TE TUPU NGĀTAHI
SUPPORTING GROWTH

Pukekohe Transport Network Landscape and Visual Effects Assessment

September 2023

Version 1.0

WAKA KOTAHI
NZ TRANSPORT AGENCY

New Zealand Government

Document Status

Responsibility	Name
Author	Matthew Jones (Isthmus Group Ltd)
Reviewer	Simon Button (Isthmus Group Ltd)
Approver	Matthew Jones (Isthmus Group Ltd)

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Glossary of Defined Terms and Acronyms

Acronym/Term	Description
AC	Auckland Council
AEE	Assessment of Effects on the Environment report
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan: Operative in Part
FULSS	Future Urban Land Supply Strategy
FUZ	Future Urban Zone
MCA	Multi-Criteria Assessment
MHS	Mixed Housing Suburban
MHU	Mixed Housing Urban
NIMT	North Island Main Trunk railway track
NoR	Notice of Requirement
ONF	Outstanding Natural Features
ONL	Outstanding Natural Landscapes
RMA	Resource Management Act 1991
RUB	Rural Urban Boundary
SEA	Significant Ecological Area
SH	State Highway
Te Tupu Ngātahi	Te Tupu Ngātahi Supporting Growth Alliance
THAB	Terrace House and Apartment Building zone
ULDMP	Urban and Landscape Design Management Plan
WDC	Waikato District Council
WDP	Waikato District Plan
Waka Kotahi	Waka Kotahi New Zealand Transport Agency

Executive Summary

This report provides a landscape assessment of the proposed Pukekohe Transport Network which forms part of the Te Tupu Ngātahi Supporting Growth Alliance. The assessment methodology is based on, and consistent with, the **Te Tangi A Te Manu Aotearoa New Zealand Landscape Assessment Guidelines**, Tuia Pito Ora New Zealand Institute of Landscape Architects, July 2022. It specifically provides an assessment of the potential landscape character and visual amenity effects associated with the construction and operation of the proposed Pukekohe project.

The proposed Pukekohe Transport Network comprises nine Notices of Requirements (NoRs) through Pukekohe, Paerata and Drury for the provision of new roads and upgrades of existing roads within the rural and urban environment. The specific designations associated with each NoR of the Pukekohe Transport Network will support the identified and emerging urban pattern in this area.

A concept design has been undertaken for the NoRs (which has been used to inform this assessment) with consent based upon designations related to each NoR. The concept design will be refined through future phases of the Project, undertaken within the scope of the designation conditions and future resource consent conditions. Significant adverse landscape effects have been 'designed out' of the respective projects through the alternatives assessment which involved a Multi Criteria Assessment process, specialist input and design refinement. As such, where possible, the respective alignments and designations avoid any landscape features and identified overlays (such as Outstanding Natural Features, Outstanding Natural Landscapes or Significant Ecological Areas) unless otherwise stated.

The proposed Pukekohe Transport Network alignment is located within both rural and urban landscapes between Drury to the north, Paerata and Pukekohe to the south. The projects provide a connection between Drury and Pukekohe, the urban setting of Pukekohe and provides connections to the existing state highway network – State Highway 22 and State Highway 1.

A high proportion of the subject areas where the designations are proposed to be aligned will form part of emerging urban environments identified through the Auckland Unitary Plan Future Urban Zone and respective structure planning processes[1]. This will substantially change the character of development in the area from rural to urban. The respective NoR Projects will form visually integrated elements within these locations, designed to respond to the underlying landscape and forming future urban patterns. They will be consistent with the anticipated urban landscape character and will be supported by the mitigation measures proposed which are to be implemented through an Urban and Landscape Design Management Plan (ULDMP). For the Waikato NoR 8, the Project will respond to the anticipated rural landscape character and be supported by the mitigation measures proposed and implemented as part of a Landscape Management Plan.

Where the designations span through what will remain as the rural environment, the alignments will change the character of the landscape. However, the proposed alignment and the extent of the designation has been tested and evaluated (from a landscape character and visual amenity

[1] As identified within the *Auckland Future Urban Land Supply Strategy* report 'FULSS', by Auckland Council (July 2017), where large tracts of land around Pukekohe and Drury have been identified for future urbanisation. As such, the likely future environment will include extensive additional development around the fringes of both Drury and Pukekohe which will result in some current rural areas becoming urban / suburban in character.

assessment perspective) and is considered to be appropriate. The mitigation measures proposed in this report (implemented through an ULDMP, or Landscape Management Plan in the Waikato NoR,) are appropriate and adequate to remedy any potential adverse effects arising from the Project.

The Pukekohe Transport Network alignment largely avoids any landscape related overlays, however NoR 5 and NoR 8 (AC and WDC) are located within the Pukekohe East Tuff Ring (Outstanding Natural Feature). These segments of the alignment represent the upgrade of the existing Pukekohe East Road. A section of alignment within NoR 4 is located within a Significant Ecological Area.

Overall, the Notices of Requirement will result in the following effects:

NOR	***Construction Effects***		***Operational Effects***	
NoR 1	*Landscape Character*	***Low - Moderate***	*Landscape Character*	***Very Low***
	Visual Amenity	***Low to Moderate***	*Visual Amenity*	***Low***
NoR 2a (South Drury Connection)	*Landscape Character*	***Low-Moderate***	*Landscape Character*	***Low-Moderate***
	Visual Amenity	***Low to Moderate-High***	*Visual Amenity*	***Low to Low-Moderate***
NoR 2b (SH22 Connection)	*Landscape Character*	***Low to Moderate***	*Landscape Character*	***Low***
	Visual Amenity	***Low to Moderate***	*Visual Amenity*	***Low***
NoR 2c (Drury – Paerata Link)	*Landscape Character*	***Moderate***	*Landscape Character*	***Low to Moderate***
	Visual Amenity	***Low to Moderate-High***	*Visual Amenity*	***Low***
NoR 2d (Paerata Arterial)	*Landscape Character*	***Moderate***	*Landscape Character*	***Low***
	Visual Amenity	***Low-Moderate to Moderate-High***	*Visual Amenity*	***Low to Low-Moderate***
NoR 3	*Landscape Character*	***Low***	*Landscape Character*	***Very Low***
	Visual Amenity	***Low to Low-Moderate***	*Visual Amenity*	***Low***

NOR	Construction Effects		Operational Effects	
NoR 4	*Landscape Character*	***Moderate-High***	*Landscape Character*	***Very Low to Moderate***
	Visual Amenity	***Moderate to Moderate-High***	*Visual Amenity*	***Low to Moderate***
NoR 5	*Landscape Character*	***Low-Moderate***	*Landscape Character*	***Very Low***
	Visual Amenity	***Low-Moderate to Moderate-High***	*Visual Amenity*	***Low***
NoR 6	*Landscape Character*	***Very Low***	*Landscape Character*	***Very Low***
	Visual Amenity	***Low***	*Visual Amenity*	***Very Low***
NoR 7	*Landscape Character*	***Low***	*Landscape Character*	***Very Low***
	Visual Amenity	***Low to Low-Moderate***	*Visual Amenity*	***Low-Moderate***
NoR 8 (AC and WDC)	*Landscape Character*	***Moderate***	*Landscape Character*	***Low-Moderate***
	Visual Amenity	***Low-Moderate***	*Visual Amenity*	***Low***

The new and upgraded transport corridors have the potential to provide positive effects through the design which can include enhanced amenity, landscape mitigation planting and safety improvements for the user.

Although there are a range of assessment conclusions reached related to the respective NoRs, this landscape assessment finds that the proposed Pukekohe Transport Network NoRs are appropriate and can be integrated into this landscape, provided the mitigation measures proposed are adhered with. These recommended measures will be implemented through a ULDMP (or Landscape Management Plan in the Waikato NoR).

1 Introduction

1.1 Purpose and Scope of this Report

This landscape assessment forms part of the suite of technical reports prepared to support the Assessment of Effects on the Environment (AEE) for nine Notices of Requirement (NoRs) being sought by Waka Kotahi NZ Transport Agency (Waka Kotahi) and Auckland Transport (AT) for the Pukekohe Transport Network under the Resource Management Act 1991 (RMA).

This report considers the actual and potential effects associated with the construction, operation and maintenance of the Pukekohe Transport Network on the existing and likely future environment as it relates to landscape character and visual amenity effects (landscape effects) and recommends measures that may be implemented to avoid, remedy and/or mitigate these effects.

The key matters addressed in this report are as follows:

- Identify and describe the context of the Pukekohe Transport Network area;
- Identify and describe the actual and potential landscape character and visual amenity effects of each Project corridor;
- Recommend measures as appropriate to avoid, remedy or mitigate actual and potential landscape character and visual amenity effects (including any conditions/management plan required) for each Project corridor; and
- Present an overall conclusion of the level of actual and potential landscape character and visual amenity effects for each Project corridor after recommended measures are implemented.

1.2 Report Structure

The report is structured as follows:

- Project overview with a summary of the Pukekohe Transport Network Projects in section 2;
- Overview of the methodology used to undertake the assessment and identification of the assessment criteria and any relevant standards or guidelines in section 3;
- Identification and description of the existing and likely future landscape environment in section 4;
- Description of the actual and potential positive effects on landscape character and visual amenity of the Project in section 5;
- Description of the actual and potential adverse landscape character and visual amenity effects of (i) construction and (ii) the operation of the Project, including recommended measures to avoid or mitigate potential adverse effects, in section 6; and
- Overall conclusion of the level of potential adverse landscape character and visual amenity effects of the Project after recommended measures are implemented in section 7.

This report should be read alongside the AEE, which contains further details on the history and context of the Projects. The AEE also contains a detailed description of works to be authorised for the Pukekohe Transport Network Projects as a whole and each NoR, and likely staging 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. As such, they are not repeated here, unless a description of an activity is necessary to understand the potential effects, then it has been included in this report for clarity.

2 Pukekohe Transport Network Overview

The Pukekohe Project comprises eight transport projects through Pukekohe, Paerata and Drury. A concept design has been undertaken for the NoRs. The design will be further refined through future phases of the Project and will be undertaken within the scope of the designation conditions and future resource consent conditions. The detailed design of the Project will be undertaken prior to construction and reflected in the Outline Plan(s) which will be submitted to Council as set out in s176A of the RMA.

The Pukekohe Transport Network encompasses nine NoRs for the Pukekohe, Paerata and Drury West areas. AT has lodged six NoRs with Auckland Council and Waka Kotahi has lodged two NoRs with Auckland Council and one with Waikato District Council. The Pukekohe Transport Network includes provision for improved walking and cycling, public transport, and general traffic connections.

For the purposes of this assessment, Mill Road and Pukekohe East Road Upgrade (that includes works within Auckland Council and Waikato District Council) is referred to as one transport project, despite being submitted as two separate NoRs. The matters relevant to each jurisdictional area are addressed through this assessment.

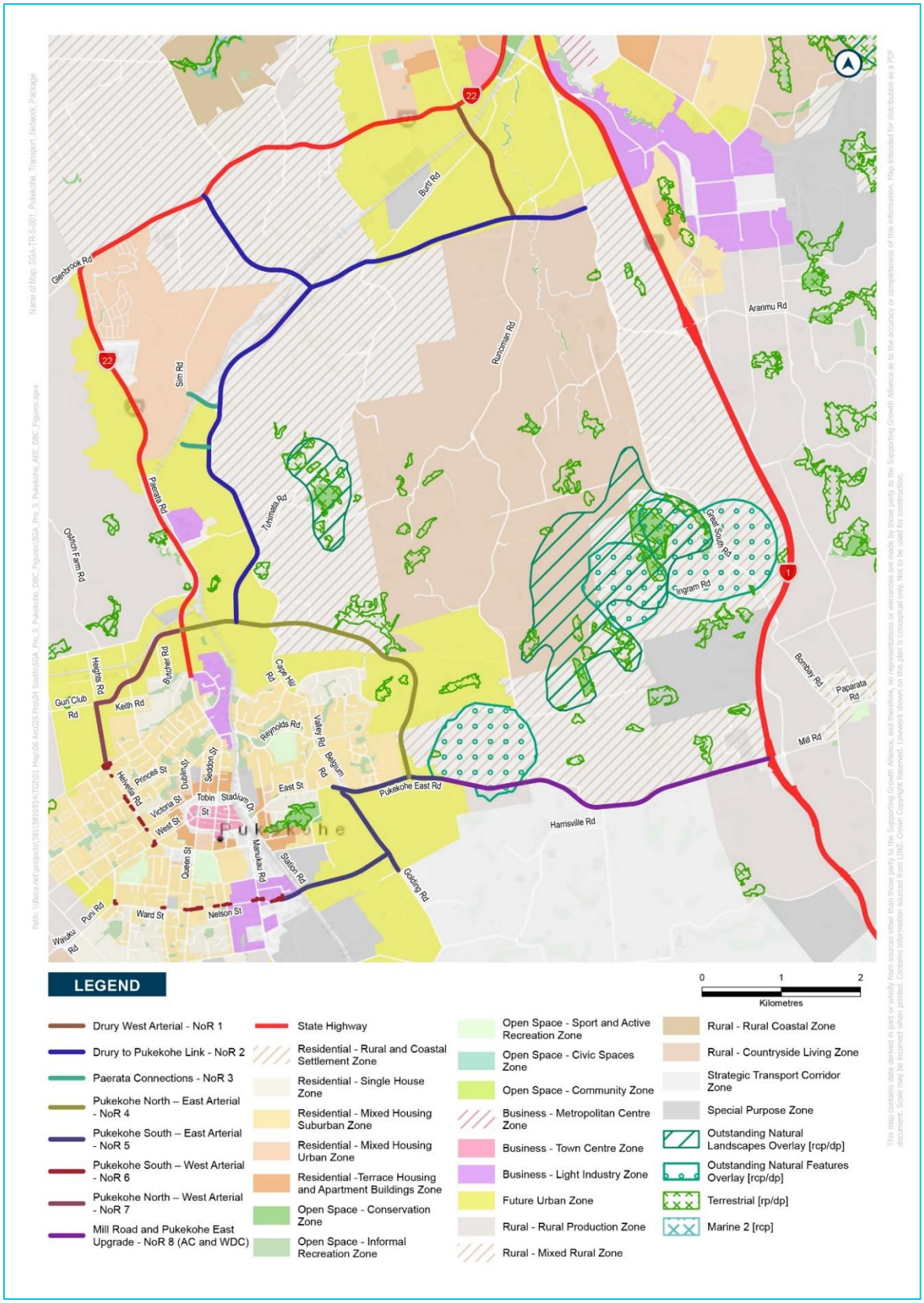

Figure 2-1: Pukekohe Transport Network

Table 2-1 Pukekohe Package Project Summary

NoR	Project	Requiring Authority	Description
1	**Drury West Arterial**	AT	• NoR 1 is a 1.6km new transport corridor extending south from the intersection of SH22 and Jesmond Road to the proposed Drury to Pukekohe Link (NoR 2). • It connects Drury West Town Centre, Drury West Rail Station and provides access to the strategic transport network including SH1 and SH22. It connects with Burtt Road and to Runciman Road in the south. • This new transport corridor improves local connectivity in Drury West and the wider area to centres, employment and rail stations. • Between SH22 and Burtt Road, the proposed cross section is a four-lane arterial 30m wide. This includes two lanes for PT and walking and cycling facilities on both sides of the corridor. • South of Burtt Road a two-lane arterial with a 24m wide cross section is proposed with two lanes for general traffic and walking and cycling facilities on both sides of the corridor. • Three new bridges are proposed over existing NIMT rail line, and two tributaries of the Ngakoroa Stream. • Three new stormwater wetlands are proposed and new culverts and swales.
2	**Drury-Pukekohe Link**	Waka Kotahi	• NoR 2 provides a north south strategic corridor with two general traffic lanes proposed and active transport facilities on one side of the corridor. The total length of the NoR is 10.6km. • NoR 2 is split into the following four segments.
	South Drury Connection segment		• South Drury Connection segment provides a new connection extending from Great South Road in the east at the proposed SH1 Drury South Interchange (a proposed Waka Kotahi SH1 project). The alignment is along the edge of the FUZ to Burtt Road in the west. • It provides a strategic connection improving local access in Drury West, provides resilience in the transport network supporting SH22 and SH1, provides direct connectivity to the proposed Drury South Interchange and supports the proposed strategic active modes corridor. • A 24m wide cross section is proposed with two lanes for general traffic, with walking and cycling on one side of the corridor. • Three new bridges are proposed over tributaries of the Ngakoroa Stream. • Three stormwater wetlands are proposed and new culverts and swales.

NoR	Project	Requiring Authority	Description
	SH22 Connection segment		• Connecting with the South Drury Connection and Drury-Paerata Link segments, this connection provides a strategic connection between State Highway 1 (SH1) and State Highway 22 (SH22). • It improves access between Drury West and Paerata, provides resilience in the transport network supporting SH22 and SH1, provides direct connectivity to the proposed Drury South Interchange and supports the proposed strategic active modes corridor. • It includes a new transport corridor and a partial upgrade of Sim Road (north). • A 24m wide cross section is proposed with two lanes for general traffic and walking and cycling on one side of the corridor. • Two new bridges are proposed over the Oria Creek and NIMT. • Two stormwater wetlands are proposed and new culverts and swales.
	Drury-Paerata Link segment		• Drury-Paerata Link segment is a new corridor connecting the segments of South Drury Connection, SH22 Connection and Paerata Arterial. This segment extends from an intersection with Burtt Road in the north, to the Paerata Arterial segment in the south. • It provides connectivity between Drury and Paerata providing a strategic connection between two areas of future urban development. • A 24m wide cross section is proposed with two lanes for general traffic and walking and cycling on one side of the corridor. • Two bridges are proposed over tributaries of the Oira Creek. • Three stormwater wetlands are proposed and new culverts and swales.
	Paerata Arterial segment		• Paerata Arterial segment is located along the eastern edge of Paerata FUZ. It connects with Paerata Connections NoR 3 at the northern extent and to the proposed Pukekohe North East Arterial NoR 4 at its southern extent. • It includes an upgrade of part of Sim Road (south), Tuhimata Road and a new section of transport corridor. • It increases connectivity to Paerata FUZ, Paerata Rail Station and Pukekohe Town Centre. • A 24m wide cross section is proposed with two lanes for general traffic and walking and cycling on one or both sides of the corridor. No bridges are proposed. • Six stormwater wetlands are proposed (one shared with NoR 4 and one shared with NoR 3) and new culverts.
3	**Paerata Connections**	AT	• The Paerata Connections provide two connections from the existing Sim Road (south) proposed to be upgraded by NoR 2 to the Paerata Rail Station and Paerata Rise development. • The connections provide the primary east-west connections for all modes in Paerata. • NoR 3 has includes two segments:

NoR	Project	Requiring Authority	Description
			• **Sim to Sim Connection segment** provides a new connection of approximately 400m between the two extents of Sim Road over the railway (NIMT). • **Paerata Rail Station Connection segment** provides a new transport corridor approximately 330m in length between the Paerata Rail Station (KiwiRail designation 6311 currently under construction) and NoR 2. • A 24m wide cross section is proposed with two lanes for general traffic and walking and cycling on both sides of the corridor. • One bridge is proposed over the NIMT to connect the two extents of Sim Road for the Sim to Sim Connection segment. • One new stormwater wetland is proposed that is shared with NoR 2 and a new culvert.
4	**Pukekohe North-East Arterial**	AT	• The Pukekohe North-East Arterial is an approximately 4km new transport corridor from SH22 in the northwest connecting to Pukekohe East Road in the south-east. • It connects the strategic corridors at SH22 (at the northern extent of the Pukekohe North-West Arterial NoR 7), the Drury to Pukekohe Link NoR 2 and Pukekohe East Road proposed to be upgraded by NoR 5 and NoR 8. • Its primary function is for general traffic, freight, an active mode links between future neighbourhoods and alleviating traffic on existing roads at Cape Hill Road and Valley Road. • A 24m wide cross section is proposed with 2 lanes for general traffic and walking and cycling proposed on both or one side of the corridor. • Seven bridges are proposed over the Whangapouri Creek, the NIMT, and other unnamed streams and tributaries. • Six new stormwater wetlands are proposed and new culverts.
5	**Pukekohe South-East Arterial**	AT	• The Pukekohe South-East Arterial upgrades part of Pukekohe East Road, Golding Road and provides a new connection between Golding Road (from north of Royal Doulton Drive) and across Station Road and the NIMT to the existing industrial development on Crosbie Road to Svendsen Road. • It is a primary east-west connection to assist in redirecting general traffic and freight away from the Pukekohe town centre to provide additional resilience to the wider network. • A 24m wide cross section is proposed with two lanes for general traffic with walking and cycling on the southern side of the corridor on Pukekohe East Road and on both sides for the remainder of the corridor. • One bridge is proposed crossing Station Road and the NIMT. • Five new stormwater wetlands are proposed and new and upgraded culverts.

NoR	Project	Requiring Authority	Description
6	**Pukekohe South-West Upgrade**	AT	• Pukekohe South-West Upgrade involves the re-allocation of road space within the existing road corridor for a bi-directional cycle way and footpath upgrade. The proposed designation is limited to specific intersections and driveways to safely accommodate active mode facilities. The existing road reserve is to be utilised where possible retaining a 20m wide cross section with 2 lane general traffic, walking on both sides and a bi-directional cycleway on one side of the corridor. • No bridges or stormwater wetlands are proposed.
7	**Pukekohe North-West Arterial**	AT	• Pukekohe North-West Arterial provides a connection between Helvetia Road in the southwest and SH22 in the northeast. It upgrades part of Helvetia Road, utilises part of Keith Road (a paper road), and forms a new connection between Beatty Road and Butcher Road to SH22 – connecting to the Pukekohe North-East Arterial NoR 4. • It provides an alternative connection for all modes travelling north to south in western Pukekohe assisting in redirection of general traffic away from the town centre and provides additional resilience to the wider network. A 24m wide cross section is proposed with two lanes for general traffic and walking and cycling on both sides of the corridor. • No bridges are proposed. • Two new stormwater wetlands are proposed and new and upgraded culverts.
8 (AC) And 8 (WD)	**Mill Road and Pukekohe East Road Upgrade**	Waka Kotahi	• NoR 8 upgrades Mill Road (Bombay) in the east and Pukekohe East Road in the west. • It provides an important strategic connection between Auckland and Waikato and from SH1 to Pukekohe urban areas for traffic and freight, with a major rural active mode connection. Harrisville Road plays a significant role in distributing traffic from further south into Waikato. • Mill Road is proposed to be upgraded to four lanes (2.1 kms) from SH1 in the east to Harrisville Road in the west. It has a 30m wide cross section with four lanes for general traffic, with walking and cycling on the southern side. • Pukekohe East Road is proposed to be upgraded (3.4 kms) for walking and cycling facilities on the southern side from Harrisville Road in the east to NoR 5 in the west. • One new stormwater wetland is proposed, swales and new and upgraded culverts.

3 Assessment Methodology

This methodology section sets out the process that has been undertaken, and the key matters which have been taken into consideration to assess the relevant landscape character and visual amenity effects of the Pukekohe Transport Network on the receiving environment. A detailed description of the work undertaken is contained under the relevant headings throughout this report.

The Pukekohe Transport Network alignment has been developed to a concept design level for designation which is what is assessed. As it moves through the detailed design process and as construction methodology is confirmed, it is likely that some details will change, but will remain within the designation and envelope of effects assessed in this report. All figures and dimensions provided are approximate and will be confirmed during the detailed design stage.

The Pukekohe Transport Network alignment includes nine NoRs, as outlined within Section 2 above. This report provides a description of the existing environment and landscape setting, and an assessment of the common landscape character and visual amenity effects (across all NoRs) and then on each individual NoR. A summary assessment of the overall alignment and designation is also provided.

The assessment methodology is based on, and consistent with, the **Te Tangi A Te Manu Aotearoa New Zealand Landscape Assessment Guidelines**, Tuia Pito Ora New Zealand Institute of Landscape Architects, July 2022. This assessment has also been prepared with consideration given to the following guidelines and documents:

- Waka Kotahi – Bridging the Gap: NZTA Urban Design Guidelines (2013);
- Waka Kotahi – Landscape and Visual Assessment Guidelines (2013);
- Waka Kotahi – Bridge Manual (2013);
- Auckland Council – Auckland Unitary Plan (AUP:OP);
- Auckland Council – Auckland's Urban Ngahere (Forest) Strategy (2019);
- Auckland Council – Drury-Ōpāheke Structure Plan (2019); and
- Auckland Council – Paerata-Pukekohe Structure Plan (2019).

3.1 Preparation for this Report

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

- Input to the options assessment process (Multi Criteria Analysis (MCA)) used to inform the preferred transport corridor alignment;
- Reviews of the project concept designs and Te Tupu Ngātahi GIS viewer and attendance at design review workshops;
- A review of the statutory setting of the Projects and surrounding context;
- A review of the other data provided via the Te Tupu Ngātahi GIS portal, such as land uses and AUP:OP zones, topography, hydrology, vegetation patterns, natural resources and natural heritage layers and aerial photography;
- A preliminary site visit on 26 January 2023 with the Project Team;
- A more focused and detailed site visit undertaken on 16 March 2023 to further understand the receiving environment;

- Attendance at a specialists' workshop held on 22 March 2023 to discuss initial findings of the assessment process and following the first site visit;
- Personal attendance at a Mana whenua hui in April 2023 to present key findings of the landscape assessment; and
- Attendance at the site visit with the Auckland Council specialists on 29 June 2023.

Alongside the preparation of this assessment, the author has reviewed the following documents:

- Construction Method Statement;
- Revisions of concept design drawings; and
- Other Technical Assessments, including:
    - Arboricultural Assessment;
    - Ecological Assessment; and
    - Urban Design Assessment.

This assessment relates to **landscape character** and **visual amenity** matters. Where other matters or expertise have been relied upon, these have been referenced or stated within the assessment with the information available at the time of issue.

3.2 Assessment Approach

The following methodology has been used to identify and assess the landscape values of the wider Pukekohe, Paerata and Drury context and the Pukekohe Transport Network's potential effects on those values:

- A desktop review of the Pukekohe Transport Network's alignment and its setting;
- A desktop review of relevant statutory and non-statutory documents, including the AUP:OP, Waikato District Plan (WDP), and design frameworks and manuals;
- Site visits to publicly accessible locations and a site visit to walk the route alignment (including across private land) were undertaken in January, March and June 2023;
- Providing a description of the Pukekohe Transport Network proposed NoR designations as it relates to landscape matters;
- A description of the existing environment and landscape context of the alignment and designation. The description includes reference to the existing (current) land uses and the rural and urban settings (where relevant);
- A description of the likely future landscape context of the alignment and proposed designations. The description includes reference to the likely future land uses and the rural and urban settings (where relevant) as anticipated by the Future Urban Land Supply Strategy (FULSS) and Future Urban Zone (FUZ);
- An analysis of the landscape character values of the alignment and designation, and the surrounding landscape context;
- Identification and analysis of the visual catchment;
- An assessment of **positive** effects arising from the designation;
- An assessment of the potential landscape character effects and visual amenity effects during the **construction** period, including any effects on any recognised landscape overlays;
- An assessment of the potential landscape character effects and visual amenity effects during **operation**, including any effects on any recognised landscape overlays; and

- Identification of recommended measures to avoid, remedy or mitigate potential effects to form part of the ULDMP (or Landscape Management Plan for the Waikato NoR) recommended as conditions on the designations.

3.3 Assessment Criteria

The assessment of effects on landscape character and visual amenity within this report refers to a rating scale for the identified landscape value. To be consistent with the ratings of the values described, in relation to potential effects, the same seven-point scale (below) is used to achieve a level of standardisation[2]. Words are used in preference to numbers to reduce the likelihood of using 'scores' in a formulaic way.

Very Low	Low	Low – Moderate	Moderate	Moderate – High	High	Very High

It should be noted that a change in a landscape does not in itself mean that a proposal will result in an adverse effect on the values of that landscape:

> *"Change itself is not an effect: landscapes change constantly. It is the implications of change for a landscape's values that is the effect."*[3]

The nature of effects can be **Adverse** (negative) or **Beneficial** (positive). An assessment of effects combines both value ratings (Very Low – Very High) and nature of effects (Adverse, Positive).

- An adverse effect relates to an activity which results in a reduction in landscape and / or visual amenity values; and
- A positive effect relates to an activity which enhances landscape and / or visual amenity values through restoration and / or provision of positive elements or features.

Where a proposal will result in a change, but that change will have no effect on the characteristics or values of a particular landscape or view, a nature of effect rating of '**neutral**' will be provided.

3.4 Landscape Character Effects

The methodology for assessing the effects of an activity or development on landscape character requires a four-stage process:

1. Definition of 'landscape';
2. Analysis of landscape characteristics and identification of landscape values;
3. Overall synthesis (or appraisal) of landscape character; and
4. Assessment of effects of an activity or change on those characteristics.

[2] The scale is symmetrical around 'moderate'. The scale is based on the recommended NZILA Best Practice Guide and is consistent with the *Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines*, July 2022.

[3] Refer Te Tangi a te Manu, paragraph 6.03

> *'While landscape draws strands from diverse sources (natural sciences, humanities, cultural perspectives), it is perceived and experienced as a unified phenomenon. It is an integrated whole. It is more than a summary of data – the whole is greater than the sum of the parts.*
>
> *The current professional practice of conceptualising 'landscape' as the overlap of its physical, associative, and perceptual dimensions'*[4]

The three overlapping dimensions of landscape character include:

- **Physical** aspects (its geomorphology, ecological communities and processes) of the site;
- **Perceptual** aspects (the vividness and memorability of the landscape features); and
- **Associative** aspects, including such meanings as the historical connections of the site.

This report includes an analysis of landscape characteristics and an assessment of physical, perceptual and associative attributes as they relate to the Pukekohe Transport Network alignment during both construction (temporary) and long-term operational effects.

Construction effects: Construction effects are generally considered temporary in duration and dynamic in nature. The construction stage includes impacts on the bio-physical landscape (including removal of vegetation and landform modification), associative aspects, and perceptual components, including visual amenity from public locations and private residences.

Operational effects: Operational effects are also assessed against the same aspects as outlined under construction; however they are assessed against the completed works of the project, and include any proposed landscape mitigation measures.

3.5 Visual Amenity Effects

Visual effects relate the changes to the landscape values experienced within a view. Visual values are inherently linked to landscape values. The nature of a view depends on how it is perceived and the extent to which it is valued or not.[5]

An assessment of visual effects is provided for both the **construction** and **operation** of the designation.

Given that this assessment is based on the projects having an unknown implementation timeframe, acknowledging that some parts of the existing environment will remain rural, it is anticipated that some will have changed by the time that the infrastructure is implemented, especially in areas of FUZ. The visual assessment of each NoR is therefore an exercise intended to provide an indication of the level of effect based on the likely future environment. Photographs[6] captured during the site visits provide visual representation of the existing environment (at the time of capture) with the likely future environment illustrated within the supporting maps and described within this report.

4 Refer Te Tangi a te Manu, Paragraphs 4.21 – 4.22
5 Refer Te Tangi a te Manu, Paragraphs 6.09 (point 2)
6 Photos captured with iPhone 12 Pro (unless otherwise specified).

3.6 Construction Effects

The assessment of construction effects is based upon an understanding of the required process to implement infrastructure of the type and scale anticipated within the designation. This will likely include, but is not limited to:

- Earthworks manipulation: including modification to the existing landscape, and machinery such as excavators, loaders, dozers, graders and scrapers.
- Road creation / widening including machinery such as milling machines, pavers, compactors and rollers.
- Lifting machinery: including machinery such as cranes for bridge construction.

It is assumed that the construction process will be staged between the NoRs. An indicative construction methodology has been prepared for the projects which are typical methodologies for roading projects and are outlined as part of the AEE. Once the project moves through the detailed design stage, a detailed construction methodology for each NoR will be prepared.

3.7 Assumptions

In preparation of this report, the following assumptions have been made:

- It is assumed that the construction of the Pukekohe Transport Network alignment will likely occur at a similar time to the development of the FUZ. For transport corridors in the FUZ, this assessment has therefore made the assumption that the construction phase of the Pukekohe Transport Network will occur in the existing environment (generally rural and urban fringe), and that the operational phase of the Pukekohe Transport Network will occur in the future urban environment.
- For those areas that are already urbanised, or are planned to be (as per precinct plans in the AUP:OP), construction and operation of the transport corridors will be within an urban environment (e.g. part of NoR 3 and NoR 6).
- For those areas that are in the rural zone and are to remain so, construction and operation of the transport corridors will be within the rural zone (e.g. parts of NoR 2 and parts of NoR 4).
- Earthworks will be limited to within the footprint of the designation.
- The assessment does not specifically address cultural landscape and any cultural effects. For matters related to the cultural impact assessment, please refer to the AEE document.
- The author and reviewer of this assessment have been involved in the MCA process to determine the Pukekohe Transport Network alignment and designation footprint.
- Regional resource consents are not currently being sought for the Pukekohe Transport Network and it is understood that the appropriate regional resource consents will be sought at the detailed design stage in the future, prior to construction of the Projects. This assessment therefore focuses on the landscape character and visual amenity effects of the land use activities that will be authorised by the proposed designations for the Projects. Effects on the natural character of wetlands, lakes, rivers and their margins have also been considered through the options assessment, design and designation footprint for the Projects.
- Site assessment has been undertaken from public and private land (where accessible) and supported through desktop analysis which included GIS mapping and aerial photography.

4 Existing and Future Receiving Environment

4.1 Broader Existing Environment

The Pukekohe Transport Network alignment is located within the rural and urban landscape between Drury to the north and Pukekohe to the south. The projects provide a connection between Drury and Pukekohe, the urban setting of Pukekohe and provides connections to the existing state highway network – SH22 and SH1.

Proximate to NoRs 1, 2 and 3

The existing environment between Drury and Pukekohe (broadly defined as the setting of NoRs 1 - 3) includes predominantly rural land with a combination of rural / rural residential, productive uses and an urbanised area at Paerata and northern parts of Pukekohe. The land use is broadly characterised by productive rural land (predominantly pastoral with some arable and horticultural land uses) interspersed with rural residential properties and farmsteads.

The area's topography is diverse and is generally between 10m – 75m above sea level. It includes undulating landforms (including a series of volcanic tuff rings) [7] with a mix of open pasture and vegetation. It has numerous catchments and stream systems which all flow to the north to the Ngakoroa Stream, Oira Creek, Whangapouri Creek, or Hingaia Creek, which eventually connect with to the Pahurehure Inlet and the wider Manukau Harbour. Landcover is a mix of open pasture, shelterbelts, planted lot boundaries and curtilages, clusters of vegetation within catchments and pockets of vegetation (native bush and plantation forests), some of which are associated with the stream margins. Generally, vegetation becomes sparser to the south, proximate to Pukekohe.

Within this area proximate to the designation areas for NoRs 1, 2 and 3 there are a number of landscape features and elements of significance which includes an Outstanding Natural Landscape (ONL)[8] and Significant Ecological Area (SEA)[9]. The designations do not directly interact with many of these features, however the alignment spans directly adjacent to SEA _T_4380.

Although currently predominantly of a rural / rural residential land use, there is existing built form and infrastructure evident in the area. This includes houses, buildings, roads, overhead Transpower transmission lines and the North Island Main Trunk (NIMT) rail line connecting to Pukekohe.

7 Refer Figure 4-3 below. Sourced from Figure 2 – Page 3 of the Geological Heritage of the Pukekohe Area Study (Bruce W Hayward, 2014), contained within the Auckland Council Pukekohe Heritage Survey.

8 The ONL is an area of *Hill country Cultured nature* relating to its indigenous forest, landforms, rock formations, stream corridors and volcanic features.
Refer *Natural Heritage: Outstanding Natural Landscapes Overlay [rcp/dp] - Area 59, West Ramarama and Bombay (two sites)* within the AUP:OP.

9 SEA_T_4380 is an area of indigenous vegetation that has the following 'factors for assessing ecological value' as identified within the AUP:OP:
(1) Representativeness
(2) Threat status and rarity
Refer *Chapter L Schedules, Schedule 3 Significant Ecological Area – Terrestrial Schedule*

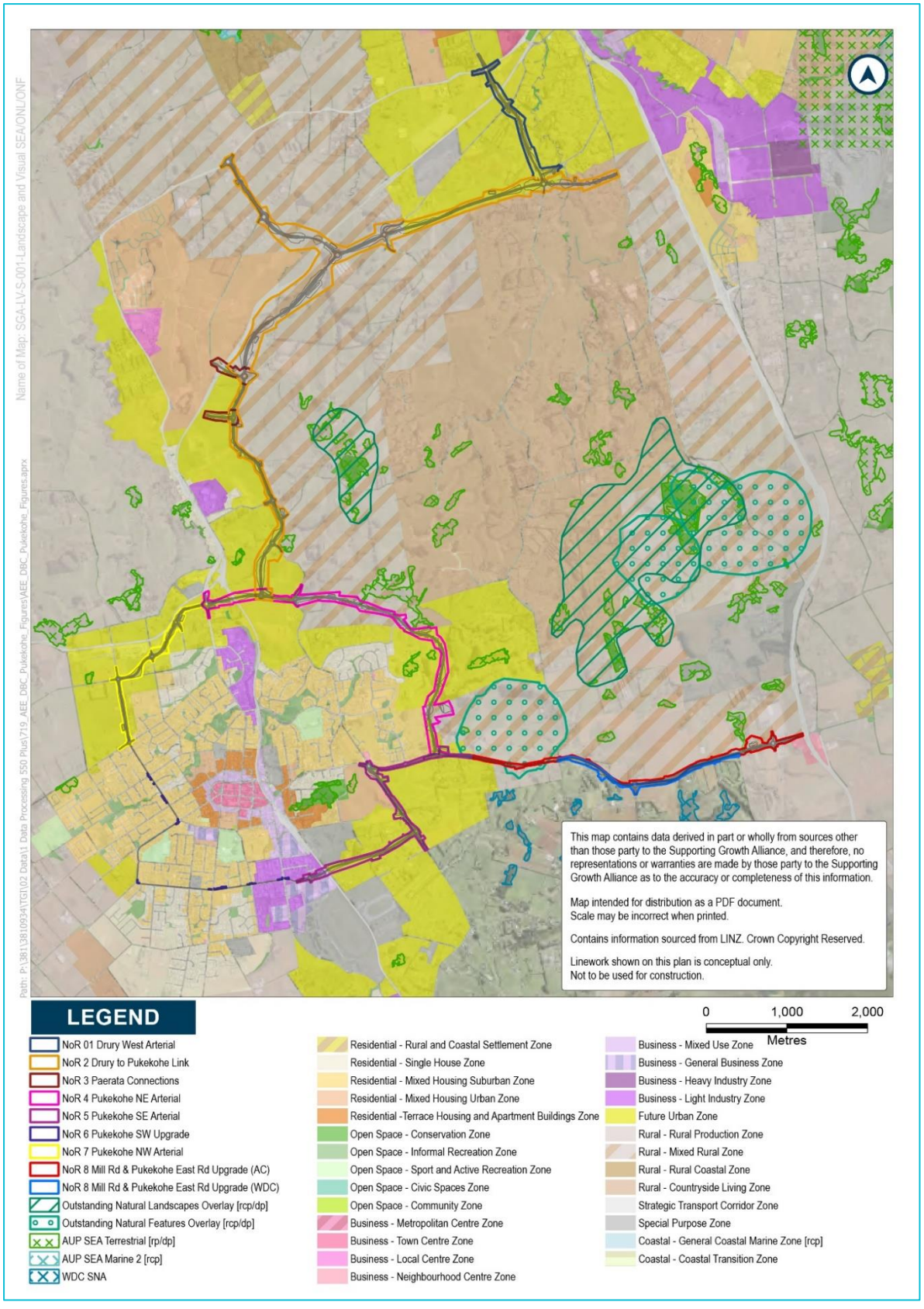

Figure 4-1: Pukekohe Transport Network showing ONL/ONF/SEA and AUP:OP zoning

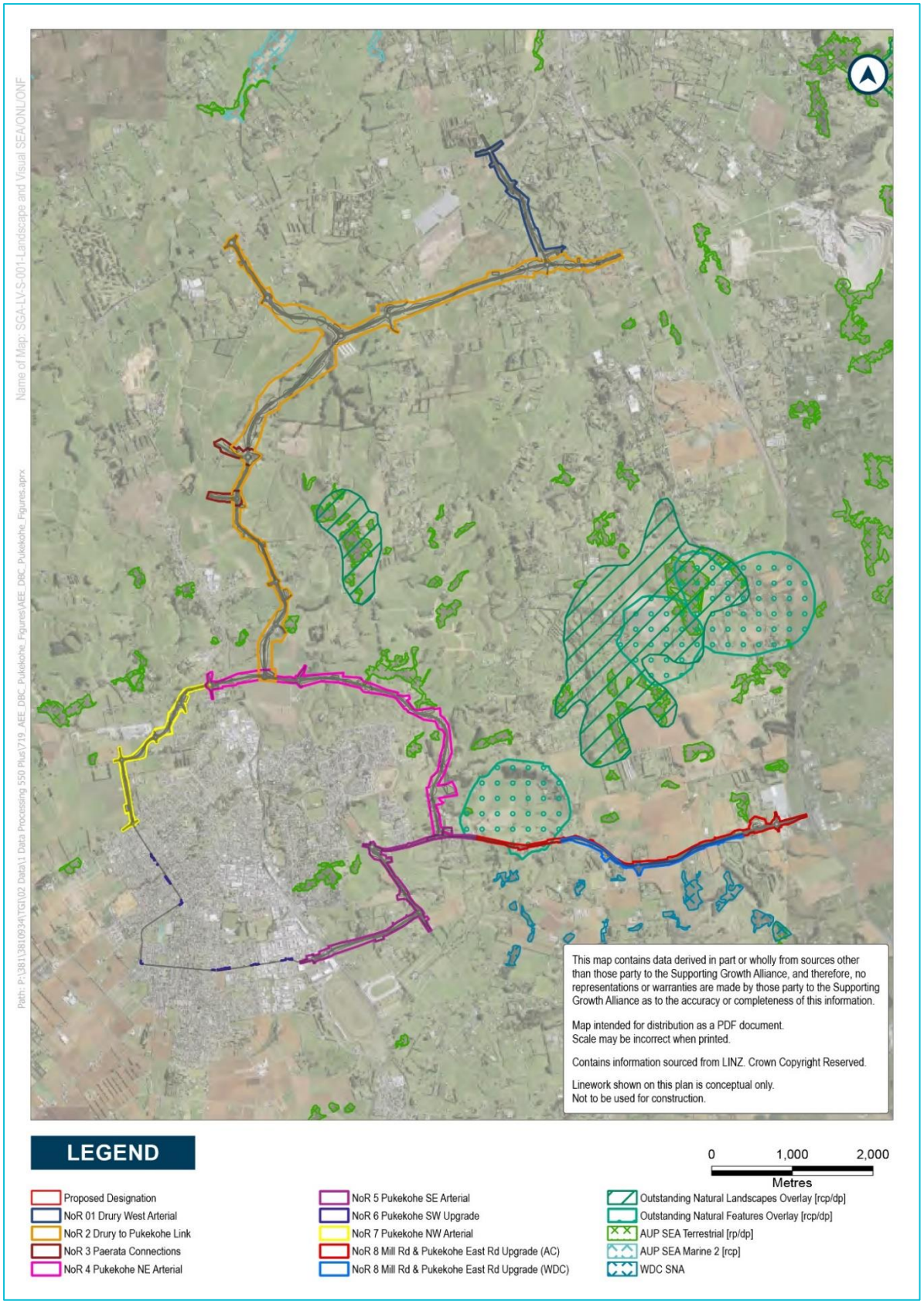

Figure 4-2: Pukekohe Transport Network showing ONL/ONF/SEA overlays upon aerial mapping

Proximate to NoRs 4, 5, 6 and 7

NoRs 4 – 7 are located within the southern extent of the proposed Pukekohe Transport Network and predominantly circumnavigate the urban edge of Pukekohe and partially extend into the adjacent rural environment.

The existing environment includes rural land uses with a combination of productive and rural residential development. NoR 6 and parts of NoR 5 and 7 are within the urban environment of Pukekohe which includes suburban residential, industrial and commercial land uses. The southern and western extent of the proposed designation for NoR 6 is located within the existing urban setting of Pukekohe which predominantly includes mixed housing suburban development, with light industrial development located to the south east (east of John Street). NoR 6 proposes designation at eight intersections and a number of driveways for regrading. NoR 7 is predominantly located within the existing rural environment.

The northern and eastern extent of the proposed designations are on the urban fringe of Pukekohe (NoRs 4 and 5) and are predominantly located in the rural environment. Land uses, landform and vegetation patterns are generally consistent with the wider rural landscape between Drury and Pukekohe, however the topography to the north east of Pukekohe is characterised by more pronounced and exaggerated interlocking gullies / catchments with more defined and regular blocks of vegetation.

The topography of the area is diverse which includes undulating landforms, particularly to the northeast and northwest. There is rolling topography within the western reaches of the area, but less than that to the east. The urban area of Pukekohe has a predominantly northern aspect due to its location on, and proximity to, Pukekohe Hill.

Landcover includes a mix of open pasture, clusters of vegetation within catchments, shelterbelts, pockets of vegetation associated with the stream margins, and the aforementioned urban areas. The area has numerous catchments and stream systems which flow to the north into the Whangapouri Creek system. This flows to the north and eventually connects with the Pahurehure Inlet and the wider Manukau Harbour.

Again, within the area proximate to these NoRs, there are a number of landscape features and elements of significance including an Outstanding Natural Feature (ONF)[10] and SEA's. These are outlined further related to the specific NoRs below.

Proximate to NoR 8

NoR 8 follows the alignment of Pukekohe East Road and Mill Road which connects Pukekohe with SH1 to the east. The existing roads extend through the rural environment and traverse the edge (and partly across) the Pukekohe East tuff ring[11] ONF[12].

A detailed description of the existing environment of each NoR is included within Section 4.3 of this report.

10 The ONF is the Pukekohe East tuff ring volcanic feature.
Refer *Natural Heritage: Outstanding Natural Features Overlay [rcp/dp] – ID 169, Pukekohe East tuff ring* within the AUP:OP.

11 Refer Figure 4-3 below. Sourced from Figure 2 – Page 3 of the Geological Heritage of the Pukekohe Area Study (Bruce W Hayward, 2014), contained within the Auckland Council Pukekohe Heritage Survey.

12 Ibid.

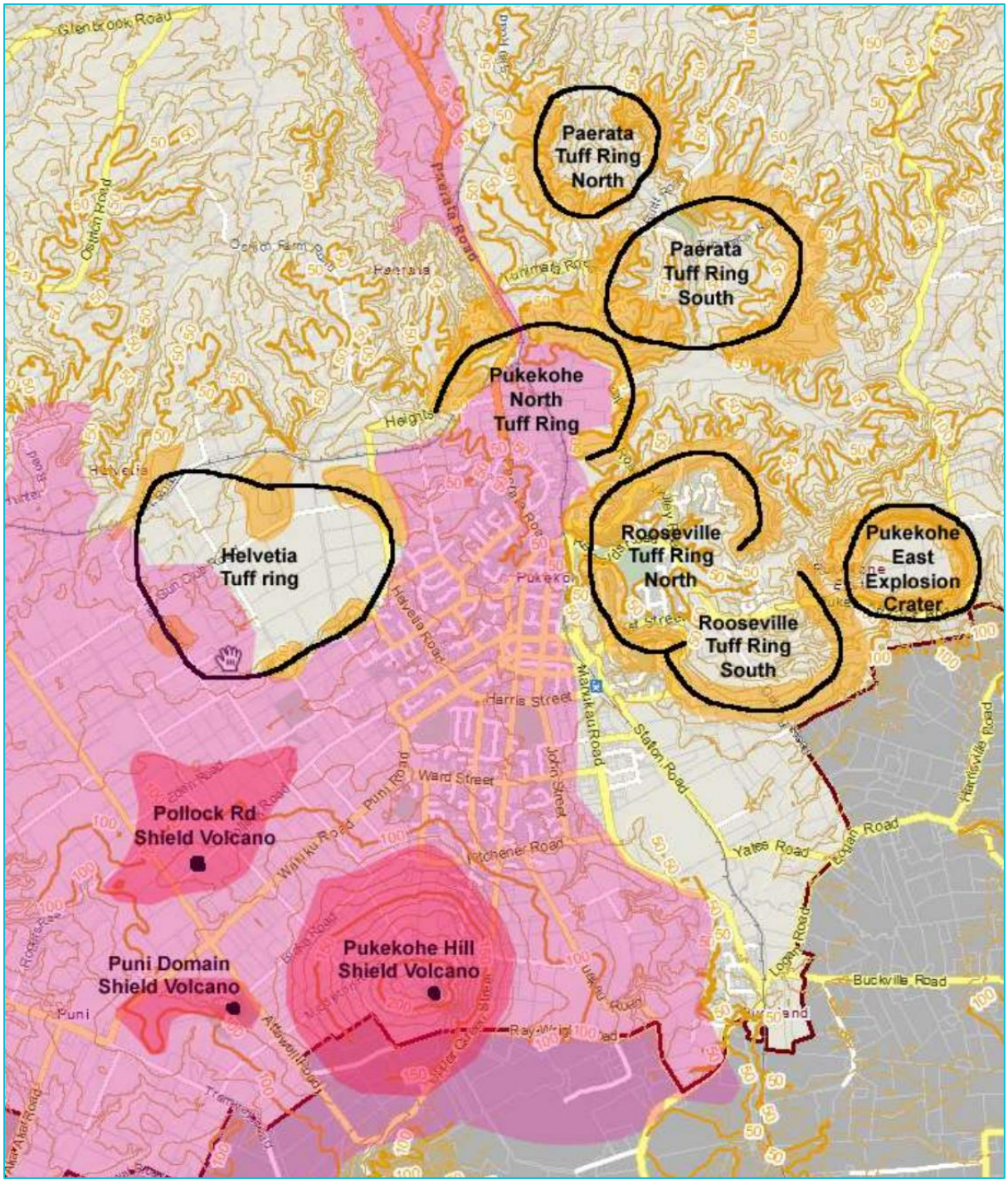

Figure 4-3: Map of the Pukekohe Heritage study area showing location of tuff rings/craters (orange), shield volcanoes (red) and the full extent of their lava flows (pink)[13]. Note, not all of these volcanic features are identified or scheduled under the AUP:OP.

13 Sourced from Page 3 of the *Geological Heritage of the Pukekohe Area Study* (Bruce W Hayward, 2014), contained within the Auckland Council Pukekohe Heritage Survey.

4.2 Broader Likely Future Environment

As part of the 'Auckland Future Urban Land Supply Strategy' July 2017 (FULSS), Auckland Council has undertaken a Plan Change of the AUP:OP to identify approximately 15,000 hectares of rural land for future development and urbanisation across Auckland. Of relevance to this assessment, large tracts of land around both Pukekohe and Drury have been identified for future urbanisation (identified as FUZ within the AUP:OP). The FUZ is a transitional zone and will remain in place until a structure plan and concurrent plan change re-zones the land to the appropriate urban zone (e.g. residential or business).

A number of private plan changes have been lodged within the FUZ or recently approved in Pukekohe and Drury. Where urban re-zoning has not yet occurred in the FUZ, further detail of the likely future environment and intended zoning of these areas are included within the Auckland Council Pukekohe-Paerata Structure Plan (2019) and the Drury-Opāheke Structure Plan (2019).

The likely future environment will include extensive additional development around the fringes of both Drury and Pukekohe which will result in current rural areas becoming urban / suburban in character. Structure plans have been prepared with consideration given to ecological and landscape features, however, it is likely that extensive modification will be required to implement development which will inherently alter the characteristics and qualities of the area. Noting, this is to be expected with a such a proposed change in land use.

The Pukekohe Transport Network alignment has been designed with consideration given to the FUZ and associated Pukekohe-Paerata and Drury-Opāheke structure plans.

As per these structure plans, areas north of Pukekohe have been identified to be rezoned to include a mix of Industrial, Terrace Housing and Apartment Building (THAB) (proximate to Paerata), Mixed Housing Urban (MHU) and Mixed Housing Suburban (MHS) (refer Figure 4-4 below). Similar zoning is anticipated south of Drury in the area near NoRs 1 and 2. This will change the character of these areas.

Furthermore, within current residential zones and land adjacent to rapid transit stops, greater intensification is anticipated in line recent policy changes including the introduction of the National Policy Statement for Urban Development (NPS-UD) and Medium Density Residential Standards (MDRS). Auckland Council has actioned this through Plan Change 78 (PC78). For the Pukekohe Town Centre, much of the residential zoned land will change from *Mixed Housing – Suburban* zone to *Mixed Housing – Urban* zone, with residential sites located closest to the Pukekohe Train Station being changed from *Mixed Housing – Urban* and *Mixed Housing – Suburban* to *Terrace Housing and Apartment Building* zone. The proposed changes as per PC 78 are shown below in Figure 4-4.

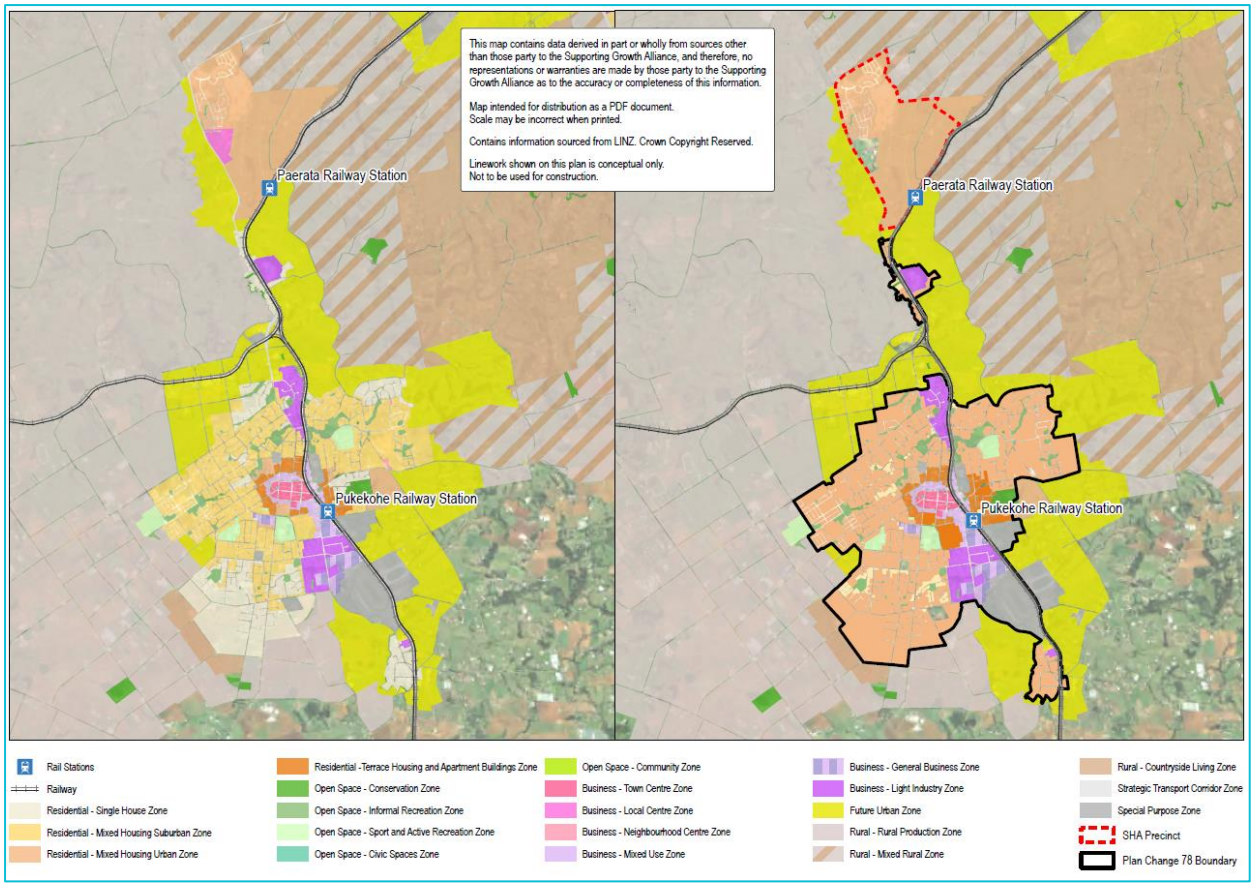

Figure 4-4: PC 78 - Changes to zoning resulting from PC 78

Beyond those areas identified as FUZ or already rezoned through private plan changes, the land will remain rural – Mixed Rural, Rural Production or Countryside Living zones under the AUP:OP.

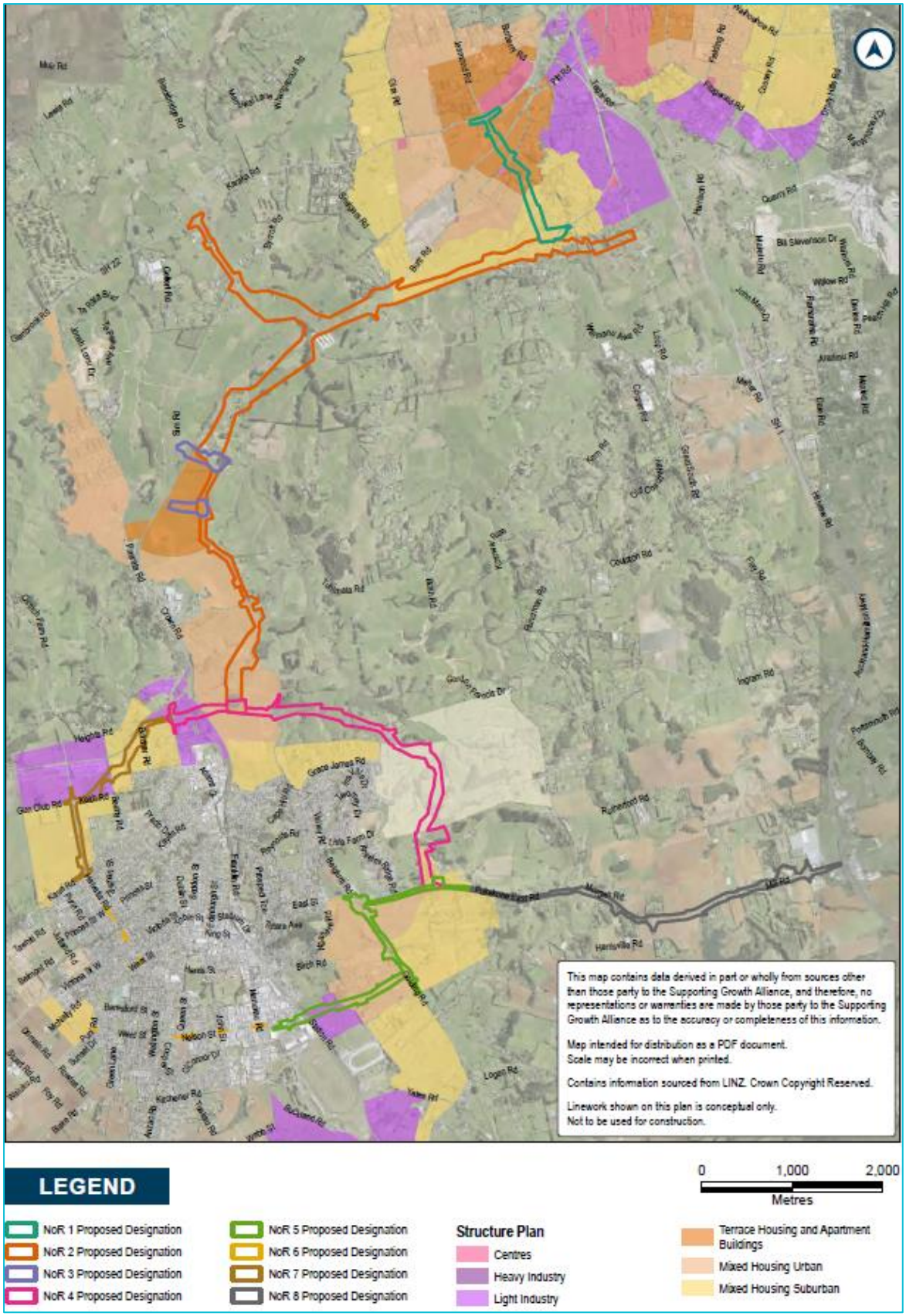

Figure 4-5: Pukekohe Transport Network integrated with the Pukekohe-Paerata Structure Plan and Drury-Opāheke Structure Plan

4.3 Existing and Likely Future Environment – relating to specific NoRs

4.3.1 NoR 1 – Drury West Arterial

NoR 1 is located between SH22 (Karaka Road) to the north and Runciman Road to the south (where it adjoins the alignment of NoR 2).

The alignment of NoR 1 is through rural land to the south west of Drury. The landscape is characterised by working agricultural and horticultural land uses, interspersed with rural residential development, farmsteads, shelterbelts and vegetation blocks as shown in Figure 4-6.

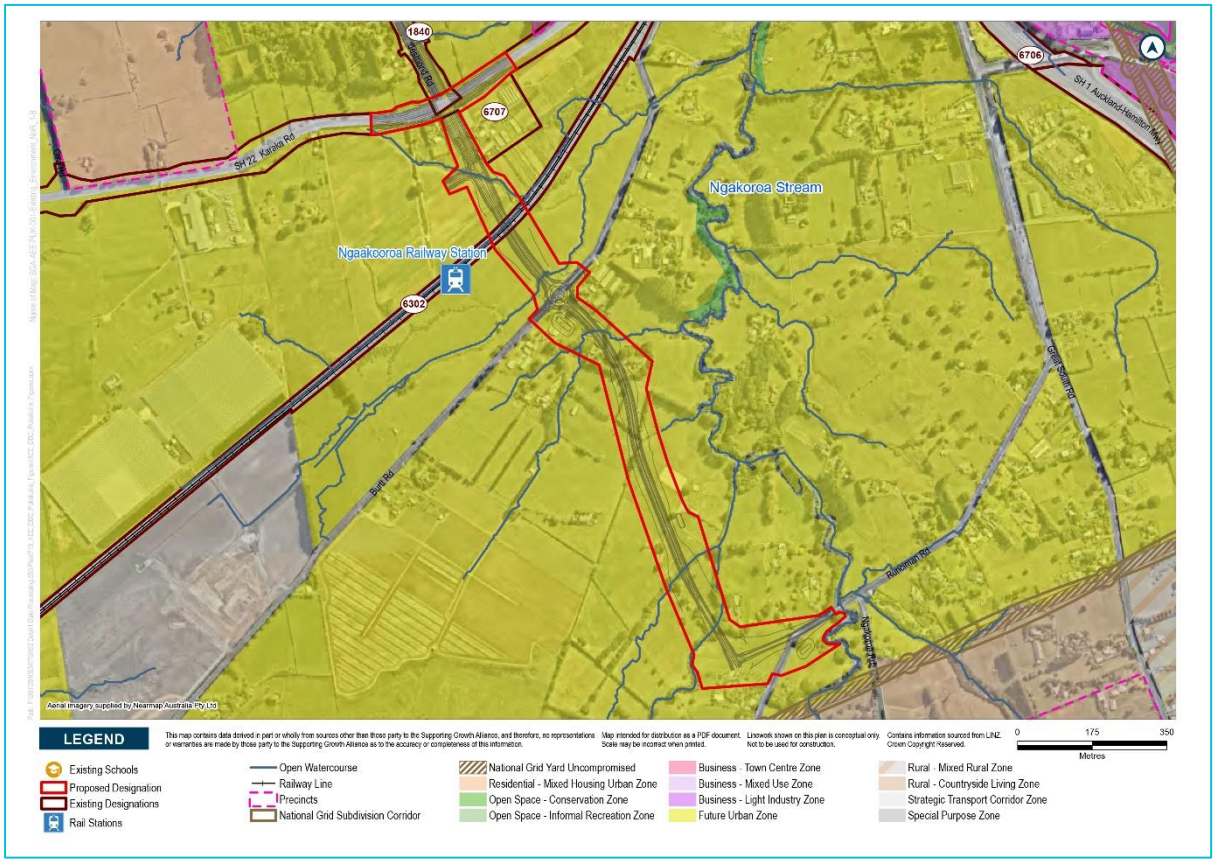

Figure 4-6: NoR 1 – Drury West Arterial – Existing Environment

The northern section of the alignment of NoR 1 is an extension from Jesmond Road. This part of the proposed designation's alignment is across horticultural land uses which includes polytunnel structures and areas of scrubland. The alignment interacts with the proposed KiwiRail Drury West rail station NoR, crosses the NIMT railway line, two intermittent streams and pastoral land where it connects to Burtt Road. The topography gently falls from Jesmond Road in the north to a stream corridor adjacent to Burtt Road in the south.

The intermittent stream corridor to the north of the NIMT railway line includes consistent and established scrub / shrub species. The intermittent stream to the south of the NIMT railway line (north of Burtt Road) includes sporadic planting along the corridor (predominantly low scrub with some individual trees).

Figure 4-7: Jesmond Road intersection with SH22 (looking south). (Source: MJ_IGL)

South of Burtt Road, the alignment is through low density rural residential development and pastoral land, which is interspersed with shelterbelts and lot boundary planting. The topography south of Burtt Road is gently undulating, with intermittent and permanent streams, shallow gullies / catchments and depressions in the landscape.

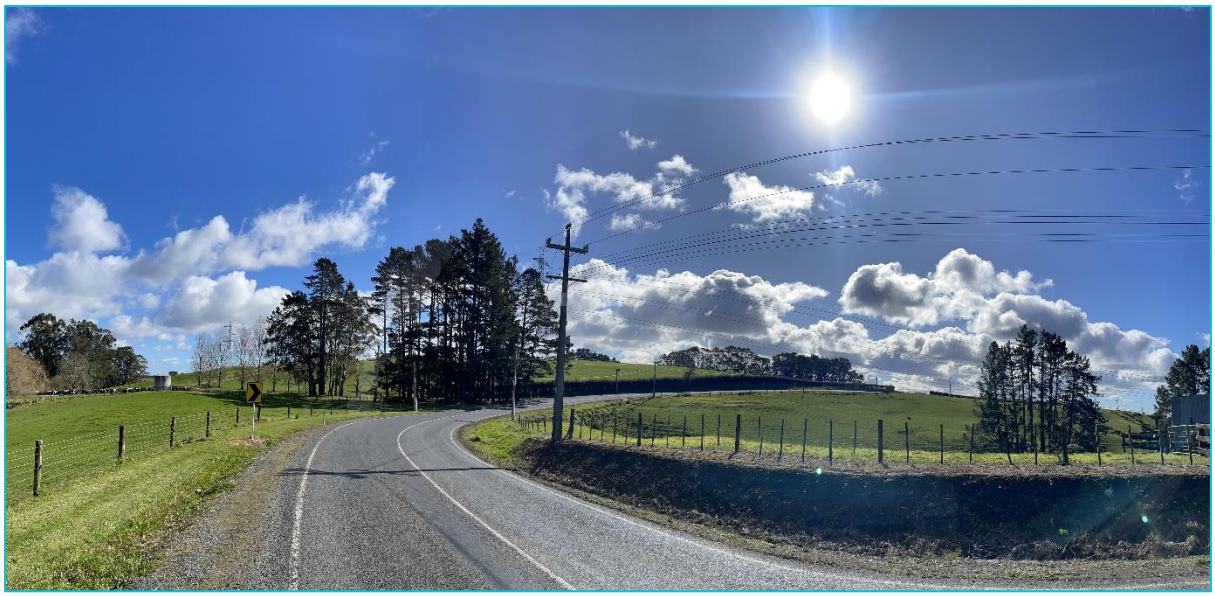

Figure 4-8: Burtt Road (near 357 Burtt Road) looking west toward the location of the proposed alignment. (Source: MJ_IGL)

Ngakoroa Stream is generally located approximately 100m to the east of the NoR 1, however the south eastern part of the alignment adjoins this stream corridor (noting that the alignment does not cross Ngakoroa Stream). The designation crosses multiple gullies / catchments and tributaries which feed into the stream network. These catchments are identified as floodplains within the AUP:OP.

An intermittent stream is located to the south of Burtt Road (located between the residential properties). The intermittent stream includes sporadic planting along its corridor, with some sections of the stream being devoid of vegetation.

Two permanent streams are located at the southern end of the NoR 1 alignment (including where the alignment adjoins the Ngakoroa Stream corridor). Both permanent streams include established planting along the corridors.

There are no known landscape related overlays within the designation alignment or setting of NoR 1.

When considering the likely future environment, NoR 1 is located within the Future Urban Zone in the AUP:OP. The Drury-Opāheke Structure Plan (2019) provides insight to the likely future zoning of this area. The Structure plan supports future Council-initiated plan changes to provide urban zones and indicates that the northern parts of the alignment will likely include THAB, with density reducing to the south to MHU and MHS zones. It is therefore anticipated that the setting of NoR 1 will undergo significant change from rural to urban land uses in the future. Near where the NoR designation is proposed to be aligned, the location of the Drury West rail station and future Auranga Town Centre are currently being evaluated. Due to this the anticipated zoning pattern (outlined on the Structure Plan) is subject to change, however it is acknowledged there will be future urban land use.

It is anticipated that the layout of the future development patterns of the FUZ will be informed by a combination of the alignment of the NoR1 and the underlying landscape, hydrological and ecological constraints and features of the area which include permanent and intermittent streams and floodplains. For the future planned environment, refer to Figure 4-9.

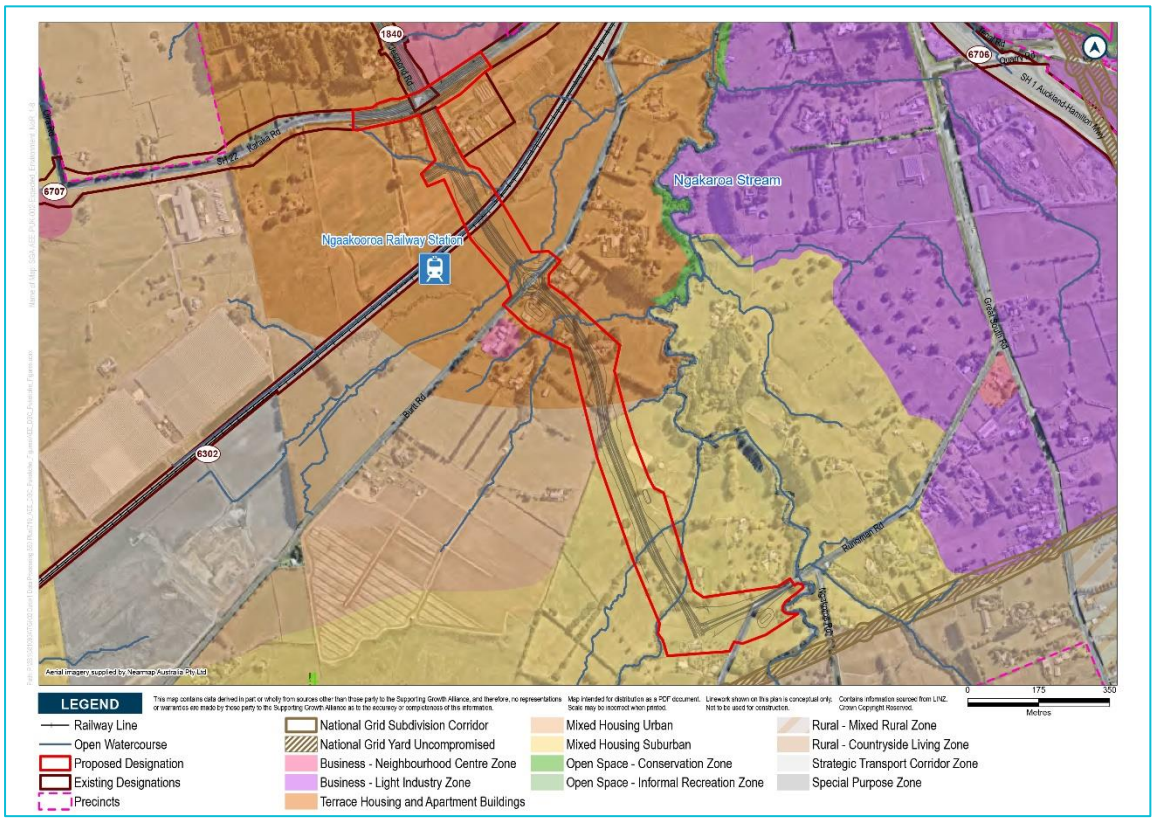

Figure 4-9: NoR 1 – Drury West Arterial – Likely, Planned Future Environment

4.3.2 NoR 2 – Drury to Pukekohe Link

NoR 2 connects Great South Road in the northeast of the subject area (proximate to Drury) to the urban fringe of Pukekohe to the south. The proposed designation predominantly includes the construction of new roading infrastructure and the upgrade of parts of Sim Road and Cape Hill Road. The designation includes junctions with Runciman Road, Burtt Road, SH22 and Tuhimata Road.

To assist in describing the transport corridor for assessment purposes, NoR 2 has been split into four segments (refer Figure 4-11 and Figure 4-12 below).

Figure 4-10: Near the location of the connection of NoR 2 with Great South Road (near 1233 Great South Road) (looking south. (Source: MJ_IGL)

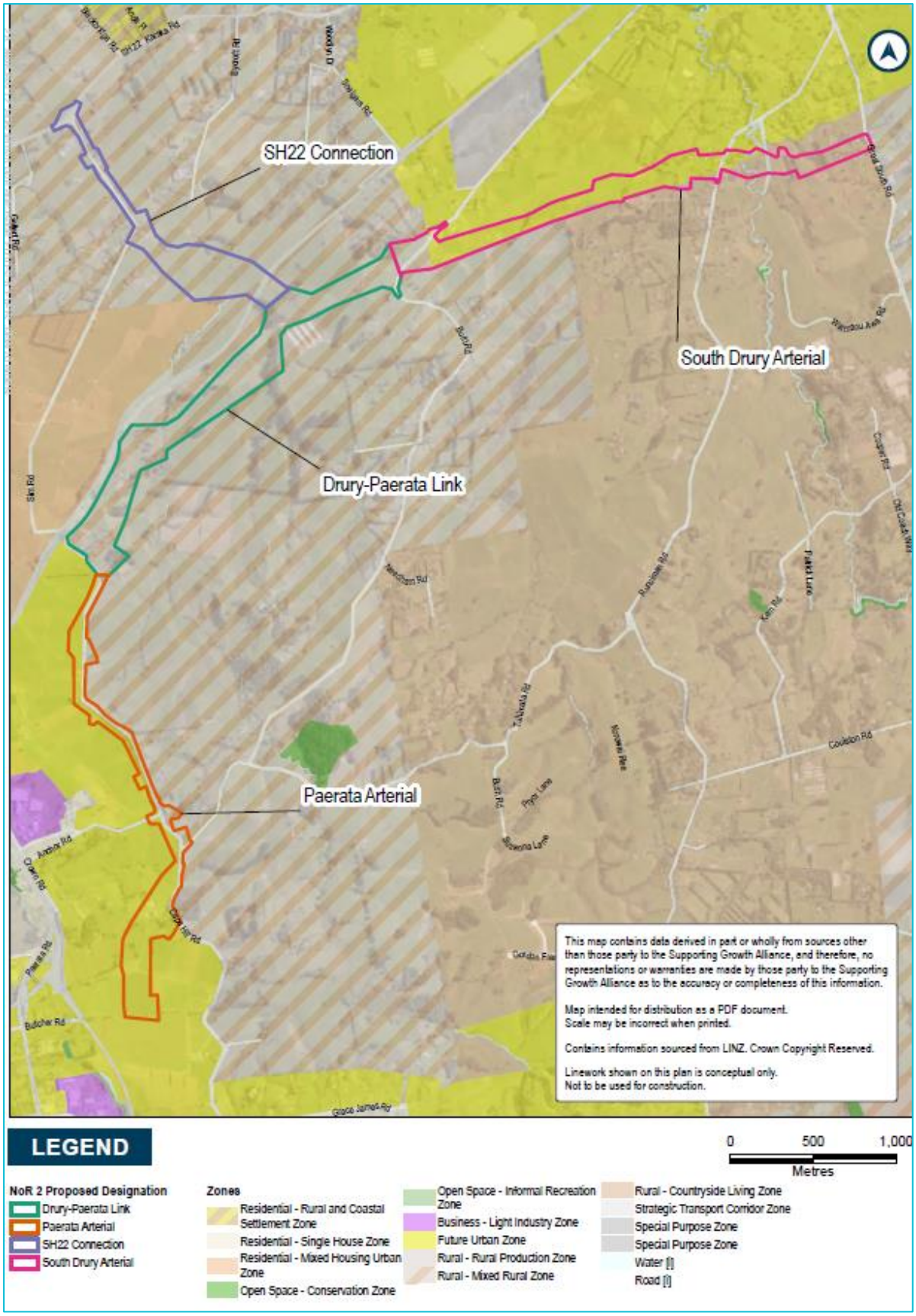

Figure 4-11: NoR 2 split into four segments with AUP:OP zoning

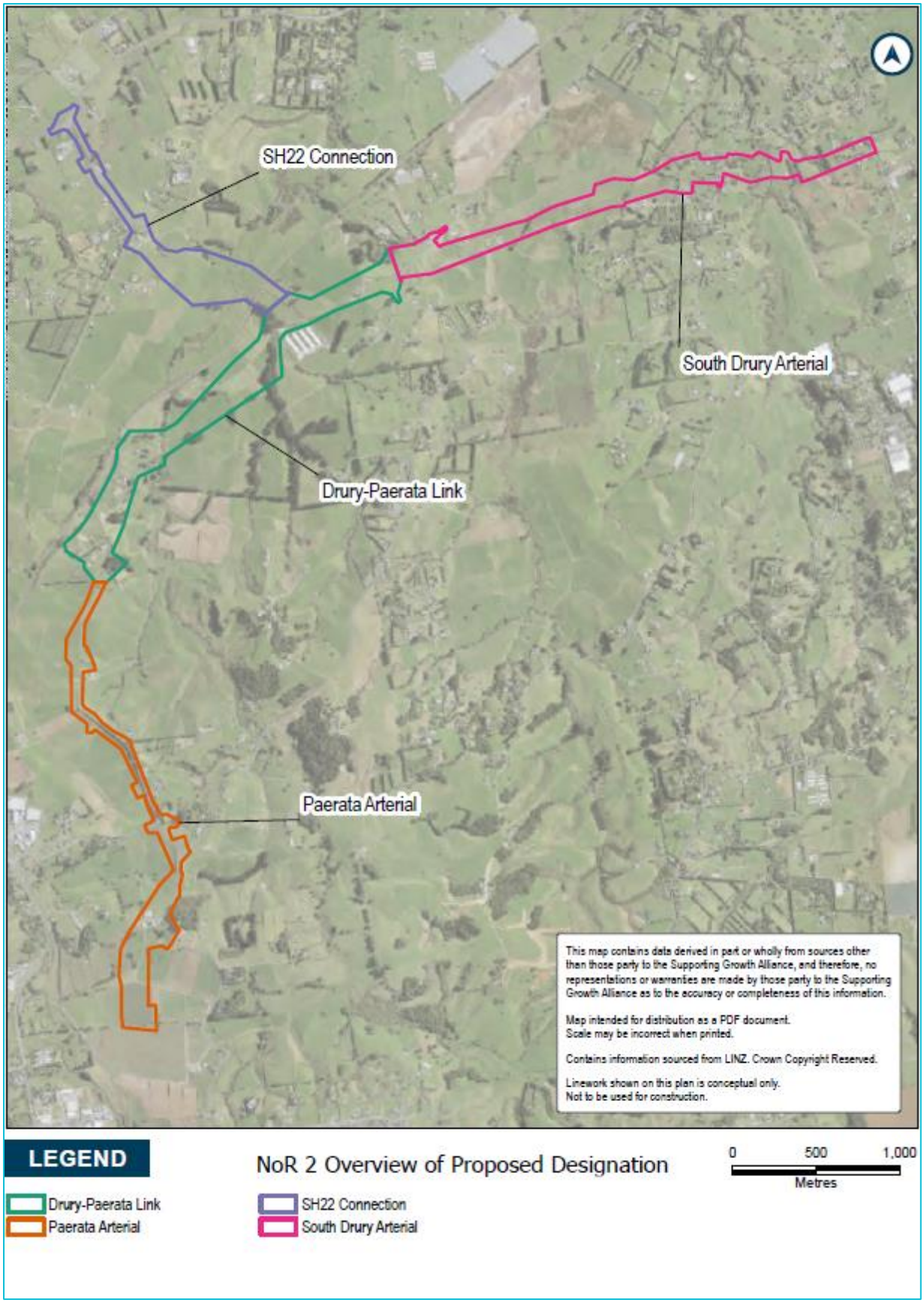

Figure 4-12: Drury - Pukekohe Link - NoR 2 split into four segments upon aerial

The four individual segments are discussed in turn below:

South Drury Connection

The South Drury Connection extends between Great South Road in the east and the junction with Burtt Road in the west. The alignment crosses and provides connection to Runciman Road. The alignment largely follows the existing 220kV overhead transmission line, which is a notable infrastructure component within the existing landscape.

Figure 4-13: The South Drury Connection is proposed to span parallel with the transmission line (right in this view). Photo from 785 Runciman Road (Source: MJ_IGL)

To the east of Runciman Road, the alignment is predominantly through pastoral land use, interspersed with rural residential properties and areas of arable land. Vegetation cover in the area includes shelterbelts, lot boundary planting and densely vegetated gullies / catchments and streams (intermittent and permanent, but namely the Ngakoroa Stream). The topography to the east of Runciman Road is undulating.

Proximate to the alignment of the NoR 2, the Ngakoroa Stream is defined by established vegetation species and has a winding form.

To the south, east and west of Runciman Road, the alignment is also through pastoral land with a number of rural residential properties accessed from Runciman Road and Great South Road. Vegetation cover is generally sparse, with scatterings of mature trees and block tree planting amongst the rural residential development. The pastoral landscape to the east of Burtt Road has limited vegetation cover. The topography falls to the west of Runciman Road and the designation traverses the edge of an area of lower lying pastoral land (identified as floodplain within the AUP:OP). The topography rises proximate to Burtt Road.

There are no known landscape related AUP:OP overlays within the proposed designation or setting of this segment of NoR 2.

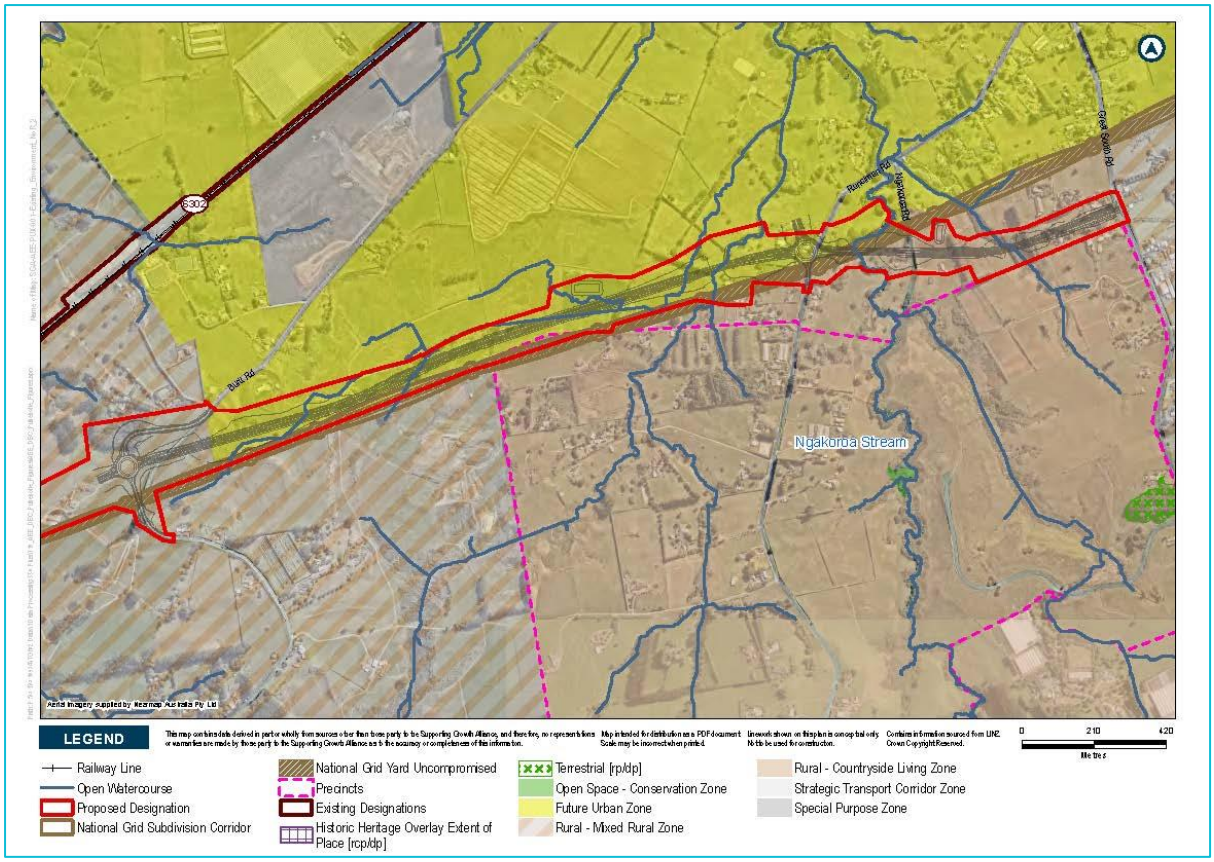

Figure 4-14: NoR 2 – South Drury Connection Segment – Existing Environment

When considering the likely future environment, the South Drury Connection segment of NoR 2 broadly aligns with the southernmost edge of the FUZ (Figure 4-11). The alignment to the west of Runciman Road is located along the FUZ boundary; however to the east of Runciman Road, the alignment deviates from the FUZ, located within the Rural – Countryside Living Zone (remaining proximate to the FUZ extent). The Drury-Opāheke Structure Plan identifies the alignment to the west of Runciman Road as being located within MHS zone, interspersed with areas of floodplain. It is therefore anticipated that the setting of this part of NoR 2 will undergo change from rural to urban land uses in the future, noting and taking heed of the potential constraints resulting from the existing stream networks and floodplains. Refer to Figure 4-15.

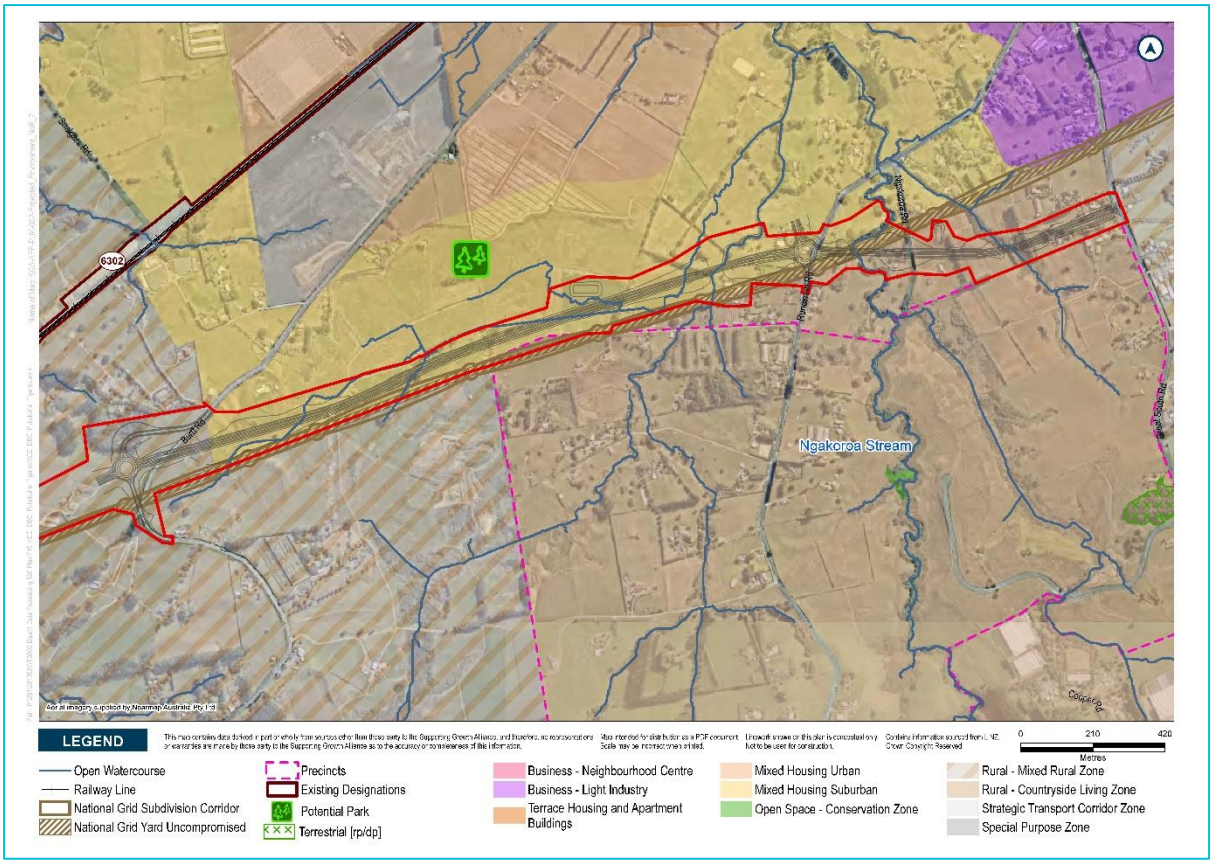

Figure 4-15: NoR 2 – South Drury Connection Segment – Likely, Planned Future Environment

SH22 Connection

The SH22 Connection extends between SH22 in the north to the main east-west corridor of the NoR 2 alignment in the south.

The northern part of the alignment is an upgrade of part of Sim Road and connection through to SH22. This part of Sim Road traverses the rural environment and is characterised by pastoral land uses interspersed with clusters of rural residential development (including an equine veterinary) accessed from Sim Road. Vegetation cover is sparse, generally limited to occasional planted catchments and vegetation along residential lot boundaries. The landform gradually rises along Sim Road to the south, with the bend in the road (proximate to 77 Sim Road) located on a localised highpoint.

Figure 4-16: Sim Road (looking east near the intersection with SH22). (Source: MJ_IGL)

The designation deviates from the alignment of Sim Road at the bend in the road (proximate to 77 Sim Road) and crosses pastoral land to the south east. Vegetation cover is sparse, with occasional groupings of trees. The landform is gently undulating, and gradually falls to the south east where the alignment crosses Oira Creek (and floodplain). The alignment crosses the NIMT rail line and connects to the main trunk of NoR 2.

Oira Creek is located west of the NIMT railway line. The creek is winding with limited established vegetation along its banks (predominantly larger grassy species). An unnamed tributary connects to Oira Cree, which crosses NIMT corridor, the tributary widens to include a scrubby catchment broadly triangular in shape east of the rail line.

Figure 4-17: Sim Road looking east near the location where the new road deviates away from the existing alignment. Photo taken from outside proximate 77 Sim Road. (Source: MJ_IGL)

There are no known landscape related overlays within the designation alignment or setting of this segment of NoR 2.

The SH22 Connection segment of NoR 2 is not located within the FUZ, and therefore the likely future environment (outside the designation area) is anticipated to remain consistent with the existing rural land use and setting.

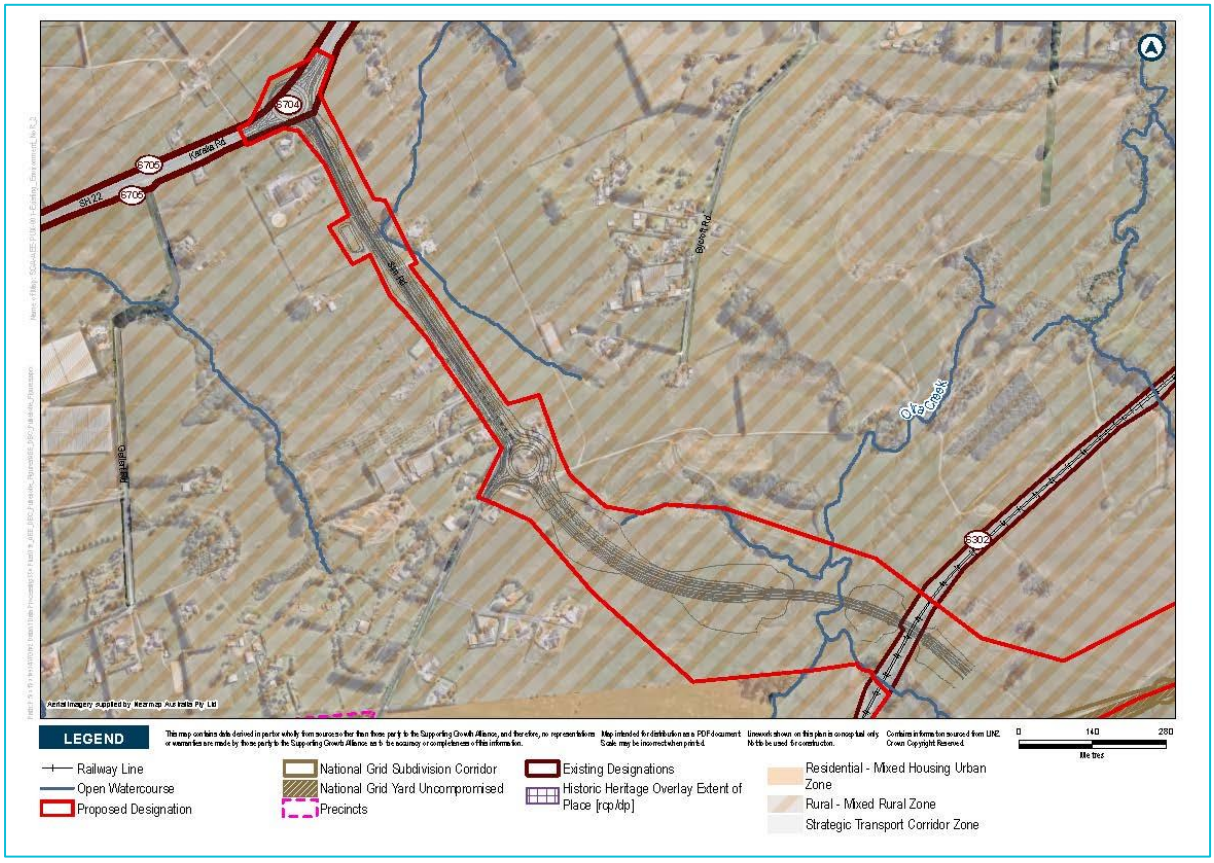

Figure 4-18: NoR 2 – SH22 Connection Segment – Existing and Likely Future Environment

Drury – Paerata Link

The Drury – Paerata Link segment of NoR 2 extends between Burtt Road to the north east and the connection to Sim Road (proximate to NoR 3, east of the NIMT rail line) to the south.

The northeastern part of the Drury – Paerata Link segment is through rural zoned agricultural (mix of pastoral and arable) land and traverses the alignment of the 220kV overhead transmission line. The landscape setting is predominantly characterised by working agricultural land, with occasional rural residential properties and farmsteads (including a poultry farm with large sheds). The residential properties are accessed via Burtt Road. The vegetation pattern is sparse with predominantly pasture, largely limited to groupings / blocks of vegetation and a scattering of trees. Lot boundaries are predominantly defined by rural fencing and tracks.

Landform gently falls along the alignment from Burtt Road in the northeast to the junction with the SH22 Connection segment of NoR 2.

South of the junction with the SH22 Connection, the alignment of the Drury – Paerata Link generally follows the alignment of the NIMT rail line. The designation alignment is predominantly through pastoral land although there is a pocket of rural residential development to the southeast (proximate to Sim Road). Vegetation cover is characterised by planted catchments (included the vegetated Oira

Creek corridor) with sporadic tree cover and groupings of trees. The landform is gently undulating and includes an engineered embankment along the rail line.

The alignment crosses the Oira Creek corridor to the north east of the terminus of Sim Road. This section of the Oira Creek is located in a located in a localised depression in the landscape (with landform rising to the east and west) and is defined by established trees along the corridor.

There are no known landscape related overlays within the designation alignment or setting of this segment of NoR 2.

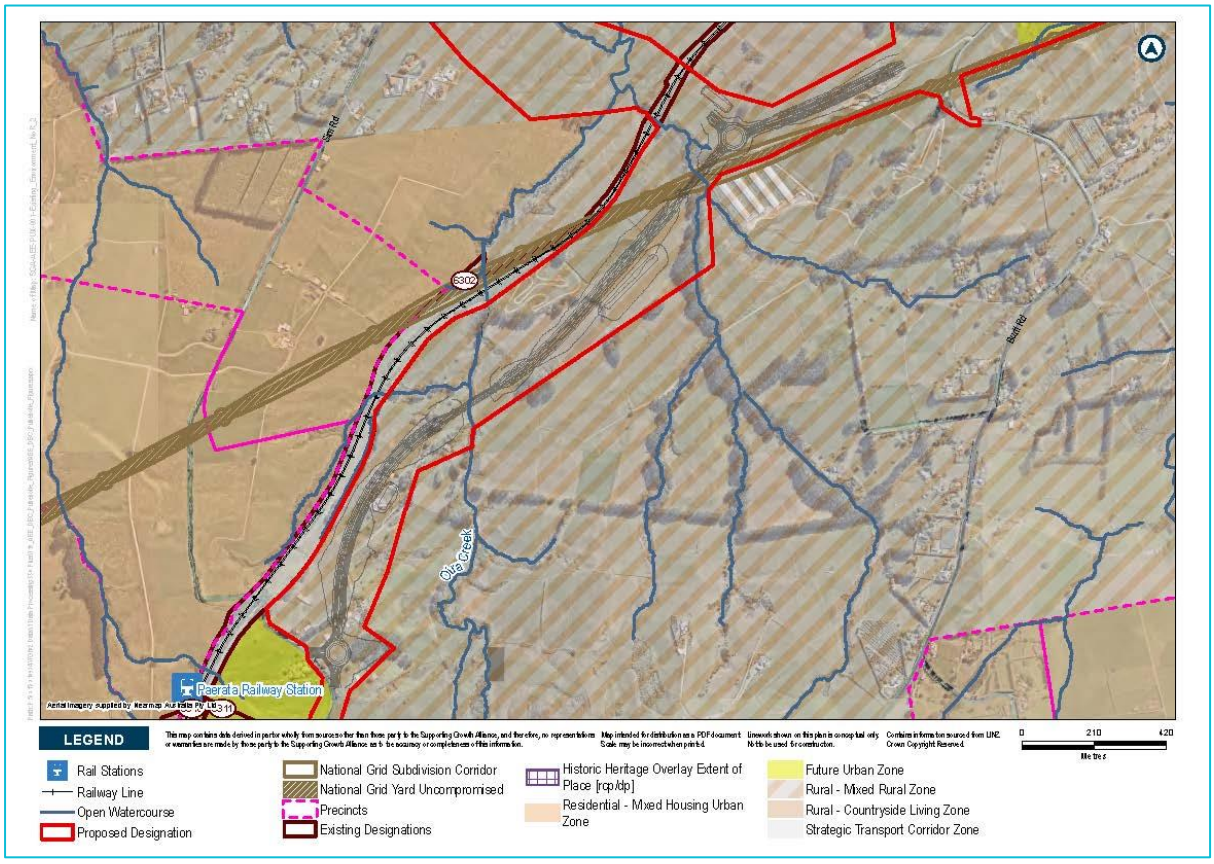

Figure 4-19: NoR 2 - Drury – Paerata Link Segment – Existing Environment

When considering the likely future environment, the majority of the segment will remain rural and the likely future environment is anticipated to remain consistent with the existing setting.

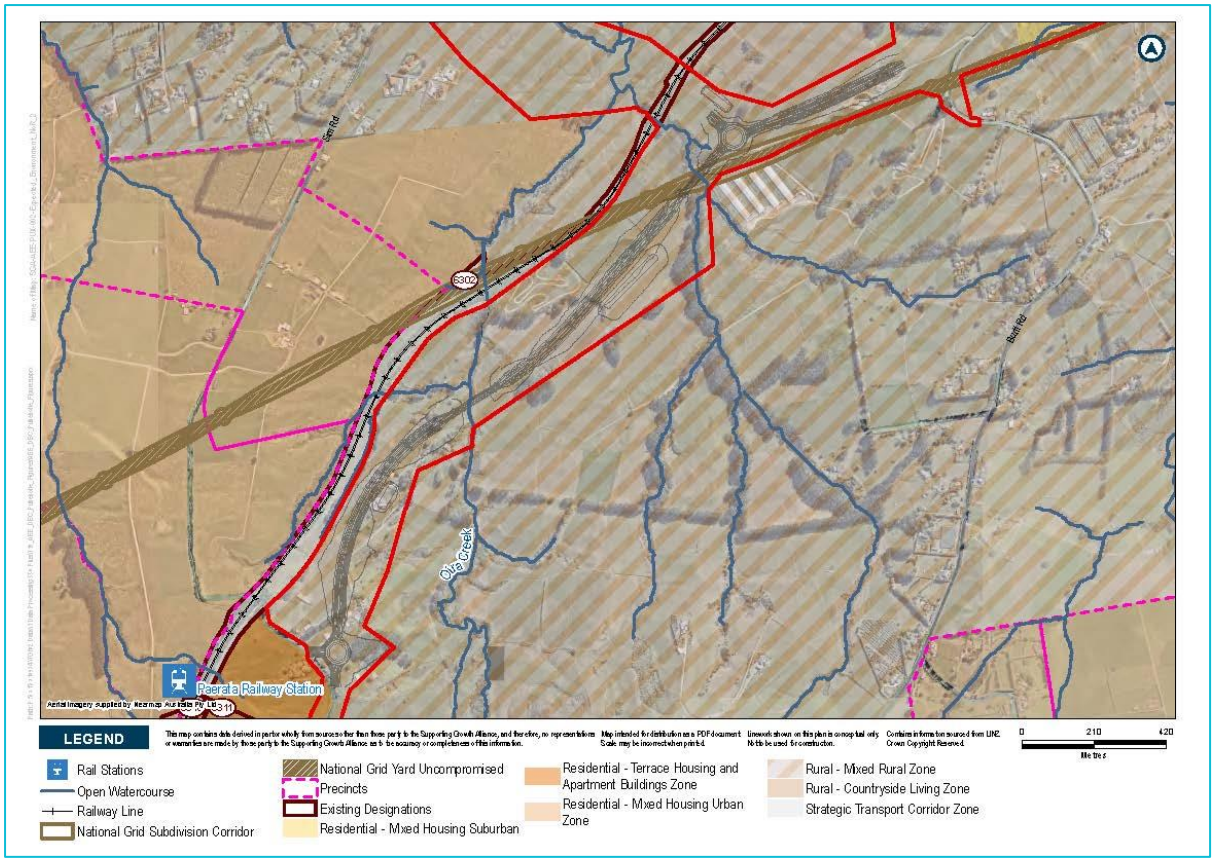

Figure 4-20: NoR 2 - Drury – Paerata Link Segment – Likely, Planned Future Environment

Paerata Arterial

The Paerata Arterial segment extends from Sim Road (proximate to NoR 3) to the connection with NoR 4 to the south. Refer to **Error! Reference source not found.** below for a map of the existing environment.

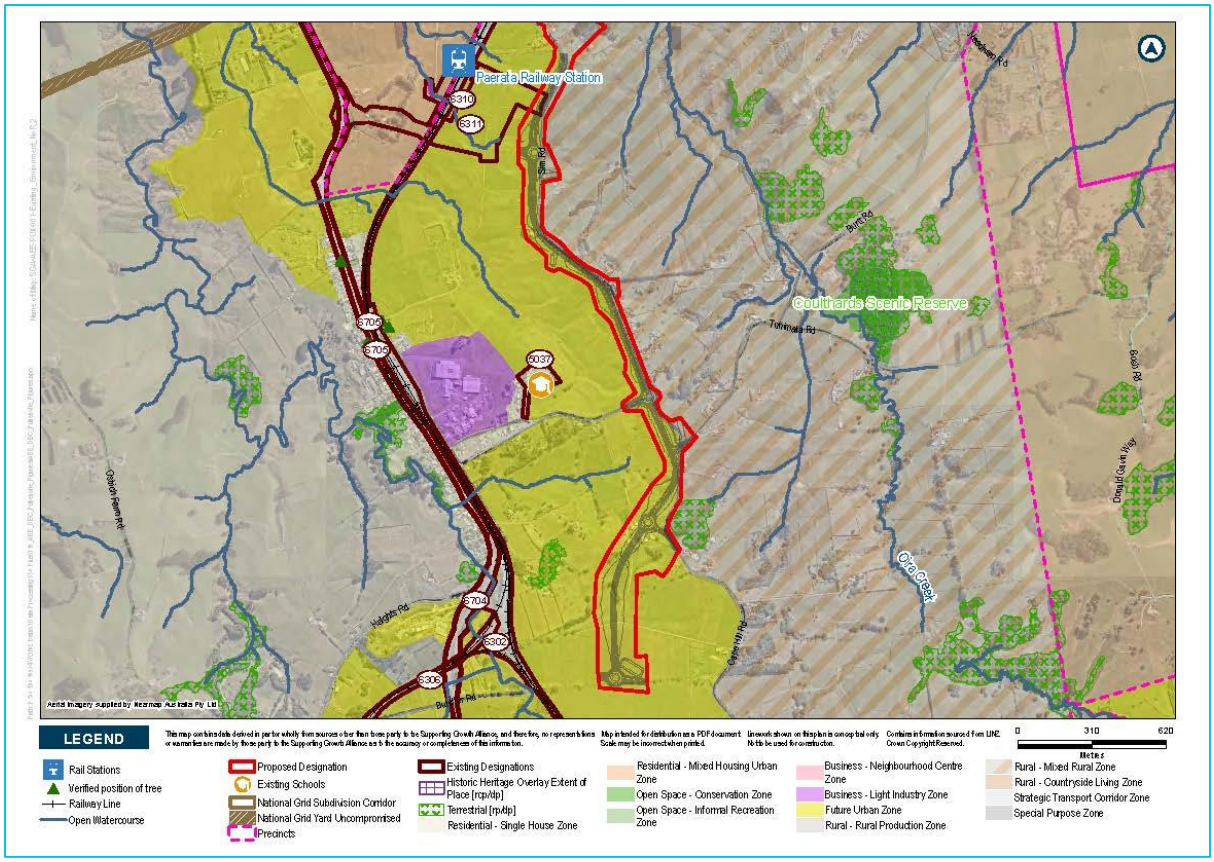

Figure 4-21: NoR 2 – Paerata Arterial Segment – Existing Environment

The northern part of the alignment includes the upgrade of approximately 2km length of existing road along Sim Road, Tuhimata Road and Cape Hill Road, and providing improved connections to Tuhimata Road. This part of the alignment is through agricultural land (predominantly pastoral) interspersed with clusters of rural residential development. The location of houses is predominantly close the respective roads (as opposed to being set back)[14]. Vegetation cover is largely limited to planting around residential lots / curtilages and infrequent shelterbelt planting (notably along the south-western part of Sim Road). Oira Creek and its catchments to the east of Sim Road are generally planted, and a scattering of trees and occasional blocks of vegetation are present proximate to Cape Hill Road. In contrast, the immediate and localised agricultural setting proximate to Sim Road to the north has given way to pasture, and is largely devoid of established vegetation. The rural setting of this part of the alignment is undulating, with the existing roads traversing localised ridgelines and hilltops. To the east of the designation alignment across the adjacent catchment is the Te Māunu a Tūmatauenga pā. This pā sits upon a natural bluff and landform and is identified as an ONL[15] within the AUP:OP.

14 Sim Road, Tuhimata Road and Cape Hill Road.
15 Refer ONL Area 59 outlined above.

Figure 4-22: The landform to the east of NoR2 upon which the Te Māunu a Tūmatauenga pā was located. Photo from outside 447 Sim Road. (Source: MJ_IGL)

The Paerata Arterial alignment deviates from Cape Hill Road (providing approximately 1.5km of new road) adjacent to the west of a block of vegetation identified as an SEA (SEA_T_4380) by the AUP:OP. This part of the alignment is through agricultural (predominantly arable) land and descends into the Pukekohe North tuff ring[16] (notably not identified as an ONF or ONL within the AUP:OP) where it connects to the NoR 4 alignment. Vegetation cover along this part of the alignment is limited to infrequent groups of trees.

Figure 4-23: Looking south along Cape Hill Road toward the vegetation identified as SEA_T_4380. Notably the designation avoids this SEA. Photo from outside 334 Cape Hill Road. (Source: MJ_IGL)

When considering the likely future environment of the Paerata Arterial segment of NoR 2, the northern part of the alignment (along Sim Road, Tuhimata Road and Cape Hill Road) is located on the eastern

16 Refer Figure 4-3 above.

edge of the FUZ (and will have views across the rural landscape to the east, and towards the Te Māunu a Tūmatauenga pā). The Pukekohe-Paerata Structure Plan identifies the northern end of this segment as being *Residential – THAB* zone, which transitions to *Residential – MHU* zone mid-way along Sim Road. The southern part of this segment crosses the *Residential – MHU* zone and adjoins NoR 4 proximate to a *Business – Local Centre* zone. It is therefore anticipated that the setting of this part of NoR 2 will undergo significant change from rural to urban land uses in the future.

Figure 4-24: Sim Road looking south (near 401 and 412 Sim Road). To the west (right of image) is zoned FUZ, with Rural – Mixed Rural zone to the east (left). (Source: MJ_IGL)

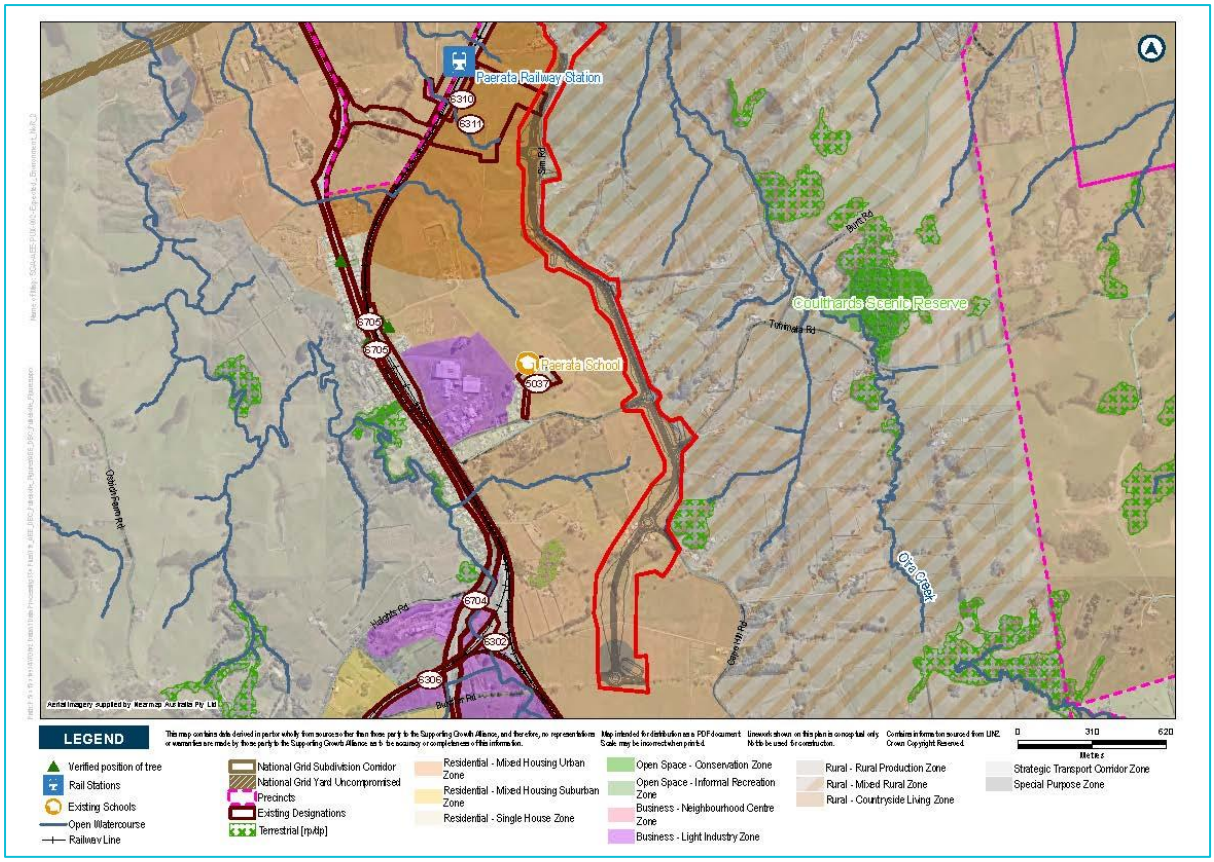

Figure 4-25: NoR 2 – Paerata Arterial Segment – Likely, Planned Future Environment

4.3.3 NoR 3 – Paerata Connections

NoR 3 includes two localised connections to the west of the NoR 2 alignment. The Sim to Sim Connection is between two parts of Sim Road bridging the NIMT rail corridor; from the NoR 2 Paerata Arterial segment to the east and the Paerata Rise development to the west. The Paerata Station Connection extends from the NoR 2 Paerata Arterial segment to the east to intersect with the Paerata Rail Station access (future railway station).

The alignment of the Sim to Sim Connection is through predominantly pastoral land and broadly follows the alignment of Sim Road (acknowledging that this part of Sim Road is unsealed and more akin to a private single lane farm track and paper road on the west side) and crosses the NIMT rail line. Vegetation cover is consistent with the wider rural landscape, with only sporadic trees found along Sim Road and scrub vegetation along the railway alignment. The landform is undulating, with the rail line cut into the landscape.

The alignment of the Paerata Station Connection is also through pastoral land and will provide access between NoR 2 (upgraded section of Sim Road), and the Paerata Rail Station access. The alignment of this southern part of the NoR 3 designation is devoid of established vegetation and is located on a gradual north facing slope within the wider undulating rural setting. The rural residential properties near the location of this NoR which might have views of the project are located on Sim Rd and Paerata Rd.

There are no known landscape related overlays within the designation alignment or setting of NoR 3.

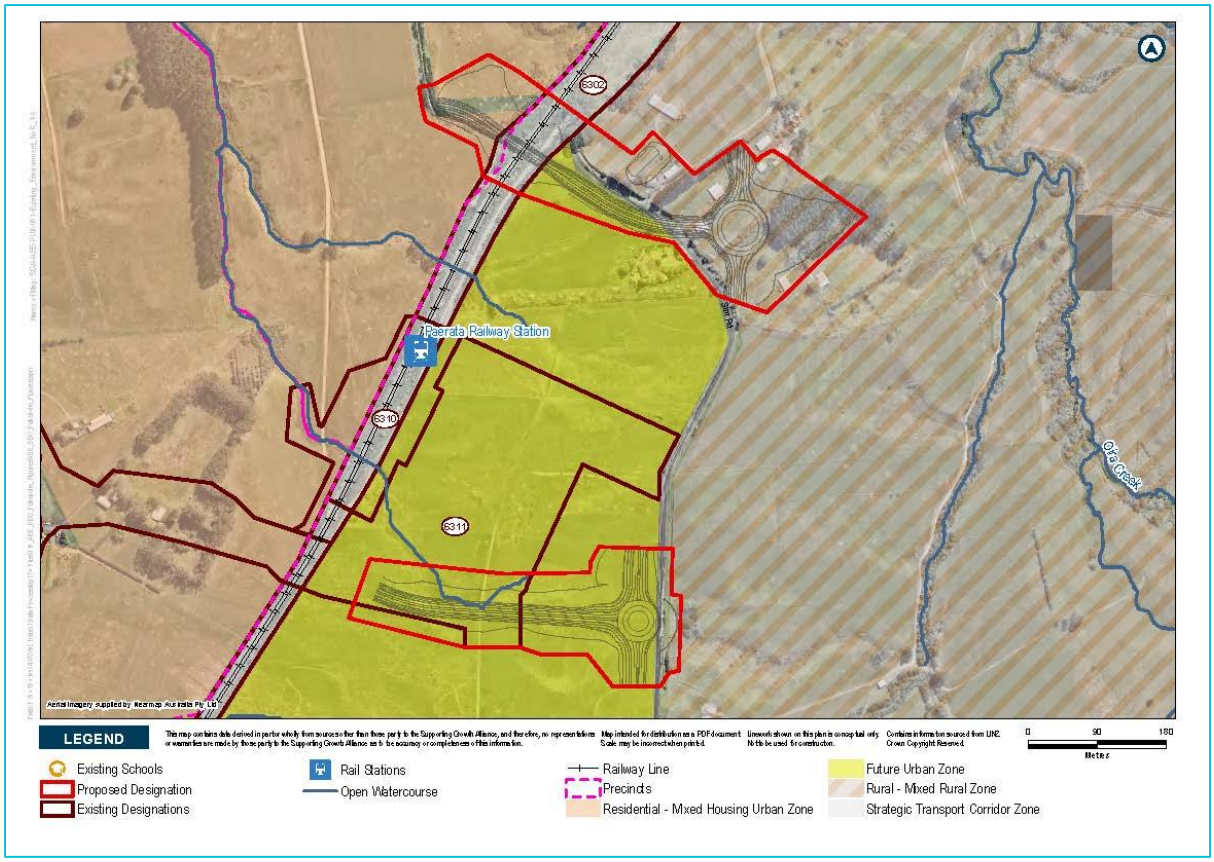

Figure 4-26: NoR 3 – Paerata Connections – Existing Environment

When considering the likely future environment, NoR 3 is located within an area identified as FUZ under the AUP:OP. Under the Pukekohe-Paerata Structure Plan these two connections are predominantly located within the THAB zone, with the western 'tip' of the northern connection within the MHU zone, west of the NIMT. As part of future enhancement of transport infrastructure in the area, NoR 3 is located adjacent to the future Paerata Rail Station. Refer to **Error! Reference source not found.** below.

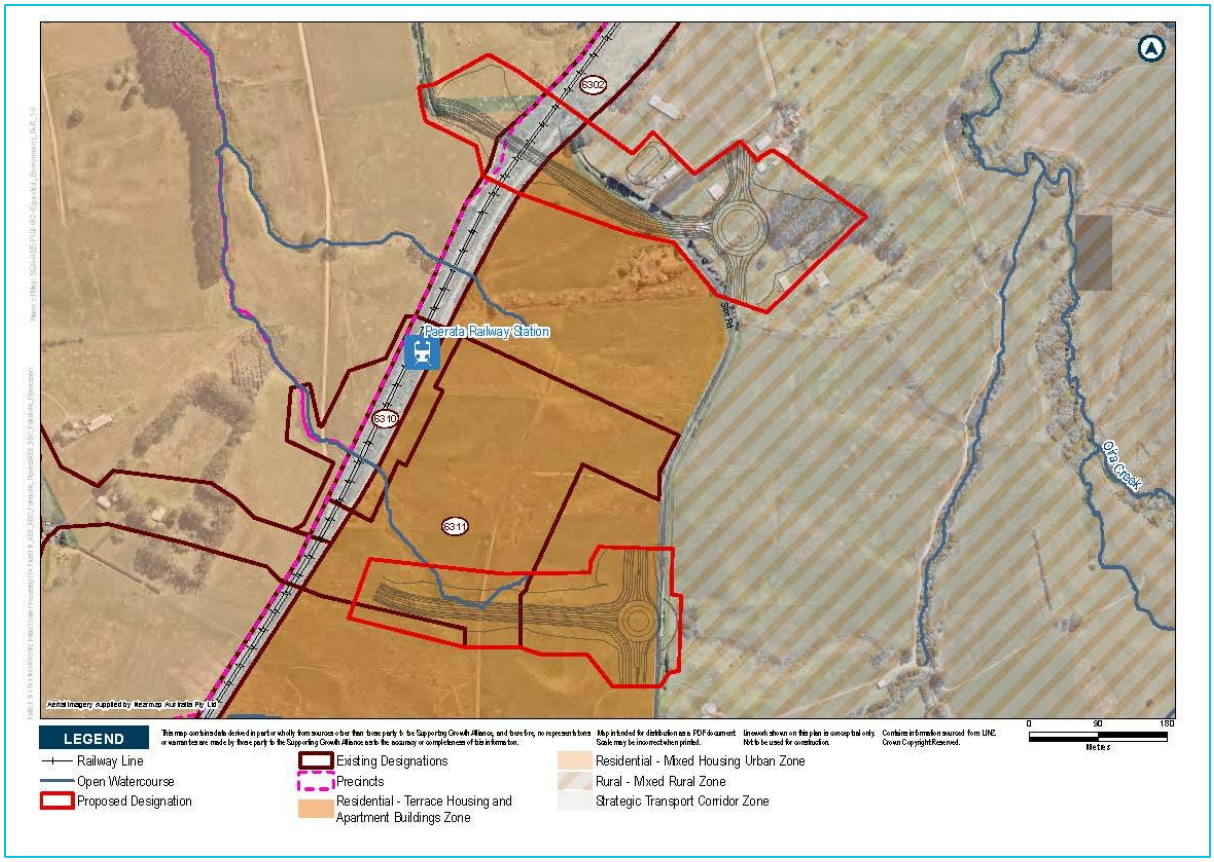

Figure 4-27: NoR 3 – Paerata Connections – Likely, Planned Future Environment

4.3.4 NoR 4 – Pukekohe North East Arterial

NoR 4 is located on the north-eastern edge of Pukekohe; connecting with Paerata Road (SH22) to the northwest and Pukekohe East Road in the southeast. The alignment connects to NoR 7 to the northwest, the southern end of NoR 2 to the north, and to NoR 5 in the southeast.

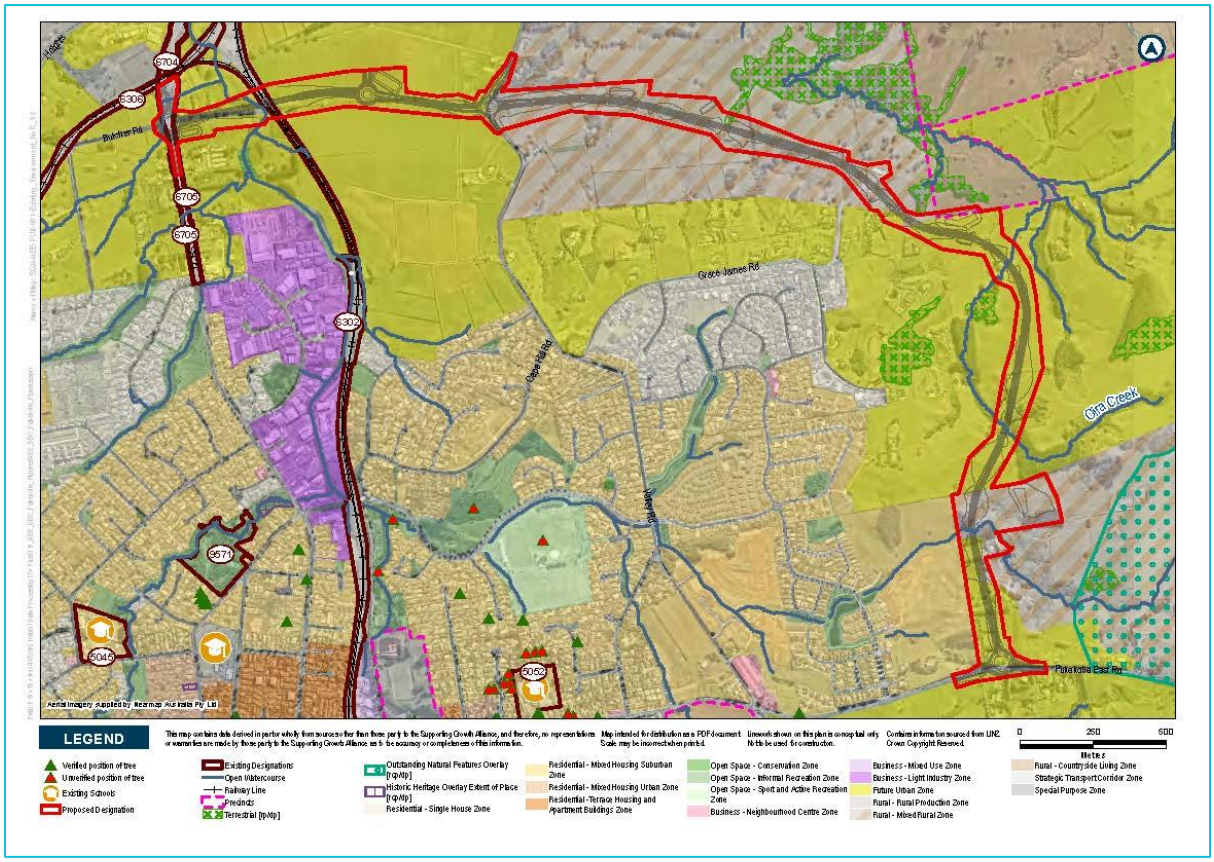

Figure 4-28: NoR 4 – Pukekohe North-East Arterial – Existing Environment

Figure 4-29: Looking west from Pukekohe East Road near the location where NoR 4 will intersect with NoR 5. Photo from near 98 Pukekohe East Road. (Source: MJ_IGL)

The alignment of NoR 4 to the east of SH22 extends from Butcher Road and crosses through an area of pastoral land, a small pocket of rural residential development (accessed from Paerata Road), the

intermittently vegetated corridor of Whangapouri Creek (which includes sporadic groupings of trees) and the NIMT rail line. East of the rail line, the alignment extends through the Pukekohe North tuff ring (again, notably not identified as an ONF or ONL within the AUP:OP); which includes a localised shallow basin with arable land uses (identified as a floodplain within the AUP:OP). The connection with NoR 2 is located centrally within the tuff ring. The landform rises proximate to Cape Hill Road as it exits the tuff ring toward the east.

Figure 4-30: Looking south from Paerata Road (SH22) at the intersection with Butcher Road. The proposed alignment connects NoR 7 from the west (right) across to NoR 4 to the east (left). (Source: MJ_IGL)

East of Cape Hill Road, the alignment crosses pastoral land on the fringe of urban Pukekohe and extends through an area of rural residential development accessed off Cape Hill Road. There is also residential development along and north of Grace James Road with sporadic tree cover, occasional shelterbelts, vegetated catchments and some blocks of planting. Landform in this area is characterised by a complex and intricate network of steep sided gullies, catchments (including intermittent and permanent steams) and hill sides.

Further east, still on the fringe of suburban Pukekohe (north of Pukekohe East Road), the landform becomes further pronounced and complex with interlocking hills, catchments and ridgelines. Vegetation cover is consistent, with defined blocks of established vegetation (mixture of native bush and exotic) in gullies and on hill slopes.

The vast majority of ecological area SEA_T_4375 has been avoided through options assessment and design. However, a small part of the SEA is located within the proposed designation boundary where a stream is crossed by a proposed bridge. This is illustrated in Figure 4-31.

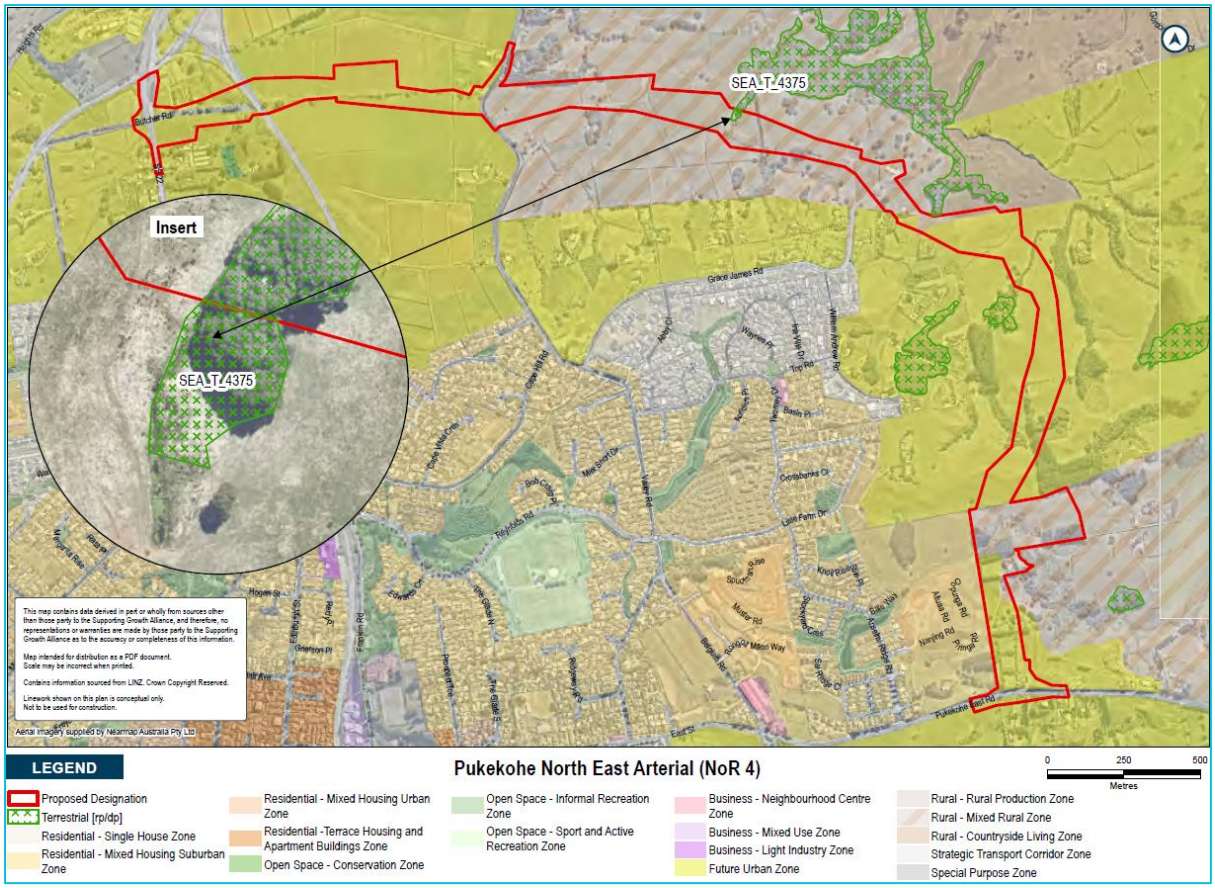

Figure 4-31: Extent of SEA_T_4375 and the designation boundary for NoR 4

It does not cross any other known landscape related overlays, however it is proximate to:

- Outstanding Natural Feature (169) Pukekohe East Tuff Ring: NoR 4 is located approximately 115m from this overlay at its closest point.
- Significant Ecological Area SEA_T_91: NoR 4 is adjacent to this overlay but does not directly interact with it.
- Significant Ecological Area SEA_T_4374: NoR 4 is located approximately 140m from this overlay at its closest point.
- Significant Ecological Area SEA_T_5278: NoR 4 is located approximately 250m from this overlay at its closest point.
- Significant Ecological Area SEA_T_4510: NoR 4 is located approximately 280m from this overlay at its closest point.

Through options assessment and design refinements, impacts on these features were reduced where possible.

The Pukekohe East tuff ring is described within *Schedule 6: Outstanding Natural Features Overlay Schedule* within the AUP:OP:

> *"Pukekōhe East tuff ring is the best preserved tuff ring in the South Auckland volcanic field. The volcano erupted through a fringe of lava from Rutherford's cone, which lies just to the northeast. The tuff ring is approximately 1km in diameter and 80m deep, with erosion resistant lava around two thirds of the crater accounting for its well-preserved morphology."*

The SEA overlays are located on blocks of established vegetation within the setting of and adjacent to the alignment. The proposed corridor does cross blocks of vegetation; however these areas of vegetation are not identified as SEA within the AUP:OP.

When considering the likely future environment of NoR 4, the corridor is located within both FUZ and the existing rural environment (shown below in Table 4-1). The Pukekohe-Paerata Structure Plan provides further insight for the intended future zones of these areas [17] (described clockwise):

Table 4-1: NoR 4 described by AUP:OP Zone

Area	AUP:OP Zone	Auckland Council Structure Plan Zone	Comments
Between Paerata Road and the NIMT rail line	FUZ	Business – Light Industry Zone	Eastern part of this zone is identified as floodplain within the AUP:OP, proximate to Whangapouri Creek
Between the NIMT rail line and Cape Hill Road (broadly identified as the Pukekohe North Tuff Ring)	FUZ	Residential – Mixed Housing Urban Business – Local Centre	Areas of this zone are identified as floodplain within the AUP:OP
Between Cape Hill Road and north east of Grace James Road	Rural – Mixed Rural Zone	-	Retained as rural
Between north east of Grace James Road and east of Lisle Farm Drive	FUZ	Residential – Single House Zone	-
Between east of Lisle Farm Drive and east of Bale Way	Rural – Mixed Rural Zone	-	Retained as rural
Between East of Bale Way and Pukekohe East Road	FUZ	Residential – Mixed Housing Suburban Zone	-

17 Refer Figure 4-32.

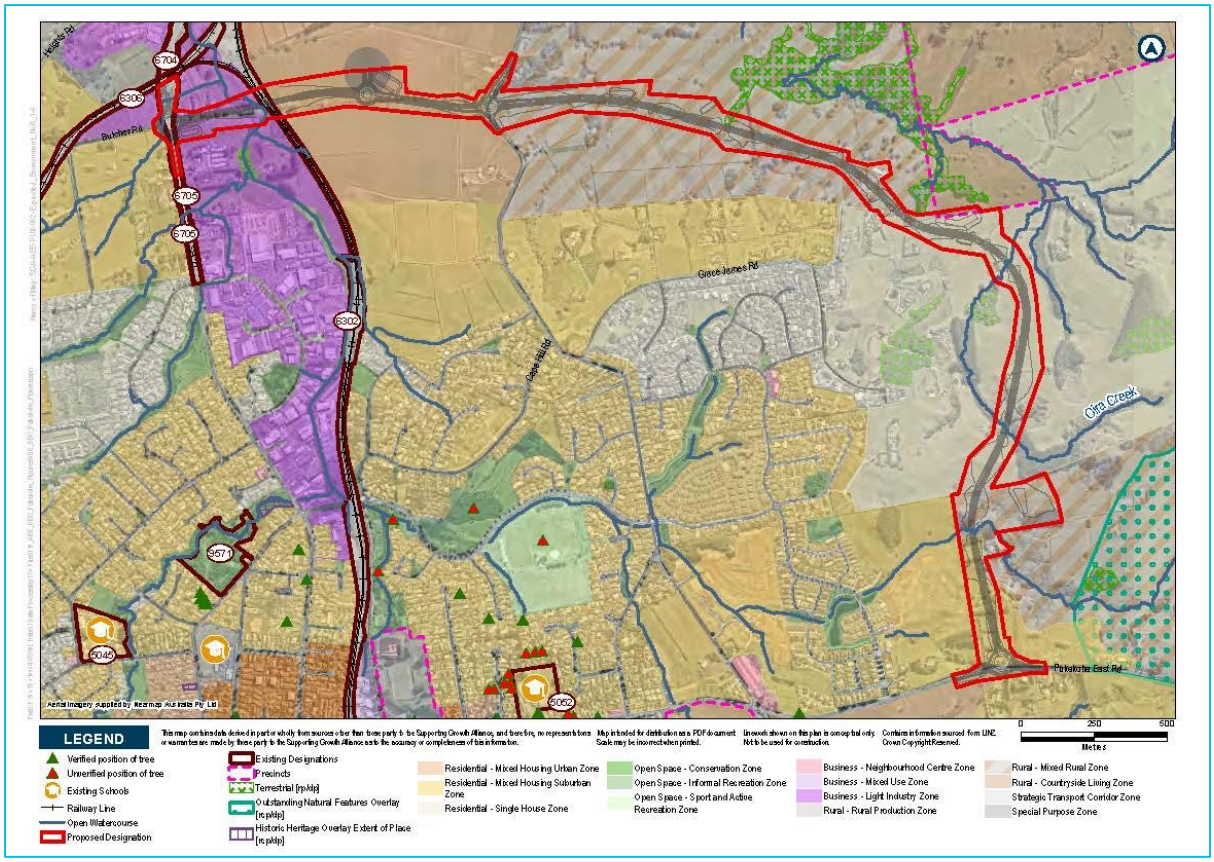

Figure 4-32: NoR 4 - Pukekohe North East Arterial integrated with the Pukekohe-Paerata Structure Plan; Likely Future Environment

The alignment of NoR 4 will cross multiple future residential and business zones and existing rural zones which will result in the alignment being set within an intermittent urban and settlement fringe. Whilst not yet developed, it is anticipated that the layout of the future development patterns of the FUZ will be informed by the underlying landscape, hydrological and ecological constraints and features of the area which include floodplains, catchments, SEA overlays and proximity to an ONF overlay. The designation will also help inform the future urban pattern associated in this area.

4.3.5 NoR 5 – Pukekohe South East Arterial

NoR 5 is located on the south eastern edge of urban Pukekohe; between Pukekohe East Road (proximate to the western edge of the Pukekohe East Tuff Ring) and Svendsen Road.

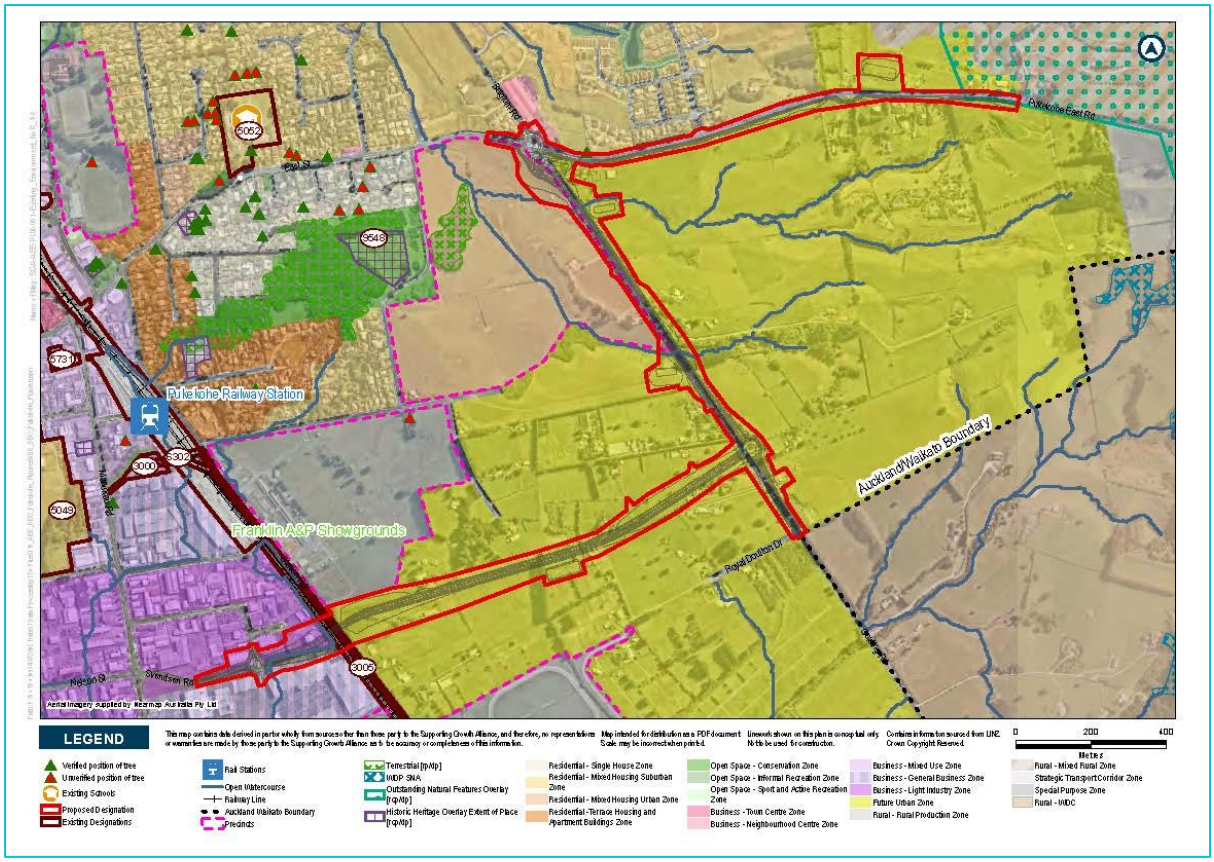

Figure 4-33: NoR 5 – Pukekohe South-East Arterial – Existing Environment

NoR 5 includes the upgrade of an approximate 1.4km length of Pukekohe East Road. The road transitions between the rural environment to the east (predominantly arable land with a pocket of rural residential development) and the urban edge of Pukekohe to the west (with existing industrial land on Svendsen Road and residential development along Stockmans Lane, Ridge View Crescent and Ambedkar Way located on the northern side of the road).

The eastern extent of the alignment of the designation for NoR 5 is along (and within) the edge of the Pukekohe East tuff ring (identified ONF), however this section of the alignment represents an upgrade of Pukekohe East Road and is an existing modified feature within the overlay. A description of the ONF is included within Section 4.3.4 of this report, and effects of the designation on the ONF are addressed later within the assessment in Sections 6 and **Error! Reference source not found.** of this r eport.

Pukekohe East Road is predominantly set upon the localised ridgeline and includes a complex network of interlocking hills and catchments to the north and south respectively. This is consistent with the wider rural setting to the north (as described within NoR 4). The alignment connects and will upgrade the intersection between Pukekohe East Road and Golding Road.

Figure 4-34: Looking east from Pukekohe East Road at the intersection with Golding Road (right). (Source: MJ_IGL).

The central section of NoR 5 includes the upgrade of an approximate 1.2km length of Golding Road. The road is located within the rural environment and is characterised by predominantly agricultural pastoral land uses (with some arable), interspersed with rural residential properties. Vegetation cover along Golding Road includes shelterbelt, lot boundary and curtilage planting. A block of exotic trees is located midway along the alignment at the entrance to rural residential properties. There is one notable tree identified on the AUP:OP planning maps within the extent of this designation. This tree is listed in **Schedule 10 – Notable Trees Schedule** of the AUP:OP as: *ID 2732 – Monterey pine*, at 3 Pukekohe East Road. However, this tree no longer exists on the property.

Figure 4-35: Looking south along Golding Road, near 26 Golding Road. (Source: MJ_IGL).

The eastern and central sections of the alignment (spatially limited to Pukekohe East Road and Golding Road) are located within the Roseville tuff ring south. The alignment is along existing road

corridors on topography which falls from north to south. The tuff ring is not identified as an ONF or ONL.

The western section of NoR 5 extends across agricultural pastoral land between Golding Road and Station Road. The landscape is scattered with rural residential properties and farmsteads, with vegetation cover including sporadic / sparse tree planting, occasional shelterbelt planting and lot boundary planting. The landform falls from Golding Road in the east, with the landform to the east of Station Road being more level.

The alignment crosses Station Road and the NIMT rail line into *Business – Light Industry* zone, where it connects to Svendsen Road. The alignment of NoR 5 to the west of the NIMT rail line crosses an existing refuse and recycling transfer station and vegetated culvert. To the north and south of this part of the alignment is established large scale industrial and commercial activities.

Figure 4-36: Looking east from Svendsen Road (near the intersection with Crosbie Road) toward the vegetated culvert which extends toward the NIMT. (Source: MJ_IGL).

When considering the likely future environment, NoR 5 is located within the FUZ. It is therefore anticipated that the rural setting of the alignment will change to a developed and urban context. There are two lodged private plan changes on the eastern and western sides of Golding Road to rezone the FUZ to residential development. There is also a recently approved plan change south of the proposed designation on Golding Road – signalling the emerging urbanisation of the area.

The Pukekohe-Paerata Structure Plan provides further insight for the likely future zones along the alignment which includes:

- Residential – MHS zone to the east and south;
- Residential – THAB zone along the central parts of the alignment; and
- Business – Light Industry zone (interspersed with floodplain) in the western part of the alignment.

This is illustrated in Figure 4-37 below.

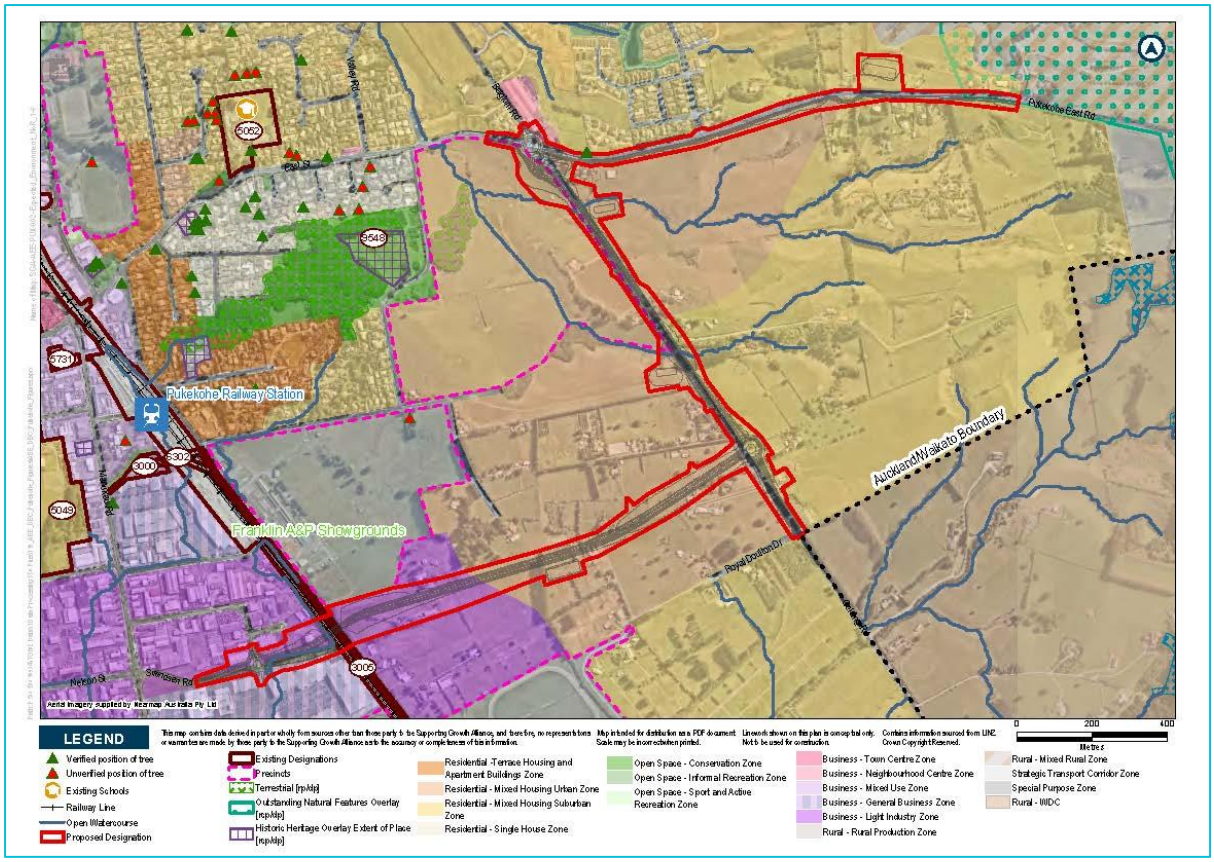

Figure 4-37: NoR 5 – Pukekohe South-East Arterial – Likely, Planned Future Environment

4.3.6 NoR 6 – Pukekohe South West Arterial

NoR 6 is located within the southwestern reaches of Pukekohe which is predominantly an urban environment with both industrial and MHS zones (as per the AUP:OP).

An active mode upgrade is proposed on the existing road network along Nelson Street West, Ward Street, Puni Road, West Street and Helvetia Road. However, the proposed designation is limited to intersection upgrades to accommodate the active mode facilities and driveways that require regrading.

In relation to the broader context of this NoR, Nelson Street (west of John Street) has an industrial character. Whereas the balance of Nelson Street, Ward Street, West Street and Helvetia Road have a suburban residential character with predominantly 1-2 storey standalone residential dwellings. These houses are largely set back from the street frontage separated by amenity planting within the front yard (to the street) and commonly a fence. There are a number of open spaces such as Samuel Miller Reserve, the Pukekohe cemetery, the Pukekohe Indian Community Centre (and fields) and Rosa Birch Park located along the alignment. West of Puni Road is existing arable / horticultural land.

Figure 4-38: Looking west along Nelson Street (near 8 Nelson Street) within the *Business – Light Industry* zoned land. (Source: MJ_IGL).

Figure 4-39: Looking west along Nelson Street (near 62 Nelson Street) within the *Residential – MHS* zoned land. (Source: MJ_IGL).

The existing road reserve of these streets includes a 'typical' cross section with grass berms, footpaths, overhead power lines, power poles and streetlights on either side of the road, a carriageway with one lane each way and roadside parking and painted road markings. There are street trees along the southern side of Ward Street, along both sides of West Street, and sporadically along Puni Road and Helvetia Road.

Figure 4-40: Looking northwest along Helvetia Road (near 36 Helvetia Road) illustrating the existing suburban character within the Residential – Single House and Residential – MHS zoned land. (Source: MJ_IGL).

When considering the likely future environment, as outlined NoR 6 is located within the industrial and MHS zones of the AUP:OP. These zones are consistent with the existing land uses and it is not anticipated that the character of the area will dramatically change, especially given the small extent of the areas identified for designation.

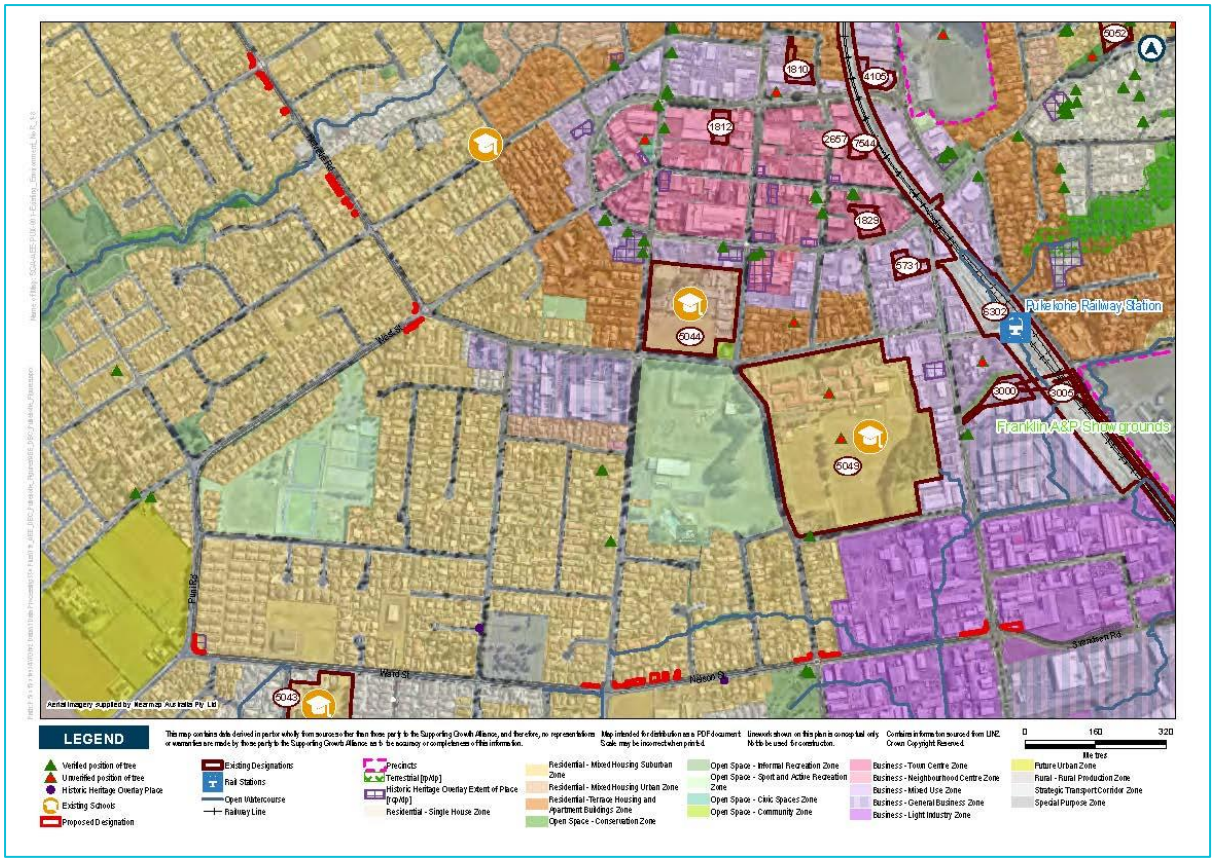

Figure 4-41: NoR 6 – South-West Arterial – Existing and Likely Future Environment

4.3.7 NoR 7 – Pukekohe North West Arterial

NoR 7 is located to the north west of urban Pukekohe; connecting Helvetia Road in the southwest to Paerata Road (SH22) in the northeast.

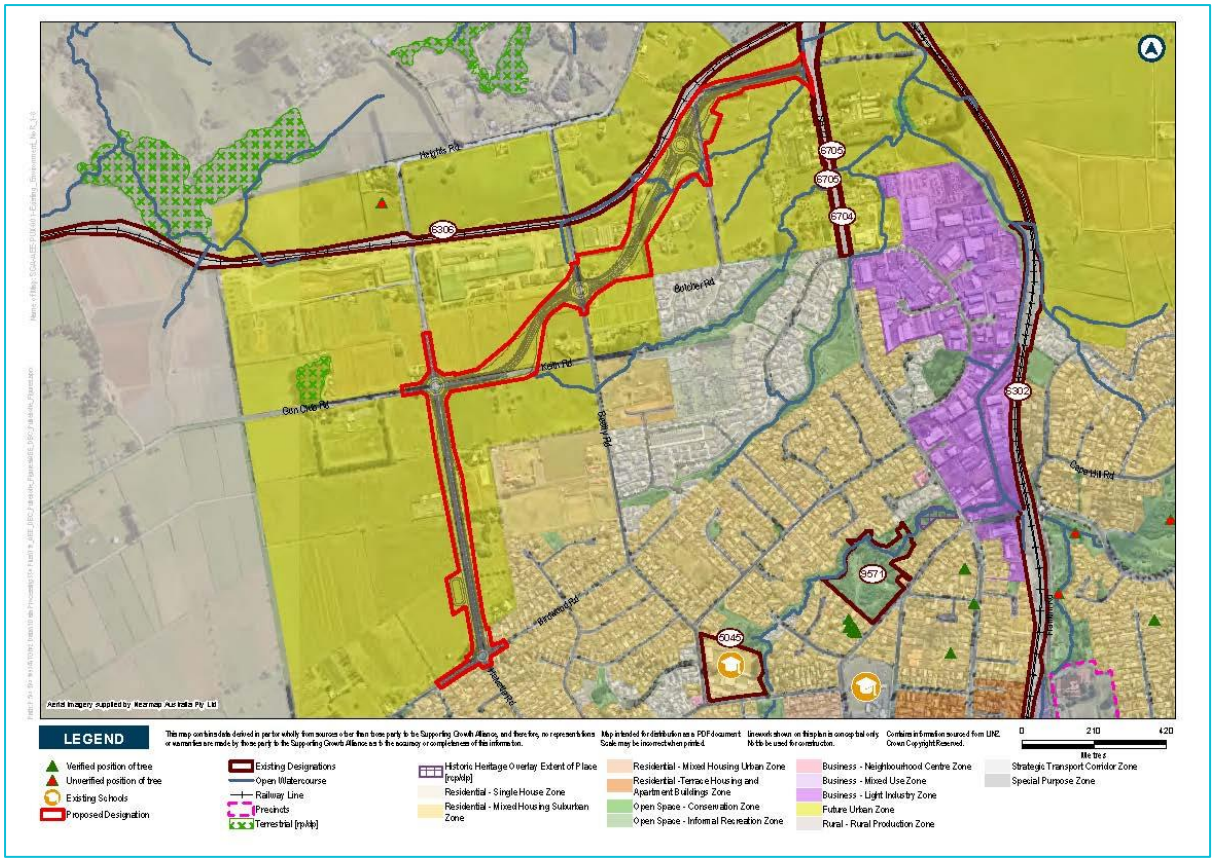

Figure 4-42: NoR 7 – Pukekohe North-West Arterial – Existing Environment

The alignment includes the upgrade of part of Helvetia Road which extends northwest from the existing urban edge of Pukekohe. The southern end of Helvetia Road is located in the Helvetia tuff ring which is characterised by largely flat arable land with scattered developments proximate to the urban edge (including rural residential properties, Nga Hau E Wha O Pukekohe Marae and commercial activities / developments). The Helvetia tuff ring is not identified as an ONF or ONL. The topography of the area is undulating.

Figure 4-43: Looking southeast along Helvetia Road (near 248 Helvetia Road) illustrating the existing rural character within the area zoned FUZ. (Source: MJ_IGL).

The alignment of NoR 7 deviates from Helvetia Road south of the junction with Gun Club Road (paper road). The alignment crosses agricultural land (predominantly arable) interspersed with rural residential properties and farmsteads, with junctions / connections to Gun Club Road and Beatty Road. There is a mix of residential and rural residential properties proximate to this NoR along Helvetia Road, Beatty Road and Butcher Road.

A band of existing commercial / agricultural activities[18] and structures (including produce storage, a distribution facility and glasshouses) are located to the north and north west of the alignment, south of the NIMT rail line (with the alignment crossing through one glasshouse). The alignment extends towards the NIMT rail line and includes the upgrade of a length of Butcher Road where it adjoins Paerata Road (SH22).

Figure 4-44: Looking north along Butcher Road (near 62 Butcher Road). The proposed alignment of NoR 7 span along the slope on the left side of the image. (Source: MJ_IGL).

The vegetation pattern along the alignment of NoR 7 includes lot boundary planting, occasional shelterbelts and scattered groupings of trees.

There are no known landscape related overlays within the designation or setting of NoR 7.

When considering the likely future environment, NoR 7 is located within the FUZ in the AUP:OP. It is therefore anticipated that the setting of NoR 7 will undergo significant change from settlement edge / rural to urban land uses in the future. The Pukekohe-Paerata Structure Plan provides further insight for the intended future zones along the alignment which includes:

- Residential – MHS zone within the southern and eastern reaches; and
- Business – Light Industry zone in the central part of the alignment.

This is illustrated in **Error! Reference source not found.** below.

18 Balle Bros Group

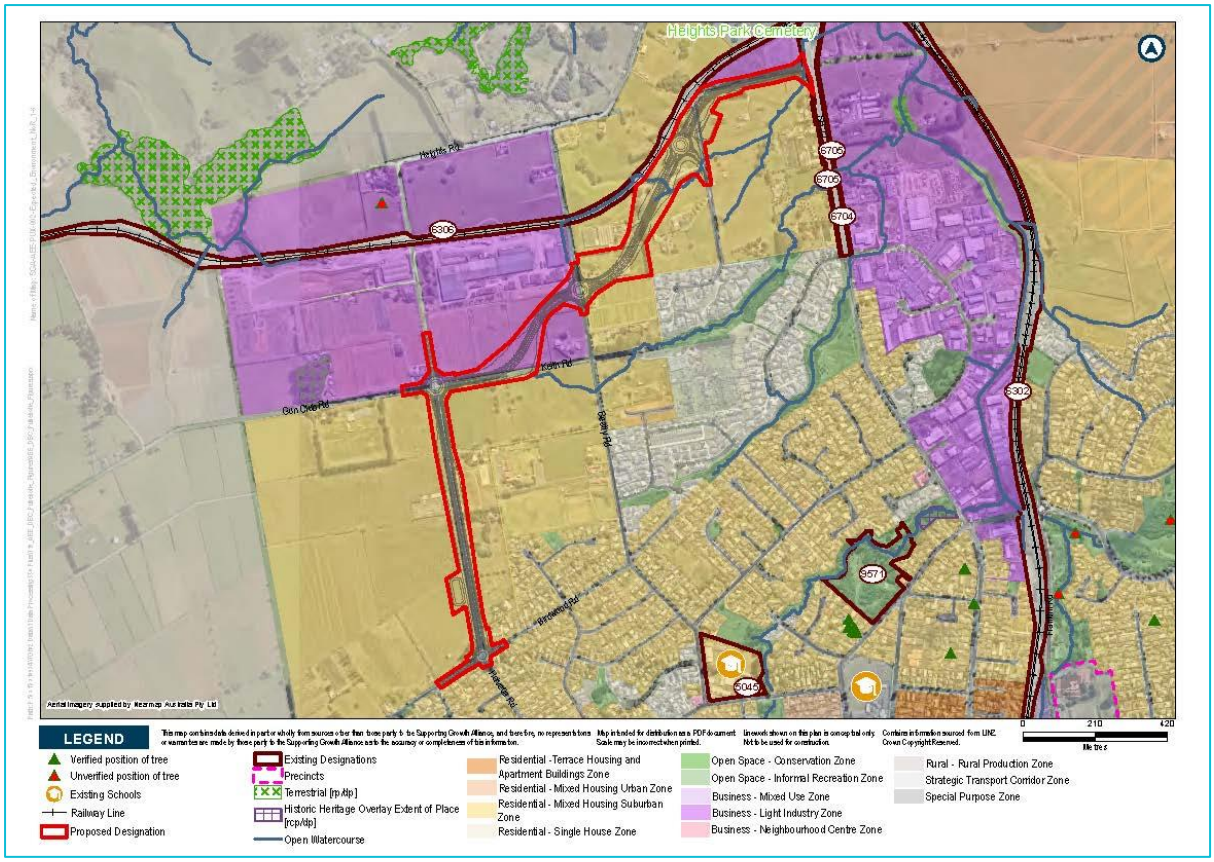

Figure 4-45: NoR 7 – Pukekohe North-West Arterial – Likely, Planned Future Environment

4.3.8 NoR 8 – Mill Road – Pukekohe East Road Upgrade

NoR 8 is located to the east of Pukekohe and upgrades Pukekohe East Road in the west and Mill Road to SH1 at Bombay in the east. It interfaces with NoR 4 (Pukekohe North East Arterial) and NoR 5 (Pukekohe South East Arterial).

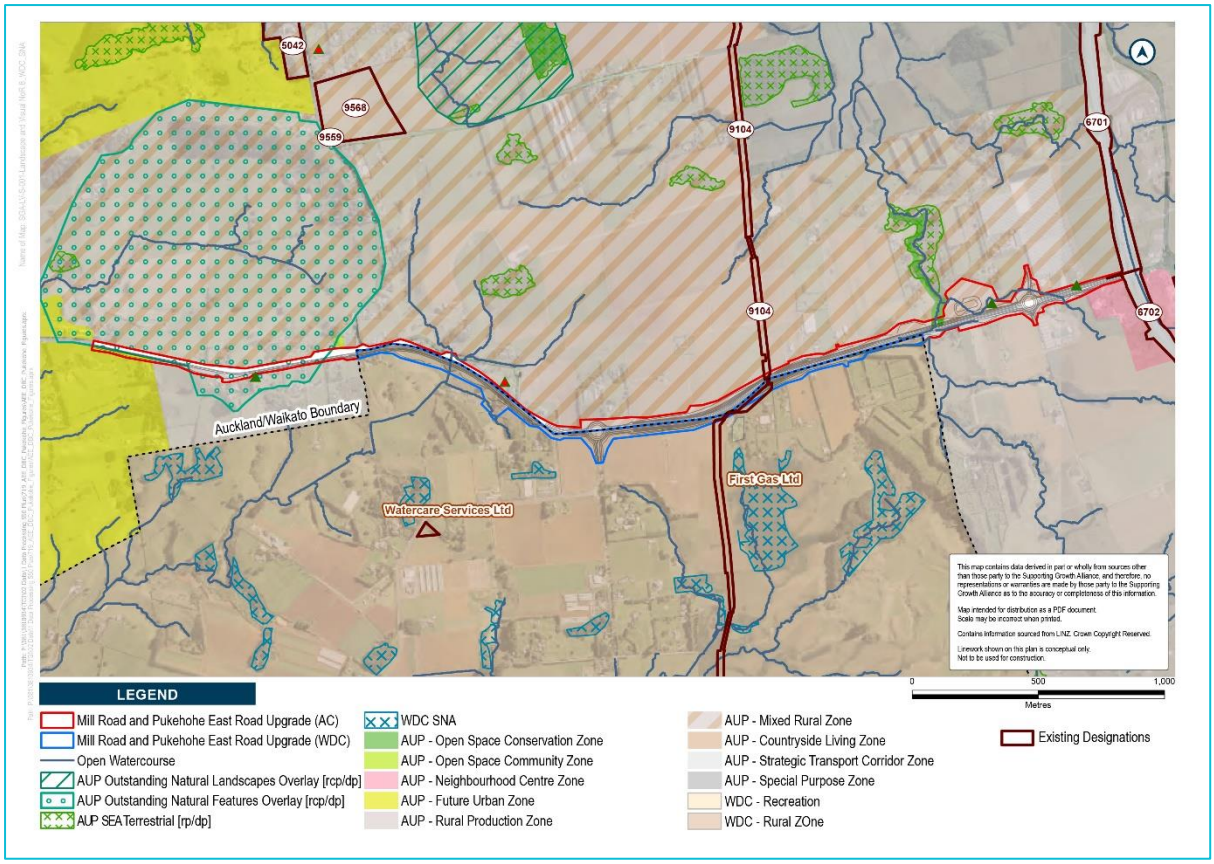

Figure 4-46: NoR 8 – Mill Road and Pukekohe Road Upgrade – Existing Environment

The section of Pukekohe East Road is rural, extending east from the urban fringe of Pukekohe. The existing two-lane road spans through agricultural land (predominantly pastoral, with some arable to the east) with rural residential properties located along the road corridor (both Pukekohe East Road and Mill Road) and within the immediate rural setting. Vegetation cover includes planted lot boundaries / curtilages, occasional shelterbelts and blocks of established vegetation within localised catchments. The topography to the south of the road is undulating. The Pukekohe East tuff ring (identified as an ONF within the AUP:OP) extends to the north and south of Pukekohe East Road and is a distinctive geological and topographical feature, albeit modified. The existing road alignment crosses the southern extent of the ONF overlay.

Figure 4-47: The distinct landform of the Pukekohe East tuff ring (ONF) as viewed from Pukekohe East Road (near #133). (Source: MJ_IGL).

The Pukekohe East Road designation will upgrade the existing road which provides an existing modified element within the Pukekohe East tuff ring ONF overlay. A description of the ONF is included previously within this report (Section 4.3.4), and effects of the designation on the ONF are addressed within Sections 6 and **Error! Reference source not found.** of this assessment.

The eastern part of NoR 8 will upgrade Mill Road; east of the upgraded junction with Harrisville Road. Mill Road extends through rural land uses (predominantly arable with some pastoral and horticultural) interspersed with rural residential and farmsteads. The eastern extent of the alignment of Mill Road runs adjacent to a large expanse of glasshouses and agricultural sheds / produce distribution centre. The alignment extends to the service station development at Exit 417 of SH1.

Figure 4-48: Looking west along Mill Road (near #39) illustrating the existing rural character of the area. To the south (left) is Waikato District and Auckland Council to the north (right). (Source: MJ_IGL).

The vegetation pattern proximate to Mill Road is varied. The western part of Mill Road is predominantly arable and vegetation cover is limited, with planted lot boundaries being infrequent.

The central and eastern parts of Mill Road include more extensive vegetation cover[19] with blocks of vegetation, steep planted catchments (including intermittent and permanent tributaries to the Ngakaroa Stream), lot boundaries and shelterbelts (notably around horticultural activities to the south of Mill Road). The topography to the north and south of Mill Road is undulating.

The stream catchments traverse a pocket of dense native bush along Mill Road (refer Figure 4-29 below) and into agricultural land uses immediately south west of the glasshouses.

As detailed in the Arboriculture Report, there are some trees within and adjacent to NoR 8 are protected under the AUP:OP provisions where they are within the Pukekohe East Tuff Crater Outstanding Natural Feature (ONF) overlay or are listed as notable trees in Schedule 10, and therefore are district level matters. The notable trees include those listed below. For descriptions of the trees within the ONF, refer to the Arboriculture Report.

- Tree 8/22 - scheduled English oak, being listed as a notable tree (ID 2785) at 60 Morgan Road, Pukekohe.
- Tree group 8/23 - scheduled Norfolk Island pine trees (x3), being listed as notable trees (ID 2785) at 60 Morgan Road, Pukekohe.
- Tree 8/71 - scheduled Puriri, being listed as a notable tree (ID 2705) at 203 Mill Road, Bombay.
- Tree 8/72 - scheduled Redwood, being listed as a notable tree (ID 2686) at 165C Mill Road, Bombay.

There is one tree protected under Waikato District Planning provisions. Tree 8/47 is a totara located at 300 Pukekohe East Road Although individually identified, these trees form part of the broader landscape and vegetated character, adding to the landscape values and amenity of the area in this environment.

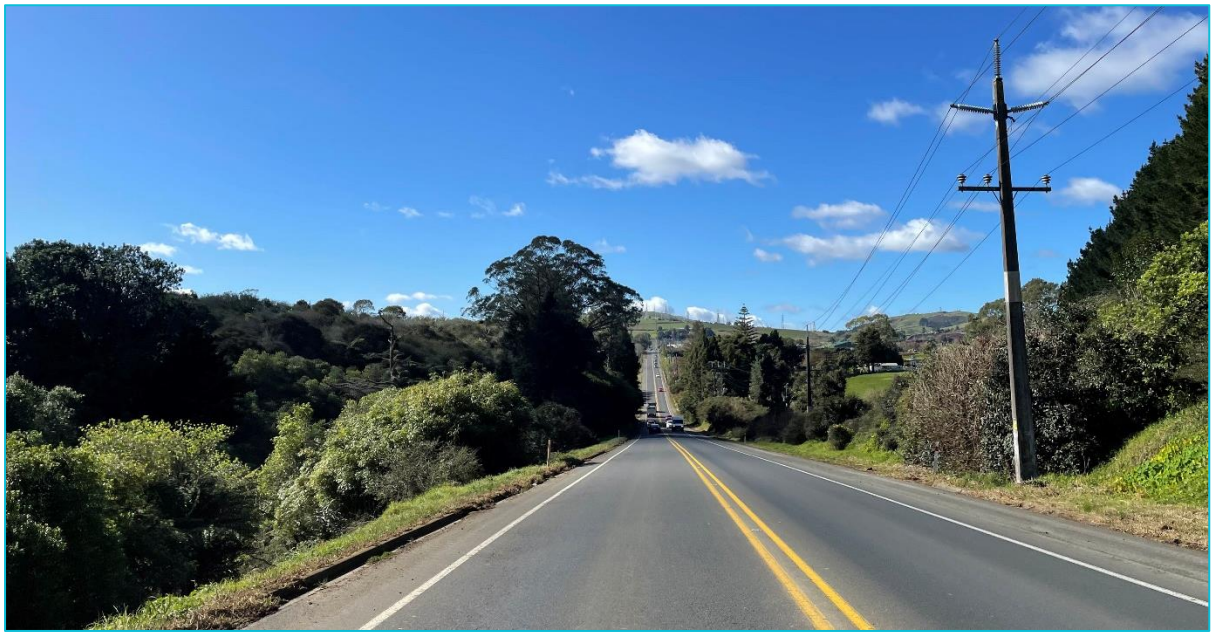

Figure 4-49: Looking east along Mill Road (near 105 Mill Road) in the context of the vegetated catchment. (Source: MJ_IGL)

19 The extent and outline of the significance of the vegetation in this area is outlined further within the ecological assessment included as part of this application.

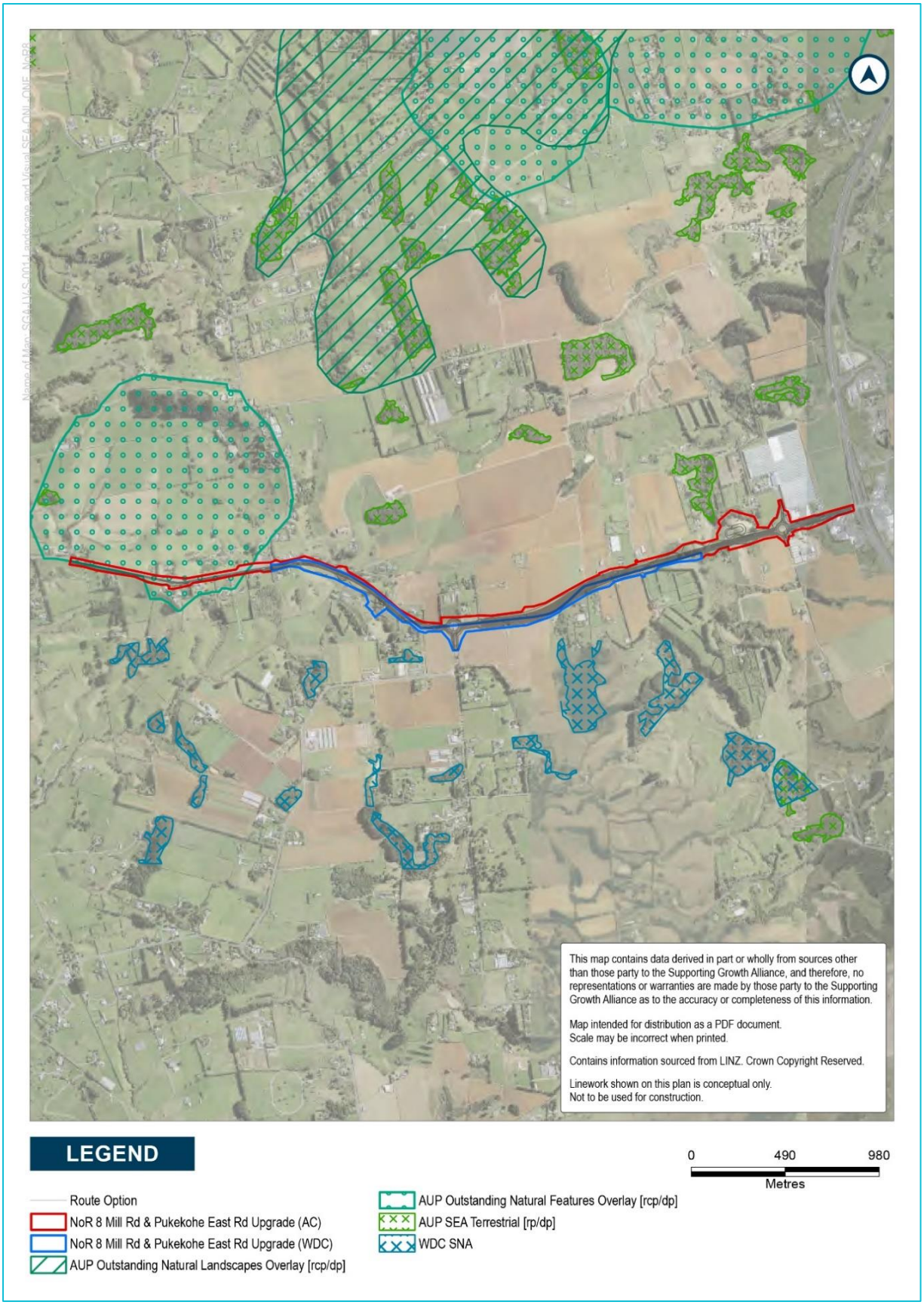

Figure 4-50: Extent of SEA and SNA relative to the designation boundary

When considering the likely future environment, a small part of the western extent of NoR 8 traverses through FUZ, identified as Residential – MHS zone within the Pukekohe-Paerata Structure Plan. The remainder of the alignment is outside of the FUZ and is therefore anticipated to remain consistent with the existing rural setting. This is shown below.

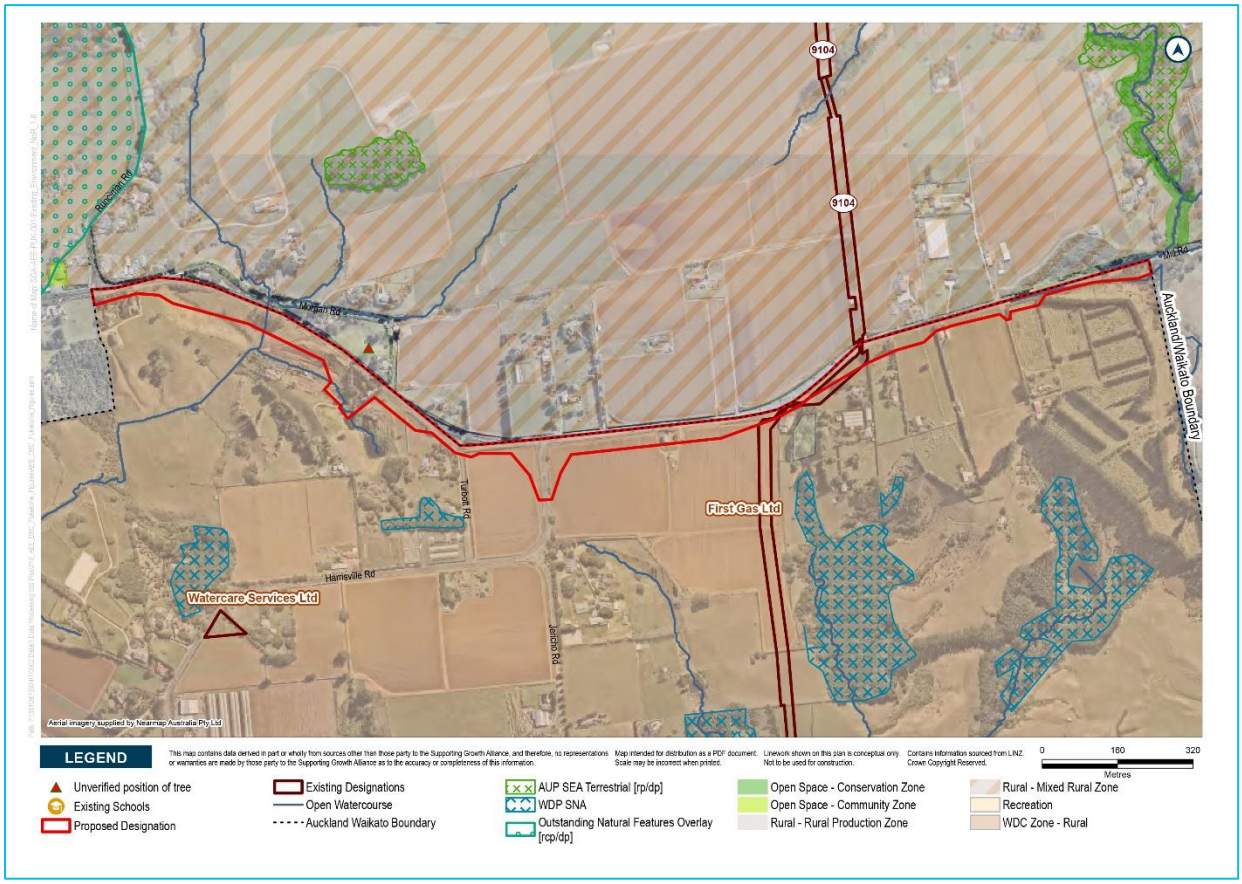

Figure 4-51: NoR 8 – Mill Road and Pukekohe East Road Upgrade – Likely, Planned Future Environment

5 Assessment of Positive Effects

The Pukekohe Transport Network includes the provision of new and upgraded roads both within the rural environment and within the FUZ (including upgrading roads in existing urban areas). The new and upgraded transport corridors have potential to provide positive effects through the design which can include landscape mitigation planting and safety improvements.

Potential positive effects anticipated by the operation of the projects have been assessed against each road type, and include:

New Road in the Rural Environment

- Landscape mitigation planting along **new road alignments within the rural environment** which has the potential to enhance and connect with the existing and wider green infrastructure network and create a more coherent vegetation pattern within the rural setting.

Upgraded Road in the Rural Environment

- When considering **upgraded road alignments within the rural environment**, landscape mitigation planting has the potential to connect to the wider green infrastructure network and improve visual amenity for road users and some adjacent properties. This will be achieved through the enhancement of the road corridor through street trees, planting and the design of street cross section, such as including active modes.
- The reduction in speed limits along **upgraded alignments of existing roads both within the rural environment and the FUZ** will improve the experiential qualities of the corridor for both road users and adjacent properties.

New Road within the FUZ

- For **new and upgraded roads within the FUZ**, landscape mitigation planting has the potential to provide coherency in streetscape character and tie in with future development through appropriate landscape design and species selection.
- Landscape mitigation planting along **new road alignments within the FUZ** can connect with proposed green corridors and recreational spaces within the future developments, creating a coherent green infrastructure network and corridors.

Upgrade of Existing Road within the FUZ or Existing Urban Area

- For **new and upgraded roads within the FUZ**, landscape mitigation planting has the potential to provide coherency in streetscape character and tie in with future development through appropriate landscape design and species selection.
- Landscape mitigation planting along **existing (upgraded) alignments within the FUZ** or **existing urban areas** has the opportunity to create a high-quality streetscape environment and improve visual amenity for road users and some adjacent (existing) properties.
- The reduction in speed limits along **upgraded alignments of existing roads both within the rural environment and the FUZ** will improve the experiential qualities of the corridor for both road users and adjacent properties.

Landscape mitigation planting will also likely result in positive ecological effects, through enhancements to biodiversity and habitat creation and the increased connectivity of natural and semi-natural areas through the planting of indigenous vegetation. Ecological mitigation measures and

positive effects are assessed and described in detail within the Assessment of Ecological Effects Assessment which accompanies this NoR Application.

For clarity and completeness, these matters are outlined and broken down within in Table 5-1. Positive effects have been grouped below with reference to the likely future environment of each alignment:

Table 5-1: Summary of positive effects resulting from Pukekohe Transport Network

NOR	New Road in the Rural Environment	Upgrade of Existing Road in the Rural Environment	New Road within the FUZ	Upgrade of existing road within the FUZ or existing urban area.
NoR 1	N/A	N/A	Fully within FUZ	N/A
NoR 2	Central part of the alignment is within the rural environment	Upgrade of Sim Road in rural environment	North eastern part of alignment is within FUZ	Upgrade of Sim Road and Cape Hill Road within FUZ
NoR 3	N/A	N/A	Fully within FUZ	N/A
NoR 4	Parts of the alignment are within the rural environment	N/A	Parts of the alignment are within the FUZ	N/A
NoR 5	N/A	N/A	South western part of alignment is within FUZ	Upgrade of Pukekohe East Road and Golding Road within FUZ
NoR 6	N/A	N/A	N/A	Specific areas of proposed designation on Nelson Street, Ward Street, Puni Road, West Street and Helvetia Road within the existing urban environment.
NoR 7	N/A	N/A	Parts of the alignment are within the FUZ	Upgrade of Helvetia Road and Butcher Road within FUZ
NoR 8	N/A	Upgrade of Pukekohe East Road and Mill Road in rural environment	N/A	A small part of the upgrade of Pukekohe East Road is within FUZ

6 Assessment of Effects

This section of the Assessment considers both the construction and operational effects of the respective designations. An overview of effects which relate to all NoRs is provided below (as they relate to both construction effects and operational effects), with an assessment of each individual NoR provided successively.

Recommended measures to avoid, remedy or mitigate effects are provided in the following section of the report.

6.1 Construction effects – matters relating to all NoRs

To assess the construction effects of the proposed designations, the key areas and issues in relation to landscape effects need to be identified and assessed. The detailed design and final alignment of the route are not yet finalised, however, it is anticipated that the project will require site enabling works, route formation works and site finishing works. These components are broken down as follows:

- Site enabling works
    - Establishment of a (temporary) site compound, lay-down areas and construction areas[20]
    - Machinery and movement of vehicles
    - Vegetation clearance

    - The nature and extent of physical impacts on private properties adjacent to the existing transport corridors during the construction period and measures to reinstate boundary fences, driveways and gardens.
        - Impacts on the physical landscape resource during construction such as vegetation clearance (within the road reserve and private property boundaries), operation of construction areas, earthworks within existing road corridors and adjacent land and construction of bridge structures within wetland and stream environments (subject to regional consent approvals).
        - Potential impacts on private properties including removal and reinstatement of boundary fences, garden plantings and driveway regrades.

- Route formation works activity
    - Modification of landform / earthworks (including cut / fill and the formation of levels for the route alignment)
    - Construction activity for wetlands / stormwater areas
    - Construction activity of physical structures including the carriageway, bridges and roundabouts
    - Activity of road construction / formation works

- Site finishing works
    - Implementation of landscape mitigation measures such as planting
    - Establishment of signage, lighting and road painting works

20 It is anticipated that any site enabling works (with the exclusion of the movement of vehicles to and from the site) will be located within the designation boundary, and has therefore been considered as part of this assessment.

The above construction stages will result in temporary effects on landscape character and visual amenity which are addressed for each NoR (refer from Section 6.3).

A detailed construction methodology for the project has not yet been prepared, however, it is anticipated that the majority of works will be undertaken during daylight-hours. Should there be a requirement for any night works, construction lighting may be required. In this event, it is anticipated that any lighting would be highly localised (to the areas being worked on at the time) and temporary in duration.

Effects on landscape character and visual amenity will likely include matters such as:

- Landscape Character
    - Effects on landscape character[21] (including rural and streetscape character) related to matters such as:
        - Vegetation clearance
        - Integration of development patterns (e.g. topography, earthworks)
        - Hydrology
        - Stormwater / wetlands[22]
        - Formation of new infrastructure / structures.
- Visual Amenity
    - Views from private residences proximate to the alignment
    - Any views from public locations

6.2 Operational effects – relating to all NoRs

For the purpose of this assessment, it is assumed that at the time of 'operation' of the Pukekohe Transport Network projects, the current land zoned as FUZ (and those which form part of the operative plan changes) within the context of Pukekohe, Paerata and Drury will be an urban area. As such, the context and setting of the NoRs located in the FUZ will be located within urbanised environments, as opposed to the existing rural environment.

For clarity and completeness, those NoRs (or parts of NoRs) located in rural zones (not in the FUZ) are assumed to be operational in the rural zone. Where NoRs are located in the existing urban area, they are assumed to operate in the urban area.

The assessment also assumes the recommendations and mitigation measures have been implemented which will minimise effects on landscape character and visual amenity.

The key components related to effects on landscape character and visual amenity will likely include:

- Landscape Character
    - Effects on landscape character / rural character / streetscape character (dependent upon route alignment) related to matters such as:

21 Dependent on the corridor alignment.

22 As outlined earlier, potential impacts on wetland and riparian areas (and therefore associated natural character values) were considered through the options assessment, design and designation footprint identification part of the process. Specific matters related to natural character will be assessed in further detail and mitigated accordingly through a future regional consent process and under the ULDMP or Landscape Management Plan conditions.

- Vegetation patterns and mitigation planting
- Integration of development patterns (e.g. topography, earthworks)
- Hydrology
- Stormwater / wetlands[23]
- Formation of new infrastructure / structures.

- Visual Amenity
    - Views from private residences proximate to the alignment
    - Any views from public locations

These are addressed for each respective NoR alignment below.

6.3 Effects – relating to specific NoRs

6.3.1 NoR 1 – Drury West Arterial

The alignment of NoR 1 is for a new road in the rural environment (zoned FUZ). The alignment connects to SH22, Burtt Road and Runciman Road. An assessment of landscape character and visual amenity in relation to construction effects and operational effects is provided under the relevant headings below:

Construction Effects

Effects on landscape character

North of Burtt Road, the alignment of the designation will require limited removal of existing vegetation (generally limited to catchments and stream corridors) to construct the corridor. South of Burtt Road, the alignment crosses existing rural residential development and will require the removal of a number of sections of shelterbelt planting and clusters of planting on the respective properties. The corridor is generally orientated at a perpendicular angle to most shelterbelts and areas of vegetation, reducing the need for large swathes of vegetation to be removed. Vegetation removal will largely be limited to short sections within a wider planted corridor, and the wider vegetation pattern of the rural environment will remain intact.

When considering the integration of NoR 1 with the underlying topography, the northern section of the alignment (north of Burtt Road) is across gently sloping land. This part of the alignment will cross the NIMT rail line, and it is anticipated that earthworks will likely be required to make-up levels for the crossing. South of Burtt Road, the designation spans across gently undulating landform and will likely require limited amounts of cut / fill earth works to construct the corridor.

The alignment spans across multiple intermittent and permanent stream corridors along the alignment. The concept design of the alignment includes three bridges across the stream corridors (inclusive of the bridge over the NIMT rail line), which will assist in ensuring the natural alignments and patterns of these hydrological features remain. Crossings over the remaining intermittent streams (approximately 3) will be ‘at grade’, with the streams diverted through a culvert. The ‘at grade’

[23] Potential impacts on wetland and riparian areas (and therefore associated natural character values) were considered through the options assessment, design and designation footprint identification part of the process. Specific matters related to natural character will be assessed in further detail and mitigated accordingly through a future regional consent process and under the ULDMP or Landscape Management Plan conditions.

crossings will require vegetation removal and changes to the natural flow pattern of the stream, limited to the footprint of the designation, with the wider corridor remaining unchanged.

Stormwater wetlands are anticipated along the alignment of NoR 1. Their construction will require limited cut / fill earthworks; however, their formation is consistent with roading and agricultural land uses and will not introduce unexpected features into the rural environment.

The alignment of NoR 1 anticipates the construction of two roundabouts and three bridges[24] (across existing streams and the NIMT rail line). The construction of these features will likely require more expansive landform modification to make-up levels; however, the extent of modification is unlikely to detract from the wider landform, hydrological and vegetation patterns; with effects being localised. Mitigation of these effects would be undertaken at the regional consenting phase (e.g. wetland and stream works, and vegetation removal).

The alignment is for a new road within the rural environment (zoned FUZ). Roading and rail infrastructure are notable components of the rural environment within the setting of the proposed designation. NoR 1 will introduce an additional road corridor into the landscape, however it will not be out of place or inconsistent with the anticipated landscape character of the area which will ultimately be transitioning to an urban environment.

Overall, for the reasons outlined above NoR 1 will result in **low - moderate** temporary effects on the rural landscape character during construction.

Effects on visual amenity

The alignment of NoR 1 is through six properties (as identified through desk-top analysis of aerial mapping), assessed as including one commercial property (north of Burtt Road accessed from Karaka Road) and five rural residential properties (south of Burtt Road) accessed from Burtt Road and Runciman Road.

Rural residential properties along the alignment generally include established planting within the curtilage and proximate to the respective houses. For those properties adjacent to the alignment (and being retained) the proposed construction works and activities will be visible with partial screening provided by existing intervening vegetation. For some properties, the proximity of the alignment may result in existing planting being removed to facilitate the works; where this occurs, direct and prolonged views of the construction works throughout the construction period are likely.

Views from rural residential properties within the wider setting will likely be largely visually contained by topography and the existing vegetation pattern (which includes shelterbelt rows, lot boundary and curtilage planting). Where visible, it is anticipated that only short sections of the alignment will be viewed, notably from properties south of Burtt Road.

Views from public locations are likely restricted to motorists travelling along SH22, Burtt Road and Runciman Road, and users of the NIMT rail line. From these locations, there will only likely be glimpse views of the proposed works (due to topography and vegetation) seen within a transient context with road users typically travelling at or around the 80km/hr speed limit. Users of the NIMT rail line will pass underneath the proposed bridge, however bridges over rail infrastructure are common and the view will be fleeting.

[24] Varying between approximately 30m and 100m in length.

Overall, for the reasons outlined above, NoR 1 will likely result in **moderate** temporary effects on visual amenity for those properties immediately adjacent to the alignment (being retained). For properties within the wider setting and from public viewpoints, NoR 1 will likely result in **low** effects on visual amenity.

Operational Effects

In relation to landscape **character**, the character and land use of the entire alignment of NoR 1 will change to that of an urbanised environment. In this area this is likely be to the THAB, MHU and MHS zones of the AUP:OP identified through the Drury-Ōpāheke Structure Plan. The project adds a new road element through this area, with unknown specific design of the adjacent urban environment. However, the density of the urban intensification is anticipated to decrease from north to south along the alignment of the NoR (THAB to MHS).

The road cross section of the design of NoR 1 proposes the following indicative arrangement and mode share design:

Figure 6-1 Generic Four-Lane Arterial - 30m cross section with 2 lanes for general traffic, public transport, and active transport facilities either side. Proposed SH22 to Burtt Road (not to scale)

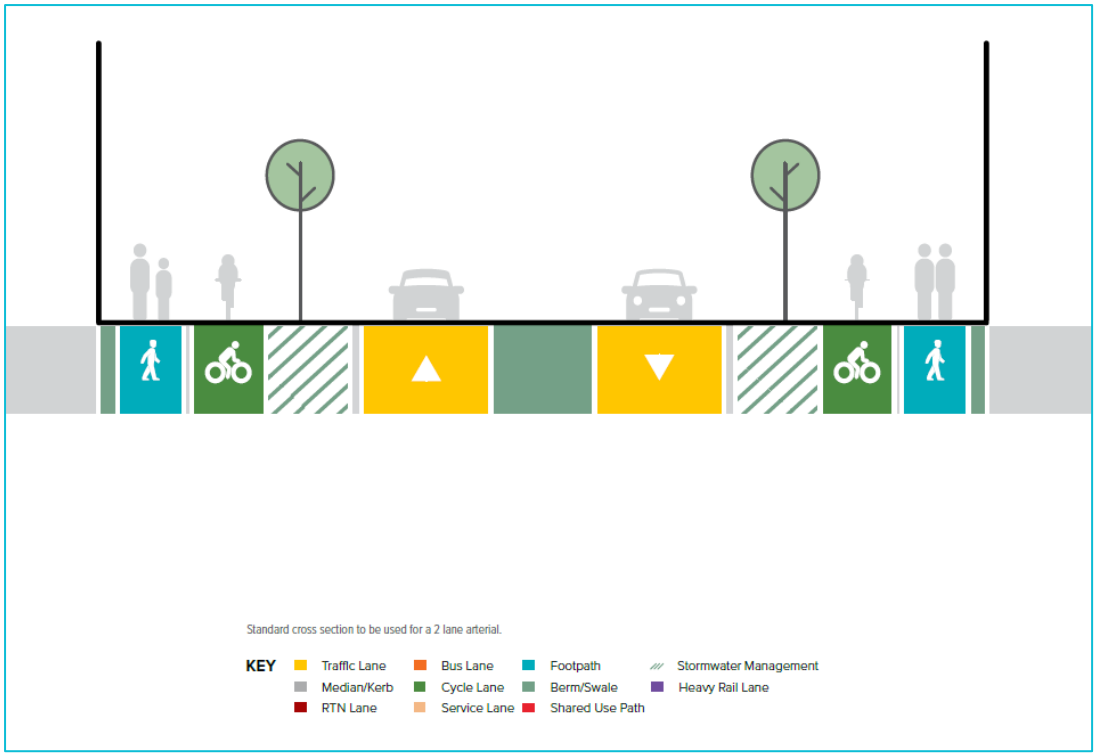

Figure 6-2: Generic Two-Lane Arterial - 24m cross section with 2 lanes for general traffic and active transport facilities either side. Proposed south of Burtt Road (not to scale)

The proposed designation will form a complementary element with the FUZ and any adverse effects on landscape character are assessed to be **very low**.

Further to the above in relation to the FUZ anticipated, the visual context will change to that of an urbanised environment. As a result, individual dwellings will not be affected in relation to **visual amenity** like those discussed in relation to *construction effects*. It is anticipated that visual effects for the operation of the project (including street lighting during night-time hours) and its alignment (post-construction) will be **low**. This is based upon the design working with and integrating into the surrounding topography (including the raised topography for bridge access), and visual amenity and user experience associated with the streetscape design, street trees, berm planting and active modes enabled along the route. From the existing roads (Karaka Rd, Burtt Rd, Runciman Rd) and the NIMT rail line the proposal will be seen in the context and will form part of the emerging urban environment.

NoR 1 - Summary of Effects Table

	Construction Effects	*Operational Effects*
Landscape Character	***Low - Moderate***	***Very Low***
Visual Amenity	***Low to Moderate***	***Low***

6.3.2 NoR 2 – Drury to Pukekohe Link

As outlined within Table 2-1 and Section 4.3.2 of this assessment, NoR 2 has been broken down into four segments; assessed in turn below:

South Drury Connection

The alignment of the South Drury Connection segment of NoR 2 is for a new road in an existing rural environment. Between Great South Road and Burtt Road this environment will remain rural, and between Burtt Road and Runciman Road the proposed designation follows the southern edge of the FUZ. The alignment connects to Great South Road, Runciman Road and Burtt Road. An assessment of landscape character and visual amenity in relation to construction effects and operational effects is provided under the relevant headings below:

Construction Effects

Effects on landscape character

East of Runciman Road the alignment of the designation will require the removal of areas of vegetation along lot boundaries, catchments and within the Ngakoroa Stream corridor. As the alignment is broadly perpendicular to the vegetation pattern, it is anticipated that only short sections of vegetation will be removed to construct the road corridor, with the broader vegetation pattern remaining intact. To the west of Runciman Road, the vegetation pattern is sparse and it is anticipated that limited vegetation will need to be removed in this area within the rural residential properties. However, further west on the approach to Burtt Road, the alignment of the designation largely avoids areas of established vegetation (with the exception of some sparse tree planting).

The alignment of the designation to the east of Runciman Road is across undulating topography. It is anticipated that the alignment will require earthworks (predominantly fill) to create the required levels, with bridges also anticipated to span the Ngakoroa Stream corridor and a broader gully. West of Runciman Road, this segment of NoR 2 traverses an area of lower-lying topography within a broad catchment (identified as a floodplain within the AUP:OP), rising to the east and west on the approach to Runciman Road and Burtt Road respectively. Earthworks (cut and fill) will be required to construct the road to the west of Runciman Road. Effects resulting from earthworks will be localised, with the broader topographic pattern remaining unchanged.

Ngakoroa Stream is located in a localised gulley. It is anticipated (as illustrated on the concept design plans) that a bridge will span this gulley which will assist in retaining the streams natural alignment. The bridge will likely require the removal of a limited section of established vegetation along the stream corridor (below and immediately adjacent to the bridge crossing point).

Stormwater wetlands are anticipated along the alignment of this segment of NoR 2. The construction of stormwater wetlands will require limited cut / fill earthworks; however, their formation is consistent with roading and agricultural land uses and will not introduce unexpected features into the rural environment.

The alignment of this segment of the designation anticipates two roundabouts and two bridges. The construction of these features will likely require more expansive cut / fill works to make-up levels; however, the extent of modification is unlikely to detract from the wider landform, hydrological and vegetation patterns; with effects being localised.

The alignment is for a new road within the rural environment and also located within and along the southern edge of and proximate to FUZ. Roading, overhead electrical (transmission) and rail infrastructure are notable components of the rural environment within the setting of this segment of NoR 2. The proposed designation largely follows the alignment of the overhead transmission line. Whilst the project will introduce an additional roading corridor into the landscape, it will not be out of

place or inconsistent with the existing and anticipated landscape character of the area, and will be seen within the context of existing infrastructure within the landscape fabric.

Overall, for the reasons outlined above, the designation alignment will result in **low-moderate** temporary effects on the rural landscape character during construction.

Effects on visual amenity

The alignment of this South Drury Connection segment of NoR 2 is through or immediately adjacent to approximately 16 properties (as identified through desk-top analysis of aerial mapping and site visits), assessed as including one commercial property (west of Runciman Road) and 15 rural residential properties accessed from Great South Road, Runciman Road and Burtt Road.

Rural residential properties along the alignment predominantly include established planting within the curtilage and proximate to the respective houses; however, in contrast, some properties have limited or no vegetation within the curtilage or along lot boundaries. For properties adjacent to the alignment (and being retained), the proposed construction works and activities will be visible, with partial screening provided by existing vegetation where present. For some properties, the proximity of the alignment may result in existing planting surrounding the curtilage being removed to facilitate the works; where this occurs, direct and prolonged views of the construction works throughout the construction period are likely.

Views from rural residential properties within the wider setting are likely to be largely visually contained by the existing vegetation pattern (which includes shelterbelt rows, lot boundary and curtilage planting and gulley / stream planting). Where visible, it is anticipated that views of a short duration of short sections of the alignment will be available, notably from properties with reduced or no vegetation within the curtilage or along lot boundaries.

Views from public locations are likely to be restricted to motorists travelling along Great South Road, Burtt Road, Ngakoroa Road and Runciman Road, and users of the NIMT rail line. From these locations the construction works will be visible, albeit seen within a transient context. Views will be partially screened by intervening topography and vegetation.

Overall, for those properties immediately adjacent to the alignment, the designation of the Drury South segment of NoR 2 will likely result in **moderate - high** temporary effects on visual amenity due to limited screening and the potential extent of landform modification. For properties within the localised and wider setting, and from public viewpoints, this segment of NoR 2 will likely result in **low** effects on visual amenity.

Operational Effects

The South Drury Connection segment of NoR 2 is for a new road within the existing rural environment and along the southern edge of the FUZ. The alignment connects to Great South Road (west of the SH1 corridor), Runciman Road and Burtt Road.

Where NoR 2 spans through the land which is to remain as *Rural – Mixed Rural* zone, the project will change the **character** of that landscape. It will introduce an urban arterial road into this location which has established rural and rural residential land use and landscape patterns, however its alignment is proximate to the area identified as FUZ under the AUP:OP. The alignment of the designation spans across rolling topography and areas of established vegetation which includes catchment planting and shelterbelts. The design includes landform modification (with both cut and fill), and also two bridges

across stream catchments before connecting back to a roundabout within the FUZ proximate to Runciman Road.

Once the alignment links into the area of FUZ it extends along its southern boundary (parallel with the overhead transmission lines) before connecting with a roundabout at Burtt Road. The landscape character of the area identified as FUZ along this part of the alignment of NoR 2 (South Drury Connection) will change to that of an urbanised environment through the provision of the MHS zone. The Project will add a new road element through this area, however with unknown specific design of the adjacent urban environment. There will be considerable landform modification required, however this can be mitigated through the recommendations outlined within Section 7.1 *'Recommended Measures to Avoid, Remedy or Mitigate Operational Effects'* later in this report.

When taking into account potential effects on landscape character of this section of NoR 2, 'in the round' any adverse effects are assessed to be **low-moderate**.

In relation to **visual amenity**, as outlined under construction effects above, the alignment spans through / immediately adjacent to some 16 properties predominantly accessed off Great South Road, Runciman Road and Burtt Road. Between Great South Road and Runciman Road (remaining as rural environment) the alignment spans very close to a number of existing houses (which are located within the Rural – Countryside Living zone) and will result in adverse visual effects which are assessed to be **moderate-high**. However, with the proximity to the emerging urban environment (including any associated night-time lighting) and the mitigation measures (including screening planting, minimising earthworks, integrating into the surrounding topography and the design of the streetscape) these effects will reduce to **low-moderate**.

Where the alignment spans through the southern part of the FUZ land, from the south the Project will be seen in the context of this emerging urban environment (including any associated night-time lighting) and also the existing overhead transmission line infrastructure. Although the road will add a new infrastructure element into this landscape (which also includes the NIMT), any potential cumulative effects are assessed to be **low**. They are located proximate to one another creating a logical infrastructure 'corridor' within this environment where these elements are grouped as opposed to spreading them across the landscape.

When viewing from the south there are a number of properties (between Runciman Road and Burtt Road) which will remain with rural zoning and have visibility of the proposal, albeit partially screened by elements in the intervening landscape. Visibility from public locations is largely restricted to along Burtt Road, Runciman Road and Great South Road, where the proposal will be seen in a transient context (these roads have an 80km/hr speed limit). Potential visual effects from these locations are assessed to be **moderate** reducing to **low** with the implementation of the mitigation measures. The Project will be seen in the context of the future urban environment and will integrate into the surrounding environment. There will also be visual amenity and user experience associated with the streetscape design, street trees, berm planting and active modes enabled along the route.

The road cross section of the design for NoR 2 – South Drury Connection proposes the following indicative arrangement and mode share design:

Figure 6-3: 24m wide cross section with two lanes for general traffic, with active transport facilities on one side of the corridor

NoR 2 (South Drury Connection) - Summary of Effects Table

	Construction Effects	*Operational Effects*
Landscape Character	***Low - Moderate***	***Low - Moderate***
Visual Amenity	***Low to Moderate - High***	***Low to Low - Moderate***

SH22 Connection

Construction Effects

The alignment of the SH22 Connection segment of NoR 2 is partially an upgrade of Sim Road and partially a new road in the rural environment. The alignment connects to SH22 and Sim Road to the north-south segments of NoR 2. An assessment of landscape character and visual amenity in relation to construction effects and operational effects is provided under the relevant headings below:

Effects on landscape character

The alignment of the proposed designation along Sim Road is largely devoid of established vegetation, with occasional front-of-lot boundary planting set back from the existing road corridor (becoming more regular to the south east). Where the proposed designation deviates from Sim Road, it traverses agricultural land which is also largely devoid of established vegetation. It is therefore anticipated that the alignment will require limited and localised vegetation removal.

The north western part of the SH22 Connection segment is for the upgrade of Sim Road. As Sim Road is existing, it is anticipated that only minimal earthworks will be required to implement the designation. To the south east, the alignment is across gently undulating land, and it is anticipated that more substantial earthworks (fill) will be required to make-up levels to establish a bridge / crossing to span both Oira Creek and the NIMT rail line. Earthworks in these areas will be in contrast to the lower-lying and gently undulating landform in the rural environment.

As discussed above, it is anticipated a bridge will span Oira Creek (as illustrated on the concept design plans) which will assist in retaining the natural alignment and pattern of the stream (and its enclosing floodplain). The upper reaches of smaller catchments will be affected by the anticipated fill earthworks and will a have stormwater culvert. Mitigation of these effects would be undertaken at the regional consenting phase (e.g. wetland and stream works, and vegetation removal). The natural alignment and extent of vegetation cover along Oira Creek within this segment of NoR2 will likely remain intact.

South of the NIMT rail line, the designation boundary widens to include a tributary and area of scrub. The concept alignment largely avoids this area of scrub and it is anticipated that this vegetation will remain largely intact.

Stormwater wetlands are anticipated along the alignment of this segment of NoR 2. Their construction will require limited cut / fill earthworks; however, they are consistent with roading (infrastructure) and agricultural land uses and will not introduce unexpected features into this environment.

The SH22 Connection segment of NoR 2 anticipates two roundabouts (at both ends of the alignment with Sim Road) and two bridges. Due to the location of the roundabouts (adjoining an existing road corridor), it is anticipated that reduced earthworks will be required (in comparison to a roundabout in the rural environment). As discussed above, and in contrast, it is anticipated that more substantial fill works will be required to implement the bridges, with expansive landform modification to make-up levels. This modification will be in contrast to the wider landform, however wider the hydrological and vegetation patterns will likely remain unchanged; with effects being localised.

The alignment along Sim Road constitutes an upgrade of an existing corridor. The alignment for the new road section within the rural environment will introduce additional roading into an agricultural rural landscape, however it will be within the setting of existing transport corridors including Sim Road, SH22 and the NIMT rail line.

Overall, for the reasons outlined above, the SH22 Connection segment of NoR 2 will result in **moderate** temporary effects on the rural landscape character during construction (focussed on the new road in the rural environment). In contrast, it is anticipated that the alignment will result in **low** temporary effects on the streetscape character of Sim Road during construction.

Effects on visual amenity

The SH22 Connection segment of NoR 2 is through or immediately adjacent to approximately ten properties (as identified through desk-top analysis of aerial mapping and site visits), assessed as including one commercial (equine veterinary) property and nine rural residential properties. All properties are located along Sim Road.

Rural residential properties are predominantly located along the western side of Sim Road. Houses are generally set back from the road corridor and have sporadic front-of-lot boundary planting. For properties along Sim Road, it is anticipated that front-of-lot boundary planting may be removed to

facilitate the road widening works, with views of the proposed construction works and activities being directly afforded.

Views of the alignment (including the extent of landform modification) will likely be available from properties within the localised and wider rural environment, including to the east of Sim Road (east of the alignment) and south of Sim Road (west of the alignment). Where visible, the upgrade of Sim Road will be seen within the context of an existing road corridor, however in contrast, the southern part of the alignment will introduce new infrastructure (roading, bridge and associated earthworks / landforms) into the rural environment.

Views from public locations will likely be restricted to motorists travelling along Sim Road and SH22, and users of the NIMT rail line. Users of the NIMT rail line will pass underneath the proposed bridge, however bridges over rail infrastructure are common and the view will be fleeting. From the rail line and SH22, the proposed works will be seen within a transient context.

Overall, the SH22 Connection segment of NoR 2 will likely result in **moderate** temporary effects on visual amenity on local properties which are proposed to be retained. When considering views from public viewpoints, the designation will likely result in **low** effects on visual amenity.

Operational Effects

The alignment of the SH22 Connection segment of NoR 2 is for an upgrade of part of Sim Road and a new road within the existing rural environment. The alignment connects to SH22 and Sim Road.

This section of NoR 2 will introduce an urban arterial road into this location and permanently change the **character** of this landscape which has existing rural characteristics, as outlined previously. In relation to potential effects related to landscape character on the operation of the Project, these are assessed to be **low-moderate** (reducing to **low** post mitigation) for the following reasons:

- The alignment largely follows a logical alignment across the landscape which follows the underlying topography,
- It partially follows the existing alignment of Sim Road which limits the introduction of new roading in this environment,
- The alignment includes bridges across the streams and NIMT route which ensures the natural alignment and patterns are not affected, and
- The proposal will integrate into the surrounding landscape (topography) through the cut / fill proposed response, which includes the rising levels for the respective bridges.

In relation to **visual amenity**, as outlined under construction effects above, the alignment spans through / immediately adjacent to some 10 properties predominantly accessed off Sim Road and Karaka Road. These properties will remain in the rural environment (not affected by FUZ zoning) and the alignment spans close to a number of existing houses. There are also houses set back from the designation (accessed from Sim Road and Karaka Road) which will afford views. However, some views are partially screened by topography and vegetation in the intervening landscape, particularly vegetation around the respective houses. From public locations such as motorists travelling along Sim Road and SH22 (to the north) and users of the NIMT rail line the proposal will be seen within a transient context (roads with 60km/h and 80km/h speed limits). It is understood that this segment of the alignment (in the rural environment) will not include street lighting, with night-time lighting effects limited to headlights and taillights of cars using the new road.

With mitigation measures (including screening planting, minimising earthworks, integrating modified landforms into the surrounding topography and the design of the streetscape) any visual effects will be **low**. There will also be improved visual amenity and user experience associated with the streetscape design, street trees, berm planting and active modes enabled along the route.

The road cross section of the design for NoR 2 – SH22 Connection proposes the following indicative arrangement and mode share design:

Figure 6-4: Generic 24m wide cross section is proposed with two lanes for general traffic and active transport facilities on one side of the corridor.

NoR 2 (SH22 Connection) - Summary of Effects Table

	Construction Effects	*Operational Effects*
Landscape Character	***Low to Moderate***	***Low***
Visual Amenity	***Low to Moderate***	***Low***

Drury – Paerata Link

Construction Effects

The alignment of the Drury – Paerata Link segment of NoR 2 is for a new road within the rural environment. The alignment connects to Burtt Road and Sim Road (south). An assessment of landscape character and visual amenity in relation to construction effects and operational effects is provided under the relevant headings below:

Effects on landscape character

The alignment is through rural land interspersed with rural residential properties. Vegetation cover is generally sparse, limited to groupings of trees, planted catchments and planting within the curtilage of properties. However, the Drury-Paerata Link segment of NoR 2 (road alignment and anticipated earthworks) will likely require the removal of parts of tree groups (notably west and proximate to Burtt Road), an expanse of scrub / regenerating bush planting (within the western part of the property at 357 Burtt Road) and sections of vegetated catchments including along the Oria Creek catchment / corridor. The alignment will likely require the removal of areas of established vegetation, however the wider vegetation pattern will remain unaffected.

The northern section of the Drury-Paerata Link is located on gently rolling topography, and it is anticipated that earthworks will be limited to implement the corridor. In contrast, the central and southern sections of the alignment (south of 357 Burtt Road) is located on more undulating landform, and it is anticipated that more significant cut / fill earthworks will be required to implement the designation. Effects will be localised, with the broader topographic pattern remaining unchanged (beyond the designation boundary).

It is anticipated a bridge will span Oria Creek (as illustrated on the concept design plans) which will assist in ensuring the natural alignment and pattern of the stream will remain, albeit with vegetation removal along the stream corridor (below and immediately adjacent to the bridge) likely required to construct the bridge.

The concept design anticipates a single large stormwater wetland along this alignment (west of 357 Burtt Road and the connection with the SH22 Connection segment of NoR 2). Bodies of water are not commonplace within the setting of this alignment; however, stormwater wetlands / agricultural ponds are a frequent and expected component of the rural environment.

The alignment of this segment of the designation anticipates two roundabouts and one bridge. The construction of these features will likely require more expansive cut / fill landform modification to make-up levels; however, the extent of modification is unlikely to detract from the wider landform, hydrological and vegetation patterns; with effects being localised.

The alignment of the Drury-Paerata Link segment of NoR 2 again broadly follows overhead transmission lines to the north and the alignment of the NIMT rail line to the south. Whilst the alignment includes a new road within the rural environment, its alignment is consistent with existing patterns of infrastructure within the landscape fabric.

Overall, for the reasons outlined above, the Drury-Paerata Link segment will result in **moderate** temporary effects on the rural landscape character during construction.

Effects on visual amenity

The alignment of this segment of NoR 2 is through or immediately adjacent to approximately eight properties (as identified through desk-top analysis of aerial mapping), assessed as including one commercial property (at 357 Burtt Road) and 7 rural residential properties / farmsteads.

Rural residential properties and farmsteads along the alignment generally have open boundaries, with occasional sporadic and sparse planting (with more vegetation in the southern parts of the alignment). For properties adjacent to the alignment (and being retained), the proposed construction and

earthworks and activities will be visible with direct and prolonged views of these works screened by intermittent planting (where present and retained).

Views from rural residential properties within the wider setting will likely be largely visually contained by the existing vegetation pattern which includes planted catchments and groupings of trees. Where the alignment is visible, it is anticipated that only glimpse views of short sections of the alignment will be available.

Views from public locations will likely be restricted to motorists travelling along Burtt Road and Sim Road at either end of the alignment, and users of the NIMT rail line. From these locations, the proposed works will predominantly be seen within a transient context (roads with 60km/h and 80km/h speed limits).

Overall, for those properties adjacent to the alignment, the designation of this segment of NoR 2 will likely result in **moderate-high** temporary effects on visual amenity due to the extent of landform modification and earthworks, a lack of screening planting and the open pastoral land use. For properties within the localised and wider setting, and from public viewpoints, the designation will likely result in **low** effects on visual amenity.

Operational Effects

The alignment of the Drury – Paerata Link segment of NoR 2 is for a new road within the rural environment, connecting the two FUZ areas north in Drury and south in Paerata. The alignment connects between Burtt Road and Sim Road.

This section of NoR 2 again will introduce an urban arterial road into this location and permanently change the **landscape character** which aligns generally adjacent to the NIMT rail line. This landscape has existing rural characteristics, as outlined previously. In relation to potential effects related to landscape character on the operation of the Project, these are assessed to be **moderate** (reducing to **low-moderate** post mitigation) for the following reasons:

- The alignment largely follows that of the NIMT rail line and the overhead transmission lines, which is another element of significant infrastructure in the localised area,
- The alignment spans through the landscape, partially responding to the underlying topography, e.g. following the underlying physical landscape patterns,
- The alignment spans a bridge over the Oira Creek which ensures its natural alignment and patterns are not affected,
- The proposed designation is proximate to (although acknowledged it is not within) an area to the west of the NIMT rail line identified as FUZ. It forms part of an emerging urban environment in this location with development associated with Paerata Rise to the west of the NIMT line,
- Although there will be landform modification, the proposal will integrate into the surrounding landscape (topography) through the cut / fill proposed response and the associated recommended planting measures. This includes on the varied topography and the rising levels for the respective bridges, and
- The proposal will present an upgrade to Sim Road (south), proximate to the FUZ (area identified for urbanisation).

In relation to **visual amenity**, as outlined under construction effects above, the alignment spans through / immediately adjacent to a number of properties predominantly accessed off Sim Road and Burtt Road. These properties will remain in the rural environment and the alignment spans very close

to a number of existing houses (some of which will be removed by the designation). There are also houses set back from the alignment (accessed from Sim Road and Burtt Road) which will afford views. However, some views are partially screened by topography and vegetation in the intervening landscape. From public locations such as motorists travelling along Burtt Road and Sim Road and users of the NIMT rail line the proposal will remain seen within a transient context (roads with 60km/h and 80km/h speed limits). The alignment of these roads will enable direct views of the proposal, however with the recommended mitigation measures they will visually integrate into the surrounding landscape. This segment of the alignment (in the rural environment) will not include street lighting, with night-time lighting, with night-time lighting effects limited to headlights and taillights of cars using the new road.

Overall, the adverse visual effects from the properties adjacent to the alignment will be **moderate**, reducing to **low** with the mitigation measures implemented (including planting measures, minimising earthworks, integrating future landform into the surrounding topography and the design of the streetscape).

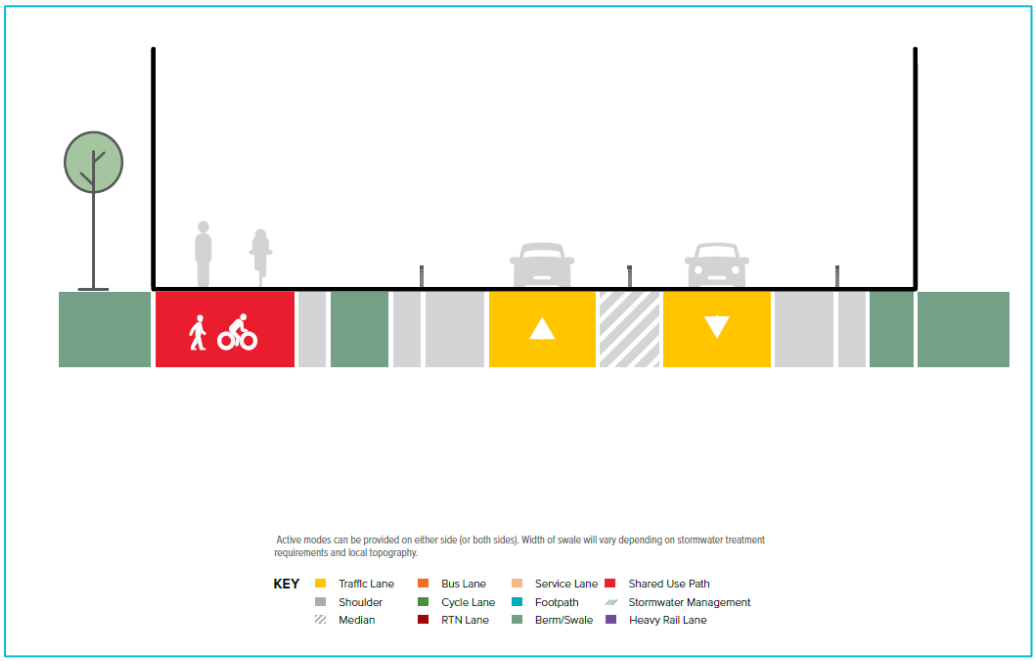

Figure 6-5: Generic 24m wide cross section is proposed with two lanes for general traffic and active transport facilities on one side of the corridor.

NoR 2 (Drury – Paerata Link) - Summary of Effects Table

	Construction Effects	*Operational Effects*
Landscape Character	***Moderate***	***Low to Moderate***
Visual Amenity	***Low to Moderate - High***	***Low***

Paerata Arterial

The alignment of the Paerata Arterial segment of NoR 2 upgrades of part of Sim Road and Cape Hill Road, and a new road within the rural environment (future FUZ). The alignment connects to Sim

Road, Tuhimata Road and Cape Hill Road. An assessment of landscape character and visual amenity in relation to construction effects and operational effects is provided under the relevant headings below:

Construction Effects

Effects on landscape character

The alignment is through rural land interspersed with rural residential properties. Vegetation cover is generally sparse, limited to shelterbelt rows, planted catchments and planting within the curtilage of properties. Occasional groups of trees are located within the southern reaches of this area (southwest of Cape Hill Road). The upgrade of Sim Road will likely result in the removal of a shelterbelt row along the western side of the existing road corridor. The upgraded road alignment will also likely result in the removal of pockets of vegetation, including vegetation within the curtilage of some properties. The alignment avoids the block of vegetation to the east of Cape Hill Road identified as a Significant Ecological Area (SEA _T_4380) (ensuring that this vegetation is not impacted), however the designation boundary is located directly adjacent to this area. The removal of vegetation (notably the shelterbelt row along Sim Road) will result in physical changes to the rural character, however opportunity exists to provide replacement planting (considered within the assessment of operational effects, refer Section 8) which will mitigate potential adverse effects.

The northern part of this alignment is for the upgrade of three existing roads. The existing roads traverse ridgelines and hilltops, and will require earthworks landform modification (predominantly fill, with some cut) to make-up levels. It is anticipated that the upgrade works will be focussed along the western side of the corridors, where topography is generally more consistent with the existing road level and offset from rural residential properties (which are generally located on the eastern side of the road). It is anticipated that the new road alignment in the southern part of the designation will require earthworks (fill) to make-up levels on the descent from the northern edge of the Pukekohe North tuff ring to tie-in to NoR 4 Pukekohe NE Arterial.

The alignment crosses one farm channel, however effects on hydrology are considered to be minimal.

Stormwater wetlands are anticipated along the alignment of this segment of NoR 2. Their construction will require limited cut / fill earthworks; however, their formation is consistent with roading and agricultural land uses and will not introduce unexpected features into the rural environment.

The Paerata Arterial segment of NoR 2 anticipates three roundabouts. The construction of these features will likely require more expansive cut / fill works to make-up levels; however, the extent of modification is unlikely to detract from the wider landform, hydrological and vegetation patterns; with effects being localised.

The alignment of the northern part of the Paerata Arterial segment of NoR 2 is along existing road corridors, and is consistent with the pattern of roading infrastructure within the rural environment. The southern section includes a new road which will deviate from the ridgeline and hilltops and descend into the Pukekohe North tuff ring, which is generally inconsistent with the existing pattern of roading infrastructure in the area.

Overall, for the reasons outlined above, the designation alignment will result in **moderate** temporary effects on the rural landscape character during construction.

Effects on visual amenity

The alignment of the Paerata Arterial segment of NoR 2 is through or immediately adjacent to approximately fifteen rural residential properties / farmsteads (as identified through desk-top analysis of aerial mapping).

Rural residential properties and farmsteads along the alignment generally have open boundaries / frontages with the existing road corridor, with the exception of more regular screening / hedgerow planting along the central parts of Sim Road. For properties adjacent to the alignment (and being retained) the proposed construction works including landform modification) and activities will be visible with direct and prolonged views of the construction works.

Views from rural residential properties within the wider setting will likely be partly visually contained by the existing vegetation pattern (which includes planted catchments and groupings of trees). Where visible, it is anticipated that only views of short sections of the alignment will be available.

Views from public locations will likely be restricted to motorists travelling along the Sim Road, Paerata Road (SH22), Tuhimata Road and Cape Hill Road corridors, with Sim Road being upgraded as part of these works. From these locations, the proposed works will be seen within a transient context (again, roads with 60km/h and 80km/h speed limits) with either open views across the pastoral landscape or partially restricted by vegetation. Large portions of the alignment will be screened by intervening topography.

Overall, for those properties adjacent to the alignment, the designation of this segment of NoR 2 will likely result in **moderate-high** temporary effects on visual amenity. For properties within the localised and wider setting, and from public viewpoints, the designation will likely result in **low-moderate** effects on visual amenity.

Operational Effects

The alignment of the Paerata Arterial segment of NoR 2 is for the upgrade of part of Sim Road and Cape Hill Road, and a new road within the future FUZ. The alignment connects to Sim Road, Tuhimata Road and Cape Hill Road. To the east of the designation is rural, with the FUZ to the west.

The Project will change the **character** of the area and the composition of the existing road. When considering the alignment proximate to the identified FUZ land, the Project will form part of that emerging urban environment, albeit set upon the upper reaches of a ridgeline and upgrading parts of existing roading infrastructure. Along this western side, where areas of fill are required these should integrate back into the underlying topography and be mitigated through planting proposed.

In relation to the land use to the east, the Project presents the upgrade and widening of existing roads and the addition of new roading which will be of an urban arterial typology. Along its eastern side there are minimal cut and fill requirements which minimises disturbance to the existing topography. Where vegetation is to be removed along the alignment (especially proximate to the SEA) this should be offset by additional planting in this area.

Overall, the designation alignment will result in **low-moderate** adverse effects on landscape character, reducing to **low** with the implementation of the mitigation measures.

In relation to **visual amenity**, as outlined above, the alignment presents new sections of roading but also the upgrade of roads which are predominantly located upon ridgelines. As such these roads will have high visibility from both the localised context and from the identified 15 adjacent properties.

From within the visual catchment to the east there are a number of existing rural residential properties. Views from these locations will be partially restricted by intervening existing vegetation and topography as discussed under construction effects above. There is also limited land form modification proposed on this eastern side of the ridge which will minimise any visual disturbance. However, for the dwelling directly adjacent to the designation views will be direct and visual softening and mitigation planting is recommended for these properties. For these properties to the east, adverse visual effects are assessed to be **low-moderate**.

This project will form an anticipated element of the landscape in the context of the emerging urban environment in relation to the FUZ (including any associated night-time lighting). The mitigation measures will assist in integrating the Project (physically and visually) into the surrounding environment and any adverse visual effects are assessed to be **low**.

Views from public locations will likely be restricted to motorists travelling along the aforementioned road corridors in the localised area – especially the users of the upgraded existing road infrastructure. Views will remain within a transient context. Where motorists are using the upgraded roads there will be improved visual amenity and user experience associated with the streetscape design, street trees, berm planting and active modes enabled along the route.

Overall, visual effects are anticipated to be mitigated by measures implemented during the finishing phase of the construction period (within the road corridor and private property boundaries), that will mature through the operational phase of the Project to adequately reduce any potential long-term residual visual effects of the Project.

Figure 6-6: Generic 24m wide cross section is proposed with two lanes for general traffic and active transport facilities on one side of the corridor.

NoR 2 (Paerata Arterial) - Summary of Effects Table

	Construction Effects	*Operational Effects*
Landscape Character	***Moderate***	***Low***
Visual Amenity	***Low - Moderate to Moderate - High***	***Low to Low - Moderate***

NoR 2 – Drury to Pukekohe Link Summary

Construction Effects

For NoR 2, when assessing 'in the round' across all four of the sections, potential adverse effects on **Landscape Character** will be **low** to **moderate**, and **low** to **moderate-high** on **visual amenity**.

Operational Effects

For NoR 2, when assessing 'in the round' across all four of the sections, potential adverse effects on **landscape character** will be **low-moderate**, and **low** to **low-moderate** on **visual amenity**. There will also be positive effects related to the provision of mode share.

6.3.3 NoR 3 – Paerata Connections

NoR 3 is for two new roads in the rural environment (zoned FUZ), extending from the alignment of NoR 2 at Sim Road. The northern alignment connects the two extents of Sim Road to the east and west of the NIMT. The southern alignment connects Sim Road (NoR 2) with the Paerata Rail Station. An assessment of landscape character and visual amenity in relation to construction effects and operational effects is provided under the relevant headings below:

Construction Effects

Effects on landscape character

The northern alignment of NoR 3 will require the removal of a limited amount of scrubby vegetation along a farm track and the embankment of the NIMT rail line. The extent of vegetation is anticipated to be minimal, and the broader vegetation pattern will remain intact. The southern alignment is not anticipated to require any vegetation removal.

When considering the integration of the designation with the underlying topography, the northern section of the alignment is broadly consistent with the alignment of an existing farm track (paper road); however, the alignment will require substantial earthworks (fill) to make up levels for the bridge crossing over the NIMT rail line. In contrast, the southern alignment is anticipated to require minimal earthworks.

The alignment crosses one small catchment which is anticipated to be managed by a stormwater culvert. Any adverse effects on hydrology are considered to be minimal.

It is anticipated that both alignments will require a stormwater wetland. Their construction will require limited cut / fill earthworks, however, their formation is consistent with roading and agricultural land uses and will not introduce an unexpected element into the rural environment.

The northern alignment of NoR 3 anticipates the construction of a bridge over the NIMT rail line, the construction of which will likely require substantial earthworks (fill) to make-up levels to cross the NIMT, however the extent of modification is unlikely to detract from the wider landform, hydrological and vegetation patterns; with effects being localised.

The alignment is for two new roads within the rural environment (zoned FUZ). Existing roading and rail infrastructure is a notable component of the rural environment within the setting of the designation. The designation will introduce an additional roading corridor into the landscape, however it will not be out of place or inconsistent with the existing landscape character of the area. The extent of fill required will marry back into the surrounding landform.

Overall, for the reasons outlined above, NoR 3 will result in **low** temporary effects on the rural landscape character during construction.

Effects on visual amenity

The southern alignment of NoR 3 is not located immediately proximate to any existing properties. The northern alignment abuts two rural residential properties (also considered within the alignment for NoR 2).

Rural residential properties along the alignment generally include established planting within the curtilage and proximate to the respective houses. It is anticipated that the alignment of NoR 3 will not require the removal of planting within the curtilage, and views from properties which are proximate to the alignment will be partly screened. Views from rural residential properties within the localised and wider setting (to be retained) will likely have distant and views of the alignment, partly screened by the wider vegetation pattern.

Views from public locations will likely be restricted to motorists travelling along Sim Road, longer views from Paerata Road and users of the NIMT rail line. Where visible, these two short sections of road (and the associated modified landforms) will be seen within a transient context with a range of open views across the pastoral landscape, or partially screened by intervening vegetation and topography. Users of the NIMT rail line will pass underneath the proposed bridge, however bridges over rail infrastructure are common and the view will be fleeting.

Overall, for those properties proximate to the alignment, NoR 3 (northern segment) will likely result in **low-moderate** temporary effects on visual amenity. For properties within the localised and wider setting, and from public viewpoints, the designation will likely result in **low** effects on visual amenity.

Operational Effects

Similar to NoR 1 in relation to **landscape character**, the character and land use of the two connections in NoR 3 will change to an urbanised environment through the provision of the future urban zones. In this instance, THAB east of the NIMT alignment and FUZ to the west[25]. The designation adds two new road elements through this area, with unknown specific design of the adjacent urban environment. However, it is anticipated to the THAB with the zoning proposed and the proximity to the Paerata rail station which is currently under construction. The road cross section of the design for NoR 3 proposes the following indicative arrangement and mode share design:

[25] Identified through the Pukekohe-Drury Structure Plan.

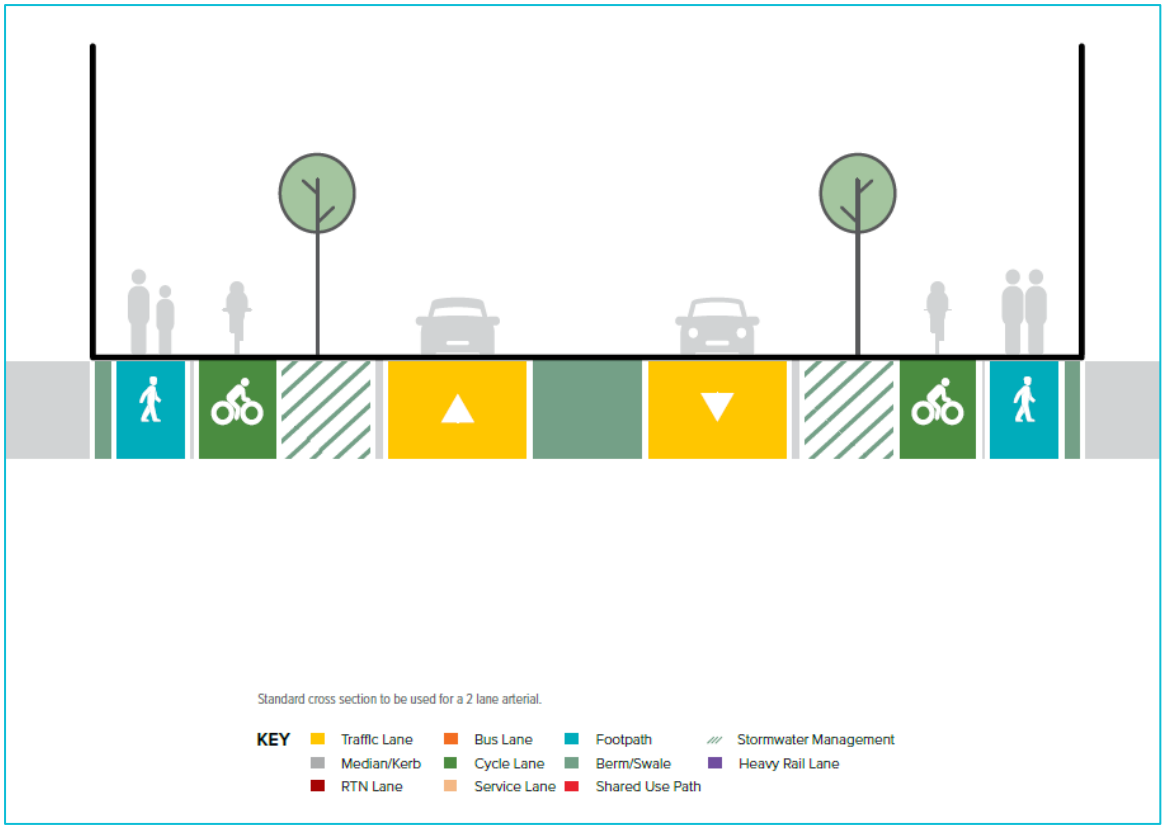

Figure 6-7: Generic 24m wide cross section with two lanes for general traffic and active transport facilities on both sides of the corridor.

The Project will provide an element into the FUZ which is consistent with the emerging urban environment anticipated through the FUZ. As such, any adverse effects on landscape character are assessed to be **very low**.

Further to the above in relation to the future urban zones anticipated, the **visual context** will change to that of an urbanised environment (including any associated night-time lighting). Individual dwellings will not be affected (like those discussed related to *construction effects*). It is anticipated that visual effects for the operation of project and its alignment (post-construction) will be **low**. This is based upon the design working with and integrating into the surrounding topography (including the raised topography and batters for bridge over the NIMT) and improved visual amenity and user experience associated with the streetscape design, street trees, berm planting and active modes enabled along the route. There will also be positive effects related to the provision of mode share and enhanced streetscape amenity through the planting and street trees proposed within the road reserve.

NoR 3 - Summary of Effects Table

	Construction Effects	*Operational Effects*
Landscape Character	***Low***	***Very Low***
Visual Amenity	***Low to Low- Moderate***	***Low***

6.3.4 NoR 4 – Pukekohe North East Arterial

NoR 4 is a new road in the rural environment (partly / intermittently within the FUZ). The alignment connects to SH22, Cape Hill Road and Pukekohe East Road. An assessment of landscape character and visual amenity in relation to construction effects and operational effects is provided under the relevant headings below:

Construction Effects

Effects on landscape character

The north-western section of NoR 4 crosses pasture and arable land and will require the removal of limited amounts of vegetation (notably along the Whangapouri Creek corridor). Further east, on the north-eastern urban fringe of Pukekohe, NoR 4 largely avoids established blocks of vegetation, with the route crossing a shelterbelt row and vegetated catchment (at perpendicular angles). The south-eastern part of the alignment on the eastern urban fringe of Pukekohe is across approximately three blocks of established / regenerating vegetation, three shelterbelt rows and groupings of trees. The alignment and associated earthworks will likely require the removal of parts of the established vegetation blocks, and sections of the shelterbelt rows. The alignment will reduce the vegetation cover within this part of the rural environment; however, the wider vegetation patterns will remain intact. The proposed alignment will avoid the identified SEAs. However, as previously mentioned a small part of SEA 4375 is within proposed designation boundary.

The underlying topography of the alignment is varied, and includes an area of flat land within the Pukekohe North tuff ring in the north west and then crosses through a complex and intricate network of steep sided gullies, catchments, hill sides and ridgelines through the central north-eastern reaches and along the eastern urban fringe. When considering the integration of NoR 4 with the underlying topography, the alignment will likely require areas of earthworks (both cut and fill) to enable levels for crossings over the NIMT rail line, across the undulating topography and for bridges to span gullies / catchments (notably on the eastern and north-eastern urban fringe of Pukekohe). Earthworks will result in landform modification and changes to the underlying topography of the rural environment within the footprint of the proposed designation, with the broader pattern of topography remaining consistent.

The alignment spans across Whangapouri Creek and multiple catchments (some of which are vegetated). The concept design of the alignment includes bridges spanning across the creek and catchments, which will assist in ensuring the natural alignments and patterns of these hydrological features remain (albeit with likely vegetation removal along the creek and catchments required to construct the respective bridges). Mitigation of these effects would be undertaken at the regional consenting phase (e.g. wetland and stream works, and vegetation removal). Cut / fill earthworks within the Whangapouri Creek corridor have been avoided to ensure that natural alignment of the creek remains intact.

Stormwater wetlands are anticipated along the alignment of NoR 4. Their construction will require cut / fill earthworks; however, their formation is consistent with roading and agricultural land uses and will not introduce unexpected elements into the rural environment or urban fringe of Pukekohe.

The alignment of NoR 4 anticipates the construction of four roundabouts and seven bridges (varying between approximately 45m and 95m in length). The construction of these features will likely require more expansive landform modification to make-up levels; however, the extent of modification is

unlikely to detract from the wider landform, hydrological and vegetation patterns; with effects being localised. Mitigation of these effects would be undertaken at the regional consenting phase (e.g. wetland and stream works, integrating future earthworks / landform modification into the surrounding landscape patterns, and vegetation removal).

Overall, for the reasons outlined above, NoR 4 will result in **moderate-high** temporary effects on the rural landscape character during construction.

Effects on visual amenity

NoR 4 spans through some 11 rural residential properties / farmsteads (as identified through desk-top analysis of aerial mapping and site visits).

Rural residential properties along the alignment include a mix of open pasture, vegetated curtilages and open boundaries. From those properties adjacent to the alignment (and being retained), the proposed construction works and activities will be visible, with partial screening provided by existing vegetation where present and retained. For some properties, the proximity of the alignment may result in existing planting surrounding the curtilage being removed to facilitate the works; where this occurs, direct and prolonged views of the construction works will be likely during the construction period.

Properties in the wider rural residential setting within both the rural and FUZ zoned land (including north and east of Grace James Road) likely have views of the alignment and construction activity (including landform modification), partly contained by the existing vegetation pattern within the rural environment and existing planting within the curtilage.

Views from public locations will likely be restricted to motorists travelling along road corridors and includes Paerata Road (SH22), Cape Hill Road, Grace James Road, William Andrew Road and Pukekohe East Road. There will also be a short section of the designation visible for users of the NIMT rail line (within the western reaches of this NoR). From these locations, the proposed works will largely be seen within a transient context. More open views will be afforded of the construction works from Grace James Road as the alignment spans east-west around the existing urban development pattern. Users of the NIMT rail line will pass underneath the proposed bridge, however bridges over rail infrastructure are common and the view will be fleeting.

Overall, for those properties immediately adjacent to the alignment located to the north and east of Grace James Road, NoR 4 will likely result in up to **moderate-high** temporary effects on visual amenity. This is due to the open nature of the views and the potential landform modification required. For properties within the wider setting, and from public viewpoints, the designation will likely result in **moderate** effects on visual amenity.

Operational Effects

Upon construction completion the alignment of NoR 4 will span through both FUZ land and the rural environment. Within the Project's western reaches it spans through properties anticipated for *Business - General Industrial* land (between Paerata Road and the NIMT) and MHU (between the NIMT and Cape Hill Road). It then extends through *Rural - Mixed Rural* zoned land extending across to proximate with Grace James Road before spanning through another area of FUZ land to the south linking through to Pukekohe East Road.

For the land zoned for FUZ the **landscape character** of these areas will change to that of an urbanised environment through the provision of these future urban zones of the AUP:OP (and

identified through the Pukekohe-Paerata Structure Plan). The project will add another 'urban element' to that environment and future land use. The scale of the road and the nature of the change anticipated within this Project area will be consistent with the future urban zoning, albeit aligned through complex landscape and topography.

The road cross section of the design of NoR 4 proposes the following indicative arrangement and mode share design:

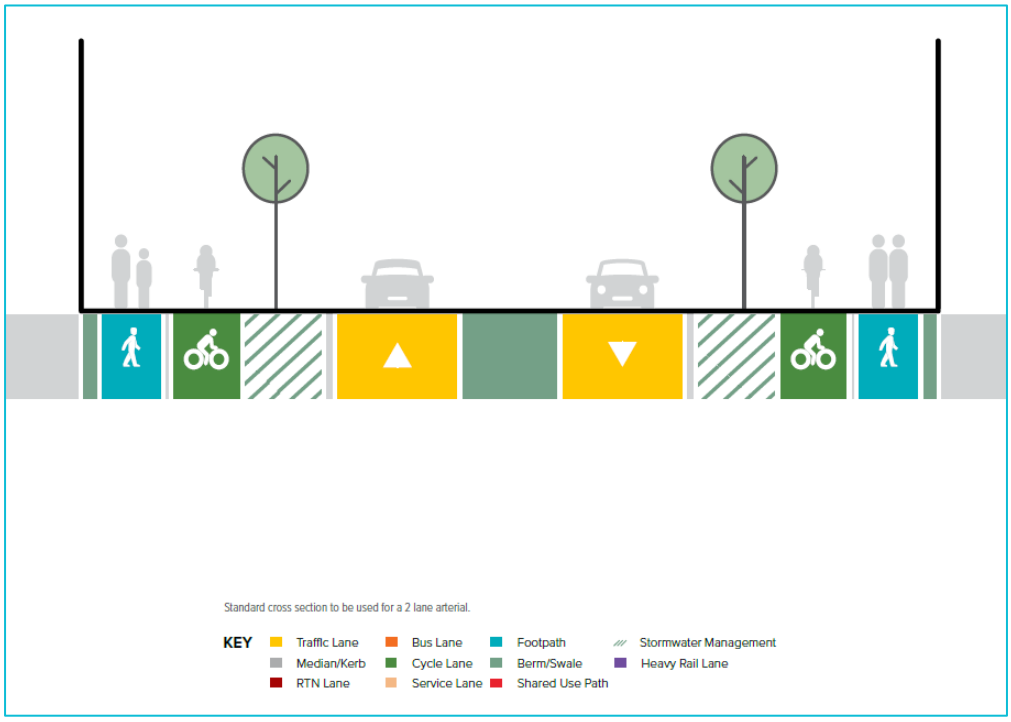

Figure 6-8: Generic 24m wide cross section is proposed with 2 lanes for general traffic and active transport facilities proposed on both or one side of the corridor

This design provides for two lanes and active mode share.

Where NoR 4 spans through the land which is to remain as *Rural – Mixed Rural* zone, the project will permanently change the character of that landscape. It will add an urban arterial road into a part of Pukekohe which is distinctly rural (owing to the land uses and landscape patterns which have been outlined earlier within this report). The 24m wide road / road reserve spans across a complex landscape of rolling topography and areas of established vegetation. The design includes bridges across the NIMT railway line, a number of streams and areas of established vegetation. To a certain degree the alignment does follow the underlying topography by following along areas of higher topography / spurs, however it does drop into and across a number of catchments requiring landform modification.

To minimise adverse effects on the landscape character, the design of the project should integrate with and tie into the underlying topography of the area and provide planting which expands and is contiguous with the existing patterns in the area (beyond the designation boundary). This is particularly related to the visual softening of the areas of cut / fill and the associated vegetation patterns within the catchments. The respective bridges should also be designed to integrate into the surrounding landscape and contribute to the local sense of place.

In relation to landscape character, for the reasons outlined above adverse effects are assessed to be **very low** within the areas zoned as FUZ, but **moderate** within the rural zoned landscape.

Further to the above in relation to the future urban zones anticipated, the visual context will change to that of an urbanised environment. The project will become part of that environment and will not be viewed out of context. Any adverse **visual effects** are anticipated to be **low**.

Where the project spans through the rural environment it will be visible from a greater visual catchment of properties (including from public open spaces such as the elevated Glens Hill Reserve). The properties from where the project is visible include those within the surrounding rural residential environment to the north and east [26]. From these properties the road (including lighting from motorists travelling along the road at night) will likely be visible spanning across the elevated topography and includes the aforementioned bridges and cut / fill areas. From a number of these properties they will be distant views to the Project across spurs, catchments and existing areas of vegetation. These elements form part of the intervening landscape which will provide perspective depth and in some instances partial screening. From these locations visual effects are likely to be **moderate** allowing for the mitigation measures to establish. The mitigation measures are to integrate the project into the surrounding topography (including the raised topography for bridge access), associated planting patterns, and improved visual amenity and user experience associated with the streetscape design, street trees, berm planting and active modes enabled along the route.

To the south of NoR 4 (where it extends through the rural environment) is Grace James Road where existing development (Residential – Single House zone within the AUP:OP) forms the existing 'suburban edge' to Pukekohe. The elevated properties in this location overlook the rural environment to the north, part of which is identified as FUZ under the AUP:OP within the RUB. As such, over time these properties (between Grace James Road and the project) will change into an urban character (with associated night time lighting). Any adverse visual effects from the existing development on these properties is anticipated to be **low**. Again, there will also be positive effects related to the provision of mode share and enhanced streetscape amenity through the planting and street trees proposed within the road reserve.

NoR 4 - Summary of Effects Table

	Construction Effects	*Operational Effects*
Landscape Character	***Moderate – High***	***Very Low to Moderate***
Visual Amenity	***Moderate to Moderate-High***	***Low to Moderate***

6.3.5 NoR 5 – Pukekohe South East Arterial

NoR 5 upgrades of Pukekohe East Road and Golding Road include a new road in the rural environment (zoned FUZ) east of the NIMT. The project provides a new crossing across the NIMT and connects to Svendsen Road to the west within an existing light industrial area. The alignment connects to Pukekohe East Road, Golding Road, East Street, Belgium Road, Svendsen Road,

[26] Accessed from Cape Hill Road, Gordon Francis Drive, Loxton Lane, Donald Gavin Way, and off Runciman Road and Pukekohe East Road.

Wrightson Way and Crosbie Road. An assessment of landscape character and visual amenity in relation to construction effects and operational effects is provided under the relevant headings below:

Construction Effects

Effects on landscape character

The alignment includes an upgrade of Pukekohe East Road and Golding Road and will require the removal of limited sections of lot boundary planting along the existing road corridor where the proposed designation encroaches into adjacent properties. Part of an existing group of trees will also likely be removed to the east of Golding Road. The alignment includes a new road within the existing rural environment to the west of Golding Road, which will likely result in the removal of some smaller groupings of trees and a section of shelterbelt row planting. West of the NIMT rail line (within the Light Industry Zone), the alignment will likely result in the removal of an engineered industrial stormwater channel at the western end of the proposed designation.

The extent of vegetation anticipated to be removed is likely limited to short sections of the vegetation along the existing road alignment, short sections of shelterbelt row planting and the engineered / industrial stormwater channel. The wider vegetation pattern will remain intact, although it is acknowledged that the alignment is located within the FUZ zone so is anticipated for future urbanisation.

There are protected trees near the designation of NoR 5, that are located outside the designation boundary, however, their root zones extend into the proposed boundary. These trees are protected by AUP district matters. However, the active mode upgrade on the southern side of the road will not affect these trees (as they are located on the northern side of the road). There are no effects on these trees if the construction works are carried out according to standard tree protection protocols. Tree protection would form part of a tree management plan, formulated with arboricultural input prior to construction. The proposed conditions also state *"where practicable, mature trees and vegetation should be retained"*. It is therefore assumed that the two identified groups of trees that are within Pukekohe East Road will remain and no landscape assessment on their removal is required.

When considering the integration of NoR 5 with the underlying topography, the upgrade of the existing roads will require earthworks, albeit limited. It is anticipated that earthworks (cut and fill) will be required in the rural environment (west of Golding Road) to make-up levels for the alignment.

The alignment does not cross any streams or catchments (with the exception of two existing culverts under Golding Road, and the engineered open stormwater channel to the west). As such, adverse effects on hydrology are considered to be minimal.

Stormwater wetlands are anticipated along the alignment of NoR 5. Their construction will require limited cut / fill earthworks, however, their formation is consistent with roading and agricultural land uses and will not introduce unexpected features into the rural environment.

The alignment of NoR 5 anticipates the construction of three roundabouts and one bridge. The construction of these features will likely require more expansive landform modification to make-up levels, however the extent of modification is unlikely to detract from the wider landform, hydrological and vegetation patterns; with effects being localised. The earthworks required to build-up levels for the crossing over the NIMT will result in the infill of the industrial stormwater channel within the Light Industry Zone.

The alignment is for the upgrade of existing roads and a new road within the rural environment (within the FUZ). Roading and rail infrastructure are not uncommon components within the setting of the proposed designation and the eastern urban fringe of Pukekohe, and NoR 5 will not be out of context. The proposed bridge over the NIMT and connection to Svendsen Road within the Light Industry Zone will not introduce new or uncharacteristic features into the environment.

Overall, for the reasons outlined above, NoR 5 will result in **low-moderate** temporary effects on the rural landscape character during construction.

Effects on visual amenity

NoR 5 is within approximately 35 urban / rural residential / farmstead properties (as identified through desk-top analysis of aerial mapping and site visits) and nine commercial properties (including the refuse and recycling transfer station). The area forms part of the emerging urbanisation and expansion of Pukekohe. There is an operative plan change for the properties at 53 Birch Road and 19 Golding Road, with another lodged for the property at 47 Golding Road.

Rural residential properties along Pukekohe East Road generally include lot boundary planting proximate to the road. For those properties, the proximity of the alignment may result in existing planting surrounding along the lot boundary / road edge being removed to facilitate the works; where this occurs, direct and prolonged views of the construction works will likely be available throughout the construction period. The suburban properties (north of Pukekohe East Road) are largely contained by tree and hedgerow planting. It is anticipated that the alignment upgrade will be focussed on the southern side of the road at this location, ensuring that visual effects from these properties are reduced.

When considering rural residential properties along Golding Road and the rural environment to the west of Golding Road, properties generally include established planting within the curtilage and proximate to the respective houses. For those properties adjacent to the alignment (and being retained) the proposed construction works and activities will be visible with partial screening provided by existing vegetation. Some boundary planting proximate to the road may be removed to facilitate the works.

Views from rural residential properties within the wider setting will likely be largely visually contained by the existing vegetation pattern (which includes shelterbelt rows, lot boundary and curtilage planting, and planted catchments). Where visible, it is anticipated that only glimpse views of short sections of the alignment will be available. A number of these houses may be removed as a result of the emerging urbanisation of the area associated with the FUZ and plan changes.

Views from public locations will likely include motorists travelling along the Pukekohe East Road and Golding Road road corridors (which will be upgraded as part of this Project), where the proposed works will be seen within a transient context of 60km/h and 80km/h speed limits. Views of the western part of the alignment and bridge over the NIMT rail line will also likely be available from the Pukekohe Showground, seen within the context of the surrounding industrial setting and urban edge of Pukekohe. Users of the NIMT rail line will pass underneath the proposed bridge, however bridges over rail infrastructure are common and the view will be fleeting.

Overall, for those properties immediately adjacent to the alignment, the designation of NoR 5 will likely result in up to **moderate-high** temporary effects on visual amenity. For properties within the localised and wider setting, and from public viewpoints, the designation will likely result in **low-moderate** effects on visual amenity.

Operational Effects

The alignment of the designation for NoR 5 provides upgrades to existing roads along Pukekohe East Road and Golding Road, and a new connection between Golding Road and Manukau Road (to the west). Along the alignment, NoR 5 runs through FUZ land. As such, the character and land use through this area will change to an urbanised environment (which includes MHU, MHS and Light Industry [27]). The road cross section of the design for NoR 5 proposes the following indicative arrangement and mode share design:

Figure 6-9: Generic 24m wide cross section is proposed with two lanes for general traffic and active transport facilities on one side of the southern side of the corridor. Proposed on Pukekohe East Road.

27 Identified through the Pukekohe-Drury Structure Plan.

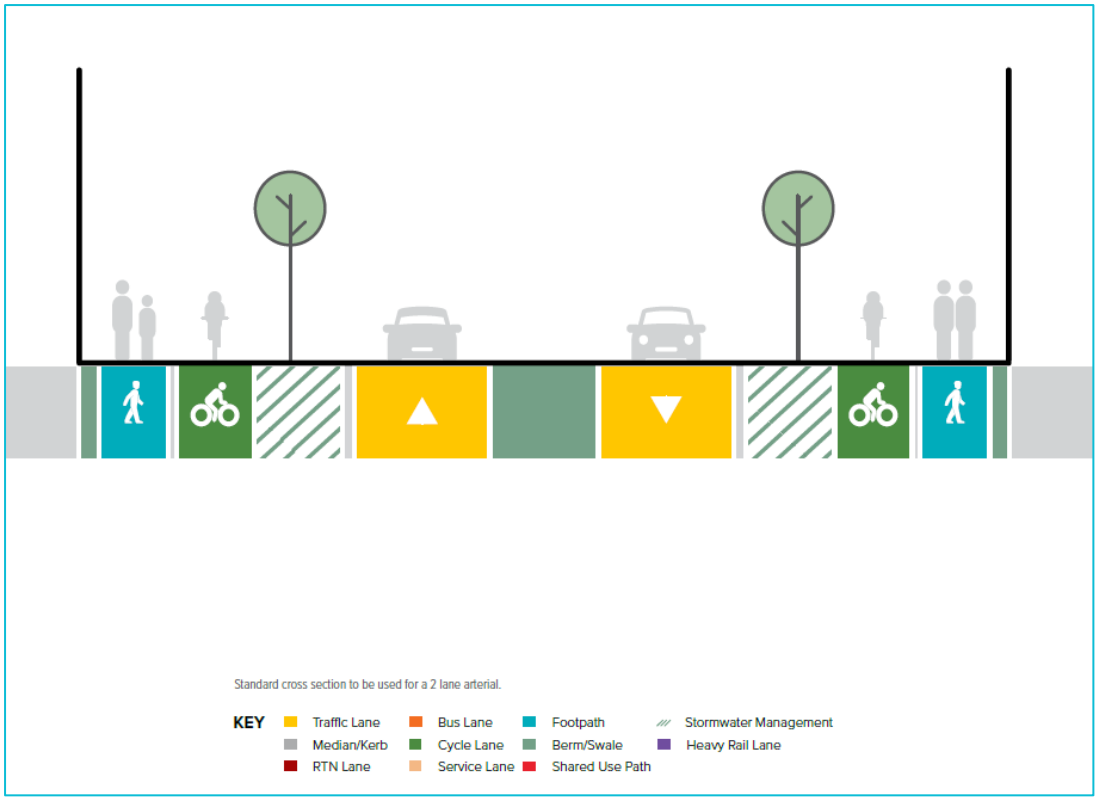

Figure 6-10: Generic 24m wide cross section with two lanes for general traffic with active transport facilities on both sides for the remainder of the corridor.

Urban development is anticipated within this area (FUZ) and the road typology is consistent with that anticipated character. The alignment also includes a short section of new road within the Light Industry Zone and bridge over the NIMT. Although a new element, the proposed bridge will have an appropriate scale and form in this context related to its height and footprint. The height will be determined at the detailed design stage and will provide adequate clearance above the NIMT rail line, consistent with other bridges in the area. Related to the zoning in the area the road alignment and proposed structures will be expected features within this environment. To the west of the rail line the existing properties have *Business – Light Industry* and *General Business* zoning and include a number of existing large scale ('big box') commercial and retail land uses which reduces the sensitivity to the changes to this landscape. Any adverse effects on **landscape character** related to the operational effects are therefore assessed to be **very low**. There will also be positive effects related to the provision of mode share and enhanced streetscape amenity through the planting and street trees proposed within the road reserve.

In relation to the future urban zones anticipated, the visual context will change to that of an urbanised environment (and will include any associated night-time lighting). Individual dwellings will not be affected (like those discussed related to *construction effects*). For the existing large scale commercial / retail businesses (west of the rail line), these properties are largely oriented away from the proposed alignment with limited views of the proposal. Also, although visible from public assets such as the Pukekohe Showgrounds the Project will be seen in the context of the emerging urban development associated with underlying zoning.

It is anticipated that **visual effects** for the operation of project and its alignment will be **low**. This is based upon the design working with and integrating into the surrounding topography (including the raised topography and batters for bridge over the NIMT) and improved visual amenity and user

experience (positive effects) associated with the streetscape design, street trees, berm planting and active modes enabled along the route.

NoR 5 - Summary of Effects Table

	Construction Effects	*Operational Effects*
Landscape Character	***Low – Moderate***	***Very Low***
Visual Amenity	***Low – Moderate to Moderate – High***	***Low***

6.3.6 NoR 6 – Pukekohe South West Upgrade

NoR 6 will partially upgrade the existing road network along Nelson Street West, Ward Street, Puni Road, West Street and Helvetia Road predominantly within the existing Pukekohe urban environment. An assessment of landscape character and visual amenity in relation to construction effects and operational effects is provided under the relevant headings below:

Construction Effects

Effects on landscape character

the proposed designation is limited to a number of driveways that require regarding and small areas adjacent to intersections on:

- the northern side of both Nelson Street and Ward Street,
- the southern side of West Street, and
- the western side of Helvetia Road.

During the construction phase, this will result in a change to these intersections as the roads are to be widened at these locations. This will mean the removal of small areas of vegetation (street trees and boundary planting) and fences along these streets. Although the removal of these elements and the introduction of additional roading elements, the designations will not be out of place or inconsistent with the existing landscape character of the area. As such, any temporary adverse effects on landscape character during construction will be **very low**.

Effects on visual amenity

The works required for NoR 6 will have a high viewing audience due to the location of the designations within an urban environment along the existing streets, movement along the respective streets and the number of houses in the area. Although a high viewing audience, adverse visual effects will be **low** as works of this nature occur in the existing urban area, are temporary and localised, and a number of elements along the street and within private property will provide screening. Also, views from motorists travelling along the streets will be within a transient context (50km/hr area).

Operational Effects

NoR 6 will provide a partial upgrade to the existing road network along Nelson Street West, Ward Street, Puni Road, West Street and Helvetia Road predominantly within the existing Pukekohe urban environment. Although there will be an upgrade to the existing roads and modification / additional elements implemented, there will only be a limited change to the character of the area. As such, any adverse effects on **landscape character** are assessed to be **very low**, especially once the proposed vegetation has established. There will be positive effects resulting from the upgrade of the streetscape environment.

For similar reasons, any adverse effects on visual amenity are assessed to be **very low**. The designation will provide an upgrade and limited additional roading elements along established streets within an existing urban environment. The proposal will not be seen out of context and will integrate into the surrounding environment. There will be positive effects related to the provision of mode share and enhanced streetscape amenity through the planting and street trees proposed within the road reserve.

The road cross section of the design for NoR 6 proposes the following indicative arrangement and mode share design:

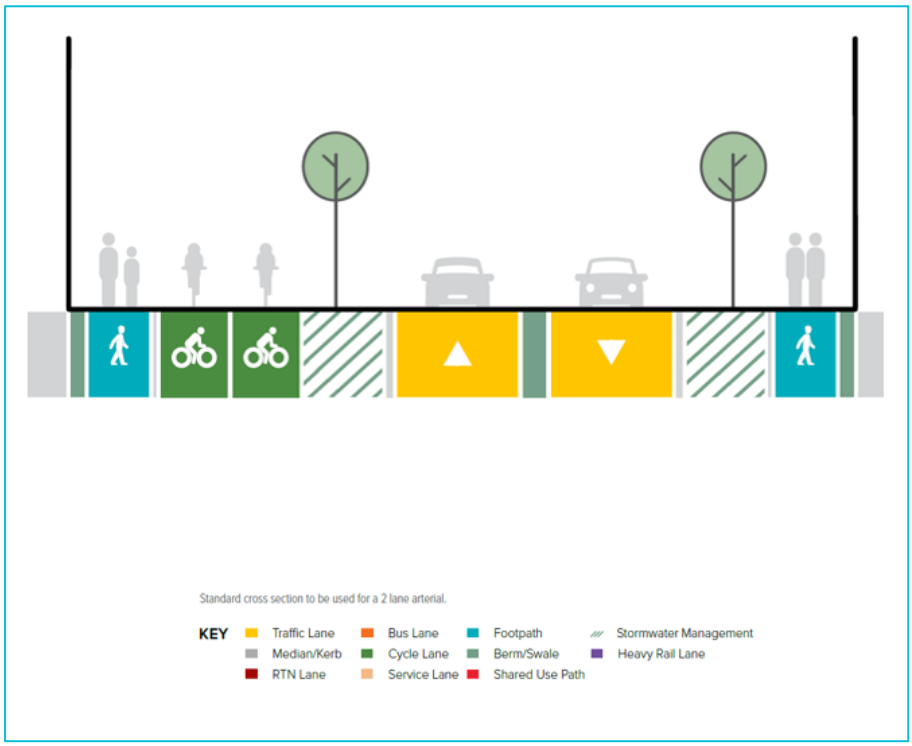

Figure 6-11: Generic 20m wide cross section is proposed with two lanes for general traffic and active transport facilities on each side of the corridor.

NoR 6 - Summary of Effects Table

	Construction Effects	*Operational Effects*
Landscape Character	***Very Low***	***Very Low***
Visual Amenity	***Low***	***Very Low***

6.3.7 NoR 7 – Pukekohe North West Arterial

NoR 7 is an upgrade of Helvetia Road and Butcher Road, and a new road in the rural environment (zoned FUZ). The alignment connects to Helvetia Road, Gun Club Road, Beatty Road and Butcher Road. An assessment of landscape character and visual amenity in relation to construction effects and operational effects is provided under the relevant headings below:

Construction Effects

Effects on landscape character

The alignment will likely require the limited removal of existing vegetation along existing road corridors, groupings of trees within the rural environment and short sections of shelterbelt rows (notably east of Beatty Road). The extent of vegetation anticipated to be removed is limited and the wider vegetation pattern will remain intact.

When considering the integration of the proposed designation with the underlying topography, the upgrade of Butcher Road will likely require minimal earthworks. In contrast, the upgrade of Helvetia Road will likely require fill works to make-up levels to enable the width expansion. The underlying landform of the rural environment proximate to NoR7 is gently undulating. It is anticipated that earthworks (predominantly fill) will be required in the rural environment to make-up levels for the new road alignment.

The proposed designation crosses catchments near where the alignment adjoins Butcher Road. It is anticipated that these water flows will be managed by proposed stormwater culverts. As such, adverse effects on hydrology are considered to be minimal. The alignment proposes an upgrade of Butcher Road at this location, and it is anticipated that the existing crossing will be maintained (albeit modified for the new alignment).

Stormwater wetlands are anticipated along the alignment of NoR 7. The construction of these stormwater wetlands will require limited cut / fill earthworks; however, their formation is consistent with roading and agricultural land uses and will not introduce an unexpected element into the rural environment.

The alignment of NoR 7 anticipates the construction of three roundabouts. Due to the gently undulating landform of the area, the construction of these features is anticipated to require only minimal earthworks. The extent of modification is unlikely to detract from the wider landform, hydrological and vegetation patterns; with effects being localised.

The alignment is for the upgrade of existing road corridors and a new road within the rural environment (zoned FUZ). Roading infrastructure is a notable component of the rural environment and urban fringe of Pukekohe within the setting of the designation. The designation will introduce an additional roading corridor into the landscape, however it will not be out of place or inconsistent with the existing landscape character of the area.

Overall, for the reasons outlined above, the designation alignment will result in **low** temporary effects on the rural landscape character during construction.

Effects on visual amenity

NoR 7 extends through approximately 11 properties along Helvetia Road, Gun Club Road, Beatty Road and Butcher Road (as identified through desk-top analysis of aerial mapping and site visits).

This includes two commercial properties (in the northern part of the alignment) and nine rural residential / urban properties[28]. The alignment is located in proximity to Nga Hau E Wha O Pukekohe Marae, located off Beatty Road.

Rural residential properties along the alignment generally include established planting within the curtilage, some of which is proximate to the respective houses and will provide partial screening of the proposed construction works. For some properties within the northern reaches of the NoR, off Beatty Road and Butcher Road, the proximity of the alignment may result in existing planting surrounding the curtilage being removed to facilitate the works, or there may be no vegetation within the curtilage; where this occurs, direct and prolonged views of the construction works will likely be available throughout the construction period. Through the centre of the NoR, earthworks will be visible.

Views from rural residential properties within the wider setting will likely be partially visually contained by the existing vegetation pattern (which includes shelterbelt rows, lot boundary and groupings of trees). Where visible, it is anticipated that only views of short sections of the alignment will be available.

Views from public locations will likely be restricted to motorists travelling along the aforementioned road corridors and users of the NIMT rail line where it is proximate to the alignment. Helvetia Road and Butcher Road will be upgraded as part of these works, with new roads providing connection between them. The construction works will be visible from these public locations, however they will be seen within a transient context (ranging from 50km/hr - 60km/hr speed limits) and as part of an emerging urban environment.

Overall, for those properties immediately adjacent to the alignment, the designation of NoR 7 will likely result in **low-moderate** temporary adverse effects on visual amenity. For properties within the wider setting, and from public viewpoints, the designation will likely result in up to **low** effects on visual amenity.

Operational Effects

The alignment of the designation for NoR 7 provides an upgrade to part of Helvetia Road (south) and Butcher Road (north). Between these locations new roading is proposed largely parallel with the NIMT. The alignment of the Project is entirely through FUZ land, identified as MHS and Light Industry within the Pukekohe-Paerata Structure Plan. As such, the character and land use through this area will change to an urbanised environment.

The road cross section of the design for NoR 7 proposes the following indicative arrangement and mode share design:

[28] Located along Helvetia Road, Beatty Road, Gun Club Road, Heights Road and Butcher Road.

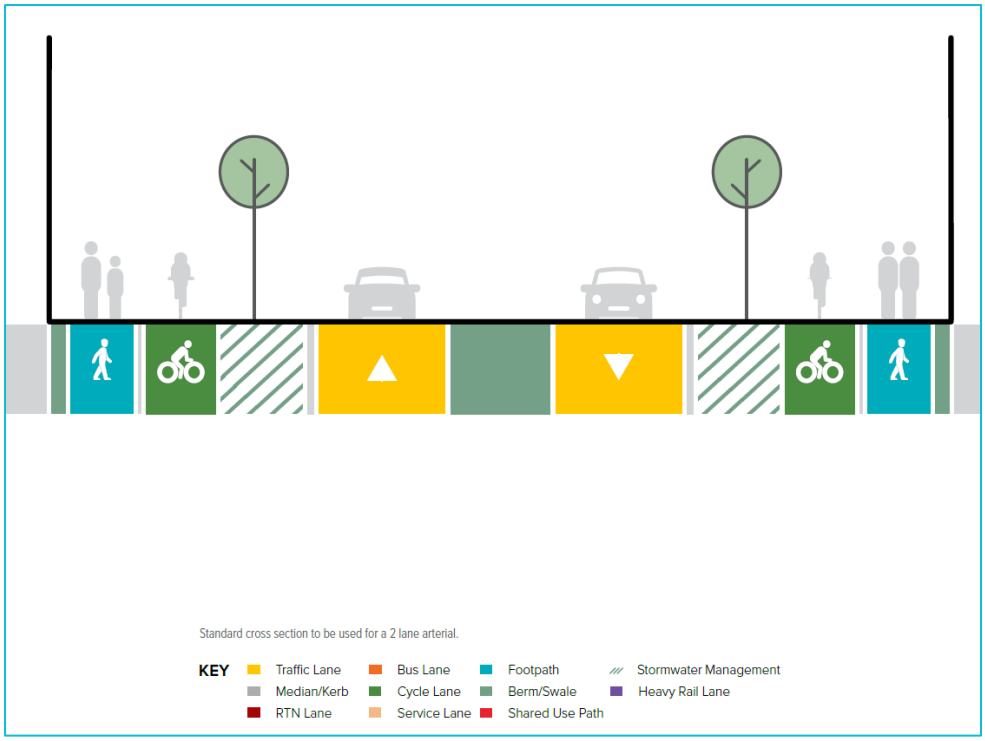

Figure 6-12: Generic 24m wide cross section is proposed with two lanes for general traffic and active transport facilities on both sides of the corridor.

Urban development is anticipated within this area and the road typology is consistent with the anticipated character. Any adverse effects on **landscape character** related to the operational effects are therefore assessed to be **very low** in this changing environment. There will be positive effects related to the provision of mode share and enhanced streetscape amenity through the planting and street trees proposed within the road reserve.

In relation to the visual context in this FUZ area, it will change to that of an urbanised environment (and will include associated night-time lighting). Individual dwellings and properties will not be affected (like those discussed related to *construction effects*). It is anticipated that visual effects for the operation of project and its alignment will be **low-moderate**. This is based upon the proposed alignment and the extent of land modification required to enable to designation / route alignment. The design should work and integrate with the surrounding topography (for the areas of cut / fill) and improved visual amenity and user experience associated with the streetscape design, street trees, berm planting and active modes enabled along the route.

NoR 7 - Summary of Effects Table

	Construction Effects	*Operational Effects*
Landscape Character	***Low***	***Very Low***
Visual Amenity	***Low to Low- Moderate***	***Low - Moderate***

6.3.8 NoR 8 – Mill Road – Pukekohe East Road Upgrade

NoR 8 is the upgrade of Pukekohe East Road and Mill Road. The alignment connects to Pukekohe East Road, Harrisville Road and Mill Road. Mill Road is proposed to be upgraded to four lanes from SH1 to Harrisville Road. Pukekohe East Road is proposed to be upgraded with a shared active mode facility on the southern side of the existing road. An assessment of landscape character and visual amenity in relation to construction effects and operational effects is provided under the relevant headings below:

Construction Effects

Effects on landscape character

The alignment includes an upgrade of the existing Pukekohe East Road and Mill Road corridors and will likely require the removal of vegetation, generally limited to roadside planting, lot boundary planting, and parts of some groups of trees. Within the incised catchments in the eastern end of the NoR on Mill Road, more extensive amounts of vegetation will be affected. The broader vegetation pattern will remain consistent, and the opportunity exists to provide replacement planting along the alignment route (considered within the assessment of operational effects, Section 8) which will mitigate permanent effects.

When considering the integration of the designation with the underlying topography, the upgrade of the existing roads will require earthworks, particularly cut and fill within the catchments within the eastern section along Mill Road, and to a lesser extent along the Pukekohe East Road section. Although there will be modification to the landform as a result of the works required, the proposal provides a widening of an existing road corridor which extends through tis rolling topography. The landform modification will integrate into the surrounding landform (as a mitigation measure) to ensure an appropriate level of effects on the character of the area. It is also critical to ensure stream flows are managed. Mitigation will be undertaken at the regional consenting phase (e.g. wetland and stream works, and vegetation removal).

The alignments of the intermittent and permanent streams will likely remain largely unchanged, with existing culverts (below Mill Road) being increased in length to accommodate the proposed alignment / widening. It is anticipated that one intermittent stream will connect to a proposed stormwater basin. Vegetation removal will be required within the catchments, however, the alignment of the flows themselves will likely remain intact.

The proposed designation will also extend into the location of the identified Pukekohe East tuff ring (ONF), shown in Figure 6-13 requiring both cut and fill within this location. Albeit, on the southern side of the existing road only. Existing vegetation on the northern side of Pukekohe East Road (within the ONF) will remain unaffected. There are notable trees and trees protected due to the ONF overlay present on the southern side of Pukekohe East Road, both near and within the proposed designation of NoR 8. These trees are protected by either the AUP district matters or the Waikato District Council Plan. Any effects on these protected tree groups are considered in full within the Arboricultural Effects Report. The Arboriculture Report anticipates that the scheduled English oak, the scheduled Norfolk Island pine trees (x3), and the scheduled redwood can be retained through future works.

It is anticipated that Tree 8/71 - scheduled Puriri may be impacted through earthworks during the construction phase. The actual impact on this tree is subject to confirmation during detailed design, which should attempt to retain and protect this tree. Should this tree be removed through the

construction phase, this would result in adverse effects on the landscape amenity of this area forming part of the earthworks and modification to this area associated with the proposed road. Long term effects could be offset by mitigation measures, particularly those associated with operational phase.

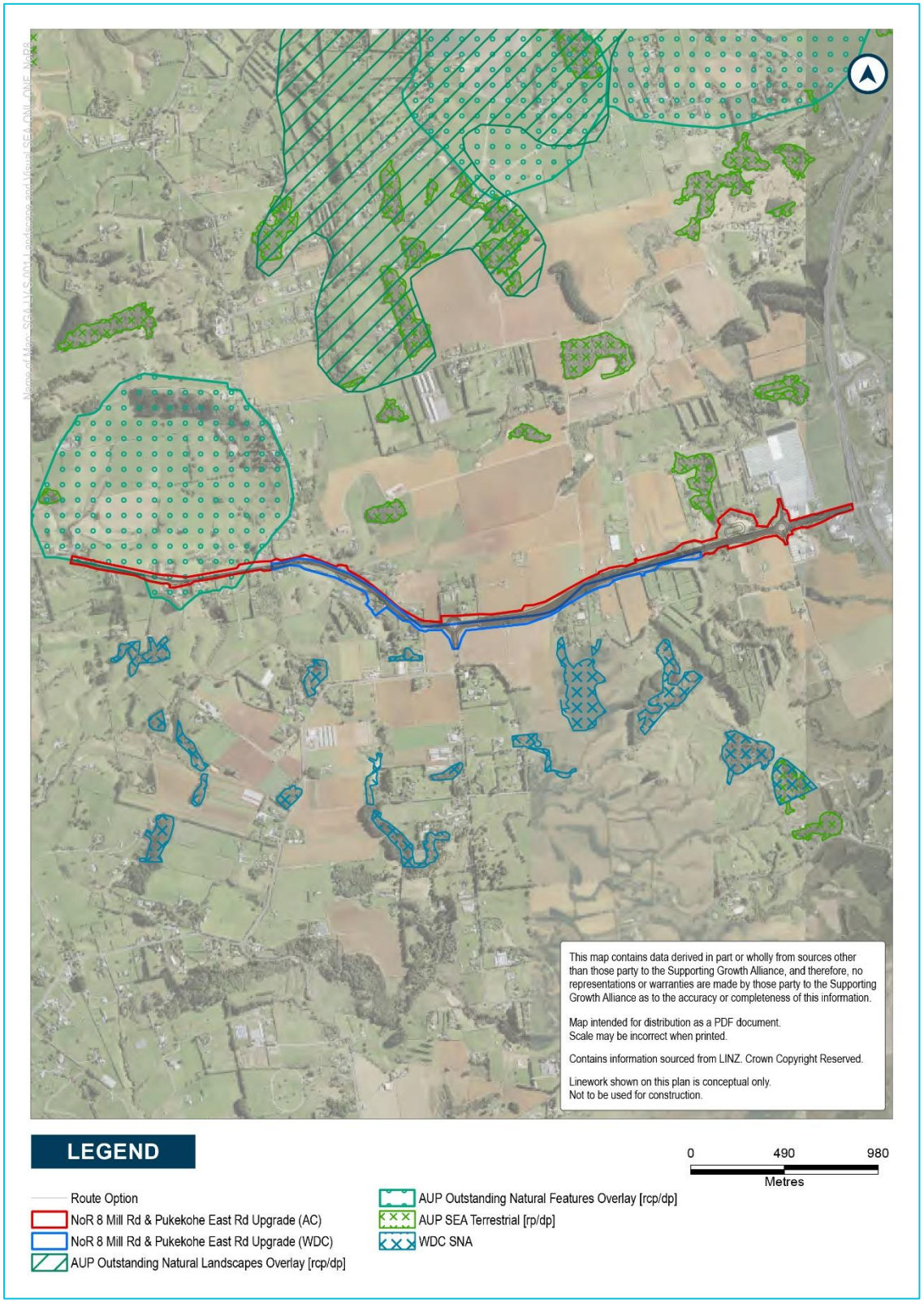

Figure 6-13: NoR 8 – Mill Road and Pukekohe East Road Upgrade and extent of ONF

One stormwater wetland is anticipated along the alignment of NoR 8. The construction of this stormwater wetland will require cut / fill earthworks; however, its formation is consistent with roading and agricultural land uses and will not introduce an unexpected element into the rural environment.

The alignment of NoR 8 anticipates the construction of one roundabout to connect to Harrisville Road. Its construction is anticipated to require only minimal earthworks as the surrounding landform is largely level with the existing road corridor at this location. The extent of modification is unlikely to detract from the wider landform, hydrological and vegetation patterns; with effects being localised.

The alignment is for the upgrade of existing roads and is consistent with the pattern of development and roading infrastructure within the rural environment.

Overall, for the reasons outlined above and due to the landform modification and potential modification to the ONF, on balance the designation alignment will result in **moderate** temporary effects on the landscape character during construction.

Effects on visual amenity

NoR 8 is within approximately 21 rural residential / farmstead properties (as identified through desk-top analysis of aerial mapping and site visits), approximately four commercial properties (predominantly horticultural). These respective properties are located on Pukekohe East Road, Mill Road, Runciman Road and Harrisville Road.

The alignment also borders a number of residential, commercial and recreational (including Pukekohe East Hall and tennis club) properties located along Pukekohe East Road and Mill Road.

Properties along Pukekohe East Road and Mill Road generally include lot boundary planting and proximate to the respective road. For those properties which have houses near the existing road, the required works may result in existing planting along the lot boundary / road edge being removed; where this occurs (including at the Pukekohe East Hall and tennis club), direct and prolonged views of the construction works will likely be available throughout the construction period.

Views from rural residential properties within the wider setting will likely be largely visually contained by the existing vegetation pattern (which includes shelterbelt rows, lot boundary and curtilage planting, and blocks of vegetation). Where visible, it is anticipated that only glimpse views of short sections of the alignment will be available.

Views from public locations will include people travelling along the Mill Road, Pukekohe East Road and Runciman Road corridors. Mill Road and Pukekohe East Road are to be upgraded as part of this Project. From these locations the proposed works will be seen within a transient context (80km/hr speed limit) but will have direct views of the upgrade to the existing transport infrastructure.

Overall, for those properties immediately adjacent to the alignment, the designation of NoR 8 will likely result in up to **low-moderate** temporary effects on visual amenity. For properties within the localised and wider setting, and from public viewpoints, the designation will also likely result in **low-moderate** effects on visual amenity.

Operational Effects

NoR 8 provides for the widening and upgrade of the existing Pukekohe East Road and Mill Road. It extends predominantly through the existing rural environment (for both Auckland Council and Waikato District Council jurisdictions), with only a small section of FUZ (Auckland Council jurisdiction) identified on the southern side of the alignment at the Project's western reaches.

In relation to the operational effects there will be a change to the **landscape character** of the area with the widening of the road reserve and the alignment providing a more 'urban arterial' typology (with active mode share). Although an existing road corridor, the project will change the character and that of the adjacent / surrounding landscape (including the removal of vegetation). The road cross section of the design for NoR 8 proposes the following indicative arrangement and mode share design:

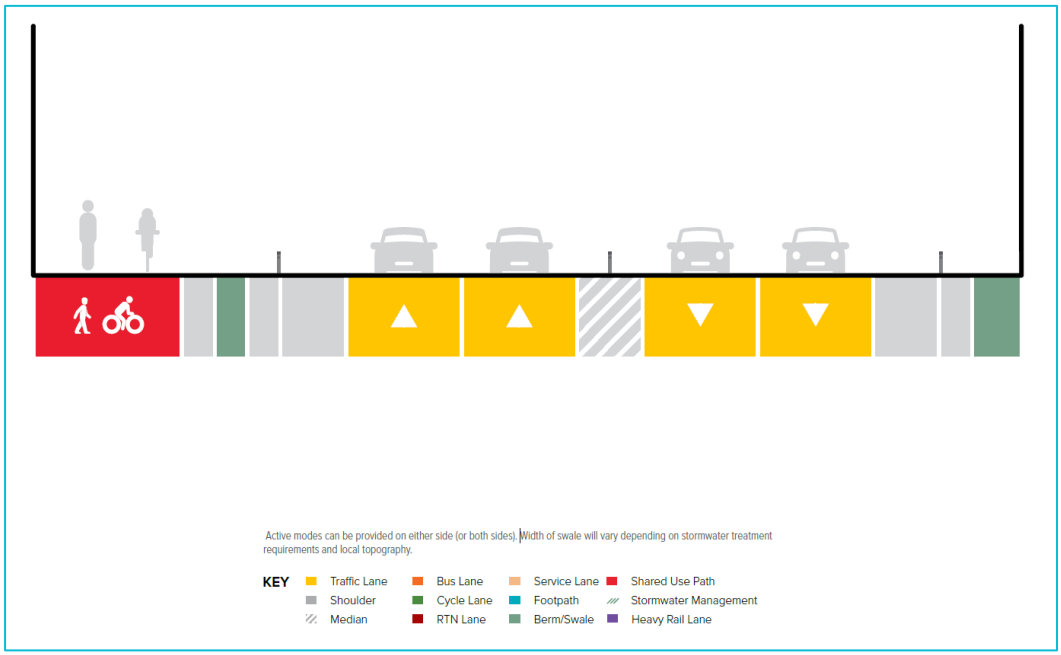

Figure 6-14: Generic 30m wide cross section with four lanes for general traffic, with active mode facilities on the southern side. Proposed along Mill Road.

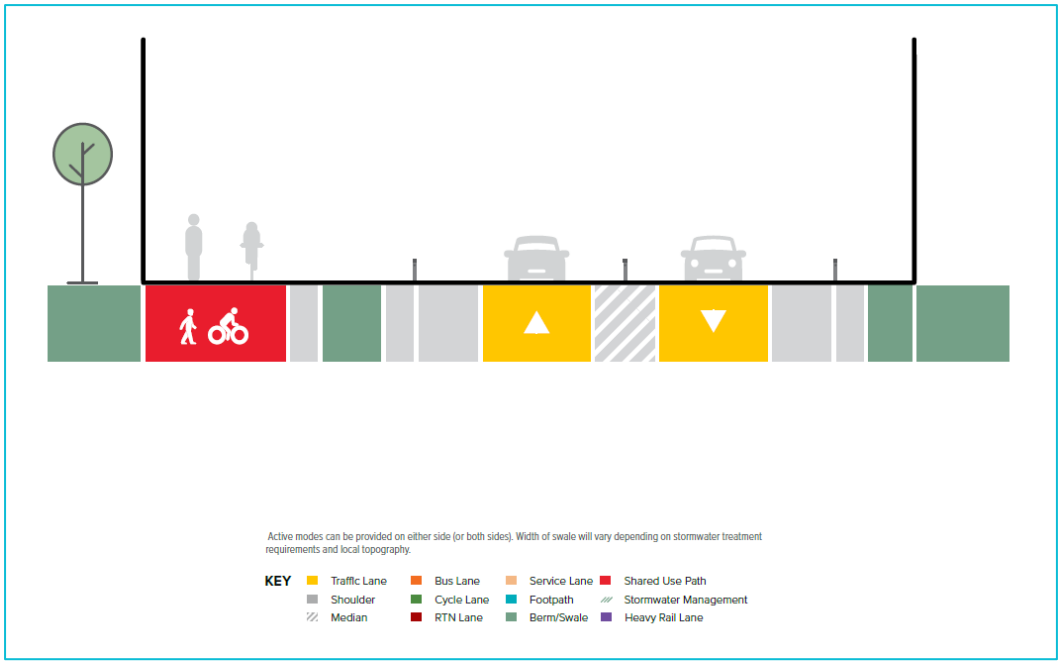

Figure 6-15: Generic 24m wide cross section is proposed with two lanes for general traffic and active transport facilities on one side of the southern side of the corridor. Proposed on Pukekohe East Road.

The alignment encroaches into properties adjacent to the road along its full alignment. This affects the street environment, the amenity associated with the corridor and in some cases the productive landscapes on those adjacent properties. The designation will affect existing road side planting including hedges, shelter belts, and productive landscapes (e.g. horticultural land). The mitigation measures proposed are to provide additional planting along the road alignment which will enhance amenity of the corridor. Additional planting should be provided within the designation boundary and adjacent catchments to provide contiguous planting patterns and assist with integrating with the existing landscape, it will also assist with offsetting any vegetation lost through the construction period.

The existing Pukekohe East Road is located within the very southern extent of the Pukekohe East tuff ring ONF. Through options assessment and design, the active mode path has been located on the southern side of the existing road to reduce impacts on the tuff ring. The introduction of the active modes path is a positive outcome of the Project. Although already modified with existing roads, houses and productive land uses this will present further encroachment into this landscape feature albeit on the southern side of Pukekohe East Road (importantly, the balance of the ONF is to the north of this road). Modification to the existing topography is recommended to be avoided where the designation encroaches into the ONF. The project will however provide formalised multi modal uses (walking and cycling) which will provide the opportunity for people to view and appreciate the ONF.

As outlined in relation to construction effects, a number of catchments within the designation (along Mill Road) will be affected by its alignment through the potential extent of cut / fill required, shown through Figure 6-16: NoR 8 cut and fill interaction with hydrologyFigure . This will modify this landscape and change their character, however, the works are associated with the widening of the existing transport corridor and earthworks will integrate back into the existing landform. This future landform and the implementation of the planting proposed will integrate with the existing landscape and vegetation patterns reducing potential effects on landscape character. When taking these factors into account, adverse effects on landscape character are assessed to be **low-moderate**, overall.

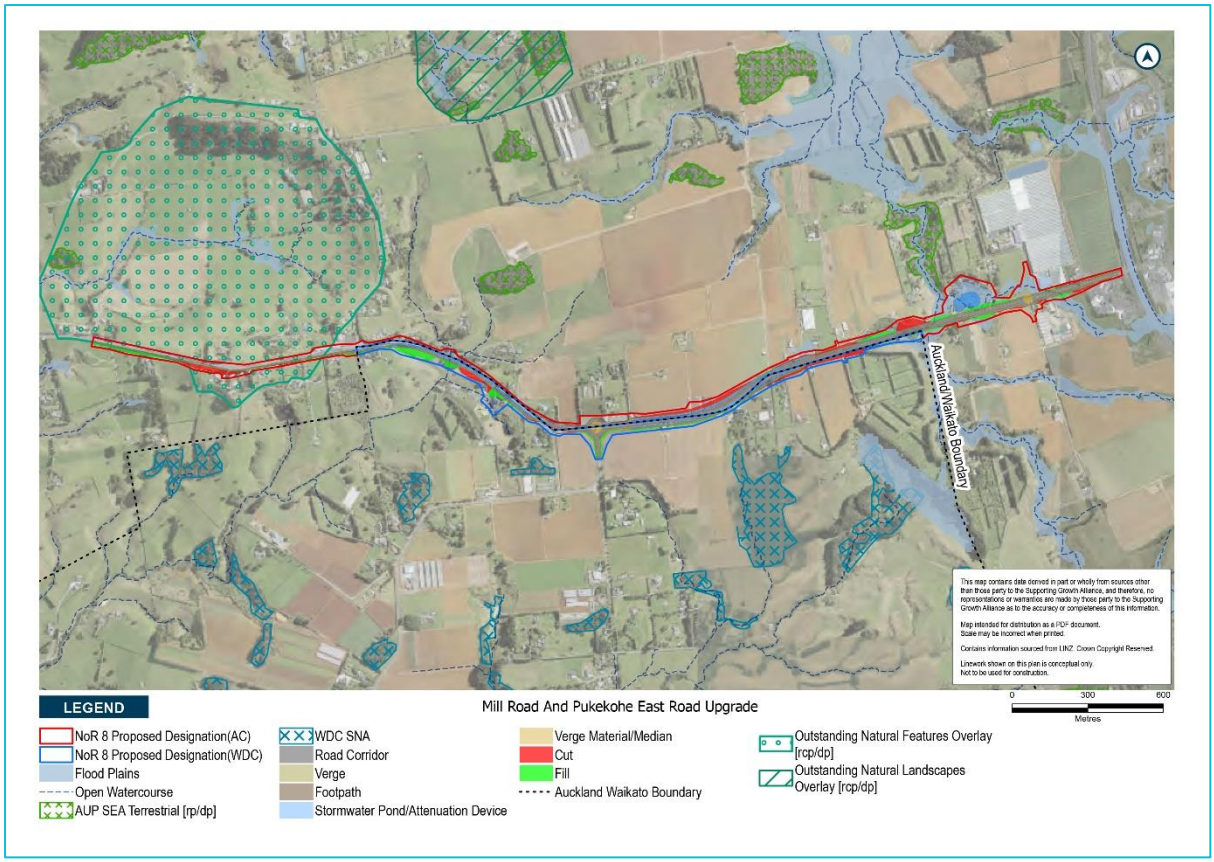

Figure 6-16: NoR 8 cut and fill interaction with hydrology

In relation to **visual amenity**, the majority of the Project follows along elevated, and in some locations rolling, topography including localised ridges / spurs, the southern edge of the Pukekohe East Tuff Ring and broader landscape patterns. As such, the alignment of the designation has a potentially large visual catchment. Consequently, there are likely to be a range of visual effects on public and private viewing locations and audiences relative to the proximity to the NoR.

For existing properties located along the alignment adverse effects are assessed to be **low-moderate** due to the proximity of the upgraded road and modification to the landscape. Where sites are setback from the road reserve (e.g. set away from the existing road down the respective slopes) visual amenity effects will be limited and relative to any existing effects of the operation of the existing road corridor. In many cases the road reserve will increase scale (width), with additional uses, but will now include amenity planting and street trees which will visually enhance the corridor. Visual effects from these properties are assessed to be **low**. Overall, any potential adverse effects on private properties are assessed to be **low**.

Public viewing audiences in the area are largely contained to the users of the existing roads who are transient. Operational effects on these audiences are anticipated to be positive with the improved visual amenity associated with the streetscape design which includes the maturing trees, amenity planting within the berms and accessibility of active modes of transport. Users of the active modes path will also gain a greater appreciation and visibility of the ONF which is visible to the north of Pukekohe East Road.

NoR 8 - Summary of Effects Table

	Construction Effects	*Operational Effects*
Landscape Character	***Moderate***	***Low – Moderate***
Visual Amenity	***Low- Moderate***	***Low***

7 Recommended Measures to Avoid, Remedy or Mitigate Effects

7.1 Construction Effects

The recommended measures to avoid, remedy or mitigate construction effects are outlined below, and relate to all NoRs where relevant:

- Site compounds, construction yards, the storage of construction machinery and locations of any overburden areas should be located in visually discrete locations (avoiding hilltops and ridgelines where practicable). At the very minimum screening of these elements is required during the construction period.
- Where possible during detailed design, the alignment of the corridor should seek to avoid effects on streams and minimise the extent of earthworks and vegetation removal. In particular of mature native vegetation.
- Where possible, the balance of fill earthworks should be sourced from cut earthworks along the alignment.
- Where possible, the extent of earthworks and modification should be minimised within the Pukekohe East Tuff Ring ONF (specific to NoR8).

It is recommended that the above measures are captured within a condition of consent and used to inform the preparation of a ULDMP (or Landscape Management Plan for the Waikato NoR) and landscape plans as the detailed design of the alignment is progressed.

7.2 Operational Effects

The matters outlined below address the key elements of the respective NoR alignments that are likely to result in adverse effects on landscape character and visual amenity. A ULDMP or Landscape Management Plan is recommended as a condition on the respective designations which should include the following measures to mitigate landscape effects.

Guidance for built structures and landscape design and planting for transport projects is provided within the *Bridging the Gap: NZTA Urban Design Guidelines (2013), Waka Kotahi Landscape and Visual Assessment Guidelines (2013) and Waka Kotahi Bridge Manual (2013)* documents. The design and mitigation measures outlined must be consistent with these design guidelines.

Bridges and structures:

- To be designed to visually integrate with the localised context and to minimise any potential adverse effects on landscape character and visual amenity in both the rural environment and also within the emerging urban context.
- Bridges should be designed to contribute to local identity, demonstrating a sense of place. This relates to bridges and structures located within both rural and urban environments which demonstrate the character and appropriate scale within that context. Their design should also be tailored to integrate with landscape features and attributes such as topography and vegetation and celebrate localised context (such as gateways etc) and associative values of the landscape.
- Engagement with mana whenua should be undertaken with the use of preferred te ao Māori design principles. Where appropriate, bridges and structures should be designed as features

within the landscape and create a threshold experience for users as they transition between urban and rural areas.
- Avoiding noise barriers where possible. If these are to be included, they should be designed to integrate into the localised environment to avoid visual prominence and adverse effects.

Integration with surrounding context:

- The respective Projects are to be designed to integrate into the adjacent urban (including proposed urban) and landscape context. This relates to topography, the urban environment (responding to density and land uses), landscape character, and any open spaces zones (including those anticipated within the FUZs).

Walking and cycling connectivity:

- Investigate opportunities to integrate with existing and future open space along the proposed designation and within the FUZ areas. This will ensure stronger connections and active mode share across a wider catchment. Footpath and cycleway connections should be designed in a manner which contributes to the local identity and urban amenity of the landscape, and aligned with mana whenua preferred design principles. Designs should also look to enhance any landscape and ecological corridors (designed in conjunction with topography and planting – outlined below).

Stormwater wetlands:

- Configure stormwater wetlands to a naturalised appearance (avoiding a purely engineered design / form), conforming and integrating with the adjacent landform and future urban context. Provide planting of appropriate indigenous plant species for long term sustainability, maintenance and hydrological and ecological function.

Permanent earthworks:

- Integrate cut and fill slopes with the surrounding context
- Shape fill slopes to a naturalised profile and integrate into the surrounding natural landform.
- Modified slopes are to be a suitable gradient to allow terrestrial and riparian planting to be established.
- Where it is anticipated that a bridge is required to span a vegetated gulley or stream catchment, a construction methodology should be prepared to minimise vegetation loss within the corridor. Any vegetation removed should be offset through future planting works.

Private properties:

- Reinstate driveways, accessways, private fences and garden plantings for existing remaining properties affected by works within the proposed designations. Elements are to be designed to minimise visual amenity effects on residents, and to integrate with the layout and design of outdoor living spaces and in consideration of streetscape character

Planting design details:

- Landscape design and planting design details should be prepared for the Project that demonstrate (but are not limited to) the following:
    - Retains existing vegetation where possible

- Provide street trees along the full length of each of the NoR designations in conjunction with shrubs and ground cover species. This will enhance streetscape amenity. The species selected should be appropriate for use within stormwater treatment areas and berms. Species and tree stature should be selected to correspond with adjacent land uses and to provide ecological enhancement, in accordance with the nine key principles outlined in the Auckland's Urban Ngahere (Forest) Strategy
- Reinstatement planting within private property boundaries
- Treatment of fill slopes and residual land to integrate with adjacent land use patterns (in relation to visual and biophysical aspects)
- Stormwater wetland design and planting
- Integration of mana whenua preferred design principles in relation to planting, structures and hard landscape elements
- Site preparation, implementation and maintenance requirements for all planting typologies.
- Planting to be designed to provide an extension of, and be contiguous with, existing established vegetation patterns.

The proposed mitigation measures should, where practicable, be integrated with revegetation requirements of future resource consent processes.

It is recommended that the above points are captured within a condition of consent and used to inform the preparation of an ULDMP or Landscape Management Plan as the detailed design of the alignment is progressed.

8 Conclusion

This report has assessed the potential landscape character and visual amenity effects associated with the construction and operation of the proposed Pukekohe Transport Network. The Pukekohe Transport Network includes some nine NoRs to provide new transport corridors and connections in and around Drury, Paerata and Pukekohe.

The specific Projects which will come from the Pukekohe Transport Network will support the identified and emerging urban pattern in this area.

Significant adverse landscape effects have been 'designed out' of the respective projects through the alternatives assessment which involved an MCA process, specialist input and design refinement. As such, where possible, the respective alignments and designations avoid any landscape features and identified overlays (such as ONF's, ONL's or SEA's) unless otherwise stated.

A high proportion of the subject areas where the designations are proposed to be aligned will form part of emerging urban environments identified through the AUP:OP FUZ and respective structure planning processes. This will substantially change the character of development in the area from rural to urban. The respective NoR Projects will form visually integrated elements within these locations, designed to respond to the underlying landscape and forming future urban patterns. They will be consistent with the anticipated urban landscape character and will be supported by the mitigation measures proposed which are to be implemented through a ULDMP. For the Waikato NoR 8, the Project will respond to the anticipated rural landscape character and be supported by the mitigation measures proposed and implemented as part of a Landscape Management Plan.

Where the designations span through what will remain as the rural environment, the alignments will change the character of the landscape. However, the proposed alignment and the extent of the designation has been tested and evaluated (from a landscape character and visual amenity assessment perspective) and is considered to be appropriate. The mitigation measures proposed in this report (implemented through an ULDMP or Landscape Management Plan) are appropriate and adequate to remedy any potential adverse effects arising from the Project.

Although there are a range of assessment conclusions reached related to the respective NoRs, this landscape assessment finds that the proposed Pukekohe Transport Network NoRs are appropriate and are able to be integrated into this landscape, provided the mitigation measures proposed are adhered with.

Table 8-1 below provides a summary of the potential landscape character and visual amenity effects of the respective NoR's during both the **construction** and **operational** phases (including the recommended mitigation measures).

Table 8-1: Summary of potential landscape character and visual amenity effects relative to specific NoRs for the Pukekohe Transport Network

NOR	*Construction Effects*		*Operational Effects*	
NoR 1	*Landscape Character*	***Low - Moderate***	*Landscape Character*	***Very Low***
	Visual Amenity	***Low to Moderate***	*Visual Amenity*	***Low***
NoR 2a (South Drury Connection)	*Landscape Character*	***Low-Moderate***	*Landscape Character*	***Low-Moderate***
	Visual Amenity	***Low to Moderate-High***	*Visual Amenity*	***Low to Low-Moderate***
NoR 2b (S22 Connection)	*Landscape Character*	***Low to Moderate***	*Landscape Character*	***Low***
	Visual Amenity	***Low to Moderate***	*Visual Amenity*	***Low***
NoR 2c (Drury – Paerata Link)	*Landscape Character*	***Moderate***	*Landscape Character*	***Low to Moderate***
	Visual Amenity	***Low to Moderate-High***	*Visual Amenity*	***Low***
NoR 2d (Paerata Arterial)	*Landscape Character*	***Moderate***	*Landscape Character*	***Low***
	Visual Amenity	***Low-Moderate to Moderate-High***	*Visual Amenity*	***Low to Low-Moderate***
NoR 3	*Landscape Character*	***Low***	*Landscape Character*	***Very Low***
	Visual Amenity	***Low to Low-Moderate***	*Visual Amenity*	***Low***
NoR 4	*Landscape Character*	***Moderate-High***	*Landscape Character*	***Very Low to Moderate***
	Visual Amenity	***Moderate to Moderate-High***	*Visual Amenity*	***Low to Moderate***
NoR 5	*Landscape Character*	***Low-Moderate***	*Landscape Character*	***Very Low***

NOR	Construction Effects		Operational Effects	
	Visual Amenity	***Low-Moderate to Moderate-High***	*Visual Amenity*	***Low***
NoR 6	*Landscape Character*	***Very Low***	*Landscape Character*	***Very Low***
	Visual Amenity	***Low***	*Visual Amenity*	***Very Low***
NoR 7	*Landscape Character*	***Low***	*Landscape Character*	***Very Low***
	Visual Amenity	***Low to Low-Moderate***	*Visual Amenity*	***Low-Moderate***
NoR 8 (AC and WDC)	*Landscape Character*	***Moderate***	*Landscape Character*	***Low-Moderate***
	Visual Amenity	***Low-Moderate***	*Visual Amenity*	***Low***