TE TUPU NGĀTAHI
SUPPORTING GROWTH

Pukekohe
Detailed Business Case

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Version 1.0

WAKA KOTAHI NZ TRANSPORT AGENCY

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Disclaimer

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

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Glossary

Acronym/Term	Description
AMC	Active Mode Corridor
BCR	Benefit Cost Ratio
Benefit	The measurable improvement from an outcome perceived as an advantage by one or more stakeholders
DBC	Detailed Business Case
Designation	A planning authorisation under the RMA that protects land for a future public work by a requiring authority
FULSS 2017	Future Urban Land Supply Strategy 2017
FUZ	Future Urban Zone
ha	hectare
IBC	Indicative Business Case
ILM	Investment Logic Map / Mapping
IPM	Investment Prioritisation Method
Mana whenua	The indigenous people (Māori) of iwi and hapū (Māori tribal groups) who have historic and territorial rights over the land
MoT	Ministry of Transport
NoR	Notice of Requirement, a statutory process under the RMA that provides interim protection on the development of land for future public work until a formal decision is made to designate land, with or without conditions.
Outcome	The change in state of a target social, economic or environmental aspect resulting from an intervention
PBC	Programme Business Case
Problem	A situation perceived as a dis-advantage by one or more stakeholders
Route protection	A planning process to identify and protect land for a future public work, such as a transport project
Requiring Authority	A Minister of the crown, Local Authority or network utility operator defined under s167 of the RMA
Te Tupu Ngātahi	“To grow together as one”. A collaboration between Auckland Transport and Waka Kotahi NZ Transport Agency
Waka Kotahi	Waka Kotahi New Zealand Transport Agency
WEB	Wider Economic Benefit

1 Executive Summary

1.1 Pukekohe growth

The Pukekohe growth area (Pukekohe, Paerata and Drury West) is situated in the southern most extent of the Auckland region. The northern most part of the growth area within the scope of this DBC (Drury West) is some 40km from the Auckland city centre, with the southernmost (Pukekohe south) a further 15km to the south adjacent to the Waikato regional boundary. It is identified as a satellite town in the Auckland Plan, acting as a rural node that serves both the surrounding rural communities as well as connecting to urban Tāmaki Makaurau /Auckland.

The Future Urban Land Supply Strategy 2017 identifies the Future Urban Zone (FUZ) areas of Pukekohe-Paerata amounting to 1,704ha of former (primarily) rural land rezoned for future business and residential growth. This growth over the next 25 years towards 2048 is anticipated to result in a total of over 14,000 new dwellings. By contrast the subsequent Pukekohe-Paerata Structure Plan 2019 provided indicative statistics of 1,262ha developable land area (529ha net available for building) anticipated to result in 12,517 additional dwellings for an additional population of 33,809[1] people and 5,018 jobs once fully developed by 2050. With the addition of Drury West, growth across the DBC area amounts to 21,000 additional households, 9,000 additional jobs and 55,000 more people at full build out post-2048.

The ratio of people to jobs is a significant factor in this business case, indicating many people living in the area will need to travel elsewhere for employment, consolidating an existing pattern of transport demand out of the Pukekohe area for employment trips, typically made in morning and evening peak periods.

1.2 Scope of Project

There are 12 transport projects within this DBC, which have been derived from the previous IBC business case phase. The nature of the decisions sought as a result of the DBC include:

- Approval of the Pukekohe recommended transport network
- Approval to implement the route protection strategy up to lodgement of Notices of Requirement (NoRs) (approval for lodgement to be sought separately) to protect the land required for the transport projects
- Approval for funding release for Pukekohe post lodgement activities
- Noting of the risks for potential early property acquisition and associated risks arising from route protection.

This document focuses on providing the overall Pukekohe DBC investment case for route protection and details the recommended route protection strategy. The completion and lodgement of the NoRs will follow the completion of this DBC.

[1] Excluding growth in existing residential areas.

1.3 Why is investment needed

The changes in land use across the Pukekohe area forecast towards and beyond 2048 presents significant challenges for infrastructure owners tasked with providing for the economic, social, environmental and cultural wellbeing of the community.

The scale of the change to the Pukekohe growth area over the next 2-3 decades will be significant:

Approximately 55,000 people added to the existing population of around 31,000, a 180% increase
Number of dwellings growing by around 21,000, from around 12,000 to over 33,000, a 275% increase
Potentially over 9,000 additional jobs

The transport effects of this change have the potential to be amongst the most impactful on the day to day lives of people living and working in the area. Without investment many adverse effects will emerge, negatively impacting on the ability of people to reasonably meet their economic, social, environmental and cultural needs. As established in the South IBC, the scale of the change in the Pukekohe area and more widely across South Auckland requires strategic transport network level responses as well as local interventions. Regardless of the future trip making patterns and travel choices of households and businesses, influenced by economic, social and technological change; the scale of the forecast transport demand arising from the planned land use changes necessitate a strategic response supported by timely investment.

There are also broader implications of this growth in transport demand that take on a national significance. Prominent among these, lowering the road toll and reducing carbon emissions have become imperatives in the national policy and planning framework prior to and during recent business case stages and have subsequently had a key influence on the planning approach used in the development of this DBC. This influence is evident throughout the DBC, including on the investment logic mapping, option development and assessment and refinement of the emerging preferred option to a final recommended option. At the same time, local outcomes important to the communities of Pukekohe, Paerata, Drury West and wider Tāmaki Makaurau / Auckland have also been a compass for the development of this DBC.

1.4 Problems anticipated and the benefits of investment

In the context of the forecast growth and present and emerging planning imperatives, without significant transport investment Pukekohe, Paerata and Drury West will experience:

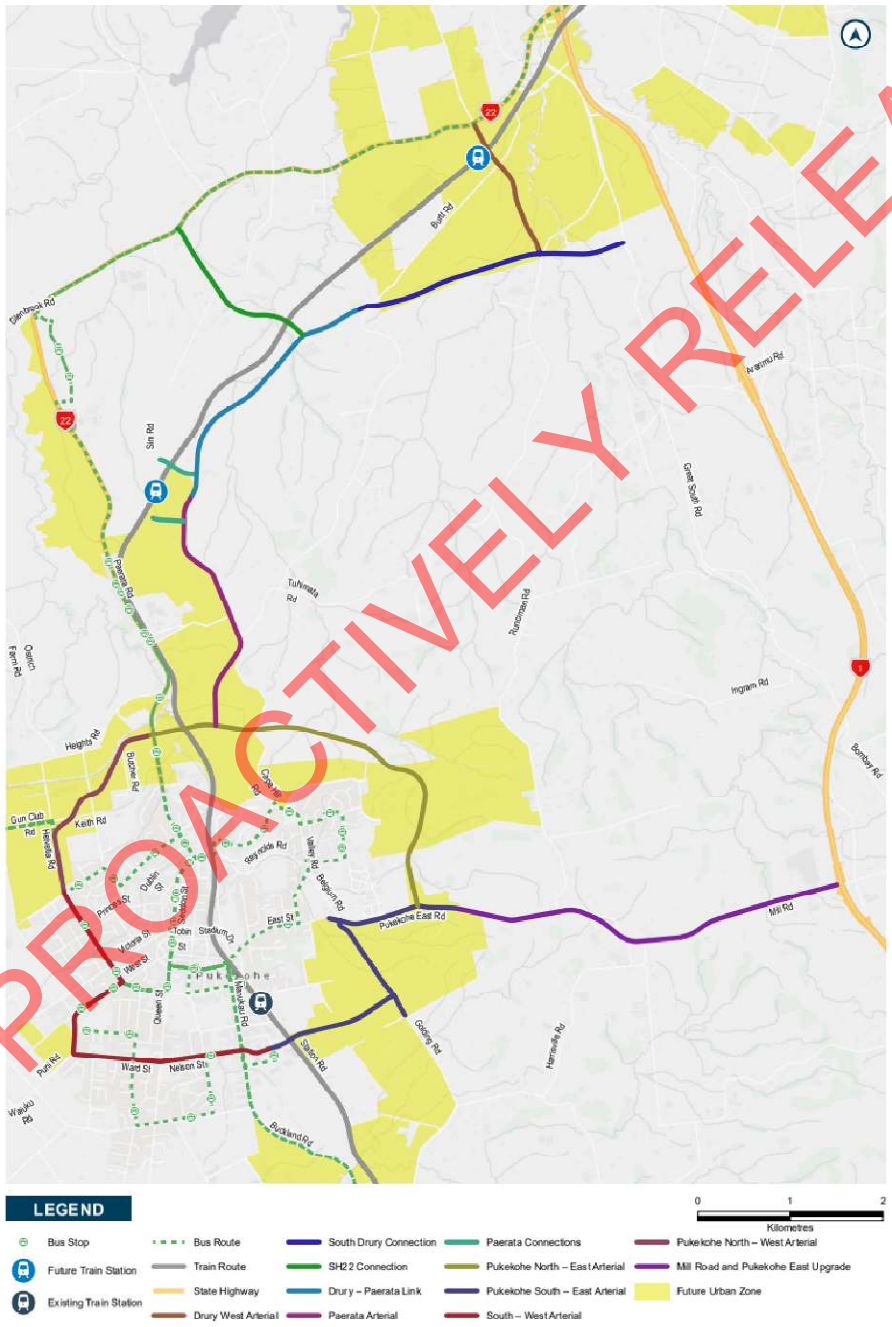
- Decreased road safety including additional conflict with active modes and increased risks on rural roads from high speeds and rat running by vehicles seeking to avoid congestion
- Poorly integrated land use which will result in reduced access to social and economic opportunities, compromised liveability, reduced opportunities to maximise transport catchments to increase mode share for public transport, walking and cycling; as well ultimately reduced development capacity of the identified Future Urban Zones
- Reduced access between destinations through a range of modes, resulting in heightened localised congestion and impacts on residential streets, impacting amenity, liveability and safety as well as limiting people's ability to meet daily needs
- Limited transport choice which will undermine efforts to reduce VKT and the carbon emissions profile of the land transport system in line with local and national emission reduction imperatives

- Reduced resilience to changes in transport costs and network outages and as a result of limited availability of alternative modes and routes

1.5 Recommended network for route protection

The recommended network for route protection is shown In **Figure 1** below. Note that only certain parts of the south-west arterial require route protection. This is discussed in subsequent sections of the DBC.

Figure 1: Recommended Pukekohe network



This network comprises 12 projects, grouped into 3 over-arching project packages, namely the Drury to Pukekohe Link, the Pukekohe Arterials and the Pukekohe East Road / Mill Road (Bombay) Upgrade. Projects are also grouped by NoR / owner for route protection purposes. **Table 1** below lists the 14 projects and how they fit with the three packages and NoR arrangements.

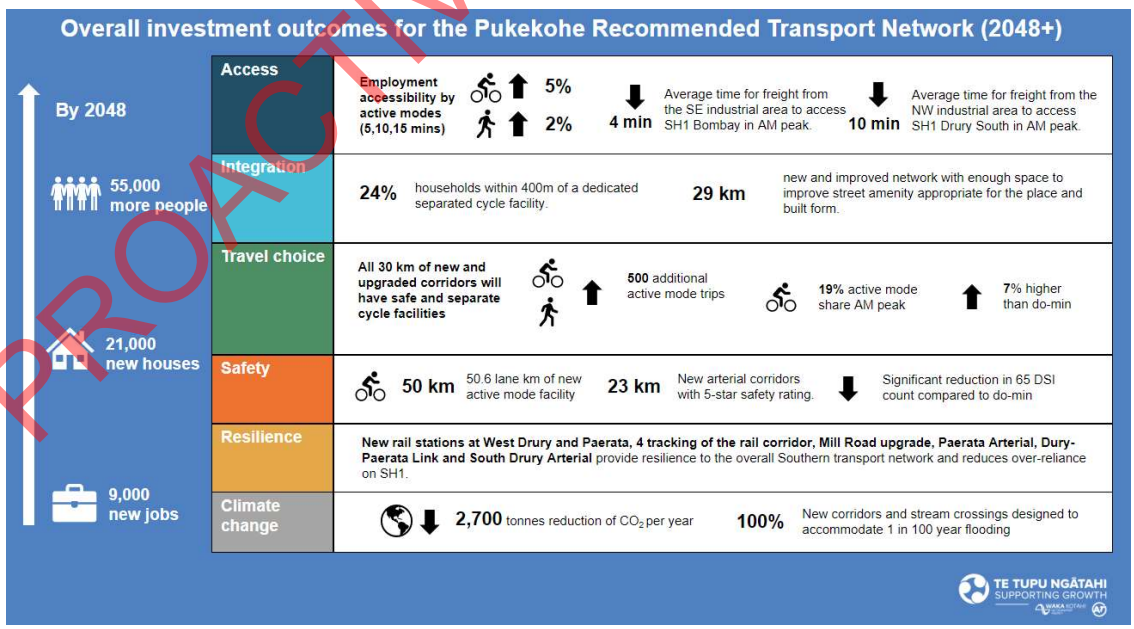
Table 1: Pukekohe recommended network packages, projects, NoR's and owners

Package	Projects (NoR#-owner)
Drury to Pukekohe Link	Drury West Arterial (NoR1-AT); South Drury Arterial, SH22 Connection, Drury-Paerata Link & Paerata Arterial (NoR2-WK); Sim to Sim Connection & Paerata Station Connection (NoR3-AT)
Pukekohe Arterials	North-east arterial (NoR4-AT); South-east arterial (NoR5-AT); South-west arterial upgrade (NoR6-AT); North-west arterial (NoR7-AT)
Pukekohe East Road / Mill Road Upgrade	Pukekohe East Road / Mill Road Upgrade (NoR8-WK)

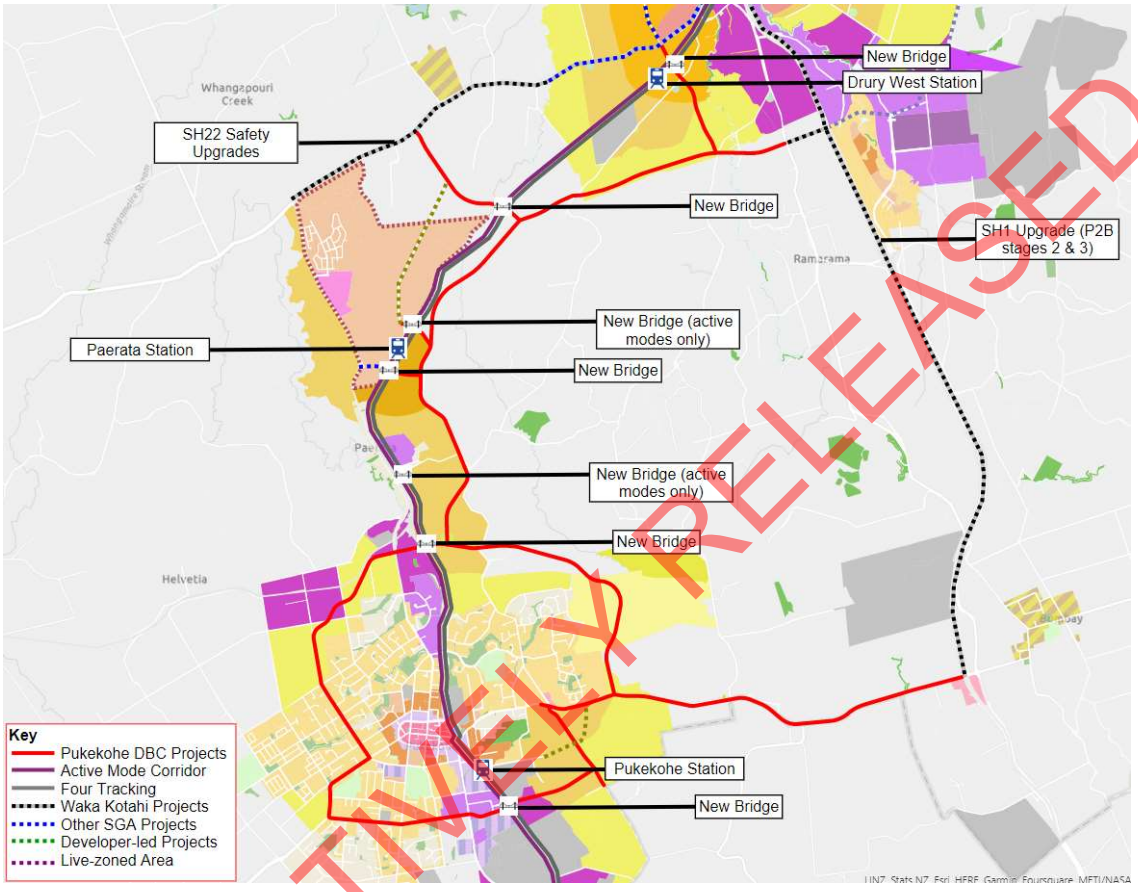
1.6 Forecast of the outcomes from investment

Forecasting the outcome of certain key performance indicators provides an indication of the transport performance of the recommended Pukekohe network at full build out of the Future Urban Zones at some time after 2048 (2048+). In addition to these forecast outcomes, the primary achievement of the network will be the enablement of 55,000 more people in 21,000 new homes and over 9,000 new local jobs. The transport outcomes forecast for the recommended network are shown in **Figure 2** below.

Figure 2: Forecast transport outcomes for Pukekohe recommended network at 2048+



In support of these outcomes, the recommended network complements a wider subset of transport investments across south the Pukekohe-Paerata-Drury South area that are outside the scope of this DBC and being developed through other programmes intended to support and enable ongoing growth, including the New Zealand Upgrade Programme, the Safer Networks Programme and other Te Tupu Ngātahi Supporting Growth DBCs. Those in the immediatearea are shown below.



1.7 Estimates of costs and benefits

The expected cost for the recommended network is $2.3b (P50 un-escalated) and includes all property and development fees, contingency, construction, operations and maintenance.

The present value of costs of the recommended network discounted in line with the planned implementation timeframes is $1.1b. Benefits of the recommended network, excluding wider economic benefits, have been assessed at $0.9b, giving a benefit-cost ratio of 0.8. By including wider economic benefits at 15% of transport benefits, the BCR rises to 0.9.

1.8 Property and route protection requirements

All projects in the Pukekohe recommended network will require route protection of some form. The projects include a mixture of new transport corridors and upgrading of existing roads. The Pukekohe South-west Arterial is an active mode upgrade on existing roads in an existing urban area. It is proposed to designate only some areas around intersections – so has much more limited route

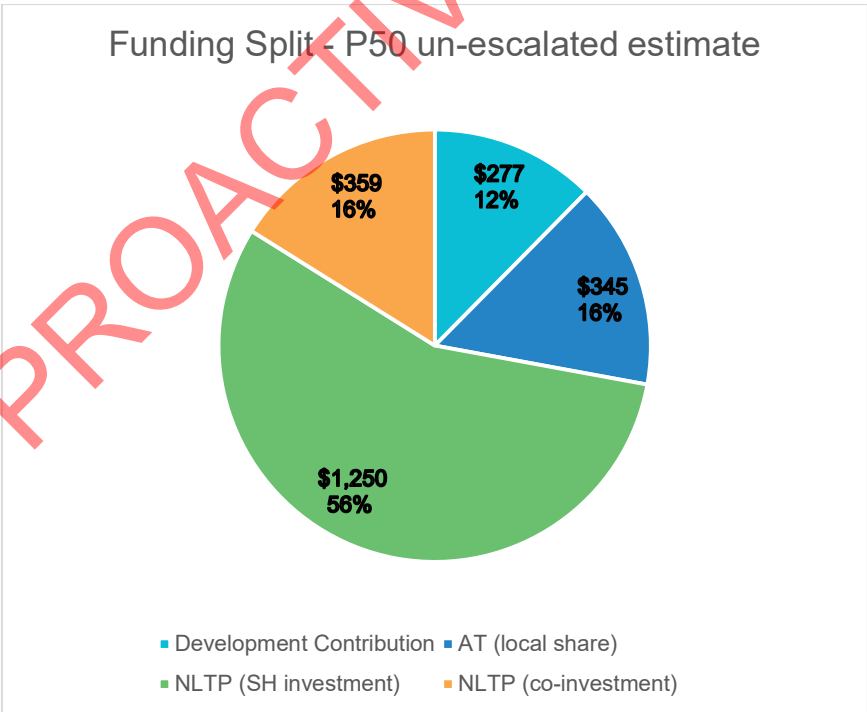
protection requirements. Total property costs (P50 un-escalated) are $259m. At 20% assumed early property acquisition risk (between the NoRs notification and 3-years before construction), some $52m plus escalation may be needed in total prior to the construction of the projects.

1.9 Funding requirements

Since this is a route protection DBC there are no imminent pre-implementation or implementation phases that need funding in the current 2021-24 NLTP period. The earliest projects for implementation are the Drury West Arterial, Sim to Sim Connection and the Paerata Station Connection, which will likely need pre-implementation funding in the 2024-27 period, and implementation funding in the following period, depending upon the rate of nearby growth and the extent to which developers may contribute to its delivery.

Funding in the short term will be needed however to cover early property acquisition risks should property owners seek the Environment Court to direct either requiring authority to purchase their property. For this DBC it has been assumed the early acquisition risk exposure for each project is 20% of the P50 property estimate for the project, spread evenly annually between the year of NoR notification and the year preceding the three years prior to construction, when the remaining 80% of the property cost is assumed to occur. Based on the assumed construction sequencing for each project the calculated first decade early (2023-33) property acquisition risk (P50 un-escalated) is $50.2m. With 5% annual escalation this figure rises to $59.3m.

There will also be implementation property costs for those projects that come first in the package. These costs (the 80% balance of P50 un-escalated property estimate) are assumed to fall in the three years immediately prior to construction. These costs in the first decade amount to $129.7m. With 5% annual escalation this figure rises to $175.3m. Funding shares are estimated based on existing FAR rates and assumptions around the level of development contributions that AT may potentially attract on local road projects. These are shown below.



1.10 Risks and opportunities

Due to the long-term nature of the route protection approach, there are several risks and opportunities from a property perspective as shown below.

Table 2: Key Property Risks for Pukekohe

Risks	Opportunities
Level of appreciation given uncertainty of timing The very nature of the area, which is forecast to grow (and hence needs supporting transport infrastructure) means that property prices will likely increase as future zoning is realised. When this happens and to what extent development is permitted by these zoning changes will have a significant impact on the potential future value of property. This is an area that is challenging to predict with certainty.	**Market appreciation** With the level of market appreciation likely in Pukekohe, the earlier property is acquired for the transport infrastructure the cheaper (in real terms) it is likely to be. It is acknowledged that this creates affordability and funding prioritisation challenges, but there is a real financial opportunity to save significant costs if funding for early acquisition can be found.
Live zones and Plan Changes Paerata has already been live zoned and there is ongoing active development which potentially impacts the timing for delivery of key Paerata infrastructure . A number of Plan Changes are also being separately progressed in Pukekohe. The main risks arising from this is the additional pressure that will be put on Auckland Transport and Waka Kotahi to develop adjacent infrastructure to harness network wide benefits. In constrained areas (e.g. North West Arterial, South East Arterial and Paerata Arterial) there is an additional risk that new developments could occur too close to the existing road blocking the opportunity to implement the recommended projects. If route protection is not achieved for the transport system imminently the opportunity may be lost to efficiently and effectively deliver the transport system and outcomes sought.	**Developer agreements** The main opportunity from Plan Changes is the ability to work with the developer regarding land acquisition, corridor alignment and co-delivery. There are a number of significant developers in the area which provides an opportunity to achieve agreements to support the funding and implementation of the corridors as well as support their development aspirations. Property is an important part of these agreements.
Cashflow for early property acquisition given long term protection Given the above timing issues, and what level of RMA s185 claims there could be, confirming a value for early property acquisition is equally uncertain.	

Section 13 covers the risks and opportunities identified in this DBC.

1.11 Next steps for route protection

The following key next steps for Te Tupu Ngātahi in terms of route protection are:

1. Preparation of documentation for NoRs
2. Lodgement of NoRs
3. Post lodgement activities.

In a DBC this complex there are a number of key activities that need to be undertaken to either reduce residual risks, better manage uncertainty, or unlock additional potential and opportunities for the projects. These activities will also support a handover to the owner organisations once the Te Tupu Ngātahi programme is completed.

Section 15 sets out the next steps for route protection.

1.12 Recommendations for approval

This DBC seeks the following approvals.

1. Approval of the Pukekohe growth area recommended transport network.

2. Approval to implement the Route Protection Strategy up to lodgement of NoRs (approval for lodgement to be sought separately).

3. Approval for funding release for Pukekohe post lodgement activities.

4. Acknowledgement of the potential early property acquisition and associated risk arising from route protection of the recommended Pukekohe NoRs.

2 Introduction

This Detailed Business Case (DBC) identifies key elements of the future transport network in the Pukekohe-Paerata- Drury West area (for simplicity hereafter referred to as Pukekohe). These elements require route protection of some form to support future urban growth in a way that helps achieve desired transport, land use integration and other outcomes. This work follows on from earlier programme business case (PBC) and indicative business case (IBC) phases, further developing and confirming an appropriate strategic network to support the future Pukekohe growth areas. This DBC specifically addresses the following:

- Revisits the previous South IBC phase assumptions, evidence and main findings
- Establishes, tests and confirms the preferred strategic network option through a robust optioneering and assessment process
- Presents a thorough analysis of the anticipated performance of the preferred option
- Identifies the arrangements needed for delivery and route protection

It is important to note that this DBC is primarily concerned with establishing the preferred strategic transport network option for Pukekohe for the purposes of identifying future transport routes that require route protection. Interventions across the wider network are identified where necessary that integrate with the strategic network and support desired outcomes. However, the future development and delivery of these wider interventions and the strategic network itself, as well as the realisation of their benefits, will be subject to future development and funding processes led by others, including Auckland Transport, Waka Kotahi and private developers.

2.1 The Pukekohe growth area

The Pukekohe growth area is situated in the southern most extent of the Auckland region. The northern most part of the growth area within the scope of this DBC (Drury West) is some 40km from the Auckland city centre, with the southernmost part of the growth area (Pukekohe south) a further 15km to the south adjacent to the Waikato regional boundary. It is identified as a satellite town in the Auckland Plan, acting as a rural node that serves both the surrounding rural communities as well as connecting to urban Tāmaki Makaurau / Auckland.

Pukekohe town centre has a railway station located on the North Island Main Trunk (NIMT) line, which continues north through Paerata and on to stations at Drury, Papakura and points north towards the Auckland city centre. The NIMT extends south from Pukekohe into the Waikato, with the Te Huia train service providing a passenger rail service between Hamilton and Auckland, with passengers currently transferring onto the Auckland electrified rail network at Papakura[2]. Work is underway to electrify the NIMT line from Papakura to Pukekohe, provide triple tracking and new stations at Drury West, Drury Central and Paerata.

State Highway 22 (SH22) provides a road link from Pukekohe to the State Highway 1 (SH1) Drury interchange via Paerata. Pukekohe is also linked by road to SH1 at Bombay, via Pukekohe East Road and Mill Road.

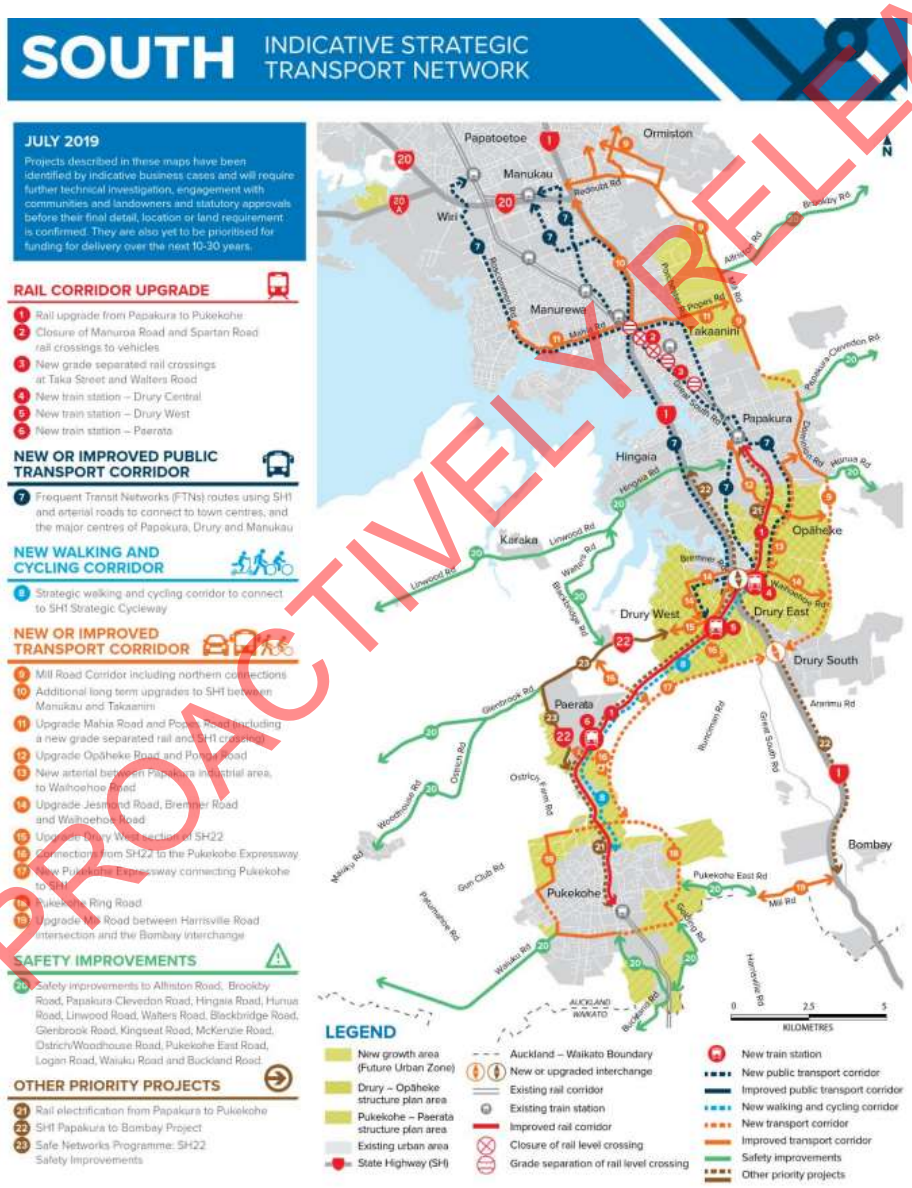
The Future Urban Land Supply Strategy 2017 identified the Future Urban Zone (FUZ) areas of Pukekohe-Paerata amounting to 1,704ha of former (primarily) rural land rezoned for future business

[2] As of 13 August 2022 Pukekohe station is closed for redevelopment until late 2024 and AT train services between Pukekohe and Papakura suspended for line upgrades. Te Huia services continue to run between the Strand and Frankton via Papakura but do not stop at Pukekohe.

and residential growth. This growth over the next 25 years towards 2048 was anticipated to result in a total of over 14,000 new dwellings. The subsequent Pukekohe-Paerata Structure Plan 2019 indicated 1,262ha of developable land (529ha net available for building) anticipated to result in 12,517 additional dwellings for an additional population of 33,809[3] people and 5,018 jobs once fully developed by 2050. With the addition of Drury West, growth across the DBC area amounts to 21,000 additional households, 9,000 additional jobs and 55,000 more people at full build out post-2048.

The ratio of people to jobs is a significant factor in this business case, indicating many people living in the area will need to travel elsewhere for employment, consolidating an existing net pattern of transport demand in and out of the Pukekohe area for employment trips, typically made in morning and evening peak periods. The strategic transport network identified in the South IBC to support this growth and resultant travel patterns in shown in the figure below.

Figure 3: South Indicative Strategic Transport Network



[3] Excluding growth in existing residential areas.

This DBC encompasses 5 projects from the South IBC network (projects 16, 17, 18, 19 and 20). Each has been revisited, revised and further developed to result in an integrated preferred strategic transport network that responds to the forecast future growth, along with the wider set of supporting local and collector roads, and active and shared mode provisions. The 5 IBC projects have been reframed as 12 DBC projects shown below. Each has been considered as stand-alone cases for investment noting however that the collective benefit of the network as a whole outweighs the individual benefits of each element.

- Drury West Arterial
- South Drury Arterial
- SH22 Connection
- Drury-Paerata Link
- Sim to Sim Connection
- Paerata Station Connection
- Paerata Arterial
- Pukekohe North-West Arterial
- Pukekohe North-East Arterial
- Pukekohe South-West Upgrade
- Pukekohe South-East Arterial
- Pukekohe East Road and Mill Road (Bombay) Upgrade

These projects form the arterial roads for Pukekohe-Paerata-Drury West, but it is acknowledged that there will also need to be a complementary local and collector road network and other modal networks and connections such as the local bus and active mode network. It is expected that these complementary measures will be considered as land use develops.

The Pukekohe-Paerata Structure Plan and Drury-Ōpāheke Structure Plan were adopted by Auckland Council in August 2019 and set out the pattern of land uses and supporting infrastructure network for the future growth of Pukekohe-Paerata and Drury-Ōpāheke as shown in the figure 2-2 and figure 2-3 below. The Auckland Unitary Plan had placed the land intended for urban growth into a transitional Future Urban Zone (FUZ) zoning prior to this in 2016 with the establishment of the operative plan. The staging for live zoning of the identified FUZ land will be led by the FULSS 2017 timeframes.

Despite this, a number of private plan changes have been lodged, potentially pre-empting planned live zoning timeframes:

- Plan Change 74: Golding Meadows and Auckland Trotting Club Incorporated. New urban zones for land between Golding Road and Station Road.
- Plan Change 76: Kohe. New urban zones on the south-west corner of Golding Road and East Street.
- Plan Change 87: Buckland Road. New business-general business zone over 7.8 ha.

A number of other private plan changes have recently been approved in Drury ahead of FULSS timeframes.

These will have varying degrees of impact depending upon where the proposed plan changes are within the existing future urban zoned land, their staging and any sequencing impacts and resulting pressure on strategic transport infrastructure. These plan changes also provide an opportunity to help deliver parts of the future transport network, notably in south-east Pukekohe. The project team is not aware of any development proposals identified outside the FUZ.

Figure 4: Pukekohe-Paerata Structure Plan

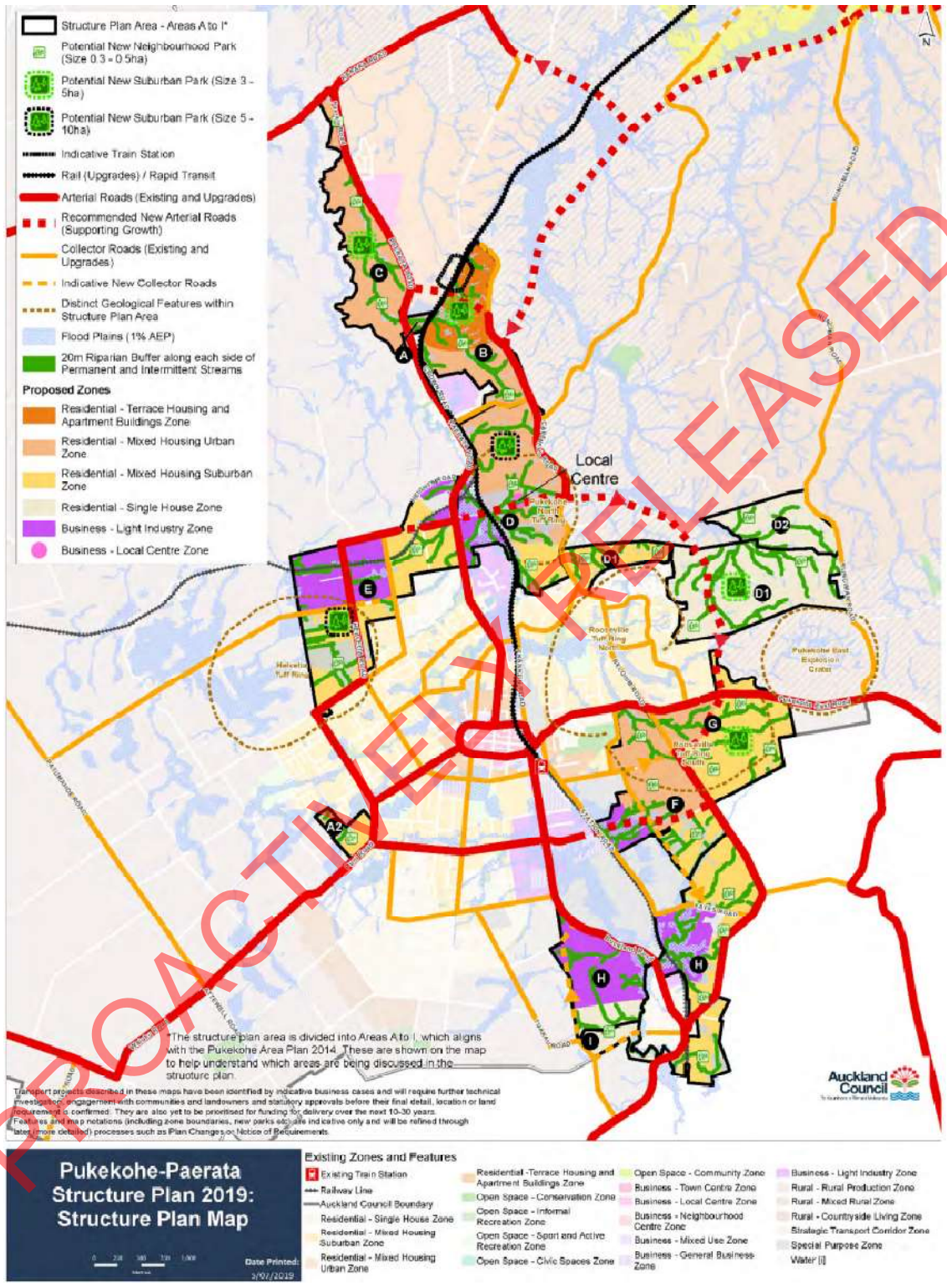
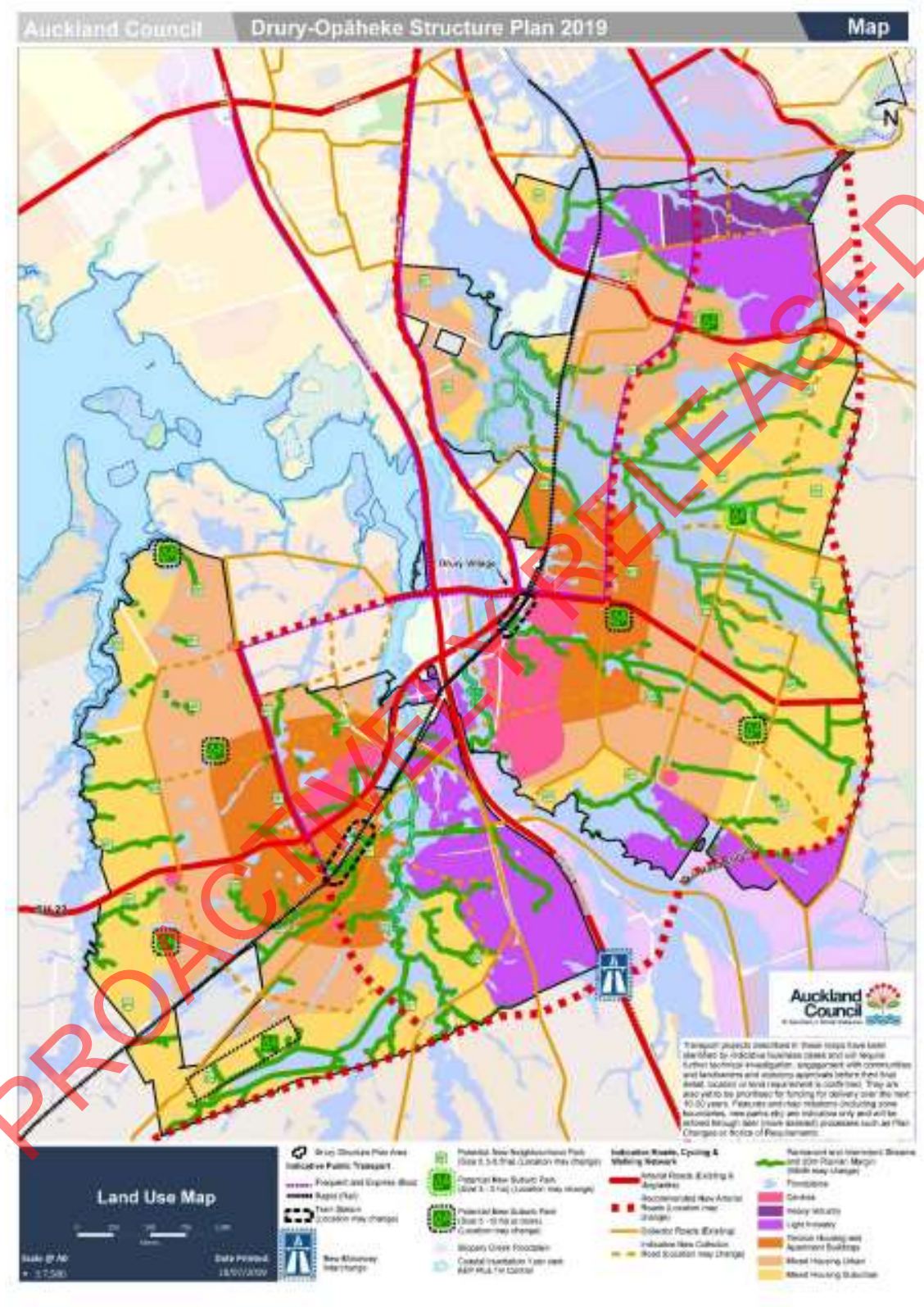


Figure 5: Drury-Ōpāheke Structure Plan



2.2 DBC scope

As described above there are 12 projects within this DBC, which have been derived from the previous South IBC business case phase. The nature of the decisions sought as a result of the DBC include:

Approval of the Pukekohe recommended transport network
Approval to implement the route protection strategy up to lodgement of Notices of Requirement (approval for lodgement to be sought separately)
Approval for funding release for Pukekohe post lodgement activities
Noting of the risks for potential early property acquisition and associated risks arising from route protection

This document focuses on providing the overall Pukekohe DBC investment case for route protection and details the recommended route protection strategy. The completion and lodgement of the NoRs will follow the completion of this DBC.

Given the number and range of projects across the entire Te Tupu Ngātahi Programme and the difference in likely timing of implementation (between 10-30+ years), three broad DBC types have been identified across the programme:

Type A: Detailed Business Case for corridor confirmation – identification of a preferred corridor; however, no further work required as no investment being sought.
Type B: Detailed Business Case for route protection – identification of a preferred corridor with sufficient design to inform the assessment of effects and lodge a NoR. Investment in pre-implementation and resultant property costs sought.
Type C: Detailed Business Case for implementation – a typical DBC assessment suitable for selection of a preferred option with sufficient detail to progress to pre-implementation, and implementation funding is sought.

All the projects in this DBC are Type B, however investment is only sought to complete the NoR process and cover the identified early property acquisition risks inherent in route protection strategies.

2.3 Document structure

This document provides a summary of the Pukekohe Detailed Business Case. More detailed information for each corridor is included in the specific appendices referenced throughout the DBC.

All appendices have been written to allow individual corridor information to be easily decoupled from this overarching DBC for use in future individual corridor business case processes or preparation of NoR workstreams. Details of the appendices' purpose are shown in the table below.

The economic case has been prepared for the overall Pukekohe strategic transport network package with an additional assessment for each of the thirteen individual strategic projects.

The programme outcomes have been reported on a similar package and individual project basis to support staged delivery as required.

Table 3: Summary of Pukekohe DBC appendices

Appendix	Summary of purpose

A: Strategic Case	Strategic Case for the DBC including specific evidence for each project. Identifies any changes to the policy and strategic direction since the completion of the IBC. Presents the DBC ILM, including KPI's.
B: Options Assessment Report	Summary of option assessment process for the DBC. Includes detailed documentation for each project individually.
C: Transport Outcomes Report	Specific information on modelling and economic assessment.
D: Transport Assessment	Specific information on transport outcomes.
E: Design Report	Detailed information explaining the engineering design process that underpins the preferred network and resultant designation boundaries.
F: Urban Design Assessment	Urban design evaluation for all projects in the DBC using the Te Tupu Ngātahi Design Framework principles.
G: Engagement Summary	Summary of results from rounds of engagement during the development of the DBC.
H: Cost Report	Assumptions and methodology for costing. Costs prepared for each project.
I: Route Protection Strategy	Strategy to route protect for the Pukekohe-Paerata strategic transport network.
J: Property Acquisition Strategy	A report identifying the property effected by the preferred network and the potential resultant property acquisition approach and its financial impacts.
K: Risk Register	Key overall Pukekohe-Paerata and individual project risks and mitigations.
L: Climate Change Response	Evaluation of how the preferred network responds to climate change objectives, particularly in regard to embodied and enabled carbon.
M: Staging Considerations	Provides an overview of the approach taken to determining the appropriate staging of the elements.

2.4 How did we get here?

A snapshot of the Pukekohe Business Case history is shown in the table below. It summarises the recommended network for each Business Case stage, the urbanisation growth assumptions and the applicable regulatory and planning policies influencing decisions made. It is noted that the drivers for transport intervention have not changed throughout this process with continuity of:

Growth in Pukekohe: Dwellings, jobs and population assumptions have continued to increase throughout the business case stages demonstrating further urban intensification.

Regulatory and planning policies: These policies support the mode neutral approach to transport interventions.

Table 4: History of the Pukekohe business case

Stage	Detail	Growth	Policy
Programme Business Case (2016-2017)	TFUG considered a programme of intervention for the North, North-west and South growth areas. The possible Pukekohe-Paerata interventions included: Pukekohe Expressway SH22 / Pukekohe Expressway rail crossings Pukekohe Inner Link New station at Paerata	Responds to the pace, scale and staging of growth identified in the AUPOIP and FULSS 2015. FULSS 2015 greenfield growth assumptions: Dwellings 11,634-13,432. Jobs 9,540.	FULSS (2015). AUPOIP (2015). I9 Land Use Scenario. ATAP first revision. GPS on Land Transport (2015-2018).
Indicative Business Case (2018 -2019)	IBC focused on South area only: Pukekohe to SH1 railway walking and cycling corridor Upgrades and improvements to SH22 New southern motorway interchange at Drury South Pukekohe Expressway and connections to SH22 Pukekohe ring road Pukekohe East Road / Mill Road upgrade and improvement	Response to the pace of the updated FULSS 2017. FULSS 2017 greenfield growth assumptions: Dwellings 14,270 Jobs 5,020.	Updated FULSS (2017). I11.4 Land Use Scenario. Updated ATAP. New GPS (2018-2021). New Auckland Plan 2050. **Outcome**: new GPS and Auckland Plan reinforces a balanced, mode neutral response in the South focusing on greater mode choice and consideration of modal priorities.
Detailed Business Case (2019-2023)	DBC investigated interventions identified during the IBC: Pukekohe arterial and SH22 connections Pukekohe north-east arterial	Response to the pace of the updated FULSS 2017. Similar modelled growth to IBC numbers so ultimate transport response is commensurate.	I11.5 Land Use Scenario New GPS (2021-2024) Pukekohe-Paerata Structure Plan 2019 Vision Zero 2019

	Upgrades to arterials for north-west, south-west and south-east Pukekohe Mill Road Bombay upgrade	Modelled growth assumptions are: 33,000 dwellings 20,000 jobs 86,000 total population Using 2048+ scenario for modelling	Climate Change Response (Zero Carbon) Amendment Act 2019 NPS Urban development (NPS-UD). NPS Freshwater Management (NPS-FM). **Outcome**: Continued focus on mode shift and choice. Increased focus on achieving climate change response and intensification of development at transport nodes.

*Modelled growth numbers are generally reported in this DBC documentation. The modelled growth assumptions include the full potential of zoning in Pukekohe-Paerata and West Drury i.e., both full build out of Future Urban Zoning as well as subdivisional capability under the Auckland Unitary Plan.

Strategic case

3 Why is investment needed?

The changes in land use across the Pukekohe area forecast towards and beyond 2048 presents significant challenges for infrastructure owners tasked with providing for the economic, social, environmental and cultural wellbeing of the community.

The scale of the change to the Pukekohe area will be significant:

Approximately 55,000 people added to the existing population of around 31,000
Number of dwellings growing by around 21,000, from around 12,000 to over 33,000
Potentially over 9,000 additional jobs

The transport effects of this change have the potential to be amongst the most impactful on the day to day lives of people living and working in the area. Without investment many adverse effects will emerge, negatively impacting on the ability of people to reasonably meet their economic, social, environmental and cultural needs. As established in the IBC, the scale of the change in the Pukekohe area and more widely across South Auckland requires strategic transport network level responses as well as local interventions. Regardless of the future trip making patterns and travel choices of households and businesses, influenced by economic, social and technological change; the scale of the forecast transport demand arising from the planned land use changes necessitate a strategic response supported by timely investment.

There are also broader implications of this growth in transport demand that take on a national significance. Prominent among these, lowering the road toll and reducing carbon emissions have become imperatives in the national policy and planning framework prior to and during recent business case stages and have subsequently had a key influence on the planning approach used in the development of this DBC. This influence is evident throughout the DBC, including on the investment logic mapping, option development and assessment and refinement of the emerging preferred option to a final recommended option. At the same time, local outcomes important to the communities of Pukekohe-Paerata-West Drury and wider Tāmaki Makaurau / Auckland have also been a compass for the development of this DBC.

In this context of growth and planning imperatives, without significant transport investment Pukekohe will experience:

Decreased road safety including additional conflict with active modes and increased risks on rural roads from high speeds and rat running by vehicles seeking to avoid congestion
Poorly integrated land use which will result in reduced access to social and economic opportunities, compromised liveability, reduced opportunities to maximise transport catchments to increase mode share for public transport, walking and cycling
Reduced access between destinations through a range of modes, resulting in heightened localised congestion and impacts on residential streets, impacting amenity, liveability and safety as well as limiting people's ability to meet daily needs
Reduced resilience to changes in transport costs and network outages and as a result of limited availability of alternative modes and routes
Limited transport choice which will undermine efforts to reduce VKT and the carbon emissions profile of the land transport system in line with local and national emission reduction imperatives.

This strategic case presents the case for each individual strategic network element, outling the role they play in addressing the above problems. The economic case then develops refined options for

each element and their spatial impacts, ultimately resulting in the primary intent of this DBC to identify which strategic transport interventions require route protection and where that route protection falls spatially. This is discussed in the following section.

3.1 Why route protect

For the reasons outlined above it is critical that the transport requirements for Pukekohe are planned for to match the intended growth. Route protection is the first and critical step for ensuring the transport enhancements needed can be provided. The intent of route protection is to identify and appropriately protect the land corridor necessary to enable the future construction, operation and maintenance of the recommended network options.

Route protection provides the mechanism to protect the network in advance as opposed to retrospectively making the transport interventions fit the existing urban form.

The key benefits of route protection are that it:

Provides certainty and direction for future land use. This supports key land use integration measures such as future structure planning processes and intensification around stations and public transport routes.

Provides a mechanism for AT and Waka Kotahi to plan for future financial investment while retaining flexibility on the detailed development of the recommended future network, enabling it to respond to the pace, scale, and exact location of future urban growth.

Allows for major infrastructure to be implemented at the right time, integrated with the urban development driving the desired transport and urban outcomes.

Reduces future cost risk. If the corridor is protected by either early acquisition or notices of requirement, then there is an opportunity to reduce some land costs.

Protects project feasibility. Route protection prevents the land from being developed in a manner which makes projects more expensive, has compromised outcomes or in the worst case the project is no longer feasible.

4 What has changed since the South IBC?

The South Indicative Business Case was endorsed by Auckland Transport and Waka Kotahi in 2019. Since then a number of changes to the local and national context have taken place that need to be accommodated in this DBC. The more significant contextual changes include:

Approval of the Pukekohe-Paerata and Drury-Opāheke Structure Plans in August 2019
Lodgement with Auckland Council of multiple private plan changes for Pukekohe and Drury
Replacement of the National Policy Statement on Urban Development Capacity 2016
Emergence of Covid as a pandemic and resultant impacts on the economy and society
Release of the Government Policy Statement on Land Transport 2021-31
Publication of New Zealand's first emissions budgets and emissions reduction plan
New Zealand Upgrade Programme accelerating the delivery of some strategic infrastructure
Road to Zero New Zealand's Road Safety Strategy 2020-2030

Table 5: Changes in context since the IBC

Change Since South IBC		DBC Response
Land Use policy and strategic alignment	• Auckland 2050 • National Policy Statement (NPS-UD) on Urban Development. • Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021. • NPS on Freshwater Management (NPS-FM). • Proposed NPS for Indigenous Biodiversity. • Proposed NPS for Highly Productive Land.	The optioneering process used multi criteria analysis (MCA) to assess a wide range of social and environmental impacts. The impact of the new NPS was also considered during the options assessment phase. The NPS-UD requires councils to plan for growth and ensure a well-functioning urban environment for all people, communities, and future generations with a key requirement to enable intensification along public transport routes. The Resource Management Amendment Act strengthens the NPS:UD and includes a new Medium Density Residential Standards (MDRS) which allow development up to three homes of three storeys on most sites without a resource consent. This differs from the Auckland Unitary Plan which has designated zones for Mixed House Urban which is the most similar zoning to the proposed MDRS. Council expects this will result in more intensified residential development in Pukekohe-Paerata than first envisaged in the structure plan. This is obviously less coordinated than through a Structure Plan process and is harder to predict where intensification might occur as it depends on public and private developer appetites and availability of suitable sites. It is understood that the MDRS is seeking to build new houses faster, rather than increasing the population in Auckland, so the overall growth assumptions for Auckland remain valid, it is potentially the timing and location of the growth which is uncertain.

		To manage this uncertainty the DBC transport modelling has been undertaken using scenarios that include for higher densities in both existing and future urban areas that reflect NPS:UD objectives. The impact of the environmental based NPS criteria was considered in the DBC by specialists as part of the MCA process. Wetlands are a key feature in Pukekohe- Paerata.
Climate Change	The Climate Change Response (Zero Carbon) Amendment Act 2019 Amendments support contribution to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5° Celsius above pre-industrial levels and allow New Zealand to prepare for, and adapt to, the effects of climate change. Ministry for the Environment Te hau Mārohi ki anamata: Transitioning to a low-emissions and climate-resilient future. Includes an emissions reduction plan. Auckland Council declaring a climate emergency in 2019.	The IBC was built on the premises of: **Transport and land use integration** – a guiding principle to provide a transport network that supports land use development and good urban form. **Prioritising mode choice** – specifically focusing on improved public transport reliability and services and creation of a well-connected walking and cycling network. The result is a recommended transport system which reduces the reliance on private vehicles and shifts trips to low carbon alternatives. The DBC also continues to build on demand management principles adopted in the IBC and does not provide for unconstrained demand but rather seeks opportunities to influence and reduce demand alongside the recommended infrastructure. The MfE emissions document details the proposed approach to reducing emissions such as reducing VKT by integrating land use and transport and providing travel choice. The premise of this DBC aligns well to these goals and as such, the DBC is well positioned to respond to climate change outcomes. Embodied and enabled carbon has been assessed through the options assessment process (Te Tupu Ngātahi MCA framework).The DBC also includes a Te Tupu Ngātahi climate change assessment of the DBC corridors to ensure proposed investment is consistent with climate change targets. This includes the new links and upgrades to existing roads.
Land Use Assumptions and development pressures	Formal land use assumption changes include: The Pukekohe-Paerata and Drury Ōpāheke Structure Plans were adopted in 2019. Increasing development pressure has been ongoing in Pukekohe and Drury with lodged plan changes seeking to accelerate	The DBC is cognisant of any changes in the land use assumptions and utilises the most current land use assumptions available. Of those identified to date, there are no significant changes to base land use assumptions from the IBC. Generally, the DBC responds to growth as currently identified in the FULSS. However, there is evidence of ongoing development pressure in Pukekohe-Paerata. These will have varying degrees of impact. Where the proposed plan changes are within the future urban zoned land these impacts will largely be focused on

	live zoning of Future Urban Zone (FUZ) comprising: Plan Change 74: Golding Meadows and Auckland Trotting Club Incorporated Plan Change 76: Kohe Plan Change 87: Buckland road	staging and sequencing and the resulting pressure on strategic transport infrastructure. There is currently no evidence of any development proposals that are located outside the FUZ which could have a wider implication on the proposed network as it generates additional demand where previously there were none. Proposed Private Plan Change 74 does involve the potential rezoning of some current Major Recreation Facility zoning to light industry zoning but the impact of this on the strategic transport system is likely to be minor, should the plan change be made operative.
Modelled Growth Assumptions	Overall growth projections in Pukekohe remain generally consistent in terms of full build out quantum. Growth projections are expected to be slightly slower and more linear in terms of full build realisation.	The overall quantum of growth in land use model i11.6 remains largely the same as i11.4 which was used in the IBC. As these growth assumptions were the basis on which the transport network was developed, the overall conclusions of the South IBC remain valid. Potential impacts from the MDRS have not been included in AFC land use models as yet so the impact of intensification will be considered qualitatively for each corridor during the optioneering process. The change in growth timing could potentially impact the recommended timing of implementation of transport projects in the DBC.
Transport Policy and Strategic Alignment	Ministry of Transport Outcomes Framework. An updated GPS on Land Transport has been released, which places increased focus on climate change objectives and freight connections rather than broader environmental outcomes and value for money. Road to Zero.	There have been some key changes to the policy and strategic direction since the IBC. These changes are however still consistent with the overarching outcomes sought from the IBC. These include access, mode shift, environmental sustainability, and safety. The GPS also has a greater focus on climate change. With these continuing objectives it is considered that the IBC conclusions are well aligned with the current transport strategic and policy directions. The problems and assessment in the DBC have been refined to accommodate these GPS changes. More details on how the network will support addressing climate change have been included.
Transport Projects	SH22 Drury upgrades SH1 Papakura to Bombay Three new rail stations (Paerata, Drury West, Drury Central)	The New Zealand Upgrade Programme – Transport has accelerated the delivery of some strategic infrastructure envisaged by the South IBC. Of particular note for this DBC are the funding of three new train stations at Paerata, Drury West and Drury Central along with rail electrification work from Pukekohe to Papakura. Along with the decision to construct a smaller scale Mill Road (Manukau) upgrade focusing on safety improvements, these investments demonstrate a clear commitment by Government to achieving climate change and housing objectives.

		Upgrades to SH22 have also been funded through NZUP, supporting housing and commercial development at Drury West. These projects were envisaged in the South IBC (albeit a smaller scale Mill Road upgrade has initially been funded through NZUP), and there has been little change that would have demonstrable effect on the conclusions in the IBC that are carried forward into this DBC.
COVID19	The impact of COVID19 on the transport system has three key impacts. Resilience of public transport operations Change in funding levels and type A kick start for working from home.	While the response to COVID19 has had a direct and immediate impact on public transport and transport demand, it is expected in the longer-term horizon, such as that assessed in the DBC that transport demands will return to projected levels. The realisation of work from home opportunities following COVID19 is considered important for Pukekohe-Paerata's role as a satellite town where a future aspiration might be for residents to live in Pukekohe-Paerata and commute some days to urban Tāmaki Makaurau. COVID19 has shown that this type of flexible working can be possible. Additional uptake in work from home will have an impact consistent with longer term aspirations for reduced travel demand, which is already predicted in the base modelling assumptions. Given the long-term nature of the DBC no specific COVID19 related changes to land use and travel demand assumptions are considered necessary.

5 Pukekohe Projects

This section provides a high-level overview of the DBC projects. More detailed information can be found in Appendix A: Strategic Case, Appendix B: Options Assessment Report and Appendix E: Design Report.

The South indicative strategic network was developed in 2018 and 2019, resulting in endorsement by Auckland Transport and Waka Kotahi of the South Indicative Business Case for Route Protection. With some exceptions, most of the identified strategic network was also identified in the pre-cursor to the IBC, the Transport For Urban Growth Programme Business Case 2016, endorsed by both organisations in late 2016. The PBC included improved connections around Pukekohe (a ring route as formerly known) and a new north-south corridor between Pukekohe and Drury, which became known in the IBC as the Pukekohe Expressway.

Therefore, evidence of the need for these strategic connections can be found throughout the PBC, the IBC as well as this DBC. This DBC however has its main focus on the detailed development of the emerging preferred options identified in the IBC, illustrating that the fully developed options presented therein are strategically aligned, economically efficient, affordable and can be delivered. But fundamentally, and uniquely for Te Tupu Ngātahi DBC's, this business case has the primary purpose to identify the need for route protection of certain key elements, where it is needed and to assemble all the necessary supporting evidence for the designation processes that will follow DBC endorsement.

The remainder of section 5 provides an overview of the need for the projects identified in this DBC, including the evidence in support of them and the consequences of doing nothing. The benefits of the projects are also outlined as well as any further related information, such as constraints, dependencies, or design features. Further, more detailed information of this nature is contained in Appendix A: Strategic Case. It should also be noted that the wider evidence base for these projects is held in a number of the other topic-based Appendices, especially Appendix B: Options Assessment Report and Appendix C: Economic Assessment. To help navigate the document, cross refencing is provided where supporting information is located elsewhere in the document.

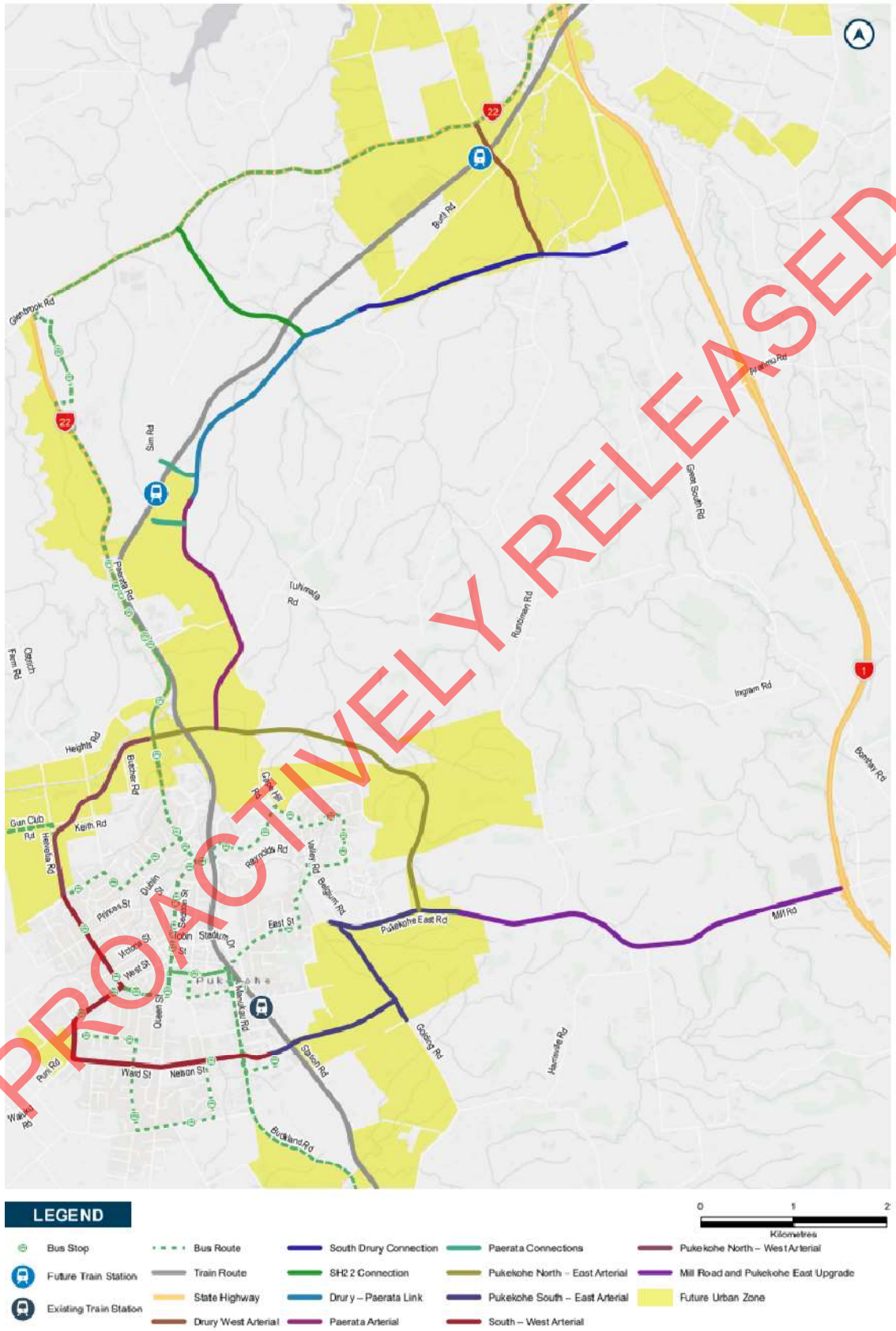
As noted above, the scope of the Pukekohe Expressway has been revisited as a result of the increasing focus on climate change objectives by both central government and Auckland Council. Whereas this was intended as a high speed, high-capacity link from Pukekohe to SH1, the potential for releasing latent demand and increased light vehicle VKT and carbon emissions were seen as contrary to climate change objectives and indeed the investment objectives of this DBC. Accordingly, the link is now anticipated to take the form of a two-lane median divided corridor largely operating as an urban arterial with speeds of 60 km/h or less in future urban areas and higher speeds of around 80km/hr in rural areas where it connects the future urban areas of Drury and Paerata. It is accompanied by active mode facilities along its length on one or both sides. Compared to the expressway option, this new form delivers largely the same outcomes in terms of access, safety, integration, and resilience but results in less induced demand for single occupant vehicle travel, achieves greater active travel and public transport uptake, and so greater travel choice. Further detail can be found in Appendix B: Options Assessment report and Appendix E: Design report.

The following figure provides an overview of the Pukekohe projects within the scope of the DBC. It shows how the projects are now packaged and presented as compared to the South IBC, and in

particular how the former Pukekohe Expressway is now represented. All of the projects in the DBC require route protection in some form.

For comparison with the South IBC, the SH22 north, central and south connections in the IBC are now included as the Drury West Arterial, SH22 Connection and Sim to Sim Connection projects. The Pukekohe Expressway is now represented by three integrated projects known as the South Drury Arterial, the Drury-Paerata Link and the Paerata Arterial. For details of the optioneering and design of the Pukekohe projects refer to Appendix B: Options assessment Report and Appendix E: Design Report.

Figure 6: Overview of Pukekohe Projects



5.1 Drury to Pukekohe Link

The Drury to Pukekohe Link is a series of projects broadly parallel to SH22 linking Pukekohe to Drury West, with three connections to SH22. These collectively form NoRs 1, 2 and 3.

At the northern extent it ties in to the P2B Stage 2 project at Great South Road and at its southern extent a connection to the proposed north-east arterial, completing a new connection between Pukekohe and SH1.

At three locations along its length are connections to SH22. These are the Drury West Arterial (NoR 1, AT requiring authority), the SH22 Connection (part of NoR 2, WK requiring authority) and the Sim-to-Sim Connection (NoR 3, AT requiring authority). NoR 3 also includes the Paerata Station Connection, which in turn connects to SH22).

As shown in Figure 5-1 above, the projects north to south, are:

- Drury West Arterial (NoR 1 - AT)
- Drury to Pukekohe Link (NoR 2 - Waka Kotahi) – split into four segments:
  - South Drury Arterial
  - SH22 Connection
  - Drury-Paerata Link
  - Paerata Arterial
- Paerata Connections (NoR 3) – split into two segments:
  - Sim to Sim Connection
  - Paerata Station Connection

These projects have been scoped in this way to reflect the anticipated staged delivery of the link to reflect the anticipated rates of localised urban growth and resultant transport effects and the need to ensure investment objectives and outcomes are achieved. Also factored into this approach are the likely issues around funding availability if delivered as a single project, as well as a strategic approach to promoting mode shift by meeting local transport needs first whilst enhancing multi-modal access to new train stations for longer distance trips. Staging is discussed further in section 10.5.

Once fully implemented the north-south corridor fulfils a number of functional intents and these are outlined in each section below, however fundamentally the corridor:

- Provides a multi-modal link from Pukekohe and Paerata to SH1 (Drury), and in the longer-term Drury with the development of the Mill Road (Drury) corridor, promoting walking and cycling for shorter trips and enhanced access for strategic vehicles trips, including for freight
- Relieves traffic volumes on SH22 through Drury West, allowing enhanced integration of transport with urban development there and the provision of a safer, multi-modal network
- Reduces traffic volumes on SH22 further west and north of Pukekohe, reducing conflicts and enhancing safety
- Enhances multi-modal access to new urban areas in Drury, Paerata and Pukekohe, maximising high quality development potential and enhanced transport outcomes
- Integrates with Pukekohe arterials to enhance freight access to markets, especially between Pukekohe, its rural hinterland and the strategic transport network
- Enhances the resilience of the strategic transport network spatially and modally by creating alternative routes and transport choice that accommodates network outages and changes in

community transport needs, limiting any adverse impacts on economic, social and cultural wellbeing

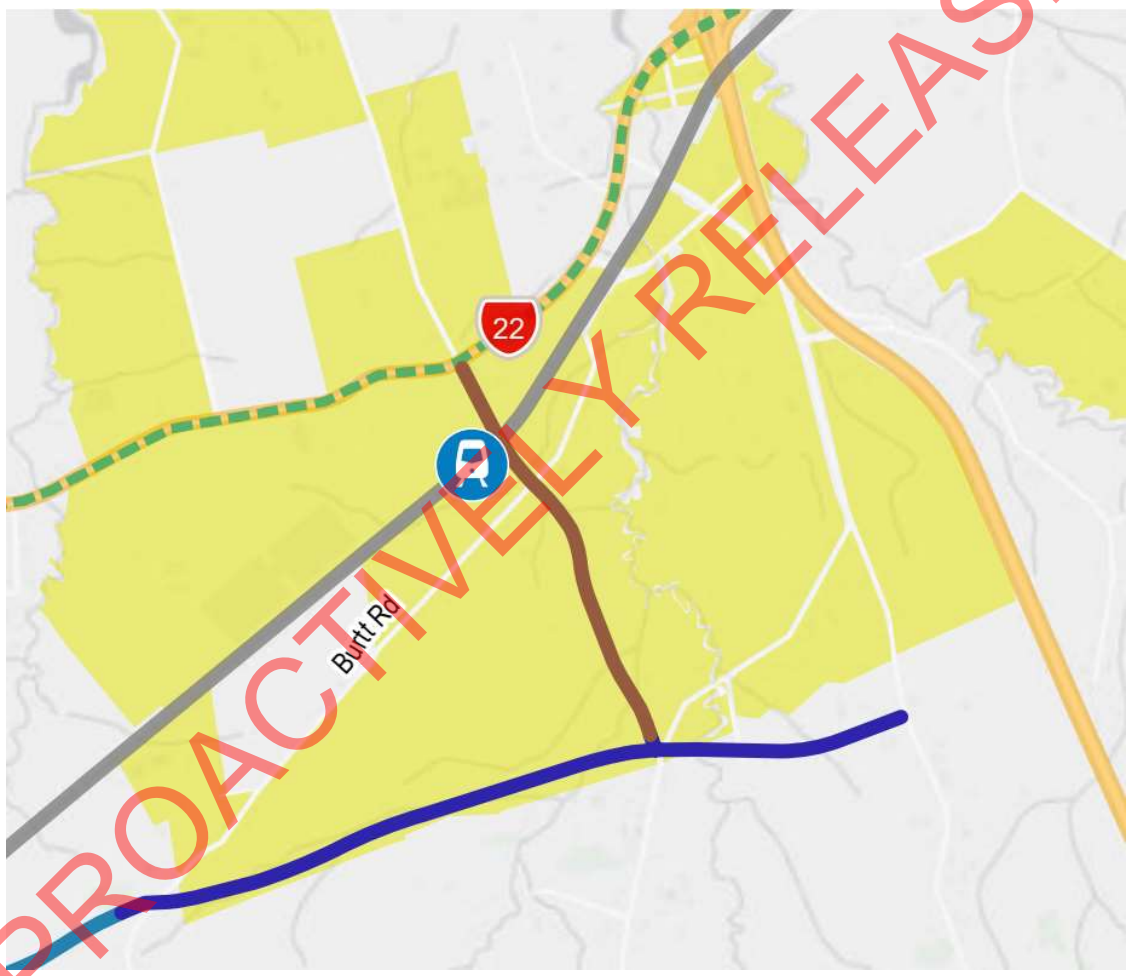
- Provides multi-modal access to new train stations at Paerata and West Drury, promoting rapid transit for longer distance trips, especially employment centres beyond the Pukekohe-Paerata-West Drury area

Sections 5.1.1 to 5.1.5 below discuss each of the Pukekohe to Drury Link projects in more detail.

5.1.1 Drury West Arterial

The location and extent of the Drury West Arterial is shown in **Figure 7** below (brown).

Figure 7: Location of the Drury West Arterial



The Drury West Arterial provides an upgrade of the West Drury Station access from SH22 (addition of a lane each way) and four lanes to Burtt Road for bus priority lanes, with two-lanes extending beyond to connections at both Runciman Road and the South Drury Arterial (see below).

The functional intent of the project remains the same as that envisaged in the IBC, whereby the link provides relief to the current Drury interchange and SH22 through Drury West as the Future Urban Zone land is developed. This will enable greater urbanisation of the SH22 corridor through Drury

West, with improved safety, access and transport-land use integration with multi-modal facilities for travel along and across the SH22 corridor.

In addition, this new arterial link also provides direct access for all modes from Drury West to the proposed new train station including FTN services from Jesmond Road. East of SH1 will be a new link (the future Mill Road corridor) skirting the eastern boundary of the Future Urban Zone around Drury East and Opāheke. The result is a continuous multi-modal link from Drury West to Drury East and beyond, overcoming the existing and compounding severance issues that would otherwise be experienced by residents and businesses in these areas as a result of SH1.

The Drury West Arterial forms on its own, NoR 1 (AT). The link has dedicated separated walking and cycling facilities on both sides along its entire length. Further details of the design and its evolution can be found in Appendix B: Options assessment Report and Appendix E: Design Report.

5.1.2 South Drury Arterial

The location and extent of the South Drury Arterial is shown in **Figure 8** below (blue).

Figure 8: Location of the Proposed South Drury Arterial

The South Drury Arterial connects at its eastern extent with Great South Road (A), where the P2B stage 2 interchange project will tie in. At its western extent is a connection to the proposed SH22 Connection (see below). As noted above, there is a connection to the Drury West Arterial.

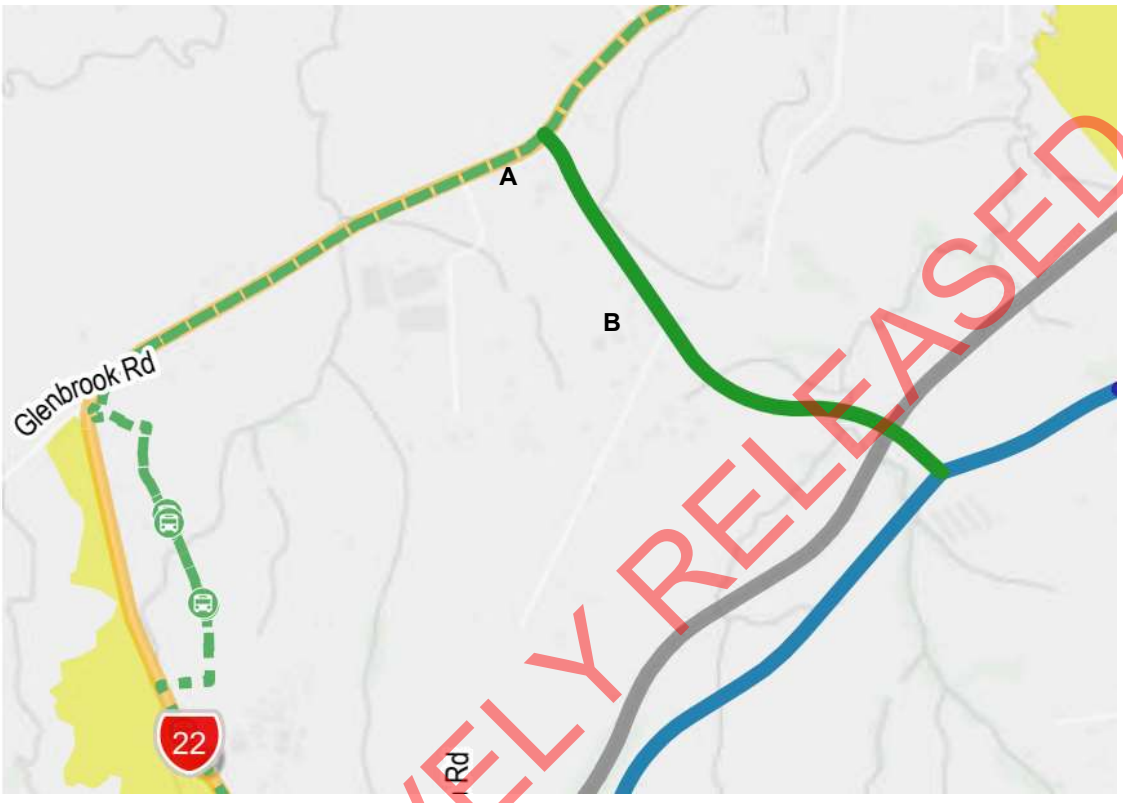
This link is a two-lane median divided cross-section with bi-directional active mode facilities on the north side, and a likely posted speed limit of 60 km/h.

Without this connection the travel demands resulting from future urban growth in north Pukekohe and Paerata that needs to access Drury and beyond will be limited to using SH22. However, due to the congestion and delay that will result there, an overspill of traffic onto the parallel rural road network will eventuate, including on Cape Hill Road, Burtt Road and Runciman Road. This has the strong potential to result in a dramatic increase in death and serious injury crashes on these links due to their rural character and geometry. These roads are not suitable for upgrade to an arterial function due to the extensive costs and impacts resulting from the need to fundamentally alter vertical and horizontal alignments, as well as bring the cross-section up to a modern arterial standard.

5.1.3 SH22 Connection

The location and extent of the SH22 Connection is shown in **Figure 9** below (green).

Figure 9: Location of the Proposed SH22 Connection



The SH22 Connection is the project formerly known as the central connector in the IBC. Its functional intent is unchanged, that being to enable inter-regional strategic traffic demand to be taken off SH22 through Drury West (at A), enabling improved functioning of the urban environment there. The project also enhances accessibility, particularly for freight to and from the rural hinterland of north and west Pukekohe onto SH1, which will experience improved access for trips north and south on the state highway.

This link is proposed as a two-lane median divided arterial with a posted speed limit of 80km/h, matching that of SH22 and its rural context. Bi-directional active mode facilities would be concentrated on the north side, enhancing access for users from Paerata (via a Sim Road connection at B) and which would also link with the proposed regional cycle route (active mode corridor, AMC) running along the NIMT rail corridor, as well as to the South Drury Arterial active mode facility.

5.1.4 Drury-Paerata Link

The location and extent of the Drury-Paerata Link is shown in **Figure 10** below (blue).

Figure 10: Location of the Proposed Drury-Paerata Link

This project is staged to be provided last in the Pukekohe to Drury Link to maximise mode shift from surrounding and wider urban growth first and avoid the early release of latent private vehicle demand.

It links the SH22 connection / South Drury Arterial intersection at its north end (A) to the Paerata Arterial to the south (B, see below) connecting the two future urban communities at Drury and Paerata. The cross-section of this connection matches those of the foregoing arterials towards SH1, with two lanes and a posted speed limit of 80km/h in recognition of the rural environment. Bi-directional active mode facilities on this link are on the north / west side of the corridor only, facing Paerata and avoiding unnecessary crossings of the arterial for pedestrians and cyclists.

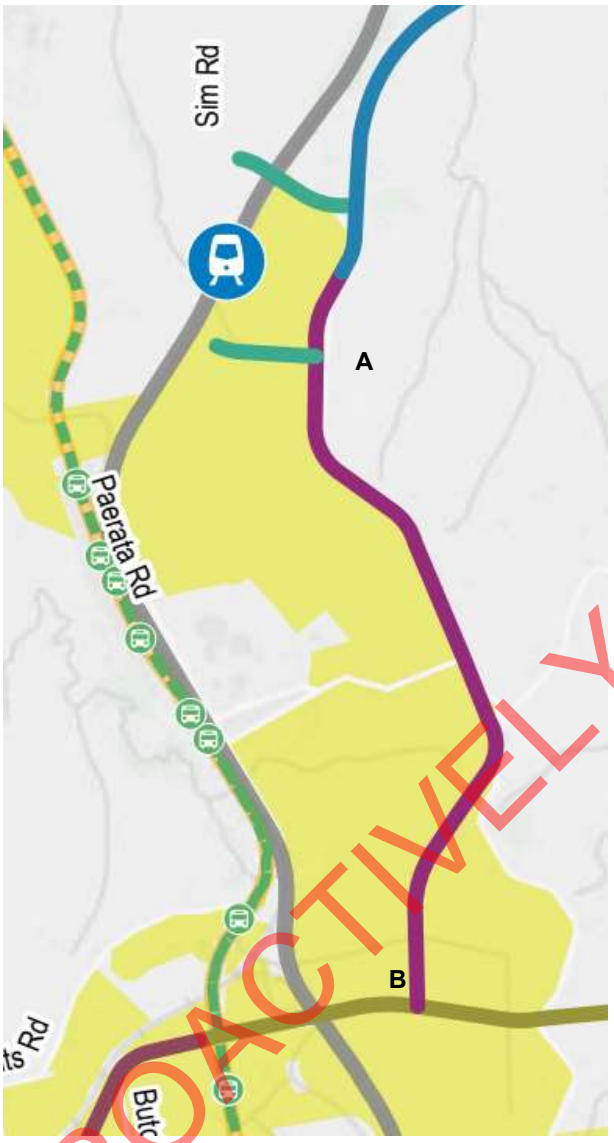
The functional intent of this project is the same as the rest of the Pukekohe to Drury Link, that being to accommodate the growth in travel demand between Pukekohe, Paerata, Drury and beyond, avoiding excess travel demands on SH22 and allowing the Drury locality to urbanise and cater for multiple modes safely and to a greater extent than is present today.

As noted above the consequence of not providing for these trip patters are congestion and poor safety outcomes on SH22 and the parallel rural road network (Burtt Road, Runciman Road), as well as an impediment to future urban zones realising their full development potential as the transport system struggles to accommodate growth and meet expected levels of service commensurate with an attractive, liveable urban environment.

5.1.5 Paerata Arterial

The approximate location and extent of the Paerata Arterial is shown in **Figure 11** below (purple).

Figure 11: Location of the Proposed Paerata Arterial



The functional intent of the Paerata Arterial is to complete the connection between Pukekohe (at the north-east arterial, B) and SH1 (Drury). At Paerata it also provides a connection to SH22 via the Paerata Station Connection (A, see also below) and to the proposed new Paerata train station, due to be completed in 2025.

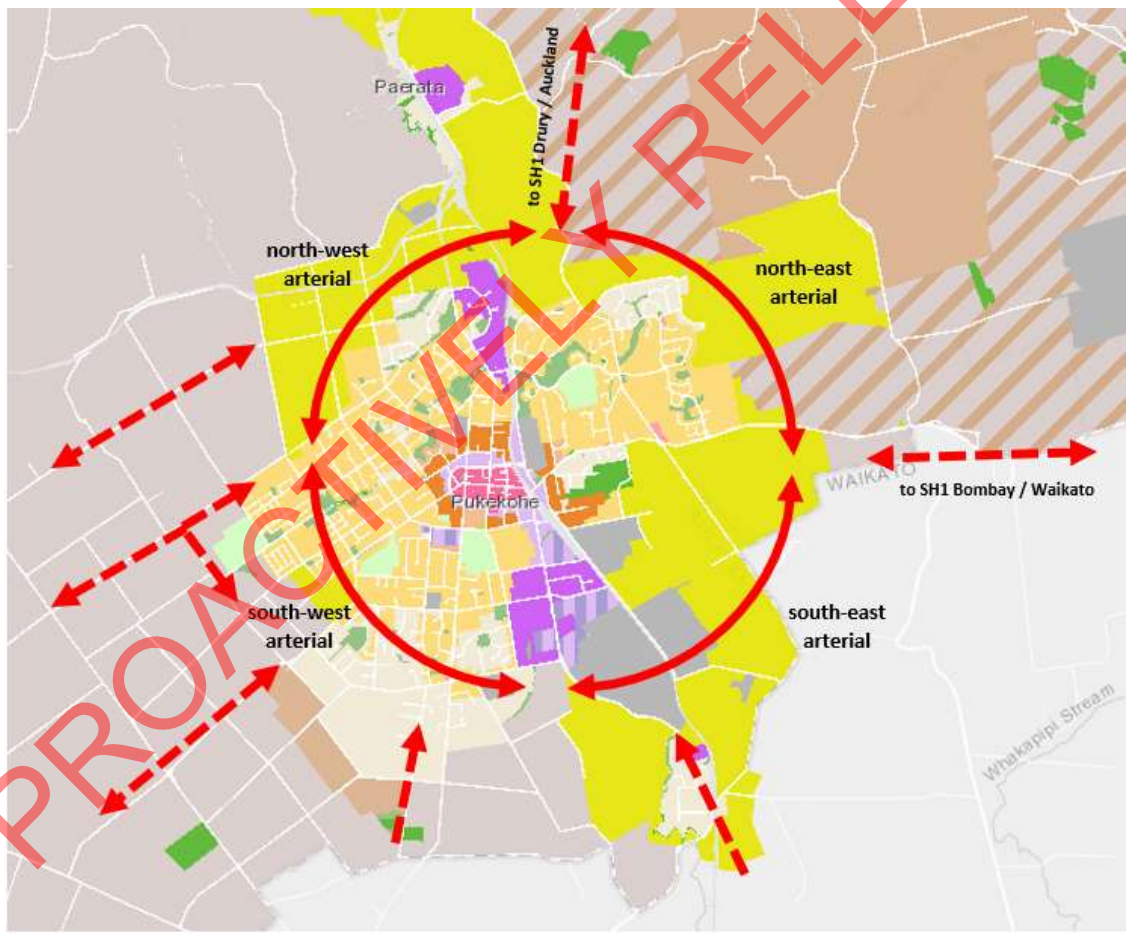
This arterial connection is a two-lane median divided road with active mode facilities on both sides in recognition of future urban development that will occur on both the west and east sides of the corridor. The posted speed limit will likely be 60km/h.

5.2 Pukekohe Arterials

Formerly known as the “ring route” the Pukekohe arterials together form a route around the periphery of Pukekohe and address the issues first identified in the IBC around the need to reduce severance and enhance east-west and north-south movement across Pukekohe as the town grows. This is needed to enhance access to new growth areas as well as to separate local and town centre traffic from regional and through traffic.

The development of these arterials will link Pukekohe’s future urban zones together with multi-modal corridors, draw through traffic away from the town centre and local residential streets as well as provide regional traffic, including freight a reliable and efficient way to access the strategic transport network. Figure 5-7 below outlines in a schematic sense how the development of orbital arterial corridors will connect Future Urban Zones planned around Pukekohe as well as enable through traffic and local traffic to access the strategic transport network, including SH22, Pukekohe East Road and Mill Road to SH1 at both Drury and Bombay.

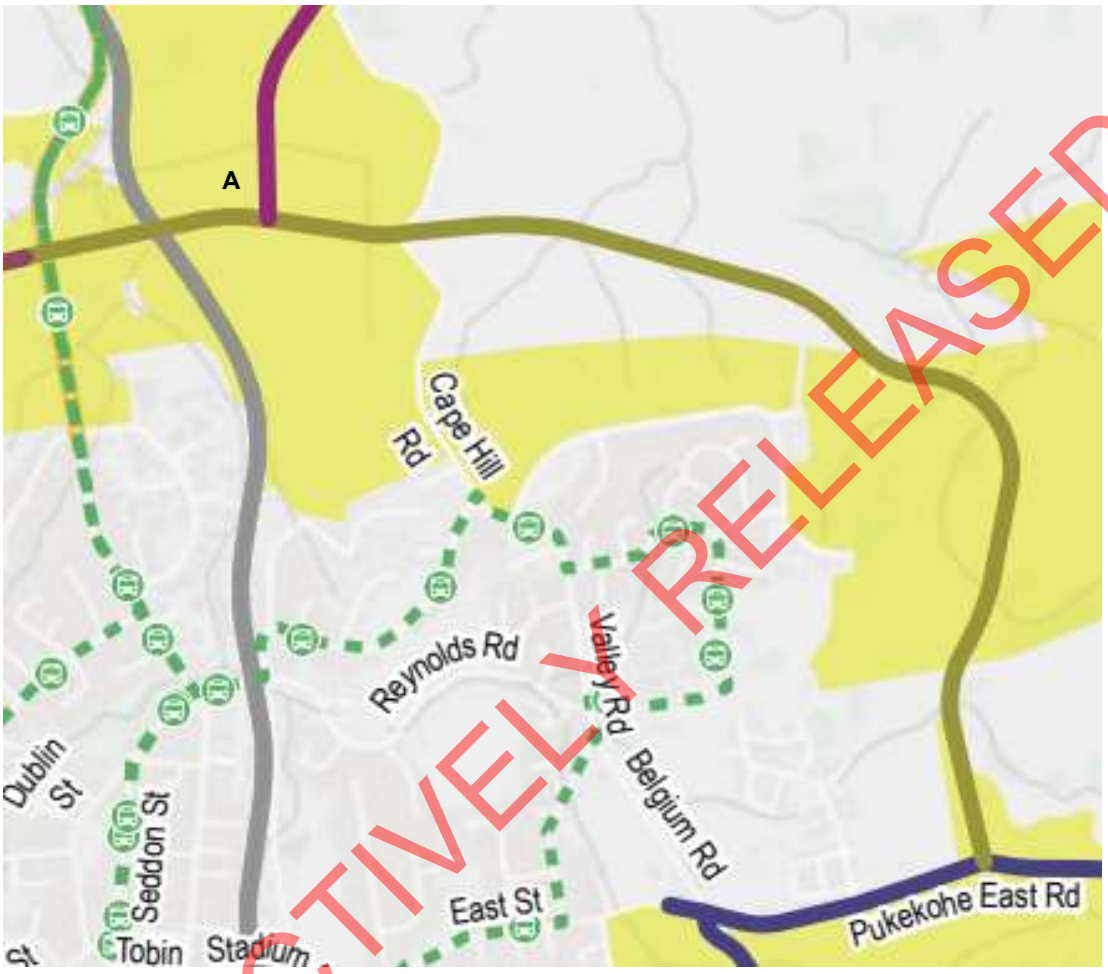
Figure 12: Pukekohe Arterials functional intent



5.2.1 Pukekohe North-east Arterial

The location and extent of the North-east Arterial is shown in Figure 13 below (brown).

Figure 13: Location of the proposed Pukekohe North-east Arterial



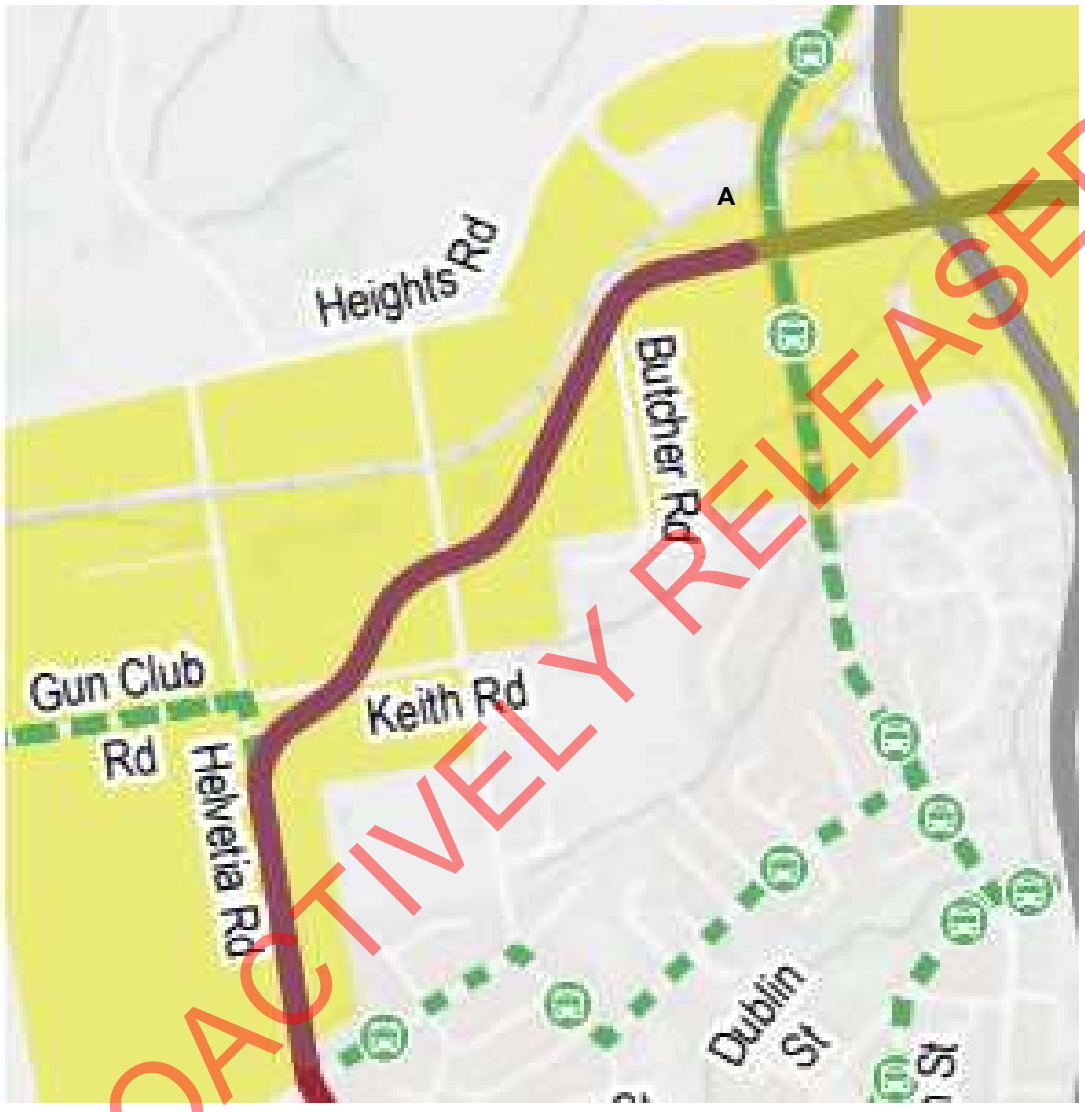
The functional intent of the north-east arterial is to increase accessibility between future urban areas east and west of SH22, including to and from the Pukekohe to Drury Link (A).

The north-east arterial is approximately 4km in length and links the north-west future urban zone from SH22 over the NIMT (via a proposed bridge) into the northern future urban zone and then via primarily rural zone around and adjacent to the north-eastern FUZ, through the eastern FUZ and connecting to Pukekohe East Road. The link will be an (entirely new) two-lane arterial, 24m wide with a 60km/h posted speed limit and active mode facilities on both sides, reflecting the primarily urban environment through which it will pass.

5.2.2 Pukekohe North-west Arterial

The location and extent of the Pukekohe North-West Arterial is shown in **Figure** 14 below (purple).

Figure 14: Location of the Proposed Pukekohe North-West Arterial



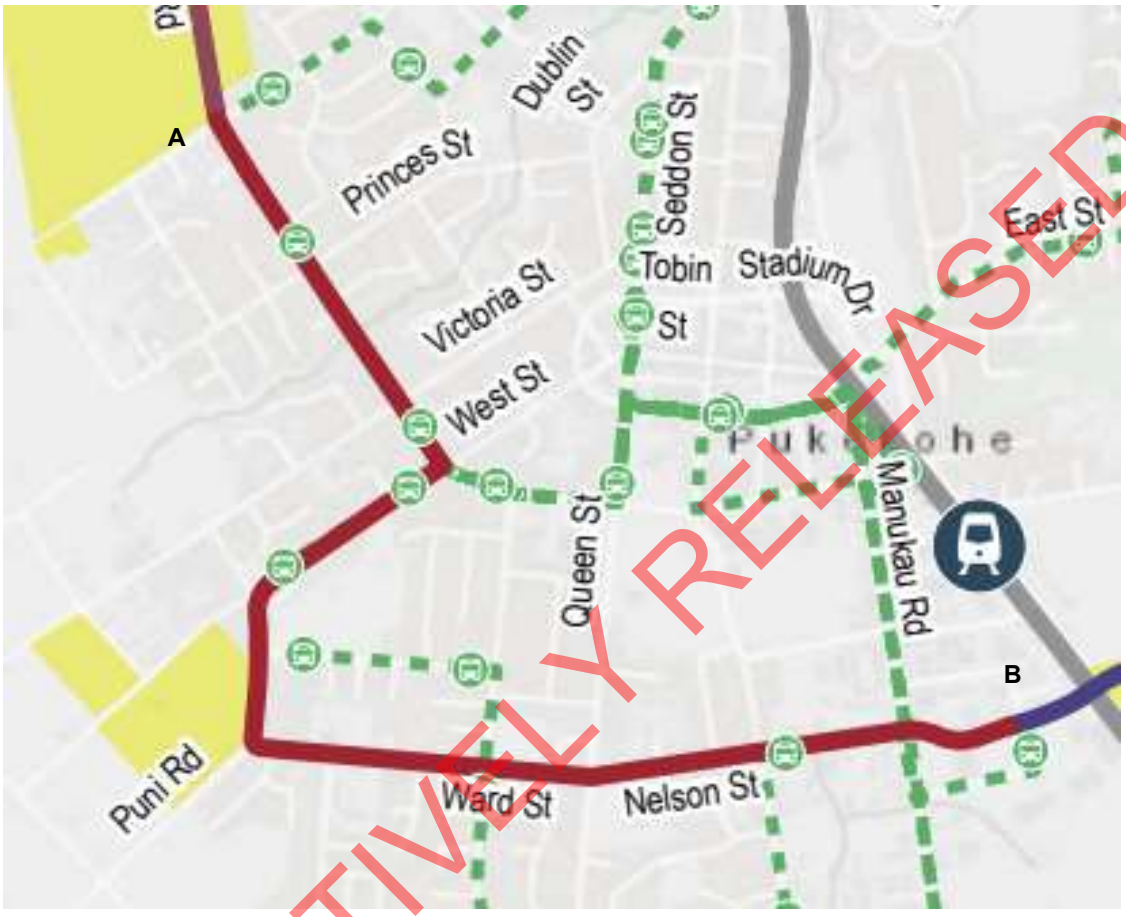
The functional intent of the north-west arterial, in keeping with all the Pukekohe local arterials, is to separate inter-regional strategic through traffic from local traffic by providing a relatively direct, reliable continuous corridor with minimal delay around the north-west quadrant of Pukekohe, so that local streets remain largely unaffected by the growth in travel demand around Pukekohe over time. This corridor will be the preferred route for freight traffic.

The corridor is approximately 1.48km long and will be a mix of an upgrade to Helvetia and Butcher Road and new corridor providing the connection to the north-east arterial at SH22 (at A). This corridor is 24m wide comprising a two-lane median divided road with separated cycle facilities on both sides.

5.2.3 Pukekohe South-west Arterial Upgrade

The location and extent of the South-West Arterial is shown in **Figure** 15 below (red).

Figure 15: Location of the Proposed Pukekohe South-west Arterial



The upgrade of the south-west arterial involves re-allocation of road space within the existing corridor and does not require route protection except at intersections to safely accommodate active mode facilities. The limits of the corridor are from the tie in with the north-west arterial at the Helvetia Road / Birdwood Road (A) intersection to the south-east arterial tie in at Manukau Road (B).

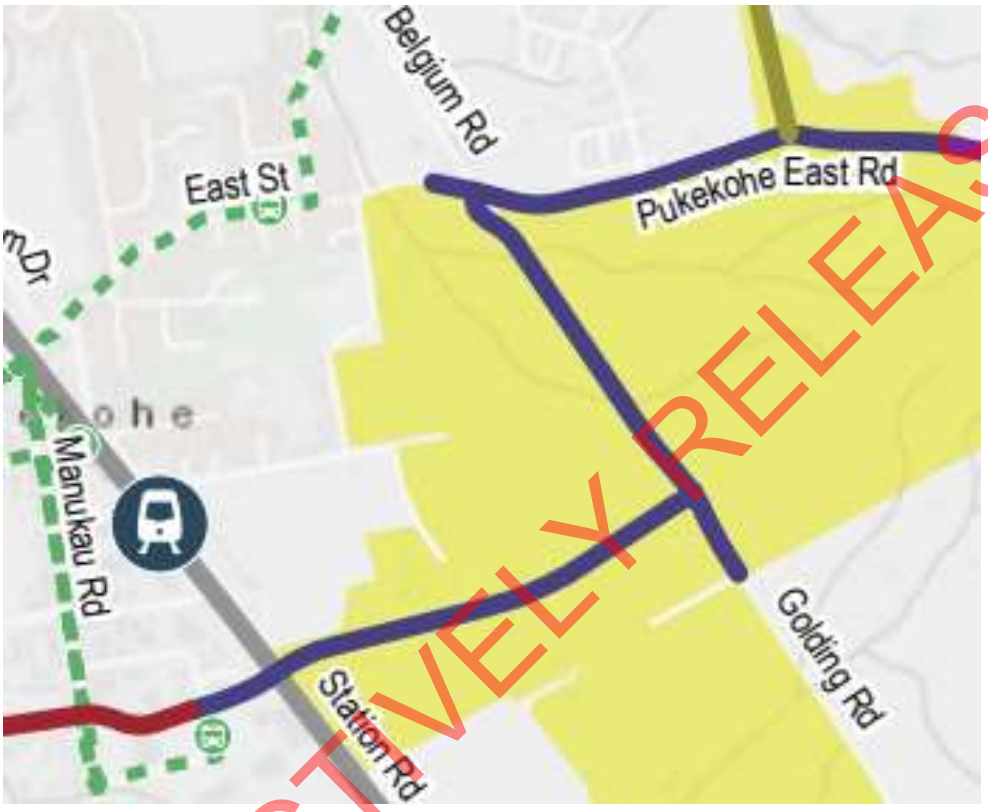
The corridor will be 20m wide and differs in cross section to the other three Pukekohe arterials because it is within a highly constrained existing urban area. The forecast demands on this section do not drive a need for a greater form and function than can already be accommodated within the existing corridor. Impacts on existing land uses would also be significant and at a property cost out of proportion to the marginal benefits that would be gained through full route protection. There is no adjacent Future Urban Zone that would generate travel demands driving the need for greater investment in this area and no opportunity for co-delivery or funding with developers .

5.2.4 Pukekohe South-east Arterial

The approximate location and extent of the South-east Arterial is shown in **Figure** 16 below (blue).

It links to the south-west arterial tie in at Manukau Road, upgrades Svendsen Road, introduces a new corridor over the NIMT and crosses Station Road and continues east through Future Urban Zone, connecting to an upgraded Golding Road that runs north to Pukekohe East Road.

Figure 16: Location of the Proposed Pukekohe South-east Arterial



The south-east arterial will play an important role in connecting current and future light industry zones around south Pukekohe, as well as freight through traffic, to SH1 at Bombay. The western extent of the project is the connection to the south-west arterial upgrade at Svendsen Road, crossing the NIMT and Station Road by bridge and then through the Future Urban Zone to a connection on Golding Road north of Royal Doulton Drive. Golding Road will be upgraded to an arterial standard, providing the link to Pukekohe East Road and Mill Road and thence to the SH1 Bombay interchange.

The south-east arterial will be a 24m wide corridor with two lanes, median divided and separated active mode facilities on both sides. There will be a 50km/h posted speed limit. As noted, this plays a key role for freight traffic crossing south-east Pukekohe to access Pukekohe East Road and Mill Road to SH1 at Bombay. The improved connectivity and reduced severance as a result of the new NIMT crossing at Svendsen Road supplements the existing height constraint and poor geometry at the Subway Road rail underpass, enabling freight trips and general traffic to avoid town centre roads including Manukau Road and East Street, which is largely residential and has existing engine breaking restrictions.

5.3 Pukekohe East Road / Mill Road Upgrade

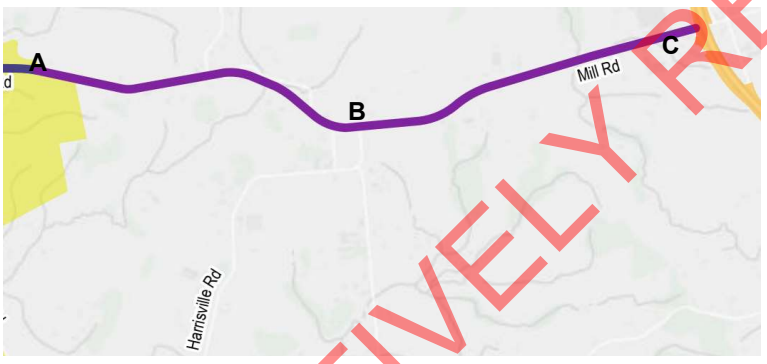
The main intent of this project is to enhance safety and access to SH1 Bombay for strategic traffic, including freight, whilst also improving travel choice with active mode facilities where currently there are none. These facilities will provide a link between the SH1 Papakura to Bombay cycleway as well as enhance cycling access to Bombay, which is a reasonable 8km cycling distance to employment and other opportunities in Pukekohe. East of Harrisville Road there is an additional focus on safely accommodating a significant forecast increase in traffic demand, with Harrisville Road playing a significant role in distributing traffic from further south into Waikato.

5.3.1 Pukekohe East Road Upgrade

The approximate location and extent of the Pukekohe East Road upgrade (A-B) is shown in **Figure 17** below (purple). The Mill Road Upgrade runs from B to C.

At its western extent the Pukekohe East Road Upgrade ties-in with the south-east arterial at the Golding Road Roundabout and at the eastern end a tie-in with the Mill Road Upgrade (B, see below) at Harrisville Road.

Figure 17: Location of the Proposed Pukekohe East Road Upgrade



The functional intent of the Pukekohe East Road Upgrade is to safely accommodate future volumes of traffic that are anticipated as a result of urban growth in the south of Pukekohe and its hinterland, as well as from the north-east residential growth area which will connect with Pukekohe East Road at the southernmost extent of the north-east arterial (B). The extents of the upgrade are from Golding Road in the west to Harrisville Road in the east, where the Mill Road (Bombay) Upgrade commences.

This upgrade will deliver a safer corridor within the existing reserve, or if needed be widened as part of the urbanisation of the south side east of Golding Road. The cross section will accommodate a central median and active mode facilities with a 50km/h posted speed limit in the future urban area and transitioning to a 100km/hr in the rural zone. Existing passing opportunities will be retained in respect of the freight volumes current and forecast.

5.3.2 Mill Road Upgrade

The Mill Road Upgrade will deliver a 30m wide four lane higher speed (100km/h) transport corridor with active mode facilities on the south side between SH1 at Bombay and Harrisville Road. This will be needed to accommodate the growth in strategic freight and general traffic moving between SH1 and Pukekohe and via Harrisville Road to Waikato. The active mode facilities at Bombay will ultimately connect with the P2B cycleway on the west side of SH1, when this is delivered.

6 Guiding Principles

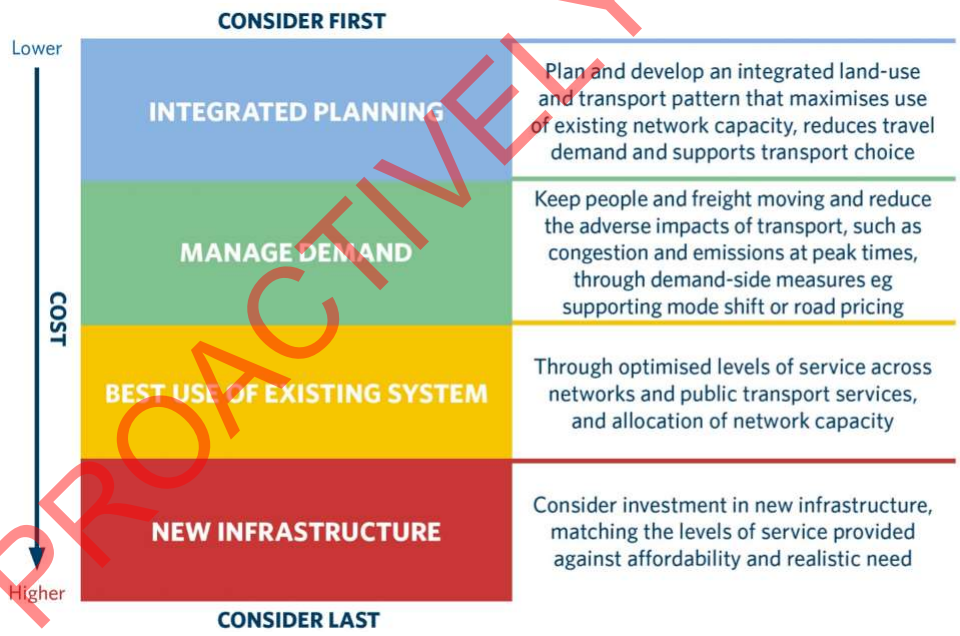
The Pukekohe DBC has been shaped by a number of key principles and these have been applied throughout the identification and development of corridors to confirm the future recommended transport network.

6.1 Intervention hierarchy

The intervention hierarchy is an approach recommended by Waka Kotahi for how Approved Organisations develop alternatives and options to address transport problems. At its simplest it is a recognition of the long lead times and high costs associated with the provision of new transport infrastructure, as well as the need to take a more holistic approach to transport planning that does more to achieve balanced mode choices and the associated transport outcomes.

The hierarchy encourages a step-by-step consideration of alternative ways to solve a transport problem, starting with integrated (land use and transport) planning that reduces the need to travel and results in urban forms that support attractive walking, cycling and public transport options, followed by demand management which includes measures to moderate demand for single occupant vehicle travel spatially and by time of day in favour of higher occupancy vehicle trips, alternative modes or working from home. Means to achieve this can include measures such as road pricing and travel planning.

Figure 18: Waka Kotahi Intervention Hierarchy



A final step before the consideration of new infrastructure is consideration of how to make best use of the existing transport system. This includes optimisation of levels of service spatially and by time of day and day of week, as well as road space re-allocation, for example the inclusion of a lane within the existing road reserve, to increase the people carrying capacity of the existing asset.

The intervention hierarchy has been applied throughout all the stages of development of the projects in this DBC, including in the PBC, IBC and DBC phases. At the PBC phase programme level

interventions were generated for the long list by starting with demand side and productivity options before looking at supply side interventions on the local, regional and state highway networks. This approach followed through into the development of South long list options as shown in **Figure 19** below.

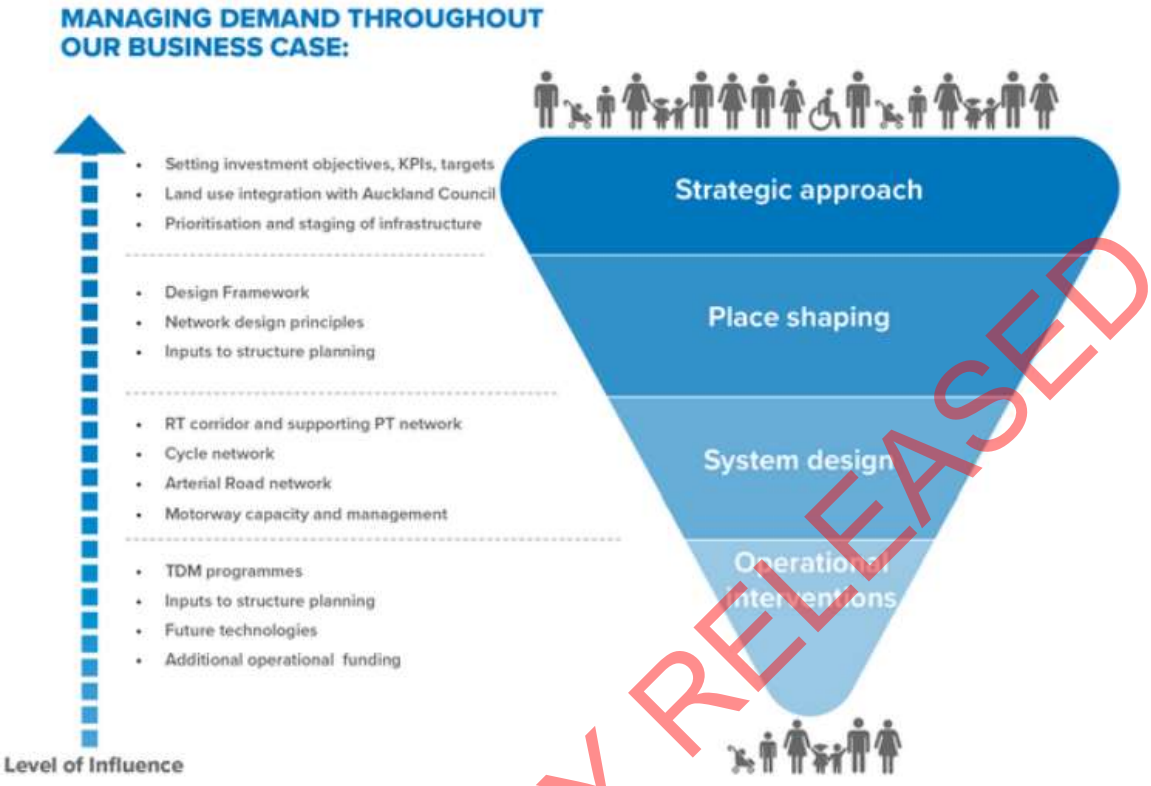
At the IBC phase this took on a higher level of significance with an explicit focus on the principle of Sustainable Urban Mobility. Prominent in this was a clear statement that unconstrained demand was not to be provided for and instead opportunities were to be sought to influence and reduce demand prior to considering infrastructure provision. A strategic approach to managing demand was adopted, recognising decisions made at this early phase in the development of interventions offers the greatest opportunity to influence long term outcomes rather than at subsequent phases of design or operational interventions where the ability to influence demand is highly constrained..

Figure 19: Influence of Intervention Hierarchy on PBC South Area Long List

Table 21: Summary of South Long-List Options and Benefits

	Options Considered	Benefits	Number of Options Considered	Discarded Options at Longlist	Number of Options Progressed
Land-use and Development (Demand)	• Reinforce existing town and employment centres • Alternative land use scenarios related to rail station location • Create additional local employment at existing and new centres	• Reduces "out" commuting and increases reverse commuting with traffic travelling against the peak traffic flow direction • Less need for long distance commuting • Provides a full range of services to local residents and businesses	1 - Takanini east option As an input to rail station options 3 - reinforcement and growth of existing centres	Takanini east option	2 - reinforcement and growth of existing centres
Operation and Management (Productivity)	• Congestion charging or tolling • Managed lanes through ITS • Managed lanes through infrastructure	• Manages use and operation of existing infrastructure to maximise capacity • Protects investment for longer periods and manages the risk of latent demand from new infrastructure	Optimisation integrated in all options 3 - managed lanes and TDM	None	Optimisation integrated in all options 3 - managed lanes and TDM
Walking/ Cycling (Supply)	• Build new cycleways alongside existing expressways and railways • Link existing cycleways	• Enhances walking and cycling connectivity with train stations, increasing train patronage • Provides a safer network for cyclists • Provides modal choice to employment areas and amenities • Improvements to the walking and cycling environment will support other measures to address congestion in key urban areas	6 - cycle network and connections along existing and new corridors	None	6 - cycle network and connections along existing and new corridors
Rail (Supply)	• New train stations to serve urban growth areas • Park and ride at rail stations • An additional new rail line to the existing rail corridor • Rail from Pukekohe to Manukau • Electrification of trains to Pukekohe	• Increases passenger rail line capacity by separating freight movements from commuter and allowing express services • Park and rides will provide access to wider catchments and help establish ridership prior to full urbanisation • Higher frequency trains and extension of electrification to Pukekohe and beyond will allow better access to employment and education • Adding train stations increases rail coverage	6 - rail capacity and electrification 8 - station locations - Drury to Pukekohe 3 - station locations in Takanini	• A direct rail link to Manukau Station • Closing Takanini and opening a train station at Tironui • Having no stations serving each growth area	5 - rail capacity and electrification 2 -station locations - Drury to Pukekohe 2 - station locations in Takanini
Bus (Supply)	• Bus RTN connecting north to south along multiple corridors • Bus RTN from the airport and along SH1 • Alternative bus station locations in Manukau to provide an interchange with rail services • Bus FTN connecting north to south and rail stations	• Supplements the rail network and can be implemented prior to rail capacity improvements • Extends public transport network to link into rail stations and provide access to employment centres • Allows buses to bypass congestion along high frequency corridors	8 - RTN options 2 - FTN options	East and West Alignment RTN Manukau to Airport RTN (split into two options)	4 - RTN options 2 - FTN options
Inter-regional connections (Supply)	• Better connections to the Waikato through rail and bus • Improvements to national, regional and local connections • Safety improvements	• Improves connections to the Waikato • Potential to improve connectivity for employment, education and access to services • Improves movement for freight and services between regions	2 - public transport improvements 2- road connections and safety improvements	Public transport options were not progressed but will form part of a future PBC in partnership with Waikato District and Waikato Regional Councils	2- road connections and safety improvements
State Highway Network (Supply)	• Add new interchanges to connect to SH1 • Widen SH1 • Upgrade SH22 • A parallel route to replace SH22 movement function • A new connection between SH1 and Auckland Airport via Weymouth bridge	• Improves connectivity to SH1 • Provides additional capacity to match improvements to the north and removes a local bottleneck • Addresses existing safety issues on SH22 • The prioritisation of freight traffic will help improve inter-regional connectivity and enhance economic growth • Use of managed lanes reduce the risks of latent demand affecting the performance of the network	7 - SH22 improvements and SH22 alternatives 5 - SH1 alternative location for interchanges 3 - strategic connections to or beyond growth areas 1 - additional SH1 capacity	Relocated Ramarama interchange A new connection between SH1 and Auckland Airport via Weymouth bridge (preliminary analysis and outputs included in Short-List Report (Appendix H))	7 - SH22 improvements and SH22 alternatives 4 - SH1 alternative location for interchanges 3 - strategic connections to or beyond growth areas 1 - additional SH1 capacity
Local and Regional Road Network (Supply)	• Grade-separated rail crossings • New north-south corridors to the east and west of SH1 • New local connections to SH1 interchange from Pukekohe • Local supporting network improvements providing access and capacity	• Promotes access for freight and commercial trips to SH1 • Reduces congestion and improves journey time reliability • Increases the proportion of jobs accessible by private car travel, by reducing congestion • Reduces safety conflicts with rail and along strategic corridors • Allows local movements to bypass congestion hotspots around Takanini interchange	7 - rail grade separation 8 - new local connections 4 - new corridors	Southern Ring Road Rail grade separation - except none or all roads Hill Road capacity improvements Eastern bypass Mill Road middle alignments / community spine Mill Road East of RUB Pukekohe expressway on edge Pukekohe expressway with bus priority Widen Mill Road, Pukekohe Do nothing at Pukekohe Eastern arterial	2 - rail grade separation 4 - new local connections 4 - new corridors

Figure 20: Strategic Approach to Sustainable Urban Mobility at the IBC Phase



At this DBC phase the strategic approach to demand management has continued through the ongoing development of the interventions identified at the IBC phase, with careful consideration of how proposed strategic network interventions might release latent demand for car travel, increasing vkt and associated carbon emissions. This is discussed later in the report as well as in Appendix L Climate Change Response, where the approach to responding to climate change is set out, in line with the Te Tupu Ngātahi technical guidance.

6.2 Te Tupu Ngātahi Urban Design Framework

The Urban Design Framework defines a systems-based approach to evaluating the environmental and cultural context of the Pukekohe DBC Supporting Growth projects. Twenty design principles are evaluated under the headings Environment, Social, Built form, Movement and Land Use.

Evaluations prepared under the UDF provide urban design focused commentary on the current design that has informed each of the proposed designations and recommends where any urban design opportunities should be considered in future design stages. An urban design designation condition requiring the preparation of an Urban and Landscape Design Management Plan (ULDMP) is proposed to ensure further consideration is given to urban design at the detailed design stage.

The development of the Pukekohe DBC has relied strongly on the principles of the Te Tupu Ngātahi Urban Design Framework (UDF). This document provides measurable guidance for land use and transport integration throughout each phase of the programme delivery. The UDF takes a systems approach to how urban areas are organised and understood and pulls these apart in layers spanning

history, the natural environment and the built form. The DBC has used the design principles for each of these system layers to understand how the transport networks contribute to the urban system as a whole. Each of the principles describe what 'good looks like' and what to aim for in the design of transport networks that contribute positively to new or planned communities, environments, corridors and the social and economic vitality of Auckland. This framework has also provided spatial definition to some of the themes such as sustainability and integration which are discussed further in the following sections.

6.3 Land use integration

Land use and transport integration is a fundamental principal of Te Tupu Ngātahi Supporting Growth. It is a recognition of the benefits of early and parallel consideration of transport goals and prospective land use development, so that outcomes are optimised for both, for all parties involved.

Early planning of this nature also assists the relevant Road Controlling Authority (RCA) to optimise the funding and delivery of infrastructure, including the potential for developer delivered infrastructure as part of or in parallel with land use development. There are many such opportunities in the Pukekohe-Paerata area, with a number of projects passing through Future Urban Zone and Live Zoned areas, where local, collector and strategic networks can be delivered in an integrated manner at a pace consistent with the rate of future development.

6.3.1 Employment to household ratio

Pukekohe-Paerata and its rural hinterland has a historical role as a regional agricultural producing hub and this is likely to remain, yet the forecast growth in households will also see increased urbanisation. The combined result will be a lowering of the employment to household ratio. This means an increasing proportion of the resident population will travel outside of the area to work given there will not be a commensurate increase in employment opportunities in proportion to household growth.

This phenomena has been captured in the transportation modelling undertaken to develop and assess options and is an important principle that in many respects differentiates Pukekohe-Paerata from other growth area in the Te Tupu Ngātahi Supporting Growth Programme. Whilst other areas have established significant RTN, FTN, cycling and walking network proposals to support their increasingly self-sustaining employment and household growth, Pukekohe's forecast growth in households relative to new jobs, combined with travel distances to nearby employment centres, means the need for strategic multi-modal responses is more pronounced, including both road and rail corridor enhancements.

6.4 Sustainable outcomes

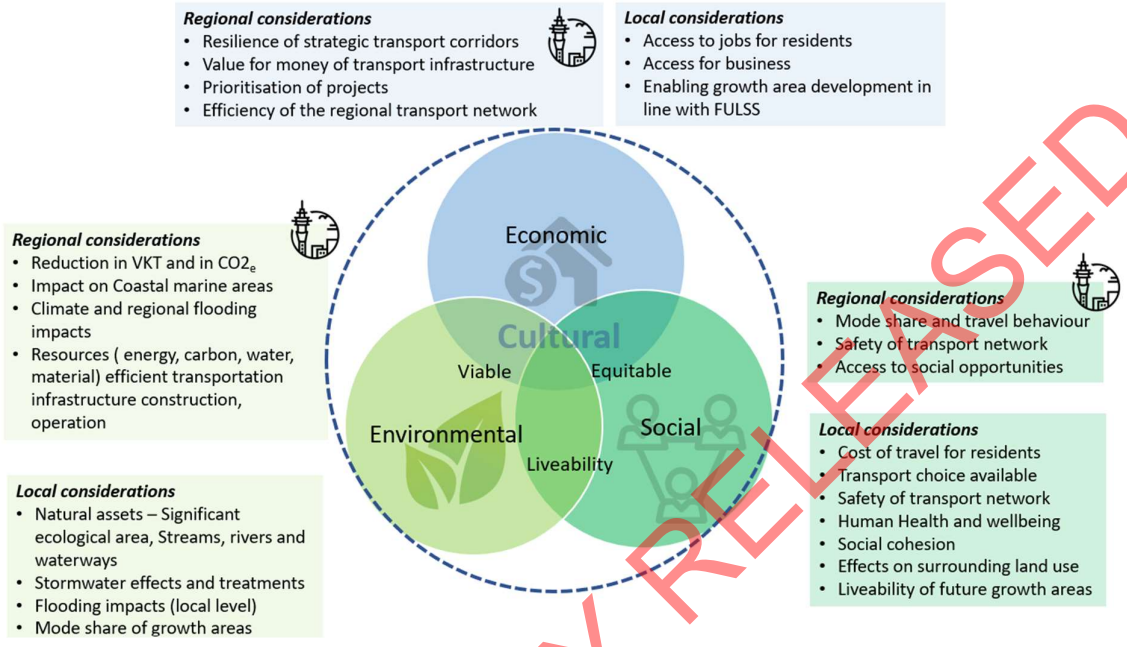
Sustainability is an overarching principle of this DBC and reflects the core principles of the GPS 2021 to ensure the land transport system is both economically and environmentally sustainable.

The Te Tupu Ngātahi Programme has identified four factors that work in partnership to achieve sustainable outcomes as shown in **Figure 20**. These pillars of sustainability include:

Natural Environment: Conserve and enhance the natural environment.
Social: Meet the social and health needs of Aucklanders.

Economic: Foster jobs, growth and economic productivity.
Cultural: Celebrate Auckland's unique cultural identity.

Figure 21: Sustainability Principles



A combination of these factors provides the pathway to achieving thriving, equitable and restorative outcomes. The Te Tupu Ngātahi UDF supports the application and measurement of these concepts.

The outcomes can be achieved at both the local and regional level and the application to the Pukekohe-Paerata transport network is shown in **Table 6**.

Table 6: Sustainability applications for Pukekohe

Sustainability factor	Measures	Applied in the Pukekohe-Paerata DBC
Cultural	Extent and effects on sites and places of cultural heritage value to manawhenua and built heritage.	• Regular manawhenua engagement and feedback, particularly in the development and assessment of options. • Heritage specialist to review option alignments.
 Environmental	Responding to climate change by providing a transport system that supports a reduction in emissions, is responsive to flooding impacts and limits impacts on our key natural assets such as wetlands and ecological habitats.	• Appropriate stormwater treatment including provision for green infrastructure in rural areas (e.g., swales) and suitable treatment and attenuation. Full details of stormwater infrastructure are included in **Appendix H: Design Report**. • Priority focus on completing a core cycling network. • Public transport priority facilities to improve the reliability and quality of services. PT facilities to be planned, designed, constructed and operated to significantly reduce not only operational but also whole of life emissions. • Identification of location and quality of wetlands, streams and ecological areas during constraint mapping to inform option selection. • Flood mapping to inform option selection and assess potential impacts of new corridors on the landscape. • Assessment of reduction of emissions on whole of life basis in the economic analysis for the recommended programme. • Protect and restore the environment across the construction, operation and maintenance of the transport network.
 Social	Transport has key role to improve people's wellbeing and liveability of places.	• DBC focuses on safety improvements, particularly for existing corridors. • DBC priority is improving transport choice and is reflected in modal priority assessments, rapid transit, walking and cycling network. • Liveability addressed primarily through our urban design specialists who input at all stages of the corridor development. • Social cohesion and human health are specific MCA assessment criteria so impacts considered in detail for all corridors.
 Economic	Access to jobs and businesses and enabling growth. At the regional level this includes resilience of the network, value for money and prioritisation	• Pukekohe investment objective and associated KPIs specifically measure improvements in access. • Land use assessment for all corridors includes consideration of trip destinations as well as an understanding of future land uses and impacts of intensification. • Specific analysis to better understand the outcomes of each corridor and to inform prioritisation for implementation. • Through option development the future cross section has been challenged from an efficiency perspective to: • Balance flexibility – e.g., retention of ability to provide for green infrastructure on rural roads or flexibility of mode for the RTC. • Maintain transport outcomes – seeking to balance land requirements with outcomes achieved e.g., does the additional land provide step change in outcomes or can the outcomes be maintained with a reduction in cross section which minimises property impacts. • These decision points have been tested with stakeholders and trade-offs clearly discussed to achieve a balanced network.

Many of the specific considerations are included as part of the investment case suite of KPI's and measures such as access to jobs, measures of resilience and emission modelling. However other aspects have been considered more broadly as part of a project option assessment process such as during multicriteria analysis (MCA), constraint mapping and option development. Cultural aspects have been considered for all three factors and regular dialogue has been undertaken with manawhenua throughout the option development process.

Therefore, the principles of sustainable development have been captured through seeking to achieve a balanced decision-making process which:

Reviews a holistic and broad suite of sustainability aspects during option development.
Identifies the biggest risks and opportunities.
Prioritises those identified aspects for focus.
Strives to enhance those sustainability aspects (not just mitigate).

6.5 Responding to climate change

Climate change considerations are one aspect of the overall sustainable response and links closely with the sustainable outcomes discussed in the previous section. Whilst climate change is not a new consideration for the development of transport infrastructure, recent changes in policy such as the Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan 2020 and Government's Te hau mārohi ki anamata: Emission Reduction Plan 2022 have reconfirmed and formalised the importance of systems change and diverse action to affect significant and timely reductions to emissions. Overall the goal is to contribute to worldwide efforts to limit global temperature increases to 1.5 degrees by reducing gross greenhouse gas emissions (excluding biogenic methane) to 50% of 2005 levels by 2030, and to net zero emissions by 2050.

Reducing transport emissions is an important contributor to meeting New Zealand's emissions targets, with transport responsible for approximately 17% of gross domestic emissions and 39% of total domestic CO_2 emissions. It is recognised that transport plays a key role and the Emissions Reduction Plan establishes three focus areas that guide the approach to reducing transport emissions, with a need to reduce reliance on cars and support people to walk, cycle and use public transport, rapidly adopt low emission vehicles and decarbonise heavy transport and freight. To support these focus areas the Emissions Reduction Plan has set four targets:

Target 1 – Reduce total kilometres travelled by the light fleet by 20% by 2035 through improved urban form and providing better travel options

Target 2 – Increase zero-emissions vehicles to 30 per cent of the light fleet by 2035

Target 3 – Reduce emissions from freight transport by 35 per cent by 2035

Target 4 – Reduce the emissions intensity of transport fuel by 10 per cent by 2035

These approaches and targets align well with GPS 2021 and by extension to the development of this Pukekohe DBC which itself aligns with the goals of the GPS 2021. The Pukekohe DBC is responding to the focus areas and targets through:

Transport and land use integration – a guiding principle as described in Section 6.3 and providing a transport network to support land use development and good urban form that promotes shorter distance trip making and trips by active and shared modes.

Prioritising mode choice – specifically focusing on delivering better travel options for walking, cycling and public transport for local trips and for improving access by these modes to rapid transit (rail) for longer distance travel.

Enhancing strategic freight connections – a focus on enhancing freight connectivity and efficiency to State Highway 1, balancing the need to reduce emissions from freight and avoid impacts on current and future urban development with the significant contribution the Pukekohe rural hinterland makes to the regional economy.

The result is a recommended transport system which has the capability to actively reduce the future growth area's reliance on private vehicles by providing accessible active mode routes and public transport options that connect people to where they need to go, both locally and regionally. It will also enhance strategic freight connections to State Highway 1, helping to support the economic contribution Pukekohe-Paerata and its hinterland makes to the regional economy.

It is noted that the climate change response of this DBC is part of a wider Aotearoa transport response which includes complementary initiatives such as increasing the adoption of electric vehicles and use of low carbon fuels. A change to an electric or low emissions fleet will not however address congestion or loss of amenity, and integrated land use planning will play an ongoing role, particularly as areas across Pukekohe-Paerata progress from structure plan to plan change to live zoned in the future. The importance of the supporting local roading network also cannot be overlooked. The Te Tupu Ngātahi Pukekohe-Paerata network will provide the key connections and initial driver for mode shift but to maximise mode shift outcomes the local roads have a parallel role to further connect local cycling, support walk up catchments to public transport and provide efficient local bus networks.

The climate change strategies can be split into two types:

Mitigation - aimed at addressing the causes and minimising the possible impacts of climate change.

Adaptation – focused on reducing the negative effects and identifying opportunities that arise from climate change.

As a route protection business case, the Pukekohe DBC is primarily focused on mitigation strategies. Decisions for the corridors have been focused on providing lower-emission travel options, including active transport that will contribute to emission reduction by replacing passenger trips by private vehicle. It is expected that adaptation measures will be considered in more detail as the projects progress through future design and implementation processes.

The Pukekohe DBC addresses enabled carbon emissions (greenhouse gas emissions associated with infrastructure end use e.g., vehicles) through its influence on how the infrastructure is used. Examples of climate mitigation strategies in Pukekohe include:

Assessment of modal priorities for each project to understand the corridors road function. This has then informed the allocation of road space to best support sustainable mobility modes such as bus, walking and cycling. By way of example, 100% of corridors provide new or improved active facilities.

Using route protection to provide a suitable footprint to allow future flexibility in design to best accommodate climate mitigation.

Restriction of the provision of additional vehicle capacity. Generally, additional capacity is reserved for projects that serve an integration role between local and strategic transport functions e.g for local roads supporting motorway interchanges. In the case of the northern corridor group of projects,

this infrastructure is focused on providing new vehicle capacity but targets specific trip types to serve a broader role in avoiding the adverse impacts of strategic traffic moving through future urban areas. Similarly, the recommended provision of new links in the north-west, south-east and north-east of Pukekohe avoids the adverse impacts of strategic traffic traversing local transport networks, delivering benefits including enhanced freight efficiency, improved local amenity and the ability to deliver high quality active mode infrastructure to support mode shift.

Development of a connected cycle network that provides both regional and local cycle links and maximises the ability of people to access public transport or key destinations.

6.5.1 Managing the demand for transport

As previously mentioned, a guiding principle of this DBC is sustainable urban mobility, which seeks to develop an urban transport system that fosters a balanced development of all relevant transport modes and encourages a shift to more sustainable modes. The other aspect within this climate change response is to improve the performance of the land transport system by changing transport demand and travel behaviour. Demand management activities influence how, when and where people and freight travel and has the following objectives:

Shaping transport demand to better balance with supply.
Shaping travel behaviour to ease pressure on the transport network and environment.
Delivering economic benefits to businesses, communities or Aotearoa as a whole.

Therefore, the Pukekohe DBC continues to build on demand management principles adopted in the IBC and does not provide for unconstrained demand but rather seeks opportunities to influence and reduce demand alongside the recommended infrastructure. A four-step approach to Travel Demand Management (TDM) and influencing travel behaviour has been used. This includes consideration of an integrated set of policy-based, soft measures to achieve the desired goal.

Specific applications of the TDM approach within this DBC are detailed in **Table 7**. Commensurate with the purpose of this DBC, a significant focus of the TDM tasks has been in maximising outcomes within the system design part of the hierarchy. However, there have still been significant strategic and place shaping opportunities that have been realised throughout the overall development of the recommended programme and these have typically been associated with the larger strategic pieces of transport infrastructure such as the New Southern Interchange or new greenfield routes.

Table 7: Demand management applications

Demand management influence	Pukekohe DBC Response

Strategic approach Decisions have a broader effect and have the potential to significantly alter transport demand at a regional level.	• Confirmed investment objectives and KPIs which are consistent with TDM principles focusing on safety, access, travel choice (particularly reducing single occupancy vehicles), resilience and integration. These investment objectives align with the Government climate change goals to develop a low carbon transport network. They also align with the MoT Transport Outcomes Framework that includes environmental sustainability. • Collaboration with Auckland Council and Waka Kotahi to understand about land use impacts arising from planned upgrades including residual land. • Consideration of staging and interdependencies in the DBC.
Place shaping Developing good urban form to influence travel behaviour e.g provision of good quality, frequent public transport service to key destinations	• The DBC has built on IBC recommended key connections and corridors. • Consideration of how changes in intensification will happen for land use near proposed frequent transit networks and changing needs of corridors. • Impacts on social infrastructure such as a planned school on SH22. • Legible and well-connected active mode network focusing on connecting key destinations.
System design Areas of focus for infrastructure design	• Rigorous application of Corridor Form and Function process to balance place and movement functions on corridor. • Focusing on connected cycle networks and a strategic approach to new capacity for private vehicles.
Operational interventions Operational measures to support targeted mode shifts	• Restricted parking on arterial corridors. • Assessment of complementary operational design measures for the recommended programme e.g. increased public transport, end of trip facilities, travel behaviour change schemes, promotions and monitoring. These types of opportunities have been identified where applicable during this DBC, but more detail is expected to be developed as corridors progress to project implementation business cases, detailed design, funding and implementation. • It is acknowledged that investment in walking, cycling and public transport infrastructure alone will not influence demand. To realise the desired changes in travel behaviour, integrated and ongoing approaches encompassing education and promotion tools and levers will be required.

7 Pukekohe Investment Case

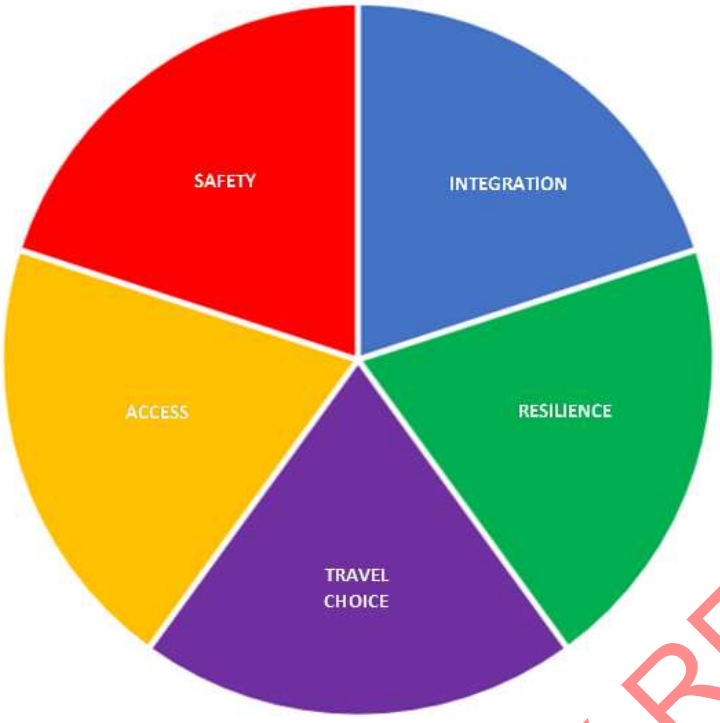
During the IBC phase problem statements, benefits, and investment objectives (PBIOs) were identified for the South growth area. The IBC demonstrated a strong case for investment and was focused around two key problem areas being (i) Capacity - meeting the transport needs of communities in the face of forecast growth, and (ii) Integration and Route Protection – transport system development failing to keep pace with the scale and form of urban development resulting in adverse effects on the urban and natural environment. Investment in these elements were determined to maximise land use and transport integration and align with the Ministry of Transport (MoT) Transport Outcomes Framework and GPS 2018 goals at the time.

Following approval of the IBC by Auckland Transport and Waka Kotahi, the scope determined for the next phase of DBC's for the south area reflected a number of factors, prominent among which was the distinct differences in needs Pukekohe Paerata presents from a transport perspective, as compared to Drury and Takaanini.

Accordingly, at the commencement of this DBC, the IBC investment areas were carefully reconsidered with respect to changes since the IBC and discussions with Auckland Transport and Waka Kotahi around the different challenges Pukekohe presents. As a result, this DBC has decoupled the two original IBC problems into six individual problems. The core elements of these remain the same, however the additional detail provides the opportunity for individual corridor assessments to be more targeted and to provide better clarity on how the individual corridor contributes to the delivery of the overall package outcomes.

Whilst this DBC is primarily assessing how to accommodate future growth and its impacts on the transport system in Pukekohe-Paerata-West Drury area, it is acknowledged that the policy framework has shifted since the IBC to have a greater focus on climate change objectives and emission reduction. In this DBC emissions reduction is recognised as an outcome achieved through interventions that address tangible intermediary outcomes on the network. Accordingly there is no climate change investment objective. For example the provision of infrastructure for alternative modes that promote ***travel choice***, alongside strategic network enhancements that improve ***access and safety*** also subsequently achieve reduced emissions through less vehicle kilometres travelled (VKT) and more efficient longer distance trip making. Likewise, ***integration*** of transport and urban form can also be a driver for mode shift and vkt reduction; whilst equally, the effects of climate change can be mitigated by improving the ***resilience*** of the transport system. For these reasons this DBC does not include emissions as an investment objective per se, but rather is seen as a benefit of solving the tangible transport problems growth across Pukekohe will drive, as set out in the following sections and the evidence base presented here and in Appendix A: Strategic Case. The five key investment themes for Pukekohe were confirmed as shown in **Figure 22** below.

Figure 22: Pukekohe-Paerata Investment Themes



7.1 Problems

The emerging safety, integration, access, resilience and travel choice problems will be significant as a consequence of growth if an accompanying fit for purpose transport network is not provided for. These are supported by the evidence detailed in the IBC and supplemented by the latest information available, as shown in the following section. The changes in policy and growth since the IBC will result in more intensification than previously assumed and will further exacerbate these significant problems, not just on the strategic linkages north and south to Drury and SH1 but also around urban Pukekohe street networks. The increase in Plan Changes and developer activity is further evidence of the pressure on the area to respond to growth.

7.1.1 Safety

The current Pukekohe-Paerata road network is largely rural in nature beyond suburban Pukekohe. State Highway 22 provides the strategic link north to State Highway 1 at Drury, with Pukekohe East Road and Mill Road providing the southern connection to State Highway 1 at Bombay. Both these roads are generally 2-lane high speed rural roads with no median and limited verge width.

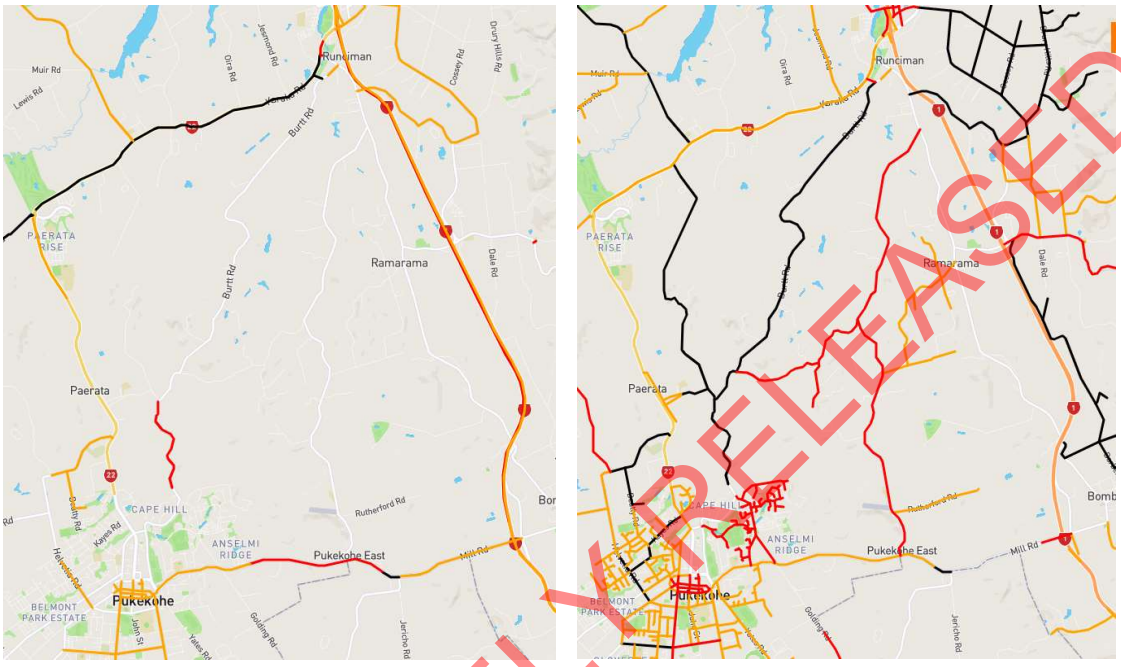
SH22 has a high collective risk and medium personal risk. In the five years to 2021 there were 2 fatal crashes and 11 serious injury crashes. SH22 is now subject to ongoing safety improvements through NZUP and to support housing growth. Pukekohe East Road / Mill Road has medium and medium-high collective risk.

Cape Hill Road has medium high collective risk and high personal risk. Beyond Cape Hill Road, Burt Road and Sim Road have high personal risk with Runciman Road and Tuhimata Road both presenting medium-high personal risk.

Looking at urban Pukekohe, Ward Street / Nelson Street has medium collective, high and medium high personal risk respectively. Helvetia has medium collective, high personal.

Across the Pukekohe-Paerata-West Drury areas CAS analysis reveals 65 death and serious injury crashes in the 5 years to 2022.

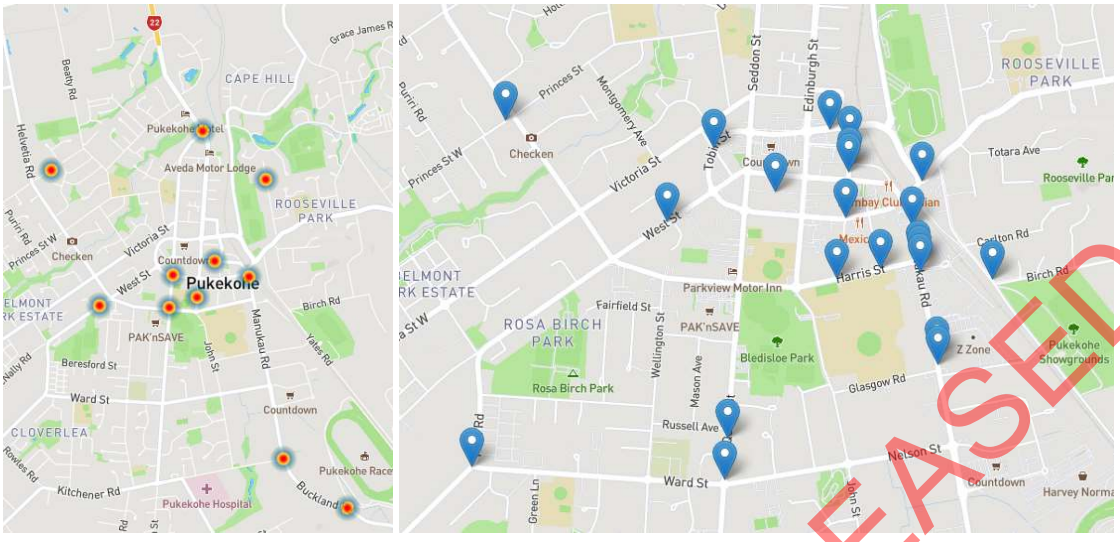
Figure 23: Pukekohe collective and personal risk maps



With the forecast growth to Pukekohe, Paerata and West Drury of some 55,000 people and 21,000 dwellings over the next 25+ years, even with mode shift targets, vehicular movements will substantially increase. This will introduce increasing delays on all routes, but particularly on the SH22 and Pukekohe east Road / Mill Road corridors, driving more people to use parallel local roads to avoid delay. As Figure 7-2 demonstrates, these roads have existing issues and are not intended to serve as strategic transport links. The increased demand on these roads will result in an increase in fatal and serious crashes, even with the introduction of safety improvements to the limited extent possible on these rural roads intended primarily to provide access to rural land, not as a through route, with challenging horizontal and vertical geometry.

In urban Pukekohe traffic will also grow and compound existing collective and personal risk deficiencies across the network. There are limited dedicated facilities for cycling around the urban areas, creating real and perceived safety concerns for existing and prospective cyclists. Pedestrian crossing facilities across key routes also provide limited protection and undermine efforts to increase walking trips for short journeys. **Figure 24** shows cyclist and pedestrian reported injury crashes in the 5 years to 2016.

Figure 24: Pukekohe town centre cycle and pedestrian crashes 2012-2016



7.1.2 Integration

Existing transport corridors across the DBC area are not suitable for the level of urban growth anticipated to 2048 and beyond. If not addressed, traffic impacts will become such that further growth will be constrained and the liveability of developing and existing urban areas will be reduced.

Growth poorly provided for through a lack of integration with the transport system and impacting existing roads and future collectors will severely limit opportunities to encourage public transport, walking and cycling, resulting in private car dominance to continue at existing levels.

A lack of integration will not support the delivery of the desired compact urban form and the resulting inability to match employment land with the transport network will not enable Pukekohe to have more local employment options and limit its ability to operate as a satellite town and as a sub-regional rural economic and employment hub.

Place making within the urban extents will be compromised if the land uses and transport infrastructure are not integrated. This could also result in reduced protection of the scale and character of the rural township which is critical to the identity and ongoing profile of Pukekohe.

An inability of the transport network to respond flexibly to changing densities from land use policies such as the NPS:UD and MDRS resulting in residential intensification that is not supported by low carbon transport network options and reinforces the current private vehicle preferences.

In addition, the opportunity to provide lead infrastructure which supports mode shift, i.e., walking and cycling, is lost due to unconnected development.

7.1.3 Access

The current form and function of corridors, lack of active mode facilities and missing transport connections does not support future growth and will constrain access to economic and social opportunities in Pukekohe Paerata.

Analysis of the do-minimum at 2048+ demonstrates the current transport system in the DBC area will be significantly impacted by traffic growth, increasing peak period delays and increasing inter-peak

journey times and unreliability as peak spreading occurs, impacting freight efficiency which tends to make trips at these times. This is discussed in more detail in Appendix C: Economic Assessment.

Currently in Pukekohe, that is little to no cycle provision, either off road or on road and this is reflected in the low cycling levels evident in the existing urban areas. If future urban zones continue to be catered for in this way, access for cycling in particular will continue to be poor.

7.1.4 Resilience

As transport demand grows, without new transport corridors network resilience will be limited and public transport, private vehicles and freight will experience unreliability as they share corridors with significantly larger volumes of traffic. In the event of network outages or incidents limited redundancy in the network will have significant impacts on the ability of users to access destinations.

Resilience in the transport system also has a broader meaning in the sense that the availability of alternative modes provides residents and businesses with the means to access their economic, social and cultural needs via a variety of modes. The absence of a developed arterial network across the DBC area severely limits the ability of both Auckland Transport and Waka Kotahi to retro-fit facilities for alternative modes to the private vehicle.

The provision of an arterial network built to modern design standards for flooding also enhances the overall resilience of the transport system across the DBC area.

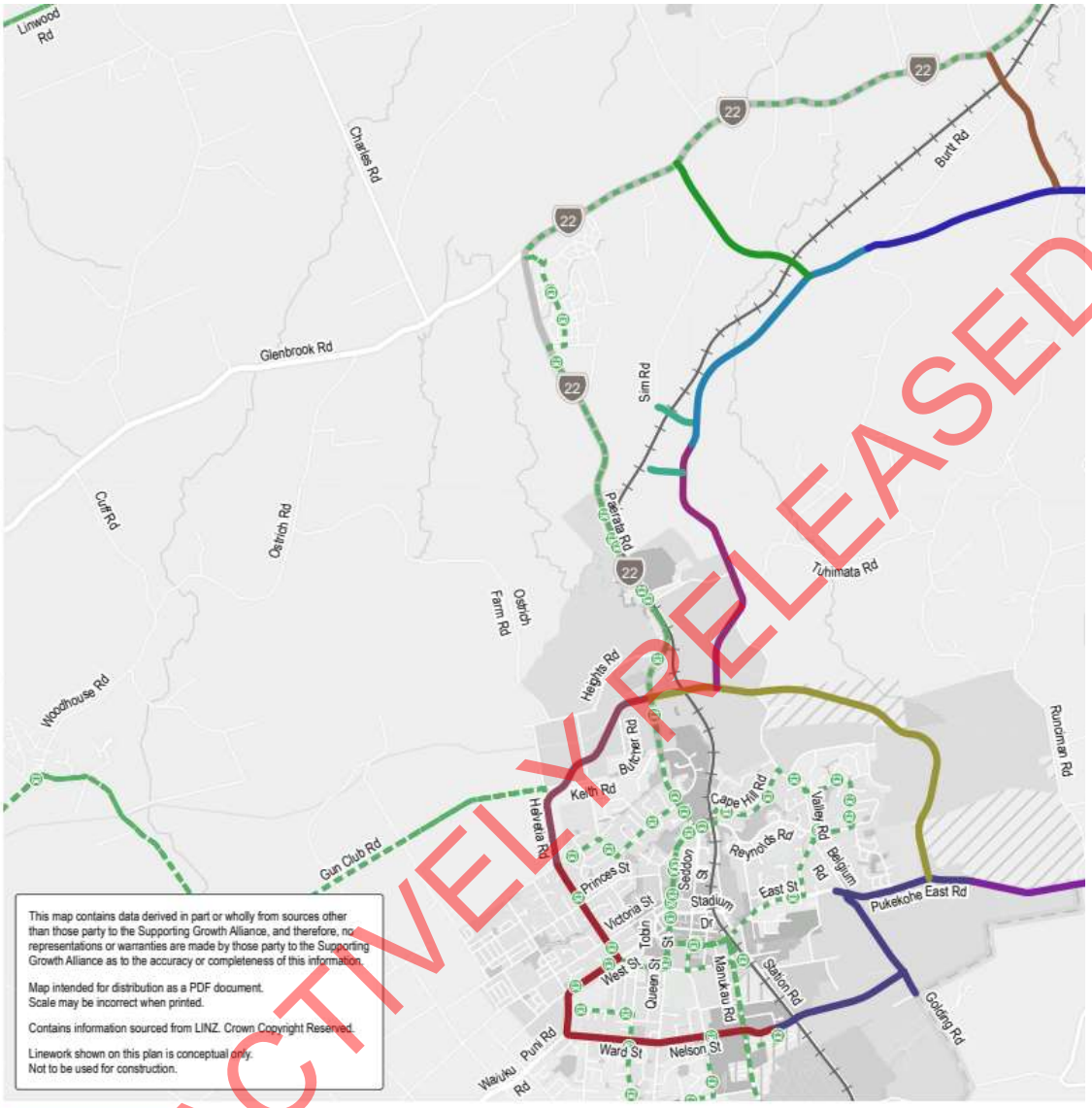
7.1.5 Travel choice

There is currently very limited provision for cycling, in particular, on the networks serving West Drury, Paerata and Pukekohe. This is evident in the current low cycling numbers evident at these locations. The public transport service provision is also relatively low currently. **Figure 25** below shows the current public transport (bus) services across the area.

As significant growth takes place across these areas, a lack of dedicated active mode and public transport facilities will compound the existing low levels of usage and as result of even greater vehicle dominance and increasing levels of real and perceived safety issues, fuel an ongoing cycle of increasing vehicle use.

The Pukekohe DBC as standard, recommends the provision of dedicated, separated walking and cycling facilities on all the projects proposed. Whilst on-road bus priority systems are not a focus of this DBC, the designation widths proposed will generally allow for flexibility to allocate road space to respond to changing needs over time, including the provision of bus priority facilities if needed.

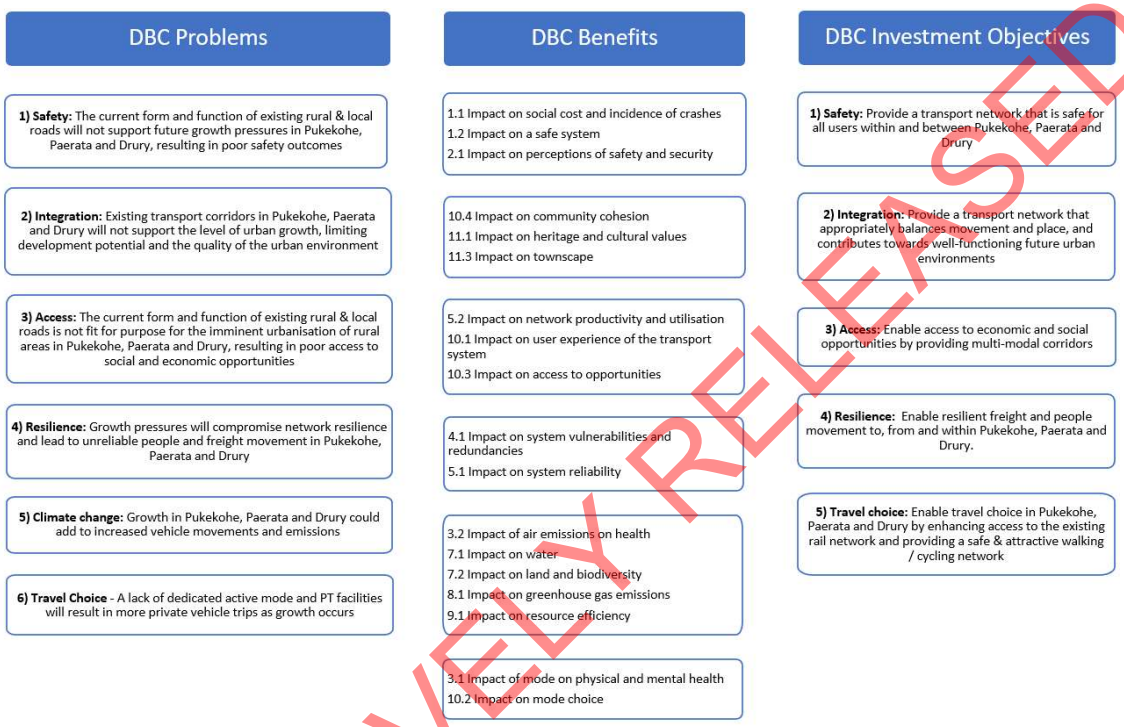
Figure 25: Existing Pukekohe bus services



7.2 Investment logic map

The evolution of problems, benefits and investment objectives from the PBC phase through to this DBC is captured in Appendix A: Strategic Case. **Figure 26** below shows the ILM for this DBC and its projects. The DBC benefits have been aligned with the Waka Kotahi benefits framework benefit clusters and associated KPI's.

Figure 26: Investment Logic Map for Pukekohe DBC



8 Partner and stakeholder engagement

Engagement with partners, stakeholders, landowners, and the wider community is an integral part of the planning process. An overview of this is provided below with more details included in Appendix G Engagement Summary.

8.1 Engagement history

In 2016, a strategic transport network for future growth areas in Tāmaki Makaurau was identified as part of a Programme Business Case (PBC). Te Tupu Ngātahi investigated the South Auckland growth area through an Indicative Business Case (IBC) in 2018. This IBC included Pukekohe, Paerata and south Drury. At that time, we heard from the community that many supported an upgrade of existing roads before building new strategic transport corridors. We also heard that people wanted minimal impacts to agricultural land, the volcanic tuff ring and property. People were supportive of the idea of a 'ring road.' The IBC was endorsed by the Waka Kotahi and Auckland Transport Boards in 2019.

In 2020, public engagement occurred on recommended options to support a business case being prepared at Te Tupu Ngātahi for the Pukekohe Expressway, the North-east Arterial and other strategic connections in South Auckland. At that time, we heard that there was mixed feedback towards the Pukekohe Expressway. Investigations into these projects were paused in 2020 due to the COVID-19 pandemic and associated funding issues.

The DBC was re-started in July 2021 and engagement re-activated

8.2 Owner engagement summary

Owner engagement has been a continuous process throughout the development of the DBC. Owner Interface Managers (OIM's) have attended all project meetings and been an effective focal point for all broader owner engagement.

Subject Matter Expert (SME) engagement has also been an ongoing process during the DBC's development, especially with respect to transport planning, engineering standards and community engagement.

8.3 Partner engagement summary

8.3.1 Manawhenua

Te Tupu Ngātahi engaged with manawhenua on the Pukekohe project prior to and during wider community engagement. Collaborating with manawhenua as project partners, we actively sought their feedback and involvement as part of the DBC process. Southern hui with manawhenua representatives were held twice a month. The purpose of these hui was to collaborate with manawhenua on option development, update manawhenua on the progress of the project, present technical information, and findings to involve manawhenua as project partners.

Date of hui	Manawhenua representative in attendance
March 3 2022	Ngāti Tamaoho, Ngāti Whanaunga, Te Ākitati Waiohua, Ngāti Te Ata Waiohua, Ngāti Maru, Te Patu Kirikiri, Ngai Tai Ki Tamaki
April 7 2022	Ngāti Tamaoho, Ngāti Whanaunga, Te Ākitati Waiohua, Ngāti Te Ata Waiohua, Ngāti Maru, Ngāti Paoa Trust Board
April 26 2022	Ngāti Tamaoho, Te Ākitai Waiohua, Ngāi Tai ki Tāmaki, Ngāti Tamaoho, Ngāti Whanaunga, Ngāti Tamaterā
May 5 2022	Ngāi Tai ki Tāmaki, Ngāti Maru, Ngāti Tamoho, Ngāti Whanaunga, Te Ākitati Waiohua, Ngāti Tamaterā
June 2 2022	Ngāti Maru, Ngāti Tamaoho, Ngāti Whanaunga, Te Ākitai Waiohua, Ngāti Tamaterā, Ngāti Te Ata
June 21 2022	Ngāti Tamaoho, Te Ākitai Waiohua, Ngāti Whanaunga, Ngāti Maru
July 7 2022	Ngāti Tamaoho, Ngāti Paoa Trust Board, Ngāti Tamaterā, Te Ākitati Waiohua, Ngāti Te Ata Waiohua, Ngāti Whanaunga
July 8 2022	Ngāti Te Ata Waiohua, Ngāti Tamaoho
August 4 2022	Ngāti Tamaoho, Ngāti Tamaterā, Te Ākitai Waiohua, Ngāti Whanaunga
August 23 2022	Ngāti Tamaoho, Te Ākitati Waiohua, Ngāti Whanaunga, Ngāti Maru, Ngāi Tai ki Tāmaki
September 27 2022	Te Ākitai Waiohua, Ngāti Whanaunga, Ngāti Tamaterā, Ngāti Paoa Trust Board
October 6 2022	Te Ākitai Waiohua, Ngāti Te Ata Waiohua, Ngāti Tamaoho, Ngāti Tamaterā
October 12 2022	Ngāti Te Ata Waiohua
October 25 2022	Te Ākitai Waiohua, Ngāti Tamaoho, Ngāti Tamaterā, Ngāti Whanaunga, Te Ahiwaru, Ngāti Maru, Ngā Tai Ki Tāmaki
December 1 2022	Te Ākitai Waiohua, Ngāti Tamaoho, Ngāti Whanaunga
December 15 2022	Te Ākitai Waiohua, Ngāti Tamaoho
December 19 2022	Ngāti Te Ata Waiohua

The project team worked with manawhenua as project partners across the DBC process, have taken on board their issues, concerns and considerations into their decision making. Te Tupu Ngātahi will continue to engage with manawhenua as the Pukekohe project progresses.

8.3.2 KiwiRail

Regular and ongoing engagement between the DBC team and KiwiRail took place throughout the development of the DBC to co-ordinate and integrate between interfacing road and rail projects as well as ensure alignment of designation proposals to ensure an integrated and comprehensive response.

The outcomes of engagement with KiwiRail are of a technical nature and are found in Appendix E: Design Report.

8.3.3 Auckland Council

Auckland Council staff were regularly engaged at each step in the DBC process. Regular Pukekohe updates were provided on a twice monthly basis via the Auckland Council Partnership Forum.

The final report to the forum was on 10 March 2023, which met with broad endorsement of the preferred network.

8.4 Elected members

Two memos were distributed to elected members of Franklin Local Board, to update them on the project and community engagement. Project updates were also presented to the Franklin Local Board on 2 August 2022 and 22 November 2022.

There were also frequent interactions with elected members with informal email updates as community engagement progressed.

8.5 Key stakeholders

We spoke to numerous key stakeholders before, during and around the engagement period. Table 2 in Appendix G summarises who we engaged with and the feedback received.

8.6 Public engagement

Feedback was gathered on preferred options from the wider community between 1 November and 20 December 2022.There was a high level of feedback overall, with a large proportion of feedback placed on the North-east Arterial proposal. Full details are provided in Appendix G.

8.6.1 Landowner engagement summary

Landowner engagement is scheduled to occur through May 2023. A summary of the engagement will be added here prior to finalisation of the DBC.

8.6.2 Community engagement summary

Between 1 November and 20 December 2022, the wider community were invited to provide their feedback on the preferred options for the network. We used our online engagement tool 'The Hive' to collect feedback, using an interactive map and an online survey. We distributed a flyer to around 15,000 properties in the Pukekohe, Paerata and West Drury area. This was intended to inform the community about the project prior to the beginning of the formal consultation period.

Due to a high level of interest from Grace James Road residents on the Pukekohe North-east Arterial, a focus group with residential representatives was held in November 2022. This was to ensure that the project team and residents had an opportunity to discuss the North-east Arterial proposal in detail.

The following are key themes from public feedback:

- Support from the wider community for improved connections for future generations.
- A high level of support for a 'ring road' around Pukekohe, with the community agreeing that it is needed sooner rather than later. There were suggestions that the 'ring road' be located further on the outskirts of Pukekohe and an "expressway" proposed from Drury to Pokeno (through Pukekohe centre and Tuakau).
- Strong opposition towards the upgrade of Grace James Road as part of the North-east Arterial from Grace James residents and those living in proximity.

- Concerns around the impact to properties/land acquisition.
- Some pieces of feedback still think the former Pukekohe Expressway is being proposed, with some comments around a preference for a four-lane arterial.
- General comments around public transport in Pukekohe and how this could improve in the future.
- Strong support for the Mill Road-Pukekohe East Road upgrade being a key strategic route.

After the public engagement period, additional transport modelling and site visits to further understand ecological features, the alignment of the Pukekohe North-east Arterial was revised and the alignment shifted further to the north to provide a more direct connection with the western and Paerata arterials leading to improved transport benefits. This was communicated to the community in April 2023 and included the Grace James Road residents' group (with Grace James Road no longer being proposed to be upgraded to an arterial).

Economic case

9 Option development and assessment

This section describes the development of the recommended Pukekohe transport network and includes:

Establishment of the Do Minimum.
Option development process.
Assessment undertaken to identify the recommended network.
Overall outcomes of the recommended network.

A summary of the recommended option for each of the projects is included in this section including a high-level assessment of how the projects will operate as a key part of the transport system. More detailed option assessment is contained in Appendix B: Options Assessment Report.

9.1 The do-minimum option

The DBC has followed the principles of the Te Tupu Ngātahi programme wide approach for the definition of the Do Minimum. The Do Minimum is defined as the least effort to maintain the existing system, including maintenance and operation of the existing system.

The assumption includes the same quantum of land use development between all scenarios.

A full description of the do-minimum network at full build out 2048+ can be found in Appendix C: Economic Assessment. This was agreed via discussions with Waka Kotahi and Auckland Transport.

Primarily, the Do Minimum network includes:

Rail DBC Package (including access roads)
SH1 Papakura to Bombay (P2B)
SH22 Drury to Paerata SNP
Drury Strategic Transport Network
Mill Road Corridor – Manukau to Drury
Takaanini DBC Package
Pukekohe-Paerata indicative new collector roads, Crown Road closure and speed limit changes

9.2 Option development and assessment methodology

The optioneering process is summarised in Figure 9-2 . The process adopted was developed to be fit-for-purpose for each corridor and is informed by the previous stage of assessment (i.e., the PBC informed the options for the IBC and the IBC informed the options for the DBC). The result of the optioneering process was to confirm an emerging preferred option to be developed into the recommended option for route protection.

An exception to this was the corridor known in the IBC as the Pukekohe Expressway. This four-lane corridor was revisited in light of the emerging focus on emission reduction from mid-2022. This led to a collaborative process with owners to establish that a two-lane corridor would deliver many of the benefits sought by the Expressway, with less embodied carbon and less release of latent private vehicle demand between Pukekohe, Paerata, Drury and beyond.

The option assessment methodology is summarised in the following sections. For a full description of the process refer to Appendix B: Options Assessment Report**.** This also includes an overview of the process followed to revisit the Pukekohe Expressway.

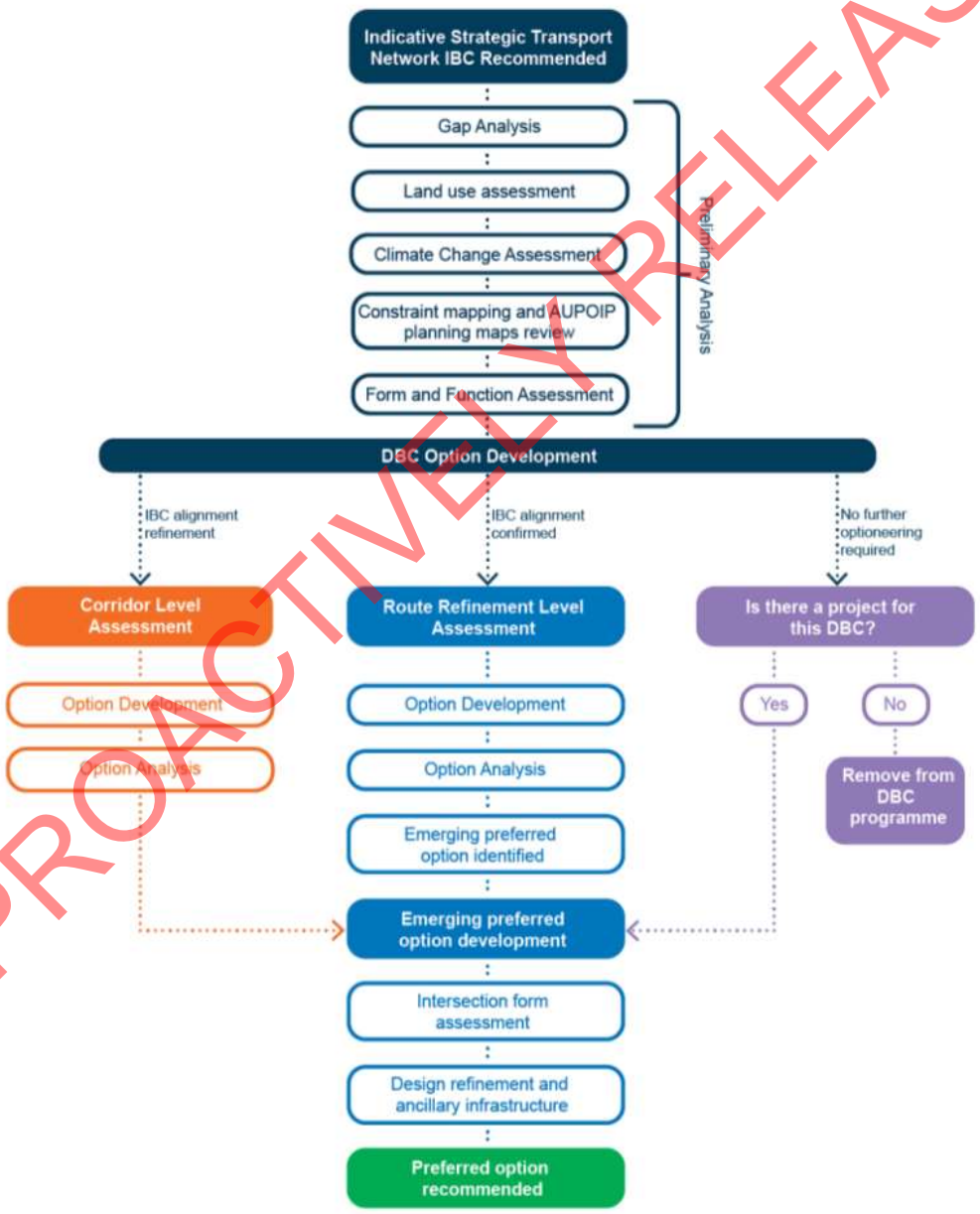
Note the following definitions used in this section:

Corridor assessment – this is referring to the location of the infrastructure within a study area. For a corridor assessment a number of different locations or connection points may be tested.

Route refinement – assumes the specific corridor has been confirmed. Optioneering is then refined to localised widening options or minor alignment variations to avoid identified constraints.

Alignment – this is used to describe how one particular option connects two points in the corridor. There may be several different alignments in a single corridor.

Figure 27: Option assessment process

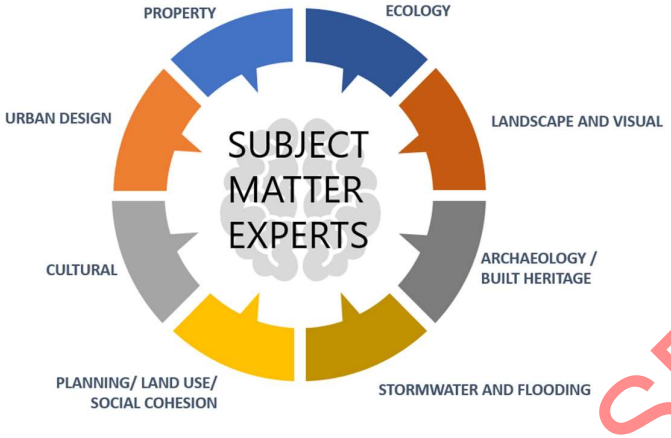


9.2.1 Preliminary analysis

There were five key steps in this preliminary analysis as summarised in Table 8.

Table 8: Preliminary analysis

Step	Description
Gap analysis	The gap analysis and background reviews were undertaken to ensure an understanding of how the Indicative Strategic Transport Network was identified, to check if anything had changed since the IBC including policy direction and statutory documents (for example, plan changes or National Policy Statements), and to identify gaps or issues that require further consideration during the DBC phase. The gap analysis included the following: Review of previous Supporting Growth PBC and IBC documents including option assessments, recommendations and identified opportunities. Alignment of the recommended options with relevant policy documents (for example, Government Policy Statement on Land Transport 2021, AUPOIP) with a focus to confirm if anything has changed since the South IBC recommendations (i.e. Pukekohe Expressway for example). Alignment with strategic plans, other statutory documents and developer aspirations that may have progressed since the IBC. For example, structure plans, plan changes (or appeals), recent Notices of Requirement and developer plans. Interaction with other projects in the area.
Land use assessment	The future land use adjacent to each corridor was individually assessed to understand the transport requirements to best service the intended land use as well as the identification of opportunities to enhance land use and transport integration. This was done using the Unitary Plan (AUPOIP), the 2019 Pukekohe-Paerata and Drury-Ōpāheke Structure Plans and any known developer plans. Land use assessment was then used as an input into the general constraint mapping process to understand opportunities to maximise the integration between land use and transport .
Climate Change Assessment	Workshops were held to consider the climate change impacts from each of the projects. This assessment: Confirmed that the corridors could not be eliminated. Identified opportunities to reduce climate impact to be considered during the optioneering process, especially for the corridor formerly known as the Pukekohe Expressway. Identified opportunities for further optimisation at later stages in the project. Refer to Appendix L: Climate Change Assessment for detailed corridor information.
Constraint mapping	Corridor mapping was undertaken by mana whenua and Subject Matter Experts to understand potential constraints to inform the refinement of the DBC options. Areas of assessment included:



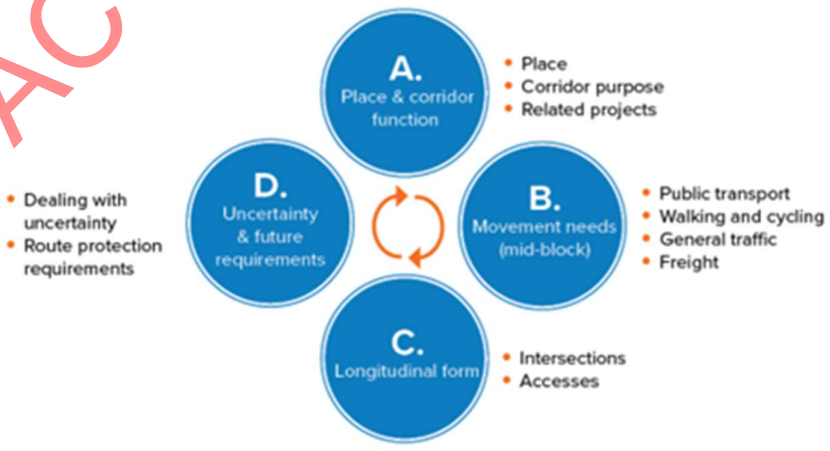
These constraints were then used as direct inputs into the option development process. Constraints were mapped on GIS and their significance recorded. The constraints and their significance were reviewed and discussed at a workshop attended by mana whenua, Subject Matter Experts (both owner and independent specialists) and the Project team.

Corridor Form and Function Assessment

The Corridor Form and Function (CFAF) process was used primarily for the purpose of assessing multi-modal corridors in Pukekohe-Paerata. The CFAF framework is a tool which formalises the optioneering process and provides consistent decision-making across the wider Te Tupu Ngātahi programme. It is based on the Auckland Transport Roads and Streets Framework (RASF) guidance.

The iterative nature of the process allowed for high stakeholder and owner engagement and an efficient design process. Note that during the development of this DBC, the CFAF assessment was revisited as necessary to address identified constraints and design considerations. Any modifications were taken back through the endorsement process. The South-west arterial is an example of this.

The key principles are related to place and movement as shown below.



Full details of the Pukekohe-Paerata CFAF can be found in Appendix E: Design Report.

9.2.2 DBC Option development and assessment

The preliminary analysis identified whether the IBC recommended option for each project required additional reconsideration in light of any new information relating to that project. The analysis also identified whether the IBC options assessment had sufficiently considered alternatives proportional to the scale of potential effects of each project. Further consideration was then given to the nature and significance of identified constraints and the land use context at the option development and option assessment phase. The choice of pathway depended on the individual needs of the corridor and the Pukekohe-Paerata decisions are summarised in **Table 9**.

Options developed for both the Corridor Assessment and Route Refinement pathways were developed to the same design standard and sufficiently detailed to allow a comprehensive assessment. Note some project corridors were segmented to allow a more localised assessment. In some cases, different approaches to option development were adopted in different segments of the same project corridor. This allowed a fit for purpose assessment of the Pukekohe-Paerata network.

The option assessment for each corridor was fit for purpose and included either a full MCA assessment with Subject Matter Expert input and/or a project team option assessment. Full details of this methodology are included in Appendix B: Options Assessment Report.

During development of the corridors, the principles from the Te Tupu Ngātahi Urban Design Framework have been applied during the MCA and the subsequent design development stages. This has been particularly important for the corridors where space constraints have required amendments to be explored and the framework has been used to help inform these decisions.

Table 9: Option development pathways

Pathway	Option development	Option Assessment
Corridor Level Assessment	Undertaken if the gap analysis identified that the IBC recommended option for the corridor required additional reconsideration. The gap analysis recommended corridor assessment of all components of the Pukekohe DBC transport projects. This was due to: Government policy changes in climate change and response - in particular the GPS for Transport 2021 and Zero Carbon Act (2021) (which amended the Climate Change Response Act 2002). Funding of new rail stations in Paerata and Drury. Numerous private plan changes lodged or approved. Pukekohe Local corridors (apart from the NE Arterial) had not been assessed since 2018 at IBC level. It was recommended that: Further alternatives be considered that may provide more of a contribution to decarbonisation as set out in government direction. This could include the investigation of upgrading existing roads and maximising connectivity to the rail stations, integration with future urban development and increasing mode shift.	MCA Assessment with Subject Matter Expert input

	The form and function of the Pukekohe Expressway should be re-assessed and the need for the expressway confirmed. Form and function of the Pukekohe Arterial routes need to be confirmed to inform options assessment (e.g. 2 vs. 4 lane) and if a two lane arterial, consideration needed to be given to upgrading existing roads rather than the offline options recommended in the IBC.	
Route Refinement Assessment	All recommended corridors (through corridor assessment) went through a route refinement assessment to further refine the recommended route.	MCA Assessment with Subject Matter Expert input

9.2.3 Emerging preferred option development

Following the option assessment process (corridor assessment followed by route refinement assessment) through multiple MCA workshops with subject matter experts, manawhenua and partners, the emerging preferred option was identified for each project. The results of the MCA can be found in Appendix B: Options Assessment Report.

Two aspects of the emerging preferred network proved to require additional development and assessment, being the former “Pukekohe Expressway” and the south-west arterial.

The Pukekohe Expressway was until the emergence of current climate change legislation and policy, a proposed four lane high speed arterial, providing a highly convenient additional transport corridor for motor vehicles between Pukekohe and SH1. With the emergence of climate policy in mid-2022 this project was revisited out of an abundance of caution and concern around how it might promote increased VKT and carbon emissions. This concern was worked through with subject matter experts over a period of months, with additional transport modelling undertaken to gauge the effects of both a four-lane arterial and a downgraded two-lane equivalent. As a result, it was agreed the downgrade to a two-lane arterial was ratified by subject matter experts from the owner organisations. The link is now proposed to be a two-lane multi-modal corridor, median divided and with speed limits varying from 60 km/h through urban zones to 80 km/h in rural areas.

The south-west arterial upgrade also underwent extensive additional analysis and consultation with subject matter experts before being confirmed. This was out of a concern that the initially anticipated extensive corridor widening would lead to community impacts and costs out of proportion to the relatively modest change in use forecast on the corridor. Additional investigations looked at how land take could be optimised to minimise the impact on existing households, whilst at the same time making provision for dedicated, separated active mode facilities. This resulted in agreement with AT experts to make provision for bi-directional facilities on one side of the corridor only, resulting in considerably less route protection being required, with less impact on existing households along the corridor and less property costs over the long term.

Further refinement of the emerging preferred option was undertaken in some other situations. For example, to establish tie ins between two intersecting projects. and further MCA assessments were completed to confirm optimal arrangements.

The emerging preferred option was then subject to a wider public engagement period. Feedback was collated and used by the project team to finalise the preferred option. Appendix G: Engagement

Summary outlines the feedback received. Notable in this was feedback received from the Grace James Road community raising concerns about certain aspects of the north-east arterial. This feedback, along with more detailed assessment of the initially proposed aligned fed into additional options being developed and assessed and a new recommendation made.

An initial view of the potential designation footprint was defined and included the consideration of:

Vertical alignment.
Horizontal alignment.
Identification of future intersection form and function using the Te Tupu Ngātahi process.
Property access – in particular driveway access for existing corridors.
Stormwater requirements including location of future stormwater ponds.
Further development of walking and cycling arrangements
Construction areas.

Designs then proceeded beyond the public engagement level of detail and issued to a wider technical stakeholder group at 50% design levels (known as revision A) to ensure early identification of issues and timely decision making for design choices such as intersection treatments, stormwater principles and constraints to the cross sections.

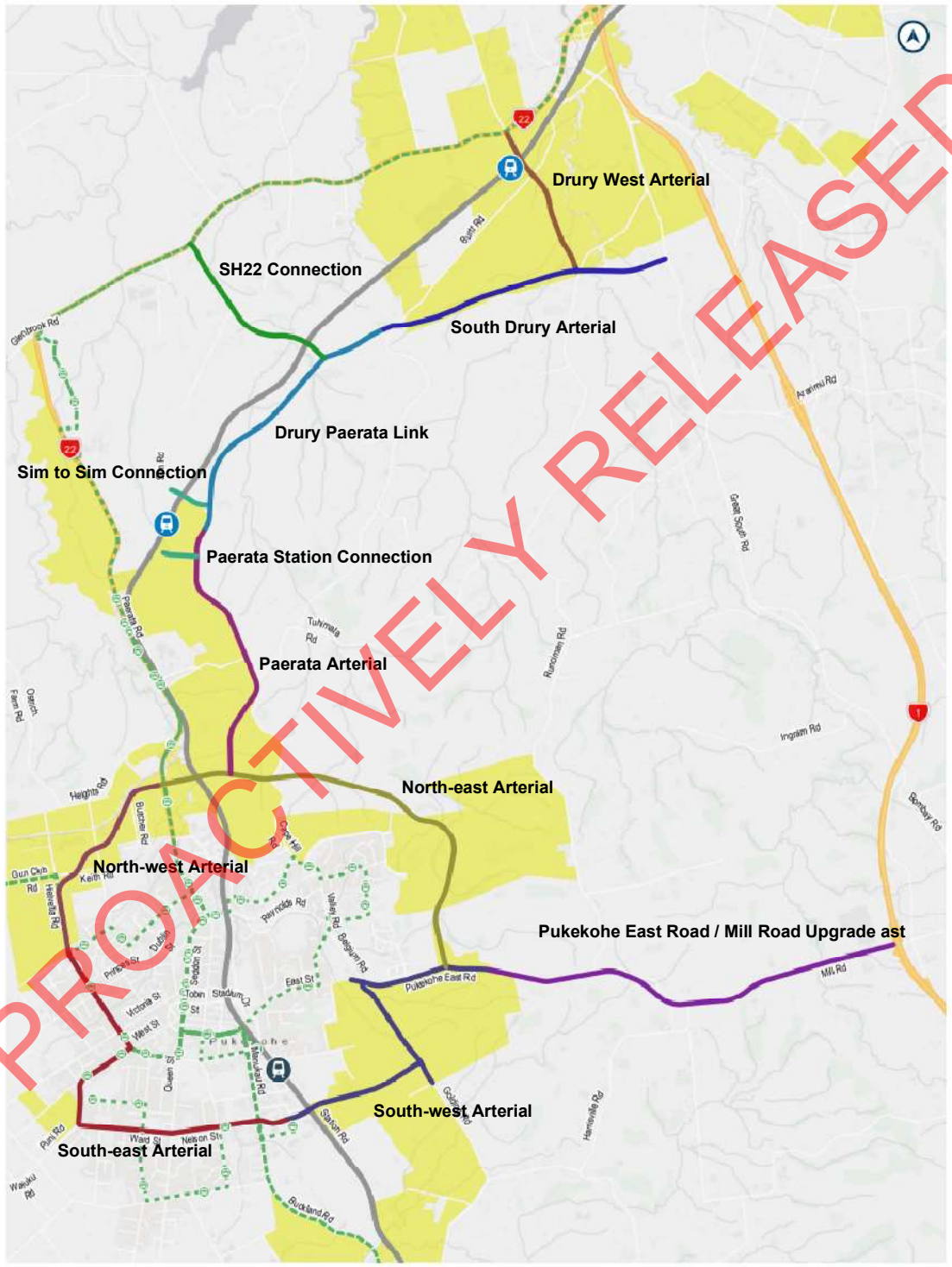
Full details of the design process for each corridor are detailed in Appendix E: Design Report.

This should be read alongside Appendix B: Options Assessment Report which provides the record of subject matter MCA considerations and scoring, which fed into the design refinement, as described above, and determination of the recommended option for each project .

10 Recommended Pukekohe Network

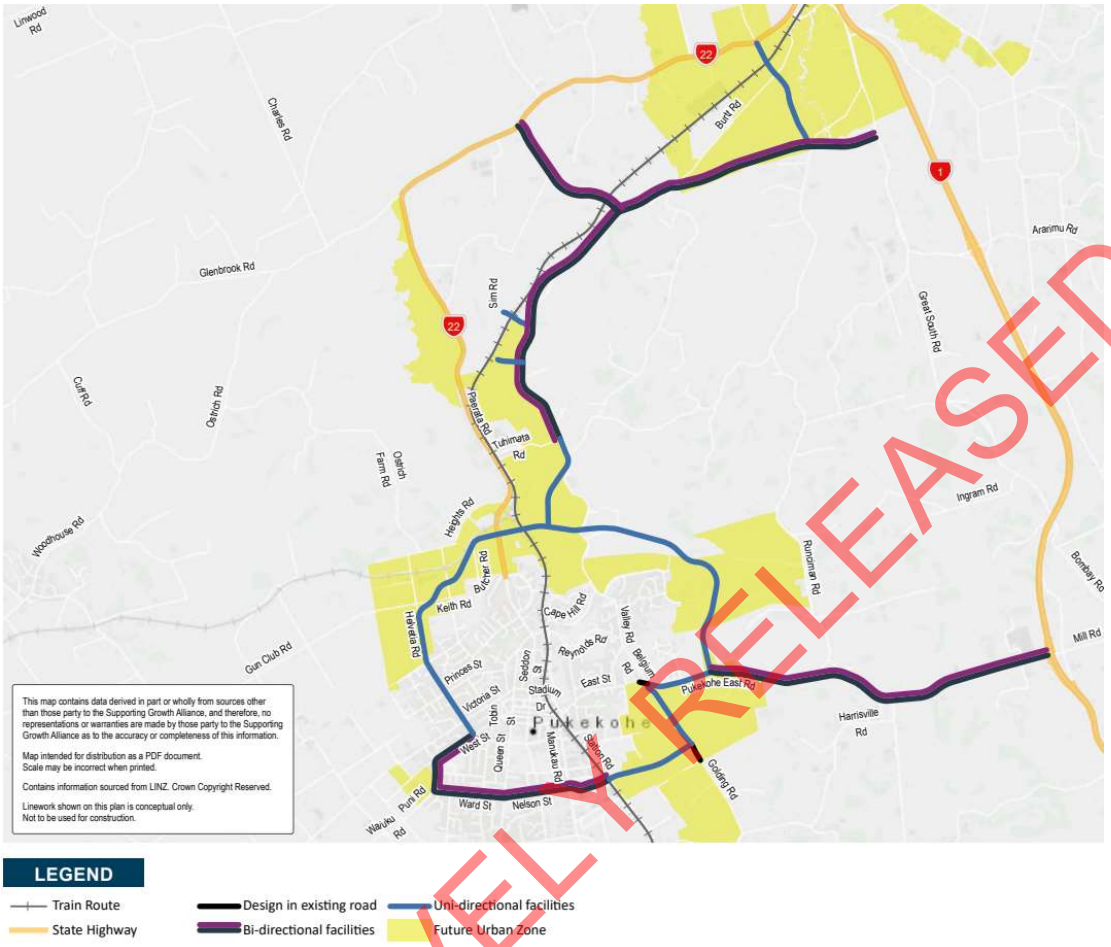
The recommended Pukekohe network is shown in **Figure 28** below.

Figure 28: Recommended Pukekohe Network



From this network the following active mode network will be achieved as shown in **Figure 29** below.

Figure 29: Recommended Pukekohe active mode network



Overall, this is a comprehensive transport solution that responds to planned growth and provides a transport network that supports:

- Long term development of a lower carbon transport system to support future growth and facilitates mode shift from private vehicles to active modes (in particular) to reduce greenhouse gas emissions.
- People living and working in Pukekohe and surrounds as part of the Satellite Town vision with direct freight connections to planned industrial land use and improved access to employment and social amenities.
- Urbanisation and intensification of adjacent land uses, particularly medium and high-density housing. Transport corridors maximise opportunities for walk up catchments to public transport.
- Increased multi modal access to RTN stations (Pukekohe, Paerata, West Drury).
- Significant additional resilience in the transport network through alternative routes.
- Integrated land use and transport planning through the strategic management of local and interregional travel demand that mitigates the adverse effects of growth whilst contributing to broader outcomes
- Real travel choice with high quality, attractive alternatives to the private vehicle. This includes a contiguous, legible active mode network that connects people to key destinations, including the RTN.

- An areawide focus on safety through a holistic set of measures including Road to Zero safety principles, fully separated cycling facilities, well designed intersections and sufficient space for all modes to interact safely, including freight.

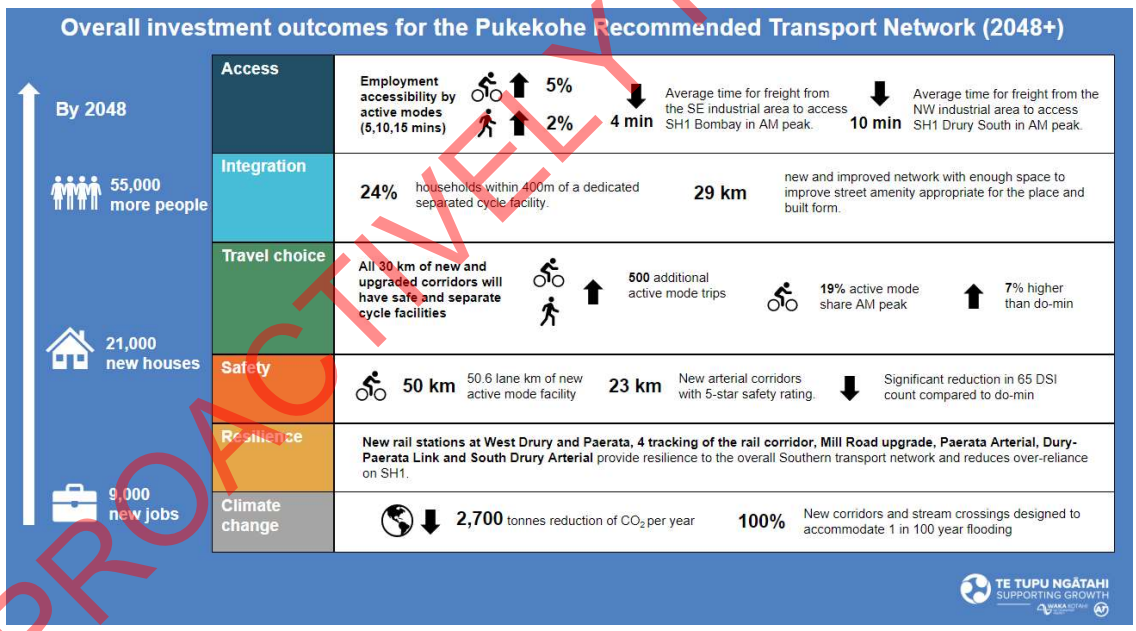
The outcomes will be achieved by targeted investment in:

- Strategic corridors to support growth as it occurs, provided as part of an overall strategic approach to promote the uptake of alternative modes and manage impacts on the existing transport system and urban areas.
- Active mode facilities on all corridors to complete an integrated active mode network. This includes 50 lane km of new and improved cycle facilities. The suite of cycling measures include:
    - Uni-directional dual separated cycle lanes on new urban corridors.
    - Bi-directional cycle facilities on rural sections of new corridors.
        - Bi-directional cycle facilities on existing urban corridor upgrades.

10.1 Performance of the recommended option

The key outcomes for this recommended network are shown in **Figure 30**. Additional detailed information on overall outcomes are included in Appendix D: Transport Outcomes Report.

Figure 30: Outcomes for the Pukekohe recommended network



This recommended programme is an integrated package of projects and whilst individual projects may vary in their performance when considered in isolation, the performance of the programme is greatly increased when considered as a connected and complementary transport response.

Each individual project addresses a local set of circumstances but then has a wider role in extending or completing the strategic and active mode network, which has a flow on effect to the wider achievement of investment objectives around safety, access, integration, resilience and travel choice.

Additional commentary on the key investment theme outcomes is summarised in **Table 10**.

Table 10: Investment theme outcomes

Pukekohe Investment Theme	Commentary
Safety	The establishment of formalised strategic corridors designed and built to modern safety standards around Pukekohe and linked north and south to, and through SH1 and SH22 will significantly enhance the overall safety of the Pukekohe-Paerata transport network, reducing deaths and serious injuries. These new corridors will prevent traffic dispersal inherent in the do-minimum, where traffic growth would give rise to dispersal across the network to avoid congestion, with the increasing use of rural local roads for strategic movements not designed for such purposes, resulting in an increase in death and serious injury accidents. Similarly, urban local roads would also experience traffic growth as a result of rat running to bypass strategic network congestion and delay. The addition of new and improved strategic corridors will prevent this rat running and support safer communities in new and existing urban areas. Dedicated separated active mode facilities on all new and upgraded corridors will appeal to all ages and abilities, removing the fear factor of mixing with live traffic and promoting the uptake of walking and cycling and micro mobility, enhancing health outcomes, mitigating traffic growth and contributing to a lowering of per capita of transport CO_2 emissions over time, relative to the do-minimum.
Access	The recommended network provides strategic connections to unlock access to the growth areas (which are primarily greenfields). These new corridors provide physical access to connect future houses and commercial premises to key destinations directly or via existing networks. The emphasis on active mode connectivity in the recommended investment will deliver additional benefits in the form of increased accessibility for non-private vehicle modes. New strategic corridors and the upgrade of existing corridors provide a focal point for strategic traffic and freight, improving access, efficiency and reliability between the wider strategic network (e.g. SH1 and SH22) and the key freight generators and attractors in and around Pukekohe and its hinterland to the south and west.
Integration	New strategic corridors are planned through or adjacent to future urban zones, allowing for effective integration spatially and over time, with adjacent urban development. Their location within urban zones will enhance household access to quality active mode facilities as well as enable the future provision of fast, direct, reliable bus services that are within easy reach by a high number of new households. Corridors through rural zones have been kept to a minimum and only used sparingly where the benefits outweigh the costs, such as to ecological areas or where stormwater impacts and/or land take can be substantially reduced. New strategic corridors can be designed and delivered to integrate effectively with local and collector road connections from new urban areas, enabling safe, attractive and multi-modal transitions from local road environments to strategic corridors, catering for the full range of travel modes and allowing for appropriate provision of street lighting, features, open space and amenity to support the creation of high-quality urban environments.

Pukekohe Investment Theme	Commentary
Resilience	Investment in new strategic routes is overall expected to reduce the percentage of Vehicle Kilometres Travelled in peak congestion (assumed as > 90% vehicle capacity) in the AM peak by 3% compared with the Do Minimum. This will improve reliability for freight and buses. Investment in a new strategic north-south link between SH1 at Drury South and Pukekohe (and associated connections) will serve an important function in removing strategic traffic and freight from SH22, especially through Drury West, supporting growth there and improved urbanisation outcomes thanks to safer roads and enhanced ability to provide for active and shared modes. Establishment of a formalised strategic network around Pukekohe will become a focal point for cross-town movements for both traffic and freight, easing traffic volumes in central Pukekohe to create enhanced amenity and liveability
Travel Choice	Active mode investment improves the number of jobs accessible by active modes by 4% within 15 minutes and 10% within 30 minutes (compared to the Do Minimum network) which reflects the benefits of the investment. The provision of corridors through and adjacent to urban zones enables the future provision of higher levels of bus coverage and accessibility for future residents, enhancing the ability to reach key local destinations and (via the RTN network) destinations even further afield without the need to use a private vehicle.

10.2 Economic, social and environmental outcomes

The concept of sustainability is in synergy with Te Ao Māori (Māori world view) and the interconnectedness and interrelationship of all living and non-living things. The development of the Pukekohe recommended transport network has been undertaken holistically and is based around the three principles of social, environmental and economic sustainability.

The overarching sustainability principles were introduced in Section 6.3 and are shown again in **Figure 31** below.

Figure 31: Sustainability principles

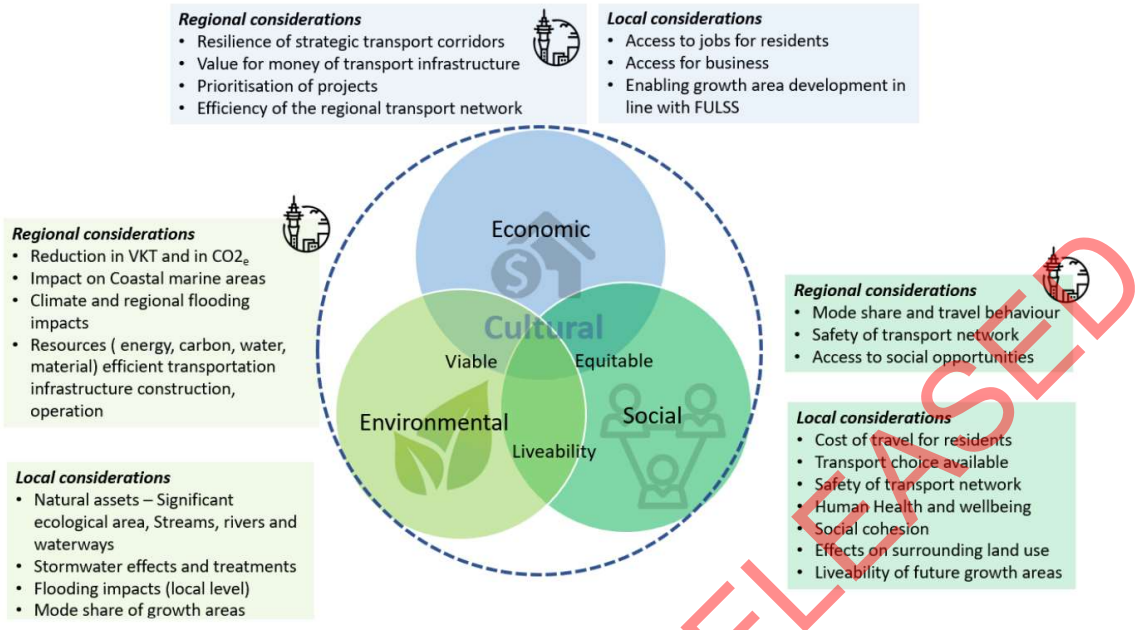


Figure 31 to **Figure 32** detail how the recommended programme delivers against these three principles to support a strong Pukekohe-Paerata culture, better community outcomes and create liveable communities.

Figure 32: Pukekohe environmental outcomes

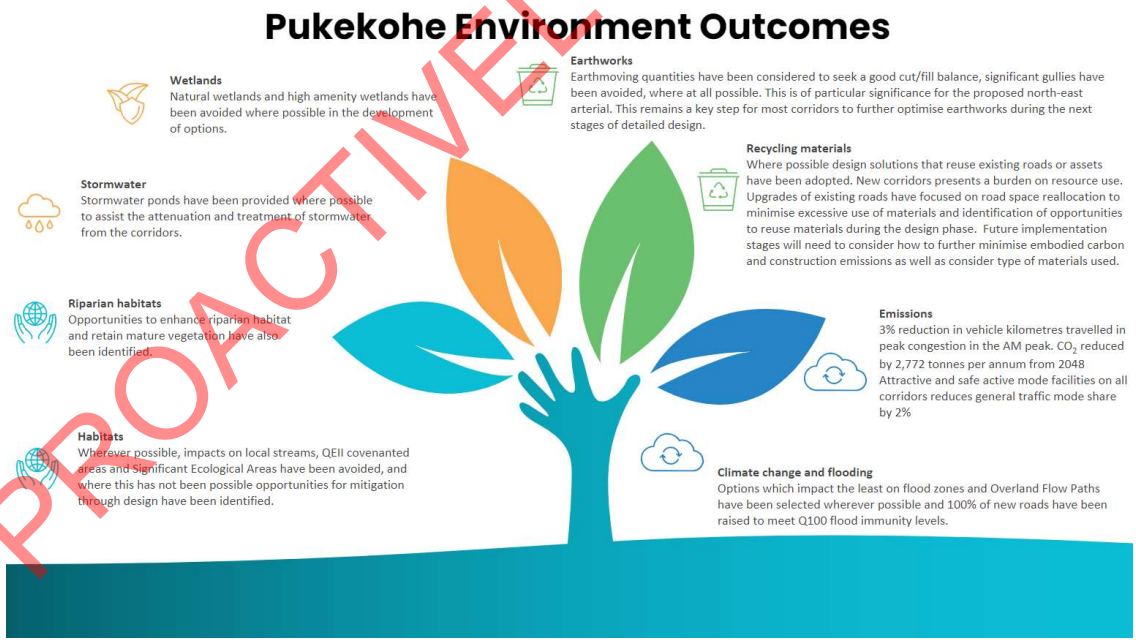


Figure 33: Pukekohe social outcomes

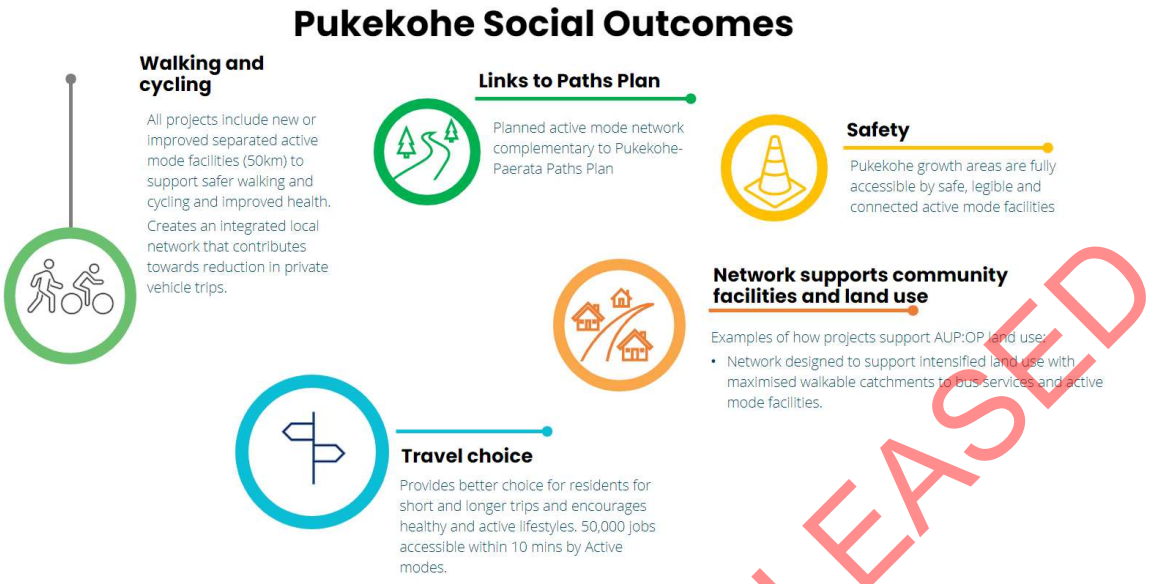
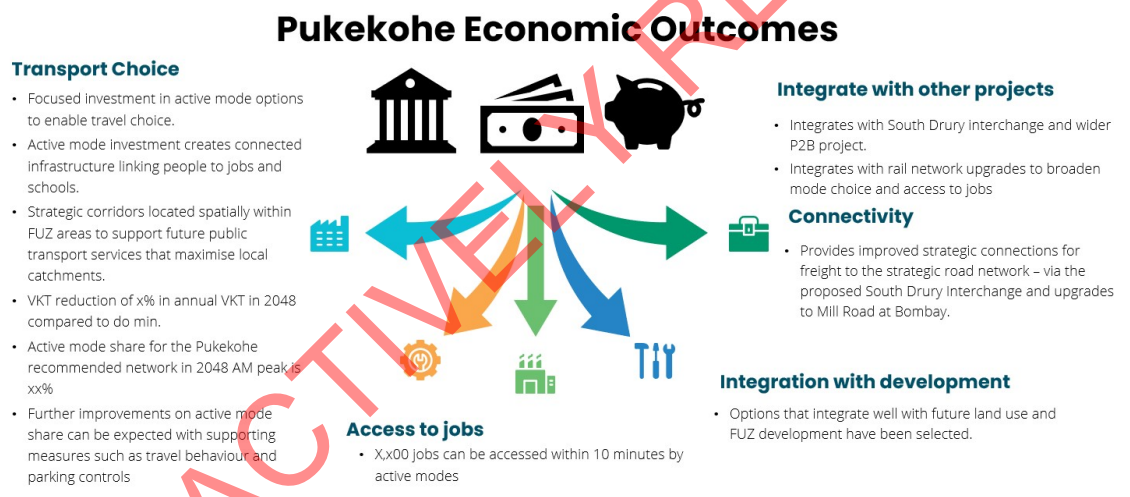


Figure 34: Pukekohe economic outcomes

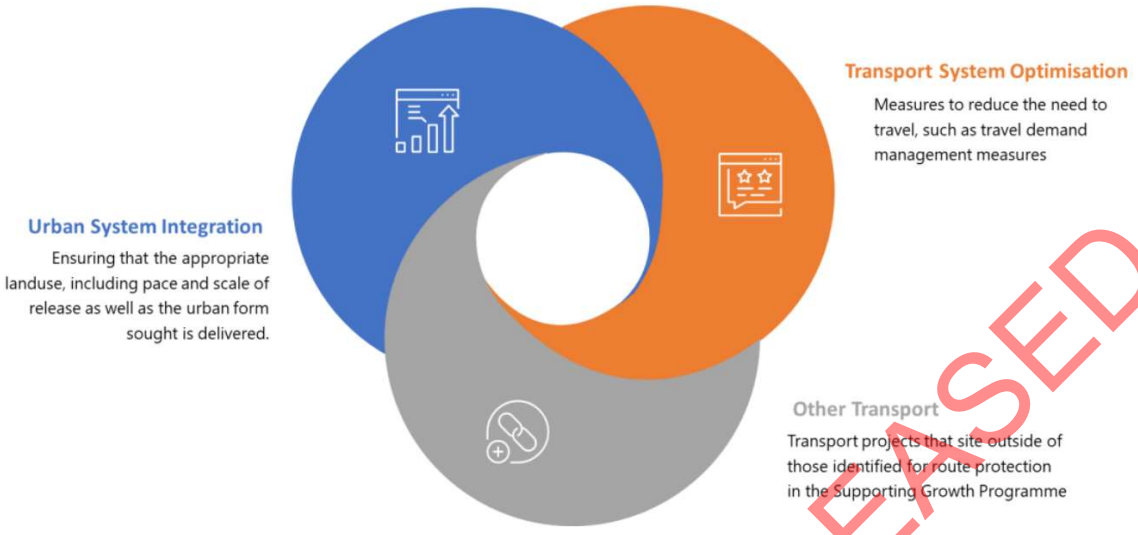


10.3 Supporting measures

If all the transport infrastructure projects identified in the Te Tupu Ngātahi programme were successfully delivered this would not guarantee or optimise the outcomes sought from the programme. This is due to the wide range of other necessary elements, including pre-conditions to investments, that also need to be implemented and monitored to ensure the successful overall outcome of the programme.

These elements can be broadly summarised into three areas, being Urban System Integration, Transport System Optimisation and Other Transport, as shown in **Figure 35**.

Figure 35: Additional contributory elements



It is critical that each of these elements are delivered in parallel and in collaboration with this programme of transport interventions to optimise and deliver the full range of outcomes sought. For example, if the projected land use is not delivered the planned transport system will be sub-optimal, underutilised, and critical elements such as mode-shift targets will not be met.

Specific Pukekohe complementary measures are summarised in **Table 11**. Management of these measures are discussed further in the Management Case of this DBC (Section 14).

Table 11: Supporting measures for the Pukekohe recommended network

Supporting measure	Measure	Pukekohe application
Urban system integration	Ongoing land use and transport integration	This programme of transport interventions is intrinsically linked to the urban system including land use, urban form & place quality, density and proximity, and employment self-sufficiency. Te Tupu Ngātahi recognises this with place making and liveability outcomes a key focus area, alongside alignment with the future pace, location and scale of the proposed growth. It is therefore critical that these urban system integration outcomes are delivered alongside and at the appropriate timing for the transport interventions recommended. Pukekohe-Paerata and Drury have Auckland Council adopted structure plans which give an initial level of certainty over how land use is expected to develop. However, with recent policy changes it is anticipated that future Plan Changes will seek even further land use intensification. Continued discussions will be required with Council to help shape the supporting collector and local road network to best support the overall Pukekohe transport outcomes. This will include maximising development around local centres and creation of local cycling networks on newly developed collector roads to connect with the

Supporting measure	Measure	Pukekohe application
		planned arterial active mode network to support the wider uptake of cycling. Ongoing discussions will be needed in relation to the timing of growth and the ability to have the core infrastructure ready to enable good travel behaviour choices and access from the outset of development.
Transport system optimisation	Travel demand management	The Te Tupu Ngātahi programme IBCs identified a wide range of Travel Demand Management initiatives to ensure the demand pressure on the transport system of Auckland substantial growth is appropriately managed prior to the transport system being called upon to move people to and from their destinations. These measures are a combination of locally driven interventions and whole of region measures, which make coordination and collaboration across the multiple parties required challenging. In Pukekohe, as in each of the nearby primary employment destinations for future Pukekohe residents, the management of parking will be an important consideration in supporting behaviour change towards active modes and RTN public transport, in particular.
	Increased bus coverage and frequencies	Pukekohe currently has a limited public transport offering. With the forecast increase in population and improve levels of RTN service, there is great potential to ramp up local bus services to access Pukekohe, Paerata and West Drury train stations as well as to Pukekohe town centre.
	Fleet management	Whilst mode shift is preferable to reduce emissions (since it also achieve a number of other benefits) there is also a role for better fleet management to support emission reduction targets. This will include wider government-led initiatives to support the uptake of electric vehicles (including buses) to reduce emissions from private vehicles and could also extend to the introduction and uptake of biofuels. Emission modelling in 2048+ includes an assumption of ~66% of the total fleet being electric and this is a major contributor to the reduction in emissions. Therefore, this is a very important measure to support the overall reduction in emissions and maximise the outcomes of the Pukekohe recommended network.
Other transport	Implementation of key projects	This programme relies on a number of other transport projects being in place within the transport system to support the Pukekohe preferred transport network and realise the desired transport outcomes. Examples of this are: Drury South interchange at SH1 and P2B stages 2 and 3 Rail package (stations, electrification and track upgrades)

10.4 Key differences to the IBC recommended option

The recommended Pukekohe transport network is overall aligned with the South Strategic IBC network as shown in **Figure 36**. The corridors highlighted in red show the IBC corridors that have changed alignment during the development of the DBC to respond to constraints and new information. However, all connections identified in the IBC are retained. Additional details of these changes are summarised in **Table 12**.

Figure 36: Comparison of the Pukekohe DBC network to the IBC network

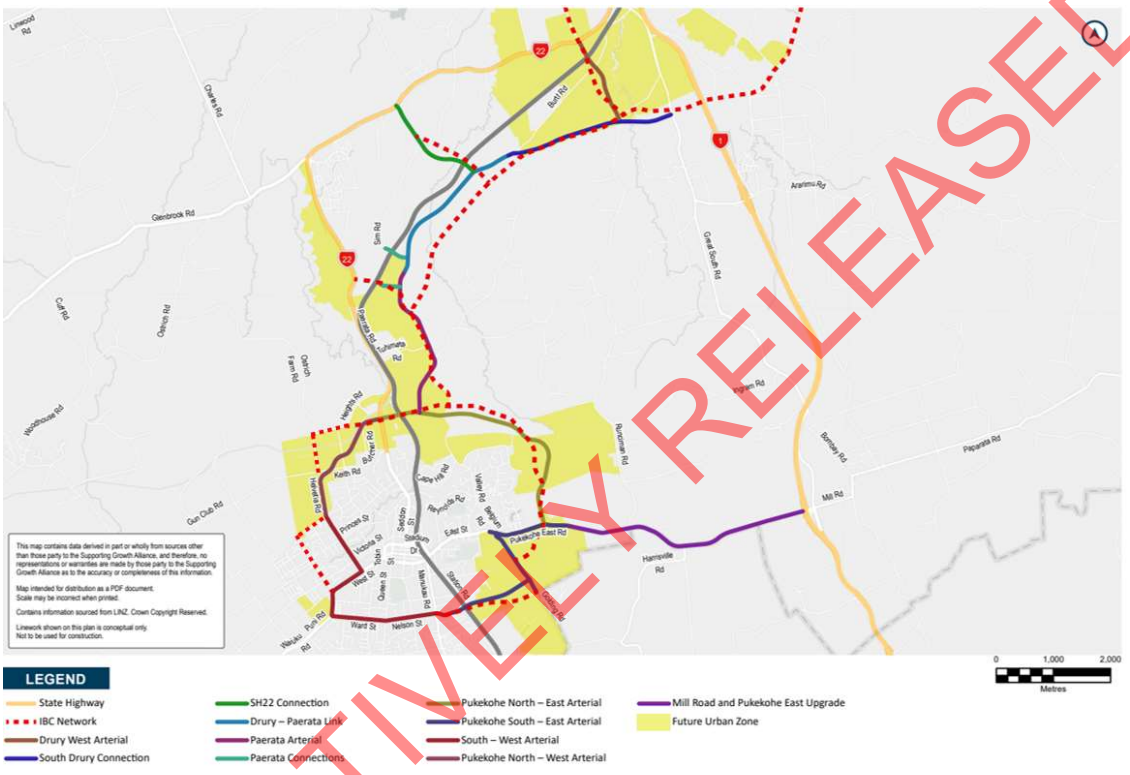


Table 12: Summary of key changes between Pukekohe DBC and IBC networks

Corridor	What has changed?
Drury-Pukekohe Link Comprising Drury South Arterial, SH22 Connection, Drury-Paerata Link, Paerata Arterial. It also includes the Drury West Arterial and Paerata Station Connection.	The main link between Pukekohe and West Drury has been rescoped to a two-lane transport corridor (with variable speeds depending on if it is in the FUZ or rural zone) from the former 4-lane higher speed link in the rural zone known as the 'Pukekohe Expressway'. The alignments are broadly the same for all elements however design refinements have optimised locations through the design process. The north-south alignment has generally shifted closer to the FUZ and closer to the NIMT.

Corridor	What has changed?
	An additional connection has been added connecting the two extents of Sim Road over the NIMT in Paerata. This additional connection reduces the reliance on one main east west connection across the NIMT at the Paerata Rail Station reducing through traffic movement past the station. This new connection also means that four laning of the station accessway to SH22 is no longer required.
North-west Arterial	The IBC originally envisaged the use primarily of existing roads (primarily Helvetia, Heights and Butcher Roads) whereas the DBC now proposes to designate through FUZ land between Helvetia and Butcher Road, providing improved access to the land that will develop around it, as well as avoid the need for two major bridge structures (crossing the railway on Heights Road, and again at Butcher Road) and road closures / turning bans.
South-west Arterial	The IBC intended to use existing upgraded roads in south-west Pukekohe and this remains, albeit different roads are now proposed due to the development in the area since the IBC. The design process has optimised the cross-section of the corridor and it is now primarily re-allocation of existing road space with designation of land minimised to enable segregated bi-directional facilities through intersections where space is limited.

10.5 Staging assessment

Staging of the delivery of the future network is discussed in Appendix M: Staging Considerations. Staging is also tested in Appendix C: Economic Assessment.

Primarily the network is needed post-2038 however certain elements, namely the Drury West Arterial, the Sim to Sim Connection and the Paerata Station Connection are needed earlier to support urban growth and enhance station access at Paerata and West Drury. These are staged for implementation in the 2028-2033 period.

10.5.1 What happens if the Do-Min interventions are delayed?

The assumed do-min network is defined in Appendix C: Economic Assessment.

Should key elements of the do-min be delayed this will have a number of consequences. Assuming planned growth takes place via live zoning of Future Urban Zones, this will still generate the need for gradual implementation of the Pukekohe network.

The knock-on effect will be impacts of this growth in the form of increased travel demands where it interfaces with the existing strategic network, namely SH22 and SH1 at both SH1 Drury Bombay interchanges. If P2B stages 2 and 3 are not completed in time to connect with the Pukekohe to Drury Link and Mill Road Bombay upgrades (in particular) then interim interfaces will need to be constructed, with the result being additional costs and unrealised transport benefits.

Delays in the roll out of the rail upgrades between Pukekohe and Papakura will also mean more private vehicle demand on the road network, compounding the above issues.

10.5.2 What happens if the assumed land uses change?

The assumed land use changes (scenario i11.6) to full build out some time post-2048 (i.e. the 2048+ scenario) were used as the basis for identifying the future needs across the network. Should land use progress slower or faster than envisaged in the modelled scenarios, the impact will be on the staging of the delivery of the various elements of the package, typically depending upon their location in the network.

Should land use exceed the levels anticipated in the modelling at 2048+ then it is likely we will see a higher degree of peak period congestion for private vehicles accompanied by a greater uptake of alternative modes enabled by the delivery of the preferred network. This will be evident in increased walking and cycling numbers, increased bus and train patronage, increased work from home and a greater number of peak period vehicle kilometres travelled congested conditions. This capacity for greater uptake of walk, cycle, bus and train enabled by this and adjacent DBC's will accommodate growth beyond that forecast in the current i11.6 land use scenario, driven for example by increased intensification of urban areas enabled by recent legislative changes (i.e. the MDRS).

Should land use development not occur at all then this will potentially avoid the need for elements of the package. This would depend on the location in the network, as certain areas of Pukekohe will still be impacted by growth elsewhere and will need infrastructure to support wider network outcomes and mitigate the negative effects that would arise without investment.

In finalising this DBC (and after the completion of transport modelling and analysis) the project team became aware of Auckland Council's proposal to consult on a range of changes to the FULSS 2017 via a draft consultation document "Auckland Future Development Strategy 2023-53".

Whilst noting it is a consultation document with some way to go before becoming establishing Auckland Council policy, the changes proposed in the consultation draft would have the general effect of delaying the live zoning of the Future Urban Zones around Pukekohe, Paerata and Drury West by 10 to 15 years, with a consequential effect on the planned infrastructure implementation timeframes.

There are no indications to suggest any relevant Future Urban Zones would be removed to the extent that they might in any way compromise the recommended preferred option or change what it might include for Pukekohe[4].

Based on the document, the following conclusions are reached:

- The same quantum of growth across the Pukekohe study area is forecast but over a longer timeframe. This means the preferred ultimate network is robust and responds to the same total quantum of growth originally envisaged.

[4] It is noted that the Takaanini Future Urban Zone was proposed to be removed. It was determined that this was sufficiently remote as to be considered having negligible impact on travel demand in and around the Pukekohe DBC area.

- Designation footprints in the DBC will give effect to the preferred option and are thus reliable.
- Construction timeframes would broadly move out 10 to 15 years in line with the delayed live zoning of development ready future urban zones.
- Much of the indicative “trigger infrastructure” noted in the draft is required before live zoning. This appears somewhat premature since much of the recommended Pukekohe network is within future urban zones and lends itself to being delivered in parallel with development, not in advance of it.
- NoR lapse periods will be 15-20 years (to approximately 2044) and will remain broadly aligned with the proposed draft FDS 2023 live zoning timeframes in the range 2035 to 2040+.
- The opportunity exists to extend lapse periods in the future should the situation demand it, however the scale of development activity in recent years suggests growth will continue to occur largely independently of the Future Development Strategy, and generally ahead of stated timeframes for the provision of bulk infrastructure and live zoning.

In light of these conclusions the project team remains confident that the route protection proposals set out in this DBC and the subsequent NoRs remain the correct course of action for Pukekohe. The draft FDS will potentially slow the rate of land use change but not add or detract from the quantum assumed by the DBC for the purposes of defining the ultimate future network. The lapse periods of 15-20 years proposed for each of the 8 NoRs are able to accommodate the changes in the rates of land use proposed.

10.5.3 Alternative staging

Alternative staging scenarios have been tested as part of the economic assessment for the preferred network and these are set out as scenarios A to J.

These scenarios provide insights into the relative contributions of individual projects within the network, but their delivery timeframes have not been tested for alternatives given the delivery for most of the network is not needed till post-2038. Any benefits of alternative staging would therefore largely be an academic interest and largely irrelevant.

11 Recommended option economic analysis

This section summarises the economic analysis which has been prepared for the full recommended package. The Pukekohe DBC is for the purposes of route protection, rather than imminent implementation. The appraisal has therefore been targeted at this decision (to progress to route protection), rather than at the more detailed assessment that could be expected for an implementation decision.

This economic evaluation has been undertaken in accordance with the Waka Kotahi NZ Transport Agency Monetised Benefits and Costs Manual (MBCM). Note that it has not taken into account the latest April 2023 updates which would increase benefits and the BCR's reported here and in Appendix C: Economic Assessment. Appendix C sets out the full methodology, assumptions, scenario testing, incremental analysis, and sensitivity analysis undertaken.

For economic assessment testing purposes (individual BCR's and alternative staging) Appendix C considers a number of scenarios A to J as shown in **Table 13**. Generally each scenario is characterised by the removal of certain dependant project elements from the preferred network to determine the residual performance of the remaining network elements against the do-min as well as against variations on the preferred network. This has enabled the testing of feasible delivery scenarios where certain project elements would only be delivered alongside others. Accordingly BCR's are reported for scenarios representing a collection of inter-dependant projects rather than a BCR for every project. This is explained further below.

Table 13: Project scenarios for assessment

BCR Scenario	Name	Option Scenario	Do minimum Scenario	Modelling Suite used
All projects	Scenario A	Recommended Network with full Pukekohe DBC projects included	No projects from Recommended Network	MSM, SATURN
Drury West & IC Connection	Scenario B	Do Minimum scenario with only Drury West and IC connection	No projects from Recommended Network	SATURN
SH22 Connection	Scenario C	Do Minimum scenario with Drury West and IC connection, SH22 Connection	No projects from Recommended Network	SATURN
Drury-Paerata Connection I	Scenario D	Recommended Network with full Pukekohe DBC projects included	Recommended Network "All projects" without the Drury-Paerata Link	SATURN
Drury-Paerata Connection II	Scenario E	Recommended Network with full Pukekohe DBC projects included	Recommended Network "All projects" without the Drury-Paerata Link and upgrades on Paerata Arterials	SATURN
Pukekohe Arterials (from Ref)	Scenario F	Recommended Network with full Pukekohe DBC projects included	Recommended Network "All projects" without the Pukekohe Arterial connections (new and upgrades)	SATURN

BCR Scenario	Name	Option Scenario	Do minimum Scenario	Modelling Suite used
Pukekohe Arterials (from DM)	Scenario G	Do Minimum scenario with Pukekohe Arterial connections (new and upgrades)	No projects from Recommended Network	SATURN
SW+SE+NW only	Scenario H	Recommended Network with full Pukekohe DBC projects included	Recommended Network "All projects" without the Pukekohe Arterial connections (new and upgrades) on SW, SE and NW	SATURN
Pukekohe East Connections (from Ref)	Scenario I	Recommended Network with full Pukekohe DBC projects included	Recommended Network "All projects" without the Mill Road Upgrades	SATURN
Pukekohe East Connections (from DM)	Scenario J	Do Minimum scenario with Mill Road upgrades	No projects from Recommended Network	SATURN

11.1 Key assumptions

The modelling has been based on the regional growth assumptions reflected in land use 'scenario i11.6' forecasts released by AFC in mid-2020.

The scenario i11.6 forecasts are based on Statistics NZ medium population growth estimates for Auckland. In those forecasts the staging of greenfield growth is based on the direction indicated in Auckland Council's Future Urban Land Supply Strategy (FULSS). The standard Scenario i11.6 forecasts extend to the year 2048, however, an additional scenario was developed for Te Tupu Ngātahi referred to as 2048+. This is based on the standard 2048 forecasts but reflects full build-out in the greenfield growth areas which would occur beyond 2048. The timing for full development build-out is uncertain, however for the purposes of this appraisal the 2048+ model results were allocated to the year 2053, estimated from the typical rate of growth predicted for the area. The land use assumed is per the Opaheke-Drury Structure plan and Pukekohe-Paerata Structure Plan.

Due to the interdependencies with other projects in this area, Do minimum and Recommended Network scenarios were created for each modelled year, based on a reference scenario. The reference scenario included an assumed sequencing of the full indicative business case (IBC) network. For example, the 2038 reference model only included a subset of the DBC networks, while the 2048+ reference model included the full DBC network.

If the project being appraised (e.g. the Pukekohe Arterials), was included in the Recommended Network for the forecast year, then this was used as the option scenario. A matching "Do minimum" was then created for that year that excluded the project being assessed (e.g. Scenario F, Pukekohe Arterials- from Ref). This scenario assumed the later staging of Pukekohe Arterial, while the rest of the DBC schemes were present. If the Recommended Network did not include the candidate project, then this was adopted as the Do minimum. An option scenario was then created by adding the

candidate project (e.g., Scenario G, Pukekohe Arterials- from DM). This scenario assumed the early staging of Pukekohe Arterial, while the rest of the DBC schemes were not in place.

Another example would be the 2038 Recommended Network which was adopted by removing the Drury-Paerata link for the BCR assessment. The Do minimum for 2038 was created by removing all Pukekohe DBC schemes from the 2038 Recommended Network. A comparison between a Do Minimum scenario (no projects from Pukekohe schemes) and the Recommended Network (all Pukekohe DBC schemes) was made to understand the benefits associated with this project.

For the overall assessment of all Pukekohe DBC schemes, the Do minimum was developed by removing "All projects" from the Recommended Pukekohe Network. This method can generate lower benefits for individual elements in later years compared to project being evaluated in isolation (as it assumes all other projects are in place).

There are some uncertainties around the project implementation year. Hence, some broad assumptions are made on the construction start date based on the expected implementation period. The construction periods were assumed based on advice from the Te Tupu Ngātahi Pukekohe DBC design team, as below:

- **Drury West & IC Connection** - the project is assumed to be implemented by 2038 (including the upgrades to the Drury West station access road from Jesmond Intersection)
- **SH22 Connection** (Drury West & IC Connection + South Drury) - the project is assumed to be implemented by 2040 (including the tie-ins to Great South Road intersection)
- **Drury-Paerata Connection I** - this project is assumed to be the last connection within the Recommended Network and will only be implemented after 2050
- **Drury Paerata Connection II** (Drury Paerata Connection I + Paerata Arterials) - assumed to be implemented by 2048
- **Pukekohe Arterials** (NE+SE+SW+NW) - assumed to be implemented by 2038
- **Pukekohe East Connections** (Pukekohe East Road + Mill Road Bombay Upgrade)- assumed to be implemented by 2048

Further assumptions around the modelling of PT, walk, cycle and traffic benefits are set out in Appendix C: Economic Assessment.

11.2 Costs

Cost estimates have been prepared in line with SM014. Full cost estimates for the recommended network are provide in Appendix H: Cost Report.

11.2.1 Capital costs

The P50 capital cost (all pre-implementation costs, property and construction plus contingencies) was calculated at $2.29 billion. Appendix H provides a full breakdown of inclusions for each project, in line with SM014.

11.2.2 Maintenance and operation costs

These costs were assumed as shown in **Table 14** below.

11.2.3 Costs for economic assessment

The net present value (NPV) of all the project costs for the economic assessment is summarised in **Table 15** below.

Table 15: NPV Project Costs

Scenario	PV capital Cost, $M	PV Maintenance Cost, $M	PV PT Operating Cost, $M	PV total net costs, $M PV
Scenario A	1,129	5.2	0.5	1,134
Scenario B	229	1.1	2.2	233
Scenario C	538	13.8	1.7	554
Scenario D	71	0.8	0.0	72
Scenario E	212	1.4	0.0	213
Scenario F	414	3.2	0.1	417
Scenario G	414	3.2	0.4	417
Scenario H	214	1.9	0.4	216
Scenario I	61	1.6	0.0	63
Scenario J	61	0.6	0.0	62

11.3 Benefits and benefit-cost ratio

Based on the methodology described above and in Appendix C, the net present values of benefits were evaluated and are summarised in **Table 16** below. The core results for the Pukekohe DBC package components were generated from a set of 'core' assumptions. The recommended Pukekohe network is represented by Scenario A.

Table 16: Summary of Core Benefits of Individual projects in Pukekohe DBC ($ million PV)

Items	NPV Benefits ($m)									
	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E	Scenario F	Scenario G	Scenario H	Scenario I	Scenario J
Traffic - Travel Time Benefits	485	75	219	57	146	107	187	27	107	105
Traffic - Congestion Benefits	86	10	33	10	24	20	33	5	23	22
Traffic - Trip Reliability	39	6	18	5	12	9	15	2	9	8
Traffic - Vehicle Operating Costs	77	13	44	10	33	19	29	6	14	14
Active Modes	151	6	7	0	46	119	98	79	0	0
Crash savings	23	3	6	3	5	5	5	3	7	7
PT - Travel Time Benefits	13	13	13	0	0	1	1	1	0	0
PT - Reliability	2	2	2	0	0	0	0	0	0	0
PT - Health benefits	-10	-10	-10	0	0	0	0	-1	0	0
CO2	6	1	3	0	2	1	2	0	1	2
PV total net benefits excluding WEBs	873	118	336	85	267	281	370	124	162	159
PV of total net costs	1,134	233	554	72	213	417	417	216	63	62
National BCR Excluding WEBs	**0.8**	**0.5**	**0.6**	**1.2**	**1.3**	**0.7**	**0.9**	**0.6**	**2.6**	**2.6**
WEBs %	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
WEBs Benefits	131	18	50	13	40	42	55	19	24	24
PV Benefits Including WEBs	1,004	136	386	97	308	323	425	142	186	183
National BCR Including WEBs[5]	**0.9**	**0.6**	**0.7**	**1.4**	**1.4**	**0.8**	**1.0**	**0.7**	**3.0**	**3.0**

[5] The National BCR including Webs is considered a sensitivity test as per the MBCM. Note that these calculations do not use the MBCM update April 2023, which if used would result in higher monetised benefits and higher BCR's.

11.4 Range of BCR estimation – sensitivity tests

The key purpose of the sensitivity tests is to understand the relative impact of key assumptions on the BCR. The sensitivity tests were carried out as per the MBCM.

The sensitivity tests are split into analysis framework and parameter sensitivity tests. The analysis framework includes discount rate and analysis period, whilst parameter sensitivity includes WEBs, cost, and active modes and traffic benefits variability. Additional sensitivity tests were performed, as agreed with the peer reviewer.

Table 17 Table 17 shows the BCR range for the above analysis framework sensitivity tests.

Table 17: BCR range for different discount rate and analysis periods

	BCR (including WEBs) by analysis period and discount rate					
	Analysis Period 40 years			Analysis Period 60 years		
Scenarios	3%	4%	6%	3%	4%	6%
All projects	0.9	0.8	0.6	1.2	0.9	0.6
Drury West & IC Connection	0.6	0.5	0.4	0.8	0.6	0.4
SH22 Connection	0.7	0.6	0.4	0.9	0.7	0.5
Drury-Paerata Connection I	0.8	1.2	0.8	1.9	1.5	0.9
Drury-Paerata Connection II	1.4	1.3	0.9	2.0	1.6	1.0
Pukekohe Arterials (from Ref)	1.5	0.7	0.5	1.0	0.8	0.5
Pukekohe Arterials (from DM)	0.8	0.9	0.6	1.4	1.1	0.7
SW+SE+NW only	1.1	0.6	0.4	0.9	0.7	0.5
Pukekohe East Connections (from Ref)	0.7	2.6	1.9	3.9	3.1	2.1
Pukekohe East Connections (from DM)	3.1	2.6	1.9	3.9	3.1	2.1

Parameter sensitivity tests were performed by altering one at a time while maintaining the rest of the core assumptions, including the 4% discount rate and 40-year analysis period. The following parameter sensitivity tests were carried out:

- Including WEBs: ±10%
- Active modes benefits variability: ±25%
- Traffic benefits variability: ±25%

Wider Economic Benefit Percentage

The WEB % was sensitivity tested at +/-10% of the central estimate i.e. 25% and 5% tested for all Pukekohe projects. The base BCR without including WEBs is also presented in **Table 18**. It is observed that the adopted 15% Webs raises the BCR from 0.8 to 0.9 for the Reference Network against the Do minimum, and further increases to 1.0 if the WEBs is doubled to 30%. However, the relative impact of WEBs on varying it +/-10% have insignificant impact.

Table 18: WEBs Percentage sensitivity tests

	BCR				
WEBs%	0% (Base)	5%	15% (adopted WEBs)	25%	30%
Scenario A	0.8	0.8	0.9	1.0	1.0
Scenario B	0.5	0.5	0.6	0.6	0.7
Scenario C	0.6	0.6	0.7	0.8	0.8
Scenario D	1.2	1.2	1.4	1.5	1.5
Scenario E	1.3	1.3	1.4	1.6	1.6
Scenario F	0.7	0.7	0.8	0.8	0.9
Scenario G	0.9	0.9	1.0	1.1	1.2
Scenario H	0.6	0.6	0.7	0.7	0.7
Scenario I	2.6	2.7	3	3.2	3.4
Scenario J	2.6	2.7	3	3.2	3.4

Active Mode benefits Sensitivity test

During the Drury Local peer review, extensive modelling methodology checks were carried out to understand better the walking benefits predicted by the model, especially for the “Other’ trip purpose. These were found to align with expected daily travel by each mode and purpose. However, the greenfield nature of the location and the extensive future population growth make it more difficult to independently check the scale of benefits. It was therefore agreed to test with +/-25% active mode benefits. The same tests have been carried out for the Pukekohe DBC Economics. The variation in active mode benefits cause no significant variance to the overall BCRs.

Table 19: BCR variation with Active Mode benefits change

Active Mode benefit %	BCR		
	-25%	0% (core)	25%
Scenario A	0.7	0.8	0.8
Scenario B	0.5	0.5	0.5
Scenario C	0.6	0.6	0.6

Active Mode benefit %	BCR		
	-25%	0% (core)	25%
Scenario D	1.2	1.2	1.2
Scenario E	1.2	1.3	1.3
Scenario F	0.6	0.7	0.7
Scenario G	0.8	0.9	0.9
Scenario H	0.5	0.6	0.7
Scenario I	2.6	2.6	2.6
Scenario J	2.6	2.6	2.6

Traffic benefits Sensitivity test

The traffic benefits variability was tested for robustness since they exhibited high sensitivity and comprise of the bulk of the total benefits. The travel time, congestion, vehicle operating cost and trip reliability was tested for ±25%. The results in **Table 20 s**how that the BCR is relatively sensitive to changes in traffic benefits, which is expected given that they form the bulk of the benefits in the present appraisal.

Table 20: BCR variation with Traffic benefits change

Traffic benefit %	BCR		
	-25%	0% (core)	25%
Scenario A	0.6	0.8	0.9
Scenario B	0.4	0.5	0.6
Scenario C	0.5	0.6	0.7
Scenario D	0.9	1.2	1.5
Scenario E	1.0	1.3	1.5
Scenario F	0.6	0.7	0.8
Scenario G	0.7	0.9	1.0
Scenario H	0.5	0.6	0.6
Scenario I	2.0	2.6	3.2
Scenario J	2.0	2.6	3.2

11.4.1 Changes in the rate of land use growth

There is particular uncertainty around the extent and timing of the land-use development in the Pukekohe growth area. To examine the possible effects of alternative land use forecasts, two tests have been carried out to test the effects of delayed growth or accelerated growth termed as land use decelerated growth (LU Dec) and land use accelerated growth (LU Acc) respectively. The tests have been undertaken by ascribing the benefits estimated for the base case to different years that reflect faster or slower rates of land-use development. For each of these it is assumed that until 2028 nothing will change, and the long-term effects will also remain the same but the timing of growth between these points will differ. For examining the longer-term effects, it is considered that the analysis period for all projects will be 60 years. In the case of the land use deceleration scenario the long-term effects will be achieved at a delayed date than base case and for land use acceleration it will be achieved earlier as exhibited in **Figure 37**. The specific assumptions for land use sensitivity tests are:

- Land use decelerated growth – It is assumed that 2038 benefits will remain the same as base case and will remain flat till 2048, and 2048+ benefits occur after 2055.
- Land use accelerated growth –Year 2038 have about 60% benefits of year 2048. Year 2048+ growth occurs in 2048 and as a result Year 2048+ experiences 20% additional benefits as the effect of land use acceleration

Figure 37: Land use deceleration or acceleration effects on Total Benefits ($ million)

Below **Table 21** shows BCRs with different land use growth scenarios.

Table 21: Land use Sensitivity tests

BCR	Landuse Scenario					
	Excluding WEBs			Including WEBs		
	Base	LU_Dec	LU_Acc	Base	LU_Dec	LU_Acc
Scenario A	0.8	0.5	0.9	0.9	0.6	1.1
Scenario B	0.5	0.3	0.6	0.6	0.4	0.7
Scenario C	0.6	0.4	0.8	0.7	0.5	0.9
Scenario D	1.2	0.9	1.6	1.4	1.0	1.9
Scenario E	1.3	0.9	1.5	1.4	1.0	1.8
Scenario F	0.7	0.5	0.8	0.8	0.5	0.9
Scenario G	0.9	0.6	1.1	1	0.7	1.2
Scenario H	0.6	0.4	0.7	0.7	0.5	0.8
Scenario I	2.6	1.7	3.1	3	2.0	3.6
Scenario J	2.6	1.7	3.1	3	2.0	3.6

From the above table it is inferred that the projects are reasonably sensitive to growth and therefore project implementation to match the growth is important.

Route protection at an early stage will be required to help ensure that changes in the timing of development either accelerated or delayed can be easily accommodated. The 'decelerated growth' sensitivity test could be taken as a conservative scenario where the growth in the Pukekohe-Paerata future urban zones do not eventuate or are delayed, considering that these are expected to occur in 2048.

11.5 Investment prioritisation method

The IPM assessment for the overall recommended network is **H/H/VL** giving a priority order of **9**.

The derivation of this assessment is set out below. It should be noted that implementation funding is not sought at this time as the focus for this DBC is route protection. Future DBC's will present a more detailed assessment of project benefits and costs, where economic efficiencies are likely to improve.

It also noted that if recent updates to the MBCM were applied to the Pukekohe economic assessment, the BCR would be at 1 or above, moving the priority order from 9 to 5.

1.1.1 GPS alignment

The proposed GPS alignment rating is **High**.

This is on the basis of:

- Better travel options - New walking/cycling link forms part of a large or major urban area network.

The Pukekohe recommended network adds over 50 km of new walking and cycling network across the Pukekohe, Paerata and Drury West urban areas.

11.5.1 Scheduling

The proposed inter-dependency rating is **High**.

This is because route protection is essential in the short term and is part of a programme, package or another investment (e.g. housing development), and its delivery in the 2021–24 NLTP period is required to enable further implementation of that programme, package, or investment.

11.5.2 Efficiency

With a BCR of 0.8 without WEBs and 0.9 with WEBs the efficiency assessment is **Very low**.

It should be noted that if the latest Waka Kotahi update factors were to be used the BCR would be 1.0 or more, giving an efficiency rating of Low, moving the priority order to 5.

Financial case

12 Financial case

This section outlines the Financial Case for both route protection and implementation of the recommended Pukekohe network. The Financial Case is based on several variables as long-term route protection has not been previously widely undertaken. The types of uncertainty include:

- Level of third party (developer) funding, as this requires negotiation, agreement and must be undertaken on a case-by-case basis.
- Change in quantum of property acquisition required.
- Cost of property is higher or lower than assumed.
- Growth is quicker or slower than assumed.

This uncertainty should be considered by funders when allocating property funding. The following analysis is based on the staging assumed in the Economic Case which is broadly based on the FULSS and the estimated release of land in Pukekohe, as well as a range of other factors set out in Appendix N Staging Considerations. It is noted that the graphs assume the "likely" escalation of 10% for property and 2% for construction costs unless otherwise stated.

All projects in the recommended network have been recommended to proceed to route protection. For more detailed information on the route protection strategy refer to Section 13.1 and Appendix L: Route Protection Strategy.

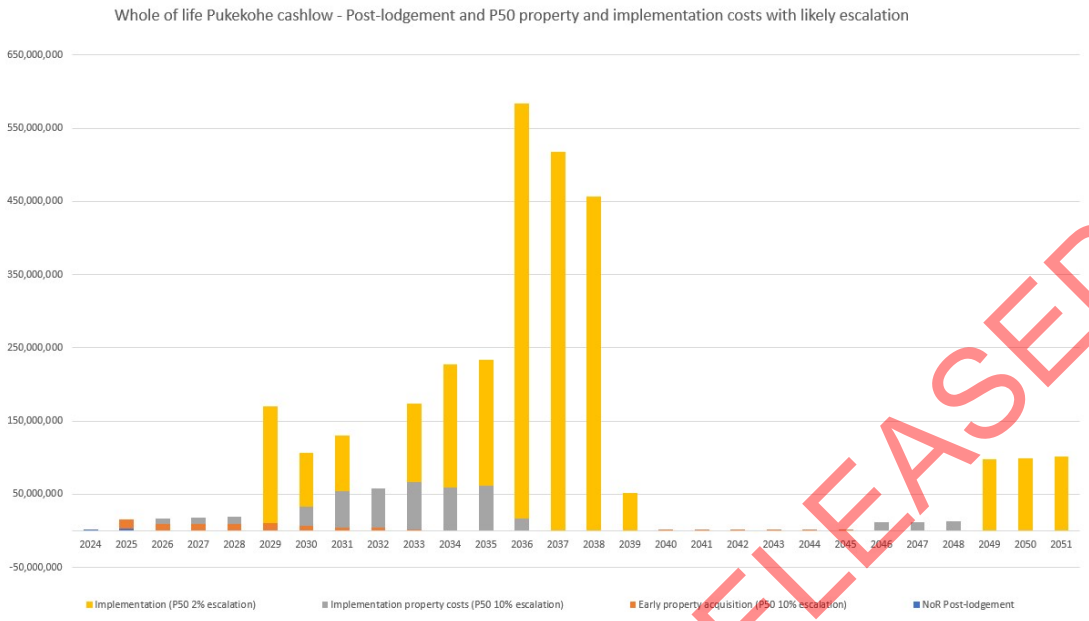
12.1 Whole of life costs

The financial implications for Waka Kotahi and Auckland Transport can be summarised into the following categories:

- **Cost of route protection** (Post lodgement costs, early property acquisition and property implementation costs).
- **Implementation costs** (Project development, pre-implementation, project implementation).
- **Operations and Maintenance costs.**

The Pukekohe cashflow for all three components by project phase is shown in **Figure 38**. This demonstrates that the initial costs are predominantly route protection and development costs with implementation costs dominating the cashflow from 2038.

Figure 38: Whole of life Pukekohe cashflow (excluding contingency)



The individual components are discussed in the following sections.

12.1.1 Cost of route protection

Route protection using NoR is the recommended mechanism for all of the projects identified in the Pukekohe package. The DBC seeks to progress the recommended network to the next phase, which includes post-lodgement. Two key cost elements have been identified as being related to route protection.

12.1.1.1 Professional Service – Post Lodgement Costs

The expected post lodgement cost is $6.4m. It is assumed these costs will be incurred following NoR lodgement in October 2023. It is assumed these costs will be equally split over 24 months from October 2023, through the 2024/25 financial year, concluding in the 2025/26 financial year. The budget for these costs is already funded through the Te Tupu Ngātahi Supporting Growth Alliance. This DBC, among other things, seeks the release of these funds.

12.1.1.2 Expected Property Costs of Route Protection

There is a potential property cost implication once the Pukekohe NoRs are lodged. While the vast majority (80%) of property purchase is typically anticipated in the three years prior to implementation of a particular project, this acquisition could occur prior to route protection being enacted, or during the route protection process.

The following costs have been developed using the Waka Kotahi Cost Estimation Manual (SM014) and property estimates are based on current zoning.

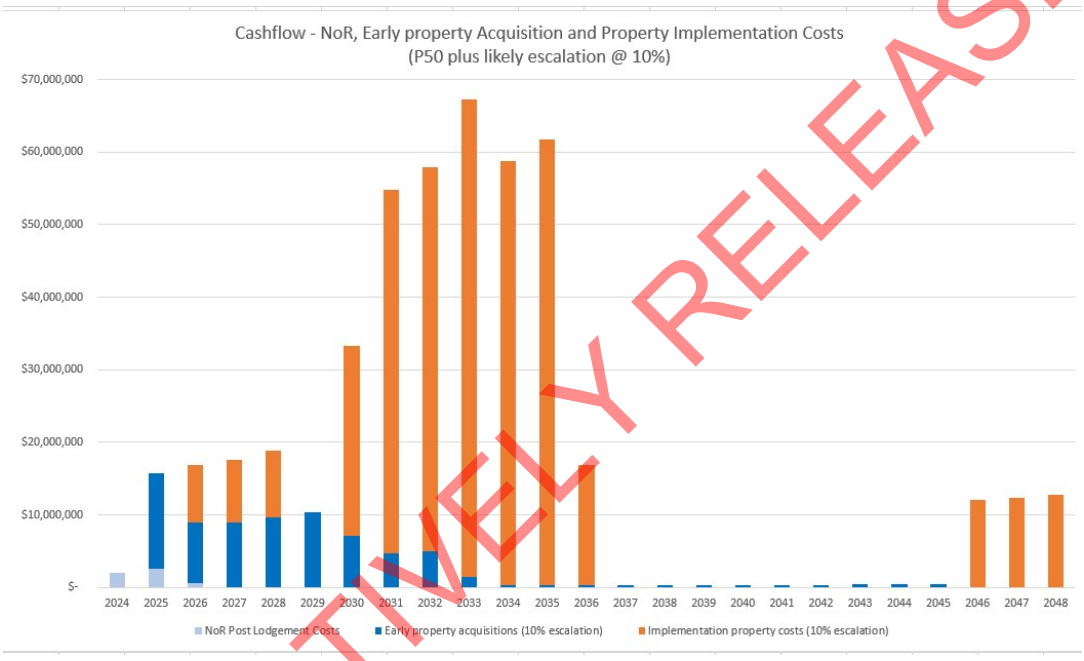
The Te Tupu Ngātahi Programme Wide Property Strategy identifies several different potential acquisition profiles for forecasting the potential property acquisition cashflow:

Profile A: Designate and hold until implementation (generally applies to greenfield sites).
Profile B: Designate and moderate acquisition (generally applies to brownfield sites).
Profile C: Early acquisition (applicable for strategic sites).

The Pukekohe profiles are assumed to all be Profile A. shown in Table 12-3 below. Note there have been no Profile C acquisitions identified. As yet there have been no early acquisition for hardship reasons identified however if they identified through landowner engagement this analysis will be updated accordingly.

The overall cashflow associated with the cost of route protection (NoR Post lodgement, Early property acquisition and property implementation) is shown in **Figure 39**.

Figure 39: Cashflow for cost of route protection



The graph illustrates the initial cost for route protection, with the NoR costs incurred in 2023/24 to 2025/26. There is then a cluster of potential early property acquisition costs (dark blue) which are phased into implementation property costs (orange) as the first decade timed projects start requiring property purchase in the 3 years prior to construction. The property implementation costs are quite concentrated towards the early-mid 2030's, reflecting the fact most projects in the Pukekohe network are staged for completion by around 2038, with only the Drury-Paerata Link project left to implement from 2048.

Exploring the early property acquisition cost in more detail it is noted:

The early property acquisition costs are the cumulative impact of the eight NoR projects of which three (West Drury Arterial, Sim to Sim Connection and Paerata Station Connection) only have 1-2 years before the construction timeline necessitates implementation property costs to start being accrued. Therefore, the allowance for early acquisition (20%) is primarily in the first decade with a small amount over the longer term related primarily to the Drury-Paerata Link. If the timelines were to slip this would decrease the early property acquisition risk in the short term, although property prices would continue to escalate during this time.

Given the nature of property prices there is a high degree of uncertainty of property cost in the future. Three levels of property escalation have been considered for sensitivity purposes:

• Low - 5% escalation.

• Likely- 10% escalation.

• High - 15% escalation.

The overall route protection costs for these three scenarios are shown in **Table 22**. The combined costs of early property acquisition and NOR post lodgement ranges from $66.6 - 89.4M for the Pukekohe programme.

Table 22: Cost of Route Protection with range of property escalation for full Pukekohe Programme

Scenario	NOR Post Lodgement $M	Early Property Acquisition $M	Property Implementation $M	Total cost for route protection $M
P50 Estimates, Low Escalation	6.4	62.2	300.8	368.3
P50 Estimates, Likely Escalation	6.4	72.4	394.5	466.9
P50 Estimates, High Escalation	6.4	83.0	488.3	576.6

The current RLTP is from 2021/22 to 2030/2031 and the Pukekohe NoR, early property acquisition and property implementation costs assuming the range of escalation above is shown in **Table 23** below.

Table 23: Cost of Route Protection 2023/24 to 2030/31 (post-lodgement, P50 early property, property implementation)

Scenario	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	Total
Cost (5% Esc)	2	12.4	14.9	15.5	16.2	8.6	27.1	43.5	140
Cost (10% Esc)	2	13.	16.2	17.6	18.9	10.3	33.3	54.7	168
Cost (15% Esc)	2	13.6	17.6	19.6	21.6	12.1	39.6	66	192

Note these reported property costs are the full estimated costs and there is potential for these to reduce following agreements with developers to vest land or with the ability to sell residual land back following the infrastructure upgrades. The potential cost savings from the developer aspect is likely to

have the most impact on the early property acquisition aspect as land would not be able to be sold until after completion of construction.

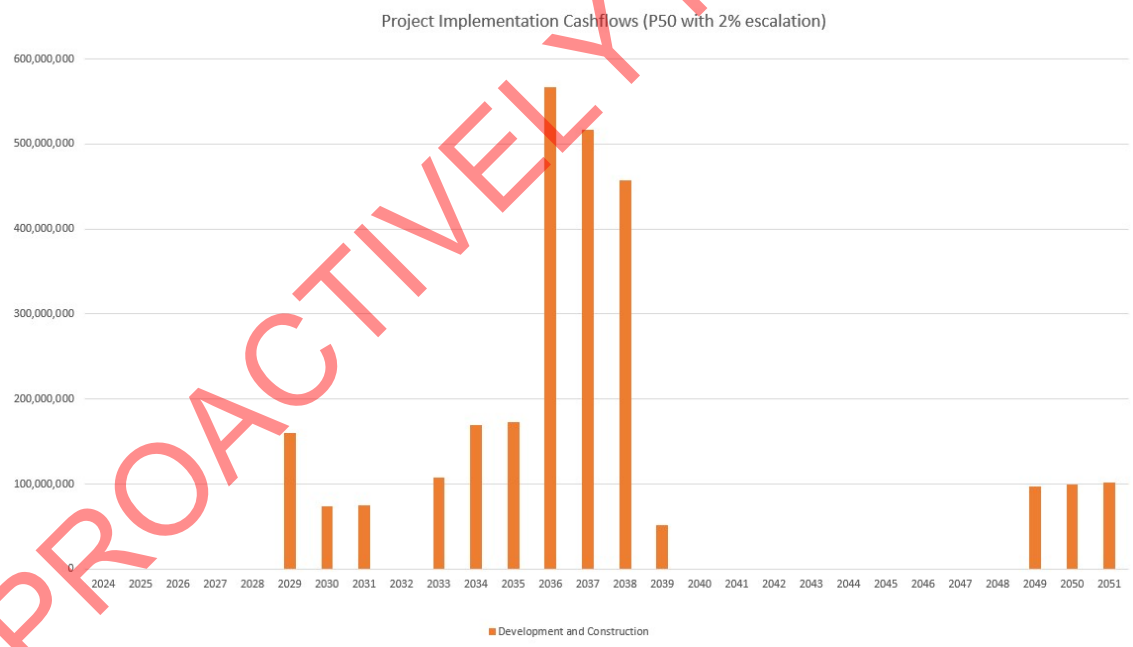
12.1.2 Implementation costs

The implementation costs include:

- Project development – including consultancy fees and Waka Kotahi and Auckland Transport management costs.
- Pre-implementation costs – including consenting, design fees, site investigations, consultation and mana whenua consultation.
- Project implementation costs. Associated with construction, as well as other non-construction costs associated with supporting the construction. An allowance of 7% of physical works costs has been allowed for non-construction costs associated with completion of the implementation phase. This is made up of 5% for consultancy fees to allow for a traditional measure and value contract, plus an additional 1% for Waka Kotahi / AT managed costs, and 1% for construction monitoring fees.
- A "likely" construction escalation scenario of 2% has been adopted.

Figure 40 shows the project cashflow for the implementation costs with the assumed land use release scenario. Further details on the implementation costs can be found in Appendix H: Cost Report.

Figure 40: Pukekohe Cashflow – Implementation costs (P50, likely construction escalation)



12.1.3 Operational costs

The operational costs were described in Section 11.2.2 and these have been applied as an annual or one-off cost as appropriate. The spend profile for these costs is shown in Figure 12-6 and as expected is weighted at the middle to end of the assessment period once infrastructure is constructed.

12.2 Funding

12.2.1 Funding sources

Potential funding sources are detailed in **Table 24**.

Table 24: Potential funding sources for Pukekohe Funding shares

Funding source	Commentary
National Land Transport Fund (NLTF)	For the 2018-21 NLTP, the total funds allocated was $13.1b (excluding local share contribution of $3.8b). This amounts to approximately $4.3b per year and around $1.8Bn of this to be spent in Auckland. • Early Investment Signals for the 2024-27 NLTP have acknowledged funding constraints based on the forecast revenue and programme commitments. A significant proportion of funding in the 2024-27 NLTP is expected to be committed for continuous programmes - state highway and local road maintenance and public transport services - and that there will be a high carry-over of activities because of project delays and cost increases. In addition, the release of the Emissions Reduction Plan (ERP) is changing the investment focus, with the transport sector expected to reduce emissions by 41 percent by 2035.
Approved organisations' local share	AT's local share for transport services and projects is funded by Auckland Council. The Auckland RLTP indicates a local share contribution of $1.1b in the 2021-24 NLTP period.
Government grants	This is a long-term delivery programme and the nature of additional government funds will vary throughout time. It is feasible that one or more of the projects may qualify for criteria under separate government funding. • Examples of current funding streams include projects being delivered under NZUP funding and new government funding available through the Climate Emergency Response Fund (CERF) to invest in transport activities that will help reduce carbon emissions. • This DBC cannot assume any of this type of funding but it is worth noting that the owners should be looking for opportunities to contest this type of future funding for the Pukekohe projects. This would obviously increase the affordability of this large-scale investment.

Funding source	Commentary
Other supplementary funding sources Refers to contributions that are additional to the NLTF, local share funding or Crown loans.	Financial contributions towards the costs of improving network infrastructure (Developer Contributions). Note Auckland Council is undertaking a citywide assessment of Developer Contributions with a framework for Drury being consulted on at the time of the writing of this DBC. It is noted the intention is that a similar process will be rolled out for both green and brownfield growth Auckland Wide. This process aims to capture contributions based on a beneficiary style analysis. Debt finance and Public Private Partnerships (PPPs). Value capture / Beneficiary pays. This DBC identifies cost saving opportunities from financial contributions from developers for the Pukekohe Programme, primarily through the delivery of growth corridors and vesting of land. This assessment has not considered debt finance or value capture and it is recommended this is further explored by the owners as the Programme progresses.

An analysis of the Regional Land Transport Plan (RLTP) 2021-2031 is detailed in **Table 25** and includes the following funding streams associated with the Pukekohe transport network.

Table 25: Identified Pukekohe Funding

Item	Description	Funding Status	Responsible Agency	Part of DBC Network
Supporting Growth – Post Lodgement and Property	To support legal costs and necessary property purchase associated with designations, including hearings and environment court costs.	$33.5m 2023/24 to 2030/31	Auckland Transport	Yes
Supporting Growth - Investigation for Growth Projects	To facilitate investigation for high priority projects in growth areas.	$3m 2023/24 to 2030/31	Auckland Transport	Yes
Supporting Growth Route Protection Programme	An AT/Waka Kotahi Alliance has been set up to look at route protection for the preferred network in the Northwest, North and Southern growth areas of Supporting Growth Programme.	$18.1m 2023/24 to 2030/31	Waka Kotahi	Yes

Item	Description	Funding Status	Responsible Agency	Part of DBC Network
SH1 Drury South to Bombay (Route Protection)	The State Highway 1 Papakura (SH1) to Bombay project proposes improvements to Auckland's Southern Motorway, between Papakura and Bombay. This covers route protection south of Drury.	$14m 2023/24 to 2030/31	Waka Kotahi	No

The Te Tupu Ngātahi programme itself is funded so there is programme wide funding for the Pukekohe NoR professional services going forward including pre lodgement and NOR documentation preparation. Preparation of this documentation does not in itself trigger the early property acquisition, this arises once the NOR is formally lodged.

However, with respect to the proposed recommended Pukekohe network to support growth and the associated likely post-lodgement costs (see above **Table 25**), there is unlikely to be sufficient funding across the programme and is likely to leave a significant funding gap for Pukekohe.

As shown in **Figure 40** above, the expected implementation costs of the Pukekohe programme (with 2% escalation) are in the region of $2.65b. As growth occurs and the demand for components of the network emerge, these project costs will need to be incorporated into future RLTP's, net of any other funding sources such as development contributions or Crown funding.

12.2.2 Funding Share

Based on discussions with owners the projects have been split for delivery by organisations as follows

- Drury West Arterial (NoR 1) – Auckland Transport
- Drury to Pukekohe Link (NoR 2) – Waka Kotahi
  - South Drury Arterial
  - SH22 Connection
  - Drury-Paerata Link
  - Paerata Arterial
- Paerata Connections (NoR 3) – Auckland Transport
  - Paerata Station Connection
  - Sim to Sim Connection
- Pukekohe North-East Arterial (NoR 4) – Auckland Transport
- Pukekohe South-East Arterial (NoR 5) – Auckland Transport
- Pukekohe South-West Upgrade (NoR 6) – Auckland Transport
- Pukekohe North-West Arterial (NoR 7) – Auckland Transport
- Pukekohe East Road / Mill Road (Bombay) Upgrade (NoR 8) – Waka Kotahi

The individual projects have been grouped into NoRs. Six of these will be delivered by Auckland Transport and two by Waka Kotahi.

In addition to the owner allocation for funding, general assumptions have been made about potential contributions from third parties. Developer contributions have been considered depending on the width and type of corridor.

Table 26: General assumptions for developer contributions and potential cost savings

Corridor Type	Third Party % of Implementation Cost	Third Party % of Property Cost	Commentary
Greenfield 24m corridor	80%	50%	Developers need these roads to activate land use. Depending on timing it is anticipated to be able to negotiate for vesting of at least 50% of property on these routes.
Greenfield 30m corridor	50%	50%	Developers need these roads to activate land use. Depending on timing it is anticipated to be able to negotiate for vesting of at least 50% of property on these routes.

The north-east arterial corridor is achieving the lowest value for money in Pukekohe due to the high cost and lowest benefits. This could suggest it is not a great investment as fully funded by Auckland Transport. However, there is a case for Auckland Transport funding key elements (such as bridges and end point intersections) with developers constructing other parts adjacent or accessing their growth. The advantage would be that Auckland Transport would then get a completed link (and strategic benefit), with a moderate contribution.

The current staging is based on the FULSS land use which assumes all growth land will be released in Decade 1 which has front loaded a lot of early property acquisition costs into Decade 1 and concentrates implementation around 2028-2038 with the final piece of investment in the third decade (2048+).

As is shown by the RLTP funding, there is only a small portion of property funding currently available for Pukekohe in Decade 1. This would suggest that unless an external funding source is identified for the route protection in particular, that the release of land may need to be slowed down and/or the infrastructure implementation delayed allowing the transport network time to respond.

Despite the lower BCR, progressing route protection is still recommended to enable the desired future transport outcomes for Pukekohe. There are a number of funding opportunities to consider to further improve the value for money proposition:

- Consider timing and scale of the north-east arterial. This might include Auckland Transport delivering key parts of (such as bridges and intersections) and protect the route for developers to complete other sections.
- This financial analysis has been based on the assumed staging; however, the policy landscape has changed such that we might reasonably expect more out of sequence development to occur. One of the opportunities to be considered when

seeking funding is the ability for Auckland Transport to make strategic property purchases if land becomes available. It is noted that an internal Auckland Transport workstream is investigating the development of a strategic property fund. Pukekohe currently has no areas highlighted for strategic property purchase but opportunities may present themselves and some flexible funding would maximise the flexibility for delivering the Pukekohe infrastructure.

- A second funding consideration is the ability for Auckland Transport to have sufficient flexibility in funding to respond to out of sequence Plan Changes, in particular if the funding would enable an Infrastructure Funding Agreement with third parties.

It is acknowledged that there is a cost to flexibility and route protection and the work undertaken to date for Pukekohe has concentrated on balancing the future needs of the corridors and desired design flexibility against the property requirements to facilitate the infrastructure. Key considerations and opportunities to note:

- Throughout the design process a rigorous approach has been undertaken to consider reductions of corridor widths for constrained brownfield corridors such as the South-West Arterial. Localised reduced cross sections or road space reallocation have been applied where appropriate and have been used to avoid significant topographical or ecological constraints or reduce significant impacts to adjacent existing property land uses.
- Provision of additional vehicle capacity for greenfield corridors has been restricted to two lanes with only approaches to SH1 on the Drury South Arterial and Mill Road triggering four lanes to support safe, efficient and resilient interchange operation.
- The topography of Pukekohe is particularly steep in some locations. For greenfield corridors, alignments have been optimised to balance cut and fill and reduce earthwork batter impacts on property.
- The DBC has not considered cross section reductions for greenfield corridors as the overall benefits of the 24 or 30m cross sections will best provide for the future growth.
- Specific analysis has been undertaken to understand which intersections in Pukekohe should remain route protected for roundabouts compared with intersections that have clear operational or legibility requirements for signals. In this way the additional footprints associated with roundabouts have been minimised.

The estimated funding split for the P50 un-escalated costs are shown in Figure 41 and Figure 42 below. This highlights that most of the funding ($1.6B) is likely to be required from the National Land Transport Fund (NLTF) which consists of 100% funding to the state highway components of the Pukekohe programme and NLTF co-investment for Auckland Transport projects. There are good opportunities for the Auckland transport local share to be offset by development contributions, where we have identified an indicative amount of some $277m that could be anticipated from developers to offset AT's project costs.

Figure 41: Funding Split for Pukekohe Projects (P50 un-escalated costs)

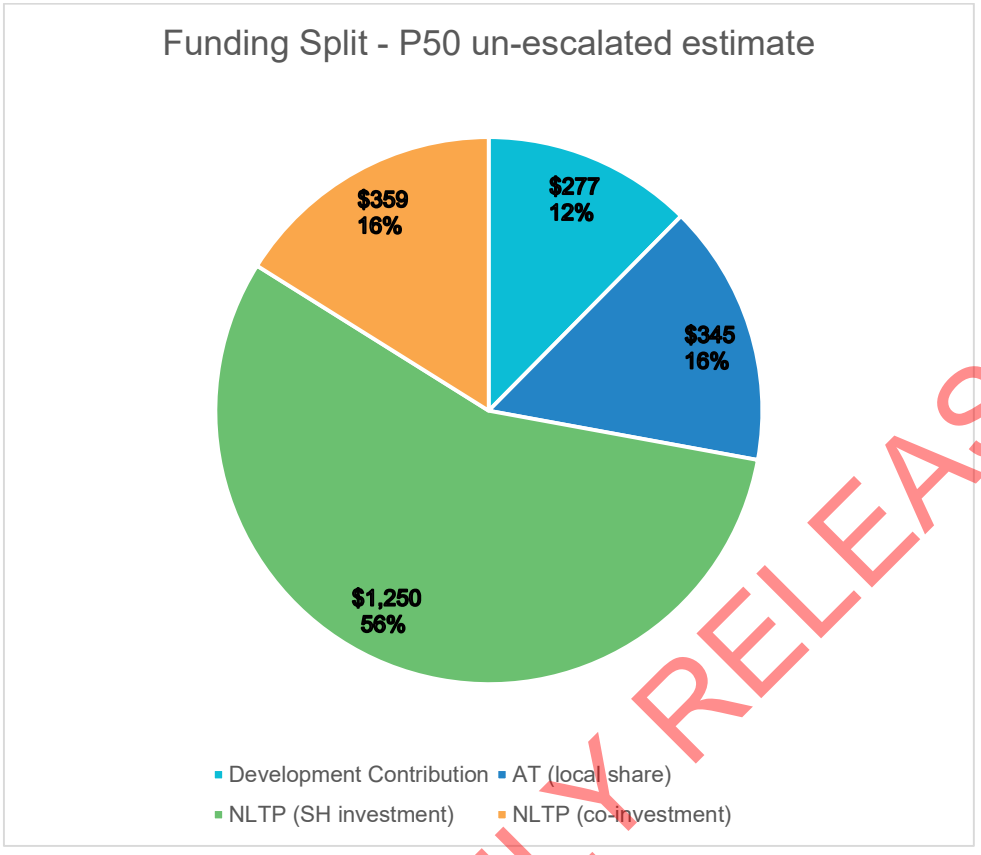
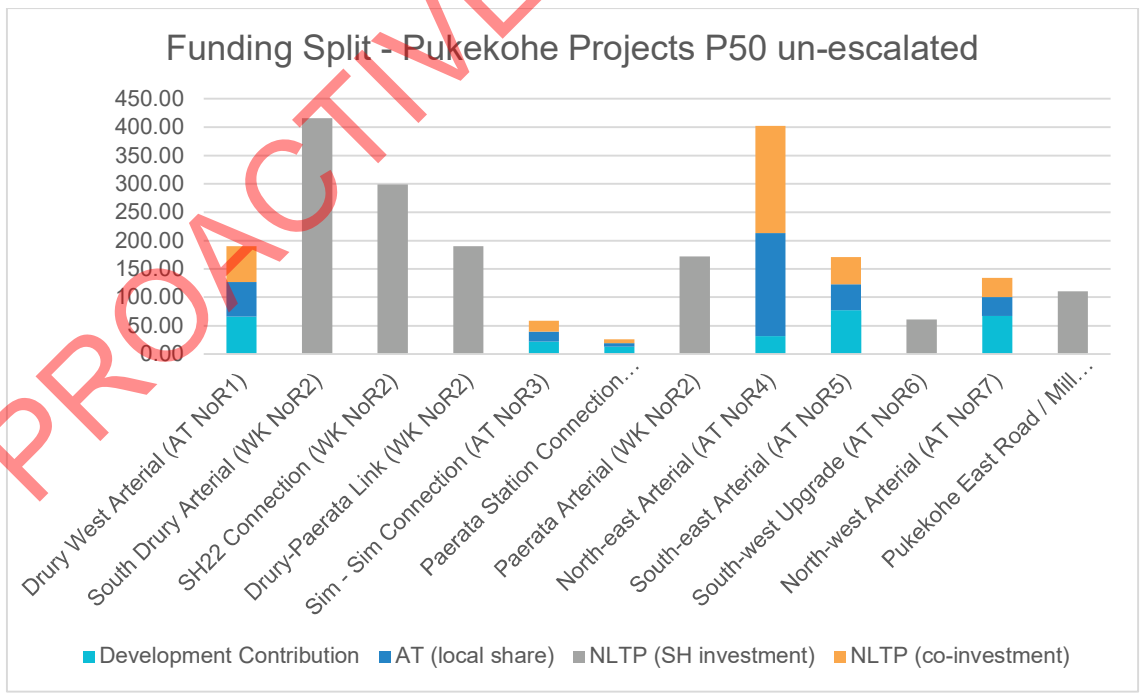


Figure 42: Funding Split by Pukekohe Project (P50 un-escalated costs)



Commercial case

13 Commercial case

The commercial case sets out the proposed commercial approach to the development of each of the recommended projects described in the strategic and economic cases. Since the emphasis of this DBC is to build the case for route protection that enables the projects, the commercial case has a focus on the optimal commercial arrangements for achieving route protection, including the potential for any land acquisition well in advance of construction.

Future business cases will prepare the implementation case for each project, and these will include commercial cases covering any balance of land acquisition required, as well a consenting strategy and procurement strategy for the physical works.

The following sections describe:

Consenting / route protection strategy for each project in this DBC
Property acquisition strategy for each project
Procurement strategy for the package

13.1 Route protection approach

The Route Protection Strategy in Appendix I has been developed to support the Pukekohe DBC and makes recommendations on the prioritisation, packaging and preferred planning mechanism to secure route protection for the Pukekohe-Paerata recommended network.

A separate consenting strategy will be prepared as part of the NoR process which will confirm consenting pathways, required technical assessments and NoR staging.

As outlined in section 2.2, the corridors in the Pukekohe DBC all require NoRs. The Route Protection Strategy in Appendix I presents the evaluation of alternative protection approaches for these corridors and the reasoning as to why NoRs are the preferred approach.

13.2 Property overview

The full property overview for the Pukekohe DBC is included in Appendix J: Property Overview.

It is important to note that whilst this property overview has been developed for a DBC, the Pukekohe DBC is for route protection purposes only and therefore the property implications are different to those of a project where implementation is imminent. There will be a subsequent Implementation Detailed Business Case to seek approval for implementation funding for individual projects, which will include more detailed analysis of the property issues. This DBC also forms part of the wider Te Tupu Ngātahi programme of works that has developed a Programme Wide Property Overview that outlines the principles for property acquisition for the entire programme. These will guide the development of the property approach for Pukekohe-Paerata with the key points being:

The programme is about long-term affordability and property will be generally acquired closer to implementation. It is noted that there is the potential for property costs escalation (in real terms) over time the longer the gap between lodgement and implementation, as a result of prevailing global and domestic economic conditions and any changes in nearby zoning and land use development.

There will be the potential for early property acquisition of land subject to a designation if landowners seek an order from the Environment Court under section 185 of the Resource Management Act obliging the requiring authority to acquire or lease the land.

The Requiring authority will take the lead on property negotiations for each specific project, utilising the current processes of that organisation (Auckland Transport or Waka Kotahi).

Advance Purchase Guideline processes will apply.

Where there is opportunity for strategically important properties to be acquired, these should be taken, however at this time no such properties have been identified in relation to this DBC.

A programme wide property resource will look at opportunities for resultant value capture from residual land as part of the land use integration opportunities of the programme.

Early property acquisition costs are a critical issue once the identified projects are route protected. This property overview outlines the analysis and approach to providing as much certainty as possible to what this cost could be into the future.

The overview has been developed for the route protection business case phase however given the long-term nature of route protection, this overview will need to be revisited, reviewed and updated each decade and more frequently in the lead up to project implementation, such as during development of detailed business cases for implementation and the design and advancement of the consenting and land acquisition programmes. Accordingly, the acquisition programme is dependent on detailed design and final land requirement plans being completed.

A total of 245 property interests have been identified for acquisition as outlined in Table 27.

Potential property compensation costs as a result of acquisition have been developed through consideration of likely base costs and then consideration of different risk profiles. An expected estimate (P50) and also a P95 cost have been identified. Given the long-term nature of the proposed route protection approach a range of potential appreciation rates have been used to recognise the uncertainty of how values will change in the long term in this area of significant growth. The three annual compounding rates of appreciation used are 5%, 10% and 15%.

Whilst a more detailed breakdown of the resultant property costs can be found in Appendix J, applying the above approaches results in the forecast property costs summarised in **Table 28**.

13.2.1 Key risks and opportunities

Due to the long-term nature of the route protection approach, there are a number of risks and opportunities from a property perspective as shown below.

Table 29: Key Property Risks for Pukekohe

Risks	Opportunities
Level of appreciation given uncertainty of timing The very nature of the area, which is forecast to grow (and hence needs supporting transport infrastructure) means that property prices will likely increase as future zoning is realised. When this happens and to what extent development is permitted by these zoning changes will have a significant impact on the potential future value of property. This is an area that is challenging to predict with certainty.	**Market appreciation** With the level of market appreciation likely in Pukekohe, the earlier property is acquired for the transport infrastructure the cheaper (in real terms) it is likely to be. It is acknowledged that this creates affordability and funding prioritisation challenges, but there is a real financial opportunity to save significant costs if funding for early acquisition can be found.
Live zones and Plan Changes Paerata has already been live zoned and there is ongoing active development which potentially impacts the timing for delivery of key Paerata infrastructure . A number of Plan Changes are also being separately progressed in Pukekohe ahead of live zoning. The main risks arising from out of sequence development is that additional pressure that will be put on Auckland Transport and Waka Kotahi to develop adjacent infrastructure earlier to harness network wide benefits. In constrained areas (e.g. North West Arterial, Paerata Arterial) there is an additional risk that new developments could occur too close to the existing road blocking the opportunity to implement the recommended projects. If route protection is not achieved for the transport system imminently the opportunity may be lost to efficiently and effectively deliver the transport system and outcomes sought.	**Developer agreements** The main opportunity from Plan Changes is the ability to work with the developer regarding land acquisition, corridor alignment and co-delivery. There are a number of significant developers in the area which provides an opportunity to achieve agreements to support the funding and implementation of the corridors as well as support their development aspirations. Property is an important part of these agreements.

Cashflow for early property acquisition given long term protection Given the above timing issues, and what level of s185 claims there could be, confirming a value for early property acquisition is equally uncertain.	

13.2.2 Managing risks

There is considerable uncertainty around the property costs given the size of this programme (and the wider Te Tupu Ngātahi programme) and therefore to best manage this uncertainty and minimise the early property acquisition expenditure as much as possible until projects are implemented the following is proposed:

Joint governance from owners. It is recommended that a joint owner approach to property be taken at a governance level to ensure the appropriate prioritisation of funding.

Appropriate resourcing. This is a large programme of works over an extended period of time and appropriate resourcing will ensure best for programme outcomes are achieved.

Developer Agreement. Focussing on getting early and comprehensive developer agreements in place could reduce the affordability burden from a property perspective.

Application of Betterment. Strengthening the case early for this aspect of the valuation process and ensuring a consistent and common approach across all projects is critical to potential successful use of this tool.

Waka Kotahi and Auckland Transport have comprehensive processes and teams dedicated to the ongoing management of properties once purchased. It is assumed that these existing processes will be used to manage the properties. With only x% of the properties being full purchases the ongoing management is considered achievable.

Potential ongoing management issues that will need consideration going forward are:

Commercial. Where properties have multiple business tenancies or business operations that need relocating, the property cost estimates assume the freehold/unit title interests will be acquired early to mitigate business relocation costs and manage leases expiring.

Rural. Rural land if acquired early might need ongoing maintenance. Leasing this land for grazing and other rural lifestyle uses could be considered.

Redevelopment. Where large parcels of contiguous land are being acquired there could be opportunities to redevelop and sell residual land. This is detailed more in the next steps.

13.2.3 Wider Te Tupu Ngātahi property management

It is also important to outline that the Te Tupu Ngātahi Property Wide Strategy sets out a number of initiatives to effectively manage the significant acquisition programme of the route protection approach. These are currently being considered and the Property Strategy is consistent with the aspirations of these wider approaches if successful. It is important to note that these wider Programme Wide proposals are not yet agreed for implementation by the partners. At the heart of these initiatives is a Strategic Property Fund.

There are some critical components needed to operate the fund successfully and these are summarised below.

The pre-allocation of funding for strategic property purchases. The current process does enable this to occur – however it requires AT Board approval and delegated approvals, and in the case of Waka Kotahi, approval from LINZ for individual property purchases on a case-by-case basis. This process would benefit from streamlining with delegated authorities in place with the respective organisations and a ring-fenced fund identified within the RLTP. This fund would be utilised for properties that are endorsed as 'Early Acquisitions'. This fund may also be used to respond to developer integration opportunities that occur in an ad-hoc manner and can occur out of sequence in response to private plan changes. This would enable a more nimble and efficient mechanism consistent with more commercial operations.

Dedicated Resources. A dedicated Waka Kotahi and Auckland Transport resource to work through commercial deals and evaluate strategic purchase opportunities. This team would work with the OIM team on the identification, acquisition and enhancement of properties purchased through the fund. Without dedicated resource, the property approach required for a programme of this scale will potentially suffer and opportunities for considerable efficiencies (and enhanced outcomes) will be lost.

Governance. The fund would need to be managed and administered by members of both organisations to ensure transparency of process. This group would oversee the expenditure of the fund and make recommendations to the acquiring entities approvals processes. The governance group would be responsible for agreeing, setting and delivering against the objectives of the fund as well as confirming the priority areas for investment.

Commercial Focus. The fund will need to be managed with commercial acumen that could also identify commercial opportunities that may arise from an advanced property purchase strategy, such as aggregation of properties and alignment with/proximity to partner land holdings. While this may require changing current approaches, and potential policy and mandate, this presents the opportunity to substantially reduce the total cost of the property for this programme. To fully realise the opportunities there may be a need to work with partners such as Kainga Ora.

Policy and Procedure Changes. The fund would benefit from some changes including allowing residual land purchased by AT to be sold and reinvested in the Strategic Property Fund, without returning to Auckland Council. Another key change could be the application of Financial Assistance Rate (FAR) for advance property purchases.

13.2.4 Next steps

This programme is focussed on route protection. Uncertainty therefore remains on the exact timing of the property acquisition needs of the projects until implementation is confirmed. This results in risk and uncertainty associated with the scale and timing of early property acquisition. To manage this risk and uncertainty appropriately and proactively, it is recommended that during the projects' development the following occurs:

The Implementation DBC reconfirms the property cost and requirements as design confidence is further developed.

Any changes in design avoid the need for minor land requirements.

Value engineering is undertaken to minimise the land required for projects.

Detailed property valuations are undertaken closer to implementation.

Agreements with developers are progressed and 'locked in' as soon as possible to try and reduce the total property costs of the programme.

Active management (including resourcing) of the property programme with a view to reduce costs as much as possible, whilst also looking for opportunities to maximise value and cost savings when opportunities and funding allows.

Reach agreement with larger developers on the approach to property acquisition. This would include agreement on the value and any other agreements reached (such as cost share for construction of portions of infrastructure). Whilst each agreement will be bespoke to the particular developer and issues associated with a particular project, agreements already reached across the Te Tupu Ngātahi Programme have seen developers agree to develop the collector portion of new road connections, with the road controlling authority responsible for the remaining 'arterial' road implementation and property costs. This type of approach will be used throughout the programme, where possible and presents an opportunity as the base property costs includes the cost of acquiring all the required land.

Willing buyer willing seller. Where there are properties that hold strategic benefit to the programme and there is an opportunity for early purchase, consideration will be given to securing these properties earlier in the acquisition programme. It is considered that early acquisitions could reduce the overall property costs if acquisition occurs in earlier decades.

Compulsory process. The remaining projects will go through the road controlling authorities' normal PWA compulsory approvals process. This will include the application of Auckland Transport's current Early Acquisition Guideline and Waka Kotahi's Advance Purchase Policy processes for any purchases prior to the typical three-year period prior to implementation.

13.3 Procurement plan

The scope of works for Te Tupu Ngātahi is to undertake the works necessary to support and obtain the designations for the recommended network (i.e. route protection) and does not currently include obtaining resource consents for individual projects. The timing and delivery model for the remainder of works needed to support resource consent applications should therefore be considered in the pre-implementation phase of work.

Once a project has been through the pre-implementation phase it will be ready for implementation. This will include detailed design, consenting and physical works. The delivery model will need to consider factors, including:

Scale
Complexity
Programme

Given that this implementation phase is many years away for most Te Tupu Ngātahi projects, a detailed procurement strategy should be developed for each project at an appropriate time in advance and closer to the implementation of each project. Some initial issues for consideration during the implementation phase are summarised in **Table 30**.

Table 30: Implementation Procurement Strategy

Consideration	Waka Kotahi Projects	Auckland Transport Projects
Scale and complexity	The scale and location of the multiple Waka Kotahi projects, which are largely offline improvements, especially those linking Pukekohe to Drury, may lend themselves to being delivered as one or two large projects so as to realise efficiencies in procurement and construction costs.	Depending on the timing for implementation, the upgrades of existing corridors could have some traffic management challenges due to the unavailability of alternative routes

		It is noted for all corridors that opportunities exist for embodied carbon material innovation during construction.
Timing and urgency	There is increased urgency for some projects where there are active developers. The need to provide road access to new rail stations at Drury South and Paerata will also influence the staging, timing and urgency of progress to the next phases of the projects.	
Defined scope	The new south Drury interchange at SH1 and the SH1 Bombay interchange upgrade could be integrated with South Drury arterial and Mill Road (Bombay) projects respectively to realise delivery efficiencies and minimise disruption during construction.	For the local roads, the detailed design will be completed prior to awarding the construction contract, this will define the expected outputs and will involve lower tendering costs for prospective suppliers than other contract models. Local roads are considered business as usual projects for Auckland Transport. Note, this DBC assumes that long term SH22 will be revoked as a state highway, transferring it from Waka Kotahi to Auckland Transport as the road controlling authority.
Supplier market conditions	There are several suppliers available for this type and scale of work in Auckland which lends itself to significantly competitive forms of delivery for traditional contracts.	
Client involvement, control and capability	Client control will depend on the delivery mechanism eventually chosen. But it is expected that the client will retain design control and site supervision for the local roads.	
Tangible demonstration of value for money	Due to the competitive tender process for the other local roads, it is relatively straightforward to demonstrate value for money in the construction phase.	

These approaches should be reviewed in detail during the Implementation DBC phase once more detail is understood and a more definitive procurement approach can be made.

13.4 Services required

Following the route protection level NoR approach described above, the remaining elements required to prepare this project for implementation include:

- Detailed design
- Property purchase
- Resource consents and other statutory approvals and management
- Surveillance and quality assurance (MSQA)

Key matters to be considered are shown in **Table 31**.

Table 31: Considerations for required services

Consideration	Waka Kotahi Projects	Auckland Transport Projects

Scale and complexity	Staging in line with land use development and enabling strategic traffic management, combined with connections into existing and new local networks will introduce complexity in delivery, especially with regard to maintaining desirable levels of service for both road and rail during construction. Specialist capability might be needed to design and deliver these strategic projects.	Smaller design fees expected for the local roads. Standard service providers are likely to be suitable for most of these upgrades.
Funding	No projects in the recommended Pukekohe DBC have confirmed implementation funding.	
Timing and urgency	Is linked to the release of land and the ability for the remaining network to be "sweated" and safety and mode shift gains made before providing additional vehicular capacity for strategic traffic.	Local road implementation is likely to be earlier in the programme due to development pressures.
Defined scope	Consent conditions to be secured before award of physical works contract.	
Supplier market conditions	Auckland market can service this range of contracts and service requirements.	
Client involvement, control and capability	Clients desire to retain control.	
Non-cost success factors	Strong desire for the clients to achieve best practice environmental and stakeholder outcomes. Committed to addressing carbon reduction and maximising the opportunities to mitigate or where necessary adapt designs to best respond.	
Tangible demonstration of value for money	Competitive tender for services recommended.	

These considerations indicate that the works proposed range from small to large scale works. It is recommended that the design, consenting and MSQA elements are packaged together. This reduces the additional time requirement associated with procuring each of these elements separately. Overall procurement risk is low considering that with appropriate planning, there are skills, capability and client expertise to deliver these Pukekohe projects.

Management case

14 Management case

The following sections describe the arrangements that will be implemented for the successful delivery of the recommended Pukekohe Transport Network. It describes the delivery arrangement for each phase of the route protection and tests the project planning, governance structure, risk management, stakeholder management, benefits realisation and assurance. It is noted that the Pukekohe DBC sits within the wider context of the Te Tupu Ngātahi programme, and as such this management case draws on the overarching management case developed as part the wider programme.

There are two distinct phases for delivery:

1. Route protection including:

    Preparation of NoR documentation for lodgement (8 NoRs in one package)
    Plan Change process and associated Developer Agreements
    Retention of existing land ownership.

2. Post route protection management – post lodgement activities for NoR packages.

These steps are discussed separately in Sections 14.1 to Figure 14-414.4 below. Each section discusses the specific governance, key activities, roles and responsibilities, risks and stakeholder engagement requirements applicable for that stage. This is followed by some additional overall programme management considerations post route protection.

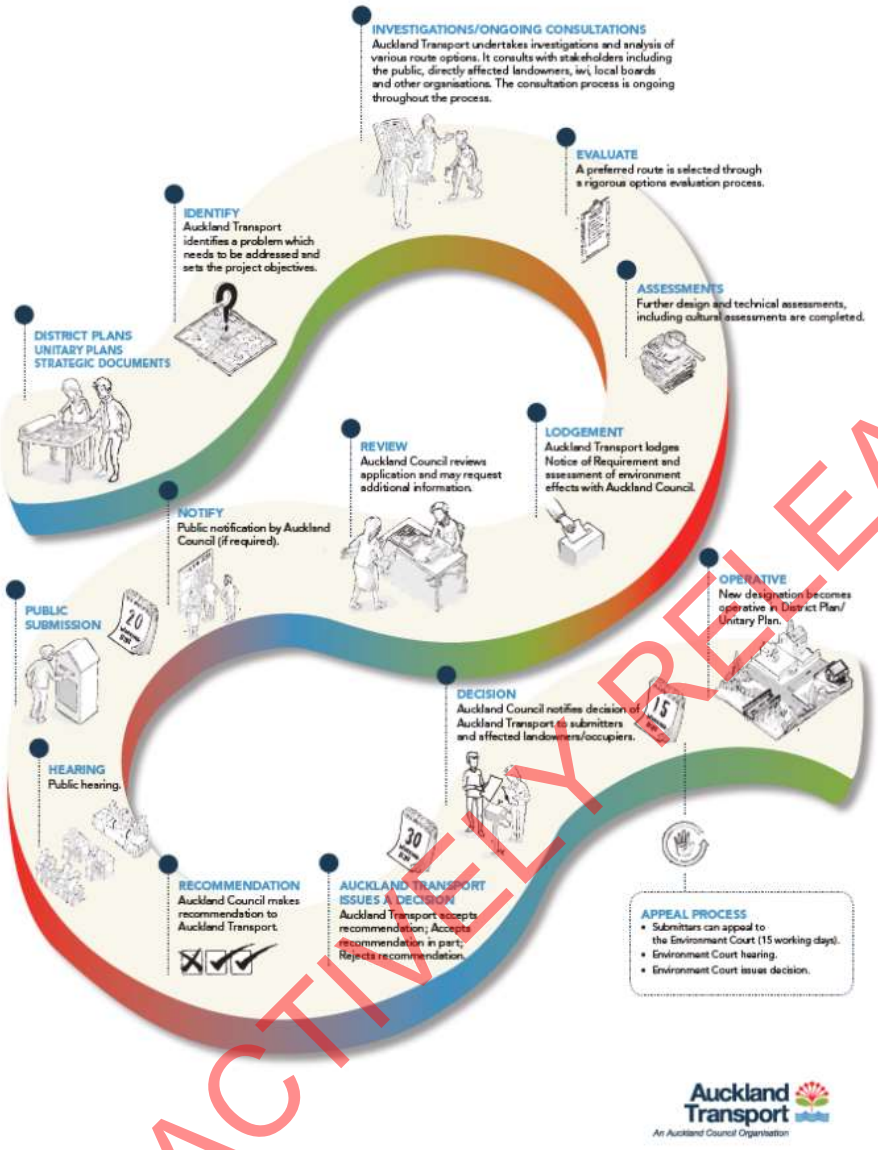
14.1 Route protection management

It is noted there are multiple methods to achieve route protection and this section is based on obtaining a transport designation. This section covers the preparation and lodgement of NoR documentation and any post lodgement activities to confirm the operative designation. It concerns 14 projects within Pukekohe to be delivered through eight NoRs.

14.1.1 NoR Route Protection Process

The route protection process is shown in **Figure** .

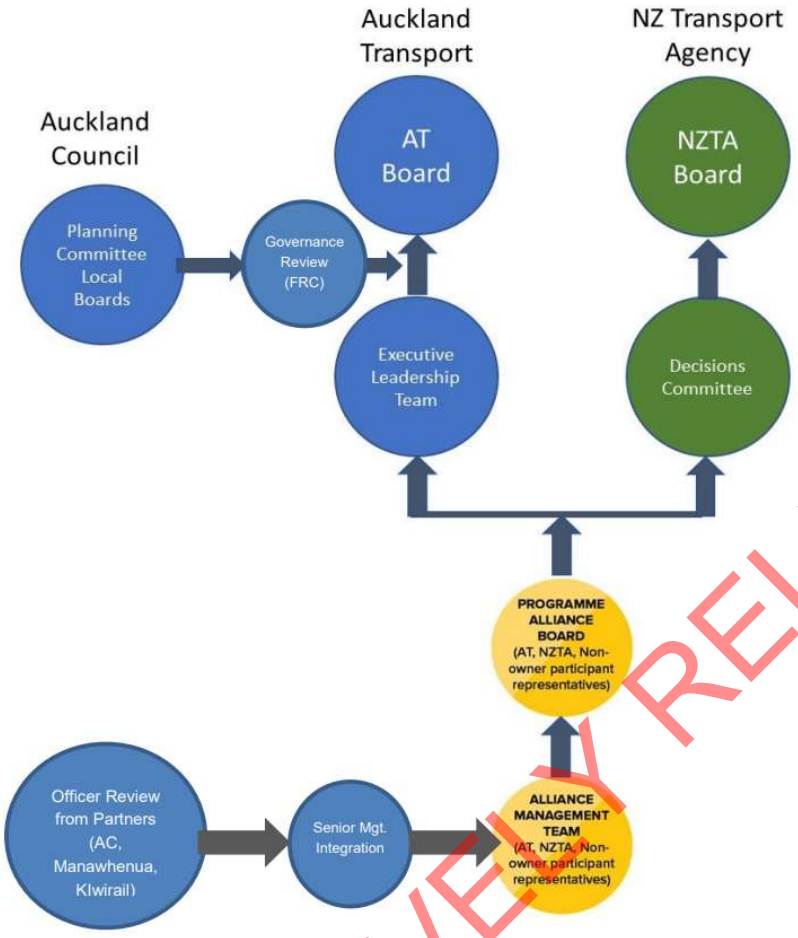
Figure 42: Route protection process Governance



14.1.2 How is the route protection phase being governed

Waka Kotahi and AT identified a collaborative Alliance model as the appropriate delivery mechanism to efficiently deliver this route protection. It is intended that the Alliance would also need to work collaboratively with owner and partner organisations in respect of wider land use, transport system planning and specific programme governance. Governance in the context of the Alliance is defined as the processes by which the Alliance is directed, controlled and held to account. The Governance Management Plan has been developed and guides the implementation of a shared understanding of why, how and who is responsible for the effective governance of the Alliance. This structure is summarised below in **Figure** .

Figure 43: Te Tupu Ngātahi governance structure



The Alliance Board is ultimately responsible for approving Alliance deliverables for release. The Alliance Board does not replace the approval processes for AT or Waka Kotahi. The outcomes sought from the Te Tupu Ngātahi alliance over the next five years are:

- Business cases that confirm the recommended transport network and enable investors to make decisions on whether first decade projects will proceed to the implementation phase or alternatively to route protect corridors for longer term projects.
- The preferred transport network for each growth area is route protected within five years.
- Efficiency of process – by protecting the recommended networks in each of the four growth areas together, efficiencies are sought through the business case and NoR processes.

While projects without a physical footprint are not within the scope of Te Tupu Ngātahi, these projects (including TDM and maximising land use opportunities) are critical in meeting programme objectives and wider policy directives and are recommended to progress in parallel with the route protection task.

14.1.3 Who decides and approves the route protection approach

The decision to formally lodge for route protection will ultimately be made by both AT and Waka Kotahi through the required delegations. There are however several steps preceding this ultimate

decision as outlined in **Figure** . The process also allows for multiple review and staged approvals of the documents as they are prepared.

Figure 44: Route Protection approval process

14.1.4 How are different projects prioritised over others?

The benefits of route protecting each transport corridor varies subject to a range of matters, including:

Urgency – development pressure including the lodgement of private plan changes, council structure planning, or the timing of related projects to the intervention.

Financial benefits obtained from protection – route protection can reduce property and construction costs associated with a project. Benefits achieved are significant if protection is obtained prior to development but erodes over time for projects in the longer term.

Place shaping – certain projects have an increased influence on the surrounding urban environment. Protection of these project corridors is likely to enable land use and shape the urban form within an area.

Potential for value capture – Some projects have significant value capture opportunities which are enabled through corridor protection and increased certainty for land use and development opportunities.

Contribution to programme outcomes – The extent to which a project contributes to the overall programme benefits including mode share, accessibility, resilience etc.

Pukekohe has been prioritised by Te Tupu Ngātahi to progress as a complete programme through route protection due to the urgency of development and the ability of this network to support place making and good urban form as the town is developed. The Te Tupu Ngātahi management team regularly review the overall programme prioritisation (at least every six months) and any changes are recommended to the Alliance board for endorsement. The Pukekohe growth area has approval to commence the pre-lodgement work in parallel to the development of the DBC and current expectation is that lodgement will occur in September 2023.

14.1.5 Property

The Te Tupu Ngātahi Programme Wide Property Strategy identifies an approach for the securing of strategic properties. Whilst the vast majority (80%) of property purchase is typically anticipated in the three years prior to implementation of a project, this acquisition could occur prior to route protection being enacted, or during the route protection process. The Te Tupu Ngātahi Programme Wide Property Strategy identifies several different potential acquisition profiles for forecasting the potential property acquisition cashflow. Typically, the purchase and ongoing management of these property purchases will be undertaken by the purchasing entities business as usual (BAU) property teams. Both AT and the Waka Kotahi have well proven and tested property management processes and dedicated teams in place to manage these property purchases and then the ongoing management of these properties.

14.1.6 NoR lodgement

The management of the NoR process is shown in **Table 32** below.

Table 32: Management of the NoR process

Stage	Management
Lodgement	The decision to formally lodge documents will be made via delegated approval channels at AT and Waka Kotahi for all projects as per current processes for both organisations. This includes the Alliance getting owner endorsement from technical leads within each owner as per the earlier described Quality Assurance process. To ensure that the documents prepared are appropriate to the receiving authority (Council) regular (fortnightly) meetings have been established with the regulatory arm of Council to agree levels of detail and standard consent conditions prior to lodgement.
Hearing	Once the decision is made to lodge, and documents are formally lodged; Te Tupu Ngātahi will manage the interface with the receiving authority (Council) and the hearing processes on behalf of the specific requiring authority (AT or Waka Kotahi). Leading into and during the hearings there is a need for fast decision making in respect to a number of key aspects, including conditions, submitter negotiations and requests from the hearings panel/court. Both AT and Waka Kotahi have considerable experience in managing these dynamic situations and the SGA team will work closely with the requiring authority (AT or Waka Kotahi) to ensure that the required delegations and decision-making approval processes are in place prior to lodgement.
Property agreements	Where the identified route protection mechanism does not include a designation process, such as a developer agreement, the following steps will be undertaken: Te Tupu Ngātahi working closely with AT and/or Waka Kotahi property teams will provide technical advice to negotiations. AT and/or Waka Kotahi will develop developer agreements. AT and/or Waka Kotahi property teams will remain the 'custodian' of the agreement and ensure any conditions are undertaken and the agreement is monitored and actioned as required.

14.2 Post route protection management

This section covers the management of tasks after the route protection has been enabled e.g., designation has become operative or infrastructure agreement is in place.

14.2.1 Key tasks

During this phase of the programme the key tasks could include:

Table 33: Key tasks post designation

Task	Commentary
Management of designations obtained in previous phase	This could include the management of conditions and the potential for monitoring lapse periods as required. The requiring authority for a project will be responsible for the management of a specific designation. Both AT and Waka Kotahi have existing and proven systems for the management of these designations and currently do this on a daily basis. The Te Tupu Ngātahi designations would be added to the respective requiring authority's current suite of designations to manage.
Scoping, procurement and delivery of required implementation DBCs	The DBCs undertaken have been focused on the case for investment in the route protection of the identified preferred interventions. It is acknowledged that given this route protection focus, there will need to be a further investment 'gate' to confirm the case for investment in the implementation of the identified interventions when required in the future. This subsequent investment decision will require appropriate information. It is proposed that this sits within the business case framework as an Implementation Detailed Business Case (ImpDBC). The scope of each ImpDBC will be informed by the specific intervention but is anticipated to include: i. Review of any changes in critical assumption since package DBC completed. ii. Further design development. iii. Safety Audit. iv. Parallel Estimate. v. Consenting Strategy. vi. Confirmation of funding sources. vii. Inter-dependences with other projects and any critical triggers. viii. Procurement Strategy. ix. The scoping of this ImpDBC will be undertaken by the lead entity for the intervention and it is recommended that: x. Scoping is undertaken at least three years prior to planned implementation. xi. The ImpDBC is completed at least one year prior to planned implementation, earlier if property issues are anticipated.
Scoping, procurement and delivery of projects to implementation	Once a project has funding (through acceptance of ImpDBC) the next stage in the implementation of the project will include four stages as shown in **Figure 41** below.

Task	Commentary
	Figure 41: Figure Project implementation  Depending on the project, there will be a number of different options to deliver each of these stages. For example, consenting, design and implementation could all be procured separately from one another, or in one collective contract (such as an Alliance). This will be very dependent on the project risks as defined in the ImpDBC. It is anticipated that the ImpDBC will include a procurement strategy that will outline in detail how each of these steps will be procured and managed. Both AT and Waka Kotahi have the systems and capability to successfully manage the procurement and delivery of each of these steps.
Purchasing and management of property acquisitions	Typically, the vast majority of property purchase for a project is anticipated in the three years prior to implementation of a particular project. The Programme Wide Property Strategy also outlines the need for a dedicated Supporting Growth Strategic Property Fund for advanced property purchase and a dedicated team to drive this fund. Both AT and Waka Kotahi have well proven and tested property management processes and dedicated teams in place to manage these property purchases and then the ongoing management of these properties.
Land use and transport integration optimisation activities	Tasks could include continued input into future structure planning or progressing intensified land use development and Transit Oriented Development at stations. These tasks are likely to involve ongoing discussions with multiple organisations with the outcome to maximise land use and transport integration. Many of these have been identified in the next steps section of this Pukekohe DBC (Chapter 15).

14.2.2 How will the Pukekohe programme be governed?

The Te Tupu Ngātahi scope finishes with the route protection of the identified transport corridors. Therefore, this next phase will be managed and governed directly by the project owners of Waka Kotahi and Auckland Transport. It is noted that a formal handover and knowledge transfer will need to occur between Te Tupu Ngātahi project team and the wider owner organisations to ensure the appropriate next steps are progressed.

These post designation activities are generally considered Business as Usual for the owners and it is expected that the owners would identify the relevant teams within the organisations to progress the tasks.

Given the scale of the overall Te Tupu Ngātahi programme there may be opportunity for the owner organisations to consider how they will resource and deliver the tasks. There are many different governance options, with three main governance 'themes':

Option 1: Individual Project BAU – Each project would be delivered and governed by appropriate requiring authority (i.e., AT would govern and deliver arterial roads and public transport service improvements) in isolation.

Option 2: Complete Programme Approach – Similar to current governance, AT and Waka Kotahi would jointly govern a programme approach and procure services together to deliver the next stages of the programme.

Option 3: Partial Programme Approach – Similar to Option 2, however whilst governance would be combined, delivery would be undertaken by either AT or Waka Kotahi, reporting to a combined governance arrangement for say funding and prioritisation.

Any future joint governance arrangement will need to be considered and agreed by Waka Kotahi and Auckland Transport.

14.2.3 Post route protection risk and opportunity management

Both the AT and Waka Kotahi delivery systems and processes have risk management at their core. In terms of the key risks envisaged at this time for this stage of the programme, these are considered to be:

Consistency of messaging to stakeholders and property owners.

Availability of funding for implementation (and property funding).

Land use including housing and business/ employment yields and co-investment in the public realm occurs at a pace and level that is generally consistent with levels assumed at the DBC.

Appropriate width of designations obtained for latest transport system requirements.

These risks (and others identified closer to the time) during the scoping and the continued project development phases will need to be proactively managed to ensure the successful implementation of the projects moving forward.

14.3 Pukekohe Risk and Opportunity Management

The Te Tupu Ngātahi programme is a large programme comprised of multiple projects and a range of policy and land use uncertainties which transpire into risks and opportunities. These must be managed to enable successful delivery.

A Risk and Opportunity Management Plan has been developed and endorsed by the Te Tupu Ngātahi governance team. The risk management process is consistent with AS/NZS ISO 31000:2009 and is consistent with typical risk management processes undertaken by AT and Waka Kotahi.

A full risk report for Pukekohe is included in Appendix M: Risk Register which includes details of the methodology undertaken to identify and manage risk for both the Pukekohe programme as well as identify future individual project risks.

Key themes include:

Interface uncertainties with parallel projects.

Complex engineering and environmental constraints.

Regional consenting complexities – greenfield corridors and mostly associated with wetlands, flooding and ecological areas.

Implementation and or/funding not prioritised – particularly for upgrades of existing urban roads which could result in new growth areas not connecting efficiently with the existing network.

14.4 Engagement

Te Tupu Ngātahi has an extensive and ongoing engagement and consultation programme. The purpose of this plan is not solely to 'consult' with partners and stakeholders, but also to collaborate and empower others, particularly partner organisations who have their own roles and responsibilities in delivery of an integrated urban transport system and sustainable land use pattern (e.g., particularly the Council).

A Communications and Engagement Management Plan has been prepared which outlines operational policies and procedures for managing the communications, stakeholder and community engagement workstream within Te Tupu Ngātahi. The Management Plan has informed the Communications and Engagement Strategy and a variety of plans to inform engagement with partners, key stakeholders and the community/public. The relationship of these documents is shown in **Figure 42**.

Figure 42: Te Tupu Ngātahi communications and engagement

The focus of the engagement at a programme wide level during the preparation of the NoR's is detailed in **Table 34**.

Table 34: Engagement during preparation of NoR

Theme	Programme Wide response	Pukekohe specific response
Manawhenua	Regular hui to communicate progress and discuss specific project activities.	Regular hui. Discussions around impacts and mitigations on sensitive locations.
Public engagement	**Continue to build understanding** of wider Te Tupu Ngātahi progress and the process of route protection as set out in the Programme Wide Comms and Engagement Strategy **Continue one-on-one engagement with landowners / developers** (e.g., meetings) regarding potential effects and opportunities for shared alignment in outcomes (e.g. through developer agreements) – particularly in areas where land is live zoned or is about to be. **Inform stakeholders about the processes for route protection** (e.g., via e-updates, meetings and website information) and provide an opportunity for participation (i.e. submission on the NoR or similar as appropriate).	Development of engagement plan for NoR preparation phase.
Council engagement	Critical ongoing discussion with the Council around land use and transport integration. This will include a range of interactions from detailed structure plans to wider discussions around achieving sustainable urban mobility in the un-zoned future urban areas. This will take place through specific Auckland Council/SGA forums, workshop environments and individual meetings.	Participation in Council land use forums. Continued relationships with Council Plans and Places about future structure plans.
Stakeholders	Provide information (and seek feedback) on staging and timing for the preferred network, including specific opportunities for sequencing of urban development (e.g., meetings with utility providers regarding integration of utilities within the future transport corridor). Ongoing workshops and communications with Programme-wide stakeholders and stakeholder groups e.g., Development/Freight/Road Users Group, Active Modes/Public Transport Advocacy Group and Environmental/Social Impact Group	Ongoing attendance at existing stakeholder forums.
Environment	Further understand specific issues/ environmental/ urban development effects and opportunities in the preferred network to identify potential design responses and environmental management / mitigation (for route protection documentation	Will be considered as part of the preparation of AEE documentation.
Property	Identify opportunities for AT and Waka Kotahi to undertake early property acquisition (e.g. willing buyer/willing seller arrangements. Note leading this process is outside the specific scope of work for Te Tupu Ngātahi.	Information to be passed on by project team to appropriate owner organisation.
Decision makers	Enable Te Tupu Ngātahi to inform decision makers on the risks and opportunities of potential route protection mechanisms for the preferred network.	Regular update of risks and opportunities registers.

Theme	Programme Wide response	Pukekohe specific response
		Project team to work with Owner Interface Managers to allow briefing into owner organisations.

14.5 Overall programme management

14.5.1 Prioritisation

Prioritisation of the overall programme is a critical component to ensuring the programme outcomes are delivered, as prioritising the programme incorrectly could in fact undermine the outcomes sought. Each individual DBC has identified an assumed prioritisation at this time to best deliver the outcomes sought. It is acknowledged that this a programme to 'support growth' and is therefore intrinsically linked to the scale and pace of development that eventuates as a result of land use zoning and market forces. Therefore, each DBC and the overall prioritisation has identified triggers for implementation of a number of the projects in the programme. At the conclusion of the route protection process undertaken by Te Tupu Ngātahi there will be an overall programme implementation and prioritisation plan based on the information at that time and based on the key principles of scale and pace of development, mode share outcomes, placemaking and contribution to transport emission reduction. Given this programme could take in the order of 30 years it is almost certain that circumstances will change that impact on the delivery and prioritisation of the programme.

14.5.2 Benefits realisation

Ongoing tracking and measurement are another important aspect of the programme to make sure the outcomes sought are delivered. This is particularly important for a programme of this scale and duration where there is likely to be considerable change in what actually occurs (such as pace and scale of land use) over this long time period.

The DBCs have therefore been developed with a consistent programme wide Benefit Logic Map (BLM). Adopting a BLM approach ensures the benefits of each project align with strategic objectives and help deliver the programme-level benefits. The BLM also allows proposed outputs to be logically mapped to benefits (via outcomes), so that different scenarios can be compared on the basis of their benefits impact.

A single BLM for the programme will also:

- Allow subsequent time profiling of benefit realisation to inform prioritisation discussions, by sub-programme and programme.
- Allow more effective and consistent programme communications and stakeholder engagement.
- Minimise the amount of re-work when completing the benefits for the DBCs.
- Inform the consenting strategy.

The BLM will act as a reference document for validating each options' contribution to programme benefits. Analysing options in this way will immediately address the value for money strategic objective, by transparently demonstrating the:

- Contribution towards the desired GPS results (benefits).

Return on the investment – expected benefits compared with expected cost.
Reason for the decisions, especially where there is a cost benefit ratio lower than would normally be required for inclusion in the NLTP.

In addition, value for money also requires investments to be made at the right time. Developing a benefit realisation profile based on when outputs are complete (i.e., when assets are commissioned) will allow resources to be focused on those activities that shift the benefits dial the most.

Re-prioritising initiatives in the event that strategic objectives change or external factors dictate - becomes a simple exercise of re-mapping the outputs and outcomes to the updated benefit set.

14.5.3 Optimising outcomes

Specific measures to support the Pukekohe recommended network have been detailed in Section 10.3. **Table 35** outlines the proposed management to ensure that these complementary and necessary elements are also delivered.

Table 35: Proposed management for supporting measures

Element	Organisations	Proposed Te Tupu Ngātahi Management
Urban System integration	This is an incredibly complex arrangement as there are often competing needs and low cross party coordination in planning and implementation activities. It is critical that common outcomes are sought, clearly communicated to all parties for alignment and that parties are held to account in the delivery of their particular aspect of the complete solution. There are multiple parties involved in these aspects, including: Auckland Council (statutory & spatial planning, consent authority, civil & social infrastructure. provider, local transport system specifier & operator, via CCO Auckland Transport). Government departments (public facilities including schools and other facilities). Developers (implement form and function ultimately). Transport authorities (build stations and supporting infrastructure). Kāinga Ora – an urban development agency to assist in delivering transport supportive urban outcomes. Separation in metropolitan rail provision between public transport operators and infrastructure providers. Council urban renewal agencies such as Panuku in Auckland.	**Develop an urban strategy for Pukekohe.** All parties will be critical to its development, actions and active monitoring. It is proposed that as well as the current organisations tasked with urban outcomes, that a dedicated role is identified that is focused on the delivery, monitoring and implementing of the Urban Strategy.
Transport system optimisation	To be led by Waka Kotahi and Auckland Transport.	**Provide a dedicated TDM resource.** It is proposed that a dedicated resource is tasked with ensuring

Element	Organisations	Proposed Te Tupu Ngātahi Management
	Financial, technological and operational incentives are also needed to support mode shifts needed to address GHG emission reduction and congestion.	the TDM elements identified are developed, implemented and monitored.
Other Transport	It is critical that there is cross organisation collaboration and alignment on the implementation of these 'other' projects so that the outcomes sought can be delivered by all projects. There are many competing needs and challenges to aligning multiple projects and careful planning and management of this integration is required. There will need to be coordination between: Waka Kotahi (funding and state highway projects). Auckland Transport (Local roads and public transport services). KiwiRail (Rail infrastructure). Developers (Key local transport links). Kainga Ora.	**Part time programme coordinator role** To ensure the coordinated delivery in a dynamic environment, a part time programme coordinator role is proposed to ensure the necessary level of coordination is achieved.

14.5.4 Ongoing programme management roles

It is proposed to manage identified roles through the establishment of a Green Fields Action team. This ongoing programme management team for the programme provides for a total of five roles as shown in **Figure 43**. This includes three roles to deliver optimised outcomes as detailed above and two additional roles for previously identified property tasks.

Figure 43: Project management team roles

15 Approvals sought and next steps

15.1 Approvals sought

This Pukekohe DBC sets out the rationale for investing in route protection for the future Pukekohe strategic network. Based on the information provided throughout this document, the following approvals are sought:

1. **Approval of the Pukekohe recommended transport network.**

Approval and endorsement are sought for the Pukekohe recommended transport network which includes the following projects (with NoRs and owners):

Drury West Arterial (NoR1 by AT)
Drury to Pukekohe Link (NoR2 by WK)
- South Drury Arterial
- SH22 Connection
- Drury-Paerata Link
- Paerata Arterial

Paerata Connections (NoR3 by AT)
- Sim to Sim Connection
- Paerata Station Connection

Pukekohe North-East Arterial (NoR4 by AT)
Pukekohe South-East Arterial (NoR5 by AT)
Pukekohe South-West Upgrade (NoR6 by AT)
Pukekohe North-West Arterial (NoR7 by AT)
Mill Road (Bombay) -Pukekohe East Road Upgrade (NoR8 by WK)

2. **Approval to implement the Route Protection Strategy up to lodgement of NoRs (Approval for lodgement to be sought separately)**

Approval to proceed with the Route Protection Strategy for the Pukekohe growth area including:

12 projects to be delivered in eight NoRs.

It is noted that the preparation of NoR documentation for the Pukekohe NoRs is underway and documentation would be subject to standard review processes by Waka Kotahi and AT.

3. **Approval for funding release for the Pukekohe post lodgement activities.**

Funding is available and will be unlocked with the above approvals.

4. **Acknowledgement of the potential early property acquisition and associated risk arising from route protection of the recommended Pukekohe Package.**

It is acknowledged that this business case is focussed on route protection and that there are funding implications associated with early property acquisition of this route protection. This business case does not seek to resolve issues surrounding the funding required for the delivery of the recommended new infrastructure and services. For a range of reasons including the impact of Covid-19 on forward

revenue projections, there is significant uncertainty surrounding the ability to fund the programme using traditional funding mechanisms/ NLTF over the long-term.

Acknowledging this uncertainty and the forecast long-term funding gap it is recommended that route protection and resultant property purchases be completed at this time due to:

- **Certainty of growth**. Extensive previous work and strategic guidance has confirmed the growth projections for Pukekohe. This predicted growth has been further reinforced by evidence of actual growth in Pukekohe, Paerata and West Drury. In addition, early outputs for Pukekohe from the Future Development Strategy (which is being progressed by Auckland Council in parallel to this DBC and is anticipated to be an update to the FULSS) indicates growth is still to be expected in all three areas.
- **Ability to plan infrastructure**. The very nature of route protection enables the provision of planned infrastructure rather than "responsive" infrastructure which typically results in infrastructure being retrospectively added and squeezed into available land that has already experienced growth-related development. This planned approach therefore provides the owners with significant opportunity to front foot and respond to key issues such as emission reductions and other mitigation/ adaptation needs of the network. Importantly it also protects the ability to actually realise the step change transport outcomes (mode shift, land use integration and accessibility enhancements) which otherwise can be compromised as space is restricted. It also allows proactive collaboration with developers to assist in the delivery of key infrastructure and drive good urban outcomes.
- **Financial upside**. Financially, a small investment now in route protection will save many millions of dollars in property and implementation costs when the projects need to be implemented. Route protection requires some upfront expenditure but is cheaper than acquiring land later that has been developed in the absence of route protection.
- **Ease of Implementation**. Implementation will be considerably less difficult (and costly) due to a designation being in place prior to the growth. In some locations it will unlock development infrastructure where land has fragmented ownership.
- **Increased certainty for developers**. Route protection provides increased certainty for developers. This increases opportunities for co-funding agreements to be reached resulting the best possible opportunity for increased affordability of the required infrastructure and achieving good urban form.

The most significant risk for route protecting now is affordability due to the early property acquisition costs. This can be managed through Programme wide initiatives to address this issue including:

Having a property team focussed on the Te Tupu Ngātahi programme.
Developing an agreed position for the programme on the approach and application to betterment.
Developing and providing programme position on advanced property purchase.

There is also the challenge of funding the implementation of the options identified given the constrained NLTF. Whilst not the focus of this business case, it is important that Auckland Transport and Waka Kotahi work together to resolve this long-term funding challenge. It is almost certain given the challenges facing the NLTF that alternative funding mechanisms are required. Whilst both organisations have experience with these, the scale of the wider Te Tupu Ngātahi programme is of a scale not undertaken before, providing unique challenges and opportunities for alternative funding models.

15.2 Next steps

The following key next steps for Te Tupu Ngātahi in terms of route protection are:

1. Preparation of documentation for NoR
2. Lodgement of NoR
3. Post lodgement activities.

In a DBC this complex there have been a number of key activities that have been identified that need to be undertaken to either reduce residual risks, better manage uncertainty or unlock additional potential and opportunities for the projects. These activities will also support a handover to the owner organisations once the Te Tupu Ngātahi programme is completed.

Appendices