4m in height or greater than 400mm in [trunk] girth are protected trees in the open space zones, which includes all of the trees within the identified groups. The protected trees include kauri (*Agathis australis*), tītoki (*Alectron excelsus*), karaka, kahikatea (*Dacrycarpus dacrydioides*), rimu (*Dacrydium cupressinum*), European beech (*Fagus sylvatica*), kapuku (*Griselinia littoralis*), tōtara, rhododendron (*Rhododendron arborea*) and blue Arizona cypress (*Cypress arizonica* 'Glauc'). The indicative design avoids these trees and with limited works, such as footpath replacement, anticipated within the TPZ. Any works undertaken within the TPZ should be in accordance with arboriculture best practice to minimise adverse effects on these trees.

A historic heritage extent of place overlay envelops trees that are on the corner of Great South Road and Wood Street (east). Trees within the overlay (Groups 68 and 69) may have heritage value from association with the historic heritage place, which is irreplaceable. The indicative design avoids these trees by keeping works to the extent of the existing pathway. Any works that may be required within the TPZ of these trees should also be undertaken in accordance with best arboriculture best practice to minimise adverse effects on these trees. Work within the NoR boundary could have substantial adverse effects on trees that are retained within the public park if the existing footpath is widened.

A wedge of public open space land at the intersection of Ōpaheke Road and Great South Road contains two individually identified trees (Trees 73 and 78) and a tree group (Group 74), including two scheduled Phoenix palms (*Phoenix canariensis*). The location has a historic heritage extent of place overlay that envelops Tree 78, a mature Italian cypress (*Cupressus sempervirens*). Tree 78 and tree group 74 containing the scheduled trees are outside of the NoR boundaries and not likely to be affected, assuming tree protection procedures are followed in accordance with a tree management plan produced prior to construction.

Tree 73 is a mature weeping elm (*Ulmus glabra* 'Camperdownii') that is inside the designation boundary, between the historic heritage overlay and the tree group to the south. This tree will require removal to facilitate the works, specifically the active modes pathway.

Three tulip trees (Group 75 and Tree 76) are street trees within Great South Road that are within the NoR boundary. These trees provide high amenity value and ecosystem services benefits, and their removal would result in adverse environmental effects proportionate to the size of the trees.

One European lime (*Tilia x europaea* – Tree 77) is located outside the designation boundary but works such as footpath replacement may be in the immediate vicinity. This tree is unlikely to be affected, assuming tree protection procedures are followed in accordance with a tree management plan produced prior to construction.

5.1.2.6 Great South Road / Beach Road

The cemetery and public open space at 298 Great South Road and 312 Great South Road, respectively, contain a significant tree resource, including:

- a large scheduled gum (*Eucalyptus* sp.) tree (Tree 81);
- a group of scheduled scarlet flowering gum (*Corymbia ficifolia* – erroneously listed as *Eucalyptus phoenica* in Schedule 10) trees (Group 79); and
- groups of mature tōtara and mixed native trees (Groups 80 and 82).

Tree removal here would have significant adverse effects, due to the amenity and ecosystem services benefits that the trees provide. Work within the NoR boundary could have substantial adverse effects on these trees, if carried out in an uncontrolled manner.

Two mature native scheduled trees, one rimu, one miro (*Prumnopitys ferruginea*) (Trees 86, 87) are growing within the traffic island at the intersection of Butterworth Avenue and Great South Road, where they are within the NoR boundary. Any alteration to the traffic island has the potential to cause adverse effects on the health and / or stability of these trees. The extent of works avoid alteration to these trees.

A number of trees within Kirks Bush (Trees/Groups 88-94), 377R Great South Road, are in close proximity to the NoR boundary and have crowns that extend over the road corridor. Alteration to the

paths and carriageway here has the potential to cause adverse effects on the health and / or stability of these trees if carried out in an uncontrolled manner. These trees form a continuous canopy and provide significant amenity and ecosystem services benefits.

A group of scheduled tōtara (Group 95) at 365-367 Great South Road are adjacent to the NoR boundary. The indicative design has limited works to the edge of the existing road reserve. Any works that may be required within the TPZ of these trees should be undertaken in accordance with best arboricultural best practice to minimise adverse effects on these trees.

5.1.2.7 GSR / Park Estate Road

Four tree groups (Groups 96, 97, 100 and 101) and four single specimen trees (Trees 99, 102, 103 and 104) are identified within the road reserve of Great South Road at the approaches to Park Estate Road. Many of the groups of trees contain trees that are not individually significant, but that collectively add to the amenity and ecosystem services benefits. Larger and solitary specimens include a mature camphor laurel (*Cinnamomum camphora* – Tree 104) that is in poor health, a fine, early-mature rimu (Tree 103), one pōhutukawa (Tree 99) and three wonder trees (*Idesia polycarpa* - Group 100). Removal of trees would result in adverse effects proportionate to the size and number of affected trees.

5.1.2.8 Slippery Creek Bridge

Groups of trees (Trees 106-113) identified within the road reserve land around the Slippery Creek Bridge are likely to require removal to enable construction activities. This includes established groups of native trees and exotic ornamental specimens in park-like settings on road reserve land. Native species include putaputāwētā (*Carpodetus serratus*), karamu (*Coprosma robusta*), tī kōuka, kahikatea, kānuka (*Kunzea robusta*), mānuka (*Leptospermum scoparium*), karo (*Pittosporum crassifolium*) and kowhai (*Sophora tetraptera*), planted in dense groups above the riverbanks. The benefits of the native trees here include habitat and soil protection in the riparian margin. The environmental effects could be significant if all of the identified trees require removal or may be lessened if trees and tree groups can be accommodated outside of the construction zones.

5.1.3 Recommended measures to avoid, remedy, or mitigate construction effects

The recommended measures to avoid, remedy, or mitigate construction effects are discussed in the Project-wide section above (refer to Section 4.3).

5.1.4 Adverse operational effects

Once the road network upgrade has been completed, no further effects on trees are anticipated. 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.

5.1.5 Recommended measures to avoid, remedy, or mitigate operational effects

Nil

5.1.6 Summary of effects for NoR 1

A total of approximately 280 trees have been recorded within or adjacent to the NoR 1 boundary. The trees here include 36 single trees and 33 tree groups. Twenty-two protected single trees and 17 groups of trees comprised of at least 111 trees are likely to require removal for the Project. Tree removal could also affect the remaining eight protected single trees and 12 groups containing 86 trees, if the design and construction process cannot accommodate and safely retain these trees.

The potential effects at Great South Road / Wellington Street and Great South Road / Beach Road could be significant due to the number, size, quality, and age of trees that are possibly affected by alteration or removal. In other locations within NoR 1, adverse effects are low to moderate and able to be mitigated by implementation of the tree management plan and replanting in the new road corridor. A net gain in the urban forest is possible in many locations due to street tree planting in the new road layout.

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

As outlined in the Project description (see section 2), NoR 2 comprises a range of interventions providing for the upgrade of Great South Road in Drury between Waihoehoe Road and the SH1 Drury Interchange. These include road widening to provide four lanes, active mode facilities, and the replacement of the Hingaia Stream bridge.

5.2.1 Positive effects

Provision of berms within the road cross section of Great South Road, allows for tree planting in this area where currently there are no street trees.

5.2.2 Adverse construction effects

The willow trees (Tree Groups 115 and 116) that exist within the NoR boundary are of significant size and contribute some amenity and other ecosystem services to the otherwise stark industrial environment.

Willow trees within open space zoned land on the western bank and of the Hingaia Stream are likely to require removal to facilitate construction work, with adverse effects proportionate to the size and number of trees that require removal.

Willow trees on the eastern bank and riparian margin of the Hingaia Stream may require removal to facilitate construction work. Few of these trees (Group 116) are protected by the District Plan where they are within the road reserve of Great South Road. The remainder will require Regional Consent to be obtained closer to the time of construction due to them being in the riparian margin.

5.2.3 Recommended measures to avoid, remedy, or mitigate construction effects

The recommended measures to avoid, remedy, or mitigate construction effects are discussed in the Project-wide section above (refer to Section 4.3). Specific to this NoR, replanting to mitigate the effects of tree removal is recommended within the open space zone land. Replanting of the riparian margin should also be undertaken to mitigate removal of trees on the bank of the Hingaia Stream. It is noted that removal of riparian margin vegetation is subject to Regional Plan provisions and will also require consideration in the future regional consenting stage.

5.2.4 Adverse operational effects

Once the road network upgrade has been completed, no further effects on trees are anticipated. 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.

5.2.5 Recommended measures to avoid, remedy, or mitigate operational effects

Nil

5.2.6 Summary of effects for NoR 2

Overall, a net gain in the urban forest will result from establishing street trees in the new berms created in Great South Road. Adverse effects applicable to District Plan provisions of the AUP:OP relate to the removal of trees in the open space zone to the west of Hingaia Stream and few trees in the road reserve east of Hingaia Stream. Replacement planting is recommended to mitigate the effects of tree removal.

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

As outlined in the Project description (see section 2), NoR 3 comprises a range of interventions providing for the Takaanini FTN route along Weymouth and Alfriston Roads generally between Selwyn Road and Alfriston Park; as well as for the Great South Road FTN route between Alfriston Road and Myers Road. These interventions include road widening to provide for four lanes (general traffic and bus lanes in both directions), active mode facilities, eight intersection upgrades, stormwater treatment wetlands, and replacements of bridges over the NIMT and SH1.

5.3.1 Positive effects

An increase in the number of street trees and overall tree canopy cover in the future is possible with the provision of street tree planting in berms within the new road cross section.

5.3.2 Adverse construction effects

Thirty-two listings of trees and tree groups are potentially affected by works in this NoR. This includes 18 individual trees and 14 tree groups containing at least 150 trees. Twenty-eight (28) protected trees are identified as street trees within road reserves on Alfriston Road, including pōhutukawa and water gum (*Tristanopsis laurina*). Tree removal will result in loss of the ecosystem services that the trees provide, to a degree that is proportionate to the size, and number of the trees that require removal.

A large and diverse group of trees (Tree 52) in the public park at Tadmor Park, 238R Great South Road, includes trees that are within and adjacent to the NoR boundary. This includes deciduous exotic trees such as oak (*Quercus spp.*), London plane (*Platanus X acerifolia*), and native tōtara and kowhai. Tree removal here would have significant adverse effects, due to the amenity and ecosystem services benefits that the trees provide. Work within the NoR boundary could have adverse effects on trees that are retained within the public park, however the extent and materiality of the batter slope that supports the transport corridor could be designed to minimise impacts on trees and allow tree retention where they are sufficiently distanced from the work.

A diverse group of trees (Group 34) in the road reserve outside Manurewa East School, 10 Scotts Road, includes trees that are within and adjacent to the NoR boundary. Tree removal here would have adverse effects, from loss of the amenity and other benefits that the trees provide. The trees here include poor quality Monterey cypress (*Cupressus macrocarpa*), tree privet (*Ligustrum lucidum*) and queen palms that add no significant benefit to the location. Small native trees, including tōtara, mapou (*Myrsine australis*) and tī kōuka could also be removed / replaced with no significant arboricultural consequences,

Tree alteration including pruning and works within the root zone has the potential to cause adverse effects on the health and / or stability of trees that are retained within and adjacent to works areas.

5.3.3 Recommended measures to avoid, remedy, or mitigate construction effects

The recommended measures to avoid, remedy, or mitigate construction effects are discussed in the Project-wide section above (refer to Section 4.3).

5.3.4 Adverse operational effects

Once the road network upgrade has been completed, no further effects on trees are anticipated. 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.

5.3.5 Recommended measures to avoid, remedy, or mitigate operational effects

Nil

5.3.6 Summary of effects for NoR 3

A total of 175 trees have been recorded within or adjacent to the NoR 3 boundary. The trees here include 18 single trees and 14 tree groups. Eighteen protected single trees and 14 groups of protected trees comprised of at least 150 trees are likely to require removal for the Project.

Removal of the trees within the NoR boundary will result in adverse effects proportionate to the size and number of trees that are removed. These effects can largely be mitigated by replacement tree planting in new road berms and where there is land within the designation boundaries that may no longer be needed post-construction of the works. Several important tree groups must be avoided to the greatest extent possible to avoid adverse arboricultural effects.

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

As outlined in the Project description (see section 2), NoR 4 comprises a range of interventions providing for the Takaanini FTN route along Porchester Road generally between Alfriston Road and Walters Road; and for the upgrade of Popes Road generally between Takanini School Road and east of Porchester Road. These interventions provide for the urbanisation of both corridors, with two traffic lanes, widening for active mode facilities, seven intersection upgrades, and stormwater treatment wetlands.

5.4.1 Positive effects

Urbanisation of the road corridor will allow for planting of street trees within new road berms along Popes Road and the eastern side of Porchester Road. A net increase in the number of street trees and in overall tree canopy cover in the long-term will occur from street tree planting as part of the Project.

5.4.2 Adverse construction effects

On the Western side of Porchester Road, zoning is Residential – Mixed Housing Suburban and Business – Light Industry zone, with small pockets of Special Purpose – School, Residential – Single House and Open Space – Informal Recreation zones. The eastern side of Porchester Road between Airfield Road and Berwyn Road is also Residential – Mixed Housing Suburban zoned. Trees in roads adjacent to these zones are protected by AUP:OP District Plan provisions.

Four trees, two pin oak (*Quercus palustris*) and two willow (*Salix sp.*) (Trees 117-120) growing in the road reserve land on the corner of Airfield Road and Porchester Road are within the NoR boundary and likely to require removal for road widening construction purposes. The large pin oak (Tree 117) is a quality tree with high arboricultural values based on its form, health and overall qualities. Removal of this tree will result in loss of important amenity and ecosystem services benefits that the tree provides. The willow trees and second, smaller pin oak are poor quality trees with reduced arboricultural merit that could be removed with no significant consequences.

Tree 121, one Japanese cedar (*Cryptomeria japonica*) street tree in Clarice Place is within the NoR boundary. The indicative design avoids removal of this tree but there may be some earthworks required within the TPZ which should be undertaken in accordance with arboriculture best practice to minimise adverse effects on the tree.

Groups of poplar and willow trees (Trees 118-124) at the western end of Popes Road appear to be in the road reserve on the northern side of road. If they are in the road reserve, they are protected trees, which would likely require removal as part of construction of the new transport corridors. As an agricultural shelter system, the protected trees provide a useful function. With future urbanisation in mind, these trees will become less suitable, due to the likelihood of stem and limb failure increasing as the trees age. The ecosystem services benefits provided by these trees will be lost with tree removal.

Outside the school at 460 Porchester Road, growing within the road reserve, is tree 127, a Norfolk Island pine (*Araucaria heterophylla*). Removal of this tree is anticipated to achieve the proposed active mode transport outcomes in this location. Removal should be avoided due to the benefits that this tree provides to the location. Loss of amenity values and ecosystem services benefits

proportionate to the size of the tree will result if the tree is removed. Future detailed design stages should identify if there are any further opportunities for this tree to be retained and minimise impact to it.

Pōhutukawa street trees are present outside 508 Porchester Road and in the road reserve of Alfriston Road, outside 7 and 8 Giani Court. Adverse effects on these trees will result from widening of the active mode transport route. Removal should be avoided due to the benefits that these trees provide. Future detailed design stages should identify if there are any further opportunities for these trees to be retained and minimise impact to them. If removal is unavoidable, the adverse effects will require mitigation in the form of new tree planting.

Tree alteration, including pruning and works within the root zone of trees has the potential to cause adverse effects on the health and / or stability of trees that are retained adjacent to construction works. If the Project design and construction methodology are completed with arboricultural input, in the form of a tree management plan, the effects on these trees can be minimised.

5.4.3 Recommended measures to avoid, remedy, or mitigate construction effects

The recommended measures to avoid, remedy, or mitigate construction effects are discussed in the Project-wide section above (refer to Section 4.3).

5.4.4 Adverse operational effects

Once the road network upgrade has been completed, no further effects on trees are anticipated. 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.

5.4.5 Recommended measures to avoid, remedy, or mitigate operational effects

Nil

5.4.6 Summary of effects for NoR 4

A total of approximately 132 trees have been recorded within or adjacent to the NoR 4 boundary. The trees here include 10 single trees and eight tree groups. Nine protected single trees and eight groups of trees comprised of 122 trees are likely to require removal for the Project.

Removal of the trees within the NoR boundary will result in adverse effects proportionate to the size and number of trees that are removed. These effects can largely be mitigated by replacement tree planting in new road berms, where a net gain in tree canopy cover in the public realm is expected in the long term. Several specimen trees and tree groups must be avoided to the greatest extent possible to avoid adverse arboricultural effects.

6 Conclusion

Sixty-four (64) individually listed trees and fifty-seven (57) groups of trees containing more than 500 total trees are identified within or adjacent to the NoR boundaries for this Project. The Project is likely to require removal of 40 groups of trees containing over 390 trees and approximately 49 of the protected individual trees that would trigger reason for consent under the District Plan provisions for their removal. Tree removal will result in adverse effects that are proportionate to the size and number of trees that are removed, due to the loss of tree canopy cover and the associated ecosystem services benefits.

Amenity values attributable to trees will also be lost when trees are removed. Larger trees' removal should be avoided wherever possible to reduce the impact of the Project on amenity values, due to the time that it takes for new trees to reach large stature. Successful retention of mature trees on development sites requires close attention to arboricultural tree preservation principles during design and construction of new infrastructure.

The removal of trees must be confirmed through implementation of a tree management plan developed to guide arboricultural matters during the final design and construction process. The tree management plan must detail mitigation planting to align with the UDLMP, so that quality environments containing good quality trees are created as part of the Project.

The tree management plan for each portion of the Project must also 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.

1 Appendix A – Tree Schedule

NoR 1

Schedule A1 – NoR1 single trees								
tree number	tree species	common name	height (m)	dbh (mm)	tpz radius (m)	ownership	protection status	Assessment assumptions
1	<i>Syagrus romanzoffiana</i>	queen palm	15	400	4.8	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
2	<i>Syagrus romanzoffiana</i>	queen palm	12	350	4.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
3	<i>Podocarpus totara</i>	totara	10	640	7.7	Unclear at this stage – Potential to be Public - Road	Unclear – Trees in Roads (assumed)	Within footprint of works and likely construction requirements – remove Tree assumed as within road reserve for the purposes of assessment - Cadastral survey should be undertaken closer to the time of detailed design to confirm ownership.
4	<i>Syagrus romanzoffiana</i>	queen palm	12	300	3.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
5	<i>Syagrus romanzoffiana</i>	queen palm	9	350	4.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
7	<i>Syagrus romanzoffiana</i>	queen palm	9	300	3.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
8	<i>Syagrus romanzoffiana</i>	queen palm	8	300	3.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
10	<i>Syagrus romanzoffiana</i>	queen palm	8	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
11	<i>Syagrus romanzoffiana</i>	queen palm	8	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
12	<i>Syagrus romanzoffiana</i>	queen palm	8	350	4.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove

Schedule A1 – NoR1 single trees								
13	<i>Metrosideros excelsa</i>	pōhutukawa	11	1200	14.4	Unclear at this stage - Potential to be Public - Road	Unclear - Trees in Roads (assumed)	Works and likely construction requirements within TPZ. Tree assumed as within road reserve for the purposes of assessment - Cadastral survey should be undertaken closer to the time of detailed design to confirm ownership.
14	<i>Syagrus romanzoffiana</i>	queen palm	8.5	300	3.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
15	<i>Syagrus romanzoffiana</i>	queen palm	10	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
17	<i>Araucaria heterophylla</i>	Norfolk Island pine	30	1300	15.6	Private	Scheduled – Notable Tree (AUP:OP ID 1664)	Outside designation boundary but footprint of works and likely construction requirements within TPZ.
56	<i>Alnus sp.</i>	alder	9	350	4.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
57	<i>Liriodendron tulipifera</i>	tulip tree	22	1000	12	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
58	<i>Liriodendron tulipifera</i>	tulip tree	25	1200	14.4	Public - Park	Trees in Open Space zones	Outside designation boundary but footprint of works and likely construction requirements within TPZ.
73	<i>Ulmus glabra</i> 'Camperdownii'	weeping elm	3.5	250	3	Public - Park	Trees in Open Space zones	Within footprint of works and likely construction requirements - remove
76	<i>Liriodendron tulipifera</i>	tulip tree	16	850	10.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements - remove
77	<i>Tilia x europaea</i>	European lime	20	850	10.2	Public - Road	Trees in Roads	Outside of designation boundary but footprint of works and likely construction requirements within TPZ.
78	<i>Cupressus sempervirens</i>	Italian cypress	9	450	5.4	Public - Park	Trees in Open Space zones	Outside of designation boundary but footprint of works and likely construction requirements within TPZ.

Schedule A1 – NoR1 single trees								
81	<i>Eucalyptus sp.</i>	Gum	28	1300	15.6	Public – Road	Trees in Roads, Scheduled – Notable Tree (AUP:OP ID 2189)	Footprint of works and likely construction requirements within TPZ.
83	<i>Phoenix canariensis</i>	Phoenix palm	22	900	10.8	Private	Scheduled – Notable Tree (AUP:OP ID: 2227)	Outside designation boundary but footprint of works and likely construction requirements within TPZ.
86	<i>Prumnopitys ferruginea</i>	miro	16	600	7.2	Public - Road	Trees in Roads, Scheduled – Notable Tree (AUP:OP ID 2190)	Within designation boundary but will not be impacted.
87	<i>Dacrydium cupressinum</i>	rimu	16	750	9	Public - Road	Trees in Roads, Scheduled – Notable Tree (AUP:OP ID 2190)	Within designation boundary but will not be impacted.
88	<i>Vitex lucens</i>	pūriri	12	250	3	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ. Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
89	<i>Metrosideros excelsa</i>	pōhutukawa	18	770	9.3	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ.

Schedule A1 – NoR1 single trees								
								Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
90	<i>Metrosideros excelsa</i>	pōhutukawa	20	800	9.6	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ. Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
91	<i>Agathis australis</i>	kauri	22	700	8.4	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ. Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
99	<i>Metrosideros excelsa</i>	pōhutukawa	9	-	-	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
102	<i>Callistemon viminalis</i>	bottlebrush	6	-	-	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
103	<i>Dacrydium cupressinum</i>	rimu	11	440	5.3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
104	<i>Cinnamomum camphora</i>	camphor laurel	13	1130	13.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
109	<i>Liquidambar styraciflua</i>	American sweet gum	11	400	4.8	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
110	<i>Liquidambar styraciflua</i>	American sweet gum	7	210	2.5	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
111	<i>Liquidambar styraciflua</i>	American sweet gum	13	380	4.6	Public - Road	Trees in Road.	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.

Schedule A2 – NoR1 tree groups							
tree group number	approx number of trees	tree species	common name	approx max height (m)	ownership	protection status	Assessment assumptions
6	22	<i>Corynocarpus laevigatus</i> , <i>Dacrydium cupressinum</i> , <i>Metrosideros excelsa</i> , <i>Podocarpus totara</i> , <i>Syzygium smithii</i>	karaka, rimu, pōhutukawa, tōtara white monkey apple	18	Public - Park	Trees in Open Space zones	Footprint of works and likely construction requirements within TPZ.
9	9	<i>Ligustrum lucidum</i> , <i>Melia azedarach</i> , <i>Pittosporum eugenioides</i>	tree privet, melia, tarata	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Noted that the tree privet is a pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
16	3	<i>Syagrus romanzoffiana</i>	queen palm	8	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
54	2	<i>Syagrus romanzoffiana</i>	queen palm	12	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
55	2	<i>Alnus cordata</i>	Italian alder	10	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
59	2	<i>Alnus cordata</i>	Italian alder	14	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
60	2	<i>Alnus cordata</i>	Italian alder	12	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
68	8	<i>Cordyline australis</i> , <i>Cupressus arizonica</i> var. <i>glabra</i> , <i>Rhododendron arborea</i>	tī kōuka, blue arizona cypress, rhododendron	20	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ

Schedule A2 – NoR1 tree groups							
69	8	<i>Agathis australis</i> , <i>Alectryon excelsus</i> , <i>Corynocarpus laevigatus</i> , <i>Dacrycarpus dacrydioides</i> , <i>Dacrydium cupressinum</i> , <i>Fagus sylvatica</i> , <i>Griselinia littoralis</i> , <i>Podocarpus totara</i>	kauri, tītoki, karaka, kahikatea, rimu, European beech, kapuku, tōtara	25	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ
70	5	<i>Cordyline australis</i> , <i>Quercus robur</i>	tī kōuka, English oak	22	Public - Park	Trees in Open Space zones, Scheduled – Notable Tree (AUP:OP 2206)	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ
71	5	<i>Agathis australis</i> , <i>Alectryon excelsus</i> , <i>Dacrydium cupressinum</i> , <i>Podocarpus totara</i>	kauri, tītoki, rimu, tōtara	24	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ
72	5	<i>Podocarpus totara</i>	tōtara	18	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ
74	5	<i>Fagus sylvatica</i> , <i>Phoenix canariensis</i>	European beech, Phoenix palm	24	Public - Park	Trees in Open Space zones	Outside designation boundary but footprint of works and likely construction requirements within TPZ
75	2	<i>Liriodendron tulipifera</i>	tulip tree	16	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
79	8	<i>Corymbia ficifolia</i>	red flowering gum	25	Public - Park	Trees in Open Space zones, Scheduled – Notable Tree (AUP:OP ID 2209)	Outside designation boundary but footprint of works and likely construction requirements within TPZ

Schedule A2 – NoR1 tree groups							
80	7	<i>Podocarpus totara</i>	tōtara	16	Public - Park	Trees in Open Space zones	Outside designation boundary but footprint of works and likely construction requirements within TPZ
82	10	<i>Agathis australis</i> , <i>Coprosma robusta</i> , <i>Pittosporum eugenioides</i> , <i>Podocarpus totara</i> , <i>Pseudopanax arboreus</i>	kauri, karamu, tarata, tōtara, houpapa	18	Public - Park	Trees in Open Space zones	Portion within designation boundary: Within footprint of works and likely construction requirements – remove Portion outside of the designation boundary: Footprint of works and likely construction requirements within TPZ.
85	3	<i>Agathis australis</i> , <i>Prunus sp.</i> , <i>Vitex lucens</i>	kauri, cherry, pūriri	14	Public - Road	Trees in Roads	Footprint of works and likely construction requirements within TPZ.
92	10	<i>Corynocarpus laevigatus</i> , <i>Dacrycarpus dacrydioides</i> , <i>Dysoxylum spectabile</i> , <i>Metrosideros excelsa</i>	karaka, kahikatea, kohekohe, pōhutukawa	15	Public - Park	Trees in Open Space zones	Outside designation boundary but footprint of works and likely construction requirements within TPZ Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
93	30	<i>Agathis australis</i> , <i>Alectryon excelsus</i> , <i>Corynocarpus laevigatus</i> , <i>Dacrycarpus dacrydioides</i> , <i>Metrosideros excelsa</i> , <i>Myrsine australis</i> , <i>Podocarpus totara</i>	kauri, tītoki, karaka, kahikatea, pōhutukawa, mapou, tōtara	25	Public - Park	Trees in Open Space zones	Outside designation boundary but footprint of works and likely construction requirements within TPZ Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
94	3	<i>Macadamia integrifolia</i> , <i>Metrosideros excelsa</i> , <i>Persea americana</i>	macadamia, pōhutukawa, avocado	18	Public - Park	Trees in Open Space zones	Outside designation boundary but footprint of works and likely construction requirements within TPZ Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
95	7	<i>Podocarpus totara</i>	tōtara	18	Private	Scheduled – Notable Tree	Outside designation boundary but footprint of works and likely construction requirements within TPZ

Schedule A2 – NoR1 tree groups							
						(AUP:OP ID 2218)	
96	10	<i>Pittosporum eugenoides</i> , <i>Pittosporum tenuifolium</i> , <i>Podocarpus totara</i>	tarata, kōhūhū, tōtara	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
97	12	<i>Photinia glabra</i> , <i>Pseudopanax ferox</i> , <i>Vitex lucens</i>	red robin, horoeka, pūriri	4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
98	4	<i>Syzygium smithii</i>	white monkey apple	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
100	3	<i>Idesia polycarpa</i>	wonder tree	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
101	5	<i>Cordyline australis</i> , <i>Pittosporum tenuifolium</i> , <i>Yucca elephantipes</i>	tī kōuka, kōhūhū, yucca	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
105	3	<i>Syzygium smithii</i>	white monkey apple	14	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
106	-	<i>Leptospermum nitidum</i> 'Copper Sheen'	copper sheen	4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.
107	13	<i>Dodonaea viscosa</i> , <i>Ligustrum lucidum</i> , <i>Pittosporum crassifolium</i>	ake ake, tree privet, karo	5	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.

Schedule A2 – NoR1 tree groups							
							Noted that the tree privet is a pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
108	-	<i>Carpodeus serratus</i> , <i>Coprosma robusta</i> , <i>Cordyline australis</i> , <i>Dacrycarpus dacrydioides</i> , <i>Kunzea robusta</i> , <i>Leptospermum scoparium</i> , <i>Pittosporum crassifolium</i> , <i>Sophora tetraptera</i>	putaputāwētā, karamu, tī kōuka, kahikatea, kānuka, mānuka, karo, kowhai	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.
112	2	<i>Leptospermum scoparium</i> , <i>Pittosporum crassifolium</i>	mānuka, karo	5	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.
113	30	<i>Cordyline australis</i> , <i>Leptospermum scoparium</i>	tī kōuka, mānuka	4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.

NoR 2

Schedule A3 – NoR2 tree groups							
tree group number	approx number of trees	tree species	common name	approx max height (m)	ownership	protection status	Assessment assumptions
115	4	<i>Salix sp.</i>	willow	15	Public - Park	Trees in Open Space zones	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.
116	4	<i>Salix sp.</i>	willow	15	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.

NoR 3

Schedule A4 – NoR3 single trees								
tree number	tree species	common name	height (m)	dbh (mm)	tpz radius (m)	ownership	protection status	Assessment assumptions
20	<i>Tristanopsis laurina</i>	water gum	7	200	2.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
22	<i>Tristanopsis laurina</i>	water gum	7	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
25	<i>Tristanopsis laurina</i>	water gum	8	200	2.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
27	<i>Podocarpus totara</i>	totara	16	650	7.8	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove

Schedule A4 – NoR3 single trees								
28	<i>Vitex lucens</i>	pūriri	5	180	2.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
29	<i>Tristanopsis laurina</i>	water gum	6	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
30	<i>Tristanopsis laurina</i>	water gum	5.5	200	2.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
31	<i>Tristanopsis laurina</i>	water gum	7.5	200	2.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
32	<i>Tristanopsis laurina</i>	water gum	8	280	3.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
33	<i>Tristanopsis laurina</i>	water gum	7	300	3.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
35	<i>Tristanopsis laurina</i>	water gum	6.5	200	2.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
36	<i>Tristanopsis laurina</i>	water gum	7	220	2.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
42	<i>Metrosideros excelsa</i>	pōhutukawa	4	150	2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
44	<i>Metrosideros excelsa</i>	pōhutukawa	5.5	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
45	<i>Metrosideros excelsa</i>	pōhutukawa	8	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
46	<i>Metrosideros excelsa</i>	pōhutukawa	6	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
47	<i>Metrosideros excelsa</i>	pōhutukawa	7	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
51	<i>Podocarpus totara</i>	tōtara	13	650	7.8	Public - Park	Trees in Open Space zones	Within footprint of works and likely construction requirements – remove

Schedule A5 – NoR3 tree groups							
tree group number	approx number of trees	tree species	common name	approx max height (m)	ownership	protection status	Assessment assumptions
18	3	<i>Quercus palustris</i>	pin oak	15	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
19	11	<i>Tristaniopsis laurina</i> , <i>Yucca elephantipes</i>	water gum, yucca	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
21	2	<i>Tristaniopsis laurina</i>	water gum	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
24	2	<i>Tristaniopsis laurina</i>	water gum	5	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
34	22	<i>Cordyline australis</i> , <i>Cupressus macrocarpa</i> , <i>Eucalyptus sp.</i> , <i>Ligustrum lucidum</i> , <i>Myrsine australis</i> , <i>Podocarpus totara</i> , <i>Syagrus romanzoffiana</i>	tī kōuka, Monterey cypress, gum, tree privet, māpou, tōtara, queen palm	18	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Noted that the tree privet is a pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
38	25	<i>Coprosma robusta</i> , <i>Ligustrum lucidum</i> , <i>Myrsine australis</i>	karamu, tree privet, māpou	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Noted that the tree privet is a pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
39	25	<i>Coprosma robusta</i> , <i>Eucalyptus sp.</i> , <i>Ligustrum lucidum</i>	karamu, gum, tree privet	12	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Noted that the tree privet is a pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.

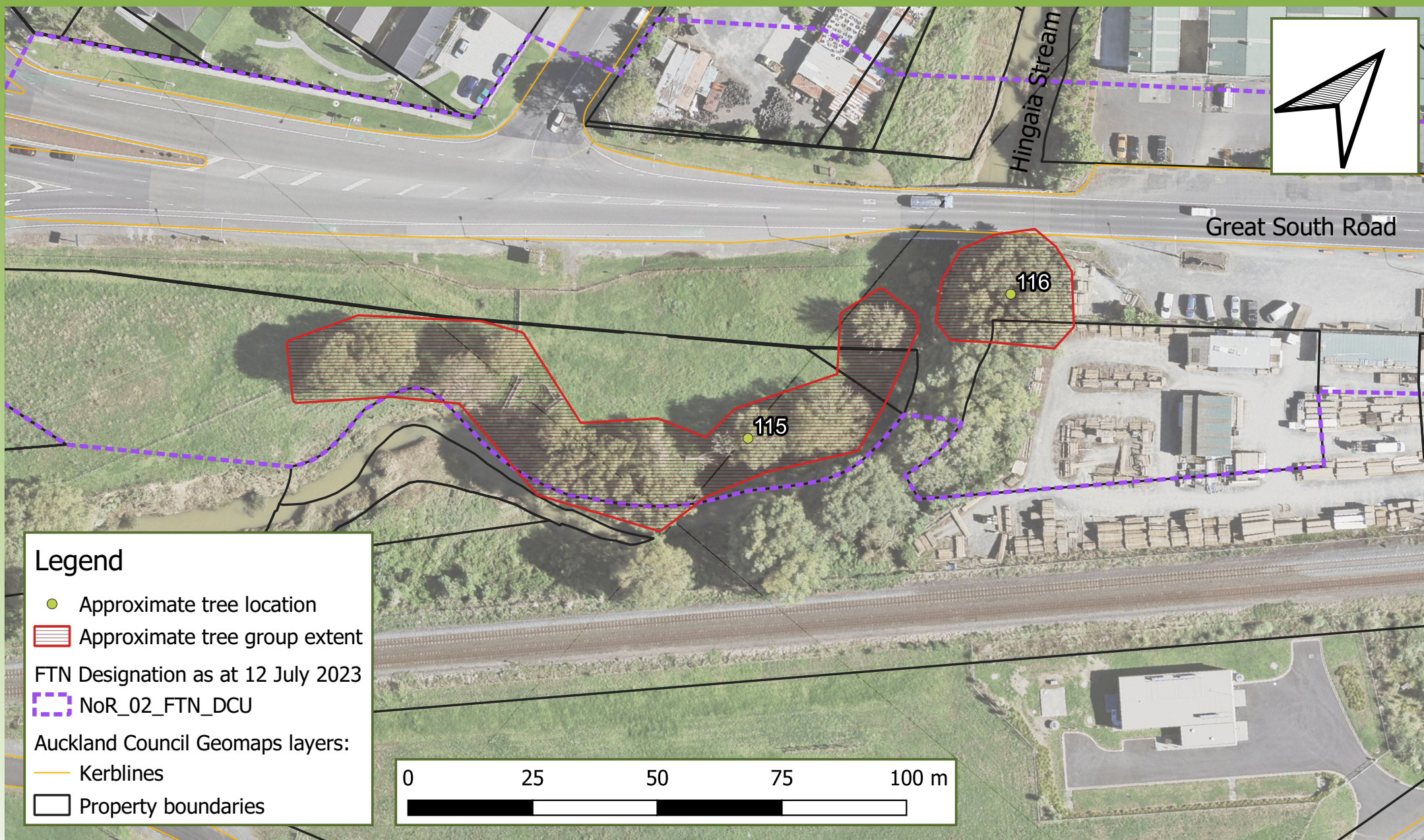
Schedule A5 – NoR3 tree groups							
41	25	<i>Coprosma robusta</i> , <i>Ligustrum lucidum</i> , <i>Quercus robur</i>	karamu, tree privet, English oak	11	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Noted that the tree privet is a pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
43	6	<i>Metrosideros excelsa</i> , <i>Podocarpus totara</i> , <i>Sophora microphylla</i>	pōhutukawa, tōtara, kowhai		Public - Park	Trees in Open Space zones	Within footprint of works and likely construction requirements – remove
48	-	<i>Cordyline australis</i>	tī kōuka	6	Public - Park	Trees in Open Space zones	Within footprint of works and likely construction requirements – remove
49	2	<i>Podocarpus totara</i>	tōtara	9	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
50	6	<i>Syzygium smithii</i>	white monkey apple	4.5	Unclear at this stage – Potential to be Public - Road	Unclear – Trees in Roads (assumed)	Within footprint of works and likely construction requirements – remove Pest plant species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
52	20	<i>Cinnamomum camphora</i> , <i>Cordyline australis</i> , <i>Hibiscus</i> sp., <i>Kunzea ericoides</i> , <i>Libocedrus bidwillii</i> , <i>Myrsine australis</i> , <i>Platanus x acerifolia</i> , <i>Populus nigra</i> , <i>Quercus robur</i>	camphor laurel, tī kōuka, hibiscus, kānuka, kawaka, māpou, London plane, black poplar, English oak	30	Public - Park	Trees in Open Space zones	Within footprint of works and likely construction requirements – remove
53	6	<i>Metrosideros excelsa</i>	pōhutukawa	5	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove

NoR 4

Schedule A6 – NoR4 single trees								
tree number	tree species	common name	height (m)	dbh (mm)	tpz radius (m)	ownership	protection status	Assessment assumptions
63	<i>Ligustrum lucidum</i>	tree privet	4.5	0	0	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
65	<i>Ulmus glabra 'Lutescens'</i>	golden elm	9	580	7	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
117	<i>Quercus palustris</i>	pin oak	13	750	9	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
118	<i>Salix sp.</i>	willow	18	1100	13.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
119	<i>Quercus palustris</i>	pin oak	7	320	3.8	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
120	<i>Salix sp</i>	willow	9	1000	12	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
121	<i>Cryptomeria japonica</i>	Japanese cedar	12	800	9.6	Public - Road	Trees in Roads	Footprint of works and likely construction requirements within TPZ
127	<i>Araucaria heterophylla</i>	Norfolk Island pine	17	450	5.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
132	<i>Metrosideros excelsa</i>	pōhutukawa	7	280	3.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
133	<i>Metrosideros excelsa</i>	pōhutukawa	6	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove

Schedule A7 – NoR4 tree groups							
tree group number	approx number of trees	tree species	common name	approx max height (m)	ownership	protection status	Assessment assumptions
61	8	<i>Liquidambar styraciflua</i>	American sweet gum	11	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
62	9	<i>Liquidambar styraciflua</i>	American sweet gum	11	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
64	15	<i>Liquidambar styraciflua</i>	American sweet gum	13	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
122	13	<i>Populus nigra</i>	black poplar	25	Unclear at this stage – Potential to be Public Road	Unclear - Trees in Roads (assumed)	Within footprint of works and likely construction requirements – remove Tree assumed as within road reserve for the purposes of assessment - Cadastral survey should be undertaken closer to the time of detailed design to confirm ownership.
123	9	<i>Salix sp.</i>	willow	12	Unclear at this stage – Potential to be Public Road	Unclear - Trees in Roads (assumed)	Within footprint of works and likely construction requirements – remove
124	55	<i>Salix sp.</i>	willow	12	Unclear at this stage – Potential to be Public Road	Unclear - Trees in Roads (assumed)	Within footprint of works and likely construction requirements – remove
128	2	<i>Metrosideros excelsa</i>	pōhutukawa	5	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
131	11	<i>Robinia pseudoacacia</i>	black locust	10	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove

2 Appendix B – Tree location plans



CRAIG WEBB
Consultant Arborist

Project: South FTN
Title: Tree Location Plan - NoR2 - GSR Drury
Client: Supporting Growth

Drawing No.: J2573-NOR2-01

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VOLUME 4

South Frequent Transit Network Assessment of Archaeological and Heritage Effects

October 2023

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Disclaimer

This is a draft document for review by specified persons at Auckland Transport and the New Zealand Transport Agency. This draft will subsequently be updated following consideration of the comments from the persons at Auckland Transport and the New Zealand Transport Agency. This document is therefore still in a draft form and is subject to change. The document should not be disclosed in response to requests under the Official Information Act 1982 or Local Government Official Information and Meetings Act 1987 without seeking legal advice.

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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
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan: Operative in Part
CHI	Cultural Heritage Inventory
FTN	Frequent Transit Network
GIS	Geographic Information System
GPS	Global Positioning System
GSR	Great South Road
HHMP	Historic Heritage Management Plan
HNZPT	Heritage New Zealand Pouhere Taonga
HNZPTA	Heritage New Zealand Pouhere Taonga Act (2014)
LINZ	Land Information New Zealand
NIMT	North Island Main Trunk
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 Road, Alfriston Road and Great South Road Upgrades
NoR 4	Notice of Requirement 4: Takaanini FTN - Porchester Road and Popes Road Upgrades
MDRS	Medium Density Residential Standards
NPS-UD	National Policy Statement on Urban Development
NZAA	New Zealand Archaeological Association

Acronym/Term	Description
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).
RMA	Resource Management Act 1991
SH1	State Highway 1
South FTN	South Frequent Transit Network
SRF	Site Record Form
SRS	Site Record System

Executive Summary

Four Notices of Requirement (**NoRs / the Project**) are proposed for the South Frequent Transit Network (**South FTN**).

Archaeological research undertaken for the Project included desktop assessment of archaeological reports, databases maintained by the NZAA (**ArchSite**), Auckland Council Cultural Heritage Inventory (**CHI**), the New Zealand Heritage List/Rārangī Kōrero and other resources to better understand the landscape surrounding the corridor. 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 road.

Across the NoRs, there are 25 recorded archaeological sites within 200m of the Project corridors, 19 of which are outside of the proposed scope of works. Six of these sites have potential to be affected by construction for the Project (see Table below). Nine sites scheduled in the AUP:OP were also identified within 200 m of the Project corridors, three of which have potential to be affected by construction for the Project. In addition to this, 38 items listed in the CHI were identified within 200 m of the Project corridors. Twenty of these were found to be outside of the scope of works, and fourteen were trees with potential heritage values that are the subject of a separate Assessment of Arboricultural Effects. Any effects on notable trees are discussed in the Assessment of Arboricultural Effects for the Project. Four CHI items have potential to be affected by construction for the Project (see Table below).

During the field assessment, six houses with potential unrecorded built heritage values were identified. It is recommended these are 'assessed by a built heritage specialist to determine if there are any potential constraints on the Project.

Based on the consideration of the statutory requirements discussed in this Report related to archaeology and historic heritage, the following key mitigation and management measures are recommended:

- A Historic Heritage Management Plan (**HHMP**) should be prepared and implemented during construction to guide works including induction requirements for contractors (and sub-contractors) and procedures for archaeological monitoring, inspection and investigation;
- A General Archaeological Authority to modify or destroy potential archaeological sites that may be encountered within the Project corridor should be applied for from Heritage New Zealand Pouhere Taonga under section 44 of the Heritage New Zealand Pouhere Taonga Act 2014. The Authority should be obtained in advance of any earthworks commencing to minimise delays should archaeological remains be exposed once works are underway; and
- Where effects on known (or unknown) archaeological sites cannot be avoided, archaeological investigation and recording of any affected archaeological sites utilising archaeological best practice should be undertaken in accordance with the Authority.

Summary of Assessment of Effects and Recommendations

NoR	ID	Source	Name / Site Type	Possible effects	Recommendations
NoRs 1, 2, 4	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.	Archaeological authority and monitoring, management under HHMP
NoR 1	R12/1154 (02830)	NZAA (AUP:OP)	Papakura Old Central School	1920s stone gate has potential to be destroyed.	Monitoring, management with HHMP
NoR 1	R12/1159	NZAA	Building	Possible subsurface material to be encountered and removed / destroyed.	Archaeological authority and monitoring, management with HHMP
NoR 1	R12/1161	NZAA	Papakura Library	Possible subsurface material to be encountered and removed / destroyed.	Archaeological authority and monitoring, management with HHMP
NoR 1	3048	CHI	Milepost 20	Low possibility for some subsurface material to be encountered and removed.	Monitoring, management with HHMP
NoR 1	12924 (02801)	CHI (AUP:OP)	WWI Memorial	Modifications to edges of memorial structure.	Monitoring, management with HHMP
NoR 1	20290	CHI	Milepost 21	Low possibility for some subsurface material to be encountered and removed.	Monitoring, management with HHMP
NoR 1	355 Great South Road	Field visit	Moderne style house	Building avoided, possible effects to context / frontage.	Further assessment by built heritage specialist

NoR	ID	Source	Name / Site Type	Possible effects	Recommendations
NoR 1	359 Great South Road	Field visit	Spanish Mission style house	Building avoided, possible effects to context / frontage.	Further assessment by built heritage specialist
NoR 1	361 Great South Road	Field visit	Spanish Mission style house	Building avoided, possible effects to context / frontage.	Further assessment by built heritage specialist
NoR 2	257 Great South Road	Field visit	Bungalow	Building avoided, possible effects to context / frontage.	Further assessment by built heritage specialist
NoR 3	R11/3477	NZAA	Manurewa Railway Station	Possibility for subsurface material related to station to be encountered and removed.	Archaeological authority and monitoring, management with HHMP
NoR 3	12481	CHI	11 Alfriston Road	Building is within the proposed designation and would be destroyed by construction.	Further assessment by built heritage specialist
NoR 4	R11/2077	NZAA	Gorrie McInnes Homestead	Possible subsurface material to be encountered and removed / destroyed.	Monitoring, management under HHMP
NoR 4	R11/2078	NZAA	John de Carteret Flax Mill	Possible subsurface material to be encountered and removed / destroyed.	Archaeological authority and monitoring, management with HHMP
NoR 4	279 Porchester Road	Field visit	Bungalow	Building avoided, possible effects to context / frontage.	Further assessment by built heritage specialist
NoR 4	281 Porchester Road	Field visit	House	Building avoided, possible effects to context / frontage.	Further assessment by built heritage specialist

1 Introduction

1.1 Purpose and scope of this report

This assessment of Archaeological and Heritage effects report has been prepared to inform the Assessment of Effects on the Environment (**AEE**) for Notice of Requirement (**NoR**) being sought by Auckland Transport (**AT**) for the South Frequent Transit Network (**South FTN**) under the Resource Management Act 1991 (**RMA**). 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 report as the **Project**.

Specifically, this report considers the actual and potential effects associated with the construction and operation of the Project on the existing and likely future environment as it relates to Archaeological and Heritage effects and recommends measures that may be implemented to avoid, remedy and/or mitigate these effects.

This report should be read alongside the AEE, which contains further details on the history and context of the Project. The AEE also contains a detailed description of works to be authorised within the NoR, and the typical construction methodologies that will be used to implement this work. These have been reviewed by the author of this report and have been considered as part of this assessment of Archaeological and Heritage effects. As such, they are not repeated here. Where a description of an activity is necessary to understand the potential effects, it has been included in this report for clarity.

1.2 Report Structure

In order to provide a clear assessment of the NoRs, this report follows as appropriate, the structure set out in the AEE. This report contains an assessment of the actual and potential effects of the Project as a whole (the four NoRs). Where appropriate, measures to avoid, remedy or mitigate effects are recommended. The sections of this report are arranged accordingly. Table 1-1 below provides an overview of the report structure and where the description of effects can be found in this report.

The report follows a nested structure where each of the four proposed NoRs is assessed.

Table 1-1: Report Structure

Report Section #	Extent Assessed (Route and/or NoR)
5	NoR 1 – Great South Road FTN Upgrade
6	NoR 2 – Great South Road Upgrade (Drury section)
7	NoR 3 – Takaanini FTN – Weymouth Road, Alfriston Road, and Great South Road Upgrades
8	NoR 4 – Takaanini FTN – Porchester Road and Popes Road Upgrades

2 Project Description

2.1 Context – South FTN network

As described further in the AEE, the South FTN is one of the transport works packages proposed for South Auckland between Manukau and Drury as part of Te Tupu Ngātahi Supporting Growth (**Te Tupu Ngātahi**) programme.¹ The South FTN is in turn part of a wider planned multi-modal transport network intended to support growth and enable mode shift in South Auckland.

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 FTN² bus services 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
- Urbanisation of adjoining key connections to FTN routes – Popes Road West, 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 2-1.

2.2 The NoRs – proposed spatial extent

Of the full South FTN network extent shown in Figure 2-1, only a portion falls within the NoRs/Project. 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.³

Accordingly, this assessment is focussed on the activities proposed to be authorised by the four NoRs. 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 2-1.

Further detail on the proposed activities and works in each NoR are provided in the AEE.

Table 2-1: South FTN – Summary of NoRs

NoR reference	Project component	Description
NoR 1	Great South Road FTN Upgrade	<ul style="list-style-type: none"> • 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 2-2Error! Reference source not found.) providing for bus priority measures, walking and cycling facilities, key intersection upgrades,

¹ The Programme is a collaboration between Auckland Transport (**AT**) and Waka Kotahi NZ Transport Agency (**Waka Kotahi**) to investigate, plan, and undertake route protection for the strategic transport networks needed to support Auckland's growth over the next 30 years.

² FTN services are defined in AT's Regional Public Transport Plan (**RPTP**) as bus routes operating at least every 15 minutes between 7am-7pm, 7 days-a-week, often supported by priority measures such as bus or transit lanes.

³ 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.

NoR reference	Project component	Description
		replacement of the existing Otūwairoa / Slippery Creek bridge, and stormwater management devices.
NoR 2	Great South Road Upgrade (Drury section)	<ul style="list-style-type: none"> 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 Road, Alfriston Road, and Great South Road Upgrades	<ul style="list-style-type: none"> 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 and Popes Road Upgrades	<ul style="list-style-type: none"> 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.

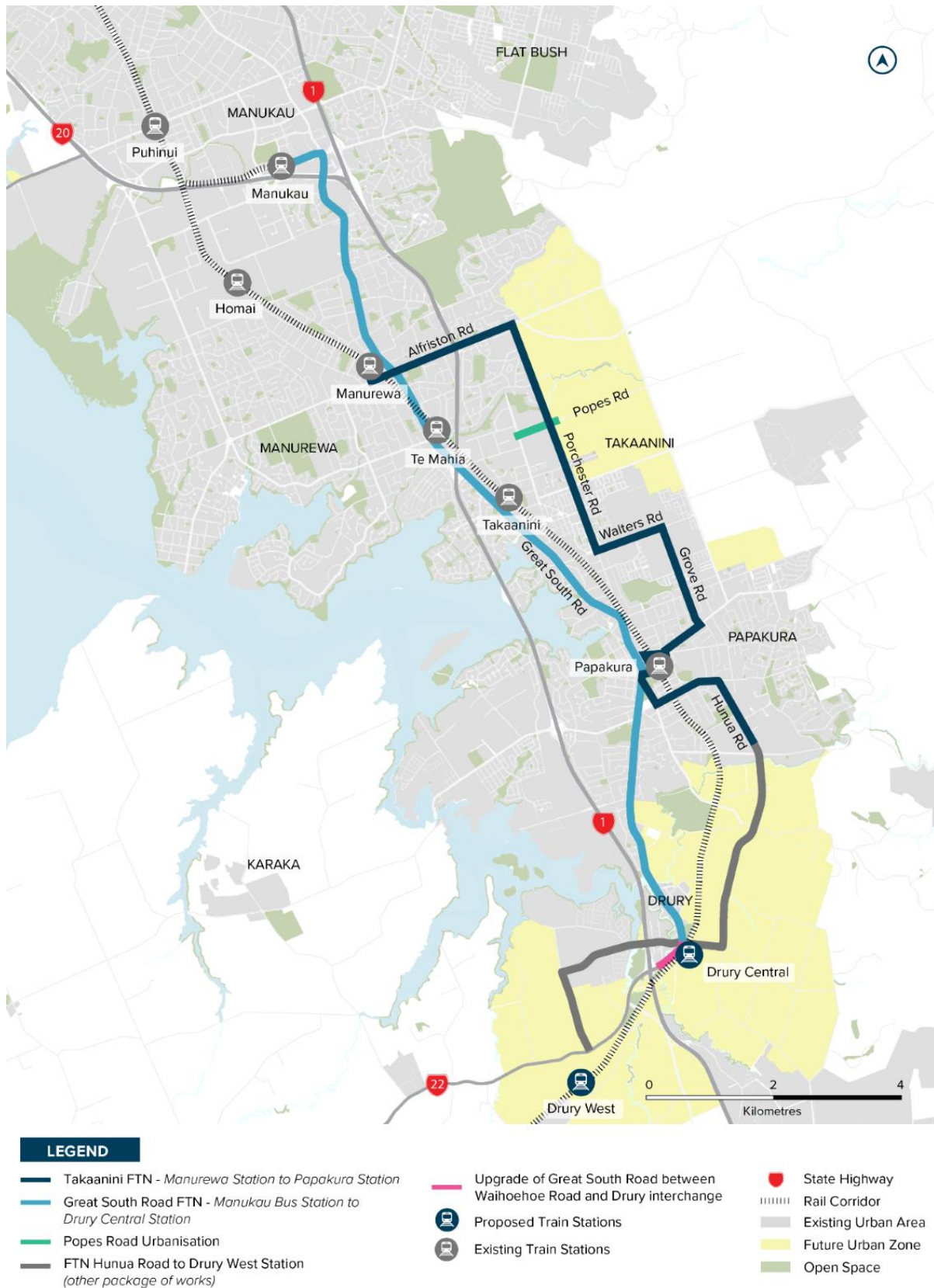


Figure 2-1: South FTN – overall project extent



Figure 2-2: South FTN – proposed NoRs

3 Assessment methodology and parameters

3.1 Preparation for this report

Work undertaken for this report commenced in July 2022. In summary, the preparation for this work has included:

- Desktop research of the NoRs using multiple online and paper resources. These are listed in the methodology section below; and
- A site visit / field assessment was undertaken on 19 July 2023 by Hayley Glover of CFG Heritage Ltd.

3.2 Methodology

The following resources were considered in this assessment:

- All recorded sites in the New Zealand Archaeological Association (**NZAA**) Site Recording Scheme (**SRS**) in the general vicinity were accessed from the New Zealand Archaeological Association Site Recording Scheme through ArchSite (<https://archsite.org.nz>) and incorporated into the Project specific Geographic Information System (**GIS**) workspace maintained by CFG Heritage;
- The Heritage New Zealand Pouhere Taonga (**HNZPT**) digital library (<https://www.heritage.org.nz/protecting-heritage/archaeology/digital-library>) was searched for records of archaeological investigations in the area;
- The HNZPT List / Rārangī Kōrero (<https://www.heritage.org.nz/the-list>) was searched to see if any listed items were within the proposed NoRs;
- Old maps and survey plans held by Land Information New Zealand (**LINZ**) were accessed using QuickMap software;
- Aerial Photographs held by LINZ (<https://data.linz.govt.nz/>), Auckland Council (<https://geomapspublic.aucklandcouncil.govt.nz/>) and Retrolens (<https://retrolens.co.nz/>) were searched;
- Local soil information was searched on the S-Map Online database maintained by Landcare Research (<https://smap.landcareresearch.co.nz/>);
- The Auckland Council Cultural Heritage Inventory (**CHI**) (<https://chi.net.nz/>), the Auckland Council GeoMaps GIS viewer (<https://geomapspublic.aucklandcouncil.govt.nz/>) and Auckland Unitary Plan Viewer (<https://unitaryplanmaps.aucklandcouncil.govt.nz/>) were accessed;
- Papers Past online database (<https://paperspast.natlib.govt.nz/>) was accessed for historic newspaper articles;
- The National Library of New Zealand's DigitalNZ website (<https://digitalnz.org/>) was accessed for old drawings, photographs, and plans;
- Several written texts on the history of the area; and
- South FTN Technical Specialist AEE briefing pack.

A field assessment was undertaken on 19 July 2023 by Hayley Glover of CFG Heritage Ltd. This was a pedestrian survey, though some sections of road were unsafe to walk through and had to be driven through instead. The survey was limited to publicly accessible areas, primarily road reserves. The purpose of this field work was to relocate recorded sites where possible and identify any potential

unrecorded sites. It was a surface assessment only, no invasive techniques like probing or test pitting were used due to the high likelihood of services being present.

3.2.1 Limitations and accuracy of data

Archaeological sites have been recorded since the 1950s and the quality of site information is variable. Sites were initially recorded on 100yd grid references, which were converted to 100m grid references as the map data became metricated in the 1980s. This has led to sites potentially only having a 200m accuracy. Therefore, all recorded archaeological and heritage sites within 200m of the proposed designations were assessed for potential to be present within the proposed designation boundaries.

Since the mid-1990s, sites recorded by hand-held GPS are generally located to $\pm 5\text{m}$. To ensure all archaeological sites that could be impacted by works are assessed, a 200m buffer was placed around the Project area and all sites contained within that buffer were subject to categorical desktop assessment to see if they were likely to be impacted by the proposed extent of works. Any sites within 200m of the Project which could not be ruled out by this method will be considered as within the Project corridor until able to be proven otherwise.

This report only assesses tangible archaeological and heritage values within the proposed extent of works. The report does not address Te Ao Māori or intangible values associated with the cultural landscape. It is acknowledged that only Manawhenua can comment on these values.

3.3 Statutory Requirements

3.3.1 Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA)

All archaeological sites, whether recorded or not, are protected by the provisions of the Heritage New Zealand Pouhere Taonga Act 2014 (**HNZPTA**) and may not be destroyed, damaged or modified without an authority issued by Heritage New Zealand Pouhere Taonga (**HNZPT**).

An archaeological site is defined in the HNZPTA as:

(a) any place in New Zealand, including any building or structure (or part of a building or structure), that—

(i) was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where the wreck occurred before 1900; and

(ii) provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and

(b) includes a site for which a declaration is made under section 43(1).

Any HNZPTA authorities will be applied for at a later date, after detailed design and before any ground disturbance and construction works.

3.3.2 Resource Management Act 1991

The RMA requires District and Regional Councils to manage the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while

sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations. The protection of historic heritage from inappropriate subdivision, use, and development is identified as a matter of national importance (section 6(f)).

Historic heritage is defined in section 2 of the RMA as:

Those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, derived from any of the following qualities: archaeological, architectural, cultural, historic, scientific, or technological.

Historic heritage includes:

- *historic sites, structures, places, and areas; and*
- *archaeological sites; and sites of significance to Māori, including wāhi tapu; and*
- *surroundings associated with the natural and physical resources.*

These categories are not mutually exclusive, and some archaeological sites may include above ground structures or may also be places that are of significance to Māori.

3.3.3 Auckland Unitary Plan: Operative in Part

The Auckland Unitary Plan: Operative in Part (**AUP:OP**) contains several applicable provisions regarding historic heritage. In the AUP:OP, archaeological sites are defined in accordance with the definitions outlined in the HNZPTA.

A scheduled historic heritage place can be an individual feature, or encompass multiple features and/or properties, and may include public land, land covered by water and any body of water. A historic heritage place may include cultural landscapes, buildings, structures, monuments, gardens and plantings, archaeological sites and features, traditional sites, sacred places, townscapes, streetscapes and settlements. The criteria for the identification and scheduling of these places is discussed in Chapter B5 2.2 of the AUP:OP.

Additionally, there are heritage provisions in Chapters E26 Infrastructure and E11 / E12 land disturbance of the AUP:OP.

3.4 Existing and future environment

The existing and anticipated future environment is further discussed in the accompanying AEE. In summary, the implementation timeframe for the Project has yet to be confirmed but is likely to be in approximately 10-15 years' time subject to funding availability. The assessment considers the effects of the Project at both the existing environment (as it exists today) and the likely future (planned) environment which consider potential urban development and intensification sought under proposed Plan Change 78.

The Project will be constructed and will operate in the existing urban environment or planned environment (i.e. what can be built under the existing AUP:OP live zones):

- a) **Existing environment:** The corridors are situated primarily within existing urban areas with live zoning including residential, commercial, and open space zones. There is some Future Urban Zone land in the wider area to the northeast/east. The existing activities within the area are generally reflective of the existing underlying zoning; and

- b) **Planned environment:** The planned environment is anticipated to remain urban and comprised of similar activities as the existing environment. The density of residential development is however anticipated to change and increase in future. In particular, this includes in the residential zones around Te Mahia and Takaanini stations, in line with the implementation of the National Policy Statement on Urban Development (**NPS-UD**) in the AUP:OP. The remaining residential areas will experience an uplift of density through the implementation of the Medium Density Residential Standards (**MDRS**) through the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021. Plan Change 78 (notified at the time of assessment) seeks to give effect to the NPS-UD and incorporate the MDRS into residential zoning. It is noted that there are some areas of existing residential zoned land (particularly east of the NIMT) that have recently been intensified (i.e., new builds), as such are unlikely to change in the near future

The likelihood and magnitude of land use change regarding the land use planning context has been identified in Table 3-1 below. This has been used to inform the assumptions made on the likely future environment.

Table 3-1: South FTN – existing and future environment

Existing environment	Current AUP:OP Zoning	Likelihood of Change for the environment ⁴	Magnitude of potential change	Likely Receiving Environment ⁵
Residential ⁶	Residential (Mixed Housing Suburban)	Low - Moderate ⁷	Low - Moderate	Residential
	Residential (Mixed Housing Urban)	Low - Moderate ⁸	Low - Moderate	Residential
	Residential (Mixed Housing Suburban and Urban) around train stations	Moderate	Moderate - High	Residential and Commercial/Retail ⁹
Business	Business (Heavy Industry)	Low	Low	Business (Industrial)
	Business (Light Industry)	Low	Low	Business (Industrial)
	Business (Neighbourhood Centre)	Low	Low	Business (Neighbourhood Centre)
	Business (Town Centre)	Low	Low	Business (Town Centre)
Open Space	Informal Recreation	Low	Low	Informal Recreation
	Community	Low	Low	Community
Greenfield areas	Future Urban	Low - Moderate	High	Urban

⁴ Based on AUP:OP zoning/policy direction.

⁵ Based on AUP:OP zoning/policy direction.

⁶ Based on the NPS-UD and MDRS, these residential areas are likely to experience increased density.

⁷ There are areas of existing Residential Zone land that has recently been intensified (i.e. new build developments), as such is unlikely to change in the near future.

⁸ There are areas of existing Residential Zone land that has recently been intensified (i.e. new build developments), as such is unlikely to change in the near future.

⁹ Note that much of the commercial operations between Manuia Road and Taka Street occur on residentially zoned land.

4 Background

The Project area lies within the Manukau Lowlands, an area of relatively flat land which is situated along the southern edge of the Manukau Harbour, near the Pahurehure Inlet. The Manukau Harbour is New Zealand's second largest harbour, with an area of about 365 km² and a shore length of approximately 460 km. It was formed by the development of a Quaternary dune barrier (Awhitu Peninsula) that enclosed a large bay between Port Waikato and the Waitakere Ranges (Kelly 2008: 3). The Project area has several waterways within it, notably the Papakura Stream, Ngakoroa / Ōtūwairoa (Slippery Creek) Stream and Hingaia Stream, which flow out to the Pahurehure Inlet through the Drury Creek (Trilford 2021).

4.1 Pre-European Māori

Pre-European Māori occupation across the Manukau lowlands was extensive, and was focused in large part along waterways and coastlines, with gardening taking place in those areas with fertile volcanic soils, such as the large gardening complex at the Matukurua Stonefields or the foothills of the Hūnua Ranges. An in-depth history of pre-European settlement of the wider Manukau lowlands area has been discussed in previous reports (see Murdoch 1990; Te Roopu Kaitiaki o Papakura 2010).

Settlement of the Manukau lowlands can be traced back to the arrival of the Tainui waka, which entered the Manukau Harbour in the 14th century (Murdoch 1990). The Harbour is thought to have been first pointed out by a priest aboard the waka, Taiehu, and was named by the Tainui captain Hoturoa. The strategic location meant that multiple different iwi occupied the area intensively with seasonal settlements (Harlow et al. 2007; Murdoch 1990).

4.1.1 Manurewa / Takaanini

The name of Manurewa, or Te Manurewa o Tamapahore, means 'rising kite' or 'the rising kite of Tamapahore' and refers to an incident during a kite flying competition where the kite of chief Tamapahore drifted away after its line was severed by rival brother Tamapahure (Calman 2013).

Much of the Māori occupation in Manurewa from the 15th century onwards was centred around the volcanic cone pa sites of Matukutūruru / Wiri Mountain (R11/32) and Matukutūreia / McLaughlins Mountain (R11/25). Gardening was conducted within the surrounding Matukurua stonefields utilising the rich volcanic soils (Bickler et. al. 2013; Sullivan 1975). These settlements were supported by intensive gardening of the fertile volcanic soils, in addition to the estuarine shellfish beds and other marine resources of the inner Manukau Harbour. The Papakura Stream, between Manurewa and Takaanini, was also an important transport route and another source of fish, eels, and water birds, as well as building and weaving materials (Te Roopu Kaitiaki o Papakura 2010).

Takaanini, named for Te Ākitai Waiohū chief Ihaka Takaanini, was mostly swampland upon initial Māori settlement, cut with a myriad of small waterways. These wetlands would have been rich in resources and would have been used for hunting waterfowl and eels, for transportation, storage, and near the edges of some wetlands, the cultivation of taro. There was also once a large kauri forest across Takaanini, as ancient stumps have been unearthed. It is likely the forest was destroyed by a natural catastrophe, well before human settlement (Craig 1982).

One important 17th century figure who was present in Takaanini was Tainui chief, Maki. Maki was from Kawhia but later lived near Waikato Heads and had interactions with the tribes of Manukau. Maki

aimed to reassert Tainui claims to the Manukau area, so went and lived with chief Whauwhau, in his kāinga at Takaanini. When Maki was visited by Taihua, one of his kin from Tamaki, he learned that Taihua's son had been killed by Whauwhau's people. Maki and his people went on to kill Whauwhau and gain a foothold in the area (Craig 1982).

4.1.2 Papakura / Drury

The Papakura / Drury area and surrounds provided access to inland areas for both Māori and later settlers to the Hunua Ranges, Clevedon and on into the Waikato. Ōpaheke / Slippery Creek was a strategic location with a complex Māori history (Murdoch 1990:1). The Papakura portage was located between Takaanini and Papakura, and was a major over-land route connecting the Manukau Harbour and the Tīkapa Moana / Hauraki Gulf. The portage started from the Pahurehure Inlet, following Old Wairoa Road, heading to the Wairoa River at Clevedon (Te Roopu Kaitiaki o Papakura 2010).

Māori settlement was concentrated around the harbour shores and navigable waterways, where there was arable land, and on the slopes of the Hunua Hills. The name Papakura refers to the rich fertile soils, translating to 'flat area of red soil' or 'ruddy plains' (Ngāti Te Ata 2021). This may however be a relatively recent name, with the traditional name for the area being Wharekawa (Ngāti Te Ata 2021).

In the early contact period, there was a major settlement at Pukekiwiriki / Pukekōiwiriki Pā, and there would have been seasonal occupation in the surrounding areas (Foster 2015). According to environmental factors including soil types, climate, and similar factors, there were large historic wetland ecosystems around the area (Whenua Māori Visualisation Tool, n.d). In precontact Māori settlement, these wetlands were utilised for hunting of waterfowl and eels, transportation, storage, and the edges of some wetlands are suitable to cultivate taro (Trilford 2021).

4.2 19th century

From 1834, missionaries began travelling through the general area, notably staying at Ōpāheke, a kāinga near Ōtūwairoa / Slippery Creek (Harlow et al. 2007). The strategic location of the area was noted by the government and in 1842 the 'Papakura Block,' stretching from what is now Papatoetoe to Papakura, was purchased, beginning a series of land purchases that would take place across South Auckland (Harlow et al. 2007; Murdoch 1990). In 1852 and 1854, additional land was purchased by the Crown, including the whole upland section of the Hunua Block. The Kirikiri Block remained in possession of the Māori owners at this time (Murdoch 1990).

Māori had been alienated from their land and unease had been building from the 1850s. By 1856, the concept of a Māori king was being discussed openly. However, the Crown saw the Kīngitanga movement as a direct attack on British sovereignty and by the late 1850s the seeds of the land war had already taken root. The Kīngitanga movement opposed the sale of Māori land and although some were receptive to leasing, the Crown saw this as a further obstruction to development.

4.2.1 1860s Waikato Campaign

Construction of Great South Road begun at the end of 1861 under the orders of Governor Grey who was preparing for war with Māori (O'Malley 2019: 259). The road was constructed by British Army troops and provided access to north Waikato from Auckland. By March 1863 the road construction was complete, and Grey had by then obtained additional British troops and armour-plated steamers (O'Malley 2019: 103).

Tensions between Māori and Europeans in the Auckland and Waikato districts gradually increased and in July 1863 Governor Grey issued an ultimatum to the Waikato tribes around Auckland to immediately swear an oath of allegiance to the Queen and to put down their arms. Those who did not comply were told to remove themselves to the Waikato, beyond the Mangatāwhiri, effectively declaring themselves as rebels against the Government (O'Malley 2019).

Papakura and Drury both became military garrisons, acting as supply bases and staging posts, and there was an influx of people associated with the British military. Several military and commissariat redoubts were established, as well as a headquarters for General Cameron's 65th Regiment Camp (R12/755) (Harlow et al. 2007). Shortly after Grey's ultimatum was announced, British troops crossed the Mangatāwhiri River and a battle broke out between the militia and Māori occupants of Te Apārangi. European settlers were temporarily evacuated (Murdoch 1990), and over the next eight months soldiers based in Drury were actively engaged in the war (Clarke 1982). By March 1864 General Cameron had moved well into the Waikato, and after battles like those of Ōrākau and Gate Pā, he took hold of the region (Clark 1982).

In an effort to increase security, consolidate territorial gains, and display government presence, in 1864 the New Zealand Government encouraged South African and British migrants to move to New Zealand by offering free 10 acre and ¼ acre blocks. These immigrants were to occupy Waikato lands that had been confiscated following the land wars. However, the scheme did not take off, after the promised financial incentives were not provided (Morris 1965).

4.2.2 Manurewa / Takaanini

European settlement around Manurewa was very sparse until the completion of the NIMT in 1875 (Scoble 2010). While the land had been part of the extensive Fairburn Purchase in the late 1830s, it had then become part of Clendon's Grant (DP 9075) in 1842. The land was subdivided and sold as smaller farms from 1885 onwards (Brassey 2015), including a large sale of land to the Martin brothers, who went on to further subdivide and sell this land in the mid-1900s, forming much of current-day Manurewa (Wichman 2001).

Industry in Manurewa was largely focussed on farming, later becoming a major centre for the dairy industry with the first creamery opening in 1905 (Wichman 2001).

4.2.3 Papakura / Drury

During the New Zealand Wars in the 1860s there was an influx of people to Papakura and Drury, with both towns becoming military garrisons, acting as supply bases and staging posts. Great South Road was the main land transport route to the Waikato, and improvements and extensions were made, particularly around Papakura. Drury had access to the Manukau Harbour through the Pāhurehure Inlet (Harlow et al. 2007). Several military and commissariat redoubts were established, as well as a headquarters for General Cameron's 65th Regiment Camp (R12/755) (Harlow et al. 2007).

The discovery of a coal seam in Drury would be one of the most significant impacts on the local economy, spurring development in the area as well as a related clay industry (Cruickshank 2017). In 1866 Henry Chamberlain purchased a block of land containing the coal mines (Platts 1971) before selling this to the Mawhinney Brothers (Coalfield Notes, PDHS). The industry would be short lived as more productive coal mines would later be discovered at Huntly. The original brickworks in Drury had closed by 1910 or slightly afterwards, though clay pit extraction remained a profitable business resulting in the construction of Drury Potter and Fireclay Works, where clay was processed for pottery.

The building was on land belonging to the Mawhinneys (Coalfield Notes, PDHS). This business was purchased by an Auckland firm in 1930 and shut down (Auckland-Waikato Historical Journal April 1984: 19, cited in Harlow et al. 2007).

Following the coal mining and clay works, several basalt quarries were established, with at least two linked to the clay works via roads or tramways. These were small-scale operations, and primarily provided kerbstones for Auckland. In addition to this, extensive gum digging occurred in surrounding areas like Karaka, Waiau Pa and Glenbrook (Wiley 1939:67), and other industries like timber milling, land clearance, pastoral farming and agriculture were present in Drury (Harlow et al. 2007). The development of many of these industries, particularly agriculture, was boosted by the construction of the railway line from Auckland to Mercer in the early 1870s. Urban growth increased in Papakura township, while Drury declined somewhat in importance (Murdoch 1990).

4.3 Archaeological background

Overall, targeted archaeological research in the area has been limited, with no large-scale archaeological surveys taking place in the Manukau Lowlands. More recently, an increase in proposed housing developments in the outskirts of Auckland has led to a number of archaeological surveys in the general area.

Despite this, there remains a lack of recorded archaeological sites, particularly pre-European Māori sites, and many of those which are recorded are out of date and have never been subject to proper investigation. The use of the area for farming over the last 50 years would have modified the landscape considerably. As wetlands are drained and turned into farmland, any high points would have been cut and used to fill hollows, and the area would have been ploughed extensively. This would obscure much of the surface evidence of any archaeological sites (Cruickshank 2017).

4.3.1 Manurewa / Takaanini

Very little archaeology has been done near the Project area within Manurewa / Takaanini, with more surveys and archaeological investigation having taken place to the west, around Weymouth (e.g. Bickler et al. 2008; Clough 2005; Cruickshank and Harris 2014; Foster 1997; 1998a).

More significant and focused investigation has taken place around Matukutūruru / Wiri Mountain and the surrounding Matukurua Stonefields. Several excavations have taken place at Matukutūruru over the years, initially led by Sullivan's research and excavations from the early 1970s onwards (e.g., Sullivan 1974, 1975, 1985). Continued excavations were carried out in the surrounding stonefield garden areas (such as the Wiri Railway site and the Wiri Oil terminal site) over the next twenty years (e.g., Bulmer 1983; Clough and Turner 1998; Coates 1985; Lawlor 1980; Rickard 1985; Veart 1986). In 1988 Foster conducted a survey of the remnants of Matukutūruru and mapped all visible features including terraces, middens, walls and mounds (Foster 1988b). More recent survey has taken place at the Matukurua stonefields by Cruickshank (2023), including the digitisation of Sullivan's earlier maps.

The most comprehensive archaeological investigation that has taken place around Alfriston / Takaanini is the cultural heritage investigation carried out by Clough and Baquié for the Takanini Structure Plan (Clough and Baquié 2000). They recorded fifteen colonial and early 20th century sites within the proposed study area, with a marked lack of visible archaeology related to pre-European Māori settlement (Clough and Baquié 2000).

Further south, Russell Foster assessed a proposed subdivision in 2006 which determined most archaeological evidence that is available suggested that pre-European Māori occupation was greater south towards Pukekoiwiriki Pā and none were at risk within the subdivision (Foster 2006a). Foster also assessed the extension of waste and stormwater works nearby (Foster 2006b). No new sites were recorded during the works.

Another relatively large survey nearby the Project area for NoR 4 was carried out in 2015 by Tatton et al. along Mill Road. The sites at the Alfriston and Mill Road junction were researched further and their condition recorded, but no new sites were recorded within the study area. The authors recommended a route that would avoid damage to known sites (Tatton et al. 2015).

4.3.2 Papakura / Drury

Recent increases in proposed housing developments in the outskirts of Auckland have led to several archaeological surveys in this area (Bickler et al. 2013; Clough and Baquié 2000; Cruickshank 2014; Cruickshank et al. 2017; Foster 2014; 2015; Prince and Clough 2003). Other surveys have included those for infrastructure work (e.g., Clough 1995).

In 1995 an archaeological survey along the route of the proposed Waikato River Pipeline was carried out by Clough. This route extended from east of Manurewa to south of Tuakau, crossing through the centre of Papakura and Drury. Archaeological sites along the route were relatively limited, and 80% of the proposed route followed roads. However, several historic buildings were identified, including churches, railyards, and schools. Most of the pre-European Māori sites were at a greater distance from the pipeline route, with the majority situated on the Waikato River. No new sites were recorded during the survey (Clough 1995).

As part of the Hingaia Structure Plan, a Cultural Heritage Investigation was undertaken to identify heritage constraints on the future development of the area (Clough et. al 2000). The study area extended from the coastline to the present-day motorway. The area was surveyed, and new archaeological sites, buildings and trees were recorded, and previous or existing data was updated.

In 2013, Clough and Associates also monitored works around the pump station on Flanagan Road, Drury, as it was near a recorded site R12/742, where the Drury Railway Station and Yards were situated (Bickler et al. 2013). However, this site refers to the station and yards built in 1918, not the original station, which was located further north near Waihoehoe Rd (R12/1139).

West of the Project area, near Pararekau Island, a midden (R12/914) was investigated as part of ground disturbance works for a subdivision (Baquié and Clough 2008b). Before this, the earthworks began without notifying the archaeologists, and a large amount of works had been completed which had destroyed evidence of sites R12/676, R12/677, R12/678 and R12/929. The investigation of R12/914 did not generate enough data to qualify for additional analysis, and evidence of ploughing and discing from previous land working suggested the midden had been too modified for analysis (Baquié and Clough 2008b).

Recent growth in the area has led to the development of the Drury-Ōpaheke Structure Plan. This was developed to guide growth for the next 30 years and commissioned the first large scale desktop study of the area (Brown and Brown 2017). This desktop study discussed general themes and the history of the area, and likely places of settlement. Although the study was extensive and sets a good foundation for future research, it was hampered by the lack of previous systematic survey in the area. Additional archaeological and heritage assessments have been undertaken or are currently underway

for various Te Tupu Ngātahi projects within the Drury-Ōpaheke Structure Plan area including the Drury Arterials AEE (Trilford, 2021) and the Drury Central Train Station (Cruickshank 2021) which will also increase the overall understanding of the landscape.

5 NoR 1 - Great South Road FTN Upgrade

As outlined in the Project description (Section 2), NoR 1 comprises a range of interventions providing for the Great South Road FTN route along Great South Road between Manukau and Drury. These include eight intersection upgrades, and the replacement of the Otūwairoa / Slippery Creek bridge. The wider corridor will provide for either three or four lanes in the midblock including bus lanes in one or both directions, and active mode facilities.

5.1 Desktop Assessment

Within 200m of the proposed designation for NoR 1, fourteen recorded archaeological sites were identified, eleven of which were confirmed to be outside of the proposed designation (refer to Figure 5-1 and Table 5-1). Seven items scheduled in the AUP:OP were identified, four of which are outside of the proposed designation. Twenty-three items listed in the CHI were identified. Fourteen of these items were heritage trees which are not assessed in this document. Of the remaining nine items, six were outside of the proposed designation.

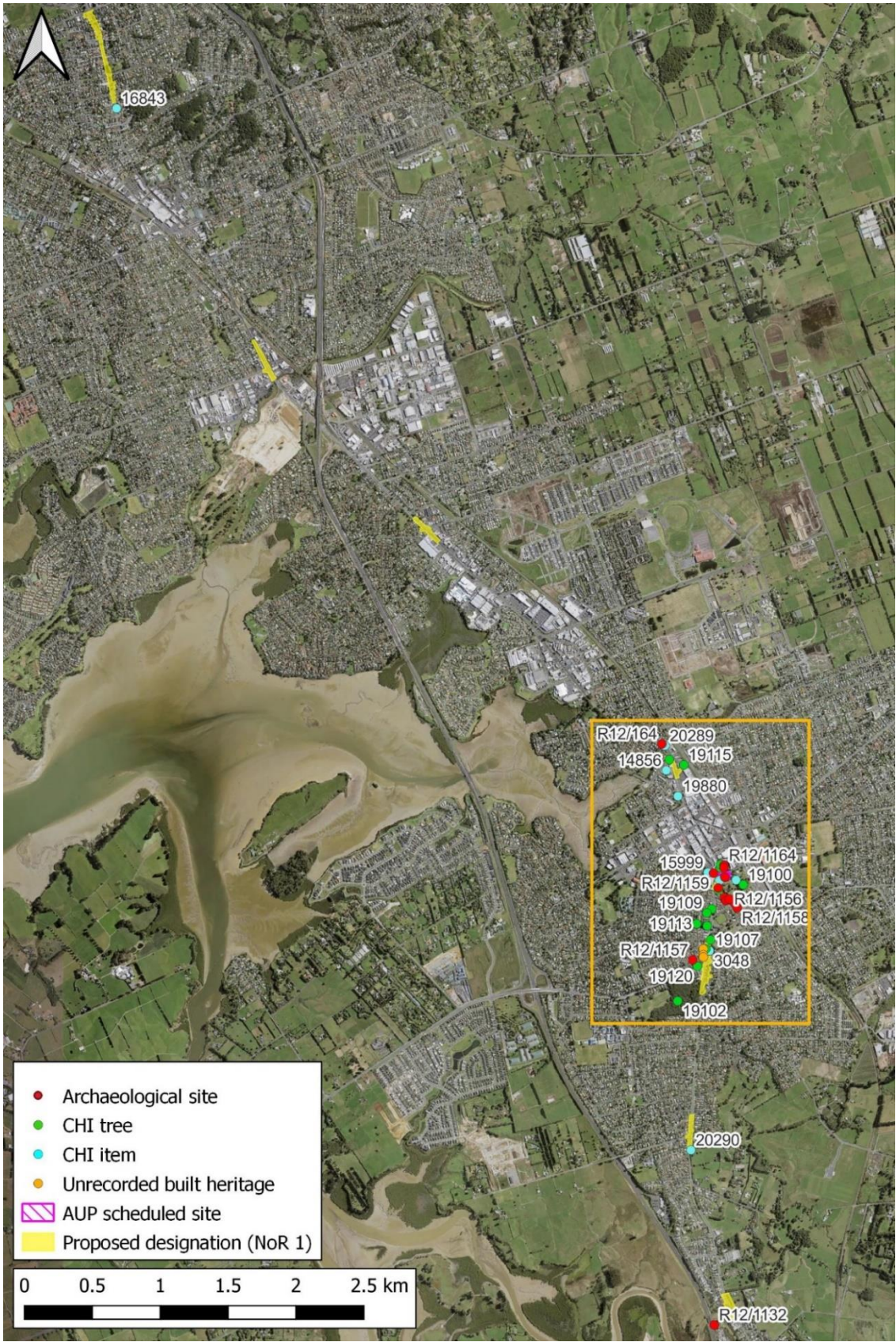


Figure 5-1: Recorded archaeological and heritage sites within 200m across NoR 1. Detail of orange box shown in Figure 5-2.



Figure 5-2: Recorded archaeological and heritage sites within 200 m of NoR 1 at Papakura.

Table 5-1: Summary of archaeological and heritage sites at NoR 1.

ID	Source	Name / Site Type	Scope
R12/164	NZAA	Midden	Outside designation
R12/961	NZAA	Coles Flour Mill	Outside designation
R12/1132	NZAA	Ōpaheke Pā	Outside designation
R12/1154	NZAA	Papakura Old Central School	Assessed further
R12/1155	NZAA	Building	Outside designation
R12/1156	NZAA	Building	Outside designation
R12/1157	NZAA	Presbyterian Church	Outside designation
R12/1158	NZAA	Building	Outside designation
R12/1159	NZAA	Building	Assessed further
R12/1161	NZAA	Papakura Library	Assessed further
R12/1162	NZAA	Building	Outside designation
R12/1163	NZAA	Building	Outside designation
R12/1164	NZAA	Papakura Police Station	Outside designation
R12/1165	NZAA	Papakura Courthouse and Lockup	Outside designation
00706	AUP:OP	Military Milestone Plaque	Assessed further
00708	AUP:OP	Christ Church Anglican Church	Outside designation
02789	AUP:OP	Papakura Centennial Restrooms	Outside designation
02800	AUP:OP	Papakura Presbyterian Church	Outside designation
02801	AUP:OP	Papakura / Karaka WWI Memorial	Assessed further
02830	AUP:OP	Papakura Old Central School	Assessed further
02831	AUP:OP	Papakura Courthouse and Lockup	Outside designation
3048	CHI	Milepost 20	Assessed further

ID	Source	Name / Site Type	Scope
12924	CHI	WWI Memorial Oak	Assessed in separate Arboricultural Assessment
15999	CHI	Catholic Convent	Outside designation
16003	CHI	Papakura / Karaka WWI Memorial	Assessed further
16843	CHI	Milepost	Outside designation
19100	CHI	Grove of Oaks	Outside designation
19102	CHI	Kirk's Bush	Assessed in separate Arboricultural Assessment
19105	CHI	Phoenix Palm	Assessed in separate Arboricultural Assessment
19106	CHI	Plane and Acmena trees	Assessed in separate Outside designation
19107	CHI	Scarlet Gums	Assessed in separate Arboricultural Assessment
19108	CHI	Rimu, Kauri, Phoenix Palm, and Oaks	Assessed in separate Arboricultural Assessment
19109	CHI	Kauri	Outside designation
19110	CHI	Phoenix Palm	Outside designation
19113	CHI	Oak	Outside designation
19115	CHI	Oak	Outside designation
19116	CHI	Jacaranda and Puriri	Outside designation
19120	CHI	Walnut	Outside designation
19121	CHI	Phoenix Palm	Assessed in separate Arboricultural Assessment

ID	Source	Name / Site Type	Scope
19880	CHI	Christ Church Anglican Church	Outside designation
20289	CHI	Milepost 19	Outside designation
20290	CHI	Milepost 21	Assessed further
20311	CHI	Papakura Centennial Restrooms	Outside designation
21912	CHI	Papakura Courthouse and Lockup	Outside designation

5.2 Field Assessment

In general, this NoR is within highly developed residential and industrial areas. Buildings and modified land are present either side of the road along the NoR boundaries, with the exception of the Slippery Creek crossing, where less modified land is present on the eastern side.

During desktop research (Section 5.1), three archaeological sites and three CHI items (two of which have AUP:OP scheduled extents), as well as one AUP:OP item, were found to have potential to be within the proposed designation boundaries, and these locations were inspected during the field assessment (Figure 5-3). In addition to these sites, three buildings with potential heritage values were identified during the field survey in the vicinity of the proposed designation boundaries and are discussed below. No other archaeological sites were identified during the survey, but there is potential for unrecorded subsurface archaeology to be present across the NoR, particularly in close proximity to waterways such as Ōtuwairoa / Slippery Creek.



Figure 5-3: Archaeological and heritage sites assessed in NoR 1.

5.2.1 Archaeological sites

5.2.1.1 R12/1154 – Papakura Old Central School (AUP:OP Scheduled extent 2830)

Papakura School opened in 1877 and was the only school in Papakura until 1954. It remained in use until 1972. The building illustrates a mixture of Edwardian and Queen Anne styles. This site was recorded in the SRS by Trilford in 2020 and is also scheduled in the AUP:OP (item 2830) and the proposed designation extends into the scheduled extent of place. While the school building itself, now in use as a community hall (Figure 5-4), Figure 5-4: Papakura Old Central School (R11/1154) – outside of the proposed designation.

Although Papakura Old Central School (R11/1154) is outside of the proposed designation, the stone wall and gate used as an entrance to the property do fall within the proposed designation and could be affected by construction (Figure 5-5). The four central pillars and gate were constructed in 1926, with the walls on either side constructed sometime after this, and are contributing features to the wider scheduled site (Auckland Council 2017).



Figure 5-4: Papakura Old Central School (R11/1154) – outside of the proposed designation.



Figure 5-5: Entrance gate to Papakura Old Central School (R11/1154).

5.2.1.2 R12/1159 – Building

An 1886 map (Auckland Libraries Heritage Collections Map 9324) shows a building in this location. No surface remains are present, but subsurface material could remain. This site was recorded by Trilford in 2020 and is now a large modern building occupied by several businesses, entirely surrounded by paved / tar sealed surfaces. No surface evidence of the pre-1900 building was visible, but subsurface material may be present within the proposed designation.

5.2.1.3 R12/1161 – Papakura Library

There is no surface evidence of the Papakura Library, which was recorded by Trilford in 2020 based on its location in a map from 1886 (Auckland Libraries Heritage Collections Map 9324) and is now the location of a WWI Memorial (CHI item 16003) (Figure 5-6). However, the proposed designation does extend into the extent marked on the 1886 map and it is possible that pre-1900 subsurface material is present within the designation (Figure 5-7).



Figure 5-6: Location of Papakura Library (R12/1161), now a war memorial (16003).

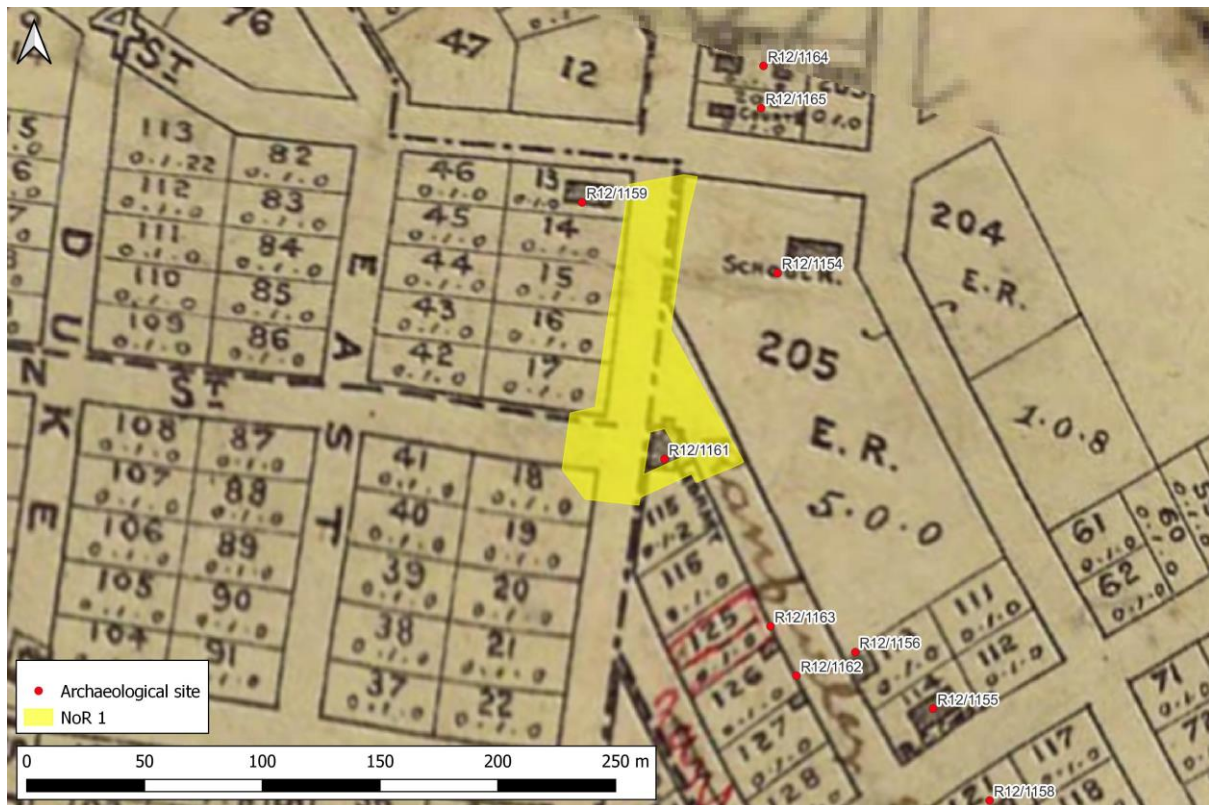


Figure 5-7: Proposed designation for NoR 1 overlain on Map 9324 from 1886, showing extent of library building (R12/1161).

5.2.2 CHI items

5.2.2.1 3048 – Milepost 20

This site was recorded by Sally Burgess in 2000 as the approximate location of milepost 20. In the 1860s, a series of 22 mileposts were constructed along Great South Road to mark the mileage from Auckland to Drury. They were triangular in shape and made from totara. Only 2 mileposts remain standing; these are mileposts 15 and 22, but 15 has been moved from its original position and 22 is suspected to be a later replica. The location of this item is within the proposed designation boundaries, in a grass garden near a copse of trees, though there is no surface evidence of this item.

5.2.2.2 16003 – WWI Memorial (Scheduled extent 02801)

This site is scheduled in the AUP:OP (02801)(Figure 5-8) and the proposed designation extends into the scheduled extent of place, including some of the walls and steps of the monument, indicating there is potential for this item to be impacted by construction works (

Figure 5-9: Map showing proposed extent of NoR 1 encroaching into War Memorial (16003).



Figure 5-8: Papakura / Karaka War Memorial (16003).



Figure 5-9: Map showing proposed extent of NoR 1 encroaching into War Memorial (16003).

5.2.2.3 20290 – Milepost 21

This site was recorded by Burgess in 2000 as the approximate location of milepost 21. The roadside where this milepost was recorded is a landscaped grass berm with footpath and dense planting between the road reserve and adjacent property. There is no surface evidence of this item (Figure 5-10).



Figure 5-10: View of approximate location of Milepost 21 (20290).

5.2.3 AUP:OP scheduled items

5.2.3.1 00706 – Military Milestone Plaque

The AUP:OP lists 00706 as a B category scheduled historic heritage site, located at 312 Great South Road, Papakura. The site has been scheduled as a “military milestone plaque” for its knowledge value. This site is not visible in the Auckland Council Geomaps and no spatial extent has been identified. The address provided is Chisholm’s Corner, where several features were noted during the site survey. There is a prominent man-made mound / hill with a damaged metal flower sculpture (possibly a poppy) atop it, a stone-walled ditch through a second mound with a plaque commemorating Chisholm, the first European land-owner in the area, and a flagpole with a plaque commemorating 50 years of the Rotary club in this area.

Nothing which could be considered a military milestone plaque was identified during the site visit. Looking at historic aerial photos accessed from Retrolens and Auckland Council’s Geomaps, this park was not built until sometime between 1989 and 1996. The plaque for the Rotary flagpole is dated to 1998 and is presumably a slightly later addition. However, it is clear that all features at this park date to the early 1990s at the earliest, and have no historic value.

The park, including the Rotary flagpole / plaque and Chisholm's plaque, is within the designation and likely to be affected by construction, but the features have no heritage value, dating to the 1990s, and could be relocated outside of the designation boundary with no loss of any historic context or value. No military milestone plaque exists within the designation at this location, and it seems that there is an error in the AUP:OP listing. As such, this item is not assessed further.



Figure 5-11: Chisholm's Corner with flower sculpture atop main hill.



Figure 5-12: Plaque at Chisholm's Corner.

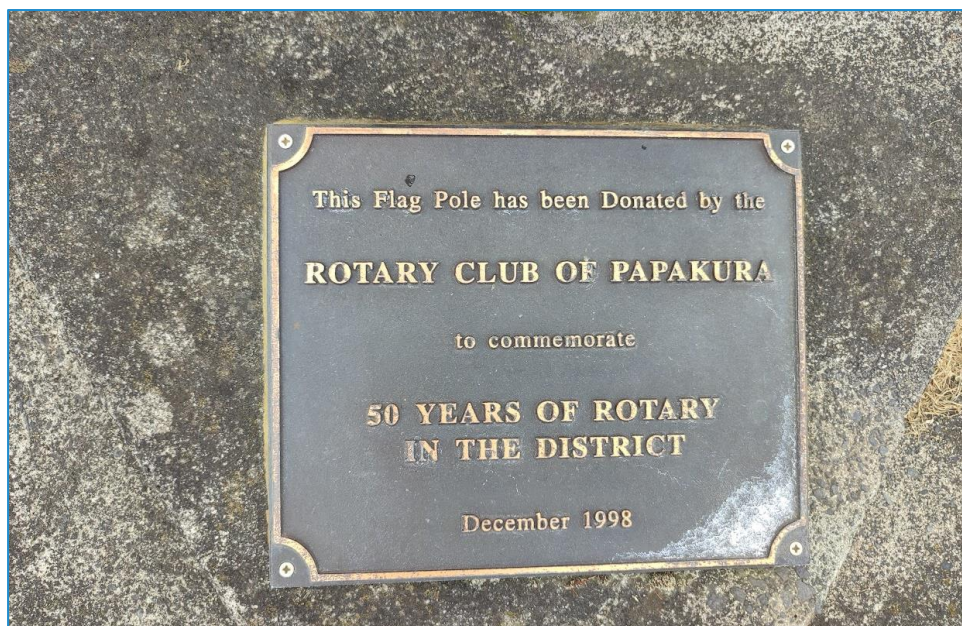


Figure 5-13: Rotary plaque at the flagpole on Chisholm's Corner.

5.2.4 Unrecorded pre-European Māori sites

The proposed designation crosses the Ōtūwairoa / Slippery Creek where a new bridge is required (Figure 5-14 and Figure 5-15). The crossing is immediately west of R12/1132 / Ōpaheke Pā and kāinga, though the proposed designation is separated from the headland by the Hingaia Stream.

It is likely that land use and settlement extended beyond the recorded kāinga and pā, along both the Ōtūwairoa / Slippery Creek and the Hingaia Stream, and it is possible that evidence of this land use remains along the riverbanks and within the proposed designation, where modification (ie. retaining walls around the current bridge abutments) has been limited. If encountered, evidence of this land use would likely be recorded as separate archaeological sites, which could include archaeological features such as, but not limited to, midden, fire features, post holes, and artefactual remains.



Figure 5-14: View east from Slippery Creek overbridge towards wetland area beside stream.



Figure 5-15: Southern abutment of Slippery Creek overbridge showing retaining wall.

5.2.5 Unrecorded built heritage

Three buildings with potential built heritage values were identified during the field survey. While the structures themselves are not within the proposed designation and not subject to any existing statutory protection, the property curtilages will be affected. These buildings are discussed below. Specialist assessment by a built heritage expert may be required for these sites to assess whether the proposed works could impact potential heritage values.

5.2.5.1 355 Great South Road

This is an Art Deco / Moderne style house, now in use as a physiotherapy clinic (Figure 5-16). The Moderne style came into use in New Zealand in the 1930s. It has been very well maintained with the character and style of the house still being very recognisable, with typical features such as the flat roof with parapet, curved stucco walls, and continuous windows flush with the walls. The dark coloured paint is not traditional, as these houses were usually painted bright white or cream (Salmond 1986). This house is visible in historic aerials from 1939 (SN139-36-10). Similar Moderne style buildings along Jervois Road have recently been proposed for scheduling in the AUP:OP (02452).



Figure 5-16: Moderne style house at 355 Great South Road, Papakura.

5.2.5.2 359 Great South Road

This is a Spanish Mission style house (Figure 5-17). The house overall is in relatively good condition, though in need of maintenance, and is largely unmodified from its original appearance. Typical of this style, the house has a plastered exterior, a parapet obscuring the low hipped roof, and decorative half-round Spanish tiles (or the often substituted half drain-pipes) along one edge of the parapet. The house has an arched entrance to the front portico, decorative hooded chimney, and rows of faux beams. The window awnings are a later addition (Salmond 1986). Houses of this style were typically

constructed between 1930 and 1940, and historic aerials show this house being present in 1939 (SN139-36-10). Similar examples of Spanish Mission style houses at 43 and 56 Marsden Avenue, Mount Eden, are scheduled in the AUP:OP as part of historic heritage area 02562.



Figure 5-17: Spanish Mission style house at 359 Great South Road, Papakura.

5.2.5.3 361 Great South Road

This is another Spanish Mission style house (Figure 5-18). The house overall is in reasonable condition, though in need of maintenance. The section of the house shown on the right of Figure 5-18 may be a later addition. Characteristics of this house exhibiting the Spanish Mission style include the stucco exterior, parapet, arched window detailing, and the arched portico entrance with wrought iron gate (Salmond 1986). Houses of this style were typically constructed between 1930 and 1940, and historic aerials show this house being present in 1939 (SN139-36-10).



Figure 5-18: Spanish Mission style house at 361 Great South Road, Papakura.

5.3 Assessment of effects

5.3.1 Positive effects

Although any archaeological or historic heritage sites encountered within the proposed area of works (either known or unknown) are likely to be destroyed, the subsequent investigations undertaken would help provide information about the sites. This information could be presented to the public through interpretive panels or displays.

5.3.2 Adverse construction effects

Three archaeological sites (one of which is also scheduled in the AUP:OP) and three CHI items (one of which is also scheduled in the AUP:OP) have been identified as having potential to be within the proposed designation boundaries. These are a historic building (R12/1159), Papakura Library (R12/1161), Papakura Old Central School (R12/1154; AUP 02830), a WWI memorial (12924; AUP 02801), and two mileposts (3048 and 20290). Three 1930s buildings have also been identified (Section 5.2.5) which are not assessed here but may require further investigation by a built heritage expert.

These sites are assessed below, with sites recorded in the SRS assessed under the criteria set out in HNZPTA (2019) and those recorded in the CHI or scheduled in the AUP:OP assessed under criteria set out in Chapter B.5 of the AUP:OP and the Auckland Council Methodology for Evaluating Historic Heritage Significance (2019).

The following assessments of values and significance relate only to archaeological and historic heritage values. Other interested parties, in particular Manawhenua, may hold different values regarding the sites.

As set out in the AEE, construction activities such as topsoil stripping, pavement removal and other earthworks are anticipated within the designation boundaries. Overall, any remaining archaeological material encountered during construction within the designation boundaries may be destroyed if unable to be preserved or avoided.

5.3.3 Assessment under the HNZPTA

5.3.3.1 R12/1159 – Building

Condition	There is no surviving surface evidence of this building but it is possible that subsurface material remains in situ.
Rarity	Archaeology associated with pre-1900 buildings is not common in this area.
Context	This building was part of the early colonial settlement of Papakura.
Information	Depending on the material retrieved, there is potential to gain information on the use and purpose of this building, methods and styles of construction, and more generally on the colonial history of Papakura.
Amenity	There are no surface remains visible to the public.
Cultural	This is a colonial period site.

5.3.3.2 R12/1161 – Papakura Library

Condition	There is no surviving surface evidence of this building but it is possible that subsurface material remains in situ.
Rarity	Archaeology associated with pre-1900 buildings is not common in this area.
Context	This building was part of the early colonial settlement of Papakura.
Information	Depending on the material retrieved, there is potential to gain information on methods and styles of construction, and more generally on the colonial history of Papakura.
Amenity	There are no surface remains visible to the public.
Cultural	This is a colonial period site.

5.3.3.3 Previously unrecorded pre-European Māori midden/oven

Condition	The condition of any unrecorded sites are unknown, but likely to be entirely subsurface.
Rarity	Surviving evidence of pre-European Māori land-use is rare in this area.
Context	Any unrecorded sites would form part of the archaeological record of the Manukau lowlands and, more specifically, pre-European Māori land-use around the Hingaia and Otūwairoa.

Information	Any unrecorded sites would help to improve knowledge on the distribution of sites in the Manukau lowlands. The most likely type of site to be found would be midden; middens can provide information about the subsistence, resource use, dietary patterns and residential patterns of pre-European Māori populations. If charcoal or other datable material is found within a secure context, it could provide temporal information about the use of the features.
Amenity	The amenity of any unrecorded site is unknown.
Cultural	This assessment refers to potential pre-European Māori sites.

5.3.4 Assessment under AUP:OP Chapter B5

5.3.4.1 Papakura Old Central School (R12/1154; Scheduled heritage extent 2830)

Papakura Old Central School is scheduled as a Category B historic heritage place (item 2830) in the AUP:OP based on its Historical, Social and Aesthetic values. These are described below:

Historical	This site was part of the early colonial settlement of Papakura and the local history of the area, being the first purpose built school in the area in 1877 when it opened. It remained in use through to the 1970s and had various alterations and additions throughout this time, including the 1920s gate and wall which are the only element of this site potentially affected by the Project.
Social	This site is now in use as a community hall and gathering space, with a public park surrounding it. The entrance gates provide access to this community space.
Aesthetic	Though modified over time, the building is well maintained and surrounded by well-kept and landscaped park and infrastructure, acting as a green space within the town. The entrance gate and wall is highly visible from the town centre and acts as a border to this part of the park and wider site, providing architectural detail around the green space.

5.3.4.2 WWI Memorial (CHI 12924; Scheduled heritage extent 2801)

The Papakura WWI Memorial is scheduled as a Category B historic heritage place (item 2801) in the AUP:OP based on its historical, social, physical, aesthetic and context values. These are described below:

Historical	This memorial commemorates contributions from the local community to a part of world history.
Social	This site is a highly visible landmark within the community and is a place of remembrance.
Physical	This site is a highly visible landmark within the community.
Aesthetic	This site is a highly visible landmark within the community with artistic and architectural value.

Context	This site commemorates contributions from the local community to a part of world history and has high contextual values in both a historical sense and in terms of WWI remembrance and ANZAC.
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5.3.4.3 3048 – Milepost 20

Historical	This site is part of the construction and use of Great South Road and has moderate historical value as part of the local history of the area.
Social	This site is not visible to the public and has no social value.
Manawhenua	Only Manawhenua can comment on the value of the site to them.
Knowledge	This site has been destroyed on the surface and there is unlikely to be any subsurface remains to investigate. This site likely has no knowledge value.
Technology	No unique or innovative technological attributes remain at this site. This site has no technology value.
Physical	There are no surface remains at this site. This site likely has no physical value.
Aesthetic	There are no surface remains at this site. This site has no aesthetic value.
Context	This site has low contextual value as part of the construction and use of Great South Road.

This site has moderate value based on its highest value, which is its historical value. Retention of values is desirable but it does not warrant any special protections and any loss of heritage values can be mitigated by archaeological monitoring and the recording, sampling, analysis, and reporting of any materials or features encountered.

5.3.4.4 20290 – Milepost 21

Historical	This site is part of the construction and use of Great South Road and has moderate historical value as part of the local history of the area.
Social	This site is not visible to the public and has no social value.
Manawhenua	Only Manawhenua can comment on the value of the site to them.
Knowledge	This site has been destroyed on the surface and there is unlikely to be any subsurface remains to investigate. This site likely has no knowledge value.
Technology	No unique or innovative technological attributes remain at this site. This site has no technology value.
Physical	There are no surface remains at this site. This site likely has no physical value.
Aesthetic	There are no surface remains at this site. This site has no aesthetic value.
Context	This site has low contextual value as part of the construction and use of Great South Road.

This site has moderate value based on its highest value, which is its historical value. Retention of values is desirable, but it does not warrant any special protections and any loss of heritage values can be mitigated by archaeological monitoring and the recording, sampling, analysis, and reporting of any materials or features encountered.

5.3.5 Adverse operational effects

No operational effects on archaeology or heritage have been identified.

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

As outlined in the Project description (see Section 2), NoR 2 comprises a range of interventions providing for the upgrade of Great South Road in Drury between Waihoehoe Road and the SH1 Drury Interchange. These include road widening to provide four lanes, active mode facilities, and the replacement of the Hingaia Stream bridge.

6.1 Desktop Assessment

Within 200 m of the proposed designation for NoR 2, eight recorded archaeological sites were identified, as well as one item scheduled in the AUP:OP and ten CHI items (Figure 6-1 and Table 6-1). All of these sites are outside of the proposed designation.

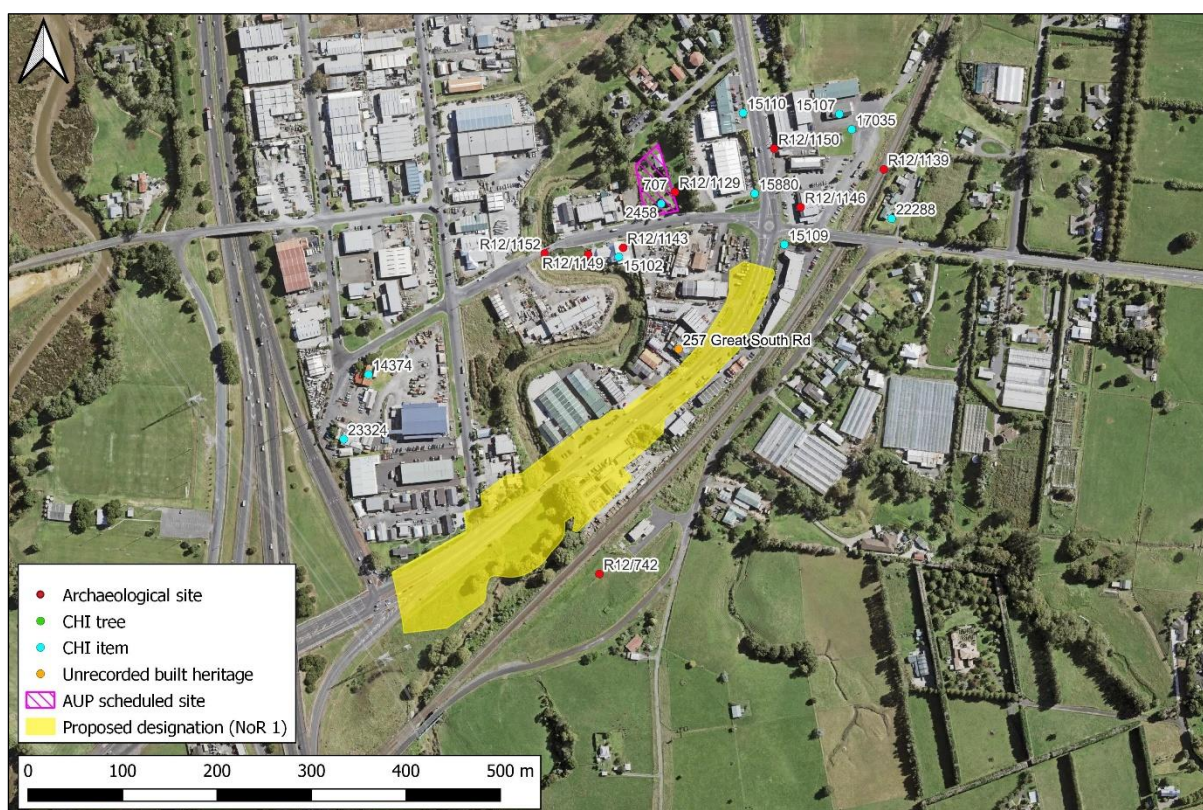


Figure 6-1: Recorded archaeological and heritage sites within 200 m of NoR 2.

Table 6-1: Summary of archaeological and heritage sites at NoR 2

ID	Source	Name / Site Type	Scope
R12/742	NZAA	Drury Railyards	Outside designation
R12/1129	NZAA	Saint John's Anglican Church	Outside designation
R12/1139	NZAA	Drury Railway Station	Outside designation
R12/1143	NZAA	Drury Post Office and Shops	Outside designation

ID	Source	Name / Site Type	Scope
R12/1146	NZAA	Railway Hotel	Outside designation
R12/1149	NZAA	Building	Outside designation
R12/1150	NZAA	Building	Outside designation
R12/1152	NZAA	Bridge	Outside designation
00707	AUP:OP	Saint John's Anglican Church	Outside designation
2458	CHI	Saint John's Anglican Church	Outside designation
14374	CHI	Norrie Street Presbyterian Church	Outside designation
15102	CHI	Drury Cheese and Casein Factory	Outside designation
15107	CHI	Drury Hall	Outside designation
15109	CHI	Drury Commercial Buildings	Outside designation
15110	CHI	Fancombe Parade Shops	Outside designation
15880	CHI	Drury Post Office	Outside designation
17035	CHI	Drury WWI Memorial	Outside designation
22288	CHI	Railway Bungalows	Outside designation
23324	CHI	Drury Manse	Outside designation

6.2 Field Assessment

This NoR is within an industrial area running parallel to the railway line and is bisected by the Hingaia Stream. During desktop research (Section 5.1), no recorded archaeological or heritage sites were found to have potential to be within the proposed designation boundaries. However, during the field assessment a building with possible heritage values was identified in the vicinity of the proposed designation boundaries and is discussed below (Figure 6-2).

6.2.1 Unrecorded pre-European Māori sites

No other archaeological sites were identified during the survey, but there is potential for unrecorded subsurface pre-European Māori archaeology to be present, particularly in close proximity to the Hingaia Stream where there is a section of relatively unmodified land (Figure 6-3

Figure 6-3: View south of Hingaia Stream from the current bridge.

Unrecorded evidence of land use around the Hingaia may include archaeological features such as, but not limited to, midden, fire features, postholes, and artefactual remains.

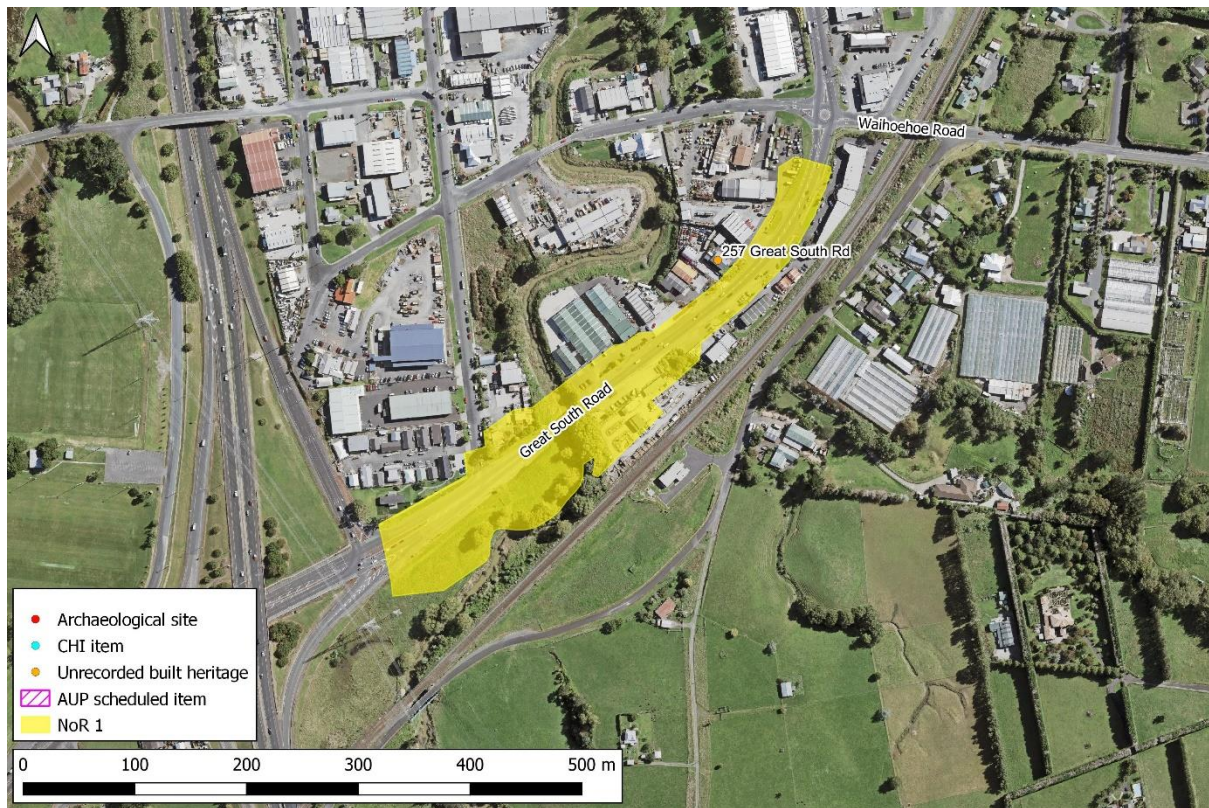


Figure 6-2. Heritage sites assessed at NoR 2.



Figure 6-3: View south of Hingaia Stream from the current bridge.

6.2.2 Unrecorded built heritage

One building with potential built heritage values was identified during the field survey. While the structure itself is not within the proposed designation and not subject to any existing statutory protection, the property curtilage will be affected. Specialist assessment by a built heritage expert may be required for this site.

6.2.2.1 257 Great South Road

This is an example of a Californian / New Zealand Bungalow style house, now in use as a veterinary clinic (Figure 6-4). This style came into use in New Zealand around 1910, persisting in popularity until c.1940. It has been very well maintained with the character and style of the house still being recognisable, with typical features such as the six-light bow window, weatherboard cladding, projecting faux ceiling joists, the louvered square ventilator at the gable, and enclosed brick porch (Salmond 1986). This house is visible in historic aerials from 1942 (SN192-274-18). Examples of similar bungalow style houses which are scheduled include the Lippiatt Road historic heritage area in Otāhuhu (02564), and at Renall Street in Freemans Bay (02512).



Figure 6-4: Bungalow at 257 Great South Road, Drury.

6.3 Assessment of effects

6.3.1 Positive effects

Although any archaeological sites encountered within the proposed area of works (either known or unknown) are likely to be destroyed, the subsequent archaeological investigations undertaken would help provide information about the sites. This information could be presented to the public through interpretive panels or displays.

6.3.2 Adverse construction effects

No previously recorded archaeological or heritage sites have been identified within the proposed designation. However, there is potential for unrecorded pre-European Māori sites to be encountered, particularly around Hingaia Stream. The following assessment of values and significance relates only to archaeological values. Other interested parties, in particular Manawhenua, may hold different values regarding the sites.

A bungalow at 257 Great South Road, Drury, with potential heritage values has also been identified which is not assessed here, but may require further investigation by a built heritage expert.

As set out in the AEE, construction activities such as topsoil stripping, pavement removal and other earthworks are anticipated within the designation boundaries. Overall, any remaining archaeological material encountered during construction within the designation boundaries could be destroyed if unable to be preserved or avoided.

6.3.3 Assessment under the HNZPTA

The following assessment of archaeological values is based on the criteria set out in the HNZPTA (2019).

6.3.3.1 Previously unrecorded pre-European Māori midden/oven

Condition	The condition of any unrecorded sites are unknown, but likely to be entirely subsurface.
Rarity	Surviving evidence of pre-European Māori land-use is rare in this area.
Context	Any unrecorded sites would form part of the archaeological record of the Manukau lowlands and, more specifically, pre-European Māori land-use around the Hingaia.
Information	Any unrecorded sites would help to improve knowledge on the distribution of sites in the Manukau lowlands. The most likely type of site to be found would be midden; middens can provide information about the subsistence, resource use, dietary patterns and residential patterns of pre-European Māori populations. If charcoal or other datable material is found within a secure context, it could provide temporal information about the use of the features.
Amenity	The amenity of any unrecorded site is unknown.
Cultural	This assessment refers to potential pre-European Māori sites.

6.3.4 Adverse operational effects

No operational effects on archaeology and heritage were identified.

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

As outlined in the Project description (see Section 2), NoR 3 comprises a range of interventions providing for the Takaanini FTN route along Weymouth and Alfriston Roads generally between Selwyn Road and Alfriston Park; as well as for the Great South Road FTN route between Alfriston Road and Myers Road. These interventions include road widening to provide for four lanes (general traffic and bus lanes in both directions), active mode facilities, eight intersection upgrades, stormwater treatment wetlands, and replacements of bridges over the NIMT and SH1.

7.1 Desktop Assessment

Within 200m of the proposed designation for NoR 3, one archaeological site, one item scheduled in the AUP:OP, and five items in the CHI were identified (Figure 7-1 and Table 7-1). The AUP:OP scheduled extent and four of the CHI items were determined to be outside of the proposed designation. The remaining three items are discussed below.



Figure 7-1: Recorded archaeological and heritage sites within 200 m of NoR 3.

Table 7-1: Summary of archaeological and heritage sites at NoR 3.

ID	Source	Name / Site Type	Scope
R11/3477	NZAA	Manurewa Railway Station	Assessed further
01451	AUP:OP	Saint Luke's Anglican Church	Outside designation
1987	CHI	Norfolk Pine	Outside designation
3062	CHI	Saint Luke's Anglican Church	Outside designation
12470	CHI	Tyre Ring Platform	Outside designation
12481	CHI	House	Assessed further
20286	CHI	Milepost 16	Outside designation

7.2 Field Assessment

This NoR is within a significantly developed residential area (Figure 7-2). Buildings and modified land are present either side of the road along the entire NoR boundaries. Within 200 m of the proposed designation, one archaeological site, five CHI items and one AUP:OP listed site were identified during desktop research. The majority of the sites were found to be outside of the scope of works, as described in Section 7.1 above.

The archaeological site and one CHI item were identified as having the potential to be within the proposed designation. No further archaeological sites or heritage items were identified during the survey.



Figure 7-2: Heritage items assessed in NoR 3.

7.2.1 Archaeological sites

7.2.1.1 R11/3477 Manurewa Railway Station

This is the original location of the Manurewa Railway Station. The Station opened in 1875 and closed in 1993 (Scoble, 2010). As of 1899, the station was a 4th class station including passenger platform, cart approach, goods shed, loading bank, urinals, stationmasters house, and post office (Scoble, n.d).

No surface evidence of this site remains, but subsurface material may still be present. While the platform itself is outside of the proposed designation, materials from associated station features such as those listed above may be present within the proposed designation.

7.2.2 CHI items

7.2.2.1 12481 – House

This house, at 11 Alfriston Road, was constructed in the 1940s or 1950s and has been listed in the CHI for its use of clay bricks in its construction (Figure 7-3). The house is within the proposed designation and would likely be demolished during construction for the Project.



Figure 7-3: 11 Alfriston Road (12481).

7.3 Assessment of effects

7.3.1 Positive effects

Although any archaeological sites encountered within the proposed area of works (either known or unknown) would likely be modified or destroyed, the subsequent archaeological investigations undertaken would help provide information about the sites. This information could be presented to the public through interpretive panels or displays.

7.3.2 Adverse construction effects

One archaeological site (R11/3477) and one CHI item (12481) were identified within the proposed designation. These sites are assessed below under the HNZPTA and the AUP:OP, Chapter B5, respectively. The following assessments of values and significance relate only to archaeological values. Other interested parties, in particular Manawhenua, may hold different values regarding the sites. It is recommended that further assessment of the house (12481) be undertaken by a built heritage expert.

As set out in the AEE, construction activities such as topsoil stripping, pavement removal and other earthworks are anticipated within the designation boundaries. Overall, any remaining archaeological material encountered during construction within the designation boundaries could be destroyed if unable to be preserved or avoided.

7.3.3 Assessment under the HNZPTA

The following assessment of archaeological values is based on the criteria set out in the HNZPTA (2019).

7.3.3.1 R11/3477 Manurewa Railway Station

Condition	All surface evidence has been destroyed but subsurface material may be present, though the condition of any subsurface material is unknown.
Rarity	Evidence related to pre-1900 railway stations in Auckland is not common. Any archaeological evidence related to the original station would be relatively uncommon.
Context	This site should be considered as having high contextual values, as it relates to the construction and development of the railway lines in Auckland, which are still in operation, and the pre-1900 railway industry.
Information	This site could provide information regarding the design and construction processes, as well as the use, of railway stations from the 1880s onwards. The station grew over time and different features from this site would show how the station grew and changed to cope with the needs of the surrounding settlers and industries, including the need to accommodate passengers and stock, and to be able to store and move goods.
Amenity	There is no visible surface evidence and this site is unlikely to have amenity values.
Cultural	This assessment refers to a colonial era site.

7.3.4 Assessment under AUP:OP Chapter B5

The following assessments of values follow the Auckland Council Methodology for Evaluating Historic Heritage Significance (2019).

7.3.4.1 12481 – House

Historical	This house was built in the 1940s or 1950s and has no historical value.
Social	This site is a private residence and has no association to any particular community or cultural group. This site has little to no social value.
Manawhenua	Only Manawhenua can comment on the value of the site to them.
Knowledge	This site appears to be in relatively original condition, though bricks have been painted, and is of relatively modern construction, therefore having low knowledge value.
Technology	No unique or innovative technological attributes remain at this site. This site has no technology value.
Physical	This site is an example of the use of clay bricks in construction but is not rare or unique, being a relatively recent construction (1940s or 1950s). This site has low physical value.

Aesthetic	This site is not notable or distinctive for its visual qualities. This site has no aesthetic value.
Context	This site does not contribute to the wider historical or cultural context of the community and has no contextual value.

This site has low values based on its highest values, which are its knowledge and physical values. Retention of values is desirable, but it does not warrant any special protections and any loss of heritage values can be mitigated by archaeological monitoring and the recording, sampling, analysis, and reporting of any materials or features encountered.

7.3.5 Adverse operational effects

No operational effects on archaeology and heritage have been identified.

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

As outlined in the Project description (see Section 2), NoR 4 comprises a range of interventions 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 Mill Road. These interventions provide for the urbanisation of both corridors, with two traffic lanes, widening for active mode facilities, seven intersection upgrades, and stormwater treatment wetlands.

8.1 Desktop Assessment

Within 200m of the proposed designation for NoR 4, two archaeological sites were identified, all of which have potential to be within the proposed designation (Figure 8-1 and Table 8-1). These are discussed in more detail below.



Figure 8-1: Archaeological and heritage sites within 200 m of NoR 4.

Table 8-1: Summary of archaeological and heritage sites at NoR 4.

ID	Source	Name / Site Type	Scope
R11/2077	NZAA	Gorrie McInnes Homestead	Assessed further
R11/2078	NZAA	John de Carteret Flax Mill	Assessed further

8.2 Field Assessment

This NoR is in a less developed area, with rural residential land remaining to the east, and dense residential lots in the west and south. This NoR crosses the Papakura Stream midway down.

During desktop research (Section 8.1), two archaeological sites were found to have potential to be within the proposed designation boundaries, and these locations were inspected during the field assessment from the roadside (Figure 8-1). In addition to these sites, two buildings with possible heritage values were identified during the field survey in the vicinity of the proposed designation boundaries and are discussed below. No other archaeological sites were identified during the survey, but there is potential for unrecorded subsurface archaeology to be present across the NoR, particularly north of Popes Road, where the land is less developed and in close proximity to the Papakura Stream.

8.2.1 Archaeological sites

8.2.1.1 R11/2077 – Gorrie McInnes Homestead

An attempt was made to view this site from the roadside but it was not visible. This homestead was built in the early 20th century and is not protected under the HNZPT. There is potential for some subsurface material such as household or farming items to be present within the proposed designation, though the house itself is outside of the designation boundaries.

8.2.1.2 R11/2078 – John de Carteret Flax Mill

The exact location of this site is not clear, but was located near the corner of Alfriston and Porchester Roads. There has been significant development of this area, including the removal / alteration of numerous tributaries of the Papakura Stream which are visible cross cutting this entire area in 1939 aerials (Figure 8-2). One of these tributaries cuts directly through the Alfriston and Porchester Road intersection, following along Porchester Road for a distance and may have been the stream used by the mill. If so, there has been significant modification and destruction around the site.

However, it is possible that materials related to use of the mill, or building materials from the mill, could be present subsurface and be within the proposed designation boundaries.



Figure 8-2: General location of John de Carteret Flax Mill (R11/2076) and 1939 streams.

8.2.2 Unrecorded pre-European Māori sites

The proposed designation crosses the Papakura Stream and passes through land which is less developed than much of the Project area. It is possible that evidence of land use and settlement remains near the historic riverbanks and within the proposed designation, where modification has been limited. If encountered, evidence of this land use would be identified as a new archaeological site, which could include archaeological features such as, but not limited to, midden, fire features, post holes, and artefactual remains.

8.2.3 Unrecorded built heritage

Two buildings with potential built heritage values were identified during the field survey. While the structures are not within the proposed designation boundaries and not subject to existing statutory protection, the property frontages may be affected. Specialist assessment by a built heritage expert may be required for these sites.

8.2.3.1 279 Porchester Road

This house exhibits some features characteristic of a Californian / New Zealand Bungalow style house, though is not a traditional example. This style came into use in New Zealand around 1910, persisting in popularity until c.1940. The house is in reasonable condition, though in need of maintenance. Typical features of this style represented include the tapered piers or pylons supporting the porch roof, the slightly scalloped bargeboards on the porch roof, the casement and fanlight windows with coloured leadlight glass, which is also present in the fixed window beside the front door, and the bay window on the side of the house (Salmond 1986). This house is visible in historic aerials from 1939 (SN139-35-8).



Figure 8-3: Bungalow at 279 Porchester Road.

8.2.3.2 281 Porchester Road

This house is visible in historic aerials from 1939 (SN139-35-8) but does not immediately appear to be representative of a particular style. The house is in need of maintenance, with degradation of cladding and rotting of window frames, and appears to have undergone some degree of modification over time.



Figure 8-4: House at 281 Porchester Road.

8.3 Assessment of effects

8.3.1 Positive effects

Although any archaeological sites encountered within the proposed area of works (either known or unknown) would likely be destroyed, the subsequent archaeological investigations undertaken would help provide information about the sites. This information could be presented to the public through interpretive panels or displays.

8.3.2 Adverse construction effects

Two archaeological sites have been identified as having potential to be within the proposed designation boundaries. These are two are the flax mill (R11/2078) and homestead (R11/2077). These sites are assessed below, with the pre-1900 site recorded in the SRS assessed under the HNZPTA and the post-1900 site under the AUP:OP, Chapter B5. The following assessments of values and significance relate only to archaeological values. Other interested parties, in particular Manawhenua, may hold different values regarding the sites.

Two 1930s buildings have also been identified (Section 8.2.3) which are not assessed here but may require further investigation by a built heritage expert.

As set out in the AEE, construction activities such as topsoil stripping, pavement removal and other earthworks are anticipated within the designation boundaries. Overall, any remaining archaeological material encountered during construction within the designation boundaries could be destroyed if unable to be preserved or avoided.

8.3.3 Assessment under the HNZPTA

The following assessment of archaeological values is based on the criteria set out in the HNZPTA (2019).

8.3.3.1 R11/2078 – John de Carteret Flax Mill

Condition	Surface evidence of this site has been destroyed but subsurface material may still be present.
Rarity	Physical remains from mill sites are very uncommon locally.
Context	This site is part of the early colonial history, industry, and settlement of Manurewa.
Information	This site has potential to inform on the land-use and lifestyle of colonial settlers in the area as well as the milling industry.
Amenity	This site is on a private property.
Cultural	This is a colonial era site.

8.3.3.2 Previously unrecorded pre-European Māori midden/oven sites

Condition	The condition of any unrecorded sites are unknown, but likely to be entirely subsurface.
Rarity	Surviving evidence of pre-European Māori land-use is rare in this area.
Context	Any unrecorded sites would form part of the archaeological record of the Manukau lowlands and, more specifically, pre-European Māori land-use around the Papakura Stream.
Information	Any unrecorded sites would help to improve knowledge on the distribution of sites in the Manukau lowlands. The most likely type of site to be found would be midden; middens can provide information about the subsistence, resource use, dietary patterns and residential patterns of pre-European Māori populations. If charcoal or other datable material is found within a secure context, it could provide temporal information about the use of the features.
Amenity	The amenity of any unrecorded site is unknown.
Cultural	This assessment refers to potential pre-European Māori sites.

8.3.4 Assessment under AUP:OP Chapter B5

The following assessments of values follow the Auckland Council Methodology for Evaluating Historic Heritage Significance (2019). While site R11/2077 is listed in the NZAA SRS, as a pre-1900 site it is not legally protected under the HNZPTA and is thus assessed under the AUP:OP, Chapter B5.

8.3.4.1 R11/2077 – Gorrie McInnes Homestead

Historical	This site is part of the early 20 th century settlement and history of Takaanini. This site has moderate historical value.
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Social	This site is not visible to the public and has no social value.
Manawhenua	Only Manawhenua can comment on the value of the site to them.
Knowledge	There is potential for the site to inform on early 20 th century construction and land-use. This site has moderate knowledge value.
Technology	There are unlikely to be any unique technological attributes at this site. This site likely has no technology value.
Physical	The physical condition, style, and quality of this site is unknown. The physical value of this site is unknown.
Aesthetic	The visual condition of this site is unknown. The aesthetic value of this site is unknown.
Context	This site has moderate contextual value as part of the historic settlement of Takaanini.

This site has moderate values based on its highest values, which are its historical, knowledge, and context values and does not meet the criteria for scheduling. Retention of values is desirable but it does not warrant any special protections and any loss of heritage values can be mitigated by archaeological monitoring and the recording, sampling, analysis, and reporting of any materials or features encountered.

8.3.5 Adverse operational effects

No operational effects on archaeology and heritage have been identified.

9 Recommended measures to avoid, remedy, or mitigate construction effects

The following recommendations are made on the basis of the archaeological values that have been outlined above. Any other values associated with special interest groups, including Manawhenua, can only be determined by them. It is recommended that:

- An authority to destroy, damage or modify recorded (R11/2078, R11/3477, R12/1154, R12/1159, R12/1161) and previously unrecorded archaeological sites that may be encountered within the identified works areas be applied for from HNZPT under Section 45 of the HNZPTA (note that this is a legal requirement);
- A HHMP 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. The HHMP would be developed during the outline plan phase of this project in conjunction with Manawhenua, Auckland Council and Heritage New Zealand;
- No authority should be applied for without consultation with the appropriate Manawhenua authorities; evidence of consultation, and views expressed, will be required by HNZPT, and will be taken into account when making a decision about the granting of the authority;
- Appropriate tikanga (protocols) should be followed during works – Manawhenua may make recommendations outlining these;
- 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; and
- It is also recommended 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]).

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.

10 Conclusion

Across the Project area, 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.

All works should be undertaken under an archaeological authority obtained from HNZPT and should be guided by a HHMP. Where there is heightened risk of encountering archaeology or post-1900 heritage, archaeological monitoring should take place. Any archaeological or heritage material identified during works should be investigated, recorded, sampled and analysed as relevant, following archaeological best practice.

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.

Table 10-1: Summary of sites with potential to be affected.

NoR	ID	Source	Name / Site Type	Possible effects	Recommendations
NoRs 1, 2, 4	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.	Archaeological authority and monitoring, management under HHMP
NoR 1	R12/1154 (02830)	NZAA (AUP:OP)	Papakura Old Central School	1920s stone gate has potential to be destroyed.	Monitoring, management with HHMP
NoR 1	R12/1159	NZAA	Building	Possible subsurface material to be encountered and removed / destroyed.	Archaeological authority and monitoring, management with HHMP
NoR 1	R12/1161	NZAA	Papakura Library	Possible subsurface material to be encountered and removed / destroyed.	Archaeological authority and monitoring, management with HHMP

NoR	ID	Source	Name / Site Type	Possible effects	Recommendations
NoR 1	3048	CHI	Milepost 20	Low possibility for some subsurface material to be encountered and removed.	Monitoring, management with HHMP
NoR 1	12924 (02801)	CHI (AUP:OP)	WWI Memorial	Modifications to edges of memorial structure.	Monitoring, management with HHMP
NoR 1	20290	CHI	Milepost 21	Low possibility for some subsurface material to be encountered and removed.	Monitoring, management with HHMP
NoR 1	355 Great South Road	Field visit	Moderne style house	Building avoided, possible effects to context / frontage.	Further assessment by built heritage specialist
NoR 1	359 Great South Road	Field visit	Spanish Mission style house	Building avoided, possible effects to context / frontage.	Further assessment by built heritage specialist
NoR 1	361 Great South Road	Field visit	Spanish Mission style house	Building avoided, possible effects to context / frontage.	Further assessment by built heritage specialist
NoR 2	257 Great South Road	Field visit	Bungalow	Building avoided, possible effects to context / frontage.	Further assessment by built heritage specialist
NoR 3	R11/3477	NZAA	Manurewa Railway Station	Possibility for subsurface material related to station to be encountered and removed.	Archaeological authority and monitoring, management with HHMP
NoR 3	12481	CHI	11 Alfriston Road	Building is within the proposed designation and would be destroyed by construction.	Further assessment by built heritage specialist
NoR 4	R11/2077	NZAA	Gorrie McInnes Homestead	Possible subsurface material to be encountered and	Monitoring, management under HHMP

NoR	ID	Source	Name / Site Type	Possible effects	Recommendations
				removed / destroyed.	
NoR 4	R11/2078	NZAA	John de Carteret Flax Mill	Possible subsurface material to be encountered and removed / destroyed.	Archaeological authority and monitoring, management with HHMP
NoR 4	279 Porchester Road	Field visit	Bungalow	Building avoided, possible effects to context / frontage.	Further assessment by built heritage specialist
NoR 4	281 Porchester Road	Field visit	House	Building avoided, possible effects to context / frontage.	Further assessment by built heritage specialist

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VOLUME 4

South Frequent Transit Network Assessment of Construction Noise and Vibration Effects

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Version 1.0

Document Status

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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
AC	Auckland Council
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan Operative in Part
BS	British Standard
CNVMP	Construction Noise and Vibration Management Plan
FTN	Frequent Transit Network
MDRS	Medium Density Residential Standards
NIMT	North Island Main Trunk
NoR	Notice of Requirement (under the Resource Management Act 1991)
NoR 1	Great South Road FTN Upgrade
NoR 2	Great South Road Upgrade (Drury section)
NoR 3	Takaanini FTN – Weymouth, Alfriston, and Great South Road Upgrades
NoR 4	Takaanini FTN – Porchester Road and Popes Road Upgrades
NPS-UD	National Policy Statement on Urban Development
PC78	Plan Change 78 to the Auckland Unitary Plan: Operative in Part
PPV	Peak Particle Velocity
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).
RMA	Resource Management Act 1991
Schedules	Site Specific or Activity Specific Construction Noise and Vibration Management Schedules
SH1	State Highway 1

Acronym/Term	Description
South FTN	South Frequent Transit Network

Executive Summary

This report assesses the construction noise and vibration from the four proposed Notices of Requirement (**NoRs / the Project**) for the South Frequent Transit Network (**South FTN**) against relevant standards and guidelines. Where necessary, we have investigated and recommended mitigation.

Construction noise and vibration can be mitigated and managed through the Construction Noise and Vibration Management Plan (**CNVMP**) proposed in the designation conditions to generally comply with the applicable noise and vibration criteria across all NoRs. Exceedances of the criteria could occur intermittently over a short duration if high noise or vibration generating equipment is used adjacent to occupied buildings. 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 site specific or activity specific construction noise and vibration management schedules (**Schedules**).

The construction boundary is assumed to be at the edge of the proposed alignment.

NoR 1 – Great South Road FTN Upgrade

The Great South Road Intersections cover eight intersection upgrades and the replacement of the Otūwairoa / Slippery Creek bridge for the Great South Road FTN route between Manukau and Drury.

The closest existing receivers are approximately 2m away from the construction boundary. With mitigation in place, the most affected receivers could still receive intermittent noise levels up to 90 dB L_{Aeq} when works are immediately adjacent. However, 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, mitigated noise levels can comply with the 70 dB L_{Aeq} noise criterion for most of the construction works.

74 existing dwellings and 14 commercial type buildings may experience vibration levels above 5mm/s Peak Particle Velocity (**PPV**), exceeding the daytime Category B criterion, if the roller compactor is used on the construction boundary in the closest position to them. Mitigation, such as the use of non-vibratory compaction equipment within 8m of buildings, is recommended to avoid potential cosmetic damage.

NoR 2 – Great South Road Upgrade (Drury section)

The Great South Road (Drury section) upgrades between Waihoehoe Road and SH1 Drury Interchange include widening lanes, constructing active mode facilities, and the replacement of the Hingaia Stream bridge. The construction area will be adjacent to both the Business – Light Industry Zone and the Business – Metropolitan Centre Zone. Construction noise received in the Business – Metropolitan Centre Zone is subject to less stringent daytime noise criteria compared to noise received in all other zones.

The closest receivers are located approximately 4m away from the construction boundary. With mitigation in place, the most affected receivers could still receive intermittent noise levels of up to 85 dB L_{Aeq} when works are immediately adjacent. However, 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, mitigated noise levels can comply with the 70 dB L_{Aeq} noise criterion for most of the construction works.

One commercial type building may experience vibration levels above the daytime Category B criterion if the roller compactor is used on the construction boundary in the closest position to them. Mitigation, such as the use of non-vibratory compaction equipment within 8m of buildings, is recommended to achieve compliance.

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

The Alfriston Road upgrades along Weymouth Road and Alfriston Road, and between Alfriston Road and Myers Road include road widening, construction of active mode facilities, intersection upgrades, and stormwater treatment wetlands, and replacement of bridges over the North Island Main Trunk (NIMT) and State Highway 1 (SH1).

The closest receivers are located approximately 2m away from the construction boundary. With mitigation in place, the most affected receivers could still receive intermittent noise levels of up to 90 dB L_{Aeq} when works are immediately adjacent. However, 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, mitigated noise levels can comply with the 70 dB L_{Aeq} noise criterion for most of the construction works.

76 existing dwellings and 12 commercial type buildings may experience vibration levels above the daytime Category B criteria if the roller compactor is used on the construction boundary in the closest position to them. Mitigation, such as the use of non-vibratory compaction equipment within 8m of buildings, is recommended to avoid potential cosmetic damage.

NoR 4 – Takaanini FTN – Porchester and Popes Road Upgrades

The Porchester Road and Popes Road upgrades include widening of roads for active mode facilities, seven intersection upgrades, and stormwater treatment wetlands.

The closest receivers are located approximately 2m away from the construction boundary. With mitigation in place, the most affected receivers could still receive intermittent noise levels of up to 90 dB L_{Aeq} when works are immediately adjacent. However, 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, mitigated noise levels can comply with the 70 dB L_{Aeq} noise criterion for most of the construction works.

98 existing dwellings and one commercial type building may experience vibration levels above the daytime Category B criteria if the roller compactor is used on the construction boundary in the closest position to them. Mitigation, such as the use of non-vibratory compaction equipment within 8m of buildings, is recommended to avoid potential cosmetic damage.

1 Introduction

1.1 Purpose and scope of this report

This report has been prepared to inform the Assessment of Effects on the Environment (**AEE**) for Notices of Requirement (**NoR**) being sought by Auckland Transport (**AT**) for the South Frequent Transit Network (**FTN**) under the Resource Management Act 1991 (**RMA**). 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 report as the **Project**.

Specifically, this report considers the actual and potential effects associated with the construction and operation of the Project on the existing and likely future environment as it relates to construction noise and vibration effects and recommends measures that may be implemented to avoid, remedy and/or mitigate these effects.

This report should be read alongside the AEE, which contains further details on the history and context of the Project. The AEE also contains a detailed description of works to be authorised within the NoR, and the typical construction methodologies that will be used to implement this work. These have been reviewed by the author of this report and have been considered as part of this assessment of construction noise and vibration effects. As such, they are not repeated here. Where a description of an activity is necessary to understand the potential effects, it has been included in this report for clarity.

New designations are sought for each of the four described NoR areas. This report only considers noise and vibration effects resulting from construction activities within each of the NoRs. It is anticipated that construction activities required for works located outside the NoRs, if necessary, will be consented as a part of a separate authorisation process. Operational noise effects are addressed in the separate Traffic Noise Assessment.

1.2 Report Structure

In order to provide a clear assessment of the NoRs, this report follows as appropriate, the structure set out in the AEE. This report contains an assessment of the actual and potential effects of the Project as a whole (the four NoRs). Where appropriate, measures to avoid, remedy or mitigate effects are recommended. The sections of this report are arranged accordingly. Table 1-1 below provides an overview of the report structure and where the description of effects can be found in this report.

The report follows a nested structure where each of the four proposed NoRs is assessed.

Table 1-1: Report Structure

Report Section #	Extent Assessed (Route and/or NoR)
6	All NoRs
7	NoR 1 – Great South Road FTN Upgrade
8	NoR 2 – Great South Road Upgrade (Drury section)
9	NoR 3 – Takaanini FTN – Weymouth, Alfriston, and Great South Road Upgrades

Report Section #	Extent Assessed (Route and/or NoR)
10	NoR 4 – Takaanini FTN – Porchester Road and Popes Road Upgrades

1.3 Preparation for this report

Work undertaken for this report commenced in July 2023. In summary, the preparation for this report has included:

- Review of information from other experts, namely traffic, construction, design and planning amongst others;
- A site visit of all NoRs on 17th July 2023; and
- Ambient noise level surveys in the Project areas (refer Section 5.2).

Where information we relied on was provided by other experts, this is noted in the report.

2 Project Description

2.1 Context – South FTN Network

As described further in the AEE, the South FTN is one of the transport works packages proposed for South Auckland between Manukau and Drury as part of Te Tupu Ngātahi Supporting Growth (**Te Tupu Ngātahi**) programme.¹ The South FTN is in turn part of a wider planned multi-modal transport network intended to support growth and enable mode shift in South Auckland.

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 FTN² bus services 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
- Urbanisation of adjoining key connections to FTN routes – Popes Road West, and the Drury section of Great South Road between Waihoehoe Road and SH1.

The total extent of the South FTN network is shown in Figure 2-1.

2.2 The NoRs – proposed spatial extent

Of the full South FTN network extent shown in Figure 2-1, only a portion falls within the NoRs/Project (see Figure 2-2). 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 designations³.

Accordingly, this assessment is focussed on the activities proposed to be authorised by the four NoRs. 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 2-1, and the extents are shown in Figure 2-2.

Further detail on the proposed activities and works in each NoR are provided in the AEE.

¹ The Programme is a collaboration between Auckland Transport (**AT**) and Waka Kotahi NZ Transport Agency (**Waka Kotahi**) to investigate, plan, and undertake route protection for the strategic transport networks needed to support Auckland's growth over the next 30 years.

² FTN services are defined in AT's Regional Public Transport Plan (RPTP) as bus routes operating at least every 15 minutes between 7am-7pm, 7 days-a-week, often supported by priority measures such as bus or transit lanes.

³ 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.

Table 2-1: South FTN – Summary of NoRs

NoR reference	Project component	Description
NoR 1	Great South Road FTN Upgrade	<ul style="list-style-type: none"> 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 2-2) 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)	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 NIMT and Alfriston Road over SH1, and stormwater management devices.
NoR 4	Takaanini FTN – Porchester Road and Popes Road Upgrade	<ul style="list-style-type: none"> 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.

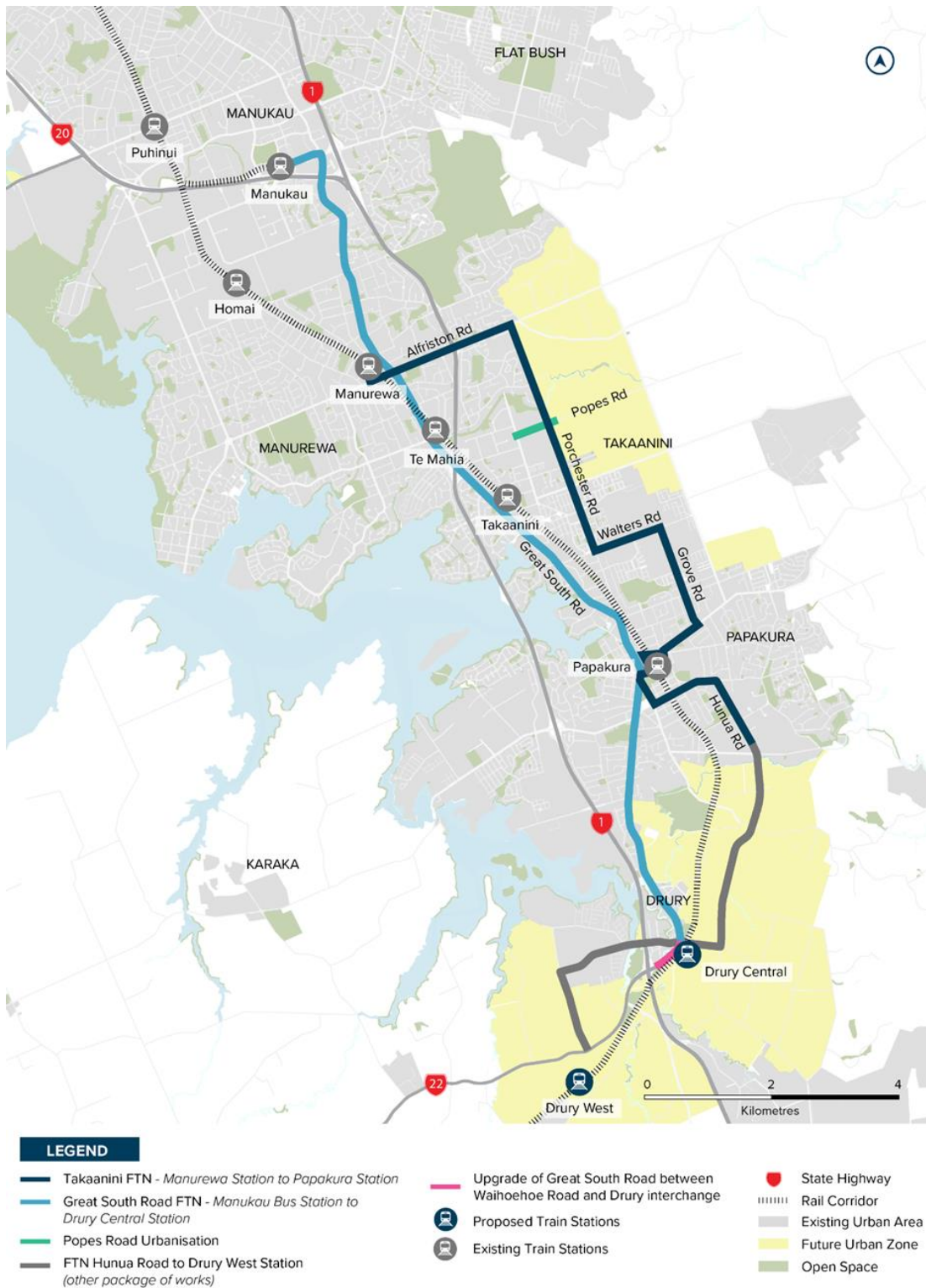


Figure 2-1: South FTN – full network extent



Figure 2-2: South FTN – NoR extents (the Project)

3 Assessment criteria

3.1 Construction noise

3.1.1 Criteria

The following guidelines and standards have been reviewed for the assessment of construction noise:

- Auckland Unitary Plan: Operative in Part (**AUP:OP**), specifically rules E25.6.27 (relating to construction noise in all zones except the City Centre and Metropolitan Centre zones), E.25.6.28 (relating to construction noise in the Business – Metropolitan Centre Zone), and E25.6.29 (relating to construction noise in the road corridor); and
- NZS 6803:1999 Acoustics – Construction Noise.

Table 3-1 and Table 3-2 below set out the recommended construction noise criteria for works in all zones except the Business – Metropolitan Centre zone. These criteria align with the long duration (more than 20 weeks) noise criteria of NZS 6803, and largely reflect the AUP:OP criteria.

Table 3-1: Construction noise criteria for occupied sensitive receivers

Day of the week	Time period	Noise level >20 weeks	
		dB L _{Aeq}	dB L _{Amax}
Weekdays	6:30 – 7:30	55	75
	7:30 – 18:00	70	85
	18:00 – 20:00	65	80
	20:00 – 06:30	45	75
Saturdays	6:30 – 7:30	45	75
	7:30 – 18:00	70	85
	18:00 – 20:00	45	75
	20:00 – 06:30	45	75
Sunday and public holidays	6:30 – 7:30	45	75
	7:30 – 18:00	55	85
	18:00 – 20:00	45	75
	20:00 – 06:30	45	75

Table 3-2: Construction noise criteria for all other occupied receivers

Time period	Noise level dB L _{Aeq} >20 weeks
07:30 – 18:00	70
18:00 – 07:30	75

There is a section of land in the Business – Metropolitan Centre zone south of Great South Road along NoR 2. Table 3-3 sets out the recommended noise criteria for construction noise received in this zone. These criteria are in line with Rule E25.6.28 from the AUP:OP.

Table 3-3: Construction noise criteria in the Business - Metropolitan Centre zone (NoR 2 south of Great South Road)

Time period	Noise level (works greater than 15 consecutive calendar days)	
	dB L _{Aeq} (30 mins)	dB L _{AFmax}
Monday to Friday, 6:30am – 10:30pm	75	90
Saturday, 7:00am – 11:00pm	80	90
Sunday, 9:00am – 7:00pm	65	85
All other times (night-time)	60	75

Figure 3-1 shows the extent of the Business – Metropolitan Centre zone south of NoR 2.

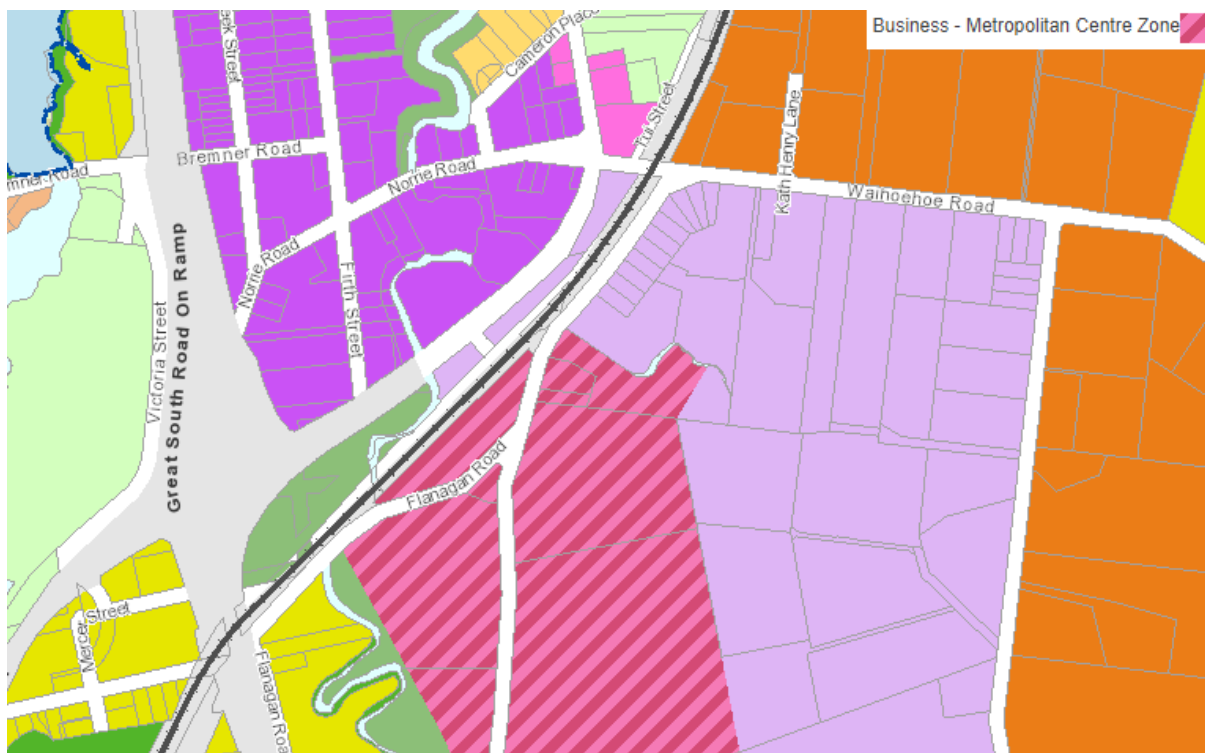


Figure 3-1: Extent of Business - Metropolitan Centre zone south of NoR 2

3.1.2 Exceedance of criteria

During construction some activities will likely occur close to buildings. In some instances, there is the potential for noise levels to exceed the recommended construction noise standards. For most large-scale construction projects, exceedances of the construction noise standards for brief periods of time are common, and management will ensure that effects are reasonable.

NZS 6803 anticipates that at times construction noise cannot be made to comply with the recommended criteria. Statements such as “*construction noise from any site should not generally exceed the numerical noise limits*”⁴ suggest that intermittent exceedances are not unreasonable, as long as the Best Practicable Option (**BPO**) has been applied to the management and mitigation of that construction noise.

The AUP:OP in its Objectives and Policies also appropriately anticipates exceedances from construction noise and states:

“(4) Construction activities that cannot meet the noise and vibration standards are enabled while controlling duration, frequency and timing to manage adverse effects.”

and

“(10) Avoid, remedy or mitigate the adverse effects of noise and vibration from construction, maintenance and demolition activities while having regard to:

[...]

The practicability of complying with permitted noise and vibration standards.”

Whether the duration of a construction activity that exceeds the standards can be considered reasonable, depends on site specific circumstances, and may vary from site to site and activity to activity. For instance, where daytime noise standards are exceeded for several days, but neighbouring residents are not at home, no one would be affected and therefore mitigation may not be required beyond communication with the residents.

If night-time works occur, these will likely only happen for a few nights in any one location. In that instance, this may be acceptable if residents have been informed and a clear timeframe has been provided. However, if night-time works are expected to be ongoing for several consecutive nights, and at a noise level that affects residents’ ability to sleep, then alternative strategies may need to be implemented, such as offering temporary relocation for those affected residents.

3.2 Construction Vibration

The main objective of controlling construction vibration is to avoid vibration-related damage to buildings, structures, and services, in the vicinity of the works. Any adverse effects of construction vibration on human comfort would typically only be experienced for short durations, for most types of construction work.

It should be noted that the level of vibration perceived by humans, and the level of vibration that is likely to result in annoyance for some people, are magnitudes lower than the level of vibration capable of damaging structures. This means that vibration levels which readily comply with the building damage criteria will likely cause annoyance and adverse reaction from building occupants who mistakenly believe that their building is sustaining damage.

The following guidelines and standards have been reviewed for the assessment of construction vibration:

⁴ NZS 6803:1999 Acoustics – Construction Noise, Section 7.1.2.

- AUP:OP rule E25.6.30 relating to construction vibration, amenity and avoidance of any damage to buildings;
- German Standard DIN 4150-3 (1999) Structural vibration – Part 3 Effects of vibration on structures; and
- British Standard (**BS**) 5228-2: 2009 “Code of practice for noise and vibration control on construction and open sites”.

Rule E25.6.30 of the AUP:OP relates to construction vibration and contains criteria for both building damage and amenity. The building vibration criteria are based on the German Standard DIN 4150-3:1999 "Structural Vibration - Part 3: Effects of Vibration on Structures". This Standard is conservative and designed to avoid all (including cosmetic) damage to buildings. Significantly higher limits would be applied if damage to structural foundations was the only consideration.

The amenity criteria act as trigger levels for consultation and communication.

Table 3-4 below shows the recommended vibration criteria for all NoRs. These criteria are based on the AUP:OP.

Table 3-4: Vibration limits at all buildings

Receiver	Details	Category A	Category B
Occupied activities sensitive to noise	Night-time 2000h-0630h	0.3 mm/s PPV	2mm/s PPV
	Daytime 0630h-2000h	2mm/s PPV	5mm/s PPV
Other occupied buildings	Daytime 0630h-2000h	2mm/s PPV	5mm/s PPV
All other buildings	At all times	Tables 1 and 3 of DIN4150-3:1999	

The two category criteria are to facilitate a progressive management response to the increasing risks and effects during construction.

Category A sets the criteria for the amenity effects where vibrations may be perceived by occupants within a building and is an indicator of when communication and consultations should be initiated to manage effects. The Category A criteria aim to generally avoid annoyance of building occupants.

If the Category A criteria cannot be practicably achieved, the focus shifts to avoiding building damage rather than avoiding annoyance by applying the Category B criteria. Building damage is unlikely to occur if the Category B criteria are complied with. If predictions indicate that the Category B criteria may be exceeded, building condition surveys must be carried out prior to works commencing and vibration monitoring must be carried out during the works. This allows an assessment of and response to any effects on buildings.

4 Assessment Methodology

A consistent approach has been adopted for the Project as set out in this section. Any buildings within the proposed designation footprint are assumed to be removed, as confirmed by the Project Team, and are not assessed.

Construction noise setback distances and vibration emission radii have been determined (based on assumptions of construction activities and equipment) for each of the NoRs.

The construction boundary is assumed to be the edge of the proposed alignment. Affected receivers have been identified using construction noise setback distances and vibration emission radii. The construction noise setback distances and vibration emission radii were used to determine where any potential construction noise and vibration exceedances of the relevant criteria could occur. Potential effects of construction noise and vibration have then been assessed and construction management and mitigation measures identified where appropriate. To avoid and/or minimise exceedances of the Project construction noise and vibration criteria, BPO mitigation and management measures should be utilised.

This report proposes a framework for construction noise and vibration management such that the most effective and practicable methods for mitigation will be planned and implemented, taking into account the extent of predicted effects. At the core of this framework is the Construction Noise and Vibration Management Plan (**CNVMP**) as discussed in Section 11.1, which will be developed prior to commencement of construction, and updated as necessary throughout the duration of construction.

4.1 Buildings to be removed

We have assumed that all existing buildings inside the designation areas will be removed. We have therefore not assessed the potential effects on these buildings. Should they be retained, they will need to be assessed and mitigation will need to be determined where necessary, during production of the CNVMP. Table 4-1 lists buildings inside designation boundaries of each NoR which are not assessed.

Table 4-1: Buildings inside designation areas (not assessed)

NoR	Address
1	322, 1/324, 330 Great South Road, Ōpaheke 1/70, 1-2/68 Great South Road, Manurewa 135 Great South Road, Drury 9, 64, 72 Great South Road, Manurewa
2	1, 1/1 Firth Street 280, 280A, 280B Great South Road, Drury
3	1/110, 1/19, 1/32, 1/77, 1/79, 1/81, 1/84, 11A, 125, 127, 141, 141A, 1-8/17, 2/77, 2/81, 23/110, 30A, 36A, 38, 40, 42, 50, 52B, 52C, 54, 59C, 6/15, 60, 7, 7A, 70, 76, 86, 90, 92 Alfriston Road 44 Claude Road

NoR	Address
	1/236A, 1/241, 1/243, 1/249, 1/251, 1-2/247, 207-209, 228, 231, 237, 253, 255, 257 Great South Road, Manurewa 25 Index Place 1/4, 1B, 1C, 2/4, 2A, 2B Scotts Road 1 Shifnal Drive 2, 4, 6, 10, 12, 1-3/11, 15, 16, 18 Weymouth Road
4	1-7 Whakarato Way

4.2 Construction methodology

An indicative construction methodology has been provided by the Project team to inform the assessment of each of the NoR.

The outline is based on a generic transport construction project and has not taken into consideration any project specific scope of works, constraints or staging requirements that may be applicable for each project. The indicative construction programme assumes a linear construction sequence.

The indicative construction methodology for the projects is as follows:

Site establishment

- Site access construction;
- Tree removal and vegetation clearance;
- Remove footpath, streetlights, grass verge berm;
- Property/ building modification or demolition, including fencing, driveways and gates;
- Install environmental controls e.g. silt fencing, sediment retention ponds;
- Implement traffic management to establish the construction zones;
- Establishment of site compounds and construction areas
- Service protection works; and
- Construct access tracks/ haul roads (if any).

Early works

- Site/ ground investigations;
- Relocation of utilities services; and
- Temporary works establishment, e.g. road diversion, closures, minor improvements.

Main works

- Topsoil stripping and earthworks (cut and fill) to formation level;
- Construct new drainage and culvert facilities;
- Bridge construction works (if any) as follows:
 - Construct substructure including foundations, piles, piers and abutments;
 - Construct superstructure including bridge beams and deck construction;

- Complete bridge finishing works, approaches, barriers, landscaping;
- Retaining wall construction (if any);
- Construct new pavement and widening works in available areas;
- Move traffic to newly constructed pavement areas and continue with the remaining widening works;
- Construct lane reconfiguration, including pavement reconstruction and/or rehabilitation;
- Complete tie in works, footpaths, cycleways, lighting and landscaping;
- Construct permanent stormwater wetlands;
- Install road safety barriers and other traffic services facilities (traffic signals, pedestrian crossing, islands); and
- Install signage and street lighting.

Finishing works and demobilisation

- Final road surfacing / resurfacing and road markings;
- Commission new services, including traffic signals (if any);
- Finishing works e.g. landscaping, street furniture, fencing and outstanding accommodation works;
- Move traffic to the final road configuration; and
- Contractor to demobilise from site.

4.3 Plant and Equipment

Table 4-2 provides an indicative list of plant and equipment which may be required for construction across each designation.

Table 4-2: Indicative construction equipment

Construction	Construction Activity
Typical across all works	<ul style="list-style-type: none"> • Light vehicles • Trucks and transporters, (Hiab, concrete, tip trucks, truck and trailer, 6-wheeler) Traffic control truck units • Portable electric generators, air compressors, temporary light towers
Earthworks	<ul style="list-style-type: none"> • Excavators (various sizes 1.5T - 45T) • Rollers and vibration compactor • Water cart • Dump trucks • Stabilizers
Drainage	<ul style="list-style-type: none"> • Excavators (various sizes) • Loaders and skid steer loader • Plate compactors • Concrete pump
Pavement Construction	<ul style="list-style-type: none"> • Graders, loaders and excavators • Water cart • Smooth drum roller • Tip Trucks • Kerbing machine • Plate compactor

Construction	Construction Activity
	<ul style="list-style-type: none"> Asphalt pavers
Bridges and structures	<ul style="list-style-type: none"> Excavators (various sizes) Cranes (mobiles or crawlers) Piling rigs with vibration equipment Telehandlers, forklifts Concrete pumps

4.4 Construction Noise

The expected duration of the construction phase for the Project ranges from 1 – 2 years to 5 – 6 years. Predictions have been assessed against the noise criteria for greater than 20 weeks “long-duration” under NZS 6803:1999 as presented in Table 3-1. It is expected that the majority of the works will be carried out between 7am – 6pm Monday to Saturday. There may be extended hours during summer earthworks season (e.g., 6am to 8pm, Monday to Saturday), and there is also the possibility of night works for critical activities (e.g. culvert and bridge construction, and road surfacing).

Various construction activities and pieces of equipment will act as noise sources on site during construction works. An indicative construction equipment list has been provided by the Project team to assess the noise and vibration effects. Given construction will occur in the future, the current methodology may not be inclusive of all equipment used nearer the time of construction. Equipment tables will need to be updated to reflect selection at the time of development of the CNVMP. A minimum set back distance from receivers to comply with the day-time noise criterion of 70 dB L_{Aeq} without mitigation has been calculated.

4.4.1 Equipment Noise Levels

Table 4-3 details the sound power levels from the likely significant noise sources and the various receiver setback distances required to achieve compliance with the 70 dB L_{Aeq} day-time noise criterion without mitigation. The noise data has been taken from BS 5228-1:2009 “Code of practice for noise and vibration control on construction and open sites”, manufacturer’s data or the AECOM database of noise measurements. Equipment selection at detailed design stage may include equipment with different sound power levels than those presented. The equipment list should be reassessed nearer the time at production of the CNVMP.

Table 4-3: Construction equipment sound levels and indicative compliance distance

Equipment	Sound power level (dB L _{WA})	Facade noise level at varying distances (dB L _{Aeq})				Minimum Setback distance to comply with day-time criteria without mitigation, metres
		5 m	10 m	20 m	50 m	
30T excavator	105	86	80	73	66	30
20T excavator	99	80	74	67	60	13
Roller compactor	101	82	76	69	62	20
Tipper Truck	107	88	82	75	68	36
Loader	105	86	80	73	66	30
Vibratory Plate Compactor	110	91	85	78	71	45
Hydrovac Truck	104	85	79	73	65	28
Smooth Drum Roller	103	84	78	71	64	25
Paver	103	84	78	71	64	25
Grader	99	80	74	67	60	13
Bridge Construction Only						
Concrete Truck	107	88	82	75	68	36
Cranes	99	80	74	67	60	13
Bored Piling Rig	111	89	83	77	69	49

4.4.2 Activity noise levels

Table 4-4 details the sound power levels for key construction activities, combining the equipment sound power levels detailed in Table 4-3 where multiple items of equipment may be operating simultaneously. Table 4-4 also details the minimum setback distance at which compliance can be achieved for each activity.

Table 4-4: Activity Sound Power Levels and Compliance Distance

Construction Type	Activity Sound Power Level (dB L _{WA})	Minimum set back distance from receivers to comply with day-time limit (70 dB L _{Aeq}) without mitigation, metres
Typical across all works	110	48
Earthworks	111	52
Drainage works	113	56
Pavement Construction	115	76
Bridge Construction	113	55

4.5 Construction Vibration

Vibration generation and propagation is highly site specific. The generation of vibration is dependent on the local site geology, the equipment being used, the nature of the works, and even the operator.

To account for the inaccuracy in the prediction of vibration, the likely worst-case vibration has been calculated based on the equipment and hard ground geology.

Vibration from a source transmits in a spherical pattern and reduces with distance. There will be a particular distance from each source at which the vibration level equals the relevant vibration criteria. This distance is called the ‘emission radii’. The vibration criteria and emission radii for high vibration generating equipment in terms of Peak Particle Velocity (**PPV**) are detailed in Table 4-5.

The vibration data have been taken from BS 5228-2:2009 “Code of practice for noise and vibration control on construction and open sites”, manufacturer’s data or the AECOM database of vibration measurements.

Table 4-5: Vibration sources and indicative emission radii

Equipment	Night-time Occupied Buildings (0.3 mm/s PPV)	Daytime Occupied Buildings (2 mm/s PPV)	DIN 4150 Vibration Criteria		
			Historic and Sensitive (2.5 mm/s PPV)	Residential (5 mm/s PPV)	Commercial (10 mm/s PPV)
Roller Compactor	140m	21m	17m	8m	4m
Bored Piling Rig	17m	4m	2m	1m	1m
Excavator	80m	12m	10m	6m	2m
Tipper Truck	16m	2m	2m	1m	0m

Equipment	Night-time Occupied Buildings (0.3 mm/s PPV)	Daytime Occupied Buildings (2 mm/s PPV)	DIN 4150 Vibration Criteria		
			Historic and Sensitive (2.5 mm/s PPV)	Residential (5 mm/s PPV)	Commercial (10 mm/s PPV)
Vibratory Plate Compactor	20m	3m	2m	1m	1m

We recommend that vibration measurements are undertaken at specific locations as identified through the CNVMP and Schedules (refer Section 11.2) at the commencement of construction activities to establish vibration propagation site laws for vibration generating equipment. This approach will confirm the emission radii used in this assessment and ensure the applicable criteria are complied with. It has been found on other major construction projects, that the measured vibration levels for a particular activity are generally much lower than those predicted during the assessment stage.

5 Existing and Future Receiving Environment

5.1 Planning and land use context

The existing and anticipated future environment is further discussed in the accompanying AEE. In summary, the implementation timeframe for the Project has yet to be confirmed but is likely to be in approximately 10-15 years' time subject to funding availability. The assessment considers the effects of the Project at both the existing environment (as it exists today) and the likely future (planned) environment which consider potential urban development and intensification sought under Plan Change 78 (**PC78**).

The Project will be constructed and will operate in the existing urban environment or planned environment (i.e. what can be built under the existing AUP:OP live zones):

- **Existing environment:** The corridors are situated primarily within existing urban areas with live zoning including residential, commercial, and open space zones. There is some Future Urban Zone land in the wider area to the northeast/east. The existing activities within the area are generally reflective of the existing underlying zoning; and
- **Planned environment:** The planned environment is anticipated to remain urban and comprised of similar activities as the existing environment. The density of residential development is however anticipated to change and increase in future. In particular, this includes in the residential zones around Te Mahia and Takaanini stations, in line with the implementation of the National Policy Statement on Urban Development (**NPS-UD**) in the AUP:OP. The remaining residential areas will experience an uplift of density through the implementation of the Medium Density Residential Standards (**MDRS**) through the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021. Plan Change 78 (notified at the time of assessment) seeks to give effect to the NPS-UD and incorporate the MDRS into residential zoning. It is noted that there are some areas of existing residential zoned land (particularly east of the NIMT) that have recently been intensified (i.e., new builds), as such are unlikely to change in the near future.

The likelihood and magnitude of land use change regarding the land use planning context has been identified in Table 5-1 below. This has been used to inform the assumptions made on the likely future environment.

Table 5-1: South FTN – existing and future environment

Existing Environment	Current AUP:OP Zoning	Likelihood of Change for the environment ⁵	Magnitude of potential change	Likely Receiving Environment ⁶
Residential ⁷	Residential (Mixed Housing Suburban)	Low - Moderate ⁸	Low - Moderate	Residential
	Residential (Mixed Housing Urban)	Low - Moderate ⁹	Low - Moderate	Residential

⁵ Based on AUP:OP zoning/policy direction.

⁶ Based on AUP:OP zoning/policy direction.

⁷ Based on the NPS-UD and MDRS, these residential areas are likely to experience increased density.

⁸ There are areas of existing Residential Zone land that has recently been intensified (i.e. new build developments), as such is unlikely to change in the near future.

⁹ There are areas of existing Residential Zone land that has recently been intensified (i.e. new build developments), as such is unlikely to change in the near future.

Existing Environment	Current AUP:OP Zoning	Likelihood of Change for the environment ⁵	Magnitude of potential change	Likely Receiving Environment ⁶
	Residential (Mixed Housing Suburban and Urban) around train stations	Moderate	Moderate - High	Residential and Commercial/Retail ¹⁰
Business	Business (Heavy Industry)	Low	Low	Business (Industrial)
	Business (Light Industry)	Low	Low	Business (Industrial)
	Business (Neighbourhood Centre)	Low	Low	Business (Neighbourhood Centre)
	Business (Town Centre)	Low	Low	Business (Town Centre)
Open Space	Informal Recreation	Low	Low	Informal Recreation
	Community	Low	Low	Community
Greenfield areas	Future Urban	Low - Moderate	High	Urban

5.2 Existing Environment – Noise

The existing noise environments for all NoRs are controlled by traffic on existing major roads (either close by or distant), the NIMT, and natural sounds.

We undertook short and long duration noise level surveys in the vicinity of the Project in August and September 2023. The location of the surveys is shown in Figure 5-1.

5.2.1 Noise Monitoring Procedure

Noise survey equipment, meteorological conditions, data analysis and results are described below. The noise monitoring was undertaken in general accordance with the relevant requirements of NZS 6801, 6802 and 6806. This meant the results could adequately inform both the operational and construction noise assessments.

Measurements were undertaken at the following locations:

- 21 Great South Road, Manurewa;
- 26 Alfriston Road; and
- Opposite 438 Porchester Road.

The measurement positions were chosen to avoid extraneous factors which could have influenced the sound levels, where practicable. Measurement and calibration details required by NZS 6801 are held on file.

¹⁰ Note that much of the commercial operations between Manuia Road and Taka Street occur on residentially zoned land.

5.2.2 Meteorological conditions

During the surveys, meteorological data was obtained from Auckland, Mangere Ews 2 (43711) weather station operated by NIWA. This is the closest station where data was available at an hourly resolution or less.

The meteorological data from this weather station was used to identify periods when conditions were likely to have been outside the meteorological restrictions given in NZS 6801, and therefore data measured during these periods has been excluded from the noise analysis.

5.2.3 Data Analysis

Road traffic was the dominant noise source at all measurement locations. There is a natural variation in the noise environment throughout the day, and often variations for the weekends. The $L_{Aeq(24h)}$ and L_{A90} was calculated for each day where there was sufficient data after unsatisfactory meteorological conditions and abnormal events were excluded. The average $L_{Aeq(24h)}$ and L_{A90} for the attended and unattended measurements are shown in Figure 5-1. It should be noted that measurement positions MP1 and MP2 were attended 1-hour measurements, while MP3 was an unattended measurement taken over a seven-day duration. Table 5-2 displays these noise survey results.



Figure 5-1: Noise survey locations

Table 5-2: Noise survey results

Measurement Position	Location	NoR	Ambient noise level	Background noise level
			dB $L_{Aeq(24h)}$	dB L_{A90}
MP1	21 Great South Road, Manurewa	NoR 3	66	59

Measurement Position	Location	NoR	Ambient noise level	Background noise level
			dB LAeq(24h)	dB LA90
MP2	26 Alfriston Road, Manurewa East	NoR 1	67	60
MP3	Opposite 438 Porchester Road, Randwick Park	NoR 4	72	60

6 Construction Noise and Vibration Effects – Relating to All NoRs

6.1 Construction noise

Table 6-1 gives examples of the potential effects on receivers at different noise levels based on NZS6803 with the most exposed façades providing a 20 dB reduction. Depending on the construction of the house, facades may provide up to a 25 – 30 dB reduction, therefore assumptions and effects provided below are based on a conservative approach.

Table 6-1: Potential construction noise effects on receivers

External Noise Level	Potential Daytime Effects Outdoors	Corresponding Internal Noise Level	Potential Daytime Effects Indoors
65 dB L _{Aeq}	Conversation becomes strained, particularly over longer distances	45 dB L _{Aeq}	Noise levels would be noticeable but unlikely to interfere with residential or office daily activities.
65 to 70 dB L _{Aeq}	People would not want to spend any length of time outside, except when unavoidable through workplace requirements	45 to 50 dB L _{Aeq}	Concentration would start to be affected. TV and telephone conversations would begin to be affected.
70 to 75 dB L _{Aeq}	Businesses that involve substantial outdoor use (for example garden centres) would experience considerable disruption.	50 to 55 dB L _{Aeq}	Phone conversations would become difficult. Personal conversations would need slightly raised voices. Office work can generally continue, but 55 dB is considered by the experts to be a tipping point for offices. For residential activity, TV and radio sound levels would need to be raised.
75 to 80 dB L _{Aeq}	Some people may choose protection for long periods of exposure. Conversation would be very difficult, even with raised voices.	55 to 60 dB L _{Aeq}	Continuing office work would be extremely difficult and become unproductive. In a residential context, people would actively seek respite.
80 to 90 dB L _{Aeq}	Hearing protection would be required for prolonged exposure (8 hours at 85	60 to 70 dB L _{Aeq}	Untenable for both office and residential environments. Unlikely to

External Noise Level	Potential Daytime Effects Outdoors	Corresponding Internal Noise Level	Potential Daytime Effects Indoors
	dB) to prevent hearing loss.		be tolerated for any extent of time.

With effective management of construction activities (refer to Section 11), which includes consultation and communication with affected parties and scheduling noisy works during the daytime rather than night-time period, noise levels can be controlled for each of the Projects so that the effects on the nearest residential receivers are reduced. Barriers will not be effective at all locations, particularly where receivers are more than one storey high. Where barriers are not going to be effective, the use of enclosures or local screening of equipment should be considered and implemented, where practicable. If noisy activities must take place during the night-time, and screening or other mitigation measures do not provide sufficient attenuation to meet the night-time noise criteria or are not practicable, it may be necessary to offer temporary relocation to affected residents. Temporary relocation should be considered on a case-by-case basis and as a last resort.

6.2 Construction Vibration

The vibration effects associated with construction of the Project are considered in terms of human response and building damage. However, in our experience the main concern for building occupants during construction is damage to the building itself.

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

Potential effects and human perception of the vibration levels found within the AUP:OP / DIN 4150 criteria have been combined below and adopted for this assessment (see Table 6-2).

Table 6-2: Potential vibration effects on human perception summary against AUP:OP /DIN criteria

Vibration level (mm/s PPV)	Potential effects Indoors
0.14 mm/s	The threshold of perception for stationary people. Just perceptible in particularly sensitive environments.
0.3 mm/s	Can be just perceptible during normal residential activities, particularly for more sensitive receivers. Levels above may wake most people from their sleep. This is the AUP:OP limit for construction vibration generated at night-time for sensitive receivers.

Vibration level (mm/s PPV)	Potential effects Indoors
1 mm/s	Is typically tolerable with prior notification. Complaint or adverse reaction is likely in office or residential environments, particularly if there is no prior warning. What people actually feel would be subject to the source but could include a steady vibration from sources such as vibratory compaction, or a small jolt such as from the movement of a large digger either of which could rattle crockery and glassware. Sleep disturbance would be almost certain for most people.
2 mm/s	Vibration would clearly be felt. However, it can typically be tolerated in indoor environments such as offices, houses and retail if it occurs intermittently during the day and where there is effective prior engagement. Effects experienced would be somewhere between levels of 1 and 5 mm/s. This is the AUP:OP limit for large construction projects generating vibration.
5 mm/s	Unlikely to be tolerable in a workplace. Highly unsettling for both workplaces and dwellings. If exposure is prolonged, some people may want to leave the building. Computer screens would shake, and items could fall off shelves if they are not level. This is the threshold below which no cosmetic damage will occur in the DIN standard.
10 mm/s	Likely to be intolerable for anything other than a very brief exposure.

The AUP:OP sets the criteria for amenity to 2 mm/s PPV during the day. Based on the worst-case source of a roller compactor, any receiver within a 21m radius of the construction area may experience vibration of 2 mm/s inside their property. Whilst at this level the likelihood of building damage approaches zero, human perception may result in slight concerns but can generally be tolerated if activity occurs intermittently and with prior notice.

The AUP:OP sets the night-time vibration criterion at 0.3 mm/s. At this level, the emission radii could be up to 140m from construction areas, and at this level people could feel slight vibrations especially during the night-time, which may cause sleep disturbance. High vibratory activities should therefore be avoided, where practicable, during the night-time and careful management of the type of equipment used at night should be included within the CNVMP (refer Section 11.1) and night-time works should require the preparation of a Schedule (refer Section 11.2).

Construction vibration effects generally have a short timeframe, typically a few days at a time. The use of high vibratory equipment, such as a roller compactor, should be managed through a CNVMP to limit potential vibration effects, and alternative equipment with lower vibratory effect should be used where practicable.

7 NoR 1 – Great South Road FTN Upgrade

As outlined in the Project description (see Section 2), NoR 1 comprises a range of interventions providing for the Great South Road FTN route along Great South Road between Manukau and Drury. These include eight intersection upgrades, and the replacement of the Otūwairoa / Slippery Creek bridge. The wider corridor will provide for either three or four lanes in the midblock including bus lanes in one or both directions, and active mode facilities.

Buildings which have been flagged for acquisition prior to construction commencing are summarised in Section 4.1.

7.1 Construction effects

7.1.1 Noise

Existing receivers are located at varying distances from the construction boundary with the closest receivers being approximately 2m away from potential works. High noise generating activities may not occur right on the construction boundary but if they do, 522 existing receivers could experience unmitigated noise levels that exceed the daytime noise criterion. Details of all properties where the criteria could be exceeded without mitigation are provided in Appendix A.

With mitigation in place as set out in Section 11, 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. At this level, effects are likely to include loss of concentration, annoyance, and a reduction in speech intelligibility. We note that the existing receivers may not be present at the time of construction.

Future receivers constructed within 76m of the works could experience unmitigated noise levels that exceed the 70 dB L_{Aeq} noise criterion during high noise generating activities, such as the pavement works.

Bridge construction for the replacement of the Otūwairoa / Slippery Creek bridge is the noisiest activity that is currently proposed for this NoR. It will only occur for a limited duration during bridge construction at the section of Great South Road where the bridge is located.

Operation of the construction equipment will be intermittent in nature. Construction will likely follow a linear path along the site, so as the equipment moves away from the receiver, noise levels will decrease. The worst-case situations where mitigated noise levels could reach 90 dB L_{Aeq} at the closest receivers, are 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.

If a critical activity has to be carried out during the night-time in close proximity to residential receivers (e.g. bridge construction works), consultation and mitigation measures will be essential. The use of noisy equipment should be avoided, where practicable, to prevent sleep disturbance. Any night-time works are likely to be limited in duration and will be managed through the CNVMP (as per Section 11.1) and a Schedule (as per Section 11.2).

7.1.2 Vibration

Existing receivers near Great South Road between Manukau and Drury are predominantly residential type structures.

74 existing dwellings may experience vibration levels above 5mm/s PPV, exceeding the daytime Category B criterion, if the roller compactor is used on the construction boundary in the closest position to them. 14 existing commercial type buildings may experience vibration levels above the 10mm/s PPV daytime criteria. The addresses of receivers where the Category B criteria may be exceeded are listed in Appendix B. Once the compactor is 8m away from the dwellings and 4m from the commercial receivers the Category B criteria will be met. The Category B criteria would be met at future residential structures that are 8m or more from the proposed works and commercial structures that are 4m or more from the proposed works.

Without mitigation, at these receivers there is potential for cosmetic damage to buildings (such as cracking) and annoyance from perception of vibration. Mitigation such as the use of non-vibratory compaction equipment within 8m of buildings is recommended to achieve compliance with the criteria.

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 the roller compactor or within the emission radii identified for the other vibration generating equipment in Table 4-5. 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.

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.

High vibration generating activities should not occur during the night-time in close proximity to residential receivers to avoid sleep disturbance unless it is a critical activity and there is no alternative.

It should be noted that the emission radii are conservative and vibration levels measured on site tend to be much lower than those predicted at the NoR stage of a project.

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

As outlined in the Project description (see Section 2), NoR 2 comprises a range of interventions providing for the upgrade of Great South Road in Drury between Waihoehoe Road and the SH1 Drury Interchange. These include road widening to provide four lanes, active mode facilities, and the replacement of the Hingaia Stream bridge.

Buildings which have been flagged for acquisition prior to construction commencing are summarised in Section 4.1.

8.1 Construction effects

8.1.1 Noise

Existing receivers are located at varying distances from the construction boundary with the closest receivers being approximately 4m away from potential works. High noise generating activities may not occur right on the construction boundary but if they do, 18 existing receivers could experience unmitigated noise levels that exceed the daytime noise criterion. Details of all properties where the criteria could be exceeded are provided in Appendix A.

With mitigation in place, as set out in Section 11, 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. At this level, effects are likely to include loss of concentration, annoyance, and a reduction in speech intelligibility. We note that some dwellings may be unoccupied at the time of construction, particularly considering this Project is located mostly within existing urban zones. It should also be noted that predicted noise levels are conservative and measured noise levels on site are likely to be lower.

Future receivers constructed within 76m of the works could experience noise levels that exceed the 70 dB L_{Aeq} noise criterion during high noise generating activities, such as the pavement works, without mitigation.

Operation of the construction equipment will be intermittent in nature. Construction will likely follow a linear path along the site, so as the equipment moves away from the receiver, noise levels will decrease. The worst-case situations where the closest receivers could experience mitigated noise levels of up to 85 dB L_{Aeq} are 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.

If a critical activity has to be carried out during the night-time in close proximity to residential receivers (e.g. works requiring road closures), consultation and mitigation measures will be essential. The use of noisy equipment should be avoided, where practicable, to prevent sleep disturbance. Any night-time works are likely to be limited in duration and will be managed through the CNVMP (as per Section 11.1) and a Schedule (as per Section 11.2).

8.1.2 Vibration

Existing receivers near Great South Road (Drury) are predominantly commercial type structures.

Vibration levels are predicted to meet the Category B criterion at existing residential receivers. One existing commercial type building may experience vibration levels above the 10mm/s PPV daytime criteria. The address of this receiver is listed in Appendix B. Once the compactor is 4m from the commercial receiver the Category B criterion will be met. The Category B criteria would be met at future residential structures that are 8m or more from the proposed works and commercial structures that are 4m or more from the proposed works.

Without mitigation, at this receiver there is potential for cosmetic damage to buildings (such as cracking) and annoyance from perception of vibration. Mitigation such as the use of non-vibratory compaction equipment within 8m of buildings is recommended to achieve compliance with the criteria.

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 the roller compactor or within the emission radii identified for the other vibration generating equipment in Table 4-5. 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.

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.

High vibration-generating activities should not occur during the night-time in close proximity to residential receivers to avoid sleep disturbance unless it is a critical activity and there is no alternative.

It should be noted that the emission radii are conservative and vibration levels measured on site tend to be much lower than those predicted at the NoR stage of a project.

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

As outlined in the Project description (see Section 2), NoR 3 comprises a range of interventions providing for the Takaanini FTN route along Weymouth and Alfriston Roads generally between Selwyn Road and Alfriston Park; as well as for the Great South Road FTN route between Alfriston Road and Myers Road. These interventions include road widening to provide for four lanes (general traffic and bus lanes in both directions), active mode facilities, eight intersection upgrades, stormwater treatment wetlands, and replacements of bridges over the NIMT and SH1.

Buildings which have been flagged for acquisition prior to construction commencing are summarised in Section 4.1.

9.1 Construction effects

9.1.1 Noise

Existing receivers are located at varying distances from the construction boundary with the closest receivers being approximately 2m away from potential works. High noise generating activities may not occur right on the construction boundary but if they do, 410 existing receivers could experience unmitigated noise levels that exceed the daytime noise criterion. Details of all properties where the criteria could be exceeded are provided in Appendix A.

With mitigation in place, as set out in Section 11, 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. At this level, effects are likely to include loss of concentration, annoyance, and a reduction in speech intelligibility. We note that the existing receivers may not be present at the time of construction.

Future receivers constructed within 76m of the works could experience unmitigated noise levels that exceed the 70 dB L_{Aeq} noise criterion during high noise generating activities such as the pavement works.

Operation of the construction equipment will be intermittent in nature. Construction will likely follow a linear path along the site, so as the equipment moves away from the receiver, noise levels will decrease. The worst-case situations where mitigated noise levels could reach 90 dB L_{Aeq} at the closest receivers are 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.

If a critical activity has to be carried out during the night-time in close proximity to residential receivers (e.g. works requiring road closures), consultation and mitigation measures will be essential. The use of noisy equipment should be avoided, where practicable, to prevent sleep disturbance. Any night-time works are likely to be limited in duration and will be managed through the CNVMP (as per Section 11.1) and a Schedule (as per Section 11.2).

9.1.2 Vibration

Existing receivers near Alfriston Road are mostly residential type structures.

76 existing dwellings may experience vibration levels above 5mm/s PPV, exceeding the daytime Category B criterion, if the roller compactor is used on the construction boundary in the closest position to them. 12 existing commercial type buildings may experience vibration levels above the 10mm/s PPV daytime criteria. The addresses of receivers where the Category B criteria may be exceeded are listed in Appendix B. Once the compactor is 8m away from the dwellings and 4m from the commercial receivers the Category B criteria will be met. The Category B criteria would be met at future residential structures that are 8m or more from the proposed works and commercial structures that are 4m or more from the proposed works.

Without mitigation, at these receivers there is potential for cosmetic damage to buildings (such as cracking) and annoyance from perception of vibration. Mitigation such as the use of non-vibratory compaction equipment within 8m of buildings is recommended to achieve compliance with the criteria.

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 the roller compactor or within the emission radii identified for the other vibration generating equipment in Table 4-5. 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.

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.

High vibration-generating activities should not occur during the night-time in close proximity to residential receivers to avoid sleep disturbance unless it is a critical activity and there is no alternative.

It should be noted that the emission radii are conservative and vibration levels measured on site tend to be much lower than those predicted at the NoR stage of a project.

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

As outlined in the Project description (see Section 2), NoR 4 comprises a range of interventions 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 Mill Road. These interventions provide for the urbanisation of both corridors, with two traffic lanes, widening for active mode facilities, seven intersection upgrades, and stormwater treatment wetlands.

Buildings which have been flagged for acquisition prior to construction commencing are summarised in Section 4.1.

10.1 Construction effects

10.1.1 Noise

Existing receivers are located at varying distances from the construction boundary with the closest receivers being approximately 2m away from potential works. High noise generating activities may not occur right on the construction boundary but if they do, 438 existing receivers could experience unmitigated noise levels that exceed the daytime noise criterion. Details of all properties where the criteria could be exceeded are provided in Appendix A.

With mitigation in place, as set out in Section 11, 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. At this level, effects are likely to include loss of concentration, annoyance, and a reduction in speech intelligibility. We note that the existing receivers may not be present at the time of construction.

Future receivers constructed within 76m of the works could experience noise levels that exceed the 70 dB L_{Aeq} noise criterion during high noise generating activities, such as the pavement works, without mitigation.

Operation of the construction equipment will be intermittent in nature. Construction will likely follow a linear path along the site, so as the equipment moves away from the receiver, noise levels will decrease. The worst-case situations where the closest receivers could experience mitigated noise levels of up to 90 dB L_{Aeq} are 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.

If a critical activity has to be carried out during the night-time in close proximity to residential receivers (e.g. works requiring road closures), consultation and mitigation measures will be essential. The use of noisy equipment should be avoided, where practicable, to prevent sleep disturbance. Any night-time works are likely to be limited in duration and will be managed through the CNVMP (as per Section 11.1) and a Schedule (as per Section 11.2).

10.1.2 Vibration

Existing receivers near Porchester Road are mainly residential type structures.

98 existing dwellings may experience vibration levels above 5mm/s PPV, exceeding the daytime Category B criterion, if the roller compactor is used on the construction boundary in the closest position to them. One existing commercial type building may experience vibration levels above the 10mm/s PPV daytime criteria. The addresses of receivers where the Category B criteria may be exceeded are listed in Appendix B. Once the compactor is 8m away from the dwellings and 4m from the commercial receivers the Category B criteria will be met. The Category B criteria would be met at future residential structures that are 8m or more from the proposed works and commercial structures that are 4m or more from the proposed works.

Without mitigation, at these receivers there is potential for cosmetic damage to buildings (such as cracking) and annoyance from perception of vibration. Mitigation such as the use of non-vibratory compaction equipment within 8m of buildings is recommended to achieve compliance with the criteria.

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 the roller compactor or within the emission radii identified for the other vibration generating equipment in Table 4-5. 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.

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.

High vibration-generating activities should not occur during the night-time in close proximity to residential receivers to avoid sleep disturbance unless it is a critical activity and there is no alternative.

It should be noted that the emission radii are conservative and vibration levels measured on site tend to be much lower than those predicted at the NoR stage of a project.

11 Recommended measures to avoid, remedy, or mitigate construction effects

11.1 Construction Noise and Vibration Management Plan

Implementing noise management and mitigation measures via a CNVMP is the most effective way to control construction noise and vibration impacts. The objective of the CNVMP is to provide a framework for the development and implementation of best practicable options to avoid, remedy or mitigate the adverse effects on receivers of noise and vibration resulting from construction. AUP:OP Rule E25.6.29(5) sets out the minimum level of information that must be provided in a CNVMP. As a minimum, we recommend that the CNVMP should include the following content:

- Description of the works and anticipated equipment/processes;
- Hours of operation, including times and days when construction activities would occur;
- The construction noise and vibration standards for the Project;
- Identification of receivers where noise and vibration standards apply;
- Management and mitigation options, including alternative strategies adopting best practices where full compliance with the relevant noise and/or vibration standards cannot be achieved;
- Methods and frequency for monitoring and reporting on construction noise and vibration, including:
 - Updating the predicted noise and vibration levels based on the final methodology and construction activities;
 - Confirming which buildings will be included in a pre and post building condition survey;
 - Identifying appropriate monitoring locations for receivers of construction noise and vibration;
 - Procedures to respond to complaints received on construction noise and vibration, including methods to monitor and identify noise and vibration sources;
 - Procedure for responding to monitored exceedances; and
 - Procedures for monitoring construction noise and vibration and reporting to the Auckland Council (AC) Consent Monitoring officer.
- Procedures for maintaining contact with stakeholders, notifying of proposed construction activities, the period of construction activities, and handling noise and vibration complaints;
- Contact details of the site supervisor or Project manager and the Requiring Authority's Project Liaison Person (phone, postal address, email address);
- Procedures for the regular training of the operators of construction equipment to minimise noise and vibration as well as expected construction site behaviours for all workers;
- Identification of areas where compliance with the noise and/or vibration standards will not be practicable and where a Site Specific Construction Noise and/or Vibration Management Schedule will be required;
- Procedures for how remedial works will be undertaken, should they be required as a result of the building condition surveys; and
- Procedures and timing of reviews of the CNVMP.

11.2 Schedules

In addition to a CNVMP, it may be necessary to produce Site Specific or Activity Specific Construction Noise and Vibration Management Schedules (**Schedules**) where noise and/or vibration limits are

predicted to be exceeded for a more sustained period or by a large margin. A schedule to the CNVMP provides a specific assessment of an activity and/or location and should include details such as:

- Activity location, start and finish dates;
- The nearest neighbours to the activity;
- A location plan;
- Predicted noise/vibration levels and best practice for mitigation for the activity and/or location;
- Communication and consultation with the affected neighbours;
- Location, times, and type of monitoring; and
- Any pre-condition survey of buildings predicted to receive vibration levels approaching the Category B vibration limits, which document their current condition and any existing damage.

11.3 Noise mitigation measures

A hierarchy of mitigation measures will be adopted through the CNVMP and Schedules (where produced), as follows:

- Managing times of activities to avoid night works and other sensitive times;
- Liaising with neighbours so they can work around specific activities;
- Selecting equipment and methodologies to restrict noise;
- Using screening/enclosures/barriers; and
- Offering neighbours temporary relocation.

By following this hierarchy, the best practicable option (**BPO**) for mitigation will be implemented, whilst avoiding undue disruption to the community. In particular, temporary relocation of neighbours can cause significant inconvenience and should only be offered where other options have been exhausted and noise levels still require mitigation.

Some activities are likely to be set back a considerable distance from the nearest receivers and require very little or no mitigation to achieve compliance with the relevant Project noise limits. Alternative methodologies, such as careful equipment selection and use of noise barriers or localised screening (e.g., for concrete cutting) may be suitable management and mitigation measures and should be implemented where they are practicable and effective.

11.4 Vibration mitigation measures

Similarly to noise, a hierarchy of vibration mitigation measures will be adopted through the CNVMP and Schedules (where produced) as follows:

- Managing times of activities to avoid night works and other sensitive times (communicated through community liaison);
- Liaising with neighbours so they can work around specific activities;
- Operating vibration generating equipment as far from sensitive sites as possible;
- Selecting equipment and methodologies to minimise vibration;
- Offering neighbours temporary relocation; and
- In specific situations, a cut-off trench may be used as a vibration barrier if located close to the source.

In general, there are less options available to mitigate vibration propagation and insulate receiver buildings, compared to noise. Mitigation will therefore focus on scheduling of activities, effective communication with neighbours, and selection of appropriate equipment and methods, where practicable.

Appropriate vibration mitigation measures for each activity will be listed in the CNVMP and Schedules (where produced).

11.5 Building condition survey

A detailed building precondition survey should be undertaken by a suitably qualified engineer prior to the start of construction at all buildings where the daytime Category B vibration criteria may be exceeded. The survey shall include, but not be limited to, the following:

- Determination of building classification: commercial, industrial, residential or a historic or sensitive structure;
- Determination of building specific vibration damage risk thresholds; and
- Recording (including photographs) the major features of the buildings including location, type, construction (including foundation type), age and present condition, including existing levels of any aesthetic damage or structural damage.

A post-construction condition survey of the same buildings shall be conducted when construction is completed, and any damage shown to have been caused by the Project construction rectified by the Project Team.

11.6 Night works

Night works have the potential to cause the greatest disturbance to residents and should be avoided where practicable. However, it is possible that night works will be required during the construction period for critical activities that cannot be carried out at any other time. Before night works are programmed, it is important to determine if there are alternative options that would avoid working at night and, if so, whether those options are technically and practicably feasible.

Where there are no practicable alternative options to night works, it may be necessary to implement enhanced noise and vibration management measures, but this will depend on the location of the worksite and the proposed activities.

When work must be carried out at night, it may be necessary to:

- Increase the frequency of communications with stakeholders; and
- Carry out regular noise and vibration monitoring to confirm noise and vibration levels; or
- Offer temporary relocation to neighbours if unreasonable noise and/or vibration levels cannot be avoided.

11.7 Services

The works will be occurring in an existing built-up area with a number of underground services. Any services in the area of the works will be dealt with appropriately at the time of construction such that

compliance with standard DIN 4150-3:1999 "Structural Vibration - Part 3: Effects of Vibration on Structures" will be achieved.

12 Conclusion

An assessment of the construction noise and vibration effects due to the Project has been undertaken considering a worst-case scenario. The predicted noise and vibration levels and effects are based on indicative information as provided by the Project Team and 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.

Construction noise and vibration can be mitigated and managed, utilising the measures set out in Section 11, to comply with the applicable limits for the majority of the works. Exceedances of the criteria could occur intermittently across all NoRs, if high noise or vibration generating equipment is used near occupied buildings. The most impacted receivers are located within 10m of the construction boundary.

Night works should be limited to critical activities that cannot be carried out at any other time.

A CNVMP will be prepared prior to construction commencing in accordance with Section 11.1 of this report. 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.

Elevated noise levels should be avoided and mitigated where possible to reduce the likelihood of adverse effects such as loss of concentration, annoyance and sleep disturbance (for night works).

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.

1 Appendix A – Receivers predicted to receive noise levels exceeding 70 dB L_{Aeq}

1.1 NoR 1

Address	Building Type / Structure
1 Butterworth Avenue, Ōpaheke, Papakura	Residential
1 Grande Vue Road, Hillpark, Auckland	Residential
1 Opaheke Road, Papakura	Residential
1 Park Estate Road, Rosehill, Papakura	Residential
1 Parkhaven Drive, Rosehill, Papakura	Residential
1 Walter Strevens Drive, Conifer Grove, Takanini	Residential
1/1 Manse Road, Pahurehure, Papakura	Residential
1/14 Great South Road, Manurewa, Auckland	Residential
1/2 Park Estate Road, Rosehill, Papakura	Residential
1/299 Great South Road, Manurewa, Auckland	Residential
1/305 Great South Road, Manurewa, Auckland	Residential
1/327 Great South Road, Papakura	Residential
1/34 Great South Road, Manurewa, Auckland	Residential
1/326 Great South Road, Ōpaheke, Papakura	Residential
1/332 Great South Road, Ōpaheke, Papakura	Residential
1/355 Great South Road, Ōpaheke, Papakura	Commercial
1/359 Great South Road, Ōpaheke, Papakura	Residential
1/37 Great South Road, Manurewa, Auckland	Residential
1/40 Great South Road, Manurewa, Auckland	Residential
1/42 Great South Road, Manurewa, Auckland	Residential
1/444 Great South Road, Ōpaheke, Papakura	Residential
1/446 Great South Road, Ōpaheke, Papakura	Residential
1/450 Great South Road, Ōpaheke, Papakura	Residential
1/454 Great South Road, Ōpaheke, Papakura	Residential
1/458 Great South Road, Ōpaheke, Papakura	Residential
1/468 Great South Road, Ōpaheke, Papakura	Residential
1/48 Great South Road, Manurewa, Auckland	Residential
1/49 Great South Road, Manurewa, Auckland	Residential
1/52 Great South Road, Manurewa, Auckland	Residential
1/53 Great South Road, Manurewa, Auckland	Residential
1/54 Great South Road, Manurewa, Auckland	Residential
1/55 Great South Road, Manurewa, Auckland	Residential
1/59 Great South Road, Manurewa, Auckland	Residential
1/65 Great South Road, Manurewa, Auckland	Residential
1/72 Great South Road, Manurewa, Auckland	Residential
10 Great South Road, Manurewa, Auckland	Residential
1-16/38 Great South Road, Manurewa, Auckland	Residential
12 Great South Road, Manurewa, Auckland	Residential
1-2/2 Walter Strevens Drive, Conifer Grove, Takanini	Residential
1-2/3 Park Estate Road, Rosehill, Papakura	Residential
1-2/45 Great South Road, Manurewa, Auckland	Residential
1-2/461 Great South Road, Ōpaheke, Papakura	Residential
1-2/462 Great South Road, Ōpaheke, Papakura	Residential

Address	Building Type / Structure
1-2/465 Great South Road, Ōpaheke, Papakura	Residential
1-2/47 Great South Road, Manurewa, Auckland	Residential
1-2/61 Great South Road, Manurewa, Auckland	Residential
1-2/78A Great South Road, Manurewa, Auckland	Residential
1-2/79 Great South Road, Manurewa, Auckland	Residential
1-3/2 Browns Road, Manurewa, Auckland	Residential
1-3/319-323 Great South Road, Papakura	Commercial
134 Great South Road, Drury	Residential
134A Great South Road, Drury	Residential
136 Great South Road, Drury	Residential
14 Great South Road, Manurewa, Auckland	Residential
1-4/1A Halsey Road, Manurewa, Auckland	Residential
141 Great South Road, Drury	Commercial
1-5/83 Great South Road, Manurewa, Auckland	Residential
152 Great South Road, Takanini	Commercial
154 Great South Road, Takanini	Commercial
155 Great South Road, Takanini	Residential
157 Great South Road, Takanini	Residential
159 Great South Road, Takanini	Residential
16 Great South Road, Manurewa, Auckland	Residential
160 Great South Road, Takanini	Commercial
160A Great South Road, Takanini	Residential
162 Great South Road, Takanini	Residential
166-168 Great South Road, Takanini	Commercial
167 Great South Road, Takanini	Commercial
170-172 Great South Road, Takanini	Commercial
18 Great South Road, Manurewa, Auckland	Residential
2 Beach Road, Pahurehure, Papakura	Commercial
2/2 Park Estate Road, Rosehill, Papakura	Residential
2/3 Liverpool Street, Papakura	Residential
2/321 Great South Road, Manurewa, Auckland	Commercial
2/326 Great South Road, Ōpaheke, Papakura	Residential
2/34 Great South Road, Manurewa, Auckland	Residential
2/42 Great South Road, Manurewa, Auckland	Residential
2/451 Great South Road, Ōpaheke, Papakura	Residential
2/469 Great South Road, Ōpaheke, Papakura	Residential
2/49 Great South Road, Manurewa, Auckland	Residential
2/52 Great South Road, Manurewa, Auckland	Residential
2/53 Great South Road, Manurewa, Auckland	Residential
2/54 Great South Road, Manurewa, Auckland	Residential
2/55 Great South Road, Manurewa, Auckland	Residential
2/70 Great South Road, Manurewa, Auckland	Residential
20 Great South Road, Manurewa, Auckland	Residential
21 Great South Road, Manurewa, Auckland	Commercial
22 Great South Road, Manurewa, Auckland	Residential
23 Great South Road, Manurewa, Auckland	Residential
24 Great South Road, Manurewa, Auckland	Residential
25 Great South Road, Manurewa, Auckland	Residential
250-260 Great South Road, Papakura	Commercial
282 Great South Road, Manurewa, Auckland	Commercial

Address	Building Type / Structure
288 Great South Road, Manurewa, Auckland	Commercial
29 Great South Road, Manurewa, Auckland	Residential
290 Great South Road, Manurewa, Auckland	Commercial
293-297 Great South Road, Papakura	Commercial
299 Great South Road, Papakura	Commercial
3/61 Great South Road, Manurewa, Auckland	Residential
301 Great South Road, Manurewa, Auckland	Residential
302 Great South Road, Manurewa, Auckland	Commercial
303-305, 311-317 Great South Road, Papakura	Commercial
304 Great South Road, Manurewa, Auckland	Commercial
307A Great South Road, Manurewa, Auckland	Residential
309 Great South Road, Manurewa, Auckland	Commercial
31 Great South Road, Manurewa, Auckland	Residential
311 Great South Road, Manurewa, Auckland	Commercial
313 Great South Road, Manurewa, Auckland	Residential
314 Great South Road, Manurewa, Auckland	Commercial
315 Great South Road, Manurewa, Auckland	Residential
317-319 Great South Road, Manurewa, Auckland	Commercial
318 Great South Road, Manurewa, Auckland	Commercial
32 Great South Road, Manurewa, Auckland	Residential
320 Great South Road, Ōpaheke, Papakura	Residential
322A Great South Road, Ōpaheke, Papakura	Residential
323 Great South Road, Manurewa, Auckland	Commercial
324 Great South Road, Manurewa, Auckland	Commercial
325 Great South Road, Manurewa, Auckland	Commercial
328 Great South Road, Ōpaheke, Papakura	Residential
33 Great South Road, Manurewa, Auckland	Residential
330A Great South Road, Ōpaheke, Papakura	Residential
334 Great South Road, Ōpaheke, Papakura	Residential
336 Great South Road, Ōpaheke, Papakura	Residential
338 Great South Road, Ōpaheke, Papakura	Residential
3-4/464 Great South Road, Ōpaheke, Papakura	Residential
3-4/79 Great South Road, Manurewa, Auckland	Residential
340 Great South Road, Ōpaheke, Papakura	Residential
35 Great South Road, Manurewa, Auckland	Residential
357 Great South Road, Ōpaheke, Papakura	Residential
357A Great South Road, Ōpaheke, Papakura	Residential
361 Great South Road, Ōpaheke, Papakura	Residential
365-367 Great South Road, Ōpaheke, Papakura	Commercial
369-371 Great South Road, Ōpaheke, Papakura	Commercial
36A Great South Road, Manurewa, Auckland	Residential
373-375 Great South Road, Ōpaheke, Papakura	Residential
377 Great South Road, Ōpaheke, Papakura	Residential
39 Great South Road, Manurewa, Auckland	Residential
4 Walter Strevens Drive, Conifer Grove, Takarangi	Residential
41 Great South Road, Manurewa, Auckland	Residential
43A Great South Road, Manurewa, Auckland	Residential
44A Great South Road, Manurewa, Auckland	Residential
44B Great South Road, Manurewa, Auckland	Residential
452 Great South Road, Ōpaheke, Papakura	Residential

Address	Building Type / Structure
453 Great South Road, Ōpaheke, Papakura	Residential
456 Great South Road, Ōpaheke, Papakura	Residential
459 Great South Road, Ōpaheke, Papakura	Residential
463A/B Great South Road, Ōpaheke, Papakura	Residential
466 Great South Road, Ōpaheke, Papakura	Residential
469 Great South Road, Ōpaheke, Papakura	Residential
46A Great South Road, Manurewa, Auckland	Residential
46B Great South Road, Manurewa, Auckland	Residential
470 Great South Road, Ōpaheke, Papakura	Residential
471 Great South Road, Ōpaheke, Papakura	Residential
473 Great South Road, Ōpaheke, Papakura	Residential
5 Park Estate Road, Rosehill, Papakura	Residential
50 Great South Road, Manurewa, Auckland	Residential
51A Great South Road, Manurewa, Auckland	Residential
51B Great South Road, Manurewa, Auckland	Residential
5-6/79 Great South Road, Manurewa, Auckland	Residential
57 Great South Road, Manurewa, Auckland	Residential
57 Wood Street, Papakura	Commercial
58 Wood Street, Papakura	Commercial
589B Great South Road, Rosehill, Papakura	Residential
589E Great South Road, Rosehill, Papakura	Residential
593 Great South Road, Rosehill, Papakura	Residential
595 Great South Road, Rosehill, Papakura	Residential
6/34 Great South Road, Manurewa, Auckland	Residential
63 Great South Road, Manurewa, Auckland	Residential
66 Great South Road, Manurewa, Auckland	Residential
67 Great South Road, Manurewa, Auckland	Residential
67 Great South Road, Papakura	Commercial
69 Great South Road, Papakura	Commercial
69A Great South Road, Manurewa, Auckland	Residential
69B Great South Road, Manurewa, Auckland	Residential
71 Great South Road, Manurewa, Auckland	Residential
71-75 Great South Road, Papakura	Commercial
73 Great South Road, Manurewa, Auckland	Residential
74 Great South Road, Manurewa, Auckland	Residential
75 Great South Road, Manurewa, Auckland	Residential
75A Great South Road, Manurewa, Auckland	Residential
77 Great South Road, Papakura	Commercial
79-83 Great South Road, Papakura	Commercial
81 Great South Road, Manurewa, Auckland	Residential
82 Great South Road, Manurewa, Auckland	Residential
84 Great South Road, Papakura	Commercial
86 Great South Road, Manurewa, Auckland	Residential
86-88 Great South Road, Papakura	Commercial
89-91 Great South Road, Papakura	Commercial

1.2 NoR 2

Address	Building Type / Structure
1/250 Great South Road, Drury	Commercial
1/257 Great South Road, Drury	Commercial
1/260 Great South Road, Drury	Commercial
2/257 Great South Road, Drury	Commercial
236 Great South Road, Drury	Commercial
250 Great South Road, Drury	Commercial
251 Great South Road, Drury	Commercial
255 Great South Road, Drury	Commercial
257-261 Great South Road, Drury	Commercial
263 Great South Road, Drury	Commercial
267 Great South Road, Drury	Commercial
271 Great South Road, Drury	Commercial

1.3 NoR 3

Address	Building Type / Structure
1 Beaumonts Way, Manurewa, Auckland	Residential
1 Scotts Road, Manurewa East, Auckland	Residential
1/124 Alfriston Road, Manurewa, Auckland	Residential
1/15 Alfriston Road, Manurewa East, Auckland	Residential
1/18A Weymouth Road, Manurewa, Auckland	Residential
1/20 Weymouth Road, Manurewa, Auckland	Residential
1/24 Alfriston Road, Manurewa East, Auckland	Residential
1/24 Weymouth Road, Manurewa, Auckland	Residential
1/252 Great South Road, Manurewa, Auckland	Residential
1/254 Great South Road, Manurewa, Auckland	Residential
1/256 Great South Road, Manurewa, Auckland	Residential
1/258 Great South Road, Manurewa, Auckland	Residential
1/26 Alfriston Road, Manurewa East, Auckland	Residential
1/262 Great South Road, Manurewa, Auckland	Residential
1/28 Alfriston Road, Manurewa East, Auckland	Residential
1/51 Alfriston Road, Manurewa East, Auckland	Residential
1/55 Alfriston Road, Manurewa East, Auckland	Residential
1/57 Alfriston Road, Manurewa East, Auckland	Residential
1/63 Alfriston Road, Manurewa East, Auckland	Residential
1/66 Alfriston Road, Manurewa East, Auckland	Residential
1/71 Alfriston Road, Manurewa East, Auckland	Residential
1/72 Alfriston Road, Manurewa East, Auckland	Residential
100 Alfriston Road, Manurewa, Auckland	Residential
106 Alfriston Road, Manurewa, Auckland	Residential
112 Alfriston Road, Manurewa, Auckland	Residential
116 Alfriston Road, Manurewa, Auckland	Residential
116A Alfriston Road, Manurewa, Auckland	Residential
12 Selwyn Road, Manurewa, Auckland	Commercial
120 Alfriston Road, Manurewa, Auckland	Residential
122A Alfriston Road, Manurewa, Auckland	Residential

Address	Building Type / Structure
122H Alfriston Road, Manurewa, Auckland	Residential
128 Alfriston Road, Manurewa, Auckland	Residential
129 Alfriston Road, Manurewa, Auckland	Residential
1-3/245 Great South Road, Manurewa, Auckland	Residential
1-3/78 Alfriston Road, Manurewa East, Auckland	Residential
130 Alfriston Road, Manurewa, Auckland	Residential
131 Alfriston Road, Manurewa, Auckland	Residential
131A Alfriston Road, Manurewa, Auckland	Residential
132 Alfriston Road, Manurewa, Auckland	Residential
133 Alfriston Road, Manurewa, Auckland	Residential
134 Alfriston Road, Manurewa, Auckland	Residential
135 Alfriston Road, Manurewa, Auckland	Residential
137 Alfriston Road, Manurewa, Auckland	Residential
139 Alfriston Road, Manurewa, Auckland	Residential
141B Alfriston Road, Manurewa, Auckland	Residential
141C Alfriston Road, Manurewa, Auckland	Residential
141D Alfriston Road, Manurewa, Auckland	Residential
141E Alfriston Road, Manurewa, Auckland	Residential
141F Alfriston Road, Manurewa, Auckland	Residential
143 Alfriston Road, Manurewa, Auckland	Residential
143A Alfriston Road, Manurewa, Auckland	Residential
16 Alfriston Road, Manurewa East, Auckland	Residential
1-8/261 Great South Road, Manurewa, Auckland	Residential
185 Great South Road, Manurewa, Auckland	Commercial
18A Weymouth Road, Manurewa, Auckland	Residential
1A Scotts Road, Manurewa East, Auckland	Residential
2 Alfriston Road, Manurewa, Auckland	Commercial
2 Beaumonts Way, Manurewa, Auckland	Residential
2/110 Alfriston Road, Manurewa, Auckland	Residential
2/124 Alfriston Road, Manurewa, Auckland	Residential
2/15 Alfriston Road, Manurewa East, Auckland	Residential
2/18A Weymouth Road, Manurewa, Auckland	Residential
2/19 Alfriston Road, Manurewa East, Auckland	Residential
2/236A Great South Road, Manurewa, Auckland	Commercial
2/24 Alfriston Road, Manurewa East, Auckland	Residential
2/256 Great South Road, Manurewa, Auckland	Residential
2/258 Great South Road, Manurewa, Auckland	Residential
2/26 Alfriston Road, Manurewa East, Auckland	Residential
2/28 Alfriston Road, Manurewa East, Auckland	Residential
2/32 Alfriston Road, Manurewa East, Auckland	Residential
2/51 Alfriston Road, Manurewa East, Auckland	Residential
2/72 Alfriston Road, Manurewa East, Auckland	Residential
2/84 Alfriston Road, Manurewa East, Auckland	Residential
2/86 Alfriston Road, Manurewa East, Auckland	Residential
203-205 Great South Road, Manurewa, Auckland	Commercial
20A Alfriston Road, Manurewa East, Auckland	Residential
214-216 Great South Road, Manurewa, Auckland	Commercial
215 Great South Road, Manurewa, Auckland	Residential
217 Great South Road, Manurewa, Auckland	Residential
218-220 Great South Road, Manurewa, Auckland	Commercial

Address	Building Type / Structure
219 Great South Road, Manurewa, Auckland	Residential
22 Skelton Avenue, Randwick Park, Auckland	Residential
22 Weymouth Road, Manurewa, Auckland	Residential
22/110 Alfriston Road, Manurewa, Auckland	Residential
221 Great South Road, Manurewa, Auckland	Residential
222A Great South Road, Manurewa, Auckland	Commercial
223 Great South Road, Manurewa, Auckland	Residential
225-227 Great South Road, Manurewa, Auckland	Commercial
229 Great South Road, Manurewa, Auckland	Residential
2-3/63 Alfriston Road, Manurewa East, Auckland	Residential
2-3/66 Alfriston Road, Manurewa East, Auckland	Residential
230 Great South Road, Manurewa, Auckland	Commercial
232 Great South Road, Manurewa, Auckland	Commercial
233 Great South Road, Manurewa, Auckland	Residential
234 Great South Road, Manurewa, Auckland	Commercial
235 Great South Road, Manurewa, Auckland	Residential
237A Great South Road, Manurewa, Auckland	Residential
240 Great South Road, Manurewa, Auckland	Residential
242 Great South Road, Manurewa East, Auckland	Commercial
246 Great South Road, Manurewa, Auckland	Residential
250 Great South Road, Manurewa, Auckland	Residential
250A Great South Road, Manurewa, Auckland	Residential
252B Great South Road, Manurewa, Auckland	Residential
259 Great South Road, Manurewa, Auckland	Residential
25A Alfriston Road, Manurewa East, Auckland	Residential
25B Alfriston Road, Manurewa East, Auckland	Residential
26 Weymouth Road, Manurewa, Auckland	Residential
260 Great South Road, Manurewa, Auckland	Residential
27A Alfriston Road, Manurewa East, Auckland	Residential
29 Alfriston Road, Manurewa East, Auckland	Commercial
29 Index Place, Manurewa, Auckland	Residential
2A-C Fleming Street, Manurewa East, Auckland	Residential
3 Beaumonts Way, Manurewa, Auckland	Residential
3 Shifnal Drive, Randwick Park, Auckland	Residential
3/32 Alfriston Road, Manurewa East, Auckland	Residential
3/81 Alfriston Road, Manurewa East, Auckland	Residential
30B Alfriston Road, Manurewa East, Auckland	Residential
33 Alfriston Road, Manurewa East, Auckland	Residential
33A Alfriston Road, Manurewa East, Auckland	Residential
34 Alfriston Road, Manurewa East, Auckland	Residential
36 Alfriston Road, Manurewa East, Auckland	Residential
37 Alfriston Road, Manurewa East, Auckland	Residential
38A Alfriston Road, Manurewa East, Auckland	Residential
39 Alfriston Road, Manurewa East, Auckland	Residential
4 Beaumonts Way, Manurewa, Auckland	Residential
4/32 Alfriston Road, Manurewa East, Auckland	Residential
4/81 Alfriston Road, Manurewa East, Auckland	Residential
40A Alfriston Road, Manurewa East, Auckland	Residential
41 Alfriston Road, Manurewa East, Auckland	Residential
42A Alfriston Road, Manurewa East, Auckland	Residential

Address	Building Type / Structure
45 Alfriston Road, Manurewa East, Auckland	Residential
4-6 Alfriston Road, Manurewa East, Auckland	Commercial
47 Alfriston Road, Manurewa East, Auckland	Residential
49 Alfriston Road, Manurewa East, Auckland	Residential
49 Claude Road, Hillpark, Auckland	Residential
5 Alfriston Road, Manurewa, Auckland	Commercial
5 Beaumonts Way, Manurewa, Auckland	Residential
5 Scotts Road, Manurewa East, Auckland	Residential
5/15 Alfriston Road, Manurewa East, Auckland	Residential
5/81 Alfriston Road, Manurewa East, Auckland	Residential
52 Alfriston Road, Manurewa East, Auckland	Residential
52A Alfriston Road, Manurewa East, Auckland	Residential
56 Claude Road, Hillpark, Auckland	Residential
59B Alfriston Road, Manurewa East, Auckland	Residential
6 Skelton Avenue, Randwick Park, Auckland	Residential
60 Claude Road, Manurewa East, Auckland	Residential
61 Alfriston Road, Manurewa East, Auckland	Residential
62 Alfriston Road, Manurewa East, Auckland	Residential
64 Alfriston Road, Manurewa East, Auckland	Residential
65 Alfriston Road, Manurewa East, Auckland	Residential
67 Alfriston Road, Manurewa East, Auckland	Residential
68 Alfriston Road, Manurewa East, Auckland	Residential
70A Alfriston Road, Manurewa East, Auckland	Residential
8 Scotts Road, Manurewa East, Auckland	Residential
80 Alfriston Road, Manurewa East, Auckland	Residential
88 Alfriston Road, Manurewa East, Auckland	Residential
88 Magic Way, Randwick Park, Auckland	Residential
90A Alfriston Road, Manurewa East, Auckland	Residential
92A Alfriston Road, Manurewa, Auckland	Residential

1.4 NoR 4

Address	Building Type / Structure
1 Giani Court, Manurewa, Auckland	Residential
1 Ricardo Court, Manurewa, Auckland	Residential
1 Sarteano Drive, Manurewa, Auckland	Residential
1 Sheriff Place, Randwick Park, Auckland	Residential
1/1 Clarice Place, Takanini	Residential
1/133 Manuroa Road, Takanini	Residential
1/156 Porchester Road, Papakura	Residential
1/160 Porchester Road, Papakura	Residential
1/2 Glenburn Place, Papakura	Residential
1/256 Porchester Road, Takanini	Residential
1/258 Porchester Road, Takanini	Residential
1/263 Porchester Road, Takanini	Residential
1/268 Porchester Road, Takanini	Residential
1/274 Porchester Road, Takanini	Residential
1/276 Porchester Road, Takanini	Residential

Address	Building Type / Structure
1/277 Porchester Road, Takanini	Residential
1/281 Porchester Road, Takanini	Residential
1/282 Porchester Road, Takanini	Residential
1/4 Glenburn Place, Papakura	Residential
1/460 Porchester Road, Randwick Park, Auckland	Residential
1/474 Porchester Road, Randwick Park, Auckland	Residential
1/476 Porchester Road, Randwick Park, Auckland	Residential
1/478 Porchester Road, Randwick Park, Auckland	Residential
1/480 Porchester Road, Randwick Park, Auckland	Residential
1/482 Porchester Road, Randwick Park, Auckland	Residential
1/490 Porchester Road, Randwick Park, Auckland	Residential
1/5 Berwyn Avenue, Takanini	Residential
1/50 Airfield Road, Takanini	Residential
1/511 Porchester Road, Randwick Park, Auckland	Commercial
1/6 Berwyn Avenue, Takanini	Residential
10 Abilene Place, Manurewa, Auckland	Residential
10 Amarillo Place, Manurewa, Auckland	Residential
10 Berwyn Avenue, Takanini	Residential
100 Takanini School Road, Takanini	Commercial
106 Hyperion Drive, Randwick Park, Auckland	Residential
108 Hyperion Drive, Randwick Park, Auckland	Residential
108 Riverton Drive, Randwick Park, Auckland	Residential
10A/B Dittmer Place, Papakura	Residential
11 Phar Lap Crescent, Takanini	Residential
11 Sheriff Place, Randwick Park, Auckland	Residential
11 Zoe Court, Manurewa, Auckland	Residential
110 Hyperion Drive, Randwick Park, Auckland	Residential
110 Riverton Drive, Randwick Park, Auckland	Residential
112 Riverton Drive, Randwick Park, Auckland	Residential
114 Riverton Drive, Randwick Park, Auckland	Residential
1185 Alfriston Road, Alfriston, Auckland	Commercial
11A/B Dittmer Place, Papakura	Residential
12 Abilene Place, Manurewa, Auckland	Residential
12 Nerissa Place, Randwick Park, Auckland	Residential
1-2/14 Nerissa Place, Randwick Park, Auckland	Residential
1-2/162 Porchester Road, Papakura	Residential
1-2/286 Porchester Road, Takanini	Residential
1-2/299 Porchester Road, Takanini	Residential
1-2/3 Berwyn Avenue, Takanini	Residential
121 Riverton Drive, Randwick Park, Auckland	Residential
123 Riverton Drive, Randwick Park, Auckland	Residential
125 Riverton Drive, Randwick Park, Auckland	Residential
125A-F Manuroa Road, Takanini	Residential
127 Manuroa Road, Takanini	Residential
127 Riverton Drive, Randwick Park, Auckland	Residential
129 Hyperion Drive, Randwick Park, Auckland	Residential
129 Manuroa Road, Takanini	Residential
129 Riverton Drive, Randwick Park, Auckland	Residential
13 Calumet Way, Takanini	Residential
13 Phar Lap Crescent, Takanini	Residential

Address	Building Type / Structure
13 Sheriff Place, Randwick Park, Auckland	Residential
13 Zoe Court, Manurewa, Auckland	Residential
1-3/150 Porchester Road, Papakura	Residential
131 Hyperion Drive, Randwick Park, Auckland	Residential
131 Manuroa Road, Takanini	Residential
13-17 Biplane Street, Takanini	Residential
133 Hyperion Drive, Randwick Park, Auckland	Residential
133A Manuroa Road, Takanini	Residential
135 Hyperion Drive, Randwick Park, Auckland	Residential
135 Porchester Road, Papakura	Residential
137 Porchester Road, Papakura	Residential
139 Porchester Road, Papakura	Residential
139A Porchester Road, Papakura	Residential
140 Porchester Road, Papakura	Residential
141 Porchester Road, Papakura	Residential
145 Porchester Road, Takanini	Residential
147 Porchester Road, Takanini	Residential
149 Porchester Road, Takanini	Residential
15 Calumet Way, Takanini	Residential
15 Phar Lap Crescent, Takanini	Residential
15 Sheriff Place, Randwick Park, Auckland	Residential
15 Zoe Court, Manurewa, Auckland	Residential
150 Manuroa Road, Takanini	Residential
150A Manuroa Road, Takanini	Residential
151 Porchester Road, Takanini	Residential
152 Manuroa Road, Takanini	Residential
153 Porchester Road, Takanini	Residential
154 Manuroa Road, Takanini	Residential
155 Porchester Road, Takanini	Residential
156 Manuroa Road, Takanini	Residential
156A Manuroa Road, Takanini	Residential
157 Porchester Road, Takanini	Residential
158 Manuroa Road, Takanini	Residential
158 Porchester Road, Papakura	Residential
158A Porchester Road, Papakura	Residential
159 Porchester Road, Takanini	Residential
16 Amarillo Place, Manurewa, Auckland	Residential
160 Manuroa Road, Takanini	Residential
164A/B Porchester Road, Papakura	Residential
165 Porchester Road, Takanini	Residential
166A Porchester Road, Papakura	Residential
166B Porchester Road, Papakura	Residential
167 Alfriston Road, Manurewa, Auckland	Residential
167 Porchester Road, Takanini	Residential
168 Porchester Road, Takanini	Residential
169 Alfriston Road, Manurewa, Auckland	Residential
17 Calumet Way, Takanini	Residential
17 Phar Lap Crescent, Takanini	Residential
17 Sarteano Drive, Manurewa, Auckland	Residential
17 Sheriff Place, Randwick Park, Auckland	Residential

Address	Building Type / Structure
17 Zoe Court, Manurewa, Auckland	Residential
170 Alfriston Road, Manurewa, Auckland	Residential
170 Porchester Road, Takanini	Residential
172 Porchester Road, Takanini	Residential
174 Porchester Road, Takanini	Residential
176 Porchester Road, Takanini	Residential
178 Porchester Road, Takanini	Residential
17A Nerissa Place, Randwick Park, Auckland	Residential
18 Amarillo Place, Manurewa, Auckland	Residential
180 Porchester Road, Takanini	Residential
182 Porchester Road, Takanini	Residential
184 Porchester Road, Takanini	Residential
186 Porchester Road, Takanini	Residential
188 Porchester Road, Takanini	Residential
19 Calumet Way, Takanini	Residential
19 Phar Lap Crescent, Takanini	Residential
19 Sheriff Place, Randwick Park, Auckland	Residential
19 Yatterina Avenue, Takanini	Residential
19 Zoe Court, Manurewa, Auckland	Residential
190 Porchester Road, Takanini	Residential
192 Porchester Road, Takanini	Residential
194 Porchester Road, Takanini	Residential
196 Porchester Road, Takanini	Residential
198 Porchester Road, Takanini	Residential
1A Berwyn Avenue, Takanini	Residential
2 Berwyn Avenue, Takanini	Residential
2 Braeburn Place, Takanini	Residential
2 Bruce Pulman Drive, Takanini	Residential
2 Clarice Place, Takanini	Residential
2 Giani Court, Manurewa, Auckland	Residential
2 Popes Road, Takanini	Residential
2 Ricardo Court, Manurewa, Auckland	Residential
2 Sarteano Drive, Manurewa, Auckland	Residential
2 Sheriff Place, Randwick Park, Auckland	Residential
2 Taipan Place, Randwick Park, Auckland	Residential
2/1 Clarice Place, Takanini	Residential
2/133 Manuroa Road, Takanini	Residential
2/154 Manuroa Road, Takanini	Residential
2/156 Porchester Road, Papakura	Residential
2/160 Porchester Road, Papakura	Residential
2/2 Clarice Place, Takanini	Residential
2/2 Glenburn Place, Papakura	Residential
2/256 Porchester Road, Takanini	Residential
2/258 Porchester Road, Takanini	Residential
2/260 Porchester Road, Takanini	Residential
2/263 Porchester Road, Takanini	Residential
2/268 Porchester Road, Takanini	Residential
2/274 Porchester Road, Takanini	Residential
2/276 Porchester Road, Takanini	Residential
2/277 Porchester Road, Takanini	Residential

Address	Building Type / Structure
2/280 Porchester Road, Takanini	Residential
2/282 Porchester Road, Takanini	Residential
2/455 Porchester Road, Randwick Park, Auckland	Commercial
2/460 Porchester Road, Randwick Park, Auckland	Residential
2/474 Porchester Road, Randwick Park, Auckland	Residential
2/480 Porchester Road, Randwick Park, Auckland	Residential
2/482 Porchester Road, Randwick Park, Auckland	Residential
2/5 Berwyn Avenue, Takanini	Residential
2/50 Airfield Road, Takanini	Residential
2/550S Porchester Road, Randwick Park, Auckland	Residential
200 Alfriston Road, Manurewa, Auckland	Residential
202 Alfriston Road, Manurewa, Auckland	Residential
204 Alfriston Road, Manurewa, Auckland	Residential
206 Alfriston Road, Manurewa, Auckland	Residential
208 Alfriston Road, Manurewa, Auckland	Residential
21 Calumet Way, Takanini	Residential
21 Phar Lap Crescent, Takanini	Residential
21 Sheriff Place, Randwick Park, Auckland	Residential
210 Alfriston Road, Manurewa, Auckland	Residential
212 Alfriston Road, Manurewa, Auckland	Residential
2-12 Whakarato Way, Takanini	Residential
214 Alfriston Road, Manurewa, Auckland	Residential
216 Alfriston Road, Manurewa, Auckland	Residential
222 Alfriston Road, Manurewa, Auckland	Residential
224 Alfriston Road, Alfriston, Auckland	Residential
226 Alfriston Road, Alfriston, Auckland	Residential
228 Alfriston Road, Alfriston, Auckland	Residential
23 Calumet Way, Takanini	Residential
23 Phar Lap Crescent, Takanini	Residential
23 Popes Road, Takanini	Commercial
230 Alfriston Road, Alfriston, Auckland	Residential
234 Alfriston Road, Alfriston, Auckland	Residential
236 Alfriston Road, Alfriston, Auckland	Residential
238 Alfriston Road, Alfriston, Auckland	Residential
24 Amarillo Place, Manurewa, Auckland	Residential
24 Biplane Street, Takanini	Residential
245 Porchester Road, Takanini	Residential
248D Porchester Road, Takanini	Residential
248E Porchester Road, Takanini	Residential
25 Calumet Way, Takanini	Residential
25 Phar Lap Crescent, Takanini	Residential
250A-E Porchester Road, Takanini	Residential
252A-D Porchester Road, Takanini	Residential
255 Porchester Road, Takanini	Residential
257 Porchester Road, Takanini	Residential
259 Porchester Road, Takanini	Residential
259A Porchester Road, Takanini	Residential
26 Amarillo Place, Manurewa, Auckland	Residential
26 Biplane Street, Takanini	Residential
260 Porchester Road, Takanini	Residential

Address	Building Type / Structure
261 Porchester Road, Takanini	Residential
262 Porchester Road, Takanini	Residential
263A Porchester Road, Takanini	Residential
265 Porchester Road, Takanini	Residential
266 Porchester Road, Takanini	Residential
267 Porchester Road, Takanini	Residential
269 Porchester Road, Takanini	Residential
27 Calumet Way, Takanini	Residential
27 Foxlaw Street, Randwick Park, Auckland	Residential
27 Walters Road, Takanini	Residential
270 Porchester Road, Takanini	Residential
271 Porchester Road, Takanini	Residential
271A Porchester Road, Takanini	Residential
272 Porchester Road, Takanini	Residential
273 Porchester Road, Takanini	Residential
273A Porchester Road, Takanini	Residential
279 Porchester Road, Takanini	Residential
279A Porchester Road, Takanini	Residential
279C Porchester Road, Takanini	Residential
279D Porchester Road, Takanini	Residential
279E Porchester Road, Takanini	Residential
28 Amarillo Place, Manurewa, Auckland	Residential
281 Porchester Road, Takanini	Residential
28-34 Biplane Street, Takanini	Residential
284 Porchester Road, Takanini	Residential
289 Porchester Road, Takanini	Residential
29 Calumet Way, Takanini	Residential
29 Foxlaw Street, Randwick Park, Auckland	Residential
29 Phar Lap Crescent, Takanini	Residential
295B Porchester Road, Takanini	Residential
295C Porchester Road, Takanini	Residential
297A Porchester Road, Takanini	Residential
297B Porchester Road, Takanini	Residential
297C Porchester Road, Takanini	Residential
2A Clarice Place, Takanini	Residential
2A Popes Road, Takanini	Residential
2A Sheriff Place, Randwick Park, Auckland	Residential
2B Sheriff Place, Randwick Park, Auckland	Residential
2C Sheriff Place, Randwick Park, Auckland	Residential
3 Arion Road, Takanini	Residential
3 Giani Court, Manurewa, Auckland	Residential
3 Glenburn Place, Papakura	Residential
3 Phar Lap Crescent, Takanini	Residential
3 Ricardo Court, Manurewa, Auckland	Residential
3 Sarteano Drive, Manurewa, Auckland	Residential
3 Sheriff Place, Randwick Park, Auckland	Residential
3 Sires Parkway, Takanini	Residential
3/258 Porchester Road, Takanini	Residential
3/263 Porchester Road, Takanini	Residential
3/286 Porchester Road, Takanini	Residential

Address	Building Type / Structure
3/460 Porchester Road, Randwick Park, Auckland	Residential
30 Walters Road, Takanini, Auckland	Commercial
301 Porchester Road, Takanini	Residential
301A Porchester Road, Takanini	Residential
305 Porchester Road, Takanini	Residential
307-309 Porchester Road, Takanini	Residential
31 Calumet Way, Takanini	Residential
31 Foxlaw Street, Randwick Park, Auckland	Residential
31 Phar Lap Crescent, Takanini	Residential
31 Walters Road, Takanini	Residential
311 Porchester Road, Takanini	Residential
33 Calumet Way, Takanini	Residential
33 Foxlaw Street, Randwick Park, Auckland	Residential
33 Phar Lap Crescent, Takanini	Residential
33 Walters Road, Takanini	Residential
333 Porchester Road, Takanini	Residential
33A Walters Road, Takanini	Residential
35 Calumet Way, Takanini	Residential
35 Foxlaw Street, Randwick Park, Auckland	Residential
35 Phar Lap Crescent, Takanini	Residential
35 Walters Road, Takanini	Residential
354 Porchester Road, Takanini	Commercial
354A Porchester Road, Takanini	Commercial
37 Calumet Way, Takanini	Residential
37 Phar Lap Crescent, Takanini	Residential
37 Walters Road, Takanini	Residential
37A Walters Road, Takanini	Residential
39 Calumet Way, Takanini	Residential
39 Phar Lap Crescent, Takanini	Residential
39 Walters Road, Takanini	Residential
391 Porchester Road, Randwick Park, Auckland	Residential
3A Glenburn Place, Papakura	Residential
4 Berwyn Avenue, Takanini	Residential
4 Braeburn Place, Takanini	Residential
4 Bruce Pulman Drive, Takanini	Residential
4 Giani Court, Manurewa, Auckland	Residential
4 Ricardo Court, Manurewa, Auckland	Residential
4 Sarteano Drive, Manurewa, Auckland	Residential
4 Sheriff Place, Randwick Park, Auckland	Residential
4 Sires Parkway, Takanini	Residential
4/263 Porchester Road, Takanini	Residential
4/460 Porchester Road, Randwick Park, Auckland	Residential
41 Calumet Way, Takanini	Residential
41 Phar Lap Crescent, Takanini	Residential
41 Walters Road, Takanini	Residential
423 Porchester Road, Randwick Park, Auckland	Residential
428 Porchester Road, Randwick Park, Auckland	Residential
43 Calumet Way, Takanini	Residential
43 Foxlaw Street, Randwick Park, Auckland	Residential
43 Phar Lap Crescent, Takanini	Residential

Address	Building Type / Structure
43 Walters Road, Takanini	Residential
430 Porchester Road, Randwick Park, Auckland	Residential
432 Porchester Road, Randwick Park, Auckland	Residential
434 Porchester Road, Randwick Park, Auckland	Residential
436 Porchester Road, Randwick Park, Auckland	Residential
438 Porchester Road, Randwick Park, Auckland	Residential
438A Porchester Road, Randwick Park, Auckland	Residential
440 Porchester Road, Randwick Park, Auckland	Residential
442 Porchester Road, Randwick Park, Auckland	Residential
444 Porchester Road, Randwick Park, Auckland	Residential
446 Porchester Road, Randwick Park, Auckland	Residential
448 Porchester Road, Randwick Park, Auckland	Residential
45 Foxlaw Street, Randwick Park, Auckland	Residential
45 Walters Road, Takanini	Residential
450 Porchester Road, Randwick Park, Auckland	Residential
452 Porchester Road, Randwick Park, Auckland	Residential
454 Porchester Road, Randwick Park, Auckland	Residential
455 Porchester Road, Randwick Park, Auckland	Commercial
456 Porchester Road, Randwick Park, Auckland	Residential
458 Porchester Road, Randwick Park, Auckland	Residential
460 Porchester Road, Randwick Park, Auckland	Residential
463-471 Porchester Road, Randwick Park, Auckland	Residential
47 Foxlaw Street, Randwick Park, Auckland	Residential
472 Porchester Road, Randwick Park, Auckland	Residential
476 Porchester Road, Randwick Park, Auckland	Residential
478 Porchester Road, Randwick Park, Auckland	Residential
479 Porchester Road, Randwick Park, Auckland	Residential
48 Airfield Road, Takanini	Residential
484 Porchester Road, Randwick Park, Auckland	Residential
487 Porchester Road, Randwick Park, Auckland	Residential
49 Foxlaw Street, Randwick Park, Auckland	Residential
49 Walters Road, Papakura	Residential
494 Porchester Road, Randwick Park, Auckland	Residential
496 Porchester Road, Randwick Park, Auckland	Residential
498 Porchester Road, Randwick Park, Auckland	Residential
49A Walters Road, Papakura	Residential
49B Walters Road, Papakura	Residential
49E Walters Road, Papakura	Residential
4A Berwyn Avenue, Takanini	Residential
4A Sheriff Place, Randwick Park, Auckland	Residential
4B Berwyn Avenue, Takanini	Residential
5 Arion Road, Takanini	Residential
5 Giani Court, Manurewa, Auckland	Residential
5 Phar Lap Crescent, Takanini	Residential
5 Ricardo Court, Manurewa, Auckland	Residential
5 Sarteano Drive, Manurewa, Auckland	Residential
5 Sheriff Place, Randwick Park, Auckland	Residential
5/460 Porchester Road, Randwick Park, Auckland	Residential
503 Porchester Road, Randwick Park, Auckland	Residential
504 Porchester Road, Randwick Park, Auckland	Residential

Address	Building Type / Structure
506 Porchester Road, Randwick Park, Auckland	Residential
508 Porchester Road, Randwick Park, Auckland	Residential
51 Popes Road, Takanini	Residential
510 Porchester Road, Randwick Park, Auckland	Residential
511 Porchester Road, Randwick Park, Auckland	Residential
52 Airfield Road, Takanini	Residential
52 Popes Road, Takanini	Residential
526 Porchester Road, Randwick Park, Auckland	Residential
52A Airfield Road, Takanini	Residential
54 Airfield Road, Takanini	Residential
56 Airfield Road, Takanini	Residential
56A Airfield Road, Takanini	Residential
56B Airfield Road, Takanini	Residential
58 Airfield Road, Takanini	Residential
6 Abilene Place, Manurewa, Auckland	Residential
6 Berwyn Avenue, Takanini	Residential
6 Braeburn Place, Takanini	Residential
6 Bruce Pulman Drive, Takanini	Residential
6 Giani Court, Manurewa, Auckland	Residential
6 Ricardo Court, Manurewa, Auckland	Residential
6 Sarteano Drive, Manurewa, Auckland	Residential
6 Sheriff Place, Randwick Park, Auckland	Residential
6/460 Porchester Road, Randwick Park, Auckland	Residential
60 Airfield Road, Takanini	Residential
60A Airfield Road, Takanini	Residential
62 Airfield Road, Takanini	Residential
63 Stratford Road, Manurewa, Auckland	Residential
63A Stratford Road, Manurewa, Auckland	Residential
63B Stratford Road, Manurewa, Auckland	Residential
63C Stratford Road, Manurewa, Auckland	Residential
64 Airfield Road, Takanini	Residential
64 Popes Road, Takanini	Residential
64A Popes Road, Takanini	Residential
65 Stratford Road, Manurewa, Auckland	Residential
65A Stratford Road, Manurewa, Auckland	Residential
66 Airfield Road, Takanini	Residential
67 Stratford Road, Manurewa, Auckland	Residential
68 Airfield Road, Takanini	Residential
6A Braeburn Place, Takanini	Residential
6A Sheriff Place, Randwick Park, Auckland	Residential
7 Abilene Place, Manurewa, Auckland	Residential
7 Arion Road, Takanini	Residential
7 Giani Court, Manurewa, Auckland	Residential
7 Phar Lap Crescent, Takanini	Residential
7 Ricardo Court, Manurewa, Auckland	Residential
7 Sarteano Drive, Manurewa, Auckland	Residential
7 Sheriff Place, Randwick Park, Auckland	Residential
7/460 Porchester Road, Randwick Park, Auckland	Residential
70 Walters Road, Takanini	Residential
73 Popes Road, Takanini	Residential

Address	Building Type / Structure
76 Popes Road, Takanini	Residential
76A Rangī Road, Takanini	Commercial
8 Abilene Place, Manurewa, Auckland	Residential
8 Amarillo Place, Manurewa, Auckland	Residential
8 Berwyn Avenue, Takanini	Residential
8 Bruce Pulman Drive, Takanini	Residential
8 Giani Court, Manurewa, Auckland	Residential
8 Ricardo Court, Manurewa, Auckland	Residential
8/460 Porchester Road, Randwick Park, Auckland	Residential
86 Takanini School Road, Takanini	Commercial
88 Takanini School Road, Takanini	Commercial
8A Berwyn Avenue, Takanini	Residential
8B Berwyn Avenue, Takanini	Residential
9 Abilene Place, Manurewa, Auckland	Residential
9 Glenburn Place, Papakura	Residential
9 Phar Lap Crescent, Takanini	Residential
9 Sheriff Place, Randwick Park, Auckland	Residential
9 Zoe Court, Manurewa, Auckland	Residential
9-15 Whakarato Way, Takanini	Residential
92 Takanini School Road, Takanini	Commercial
94 Takanini School Road, Takanini	Commercial
96 Takanini School Road, Takanini	Commercial
98 Takanini School Road, Takanini	Commercial

2 Appendix B - Receivers predicted to receive vibration levels exceeding Category B

2.1 NoR 1

Address	Building Type / Structure
328 Great South Road, Ōpaheke, Papakura	Residential
1/326 Great South Road, Ōpaheke, Papakura	Residential
1/332 Great South Road, Ōpaheke, Papakura	Residential
1/42 Great South Road, Manurewa, Auckland	Residential
1/468 Great South Road, Ōpaheke, Papakura	Residential
1/48 Great South Road, Manurewa, Auckland	Residential
1/49 Great South Road, Manurewa, Auckland	Residential
1/52 Great South Road, Manurewa, Auckland	Residential
1/53 Great South Road, Manurewa, Auckland	Residential
1/54 Great South Road, Manurewa, Auckland	Residential
1/55 Great South Road, Manurewa, Auckland	Residential
10 Great South Road, Manurewa, Auckland	Residential
1-16/38 Great South Road, Manurewa, Auckland	Residential
1-2/2 Walter Strevens Drive, Conifer Grove, Takanini	Residential
1-2/47 Great South Road, Manurewa, Auckland	Residential
1-2/61 Great South Road, Manurewa, Auckland	Residential
23 Great South Road, Manurewa, Auckland	Residential
25 Great South Road, Manurewa, Auckland	Residential
3/61 Great South Road, Manurewa, Auckland	Residential
33 Great South Road, Manurewa, Auckland	Residential
336 Great South Road, Ōpaheke, Papakura	Residential
338 Great South Road, Ōpaheke, Papakura	Residential
3-4/79 Great South Road, Manurewa, Auckland	Residential
35 Great South Road, Manurewa, Auckland	Residential
357 Great South Road, Ōpaheke, Papakura	Residential
43A Great South Road, Manurewa, Auckland	Residential
44A Great South Road, Manurewa, Auckland	Residential
466 Great South Road, Ōpaheke, Papakura	Residential
46A Great South Road, Manurewa, Auckland	Residential
50 Great South Road, Manurewa, Auckland	Residential
5-6/79 Great South Road, Manurewa, Auckland	Residential
69A Great South Road, Manurewa, Auckland	Residential
71 Great South Road, Manurewa, Auckland	Residential
74 Great South Road, Manurewa, Auckland	Residential
81 Great South Road, Manurewa, Auckland	Residential
1 Butterworth Avenue, Ōpaheke, Papakura	Residential
1 Grande Vue Road, Hillpark, Auckland	Residential
1 Park Estate Road, Rosehill, Papakura	Residential
1/2 Park Estate Road, Rosehill, Papakura	Residential
1/34 Great South Road, Manurewa, Auckland	Residential
1/359 Great South Road, Ōpaheke, Papakura	Residential
1/446 Great South Road, Ōpaheke, Papakura	Residential
1/65 Great South Road, Manurewa, Auckland	Residential

Address	Building Type / Structure
1-2/3 Park Estate Road, Rosehill, Papakura	Residential
1-2/45 Great South Road, Manurewa, Auckland	Residential
1-2/461 Great South Road, Ōpaheke, Papakura	Residential
1-2/78A Great South Road, Manurewa, Auckland	Residential
1-2/79 Great South Road, Manurewa, Auckland	Residential
134 Great South Road, Drury	Residential
14 Great South Road, Manurewa, Auckland	Residential
1-4/1A Halsey Road, Manurewa, Auckland	Residential
155 Great South Road, Takanini	Residential
159 Great South Road, Takanini	Residential
16 Great South Road, Manurewa, Auckland	Residential
160A Great South Road, Takanini	Residential
18 Great South Road, Manurewa, Auckland	Residential
2/469 Great South Road, Ōpaheke, Papakura	Residential
24 Great South Road, Manurewa, Auckland	Residential
29 Great South Road, Manurewa, Auckland	Residential
307A Great South Road, Manurewa, Auckland	Residential
31 Great South Road, Manurewa, Auckland	Residential
313 Great South Road, Manurewa, Auckland	Residential
3-4/464 Great South Road, Ōpaheke, Papakura	Residential
361 Great South Road, Ōpaheke, Papakura	Residential
39 Great South Road, Manurewa, Auckland	Residential
456 Great South Road, Ōpaheke, Papakura	Residential
469 Great South Road, Ōpaheke, Papakura	Residential
471 Great South Road, Ōpaheke, Papakura	Residential
473 Great South Road, Ōpaheke, Papakura	Residential
595 Great South Road, Rosehill, Papakura	Residential
63 Great South Road, Manurewa, Auckland	Residential
67 Great South Road, Manurewa, Auckland	Residential
73 Great South Road, Manurewa, Auckland	Residential
75 Great South Road, Manurewa, Auckland	Residential
1-3/319-323 Great South Road, Papakura	Commercial
152 Great South Road, Takanini	Commercial
166-168 Great South Road, Takanini	Commercial
167 Great South Road, Takanini	Commercial
21 Great South Road, Manurewa, Auckland	Commercial
282 Great South Road, Manurewa, Auckland	Commercial
299 Great South Road, Papakura	Commercial
303-305, 311-317 Great South Road, Papakura	Commercial
309 Great South Road, Manurewa, Auckland	Commercial
311 Great South Road, Manurewa, Auckland	Commercial
369-371 Great South Road, Ōpaheke, Papakura	Commercial
69 Great South Road, Papakura	Commercial
79-83 Great South Road, Papakura	Commercial
86-88 Great South Road, Papakura	Commercial

2.2 NoR 2

Address	Building Type / Structure
257-261 Great South Road, Drury	Commercial

2.3 NoR 3

Address	Building Type / Structure
1/28 Alfriston Road, Manurewa East, Auckland	Residential
25A Alfriston Road, Manurewa East, Auckland	Residential
129 Alfriston Road, Manurewa, Auckland	Residential
137 Alfriston Road, Manurewa, Auckland	Residential
139 Alfriston Road, Manurewa, Auckland	Residential
1/51 Alfriston Road, Manurewa East, Auckland	Residential
80 Alfriston Road, Manurewa East, Auckland	Residential
27A Alfriston Road, Manurewa East, Auckland	Residential
2/84 Alfriston Road, Manurewa East, Auckland	Residential
1/124 Alfriston Road, Manurewa, Auckland	Residential
135 Alfriston Road, Manurewa, Auckland	Residential
215 Great South Road, Manurewa, Auckland	Residential
20A Alfriston Road, Manurewa East, Auckland	Residential
1/55 Alfriston Road, Manurewa East, Auckland	Residential
2 Beaumonts Way, Manurewa, Auckland	Residential
131A Alfriston Road, Manurewa, Auckland	Residential
1/258 Great South Road, Manurewa, Auckland	Residential
2/32 Alfriston Road, Manurewa East, Auckland	Residential
18A Weymouth Road, Manurewa, Auckland	Residential
2A-C Fleming Street, Manurewa East, Auckland	Residential
217 Great South Road, Manurewa, Auckland	Residential
1/72 Alfriston Road, Manurewa East, Auckland	Residential
1-3/245 Great South Road, Manurewa, Auckland	Residential
122A Alfriston Road, Manurewa, Auckland	Residential
1/57 Alfriston Road, Manurewa East, Auckland	Residential
141B Alfriston Road, Manurewa, Auckland	Residential
2/26 Alfriston Road, Manurewa East, Auckland	Residential
219 Great South Road, Manurewa, Auckland	Residential
128 Alfriston Road, Manurewa, Auckland	Residential
143 Alfriston Road, Manurewa, Auckland	Residential
130 Alfriston Road, Manurewa, Auckland	Residential
141C Alfriston Road, Manurewa, Auckland	Residential
250 Great South Road, Manurewa, Auckland	Residential
16 Alfriston Road, Manurewa East, Auckland	Residential
1-8/261 Great South Road, Manurewa, Auckland	Residential
250A Great South Road, Manurewa, Auckland	Residential
116 Alfriston Road, Manurewa, Auckland	Residential
1/66 Alfriston Road, Manurewa East, Auckland	Residential
1/15 Alfriston Road, Manurewa East, Auckland	Residential
1 Beaumonts Way, Manurewa, Auckland	Residential
221 Great South Road, Manurewa, Auckland	Residential

Address	Building Type / Structure
141D Alfriston Road, Manurewa, Auckland	Residential
45 Alfriston Road, Manurewa East, Auckland	Residential
260 Great South Road, Manurewa, Auckland	Residential
1-3/78 Alfriston Road, Manurewa East, Auckland	Residential
240 Great South Road, Manurewa, Auckland	Residential
141E Alfriston Road, Manurewa, Auckland	Residential
100 Alfriston Road, Manurewa, Auckland	Residential
5/81 Alfriston Road, Manurewa East, Auckland	Residential
88 Alfriston Road, Manurewa East, Auckland	Residential
26 Weymouth Road, Manurewa, Auckland	Residential
246 Great South Road, Manurewa, Auckland	Residential
1/256 Great South Road, Manurewa, Auckland	Residential
33 Alfriston Road, Manurewa East, Auckland	Residential
1/24 Weymouth Road, Manurewa, Auckland	Residential
1/24 Alfriston Road, Manurewa East, Auckland	Residential
106 Alfriston Road, Manurewa, Auckland	Residential
3 Shifnal Drive, Randwick Park, Auckland	Residential
1/254 Great South Road, Manurewa, Auckland	Residential
112 Alfriston Road, Manurewa, Auckland	Residential
1/71 Alfriston Road, Manurewa East, Auckland	Residential
61 Alfriston Road, Manurewa East, Auckland	Residential
122H Alfriston Road, Manurewa, Auckland	Residential
49 Alfriston Road, Manurewa East, Auckland	Residential
259 Great South Road, Manurewa, Auckland	Residential
141F Alfriston Road, Manurewa, Auckland	Residential
22 Weymouth Road, Manurewa, Auckland	Residential
143A Alfriston Road, Manurewa, Auckland	Residential
2/86 Alfriston Road, Manurewa East, Auckland	Residential
34 Alfriston Road, Manurewa East, Auckland	Residential
60 Claude Road, Manurewa East, Auckland	Residential
133 Alfriston Road, Manurewa, Auckland	Residential
30B Alfriston Road, Manurewa East, Auckland	Residential
1/252 Great South Road, Manurewa, Auckland	Residential
4 Beaumonts Way, Manurewa, Auckland	Residential
132 Alfriston Road, Manurewa, Auckland	Residential
2 Alfriston Road, Manurewa, Auckland	Commercial
242 Great South Road, Manurewa East, Auckland	Commercial
222A Great South Road, Manurewa, Auckland	Commercial
234 Great South Road, Manurewa, Auckland	Commercial
218-220 Great South Road, Manurewa, Auckland	Commercial
29 Alfriston Road, Manurewa East, Auckland	Commercial
230 Great South Road, Manurewa, Auckland	Commercial
4-6 Alfriston Road, Manurewa East, Auckland	Commercial
232 Great South Road, Manurewa, Auckland	Commercial
214-216 Great South Road, Manurewa, Auckland	Commercial
225-227 Great South Road, Manurewa, Auckland	Commercial
203-205 Great South Road, Manurewa, Auckland	Commercial

2.4 NoR 4

Address	Building Type / Structure
1 Sarteano Drive, Manurewa, Auckland	Residential
1 Sheriff Place, Randwick Park, Auckland	Residential
1/133 Manuroa Road, Takanini	Residential
1/156 Porchester Road, Papakura	Residential
1/160 Porchester Road, Papakura	Residential
1/258 Porchester Road, Takanini	Residential
1/263 Porchester Road, Takanini	Residential
1/274 Porchester Road, Takanini	Residential
1/277 Porchester Road, Takanini	Residential
1/281 Porchester Road, Takanini	Residential
1/474 Porchester Road, Randwick Park, Auckland	Residential
1/480 Porchester Road, Randwick Park, Auckland	Residential
1/482 Porchester Road, Randwick Park, Auckland	Residential
11 Sheriff Place, Randwick Park, Auckland	Residential
114 Riverton Drive, Randwick Park, Auckland	Residential
1-2/286 Porchester Road, Takanini	Residential
1-2/299 Porchester Road, Takanini	Residential
129 Riverton Drive, Randwick Park, Auckland	Residential
13 Sheriff Place, Randwick Park, Auckland	Residential
135 Hyperion Drive, Randwick Park, Auckland	Residential
141 Porchester Road, Papakura	Residential
149 Porchester Road, Takanini	Residential
15 Phar Lap Crescent, Takanini	Residential
15 Sheriff Place, Randwick Park, Auckland	Residential
158 Manuroa Road, Takanini	Residential
158 Porchester Road, Papakura	Residential
160 Manuroa Road, Takanini	Residential
164A/B Porchester Road, Papakura	Residential
166B Porchester Road, Papakura	Residential
168 Porchester Road, Takanini	Residential
17 Sheriff Place, Randwick Park, Auckland	Residential
170 Porchester Road, Takanini	Residential
172 Porchester Road, Takanini	Residential
174 Porchester Road, Takanini	Residential
176 Porchester Road, Takanini	Residential
178 Porchester Road, Takanini	Residential
180 Porchester Road, Takanini	Residential
182 Porchester Road, Takanini	Residential
184 Porchester Road, Takanini	Residential
186 Porchester Road, Takanini	Residential
188 Porchester Road, Takanini	Residential
190 Porchester Road, Takanini	Residential
2 Berwyn Avenue, Takanini	Residential
2 Bruce Pulman Drive, Takanini	Residential
2 Ricardo Court, Manurewa, Auckland	Residential
2 Sarteano Drive, Manurewa, Auckland	Residential
200 Alfriston Road, Manurewa, Auckland	Residential
206 Alfriston Road, Manurewa, Auckland	Residential

Address	Building Type / Structure
208 Alfriston Road, Manurewa, Auckland	Residential
2-12 Whakarato Way, Takanini	Residential
214 Alfriston Road, Manurewa, Auckland	Residential
216 Alfriston Road, Manurewa, Auckland	Residential
222 Alfriston Road, Manurewa, Auckland	Residential
224 Alfriston Road, Alfriston, Auckland	Residential
234 Alfriston Road, Alfriston, Auckland	Residential
252A-D Porchester Road, Takanini	Residential
257 Porchester Road, Takanini	Residential
260 Porchester Road, Takanini	Residential
261 Porchester Road, Takanini	Residential
262 Porchester Road, Takanini	Residential
267 Porchester Road, Takanini	Residential
273 Porchester Road, Takanini	Residential
279 Porchester Road, Takanini	Residential
284 Porchester Road, Takanini	Residential
295B Porchester Road, Takanini	Residential
2A Sheriff Place, Randwick Park, Auckland	Residential
2B Sheriff Place, Randwick Park, Auckland	Residential
3 Sarteano Drive, Manurewa, Auckland	Residential
3 Sheriff Place, Randwick Park, Auckland	Residential
3/286 Porchester Road, Takanini	Residential
31 Calumet Way, Takanini	Residential
33 Calumet Way, Takanini	Residential
33 Walters Road, Takanini	Residential
35 Calumet Way, Takanini	Residential
35 Walters Road, Takanini	Residential
37 Calumet Way, Takanini	Residential
37 Walters Road, Takanini	Residential
39 Calumet Way, Takanini	Residential
430 Porchester Road, Randwick Park, Auckland	Residential
446 Porchester Road, Randwick Park, Auckland	Residential
448 Porchester Road, Randwick Park, Auckland	Residential
458 Porchester Road, Randwick Park, Auckland	Residential
460 Porchester Road, Randwick Park, Auckland	Residential
472 Porchester Road, Randwick Park, Auckland	Residential
49 Walters Road, Papakura	Residential
49A Walters Road, Papakura	Residential
5 Sarteano Drive, Manurewa, Auckland	Residential
504 Porchester Road, Randwick Park, Auckland	Residential
506 Porchester Road, Randwick Park, Auckland	Residential
508 Porchester Road, Randwick Park, Auckland	Residential
526 Porchester Road, Randwick Park, Auckland	Residential
56 Airfield Road, Takanini	Residential
56A Airfield Road, Takanini	Residential
58 Airfield Road, Takanini	Residential
7 Giani Court, Manurewa, Auckland	Residential
7 Sarteano Drive, Manurewa, Auckland	Residential
8 Giani Court, Manurewa, Auckland	Residential
9-15 Whakarato Way, Takanini	Residential

Address	Building Type / Structure
1/511 Porchester Road, Randwick Park, Auckland	Commercial

VOLUME 4

South Frequent Transit Network Assessment of Ecological Effects

October 2023

Version 1.0

Document Status

Responsibility	Name
Author	Sahar Firoozkoohi and Conor Reid
Reviewer	Fiona Davies
Approver	Liam Winter

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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
Auckland Council	Means the unitary authority that replaced eight councils in the Auckland Region as of 1 November 2010
Ecological Baseline	Means the prevailing ecological state at the time of the assessment
Likely Future Ecological Environment	The likely future environment informed by the Auckland Unitary Plan (AUP)
Ecological Feature	Specific aspects of an ecosystem that are described and evaluated, the term includes components such as species and habitats and related processes and functions, such as habitat buffers and roosting and feeding habitat
Greenfields	Generally rural land identified to be urbanised over time i.e. Future Urban Zoned land
Hydroperiod	Flow and/or soil saturation period of streams or wetlands
Project Area	Area of land that is within the proposed designation boundary
Project Footprint	Area of land that is within the road design
Significant Ecological Area	An overlay within the Auckland Unitary Plan Operative in Part, whereby areas of terrestrial, freshwater or marine habitat of significant indigenous vegetation or significant habitats of indigenous fauna are identified and protected from the adverse effects of subdivision, use or development
Wetland	Defined in the Resource Management Act 1991 as “includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions”
Rapid Habitat Assessment	The RHA provides a standardised protocol for making a quick, qualitative, site-based assessment of physical stream habitat conditions (Clapcott, 2015)
ABM	Automatic Bat Monitors
AEE	Assessment of Effects on the Environment report
ASCV	Area of Significant Conservation Value
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan: Operative in Part

Acronym/Term	Description
BMP	Bat Management Plan
District Plan Tree	Any notable tree, or tree that is greater than 4m in height and/or greater than 400mm in girth located within existing Road reserve and / or Open Space Zone that would require resource consent under the District Plan provisions to be removed (refer to Table E26.4.3.1(A89) and (A92))
DOC	Department of Conservation
EcIA	Ecological Impact Assessment
ED	Ecological District
EIANZ	Ecological Impact Assessment New Zealand: terrestrial and freshwater ecosystems (2018)
LINZ	Land Information New Zealand
LMP	Lizard Management Plan
MDRS	Medium Density Residential Standards
MCA	Multi-Criteria Assessment
N/A	Not Applicable
NIMT	North Island Main Trunk rail line
NIWA	National Institute of Water and Atmospheric Research
NPS	National Policy Statement
NPS-FM	National Policy Statement on Freshwater Management 2022
NPS-UD	National Policy Statement on Urban Development 2020
NoR	Notice of Requirement
NoR 1	Great South Road FTN Upgrade
NoR 2	Great South Road Upgrade (Drury section)
NoR 3	Takaanini FTN – Weymouth Road, Alfriston Road, and Great South Road Upgrades
NoR 4	Takaanini FTN – Porchester Road and Popes Road Upgrades
NZ	New Zealand
NZFFDMS	New Zealand Freshwater Fish Database
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).
RHA	Rapid Habitat Assessment

Acronym/Term	Description
RMA	Resource Management Act 1991
RTC	Rapid Transit corridor
SEA	Significant Ecological Area
SEV	Stream Ecological Valuation
South FTN	South Frequent Transit Network
Te Tupu Ngātahi	Te Tupu Ngātahi Supporting Growth Alliance
TAR	Threatened and At-Risk Species
Waka Kotahi	Waka Kotahi New Zealand Transport Agency
ZoI	Zone of Influence - The Zone of Influence is defined in the EIANZ Guidelines as “the areas/resources that may be affected by the biophysical changes caused by the proposed Project and associated activities.”

Executive Summary

This Ecological Impact Assessment (**EclA / Report**) has been prepared to inform the Assessment of Effects on the Environment (**AEE**) for four Notices of Requirement (**NoRs / the Project**) being sought by Auckland Transport (**AT**) for the South Frequent Transit Network (**FTN**) under the Resource Management Act 1991 (**RMA**). The NoRs (in the table below) are to designate land for roading upgrades necessary to enable the operation of high-quality bus services along two routes in South Auckland (referred to as the Great South Road FTN and Takaanini FTN) and urbanisation of complementary non-FTN corridors (along Popes Road and the Drury section of Great South Road).

South FTN – Notices of Requirement and Projects

Notice	Project	Requiring Authority
NoR 1	Great South Road FTN Upgrade	Auckland Transport (AT)
NoR 2	Great South Road Upgrade (Drury section)	
NoR 3	Takaanini FTN – Weymouth Road, Alfriston Road and Great South Road Upgrades	
NoR 4	Takaanini FTN - Porchester Road and Popes Road Upgrades	

As the Project relates to proposed designations, this EclA assesses District Plan matters only. Regional matters (along with Wildlife Act 1953 compliance) will be subject to a future consenting phase along with a supporting EclA. As such, regional matters have not been formally assessed in this report, however the relevant matters have been considered to inform the designation boundaries and future regional resource consents.

To inform the ecological baseline, ecological features within each NoR boundary were identified, mapped and their value assessed in terms of representativeness, rarity/distinctiveness, diversity/pattern and ecological context. Ecological features included:

- A total of nine vegetation types ranging in value from **Low** to **Very High**;
- Long-tailed bats potentially associated with all NoRs, assessed as having **Very High** value (albeit likely transient visitors to the area);
- A total of 56 avifauna species may be present, of which, 35 are native, 13 have a Threatened or At-Risk (**TAR**) status, and the remainder are exotic;
- A total of two herpetofauna species were likely to occur within the Project Area, which have a TAR status;
- A total of three intermittent streams and seven permanent streams have been assessed and range in value from **Low** to **High**. Streams which are associated with the following main catchments: Papakura Stream, Slippery Creek/Waihaihio Stream, and Hingaia Stream;
- A total of nine native fish of which two have a TAR status have the potential to occur in the Project Area; and
- A total of seven wetlands have delineated, representing two wetland types. Wetlands range in value from **Low** to **High**.

Construction Effects

The District Plan matter ecological effects relevant to construction prior to any mitigation identified are:

- disturbance and displacement to long-tailed bat (*Chalinolobus tuberculatus*) roosts;
- disturbance and displacement to threatened bird nests (existing) due to construction activities (noise, light, dust, vibration etc.); and
- the effect of habitat removal (district plan trees only¹) on long-tailed bats, birds and lizards, specifically relating to mortality/injury and roost/refugia loss.

The level of effect on bats and birds was considered to be **Low** to **Very Low**, therefore no mitigation was required at this stage in the assessment.

The level of effect for native lizards in relation to district plan tree/vegetation removal (at specific locations) was however assessed to be **Moderate** and therefore mitigation has been developed. Recommended construction effect mitigation measures include the development of a Lizard Management Plan (**LMP**) for all NoRs should consider the following:

- Preconstruction surveys and/or habitat potential surveys to confirm (potential) presence and guide further management;
- Timing of the implementation of the LMP;
- 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; and
 - 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;
- 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; and
- Lizard management should be consistent with any regional consent conditions (and the Wildlife Act) that may be required for regional compliance.

¹ As per the South FTN 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 in respect of infrastructure projects, and effects on trees in Open Space zones.

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

Operational Effects

District matter ecological effects relevant to operation prior to any mitigation identified are disturbance and displacement to long-tailed bat roosts and 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). Potential effects on long-tailed bat roosts and bird nests were considered to be **Low**, therefore no mitigation was required at this stage in the assessment.

Future regional resource consenting

Consideration was also given to future regional resource consenting matters and the range of ecological assessments likely required to inform the regional consenting process. These may include:

- Detailed habitat and fauna surveys to inform the Ecological Impact Assessment which will be used to support future regional resource consent;
- Stream Ecological Valuation (**SEV**) assessments will need to be undertaken to inform the re-evaluation of streams. Opportunities to restore riparian habitat along these features will also need to be taken into consideration. Fish salvage and relocation, sediment control and management of the riparian condition will also be required;
- A detailed wetland assessment, including delineation and functional assessments, will be required. Opportunities for wetland restoration and / or enhancement will also need to be assessed; and
- An additional cumulative ecological effects assessment. The cumulative effect of all the NoRs proposed requires consideration, along with other key drivers of change. A more comprehensive cumulative ecological effects assessment should be undertaken early in the resource consenting process.

1 Introduction

1.1 Purpose and Scope of this Report

This Report has been prepared to inform the Assessment of Effects on the Environment (**AEE**) for Notices of Requirement (**NoRs**) being sought by Auckland Transport (**AT**) for the South Frequent Transit Network (**South FTN**) under the RMA. Four NoR 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 report as the Project.

Specifically, this Report considers the actual and potential effects associated with the construction and operation of the Project on the existing and likely future environment as it relates to ecological effects and recommends measures that may be implemented to avoid, remedy and/or mitigate these effects.

This Report should be read alongside the AEE, which contains further details on the history and context of the Project. The AEE also contains a detailed description of works to be authorised within the NoR, and the typical construction methodologies that will be used to implement this work. These have been reviewed by the author of this Report and have been considered as part of this assessment of ecological effects. As such, they are not repeated here. Where a description of an activity is necessary to understand the potential effects, it has been included in this Report for clarity.

1.2 Report Structure

In order to provide a clear assessment of the NoRs, this Report follows as appropriate, the structure set out in the AEE. This Report contains an assessment of the actual and potential effects of the Project as a whole (the NoRs). Where appropriate, measures to avoid, remedy or mitigate effects are recommended. The sections of this Report are arranged accordingly.

The Report is structured as follows:

- **Section 2** - Project overview with a summary of the proposed works;
- **Section 3 and Section 4** - Overview of the methodology used to undertake the assessment and identification of the assessment criteria and any relevant standards or guidelines
- **Section 5**- Identification and description of the existing (baseline) and likely future ecological environment
- **Section 8** - Assessment of the actual and potential effects (adverse and positive) of construction and operation of the work to be enabled by the NoRs on relevant ecological features. Includes recommended measures to avoid or mitigate potential adverse effects;
- **Section 9** – Design and future Regional Plan/National Environmental Standards/Wildlife Act consenting considerations are discussed in relation to the ecological features; and
- **Section 10** - Overall conclusion of the level of potential adverse ecological effects after recommended measures are implemented.

2 Project Description

2.1 Context – South FTN network

As described further in the AEE, the South FTN is one of the transport works packages proposed for South Auckland between Manukau and Drury as part of Te Tupu Ngātahi Supporting Growth (**Te Tupu Ngātahi**) programme.² The South FTN is in turn part of a wider planned multi-modal transport network intended to support growth and enable mode shift in South Auckland.

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 FTN³ bus services 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
- Urbanisation of adjoining key connections to FTN routes – Popes Road West, 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 2-1.

2.2 The NoRs – proposed spatial extent

Of the full South FTN network extent shown in Figure 2-1, only a portion falls within the NoRs/Project (see Figure 2-2). 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.⁴

Accordingly, this assessment is focussed on the activities proposed to be authorised by the NoRs. 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 2-1, and the extents are shown in Figure 2-2.

Further detail on the proposed activities and works in each NoR are provided in the AEE.

² The Programme is a collaboration between AT and Waka Kotahi NZ Transport Agency (**Waka Kotahi**) to investigate, plan, and undertake route protection for the strategic transport networks needed to support Auckland's growth over the next 30 years.

³ FTN services are defined in AT's Regional Public Transport Plan (**RPTP**) as bus routes operating at least every 15 minutes between 7am-7pm, 7 days-a-week, often supported by priority measures such as bus or transit lanes.

⁴ 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.

Table 2-1: Summary of the proposed Project

NoR reference	Project component	Description
NoR 1	Great South Road FTN Upgrade	<ul style="list-style-type: none"> 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 2-2) 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)	<ul style="list-style-type: none"> 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 – Alfriston Road, Weymouth Road and Great South Road Upgrade	<ul style="list-style-type: none"> 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 and Popes Road Upgrade	<ul style="list-style-type: none"> 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.

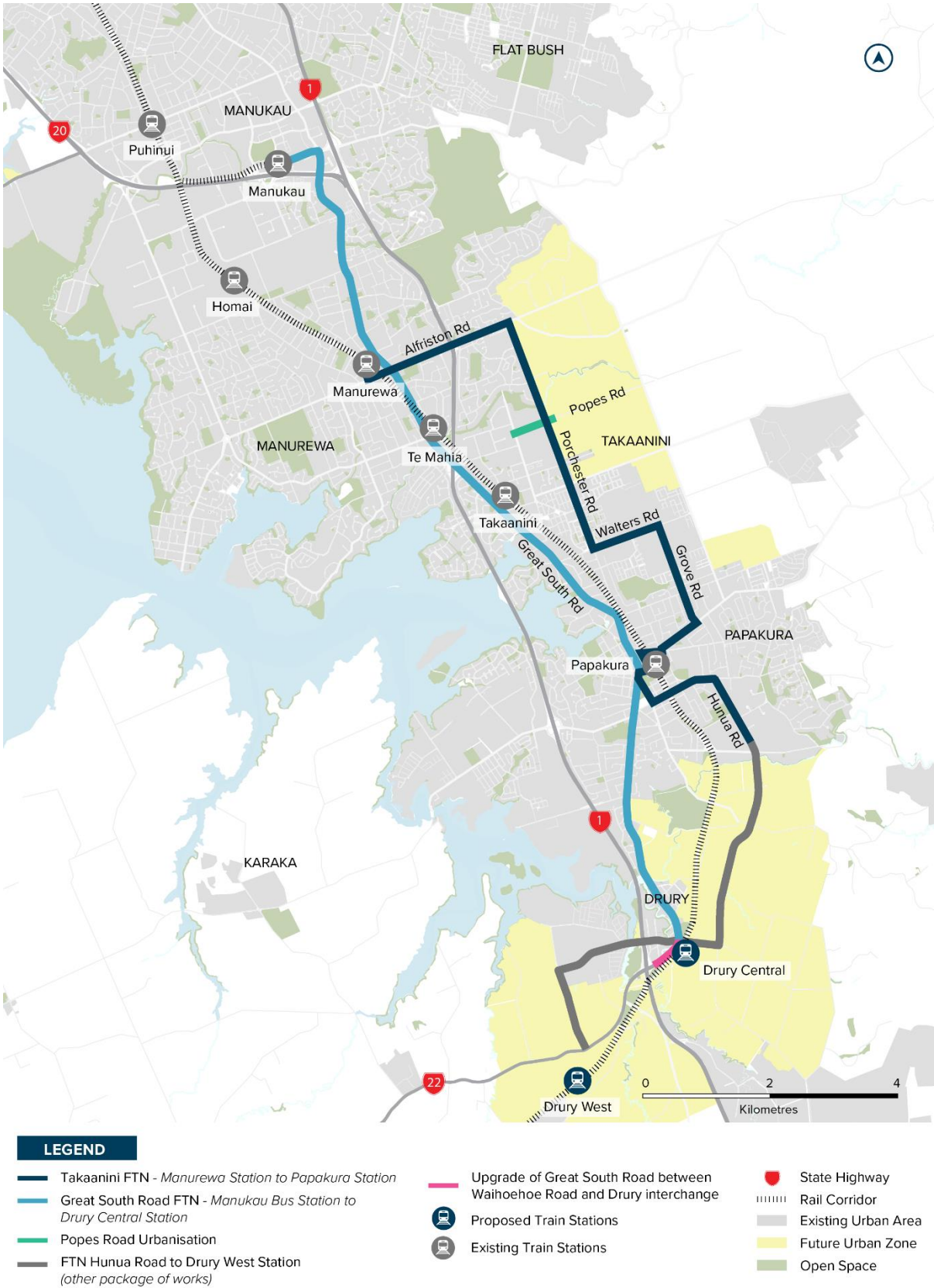


Figure 2-1: South FTN – full network



Figure 2-2: South FTN – NoR extents (the Project)

3 Assessment Approach

3.1 EcIA Assessment

The approach followed in this study is consistent with the approach outlined in the EcIA Guidelines (Roper-Lindsay *et al.*, 2018) referred to as the EIANZ Guidelines in this report). The overarching goal of the ecological assessment is to determine the ecological effects of specific Project features or activities and has been considered under two scenarios – 1) the existing ecological baseline and 2) the likely future ecological environment. The requirements for such an assessment are outlined with the EIANZ Guidelines and form the basis of this report. This process is summarised in Figure 3-1 below.

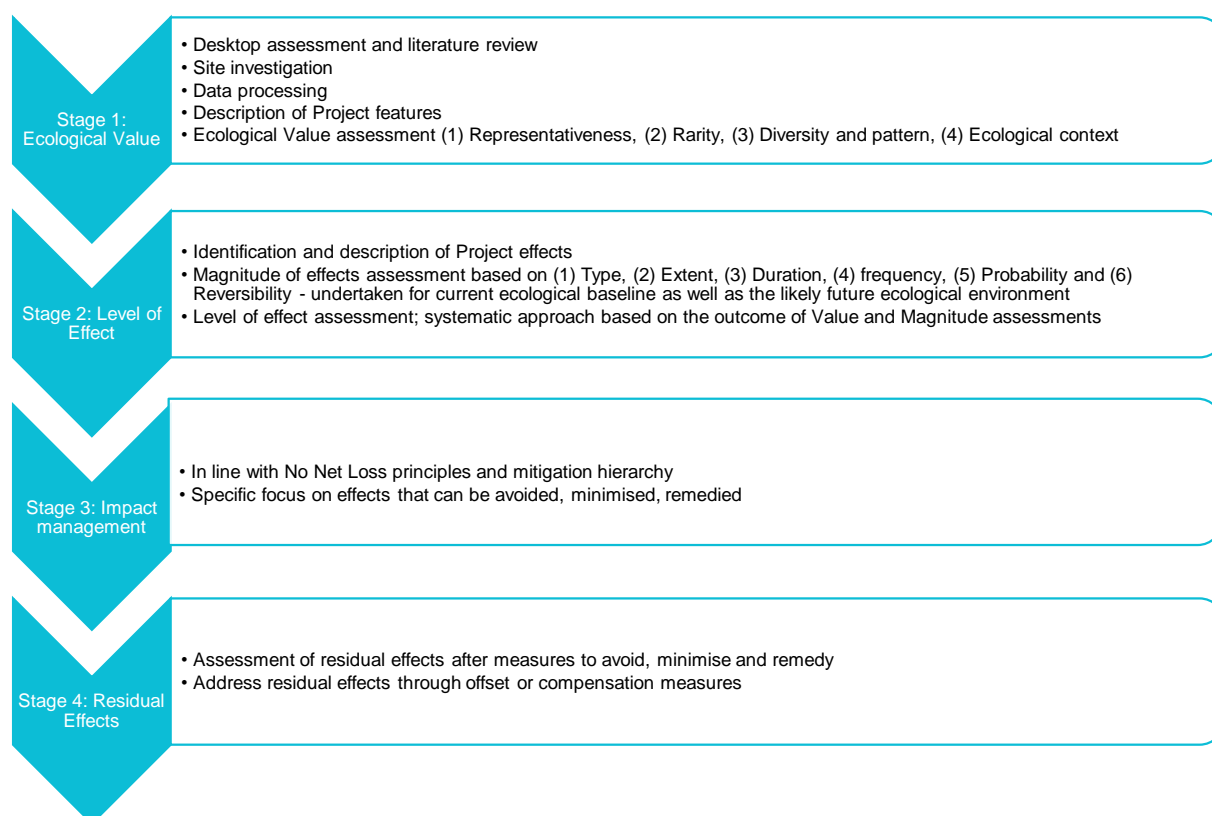


Figure 3-1: Approach process followed for this assessment.

3.2 Manawhenua Values

Māori value indigenous species for a variety of reasons with two key components being whakapapa (or genealogical and ancestral connection) and mahinga kai (food and resource gathering practices). According to the EIANZ Guidelines, Manawhenua values may be considered when making ecological evaluations. Importantly, effects on these values should only be assessed by the appropriate iwi or hapū, or by working in collaboration with Manawhenua.

At the impact management stage, management of impacts on cultural values and on ecological values may involve similar goals and there may be synergies around approaches to achieving those goals (EIANZ Guidelines). Cultural Value Assessments have been undertaken for the project and Huis held with Manawhenua to discuss the ecological values and proposed mitigation for the Project.

No specific changes were requested from Manawhenua in relation to ecology. Please refer to the AEE for more details on the Manawhenua engagement.

3.3 EclA and the Likely Future Ecological Environment

The EIANZ Guidelines provide guidance to assist with the assessment of the likely future ecological environment in this report. The assessment states:

“The ecologist needs to consider the permitted baseline in order to describe the potential “future ecological environment and to assess effects at that time, and should discuss this with the project planner or legal advisor if in any doubt”.

The Planning Team from Te Tupu Ngātahi has advised of the following to inform the assessment of the likely future ecological environment:

- The purpose of the NoRs for the South FTN is to route protect the roading upgrades necessary to enable high-quality FTN bus services and urbanisation of complementary non-FTN corridors (as described above) that will support the existing and anticipated development in South Auckland;
- In addition, the AUP:OP permits activities for infrastructure and development, which will also change the likely future ecological environment. These activities include vegetation clearance and the removal of trees, excluding notable trees and street trees; and
- A summary of the likely future ecological environment is provided in Section 5 and within the AEE.

3.4 Permitted Activities and the Likely Future Environment

The majority of the Project (i.e., works within NoR 1, 2 & 3) are within existing urban areas with live zoning including residential, commercial, and open space zones. NoR 4 largely runs along the outer edge of the live zoned existing urban area and is bound to the east by rural land. The majority of the Popes Road portion of NoR 4 is adjacent to rural land apart from its western most portion which runs through an industrial zoned area and the most southern point (around the Walters Road and Porchester Road intersection) which adjoins residential zoned land. The existing activities within the area are generally reflective of the existing underlying zoning.

3.5 Assessment of District Plan Matters and Approach to Regional Matters

The designation authorises AT, as the relevant requiring authority, to undertake work and activity without the need for land use consent. The designated area is still subject to restrictions on land use under Regional Plan matters in the AUP:OP.

As the Project relate to proposed designations, this EclA assesses District Plan matters only. Regional Plan matters will be subject to a future consenting phase along with a supporting EclA. As such Regional Plan matters have not been formally assessed in this report, however the relevant matters have been screened to inform the alternatives assessment, proposed designation boundaries and potential implications for future regional resource consents and are presented in Section 9. Appendix 3 sets out the split between District and Regional Plan matters in the AUP:OP.

The assessment of District Plan matter effects assumed that the value of ecological features, such as wetlands and riparian features, to native fauna will be the same in the future, as these features are protected under the AUP:OP and have been assumed unchanged in a future environment.

3.6 Wildlife Act Matters

The Wildlife Act includes specific provisions for activities that may disturb, injure, or kill native animals. Construction and operational activities that may require consideration under the Wildlife Act are outlined in Appendix 3. The scope of this report pertains to District matters and although not required for NoRs, further consideration has been given to ecological effects under the Wildlife Act in Section 9.

3.7 National Policy Statements

3.7.1 National Policy Statement for Freshwater Management

The overarching concept of the National Policy Statement for Freshwater Management (**NPS-FM**) is Te Mana o te Wai, which refers to the fundamental importance of water, and recognises that protecting the health of freshwater protects the health and well-being of the environment. The NPS-FM seek to ensure that natural and physical resources are managed in a way that prioritises:

- Firstly, the health and well-being of water bodies and freshwater ecosystems;
- Followed by the health needs of people; and
- Then the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

In particular, the NPS-FM seeks to protect natural wetlands, rivers, outstanding waterbodies, and habitats of indigenous freshwater species.

Ecological effects associated with activities that require regional consents and consideration under the NPS-FM were considered to inform design and alignment options for the Project.

3.7.2 National Policy Statement for Indigenous Biodiversity

The National Policy Statement for Indigenous Biodiversity (**NPS-IB**) seeks to maintain indigenous biodiversity across New Zealand so that there is at least no overall loss in indigenous biodiversity. The NPS-IB highlights the need for a cautionary approach to considering effects on indigenous biodiversity both within and beyond Significant Natural Areas (**SNAs**) and including areas supporting highly mobile fauna. Increased indigenous vegetation cover in urban and non-urban environments is promoted, as is information gathering and monitoring of indigenous biodiversity.

At the same time, the NPS-IB sets out a need to recognise and allow for activities which contribute to New Zealand's social, economic, cultural, and environmental wellbeing. The NPS-IB provides a consenting pathway for specified infrastructure which provides significant national or regional public benefit, and which has a functional or operational need to locate in a particular location, when there are no practicable alternatives.

At the date of preparing the report, the NPS-IB had not been given effect to in the AUP:OP. However, many of the policy directions in the NPS-IB are already contained within the AUP:OP and in relation to

large scale infrastructure projects there is not a notable change in policy direction. The assessment of the Project against the NPS-IB is therefore substantively similar to the assessment against the corresponding AUP provisions along with EIANZ 2018.

Relevant policies within the NPS-IB have been considered as part of this assessment, in particular Policy 15 relating to highly mobile fauna such as banded rail and long-tailed bats. We have considered construction and operational effects from the Project on highly mobile fauna in relation to disturbance and habitat fragmentation (refer Table 8.2 and 8.3). This formed part of the options assessment process to inform design and alignment options for the Project. The overall level of effect was assessed as Low for all effects and as such no additional mitigation has been proposed.

3.7.3 New Zealand Coastal Policy Statement

The New Zealand Coastal Policy Statement (**NZCPS**) seeks to promote sustainable management of the coastal environment. Due to its strategic and desirable location, there is significant established development and infrastructure within coastal locations. Continued growing demand for commercial activities in the coastal environment will need to manage inherent vulnerability to natural hazards and manage the effects of ongoing degradation to coastal environments.

The NZCPS sets out a need to recognise and allow for activities which contribute to New Zealand's social, economic, cultural, and environmental wellbeing. When considering a requirement for a designation and any submissions received, a territorial authority must consider the effects on the environment of allowing the requirement, having regard to any relevant provisions of this NZCPS.

Relevant requirements under the NZCPS have been considered as part of this assessment, in particular Policy 1 relating to extent and characteristics of the coastal environment. This recognises that although the Project is not within the Coastal Marine Area (**CMA**), the intertidal zone extends beyond these recognised points and that impacts on tidal estuaries, coastal vegetation and habitats of indigenous coastal species may still be relevant. The report therefore considered the construction and operational effects from the Project on coastal wetland vegetation (Section 9.3) and habitats of indigenous coastal species (Section 8.3). This formed part of the options assessment process to inform design and alignment options for the Project. The overall level of effect was assessed as Low for all effects assessed. Regional matters such as impacts on coastal wetlands have not been formally addressed at this stage, however measures have been made to avoid features (coastal wetlands) where possible and to ensure any future requirements to remedy and mitigate potential impacts are practical and achievable.

4 Assessment Methodology

Desktop and site investigations were undertaken for ecological features within the Zone of Influence (ZOI) (refer Section 4.1 for a ZOI description) for all four NoRs. Terrestrial, stream, and wetland features were investigated and mapped to inform the proposed designation boundaries and potential future consenting processes. In addition to the areas included in the ecological mapping, potential habitat for native fauna was also considered.

4.1 Zone of Influence

The ZOI relates to an area occupied by habitats and species that are adjacent to and may go beyond the proposed designation boundaries for the Project. It is defined in the EIANZ Guidelines as “*the areas/resources that may be affected by the biophysical changes caused by the proposed Project and associated activities.*” The distance of the ZOI and type of effect from the Project can vary for different species and habitat types and depends on a number of environmental and biological factors. The ZOI is used throughout this report to describe the potential impacts of the Project (construction and operational) on adjacent or connected terrestrial, freshwater, and wetland habitats and associated native species. It should be noted that the desktop assessment includes a potentially larger ZOI area than is assessed for site investigations, which are generally constrained to within the designation boundary. Features included within the initial ZOI desktop assessment are not necessarily always impacted by the Project.

The ZOI of the Project on different habitats and/or species differs depending on factors such as connectivity to the Project and how individual species use their environment e.g., mobile species such as long-tailed bats have a larger home range and more diverse habitat requirements compared to lizards which may be restricted to a small area or specific habitat type. This affects how a habitat and/or species could be impacted by the Project, and this was taken into consideration during the desktop review (refer Table 4-1 for detailed breakdown of potential ZOI selected for desktop assessment of habitats and species).

Table 4-1: Zone of Influence for Desktop Assessment – Habitats and Species

Habitat/Species	ZOI – approximate distance	Justification
SEAs	2km	<ul style="list-style-type: none"> Larger distance to ensure that these important habitats and any associated, highly mobile fauna species within them or the wider landscape could be considered
Terrestrial habitats (non SEA)	Within the proposed designation	<ul style="list-style-type: none"> Vegetation not considered significant and therefore only likely to be relevant at a local scale, limited suitability for highly mobile fauna species. Therefore, only direct impacts on terrestrial habitats within the proposed designation in relation to the impacts of construction and operation are considered.
Wetlands	100m	<ul style="list-style-type: none"> The taking, use, damming, diversion, or discharge of water outside of a natural wetland, but within a 100m setback from a natural wetland has the potential to result in the complete or partial drainage of all or part of a natural

Habitat/Species	ZOI – approximate distance	Justification
		wetland. Given the varied sensitivity of wetland habitats to changes in hydrology, 100m ZOI is appropriate for consideration.
Streams	Within or adjacent to the proposed designation	<ul style="list-style-type: none"> Given the highly urban nature of the project environment, evaluating streams within or adjacent to the suggested designation considered sufficient to enable assess the project effects of construction and operations
Bats	10km	<ul style="list-style-type: none"> Takes into account the highly mobile nature of bats with a vast home range and extensive foraging that can cover up to 13,000 hectares
Birds	2km	<ul style="list-style-type: none"> Highly mobile species, with small to large home range during breeding and non-breeding season to include avifauna highly likely occur within the proposed designation areas
Lizards	5km	<ul style="list-style-type: none"> Actual ZOI for lizard species is much smaller (their home range is 100-200m² depending on habitat conditions). However, the area included in the desktop search is larger to account for the cryptic nature of surveying lizards and often deficient desktop records on species presence and potential distribution within potential suitable habitats.

4.2 Desktop Assessment

A desktop review of existing ecological records was undertaken to gain an understanding of the species and habitats that could be present within the ZOI for each NoR.

The sources of information that were reviewed to determine the likelihood of a species or habitat occurring within or adjacent to each of the NoR included:

- Auckland Council Geomaps;⁵
- Department of Conservation (DOC) Bioweb records;⁶
- Department of Conservation Threat Classification Series;⁷
- Ecological Regions and Districts of New Zealand (McEwen, 1987);
- iNaturalist records⁸, records within approximately 2-5 km buffer of the NoRs;
- Indigenous terrestrial and wetland ecosystems of Auckland (Singers et al., 2017);
- National Institute of Water and Atmospheric Research (NIWA) freshwater fish database (NZFFDMS);⁹

⁵ <https://geomapspublic.aucklandcouncil.govt.nz/viewer/index.html>.

⁶ <https://www.doc.govt.nz/our-work/monitoring-reporting/request-monitoring-data/>.

⁷ All Department of Conservation Threat Classification Documents are listed in the below webpage. When individual reports are referenced hereafter; they are referenced in-text. <https://www.doc.govt.nz/about-us/science-publications/conservation-publications/nz-threat-classification-system/>.

⁸ <https://www.inaturalist.org/>.

⁹ <https://nzffdms.niwa.co.nz/search>.

- New Zealand Bird Atlas eBird database¹⁰; recorded within 10km² grid squares. Results from grid squares AD69, AE69, AD69;
- NZ River Name Lines (LINZ Data Service¹¹); and
- Retrolens Historical Aerial Imagery¹².

4.3 Site Investigations

Site investigations¹³ were 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.

4.3.1 Site Investigation Limitations

Site investigations were somewhat limited due to a lack of private property access. Where possible, potential ecological features were assessed using roadside observation and/or from adjacent properties where access had been granted, and results were analysed further with an in-depth desktop review.

Where access was limited, a comparative analysis was undertaken between ecological features. This analysis looked for commonality and/or notable patterns between each terrestrial, freshwater/stream, and wetland ecosystems that had been assessed within the field, and then applied these commonalities and/or notable patterns to desktop identified terrestrial, freshwater/stream, and wetland ecosystems in an attempt to provide a high-level ecological value to all features, noting that these features will likely be reassessed (as required) at resource consent stage.

4.3.2 Terrestrial Habitat

Site walkovers were undertaken between June and July 2023 by experienced ecologists; to map and describe the habitats present within the FTN Projects area. Habitats were classified into ecosystem types based on those described in Section 6. The habitats were also assessed as to their potential to support indigenous fauna, including birds, bats, and lizards. For district plan trees a more detailed fauna assessment was undertaken. For bats this included an assessment of bat roost potential (**Low**, **Moderate** or **High**) which took into account tree size (over 15 dbh), the presence of roost features (cracks, splits, hollows, flaking bark) as well as the likelihood of bats utilising that feature i.e. proximity to road, bat activity data, surrounding land use.

Habitat assessment focused on areas of potentially significant value, such as habitat that was identified as an SEA under the AUP:OP, classified as forest habitat on Auckland Council's Geomaps – Ecosystems Current Extent (Singers et al., 2017) or appears to be wetland or forest habitat based

¹⁰ <https://ebird.org/atlasnz/home>.

¹¹ <https://data.linz.govt.nz/layer/103632-nz-river-name-lines-pilot/>.

¹² <https://retrolens.co.nz/>.

¹³ Not all features were subject to a site investigation due to access constraints. Features assessed at desktop level are identified throughout the report.

on aerial photos and during site investigation. Species records from relevant literature and biodiversity databases were used to focus search efforts on certain areas within the Project Areas.

During the site walkovers the vegetation assessment included recording the dominant or characteristic species present and the general quality described (Including: structure, maturity, presence of weeds, and evidence of grazing). Vegetation surveys also included searches for any rare or threatened plant species previously recorded within the Project Areas.

Common plant names are predominantly used within this report. Maps showing the vegetation cover along and adjacent to the proposed designation boundaries are provided in Appendix 4. Terrestrial ecological value assessment methodology is discussed in Appendix 7.

4.3.3 Freshwater Habitat

Where access allowed, streams within the Project Areas identified on the Auckland Council Geomaps ('Named Streams') were ground-truthed and classified as permanent, intermittent, or ephemeral, according to the stream definitions described by (Auckland Regional Council, 2009). Any additional streams observed during site walkovers were also classified. Streams are mapped in Appendix 4.

Freshwater assessments were undertaken by experienced ecologists on all streams identified on site and included stream classification, assessment of the riparian vegetation composition and the implementation of the Rapid Habitat Assessment (**RHA**) protocol. The RHA provides a standardised protocol for making a quick, qualitative, site-based assessment of physical stream habitat conditions (Clapcott, 2015). SEV assessments were not undertaken at this stage but may be completed to support the future regional resource consenting phase as necessary. As such, macroinvertebrate and fish surveys were not undertaken as part of this assessment. However, records from NZFFDMS (Stoffels, 2022) were used to inform the potential ecological value of streams. Freshwater ecological value assessment methodology is discussed in Appendix 8 – Aquatic Value Assessment.

4.3.4 Wetland Habitat

Potential wetland habitat areas were identified by ecologists based on Auckland Council Geomaps contours and the presence of wetland vegetation on aerial maps including a review of historical images. Potential wetlands were mapped and where access permitted, ground-truthed through the use of the rapid technique outlined in the wetland delineation protocol (MfE, 2020). A more conservative approach was adopted where wetland delineation relied on desktop assessment. Ambiguous areas were assumed to be wetlands, where these areas were not accessible Wetland areas along the proposed designation of the NoRs are mapped in Appendix 4.

We note that the scope of the specialist study, for route protection, did not provide for a detailed wetland delineation (i.e. mapping accuracy of <1:10 000). The key focus was to confirm wetland presence and approximate extent. This approach is considered practical for the purposes of route protection, while it is expected that a more detailed wetland assessment will be undertaken during the resource consenting phase, as necessary.

Wetlands were assessed based on the RMA definition of a wetland¹⁴ and classified into ecosystem types based on those described in (Singers et al., 2017). If the habitat present met this RMA definition, it was then further evaluated against the provisions of the NPS-FM for natural wetlands

¹⁴ "Wetland includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions".

(assessed for potential exclusions). Details regarding the wetland value assessment are outlined in Appendix 9 – Wetland Value Assessment.

4.4 Ecological Value Assessment

The ecological value of each visited ecological feature (terrestrial, freshwater and wetland) was assessed using a spreadsheet template by assigning a score of 0 (**None**), 1 (**Low**), 2 (**Moderate**), 3 (**High**), or 4 (**Very High**) based on professional judgement (with justification) to attributes associated with each of the four ecological matters recommended within EIANZ (2018): 1) *Representativeness*; 2) *Rarity/distinctiveness*; 3) *Diversity and pattern*; and 4) *Ecological context*.

Considerations in relation to the four matters and corresponding aspects for terrestrial, freshwater, and wetland features are detailed below:

Terrestrial Ecology

1. **Representativeness:** Typical structure, species composition, and indigenous representation;
2. **Rarity/distinctiveness:** Species of conservation significance, and distinctive ecological values;
3. **Diversity and pattern:** Habitat diversity, species diversity, and patterns in habitat use; and
4. **Ecological context:** Size, shape and buffering function, sensitivity to change, and ecological networks (i.e., linkages, pathways, migration).

Freshwater Ecology

1. **Representativeness:** RHA score for accessible sites and riparian habitat modification based on desktop stream and catchment assessments;
2. **Rarity/distinctiveness:** Species of conservation significance informed by the potential occurrence of Threatened and At-Risk (TAR) fish species;
3. **Diversity and pattern:** Level of natural diversity informed by the habitat diversity subsection of the RHA. Stream order, slope, and hydroperiod were applied as desktop proxies to judge the likely habitat diversity for streams where access was constraint; and
4. **Ecological context:** Stream order and hydroperiod.

Wetland Ecology

1. **Representativeness:** Hydrological modification based on observations of drains, ponds, and catchment land use. Native vegetation informed by site visits and the review of landcover information;
2. **Rarity/distinctiveness:** Wetland type (rare or distinctive), and distinctive ecological values (ecosystem services) in a larger catchment context;
3. **Diversity and pattern:** Representation of different hydroperiods (permanent, seasonal, or temporary) and the structural complexity of vegetation cover; and
4. **Ecological context:** Flood attenuation, streamflow regulation, sediment trapping, water purification, and connectivity and migration.

The score for each matter was constrained to the highest score for each aspect (e.g., a **High** score allocated to a wetland for flood attenuation will result in a **High** score for the Ecological context matter). The combined ecological value score (ranging from **Very High** to **Negligible**), for the four matters, was determined in accordance with the EIANZ Guidelines.

Where ecological features were not visited during the site investigation, these were assessed using desktop information coupled with the analysis of commonalities and patterns noted of similar ecosystem type to determine a high level assumed ecological value. Detailed ecological value assessment of each ecological feature would be undertaken at the future regional resource consent stage, as relevant.

Notwithstanding the ecological value associated with vegetation/habitat units, specific consideration still needs to be given to individual species and their conservation significance for the following reasons (in accordance with EIANZ Guidelines, Table 5):

- The habitat value may dilute the conservation value associated with specific species. For example, the combined value for exotic grassland is **Low**, while the value for copper skink (At Risk - Declining) is **High**. The combined value of **Low** therefore understates the conservation value of the species;
- Species may not be restricted to a single vegetation unit;
- Potential effects on species are unrelated to habitat units. For example, impact on highly mobile species (such as bats) by noise and light may be independent of the habitat loss associated with the Project; and
- Consideration and adjustment of ecological value may occur dependent on regional threat status and local knowledge (if available). The more conservative of the ecological values should be used.

5 Existing and Likely Future Ecological Environment

5.1 Planning and Land Use Context

The existing and anticipated future environment is further discussed in the accompanying AEE. In summary, the implementation timeframe for the Project has yet to be confirmed but is likely to be in approximately 10-15 years' time subject to funding availability. The assessment considers the effects of the Project at both the existing environment (as it exists today) and the likely future (planned) environment which consider potential urban development and intensification sought under PC78.

The Project will be constructed and will operate in the existing urban environment or planned environment (i.e. what can be built under the existing Auckland Unitary Plan: Operative in Part (AUP:OP) live zones):

- a) **Existing environment:** The corridors are situated primarily within existing urban areas with live zoning including residential, commercial, and open space zones. There is some Future Urban Zone land in the wider area to the northeast/east. The existing activities within the area are generally reflective of the existing underlying zoning; and
- b) **Planned environment:** The planned environment is anticipated to remain urban and comprised of similar activities as the existing environment. The density of residential development is however anticipated to change and increase in future. In particular, this includes in the residential zones around Te Mahia and Takaanini stations, in line with the implementation of the National Policy Statement on Urban Development (NPS-UD) in the AUP:OP. The remaining residential areas will experience an uplift of density through the implementation of the Medium Density Residential Standards (MDRS) through the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021. Plan Change 78 (notified at the time of assessment) seeks to give effect to the NPS-UD and incorporate the MDRS into residential zoning. It is noted that there are some areas of existing residential zoned land (particularly east of the NIMT) that have recently been intensified (i.e., new builds), as such are unlikely to change in the near future.

The likelihood and magnitude of land use change regarding the land use planning context has been identified in Table 5-1 below. This has been used to inform the assumptions made on the likely future environment.

Table 5-1: South FTN – existing and future environment

Existing Environment	Current AUP:OP Zoning	Likelihood of Change for the environment ¹⁵	Magnitude of potential change	Likely Receiving Environment ¹⁶
Residential ¹⁷	Residential (Mixed Housing Suburban)	Low - Moderate ¹⁸	Low - Moderate	Residential
	Residential (Mixed Housing Urban)	Low - Moderate ¹⁹	Low - Moderate	Residential

¹⁵ Based on AUP:OP zoning/policy direction.

¹⁶ Based on AUP:OP zoning/policy direction.

¹⁷ Based on the NPS-UD and MDRS, these residential areas are likely to experience increased density.

¹⁸ There are areas of existing Residential Zone land that has recently been intensified (i.e. new build developments), as such is unlikely to change in the near future.

¹⁹ There are areas of existing Residential Zone land that has recently been intensified (i.e. new build developments), as such is unlikely to change in the near future.

Existing Environment	Current AUP:OP Zoning	Likelihood of Change for the environment ¹⁵	Magnitude of potential change	Likely Receiving Environment ¹⁶
	Residential (Mixed Housing Suburban and Urban) around train stations	Moderate	Moderate - High	Residential and Commercial/Retail ²⁰
Business	Business (Heavy Industry)	Low	Low	Business (Industrial)
	Business (Light Industry)	Low	Low	Business (Industrial)
	Business (Neighbourhood Centre)	Low	Low	Business (Neighbourhood Centre)
	Business (Town Centre)	Low	Low	Business (Town Centre)
Open Space	Informal Recreation	Low	Low	Informal Recreation
	Community	Low	Low	Community
Greenfield areas	Future Urban	Low - Moderate	High	Urban

²⁰ Note that much of the commercial operations between Manuia Road and Taka Street occur on residentially zoned land.

6 Ecological Baseline

6.1 Historical Ecological Context

The Project Area is situated within the Manukau Ecological District (**ED**), which has a warm humid climate and is characterised by poorly drained and gleyed alluvial soils and peats that originating from river flats and swamps (McEwen, 1987). However, due to urban development (Manukau City) and surrounding suburbs, the district has undergone significant modifications and urbanisation.

Once covered in forests and swamps, the ED represents the southernmost extent of the northern North Island lowland forest type, with abundant taraire (*Beilschmiedia tarairi*) and pūriri (*Vitex lucens*) (McEwen, 1987). Now only 1.6% of the land area remains in native vegetation cover in the Manukau ED (Auckland Regional Council, 2013). A reduction to around 20% of its former extent is typically considered significant, and a reduction below 5% is deemed severe (Walker et al., 2008).

6.2 Terrestrial Habitat and Fauna

6.2.1 Significant Ecological Areas

Where natural habitat remains, the AUP:OP has mapped and classified habitats as terrestrial or marine SEAs. A distance of 2km was selected as potential ZOI for adverse effects depending on the potential receiving environment and the habitats and species present within an SEA (refer Figure 6-1). The full list of SEAs which occur within 2km of the Project Area are described in Appendix 5. Upon review, only SEA_T_5248 (directly adjacent) was identified to have the potential to be affected by the Project. A full description is presented in Table 6-1.

Table 6-1: Description of SEA_T_5248 and relevance to the Project Area

SEA	Relevant Project NoR and Distance (km)	SEA Description
SEA_T_5248	NoR 1 GSR near Butterworth Ave junction (1G) 0km (directly adjacent)	Kirks Bush Reserve. This site is a representative of the natural extent within the Eco District, covering >10% of the Puriri forest WF7 (7.03 ha). This area provides habitat for rare plant species, including Yoania (<i>Danhatchia australis</i>), Kāpuka (<i>Griselinia littoralis</i>) and Carmine rātā (<i>Metrosideros carminea</i>).

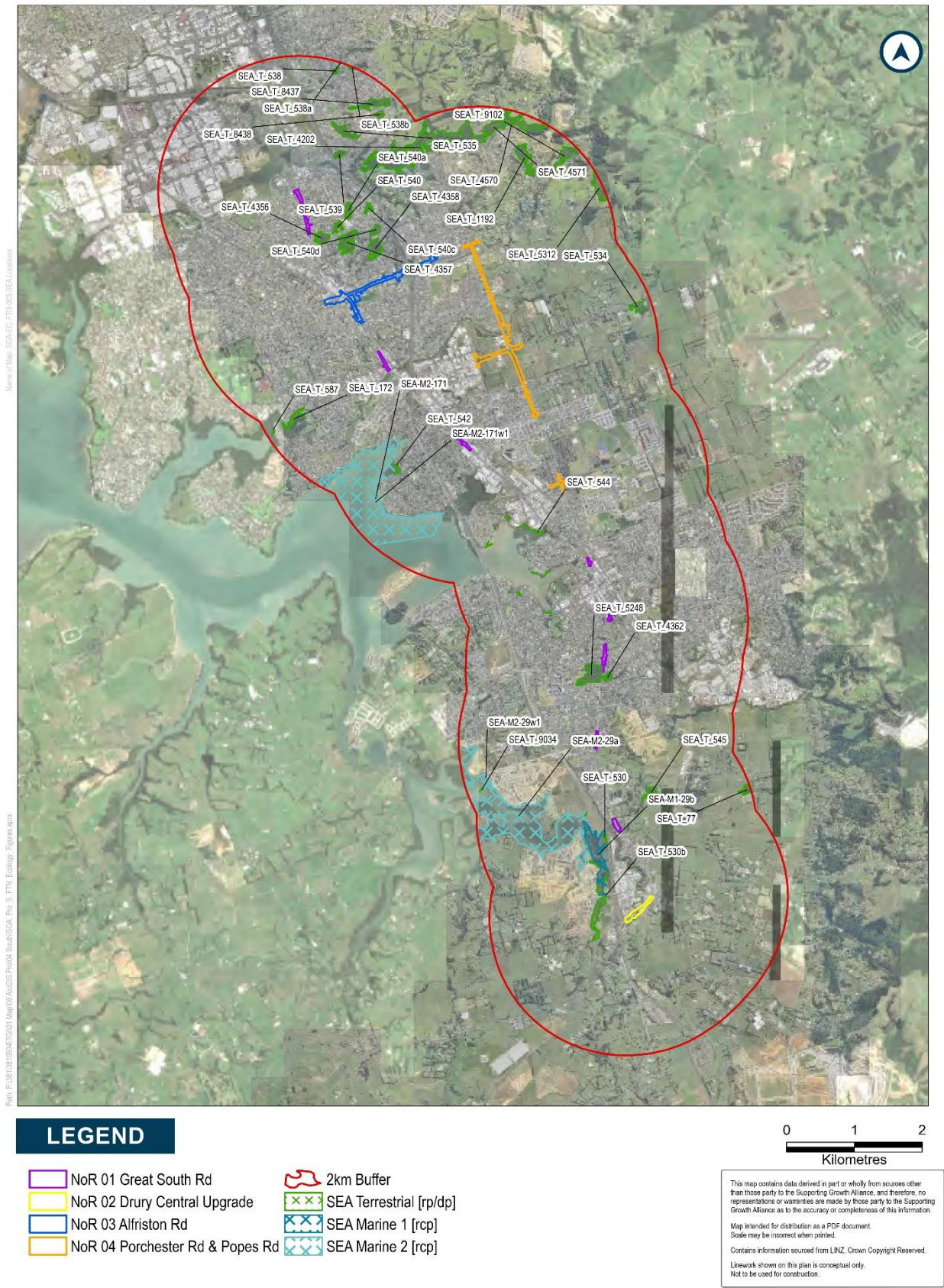


Figure 6-1: SEAs present within 2km of the Project Area.

6.2.2 Terrestrial Habitat

All terrestrial vegetation has been described using a combination of desktop and site investigations. Table 6-2 summarises the terrestrial vegetation types associated with the Project Area. Table 6-3: represents the type and ecological value of the terrestrial vegetation that fall within the proposed designation boundaries of each NoR. Mapping of terrestrial vegetation is presented in Appendix 4, and the detailed ecological values for terrestrial vegetation are presented in Appendix 7.

Table 6-2: Description of the terrestrial vegetation types present within the Project Area. Vegetation type is classified according to (Singers & Rogers, 2014)

Terrestrial Vegetation Type	Abbrev.	Description
Brown Field (includes cropland)	BF	This definition includes industrial hard standing concrete and unmanaged bare ground
Exotic Grassland	EG	Grassland dominated by exotic species
Exotic Scrub	ES	Exotic secondary scrub or shrubland with >50% cover/biomass of exotic species
Planted Vegetation – Native (recent)	PL.1	Native restoration plantings with <50% exotic biomass. Recently planted native scrub and forest <20 years old
Planted Vegetation – Native (mature)	PL.2	Native restoration plantings with <50% exotic biomass. Mature planted native scrub and forest >20 years old
Planted Vegetation – Exotic and / Native (amenity)	PL.3	Amenity plantings. This includes planted exotic and / or mixed native and exotic vegetation within parks, roads, amenity areas and private gardens
Treeland – Native-Dominated	TL.1	Tree canopy cover 20-80%: Native-dominated: >75% native tree cover. For the purposes of mapping this includes planted and wilding native vegetation and mature shelterbelts. This includes mature riparian vegetation and scattered or discontinuous canopy of mature trees within gardens, farms, and amenity areas
Treeland – Mixed Native/Exotic	TL.2	Tree canopy cover 20-80%. Mixed native/exotic: with 25-75% native tree cover. For the purposes of mapping this includes planted and wilding exotic vegetation and mature shelterbelts. This includes mature riparian vegetation and scattered or discontinuous canopy of mature trees within gardens, farms, and amenity areas
Treeland – Exotic-Dominated	TL.3	Tree canopy cover 20-80%: <25% native with exotic tree cover dominant. For the purposes of mapping this includes planted and wilding exotic vegetation and mature shelterbelts. This includes mature riparian vegetation and scattered or discontinuous canopy of mature trees within gardens, farms, and amenity areas
Pūriri forest	WF7	Characterised by large emergent rimu and northern rātā, with kahikatea in gullies emerging over a broadleaved canopy of taraire and kohekohe. In the Project Area, it is mostly old remnant forest associated with Kirk's Bush SEA_T_5248

Table 6-3: The terrestrial vegetation types that fall within the proposed designation boundary or directly adjacent to each NoR and their ecological value (see Section 4.4 for assessment methodology)

Terrestrial Vegetation Type	Ecological Value			
	NoR 1	NoR 2	NoR 3	NoR 4
BF – Brown Field	Negligible	Negligible	Negligible	Negligible
EG – Exotic Grassland	Negligible	Negligible	Negligible	Negligible
ES – Exotic Scrub	Low	Low	Low	Low
PL.1 – Planted Vegetation Native (recent)	Moderate	Moderate	Moderate	NA
PL.2 – Planted Vegetation Native (mature)	NA	NA	Moderate	Moderate
PL.3 – Planted Vegetation – Amenity	Low	Low	Low	Low
TL.1 – Treeland – Native-Dominated	Moderate	NA	Moderate	Moderate
TL.2 – Treeland – Mixed Native/Exotic	Moderate	NA	Moderate	NA
TL.3 – Treeland – Exotic-Dominated	Moderate	Moderate	Moderate	Moderate
WF7 – Pūriri Forest	High*	NA	High	NA

Notes: *= associated with SEA_5248;

6.2.2.1 TAR Plant Species

Individual TAR plant / tree species were identified during the site investigations.

The surveys identified the presence of planted kauri (*Agathis australis*), within or immediately adjacent to NoR 1 (Tree Groups 69, 71, 82, 85, 93 and Tree 91, refer further to Arboricultural Assessment). Kauri are listed as ‘Threatened – Nationally Vulnerable’ because of the spread of kauri dieback (*Phytophthora agathidicida*), which has the potential to significantly impact indigenous forest (De Lange et al., 2013).

Pōhutukawa (*Metrosideros excelsa*) were identified within or immediately adjacent to NoR 1 (Tree Groups 6, 92, 93 and Trees 13, 89, 90, 99), NoR 3 (Tree Groups 43, 53 and Trees 23, 42, 44, 45, 46, 47) and NoR 4 (Tree Group 128 and Trees 132, 133). Manuka (*Leptospermum scoparium*) was identified within small areas of native revegetation within NoR 1 (Group 108, 112 and 113)). Kanuka (*Kunzea robusta*) was also identified within NoR 1 (Group 108) and within NoR 3 (Group 52). These three species are listed as ‘Threatened – Nationally Vulnerable’ because of the spread of myrtle rust (*Austropuccinia psidii*) within New Zealand and the risk that this poses to indigenous forest (De Lange et al., 2013).

Within the Project context these TAR plants are not considered relevant as they are planted, isolated, and not associated with any native forest areas. However, some of these trees are considered relevant to the ecological effects assessment under the AUP:OP district plan provisions (relevant to the effects assessment in Section 8 of this report and the Arboricultural Assessment).

6.2.3 District Plan Trees

Trees subject to District Plan provisions under the AUP:OP (referred in this assessment as District Plan trees) e.g., street trees, open space trees, notable trees meeting the relevant minimum height and/or girth) have been considered in the Assessment of Arboricultural Effects Report and subsequently as part of this effects assessment. As detailed in Section 2 and Appendix 2, the remainder of terrestrial habitat (and associated fauna) identified is anticipated to be subject to an ecological effects assessment in the future regional consenting phase (including Wildlife Act compliance) as necessary.

Mature native and exotic trees occur throughout the Project Area, these are all street trees or within open space reserves. As such they are all within the existing urban environment and adjacent to existing transport corridors and therefore their ecological value is limited (potential local nesting and foraging potential for non-TAR birds). Their value has therefore been assessed from within the Assessment of Arboricultural Effects Report, for amenity value. Ecological effects related to the removal of these trees is considered **Negligible to Low** and as such have not been considered any further in this ecological effects assessment.

However, there are some groups of district Plan trees within NoR 1, 2 and 3 that have been highlighted as potentially suitable habitat for native lizards, see Section 8.4. These are:

- NoR 1: Slippery Creek (Tree group 107, 108 and 113);
- NoR 2: Hinagaia Stream (Tree group 115 & 116); and
- NoR 3: State highway one crossing (Tree group 38, 39, 41 & 48).

Additionally, the Wildlife Act provisions would apply for all impacted vegetation, refer to Section 9.1.2.

6.2.4 Long-tailed Bats

Existing desktop records (DOC, 2022a) confirm the presence of long-tailed bats (*Chalinolobus tuberculatus*) within 10km ZOI (home range specific to bat movement and a conservative buffer for assessment) of the Project Area (refer to Figure 6-2). These records include the DOC Bioweb database, which includes previous Automatic Bat Monitors (**ABM**) survey results conducted for various Te Tupu Ngātahi projects. Figure 6-2 shows areas where bat activities have been recorded and also highlights the large number of locations where ABMs have not detected any bat calls. Bat activity is generally absent from the surrounding urban and rural areas, with limited records from intact forest areas or forest corridors in the Clevedon Hill, Hunua Ranges and connected habitat such as Totara Park.

The desktop assessment revealed several stream systems and areas of vegetation with large trees (e.g., areas of TL.1, TL.2, TL.3, WF7) within the Project Area that long-tailed bats have the potential to utilise (albeit they are likely to be absent or to occur only fleetingly (likely only for foraging), based on previous survey data and due to lack of contiguous habitat).

No project specific surveys were undertaken in 2023, as sufficient desktop records (including DOC Bioweb database and Te Tupu Ngātahi 2020 survey records) have confirmed bat activity in the wider ZOI (10km) and highlighted apparent absence or limited activity from the Project Area. The following records have been listed as relevant to the Project Area:

- One record of the presence of long-tailed bats 3.2kms to the northeast of GSR/Browns/Orams Road (NoR 1);

- One record of the long-tailed bats 1.8kms to the west of GSR/ Park Estate Road (NoR 1);
- One record of the long-tailed bats 4.8kms to the east of the Great South Road/ Drury Station (NoR 2);
- One record of the presence of long-tailed bats 2.5kms to the north of Alfriston Road/Porchester Road (NoR 3); and
- One record of the presence of long-tailed bats 2.1kms to the north of Porchester Road (NoR 4).

Table 6-4 presents the ecological value for bats for each NoR based on the results of the desktop assessment, ABM and habitat potential surveys. The conservation status of this species is 'Threatened - Nationally Critical' (O'Donnell et al., 2013), therefore the ecological value of long-tailed bats is **Very High**, albeit they are considered to be transient visitors to the Project Area (see Section 4.4 for assessment methodology of ecological value).

Table 6-4: Results of desktop, ABM, and habitat potential surveys for long-tailed bats within to the ZOI of each NoR

NoR	Desktop Records within 10km Buffer	Potential Bat habitat	Ecological Value
NoR 1	Yes – 3.2km and 1.8km	Kirks Bush Reserve (SEA_T_5248) Otūwairoa Stream / Slippery Creek riparian corridor	Very high
NoR 2	Yes – 4.8km	Hingaia Stream riparian corridor	Very high
NoR 3	Yes – 2.5km	No suitable habitat	N/A
NoR 4	Yes – 2.1km	Papakura Stream riparian corridor and mature trees along Popes Road	Very high

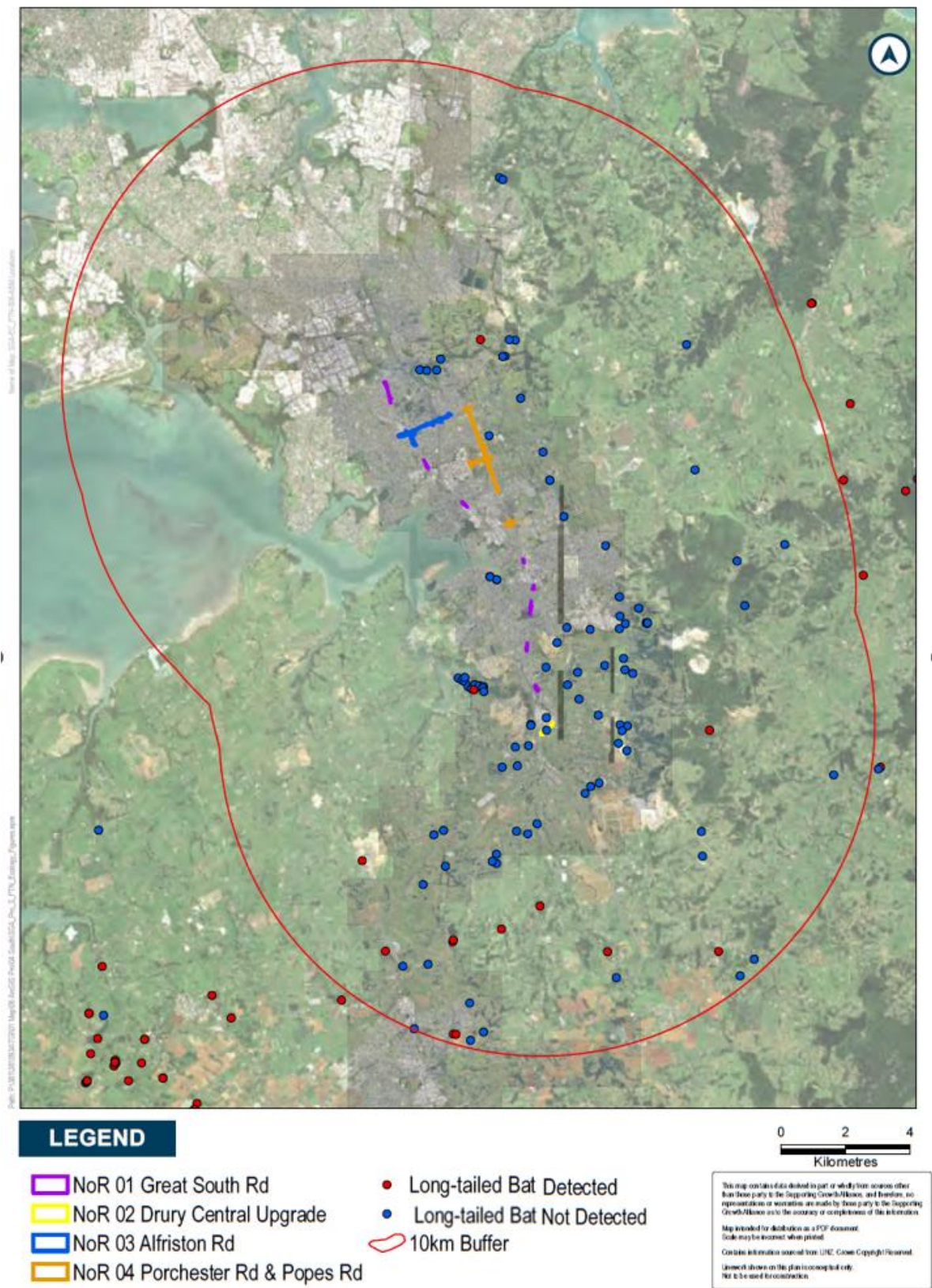


Figure 6-2: Long-tailed bat records within 10 km radius of the Project Area

6.2.5 Avifauna

An area wide desktop review identified the presence of native forest, freshwater, and coastal avifauna (bird) species within a 2 km buffer of the Project Area (eBird, 2022; GBIF.Org User, 2022). No dedicated bird surveys were undertaken for the Project; however, incidental observations of birds were recorded during site visits. A full list of species identified from the desktop review and incidental observations is included in Appendix 6 (including introduced and naturalised species). A total of 56 species were identified, of which, 35 are native, 13 have a TAR status (Table 6-5), and the remainder are exotic (Robertson et al., 2021).

A desktop assessment identified potential habitat for several TAR species. Table 6-5 details all the observed and potential TAR bird species for each NoR, including the ecological value for each species, based on the availability of potential habitat within the Project Area²¹. The NoR was considered relevant to the species if desktop records indicate presence in that area and if its potential habitat falls within or adjacent to the the FTN Project Area.

Any TAR species that were identified during desktop review but are expected to be absent from the Project Area due to a lack of suitable habitat, were not assessed for ecological value and impact. This includes species that have a strong preference for oceanic or coastal habitats (e.g., petrels, shearwaters, and spoonbills), sandy beaches (e.g., dotterels), rocky shores (e.g., reef herons), and large, open mudflat areas (e.g., godwits).

²¹ Non-threatened native bird species are considered to have a **Low** ecological value. The full list of bird species identified via desktop assessment and incidental observations are included in Appendix 6 – Full list of Fauna Records.

Table 6-5: TAR bird species observed or likely to occur within the Project Area based on suitable habitat, as well as their ecological values (see Section 4.4 for assessment methodology)

Species	Conservation Status (Robertson et al., 2021)	Record Source	Distribution and Preferred Habitat	Suitable Habitat within FTN Project Area	Ecological Value	Relevant NoR (Location)
Red-billed gull (<i>Larus novaehollandiae scopulinus</i>)	At Risk - Declining	eBird and iNaturalist	Found in most coastal areas including urban areas, reserves and sports fields. Breeding habitat, rocky shoreline (Gurr & Kinsky, 1965)	Likely to occur within all NoRs, from the urban to rural areas. Roosting and foraging throughout urban areas riparian margins and grass paddock / reserves. No breeding habitat within the Project Area.	High	All NoRs any open habitat areas grass reserves
Variable Oystercatcher (<i>Haematopus unicolor</i>)	At Risk - Recovering	eBird and iNaturalist	Found in most coastal areas, including intertidal mudflats, beaches or rocky shoreline. Breeding habitat along shorelines. Although usually stays close to the coast, occasionally forage in paddocks and nest a short distance inland on mown or grazed grassy areas or bare ground (Dowding, 2014).	Unlikely to occur within urban areas. However, has the potential to occur and utilize coastal / riparian margins and grass paddock / reserves (e.g. Otūwairoa Stream / Slippery Creek) (NoR 1). No breeding habitat within the Project Area.	High	NoR 1 (Otūwairoa Stream / Slippery Creek)
South Island pied oystercatcher (<i>Haematopus finschi</i>)	At Risk - Declining	eBird and iNaturalist	Found in most coastal areas, generally foraging in intertidal mudflats around estuaries and harbours. Often also utilises grass reserves, sports pitches and paddocks by the coast for foraging and roosting. Breed inland in the South Island, primarily to the east of the Southern Alps on riverbeds and farmland.	Unlikely to occur within urban areas. However, has the potential to occur and utilize coastal / riparian margins and grass paddock / reserves (e.g. Otūwairoa Stream / Slippery Creek) (NoR 1). No breeding habitat within the Project Area.	High	NoR 1 (Otūwairoa Stream / Slippery creek bridge)
Caspian tern (<i>Hydroprogne caspia</i>)	Threatened - Nationally Vulnerable	eBird and iNaturalist	Found in most coastal areas, generally foraging in bays and harbours. Also, large inland lakes and rivers. Breeding habitat along shorelines.	Unlikely to occur within urban areas. However, has the potential to occur and utilize coastal / riparian margins (e.g. Otūwairoa Stream / Slippery Creek) (NoR1)	High	NoR 1 (Otūwairoa Stream / Slippery creek bridge)

Species	Conservation Status (Robertson et al., 2021)	Record Source	Distribution and Preferred Habitat	Suitable Habitat within FTN Project Area	Ecological Value	Relevant NoR (Location)
				No breeding habitat within the Project Area.		
Dabchick (<i>Poliiocephalus rufopectus</i>)	Threatened - Nationally Vulnerable	eBird and iNaturalist	Uncommon but widespread in the Auckland region (Szabo, 2013). Small shallow freshwater lakes and ponds, with dense vegetation around margins. Notably can utilise stormwater ponds for foraging and or breeding, where habitat quality is suitable.	Unlikely to occur within urban areas. Potential to occur fleetingly for foraging. Breeding potential is highly unlikely due lack of suitable breeding habitat and disturbance due to existing roads/urban areas. Potential to use Otūwairoa Stream / Slippery creek bridge (NoR 1) or stormwater ponds adjacent to the Project Area (NoR 3). No breeding habitat within the Project Area.	Very High	NoR 1 (Otūwairoa Stream / Slippery creek bridge). NoR 3 Stormwater wetland near State Highway 1 bridge crossing.
Banded rail (<i>Gallirallus philippensis assimilis</i>)	At Risk - Declining	eBird	Restricted to mangroves and saltmarshes in the estuaries of Northland, Auckland, Waikato and Bay of Plenty (O'Donnell et al., 2015a)	Unlikely to occur within urban areas. However, has the potential to occur and utilize coastal / riparian margins (e.g. Otūwairoa Stream / Slippery Creek) (NoR 1). Small area of habitat, Oioi, restiad rushland/reedland (WL10) within the Project Area. However, breeding highly unlikely due to small habitat extent and disturbance due to the existing roads.	High	NoR 1 (Otūwairoa Stream / Slippery creek bridge)
Black Shag (<i>Phalacrocorax carbo</i>)	At Risk - Relict	iNaturalist (incl. records in	It is widespread throughout New Zealand, although sparsely so (Powlesland, 2022). Generally coastal, but also occurs in open water wetland, lakes, ponds and	Likely to occur along the major streams which bisect the NoRs. Including Otūwairoa Stream / Slippery Creek (NoR 1), Hingaia	High	NoR 1 (Otūwairoa Stream / Slippery Creek bridge),

Species	Conservation Status (Robertson et al., 2021)	Record Source	Distribution and Preferred Habitat	Suitable Habitat within FTN Project Area	Ecological Value	Relevant NoR (Location)
		proximity to NoR 4)	streams. Where there are large, mature trees with overhanging branches these may be used for roosting and breeding.	Stream (NoR 2).and Papakura streams, (NoR 4). No breeding habitat within the Project Area.		NoR 2 (Hingaia Stream), NoR 4 (Papakura Stream)
Little Black Shag (<i>Phalacrocorax sulcirostris</i>)	At Risk - Naturally Uncommon	eBird	Common and widespread in the Auckland region (Armitage, 2013). Occur in coastal inlets, lakes, and ponds, including stormwater ponds. Roosting and breeding in overhanging trees.	Likely to occur in open water, and ponds within the Project Area for foraging and nesting. Including Otūwairoa Stream / Slippery Creek (NoR 1), Hingaia Stream (NoR 2).and Papakura streams, (NoR 4). No breeding habitat within the Project Area.	High	NoR 1 (Otūwairoa Stream / Slippery Creek bridge), NoR 2 (Hingaia Stream), NoR 4 (Papakura Stream)
Pied Shag (<i>Phalacrocorax varius</i>)	At Risk - Recovering	eBird, iNaturalist	Common and widespread in the Auckland region (Powlesland, 2022). Occur in coastal inlets, lakes and ponds, including stormwater ponds. Roosting and breeding in overhanging trees.	Likely to occur in open water, and ponds within the project area for foraging and nesting. Including Otūwairoa Stream / Slippery Creek (NoR 1), Hingaia Stream (NoR 2) and Papakura streams, (NoR 4). No breeding habitat within the Project Area.	High	NoR 1 (Otūwairoa Stream / Slippery Creek bridge), NoR 2 (Hingaia Stream), NoR 4 (Papakura Stream)
Long-tailed Cuckoo (<i>Eudynamys taitensis</i>)	Threatened - Nationally Vulnerable	eBird	Summer migrant to New Zealand, spending winter in tropical Pacific islands. As a parasite nester, their breeding range is restricted to host species whitehead, brown creeper, and yellowhead. Absent as a breeding species from Auckland region (except Te Hauturu-o-Toi, Little Barrier Island) but occurs on migration passage throughout New Zealand (Gill & Huaber, 2013).	Has the potential to occur fleetingly on migration passage across the Project Area. Can occur in native / exotic forest, scrub, farmland, or urban areas on passage to breeding / winter habitat. Only likely to occur fleetingly within Kirks Bush SEA_T_5248 (NoR 1).	Very High	NoR 1 Kirks Bush SEA_T_5248

Species	Conservation Status (Robertson et al., 2021)	Record Source	Distribution and Preferred Habitat	Suitable Habitat within FTN Project Area	Ecological Value	Relevant NoR (Location)
				No breeding habitat within the Project Area		
Royal spoonbill (<i>Platalea regia</i>)	At Risk – Naturally Uncommon	eBird, iNaturalist	Common and widespread in the Auckland region (Powlesland, 2022). Foraging and breeding around freshwater to saltwater wetlands. Often roosting and breeding in overhanging trees.	Has the potential to occur and utilize coastal / riparian margins (e.g. Otūwairoa Stream / Slippery Creek). No breeding habitat within the Project Area.	High	NoR 1 (e.g., (Otūwairoa Stream / Slippery creek bridge)
North Island Kākā (<i>Nestor meridionalis</i>)	At Risk - Recovering	eBird, iNaturalist	Rare but widespread (seasonal migrant) in the Auckland region (Moorhouse, 1997). Kākā are generally restricted to indigenous forest habitat and offshore islands in the Auckland region. However, they make nomadic movements to the Auckland mainland, particularly in winter where they often utilize exotic / native trees in rural and urban areas.	Has the potential to occur fleeting during season winter foraging movements. Only likely to occur fleetingly within Kirks Bush SEA_T_5248 (NoR 1). No breeding habitat within the Project Area.	High	NoR 1 Kirks Bush SEA_T_5248
Red knot (<i>Calidris canutus rogersi</i>)	At Risk - Declining	eBird & iNaturalist	Found widely around the large harbours and estuaries of New Zealand (Studds et al., 2017). Foraging in intertidal mudflats and roosting on shell banks and sandspits. Breeds areas are in in Russia.	Unlikely to occur within the Project Area	High	Unlikely to occur
New Zealand pipit (<i>Anthus novaeseelandiae novaeseelandiae</i>)	At Risk - Declining	eBird	Widespread in rough open habitats (grassland and scrub) from the coastline to alpine, often in coastal habitat in Auckland region (Beauchamp, 2007)	Unlikely to occur within the Project Area. No breeding habitat within the Project Area.	High	Unlikely to occur

Species	Conservation Status (Robertson et al., 2021)	Record Source	Distribution and Preferred Habitat	Suitable Habitat within FTN Project Area	Ecological Value	Relevant NoR (Location)
North Island fernbird (<i>Bowdleria punctata vealeae</i>)	At Risk - Declining	eBird	Widely but patchily distributed in dense wetland vegetation (M'Lean, 1906; O'Donnell et al., 2015b)	Unlikely to occur within the Project Area	High	Unlikely to occur

6.2.6 Herpetofauna

Existing desktop records (DOC, 2022b; GBIF.Org User, 2022) have identified the presence of native herpetofauna species within 5 km of the Project Area. No dedicated herpetofauna surveys were undertaken for the Project; however opportunistic searches were conducted where possible. Table 6-6 lists the four species identified through desktop records alongside their threat status (Hitchmough et al., 2021; Melzer et al., 2022) and details all the potential native herpetofauna species for each NoR, including the ecological value for each species, based on the availability of potential habitat within the Project Area.²² The NoR was considered relevant to the species if desktop records indicate presence in that area and if its potential habitat falls within or adjacent to the designation of the NoR.

Auckland Green gecko, and Forest gecko were identified during the desktop review but are expected to be absent from the Project Area due to a lack of indigenous forested habitat within the Project Area (NZ Herpetological Society, 2021). Therefore, they will not be assessed for ecological value and impact.

²² The full list of herpetofauna species identified via desktop assessment and incidental observations are included in Appendix 6 – Full list of Fauna Records.

Table 6-6: Native lizards potentially likely to occur within the proposed designation boundary for the Project, as well as their ecological values (see Section 4.4 for assessment methodology)

Species	Conservation Status (Hitchmough et al., 2021; Melzer et al., 2022)	Record Source	Distribution and Preferred Habitat	Suitable Habitat within the Project Area	Ecological Value	Relevant NoR
Copper Skink (<i>Oligosoma aeneum</i>)	At Risk – Declining	DOC Bioweb & iNaturalist	Inhabits areas with good groundcover in open and shaded areas of forests. Also found in urban areas, including thick-rank grass, compost heaps, or under rocks, logs and other debris (NZ Herpetological Society, 2021).	Likely to occur in urban areas. Areas with sufficient understorey relating to vegetation units EG (unmanaged rank grass, not grazed or mown), ES, PL.1, PL.2, PL.3, TL.2, TL.3, WF7, and mature indigenous forest types	High	All NoRs
Ornate skink (<i>Oligosoma ornatum</i>)	At Risk – Declining	iNaturalist	Inhabit forested areas, shrubland and heavily vegetated coastlines; they are often found amongst leaf litter, in dense low foliage, thick rank grass and under rocks or logs (Hitchmough et al., 2018)	Unlikely to occur in urban areas. Indigenous forest types and areas contiguous to such habitat with sufficient understorey, such as ES, PL.1, PL.2, TL.2 and TL.3	High	All NoRs
Auckland green gecko (<i>Naultinus elegans</i>)	At Risk – Declining	DOC Bioweb	Inhabits forests, including scrubby/regenerating habitat, swamps, scrubland, and mature forest (NZ Herpetological Society, 2021)	Unlikely to occur within urban areas. Requires contiguous indigenous vegetation	High	Unlikely to occur
Forest gecko (<i>Mokopirirakau granulatus</i>)	At Risk - Declining	Unconfirmed, likely forest gecko (Boffa Miskel Ltd, 2014)	Inhabits a range of habitats, including scrubland, mature forests (beech, podocarp, and broadleaf), and rock fields. In the North Island, they appear to favor scrubby/regenerating habitats (NZ Herpetological Society, 2021).	Unlikely to occur within urban areas. Requires contiguous indigenous vegetation	High	Unlikely to occur

6.3 Freshwater Habitat and Fauna

6.3.1 Streams

A review of the NZ River Name Lines dataset (LINZ, 2022) indicated that named rivers/streams and their tributaries will be crossed in the Project Area.

All potential streams within the Project Area were mapped (Appendix 4), classified as either permanent or intermittent (ephemeral streams were mapped when possible). Permanent or intermittent streams that were within the NoR areas were numbered and assessed. Additionally, all streams that were accessed during site investigations were surveyed using the RHA, with the detailed RHA results included in Appendix 10. Table 6-7 identifies the streams crossed by each NoR and presents their detailed ecological value.

Table 6-7: Summary of streams identified in the Project Area and their ecological value

Stream ID	Stream Name	Hydroperiod	RHA Category	Ecological Value	Relevant NoR
FTN1_S1	Slippery Creek/ Otūwairoa Stream	Permanent	Moderate	High	NoR 1
FTN1_S2	Papakura Stream	Permanent	Moderate	High	
FTN2_S1	Hingaia Stream	Permanent	Moderate	High	NoR 2
FTN2_S2	Unnamed Hingaia Stream tributary	Permanent	Moderate	Moderate	
FTN3_S1*	Unnamed Papakura Stream tributary	Permanent	Moderate	Moderate	NoR 3
FTN3_S2	Unnamed Papakura Stream tributary	Permanent	Moderate	Moderate	
FTN3_S3	Unnamed Papakura Stream tributary	Intermittent	Moderate	Low	
FTN3_S4	Unnamed Papakura Stream tributary	Intermittent	Moderate	Low	
FTN4_S1	Unnamed Papakura Stream tributary	Intermittent	Poor	Low	NoR 4
FTN4_S2	Papakura Stream	Permanent	Good	High	

Note: * = Ecological feature assessed at a desktop level due to access restrictions.

6.3.2 Roadside drain

Following desktop survey, site investigation and reviewing historical images, the majority (excluding FTN4_S1 and FTN4_S2) of watercourses within NoR 4, were classified as artificial watercourses²³ (drains²⁴). These drains run along Porchester and Popes Roads. Despite their original design for subsurface land drainage and stormwater management, these ditches possess ecological value,

²³ Constructed watercourses that contain no natural portions from their confluence with a river or stream to their headwaters. (Auckland Unitary Plan).

²⁴ Drain means any artificial watercourse, designed, constructed, or used for the drainage of surface or subsurface water, but excludes artificial watercourses used for the conveyance of water for electricity generation, irrigation, or water supply purposes. (RMA).

providing suitable freshwater habitats and supporting local biodiversity (Keßler et al., 2012; Lou et al., 2023). As these features are artificial, they have no formal protection and therefore they have been excluded from aquatic habitat assessment. However, the presence of fish within these features should be considered during regional consenting processes.

6.3.3 Freshwater Fish

The New Zealand Freshwater Fish Database (**NZFFD**) (Stoffels, 2022) was reviewed for native freshwater fish and freshwater invertebrate records within stream catchments associated with the Project Area. Fish surveys were not carried out during site investigations, and no native fish species were incidentally observed onsite.

A full list of species (including introduced and naturalised species) is included in Table 6-8. Of the freshwater fish and invertebrates recorded, nine are native and two have a TAR status (Dunn et al., 2018; Grainger et al., 2018).

Table 6-8: Native freshwater fish species recorded within the catchments associated with the Project Area

Common name	Conservation Status (Dunn et al., 2017)	Catchment and Relevant NoR			
		NoR 1	NoR 2	NoR 3	NoR 4
		Slippery Creek/ Waihoihoi Stream and Papakura Stream	Hingaia Stream	Papakura Stream	Papakura Stream
Shortfin eel	Not threatened	✓	✓	✓	✓
Common bully	Not threatened	✓	✓	✓	✓
Crans bully	Not threatened	✓	NA	✓	✓
Inanga	Not threatened	✓	✓	✓	✓
Red Rock Lobster (Koura)	Not threatened	✓	NA	NA	✓
New Zealand Longfin eel	At Risk: Endangered	✓	NA	✓	✓
Torrentfish	At Risk: Declining	NA	NA	✓	✓
Banded Kokopu	Not threatened	✓	✓	✓	✓
Gambusia (mosquitofish)	Introduced and naturalised	✓	✓	✓	✓
brown bullhead catfish	Introduced and naturalised	✓	✓	✓	✓
Perch	Introduced and naturalised	NA	NA	✓	✓

Common name	Conservation Status (Dunn et al., 2017)	Catchment and Relevant NoR			
		NoR 1	NoR 2	NoR 3	NoR 4
		Slippery Creek/ Waihoihoi Stream and Papakura Stream	Hingaia Stream	Papakura Stream	Papakura Stream
Rudd	Introduced and naturalised	✓	✓	✓	✓
Tench	Introduced and naturalised	✓	✓	✓	✓
Redfin bully	Not Threatened	✓	✓	✓	✓

6.3.4 Wetland Habitat

A desktop review of existing ecological records was undertaken to gain an understanding of the wetland habitat that could be present within the Project Area.

A total of six wetlands within the Project Area were identified and assessed. The different wetland types and their classification are summarised in Table 6-9 (Singers et al., 2017; Singers & Rogers, 2014).

Table 6-9: Description of the wetland types present within the Project Area

Wetland Type	Abbrev.	Description
Exotic Wetland	EW	Wetland ecosystems with >50% exotic plant biomass
Open Water	OW	Open Water (e.g., ornamental ponds, stormwater ponds, stock ponds)
Planted Wetland - Native (recent)	PLW.1	Native restoration plantings with <50% exotic biomass
Oioi restiad rushland/reedland	WL10	Riverine/lacustrine wetlands occurring in freshwater areas of estuaries, coastal stream margins. Dominated by oioi, occasional pūrua grass, kuta and lake clubrush, scattered raupō and harakeke

Details regarding the vegetation cover, potential NPS-FM classification, potential for supporting TAR species, and ecological value for each wetland is presented in Table 6-10. Appendix 8 presents the detailed ecological value for wetlands identified in the Project Area. Refer to Appendix 4 for a map showing the spatial distribution of wetlands.

Table 6-10: Summary of wetlands identified in the Project Area and their ecological value

Wetland ID	Wetland vegetation Type (Singers, 2017) ²⁵	Wetland Description	NPS-FM Classification	Potential for TAR Species	Ecological Value	Relevant NoR
FTN1_W1	Oioi restiad rushland/reedland (WL10) (occurs on both left and right banks of the Otūwairoa Stream / Slippery Creek) and Planted wetland (PLW.1)	Riverine/lacustrine upper estuarine zone	Natural inland wetland	Potential inanga (At Risk Declining) spawning habitat. Unlikely to support TAR birds. Banded rail may occur fleetingly for foraging	High	NoR 1
FTN3_W1*	Exotic Wetland (EW)	Valley bottom (with/without channel)	Natural inland wetland	Unlikely to support TAR species	Low	NoR 3
FTN3_W2	Open Water (OW)	Stormwater pond	Artificial wetland	Unlikely to support TAR species	Low	
FTN3_W3	Exotic Wetland (EW)	Valley bottom (with channel)	Natural inland wetland	Unlikely to support TAR species	Low	
FTN4_W1	Exotic Wetland (EW)	Oxbow wetland former disconnected meandering channel	Natural inland wetland	Unlikely to support TAR species	Low	NoR 4
FTN4_W2	Planted wetland (PLW.1)	Stormwater swale	Artificial wetland	Unlikely to support TAR species	Low	

Note: * = Ecological feature assessed at a desktop level due to access restrictions.

6.4 Likely Future Ecological Environment

The assessment of ecological effects should take account of the likely future environment, including the likelihood of change from the existing environment, based on the current AUP:OP zoning, permitted activities for infrastructure, and planned urbanisation and directions within any current National Policy Statements i.e., NPS-FM. Based on these components, the implications of the future environment are not anticipated to differ for all NoRs.

²⁵ Open water, as an ecological feature, has been included under the wetland section.

7 Assessment of Positive Effects

The following section outlines the positive effects of the proposed alignment for each NoR in relation to specific ecological features (Table 7-1). The statement regarding positive effects assumes that some native planting will occur on the sides of the transport corridors as part of the landscape management.

There is the potential for positive effects which apply to each NoR. These include:

- Improved blue/green infrastructure (stormwater wetlands, swales, raingardens) and associated landscaping (which will be indigenous species); and
- Mass revegetation / landscaping of sloping berms, batters, and embankments to connect with retained vegetation/mature trees.

Table 7-1: Summary of positive effects associated with each NoR

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	NoR 1, 2 and 4

8 NoR Level Assessment of Ecological Effects and Measures to Avoid, Remedy or Mitigate Actual or Potential Adverse Effects

This section assesses the ecological effects of activities (construction and operational) which relate to district plan matters under the AUP:OP, as these relate to the designations sought (noting regional consents will be sought later, closer to construction). For each key ecological effect, the assessment details the 'Magnitude of Effect' and subsequent 'Overall level of Effect' (see Appendix 1 for details on assessment methodology) as they relate to the ecological features identified. Impact management and residual effects are presented where the overall level of effect is assessed to be Moderate or higher.

The effects assessment has considered two scenarios – the current ecological baseline and the likely future ecological environment. Refer to Section 5.1 for a discussion regarding the assumptions made for the effects assessment as it relates to permitted activities and likely future environment.

8.1 Overview of Construction and Operational Effects

The Project involves the upgrading and widening of existing roads in existing urban areas.

The potential **construction effects** (direct and indirect) to the 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 bats (including roost sites), birds (including nests), and lizards adjacent to construction activities (e.g., noise, light, vibration, and dust from construction activities). It is assumed that this effect will occur after vegetation clearance (subject to regional consent controls) has been implemented and is therefore likely to happen in habitats adjacent to the project footprint/designation or underneath structures such as bridges where vegetation is most likely to occur.

In relation to AUP:OP district plan vegetation²⁶, 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 potential **operational effects** (direct and indirect) to the terrestrial habitat, bats, birds, and lizards within and adjacent to the Project (as they relate to district plan matters) include:

- Disturbance and displacement of bats (including roost sites), birds (including nests), and lizards due to light, noise, and vibration effects from the presence of the road; and

²⁶ As per the South FTN 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 ONF, HNC, ONL and ONC overlays, effects on trees in roads, except where adjacent to rural zoned in respect of infrastructure projects, and effects on trees in Open Space zones.

- Loss in connectivity due to permanent habitat loss, and light and noise effects from the road, which leads to fragmentation of terrestrial, wetland and riparian habitat.

8.1.1 Construction effect -Terrestrial vegetation

Vegetation to be removed that is subject to district plan provisions in the AUP:OP, is guided by the findings of the Arboricultural Effects Assessment for the Project.

For a list of trees protected by the district plan provisions (AUP:OP) refer to the Arboricultural Effects Assessment. The removal of the protected trees was taken into consideration for the assessment of:

- The permanent loss of habitat, which may result in fragmentation and edge effects due to the removal of the 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; and
- Bat roost and bird nest loss through the removal of trees protected by the district plan.

The above ecological effects related to the removal of these trees is considered Low and as such have not been considered any further in the ecological effects assessment. As such no impact management is recommended for these effects. However, the effect of the loss of these trees on killing/injuring TAR fauna species is considered separately in Sections 8.2 - 8.4.

These effects assessments considered two scenarios – the current ecological baseline and the 'likely future ecological environment' (i.e., allowing for permitted activities). A precautionary approach was applied considering the level of effect within the likely future ecological environment. The likely future ecological environment was generally assessed as the same as the baseline, unless otherwise specified.

8.2 Long Tailed Bats

8.2.1 Construction effects

During construction of the Project, 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 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. This potential impact has been considered in light of the existing transport corridor and therefore existing disturbance, which will significantly reduce the magnitude of effects from the proposed upgrades.

The upgrade of existing transport corridors, within an existing urban area is highly unlikely to cause additional disturbance to habitat potentially utilised by bats. Disturbance such as noise and light are pre-existing and therefore any bat utilising the area will be habituated / deterred from roosting adjacent to the road. Roost sites are highly unlikely to occur within or adjacent to the designation.

The effects of District Plan tree removal on roosting bats and for the provision of roosting habitat has been assessed. With the exception of one location (i.e. a willow that is part of tree group 115 and has **Moderate** bat roost potential), all of the trees identified within the Arboriculture Effects Assessment were identified as having **Low** bat roost potential. This was based upon lack of roosting features and/or proximity to road and surrounding land use. For example tree group 122 was observed to have some roost features, but given the location of these features at eye level and proximity to a busy road

within an urban area, they were considered as **Low** roost potential. In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.

The magnitude of effect is assessed as **Negligible** for all effects due to the existing urban environment, very low bat activity, lack of roost habitat (district plan trees only) and scope of project upgrades within an existing road corridor. Therefore, impacts on bats are considered to be highly unlikely. The ecological value of bats is assessed to be **Very High**, and the overall level of effect is 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.

It is expected that any risk associated with the removal of the willow tree (tree group 115) with **Moderate** bat roost potential would be assessed and managed as part of the Wildlife Act compliance process during the resource consent phase of work.

8.2.2 Operational Effects

The loss of connectivity through the presence of the road 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 corridor and therefore existing disturbance.

The upgrade of an existing transport corridor is highly unlikely to further fragment habitat that might be used by bats. Disturbance such as noise and light are pre-existing and therefore any bat utilising the area will likely be deterred from roosting adjacent to the road. Roost sites are highly unlikely to occur within or adjacent to the designation. In a Likely Future Environment, there is no expected change to baseline as riparian corridors will remain. The magnitude and level of effect are the same as the Baseline.

The magnitude of effect is assessed as **Negligible** for all effects due to the existing urban environment, very low bat activity, lack of roost habitat (district plan trees only) and scope of project upgrades within an existing road corridor. Therefore, impacts on bats are considered to be highly unlikely. The ecological value of bats is assessed to be **Very High**, and the overall level of effect is 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.

8.3 Avifauna

The effect on birds has been considered against the typical behaviours, habitat preference, and the sensitivity of the various TAR species within the Project. Birds have been grouped and effects assessed based upon similar habitat preferences. These groups are as follows:

Freshwater Water / Wetland Birds:

Including the shag species, and dabchick. Typically, these species can be found utilising open water wetlands (ponds), lowland wetlands and large stream systems with plenty of slow moving or still water. Nest behaviour is generally typified by breeding on mature trees with overhanging branches over water or in colonies on cliff sides near water. They are noted as being generally sensitive to disturbance, however there are ample records of shag species and dabchick developing a level of

tolerance to noise and light, with individuals and breeding pairs being noted on stormwater ponds, where suitable breeding habitat is available. They are noted as being relatively mobile outside of the breeding season with frequent habitat relocations. In relation to freshwater/wetland birds, it has been considered that no current habitat within the Project Area presents suitable breeding TAR bird habitat.

Coastal Birds:

Including wading birds, gulls, terns, banded rail. Typically, these are noted as occurring within the coastal and tideline of sandy beaches environment, including harbours, estuaries, riverbeds. These species may occasionally be vagrant with freshwater and open landscapes including rough pasture, wetlands and river margins. In relation to coastal birds, it has been considered that no current habitat within the Project Area presents suitable breeding TAR bird habitat.

Forest Birds:

Including Long-tailed cuckoo and Kaka. Typically, these species are noted as occurring within large areas of indigenous forest. Both species are noted as having a wide home range and both undertaking annual migrations / seasonal movements. Both are affected by the presence of mammalian predators which affect reproductive success. In relation to Forest birds, it considered that no current habitat with the Project Area presents suitable breeding TAR bird habitat.

8.3.1 Construction Effects

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. It is considered that no current habitat with the Project Area presents suitable breeding habitat for TAR bird habitat. This potential impact has been considered in light of the existing transport corridor and therefore existing disturbance.

Non-TAR birds may breed throughout the Project Area, within suitable habitat such as planted vegetation and treelands within the NoR. Non-TAR birds may be impacted by the removal of vegetation which is protected by the AUP:OP. The removal of vegetation protected under these district plan provisions may result in mortality or injury to birds within the Project Area.

Table 8-1: and Table 8-2 details the potential magnitude of effect and subsequent level of effect (with justification) on for each NoR. The effects assessment has considered two scenarios – the current ecological baseline and the 'likely future ecological environment'. The level of effect for the current baseline and the 'likely future ecological environment' were the same for both assessments. As such, Table 8-1: Summary of disturbance to native birds and nests, resulting in changes to population dynamics, during construction and Table 8-2: Summary of the effects due to the removal of district plan trees (AUP:OP) - mortality or injury to birds provides the level of effect for both scenarios.

The magnitude of effect for TAR birds is assessed as **Negligible** due to the existing road 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 fleeting 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 FTN Project Area. The ecological value of TAR birds is assessed to be **Very High**, and the overall level of effect is 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.

The effect of habitat removal on native birds (specifically relating to mortality/injury and nest loss/disturbance) has also been considered for the District Plan trees located in NoR 1 - 4 (refer to Arborist Report). All of these groups of trees have the potential for Non-TAR native bird habitat. Non-TAR native birds have a **Low** ecological value, and the magnitude of effect is considered to be **Low**, with the overall level of effect assessed as **Very Low** prior to mitigation. However, impact management will be required under the Wildlife Act to prevent killing or injuring of native birds and is described in Section 9.1.2.

Table 8-1: Summary of disturbance to native birds and nests, resulting in changes to population dynamics, during construction

Bird Type	Species	Ecological Value	NoR	Effect Justification	Magnitude	Level of Effect (pre-mitigation)
Freshwater Water / Wetland Birds	Shag species: Black shag, Little black shag, Pied shag	High	NoR 1, 2 & 4	<p>Baseline and Likely Future Environment:</p> <p>Upgrade of an existing transport corridor. Potential for shag species to utilise Otuwairoa Stream / Slippery Creek (NoR 1), Hingaia Stream (NoR 2) and Papakura Stream (NoR 4) corridor. Breeding potential is unlikely due to existing roads and human disturbance.</p> <p>As upgrade to an existing transport corridor, any birds present are expected to be habituated to road disturbance hence disturbance due to construction presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Very Low
	New Zealand Dabchick	Very High	NoR 1 & 3	<p>Baseline and Likely Future Environment:</p> <p>Upgrade of an existing transport corridor. Potential for dabchick to utilise Otuwairoa Stream / Slippery Creek (NoR1), any open water and artificial pond, existing stormwater ponds (NoR 3) fleetingly for foraging. Breeding potential is highly unlikely due lack of suitable breeding habitat and disturbance due to existing roads /urban areas.</p> <p>As upgrade to an existing transport corridor, any birds present are expected to be habituated to road disturbance hence disturbance due to construction presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline as riparian corridor and stormwater infrastructure will remain. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Low
Coastal Birds	Wading birds: Variable oystercatcher, South Island pied oystercatcher, Royal spoonbill	High	NoR 1	<p>Baseline and Likely Future Environment:</p> <p>Upgrade of an existing transport corridor. Potential for wading birds to utilise Otuwairoa Stream / Slippery Creek Corridor (NoR 1). Breeding potential is unlikely due to existing roads and human disturbance.</p>	Negligible	Very Low

Bird Type	Species	Ecological Value	NoR	Effect Justification	Magnitude	Level of Effect (pre-mitigation)
				<p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to construction presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.</p>		
	Red-bill gulls	High	All NoRs	<p>Baseline and Likely Future Environment:</p> <p>Upgrade of an existing transport corridor. Potential for red-billed gull to utilise Otuwairoa Stream / Slippery Creek Corridor (NoR 1) and any open maintained grass reserves. Breeding potential is unlikely due to existing roads and human disturbance.</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to construction presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Very Low
	Caspian tern	Very High	NoR 1	<p>Baseline and Likely Future Environment:</p> <p>Upgrade of an existing transport corridor. Potential for Caspian tern to utilise Otuwairoa Stream / Slippery Creek Corridor (NoR 1). Breeding potential is unlikely due to existing roads and human disturbance.</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to construction presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Low
	Banded rail	High	NoR 1	<p>Baseline and Likely Future Environment:</p> <p>Upgrade of an existing transport corridor. Potential for Banded rail to utilise Otuwairoa Stream / Slippery Creek Corridor (NoR</p>	Negligible	Very Low

Bird Type	Species	Ecological Value	NoR	Effect Justification	Magnitude	Level of Effect (pre-mitigation)
				<p>1). Breeding potential is unlikely due to existing roads and human disturbance.</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to construction presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.</p>		
Forest Birds	Kaka	High	NoR 1	<p>Baseline and Likely Future Environment:</p> <p>Upgrade of an existing transport corridor. Potential of kākā to utilise Pūriri Forest (WF7) within adjacent SEA_T_5248 (NoR 1).</p> <p>However only likely to occur fleetingly for seasonal foraging. No breeding habitat. Disturbance due to construction activity is highly unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline as SEAs will remain. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Very Low
	Long-tailed cuckoo	Very High	NoR 1	<p>Baseline and Likely Future Environment:</p> <p>Upgrade of an existing transport corridor. Potential of long-tailed cuckoo to utilise Pūriri Forest (WF7) within adjacent SEA_T_5248 (NoR 1).</p> <p>However only likely to occur fleetingly for seasonal on migration. No breeding habitat. Disturbance due to construction activity is highly unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline, as SEAs will remain. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Low
Non-TAR birds	Non-TAR native birds	Low	NoR 1, 2, 3 & 4	<p>Baseline and Likely Future Environment:</p> <p>Upgrade of an existing transport corridor.</p>	Low	Very Low

Bird Type	Species	Ecological Value	NoR	Effect Justification	Magnitude	Level of Effect (pre-mitigation)
				<p>If birds are present, they are unlikely to be disturbed by construction activities (due to habituation to current conditions).</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p> <p>The most conservative non-TAR species, such as grey warbler, has been used for this assessment.</p>		

Table 8-2: Summary of the effects due to the removal of district plan trees (AUP:OP) - mortality or injury to birds

Bird Type	Species	Ecological Value	NoR	Effect Justification	Magnitude	Level of Effect (pre-mitigation)
Non-TAR birds	Non-TAR native birds	Low	NoR 1, 2, 3 & 4	<p>Baseline and Likely Future Environment:</p> <p>Upgrade of an existing transport corridor.</p> <p>Potential for non-TAR birds to be present and breeding with district Plan vegetation is likely.</p> <p>Although the Magnitude of effect is considered to be low impact management will be required under the Wildlife Act to prevent killing or injuring of native birds.</p> <p>The most conservative non-TAR species, such as grey warbler, has been used for this assessment.</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p>	Low	Very Low

8.3.2 Operational Effects

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, and has the potential to impact on bird movements in the broader landscape. This potential impact has been considered in light of the existing transport corridor and therefore existing disturbance.

The level of effect on birds due to operational impacts associated with loss or decrease in connectivity has been assessed in the context of habitat suitability, the existing degree of disturbance and fragmentation in the baseline urban setting and the likely future environment. Table 8-3: Summary of habitat fragmentation leading to loss in connectivity to native birds, due to light, noise, and vibration effects from the operation of the road. summarises the level of effect on birds in relation to connectivity.

Noise, vibration, and lighting disturbance caused by the presence of the transport corridors has been assessed in the context of habitat suitability, the existing degree of disturbance and fragmentation in the urban setting and the likely future environment. Table 8-4: Summary of disturbance and displacement to native birds and nests (new and existing) due to light, noise, and vibration effects from the operation of the road. summarises the operational disturbance effects for birds for all NoRs related to disturbance.

The FTN Project area is largely within an urban environment with limited habitat that is unlikely to support TAR birds (some native birds may utilise the remaining habitat within these areas). As such, the upgrading of the road within the FTN Project area is 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).

Table 8-3: Summary of habitat fragmentation leading to loss in connectivity to native birds, due to light, noise, and vibration effects from the operation of the road.

Bird Type	Species	Ecological Value	NoR	Effect Justification	Magnitude	Level of Effect (pre-mitigation)
Freshwater Water / Wetland Birds	Shag species: Black shag, Little black shag, Pied shag	High	NoR 1 & 2	<p>Potential for shag species to utilise Otuwairoa Stream / Slippery Creek (NoR 1), Hingaia Stream (NoR 2) and Papakura Stream (NoR 4) corridor.</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence fragmentation due to road presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Very Low
	New Zealand Dabchick	Very High	NoR 1 & 3	<p>Potential for shag species to utilise Otuwairoa Stream / Slippery Creek (NoR 1) and stormwater ponds (NoR 3).</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence fragmentation due to road presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Low
Coastal/ Open country Birds	Wading birds: Variable oystercatcher, South Island pied oystercatcher, Royal spoonbill, Red knot	High	NoR 1	<p>Potential for Wading birds to utilise Otuwairoa Stream / Slippery Creek Corridor (NoR 1).</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence fragmentation due to road presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Very Low
	Red-bill gulls	High	All NoR	<p>Potential for gull species to utilise Otuwairoa Stream / Slippery Creek (NoR 1) and any open maintained grassland areas (reserves).</p>	Negligible	Very Low

Bird Type	Species	Ecological Value	NoR	Effect Justification	Magnitude	Level of Effect (pre-mitigation)
				As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence fragmentation due to road presence is unlikely. In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.		
	Caspian tern	Very High	NoR 1	Potential for Caspian tern to utilise Otuwairoa Stream / Slippery Creek Corridor (NoR 1). As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence fragmentation due to road presence is unlikely. In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.	Negligible	Low
	Banded rail	High	NoR 1	Potential for banded rail to utilise Otuwairoa Stream / Slippery Creek Corridor (NoR 1). As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence fragmentation due to road presence is unlikely. In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.	Negligible	Very Low
Forest Birds	Kaka	High	NoR 1	Potential of kaka to utilise Pūriri Forest (WF7) within adjacent SEA_T_5248 (NoR 1). As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence fragmentation due to road presence is unlikely. In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.	Negligible	Very Low

Bird Type	Species	Ecological Value	NoR	Effect Justification	Magnitude	Level of Effect (pre-mitigation)
	Long-tailed cuckoo	Very High	NoR 1	Potential of long-tailed cuckoo to utilise Pūriri Forest (WF7) within adjacent SEA_T_5248 (NoR 1). As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence fragmentation due to road presence is unlikely. In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.	Negligible	Low
Non-TAR Birds	Non-TAR native birds	Low	NoR 1, 2, 3 & 4	Potential of non-TAR birds to utilise any adjacent habitat, within all NoRs. As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence fragmentation due to road presence is unlikely. In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.	Low	Very Low

Table 8-4: Summary of disturbance and displacement to native birds and nests (new and existing) due to light, noise, and vibration effects from the operation of the road.

Bird Type	Species	Ecological Value	NoR	Effect Justification	Magnitude	Level of Effect (pre-mitigation)
Freshwater Water / Wetland Birds	Shag species: Black shag, Little black shag, Pied shag	High	NoR 1, 2 & 4	Potential for shag species to utilise Otuwairoa Stream / Slippery Creek (NoR 1), Hingaia Stream (NoR 2) and Papakura Stream (NoR 4) corridor. As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Negligible	Very Low

Bird Type	Species	Ecological Value	NoR	Effect Justification	Magnitude	Level of Effect (pre-mitigation)
				In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.		
	New Zealand Dabchick	Very High	NoR 1 & 3	<p>Potential for shag species to utilise Otuwairoa Stream / Slippery Creek (NoR 1) and stormwater ponds (NoR 3).</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Low
Coastal/ Open country Birds	Wading birds: Variable oystercatcher, South Island pied oystercatcher, Royal spoonbill, Red knot	High	NoR 1	<p>Potential for Wading birds to utilise Otuwairoa Stream / Slippery Creek Corridor (NoR 1).</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Very Low
	Red-bill gulls	High	All NoR	<p>Potential for gull species to utilise Otuwairoa Stream / Slippery Creek (NoR 1) and any open maintained grassland areas (reserves).</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Very Low

Bird Type	Species	Ecological Value	NoR	Effect Justification	Magnitude	Level of Effect (pre-mitigation)
	Caspian tern	Very High	NoR 1	<p>Potential for Caspian tern to utilise Otuwairoa Stream / Slippery Creek Corridor (NoR 1).</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Low
	Banded rail	High	NoR 1	<p>Potential for banded rail to utilise Otuwairoa Stream / Slippery Creek Corridor (NoR 1).</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Very Low
Forest Birds	Kaka	High	NoR 1	<p>Potential of kaka to utilise Pūriri Forest (WF7) within adjacent SEA_T_5248 (NoR 1).</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p>	Negligible	Very Low
	Long-tailed cuckoo	Very High	NoR 1, 3 & 4	<p>Potential of long-tailed cuckoo to utilise Pūriri Forest (WF7) within adjacent SEA_T_5248 (NoR 1).</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.</p>	Negligible	Low

Bird Type	Species	Ecological Value	NoR	Effect Justification	Magnitude	Level of Effect (pre-mitigation)
				In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.		
Non-TAR Birds	Non-TAR native birds	Low	NoR 1, 2, 3 & 4	<p>Potential of non-TAR birds to utilise any adjacent habitat, within all NoRs.</p> <p>As upgrade to an existing transport corridor, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.</p> <p>In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.</p>	Low	Very Low

8.4 Herpetofauna

The effects on herpetofauna have been considered against the typical behaviours, habitat preference and sensitivity of the various species. Two species are likely to occur within the Project and can be grouped as ground skink species.

Ground skink species

Species included in this group are copper skinks (*Oligosoma aeneum*) and ornate skinks (*Oligosoma ornatum*). These two species are considered to be habitat generalists relative to other skink species, requiring either overgrown vegetation or organic refuge that maintains a moist environment.

Populations typically occur in greater density within forested areas but have been noted to occur in urban and rural areas. In general, they are considered to be relatively resilient to dust and noise disturbance.

8.4.1 Construction Effects

Noise and vibration during construction are not considered to have impacts on native herpetofauna species. Indeed, it is not uncommon within salvage projects to relocate herpetofauna to the immediate habitat (where available) adjacent to any construction site. This potential impact has been considered in light of the existing transport corridor and therefore existing disturbance.

Table 8-5: summarises the magnitude of effects of habitat removal on lizards considered for the removal of District Plan Trees in NoRs 1, 2 & 3 (refer Section 6.2.3). The groups of trees listed in Table 8-5: have the potential for lizard habitat which should be confirmed during pre-construction surveys. Lizards (all potential species identified) are **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 described in Section 8.4.2 below.

Table 8-5: Summary of effects to herpetofauna through the removal of district plan trees/ vegetation during construction

NoR	Effect Description	Effects Justification	Ecological Value	Magnitude	Level of Effect (pre-mitigation)
NoR 1	Kill or injure due to vegetation removal	Baseline and Likely Future Environment: Potential for skinks to be present within district plan vegetation (which will be removed). Impact likely to occur, impacting suitable lizard habitat: NoR 1: Slippery Creek (Tree group 107, 108 and 113) NoR 2: Hingaia Stream (Tree group 115 & 116) NoR 3: State highway one crossing (Tree group 38, 39, 41 & 48)	High	Moderate	High
NoR 2			High	Moderate	High
NoR 3			High	Moderate	High

NoR	Effect Description	Effects Justification	Ecological Value	Magnitude	Level of Effect (pre-mitigation)
		In a Likely Future Environment, there is no expected change to baseline. The magnitude and level of effect are the same as Baseline.			

8.4.2 Impact Management and Residual Effects During Construction

NoRs 1, 2 & 3 have construction related effects that might relate in killing/injuring skinks during District Plan vegetation removal that are **Moderate** and as such impact management is required. To address effects, an LMP for each affected NoR should consider the following:

- Preconstruction surveys and/or habitat potential surveys to confirm (potential) presence and guide further management if required;
- Timing of the implementation of the LMP noting that regional consents for earthworks to enable the Project works and Wildlife Permits will also be required;
- A description of methodology for survey, trapping and relocation of lizards rescued including but not limited to: salvage protocols, relocation protocols (including method 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 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; and
- Lizard management should be consistent with any regional consent conditions (and the Wildlife Act) that may be required for regional compliance. As regional consents will be required to construct the Project works which will take place in advance of vegetation removal, lizard management could also be managed via the regional consenting framework.

The residual impact is assessed as **Low** post mitigation.

8.4.3 Operational Effects

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

- Loss in connectivity due to the extension of the transport corridor (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 corridor.

Suitable habitat was identified within all NoRs which could potentially support both native skinks. Native skinks require vegetated corridors to facilitate natural dispersal, although they are relatively resident species and do not require migration or large-scale movement to support reproduction, refuge and feeding.

The loss of connectivity through the presence of the road 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 existing infrastructure upgrade the overall level of effect due to operational disturbance is assessed as **Negligible** prior to mitigation. The likely future ecological environment was anticipated to be the same as the baseline.

8.5 Cumulative Effects

According to a recent review of international and New Zealand literature (Smith et al., 2017), the RMA does not effectively consider cumulative effects from multiple roads across landscapes. In addition, the delayed nature of effects that occur after initial project completion and/or beyond consenting periods also means such impacts of roads are likely underestimated (Figure 8-1).

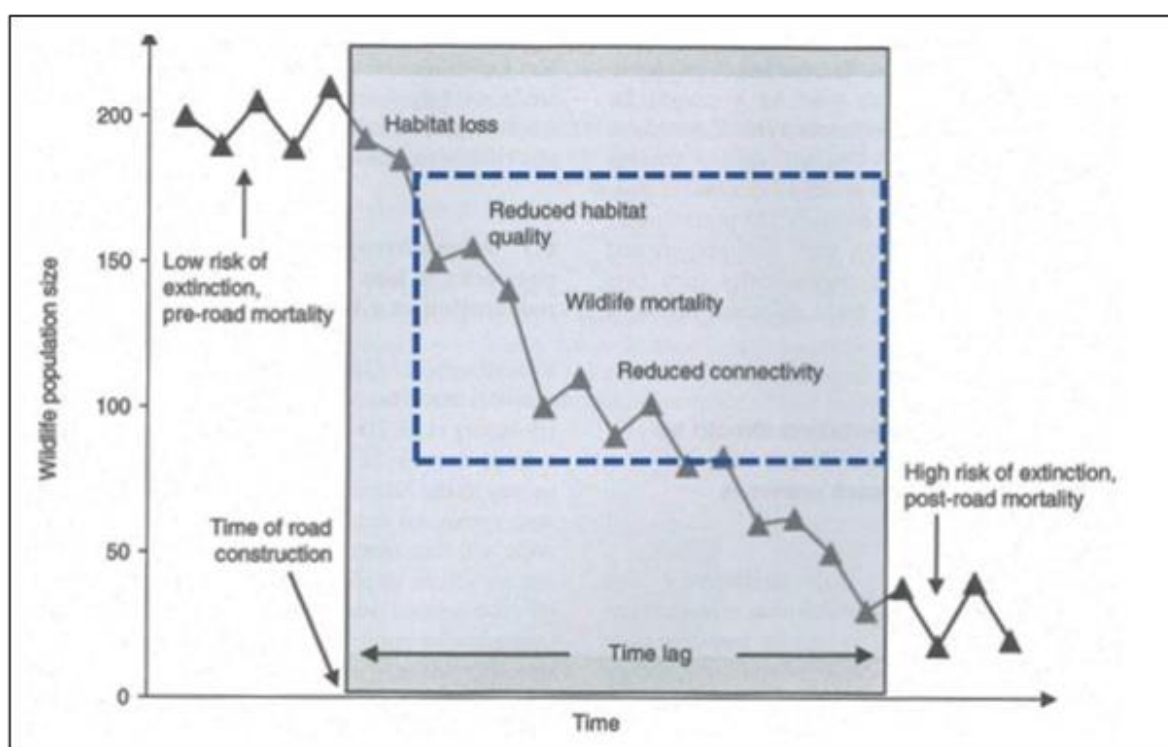


Figure 8-1: Major ecological impacts of roads and traffic on faunal populations and time lag (in the order of decades, shown in grey). The blue dotted line identifies effects due to road edges excluding the footprint at construction (in Simcock, et al., 2022, adapted by van der Ree et al., 2015, from Forman et al., 2003)

As stated in the EIANZ Guidelines, an assessment of ecological effects of a project should consider cumulative impacts on the environment and not just the direct effects of the single Project under review. Upgrading existing roads within the Project Area combined with urban development (external projects), and the consequences of a changing climate, risk a cumulative effect that does not necessarily require mitigation from the perspective of a singular project.

8.5.1 District Cumulative Effects

Mobile native fauna species are expected to use the Project Area and wider landscape. The Project Area is predominantly urban as of present (with exception of NoR 4), and hence existing native fauna are expected to be less sensitive to disturbance. If present they are likely to be habituate to disturbance by noise, light, and vibration as a consequence of transport corridors. However, eventually, gradual incremental changes in habitat caused by surrounding urbanisation could discourage nesting/roosting and reduce viability of native fauna over time.

The potential cumulative impacts of lighting from transport corridors and urban growth on bird movement and distribution in the Auckland region is specifically considered within this section, as the Project does not pose a direct risk in isolation. According to Adams et al. (2021) artificial light is abundant in the built environment with many known or suspected impacts on birds. Birds flying at night are known to aggregate around artificial light and collide with illuminated objects, which may result from attraction and/or disorientation. Birds are known to be repelled by light-based deterrents, and artificial light can also change birds' perceptions of habitat quality, resulting in selection or avoidance of illuminated areas.

All developments should be aware of the vulnerability and resilience of the receiving environment and the cumulative effects which may arise from multiple development activities within the Project Area.

As urban areas expand and transport infrastructure develops, it is important for collaboration between transport providers, consenting authorities (i.e., Auckland Council), and developers to assess the combined effects of lighting and take measures to mitigate these impacts (at a landscape scale). These measures may include the provision of vegetated (including dark) corridors, wildlife-friendly lighting designs, wildlife crossings, and vegetated buffers to protect sensitive habitats and fauna.

8.5.2 Regional Cumulative Effects

The wider area of the Project Area is already largely urban and some areas designated Future Urban Zone. Regardless of whether the transport corridors are developed, or urbanisation occurs first, construction often involves clearing of vegetation which can lead to the loss of habitat for native plant and animal species. The habitat degradation from ongoing cumulative removal of low value vegetation (which does not necessarily require impact management under EIANZ Guidelines) should be considered at a landscape scale by the consenting authorities in the wider regional context to prevent a decline in biodiversity and changes to ecosystem function and services.

To mitigate adverse effects on low value habitat, the use of green infrastructure (at a landscape scale) including riparian setbacks, riparian planting and stormwater management in the context of external development will be important. Implementing these mitigating measures, and others, will also aid in minimising flooding risks and protecting water quality.

9 Design and Future Regional Resource Consent Considerations

Ecological effects associated with activities that require regional consents and consideration under the NPS-FM are briefly discussed in the following sections to inform design and alignment options for each NoR. Wildlife Act Authority permits are also discussed in relation to the potential for killing or injuring of native fauna associated with the Project's activities.

Ecological features relevant to Regional Plan matters (and their approximate values) were considered during the Multi Criteria Assessment (**MCA**) to inform the Alternatives Assessment and proposed designation boundaries (refer to Appendix A of the AEE). This was achieved through a desktop assessment and a proxy-based assessment of ecological value (catchment condition, vegetation type, relationship with other ecological features).

Note that during the future detailed design process (as an additional consideration under the future regional consent process) there is scope within the designation to address (including to avoid) some potential effects/concerns/regional matters through design considerations at the detailed design phase.

9.1 Terrestrial Ecology

Construction of the Project will result in temporary and permanent loss of vegetation within the Project Area and is comprised of both native and exotic vegetation which ranges from **Low** to **High** (high value habitat is within unaffected but directly adjacent SEA_T_5248) ecological value (Appendix 7).

As the design develops and resource consent applications are prepared, more detailed habitat and fauna surveys may be required to inform an EclA (in line with the EIANZ Guidelines) which will be used to support future regional resource consents as required (for example, removal of vegetation, with bat roost potential, or within riparian setbacks) and wildlife permit applications (if required).

The potential extents and types of all terrestrial vegetation that could be permanently lost from the Project is presented in Table 9-1. This includes vegetation that will be directly impacted by the footprint of the road and batter slopes. It also includes vegetation that is subject to District and Regional Plan controls, as well as vegetation that can be removed as a permitted activity. Some of these areas are likely to provide habitat to native fauna, and this is discussed in Sections 9.1.1, 9.1.3 and Table 9-1 below.

Table 9-1: Approximate potential area of permanent terrestrial vegetation loss within the road footprint for the FTN Projects Area

Terrestrial Vegetation Feature	Classification*	Approximate Vegetation Loss (m ²)			
		NoR 1	NoR 2	NoR 3	NoR 4
Exotic Grassland*	EG	10175	2134	10794	26317
Exotic Scrub	ES	NA	NA	NA	NA
Planted Vegetation – Native (recent)	PL.1	783	NA	698	36
Planted Vegetation - Native (mature)	PL.2	267	NA	39	878
Planted Vegetation – Amenity	PL.3	2075	NA	2028	4402
Treeland – Native-Dominated	TL.1	1602	NA	1033	53
Treeland – Mixed Native/Exotic	TL.2	5	NA	409	45
Treeland – Exotic-Dominated	TL.3	169	300	647	9593

Notes: * = Not all degraded / transformed areas were mapped during the assessment.

9.1.1 Long Tailed Bats

Mature vegetation in suitable habitat areas (as identified in Section 6.2.2) may provide potential habitat for bat roosts and facilitate bat movement in the broader landscape (Smith et al., 2017). The presence of bats and roosts will need to be re-assessed prior to obtaining any regional resource consents for vegetation removal (relevant under regional matters) and to support an application for a wildlife permit.

The presence of bat habitat and bat roosts will require a BMP under regional consents. The objectives of bat management will be to:

- Identify bat habitat that may be affected by the Project;
- Avoid habitat through alignment and design;
- Avoid effects of lighting and noise on bat habitat;
- Avoid injury and/or death of roosting bats during vegetation removal;
- Avoid disturbance through construction management (seasonal restriction on vegetation removal December to April); and
- Outline additional mitigation where avoidance is not feasible including any offset/compensation that may be required.

9.1.2 Avifauna

Native birds as identified in Section 6.2.5 have the potential to be present within the Project Area. The habitats within each NoR that native avifauna may utilise are detailed in Table 6-5. Vegetation clearance required for construction could result in the loss of these habitats and any vegetation

clearance within the bird nesting season (September – February) will need to be managed in accordance with regional consents and the Wildlife Act.

9.1.3 Herpetofauna

Native herpetofauna as identified in Section 6.2.6 have the potential to be present within vegetation impacted by the Project. Therefore, there is potential that site clearance required for construction could kill or injure native herpetofauna species and result in the removal of their habitat. Any vegetation clearance where native herpetofauna are likely to occur will also need to be managed in accordance with regional consents and the Wildlife Act.

9.1.4 Invertebrates

Impact management may be required under the Wildlife Act to prevent killing or injuring of any native invertebrate species. Therefore, native invertebrates will need to be assessed prior to obtaining any regional resource consents for vegetation removal.

9.2 Freshwater Ecology

The construction of the Project will directly impact 10 streams, ranging from **Low** to **High** ecological value. Approximately 45m of stream reclamation may be required to accommodate the Project works; however, this could change during the detailed design and resource consenting phase which would look to assess and avoid, remedy and mitigate freshwater effects. The predicted permanent and intermittent stream loss for the Project is presented in Table 9-2, based on where the indicative designs require the stream sections to be culverted, piped, or realigned.

These calculations will require re-evaluation as part of the future regional consent process. Stream Ecological Valuation (**SEV**) assessments will need to be undertaken to inform the re-evaluation. All assessed streams have been modified and degraded to varying degrees and there is an opportunity to restore riparian habitat along these features. Where stream loss is likely to be unavoidable, there are opportunities within the designation boundary or within adjacent public land to accommodate potential future compensation requirements.

During the detailed design phase, stream crossing plans (i.e., bridge and culvert design) will be confirmed as well as details regarding fish passage requirements. Under future regional consents for instream works, earthworks and vegetation removal, impact management would also be required for fish salvage and relocation, sediment control and management of the riparian condition.

Table 9-2: Potential stream loss (permanent and intermittent) within the Project Area

Stream ID	Hydroperiod	Ecological Value	Estimate of potential length lost (m)*
NoR 1 – Great South Road Intersections			
FTN1_S1	Permanent	High	NA
FTN1_S2	Permanent	High	NA
Total			NA

Stream ID	Hydroperiod	Ecological Value	Estimate of potential length lost (m)*
NoR 2 – Great South Road (Drury Station)			
FTN2_S1	Permanent	High	NA
FTN2_S2	Permanent	Moderate	10
Total			10
NoR 3 – Alfriston Road			
FTN3_S1	Permanent	Moderate	NA
FTN3_S2	Permanent	Moderate	10
FTN3_S3	Intermittent	Low	5
FTN3_S4	Intermittent	Low	15
Total			30
NoR 4 – Porchester and Popes Roads			
FTN4_S1	Intermittent	Low	4
FTN4_S2	Permanent	High	NA
Total			5

Notes: * = All potential stream loss measurements are indicative. The measurements are based on a potential route option and an approximate measurement of loss.

9.3 Wetland Ecology

Wetland extent and approximate values were considered during the MCA to inform the Alternatives Assessment and proposed designation boundaries. This was achieved through a desktop wetland delineation for all the NoR options along with a proxy-based assessment of ecological value (catchment condition, vegetation cover, relationship with other ecological features).

The construction of the Project will directly impact three natural inland wetlands, ranging from **Low** to **High** ecological value based on the indicative designs. Approximately 1053m² of direct wetland loss is estimated based on the footprint of the corridor widening and batter slopes, additionally 550m² are likely to be temporarily impacted during construction (see Table 9-3).

These calculations will require re-evaluation as part of the future regional consent process. Specific requirements of the National Policy for Freshwater Management (2022) will also need to be taken into consideration. Of particular importance will be the need to:

- delineate the wetlands according to acceptable protocols (e.g., Ministry for the Environment, 2022);
- determine wetland functionality (i.e., ecosystem services provided by the wetlands);
- determine wetland condition/health; and

- determine whether any of the wetlands are suitable habitats for TAR species. Specific mitigation is likely to be required, for construction works within potential Inanga breeding habitat FTN1_W1 (WL10& PLW.1) in Otūwairoa Stream / Slippery Creek (NoR 1).

Where permanent wetland loss is likely to be unavoidable, there are opportunities within the designation boundary or within adjacent public land to accommodate potential future compensation requirements.

Table 9-3: Approximate potential permanent and temporary wetland loss within the Project Area

Wetland ID	Wetland / Open Water*	Ecological Value	Potential Permanent Loss (m ²)	Potential Temporary (construction only) Loss (m ²)
NoR 1 – Great South Road Intersections				
FTN1_W1	WL10& PLW.1	High	29	508
Total			29	508
NoR 3 – Alfriston Road				
FTN3_W1	EW	Low	NA	NA
FTN3_W2	EW	Low	209	50
Total			209	50
NoR 4 – Porchester and Popes Roads				
FTN4_W1	EW	Low	758	NA
Total			758	NA

Notes: = Artificial wetlands (i.e., most of the open water bodies) are excluded in the calculation of approximate wetland loss at this stage.

The wetland assessment to inform the future regional consent process should also assess the opportunities for wetland restoration / enhancement, and where required outline additional mitigation where avoidance is not feasible. This may include offsets and/or compensation.

10 Conclusion

This report has considered the actual and potential ecological effects associated with the construction, operation, and maintenance of the Project. The focus was on ecological effects pertaining to district plan matters, and providing recommendation which may be implemented to avoid, remedy, and/or mitigate these likely effects.

The district matter ecological effects relevant to construction and operation, prior to any mitigation, were assessed. All ecological effects assessed to be Moderate or higher required mitigation. The effects on TAR herpetofauna species due to the removal of district plan trees/vegetation was the only effect which required mitigation. A LMP for NoR 1 – 3 should consider the following:

- Preconstruction surveys and/or habitat potential surveys to confirm (potential) presence and guide further management;
- Timing of the implementation of the LMP;
- A description of methodology for survey, trapping and relocation of lizards rescued including but not limited to: salvage protocols, relocation protocols (including method 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 suitably qualified and experienced ecologist/herpetologist approved to oversee the implementation of the Lizard Management Plan (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; and
- Lizard management should be consistent with any regional consent conditions (and the Wildlife Act) that may be required for regional compliance.

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

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1 Appendix 1 – Ecological Impact Assessment Methodology

The standard by which this EclA was undertaken follows the guidelines published by the Environment Institute of Australia and New Zealand (EIANZ Guidelines) (Roper-Lindsay et al., 2018).

1.1 Assessment of Ecological Value

The first step in the EclA approach is to assess the value of ecological features in terms of representativeness, rarity, diversity and pattern and ecological context. Details on each matter and its associated considerations are provided in Table 1 for terrestrial ecological value and Table 2 for aquatic ecological value.

Table 1: Matters and considerations for the assessment of terrestrial ecological value

Representativeness
Typical structure and composition
Indigenous representation
Rarity/distinctiveness
Species of conservation significance
Range restricted or endemic species
Distinctive ecological values
Diversity and pattern
Habitat diversity
Species diversity
Patterns in habitat use
Ecological context
Size, shape and buffering
Sensitivity to change
Ecological networks (linkages, pathways, migration)

Table 2: Matters and considerations for the assessment of aquatic ecological value

Representativeness (including SEV, RHA and ecological integrity)
Extent to which site/catchment is typical of characteristic
Instream habitat modification

Representativeness (including SEV, RHA and ecological integrity)
Riparian habitat modification
Hydrological modification
Catchment conditions
Geomorphological modification
Water quality modification
Presence of alien and invasive species
Invertebrate assemblage representation
Fish assemblage representation
Rarity/descriptiveness
Pool characterisation
Species of conservation significance
Range restricted or endemic species
Stream type (rare or distinctive)
Diversity and pattern
Distinctive ecological values
Level of natural diversity
Diversity metrics
Complexity of community
Ecological context (Ecosystem services, importance sensitivity)
Stream order
Catchment size
Hydroperiod
Sensitivity to flow modification
Sensitivity water quality modification
Sensitivity to sedimentation/erosion
Connectivity and migration

1.2 Assessment of Ecological Effects

The ecological effects assessment includes several steps that collectively assess the way the Project will interact with elements of the physical and biological, environment to produce effects to habitat and receptors. The methods for determining the level of effect are outlined in the following sections.

Basic impact characteristic terminology and respective descriptors are in line with the EIANZ Guidelines and are provided in Table 3 below.

Table 3: Magnitude of effect assessment terminology

Characteristic	Definition	Designations
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect)	Direct
		Indirect
Extent	The “reach” of the impact (e.g., confined to a small area around the Project Footprint, projected for several kilometres, etc.)	Local
		Regional
		National
Duration	The time period over which a resource/receptor is affected	Temporary (days or months)
		Short-term (<5 years)
		Long-term (15-25 years)
		Permanent (>25 years)
Frequency	A measure of the constancy or periodicity the receptor will be affected	Infrequently
		Periodically
		Frequently
		Continuously
Likelihood	The probability of an effect occurring if it is unplanned	Highly Unlikely
		Unlikely
		Likely
		Highly Likely
		Definite
Reversibility	The degree to which the ecological effect can be reversed in a reasonable time scale through natural processes or mitigation	Totally
		Partially
		Irreversible
		Not applicable

Based on the above-mentioned descriptors, the characteristics of each effect are used to assign a magnitude to the specific effect. Magnitude designations are provided in Table 4.

Table 4: Magnitude of effect descriptions

Magnitude	Description
Very High	Total loss of, or very major alteration to, key elements/features of the existing baseline conditions, such that the post-development character, composition and or attributes will be fundamentally changed and may be lost from the site altogether; and/or loss of very high proportion of the known population or range of the elements/features
High	Major loss or major alteration to key elements/features of the existing baseline such that the post-development character, composition and/or attributes will be fundamentally changed; and/or loss of a high proportion of the known population or range of the element/feature
Moderate	Loss or alteration to one or more key elements/features of the existing baseline such that the post-development character, composition and/or attributes will be partially changed; and/or loss of a moderate proportion of the known population or range of the element/feature
Low	Minor shift away from the existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline conditions will be similar or pre-development circumstances or patterns; and or having a minor effect on the known population or range of the element/feature
Negligible	Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation; and/or having negligible effect on the known population or range of the element/feature

The magnitude of an effect is considered in relation to the ecological value of the habitat or receptor to be impacted on. The ecological value of habitat or receptors are the primary focus of the ecological assessment. The ecological value of habitat or receptors are typically expressed on a local, district, regional or national scale. The ecological value designations are provided in Table 5.

Table 5: Ecological value descriptions

Value	Description
Very high	Area rates High for three or all the four assessment matters. Likely to be of National importance and recognised as such
High	Area rates High for two of the assessment matters, Moderate and Low for the remainder or Area rates High for 1 so the assessment matters, moderate for the remainder. Likely to be regionally important and recognised as such
Moderate	Area rates High for one matter, Moderate and Low Dortha remainder, or Area rates Moderate for 2 or more assessment matters Low or Very low for the remainder. Likely to be important at the level of the Ecological District
Low	Area rates Low or Very low for most assessment matters and Moderate for one. Limited ecological value other as local habitat for tolerant species
Negligible	Area rates Very low for three matters and Moderate, Low or Very low for the remainder

Once magnitude of effect and the ecological value of the habitat or receptor have been determined, the level of effect can be assigned for each effect using the matrix shown in Table 6.

Table 6: Ecological effect matrix

		Ecological Values				
		Very High	High	Moderate	Low	Negligible
Magnitude	Very High	Very High	Very High	High	Moderate	Low
	High	Very High	Very High	Moderate	Low	Very Low
	Moderate	High	High	Moderate	Low	Very Low
	Low	Moderate	Low	Low	Very Low	Very Low
	Negligible	Low	Very Low	Very Low	Very Low	Very Low
	Positive	Negligible	Negligible	Negligible	Negligible	Negligible

Note = The ecological effect matrix is not a rigid matrix but rather a guideline to help assign an appropriate effect. Specialist expertise can be used to adjust the ratings when deemed appropriate (e.g., when applying a conservative approach, it would be appropriate to score a Moderate ecological effect for a high Value, and low Magnitude).

From Table 6 the level of effect designations are defined below:

- **Negligible:** an effect of negligible consequence is one where habitat or receptors will not be affected in any meaningful way by a Project activity, or the predicted effect is indistinguishable from natural background variations;
- **Low:** an effect of minor consequence is one where habitat or receptors will experience a noticeable effect, but the effect magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low ecological value. In either case, the magnitude should be well within applicable standards;
- **Moderate:** an effect of moderate consequence has an effect magnitude that is within applicable standards but higher than that of a minor effect. The emphasis for moderate effects is to show that the effect has been reduced or minimised in line with the mitigation hierarchy;
- **High:** a high level of effect of is one where an accepted limit or standard may be exceeded, or moderate magnitude of effect will occur to moderate or high value habitat or receptors; and
- **Very High:** a very high level of effect will occur when the magnitude and value of effects are assessed as high or very high. Typically, very high level of effects notably exceeds standard limits.

1.3 Impact Management

Informed by the level of effects suitable impact management measures are provided consistent with the mitigation hierarchy. The priority in mitigation is to first apply mitigation measures to the source of the impact (avoid) and then to address the resultant effects (reduce or minimise) of the impact.

1.4 Residual Impacts

Once mitigation measures are declared, the next step in the effect assessment process was to assign residual impact significance. This is a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional recommended mitigation measures.

1.5 Managing Uncertainty

Biophysical impacts are difficult to predict with certainty, but uncertainty stemming from on-going development of the Project design and implementation is inevitable and the environment is variable over time. If uncertainties are relevant to the effect assessment, they were stated and approached conservatively, to identify a range of likely residual effects and relevant mitigation measures.

1.6 Cumulative Effects

Cumulative impacts and effects are those that arise because of an impact and effect from the Project interacting with those from another activity to create an additional impact and effect. These are termed cumulative impacts and effects. No structured methods were employed to assess cumulative impacts, but where relevant descriptions of potential cumulative effects have been provided.

2 Appendix 2 – Auckland Unitary Plan Activities

Auckland Unitary Plan – E26 Infrastructure

Table E26.4.3.1 below is relevant for considering effects and recommending mitigation in relation to tree removal. Note that, except for Trees in Roads, in Open Space Zones and Notable Trees, trees are not protected under the AUP.

Table E26.4.3.1 Activity table - Network utilities and electricity generation – Trees in roads and open space zones and the Notable Trees Overlay

Activity	Activity Status			Permitted Standards or Matters of Discretion / Control
	Trees in roads [dp]	Open space zones [dp]	Notable trees [dp]	
(A89) Tree removal of Notable Trees	N/A	N/A	Discretionary	N/A
(A90) Tree trimming, alteration or removal on roads adjoining rural zones and on roads adjoining the Future Urban Zone	Permitted	N/A	N/A	N/A
(A91) Tree alteration or removal of any tree less than 4m in height and/or less than 400mm in girth	Permitted	Permitted	Restricted Discretionary	N/A
(A92) Tree alteration or removal of any tree greater than 4m in height and/or greater than 400mm in girth	Restricted Discretionary	Restricted Discretionary	N/A	N/A
(A93) Tree trimming, alteration and removal not otherwise provided for	D	D	D	N/A

Auckland Unitary Plan – E26 Infrastructure

The table below is relevant for considering effects and recommending mitigation in relation to vegetation clearance. Also refer to Table E15.4.1.

Table E26.3.3.1 Activity table – Network utilities and electricity generation and vegetation management

Activity	Activity Status						Permitted Standards
	Rural zones, coastal areas and riparian areas [rp]	SEA [rp]	ONF [dp]	HNC [dp]	ONL [dp]	ONC [dp]	
(A76) Vegetation alteration or removal	P	P	P	P	P	P	Refer to E26.3.5.4. Vegetation alteration or removal for Permitted Activity Standards
(A77) Vegetation alteration or removal that does not comply with Standards E26.3.5.1 to E26.3.5.4	RD	RD	RD	RD	RD	RD	
(A78) Vegetation alteration or removal not otherwise provided for	D	D	D	D	D	D	

Note: Greyed-out boxes relate to Regional Activities which are not considered as part of the NoR and will be relevant for future Regional Resource Consents.

Auckland Unitary Plan – E15 Vegetation management and biodiversity

Table E15.4.1 below is relevant for considering effects of activities over and above those that are permitted and recommending mitigation in relation to vegetation clearance in urban zones, and adjacent to riparian areas.

Table E15.4.1 Activity table - Auckland-wide vegetation and biodiversity management rules

Activity	Activity Status	Permitted Standards
Riparian areas (as described below)		
(A16) Vegetation alteration or removal within 20m of rural streams, other than those in Rural – Rural Production Zone and Rural – Mixed Rural Zone	RD	N/A
(A17) Vegetation alteration or removal within 10m of rural streams in the Rural – Rural Production Zone and Rural – Mixed Rural Zone	RD	N/A

Activity	Activity Status	Permitted Standards
(A18) Vegetation alteration or removal within 20m of a natural inland wetland, in the bed of a river or stream (permanent or intermittent), or lake	RD	N/A
(A19) Vegetation alteration or removal within 10m of urban streams	RD	N/A
All other zones and areas not covered above (i.e. Urban Zones)		
(A22A) Vegetation alteration or removal	P	Refer to E15.6. Vegetation alteration or removal for Permitted Activity Standards
All areas		
(A23) Permitted activities in Table E15.4.1 that do not comply with one or more of the standards in E15.6	RD	N/A

Auckland Unitary Plan – E26 Infrastructure - Earthworks

The table below is relevant for considering effects of activities over and above those that are permitted and recommending mitigation in relation to earthworks.

Table E26.5.3.1 Activity table - Earthworks all zones and roads [dp]

Activity	Activity Status	Permitted Standards
(A95) Earthworks up to 2500m ² other than for maintenance, repair, renewal, minor infrastructure upgrading	P	Refer to E26.5.5.2. General standards (District)
(A96) Earthworks up to 2500m ³ other than for maintenance, repair, renewal, minor infrastructure upgrading	P	Refer to E26.5.5.2. General standards (District)
(A97) Earthworks greater than 2500m ² other than for maintenance, repair, renewal, minor infrastructure upgrading	RD	N/A
(A97A) Earthworks greater than 2500m ³ other than for maintenance, repair, renewal, minor infrastructure upgrading	RD	N/A

3 Appendix 3 – Regional Plan, District Plan and Wildlife Act Matters

Ecological effects of road infrastructure construction broken down into AUP:OP Regional and District Plan matters

Ecological feature	Activity	Ecological Effect	AUP:OP District Plan provisions	AUP:OP Regional Plan provisions	Wildlife Act
Construction					
Terrestrial habitat	Vegetation removal (including trees) outside of roads and public spaces in: <ul style="list-style-type: none"> a rural zone riparian margins coastal areas SEAs This also includes other terrestrial habitat of value identified in the EclA	Permanent loss of habitat/ecosystem, fragmentation and edge effects		<input type="checkbox"/>	
	Vegetation removal (including trees) in: <ul style="list-style-type: none"> Roads Public spaces ONFs ONLs HNCs ONCs 	Permanent loss of habitat/ecosystem, fragmentation and edge effects	<input type="checkbox"/>		
	Earthworks – leading to invasion of bare earth surfaces with weeds and transfer of weeds (seeds and fragments) between earthworks areas	Weed dispersal to previously unaffected areas of indigenous vegetation, reduction in terrestrial biodiversity		<input type="checkbox"/>	
Bats	Vegetation removal	Roost loss.		<input type="checkbox"/>	<input type="checkbox"/>
	Vegetation removal	Kill or injure individual			<input type="checkbox"/>
	Vegetation removal	Loss of foraging habitat		<input type="checkbox"/>	
	Construction activities (Noise, light, dust etc.)	Disturbance and displacement to roosts and to individuals (existing)	<input type="checkbox"/>		<input type="checkbox"/>
Birds (native)	Vegetation removal	Nest loss		<input type="checkbox"/>	<input type="checkbox"/>

Ecological feature	Activity	Ecological Effect	AUP:OP District Plan provisions	AUP:OP Regional Plan provisions	Wildlife Act
	Vegetation removal	Kill or injure individual			✓
	Vegetation removal	Loss of foraging habitat		✓	
	Construction activities (noise, light, dust etc)	Disturbance and displacement of roosts and individuals (existing)	✓		✓
Herpetofauna (native)	Vegetation removal	Lizard habitat loss		✓	
	Vegetation removal	Kill or injure individual			✓
	Construction activities (noise, light, dust etc)	Disturbance and displacement of individuals (existing)	✓		✓
	Reclamation/culvertin g/other structures e.g., bank armouring	Permanent loss/modification of habitat/ecosystem		✓	
Freshwater habitat – wetland or stream (including riparian margins)	Vegetation removal	Permanent loss of habitat/ecosystem, fragmentation and edge effects		✓	
	Construction activities – earthworks (leading to sediment discharge), machinery use and chemical storage (leading to leaks/spills)	Uncontrolled discharge leading to habitat and water quality degradation		✓	
	Diversion, abstraction or bunding of watercourses and water level/flow/periodicity changes	Detrimental effects on habitats including plant composition and fauna		✓	
Fish (native)	Reclamation/diversion /other structures e.g., bank armouring	Loss of aquatic habitat		✓	
	Reclamation/diversion /culverting/other structures e.g., bank armouring	Kill or injure individual			✓
Operation					
Terrestrial habitat	Presence of the road – use of road edges as dispersal corridors by invasive plant species	Weed dispersal to previously unaffected areas of indigenous vegetation, reduction in terrestrial biodiversity		✓	

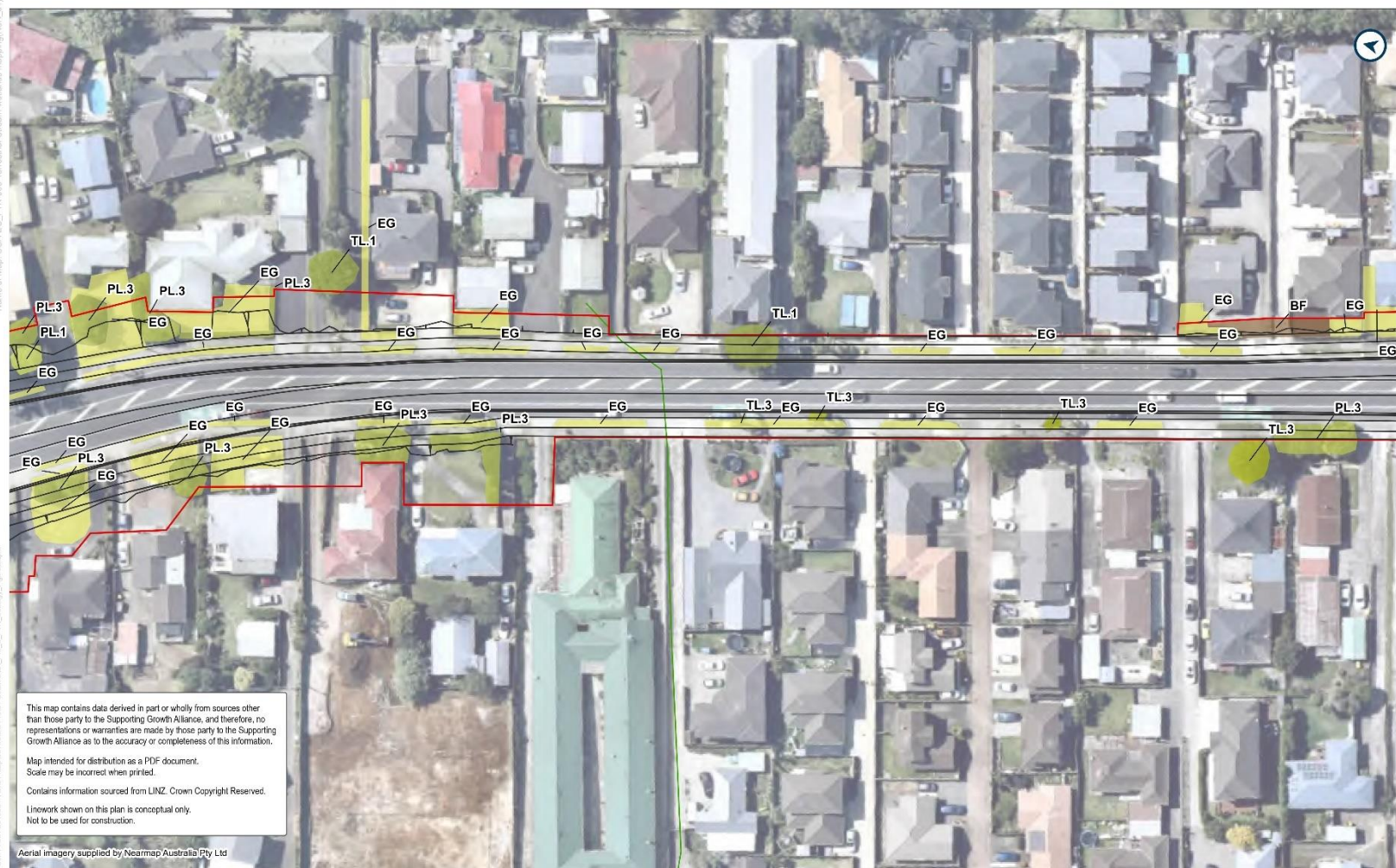
Ecological feature	Activity	Ecological Effect	AUP:OP District Plan provisions	AUP:OP Regional Plan provisions	Wildlife Act
	Road maintenance – increased use of herbicides	Increased weed incursion, unintentional spray of indigenous vegetation		✓	
Bats	Vehicle movement	Kill or injure individual			✓
	Presence of the road	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat	✓		✓
	Lighting and noise/vibration	Disturbance and displacement of (new and existing) roosts and individuals	✓		✓
Birds (native)	Vehicle movement	Kill or injure individual	✓		✓
	Presence of the road	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat	✓		✓
	Lighting and noise/vibration	Disturbance and displacement of (new and existing) nests and individuals	✓		✓
Herpetofauna (native)	Vehicle movement	Kill or injure individual			✓
	Presence of the road	Loss in connectivity due to permanent habitat loss, light and noise/vibration effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat	✓		✓
	Lighting	Disturbance of nocturnal lizard behaviour	✓		✓
Freshwater habitat – wetland or stream (including riparian margins)	Vehicle (cartage) movement – risk of spills of potential toxins (oil, milk, chemicals)	Temporary degradation of instream/wetland habitat and water quality		✓	
	Presence of bridge	Shading leading to change in ecosystem structure		✓	
	Gradual change in hydrology from	Effect on downstream habitat (including		✓	

Ecological feature	Activity	Ecological Effect	AUP:OP District Plan provisions	AUP:OP Regional Plan provisions	Wildlife Act
	presence of the road/stormwater, including reclamations	erosion/sediment discharge) due to change in hydrology (increase or decrease)			
	Stormwater discharges – pollutants (such as heavy metals and herbicides)	Permanent degradation of wetland or instream habitat and water quality		✓	
Fish (native)	Presence of culvert	Loss of connectivity due to culvert preventing fish passage up and downstream		✓	

4 Appendix 4 – Ecological Habitat Maps

Terrestrial, Aquatic and Wetland Maps Related to NoR 1





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Metres

Page 2 of 15

NoR 1 - Great South Road

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Page 3 of 15



Name of Map: SCA-EC-PTN-003-Territorial Stream-landmarks mapping(NOR_01)

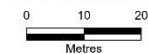
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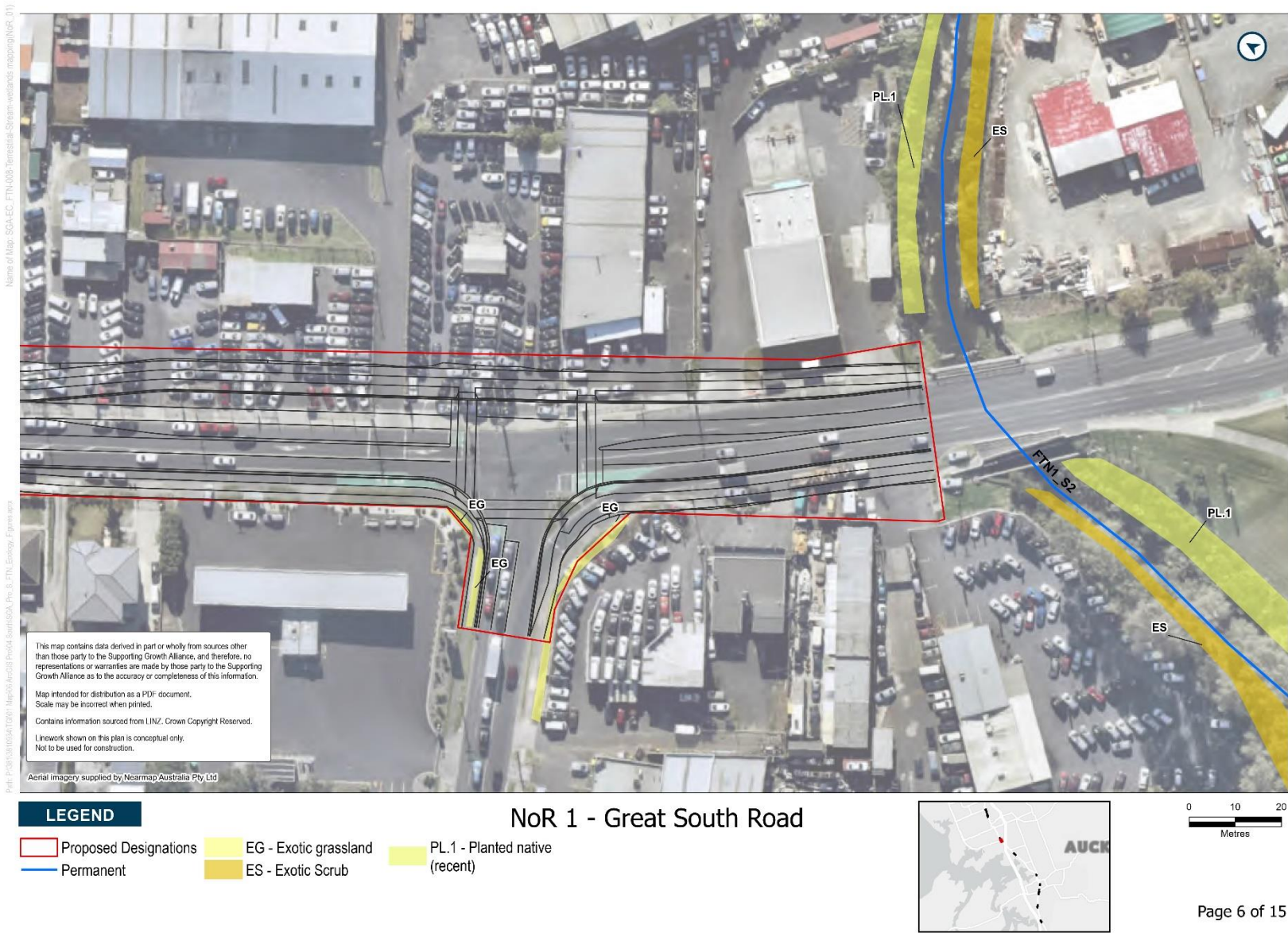


LEGEND

- Proposed Designations
- TL.1 - Native treeland

NoR 1 - Great South Road





Name of Map: SGA-EG-FTN-005-Territorial-Stream-valleys (MappingNoR_01)

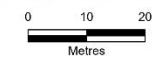
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LEGEND

- | | | |
|--|---|---|
| Proposed Designations | EG - Exotic grassland | TL.1 - Native treeland |
| BF - Brownfield | PL.3 - Planted amenity | TL.3 - Exotic treeland |

NoR 1 - Great South Road







NoR 1 - Great South Road



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Metres

Page 9 of 15

Name of Map: SGA-EG_FTH-002-Terrestrial-Suian-wetlands_mapping(NOR_01)

Path: P:\GIS\002\01\002\MapDocs\Proja\SGA_FTH_002_Terrestrial_Suian_wetlands_mapping(NOR_01).mxd



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

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LEGEND

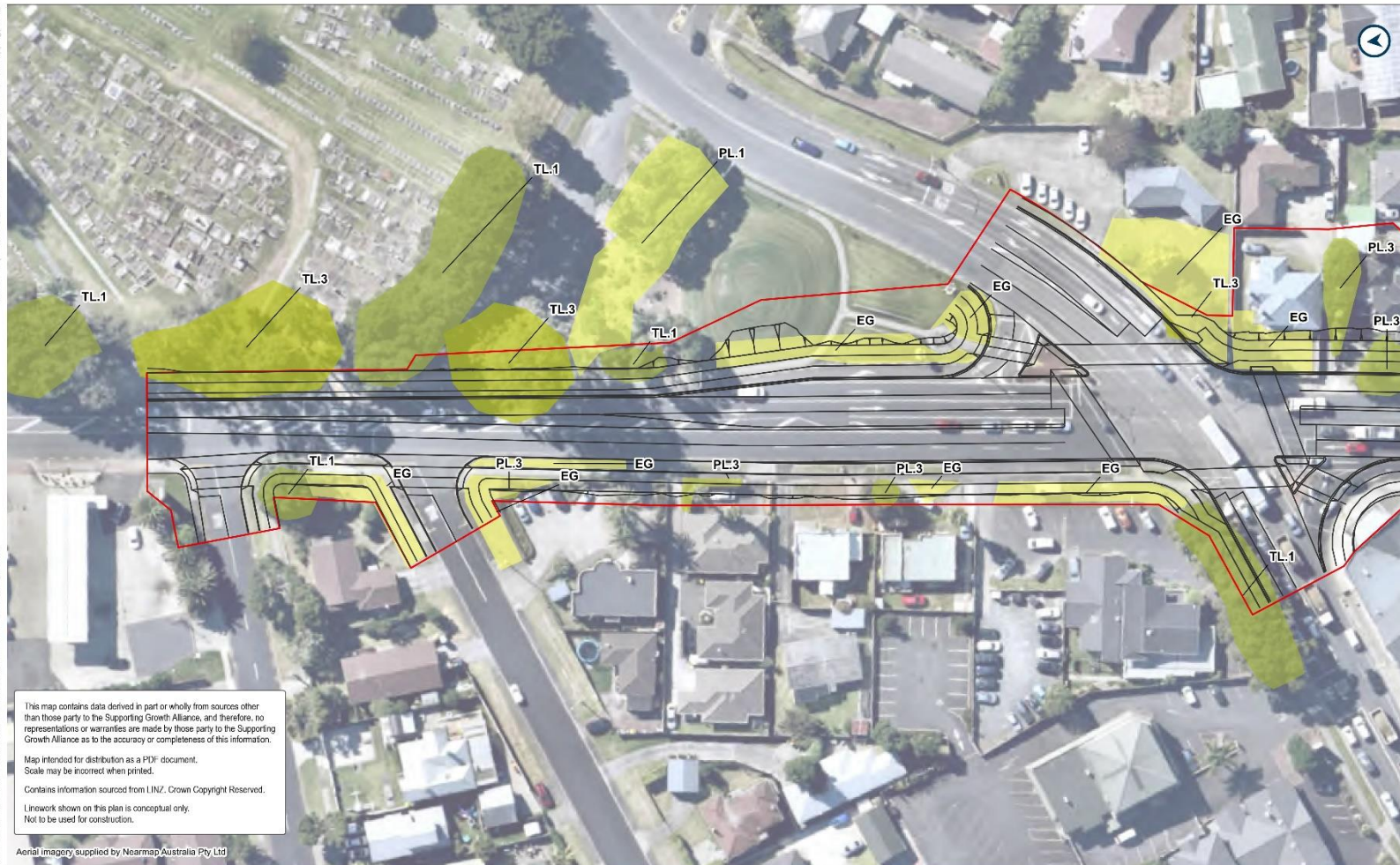
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|---|--|--|
|  Proposed Designations |  PL.3 - Planted amenity |  TL.3 - Exotic treeland |
|  EG - Exotic grassland |  TL.1 - Native treeland | |

NoR 1 - Great South Road



Name of Map: SGA-EG_FTH-002-Terrestrial-Stream-wetlands_mapping(NOR_01)

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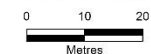
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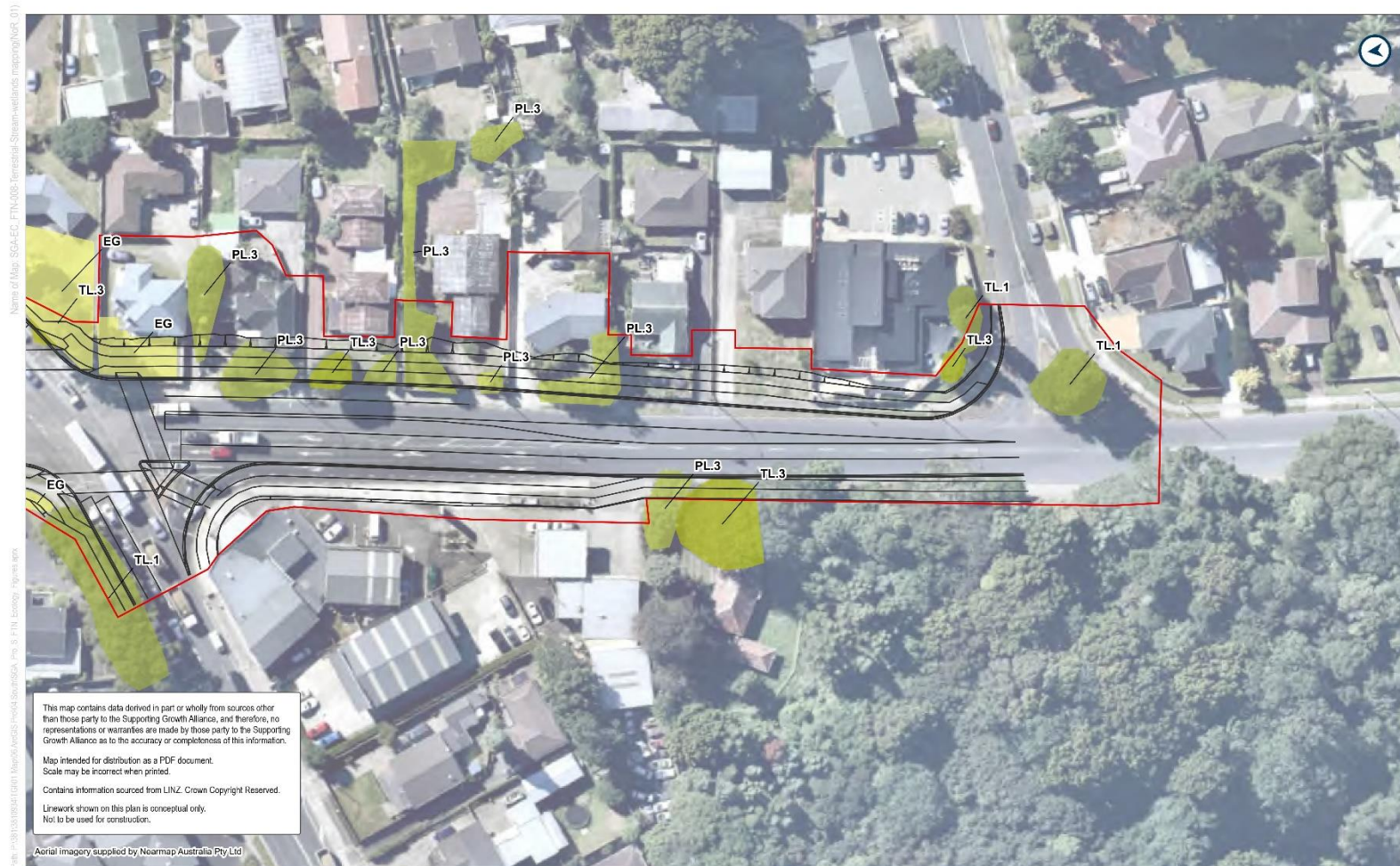
Aerial imagery supplied by Nearmap Australia Pty Ltd

LEGEND

- | | | |
|--|--|---|
| Proposed Designations | PL.1 - Planted native (recent) | TL.1 - Native treeland |
| EG - Exotic grassland | PL.3 - Planted amenity | TL.3 - Exotic treeland |

NoR 1 - Great South Road

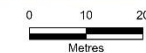


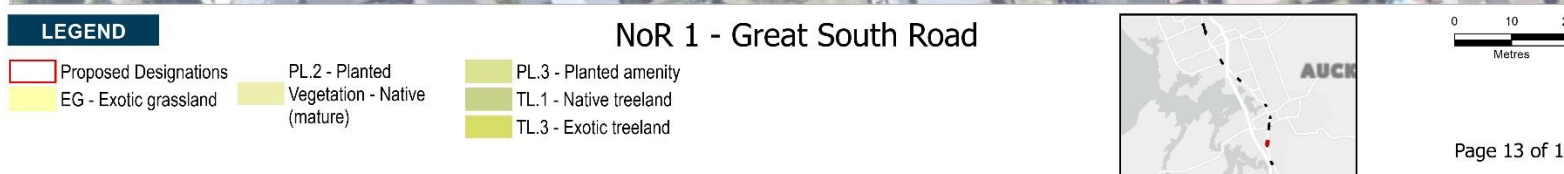


LEGEND

- | | | |
|--|---|---|
| Proposed Designations | PL.3 - Planted amenity | TL.3 - Exotic treeland |
| EG - Exotic grassland | TL.1 - Native treeland | |

Nor 1 - Great South Road



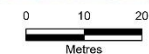


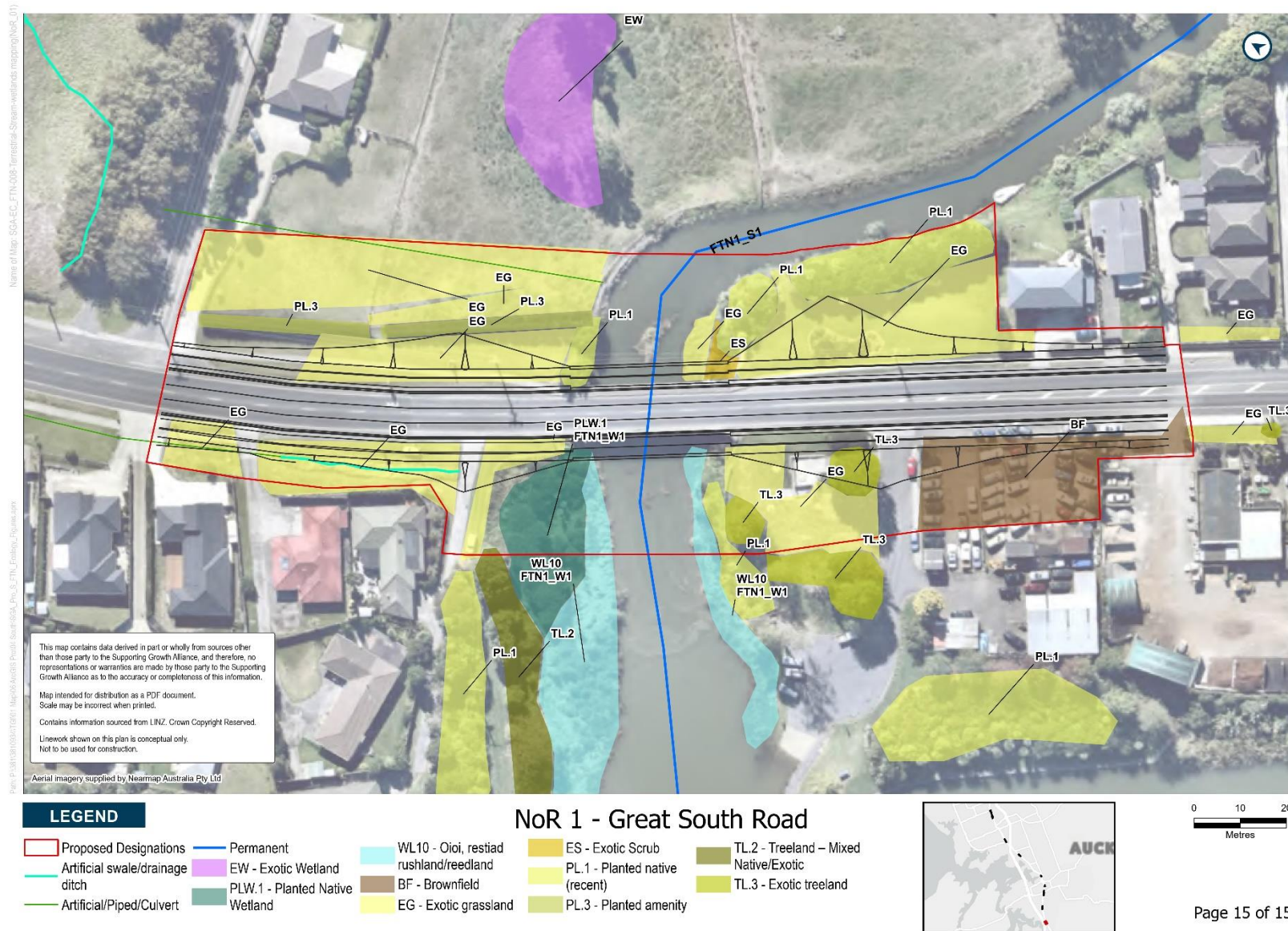


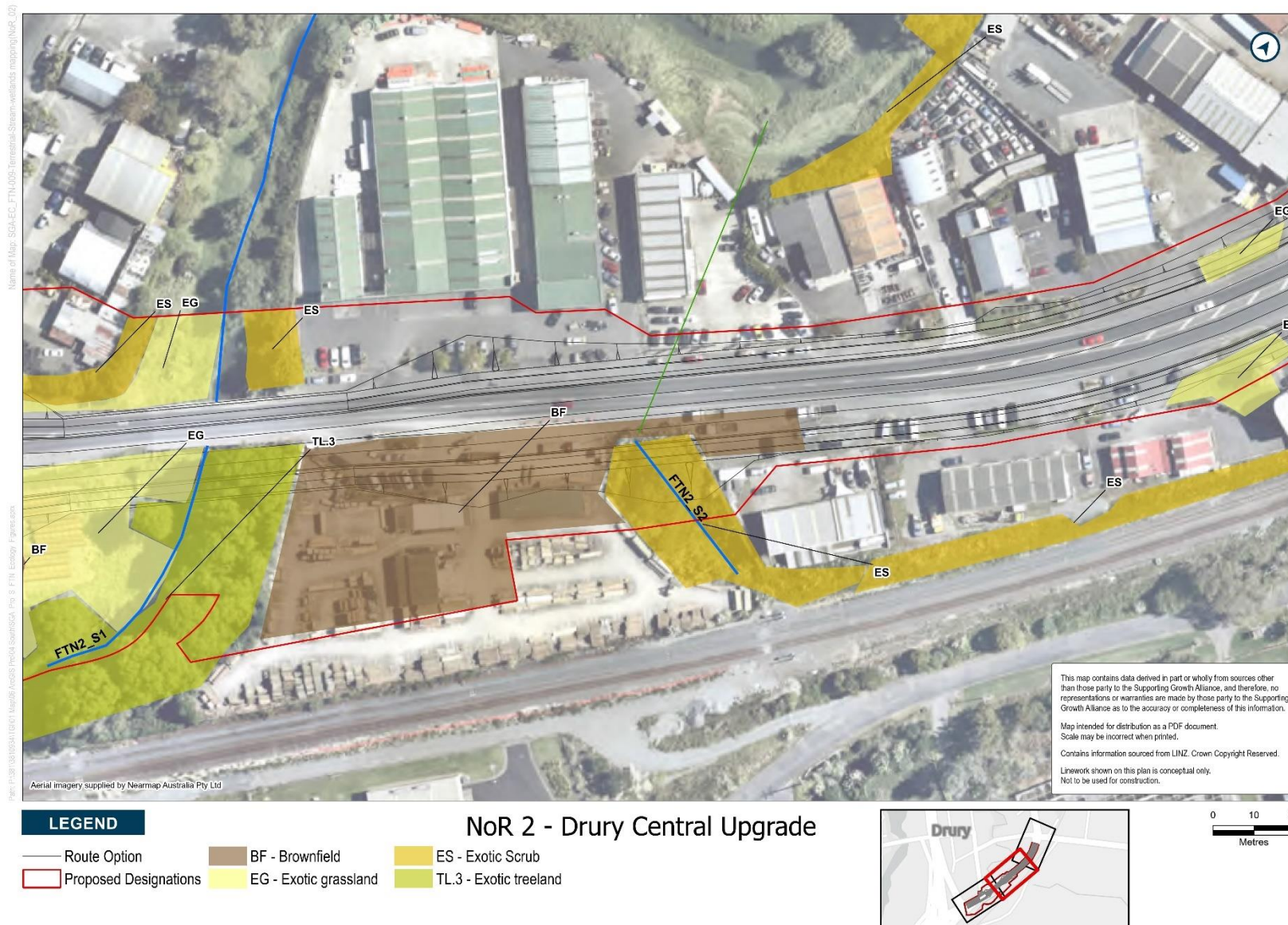
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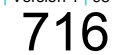
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|--|--|---|---|
| Proposed Designations | Intermittent | PL.2 - Planted Vegetation - Native (mature) | TL.1 - Native treeland |
| Artificial swale/drainage ditch | EG - Exotic grassland | PL.3 - Planted amenity | TL.3 - Exotic treeland |
| Artificial/Piped/Culvert | PL.1 - Planted native (recent) | | |

NoR 1 - Great South Road









Terrestrial, Aquatic and Wetland Maps Related to NoR 3



Page 1 of 10





LEGEND

- | | | |
|--|---|--|
|  Proposed Designations |  BF - Brownfield |  PL.3 - Planted amenity |
| Artificial/Piped/Culvert |  EG - Exotic grassland |  TL.3 - Exotic treeland |
|  Intermittent |  EW - Exotic Wetland | |



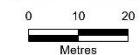
Te Tupu Ngātahi Supporting Growth











LEGEND

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|--|---|--|---|
| Proposed Designations | BF - Brownfield | PL.3 - Planted amenity | TL.3 - Exotic treeland |
| Artificial/Piped/Culvert | EG - Exotic grassland | TL.1 - Native treeland | |
| Permanent | PL.1 - Planted native (recent) | TL.2 - Treeland – Mixed Native/Exotic | |

Nor 3 - Alfriston Road



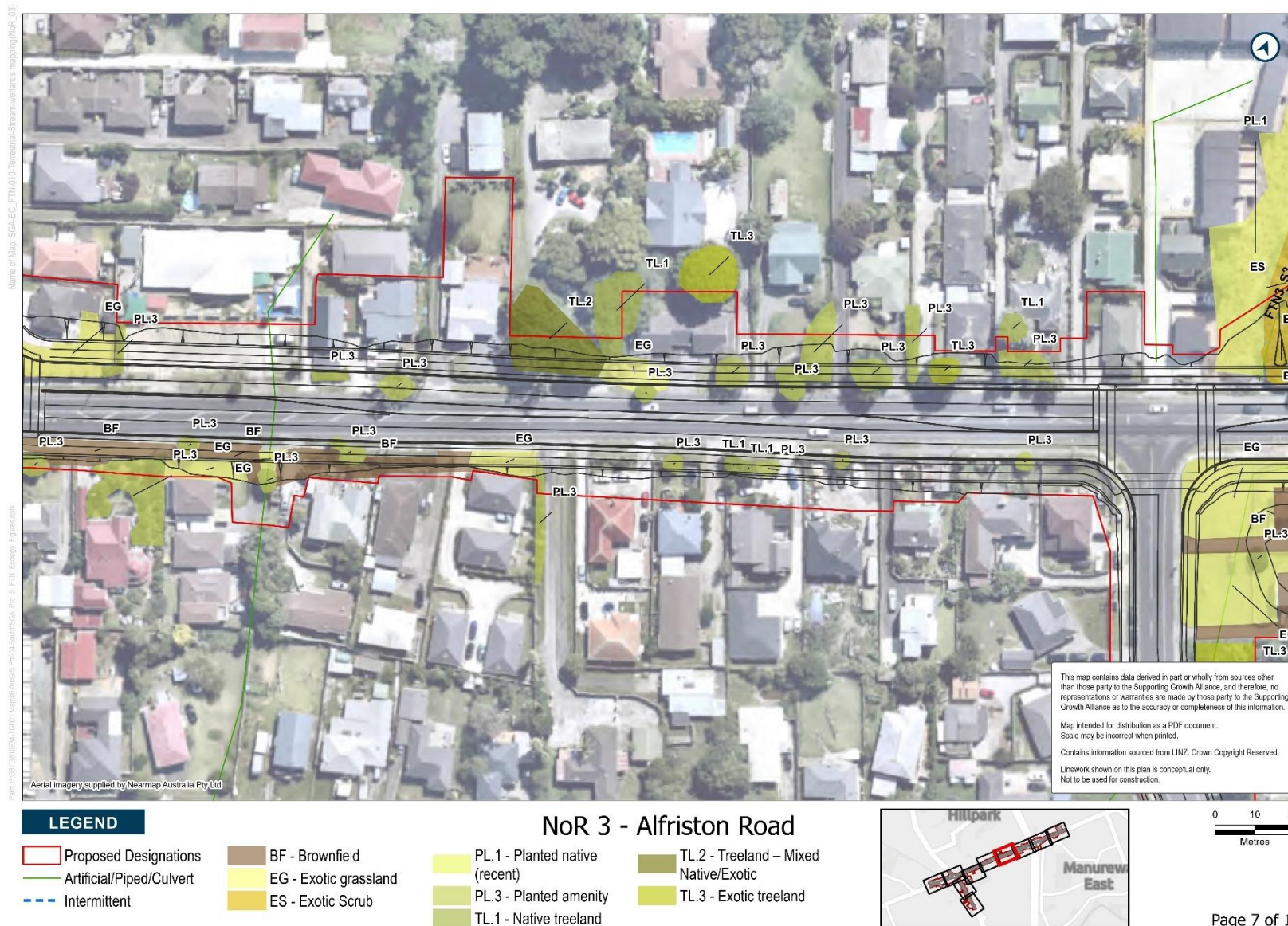
LEGEND

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|---|--------------------------|---|--------------------------------|---|------------------------|
|  | Proposed Designations |  | EG - Exotic grassland |  | PL.3 - Planted amenity |
|  | Artificial/Piped/Culvert |  | PL.1 - Planted native (recent) |  | TL.1 - Native treeland |
|  | BF - Brownfield | | |  | TL.3 - Exotic treeland |



A scale bar with markings at 0, 10, and 20 metres. The bar is divided into two equal segments of 10 metres each, with the first segment shaded black and the second white.

Te Tupu Ngātahi Supporting Growth

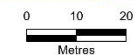
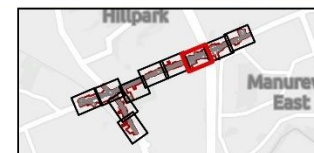


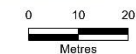
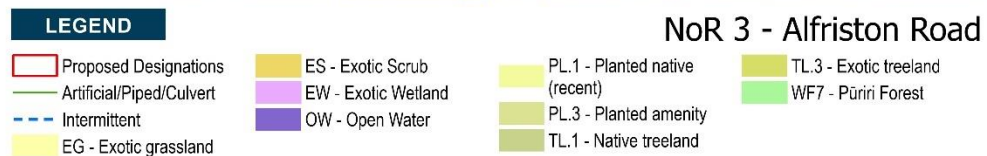


LEGEND

 Proposed Designations	 BF - Brownfield	 PL.1 - Planted native (recent)	 TL.1 - Native treeland
 Artificial/Piped/Culvert	 EG - Exotic grassland	 PL.3 - Planted amenity	 TL.3 - Exotic treeland
 Intermittent	 ES - Exotic Scrub		 WF7 - Pūriri Forest

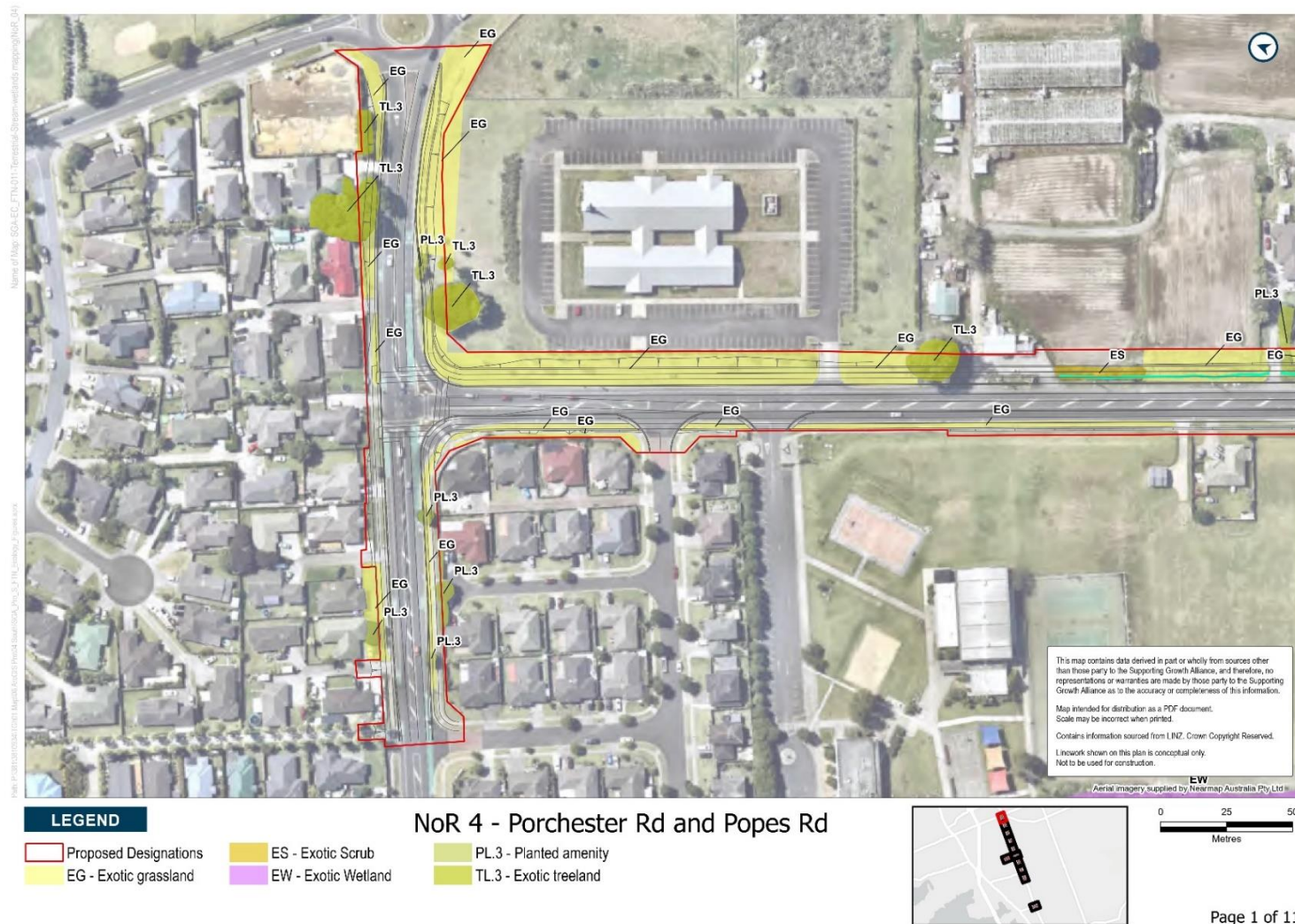
NoR 3 - Alfriston Road

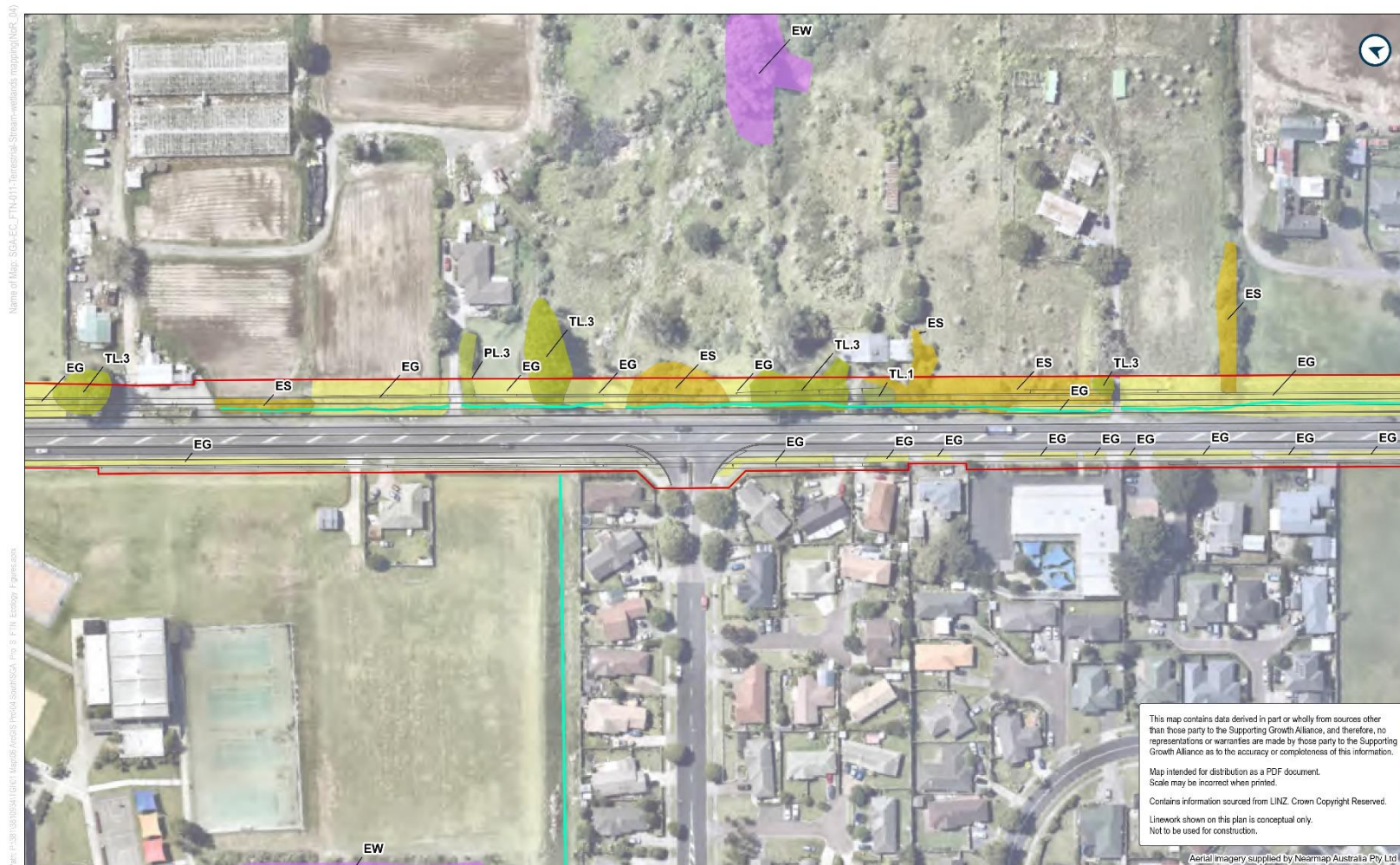






Terrestrial, Aquatic and Wetland Maps Related to NoR 4





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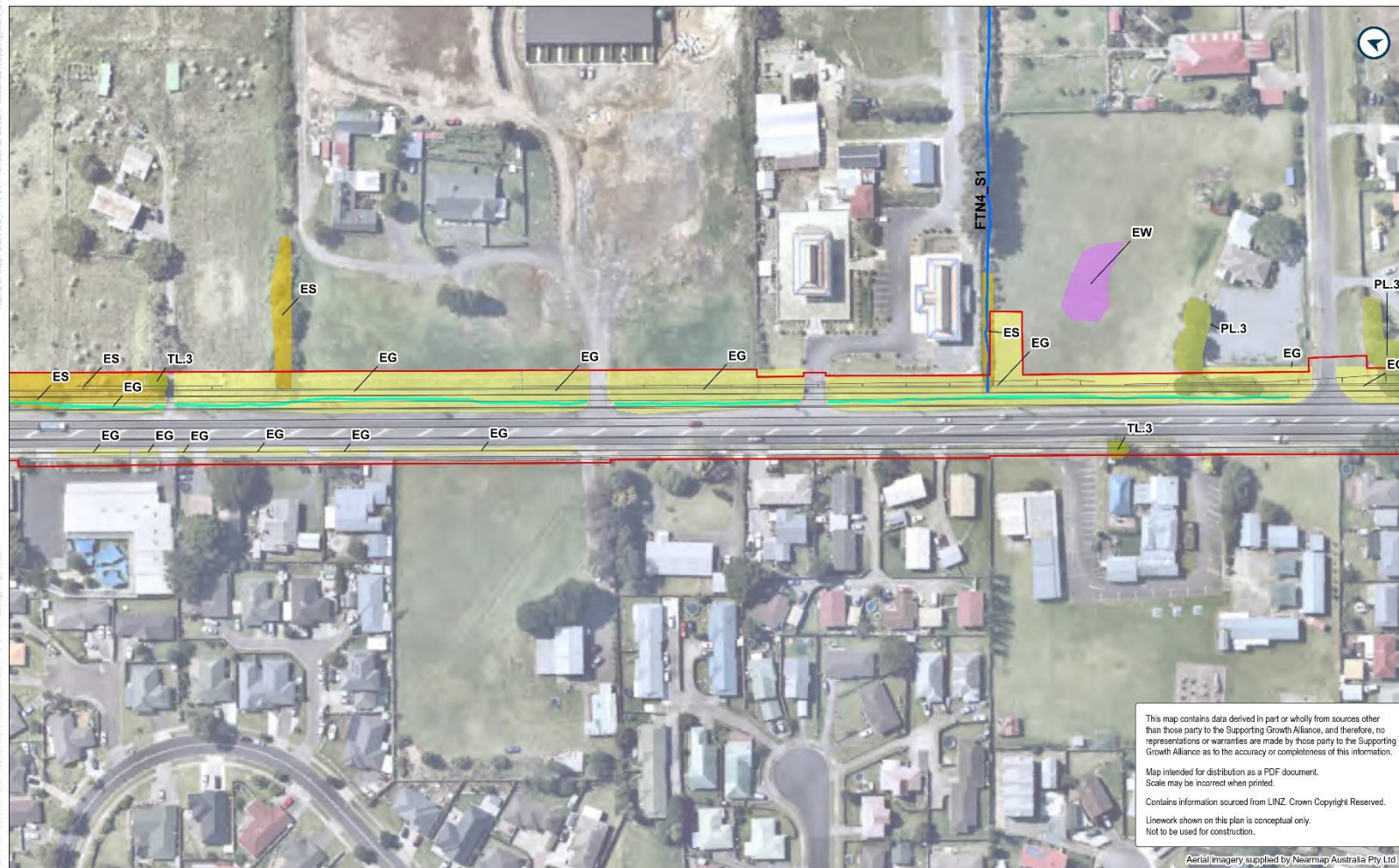
- | | | |
|-----------------------|------------------------|------------------------|
| Proposed Designations | EW - Exotic Wetland | TL.3 - Exotic treeland |
| EG - Exotic grassland | PL.3 - Planted amenity | |
| ES - Exotic Scrub | TL.1 - Native treeland | |

NoR 4 - Porchester Rd and Popes Rd



Name of Map: SGA-EG-FTN-011-Territorial-Stream-ecobeds_maping(NR_04)

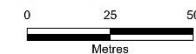
Plan (2023/03/01/01/01) - Maps (2023/03/01/01) - P18 Ecology - Plan (2023/03/01/01)

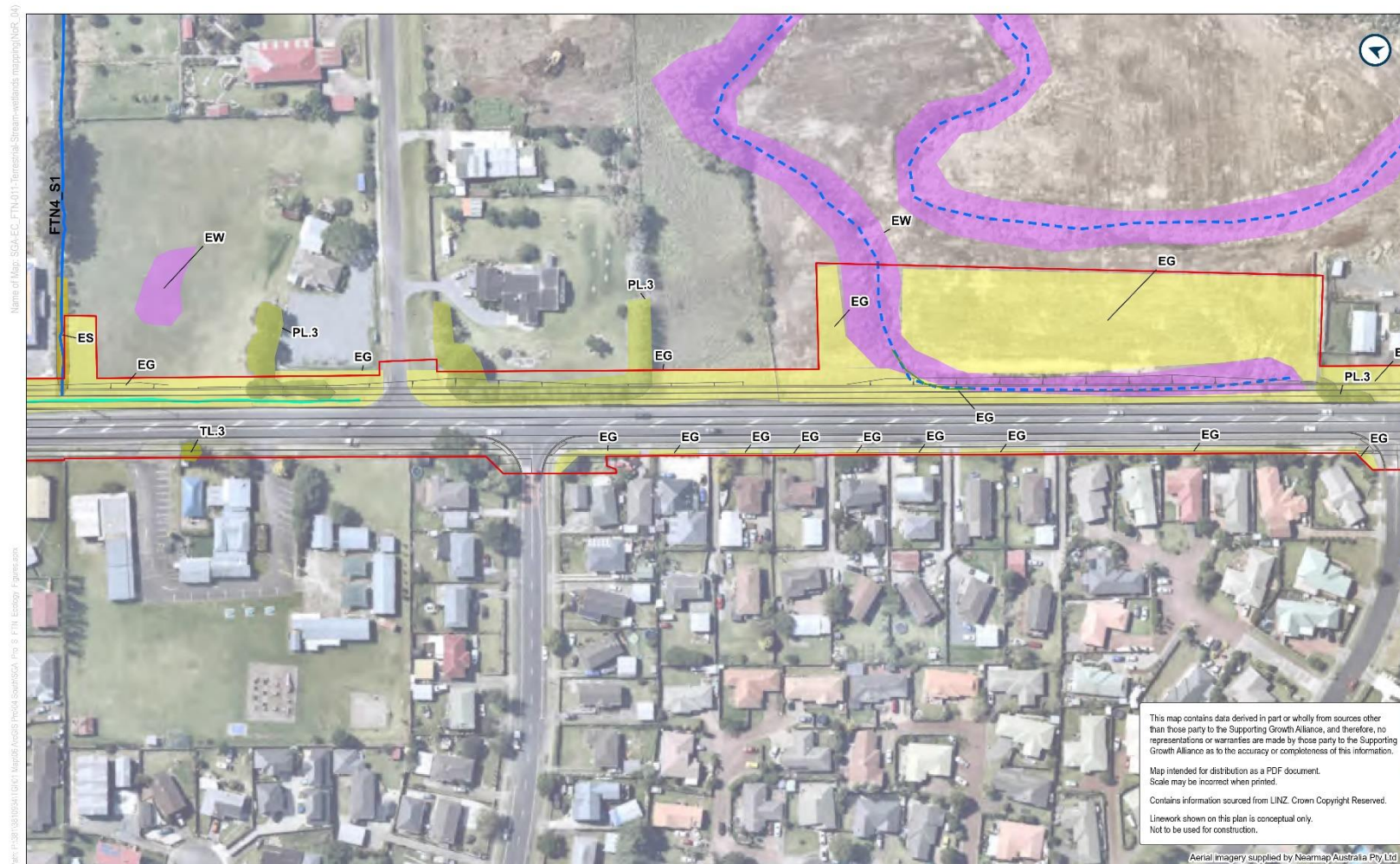


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|--|--|---|
| Proposed Designations | ES - Exotic Scrub | PL.3 - Planted amenity |
| EG - Exotic grassland | EW - Exotic Wetland | TL.3 - Exotic treeland |

NoR 4 - Porchester Rd and Popes Rd

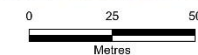


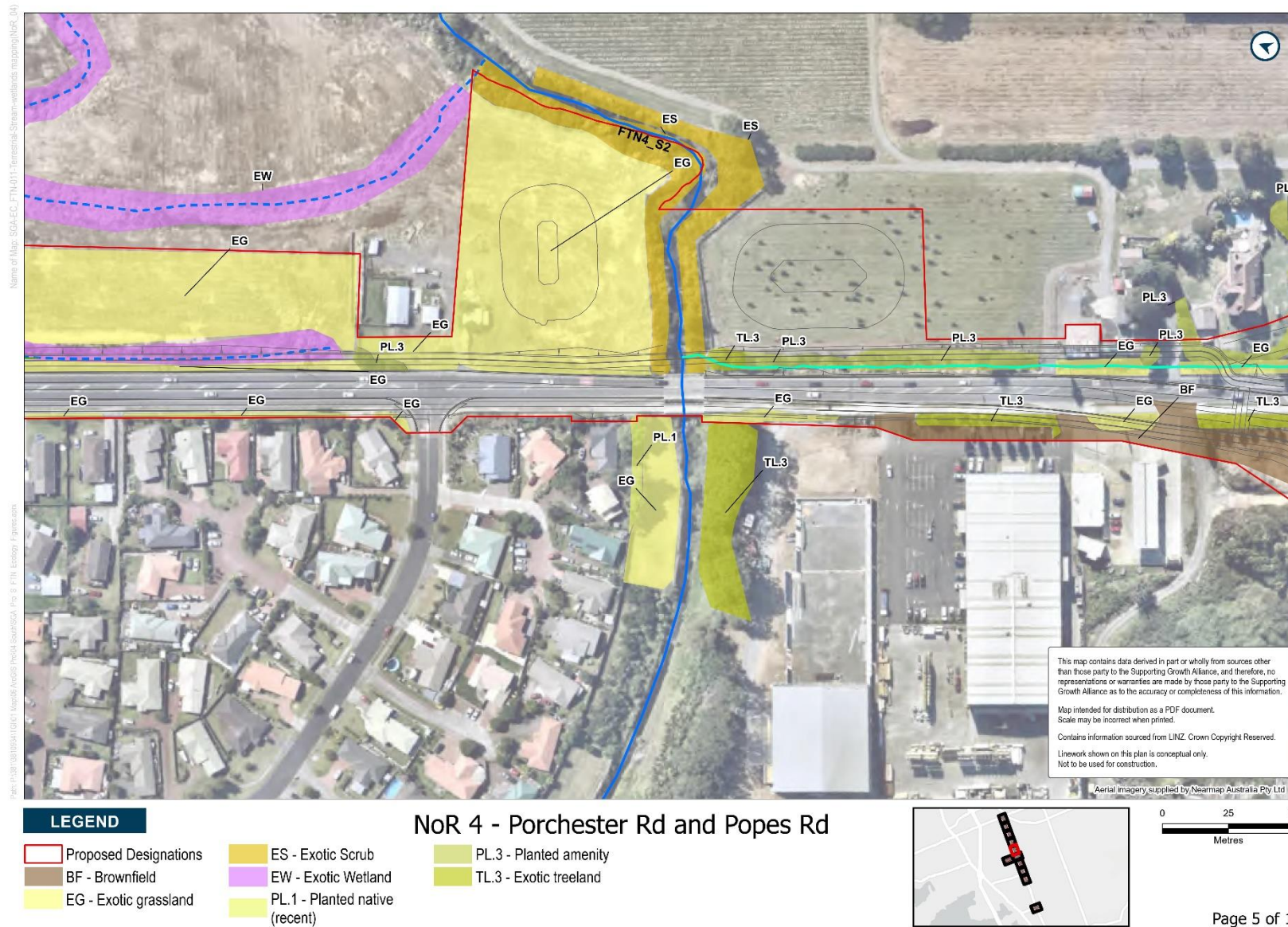


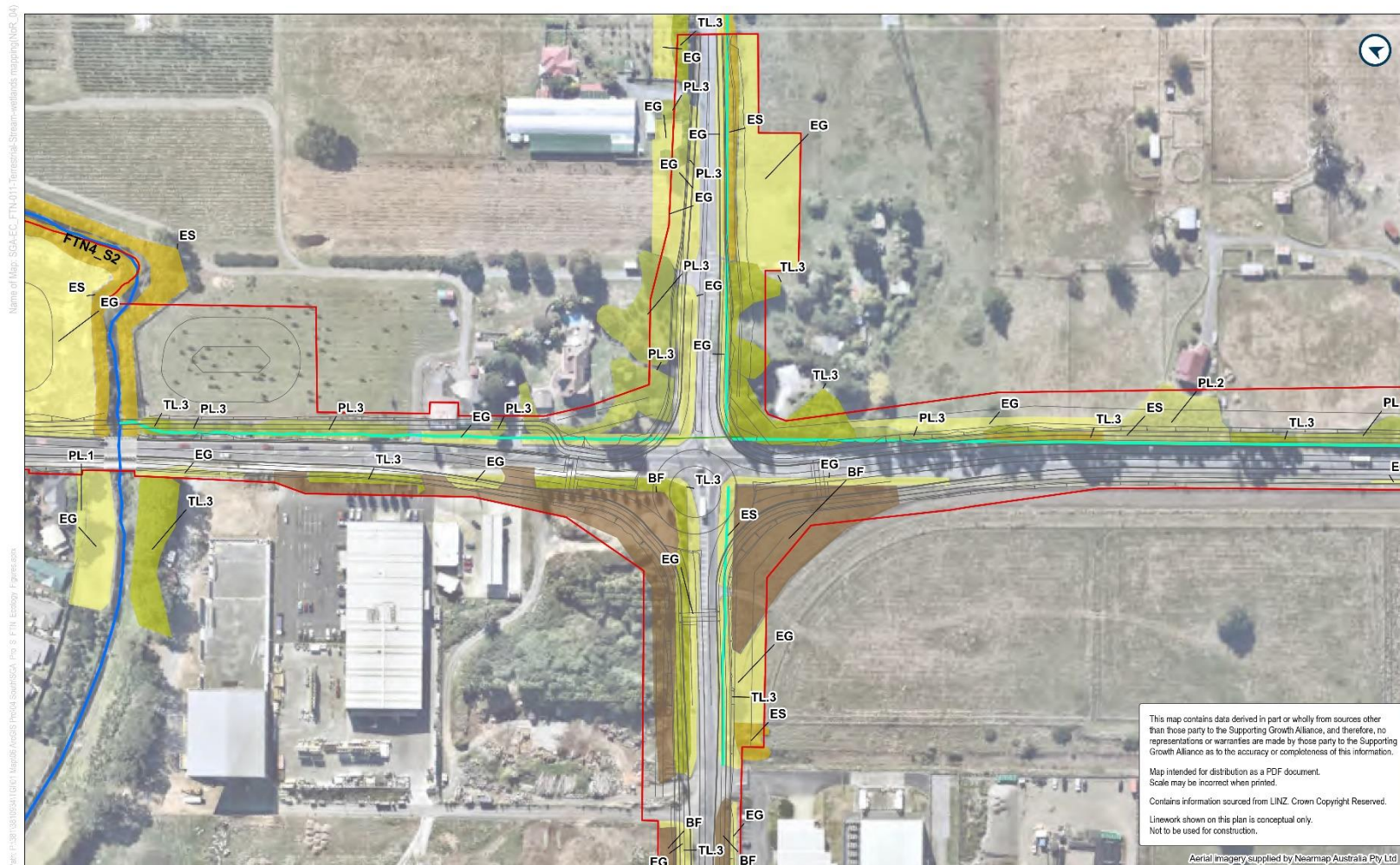
LEGEND

- | | | |
|---|---|--|
| Proposed Designations | ES - Exotic Scrub | PL.3 - Planted amenity |
| EG - Exotic grassland | EW - Exotic Wetland | TL.3 - Exotic treeland |

NoR 4 - Porchester Rd and Popes Rd



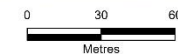




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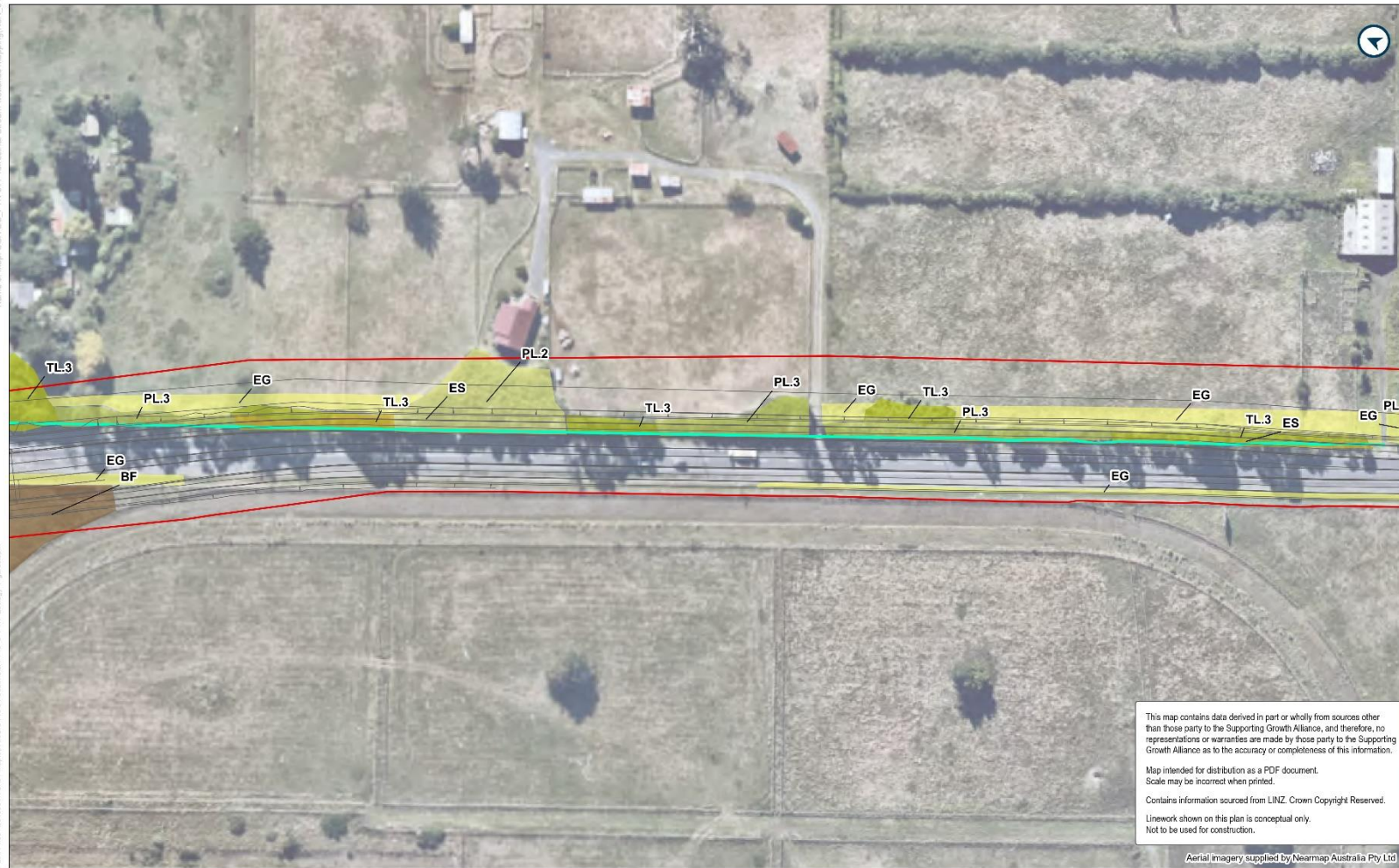
- | | | |
|---|--|--|
| Proposed Designations | PL.1 - Planted native (recent) | PL.3 - Planted amenity |
| BF - Brownfield | PL.2 - Planted Vegetation - Native (mature) | TL.3 - Exotic treeland |
| EG - Exotic grassland | | |
| ES - Exotic Scrub | | |

NoR 4 - Porchester Rd and Popes Rd



Name of Map: SGA-EC-FTN-011-Territorial Stream-vegetation mapping(Nor_04)

Plan (not to scale) Date: 14/05/2023 Project: Porchester Rd and Popes Rd



LEGEND

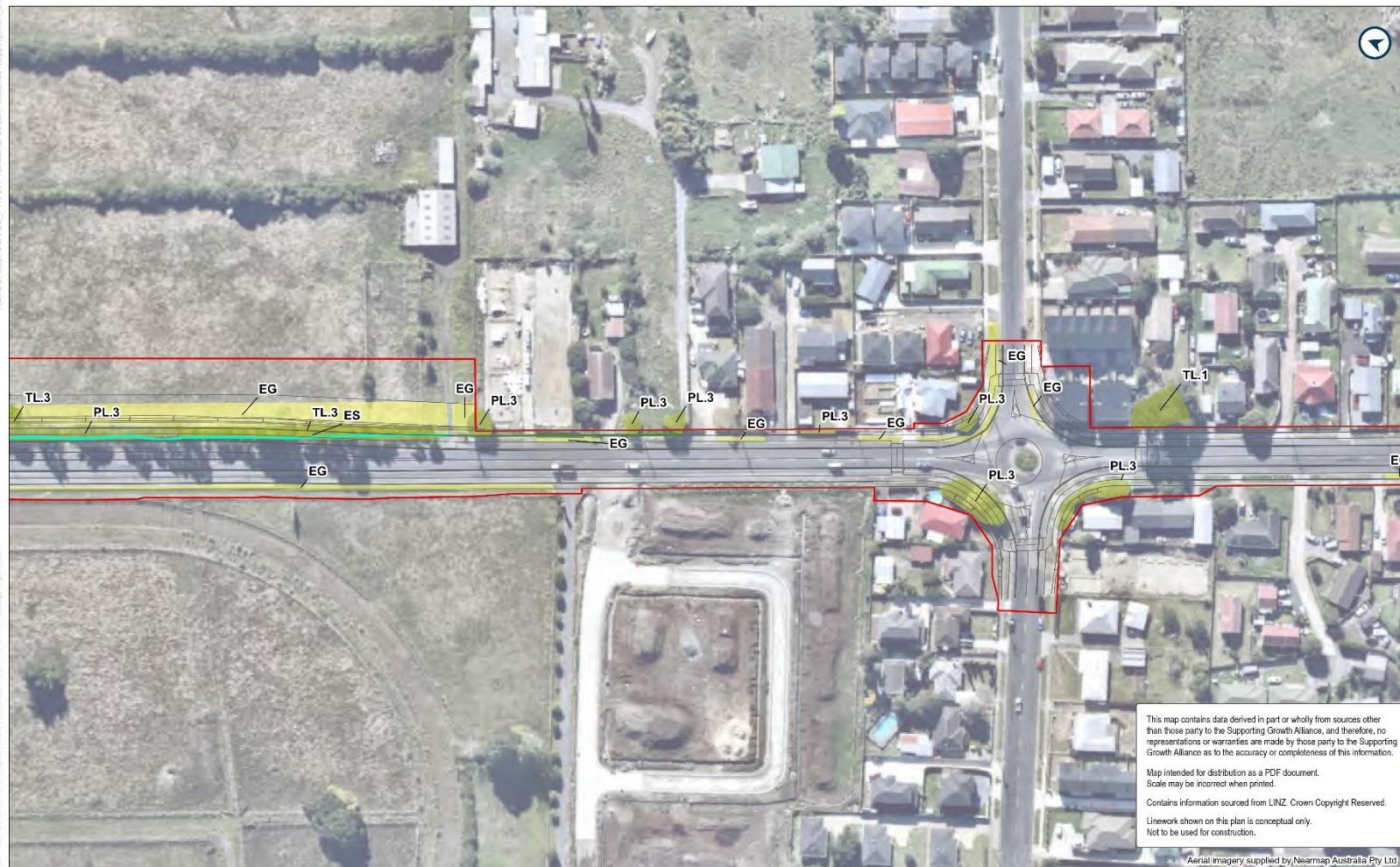
 Proposed Designations	 ES - Exotic Scrub	 PL.3 - Planted amenity
 BF - Brownfield	 PL.2 - Planted Vegetation - Native (mature)	 TL.3 - Exotic treeland
 EG - Exotic grassland		

NoR 4 - Porchester Rd and Popes Rd



Name of Map: SGA-ECU-FTN-011-Territorial Stream-vegetation.mxd (v01.04)

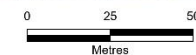
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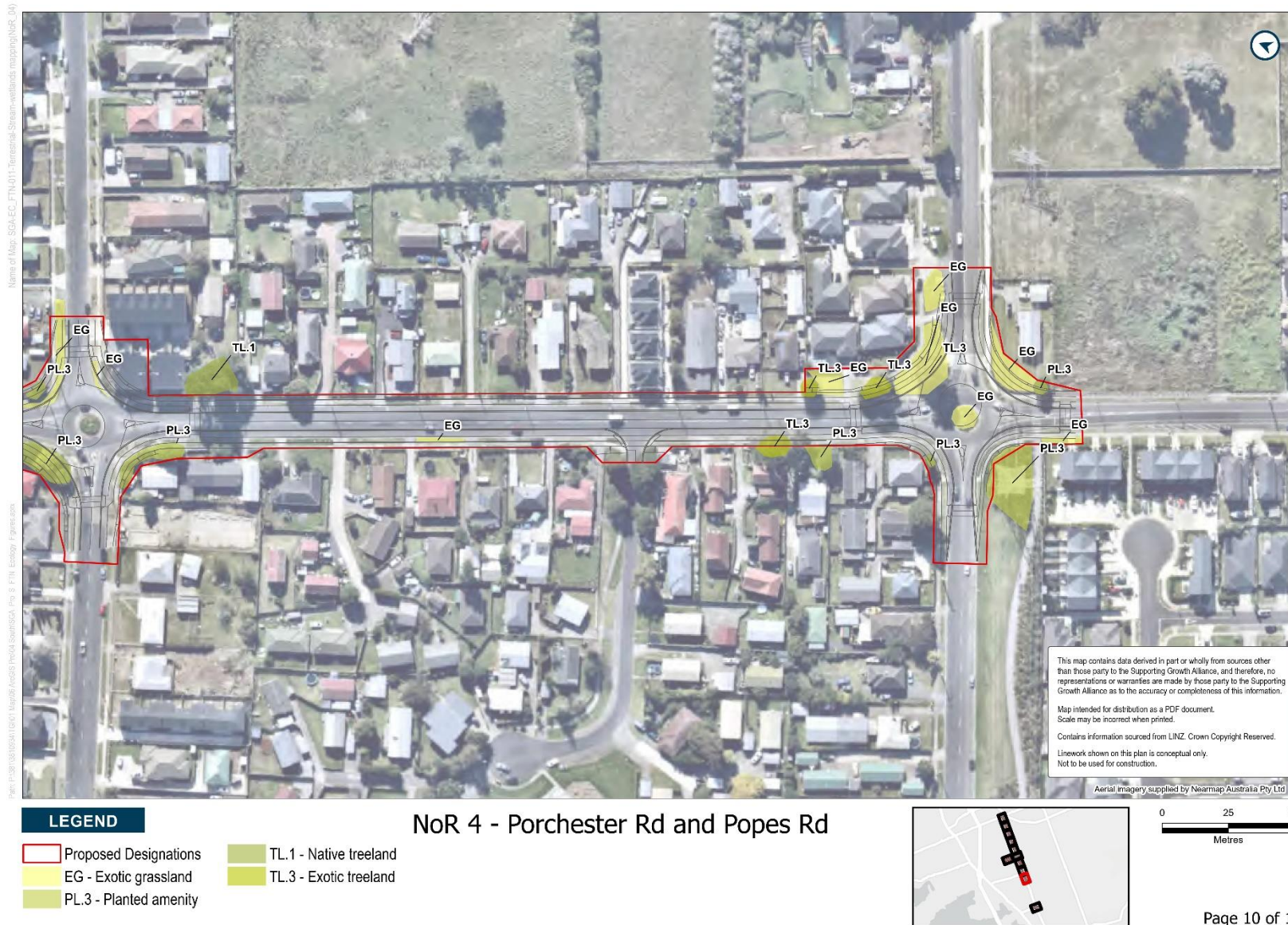


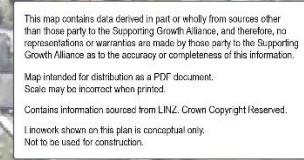
LEGEND

- | | | |
|--|---|---|
| Proposed Designations | ES - Exotic Scrub | TL.1 - Native treeland |
| EG - Exotic grassland | PL.3 - Planted amenity | TL.3 - Exotic treeland |

NoR 4 - Porchester Rd and Popes Rd







LEGEND

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5 Appendix 5 – Significant Ecological Areas

Terrestrial SEAs which are present within 2 km of the Project Area

SEA	Criteria met for SEA Classification	SEA Description	Relevant NoR
SEA_M2_171	NA	This area is comprised of mangroves on the outer coastline of Pahurehure Inlet, adjoining wading bird habitat (171w) to the west of the motorway causeway	NoR 1
SEA_M2_29a	NA	This area is comprised of a variety of intertidal habitats ranging from sandy mud intertidal flats to current-exposed rocky reefs and a variety of saline vegetation. Drury Creek is comprised of a variety of intertidal habitats ranging from sandy mud intertidal flats to current-exposed rocky reefs and a variety of saline vegetation. Wading bird roosting area, including important area for pied stilt	NoR 1 and 2
SEA_M2_29b	NA	Within the upper tidal reaches of Drury Creek there are a variety of marshes, grading from mangroves through to extensive areas of jointed rush-dominated saltmarsh, to freshwater vegetation in response to salinity changes. This same area is a migration pathway between marine and freshwater habitats for a number of different species of native freshwater fishes	NoR 1
SEA_T_1192	3,4	This area supports a diversity of habitat type that inhabitant typical species richness and also acts as migration pathway	NoR 1, 3 and 4
SEA_T_4202	1,2,3,4	<p>This area encompassess <10% natural Taraire-tawa-podocarp forest WF9 (0.08 ha), WF12 (0.29 ha). This area is vital for supporting a threatened ecosystem, including Kahikatea forest MF4 (2.3 ha), as well as several TAR species such as NZ longfin eel (<i>Anguilla dieffenbachii</i>), Swamp astelia (<i>Astelia grandis</i>), Redfin bully (<i>Gobiomorphus huttoni</i>), Black maire (<i>Nestegis cunninghamii</i>), Koura (<i>Paranephrops</i>), Poporo (<i>Solanum aviculare</i> var. <i>aviculare</i>).</p> <p>Within this SEA, there are also some rare species present, including Kaikomako (<i>Pennantia corymbosa</i>), Kowhai (<i>Sophora microphylla</i>). The diversity of habitats inside this SEA is WF12, WF9, MF4. This area also acts as buffer around a protected area.</p>	NoR 1
SEA_T_4356	1,2	This area is a representation of the natural extent within the Eco District, comprising less than 10% of the Taraire-tawa-podocarp forest, specifically WF9 (2.28 ha). Notably, this habitat supports threatened species, including the Kaka (<i>Nestor meridionalis septentrionalis</i>)	NoR 1 and 3
SEA_T_4357	1,2,4	This area serves as a representative of the natural extent within the Eco District, constituting >10% of the Pūriri forest WF7 (4.28 ha)	NoR 1 and 3
SEA_T_4358	1,2	This area serves as a representative of the natural extent within the Eco District, constituting >10% of the Pūriri forest WF7 (3.35 ha)	NoR 1 and 3
SEA_T_4362	1,2	This site is a representative of the natural extent within the Eco District, covering >10% of the Puriri forest, particularly WF7 (0.53 ha). Also, this area is home to rare species, including the Danhatchia Orchid (<i>Danhatchia australis</i>)	NoR 1
SEA_T_5248	1,2	This site is a representative of the natural extent within the Eco District, covering >10% of the Puriri forest WF7 (0.53 ha)	NoR 1

SEA	Criteria met for SEA Classification	SEA Description	Relevant NoR
SEA_T_530	2,4	This area is characterized by the presence of threatened species, including Mingmingi (<i>Coprosma propinqua</i> var. <i>propinqua</i>), Inanga (<i>Galaxias maculatus</i>), and Hawkweed (<i>Picris burbridgeae</i>). Additionally, it is home to several rare species, such as Korokio (<i>Corokia cotoneaster</i>), Kaikomako (<i>Pennantia corymbosa</i>), and Kowhai (<i>Sophora microphylla</i>). This area serves as a buffer for both a Protected Area and a Significant Ecological Area (SEA)	NoR 1
SEA_T_5312	2,3,4	This area provides habitats to threatened species, including the King fern (<i>Ptisana salicina</i>), Strap fern (<i>Grammitis billardierei</i>). This area exhibits habitat diversity, encompassing WF9 and VS5 and acts as a protective buffer for both a designated Protected Area and a SEA	NoR 4
SEA_T_535	1,2	This area serves as a representative of the natural extent within the Eco District, constituting >10% of the Pūriri forest WF7 (4.37 ha)	NoR 1
SEA_T_539	1,2	This area serves as a representative of the natural extent within the Eco District, constituting >10% of the Pūriri forest WF7 (1.25 ha). It provides habitat for a rare species, including Kaikomako (<i>Pennantia corymbosa</i>)	NoR 1
SEA_T_540	1	This area serves as a representative of the natural extent within the Eco District, constituting >10% of the Taraire-tawa-podocarp forest WF9 (1.31 ha)	NoR 1 and 3
SEA_T_540a	1	This area serves as a representative of the natural extent within the Eco District, constituting >10% of the Taraire-tawa-podocarp forest WF9 (1.4 ha)	NoR 1 and 3
SEA_T_540c	1	This area serves as a representative of the natural extent within the Eco District, constituting >10% of the Taraire-tawa-podocarp forest WF9 (0.68 ha)	NoR 1 and 3
SEA_T_540d	2	This area contains threatened ecosystem, including Totara-kanuka-broadleaved forest, which includes both dune forest & scrub habitats, WF5(1.6ha)	NoR 1 and 3
SEA_T_545	1,2	This area serves as a representative of the natural extent within the Eco District, constituting >10% of the Pūriri forest WF7 (2.03 ha)	NoR 1 and 2
SEA_T_5421b	4	This area serves as migration pathway for TAR species	NoR 4
SEA_T_4359	1,4	This area serves as a representative of the natural extent within the Eco District, constituting >10% of the Taraire-tawa-podocarp forest WF9 (4.09 ha). This SEA act as a buffer around a protected area	NoR 4
SEA_T_534	1,2,3	This area serves as a representative of the natural extent within the Eco District, constituting >10% of the Pūriri forest WF7 (0.45 ha) and Kahikatea Forest MF4 (1.5 ha)	NoR 4
SEA_T_530b	2	This area provides habitats for TAR species, including South Island Pied Oystercatcher (<i>Haematopus finschi</i>) and Caspian tern (<i>Sterna caspia</i>).	NoR 2

6 Appendix 6 – Full List of Avifauna Records

List of bird species recorded within 2 km of the Project Area based on the eBird and iNaturalist databases, as well as incidental observations onsite (mark with *)

Common Name	Māori Name	Scientific Name	Conservation Status (Robertson et al., 2021)	Record Source	Relevant NoR
New Zealand pigeon*	Kereru	<i>Hemiphaga novaeseelandiae</i>	Not Threatened	iNaturalist and eBird	All NoRs
Mallard*	Rakiraki	<i>Anas platyrhynchos</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
Silvereye*	Tauhou	<i>Zosterops lateralis</i>	Not Threatened	iNaturalist and eBird	All NoRs
Ring-necked pheasant	NA	<i>Phasianus colchicus</i>	Introduced and Naturalised	iNaturalist and eBird	NoR 4
Red-billed gull*	Tarāpunga	<i>Larus novaehollandiae scopulinus</i>	At Risk: declining	iNaturalist and eBird	NoR 1 and NoR 2
Wild turkey	NA	<i>Meleagris gallopavo</i>	Introduced and Naturalised	iNaturalist and eBird	NoR 4
Grey Warbler*	Riroriro	<i>Gerygone igata</i>	Not Threatened	iNaturalist and eBird	All NoRs
Tui*	NA	<i>Prosthemadera novaeseelandiae</i>	Not Threatened	iNaturalist and eBird	All NoRs
Fantail*	Pīwakawaka	<i>Rhipidura fuliginosa</i>	Not Threatened	iNaturalist and eBird	All NoRs
Greenfinch*	NA	<i>Chloris chloris</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
Pukeko*	NA	<i>Porphyrio melanotus</i>	Not Threatened	iNaturalist and eBird	All NoRs
Welcome swallow*	Warou	<i>Hirundo neoxena neoxena</i>	Not Threatened	iNaturalist and eBird	All NoRs
White-faced heron*	Matuku moana	<i>Egretta novaehollandiae</i>	Not Threatened	iNaturalist and eBird	All NoRs
Spur-winged plover*	NA	<i>Vanellus miles</i>	Not Threatened	iNaturalist and eBird	All NoRs
Dabchick	Weweia	<i>Poliocephalus rufopectus</i>	Threatened: Nationally Vulnerable	iNaturalist and eBird	NoR 3 and 4
House sparrow*	Tiu	<i>Passer domesticus</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
Common Indian Myna*	Maina	<i>Acridotheres tristis</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
Australasian Harrier*	Kāhu	<i>Circus approximans</i>	Not Threatened	iNaturalist and eBird	All NoRs
Song thrush*	Manu-kai-hua-rakau	<i>Turdus philomelos</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs

Common Name	Māori Name	Scientific Name	Conservation Status (Robertson et al., 2021)	Record Source	Relevant NoR
Blackbird*	Manu pango	<i>Turdus merula</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
Variable Oystercatcher	Tōrea pango	<i>Haematopus unicolor</i>	At Risk: Recovering	iNaturalist and eBird	NoR 1
Sacred kingfisher*	Kōtare	<i>Todiramphus sanctus</i>	Not Threatened	iNaturalist and eBird	All NoRs
Eastern Rosella*	Kākā uhi whero	<i>Platycercus eximius</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
Eurasian Skylark	Kairaka	<i>Alauda arvensis</i>	Introduced and Naturalised	iNaturalist and eBird	NoR 4
Little Black shag	Kawau tūī	<i>Phalacrocorax sulcirostris</i>	At Risk: Naturally Uncommon	iNaturalist and eBird	NoR 1
Little shag	Kawaupaka	<i>Phalacrocorax melanoleucos brevirostris</i>	At Risk: Relict	iNaturalist and eBird	NoR 1
Shinning cuckoo	Pīpīwharau	<i>Chrysococcyx lucidus</i>	Not Threatened	iNaturalist and eBird	NoR 3
New Zealand pied shag*	Kāruhiruhi	<i>Phalacrocorax varius varius</i>	At Risk: Recovering	iNaturalist and eBird	NoR 1
South Island pied oystercatcher	Tōrea	<i>Haematopus finschi</i>	At Risk: Declining	iNaturalist and eBird	NoR 1
Canada Goose	Kuihi	<i>Branta canadensis</i>	Introduced and Naturalised	iNaturalist and eBird	NoR 1 and 4
African Collared Dove*	NA	<i>Streptopelia roseogrisea</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
Spotted Dove*	NA	<i>Streptopelia chinensis</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
European Greenfinch*	NA	<i>Chloris chloris</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
California Quail	NA	<i>Callipepla californica</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
European Starling*	Tāringi	<i>Sturnus vulgaris</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
European Goldfinch*	Kōurarini	<i>Carduelis carduelis</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
Paradise Shelduck*	Pūtangitangi	<i>Tadorna variegata</i>	Not Threatened	iNaturalist and eBird	All NoRs
Morepork	Ruru	<i>Ninox novaeseelandiae</i>	Not Threatened	iNaturalist and eBird	All NoRs
Yellowhammer	Hurukōwhai	<i>Emberiza citrinella</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs

Common Name	Māori Name	Scientific Name	Conservation Status (Robertson et al., 2021)	Record Source	Relevant NoR
Australian Magpie*	Makipai	<i>Gymnorhina tibicen</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
White-fronted tern	Tara	<i>Sterna striata</i>	At Risk: declining	iNaturalist and eBird	NoR 1
Domestic Muscovy Duck	NA	<i>Cairina moschata</i>	Introduced, not established	iNaturalist and eBird	All NoRs
Chaffinch*	Pahirini	<i>Fringilla coelebs</i>	Introduced and Naturalised	iNaturalist and eBird	All NoRs
Southern black-backed gull*	Karoro	<i>Larus dominicanus</i>	Not Threatened	iNaturalist and eBird	NoR 1
Caspian tern	Taranui	<i>Hydroprogne caspia</i>	Threatened: Nationally Vulnerable	iNaturalist and eBird	NoR 1
Royal Spoonbill	Kōtuku ngutupapa	<i>Platalea regia</i>	At Risk: Naturally Uncommon	iNaturalist and eBird	NoR 1
Red Knot	Huahou	<i>Calidris canutus rogersi</i>	At Risk: Declining	eBird	NoR 1
Australian shoveler	Kuruwhengi	<i>Spatula rhynchotis</i>	Not Threatened	iNaturalist and eBird	NoR 1
Black Swan	Kakīānau	<i>Cygnus atratus</i>	Not Threatened	iNaturalist and eBird	NoR 1
Greylag goose	Kuihi	<i>Anser anser</i>	Introduced and Naturalised	iNaturalist and eBird	NoR 1
Banded rail	Moho pererū	<i>Gallirallus philippensis</i>	At Risk: declining	iNaturalist and eBird	NoR 1
Australasian Gannet	Tākapu	<i>Morus serrator</i>	Not Threatened	iNaturalist and eBird	NoR 1
New Zealand pipit	Pīhoihoi	<i>Anthus novaeseelandiae novaeseelandiae</i>	At Risk: Declining	eBird	NoR 4
New Zealand fernbird	Mātātā	<i>Poodytes punctatus</i>	At Risk: Declining	eBird	NoR 1 and 4
Black-tailed Godwit	NA	<i>Limosa limosa</i>	Non-Resident: Vagrant	iNaturalist and eBird	NoR 1
Pied stilt	Poaka	<i>Himantopus himantopus leucocephalus</i>	Not Threatened	eBird	NoR 1
North Island kaka	Kaka	<i>Nestor meridionalis septentrionalis</i>	At Risk: Recovering	iNaturalist and eBird	NoR 1 and NoR 4
Grey teal	Tētē-moroiti	<i>Anas gracilis</i>	Not Threatened	iNaturalist and eBird	NoR 1

7 Appendix 7 – Terrestrial Value Assessment

NoR 1: Great South Road FTN Upgrade

Assessment of ecological value for Terrestrial ecology features for NoR 1

Attributes to be considered	EG	ES	PL.1	PL.3	TL.1	TL.2	TL.3	WF7	Justification
Representativeness	1	2	3	2	3	3	2	3	Associated with SEA-5248 – WF7
Typical structure and composition	1	2	2	2	2	2	2	3	ES, PL.3, TL.3: Habitats have been significantly altered by human activities (exotic dominated). PL.1, PL.2: Habitat and species have been affected by human activities.
Indigenous representation	1	2	3	2	3	3	2	3	ES: <10% of the species are indigenous. PL.3, TL.3: 10-50% of the species are indigenous. TL.2: 50-90% of the species are indigenous. WF7, PL.1, PL.2, TL.1, TL.2: >90% of the species are indigenous.
Rarity/distinctiveness	1	2	3	1	3	3	3	3	
Species conservation significance	-	-	-	-	-	-	-	3	WF7 provides high value habitat for native species
Species (habitat) of conservation significance	1	2	3	1	3	3	3	3	PL.1, and WF7 have the potential to support native skink. TL.1, TL.2, TL.3 and WF7 have the potential to support native birds and bats
Distinctive ecological values	-	-	-	-	-	-	-	3	WF7: Habitat playing an important role in provisional or regulatory ecosystem services typically on Regional scale (native forest cover). All other habitats not playing an important role in provisional or regulatory ecosystem services at any scale.
Diversity and pattern	1	2	2	2	2	2	2	3	

Attributes to be considered	EG	ES	PL.1	PL.3	TL.1	TL.2	TL.3	WF7	Justification
Habitat diversity	1	1	2	1	2	1	1	3	Indigenous terrestrial forests value score 3 PL.1 and TL.1 value score 2 Mixed native/exotic plantings value score 1
Patterns in habitat use	1	2	2	2	2	2	2	2	PL.3, PL.1, TL.1, TL.3, TL.2, ES supports a diverse range of invertebrates, amphibians, reptiles, birds and bats at a local scale.
Ecological context	1	2	2	1	2	2	2	4	
Size, shape and buffering	1	1	2	1	1	1	1	4	TL.1, TL.2 and PL.1 represent <5% of original habitat type value score 1. WF7 very high representation original habitat type (>20%)
Ecological networks (linkages, pathways, migration)	--	2	2	-	2	2	2	3	All habitats (excluding BF) are locally an important breeding and feeding link in terms of connectivity for the survival of species (e.g. native birds). Planted shrubs and aged woody structure (PL.1 and TL.1 TL.3 TL.2) increase stepping stone value (connecting other areas of ecological value) for long-tailed bats, lizards and TAR bird species such as Kaka
Combined value	N	L	M	L	M	M	M	H	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

NoR 2: Great South Road Upgrade (Drury section)

Assessment of ecological value for Terrestrial ecology features for NoR 2

Attributes to be considered	EG	ES	PL.1	PL.3	TL.3	Justification
Representativeness	1	2	3	2	2	
Typical structure and composition	1	2	3	2	2	BF, EG, ES, PL.3, TL.3: Habitats have been significantly modified by human activities. It's grouped as Urban.
Indigenous representation	1	2	3	2	2	EG: <10% of the species are indigenous. ES, PL.3, TL.3: 10-50% of the species are indigenous. PL.1>50% of the species are indigenous.
Rarity/distinctiveness	0	0	3	2	2	
Species (habitat) of conservation significance	-	-	3	2	2	PL.1, TL.2 and TL.1 contain totara, matipo, kanuka, cabbage tree
Diversity and pattern	1	2	2	2	2	
Habitat diversity	1	1	2	2	1	PL.1 and TL.1 value score 2 Mixed native/exotic plantings value score 1
Patterns in habitat use	1	2	2	2	2	PL.3, PL.1, TL.3, ES supports a diverse range of invertebrates, amphibians, reptiles, birds and bats.
Ecological context	1	2	3	2	3	
Size, shape and buffering	1	1	2	2	1	PL.1 represent <10% of original habitat type value score 2
Ecological networks (linkages, pathways, migration)	-	2	3	2	3	All habitats (excluding BF) are locally an important breeding and feeding link in terms of connectivity for the survival of species (e.g. native birds). Planted shrubs and aged woody structure (PL.3 , PL.1 , TL.3) increase stepping stone value (connecting other areas of ecological value) for

Attributes to be considered	EG	ES	PL.1	PL.3	TL.3	Justification
						long-tailed bats and TAR bird species such as Dabchick, little black shag.
Combined value	N	L	M	L	M	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

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

Assessment of ecological value for Terrestrial ecology features for NoR 3

Attributes to be considered	EG	ES	PL.1	PL.3	TL.1	TL.2	TL.3	WF7	Justification
Representativeness	1	2	3	2	3	2	2	3	
Typical structure and composition	1	1	2	1	2	2	2	3	EG, ES, PL.3, TL.3: Habitats have been significantly modified by human activities.
Indigenous representation	1	2	3	2	3	2	2	3	EG: <10% of the species are indigenous. ES, PL.3, TL.3: 10-50% of the species are indigenous. PL.1, PL.2, TL.2, TL.1, WF7 >50% of the species are indigenous.
Rarity/distinctiveness	1	2	3	1	3	3	3	3	
Species of conservation significance	-	-	-	-	-	-	-	3	Kaka and long-tailed cuckoo to be foraged and present
Species (habitat) of conservation significance	1	2	3	1	3	3	3	3	PL.1, TL.2 and TL.1, WF7 contain totara, matipo, kanuka, cabbage tree
Diversity and pattern	1	2	2	2	3	3	2	3	
Habitat diversity	1	1	2	1	2	1	1	3	PL.1 and TL.1 value score 2 Mixed native/exotic plantings value score 1
Species diversity	-	-	-	-	-	-	-	3	Provide high value habitat for native species
Patterns in habitat use	1	2	2	2	3	3	2	2	PL.3, PL.1, TL.3, ES supports a diverse range of invertebrates, amphibians, reptiles, birds and bats.
Ecological context	1	2	2	2	2	2	2	3	

Attributes to be considered	EG	ES	PL.1	PL.3	TL.1	TL.2	TL.3	WF7	Justification
Size, shape and buffering	1	1	2	1	1	1	1	3	WF7 represent >10% of original habitat type value scoring 3 PL.1 represent <10% of original habitat type value score 2
Ecological networks (linkages, pathways, migration)	1	2	2	2	2	2	2	3	All habitats (excluding BF) are locally an important breeding and feeding link in terms of connectivity for the survival of species (e.g. native birds). Planted shrubs and aged woody structure (PL.3, PL.1 , TL.1, TL.2, TL.3, WF7) increase stepping stone value (connecting other areas of ecological value) for native bird species such as kereru, tui, kingfisher, silvereye, fantail and TAR species Kaka
Combined value	N	L	M	L	M	M	M	H	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

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

Assessment of ecological value for Terrestrial ecology features for NoR 4

Attributes to be considered	EG	ES	PL.2	PL.3	TL.1	TL.3	Justification
Representativeness	1	2	3	2	3	3	
Typical structure and composition	1	1	2	1	2	2	BF, EG, ES, PL.3, TL.3: Habitats have been significantly modified by human activities. It's grouped as Rural.
Indigenous representation	1	2	3	1	3	2	ES: <10% of the species are indigenous. PL.3, TL.3: 10-50% of the species are indigenous. PL.2, TL.1 >50% of the species are indigenous.
Rarity/distinctiveness	1	2	2	2	2	2	
Species (habitat) of conservation significance	1	1	2	1	2	1	Long-tailed bat (Threatened – Nationally Critical, value score of 4) present and potentially using suitable habitat (TL.3, TL.1) Kākā (At Risk – Recovering, value 3) and long-tailed cuckoo (Threatened – Nationally Vulnerable, value score of 4) may use established forests (PL.2, TL.3, TL.2) Herpetofauna (At Risk - Declining, value score of 3) likely to utilise all forest types that have appropriate understorey.
Diversity and pattern	1	1	2	2	2	2	
Habitat diversity	1	1	2	1	2	1	PL.1 and TL.1 value score 2 Mixed native/exotic plantings value score 1
Patterns in habitat use	1	1	2	1	2	2	TL.3, TL.1 rated high due to potential seasonal utilisation by long-tailed bat, North Island kākā, and long-tailed cuckoo. All other habitats are not important for lifecycle completion or periodic habitat utilisation on any scale.
Ecological context	1	2	3	1	3	3	

Attributes to be considered	EG	ES	PL.2	PL.3	TL.1	TL.3	Justification
Size, shape and buffering	1	1	2	1	2	1	TL.1 and PL.2 represent <10% of original habitat type value score 2
Ecological networks (linkages, pathways, migration)	1	2	2	1	3	3	<p>All habitats (excluding BF) are locally an important breeding and feeding link in terms of connectivity for the survival of species (e.g. native birds).</p> <p>TL.1 and TL.3 increase stepping stone value (connecting other areas of ecological value) for long-tailed bats and TAR bird species such as Kaka</p>
Combined value	N	L	M	L	M	M	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

8 Appendix 8 – Aquatic Value Assessment

NoR 1: Great South Road FTN Upgrade

Assessment of ecological value for aquatic ecology features for NoR 1

Attributes to be considered	FTN1_S1	FTN1_S2	Justification
Representativeness	2	2	(Including SEV, RHA and ecological integrity)
Instream habitat modification	2	3	Instream habitat features have been altered by human activities.
Riparian habitat modification	2	2	Riparian features have been significantly altered by human activities
RHA scores relative to potential score	2	2	Instream RHA scores: FTN1_S1: 59 FTN1_S2: 52
Rarity/distinctiveness	2	2	
Species of conservation significance	4	4	Torrenfish (At Risk - Declining) and longfin eel (At Risk – Endangered) has been recorded in the wider catchment. There is a high likelihood that these species utilise permanent streams.
Diversity and pattern	2	2	
Level of natural diversity	2	2	Instream habitat diversity proxy FTN1_S2: SS, S, LO, LG, Permanent FTN1_S3: SS, S, LO, LG, Permanent
Ecological context	4	4	
Stream order	4	4	FTN1_S2 stream order = 4 FTN1_S3 stream order = 4

Attributes to be considered	FTN1_S1	FTN1_S2	Justification
Hydroperiod	4	4	Both streams are permanent
Connectivity and migration	2	2	Connectivity and migration scores based on stream order (proxy).
Combined value	H	H	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

NoR 2 : Great South Road Upgrade (Drury section)

Assessment of ecological value for aquatic ecology features for NoR 2

Attributes to be considered	FTN2_S1	FTN2_S2	Justification
Representativeness	2	2	(Including SEV, RHA and ecological integrity)
Instream habitat modification	2	2	Instream habitat features have been significantly altered by human activities.
Riparian habitat modification	2	2	Riparian features have been significantly altered by human activities
RHA scores relative to potential score	2	2	Instream RHA scores: FTN2_S1: 48 FTN2_S2: 44
Rarity/distinctiveness	2	2	
Species of conservation significance	4	2	Torrenshish (At Risk - Declining) and longfin eel (Threatened) have been recorded in the wider catchment associated with NoR2 (Hingaia Stream). There is a high likelihood that these species utilise permanent streams.
Diversity and pattern	2	2	
Level of natural diversity	2	2	Instream habitat diversity proxy FTN2_S1 & 2: SS, S, LO, LG, Permanent
Species diversity	3	2	Stream S1 Rated on a Regional scale, S2 at a local scale
Ecological context	4	4	
Stream order	4	3	FTN2_S1 stream order = 4 FTN2_S2 Stream order = 2
Hydroperiod	4	4	Both streams are permanent

Attributes to be considered	FTN2_S1	FTN2_S2	Justification
Connectivity and migration	2	2	Connectivity and migration scores based on stream order (proxy).
Protected status	1	-	FTN2_S1 Floodplains protected within local reserves.
Combined value	H	M	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

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

Assessment of ecological value for aquatic ecology features for NoR 3 (FTN3_S1 has been evaluated through desktop assessment due to access restriction)

Attributes to be considered	FTN3_S1	FTN3_S2	FTN3_S3	FTN3_S4	Justification
Representativeness	2	2	2	2	(Including SEV, RHA and ecological integrity)
Instream habitat modification	2	2	2	2	Instream habitat features have been significantly altered by human activities.
Riparian habitat modification	-	2	2	2	Riparian features have been significantly altered by human activities
RHA scores relative to potential score	-	2	2	2	Instream RHA scores: FTN3_S1: Not assessed. FTN3_S2: 50 FTN3_S3: 49 FTN3_S4: 62
Rarity/distinctiveness	1	1	1	1	
Species of conservation significance	1	1	1	1	these streams flow through highly urbanised landscapes and connected to mainstream by pipes and covered by culverts. The fish passage assessment tool shows no fish passage within NoR 3.
Diversity and pattern		2	2	2	
Level of natural diversity	-	2	2	2	Instream habitat diversity proxy FTN3_S1 & FTN3_S2: SS, S, LO, LG, Permanent FTN3_S1 & FTN3_S4: SS, S, LO, LG, intermittent
Ecological context	3	4	3	3	
Stream order	2	-	-	2	Stream order: FTN3_S1: 1 FTN3_S2: 2 FTN3_S3: 1

Attributes to be considered	FTN3_S1	FTN3_S2	FTN3_S3	FTN3_S4	Justification
					FTN3_S4: 2
Hydroperiod	3	4	3	3	FTN3_S1: Intermittent FTN3_S2: Permanent FTN3_S3: Intermittent FTN3_S4: Intermittent
Connectivity and migration	2	2	2	2	local scale ecological connectivity in the wider landscape
Combined value	L	M	L	L	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

NoR 4: Takaanini FTN - Porchester Road and Popes Road Upgrades

Assessment of ecological value for aquatic ecology features for NoR 4

Attributes to be considered	FTN4_S1	FTN4_S2	Justification
Representativeness	2	3	(Including SEV, RHA and ecological integrity)
Instream habitat modification	1	3	Instream habitat features have been significantly altered by human activities.
Riparian habitat modification	2	2	Riparian features have been significantly altered by human activities
RHA scores relative to potential score	1	2	Instream RHA scores: FTN4_S1: 20 FTN4_S2: 67
Rarity/distinctiveness	1	3	
Species of conservation significance	1	4	longfin eel (At Risk – Declining) has been recorded in the wider catchment. There is a high likelihood that these species utilise permanent streams.
Diversity and pattern	2	2	
Level of natural diversity	2	2	Instream habitat diversity proxy FTN4_S1: SS, S, LO, LG, Permanent FTN4_S2: SS, S, LO, LG, intermittent
Species diversity	2	3	S1 at a local scale, S2 Rated on a Regional scale
Ecological context	2	3	
Stream order	2	4	Stream order: FTN4_S1: 1 FTN4_S2: 4

Attributes to be considered	FTN4_S1	FTN4_S2	Justification
Hydroperiod	2	4	FTN4_S1: Intermittent FTN4_S2: Permanent
Connectivity and migration	2	4	Connectivity and migration scores based on stream order
Combined value	L	H	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

9 Appendix 9 – Wetland Value Assessment

NoR 1: Great South Road FTN Upgrade

Assessment of ecological value for wetland (open water) ecology features for NoR 1

Attributes to be considered	FTN1_W1	Justification
Representativeness	3	(Wetland condition assessment)
Hydrological modification	3	Largely intact wetland, with mostly indigenous vegetation (some areas of planted native vegetation). Score provided for representativeness in general. Transformed catchments - largely rural.
Rarity/distinctiveness	4	
Species of conservation significance	4	Potential inanga spawn habitat
Wetland type (rare or distinctive)	3	Rushland/reedland wetland score value 3
Diversity and pattern	3	
Diversity of habitat types	2	Moderate diversity of vegetation and geomorphological structure and Moderate patchiness/interspersion
Species diversity	3	Rated on a Regional scale
Ecological context	4	(Ecosystem services, importance and sensitivity)
Sensitivity to change in floods	3	Perennial, and tidally influenced.
Streamflow augmentation	2	Aquatic habitat of a particular size (often "larger") and with habitat types supported by large infrequent floods (< annual) less easily affected by anthropogenic changes.

Attributes to be considered	FTN1_W1	Justification
Connectivity and migration	4	
Combined value	H	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

NoR 3: Weymouth Road, Alfriston Road and Great South Road Upgrades

Assessment of ecological value for wetland (open water) ecology features for NoR 3

Attributes to be considered	FTN1_W1	FTN1_W2	Justification
Representativeness	2	2	(Wetland condition assessment)
Hydrological modification	2	2	Significantly modified. Score provided for representativeness in general. Transformed catchments - largely urban development.
Rarity/distinctiveness	1	1	
Species of conservation significance	1	1	Nationally and locally common indigenous species
Wetland type	1	1	Wetland type common at any scale
Diversity and pattern	1	2	
Diversity of habitat types	1	2	Moderate diversity of vegetation and geomorphological structure and Moderate patchiness/interspersion
Species diversity	1	1	Not significant at any scale
Ecological context	3	3	(Ecosystem services, importance and sensitivity)
Sensitivity to change in floods	3	3	Intermittent (>6 months Moderate)
Connectivity and migration	1	2	Habitat is locally an important breeding and feeding link in terms of connectivity for the survival of species
Combined value	L	L	

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

NoR 4: Porchester Road and Popes Road Upgrades

Assessment of ecological value for wetland (open water) ecology features for NoR 4

Attributes to be considered	FTN4_W1	FTN4_W2	Justification
Representativeness	1		(Wetland condition assessment)
Hydrological modification	1		Wetland significantly modified. Score provided for representativeness in general. Transformed catchments - largely agricultural and rural developments. Wetland physically modified through dredging, drainage and stormwater.
Rarity/distinctiveness	3		
Species of conservation significance	1		Nationally and locally common indigenous species
Wetland type (rare and distinctive)	3		Oxbow lake formation. Within the district (wetlands type is rare distinctive within the Region)
Diversity and pattern	1		
Diversity of habitat types	1		Moderate diversity of vegetation and geomorphological structure and Moderate patchiness/interspersion
Species diversity	1		Not significant at any scale
Ecological context	1		(Ecosystem services, importance and sensitivity)
Sensitivity to change in floods			Aquatic habitat of a particular size (often "larger") and with habitat types supported by large infrequent floods (< annual) less easily affected by anthropogenic changes. Only pollution tolerant taxa present
Connectivity and migration	1		Habitat is locally an important breeding and feeding link in terms of connectivity for the survival of species
Combined value	L		

Notes: N = Negligible, L = Low, M = Moderate, H = High, VH = Very High

10 Appendix 10 – Rapid Habitat Assessment

The result of RHA for all streams related to the Project Area

Stream ID	Deposited Sediment	Invertebrate habitat diversity	Invertebrate habitat abundance	Fish cover diversity	Fish cover abundance	Hydraulic heterogeneity	Bank erosion	Bank vegetation	Riparian width	Riparian shade	RHA Habitat Quality Score	Corresponding Habitat Value*
FTN1_S1	2	10	6	10	7	9	7	6	6	2	59	M
FTN1_S2	2	9	5	8	3	9	4	4	5	3	52	M
FTN2_S1	2	9	1	7	7	6	3	4	8	4	48	M
FTN2_S2	3	8	1	5	4	6	2	4	9	4	44	M
FTN3_S1*												
FTN3_S2	2	9	5	8	3	9	4	4	5	3	50	M
FTN3_S3	6	9	1	7	9	1	7	5	2	9	49	M
FTN3_S4	7	10	3	6	10	6	7	7	3	10	62	G
FTN4_S1	2	4	1	2	1	1	4	2	2	5	20	P
FTN4_S2	5	8	7	10	8	10	9	7	7	5	65	G

Notes - Corresponding habitat values for each habitat quality score:

P = Poor (Score 10-40)

M = Moderate (Score 41-60)

G = Good (Score 61-80)

E = Excellent (Score 81+)

Light blue shading = Permanent stream; No shading = Intermittent stream

*Not assessed due to property access

11 Appendix 11 – Impact Assessment

See separate document attached

Terrestrial Habitat and Species								Magnitude Assessment										Level of Effect (Pre-mitigation)
Phase	Project Activity	Resource Unit (Habitat/Species)	Ecological Value	Effect Description Main	Effect Description Detailed (Dropdown)	Effects Description Manual	Type	Extent	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)					
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column16	Column17		
				Very High	Construction- Bats	Loss of foraging habitat due to vegetation removal	Baseline. Upgrade to existing road within a largely urban environment. The potential for District Plan trees to provide foraging habitat for bats is highly unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Partially		Negligible	Low		
1	Construction	Vegetation removal	Long-tailed bats					Roost loss through vegetation removal	Baseline. Upgrade to existing road within a largely urban environment. The potential for District Plan trees to provide roosting habitat for bats is highly unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Partially		Negligible	Low
2	Construction	Vegetation removal	Long-tailed bats					Kill or injure individual bats due to vegetation removal	Baseline. Upgrade to existing road within a largely urban environment. The potential for District Plan trees to provide roosting habitat and therefore be injured during vegetation removal is highly unlikely. However requirements of the Wildlife Act 1953 will need to be adhered to'	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible		Negligible	Low
3	Construction	Vegetation removal	Long-tailed bats					Loss of foraging habitat due to vegetation removal	Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Partially		Negligible	Low
4	Construction	Vegetation removal	Long-tailed bats					Roost loss through vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Partially		Negligible	Low
5	Construction	Vegetation removal	Long-tailed bats					Kill or injure individual bats due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible		Negligible	Low
6	Construction	Vegetation removal	Long-tailed bats	Very High	Construction- Bats	Same as Baseline.	Same as Baseline.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible		Negligible	Low		
14						Loss of foraging habitat due to vegetation removal	Baseline. Potential for non-TAR birds to use district plan vegetation for foraging (which will be removed) is likely. Baseline. Potential for non-TAR birds to be present is likely. However requirements of the Wildlife Act 1953 will need to be adhered to Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)	Partially		Low	Very Low		
15	Construction	Vegetation removal	Other Non-TAR birds	Low	Construction- Birds	Kill or injure individual due to vegetation removal	Baseline. Potential for non-TAR birds to be present is likely. However requirements of the Wildlife Act 1953 will need to be adhered to Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
17	Construction	Vegetation removal	Other Non-TAR birds	Low	Construction- Birds	Loss of foraging habitat due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)	Partially		Low	Very Low		
18	Construction	Vegetation removal	Other Non-TAR birds	Low	Construction- Birds	Kill or injure individual due to vegetation removal	Same as Baseline.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)	Irreversible		Low	Very Low		
20	Construction	Vegetation removal	Other Non-TAR birds	Low	Construction- Birds		Same as Baseline.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			#VALUE!	Very Low		
21						Loss of foraging habitat due to vegetation removal	Baseline. North Island kākā are a highly mobile species in the wider landscape, therefore loss of foraging habitat due to the removal of district plan trees is unlikely.	Direct	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Partially		Low	Low		
22	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Kill or injure individual due to vegetation removal	Baseline. North Island kākā are a highly mobile species in the wider landscape, therefore killing or injuring a North Island kākā due to the removal of district plan vegetation is highly unlikely. However requirements of the Wildlife Act 1953 will need to be adhered to Likely Future Ecological Environment.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible		Negligible	Very Low		
24	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Loss of foraging habitat due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Partially		Low	Low		
25	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Kill or injure individual due to vegetation removal	Same as Baseline.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible		Negligible	Very Low		
27	Construction	Vegetation removal	North Island kākā	High	Construction- Birds		Same as Baseline.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low		
28						Loss of foraging habitat due to vegetation removal	Baseline. Long-tailed cuckoo are an infrequent passage migrants in rural / urban areas, therefore loss of foraging habitat due to the removal of district plan vegetation is highly unlikely. Baseline. Long-tailed cuckoo are an infrequent passage migrant in rural / urban areas and highly mobile species in the wider landscape, therefore killing or injuring a long-tailed cuckoo due to the removal of district plan vegetation is highly unlikely. However requirements of the Wildlife Act 1953 will need to be adhered to Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Partially		Negligible	Low		
29	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Kill or injure individual due to vegetation removal	Baseline. Long-tailed cuckoo are an infrequent passage migrant in rural / urban areas and highly mobile species in the wider landscape, therefore killing or injuring a long-tailed cuckoo due to the removal of district plan vegetation is highly unlikely. However requirements of the Wildlife Act 1953 will need to be adhered to Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible		Negligible	Low		
31	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Loss of foraging habitat due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Partially		Negligible	Low		
32	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Kill or injure individual due to vegetation removal	Same as Baseline.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible		Negligible	Low		
34	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds		Same as Baseline.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible		Negligible	Low		
36																		
37	Construction	Vegetation removal	Skinks	High	Construction- Herpetofauna (native)	Lizard habitat loss due to vegetation removal	Baseline. Potential for skinks to be present within district plan vegetation (Tree group 107, 108 and 113). Extent is local only due to extent of vegetation removed in the context of the wider habitat available in the landscape Baseline. Potential for skinks to be present within district plan vegetation (which will be removed). Impact likely to occur, impacting suitable lizard habitat, riparian vegetation along Slippery Creek (Tree group 107, 108 and 113). Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Partially		Low	Low		
38	Construction	Vegetation removal	Skinks	High	Construction- Herpetofauna (native)	Kill or injure individual due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	>Local,<Regional	Permanent (>25 years)		Likely (>40-70% chance)	Irreversible		Moderate	High		
39	Construction	Vegetation removal	Skinks	High	Construction- Herpetofauna (native)	Lizard habitat loss due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)	Partially		Low	Low		
40	Construction	Vegetation removal	Skinks	High	Construction- Herpetofauna (native)	Kill or injure individual due to vegetation removal	Same as Baseline.	Direct	>Local,<Regional	Permanent (>25 years)		Likely (>40-70% chance)	Irreversible		Moderate	High		

Terrestrial Habitat and Species																		
								Magnitude Assessment										Level of Effect (Pre-mitigation)
Phase	Project Activity	Resource Unit (Habitat/Species)	Ecological Value	Effect Description Main	Effect Description Detailed (Dropdown)	Effects Description Manual	Type	Extent	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)					
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column16	Column17	Column18	Column19
1	Construction	Noise/Vibration/Dust	Bats	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	<u>Current conditions</u> Upgrade of existing road, largely within an urban area. Roost sites highly unlikely to occur within the designation	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally				Negligible	Low
	Operation	Presence of the roads	Bats		Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	<u>Current conditions</u> The loss of habitat and connectivity is highly unlikely. Upgrade of existing road, largely within an urban area. Slippery Creek may form a bat corridor but the bridge crossing upgrade is unlikely to cause additional fragmentation.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Low
2	Construction	Noise/Vibration/Dust	Bats	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	<u>Likely future conditions</u> No change from baseline.	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally				Negligible	Low
	Operation	Lighting and noise	Bats		Operation- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	<u>Current conditions</u> Upgrade of existing road mostly within urban area. Roost sites highly unlikely to occur within the designation.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Low
6	Construction	Noise/Vibration/Dust	Bats	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	<u>Likely future conditions</u> No change from baseline.	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally				Negligible	Low
	Operation	Presence of the roads	Bats		Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	<u>Likely future conditions</u> No change from baseline.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Low
7	Construction	Noise/Vibration/Dust	Bats	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	<u>Likely future conditions</u> No change from baseline.	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally				Negligible	Low
	Operation	Lighting and noise	Bats		Operation- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	<u>Likely future conditions</u> No change from baseline.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Low
9	Construction	Noise/Vibration/Dust	Bats	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	<u>Likely future conditions</u> No change from baseline.	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally				Negligible	Low
	Operation	Lighting and noise	Bats		Operation- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	<u>Likely future conditions</u> No change from baseline.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Low

Terrestrial Habitat and Species								Magnitude Assessment										Level of Effect (Pre-mitigation)
Phase	Project Activity	Resource Unit (Habitat/Species)	Ecological Value	Effect Description Main	Effect Description Detailed (Dropdown)	Effects Description Manual	Type	Extent	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)					
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column16	Column17	Column18	Column19
	Construction	Noise/vibration/Dust	Non-TAR species		Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Upgrade of an existing road. If birds are present, they are unlikely to be disturbed by construction activities (due to habituation to current conditions). The most conservative non-TAR species, such as grey warbler, has been used for this assessment.	Indirect	Local	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally					
1	Operation	Presence of the road	Non-TAR species	Low	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Baseline. Upgrade of an existing road. Existing baseline fragmentation (existing road and bridged/culverted streams) means that loss in connectivity resulting in changes to the population dynamics is unlikely.	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible				Low	Very Low
2	Operation	Lighting and noise	Non-TAR species	Low	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Baseline. Upgrade of an existing road. If birds are present, they are unlikely to be disturbed by the presence of the road (due to habituation to current conditions).	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible				Low	Very Low
3	Construction	Noise/vibration/Dust	Non-TAR species	Low	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally				Low	Very Low
4	Operation	Presence of the road	Non-TAR species	Low	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible				Low	Very Low
5	Operation	Lighting and noise	Non-TAR species	Low	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible				Low	Very Low
6				Low			NoR is located in an existing urban area and therefore no change is expected.										Low	Very Low
7																	#VALUE!	
8	Construction	Noise/vibration/Dust			Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Upgrade of the existing Road. Potential of kākā to utilise Puriri Forest (WF7) within adjacent SEA_T_5248. However as only likely to occur fleetingly for seasonal foraging. No breeding habitat. Disturbance due to construction activity is highly unlikely.	Indirect	>Local,<Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally					
9	Operation	Presence of the road	North Island kākā	High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Baseline. Potential of kākā to utilise Puriri Forest (WF7) within adjacent SEA_T_5248. As it is an upgrade to an existing there will be no additional loss of connectivity.	Indirect	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Very Low
10	Operation	Presence of the road	North Island kākā	High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Baseline. Potential of kākā to utilise Puriri Forest (WF7) within adjacent SEA_T_5248. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Very Low
11	Construction	Noise/vibration/Dust	North Island kākā	High	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	>Local,<Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally				Negligible	Very Low
12	Operation	Presence of the road	North Island kākā	High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Very Low
13	Operation	Presence of the road	North Island kākā	High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Very Low
14																	#VALUE!	
15	Construction	Noise/vibration/Dust			Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Upgrade of the existing Road. Potential of long-tailed cuckoo to utilise Puriri Forest (WF7) within adjacent SEA_T_5248. However as only likely to occur fleetingly for seasonal foraging. No breeding habitat. Disturbance due to construction activity is highly unlikely.	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally					
16	Operation	Presence of the road	Long-tailed cuckoo	Very High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Baseline. Potential of long-tailed cuckoo to utilise Puriri Forest (WF7) within adjacent SEA_T_5248. As it is an upgrade to an existing there will be no additional loss of connectivity.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Low
17			Long-tailed cuckoo	Very High													Negligible	Low

	Operation	Presence of the road			Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Baseline. Potential of long-tailed cuckoo to utilise Puriri Forest (WF7) within adjacent SEA, T_5248. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible		
17	Construction	Noise/vibration/Dust	Long-tailed cuckoo	Very High	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Likely Future Ecological Environment. Nok is located in an existing urban area and therefore no change is expected.	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally		Negligible Low
18	Operation	Presence of the road	Long-tailed cuckoo	Very High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. Nok is located in an existing urban area and therefore no change is expected.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible		Negligible Low
19	Operation	Presence of the road	Long-tailed cuckoo	Very High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. Nok is located in an existing urban area and therefore no change is expected.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible		Negligible Low
20	Construction	Noise/vibration/Dust	Long-tailed cuckoo	Very High	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Upgrade of the existing Road. Potential of Shag and gull species to utilise Otuwairoa Stream / Slippy Creek Corridor. Breeding potential is unlikely due to existing roads and human disturbance. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to construction presence is unlikely.	Indirect	>Local,<Regional	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally		#VALUE! Low
22	Operation	Presence of the road	Shags and gulls	High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Baseline. Potential of Shag and gull species to utilise Otuwairoa Stream / Slippy Creek Corridor. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low Low
23	Operation	Presence of the road	Shags and gulls	High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Baseline. Potential of Shag and gull species to utilise Otuwairoa Stream / Slippy Creek Corridor. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low Low
24	Construction	Noise/vibration/Dust	Shags and gulls	High	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Likely Future Ecological Environment. Nok largely urban. Although Otuwairoa Stream / Slippy Creek is adjacent to a Future Urban Zone. Breeding potential is unlikely due to existing roads and human disturbance. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.	Indirect	>Local,<Regional	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally		Low Low
25	Operation	Presence of the road	Shags and gulls	High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. Nok largely urban. Although Otuwairoa Stream / Slippy Creek is adjacent to a Future Urban Zone. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low Low
26	Operation	Presence of the road	Shags and gulls	High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. Nok largely urban. Although Otuwairoa Stream / Slippy Creek is adjacent to a Future Urban Zone. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low Low
27	Construction	Noise/vibration/Dust	Shags and gulls	High	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Upgrade of the existing Road. Potential of banded rail to utilise Otuwairoa Stream / Slippy Creek Corridor. Breeding potential is unlikely due to existing roads and human disturbance. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to construction presence is unlikely.	Indirect	>Local,<Regional	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally		#VALUE! Low
29	Operation	Presence of the road	Banded rail	High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Baseline. Potential of banded rail to utilise Otuwairoa Stream / Slippy Creek Corridor. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low Low
30	Operation	Presence of the road	Banded rail	High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Baseline. Potential of banded rail to utilise Otuwairoa Stream / Slippy Creek Corridor. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low Low

	Operation	Presence of the road			Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Baseline. Potential of banded rails to utilise Otuwairoa Stream / Slippy Creek Corridor. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		
31	Construction	Noise/vibration/Dust	Banded rail	High	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Likely Future Ecological Environment. Not largely urban. Although Otuwairoa Stream / Slippy Creek is adjacent to a Future Urban Zone. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.	Indirect	>Local,<Regional	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally	Low	Low
32	Operation	Presence of the road	Banded rail	High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. Not largely urban. Although Otuwairoa Stream / Slippy Creek is adjacent to a Future Urban Zone. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible	Low	Low
33	Operation	Presence of the road	Banded rail	High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. Not largely urban. Although Otuwairoa Stream / Slippy Creek is adjacent to a Future Urban Zone. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible	Low	Low
34	Operation	Presence of the road	Banded rail	High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. Not largely urban. Although Otuwairoa Stream / Slippy Creek is adjacent to a Future Urban Zone. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible	Low	Low
35														#VALUE!	Low
36	Construction	Noise/vibration/Dust			Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Upgrade of the existing Road. Potential of caspian tern to utilise Otuwairoa Stream / Slippy Creek Corridor. Breeding potential is highly unlikely due to existing roads and human disturbance. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to construction presence is unlikely.	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally		
37	Operation	Presence of the road	Caspian tern	Very High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Baseline. Potential of caspian tern to utilise Otuwairoa Stream / Slippy Creek Corridor. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible	Negligible	Low
38	Operation	Presence of the road	Caspian tern	Very High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Baseline. Potential of caspian tern to utilise Otuwairoa Stream / Slippy Creek Corridor. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible	Negligible	Low
39	Construction	Noise/vibration/Dust	Caspian tern	Very High	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Likely Future Ecological Environment. Not largely urban. Although Otuwairoa Stream / Slippy Creek is adjacent to a Future Urban Zone. Breeding potential is unlikely due to existing roads and human disturbance. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally	Negligible	Low
40	Operation	Presence of the road	Caspian tern	Very High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. Not largely urban. Although Otuwairoa Stream / Slippy Creek is adjacent to a Future Urban Zone. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible	Negligible	Low
41	Operation	Presence of the road	Caspian tern	Very High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. Not largely urban. Although Otuwairoa Stream / Slippy Creek is adjacent to a Future Urban Zone. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same as Baseline.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible	Negligible	Low

Terrestrial Habitat and Species								Magnitude Assessment										Level of Effect (Pre-mitigation)				
Phase	Project Activity	Resource Unit (Habitat/Species)	Ecological Value	Effect Description Main	Effect Description Detailed (Dropdown)	Effects Description Manual	Type	Extent	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)									
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column16	Column17	Column18	Column19				
				Very High	Construction- Bats	Loss of foraging habitat due to vegetation removal	Baseline. Upgrade to existing road within a largely urban environment. The potential for District Plan trees to provide foraging habitat for bats is Highly unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)					Negligible	Low				
1	Construction	Vegetation removal	Long-tailed bat		Construction- Bats	Roost loss through vegetation removal	Baseline. Upgrade to existing road within a largely urban environment. The potential for District Plan trees to provide foraging habitat for bats is Highly unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)						Negligible	Low			
2	Construction	Vegetation removal	Long-tailed bat		Construction- Bats	Kill or injure individual bats due to vegetation removal	Baseline. Upgrade to existing road within a largely urban environment. The potential for District Plan trees to provide roosting habitat and therefore be injured during vegetation removal is Highly unlikely. However requirements of the Wildlife Act 1953 will need to be adhered to	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)						Negligible	Low			
3	Construction	Vegetation removal	Long-tailed bat		Construction- Bats	Loss of foraging habitat due to vegetation removal	Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)							Negligible	Low		
4	Construction	Vegetation removal	Long-tailed bat		Construction- Bats	Roost loss through vegetation removal	Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)							Negligible	Low		
5	Construction	Vegetation removal	Long-tailed bat		Construction- Bats	Kill or injure individual bats due to vegetation removal	Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)							Negligible	Low		
6	Construction	Vegetation removal	Long-tailed bat		Construction- Bats	Same as Baseline.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)								Negligible	Low		
7						Loss of foraging habitat due to vegetation removal	Baseline. Potential for non-TAR birds to use district plan vegetation for foraging (which will be removed). Restricted to exotic willows with low foraging value for most native species.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)						Low	Very Low			
8	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Kill or injure individual due to vegetation removal	Baseline. Potential for non-TAR birds to be present Requirements of the Wildlife Act 1953 will need to be adhered to	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)						Low	Very Low			
10	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Loss of foraging habitat due to vegetation removal	Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)						Low	Very Low			
11	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Willows present are within riparian margin and are likely to remain (or be enhanced with native planting) in a future environment. Same as Baseline.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)							Low	Very Low			
13	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Kill or injure individual due to vegetation removal	Likely Future Ecological Environment. Willows present are within riparian margin and are likely to remain (or be enhanced with native planting) in a future environment. Same as Baseline.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)						Low	Very Low			
14						Loss of foraging habitat due to vegetation removal	Baseline. North Island kākā are a highly mobile species in the wider landscape, therefore loss of foraging habitat due to the removal of district plan trees is unlikely.	Direct	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)						Low	Low			
15	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Kill or injure individual due to vegetation removal	Baseline. North Island kākā are a highly mobile species in the wider landscape, therefore killing or injuring a North Island kākā due to the removal of district plan vegetation is highly unlikely. However requirements of the Wildlife Act 1953 will need to be adhered to	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)							Negligible	Very Low		
16	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Loss of foraging habitat due to vegetation removal	Likely Future Ecological Environment.	Direct	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)						Low	Low			
17	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Kill or injure individual due to vegetation removal	Same as Baseline.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)							Negligible	Very Low		
18	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Same as Baseline.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)								Negligible	Very Low		
19						Loss of foraging habitat due to vegetation removal	Baseline. Long-tailed cuckoo are an infrequent passage migrant in rural / urban areas, therefore loss of foraging habitat due to the removal of district plan vegetation is highly unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible						Negligible	Low		
20	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Kill or injure individual due to vegetation removal	Baseline. Long-tailed cuckoo are an infrequent passage migrant in rural / urban areas and highly mobile species in the wider landscape, therefore killing or injuring a long-tailed cuckoo due to the removal of district plan vegetation is highly unlikely. However requirements of the Wildlife Act 1953 will need to be adhered to	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible							Negligible	Low	
21	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Loss of foraging habitat due to vegetation removal	Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible							Negligible	Low	
22	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Same as Baseline.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Partially								Negligible	Low	
23	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Kill or injure individual due to vegetation removal	Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible							Negligible	Low	
24						Next loss due to vegetation removal	Baseline. Shag can nest within mature tree overhanging wetland / waterbodies (Hingaia Stream). However, habitat quality is low and highly unlikely to support a breeding population. Therefore next loss due to the removal of district plan vegetation is highly unlikely.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible								Negligible	Very Low
25	Construction	Vegetation removal	Shags	High	Construction- Birds	Same as Baseline.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible									Negligible	Very Low

						Kill or injure individual due to vegetation removal	Baseline. Shags are highly mobile species in the wider landscape, therefore killing or injuring a them due to the removal of district plan vegetation is highly unlikely								
26	Construction	Vegetation removal	Shags	High	Construction- Birds	Nest loss due to vegetation removal	Likely Future Ecological Environment.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible	Negligible	Very Low
27	Construction	Vegetation removal	Shags	High	Construction- Birds	Kill or injure individual due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible	Negligible	Very Low
28	Construction	Vegetation removal	Shags	High	Construction- Birds	Kill or injure individual due to vegetation removal	Same as Baseline.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible	Negligible	Very Low
29															
30	Construction	Vegetation removal	Skinks	High	Construction- Herpetofauna (native)	Lizard habitat loss due to vegetation removal	Baseline. Potential for skinks to be present within district plan vegetation (which will be removed)(Tree group 114, 115 & 116). Extent is local only due to extent of vegetation removed in the context of the wider habitat available in the landscape	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)	Partially	Low	Low
31	Construction	Vegetation removal	Skinks	High	Construction- Herpetofauna (native)	Kill or injure individual due to vegetation removal	Baseline. Potential for skinks to be present within district plan vegetation (which will be removed). Impact likely to occur, impacting suitable lizard habitat, riparian vegetation along Hingaia Stream (Tree group 114, 115 & 116).	Direct	>Local,<Regional	Permanent (>25 years)		Likely (>40-70% chance)	Irreversible	Moderate	High
32	Construction	Vegetation removal	Skinks	High	Construction- Herpetofauna (native)	Lizard habitat loss due to vegetation removal	Likely Future Ecological Environment. Same as Baseline	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)	Partially	Low	Low
33	Construction	Vegetation removal	Skinks	High	Construction- Herpetofauna (native)	Kill or injure individual due to vegetation removal	Likely Future Ecological Environment. Same as Baseline	Direct	>Local,<Regional	Permanent (>25 years)		Likely (>40-70% chance)	Irreversible	Moderate	High

Terrestrial Habitat and Species																			
								Magnitude Assessment								Level of Effect (Pre-mitigation)			
Phase	Project Activity	Resource Unit (Habitat/Species)	Ecological Value	Effect Description Main	Effect Description Detailed (Dropdown)	Effects Description Manual	Type	Extent	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)						
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column16	Column17	Column18	Column19	
	Construction	Noise/Vibration/Dust	Bats	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	<u>Current conditions</u> Upgrade of existing road, largely within an urban area. Roost sites highly unlikely to occur within the designation.	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally				Negligible	Low	
1	Operation	Presence of the roads	Bats		Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	<u>Current conditions</u> The loss of habitat and connectivity is highly unlikely. Upgrade of existing road, largely within an urban area. Hingala Stream may form a bat corridor but the bridge crossing upgrade is unlikely to cause additional fragmentation.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Low	
2			Bats					<u>Current conditions</u> Upgrade of existing road mostly within urban area. Roost sites highly unlikely to occur within the designation.										Negligible	Low
4	Operation	Lighting and noise	Bats		Operation- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration			Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Low
5	Construction	Noise/Vibration/Dust	Bats	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	<u>Likely future conditions</u> No change from baseline.	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Irreversible				Negligible	Low	
6	Operation	Presence of the roads	Bats		Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	<u>Likely future conditions</u> No change from baseline.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Low	
7			Bats					<u>Likely future conditions</u> No change from baseline.										Negligible	Low
9	Operation	Lighting and noise	Bats		Operation- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration			Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible				Negligible	Low

Terrestrial Habitat and Species								Magnitude Assessment									
Phase		Project Activity	Resource Unit (Habitat/Species)	Ecological Value	Effect Description Main	Effect Description Detailed (Dropdown)	Effects Description Manual	Type	Extent	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)		Level of Effect (Pre-mitigation)	
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column18	Column19	
1	Construction	Notice/vibration/Dust	Non-TAR species	Low	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Upgrade of an existing road. If birds are present, they are unlikely to be disturbed by construction activities (due to habituation to current conditions). The most conservative non-TAR species, such as grey warbler, has been used for this assessment.	Indirect	Local	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally		Low	Very Low	
	Operation		Non-TAR species	Low	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Baseline. Upgrade of an existing road. Existing baseline fragmentation (existing road and bridged/culverted streams) means that loss in connectivity resulting in changes to the population dynamics is unlikely.	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Very Low	
2	Operation	Presence of the road	Non-TAR species	Low	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Baseline. Upgrade of an existing road. If birds are present, they are unlikely to be disturbed by the presence of the road (due to habituation to current conditions).	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Very Low	
3	Construction	Notice/vibration/Dust	Non-TAR species	Low	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally		Low	Very Low	
4	Operation		Non-TAR species	Low	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Very Low	
5	Operation	Presence of the road	Non-TAR species	Low	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Very Low	
6	Operation	Presence of the road	Non-TAR species	Low	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Very Low	
7		Notice/vibration/Dust					Baseline. Upgrade of the existing Road. Potential of shag species to utilise Hingaia Creek corridor. Breeding potential is unlikely due to existing roads and human disturbance. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to construction presence is unlikely.	Indirect			Frequently						
14	Construction		Shag and Gulls Species Shag and Gulls Species	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Potential of shag species to utilise Hingaia Stream corridor. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	>Local, <Regional	Short-term (<5 years)		Unlikely (20-40% chance) Unlikely (20-40% chance)	Totally Irreversible		Low	Low	
15	Operation	Presence of the road	Shag and Gulls Species	High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	>Local, <Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Low	
16	Operation	Presence of the road	Shag and Gulls Species	High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Baseline. Potential of Shag species to utilise Hingaia Stream corridor. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	>Local, <Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Low	
17	Operation	Notice/vibration/Dust	Shag and Gulls Species	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Likely Future Ecological Environment. NoR largely urban. Although Hingaia Stream is adjacent to a Future Urban Zone. Breeding potential is unlikely due to existing roads and human disturbance. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same a Baseline.	Indirect	>Local, <Regional	Short-term (<5 years)		Unlikely (20-40% chance)	Totally		Low	Low	
18	Construction	Presence of the road	Shag and Gulls Species	High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. NoR largely urban. Although Hingaia Stream is adjacent to a Future Urban Zone. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same a Baseline.	Indirect	>Local, <Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Low	

		Shag and Gulls Species			Likely Future Ecological Environment. Not largely urban. Although Hingais Stream is adjacent to a Future Urban Zone. Breeding potential is unlikely due to existing roads and human disturbance. There is no expected change to baseline as riparian corridor will remain. The magnitude and level of effect are the same a Baseline.	Indirect				Unlikely (20-40% chance)	Irreversible			
19 Operation	Presence of the road	High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration			>Local,<Regional	Permanent (>25 years)				Low	Low	

Terrestrial Habitat and Species								Magnitude Assessment										Level of Effect (Pre-mitigation)
Phase	Project Activity	Resource Unit (Habitat/Species)	Ecological Value	Effect Description Main	Effect Description Detailed (Dropdown)	Effects Description Manual	Type	Extent	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)					
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column16	Column17		
				Very High	Construction- Bats	Loss of foraging habitat due to vegetation removal	Baseline. Upgrade to existing road within an urban environment. The potential for District Plan trees to provide foraging habitat for bats is highly unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
1	Construction	Vegetation removal	Long-tailed bat		Construction- Bats	Roost loss through vegetation removal	Baseline. Upgrade to existing road within an urban environment. The potential for District Plan trees to provide roosting habitat for bats is highly unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
2	Construction	Vegetation removal	Long-tailed bat		Construction- Bats	Kill or injure individual bats due to vegetation removal	Baseline. Upgrade to existing road within an urban environment. The potential for District Plan trees to provide roosting habitat and therefore be injured during vegetation removal is highly unlikely. However requirements of the Wildlife Act 1953 will need to be adhered to.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
3	Construction	Vegetation removal	Long-tailed bat		Construction- Bats	Loss of foraging habitat due to vegetation removal	Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
4	Construction	Vegetation removal	Long-tailed bat		Construction- Bats	Roost loss through vegetation removal	Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
5	Construction	Vegetation removal	Long-tailed bat		Construction- Bats	Kill or injure individual bats due to vegetation removal	Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
6	Construction	Vegetation removal	Long-tailed bat		Construction- Bats		Same as Baseline.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
7						Loss of foraging habitat due to vegetation removal	Baseline. Potential for non-TAR birds to use district plan vegetation for foraging (which will be removed). Restricted to exotic willows with low foraging value for most native species.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
8	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Nest loss due to vegetation removal	Baseline. Potential for non-TAR bird nests to be present	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
9	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Kill or injure individual due to vegetation removal	Potential for non-TAR birds to be present Requirements of the Wildlife Act 1953 will need to be adhered to. Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
10	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Loss of foraging habitat due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
11	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Nest loss due to vegetation removal	Same as Baseline.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
12	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Kill or injure individual due to vegetation removal	Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
13	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds		Same as Baseline.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
14				High	Construction- Birds	Loss of foraging habitat due to vegetation removal	Baseline. North Island kākā are a highly mobile species in the wider landscape, therefore loss of foraging habitat due to the removal of district plan trees is highly unlikely.	Direct	>Local, <Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low		
15	Construction	Vegetation removal	North Island kākā		Construction- Birds	Nest loss due to vegetation removal	Baseline. North Island kākā nests are generally in mature tree cavities on offshore islands (in the Auckland Region), therefore nest loss due to the removal of district plan vegetation is highly unlikely.	Direct	>Local, <Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low		
16	Construction	Vegetation removal	North Island kākā		Construction- Birds	Kill or injure individual due to vegetation removal	Baseline. North Island kākā are a highly mobile species in the wider landscape, therefore killing or injuring a North Island kākā due to the removal of district plan vegetation is highly unlikely. However requirements of the Wildlife Act 1953 will need to be adhered to.	Direct	>Local, <Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low		
17	Construction	Vegetation removal	North Island kākā		Construction- Birds	Loss of foraging habitat due to vegetation removal	Likely Future Ecological Environment.	Direct	>Local, <Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low		
18	Construction	Vegetation removal	North Island kākā		Construction- Birds	Nest loss due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	>Local, <Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low		
19	Construction	Vegetation removal	North Island kākā	Construction- Birds	Kill or injure individual due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	>Local, <Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low			
20	Construction	Vegetation removal	North Island kākā	Construction- Birds		Same as Baseline.	Direct	>Local, <Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low			
21				Very High	Construction- Birds	Loss of foraging habitat due to vegetation removal	Baseline. Long-tailed cuckoo are an infrequent passage migrant in rural / urban areas, therefore loss of foraging habitat due to the removal of district plan vegetation is highly unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
22	Construction	Vegetation removal	Long-tailed cuckoo		Construction- Birds	Nest loss due to vegetation removal	Baseline. Long-tailed cuckoo do not breed in the Auckland Region (other than Little Barrier Island/ Te Hauturu-o-Toi). Therefore nest loss due to the removal of district plan vegetation is highly unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
23	Construction	Vegetation removal	Long-tailed cuckoo		Construction- Birds			Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		

						Kill or injure individual due to vegetation removal	Baseline. Long-tailed cuckoo are an infrequent passage migrant in rural / urban areas and highly mobile species in the wider landscape, therefore killing or injuring a long-tailed cuckoo due to the removal of district plan vegetation is highly unlikely However requirements of the Wildlife Act 1953 will need to be adhered to								
24	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds			Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)		Negligible	Low
25	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Loss of foraging habitat due to vegetation removal	Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)		Negligible	Low
26	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Nest loss due to vegetation removal	Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)		Negligible	Low
27	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Kill or injure individual due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)		Negligible	Low
28															
29	Construction	Vegetation removal	Skink	High	Construction- Herpetofauna (native)	Lizard habitat loss due to vegetation removal	Baseline. Potential for skinks to be present within district plan vegetation (which will be removed) [Tree group 38, 39, 40 & 41]. Extent is local only due to extent of vegetation removed in the context of the wider habitat available in the landscape	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)	Partially	Low	Low
30	Construction	Vegetation removal	Skink	High	Construction- Herpetofauna (native)	Kill or injure individual due to vegetation removal	Baseline. Potential for skinks to be present within district plan vegetation (which will be removed). Impact likely to occur, impacting suitable lizard habitat, riparian vegetation along Hingalo Stream [Tree group 38, 39, 40 & 41].	Direct	>Local, <Regional	Permanent (>25 years)		Likely (>40-70% chance)	Irreversible	Moderate	High
31	Construction	Vegetation removal	Skink	High	Construction- Herpetofauna (native)	Lizard habitat loss due to vegetation removal	Likely Future Ecological Environment. Same as Baseline.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)	Partially	Low	Low
32	Construction	Vegetation removal	Skink	High	Construction- Herpetofauna (native)	Kill or injure individual due to vegetation removal	Likely Future Ecological Environment. Same as Baseline.	Direct	>Local, <Regional	Permanent (>25 years)		Likely (>40-70% chance)	Irreversible	Moderate	High

Terrestrial Habitat and Species																		
								Magnitude Assessment										Level of Effect (Pre-mitigation)
Phase	Project Activity	Resource Unit (Habitat/Species)	Ecological Value	Effect Description Main	Effect Description Detailed (Dropdown)	Effects Description Manual		Type	Extent	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)				
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column16	Column17	Column18	Column19
	Construction	Noise/Vibration/Dust	Bats	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	<u>Current conditions</u> Upgrade of existing road, within an urban area. Roost sites unlikely to occur within the designation.	Indirect	<Local	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally			Negligible	Low	
1																		
	Operation	Presence of the roads	Bats	Very High	Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	<u>Current conditions</u> The loss of habitat and connectivity is highly unlikely. Upgrade of existing road, within an urban area.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible			Negligible	Low	
2																		
	Operation	Lighting and noise	Bats	Very High	Operation- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	<u>Current conditions</u> Upgrade of existing road mostly within urban area. Existing conditions are likely to deter bats.	Indirect	Local	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible			Negligible	Low	
4																		
5																		
	Construction	Noise/Vibration/Dust	Bats	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	<u>Likely future conditions</u> No change from baseline.	Indirect	<Local	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Irreversible			Negligible	Low	
6																		
	Operation	Presence of the roads	Bats	Very High	Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	<u>Likely future conditions</u> No change from baseline.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible			Negligible	Low	
7																		
	Operation	Lighting and noise	Bats	Very High	Operation- Bats	Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	<u>Likely future conditions</u> No change from baseline.	Indirect	Local	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible			Negligible	Low	
9																		

Terrestrial Habitat and Species								Magnitude Assessment										Level of Effect (Pre-mitigation)
Phase	Project Activity	Resource Unit (Habitat/Species)	Ecological Value	Effect Description Main	Effect Description Detailed (Dropdown)	Effects Description Manual	Type	Extent	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)					
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column16	Column17		
1	Construction	Noise/Vibration/Dust	Non-TAR species	Low	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Upgrade of an existing road. If birds are present, they are unlikely to be disturbed by construction activities (due to habituation to current conditions). The most conservative non-TAR species, such as grey warbler, has been used for this assessment.	Indirect	Local	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally		Low	Very Low		
	Operation	Presence of the road				Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Baseline. Upgrade of an existing road. Existing baseline fragmentation (existing road and bridged/culverted streams) means that loss in connectivity resulting in changes to the population dynamics is unlikely.	Indirect	Local	Permanent (>25 years)	Unlikely (20-40% chance)	Irreversible					
	2	Operation				Presence of the road	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Baseline. Upgrade of an existing road. If birds are present, they are unlikely to be disturbed by the presence of the road (due to habituation to current conditions).	Indirect	Local	Permanent (>25 years)	Unlikely (20-40% chance)				Irreversible	
3	Construction	Noise/Vibration/Dust	Non-TAR species	Low	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally		Low	Very Low		
	Operation	Presence of the road				Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)	Unlikely (20-40% chance)	Irreversible					
	4	Operation				Presence of the road	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)	Unlikely (20-40% chance)				Irreversible	
5	Construction	Noise/Vibration/Dust	Non-TAR species	Low	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Upgrade of an existing road. May utilise stormwater wetland near SH1 bridge crossing adjacent to Project Area for foraging and/or breeding. Unlikely to occur in urban areas, impact highly unlikely.	Indirect	Local	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally		Negligible	Low		
	Operation	Presence of the road				Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Baseline. Upgrade of an existing road. May utilise stormwater wetland near SH1 bridge crossing adjacent to Project Area. Existing baseline fragmentation (existing road and bridged/culverted streams) means that loss in connectivity resulting in changes to the population dynamics is unlikely.	Indirect	Local	Permanent (>25 years)	Highly Unlikely (<20% chance)	Irreversible					
	9	Operation				Presence of the road	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Baseline. Upgrade of an existing road. If birds are present, they are unlikely to be disturbed by the presence of the road (due to habituation to current conditions).	Indirect	Local	Permanent (>25 years)	Highly Unlikely (<20% chance)				Irreversible	
6	Construction	Noise/Vibration/Dust	Dabchick	Very High	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally		Negligible	Low		
	Operation	Presence of the road				Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)	Highly Unlikely (<20% chance)	Irreversible					
	10	Operation				Presence of the road	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)	Highly Unlikely (<20% chance)				Irreversible	
7	Construction	Noise/Vibration/Dust	Dabchick	Very High	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Upgrade of an existing road. May utilise stormwater wetland near SH1 bridge crossing adjacent to Project Area for foraging and/or breeding. Unlikely to occur in urban areas, impact highly unlikely.	Indirect	Local	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally		Negligible	Low		
	Operation	Presence of the road				Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)	Highly Unlikely (<20% chance)	Irreversible					
	11	Operation				Presence of the road	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)	Highly Unlikely (<20% chance)				Irreversible	
8	Construction	Noise/Vibration/Dust	Dabchick	Very High	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Upgrade of an existing road. May utilise stormwater wetland near SH1 bridge crossing adjacent to Project Area for foraging and/or breeding. Unlikely to occur in urban areas, impact highly unlikely.	Indirect	Local	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally		Negligible	Low		
	Operation	Presence of the road				Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)	Highly Unlikely (<20% chance)	Irreversible					
	12	Operation				Presence of the road	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)	Highly Unlikely (<20% chance)				Irreversible	
9	Construction	Noise/Vibration/Dust	Dabchick	Very High	Construction- Birds	Disturbance and displacement to nests and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Upgrade of an existing road. May utilise stormwater wetland near SH1 bridge crossing adjacent to Project Area for foraging and/or breeding. Unlikely to occur in urban areas, impact highly unlikely.	Indirect	Local	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally		Negligible	Low		
	Operation	Presence of the road				Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)	Highly Unlikely (<20% chance)	Irreversible					
	13	Operation				Presence of the road	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. NoR is located in an existing urban area and therefore no change is expected.	Indirect	Local	Permanent (>25 years)	Highly Unlikely (<20% chance)				Irreversible	

Terrestrial Habitat and Species								Magnitude Assessment										Level of Effect (Pre-mitigation)
Phase	Project Activity	Resource Unit (Habitat/Species)	Ecological Value	Effect Description Main	Effect Description Detailed (Dropdown)	Effects Description Manual	Type	Extent	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)					
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column16	Column17		
				Very High	Construction- Bats	Loss of foraging habitat due to vegetation removal	Baseline. Upgrade to existing road. The potential for District Plan trees to provide foraging habitat for bats is unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
1	Construction	Vegetation removal	Long-tailed bat				Roost loss through vegetation removal	Baseline. Upgrade to existing road. The potential for District Plan trees to provide foraging habitat for bats is unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low	
2	Construction	Vegetation removal	Long-tailed bat				Kill or injure individual bats due to vegetation removal	Baseline. Upgrade to existing road. The potential for District Plan trees to provide foraging habitat for bats is unlikely. Requirements of the Wildlife Act 1953 will need to be adhered to.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low	
3	Construction	Vegetation removal	Long-tailed bat				Loss of foraging habitat due to vegetation removal	Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low	
4	Construction	Vegetation removal	Long-tailed bat				Roost loss through vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low	
5	Construction	Vegetation removal	Long-tailed bat				Kill or injure individual bats due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low	
6	Construction	Vegetation removal	Long-tailed bat				Same as Baseline.	Same as Baseline.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low	
7						Loss of foraging habitat due to vegetation removal	Baseline. Potential for non-TAR birds to use district plan vegetation for foraging (which will be removed).	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
8	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Nest loss due to vegetation removal	Baseline. Potential for non-TAR bird nests to be present	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
9	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Kill or injure individual due to vegetation removal	Baseline. Potential for non-TAR birds to be present	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
10	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Loss of foraging habitat due to vegetation removal	Requirements of the Wildlife Act 1953 will need to be adhered to. Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
11	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Same as Baseline.	Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
12	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Nest loss due to vegetation removal	Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
13	Construction	Vegetation removal	Non-TAR birds	Low	Construction- Birds	Kill or injure individual due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
14						Loss of foraging habitat due to vegetation removal	Same as Baseline.	Direct	Local	Permanent (>25 years)		Likely (>40-70% chance)			Low	Very Low		
15	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Loss of foraging habitat due to vegetation removal	Baseline. North Island kākā are a highly mobile species in the wider landscape, therefore loss of foraging habitat due to the removal of district plan trees is unlikely.	Direct	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)			Low	Low		
16	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Nest loss due to vegetation removal	Baseline. North Island kākā nests are generally in mature tree cavities on offshore islands (in the Auckland Region), therefore nest loss due to the removal of district plan vegetation is highly unlikely.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low		
17	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Kill or injure individual due to vegetation removal	Baseline. North Island kākā are a highly mobile species in the wider landscape, therefore killing or injuring a North Island kākā due to the removal of district plan vegetation is highly unlikely.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low		
18	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Loss of foraging habitat due to vegetation removal	Likely Future Ecological Environment.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low		
19	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Nest loss due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low		
20	Construction	Vegetation removal	North Island kākā	High	Construction- Birds	Kill or injure individual due to vegetation removal	Same as Baseline. Likely Future Ecological Environment.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Very Low		
21						Loss of foraging habitat due to vegetation removal	Baseline. Long-tailed cuckoo are an infrequent passage migrant in rural / urban areas, therefore loss of foraging habitat due to the removal of district plan vegetation is highly unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
22	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Nest loss due to vegetation removal	Baseline. Long-tailed cuckoo do not breed in the Auckland Region (other than Little Barrier Island/ Te Hauturu-o-Toi). Therefore nest loss due to the removal of district plan vegetation is highly unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
23	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Kill or injure individual due to vegetation removal	Baseline. Long-tailed cuckoo are an infrequent passage migrant in rural / urban areas and highly mobile species in the wider landscape, therefore killing or injuring a long-tailed cuckoo due to the removal of district plan vegetation is highly unlikely.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
24	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Loss of foraging habitat due to vegetation removal	Likely Future Ecological Environment. However requirements of the Wildlife Act 1953 will need to be adhered to.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		
25	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Same as Baseline.	Same as Baseline.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)			Negligible	Low		

						Nest loss due to vegetation removal	Likely Future Ecological Environment.								
26	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds	Kill or injure individual due to vegetation removal	Same as Baseline.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)		Negligible	Low
27	Construction	Vegetation removal	Long-tailed cuckoo	Very High	Construction- Birds		Same as Baseline.	Direct	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)		Negligible	Low
28						Nest loss due to vegetation removal	Baseline. Shag can nest within mature tree overhanging wetland / waterbodies. However, habitat quality is low and highly unlikely to support a breeding population. Therefore nest loss due to the removal of district plan vegetation is highly unlikely.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)		Negligible	Very Low
29	Construction	Vegetation removal	Shags	High	Construction- Birds	Kill or injure individual due to vegetation removal	Baseline. Shags are highly mobile species in the wider landscape, therefore killing or injuring a them due to the removal of district plan vegetation is highly unlikely. However requirements of the Wildlife Act 1953 will need to be adhered to	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)		Negligible	Very Low
30	Construction	Vegetation removal	Shags	High	Construction- Birds			Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)		Negligible	Very Low
31	Construction	Vegetation removal	Shags	High	Construction- Birds	Nest loss due to vegetation removal	Likely Future Ecological Environment.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)		Negligible	Very Low
32	Construction	Vegetation removal	Shags	High	Construction- Birds	Kill or injure individual due to vegetation removal	Same as Baseline.	Direct	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)		Negligible	Very Low

Terrestrial Habitat and Species																		
								Magnitude Assessment							Level of Effect (Pre-mitigation)			
Phase	Project Activity	Resource Unit (Habitat/Species)	Ecological Value	Effect Description Main	Effect Description Detailed (Dropdown)	Effects Description Manual	Type	Extent	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)					
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column16	Column17	Column18	Column19
1	Construction	Noise/Vibration/Dust	Bats	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	<u>Current conditions</u> Upgrade of existing Road. Bat roost potential unlikely to occur within the designation. Bats unlikely to be disturbed by construction activities.	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally			Negligible		Low
	Operation	Presence of the road	Bats	Very High	Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	<u>Current conditions</u> The loss of habitat and connectivity is highly unlikely. Upgrade of existing road, largely within an urban area. Papakura Stream may form a bat corridor but the upgrade of the bridge crossing it is unlikely to cause additional fragmentation.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible			Negligible		Low
2			Bats	Very High		Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	<u>Current conditions</u> Upgrade of existing road. Bats are likely only fleeting visitors to the area.			Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible			Negligible		Low
3	Operation	Lighting and noise	Bats	Very High	Operation- Bats			Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible			Negligible		Low
4	Construction	Noise/Vibration/Dust	Bats	Very High	Construction- Bats	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	<u>Likely future conditions</u> No change from baseline.	Indirect	Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Irreversible			Negligible		Low
5	Operation	Presence of the road	Bats	Very High	Operation- Bats	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	<u>Likely future conditions</u> No change from baseline.	Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible			Negligible		Low
6			Bats	Very High		Disturbance and displacement of (new and existing) roosts and individuals due to lighting and noise/vibration	<u>Likely future conditions</u> No change from baseline.			Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible			Negligible		Low
7	Operation	Lighting and noise	Bats	Very High	Operation- Bats			Indirect	Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible			Negligible		Low

Terrestrial Habitat and Species								Magnitude Assessment										Level of Effect (Pre-mitigation)
Phase	Project Activity	Resource Unit (Habitat/Species)	Ecological Value	Effect Description Main	Effect Description Detailed (Dropdown)	Effects Description Manual	Type	Extent	Duration	Frequency	Likelihood	Reversibility	Magnitude (pre-mitigation)					
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column18	Column19		
1	Construction	Notice/vibration/Dust	Non-TAR species	Low	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.) Upgrade of an existing road. If birds are present, they are unlikely to be disturbed by construction activities (due to habituation to current conditions). The most conservative non-TAR species, such as grey warbler, has been used for this assessment.	Baseline. Upgrade of an existing road. Existing baseline fragmentation (existing road and bridged/culverted streams) means that loss in connectivity resulting in changes to the population dynamics is unlikely.	Indirect	Local	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally		Low	Very Low		
	Operation	Presence of the road	Non-TAR species	Low	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Baseline. Upgrade of an existing road. Existing baseline fragmentation (existing road and bridged/culverted streams) means that loss in connectivity resulting in changes to the population dynamics is unlikely.	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Very Low		
	Operation		Non-TAR species	Low	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Baseline. Upgrade of an existing road. If birds are present, they are unlikely to be disturbed by the presence of the road (due to habituation to current conditions).	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Very Low		
	Construction	Notice/vibration/Dust	Non-TAR species	Low	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Likely Future Ecological Environment. No expected change to baseline	Indirect	Local	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally		Low	Very Low		
	Operation	Presence of the road	Non-TAR species	Low	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. No expected change to baseline	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Very Low		
	Operation		Non-TAR species	Low	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Likely Future Ecological Environment. No expected change to baseline	Indirect	Local	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Very Low		
	Operation	Presence of the road	Non-TAR species	Low	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	No expected change to baseline								Low	Very Low		
8	Construction	Notice/vibration/Dust	New Zealand Pipit	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.) Upgrade of the existing Road. Potential of NZ Pipit to utilise rough grassland within adjacent FUZ. Disturbance due to construction activity likely.	Baseline. Upgrade of the existing Road. Potential of NZ Pipit to utilise rough grassland within adjacent FUZ. Disturbance due to construction activity likely.	Indirect	>Local,<Regional	Short-term (<5 years)	Frequently	Likely (>40-70% chance)	Totally			Low	Low	
	Operation	Presence of the road	New Zealand Pipit	High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Baseline. Potential of NZ Pipit to utilise rough grassland within adjacent FUZ. NoR doesn't cover much habitat, connectivity loss resulting in changes in population dynamics unlikely.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Low		
	Operation			High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	Baseline. Potential of NZ Pipit to utilise rough grassland within adjacent FUZ. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible	Low	Low			
	Construction	Notice/vibration/Dust	New Zealand Pipit	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Likely Future Ecological Environment. No expected change to baseline as riparian corridor will remain.	Indirect	>Local,<Regional	Short-term (<5 years)	Frequently	Highly Unlikely (<20% chance)	Totally		Negligible	Very Low		
	Operation	Presence of the road	New Zealand Pipit	High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	Likely Future Ecological Environment. NoR is located in Future Urban Zone. Suitable habitat will likely have been removed.	Indirect	>Local,<Regional	Permanent (>25 years)		Highly Unlikely (<20% chance)	Irreversible		Negligible	Very Low		
	Operation			High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	The magnitude and level of effect are lower than Baseline. Baseline. Upgrade of the existing Road. Potential of Shag species to utilise Papakura Stream Corridor.	Indirect	>Local,<Regional	Permanent (>25 years)	Frequently	Highly Unlikely (<20% chance)	Irreversible		Negligible	Very Low		
	Construction	Notice/vibration/Dust	Shag Species Shag Species	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	Baseline. Potential of Shag species to utilise Papakura Stream Corridor. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to construction presence is unlikely.	Indirect	>Local,<Regional	Short-term (<5 years)		Unlikely (20-40% chance)	Totally	Irreversible	Low	Low		
15	Presence of the road			High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	>Local,<Regional	Permanent (>25 years)					Low	Low			

	Operation		Shag Species				Baseline. Potential of Shag species to utilise Papakura Stream Corridor. As it is an upgrade to an existing road, any bird present is expected to be habituated to road disturbance hence disturbance due to road presence is unlikely.	Indirect				Unlikely (20-40% chance)	Irreversible			
16		Presence of the road	Shag Species	High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration			>Local,<Regional	Permanent (>25 years)				Low	Low	
17	Operation	Noise/vibration/Dust	Shag Species	High	Construction- Birds	Disturbance and displacement to roosts and individuals (existing) due to construction activities (noise, light, dust etc.)	No expected change to baseline as riparian corridor will remain.	Indirect	>Local,<Regional	Short-term (<5 years)	Frequently	Unlikely (20-40% chance)	Totally		Low	Low
18	Construction	Presence of the road	Shag Species	High	Operation- Birds (native)	Loss in connectivity due to permanent habitat loss, light and noise effects from the road, leading to fragmentation of terrestrial, wetland and riparian habitat due to the presence of the infrastructure	No expected change to baseline as riparian corridor will remain.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Low
19	Operation	Presence of the road	Shag Species	High	Operation- Birds (native)	Disturbance and displacement of (new and existing) nests and individuals due to lighting and noise/vibration	No expected change to baseline as riparian corridor will remain.	Indirect	>Local,<Regional	Permanent (>25 years)		Unlikely (20-40% chance)	Irreversible		Low	Low

VOLUME 4

South Frequent Transit Network Assessment of Operational Noise Effects

October 2023

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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
AC-14	Asphaltic concrete (low-noise road surface)
AEE	Assessment of Effects on the Environment report
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan: Operative in Part
A-weighting	A set of frequency-dependent sound level adjustments that are used to better represent how humans hear sounds. Humans are less sensitive to low and very high frequency sounds. Sound levels using an “A” frequency weighting are expressed as dB L _A . Alternative ways of expressing A-weighted decibels are dBA or dB(A).
BPO	Best Practicable Option as defined in Section 2 of the Resource Management Act 1991
dB	Decibel. The unit of sound level.
FTN	Frequent Transit Network
L_{A90}	The A-weighted sound level exceeded for 90 % of the measurement period, measured in dB. Commonly referred to as the background noise level.
L_{Aeq}	The equivalent continuous A-weighted sound level. Commonly referred to as the average sound level and is measured in dB.
L_{Aeq(24h)}	The L _{Aeq} sound level averaged over a 24-hour period from midnight to midnight.
L_{Amax}	The A-weighted maximum sound level. The highest sound level which occurs during the measurement period. Usually measured with a fast time-weighting i.e. LAFmax
MDRS	Medium Density Residential Standards
N/A	Not Applicable
NIWA	National Institute of Water and Atmospheric Research
Noise	A subjective term used to describe sound that is unwanted by, or distracting to, the receiver.
NPS	National Policy Statement
NPS:UD	National Policy Statement on Urban Development

Acronym/Term	Description
NoR	Notice of Requirement
NZ	New Zealand
NZS 6801	New Zealand Standard NZS 6801:2008 Acoustics – Measurement of environmental sound
NZS 6802	New Zealand Standard NZS 6802:2008 Acoustics - Environmental Noise
NZS 6806	New Zealand Standard NZS 6806:2010 Acoustics - Road-traffic noise - New and altered roads
PA10	Open graded porous asphalt
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).
RMA	Resource Management Act 1991
SH1	State Highway 1
South FTN	South Frequent Transit Network
Te Tupu Ngātahi	Te Tupu Ngātahi Supporting Growth
THAB	Terraced House and Apartment Building zone
Waka Kotahi	Waka Kotahi New Zealand Transport Agency

Executive Summary

This report assesses the project wide traffic noise effects from the four proposed Notices of Requirement (**NoRs/the Project**) sought to enable the South Frequent Transit Network (**FTN**) against relevant standards and guidelines. Where necessary, we have investigated and recommended mitigation for each of the four NoRs.

Road traffic noise for altered roads has been assessed against NZS 6806 and other relevant guidance, including the Auckland Unitary Plan (Operative in Part) (**AUP:OP**). In addition, we have assessed the change in noise level due to the Project.

Active mode transport, i.e. walking and cycling, does not generate noise levels high enough to affect the ambient noise environment, particularly where the facilities are adjacent to busy roads, and has therefore not been assessed in this report.

The Project will result in a redistribution of traffic across the wider area. This has been taken into consideration when assessing the individual NoRs.

NoR 1 – Great South Road FTN Upgrade

NoR 1-A-B

NoR 1-A-B includes the length of road proposed to be designated along Great South Road between Browns Road and Halsey Road.

The Project section does not meet the definition of an Altered Road under NZS 6806 as the noise levels due to the Project do not change to a noticeable degree. Therefore, mitigation does not need to be considered further under the Standard. 246 Protected Premises and Facilities (**PPFs**) are predicted to achieve noise levels in Category A under the Do Minimum scenario, and 15 PPFs are predicted to fall into Categories B and C.

When considering noise contributions from other roads in the vicinity of NoR 1-A-B, noise levels are predicted to remain similar at the vast majority of PPFs when comparing the Do-nothing and Do Minimum scenarios.

NoR 1-C

NoR 1-C includes the length of Great South Road proposed to be designated near its intersection with Mahia Road.

The Project section does not meet the definition of an Altered Road under NZS 6806 as the noise levels due to the Project do not change to a noticeable degree. Therefore, mitigation does not need to be considered further under the Standard. In the Do Minimum scenario, 36 PPFs are predicted to fall in Category A and three PPFs are predicted to fall in Category B.

When considering noise contributions from other roads in the vicinity of NoR 1-C, noise levels are predicted to remain similar at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

NoR 1-D

NoR 1-D includes the intersection of Great South Road with Taka Street and Walter Strevens Drive.

The Project section does not meet the definition of an Altered Road under NZS 6806 as the noise levels due to the Project not changing it to a noticeable degree. Therefore, mitigation does not need to be considered further under the Standard. 51 PPFs are predicted to fall in Category A and only one PPF is predicted to fall in Category B under the Do Minimum scenario.

When considering noise contributions from other roads in the vicinity of NoR 1-D, noise levels are predicted to remain similar at all PPFs when comparing the Do-nothing and Do Minimum scenarios..

NoR 1-E

NoR 1-E includes the intersection of Great South Road with Coles Crescent, Subway Road and O'Shannessey Street.

The Project section does not meet the definition of an Altered Road under NZS 6806, as the noise levels due to the Project do not change to a noticeable degree. Therefore, mitigation does not need to be considered further under the Standard. All PPFs are predicted to fall in Category A under the Do Minimum scenario.

When considering noise contributions from other roads in the vicinity of NoR 1-E, noise levels are predicted to remain similar at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

NoR 1-F

NoR 1-F includes the intersection of Great South Road with Wellington Street.

The Project section does not meet the definition of an Altered Road under NZS 6806 as the noise levels due to the Project do not change to a noticeable degree. Therefore, mitigation does not need to be considered further under the Standard. All PPFs are predicted to fall in Category A under the Do Minimum scenario.

When considering noise contributions from other roads in the vicinity of NoR 1-F, noise levels are predicted to remain similar at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

NoR 1-G

NoR 1-G includes the intersection of Great South Road with Settlement Road, Beach Road, Liverpool Street and Butterworth Avenue.

The Project section does not meet the definition of an Altered Road under NZS 6806 as the noise levels due to the Project do not change to a noticeable degree. Therefore, mitigation does not need to be considered further under the Standard. Under the Do Minimum scenario, all 87 PPFs are predicted to achieve noise levels within Category A.

When considering noise contributions from other roads in the vicinity of NoR 1-F, noise levels are predicted to remain similar at the vast majority of PPFs when comparing the Do-nothing and Do Minimum scenarios.

NoR 1-H

NoR 1-H includes the intersection of Great South Road with Park Estate Road.

The Project section does not meet the definition of an Altered Road under NZS 6806 as the noise levels due to the Project do not change to a noticeable degree. Therefore, mitigation does not need to

be considered further under the Standard. The majority of PPFs are predicted to fall in Category A under the Do Minimum scenario.

When considering noise contributions from other roads in the vicinity of NoR 1-H, noise levels are predicted to remain similar or reduce at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

NoR 1 – Bridge

NoR 1-Bridge includes the section of the bridge along Great South Road over Slippery Creek.

The PPFs in NoR 1-Bridge have been assessed against the Altered Roads criteria in accordance with NZS 6806. The Project section does not meet the definition of an Altered Road under NZS 6806 as the noise levels due to the Project do not change to a noticeable degree. Therefore, mitigation does not need to be considered further under the Standard. All PPFs are predicted to fall in Category A under the Do Minimum scenario.

When considering noise contributions from other roads in the vicinity of NoR 1-Bridge, noise levels are predicted to remain similar at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

NoR 2 – Great South Road Upgrade (Drury Section)

NoR 2 includes the section of Great South Road between Waihoehoe Road and the SH1 Drury Interchange.

The Project section does not meet the definition of an Altered Road under NZS 6806 as the noise levels due to the Project do not change to a noticeable degree. Therefore, mitigation does not need to be considered further under the Standard. All PPFs are predicted to fall in Category A under the Do Minimum scenario.

When considering noise contributions from other roads in the vicinity of NoR 2, noise levels are predicted to remain similar or reduce at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

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

NoR 3 traverses along Weymouth and Alfriston Roads generally between Selwyn Road and Alfriston Park, and the section of Great South Road between Alfriston Road and Myers Road.

The PPFs near NoR 3 have been assessed against the Altered Roads criteria in accordance with NZS 6806. The NoR meets the definition of an Altered Road under NZS 6806.

39 PPFs will fall in Category B and two PPFs in Category C in 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 the barrier, and an asphalt low-noise road surface has already been implemented near the Category B and C PPFs in the Do Minimum scenario.

Noise barriers at Category B and C PPFs will be re-assessed at the time of detailed design to determine if they represent the Best Practicable Option (**BPO**). For any PPFs predicted to receive noise levels in Category C once the BPO mitigation has been determined, we recommend that building modification is investigated at the implementation of the Project.

When considering noise contributions from other roads in the vicinity of NoR 3, noise levels at the vast majority of PPFs are generally expected to remain similar between the Do-nothing and Do Minimum scenarios with a negligible change in noise level of 2 dB or less.

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

NoR 4 traverses along Porchester Road generally between Alfriston Road and Walters Road and along Popes Road generally between Takanini School Road and Porchester Road.

The PPFs near NoR 4 have been assessed against the Altered Roads criteria in accordance with NZS 6806. The Project meets the definition of an Altered Road under NZS 6806.

After the application of a low-noise surface and implementation of effective noise barriers in the Mitigation Option 2 scenario which assumes AC-14 (asphaltic concrete low-noise road surface) where required and noise barriers implemented where they would be effective, 38 PPFs will be in Category B and eight PPFs in Category C. Noise barriers at these Category B and C PPFs would not provide the reduction required by the Standard due to the gaps required for driveways which significantly reduce the performance of the barrier.

Noise barriers at Category B and C PPFs will be re-assessed at the time of detailed design to determine if they represent the BPO. For any PPFs predicted to receive noise levels in Category C once the BPO mitigation has been determined, we recommend that building modification is investigated at the implementation of the Project. Mitigation Option 2 is the recommended mitigation option for the Altered Roads within NoR 4; however this is subject to future BPO assessment.

When considering noise contributions from other roads in the vicinity of NoR 4, noise levels are predicted to remain similar or reduce at almost all PPFs when comparing the Do-nothing and Mitigation Option 2 scenarios.

1 Introduction

1.1 Purpose and scope of this report

This report has been prepared to inform the Assessment of Effects on the Environment (**AEE**) for Notices of Requirement (**NoR**) being sought by Auckland Transport (**AT**) for the South Frequent Transit Network (**FTN**) under the Resource Management Act 1991 (**RMA**). 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 report as the **Project**.

Specifically, this report considers the actual and potential effects associated with the construction and operation of the Project on the existing and likely future environment as it relates to operational noise effects and recommends measures that may be implemented to avoid, remedy and/or mitigate these effects.

This report should be read alongside the AEE, which contains further details on the history and context of the Project. The AEE also contains a detailed description of works to be authorised within the NoR, and the typical construction methodologies that will be used to implement this work. These have been reviewed by the author of this report and have been considered as part of this assessment of operational noise effects. As such, they are not repeated here. Where a description of an activity is necessary to understand the potential effects, it has been included in this report for clarity.

1.2 Report Structure

In order to provide a clear assessment of the NoRs, this report follows as appropriate, the structure set out in the AEE. This report contains an assessment of the actual and potential effects for each of the Project as a whole (the four NoRs). Where appropriate, measures to avoid, remedy or mitigate effects are recommended. The sections of this report are arranged accordingly. Table 1-1 below provides an overview of the report structure and where the description of effects can be found in this report.

The report follows a nested structure where each of the four NoRs are assessed. Note that each of the NoR 1 sections were assessed individually due to their geographical separation from each other.

Table 1-1: Report Structure

Report Section #	Extent Assessed (Route and/or NoR)
7	NoR 1 – Great South Road FTN Upgrade (divided into sub-sections per intersection)
7.1	NoR 1-A-B
7.2	NoR 1-C
7.3	NoR 1-D
7.4	NoR 1-E
7.5	NoR 1-F
7.6	NoR 1-G

Report Section #	Extent Assessed (Route and/or NoR)
7.7	NoR 1-H
7.8	NoR 1-Bridge
8	NoR 2 – Great South Road (Drury section)
9	NoR 3 – Takaanini FTN – Weymouth Road, Alfriston Road and Great South Road Upgrades
10	NoR 4 – Takaanini FTN – Porchester Road / Popes Road

2 Project Description

2.1 Context – South FTN network

As described further in the AEE, the South FTN is one of the transport works packages proposed for South Auckland between Manukau and Drury as part of Te Tupu Ngātahi Supporting Growth (**Te Tupu Ngātahi**).¹ The South FTN is in turn part of a wider planned multi-modal transport network intended to support growth and enable mode shift in South Auckland.

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 FTN² bus services 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
- Urbanisation of adjoining key connections to FTN routes – Popes Road West, 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 2-1.

2.2 The NoRs – proposed spatial extent

Of the full South FTN network extent shown in Figure 2-1, only a portion falls within the NoRs/Project (Figure 2-2). 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.³

Accordingly, this assessment is focussed on the activities proposed to be authorised by the four NoRs. 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 2-1, and the extents are shown in Figure 2-2

Further detail on the proposed activities and works in each NoR are provided in the AEE.

¹ The Programme is a collaboration between Auckland Transport (**AT**) and Waka Kotahi NZ Transport Agency (**Waka Kotahi**) to investigate, plan, and undertake route protection for the strategic transport networks needed to support Auckland's growth over the next 30 years.

² FTN services are defined in AT's Regional Public Transport Plan (RPTP) as bus routes operating at least every 15 minutes between 7am-7pm, 7 days-a-week, often supported by priority measures such as bus or transit lanes.

³ 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.

Table 2-1: South FTN – Summary of NoRs

NoR reference	Project component	Description
NoR 1	Great South Road FTN Upgrade	<ul style="list-style-type: none"> 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 2-2) 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)	<ul style="list-style-type: none"> 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 Road, Alfriston Road and Great South Road Upgrades	<ul style="list-style-type: none"> 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 and Popes Road Upgrades	<ul style="list-style-type: none"> 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.

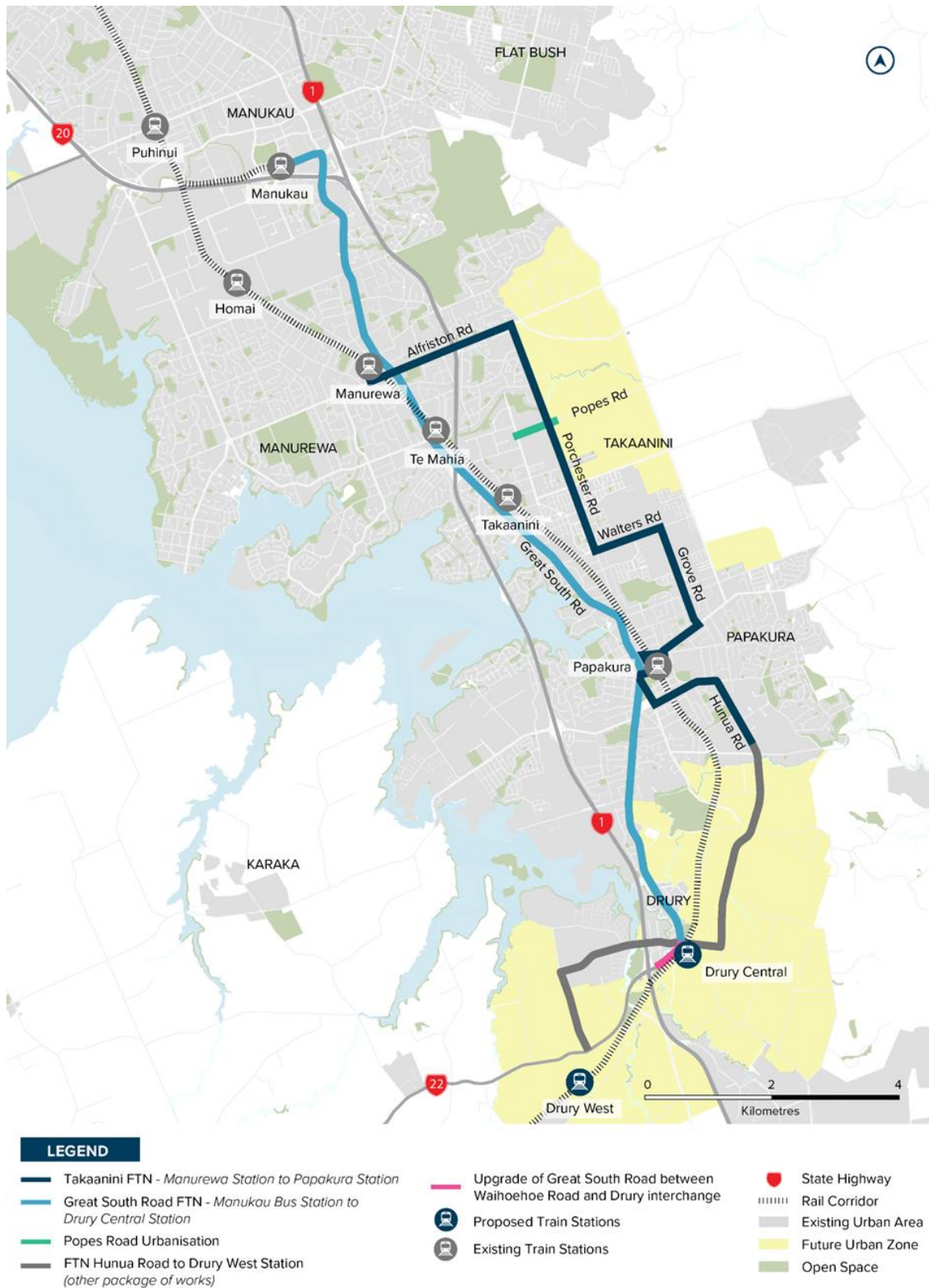


Figure 2-1: South FTN – full network



Figure 2-2: South FTN – NoR extents (the Project) including NoR 1 intersection references

3 Assessment methodology and parameters

New designations are sought for the four NoR areas. Whilst this report considers noise effects from traffic both within and outside the proposed designation boundaries, appropriate mitigation measures have only been determined for effects arising from activities within the boundary of each NoR (i.e., within the scope of the NoRs).

3.1 Operational Noise

3.1.1 Guidelines and Standards reviewed

We reviewed the following guidelines and standards for the assessment of traffic and operational noise:

- AUP:OP, specifically rule E25.6.33 relating to transport noise and referencing NZ 6806;
- NZS 6806:2010 Acoustics – Road-traffic Noise – New and altered roads; and
- Waka Kotahi’s “Guide to assessing road-traffic noise using NZS 6806 for state highway asset improvement projects” (**Guide**), V1.1, August 2016.

We recommend applying the requirements of NZS 6806.

We recommend that the additional information provided in the Guide is applied to this Project. The Guide describes how NZS 6806 should be implemented. While it describes some Waka Kotahi specific processes, such as the use of a Waka Kotahi internal matrix of project discipline feedback when determining the BPO for noise mitigation, the methodology and process set out in the Guide is considered best practice and should be applied to all Projects that involve new or altered roads. Overall, the Guide provides background on how to implement NZS 6806 and is therefore a useful complementary document to the Standard.

3.1.2 Road traffic noise

Road traffic noise is assessed in accordance with NZS 6806. This Standard is also required by the AUP:OP rule E25.6.33.

We consider the intent of NZS 6806 is to provide a pragmatic approach to the use of noise mitigation. This approach includes the requirement that a roading project needs to have a noticeable noise effect before mitigation is considered, and that any mitigation needs to achieve a noticeable reduction in noise level.

NZS 6806 applies to traffic noise assessments where a project falls within its thresholds. The Standard and its thresholds are briefly explained below.

- **Assessment Positions** are described as “Protected Premises and Facilities” (**PPFs**). 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.

– Note that:

- 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 the future developers, we have provided noise level predictions over vacant land also.
- Businesses are not PPFs as they are not considered noise sensitive and are often noise generators in their own right. This includes any potential future businesses that may be established through a Structure Plan.
- **Assessment Extent** is 100m from the edge of the new carriageway for urban areas and 200m for rural areas, in accordance with NZS6806. Urban areas are defined by Statistics NZ and are independent from the underlying zoning. Different parts of the Project are in Urban and Rural areas as indicated in Figure 3-1, with the light green indicating the Rural area and the light orange indicating Urban areas. The majority of the NoRs are located in the Urban area, with a 100m assessment area. Part of NoR 2 falls within the Rural area, and a small section of NoR 4 falls within the Rural area; these sections have a 200m assessment area.



Figure 3-1: Urban/Rural classification by Statistics NZ

- **Assessment Areas** are areas which combine PPFs that would benefit from the same mitigation (e.g. barrier). For these Projects, given the potential long implementation period, we have prepared an overview of proposed mitigation for each of the NoRs rather than dividing the areas further.
- **Design Year** is a year 10 to 20 years after opening of the Project. Since there are a number of NoRs assessed, without a defined implementation year, we chose the scenario for the latest traffic data available. The traffic data assumes that the area is developed to its fullest potential. The design year for this scenario is 2048+.
- **Noise Criteria Categories** are set out in the Standard for ‘new’ and ‘altered’ roads. This Project includes only altered roads. The Noise Criteria Categories for Altered Roads are set out in Table 3-1 below.

Table 3-1: Traffic noise criteria categories

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)

The applicable category at any PPF depends on the BPO test, by progressively applying the noise criteria categories to determine which can practicably be achieved. NZS6806 is clear that preference is to be given to structural mitigation over building modification mitigation. NZS6806 also requires that the lowest external noise level is achieved with practicable structural mitigation, before considering building modification to mitigate residual internal noise levels.

- **Assessment Scenarios** are the various operational scenarios that we assess and compare. The Standard includes the following scenarios:
 - Existing noise environment: consists of the current road layout and traffic volume (for the Project we were provided traffic data from 2016 from the traffic modelling team at Te Tupu Ngātahi). (Note that a significant change in traffic volume is required to affect a noticeable change in traffic noise – refer Section 3.1.3);
 - Future Do-nothing scenario: This scenario only applies to altered roads. It consists of the existing roads for the existing noise environment, with traffic volume at the design year 2048. This scenario assumes that the full development of all surrounding areas has occurred, and traffic volumes have increased because of that development, but that traffic can only use the existing roads;
 - Future Do-minimum scenario: consists of all proposed transport corridors (the NoRs) at the design year 2048, without any specific noise mitigation. This scenario means that the only barriers included are solid safety barriers, which are required for reasons other than noise mitigation. Where a low noise road surface such as AC-14 (asphaltic concrete low-noise road surface) is proposed as the “base” road surface (e.g. as is the case for NoR 1-A-B along Great South Road), this is also included in the Do-minimum scenario. Other roads that are not proposed to be altered by the Project (e.g. those crossing or connecting with the Project) are not included in the assessment; and

- **Future Project with mitigation:** consists of the proposed Project transport corridors at the design year 2048, and includes mitigation that is designed specifically to reduce noise levels.
- **Altered Roads:** In order for a Project to qualify as an Altered Road, a vertical or horizontal realignment of an existing road is required, and the noise level change due to the implementation of the Project (i.e. comparing the Do-nothing and Do-minimum scenarios) must be more than 3 dB for noise levels above 64 dB $L_{Aeq(24h)}$ and more than 1 dB for noise levels above 68 dB $L_{Aeq(24h)}$ at any PPF.
For Altered roads, the noise predictions for the NZS 6806 assessment did not include the surrounding road network for the Do-minimum scenario, as Section 6.2.2 of NZS 6806 states that mitigation is only required for road traffic noise generated from the New or Altered road.
- **Mitigation Requirements** are set out in the Standard based on the BPO. Mitigation is split into structural (road surface, barriers, bunds) and building modification mitigation (improvement of building façades and ventilation, after the implementation of any structural mitigation, generally only considered for PPFs receiving noise levels within Category C). Any mitigation should achieve a noticeable noise level reduction of an average of 3 decibels within each assessment area or 5 dB for standalone PPFs.

3.1.3 Subjective perception of noise level changes

The subjective impression of changes in noise can generally be correlated with the numerical change in noise level. While every person reacts differently to noise level changes, research shows a general correlation between noise level changes and subjective responses.⁴ Table 3-2 shows indicative subjective responses to explain the noise level changes discussed in this report.

The perception of these noise level changes generally applies to immediate changes in noise level, as would be the case for a new road. However, people may subjectively have an annoyance reaction to a greater or lesser degree, depending on their perception of the Project.

Table 3-2: Noise level change compared with general subjective perception

Noise level change	General subjective perception ⁵
1–2 decibels	Insignificant/imperceptible change
3–4 decibels	Just perceptible change
5–8 decibels	Appreciable to clearly noticeable change
9–11 decibels	Halving/doubling of loudness
>11 decibels	More than halving/doubling of loudness

Noise is measured on a logarithmic scale, meaning that a doubling in traffic volume (e.g. from 10,000 vehicles per day (vpd) to 20,000 vpd) results in a noise level increase of 3 decibels, a just-perceptible

⁴ For instance, LTNZ Research Report No. 292: Road traffic noise: determining the influence of New Zealand Road surfaces on noise levels and community annoyance, Table 18.

⁵ Based on research by Zwicker & Scharf (1965); and Stevens (1957, 1972).

change. A tenfold increase in traffic volume (e.g. from 10,000 to 100,000 vpd) would result in a noise level increase of 10 decibels, which would sound twice as loud.

While for the assessment in accordance with NZS 6806 only the Project roads are included, when discussing the effect on people, in relation to the change in noise level, the surrounding road network was included in the noise predictions. This provides a more realistic representation of the level of effects, particularly for a suite of Projects that are proposed for a similar geographic region which influence each other and the wider environment.

3.2 Operational Vibration

Traffic vibration from new or upgraded roading projects is not generally expected to create issues. A key factor with new roads is the uniformity of the basecourse/pavement and the absence of near surface services. This is due to new or upgraded roads being designed to be smooth and even and avoiding vibration generated from passing traffic over uneven surfaces. Therefore, traffic vibration effects arising from operation of the Project has not been assessed further.

4 Methodology

We have assessed the road traffic noise effects at PPFs based on:

- The noise criteria categories of NZS 6806; and
- Noise effects (both beneficial and adverse) through determination of noise level changes.

The reason for the two-pronged approach is that in some circumstances, compliance with a Standard does not necessarily mean that the effects of a project would be minor, and vice versa.

Potentially, the effects of a noise level increase can be small (e.g. a noise level increase of less than 3 decibels). At the same time, the resulting noise environment can be very high, particularly adjacent to existing state highways, and cause (potentially further) adverse effects for residential use.

The Project is intended to unlock the development potential of land in some areas and support existing development and transport demands surrounding the transport corridors in other areas. The proposed extensive urban development of land in the vicinity is predicted to result in traffic volumes changing, thus resulting in noise level changes for some areas when comparing current and future 2048 traffic volumes.

The assessment in accordance with NZS 6806 is undertaken for each Project road individually, excluding other roads in the area. The reason is that the only effects that can be mitigated by a project are those of the roads that are directly affected by that project, i.e. excluding other roads that may contribute to the overall noise levels but are not being changed by a project.

On the other hand, the assessment of traffic noise change takes account of all major roads in the vicinity of the Project road. In this instance, the traffic noise levels that may be experienced at PPFs from all traffic in the area is assessed to gain a good understanding of:

- Whether a Project road has an effect on the overall noise level received at individual PPFs; and
- The change in noise level assuming all NoRs have been implemented (refer Section 4.2 below).

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

4.1 Preparation for this report

Work undertaken for this report commenced in December 2022. In summary, the preparation for this report has included:

- Review of information from other experts, namely traffic, construction, design and planning amongst others;
- A site visit of all project areas within the NoRs on 17 July 2023; and
- Ambient noise level surveys in the Project areas (refer to section 5.2).

Where information we relied on was provided by other experts, this is noted in the report.

4.2 Assumptions

Assessment of operational noise and vibration effects is based on information provided by other experts, specifically the team's traffic specialists.

Since we have assessed four NoRs, without a defined implementation year, we chose a scenario where all NoRs are likely to be implemented, and the area is developed to its fullest potential. The design year for this scenario is 2048.

The assessment of the Do-nothing scenario (refer Section 3.1.2) is that the surrounding environment is fully developed, but without any changes to the transport corridors. We understand from the traffic specialists that a sensitivity factor is included in these traffic volumes that does not allow for impractically high traffic volumes on existing roads. The assumption is that peak traffic would occur for more hours of the day.

We have assumed that all existing buildings inside the designation areas will be removed or will not represent a PPF (e.g. buildings may be repurposed to contain non-noise sensitive uses). We have therefore not assessed these buildings as PPFs (refer Table 4-1). Should they be retained and be used for any uses identifying them as a PPF, they will need to be assessed and mitigation will need to be determined where necessary, during detailed design.

Table 4-1: Buildings inside designation (not assessed)

NoR	Address
1	322, 1/324, 330 Great South Road, Ōpaheke 1/70, 1-2/68 Great South Road, Manurewa 135 Great South Road, Drury 9, 64, 72 Great South Road, Manurewa
2	1, 1/1 Firth Street 280, 280A, 280B Great South Road, Drury
3	1/110, 1/19, 1/32, 1/77, 1/79, 1/81, 1/84, 11A, 125, 127, 141, 141A, 1-8/17, 2/77, 2/81, 23/110, 30A, 36A, 38, 40, 42, 50, 52B, 52C, 54, 59C, 6/15, 60, 7, 7A, 70, 76, 86, 90, 92 Alfriston Road 44 Claude Road 1/236A, 1/241, 1/243, 1/249, 1/251, 1-2/247, 207-209, 228, 231, 237, 253, 255, 257 Great South Road, Manurewa 25 Index Place 1/4, 1B, 1C, 2/4, 2A, 2B Scotts Road 1 Shifnal Drive 2, 4, 6, 10, 12, 1-3/11, 15, 16, 18 Weymouth Road
4	1-7 Whakarato Way

4.3 Assessment basis

The assessment considers the proposed transport infrastructure in two categories:

- **Altered roads:** Altered roads are proposed for all the NoRs and have been assessed against NZS6806 and in relation to the change in noise levels.
- **Walking and Cycling:** All four NoRs allow for some form of active mode transport, i.e. walking and cycling. Walking and cycling facilities do not cause any significant noise levels that would be consistently noticeable adjacent to the integrated major transport corridors that they are located at. Therefore, no specific operational noise assessment of walking and cycling facilities was undertaken.

4.4 Computer noise modelling

The propagation of transport noise is affected by multiple factors, amongst them:

- Terrain elevations, including shielding from intervening terrain and exposure due to elevation;
- Ground condition, including absorptive ground such as meadows or hard reflective ground;
- Atmospheric conditions, including wind or temperature inversions; and
- Road parameters, including road surface, traffic speed, vehicle types and gradient.

Because of the multiple factors and their interaction, computer noise modelling is a vital tool in predicting traffic noise impacts in the vicinity of major roads and for the determination of mitigation measures. Modelling enables a comprehensive and overall picture of noise impacts to be produced, taking into consideration all factors potentially affecting noise propagation.

We used the software SoundPLAN, which is an internationally recognised computer noise modelling programme. SoundPLAN uses a three-dimensional digital topographical terrain map of the area as its base. In addition, we entered data into the model for existing buildings, proposed earthworks edges and ground absorption within the assessment area. We digitised road traffic noise sources, with road lanes located on the terrain file, for the existing/Do-nothing scenarios and the Do-minimum scenario.

The SoundPLAN model implements the calculation algorithms of the “Calculation of Road Traffic Noise” methodology which is referenced in NZS 6806 in Section 5.3.2 of the standard.

The calculation algorithms take account of the factors set out above, including relevant atmospheric and ground conditions within appropriate parameters.

For road noise, we have used the adjustments for New Zealand road conditions, specifically road surface types, as set out in the Waka Kotahi “Guide to state highway road surface noise”, V1.0, January 2014, Table 2.1. Therefore, modelling results can be compared with the relevant criteria without further adjustment.

4.4.1 Model verification

The accuracy of the computer model needs to be verified. We used the measurement results set out in Section 5.2 to verify that the computer model operates within satisfactory tolerances (refer Table 4-2).

Table 4-2: Computer noise model verification

Measurement position	Location	Measured Level	Predicted Level	Difference	Comment
		dB L _{Aeq} (24h)	dB L _{Aeq} (24h)	decibels	
MP1	NoR 1	66	65	+1	Within acceptable range.
MP2	NoR 3	67	65	+2	Within acceptable range.
MP3	NoR 4	72	65	+7	Higher noise level measured than predicted. Potentially due to noise from foliage near the monitoring location, a worn road surface near the measurement location, and also from cars travelling at a higher speed than the 60 km/h posted speed limit used in the noise model.

A comparison of the measured and predicted levels shows that there is generally good agreement between measured and predicted levels at two out of the three locations, with a difference of no more than 2 decibels, for those positions where traffic on existing roads is the controlling noise source. This accuracy fulfils the requirements of NZS 6806 which states in Section 5.3.4.2: “*The difference between measured and predicted levels should not exceed ± 2 dB.*”

The larger discrepancy at the measurement location near Porchester Road was likely due to noise from foliage, and cars travelling faster than the 60 km/h posted speed limit along Porchester Road.

4.4.2 Individual receiver noise levels

We have assessed noise effects at all PPFs. We have included predicted noise levels for all PPFs, for all scenarios, in the tables in Appendix A. The locations of these dwellings are shown in the maps in Appendix B.

Noise criteria categories for the PPFs are shown as a graphic representation by colouring the buildings with a colour scale, showing NZS 6806 Category A buildings in green, Category B buildings in orange and Category C buildings in red. Any buildings not shown in these three colours on the figures are outside the assessment area, or are not PPFs, e.g. garages, sheds or business premises.

4.4.3 Noise contour plans

Noise contour plans are a useful tool to obtain a graphical overview of a project area including currently vacant land that may be developed in the future. The contours are calculated in SoundPLAN by interpolating a large number of individual points. Therefore, noise contour maps should not be used to “read” noise levels for specific locations. For individual noise levels for each PPF, the receiver noise levels in the tables in Appendix A should be used.

Noise contour plans are contained in maps in Appendix B. These plans show interpolated noise level bands at 5 decibel intervals from 55 dB to 70 dB L_{Aeq}(24h).

4.5 Assessment of operational vibration

As noted in Section 3.2, vibration from well-constructed and maintained roads is not an issue that causes adverse effects. As such vibration effects are not anticipated and we have therefore not assessed road traffic vibration further.

5 Existing and future environment

5.1 Planning and land use context

The existing and anticipated future environment is further discussed in the accompanying AEE. In summary, the implementation timeframe for the Project has yet to be confirmed but is likely to be in approximately 10-15 years' time subject to funding availability. The assessment considers the effects of the Project at both the existing environment (as it exists today) and the likely future (planned) environment which consider potential urban development and intensification sought under Plan Change 78 (**PC78**).

The Project will be constructed and will operate in the existing urban environment or planned environment (i.e. what can be built under the existing AUP:OP live zones):

- a) **Existing environment:** The corridors are situated primarily within existing urban areas with live zoning including residential, commercial, and open space zones. There is some Future Urban Zone land in the wider area to the northeast/east. The existing activities within the area are generally reflective of the existing underlying zoning; and
- b) **Planned environment:** The planned environment is anticipated to remain urban and comprised of similar activities as the existing environment. The density of residential development is however anticipated to change and increase in future. In particular, this includes in the residential zones around Te Mahia and Takaanini stations, in line with the implementation of the National Policy Statement on Urban Development (**NPS:UD**) in the AUP:OP. The remaining residential areas will experience an uplift of density through the implementation of the Medium Density Residential Standards (**MDRS**) through the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021. PC78 (notified at the time of assessment) seeks to give effect to the NPS:UD and incorporate the MDRS into residential zoning. It is noted that there are some areas of existing residential zoned land (particularly east of the NIMT) that have recently been intensified (i.e., new builds), as such are unlikely to change in the near future.

The likelihood and magnitude of land use change regarding the land use planning context has been identified in Table 5-1 below. This has been used to inform the assumptions made on the likely future environment.

Table 5-1: South FTN – existing and future environment

Existing environment	Current AUP:OP Zoning	Likelihood of Change for the environment ⁶	Magnitude of potential change	Likely Receiving Environment ⁷
Residential ⁸	Residential (Mixed Housing Suburban)	Low - Moderate ⁹	Low - Moderate	Residential
	Residential (Mixed Housing Urban)	Low - Moderate ¹⁰	Low - Moderate	Residential
	Residential (Mixed Housing Suburban and Urban) around train stations	Moderate	Moderate - High	Residential and Commercial/Retail ¹¹
Business	Business (Heavy Industry)	Low	Low	Business (Industrial)
	Business (Light Industry)	Low	Low	Business (Industrial)
	Business (Neighbourhood Centre)	Low	Low	Business (Neighbourhood Centre)
	Business (Town Centre)	Low	Low	Business (Town Centre)
Open Space	Informal Recreation	Low	Low	Informal Recreation
	Community	Low	Low	Community
Greenfield areas	Future Urban	Low - Moderate	High	Urban

5.2 Existing Environment – Noise

The existing noise environments for all NoRs are controlled by traffic on existing major roads (either close by or distant) and natural sounds.

We undertook short and long duration noise level surveys in the vicinity of the Project in August and September 2023. The location of the surveys is shown in **Error! Reference source not found.**

5.2.1 Noise Monitoring Procedure

Noise survey equipment, meteorological conditions, data analysis and results are described below. The noise monitoring was undertaken in general accordance with the relevant requirements of NZS 6801, 6802 and 6806. This meant the results could adequately inform both the operational and construction noise assessments.

Measurements were undertaken at the following locations:

- 21 Great South Road, Manurewa (one hour duration);

⁶ Based on AUP:OP zoning/policy direction.

⁷ Based on AUP:OP zoning/policy direction.

⁸ Based on the NPS:UD and MDRS, these residential areas are likely to experience increased density.

⁹ There are areas of existing Residential Zone land that has recently been intensified (i.e. new build developments), as such is unlikely to change in the near future.

¹⁰ There are areas of existing Residential Zone land that has recently been intensified (i.e. new build developments), as such is unlikely to change in the near future.

¹¹ Note that much of the commercial operations between Manuia Road and Taka Street occur on residentially zoned land.

- 26 Alfriston Road (one hour duration); and
- Opposite 438 Porchester Road (one-week duration).

The measurement positions were chosen to avoid extraneous factors which could have influenced the sound levels, where practicable. Measurement and calibration details required by NZS 6801 are held on file.

5.2.2 Meteorological conditions

During the surveys, meteorological data was obtained from Auckland, Mangere Ews 2 (43711) weather station operated by NIWA. This is the closest station where data was available at an hourly resolution or less.

The meteorological data from this weather station was used to identify periods when conditions were likely to have been outside the meteorological restrictions given in NZS 6801, and therefore data measured during these periods has been excluded from the noise analysis.

5.2.3 Data Analysis

Road traffic was the dominant noise source at all measurement locations. There is a natural variation in the noise environment throughout the day, and often variations for the weekends. The $L_{Aeq(24h)}$ and L_{A90} was calculated for each day where there was sufficient data after unsatisfactory meteorological conditions and abnormal events were excluded. The average $L_{Aeq(24h)}$ and L_{A90} for the unattended measurement are shown in Table 5-2. It should be noted that measurement positions MP1 and MP2 were attended 1-hour measurements, while MP3 was an unattended measurement taken over a seven-day duration.



Figure 5-1: Noise survey locations

Table 5-2: Noise survey results

Measurement Position	Location	NoR	Ambient noise level	Background noise level
			dB LAeq(24h)	dB LA90
MP1	21 Great South Road, Manurewa	NoR 3	66	59
MP2	26 Alfriston Road, Manurewa East	NoR 1	67	60
MP3	Opposite 438 Porchester Road, Randwick Park	NoR 4	72	60

6 Measures available to avoid, remedy or mitigate effects

Traffic on the roads will generate noise that may require mitigation. The below noise mitigation measures have been applied to the NoRs as required and are described in more detail for each NoR in the following sections.

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

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

NZS6806 states:

The noise criteria are intended to address the adverse effects of road-traffic noise on people. Land-use planning is the preferred method of avoiding these effects. Where this is impracticable, the Standard sets out procedures and methods of the prediction, measurement and assessment, and guidelines for mitigation of road-traffic noise in accordance with the duty to adopt the best practicable option.¹²

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

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

Where future developments are not yet implemented, the road controlling authorities and developers have a shared responsibility to implement reasonable and appropriate mitigation. This is normally achieved:

- by the road controlling authority through the use of low noise road surface materials in suburban and urban areas; and
- by the developers through appropriate placement, orientation and design of noise sensitive activities to achieve reasonable internal and, as far as practicable, external noise levels.

¹² NZS6806, Section 1.1.1.

7 NoR 1 – Great South Road FTN Upgrade

As outlined in the Project description (see Section 2), NoR 1 comprises a range of interventions providing for the Great South Road FTN route along Great South Road between Manukau and Drury. These include eight intersection upgrades, and the replacement of the Otūwairoa / Slippery Creek bridge. The wider corridor will provide for either three or four lanes in the midblock including bus lanes in one or both directions, and active mode facilities.

Due to their proximity, NoR 1-A and NoR 1-B have been considered within the same noise modelling scenario. This modelling scenario is therefore referred to from here as NoR 1-A-B.

Buildings that are within the designation area for this NoR and are assumed will be removed are included in Table 4-1.

7.1 NOR 1-A-B

NoR 1-A-B includes the length of road proposed to be designated along Great South Road between Browns Road and Halsey Road (Figure 7-1). In the Do Minimum scenario, AC-14 has been modelled as the road surface, with chipseal along Grande Vue Road. This is shown in Figure 7-1.



Figure 7-1: NoR 1-A-B – extent and road surface finishes (orange – AC-14, blue – chipseal)

7.1.1 NoR 1-A-B NZS 6806 Assessment

NoR 1-A-B has been assessed against the Altered Road criteria (refer section 3.1.2). NoR 1-A-B falls within an urban area (as defined by Stats NZ), meaning that PPFs within 100m of the road edges were assessed.

In the Existing scenario, almost all PPFs are predicted to receive noise levels within Category A, with 17 PPFs falling in Category B and three PPFs falling in Category C. These categories are defined in Table 3-1.

In the Do-nothing scenario (where the Project does not go ahead but traffic changes over time), traffic volumes are predicted to increase compared to the Existing scenario, resulting in an average 1 decibel noise level increase for most PPFs, and therefore resulting in noise levels at some PPFs in less stringent noise criteria categories.

In the Do Minimum scenario (considering only Project roads without surrounding roads), almost all PPFs fall within Category A, with twelve PPFs in Category B and three PPFs in Category C.

The road does not meet the definition of an Altered Road under NZS 6806, as the noise level increases between the Do-nothing and Do Minimum scenario as set out in Section 3.1.2 are not met. Therefore, the Standard does not apply, and mitigation options do not need to be considered further under the Standard.

A summary of the results of the NZS 6806 assessment is presented in Table 7-1.

Table 7-1: Summary of NZS 6806 assessment – NoR 1-A-B, Altered Roads

Scenario	Number of PPFs		
	NZS 6806 Categories		
	Category A	Category B	Category C
Existing	244	14	3
Do-nothing	243	12	6
Do Minimum	246	12	3

7.1.2 Assessment of noise effects

Noise effects can be described based on the change in noise level with and without the Project by comparing the Do-nothing and Do Minimum scenarios.

Figure 7-2 shows the predicted change in noise level at PPFs when comparing the Do-nothing and Do Minimum scenarios.

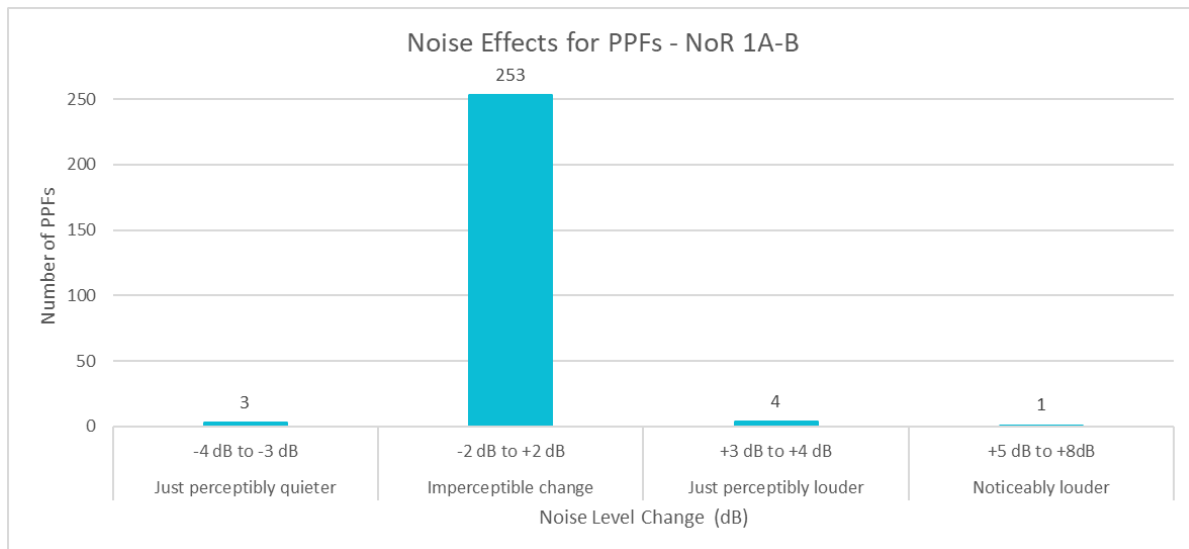


Figure 7-2: Change in noise level – NoR 1-A-B

When comparing the Do-nothing and Do Minimum scenario, noise levels at PPFs are generally expected to remain similar with the majority of PPFs predicted to experience a negligible change in noise level of 2 dB or less. One PPF is predicted to experience an increase in noise level of 5-8 dB resulting in a noticeable increase in noise. Four PPFs are predicted to experience an increase in noise level of 3-4 dB resulting in a just-perceptible increase in noise.

The increases in noise levels at PPFs are primarily due to the demolition of dwellings which would otherwise provide acoustic shielding to PPFs behind in the Do-nothing scenario when compared to the Do Minimum scenario. Nevertheless, all PPFs that are predicted to experience noise level increases will still receive noise levels in Category A.

A reduction of 3-4 dB is predicted at three PPFs resulting in slight positive effects. This is due to changes in the road alignment causing reductions in noise levels at these PPFs.

7.1.3 Summary of effects for NoR 1-A-B

The PPFs in the assessment area for NoR 1-A-B have been assessed against the Altered Roads criteria in accordance with NZS 6806. The Project section does not meet the definition of an Altered Road under NZS 6806, therefore mitigation does not need to be considered further under the Standard. 246 PPFs are predicted to achieve noise levels in Category A under the Do Minimum scenario, and 15 PPFs are predicted to fall into Categories B and C.

When considering noise contributions from other roads in the vicinity of NoR 1-A-B, noise levels are predicted to remain similar at the vast majority of PPFs when comparing the Do-nothing and Do Minimum scenarios.

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.

7.2 NoR 1-C

NoR 1-C includes the length of Great South Road proposed to be designated near its intersection with Mahia Road (Figure 7-3). In the Do Minimum scenario, AC-14 has been modelled as the road surface. This is shown in Figure 7-2.



Figure 7-3: NoR 1-C – extent and road surface finishes (orange – AC-14)

7.2.1 NZS 6806 Assessment

NoR 1-C has been assessed against the Altered Road criteria (refer Section 3.1.2). NoR 1-C falls within an urban area (as defined by Stats NZ), meaning that PPFs within 100m of the road edges were assessed.

In the Existing scenario, almost all PPFs are predicted to receive noise levels within Category A, with two PPFs falling in Category B. These categories are defined in Table 3-1.

In the Do-nothing scenario, the traffic volumes are predicted to increase compared to the Existing scenario, resulting in an average 3 decibel noise level increase for most PPFs, and therefore resulting in four PPFs moving to Category B.

In the Do Minimum scenario (considering only Project roads without surrounding roads), almost all PPFs are predicted to fall within Category A, with three PPFs predicted to remain to Category B.

The road does not meet the definition of an Altered Road under NZS 6806, as the noise level increases between the Do-nothing and Do Minimum scenario as set out in Section 3.1.2 are not met. Therefore, the Standard does not apply, and mitigation options do not need to be considered further under the Standard.

A summary of the results of the NZS 6806 assessment is shown in Table 7-2.

Table 7-2: Summary of NZS 6806 assessment – NoR 1-C, Altered Roads

Scenario	Number of PPFs		
	NZS 6806 Categories		
	Category A	Category B	Category C
Existing	37	2	0
Do-nothing	35	4	0
Do Minimum	36	3	0

7.2.2 Assessment of noise effects

Noise effects can be described based on the change in noise level with and without the Project by comparing the Do-nothing and Do Minimum scenarios. Figure 7-4 shows the predicted change in noise level at PPFs when comparing the Do-nothing and Do Minimum scenarios.

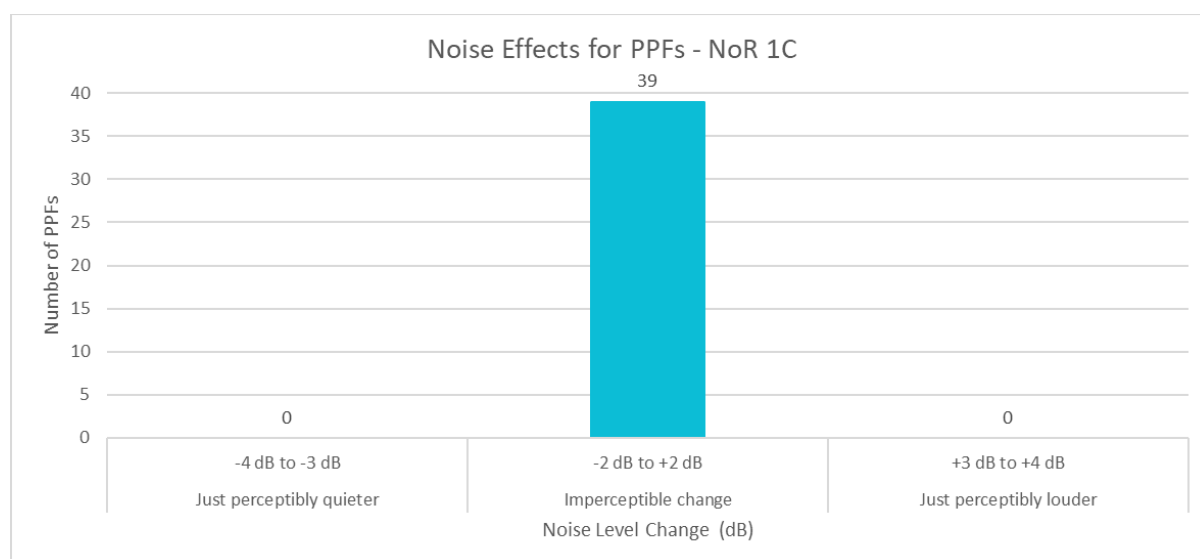


Figure 7-4: Change in noise level – NoR 1-C

When considering noise contributions from other roads in the vicinity of NoR 1-C, noise levels at all PPFs are predicted to change only by an imperceptible margin when comparing the Do-nothing and Do Minimum scenarios.

7.2.3 Summary of effects for NoR 1-C

The PPFs in the assessment area for NoR 1-C have been assessed against the Altered Roads criteria in accordance with NZS 6806. The Project section does not meet the definition of an Altered

Road under NZS 6806, therefore mitigation does not need to be considered further under the Standard. In the Do Minimum scenario, 36 PPFs are predicted to fall in Category A and three PPFs are predicted to fall in Category B.

When considering noise contributions from other roads in the vicinity of NoR 1-C, noise levels are predicted to remain similar at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

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.

7.3 NoR 1-D

NoR 1-D includes the intersection of Great South Road Taka Street and Walter Strevens Drive (Figure 7-5). In the Do Minimum scenario, AC-14 has been modelled as the road surface along Great South Road and Taka Street, with chipseal along Walter Strevens Drive. This is shown in Figure 7-5.



Figure 7-5: NoR 1-D – extent and road surface finishes (orange – AC-14, blue – chipseal)

7.3.1 NZS 6806 Assessment

NoR 1-D has been assessed against the Altered road criteria (refer section 3.1.2). NoR 1-D falls within an urban area (as defined by Stats NZ), meaning that PPFs within 100m of the road edges were assessed. Note that some PPFs may not exist anymore at the time of construction of the Project.

In the Existing scenario, almost all PPFs receive noise levels within Category A, with one PPF falling in Category B. These categories are defined in Table 3-1.

In the Do-nothing scenario, noise levels are predicted to change across most PPFs due to a redistribution in traffic in the local area compared to the Existing scenario. This is predicted to result in one Category B PPF moving to Category A between the Existing and Do Nothing scenarios.

In the Do Minimum scenario (considering only Project roads without surrounding roads), almost all PPFs fall within Category A, and one PPF is predicted to move to Category B.

The road does not meet the definition of an Altered Road under NZS 6806, as the noise level increases between the Do-nothing and Do Minimum scenario as set out in section 3.1.2 are not met. Therefore, the Standard does not apply, and mitigation options do not need to be considered further under the Standard.

A summary of the results of the noise predictions is presented in Table 7-3.

Table 7-3: Summary of NZS 6806 assessment – NoR 1-D, Altered Roads

Scenario	Number of PPFs		
	NZS 6806 Categories		
	Category A	Category B	Category C
Existing	51	1	0
Do-nothing	52	0	0
Do Minimum	51	1	0

7.3.2 Assessment of noise effects

Noise effects can be described based on the change in noise level with and without the Project by comparing the Do-nothing and Do Minimum scenario (while including noise from surrounding roads).

Figure 7-6 shows the distribution of noise level changes when comparing the Do-nothing and Do Minimum scenarios.

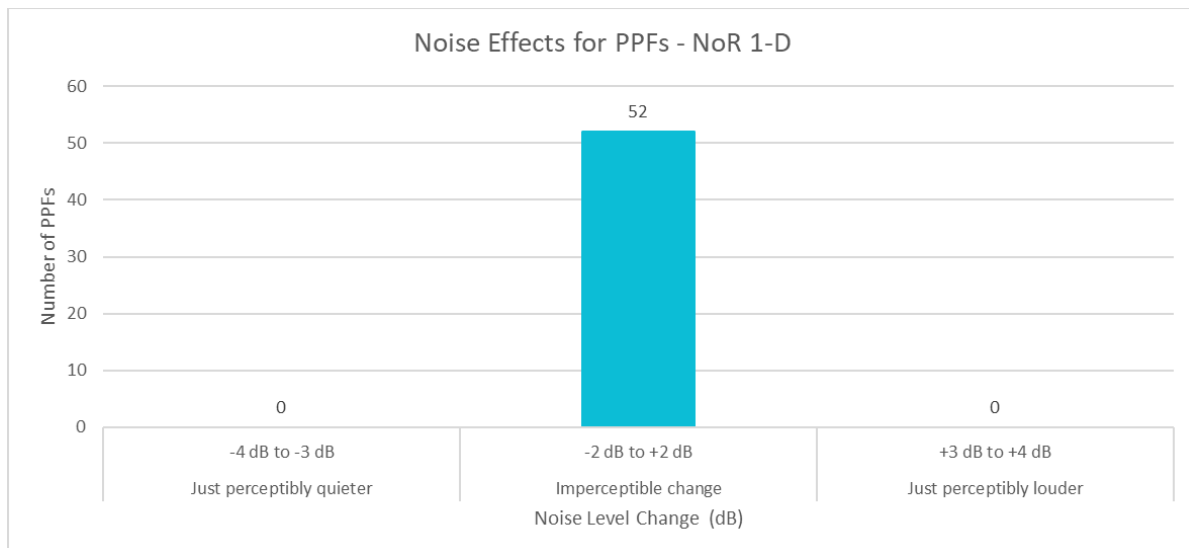


Figure 7-6: Change in noise level – NoR 1-D

When considering noise contributions from other roads in the vicinity of NoR 1-D, noise levels at all PPFs are predicted to change only by an imperceptible margin when comparing the Do-nothing and Do Minimum scenarios.

7.3.3 Summary of effects for NoR 1-D

The PPFs near NoR 1-D have been assessed against the Altered Roads criteria in accordance with NZS 6806. The Project section does not meet the definition of an Altered Road under NZS 6806, therefore mitigation does not need to be considered further under the Standard. 51 PPFs are predicted to fall in Category A and only one PPF is predicted to fall in Category B under the Do Minimum scenario.

When considering noise contributions from other roads in the vicinity of NoR 1-D, noise levels are predicted to remain similar at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

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.

7.4 NOR 1-E

NoR 1-E includes the intersection of Great South Road with Coles Crescent, Subway Road and O'Shannessey Street (Figure 7-7). In the Do Minimum scenario, AC-14 has been modelled as the road surface. This is shown in Figure 7-7.



Figure 7-7: NOR 1-E – extent and road surface finishes (orange – AC-14)

7.4.1 NZS 6806 Assessment

NoR 1-E has been assessed against the Altered road criteria (refer section 3.1.2). NoR 1-E falls within an urban area (as defined by Stats NZ), meaning that PPFs within 100m of the road edges were assessed.

In the Existing scenario, all PPFs are predicted to receive noise levels within Category A. These categories are defined in Table 3-1.

In the Do-nothing scenario, traffic volumes are predicted to increase slightly compared to the Existing scenario, resulting in an average 1 decibel noise level increase for most PPFs. However, no noise criteria Category changes are predicted at any PPFs.

In the Do Minimum scenario (considering only Project roads without surrounding roads), all PPFs are still predicted to fall within Category A.

The road does not meet the definition of an Altered Road under NZS 6806, as the noise level increases between the Do-nothing and Do Minimum scenario as set out in section 3.1.2 are not met. Therefore, the Standard does not apply, and mitigation options do not need to be considered further under the Standard.

A summary of the results of the noise predictions is presented in Table 7-4.

Table 7-4: Summary of NZS 6806 assessment – NoR 1-E, Altered Roads

Scenario	Number of PPFs		
	NZS 6806 Categories		
	Category A	Category B	Category C
Existing	18	0	0
Do-nothing	18	0	0
Do Minimum	18	0	0

7.4.2 Assessment of noise effects

Noise effects can be described based on the change in noise level with and without the Project by comparing the Do-nothing and Do Minimum scenarios.

Figure 7-8 shows the distribution of noise level changes when comparing the Do-nothing and Do Minimum scenarios.

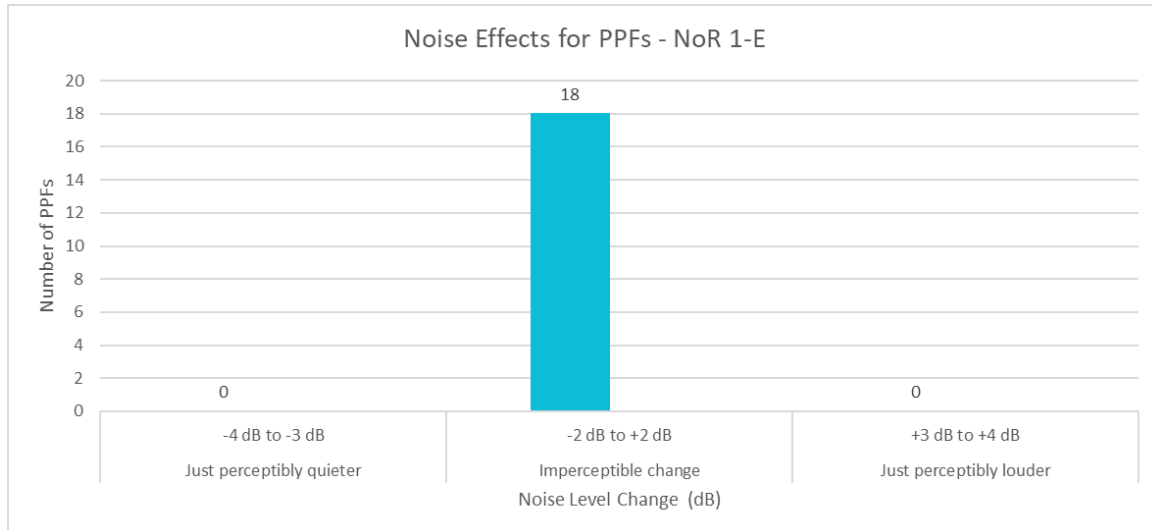


Figure 7-8: Change in noise level – NoR 1-E

When considering noise contributions from other roads in the vicinity of NoR 1-E, noise levels at all PPFs are predicted to change only by an imperceptible margin when comparing the Do-nothing and Do Minimum scenarios.

7.4.3 Summary of effects for NoR 1-E

The PPFs near NoR 1-E have been assessed against the Altered Roads criteria in accordance with NZS 6806. The Project section does not meet the definition of an Altered Road under NZS 6806, therefore mitigation does not need to be considered further under the Standard. All PPFs are predicted to fall in Category A under the Do Minimum scenario.

When considering noise contributions from other roads in the vicinity of NoR 1-E, noise levels are predicted to remain similar at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

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.

7.5 NoR 1-F

NoR 1-F includes the intersection of Great South Road with Wellington Street (Figure 7-9). In the Do Minimum scenario, AC-14 has been modelled as the road surface along Great South Road, with chipseal along Opaheke Road and Wellington Street. This is shown in Figure 7-5.



Figure 7-9: NOR 1-F – extent and road surface finishes (orange – AC-14, blue – chipseal)

7.5.1 NZS 6806 Assessment

NoR 1-F has been assessed against the Altered Road criteria (refer Section 3.1.2). NoR 1-F falls within an urban area (as defined by Stats NZ), meaning that PPFs within 100m of the road edges were assessed.

In the Existing scenario, all PPFs are predicted to receive noise levels within Category A. These categories are defined in Table 3-1.

In the Do-nothing scenario, the traffic volumes are predicted to increase slightly compared to the Existing scenario, resulting in an average 1 dB noise level increase for most PPFs. However, no noise criteria Category changes are predicted at any PPFs.

In the Do Minimum scenario (considering only Project roads without surrounding roads), all PPFs are predicted to fall within Category A.

The road does not meet the definition of an Altered Road under NZS 6806, as the noise level increases between the Do-nothing and Do Minimum scenario as set out in section 3.1.2 are not met. Therefore, the Standard does not apply, and mitigation options do not need to be considered further under the Standard.

A summary of the results of the noise predictions is presented in Table 7-5.

Table 7-5: Summary of NZS 6806 assessment – NoR 1-F, Altered Roads

Scenario	Number of PPFs		
	NZS 6806 Categories		
	Category A	Category B	Category C
Existing	29	0	0
Do-nothing	29	0	0
Do Minimum	29	0	0

7.5.2 Assessment of noise effects

Noise effects can be described based on the change in noise level with and without the Project by comparing the Do-nothing and Do Minimum scenarios.

Figure 7-10 shows the distribution of noise level changes when comparing the Do-nothing and Do Minimum scenarios.

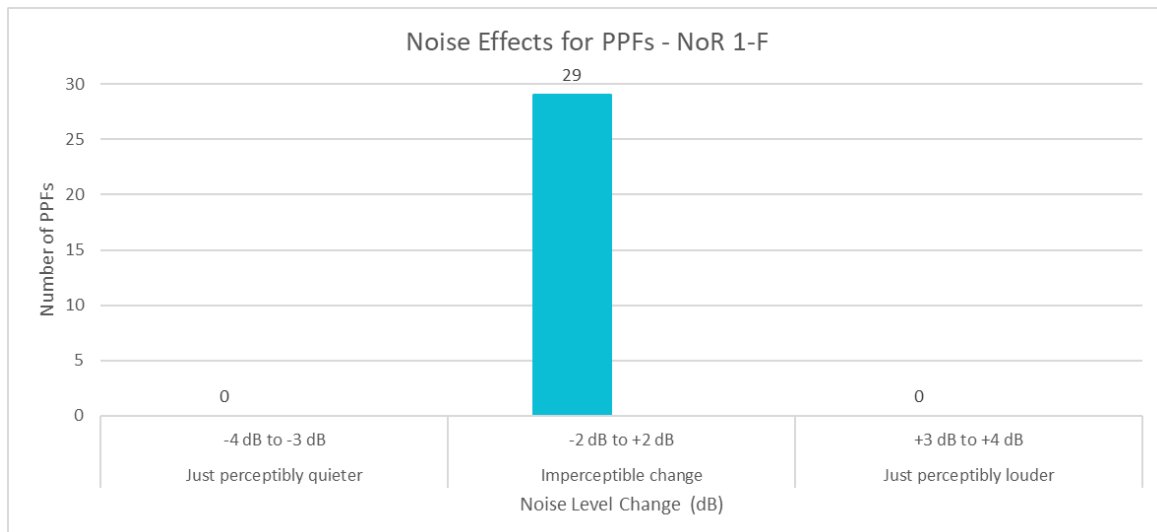


Figure 7-10: Change in noise level – NoR 1-F

When considering noise contributions from other roads in the vicinity of NoR 1-F, noise levels at all PPFs are predicted to change only by an imperceptible margin between the Do-nothing and Do Minimum scenarios.

7.5.3 Summary of effects for NoR 1-F

The PPFs near NoR 1-F have been assessed against the Altered Roads criteria in accordance with NZS 6806. The Project section does not meet the definition of an Altered Road under NZS 6806, therefore mitigation does not need to be considered further under the Standard. All PPFs are predicted to fall in Category A under the Do Minimum scenario.

When considering noise contributions from other roads in the vicinity of NoR 1-F, noise levels are predicted to remain similar at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

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.

7.6 NoR 1-G

NoR 1-G includes the intersection of Great South Road with Settlement Road, Beach Road and Liverpool Street. In the Do Minimum scenario, AC-14 has been modelled as the road surface along all roads, as shown in Figure 7-11.



Figure 7-11: NoR 1-G – extent and road surface finishes (orange – AC-14)

7.6.1 NZS 6806 Assessment

In the Existing scenario, all PPFs are predicted to receive noise levels within Category A. These categories are defined in Table 3-1.

In the Do-nothing scenario, the traffic volumes are predicted to increase slightly compared to the Existing scenario. However, no noise criteria Category changes are predicted at any PPFs.

In the Do Minimum scenario (considering only Project roads without surrounding roads), all PPFs are predicted to fall within Category A.

The road does not meet the definition of an Altered Road under NZS 6806, as the noise level increases between the Do-nothing and Do Minimum scenario as set out in section 3.1.2 are not met. Therefore, the Standard does not apply, and mitigation options do not need to be considered further under the Standard.

A summary of the results of the NZS 6806 assessment is shown in Table 7-6.

Table 7-6: Summary of NZS 6806 assessment – NoR 1-G, Altered Roads

Scenario	Number of PPFs		
	NZS 6806 Categories		
	Category A	Category B	Category C
Existing	91	0	0
Do-nothing	91	0	0
Do Minimum	91	0	0

7.6.2 Assessment of noise effects

The effects associated with a change in noise level have been considered in addition to the NZS 6806 assessment. The Do-nothing scenario and Do Minimum scenario can be compared to determine the predicted noise level increase or decrease at PPFs as a result of the Project. Figure 7-12 shows the predicted change in noise level at PPFs when comparing the Do-nothing and Do Minimum scenarios.

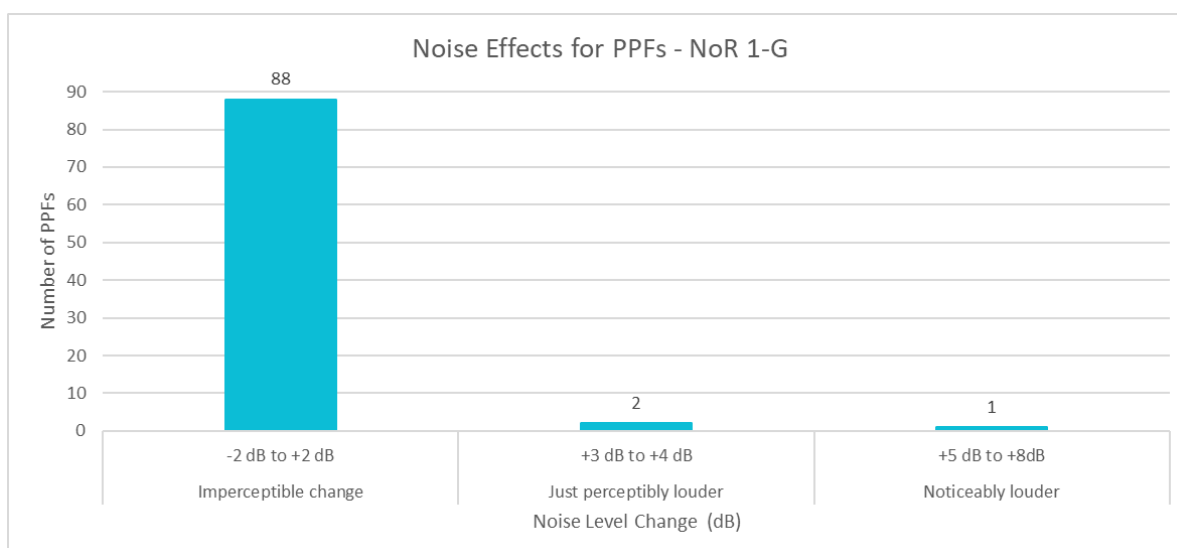


Figure 7-12: Change in noise level – NoR 1-G

When comparing the Do Minimum scenario and the Do-nothing scenario, noise levels at PPFs are generally expected to remain similar with the majority of PPFs predicted to experience a negligible change in noise level of 2 dB or less as shown in Figure 7-12.

Two PPFs are predicted to experience a 3-4 dB increase in noise which would be just perceptibly louder. One PPF is predicted to experience an increase in noise level of 5-8 dB which would be noticeably louder. The increases in noise levels at PPFs are due to the demolition of several dwellings which would otherwise provide acoustic shielding to PPFs behind in the Do-nothing scenario when compared to the Do Minimum scenario, along with predicted increases in traffic volumes. Despite these predicted noise level increases, these PPFs are still predicted to fall within Category A in the Do Minimum scenario.

7.6.3 Summary of effects for NoR 1-G

The PPFs in the assessment area for NoR 1-G have been assessed against the Altered Roads criteria in accordance with NZS 6806. The Project section does not meet the definition of an Altered Road under NZS 6806, therefore mitigation does not need to be considered further under the Standard. Under the Do Minimum scenario, all 87 PPFs are predicted to achieve noise levels within Category A.

When considering noise contributions from other roads in the vicinity of NoR 1-F, noise levels are predicted to remain similar at the vast majority of PPFs when comparing the Do-nothing and Do Minimum scenarios.

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.

7.7 NoR 1-H

NoR 1-H includes the intersection of Great South Road with Park Estate Road (Figure 7-13). In the Do Minimum scenario, AC-14 has been modelled as the road surface along Great South Road, with chipseal along Park Estate Road. This is shown in Figure 7-11.

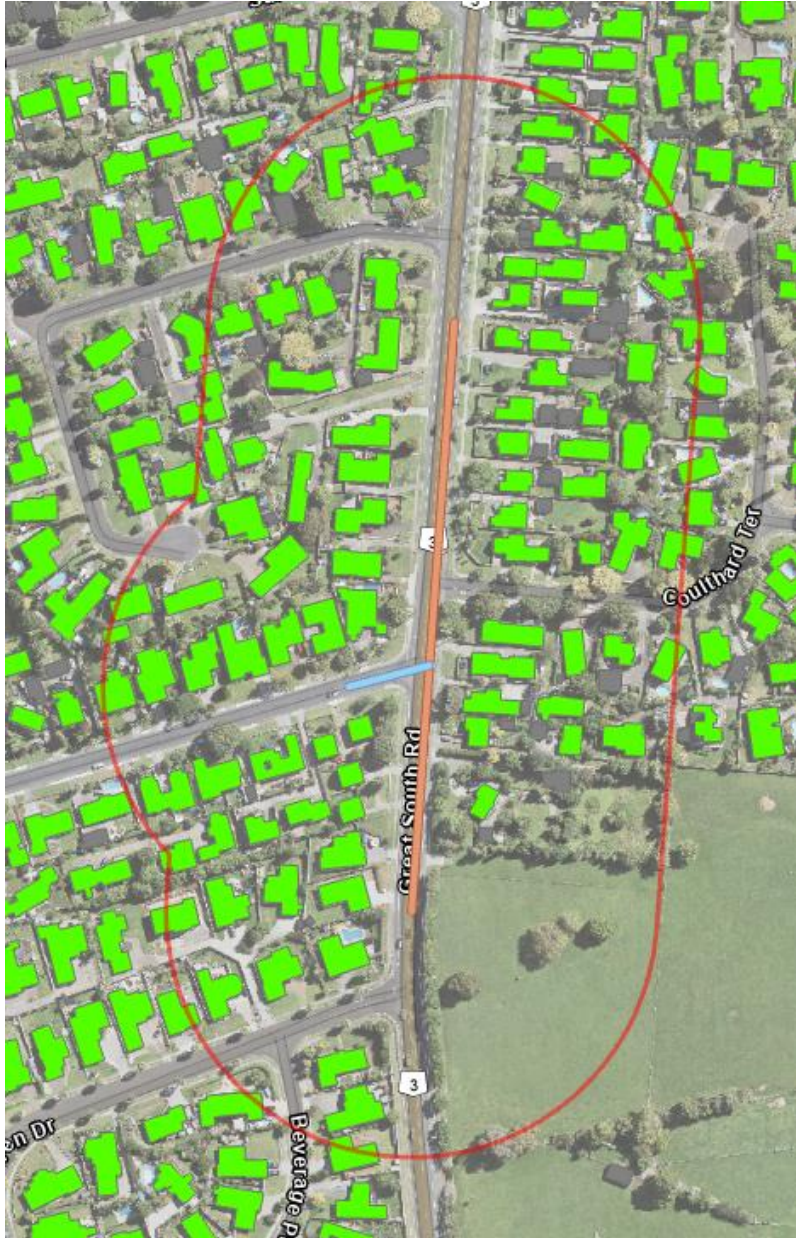


Figure 7-13: NOR 1-H – extent and road surface finishes (orange – AC-14, blue – chipseal)

7.7.1 NZS 6806 Assessment

NoR 1-H has been assessed against the Altered Road criteria (refer Section 3.1.2). NoR 1-H falls within an urban area (as defined by Stats NZ), meaning that PPFs within 100m of the road edges were assessed.

In the Existing scenario, almost all PPFs receive noise levels within Category A, with one PPF predicted to receive noise levels within Category B. These categories are defined in Table 3-1.

In the Do-nothing scenario, traffic volumes are predicted to increase slightly compared to the Existing scenario, resulting in an average 1 decibel noise level increase for most PPFs; therefore resulting in three PPFs moving to Category B.

In the Do Minimum scenario (considering only Project roads without surrounding roads), one more PPF is predicted to move to Category B.

The road does not meet the definition of an Altered Road under NZS 6806, as the noise level increases between the Do-nothing and Do Minimum scenario as set out in Section 3.1.2 are not met. Therefore, the Standard does not apply, and mitigation options do not need to be considered further under the Standard.

A summary of the results of the noise predictions is presented in Table 7-7.

Table 7-7: Summary of NZS 6806 assessment – NoR 1-H, Altered Roads

Scenario	Number of PPFs		
	NZS 6806 Categories		
	Category A	Category B	Category C
Existing	105	1	0
Do-nothing	102	4	0
Do Minimum	101	5	0

7.7.2 Assessment of noise effects

Noise effects can be described based on the change in noise level with and without the Project by comparing the Do-nothing and Do Minimum scenarios.

Figure 7-14 shows the distribution of noise level changes when comparing the Do-nothing and Do Minimum scenarios.

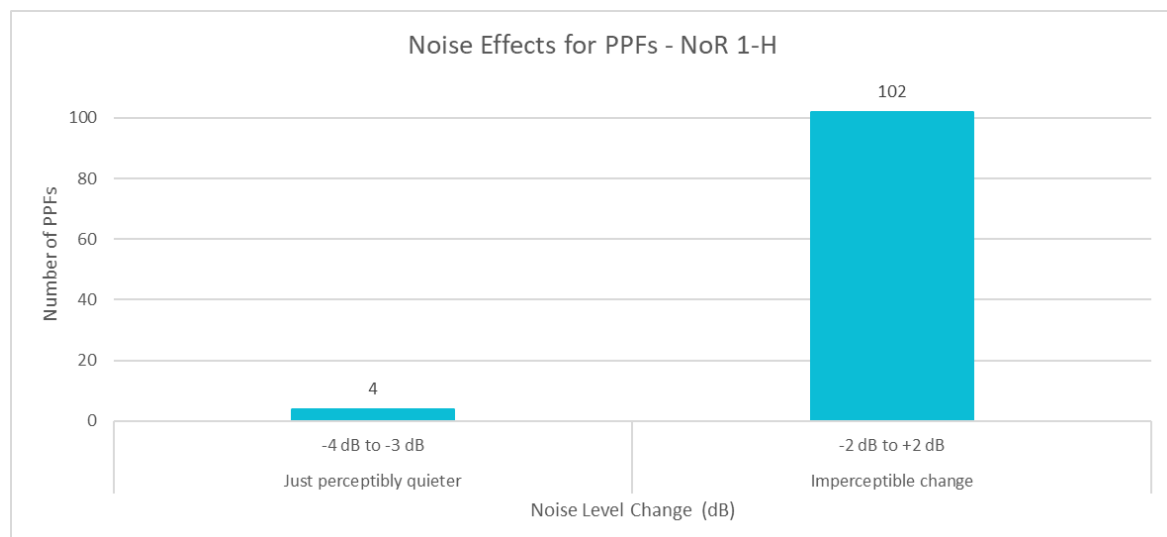


Figure 7-14: Change in noise level – NoR 1-H

When considering noise contributions from other roads in the vicinity of NoR 1-H, noise levels at all PPFs are predicted to either reduce or change only by an imperceptible margin when comparing the Do-nothing and Do Minimum scenarios.

7.7.3 Summary of effects for NoR 1-H

The PPFs near NoR 1-H have been assessed against the Altered Roads criteria in accordance with NZS 6806. The Project section does not meet the definition of an Altered Road under NZS 6806, therefore mitigation does not need to be considered further under the Standard. The majority of PPFs are predicted to fall in Category A under the Do Minimum scenario.

When considering noise contributions from other roads in the vicinity of NoR 1-H, noise levels are predicted to remain similar or reduce at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

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.

7.8 NoR 1-Bridge

NoR 1-Bridge includes the section of the bridge along Great South Road over Slippery Creek. In the Do Minimum scenario, AC-14 has been modelled as the road surface along Great South Road. This is shown in Figure 7-15.



Figure 7-15: NOR 1-Bridge – extent and road surface finishes (orange – AC-14)

7.8.1 NZS 6806 Assessment

NoR 1-Bridge has been assessed against the Altered Road criteria (refer Section 3.1.2). NoR 1-Bridge falls within an urban area (as defined by Stats NZ), meaning that PPFs within 100m of the road edges were assessed.

In the Existing scenario, all PPFs are predicted to receive noise levels within Category A. These categories are defined in Table 3-1.

In the Do-nothing scenario, traffic volumes are predicted to increase compared to the Existing scenario, resulting in an average 1 decibel noise level increase at most PPFs; therefore resulting in one PPF moving to Category B. In the Do Minimum scenario (taking into account only Project roads without adjacent roads), all PPFs are predicted to fall within Category A.

The road does not meet the definition of an Altered Road under NZS 6806, as the noise level increases between the Do-nothing and Do Minimum scenario as set out in section 3.1.2 are not met. Therefore, the Standard does not apply, and mitigation options do not need to be considered further under the Standard.

A summary of the results of the NZS 6806 assessment is shown in Table 7-8.

Table 7-8: Summary of NZS 6806 assessment – NoR 1-Bridge, Altered Roads

Scenario	Number of PPFs		
	NZS 6806 Categories		
	Category A	Category B	Category C
Existing	33	0	0
Do-nothing	32	1	0
Do Minimum	33	0	0

7.8.2 Assessment of noise effects

The effects associated with a change in noise level have been considered in addition to the NZS 6806 assessment. The Do-nothing scenario and Do Minimum scenarios can be compared to determine the predicted noise level increase or decrease at PPFs as a result of the Project.

Figure 8-2 shows the predicted change in noise level at PPFs when comparing the Do-nothing and Do Minimum scenarios.

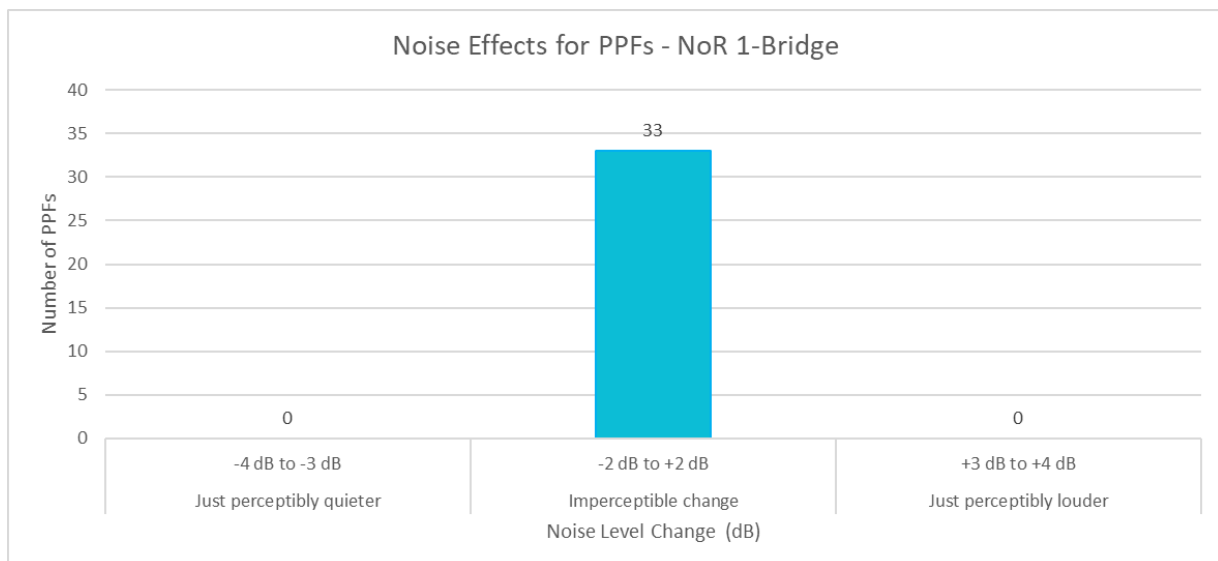


Figure 7-16: Change in noise level – NoR 1-Bridge

When considering noise contributions from other roads in the vicinity of NoR 1-H, noise levels at all PPFs are predicted to change only by an imperceptible margin when comparing the Do-nothing and Do Minimum scenarios.

7.8.3 Summary of effects for NoR 1-Bridge

The PPFs in NoR 1-Bridge have been assessed against the Altered Roads criteria in accordance with NZS 6806. The Project section does not meet the definition of an Altered Road under NZS 6806, therefore mitigation does not need to be considered further under the Standard. All PPFs are predicted to fall in Category A under the Do Minimum scenario.

When considering noise contributions from other roads in the vicinity of NoR 1-Bridge, noise levels are predicted to remain similar at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

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.

8 NoR 2 – Great South Road (Drury section)

As outlined in the Project description (see Section 2), NoR 2 comprises a range of interventions providing for the upgrade of Great South Road in Drury between Waihoehoe Road and the SH1 Drury Interchange. These include road widening to provide four lanes, active mode facilities, and the replacement of the Hingaia Stream bridge. In the Do Minimum scenario, AC-14 has been modelled as the road surface along Great South Road, with chipseal along Firth Street. This is shown in Figure 7-11.

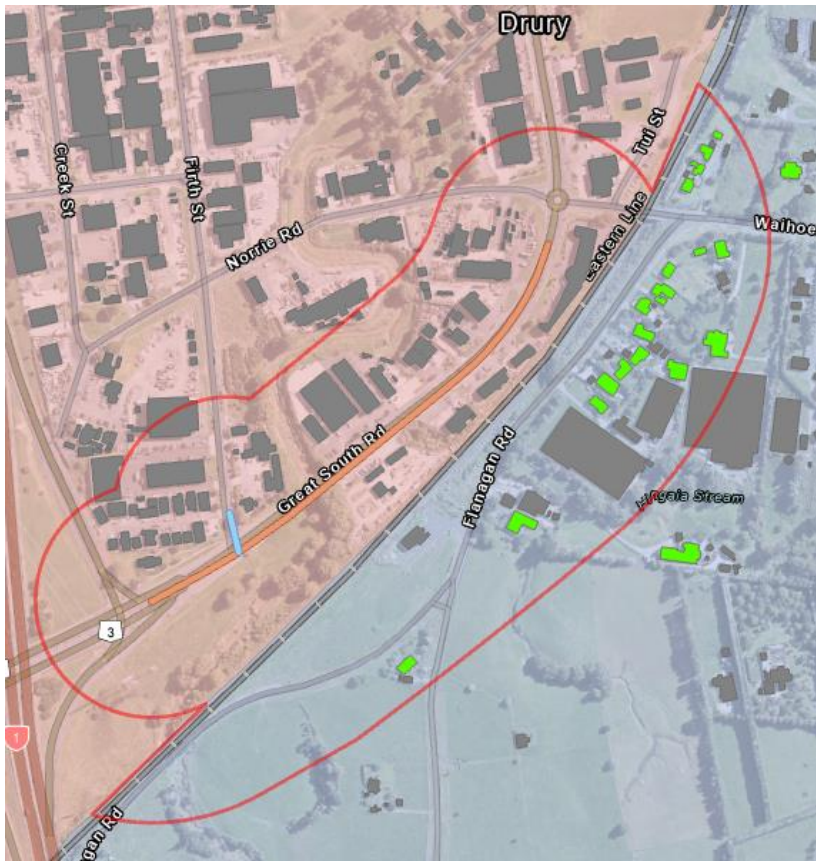


Figure 8-1: Road surface finishes (orange – AC-14, blue – chipseal), and urban (orange) and rural (light blue) areas

Buildings that are within the designation area for this NoR and are assumed will be removed are included in Table 4-1.

8.1 NZS 6806 Assessment

NoR 2 has been assessed against the Altered Road criteria (refer Section 3.1.2). The majority of NoR 2 falls within an urban area (as defined by Stats NZ), meaning that PPFs within 100m of the road edges were assessed for the majority of the alignment. Where NoR 2 fell within the rural area, PPFs within 200m of the road edges were assessed.

In the Existing scenario, all PPFs fall within Category A, due to their distance from the road. These categories are defined in Table 3-1.

In the Do-nothing scenario, the traffic volumes are predicted to increase compared to the Existing scenario, resulting in an average 2 decibel noise level increase for most PPFs; however no changes in noise criteria Categories are predicted at any PPFs.

In the Do Minimum scenario (considering only Project roads without surrounding roads), all PPFs are predicted to fall within Category A.

The road does not meet the definition of an Altered Road under NZS 6806, as the noise level increases between the Do-nothing and Do Minimum scenario as set out in section 3.1.2 are not met. Therefore, the Standard does not apply, and mitigation options do not need to be considered further under the Standard.

A summary of the results of the noise predictions is presented in Table 8-1.

Table 8-1: Summary of NZS 6806 assessment – NoR 2, Altered Roads

Scenario	Number of PPFs		
	NZS 6806 Categories		
	Category A	Category B	Category C
Existing	18	0	0
Do-nothing	18	0	0
Do Minimum	18	0	0

8.2 Assessment of noise effects

Noise effects can be described based on the change in noise level with and without the Project by comparing the Do-nothing and Do Minimum scenarios.

Figure 8-2 shows the distribution of noise level changes when comparing the Do-nothing and Do Minimum scenarios.

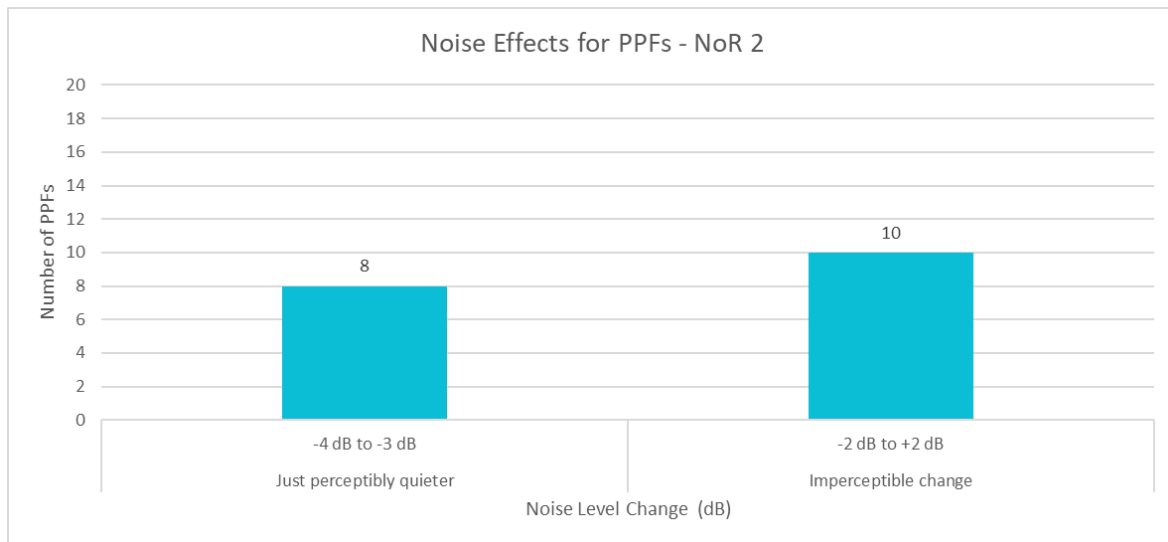


Figure 8-2: Change in noise level – NoR2

When considering noise contributions from other roads in the vicinity of NoR 2, noise levels are predicted to remain similar or reduce at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

8.3 Summary of effects for NoR 2

The PPFs near NoR 2 have been assessed against the Altered Roads criteria in accordance with NZS 6806. This NoR does not meet the definition of an Altered Road under NZS 6806, therefore mitigation does not need to be considered further under the Standard. All PPFs are predicted to fall in Category A under the Do Minimum scenario.

When considering noise contributions from other roads in the vicinity of NoR 2, noise levels are predicted to remain similar or reduce at all PPFs when comparing the Do-nothing and Do Minimum scenarios.

It is noted that some PPFs may no longer exist at the time of road construction, particularly given the proposed zone changes in the area allowing for urban development. Therefore, the predicted effects may not be experienced by current residents, particularly where buildings between the proposed corridor and the PPFs have been demolished.

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

As outlined in the Project description (see Section 2), NoR 3 comprises a range of interventions providing for the Takaanini FTN route along Weymouth and Alfriston Roads generally between Selwyn Road and Alfriston Park; as well as for the Great South Road FTN route between Alfriston Road and Myers Road (Figure 7-9). These interventions include road widening to provide for four lanes (general traffic and bus lanes in both directions), active mode facilities, eight intersection upgrades, stormwater treatment wetlands, and replacements of bridges over the NIMT and SH1. In the Do Minimum scenario, AC-14 has been modelled as the road surface along Great South Road and Alfriston Road, with chipseal along other roads. This is shown in Figure 9-1.

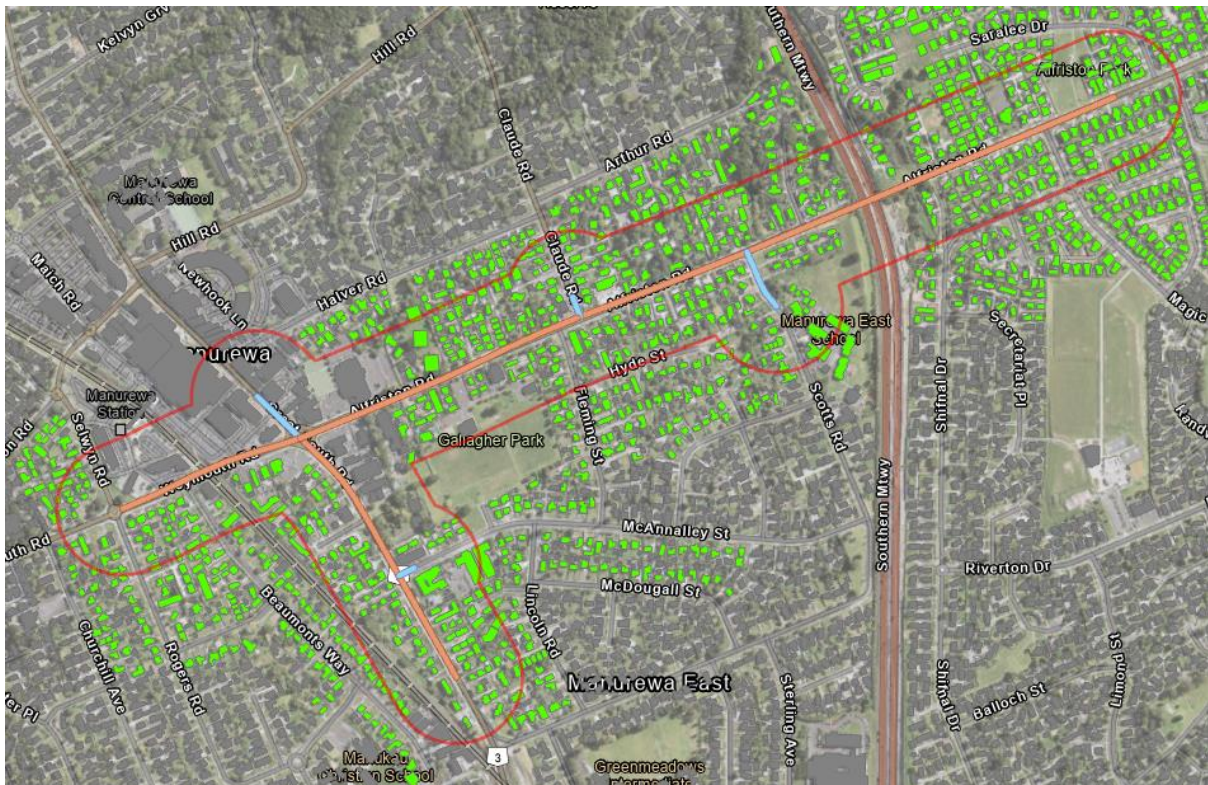


Figure 9-1: NOR 3 – extent and road surface finishes (orange – AC-14, blue – chipseal)

Buildings that are within the designation area for this NoR and are assumed will be removed are included in Table 4-1.

9.1 NZS 6806 Assessment

NoR 3 has been assessed against the Altered Road criteria (refer Section 3.1.2). NoR 3 falls within an urban area (as defined by Stats NZ), meaning that PPFs within 100m of the road edges have been assessed.

In the Existing scenario, the majority of PPFs are predicted to receive noise levels within Category A, with seven PPFs predicted to fall within Category B. These categories are defined in Table 3-1.

In the Do-nothing scenario, traffic volumes are predicted to increase compared to the Existing scenario, resulting in an average 2 decibel noise level increase for most PPFs, and therefore resulting in noise levels in less stringent noise criteria categories at a number of PPFs.

In the Do Minimum scenario (taking into account only Project roads without adjacent roads), 39 PPFs are predicted to fall within Category B and two PPFs are predicted to fall within Category C.

The road meets the definition of an Altered Road under NZS 6806, as the noise level increases between the Do-nothing and Do Minimum scenario as set out in Section 3.1.2 are met.

As a low-noise road surface is already implemented along the length of roads for NoR 3 under the Do Minimum scenario where the Category B and C PPFs are located, noise barriers were considered as a potential mitigation option.

However, noise barriers were not considered to be an appropriate mitigation measure as there is a need to maintain access to houses via driveways, which would mean that line-of-sight would still be retained between the PPF and the road where screening would be required. This means that the minimum 5 dB reduction at individual PPFs as required by NZS 6806 (refer Section 2.1.5) would not be achieved at the PPF façades where barriers would be implemented. Therefore, noise barriers were not considered a suitable mitigation option.

Noise barriers should be re-assessed at the Category B and C PPFs at the time of detailed design to determine if they represent the BPO.

For any PPFs predicted to receive noise levels in Category C once the BPO mitigation has been determined, we recommend that building modification is investigated at the implementation of the Project.

A summary of the results of the NZS 6806 assessment is shown in Table 9.

Table 9-1: Summary of NZS 6806 assessment – NoR 3, Altered Roads

Scenario	Number of PPFs		
	NZS 6806 Categories		
	Category A	Category B	Category C
Existing	473	7	0
Do-nothing	438	37	5
Do Minimum	439	39	2

9.2 Assessment of noise effects

The effects associated with a change in noise level have been considered in addition to the NZS 6806 assessment. The Do-nothing scenario and Do Minimum scenarios can be compared to determine the predicted noise level increase or decrease at PPFs as a result of the Project. Figure 9-2 shows the predicted change in noise level at PPFs when comparing the Do-nothing and Do Minimum scenarios.

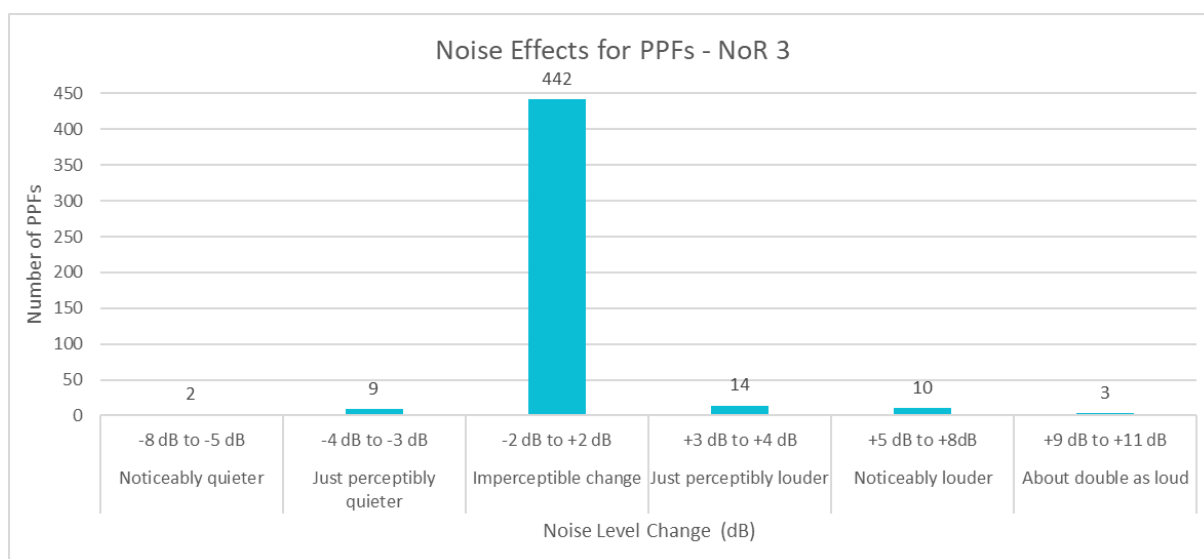


Figure 9-2: Change in noise level – NoR3

When considering noise contributions from other roads in the vicinity of NoR 3, noise levels at the vast majority of PPFs are expected to remain similar between the Do-nothing and Do Minimum scenarios, with a negligible change in noise level of 2 dB or less.

14 PPFs are predicted to experience a 3-4 dB increase in noise which would be just perceptibly louder. Ten PPFs are predicted to experience an increase in noise level of 5-8 dB which would be a noticeable increase in noise. Three PPFs are predicted to experience a noise increase of 9 dB, which would be perceived as approximately a doubling in loudness. The increases in noise levels at PPFs is due to the demolition of several dwellings which would otherwise provide acoustic shielding to PPFs behind. Almost all 14 of these PPFs are predicted to remain in Category A despite the noise level increases, with one PPF predicted to move from Category A to Category B.

11 PPFs are predicted to experience a perceptible decrease in noise levels overall, with nine PPFs experiencing a reduction of 3 to 4 dB resulting in a just-perceptible decrease in noise levels, and two PPFs having reduced noise levels of 5 to 8 dB resulting in a noticeable decrease in noise levels. Predicted reductions in noise levels are due to changes in the road geometry.

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, where buildings between the proposed corridor and the residence have been demolished.

9.3 Summary of effects for NoR 3

The PPFs near NoR 3 have been assessed against the Altered Roads criteria in accordance with NZS 6806. This NoR meets the definition of an Altered Road under NZS 6806.

39 PPFs will be in Category B and two PPFs in Category C in the Do Minimum scenario. Noise barriers at these PPFs are unlikely to provide the reduction required by the Standard due to the gaps required for driveways which would significantly reduce the performance of the barrier. An asphalt low-noise road surface has already been implemented near the Category B and C PPFs in the Do Minimum scenario.

While noise barriers are considered unlikely to be appropriate or effective now, future assessment at the detailed design stage will confirm whether barriers are or are not a practicable mitigation measure for Category B and C PPFs at the time of future implementation, and whether they represent the BPO. For any PPFs predicted to receive noise levels in Category C once the BPO mitigation has been determined, we recommend that building modification is investigated at the implementation of the Project.

When considering noise contributions from other roads in the vicinity of NoR 3, noise levels at the vast majority of PPFs are generally expected to remain similar between the Do-nothing and Do Minimum scenarios with a negligible change in noise level of 2 dB or less.

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.

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

As outlined in the Project description (see Section 2), NoR 4 comprises a range of interventions 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. These interventions provide for the urbanisation of both corridors, with two traffic lanes, widening for active mode facilities, seven intersection upgrades, and stormwater treatment wetlands.

In the Do Minimum scenario, AC-14 has been modelled as the road surface along the majority of roads, with chipseal along Popes Road, Takanini School Road and Walters Road. This is shown in Figure 10-1.

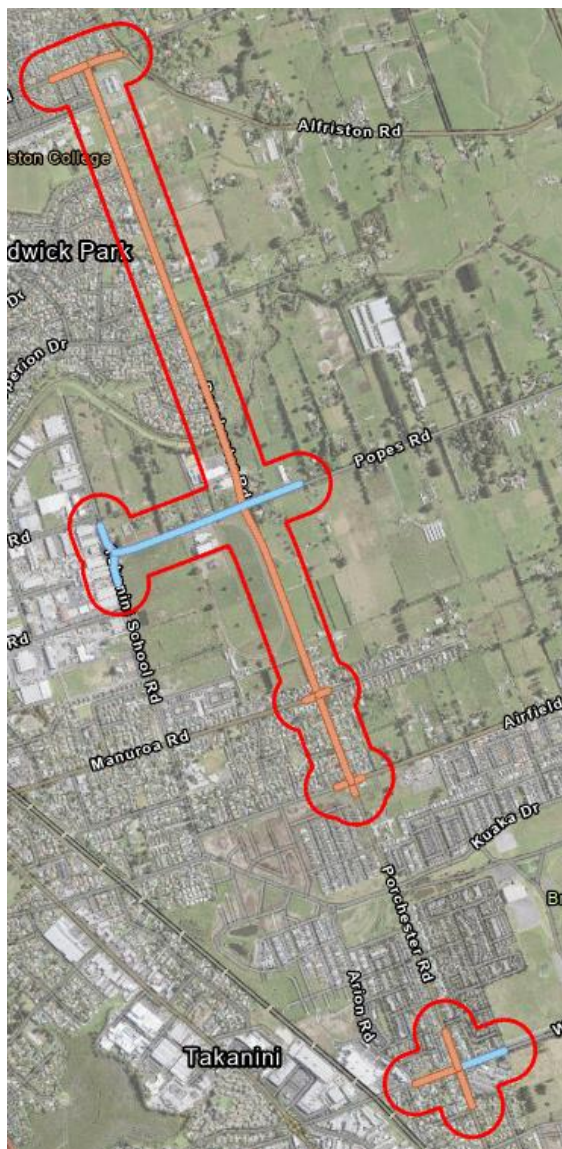


Figure 10-1: NoR 4 – extent and road surface finishes (orange – AC-14, blue – chipseal)

Buildings that are within the designation area for this NoR and are assumed will be removed are included in Table 4-1.

10.1 NZS 6806 Assessment

NoR 4 has been assessed against the Altered road criteria (refer Section 3.1.2). NoR 4 falls within an urban area (as defined by Stats NZ), meaning that PPFs within 100m of the road edges have been assessed.

In the Existing scenario, the majority of PPFs are predicted to receive noise levels within Category A, with 22 PPFs falling in Category B and 6 PPFs falling in Category C. These categories are defined in Table 3-1.

In the Do-nothing scenario, traffic volumes are predicted to increase compared to the Existing scenario, resulting in an average 3 decibel noise level increase for most PPFs, and therefore resulting in noise levels in less stringent noise criteria categories at a number of PPFs.

In the Do Minimum scenario (taking into account only Project roads without adjacent roads), 64 PPFs are predicted to be within Category B and nine PPFs are predicted to be within Category C. The decrease in the number of PPFs in Category B and C compared to the Do-nothing scenario is due to a predicted re-distribution in traffic flows in the local area, along with implementation of an asphalt road surface finish along Porchester Road south of Walters Road.

The road meets the definition of an Altered Road under NZS 6806, as the noise level increases between the Do-nothing and Do Minimum scenario as set out in section 3.1.2 are met.

Two mitigation options have been considered to reduce noise levels at PPFs, noting a the full BPO assessment will be required at detailed design/outline plan stage. The options comprise of low noise road surface and localised barriers.

Mitigation option 1 involves applying AC-14 to the Altered Roads where they are chipseal roads in the Do Minimum scenario, and where there are PPFs in Category B and C under the Do Minimum scenario. This mitigation option results in six PPFs moving to Category A from Category B. However, this mitigation option leaves 58 PPFs in Category B and nine in Category C.

Mitigation option 2 involves applying AC-14 to the same roads as per the first mitigation option, and installing two-metre-high noise barriers at the remaining Category B and C PPFs.

While two-metre-high noise barriers will be effective for some of the PPFs, others would not receive any benefit from a barrier (either at the road or designation boundary). We have considered barriers where they are likely to be effective (i.e. where they will achieve a noticeable noise level reduction, or where they will achieve a noise level reduction for PPFs from Category C into Category A or B).

Modelling indicates that two-metre-high noise barriers would be effective at reducing the number of Category B PPFs by 26 and reducing the number of Category C PPFs by one, when compared to the Do Minimum scenario.

At the remaining Category B and C PPFs, the two-metre-high noise barriers would not provide the reduction required by the Standard due to the gaps required for driveways which would significantly reduce the performance of the barrier.

Where barriers may be practicable for PPFs, these will be assessed at the time of detailed design to determine if they represent the BPO.

For any PPFs predicted to receive noise levels in Category C once the BPO mitigation has been determined, we recommend that building modification is investigated at the implementation of the Project.

Based on this assessment, Mitigation Option 2 is the recommended mitigation option for the Altered Roads within NoR 4.

A summary of the results of the NZS 6806 assessment is shown in Table 10-1.

Table 10-1: Summary of NZS 6806 assessment – NoR 4, Altered Roads

Scenario	Number of PPFs		
	NZS 6806 Categories		
	Category A	Category B	Category C
Existing	606	22	6
Do-nothing	530	74	30
Do Minimum	561	64	9
Mitigation 1	567	58	9
Mitigation 2	588	38	8

10.2 Assessment of noise effects

The effects associated with a change in noise level have been considered in addition to the NZS 6806 assessment. The Do-nothing scenario and Mitigation 2 scenario can be compared to determine the predicted noise level increase or decrease at PPFs as a result of the Project. Figure 10-2 shows the predicted change in noise level at PPFs when comparing the Do-nothing and Mitigation 2 scenarios.

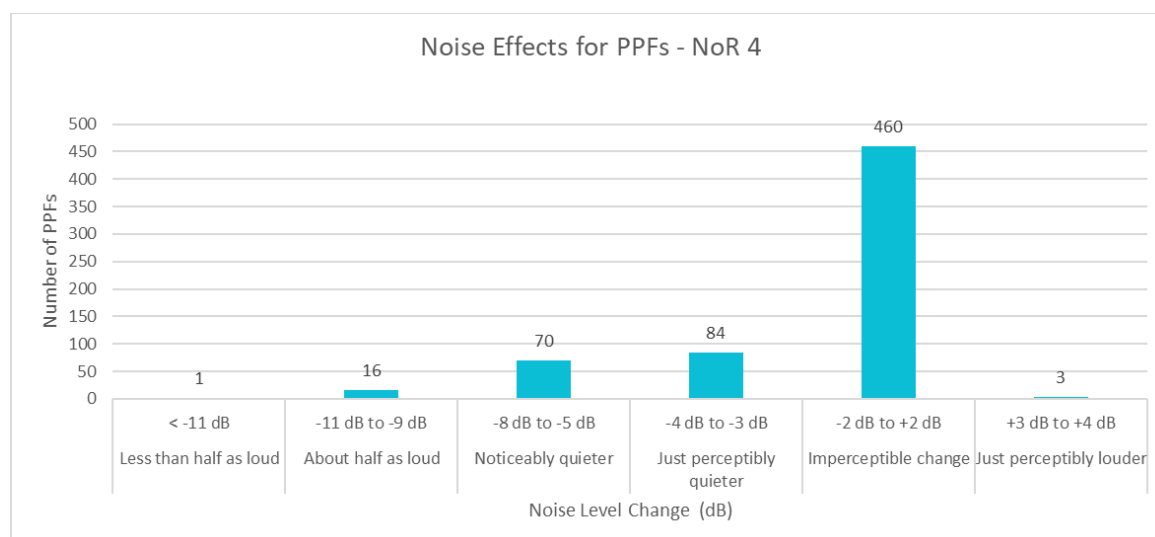


Figure 10-2: Change in noise level – NoR4

When considering noise contributions from other roads in the vicinity of NoR 4, noise levels at almost all PPFs are expected to remain similar or reduce between the Do-nothing and Mitigation 2 scenarios. Only 3 PPFs are predicted to experience a 3-4 dB increase in noise which would be just perceptibly louder, however these PPFs are predicted to move from Category B to Category C.

Noise reductions are predicted at 171 PPFs. The predicted noise reductions are due to a redistribution of traffic flows in the local area, the implementation of asphaltic concrete AC-14 road surface, and noise barriers at some PPFs through the Mitigation 2 scenario.

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, where buildings between the proposed corridor and the residence have been demolished.

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.

10.3 Summary of effects for NoR 4

The PPFs near NoR 4 have been assessed against the Altered Roads criteria in accordance with NZS 6806. The Project meets the definition of an Altered Road under NZS 6806, as the noise level increases between the Do-nothing and Do Minimum scenario as set out in Section 3.1.2 are met.

After the application of a low-noise surface and implementation of effective noise barriers in the Mitigation 2 scenario, 38 PPFs will be in Category B and eight PPFs in Category C. 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 the barrier.

Where barriers may be practicable for existing PPFs, these will be assessed at the time of detailed design to determine if they represent the BPO. For any PPFs predicted to receive noise levels in Category C once the BPO mitigation has been determined, we recommend that building modification is investigated at the implementation of the Project.

When considering noise contributions from other roads in the vicinity of NoR 4, noise levels are predicted to remain similar or reduce at all PPFs when comparing the Do-nothing and Mitigation 2 scenarios.

It is noted that some PPFs may no longer exist at the time of road construction, particularly given the proposed zone changes in the area allowing for urban development. Therefore, the predicted effects may not be experienced by current residents, particularly where buildings between the proposed corridor and PPFs have been demolished.

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.

11 Recommended measures to avoid, remedy or mitigate operational effects – summary for all NoRs

Of all NoRs assessed within the Project, only NoR 3 (Alfriston Road) and NoR 4 (Porchester Road / Popes Road) require mitigation in line with NZS 6806.

For NoR 3, noise barriers were not considered to be a suitable mitigation option, and a low-noise road surface is already proposed in the Do Minimum scenario.

For NoR 4, AC-14 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 reduce noise levels from Categories B or C to Category A or B.

Noise barriers should 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 BPO.

NoR 1 and NoR 2 cause either insufficient effects to require mitigation, or all PPFs receive noise levels within Category A.

12 Conclusion

We have assessed operational traffic noise for all four NoRs proposed to enable the South FTN.

NoR 1 and NoR 2 require no further noise mitigation under NZS 6806 as all PPFs are predicted to receive noise levels in Category A. Mitigation was considered for NoR 3, however a low-noise road surface is already implemented along the length of this NoR and noise barriers were not found to be effective at any Category B or C PPFs. NoR 4 requires some mitigation, which was assessed in the form of roadside barriers or boundary fences. While some noise level reduction is predicted assuming this mitigation, and the vast majority of PPFs are predicted to receive noise levels in Category A, a small number would still receive noise levels within Category B and C (unchanged from a scenario if the Project is not implemented). Where barriers may be practicable for Category B and C PPFs, these will be assessed at the time of detailed design to determine if they represent the BPO. For any PPFs predicted to receive noise levels in Category C once the BPO mitigation has been determined, we recommend that building modification is investigated at the implementation of the Project.

Road traffic vibration is not normally an issue, particularly for newly constructed and well-maintained roads. Therefore, it was not assessed.

Overall, the implementation of the suite of NoRs assessed in this report is predicted to result in no noticeable noise level changes across the majority of PPFs. 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.

1 Appendix A: Noise levels for all PPFs

1.1 NoR 1-A-B

Address	Existing, dB LAeq(24hr)	Do Nothing, dB LAeq(24hr)	Do Minimum, LAeq(24hr)
44A Great South Road, Manurewa	68	69	68
46A Great South Road, Manurewa	68	68	68
1/42 Great South Road, Manurewa	67	68	68
1-16/38 Great South Road, Manurewa	67	68	67
1/55 Great South Road, Manurewa	68	68	67
50 Great South Road, Manurewa	66	67	67
33 Great South Road, Manurewa	64	65	66
43A Great South Road, Manurewa	66	67	66
69A Great South Road, Manurewa	67	68	66
1/52 Great South Road, Manurewa	65	66	66
1/34 Great South Road, Manurewa	65	66	66
1-2/61 Great South Road, Manurewa	67	67	66
1/48 Great South Road, Manurewa	65	66	66
35 Great South Road, Manurewa	65	65	66
1/54 Great South Road, Manurewa	65	65	66
24 Great South Road, Manurewa	65	66	64
74 Great South Road, Manurewa	63	63	64
1-2/45 Great South Road, Manurewa	65	65	64
3/61 Great South Road, Manurewa	66	66	64
6/34 Great South Road, Manurewa	63	64	63
1 Grande Vue Road, Hillpark	61	62	64
82 Great South Road, Manurewa	62	63	63
20 Great South Road, Manurewa	63	63	63
1-2/78A Great South Road, Manurewa	62	63	63
14 Great South Road, Manurewa	62	63	62
66 Great South Road, Manurewa	59	59	62
32 Great South Road, Manurewa	62	62	62
18 Great South Road, Manurewa	62	63	62
1-4/1A Halsey Road, Manurewa	64	64	61
1/53 Great South Road, Manurewa	62	63	61
10 Great South Road, Manurewa	61	61	61
1/49 Great South Road, Manurewa	62	62	61
63 Great South Road, Manurewa	63	64	61
31 Great South Road, Manurewa	60	61	60
3-4/79 Great South Road, Manurewa	61	62	60
51A Great South Road, Manurewa	61	61	60
1/40 Great South Road, Manurewa	59	60	60
25 Great South Road, Manurewa	61	61	60
22 Great South Road, Manurewa	60	61	60

Address	Existing, dB LAeq(24hr)	Do Nothing, dB LAeq(24hr)	Do Minimum, LAeq(24hr)
1-2/79 Great South Road, Manurewa	63	64	60
1/72 Great South Road, Manurewa	55	56	59
67 Great South Road, Manurewa	63	64	60
2/70 Great South Road, Manurewa	50	51	59
23 Great South Road, Manurewa	61	62	59
1-2/47 Great South Road, Manurewa	61	61	59
36A Great South Road, Manurewa	59	59	59
12 Great South Road, Manurewa	58	59	59
1/65 Great South Road, Manurewa	61	62	59
16 Great South Road, Manurewa	59	59	59
29 Great South Road, Manurewa	59	60	58
5-6/79 Great South Road, Manurewa	60	60	58
41 Great South Road, Manurewa	59	59	58
86 Great South Road, Manurewa	57	58	57
2/34 Great South Road, Manurewa	57	58	57
46B Great South Road, Manurewa	56	57	57
57 Great South Road, Manurewa	59	60	57
1/59 Great South Road, Manurewa	58	59	56
1/37 Great South Road, Manurewa	56	57	56
75 Great South Road, Manurewa	57	58	56
73 Great South Road, Manurewa	57	58	56
1A Grande Vue Road, Hillpark	56	57	57
74A Great South Road, Manurewa	52	52	55
2/54 Great South Road, Manurewa	54	55	55
44B Great South Road, Manurewa	54	55	55
2/42 Great South Road, Manurewa	54	55	54
43B Great South Road, Manurewa	54	55	54
39 Great South Road, Manurewa	54	55	54
81 Great South Road, Manurewa	55	56	54
2/52 Great South Road, Manurewa	54	55	54
88 Great South Road, Manurewa	54	54	54
3/54 Great South Road, Manurewa	53	54	54
6/61 Great South Road, Manurewa	56	57	54
1-5/83 Great South Road, Manurewa	56	57	54
71 Great South Road, Manurewa	55	56	53
1-2/35 Great South Road, Manurewa	52	53	53
50A Great South Road, Manurewa	53	53	53
2/16 Great South Road, Manurewa	52	53	53
1/90 Great South Road, Manurewa	52	53	53
1-2/3A Grande Vue Road, Hillpark	52	54	53
69B Great South Road, Manurewa	54	55	52
1/87 Great South Road, Manurewa	53	53	52
3/70 Great South Road, Manurewa	48	48	52
4-5/61 Great South Road, Manurewa	53	54	52
46C Great South Road, Manurewa	51	52	52

Address	Existing, dB LAeq(24hr)	Do Nothing, dB LAeq(24hr)	Do Minimum, LAeq(24hr)
3 Grande Vue Road, Hillpark	47	48	52
2/53 Great South Road, Manurewa	52	53	52
2/49 Great South Road, Manurewa	52	52	51
4A Halsey Road, Manurewa	52	53	51
6 Orams Road, Manurewa	51	51	51
5-8/1A Halsey Road, Manurewa	52	53	51
56 Great South Road, Manurewa	50	51	51
51B Great South Road, Manurewa	51	51	51
1 Browns Road, Manurewa	48	49	51
44C Great South Road, Manurewa	50	51	51
41A Great South Road, Manurewa	50	51	51
2/55 Great South Road, Manurewa	51	52	51
6A Orams Road, Manurewa	50	51	51
2/48 Great South Road, Manurewa	50	50	50
1/45A Great South Road, Manurewa	50	51	50
26 Great South Road, Manurewa	49	50	50
1-3/2 Browns Road, Manurewa	46	46	50
22A Great South Road, Manurewa	49	50	50
82A Great South Road, Manurewa	49	50	50
3/42 Great South Road, Manurewa	49	50	50
5 Grande Vue Road, Hillpark	50	50	50
1-3/7 Grande Vue Road, Hillpark	49	50	50
3/55 Great South Road, Manurewa	50	51	50
47A Great South Road, Manurewa	50	50	50
46D Great South Road, Manurewa	49	50	50
32A Great South Road, Manurewa	49	49	50
26B Great South Road, Manurewa	49	49	49
3/52 Great South Road, Manurewa	49	50	49
3/34 Great South Road, Manurewa	49	49	49
1A Orams Road, Hillpark	48	49	49
3-4/3A Grande Vue Road, Hillpark	46	47	49
50B Great South Road, Manurewa	49	49	49
1/78 Great South Road, Manurewa	49	49	49
69C Great South Road, Manurewa	49	50	49
6 Great South Road, Manurewa	48	49	49
44D Great South Road, Manurewa	48	49	49
3/48 Great South Road, Manurewa	49	49	49
4/52 Great South Road, Manurewa	48	49	49
2/65 Great South Road, Manurewa	50	51	50
5/34 Great South Road, Manurewa	48	49	49
84A Great South Road, Manurewa	48	49	49
2/45A Great South Road, Manurewa	49	49	49
63B Great South Road, Manurewa	50	52	50
2/90 Great South Road, Manurewa	49	49	49
2/92A Great South Road, Manurewa	49	49	49
1/67 Great South Road, Manurewa	49	50	49
7 Sime Road, Hillpark	48	48	49

Address	Existing, dB LAeq(24hr)	Do Nothing, dB LAeq(24hr)	Do Minimum, LAeq(24hr)
25A Great South Road, Manurewa	48	49	48
44E Great South Road, Manurewa	47	48	48
1/14 Great South Road, Manurewa	47	48	48
1-2/5 Great South Road, Manurewa	47	48	48
6 Sime Road, Hillpark	47	48	48
23A Great South Road, Manurewa	48	48	48
30 Great South Road, Manurewa	47	48	48
28 Great South Road, Manurewa	47	47	48
2/78 Great South Road, Manurewa	48	48	48
51C Great South Road, Manurewa	48	49	48
75A Great South Road, Manurewa	48	49	48
46E Great South Road, Manurewa	47	48	48
2/37 Great South Road, Manurewa	47	48	48
1-2/3 Browns Road, Manurewa	45	45	48
43C Great South Road, Manurewa	47	48	48
1-2/7 Great South Road, Manurewa	47	48	48
3/40 Great South Road, Manurewa	47	48	48
14 Brouder Place, Hillpark	47	47	48
2/72 Great South Road, Manurewa	46	47	48
4/42 Great South Road, Manurewa	47	47	48
16 Tampin Road, Hillpark	46	47	47
27 Great South Road, Manurewa	47	47	47
3/78 Great South Road, Manurewa	47	47	47
26A Great South Road, Manurewa	47	47	47
16 Brouder Place, Hillpark	46	47	47
76A Great South Road, Manurewa	46	47	47
1/49A Great South Road, Manurewa	47	47	47
69D Great South Road, Manurewa	48	48	47
1/47A Great South Road, Manurewa	47	48	47
7-8/61 Great South Road, Manurewa	47	48	47
36 Great South Road, Manurewa	46	47	47
9/61 Great South Road, Manurewa	47	48	47
1/6 Halsey Road, Manurewa	47	48	47
53A Great South Road, Manurewa	47	47	47
3/45A Great South Road, Manurewa	46	47	47
76B Great South Road, Manurewa	44	45	47
4/34 Great South Road, Manurewa	46	47	47
5 Sime Road, Hillpark	46	46	47
2-3/59 Great South Road, Manurewa	47	48	47
4-6/2 Browns Road, Manurewa	45	46	46
3/1 Halsey Road, Manurewa	47	47	47
63A Great South Road, Manurewa	46	47	46
5B Browns Road, Manurewa	43	44	46
33A Great South Road, Manurewa	45	46	46

Address	Existing, dB LAeq(24hr)	Do Nothing, dB LAeq(24hr)	Do Minimum, LAeq(24hr)
1-2/1 Great South Road, Manurewa	47	47	46
51 Great South Road, Manurewa	46	47	46
4/45A Great South Road, Manurewa	46	46	46
1-2/93 Great South Road, Manurewa	46	47	46
3C Orams Road, Hillpark	45	46	46
2-4/47A Great South Road, Manurewa	46	47	46
3B Orams Road, Hillpark	45	46	46
76 Great South Road, Manurewa	45	46	46
43D Great South Road, Manurewa	45	46	46
1/55A Great South Road, Manurewa	45	46	46
1/84A Great South Road, Manurewa	45	46	46
3/137 Maich Road, Manurewa	45	45	46
26 Tampin Road, Hillpark	45	46	46
5/3A Grande Vue Road, Hillpark	45	46	46
69E Great South Road, Manurewa	46	46	46
1/94 Great South Road, Manurewa	46	46	46
1/3 Halsey Road, Manurewa	46	47	46
18 Brouder Place, Hillpark	45	45	46
2/1 Halsey Road, Manurewa	46	46	46
2/49A Great South Road, Manurewa	45	46	45
41B Great South Road, Manurewa	45	46	45
1/1 Halsey Road, Manurewa	45	46	45
71B Great South Road, Manurewa	45	46	45
22 Tampin Road, Hillpark	44	45	45
43E Great South Road, Manurewa	45	45	45
5A Grande Vue Road, Hillpark	45	45	45
1-2/3 Great South Road, Manurewa	44	44	45
59A Great South Road, Manurewa	45	46	45
4 Sime Road, Hillpark	44	45	45
30 Tampin Road, Hillpark	44	45	45
2/55A Great South Road, Manurewa	44	45	45
2/25A Great South Road, Manurewa	44	44	45
3A Orams Road, Hillpark	44	45	45
1/5 Halsey Road, Manurewa	45	46	45
4B Halsey Road, Manurewa	45	45	45
71C Great South Road, Manurewa	44	45	45
2/53A Great South Road, Manurewa	44	45	45
2/3 Halsey Road, Manurewa	44	45	45
12 Brouder Place, Hillpark	44	45	44
8 Halsey Road, Manurewa	45	46	44
80 Great South Road, Manurewa	44	44	44

Address	Existing, dB LAeq(24hr)	Do Nothing, dB LAeq(24hr)	Do Minimum, LAeq(24hr)
3/84C Great South Road, Manurewa	44	44	44
71A Great South Road, Manurewa	44	45	44
3 Sime Road, Hillpark	44	44	44
4C Halsey Road, Manurewa	44	45	44
2/87 Great South Road, Manurewa	45	45	44
27A Great South Road, Manurewa	44	44	44
91 Great South Road, Manurewa	44	44	44
2/41A Great South Road, Manurewa	43	44	44
1-4/4A Browns Road, Manurewa	43	43	43
92 Great South Road, Manurewa	43	44	43
3/5 Halsey Road, Manurewa	43	44	43
141B Maich Road, Manurewa	43	43	43
4 Browns Road, Manurewa	43	43	43
3/145 Maich Road, Manurewa	42	43	43
8 Orams Road, Hillpark	42	43	43
141A Maich Road, Manurewa	42	43	43
81A Great South Road, Manurewa	43	43	43
2/5 Halsey Road, Manurewa	43	43	43
3D Orams Road, Hillpark	42	43	43
1/84 Great South Road, Manurewa	42	43	42
2/6 Halsey Road, Manurewa	42	43	42
9 Grande Vue Road, Hillpark	41	42	42
1/89 Great South Road, Manurewa	42	42	42
3 Orams Road, Hillpark	41	42	42
1-2/7 Halsey Road, Manurewa	41	42	42
2/8 Halsey Road, Manurewa	41	42	41
3/87 Great South Road, Manurewa	41	42	41
2/89 Great South Road, Manurewa	41	41	41
1/75 Maich Road, Manurewa	41	41	41
5 Orams Road, Hillpark	40	40	40
3/89 Great South Road, Manurewa	40	40	40
4/87 Great South Road, Manurewa	40	40	40
92B Great South Road, Manurewa	39	40	40
1-2/3 Costar Place, Wiri	39	40	40
3/7 Halsey Road, Manurewa	39	40	40
1-3/6 Browns Road, Manurewa	39	39	39
85 Great South Road, Manurewa	39	40	39
2/94 Great South Road, Manurewa	38	39	39
3/90 Great South Road, Manurewa	39	39	39
1/91A Great South Road, Manurewa	39	39	39
2/91A Great South Road, Manurewa	38	39	39
94A Great South Road, Manurewa	37	38	38
4 Great South Road, Manurewa	37	37	37
8A Orams Road, Hillpark	36	37	36
96A Great South Road, Manurewa	35	36	36

1.2 NoR 1-C

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
315 Great South Road, Manurewa	65	67	66
313 Great South Road, Manurewa	65	67	65
307A Great South Road, Manurewa	64	67	65
1/305 Great South Road, Manurewa	62	65	63
301 Great South Road, Manurewa	62	64	63
1/299 Great South Road, Manurewa	58	61	60
1/297 Great South Road, Manurewa	58	61	60
307 Great South Road, Manurewa	55	58	57
1-3/295 Great South Road, Manurewa	56	58	57
1-3/293 Great South Road, Manurewa	54	56	55
1-2/291 Great South Road, Manurewa	53	55	54
2/305 Great South Road, Manurewa	52	54	53
289 Great South Road, Manurewa	52	54	52
1/301 Great South Road, Manurewa	51	53	52
313A Great South Road, Manurewa	49	51	50
122 Beaumonts Way, Manurewa	49	51	50
2/299 Great South Road, Manurewa	47	50	49
35B Ferguson Street, Manurewa East	46	49	48
114A Beaumonts Way, Manurewa	46	49	48
112 Beaumonts Way, Manurewa	45	48	47
33B Ferguson Street, Manurewa East	45	48	46
120 Beaumonts Way, Manurewa	44	47	46
118 Beaumonts Way, Manurewa	44	46	45
110 Beaumonts Way, Manurewa	43	46	45
114 Beaumonts Way, Manurewa	43	46	45
2/116 Beaumonts Way, Manurewa	43	45	44
108 Beaumonts Way, Manurewa	42	45	44
106 Beaumonts Way, Manurewa	42	44	43
2/297 Great South Road, Manurewa	42	44	43
1/116 Beaumonts Way, Manurewa	42	44	43
104 Beaumonts Way, Manurewa	41	44	43

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
102 Beaumonts Way, Manurewa	41	44	42
100 Beaumonts Way, Manurewa	40	43	42
2/98 Beaumonts Way, Manurewa	40	43	42
96A Beaumonts Way, Manurewa	40	42	41
1/98 Beaumonts Way, Manurewa	40	42	41
25 Ferguson Street, Manurewa East	39	41	41
96 Beaumonts Way, Manurewa	39	42	41
4/291 Great South Road, Manurewa	39	41	40

1.3 NoR 1-D

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
1-2/2 Walter Strevens Drive, Conifer Grove, Takanini	63	64	65
159 Great South Road, Takanini	65	64	64
160A Great South Road, Takanini	64	63	63
1 Walter Strevens Drive, Conifer Grove, Takanini	63	63	64
155 Great South Road, Takanini	64	64	63
157 Great South Road, Takanini	64	63	62
162 Great South Road, Takanini	63	62	62
4 Walter Strevens Drive, Conifer Grove, Takanini	61	62	64
8 Walter Strevens Drive, Conifer Grove, Takanini	55	56	58
2/6 Taka Street, Takanini	55	56	56
3 Walter Strevens Drive, Conifer Grove, Takanini	54	55	57
3-4/6 Taka Street, Takanini	54	54	55
1/6 Taka Street, Takanini	53	54	54
1-2/10 Walter Strevens Drive, Conifer Grove, Takanini	53	53	55
1/10 Taka Street, Takanini	51	52	53
9 Walter Strevens Drive, Conifer Grove, Takanini	50	51	53
144 Great South Road, Takanini	52	52	52
5-6/7 Maru Road, Takanini	52	52	52
1-2/6 Walter Strevens Drive, Conifer Grove, Takanini	51	51	52
144B Great South Road, Takanini	51	51	51
1-4/5 Maru Road, Takanini	51	50	51
1-2/5 Walter Strevens Drive, Conifer Grove, Takanini	51	50	50
5-6/9 Maru Road, Takanini	50	51	51
1-2/12 Taka Street, Takanini	49	50	51
9-11 Taka Street, Takanini	49	50	50
11 Walter Strevens Drive, Conifer Grove, Takanini	48	49	51
12 Walter Strevens Drive, Conifer Grove, Takanini	48	49	50
144A Great South Road, Takanini	49	48	48
5-6/6 Taka Street, Takanini	48	48	49
3 Maru Road, Takanini	48	48	48
11A Maru Road, Takanini	47	47	48
7-8/6 Taka Street, Takanini	47	47	48
3-4/7 Maru Road, Takanini	47	47	47
1-2/27 Waimana Road, Conifer Grove, Takanini	46	46	48
7 Walter Strevens Drive, Conifer Grove, Takanini	46	46	46

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
1-2/7 Maru Road, Takanini	45	45	45
3-4/9 Maru Road, Takanini	45	45	45
1-2/25 Waimana Road, Conifer Grove, Takanini	45	45	45
3/10 Taka Street, Takanini	44	44	45
2/10 Taka Street, Takanini	44	44	45
7A Takanini Road, Takanini	44	44	44
3/12 Taka Street, Takanini	44	44	44
1/6 Maru Road, Takanini	44	43	44
2-3/6 Maru Road, Takanini	44	43	43
2/32 Waimana Road, Conifer Grove, Takanini	43	43	43
1/32 Waimana Road, Conifer Grove, Takanini	43	43	43
1 Kirrama Place, Conifer Grove, Takanini	43	42	43
1-2/13 Walter Strevens Drive, Conifer Grove, Takanini	42	42	42
8 Maru Road, Takanini	42	42	42
1/10 Maru Road, Takanini	41	41	42
9A Takanini Road, Takanini	41	40	41
144C Great South Road, Takanini	38	38	39

1.4 NoR 1-E

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
6-8 Coles Crescent, Papakura	46	48	48
1 Coles Crescent, Papakura	39	40	40
4/30 Coles Crescent, Papakura	40	41	40
6 Coles Crescent, Papakura	38	39	39
3/30 Coles Crescent, Papakura	38	39	38
26B Coles Crescent, Papakura	38	39	38
1-6/18 Coles Crescent, Papakura	36	38	37
4/32 Coles Crescent, Papakura	35	36	36
3/34 Coles Crescent, Papakura	35	36	36
3-3A Coles Crescent, Papakura	35	36	36
3/32 Coles Crescent, Papakura	34	35	35
11 Coles Crescent, Papakura	34	35	35
9 Coles Crescent, Papakura	34	35	35
7 Coles Crescent, Papakura	32	34	34
5-5A Coles Crescent, Papakura	32	33	34
63 Great South Road, Papakura	31	32	32
5B Coles Crescent, Papakura	31	32	32
3B Coles Crescent, Papakura	30	31	32

1.5 NoR 1-F

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
1 Opaheke Road, Papakura	59	60	60
1/327 Great South Road, Papakura	57	58	57
280A/B Great South Road, Papakura	57	58	57
1-3/3 Opaheke Road, Papakura	54	54	53
6/327 Great South Road, Papakura	54	54	53
284 Great South Road, Papakura	53	53	52
331 Great South Road, Papakura	51	51	50
4-5/3 Opaheke Road, Papakura	52	53	53
1/5 Opaheke Road, Papakura	48	50	50
2/327 Great South Road, Papakura	47	48	47
329 Great South Road, Papakura	47	48	48
14-27/52 East Street, Papakura	47	48	48
1/7 Opaheke Road, Papakura	47	48	48
1-13/52 East Street, Papakura	46	47	47
3/327 Great South Road, Papakura	44	45	45
51 Wood Street, Papakura	43	43	43
5/327 Great South Road, Papakura	43	44	44
329A Great South Road, Papakura	42	43	43
2/54 East Street, Papakura	41	41	42
331A Great South Road, Papakura	41	42	42
1-3/56 East Street, Papakura	40	41	41
1/54 East Street, Papakura	40	40	41
1/1 Nelson Street, Papakura	40	41	41
286 Great South Road, Papakura	39	40	40
1A Nelson Street, Papakura	39	40	40
2-3/5 Opaheke Road, Papakura	38	39	39
333 Great South Road, Papakura	39	40	40
2-3/7 Opaheke Road, Papakura	37	38	38
1-2/288 Great South Road, Papakura	34	34	34

1.6 NoR 1-G

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
1/332 Great South Road, Ōpaheke, Papakura	64	64	64
336 Great South Road, Ōpaheke, Papakura	63	63	63
357 Great South Road, Ōpaheke, Papakura	64	64	62
361 Great South Road, Ōpaheke, Papakura	63	63	62
1/326 Great South Road, Ōpaheke, Papakura	63	63	62
328 Great South Road, Ōpaheke, Papakura	62	62	61
320 Great South Road, Ōpaheke, Papakura	62	62	61
377 Great South Road, Ōpaheke, Papakura	62	62	61
1/359 Great South Road, Ōpaheke, Papakura	63	63	61
322A Great South Road, Ōpaheke, Papakura	59	59	58
334 Great South Road, Ōpaheke, Papakura	60	61	59
1/1 Manse Road, Pahurehure, Papakura	62	62	60
1 Butterworth Avenue, Ōpaheke, Papakura	55	54	53
2/326 Great South Road, Ōpaheke, Papakura	50	50	49
338 Great South Road, Ōpaheke, Papakura	55	53	53
330A Great South Road, Ōpaheke, Papakura	50	50	50
2/324 Great South Road, Ōpaheke, Papakura	50	51	50
2/3 Liverpool Street, Papakura	58	58	57
2/332 Great South Road, Ōpaheke, Papakura	51	51	50
18 McCall Place, Ōpaheke, Papakura	56	56	55
4 McCall Place, Ōpaheke, Papakura	50	50	51
4-4A Butterworth Avenue, Ōpaheke, Papakura	51	50	50
3 Butterworth Avenue, Ōpaheke, Papakura	52	51	51
1/3 Liverpool Street, Papakura	56	56	54
340 Great South Road, Ōpaheke, Papakura	52	51	51
5A Liverpool Street, Papakura	54	54	53
5 Beach Road, Pahurehure, Papakura	54	54	54
2/4 Beach Road, Pahurehure, Papakura	53	53	53

6 McCall Place, Ōpaheke, Papakura	49	49	50
2/1 Manse Road, Pahurehure, Papakura	54	55	53
4 Clark Road, Pahurehure, Papakura	54	54	52
1/4 Beach Road, Pahurehure, Papakura	52	52	52
7A Liverpool Street, Papakura	53	53	51
10 McCall Place, Ōpaheke, Papakura	48	48	48
12 McCall Place, Ōpaheke, Papakura	47	47	48
16 McCall Place, Ōpaheke, Papakura	52	52	48
8 McCall Place, Ōpaheke, Papakura	47	47	51
14 McCall Place, Ōpaheke, Papakura	47	47	48
7 Beach Road, Pahurehure, Papakura	50	51	50
5 Settlement Road, Papakura	51	51	50
2/359 Great South Road, Ōpaheke, Papakura	51	51	51
357A Great South Road, Ōpaheke, Papakura	52	52	50
2/355 Great South Road, Ōpaheke, Papakura	51	51	49
8B Beach Road, Pahurehure, Papakura	48	48	48
2/10 Beach Road, Pahurehure, Papakura	48	47	48
346A Great South Road, Ōpaheke, Papakura	47	47	47
6 Beach Road, Pahurehure, Papakura	49	50	49
2A Manse Road, Pahurehure, Papakura	50	50	49
6 Butterworth Avenue, Ōpaheke, Papakura	46	46	47
7A Butterworth Avenue, Ōpaheke, Papakura	46	46	45
8A Beach Road, Pahurehure, Papakura	49	49	48
2/9 Liverpool Street, Papakura	48	48	47
1/1 Clark Road, Pahurehure, Papakura	50	50	48
357B Great South Road, Ōpaheke, Papakura	49	49	48
2/6 Clark Road, Pahurehure, Papakura	48	49	47
3B Butterworth Avenue, Ōpaheke, Papakura	45	44	44
20 McCall Place, Ōpaheke, Papakura	47	47	47
2 Manse Road, Pahurehure, Papakura	47	47	47
5 Liverpool Street, Papakura	47	47	47

2/1 Clark Road, Pahurehure, Papakura	49	49	46
1-2/4 Liverpool Street, Papakura	47	47	46
9 Butterworth Avenue, Ōpaheke, Papakura	44	44	43
11A Liverpool Street, Papakura	46	46	46
15 McCall Place, Ōpaheke, Papakura	45	45	45
7 Liverpool Street, Papakura	46	46	46
1/1A Clark Road, Pahurehure, Papakura	48	48	45
6 Manse Road, Pahurehure, Papakura	46	46	46
4A Clark Road, Pahurehure, Papakura	47	47	45
7B Argyle Avenue, Pahurehure, Papakura	46	46	45
5 Argyle Avenue, Pahurehure, Papakura	45	45	45
1/9 Liverpool Street, Papakura	45	45	44
3A Butterworth Avenue, Ōpaheke, Papakura	424	42	43
4 Manse Road, Pahurehure, Papakura	45	45	45
11 Liverpool Street, Papakura	44	44	43
2/3 Clark Road, Pahurehure, Papakura	46	46	43
1/6 Clark Road, Pahurehure, Papakura	43	44	43
2/3 Argyle Avenue, Pahurehure, Papakura	43	43	42
346 Great South Road, Ōpaheke, Papakura	40	38	38
8 Butterworth Avenue, Ōpaheke, Papakura	40	39	39
2A South Street, Papakura	43	43	42
5A Argyle Avenue, Pahurehure, Papakura	42	43	42
7A Argyle Avenue, Pahurehure, Papakura	42	43	42
1/10 Beach Road, Pahurehure, Papakura	41	41	43
2 South Street, Papakura	43	43	42
342 Great South Road, Ōpaheke, Papakura	40	39	40
2/1A Clark Road, Pahurehure, Papakura	42	43	41
9 Manse Road, Pahurehure, Papakura	42	42	42
1/3 Argyle Avenue, Pahurehure, Papakura	42	42	42
1 Argyle Avenue, Pahurehure, Papakura	41	41	41
1/3 Clark Road, Pahurehure, Papakura	41	41	40
2/4 South Street, Papakura	40	41	40

1.7 NoR 1-H

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
466 Great South Road, Ōpaheke, Papakura	64	65	65
1/468 Great South Road, Ōpaheke, Papakura	63	65	65
1 Park Estate Road, Rosehill, Papakura	65	66	65
3-4/464 Great South Road, Ōpaheke, Papakura	63	64	65
1/2 Park Estate Road, Rosehill, Papakura	64	66	65
1-2/465 Great South Road, Ōpaheke, Papakura	62	63	62
2/469 Great South Road, Ōpaheke, Papakura	62	63	62
1-2/461 Great South Road, Ōpaheke, Papakura	62	62	62
463A/B Great South Road, Ōpaheke, Papakura	62	62	62
459 Great South Road, Ōpaheke, Papakura	62	62	61
469 Great South Road, Ōpaheke, Papakura	61	63	61
471 Great South Road, Ōpaheke, Papakura	61	62	61
1-2/462 Great South Road, Ōpaheke, Papakura	62	63	62
470 Great South Road, Ōpaheke, Papakura	61	62	60
453 Great South Road, Ōpaheke, Papakura	61	61	60
1-2/3 Park Estate Road, Rosehill, Papakura	61	64	63
1/450 Great South Road, Ōpaheke, Papakura	62	62	59
473 Great South Road, Ōpaheke, Papakura	59	60	59
452 Great South Road, Ōpaheke, Papakura	62	62	59
456 Great South Road, Ōpaheke, Papakura	61	61	58
1/458 Great South Road, Ōpaheke, Papakura	61	61	58
1/446 Great South Road, Ōpaheke, Papakura	61	61	58
1/454 Great South Road, Ōpaheke, Papakura	61	61	58
2/451 Great South Road, Ōpaheke, Papakura	58	58	57
1/444 Great South Road, Ōpaheke, Papakura	59	59	56
448 Great South Road, Ōpaheke, Papakura	57	57	55
2/2 Park Estate Road, Rosehill, Papakura	56	59	59

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
1 Parkhaven Drive, Rosehill, Papakura	54	55	54
5 Park Estate Road, Rosehill, Papakura	55	58	57
6 Park Estate Road, Rosehill, Papakura	55	58	57
1/442A Great South Road, Ōpaheke, Papakura	55	55	53
7 Park Estate Road, Rosehill, Papakura	55	57	57
1 Magnolia Avenue, Ōpaheke, Papakura	53	53	53
4 Beverage Place, Rosehill, Papakura	51	53	52
2/446 Great South Road, Ōpaheke, Papakura	52	52	51
1 Coulthard Terrace, Ōpaheke, Papakura	51	51	51
4 Magnolia Avenue, Ōpaheke, Papakura	50	51	51
2 Beverage Place, Rosehill, Papakura	50	51	51
1/438 Great South Road, Ōpaheke, Papakura	51	52	50
2/468 Great South Road, Ōpaheke, Papakura	49	51	50
1/4 Park Estate Road, Rosehill, Papakura	50	51	50
440 Great South Road, Ōpaheke, Papakura	50	50	49
2/458 Great South Road, Ōpaheke, Papakura	50	51	50
1/436 Great South Road, Ōpaheke, Papakura	50	51	49
9 Park Estate Road, Rosehill, Papakura	50	52	53
28 Magnolia Avenue, Ōpaheke, Papakura	49	49	49
2/450 Great South Road, Ōpaheke, Papakura	49	49	48
466A Great South Road, Ōpaheke, Papakura	48	50	49
8 Park Estate Road, Rosehill, Papakura	50	52	52
2/444 Great South Road, Ōpaheke, Papakura	48	49	48
2/454 Great South Road, Ōpaheke, Papakura	49	49	48
1-2/457 Great South Road, Ōpaheke, Papakura	48	48	48
3 Coulthard Terrace, Ōpaheke, Papakura	48	48	48
452A Great South Road, Ōpaheke, Papakura	48	49	48
1/455 Great South Road, Ōpaheke, Papakura	47	48	48

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
4 Coulthard Terrace, Ōpaheke, Papakura	48	48	47
11 Park Estate Road, Rosehill, Papakura	47	49	50
1-2/10 Park Estate Road, Rosehill, Papakura	47	50	50
20 Coulthard Terrace, Ōpaheke, Papakura	46	46	46
26 Magnolia Avenue, Ōpaheke, Papakura	46	46	46
14 Magnolia Avenue, Ōpaheke, Papakura	45	46	46
2/442A Great South Road, Ōpaheke, Papakura	45	46	46
6 Magnolia Avenue, Ōpaheke, Papakura	45	45	45
3 Parkhaven Drive, Rosehill, Papakura	45	46	45
8 Magnolia Avenue, Ōpaheke, Papakura	45	45	45
5 Parkhaven Drive, Rosehill, Papakura	45	46	45
12 Coulthard Terrace, Ōpaheke, Papakura	45	45	45
5 Coulthard Terrace, Ōpaheke, Papakura	44	45	45
3 Magnolia Avenue, Ōpaheke, Papakura	44	44	45
24 Magnolia Avenue, Ōpaheke, Papakura	44	45	45
13 Park Estate Road, Rosehill, Papakura	45	47	47
2/455 Great South Road, Ōpaheke, Papakura	44	45	45
2/4 Park Estate Road, Rosehill, Papakura	44	45	44
37 Magnolia Avenue, Ōpaheke, Papakura	44	45	45
6 Beverage Place, Rosehill, Papakura	41	42	44
6 Coulthard Terrace, Ōpaheke, Papakura	44	45	44
7 Coulthard Terrace, Ōpaheke, Papakura	43	44	44
22 Coulthard Terrace, Ōpaheke, Papakura	43	43	44
10 Magnolia Avenue, Ōpaheke, Papakura	43	43	43
442 Great South Road, Ōpaheke, Papakura	43	44	43
8 Coulthard Terrace, Ōpaheke, Papakura	43	43	43
10 Coulthard Terrace, Ōpaheke, Papakura	43	43	43
2/12 Park Estate Road, Rosehill, Papakura	43	44	43

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
1 Beverage Place, Rosehill, Papakura	42	43	43
7 Parkhaven Drive, Rosehill, Papakura	42	43	43
13 Parkhaven Drive, Rosehill, Papakura	42	43	42
12 Magnolia Avenue, Ōpaheke, Papakura	42	42	42
35 Magnolia Avenue, Ōpaheke, Papakura	42	43	43
1/12 Park Estate Road, Rosehill, Papakura	41	43	42
35A Magnolia Avenue, Ōpaheke, Papakura	41	42	42
16 Coulthard Terrace, Ōpaheke, Papakura	41	42	41
5 Magnolia Avenue, Ōpaheke, Papakura	41	41	41
7 Magnolia Avenue, Ōpaheke, Papakura	41	41	41
440B Great South Road, Ōpaheke, Papakura	41	41	41
26 Coulthard Terrace, Ōpaheke, Papakura	41	41	41
14 Coulthard Terrace, Ōpaheke, Papakura	41	41	41
24 Coulthard Terrace, Ōpaheke, Papakura	41	41	41
445A Great South Road, Ōpaheke, Papakura	39	40	40
2/438 Great South Road, Ōpaheke, Papakura	40	41	40
9 Parkhaven Drive, Rosehill, Papakura	40	41	40
447 Great South Road, Ōpaheke, Papakura	39	40	40
15 Parkhaven Drive, Rosehill, Papakura	39	40	40
2/436 Great South Road, Ōpaheke, Papakura	39	40	40
18 Coulthard Terrace, Ōpaheke, Papakura	38	39	39
2/445 Great South Road, Ōpaheke, Papakura	36	37	37
434 Great South Road, Ōpaheke, Papakura	36	36	36

1.8 NoR 1-Bridge

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
134 Great South Road, Drury	64	65	64
595 Great South Road, Rosehill, Papakura	61	63	64
593 Great South Road, Rosehill, Papakura	61	63	64
589E Great South Road, Rosehill, Papakura	60	61	62
589B Great South Road, Rosehill, Papakura	57	58	58
136 Great South Road, Drury	58	60	58
591 Great South Road, Rosehill, Papakura	53	55	57
600 Great South Road, Rosehill, Papakura	55	56	57
589A Great South Road, Rosehill, Papakura	55	57	57
134A Great South Road, Drury	58	60	57
138A Great South Road, Drury	55	57	56
589 Great South Road, Rosehill, Papakura	52	54	55
597 Great South Road, Rosehill, Papakura	51	52	54
585 Great South Road, Rosehill, Papakura	49	50	53
136A Great South Road, Drury	54	55	53
587 Great South Road, Rosehill, Papakura	49	51	53
147 Great South Road, Drury	51	52	52
1/2 Miro Street, Drury	51	53	52
149 Great South Road, Drury	50	51	51
2/2 Miro Street, Drury	50	52	51
136B Great South Road, Drury	50	51	49
589D Great South Road, Rosehill, Papakura	44	45	48
1/140 Great South Road, Drury	45	47	46
138C Great South Road, Drury	46	47	46
589C Great South Road, Rosehill, Papakura	42	43	45
3/140 Great South Road, Drury	40	42	42
30 Kilmacrennan Drive, Rosehill, Papakura	39	40	42
28 Kilmacrennan Drive, Rosehill, Papakura	38	39	41
2/140 Great South Road, Drury	38	39	40
138B Great South Road, Drury	38	40	40
4 Miro Street, Drury	37	38	39
26 Kilmacrennan Drive, Rosehill, Papakura	36	37	39
1-2/6 Miro Street, Drury	37	38	39

1.9 NoR 2

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
108 Flanagan Road, Drury	48	50	50
64 Flanagan Road, Drury	43	45	48
32 Flanagan Road, Drury	43	44	45
36 Flanagan Road, Drury	42	44	45
28 Flanagan Road, Drury	41	43	43
24 Flanagan Road, Drury	41	42	43
22 Flanagan Road, Drury	39	41	42
20 Flanagan Road, Drury	39	41	41
37 Waihoehoe Road, Drury	38	40	40
8 Flanagan Road, Drury	37	39	40
35 Waihoehoe Road, Drury	37	39	39
16 Flanagan Road, Drury	36	38	39
31 Waihoehoe Road, Drury	35	37	39
4 Flanagan Road, Drury	33	35	35
16 Waihoehoe Road, Drury	32	34	34
18 Waihoehoe Road, Drury	31	33	34
18A Waihoehoe Road, Drury	31	32	34
18B Waihoehoe Road, Drury	30	32	34

1.10 NoR 3

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
250 Great South Road, Manurewa	67	70	69
250A Great South Road, Manurewa	67	69	69
1/254 Great South Road, Manurewa	66	69	67
1/256 Great South Road, Manurewa	65	68	67
1-3/245 Great South Road, Manurewa	65	67	66
240 Great South Road, Manurewa	64	67	66
1/124 Alfriston Road, Manurewa	63	66	66
137 Alfriston Road, Manurewa	63	65	66
116 Alfriston Road, Manurewa	63	66	66
1/28 Alfriston Road, Manurewa East	63	65	66
131A Alfriston Road, Manurewa	63	66	66
128 Alfriston Road, Manurewa	63	65	66
1/72 Alfriston Road, Manurewa East	64	66	66
246 Great South Road, Manurewa	64	67	66
122A Alfriston Road, Manurewa	63	65	66
1/66 Alfriston Road, Manurewa East	63	65	66

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
2/26 Alfriston Road, Manurewa East	63	66	66
217 Great South Road, Manurewa	63	66	66
215 Great South Road, Manurewa	63	66	66
112 Alfriston Road, Manurewa	62	64	66
22 Weymouth Road, Manurewa	63	66	66
219 Great South Road, Manurewa	64	67	66
130 Alfriston Road, Manurewa	62	65	66
106 Alfriston Road, Manurewa	62	64	66
1/252 Great South Road, Manurewa	64	67	66
1/20 Weymouth Road, Manurewa	63	66	65
2A-C Fleming Street, Manurewa East	65	67	65
100 Alfriston Road, Manurewa	62	64	65
143 Alfriston Road, Manurewa	62	64	65
1-3/78 Alfriston Road, Manurewa East	64	66	65
135 Alfriston Road, Manurewa	62	65	65
141B Alfriston Road, Manurewa	62	65	65
1/24 Weymouth Road, Manurewa	62	65	65
141E Alfriston Road, Manurewa	62	64	65
20A Alfriston Road, Manurewa East	63	66	65
141C Alfriston Road, Manurewa	62	64	65
221 Great South Road, Manurewa	64	67	65
49 Alfriston Road, Manurewa East	63	65	65
45 Alfriston Road, Manurewa East	63	66	65
2/32 Alfriston Road, Manurewa East	56	59	65
141D Alfriston Road, Manurewa	62	64	65
60 Claude Road, Manurewa East	61	61	64
1/24 Alfriston Road, Manurewa East	62	65	64
1/57 Alfriston Road, Manurewa East	62	65	64
1/15 Alfriston Road, Manurewa East	60	62	64
16 Alfriston Road, Manurewa East	63	66	64
141F Alfriston Road, Manurewa	61	64	64
233 Great South Road, Manurewa	61	64	64
26 Weymouth Road, Manurewa	62	64	64
80 Alfriston Road, Manurewa East	62	65	64
122H Alfriston Road, Manurewa	61	63	64
68 Alfriston Road, Manurewa East	60	62	64
42A Alfriston Road, Manurewa East	51	53	64
49 Claude Road, Hillpark	58	59	63
2/110 Alfriston Road, Manurewa	50	53	63
40A Alfriston Road, Manurewa East	52	54	63
22/110 Alfriston Road, Manurewa	52	54	63

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
139 Alfriston Road, Manurewa	62	64	63
1/258 Great South Road, Manurewa	65	68	63
1-8/261 Great South Road, Manurewa	62	64	63
34 Alfriston Road, Manurewa East	58	60	63
229 Great South Road, Manurewa	60	63	63
18A Weymouth Road, Manurewa	62	65	63
133 Alfriston Road, Manurewa	58	60	63
260 Great South Road, Manurewa	62	65	63
1/55 Alfriston Road, Manurewa East	63	65	63
64 Alfriston Road, Manurewa East	59	62	63
36 Alfriston Road, Manurewa East	52	55	62
120 Alfriston Road, Manurewa	59	62	62
1/262 Great South Road, Manurewa	61	63	62
47 Alfriston Road, Manurewa East	61	63	62
1/63 Alfriston Road, Manurewa East	60	62	62
129 Alfriston Road, Manurewa	62	65	62
1/71 Alfriston Road, Manurewa East	58	60	62
132 Alfriston Road, Manurewa	59	61	62
52A Alfriston Road, Manurewa East	52	55	62
30B Alfriston Road, Manurewa East	51	54	62
38A Alfriston Road, Manurewa East	48	51	62
5/15 Alfriston Road, Manurewa East	49	51	61
65 Alfriston Road, Manurewa East	60	62	61
61 Alfriston Road, Manurewa East	60	63	61
52 Alfriston Road, Manurewa East	57	60	61
62 Alfriston Road, Manurewa East	56	58	61
25A Alfriston Road, Manurewa East	62	64	61
223 Great South Road, Manurewa	61	64	61
2/84 Alfriston Road, Manurewa East	56	59	61
143A Alfriston Road, Manurewa	58	61	61
60A Alfriston Road, Manurewa East	54	56	60
1A Scotts Road, Manurewa East	59	60	60
70A Alfriston Road, Manurewa East	54	56	60
2/79 Alfriston Road, Manurewa East	53	55	60
39 Alfriston Road, Manurewa East	61	64	60
27A Alfriston Road, Manurewa East	61	63	60
56 Claude Road, Hillpark	56	56	60

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
2/72 Alfriston Road, Manurewa East	56	58	59
235 Great South Road, Manurewa	59	61	59
59B Alfriston Road, Manurewa East	54	56	59
37 Alfriston Road, Manurewa East	59	62	59
1 Scotts Road, Manurewa East	58	59	59
33 Alfriston Road, Manurewa East	59	62	59
67 Alfriston Road, Manurewa East	58	61	59
134 Alfriston Road, Manurewa	56	59	59
2/86 Alfriston Road, Manurewa East	52	55	59
1/51 Alfriston Road, Manurewa East	62	64	59
2/243 Great South Road, Manurewa	49	52	59
41 Alfriston Road, Manurewa East	59	61	59
1/240 Great South Road, Manurewa	57	59	59
237A Great South Road, Manurewa	52	55	58
266 Great South Road, Manurewa	57	60	58
2/19 Alfriston Road, Manurewa East	53	55	58
2/241 Great South Road, Manurewa	50	52	58
259 Great South Road, Manurewa	58	61	58
1-2/54 Claude Road, Hillpark	53	54	58
2/71 Alfriston Road, Manurewa East	51	53	58
2-3/66 Alfriston Road, Manurewa East	54	57	58
92A Alfriston Road, Manurewa	54	57	58
2/15 Alfriston Road, Manurewa East	51	53	57
263 Great South Road, Manurewa	56	58	57
47 Claude Road, Hillpark	54	55	57
11 Alfriston Road, Manurewa East	47	49	57
45 Claude Road, Hillpark	53	54	57
88 Alfriston Road, Manurewa East	58	60	57
268A Great South Road, Manurewa	55	58	57
2/28 Alfriston Road, Manurewa East	54	56	57
2/124 Alfriston Road, Manurewa	53	55	56
1/26 Alfriston Road, Manurewa East	54	56	56
2 Beaumonts Way, Manurewa	50	52	56
3-7/72 Alfriston Road, Manurewa East	53	55	56
2 Saralee Drive, Manurewa	53	56	56
102 Alfriston Road, Manurewa	51	53	56
2/24 Alfriston Road, Manurewa East	54	56	56

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
5 Scotts Road, Manurewa East	55	56	56
8F Scotts Road, Manurewa East	52	53	56
29 Index Place, Manurewa	53	56	56
265 Great South Road, Manurewa	54	57	56
88 Magic Way, Randwick Park	50	53	56
8 Weymouth Road, Manurewa	49	52	56
3/243 Great South Road, Manurewa	49	52	56
3/32 Alfriston Road, Manurewa East	51	54	56
1/18A Weymouth Road, Manurewa	52	55	55
2/249 Great South Road, Manurewa	48	51	55
22A Saralee Drive, Manurewa	52	55	55
1 Beaumonts Way, Manurewa	53	55	55
21A/B Selwyn Road, Manurewa	51	54	55
8 Scotts Road, Manurewa East	54	55	55
20B Alfriston Road, Manurewa East	52	55	55
1/16 McAnnalley Street, Manurewa East	53	56	55
143B Alfriston Road, Manurewa	54	57	55
2/251 Great South Road, Manurewa	49	52	55
17 Selwyn Road, Manurewa	50	52	55
122G Alfriston Road, Manurewa	52	54	55
3/81 Alfriston Road, Manurewa East	48	51	55
122B Alfriston Road, Manurewa	51	54	55
2 Brough Road, Manurewa East	51	53	55
143D Alfriston Road, Manurewa	52	54	55
48 Beaumonts Way, Manurewa	51	53	55
90A Alfriston Road, Manurewa East	52	54	55
1/21 Weymouth Road, Manurewa	52	54	54
1/2 Woodside Road, Manurewa	50	53	54
23B Weymouth Road, Manurewa	51	54	54
2/18A Weymouth Road, Manurewa	48	51	54
2/256 Great South Road, Manurewa	53	56	54
116A Alfriston Road, Manurewa	51	53	54
59 Magic Way, Randwick Park	50	52	54
4 Beaumonts Way, Manurewa	50	53	54
1/13 Selwyn Road, Manurewa	48	51	54
25B Alfriston Road, Manurewa East	52	55	54
3 Scotts Road, Manurewa East	53	54	54
32 Skelton Avenue, Randwick Park	46	48	54
8-9/72 Alfriston Road, Manurewa East	50	53	54
46 Beaumonts Way, Manurewa	50	53	54

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
6 Skelton Avenue, Randwick Park	51	54	54
213 Great South Road, Manurewa	49	52	54
54 Beaumonts Way, Manurewa	49	52	54
4/81 Alfriston Road, Manurewa East	49	51	54
3/28 Alfriston Road, Manurewa East	51	53	54
52 Beaumonts Way, Manurewa	50	53	54
31 Index Place, Manurewa	50	53	54
252B Great South Road, Manurewa	52	55	54
35A Alfriston Road, Manurewa East	53	56	53
2/21 Weymouth Road, Manurewa	50	53	53
3 Beaumonts Way, Manurewa	48	51	53
50 Beaumonts Way, Manurewa	48	51	53
2/239 Great South Road, Manurewa	50	53	53
3/110 Alfriston Road, Manurewa	49	51	53
2/2 Woodside Road, Manurewa	47	49	53
2-3/254 Great South Road, Manurewa	51	54	53
2/51 Alfriston Road, Manurewa East	54	56	53
7 Scotts Road, Manurewa East	51	52	53
4/110 Alfriston Road, Manurewa	49	51	53
3 Brough Road, Manurewa East	47	50	53
2/258 Great South Road, Manurewa	52	54	53
2/1A Woodside Road, Manurewa	51	54	53
1/239 Great South Road, Manurewa	48	51	53
17A Selwyn Road, Manurewa	48	51	53
5 Beaumonts Way, Manurewa	49	51	53
3/24 Alfriston Road, Manurewa East	50	53	53
16 McAnnalley Street, Manurewa East	50	53	53
5/81 Alfriston Road, Manurewa East	50	53	53
2/262 Great South Road, Manurewa	51	54	53
1-2/219A Great South Road, Manurewa	51	54	53
94 Alfriston Road, Manurewa	51	53	53
4/15 Alfriston Road, Manurewa East	46	48	52
1/124A Alfriston Road, Manurewa	49	52	52
52 Claude Road, Hillpark	48	50	52
3/241 Great South Road, Manurewa	49	51	52
4/28 Alfriston Road, Manurewa East	50	52	52
21/110 Alfriston Road, Manurewa	49	51	52

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
2/20 Weymouth Road, Manurewa	48	51	52
1 Brough Road, Manurewa East	49	51	52
2/55 Alfriston Road, Manurewa East	52	54	52
4/243 Great South Road, Manurewa	46	49	52
4/32 Alfriston Road, Manurewa East	48	51	52
4/239 Great South Road, Manurewa	47	50	52
8E Scotts Road, Manurewa East	50	51	52
1-2/32 Weymouth Road, Manurewa	49	51	52
56 Alfriston Road, Manurewa East	46	49	52
131 Alfriston Road, Manurewa	49	51	52
6A Skelton Avenue, Randwick Park	46	48	52
3/19 Alfriston Road, Manurewa East	50	53	52
22 Saralee Drive, Manurewa	49	51	52
10-13/72 Alfriston Road, Manurewa East	47	50	52
28-30 Weymouth Road, Manurewa	49	51	52
4 Woodside Road, Manurewa	50	52	52
7 Brough Road, Manurewa East	47	50	52
57 Magic Way, Randwick Park	47	50	52
1/14A Alfriston Road, Manurewa East	50	52	52
5/110 Alfriston Road, Manurewa	48	50	52
35 Alfriston Road, Manurewa East	51	54	52
4 Brough Road, Manurewa East	47	49	52
61C Alfriston Road, Manurewa East	49	51	52
122F Alfriston Road, Manurewa	49	51	52
1 Woodside Road, Manurewa	49	52	52
94A Alfriston Road, Manurewa	49	51	52
1/52 Claude Road, Hillpark	46	49	52
4/54 Claude Road, Hillpark	46	48	52
27B Alfriston Road, Manurewa East	49	51	51
3B Woodside Road, Manurewa	48	50	51
4/20 Weymouth Road, Manurewa	47	50	51
18A Saralee Drive, Manurewa	48	51	51
3/239 Great South Road, Manurewa	48	51	51
48 Claude Road, Hillpark	47	49	51
1/39 Claude Road, Hillpark	47	49	51
3/15 Alfriston Road, Manurewa East	46	49	51
33 Index Place, Manurewa	49	51	51
8D Scotts Road, Manurewa East	45	47	51
21 Alfriston Road, Manurewa East	46	49	51
5A Woodside Road, Manurewa	47	50	51

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
60B Alfriston Road, Manurewa East	46	49	51
3 Shifnal Drive, Randwick Park	50	52	51
2/124A Alfriston Road, Manurewa	48	51	51
6/110 Alfriston Road, Manurewa	47	50	51
11 Selwyn Road, Manurewa	46	49	51
1A Beaumonts Way, Manurewa	46	49	51
1-5/7 Woodside Road, Manurewa	49	51	51
5A Scotts Road, Manurewa East	49	50	51
3/20 Weymouth Road, Manurewa	47	49	51
56B Claude Road, Hillpark	46	48	51
18 McAnnalley Street, Manurewa East	49	51	51
30A Saralee Drive, Manurewa	48	50	51
5/54 Claude Road, Hillpark	46	48	51
45A Alfriston Road, Manurewa East	50	51	51
2/41 Alfriston Road, Manurewa East	50	52	51
2/24 Weymouth Road, Manurewa	47	50	51
1/9 Scotts Road, Manurewa East	48	49	51
86 Magic Way, Randwick Park	48	50	51
5 Brough Road, Manurewa East	47	49	51
30C/D Alfriston Road, Manurewa East	47	50	51
1/39 Alfriston Road, Manurewa East	50	52	51
1/6 Woodside Road, Manurewa	48	51	51
4/24 Alfriston Road, Manurewa East	48	51	51
1/1A Woodside Road, Manurewa	49	51	51
14-17/72 Alfriston Road, Manurewa East	45	48	51
30 Skelton Avenue, Randwick Park	44	47	51
2/57 Alfriston Road, Manurewa East	48	50	51
59A Alfriston Road, Manurewa East	49	51	51
46A Claude Road, Hillpark	47	48	51
22 Skelton Avenue, Randwick Park	48	50	50
3/51 Alfriston Road, Manurewa East	51	53	50
3/262 Great South Road, Manurewa	49	52	50
70C Alfriston Road, Manurewa East	45	47	50
20/110 Alfriston Road, Manurewa	47	49	50
33A Alfriston Road, Manurewa East	49	52	50
4/6 Woodside Road, Manurewa	47	50	50
98 Alfriston Road, Manurewa	46	48	50

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
54A Alfriston Road, Manurewa East	45	47	50
2-3/63 Alfriston Road, Manurewa East	48	50	50
59 Alfriston Road, Manurewa East	48	51	50
3/256 Great South Road, Manurewa	49	52	50
5/32 Alfriston Road, Manurewa East	47	49	50
1/5 Woodside Road, Manurewa	47	49	50
4/262 Great South Road, Manurewa	48	51	50
1/35 Claude Road, Hillpark	46	48	50
96 Alfriston Road, Manurewa	47	49	50
5 Shifnal Drive, Randwick Park	48	51	50
2/1 Scotts Road, Manurewa East	46	48	50
6 Brough Road, Manurewa East	45	48	50
3/252 Great South Road, Manurewa	48	51	50
8 Rogers Road, Manurewa	45	48	50
4 Skelton Avenue, Randwick Park	48	51	50
122C Alfriston Road, Manurewa	46	49	50
6-8/7 Woodside Road, Manurewa	45	48	50
143C Alfriston Road, Manurewa	49	52	50
70D Alfriston Road, Manurewa East	44	47	50
66 Saralee Drive, Manurewa	46	49	50
43 Claude Road, Hillpark	45	47	50
45A Claude Road, Hillpark	45	47	50
56A Claude Road, Hillpark	44	46	50
6 Sonterra Close, Randwick Park	45	47	49
2 Villino Place, Randwick Park	45	48	49
1/12 Skelton Avenue, Randwick Park	44	46	49
26A/B Hyde Street, Manurewa East	44	46	49
6 Hyde Street, Manurewa East	47	49	49
41 Claude Road, Hillpark	45	47	49
1-3/5 Beaumonts Way, Manurewa	45	47	49
1/62A Alfriston Road, Manurewa East	46	48	49
34 Saralee Drive, Manurewa	47	49	49
114A Alfriston Road, Manurewa	46	49	49
7 McAnnalley Street, Manurewa East	47	49	49
24 Hyde Street, Manurewa East	44	46	49
30 Saralee Drive, Manurewa	46	49	49
4 Sonterra Close, Randwick Park	44	47	49
35 Index Place, Manurewa	46	48	49
1/68A Alfriston Road, Manurewa East	45	47	49
122E Alfriston Road, Manurewa	46	49	49

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
3 Woodside Road, Manurewa	47	49	49
6 Camberley Court, Manurewa East	47	50	49
3/21 Weymouth Road, Manurewa	46	49	49
52 Saralee Drive, Manurewa	46	48	49
3/258 Great South Road, Manurewa	48	50	49
4 Rogers Road, Manurewa	44	47	49
8B Scotts Road, Manurewa East	44	46	49
2 Hyde Street, Manurewa East	48	50	49
3/6 Woodside Road, Manurewa	46	49	49
2/14A Alfriston Road, Manurewa East	47	49	49
1 Rogers Road, Manurewa	47	49	49
8C Scotts Road, Manurewa East	46	48	49
70B Alfriston Road, Manurewa East	45	47	49
18 Saralee Drive, Manurewa	46	48	49
2/10 Scotts Road, Manurewa East	44	47	49
22 McAnnalley Street, Manurewa East	46	49	49
114 Alfriston Road, Manurewa	46	48	49
1 Fleming Street, Manurewa East	47	50	49
2/68A Alfriston Road, Manurewa East	44	46	49
65A Alfriston Road, Manurewa East	46	49	49
20 McAnnalley Street, Manurewa East	46	49	49
10 Scotts Road, Manurewa East	45	47	49
36 Skelton Avenue, Randwick Park	45	48	49
20A Lincoln Road, Manurewa East	47	49	48
18 Hyde Street, Manurewa East	46	48	48
20 Hyde Street, Manurewa East	44	46	48
6 Beaumonts Way, Manurewa	45	48	48
5/6 Woodside Road, Manurewa	45	48	48
32A Alfriston Road, Manurewa East	45	47	48
19/110 Alfriston Road, Manurewa	45	47	48
24A McAnnalley Street, Manurewa East	46	48	48
8A Scotts Road, Manurewa East	45	47	48
2/12 Skelton Avenue, Randwick Park	44	47	48
10A Lincoln Road, Manurewa East	46	49	48
9 Shifnal Drive, Randwick Park	46	48	48
61A Alfriston Road, Manurewa East	46	48	48
20 Lincoln Road, Manurewa East	47	49	48
4-5/66 Alfriston Road, Manurewa East	45	47	48
3 Fleming Street, Manurewa East	46	48	48

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
2 Skelton Avenue, Randwick Park	46	48	48
4/9 Scotts Road, Manurewa East	46	47	48
16 Hyde Street, Manurewa East	45	48	48
24 Skelton Avenue, Randwick Park	44	46	48
2A Rogers Road, Manurewa	45	47	48
61B Alfriston Road, Manurewa East	45	47	48
2 Sonterra Close, Randwick Park	43	45	48
3/9 Scotts Road, Manurewa East	45	47	48
18 Lincoln Road, Manurewa East	46	49	48
12 Sonterra Close, Randwick Park	45	48	48
1/10 Scotts Road, Manurewa East	44	46	48
53B Halver Road, Hillpark	44	47	48
2 Rogers Road, Manurewa	44	47	48
37 Claude Road, Hillpark	44	45	48
50 Claude Road, Hillpark	43	45	48
3/54 Claude Road, Hillpark	44	46	48
51B Halver Road, Hillpark	45	47	48
10 Sonterra Close, Randwick Park	45	47	48
34 Skelton Avenue, Randwick Park	42	45	47
18/110 Alfriston Road, Manurewa	44	46	47
10 Lincoln Road, Manurewa East	45	48	47
24 McAnnalley Street, Manurewa East	45	47	47
2/62A Alfriston Road, Manurewa East	43	46	47
5/20 Weymouth Road, Manurewa	44	47	47
50 Saralee Drive, Manurewa	44	46	47
20 Skelton Avenue, Randwick Park	43	46	47
3 Sonterra Close, Randwick Park	43	45	47
8 Sonterra Close, Randwick Park	44	47	47
3A Fleming Street, Manurewa East	45	48	47
122D Alfriston Road, Manurewa	44	46	47
2/6 Woodside Road, Manurewa	44	47	47
12 Saralee Drive, Manurewa	44	46	47
2/39 Claude Road, Hillpark	43	46	47
10 Hyde Street, Manurewa East	45	48	47
37 Halver Road, Hillpark	43	46	47
34A Alfriston Road, Manurewa East	43	46	47
7 Camberley Court, Manurewa East	45	48	47
14A Saralee Drive, Manurewa	43	45	47
4/26 Alfriston Road, Manurewa East	44	46	47
1/22 Alfriston Road, Manurewa East	44	46	47
8 Hyde Street, Manurewa East	44	46	47
22 Hyde Street, Manurewa East	43	45	47

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
1 Sonterra Close, Randwick Park	43	45	46
13 Scotts Road, Manurewa East	42	44	46
12 Hyde Street, Manurewa East	45	48	46
8 Camberley Court, Manurewa East	45	47	46
64 Saralee Drive, Manurewa	43	46	46
5 Camberley Court, Manurewa East	44	47	46
14 Hyde Street, Manurewa East	43	46	46
1/3 Rogers Road, Manurewa	43	46	46
4 Camberley Court, Manurewa East	44	47	46
32B Alfriston Road, Manurewa East	43	45	46
264A/B Great South Road, Manurewa	44	47	46
6-7/66 Alfriston Road, Manurewa East	43	45	46
5 Sonterra Close, Randwick Park	42	44	46
4 Hyde Street, Manurewa East	44	46	46
53 Halver Road, Hillpark	43	46	46
2/11 Scotts Road, Manurewa East	41	44	46
5 Fleming Street, Manurewa East	45	47	46
3/26 Alfriston Road, Manurewa East	43	46	46
28 Skelton Avenue, Randwick Park	43	45	46
10 Skelton Avenue, Randwick Park	42	44	46
41A Claude Road, Hillpark	43	45	46
268B Great South Road, Manurewa	44	47	46
14 Saralee Drive, Manurewa	42	44	46
8 Skelton Avenue, Randwick Park	42	44	46
18 Skelton Avenue, Randwick Park	42	45	46
7 Sonterra Close, Randwick Park	41	44	46
26 Skelton Avenue, Randwick Park	42	44	46
1/11 Scotts Road, Manurewa East	42	44	45
4/21 Weymouth Road, Manurewa	40	43	45
1A Rogers Road, Manurewa	43	45	45
264 Great South Road, Manurewa	43	46	45
36 Saralee Drive, Manurewa	42	45	45
33A Hyde Street, Manurewa East	41	43	45
6 Rogers Road, Manurewa	42	45	45
16 Skelton Avenue, Randwick Park	41	44	45
2-3/35 Claude Road, Hillpark	42	44	45
31 Claude Road, Hillpark	42	44	45
2-3/13 Selwyn Road, Manurewa	42	45	45
2/46A Claude Road, Hillpark	41	43	45
270 Great South Road, Manurewa	43	45	45

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
46 Claude Road, Hillpark	41	44	45
51A Halver Road, Hillpark	42	44	45
272 Great South Road, Manurewa	42	44	44
2/22 Alfriston Road, Manurewa East	42	44	44
14 Sonterra Close, Randwick Park	41	44	44
10 Saralee Drive, Manurewa	41	43	44
2/9 Scotts Road, Manurewa East	41	43	44
1 Saralee Drive, Manurewa	40	43	44
4 Saralee Drive, Manurewa	40	43	44
51 Halver Road, Hillpark	41	44	44
8D Lincoln Road, Manurewa East	42	45	44
2/3 Rogers Road, Manurewa	40	43	44
5 Short Street, Manurewa East	40	42	44
13 McAnnalley Street, Manurewa East	42	44	44
6 Saralee Drive, Manurewa	40	43	43
9 Sonterra Close, Randwick Park	39	42	43
45G Halver Road, Manurewa East	40	43	43
34 Weymouth Road, Manurewa	38	40	43
1/5 Rogers Road, Manurewa	40	42	43
23A Weymouth Road, Manurewa	40	42	42
16 Sonterra Close, Randwick Park	39	42	42
24 Sonterra Close, Randwick Park	38	41	42
8 Saralee Drive, Manurewa	38	41	41
18 Sonterra Close, Randwick Park	38	41	41
20 Sonterra Close, Randwick Park	38	41	41
3 Saralee Drive, Manurewa	38	40	41
1-2/2 Myers Road, Manurewa East	39	41	41
22 Sonterra Close, Randwick Park	37	39	39
4A Churchill Avenue, Manurewa	37	39	39
62 Saralee Drive, Manurewa	36	39	39
15 Scotts Road, Manurewa East	36	39	39
140 Alfriston Road, Manurewa	36	38	39
143E Alfriston Road, Manurewa	35	38	38
25A/B Weymouth Road, Manurewa	34	36	36

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Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
7 Giani Court, Manurewa	64	68	69
8 Giani Court, Manurewa	63	67	69
222 Alfriston Road, Manurewa	68	71	69
216 Alfriston Road, Manurewa	65	68	68
9-15 Whakarato Way, Takanini	66	70	68
224 Alfriston Road, Alfriston	70	73	68
214 Alfriston Road, Manurewa	63	67	68
7 Sarteano Drive, Manurewa	66	69	68
206 Alfriston Road, Manurewa	62	65	68
200 Alfriston Road, Manurewa	62	65	67
208 Alfriston Road, Manurewa	62	65	67
1/263 Porchester Road, Takanini	65	69	67
261 Porchester Road, Takanini	65	69	67
2 Berwyn Avenue, Takanini	64	68	67
295B Porchester Road, Takanini	64	68	67
234 Alfriston Road, Alfriston	69	72	67
31 Calumet Way, Takanini	63	62	66
1-2/299 Porchester Road, Takanini	63	67	66
5 Sarteano Drive, Manurewa	65	68	66
164A Porchester Road, Papakura	68	71	66
238 Alfriston Road, Alfriston	68	71	66
2 Bruce Pulman Drive, Takanini	62	60	66
526 Porchester Road, Randwick Park	63	67	66
446 Porchester Road, Randwick Park	63	67	66
17 Sheriff Place, Randwick Park	64	68	66
3 Sarteano Drive, Manurewa	64	68	66
506 Porchester Road, Randwick Park	64	67	66
49 Walters Road, Papakura	68	71	66
13 Sheriff Place, Randwick Park	63	67	66
1/480 Porchester Road, Randwick Park	63	67	66
448 Porchester Road, Randwick Park	63	67	66
15 Sheriff Place, Randwick Park	63	67	66
1/482 Porchester Road, Randwick Park	63	67	66
1/258 Porchester Road, Takanini	64	68	66
160 Manuroa Road, Takanini	63	67	66
3 Sheriff Place, Randwick Park	63	67	66
1-2/286 Porchester Road, Takanini	65	69	66
3/286 Porchester Road, Takanini	64	68	66
33 Calumet Way, Takanini	62	61	66
11 Sheriff Place, Randwick Park	63	67	66
168 Porchester Road, Takanini	67	68	66
2 Ricardo Court, Manurewa	59	63	66
170 Porchester Road, Takanini	65	67	66

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
460 Porchester Road, Randwick Park	62	66	65
1 Sarteano Drive, Manurewa	63	67	65
472 Porchester Road, Randwick Park	62	66	65
2B Sheriff Place, Randwick Park	64	68	65
508 Porchester Road, Randwick Park	63	67	65
438 Porchester Road, Randwick Park	62	66	65
430 Porchester Road, Randwick Park	63	66	65
1/281 Porchester Road, Takanini	64	67	65
454 Porchester Road, Randwick Park	62	66	65
440 Porchester Road, Randwick Park	62	66	65
391 Porchester Road, Randwick Park	61	65	65
2 Sarteano Drive, Manurewa	63	66	65
114 Riverton Drive, Randwick Park	63	66	65
172 Porchester Road, Takanini	64	66	65
1/277 Porchester Road, Takanini	63	67	65
37 Calumet Way, Takanini	60	59	65
174 Porchester Road, Takanini	64	66	65
432 Porchester Road, Randwick Park	62	66	65
129 Riverton Drive, Randwick Park	62	66	65
1/474 Porchester Road, Randwick Park	62	65	65
49A Walters Road, Papakura	67	70	65
1/274 Porchester Road, Takanini	64	67	65
1 Sheriff Place, Randwick Park	62	66	65
273 Porchester Road, Takanini	63	67	65
1/160 Porchester Road, Papakura	66	69	65
39 Calumet Way, Takanini	60	59	65
494 Porchester Road, Randwick Park	61	65	65
56 Airfield Road, Takanini	64	68	65
305 Porchester Road, Takanini	61	65	65
2A Sheriff Place, Randwick Park	62	66	65
176 Porchester Road, Takanini	63	65	64
498 Porchester Road, Randwick Park	61	65	64
35 Calumet Way, Takanini	59	58	64
487 Porchester Road, Randwick Park	60	64	64
456 Porchester Road, Randwick Park	62	66	64
245 Porchester Road, Takanini	61	65	64
1-2/162 Porchester Road, Papakura	66	69	64
279 Porchester Road, Takanini	62	66	64
1/133 Manuroa Road, Takanini	60	63	64

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
158 Manuroa Road, Takanini	59	62	64
2 Sheriff Place, Randwick Park	62	65	64
182 Porchester Road, Takanini	62	64	64
180 Porchester Road, Takanini	62	64	64
178 Porchester Road, Takanini	62	64	64
141 Porchester Road, Papakura	66	69	64
70 Walters Road, Takanini	64	65	64
307-309 Porchester Road, Takanini	61	65	64
166A Porchester Road, Papakura	67	68	64
2-12 Whakarato Way, Takanini	56	64	63
51 Popes Road, Takanini	64	67	63
496 Porchester Road, Randwick Park	61	64	63
56A Airfield Road, Takanini	63	67	63
269 Porchester Road, Takanini	62	65	63
15A Phar Lap Crescent, Takanini	67	67	63
186 Porchester Road, Takanini	62	63	63
166B Porchester Road, Papakura	67	68	63
184 Porchester Road, Takanini	62	63	63
252A-D Porchester Road, Takanini	62	65	63
1-3/150 Porchester Road, Papakura	65	68	63
272 Porchester Road, Takanini	61	65	63
58 Airfield Road, Takanini	61	64	63
255 Porchester Road, Takanini	61	64	63
284 Porchester Road, Takanini	63	66	63
149 Porchester Road, Takanini	62	64	63
2/133 Manuroa Road, Takanini	58	61	63
271 Porchester Road, Takanini	61	65	63
15 Phar Lap Crescent, Takanini	67	67	63
257 Porchester Road, Takanini	62	65	63
301 Porchester Road, Takanini	59	63	63
423 Porchester Road, Randwick Park	59	62	63
267 Porchester Road, Takanini	61	65	63
4 Berwyn Avenue, Takanini	57	63	63
151 Porchester Road, Takanini	61	63	63
458 Porchester Road, Randwick Park	62	66	63
260 Porchester Road, Takanini	63	67	62
52 Popes Road, Takanini	61	65	62
1/268 Porchester Road, Takanini	61	64	62
270 Porchester Road, Takanini	61	64	62
297A Porchester Road, Takanini	59	63	62
145 Porchester Road, Takanini	63	64	62
266 Porchester Road, Takanini	61	65	62
135 Hyperion Drive, Randwick Park	62	66	62
155 Porchester Road, Takanini	61	63	62
70A Walters Road, Takanini	61	62	62
510 Porchester Road, Randwick Park	60	63	62

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
259 Porchester Road, Takanini	61	64	62
147 Porchester Road, Takanini	62	64	62
279E Porchester Road, Takanini	60	64	62
504 Porchester Road, Randwick Park	60	63	62
13 Zoe Court, Manurewa	55	58	62
188 Porchester Road, Takanini	60	62	62
333 Porchester Road, Takanini	58	62	62
511 Porchester Road, Randwick Park	57	61	62
2/460 Porchester Road, Randwick Park	59	63	62
131 Manuroa Road, Takanini	57	60	61
262 Porchester Road, Takanini	61	65	61
37 Walters Road, Takanini	66	67	61
139A Porchester Road, Papakura	64	66	61
157 Porchester Road, Takanini	60	62	61
226 Alfriston Road, Alfriston	60	63	61
60 Airfield Road, Takanini	58	62	61
503 Porchester Road, Randwick Park	57	60	61
153 Porchester Road, Takanini	59	61	61
1/256 Porchester Road, Takanini	61	64	60
35 Walters Road, Takanini	65	66	60
54 Airfield Road, Takanini	57	59	60
159 Porchester Road, Takanini	59	61	60
67 Stratford Road, Manurewa	63	65	60
158 Porchester Road, Papakura	62	65	60
1 Ricardo Court, Manurewa	56	59	60
11 Zoe Court, Manurewa	56	59	60
41 Walters Road, Takanini	65	66	60
484 Porchester Road, Randwick Park	56	60	60
39 Walters Road, Takanini	65	66	60
64A Popes Road, Takanini	53	57	60
1/460 Porchester Road, Randwick Park	58	61	60
190 Porchester Road, Takanini	58	60	59
2 Taipan Place, Randwick Park	55	59	59
52 Airfield Road, Takanini	55	58	59
156 Manuroa Road, Takanini	55	57	59
139 Porchester Road, Papakura	61	63	59
129 Manuroa Road, Takanini	54	57	59
7/460 Porchester Road, Randwick Park	57	61	59
3 Arion Road, Takanini	63	63	59
8A Berwyn Avenue, Takanini	54	58	59
49C Walters Road, Papakura	53	53	58
6 Berwyn Avenue, Takanini	52	58	58
4 Bruce Pulman Drive, Takanini	53	52	58
64 Airfield Road, Takanini	55	58	58
228 Alfriston Road, Alfriston	56	59	58

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
65A Stratford Road, Manurewa	59	62	58
112 Riverton Drive, Randwick Park	55	58	58
2/550S Porchester Road, Randwick Park	54	57	58
1/2 Glenburn Place, Papakura	60	62	57
463-471 Porchester Road, Randwick Park	53	57	57
3 Sires Parkway, Takanini	57	58	57
3/460 Porchester Road, Randwick Park	54	57	57
133A Manuroa Road, Takanini	56	59	57
295C Porchester Road, Takanini	54	58	57
33 Walters Road, Takanini	63	64	57
13 Phar Lap Crescent, Takanini	61	62	57
250A-E Porchester Road, Takanini	55	59	57
4 Sarteano Drive, Manurewa	54	58	57
154 Manuroa Road, Takanini	52	55	57
2/482 Porchester Road, Randwick Park	54	57	57
29 Calumet Way, Takanini	55	56	57
156A Manuroa Road, Takanini	53	57	57
17 Phar Lap Crescent, Takanini	61	61	57
2A Popes Road, Takanini	56	59	56
236 Alfriston Road, Alfriston	58	60	56
311 Porchester Road, Takanini	53	56	56
479 Porchester Road, Randwick Park	52	56	56
18 Amarillo Place, Manurewa	55	58	56
28-34 Biplane Street, Takanini	53	57	56
164B Porchester Road, Papakura	59	61	56
28 Amarillo Place, Manurewa	53	57	56
2C Sheriff Place, Randwick Park	54	57	56
1 Giani Court, Manurewa	53	57	56
5 Giani Court, Manurewa	53	56	56
8 Berwyn Avenue, Takanini	49	55	56
127 Riverton Drive, Randwick Park	52	56	56
26 Amarillo Place, Manurewa	57	60	56
6 Giani Court, Manurewa	51	55	56
1A Berwyn Avenue, Takanini	50	56	56
438A Porchester Road, Randwick Park	52	56	56
1/490 Porchester Road, Randwick Park	52	56	56
170 Alfriston Road, Manurewa	52	55	56
76 Popes Road, Takanini	53	56	55
127 Manuroa Road, Takanini	51	54	55
289 Porchester Road, Takanini	52	56	55
210 Alfriston Road, Manurewa	51	55	55
66 Airfield Road, Takanini	52	56	55
2/263 Porchester Road, Takanini	54	58	55
1 Senator Drive, Manurewa	52	55	55
152 Manuroa Road, Takanini	50	54	55

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
125A-F Manuroa Road, Takanini	49	53	55
192 Porchester Road, Takanini	54	56	55
6 Sarteano Drive, Manurewa	51	55	55
26 Biplane Street, Takanini	51	54	55
12 Nerissa Place, Randwick Park	51	55	55
2 Popes Road, Takanini	54	57	55
110 Hyperion Drive, Randwick Park	53	57	54
4/460 Porchester Road, Randwick Park	51	55	54
2/154 Manuroa Road, Takanini	51	55	54
1-2/3 Berwyn Avenue, Takanini	49	54	54
5/460 Porchester Road, Randwick Park	50	54	54
2/274 Porchester Road, Takanini	53	56	54
135 Porchester Road, Papakura	56	59	54
73 Popes Road, Takanini	53	57	54
110 Riverton Drive, Randwick Park	50	54	54
194 Porchester Road, Takanini	53	56	54
1/50 Airfield Road, Takanini	50	52	54
301A Porchester Road, Takanini	50	54	54
19 Phar Lap Crescent, Takanini	58	59	54
123 Riverton Drive, Randwick Park	50	54	54
3 Ricardo Court, Manurewa	49	52	54
3 Giani Court, Manurewa	51	55	54
2/474 Porchester Road, Randwick Park	51	54	54
4 Sires Parkway, Takanini	53	55	54
4B Berwyn Avenue, Takanini	50	54	54
140 Porchester Road, Papakura	55	58	54
29 Foxlaw Street, Randwick Park	50	53	53
3 Taipan Place, Randwick Park	50	53	53
5 Sheriff Place, Randwick Park	50	54	53
19B Phar Lap Crescent, Takanini	56	58	53
4A Berwyn Avenue, Takanini	49	53	53
212 Alfriston Road, Manurewa	50	53	53
6 Sheriff Place, Randwick Park	51	54	53
297B Porchester Road, Takanini	50	53	53
165 Porchester Road, Takanini	53	54	53
169 Alfriston Road, Manurewa	48	52	53
196 Porchester Road, Takanini	53	55	53
2/156 Porchester Road, Papakura	55	57	53
8B Berwyn Avenue, Takanini	48	52	53
14A Berwyn Avenue, Takanini	48	53	53
202 Alfriston Road, Manurewa	50	53	53
8 Sarteano Drive, Manurewa	49	53	53
125 Riverton Drive, Randwick Park	49	53	53
150 Manuroa Road, Takanini	49	52	53
2/480 Porchester Road, Randwick Park	49	53	53
167 Alfriston Road, Manurewa	51	54	53
4 Sheriff Place, Randwick Park	51	54	53

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
204 Alfriston Road, Manurewa	50	53	53
4 Giani Court, Manurewa	49	52	53
150A Manuroa Road, Takanini	49	53	53
15 Zoe Court, Manurewa	50	53	53
6A Sheriff Place, Randwick Park	49	53	53
133 Hyperion Drive, Randwick Park	51	55	53
41 Calumet Way, Takanini	48	47	53
1/478 Porchester Road, Randwick Park	49	53	53
1/5 Berwyn Avenue, Takanini	47	52	53
21 Phar Lap Crescent, Takanini	57	57	53
3/263 Porchester Road, Takanini	51	54	53
4 Ricardo Court, Manurewa	48	52	53
151A Porchester Road, Takanini	51	52	52
4A Sheriff Place, Randwick Park	49	53	52
149A Porchester Road, Takanini	50	52	52
198 Porchester Road, Takanini	52	54	52
10 Sarteano Drive, Manurewa	49	52	52
10 Amarillo Place, Manurewa	53	55	52
167 Porchester Road, Takanini	52	54	52
65 Stratford Road, Manurewa	53	56	52
11 Civita Court, Manurewa	50	52	52
1/282 Porchester Road, Takanini	50	53	52
8/460 Porchester Road, Randwick Park	49	53	52
6 Bruce Pulman Drive, Takanini	47	47	52
6 Abilene Place, Manurewa	50	54	52
281 Porchester Road, Takanini	50	53	52
12 Berwyn Avenue, Takanini	46	52	52
148A Manuroa Road, Takanini	48	52	52
2 Giani Court, Manurewa	48	52	52
230 Alfriston Road, Alfriston	52	55	52
19 Sheriff Place, Randwick Park	48	52	52
108 Hyperion Drive, Randwick Park	50	54	52
133 Porchester Road, Papakura	54	57	52
1-2/14 Nerissa Place, Randwick Park	48	52	52
48 Airfield Road, Takanini	48	51	52
248D Porchester Road, Takanini	49	52	52
2/258 Porchester Road, Takanini	51	55	52
11 Phar Lap Crescent, Takanini	56	56	52
2-14 Windfola Parkway, Takanini	51	54	52
434 Porchester Road, Randwick Park	48	51	52
2/282 Porchester Road, Takanini	49	53	51
131 Porchester Road, Papakura	54	56	51
2/2 Glenburn Place, Papakura	54	56	51
9 Abilene Place, Manurewa	49	52	51
137 Porchester Road, Papakura	54	56	51
248C Porchester Road, Takanini	49	53	51
10 Abilene Place, Manurewa	49	52	51

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
56B Airfield Road, Takanini	51	54	51
121 Riverton Drive, Randwick Park	48	51	51
239A Porchester Road, Takanini	49	53	51
1/46 Airfield Road, Takanini	48	51	51
131 Hyperion Drive, Randwick Park	50	53	51
169 Porchester Road, Takanini	51	53	51
31 Walters Road, Takanini	58	58	51
25 Calumet Way, Takanini	49	50	51
49B Walters Road, Papakura	47	47	51
115 Riverton Drive, Randwick Park	47	51	51
108 Riverton Drive, Randwick Park	48	51	51
20 Biplane Street, Takanini	47	50	51
303 Porchester Road, Takanini	47	51	51
248B Porchester Road, Takanini	49	52	51
23 Phar Lap Crescent, Takanini	55	55	51
47 Foxlaw Street, Randwick Park	47	51	51
121 Manuroa Road, Takanini	46	50	51
17 Zoe Court, Manurewa	48	51	51
27 Calumet Way, Takanini	48	49	51
1/476 Porchester Road, Randwick Park	47	51	51
171 Porchester Road, Takanini	50	52	51
64 Popes Road, Takanini	50	53	51
9 Sheriff Place, Randwick Park	47	51	51
4/263 Porchester Road, Takanini	49	52	51
23 Calumet Way, Takanini	49	50	51
490 Porchester Road, Randwick Park	47	51	51
27 Walters Road, Takanini	57	57	51
1/6 Berwyn Avenue, Takanini	47	51	51
1/1 Clarice Place, Takanini	48	52	51
5 Ricardo Court, Manurewa	47	50	51
8 Abilene Place, Manurewa	49	52	51
52A Airfield Road, Takanini	47	50	51
428 Porchester Road, Randwick Park	47	50	51
1-2/7 Berwyn Avenue, Takanini	45	50	50
5 Arion Road, Takanini	55	55	50
7 Sheriff Place, Randwick Park	47	51	50
6 Ricardo Court, Manurewa	47	50	50
63B Stratford Road, Manurewa	50	53	50
2/268 Porchester Road, Takanini	48	52	50
279A Porchester Road, Takanini	48	52	50
259A Porchester Road, Takanini	48	52	50
19 Zoe Court, Manurewa	48	51	50
2A Clarice Place, Takanini	49	52	50
200 Porchester Road, Takanini	49	51	50
45 Foxlaw Street, Randwick Park	47	50	50
248A Porchester Road, Takanini	48	52	50
6/460 Porchester Road, Randwick Park	47	50	50

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
106 Hyperion Drive, Randwick Park	48	52	50
173 Porchester Road, Takanini	49	51	50
43 Calumet Way, Takanini	45	47	50
9 Phar Lap Crescent, Takanini	54	54	50
43 Walters Road, Takanini	53	54	50
436 Porchester Road, Randwick Park	46	50	50
158A Porchester Road, Papakura	52	54	50
130 Porchester Road, Papakura	52	55	50
2/160 Porchester Road, Papakura	52	54	50
4B Sheriff Place, Randwick Park	47	50	50
14E Berwyn Avenue, Takanini	46	50	50
12 Abilene Place, Manurewa	47	50	50
478 Porchester Road, Randwick Park	46	50	50
16 Amarillo Place, Manurewa	51	54	50
263A Porchester Road, Takanini	47	51	50
271A Porchester Road, Takanini	48	51	50
117 Riverton Drive, Randwick Park	46	50	50
18 Biplane Street, Takanini	46	49	50
23A Phar Lap Crescent, Takanini	51	52	50
14D Berwyn Avenue, Takanini	46	49	50
6B Sheriff Place, Randwick Park	46	50	50
60A Airfield Road, Takanini	47	51	50
2 Clarice Place, Takanini	47	51	50
279D Porchester Road, Takanini	47	51	50
42A Airfield Road, Takanini	46	49	50
19 Calumet Way, Takanini	48	50	50
297C Porchester Road, Takanini	46	50	50
78 Popes Road, Takanini	47	51	50
2/256 Porchester Road, Takanini	47	51	49
29A Phar Lap Crescent, Takanini	50	51	49
19A Phar Lap Crescent, Takanini	52	53	49
2/277 Porchester Road, Takanini	47	51	49
106 Riverton Drive, Randwick Park	46	49	49
62 Airfield Road, Takanini	46	50	49
27 Foxlaw Street, Randwick Park	45	49	49
1/276 Porchester Road, Takanini	47	51	49
476 Porchester Road, Randwick Park	46	49	49
21 Sheriff Place, Randwick Park	46	49	49
2/280 Porchester Road, Takanini	46	50	49
7 Abilene Place, Manurewa	47	50	49
7 Ricardo Court, Manurewa	46	49	49
444 Porchester Road, Randwick Park	45	49	49
2/260 Porchester Road, Takanini	48	51	49
8 Bruce Pulman Drive, Takanini	45	46	49
24 Amarillo Place, Manurewa	50	52	49
4C Sheriff Place, Randwick Park	46	49	49
25 Phar Lap Crescent, Takanini	53	54	49

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
8 Amarillo Place, Manurewa	49	52	49
11A/B Dittmer Place, Papakura	50	53	49
8 Ricardo Court, Manurewa	46	49	49
4 Abilene Place, Manurewa	48	51	49
7 Phar Lap Crescent, Takanini	52	53	49
1/280 Porchester Road, Takanini	46	50	49
21 Zoe Court, Manurewa	45	48	49
13-17 Biplane Street, Takanini	46	49	49
265 Porchester Road, Takanini	46	50	49
129 Hyperion Drive, Randwick Park	47	50	49
5 Abilene Place, Manurewa	46	49	49
68 Airfield Road, Takanini	46	50	49
279C Porchester Road, Takanini	46	50	49
25 Walters Road, Takanini	54	55	49
49 Foxlaw Street, Randwick Park	45	49	49
25 Sheriff Place, Randwick Park	45	49	49
21 Calumet Way, Takanini	47	49	49
248E Porchester Road, Takanini	46	49	49
14 Amarillo Place, Manurewa	49	52	49
3/258 Porchester Road, Takanini	46	50	49
119 Riverton Drive, Randwick Park	45	48	49
33A Walters Road, Takanini	53	54	48
104 Hyperion Drive, Randwick Park	46	50	48
442 Porchester Road, Randwick Park	44	48	48
4 Clarice Place, Takanini	46	50	48
16 Nerissa Place, Randwick Park	45	48	48
1/278 Porchester Road, Takanini	45	49	48
63A Stratford Road, Manurewa	48	51	48
13B Clarice Place, Takanini	45	49	48
12 Sarteano Drive, Manurewa	45	49	48
127 Hyperion Drive, Randwick Park	46	50	48
17 Calumet Way, Takanini	47	48	48
452 Porchester Road, Randwick Park	45	48	48
148 Manuroa Road, Takanini	45	48	48
27 Sheriff Place, Randwick Park	45	48	48
450 Porchester Road, Randwick Park	44	48	48
31 Foxlaw Street, Randwick Park	44	48	48
273A Porchester Road, Takanini	45	49	48
35 Foxlaw Street, Randwick Park	44	48	48
23 Sheriff Place, Randwick Park	44	48	48
45 Walters Road, Takanini	50	52	48
23 Walters Road, Takanini	53	54	48
37A Walters Road, Takanini	52	53	48
1/4 Glenburn Place, Papakura	50	52	48
21A Phar Lap Crescent, Takanini	50	51	48
20 Amarillo Place, Manurewa	47	50	48
44 Airfield Road, Takanini	45	48	48
24 Calumet Way, Takanini	45	46	48

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
279B Porchester Road, Takanini	45	49	48
12 Amarillo Place, Manurewa	48	50	48
2/1 Clarice Place, Takanini	45	49	48
31A Phar Lap Crescent, Takanini	47	49	48
17A Nerissa Place, Randwick Park	44	48	48
25 Foxlaw Street, Randwick Park	44	47	48
2/50 Airfield Road, Takanini	45	48	48
49 Sheriff Place, Randwick Park	44	48	48
22 Amarillo Place, Manurewa	47	50	48
49E Walters Road, Papakura	47	49	48
109 Riverton Drive, Randwick Park	44	48	48
5 Phar Lap Crescent, Takanini	51	52	48
3 Phar Lap Crescent, Takanini	51	52	48
3 Clarice Place, Takanini	45	49	47
7 Arion Road, Takanini	52	53	47
35 Sheriff Place, Randwick Park	44	47	47
33A Phar Lap Crescent, Takanini	47	48	47
2/276 Porchester Road, Takanini	45	48	47
76 Airfield Road, Takanini	45	48	47
2/278 Porchester Road, Takanini	44	48	47
2/2 Clarice Place, Takanini	45	48	47
47 Sheriff Place, Randwick Park	44	47	47
9 Zoe Court, Manurewa	46	49	47
19 Yatterina Avenue, Takanini	44	47	47
8 Sheriff Place, Randwick Park	44	47	47
51 Foxlaw Street, Randwick Park	44	48	47
6 Amarillo Place, Manurewa	47	50	47
63C Stratford Road, Manurewa	49	52	47
29 Sheriff Place, Randwick Park	44	47	47
7 Zoe Court, Manurewa	44	47	47
10A/B Dittmer Place, Papakura	49	51	47
1/140 Manuroa Road, Takanini	44	47	47
4 Amarillo Place, Manurewa	46	49	47
11B Clarice Place, Takanini	44	48	47
10 Berwyn Avenue, Takanini	43	47	47
53 Foxlaw Street, Randwick Park	43	47	47
49D Walters Road, Papakura	45	46	47
74 Airfield Road, Takanini	44	48	47
33 Foxlaw Street, Randwick Park	43	47	47
12 Bruce Pulman Drive, Takanini	45	46	47
25A Phar Lap Crescent, Takanini	48	49	47
15 Nerissa Place, Randwick Park	43	47	47
23 Zoe Court, Manurewa	45	48	47
1-2/9 Berwyn Avenue, Takanini	43	47	47
16B Nerissa Place, Randwick Park	43	47	47
123 Manuroa Road, Takanini	44	47	47
5 Zoe Court, Manurewa	44	47	47
20 Calumet Way, Takanini	45	47	47
29 Phar Lap Crescent, Takanini	47	48	47
15A Nerissa Place, Randwick Park	43	47	47

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
49F Walters Road, Papakura	46	48	47
2/5 Berwyn Avenue, Takanini	43	47	47
113 Riverton Drive, Randwick Park	43	47	47
9 Glenburn Place, Papakura	49	50	47
1-2/13 Nerissa Place, Randwick Park	43	47	47
8A Sheriff Place, Randwick Park	43	47	47
7 Clarice Place, Takanini	44	47	47
13 Calumet Way, Takanini	46	47	47
12 Dittmer Place, Papakura	48	50	47
45 Sheriff Place, Randwick Park	43	47	47
43 Foxlaw Street, Randwick Park	43	46	46
2/4 Clarice Place, Takanini	44	47	46
41 Foxlaw Street, Randwick Park	43	46	46
10 Bruce Pulman Drive, Takanini	44	45	46
37 Sheriff Place, Randwick Park	43	46	46
11 Calumet Way, Takanini	45	47	46
9 Clarice Place, Takanini	43	47	46
15 Calumet Way, Takanini	45	47	46
17 Nerissa Place, Randwick Park	43	46	46
51 Sheriff Place, Randwick Park	43	46	46
1/6 Glenburn Place, Papakura	49	51	46
10 Nerissa Place, Randwick Park	43	46	46
67 Sheriff Place, Randwick Park	43	46	46
2/5 Clarice Place, Takanini	43	47	46
11A Clarice Place, Takanini	43	47	46
6A Braeburn Place, Takanini	49	50	46
123A Manuroa Road, Takanini	43	47	46
65 Sheriff Place, Randwick Park	42	46	46
24 Biplane Street, Takanini	43	46	46
2/8 Nerissa Place, Randwick Park	43	46	46
37A Phar Lap Crescent, Takanini	45	47	46
39 Foxlaw Street, Randwick Park	42	46	46
53 Sheriff Place, Randwick Park	42	46	46
69 Sheriff Place, Randwick Park	42	46	46
71 Sheriff Place, Randwick Park	42	46	46
18 Calumet Way, Takanini	45	46	46
2-3/46 Airfield Road, Takanini	43	47	46
4 Braeburn Place, Takanini	49	50	46
1/5 Clarice Place, Takanini	43	47	46
12A Berwyn Avenue, Takanini	42	46	46
17 Yatterina Avenue, Takanini	42	46	46
14 Phar Lap Crescent, Takanini	48	49	46
37A Foxlaw Street, Randwick Park	42	46	46
121A Manuroa Road, Takanini	43	46	46
5 Civita Court, Manurewa	43	47	46
17 Sarteano Drive, Manurewa	43	46	46
18 Yatterina Avenue, Takanini	43	46	46
22 Calumet Way, Takanini	44	46	46
21 Sarteano Drive, Manurewa	43	46	46
61 Stratford Road, Manurewa	45	48	46

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
31 Phar Lap Crescent, Takanini	49	49	46
8 Clarice Place, Takanini	43	46	46
19 Sarteano Drive, Manurewa	42	46	45
7 Glenburn Place, Papakura	47	49	45
73 Sheriff Place, Randwick Park	42	45	45
6 Clarice Place, Takanini	43	46	45
55 Foxlaw Street, Randwick Park	42	45	45
11 Biplane Street, Takanini	42	46	45
3A Glenburn Place, Papakura	48	49	45
16 Phar Lap Crescent, Takanini	48	49	45
5 Glenburn Place, Papakura	47	49	45
35A Phar Lap Crescent, Takanini	45	47	45
33 Phar Lap Crescent, Takanini	49	49	45
2/8 Clarice Place, Takanini	42	46	45
41A Phar Lap Crescent, Takanini	45	47	45
4 Phar Lap Crescent, Takanini	49	49	45
7 Civita Court, Manurewa	42	45	45
3 Glenburn Place, Papakura	48	49	45
125 Hyperion Drive, Randwick Park	41	45	45
63 Stratford Road, Manurewa	45	48	45
12 Phar Lap Crescent, Takanini	48	48	45
22 Biplane Street, Takanini	41	45	45
18 Phar Lap Crescent, Takanini	47	48	45
14C Berwyn Avenue, Takanini	41	45	44
2 Braeburn Place, Takanini	48	49	44
15 Yatterina Avenue, Takanini	41	44	44
6 Braeburn Place, Takanini	47	48	44
7 Sires Parkway, Takanini	43	44	44
10 Phar Lap Crescent, Takanini	47	48	44
8 Dittmer Place, Papakura	45	47	44
35 Phar Lap Crescent, Takanini	48	48	44
44A Airfield Road, Takanini	41	45	44
10 Braeburn Place, Takanini	46	48	44
39A Phar Lap Crescent, Takanini	44	46	44
3 Senator Drive, Manurewa	44	47	44
9 Biplane Street, Takanini	41	44	44
9 Civita Court, Manurewa	41	45	44
1/8 Glenburn Place, Papakura	46	48	44
41 Phar Lap Crescent, Takanini	44	45	44
20 Phar Lap Crescent, Takanini	46	47	44
3 Civita Court, Manurewa	41	44	44
14B Berwyn Avenue, Takanini	40	44	44
8 Braeburn Place, Takanini	46	47	44
16 Biplane Street, Takanini	41	44	44
6 Dittmer Place, Papakura	45	47	43
13 Yatterina Avenue, Takanini	40	43	43
132 Porchester Road, Papakura	45	47	43
37 Phar Lap Crescent, Takanini	47	47	43
42 Airfield Road, Takanini	40	44	43
6 Phar Lap Crescent, Takanini	46	47	43

Address	Existing, dB L _{Aeq} (24hr)	Do Nothing, dB L _{Aeq} (24hr)	Do Minimum, L _{Aeq} (24hr)
43 Phar Lap Crescent, Takanini	45	46	43
12 Biplane Street, Takanini	40	44	43
140G Porchester Road, Papakura 2110	45	47	43
39 Phar Lap Crescent, Takanini	46	47	43
14 Bruce Pulman Drive, Takanini	41	43	43
5 Senator Drive, Manurewa	39	42	43
2/4 Glenburn Place, Papakura	44	46	43
2/6 Glenburn Place, Papakura	44	46	43
8 Phar Lap Crescent, Takanini	45	46	43
43A Phar Lap Crescent, Takanini	43	45	43
1/20 Tironui Station Road East, Papakura	44	46	42
1/3 Braeburn Place, Takanini	44	46	42
5 Sires Parkway, Takanini	40	42	42
5 Braeburn Place, Takanini	44	46	42
47A Phar Lap Crescent, Takanini	42	44	42
36 Airfield Road, Takanini	39	43	42
2/20 Tironui Station Road East, Papakura	43	45	42
130A Porchester Road, Papakura	43	45	41
45A Phar Lap Crescent, Takanini	42	43	41
9 Calumet Way, Takanini	41	42	41
45 Phar Lap Crescent, Takanini	44	44	41
127-129 Porchester Road, Papakura	42	43	41
49 Phar Lap Crescent, Takanini	41	42	40
49A Phar Lap Crescent, Takanini	41	42	40
47 Phar Lap Crescent, Takanini	43	44	40
7 Calumet Way, Takanini	40	42	40
51 Phar Lap Crescent, Takanini	40	42	40
51A Phar Lap Crescent, Takanini	40	41	39
21 Walters Road, Takanini	41	43	39
128 Porchester Road, Papakura	39	41	38

2 Appendix B: noise modelling contours