

Pukekohe

Appendix M: Staging Considerations

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Disclaimer

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

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Acronym/Term	Description
AT	Auckland Transport
AUP	Auckland Unitary Plan
DBC	Pukekohe Detailed Business Case
Do-min	Do-Minimum Option
FUZ	Future Urban Zone
FULSS	Future Urban Land Supply Strategy
IBC	Pukekohe Indicative Business Case
MSM	Macro Strategic Model
SATURN	Meso-simulation modelling software package used for transport assessment – Simulation and Assignment of Traffic to Urban Road Network
Te Tupu Ngātahi	Supporting Growth Alliance
Waka Kotahi	Waka Kotahi New Zealand Transport Agency

1 Introduction

1.1 Purpose

This report has been prepared to support the Pukekohe Detailed Business Case (DBC) and sets out considerations relating to the potential phasing of the transport projects identified in the Pukekohe DBC. This report will inform the development of the Financial Case for the Pukekohe DBC.

The implementation of projects within the Pukekohe area is highly dependent on the development of FUZ land and availability of funding to deliver the transport infrastructure. Critically, this assessment looks to identify interdependencies between projects and relationships between transport projects and land use as opposed to providing an accurate implementation timeframe.

1.2 Background

The IBC and DBC have identified the need for significant transport infrastructure to support the next 30+ years of growth in South Auckland and wider regional growth. The scale of growth is significant, and projects will have extended delivery timeframes staged over three decades.

The growth in the relevant Structure Plan areas (specifically Pukekohe-Paerata, and more broadly Drury-Opāheke) is occurring in the context of strong growth in adjacent areas including existing urban areas to the north, and the Waikato to the south. This means that transport demands (and therefore, staging considerations) are influenced by regional and inter-regional growth for the strategic networks, not just growth in the Structure Plan areas.

The staging of transport networks within the Southern growth areas is highly influenced by the proposed release of FUZ areas by Council through Plan Changes. The Council's proposed sequencing of land release is identified in the FULSS. There are known growth pressures from landowners and developers for accelerated growth in some areas which may result in a different timing and sequencing of land release than is indicated in the FULSS.

While the considerations relating to the implementation of the Pukekohe DBC transport projects are heavily driven by assumptions around the land use roll-out, there are various other factors that may impact the staging of such projects. Specific triggers include legislation surrounding greenhouse gas emission reduction and adaptation to climate change, shift in investment priorities, cash-flow availability and protection and restoration of the natural environment. Due to the strategic nature of the Pukekohe arterial network, triggers might range from local to regional, with the development of the Pukekohe network acting as a trigger for development in some cases.

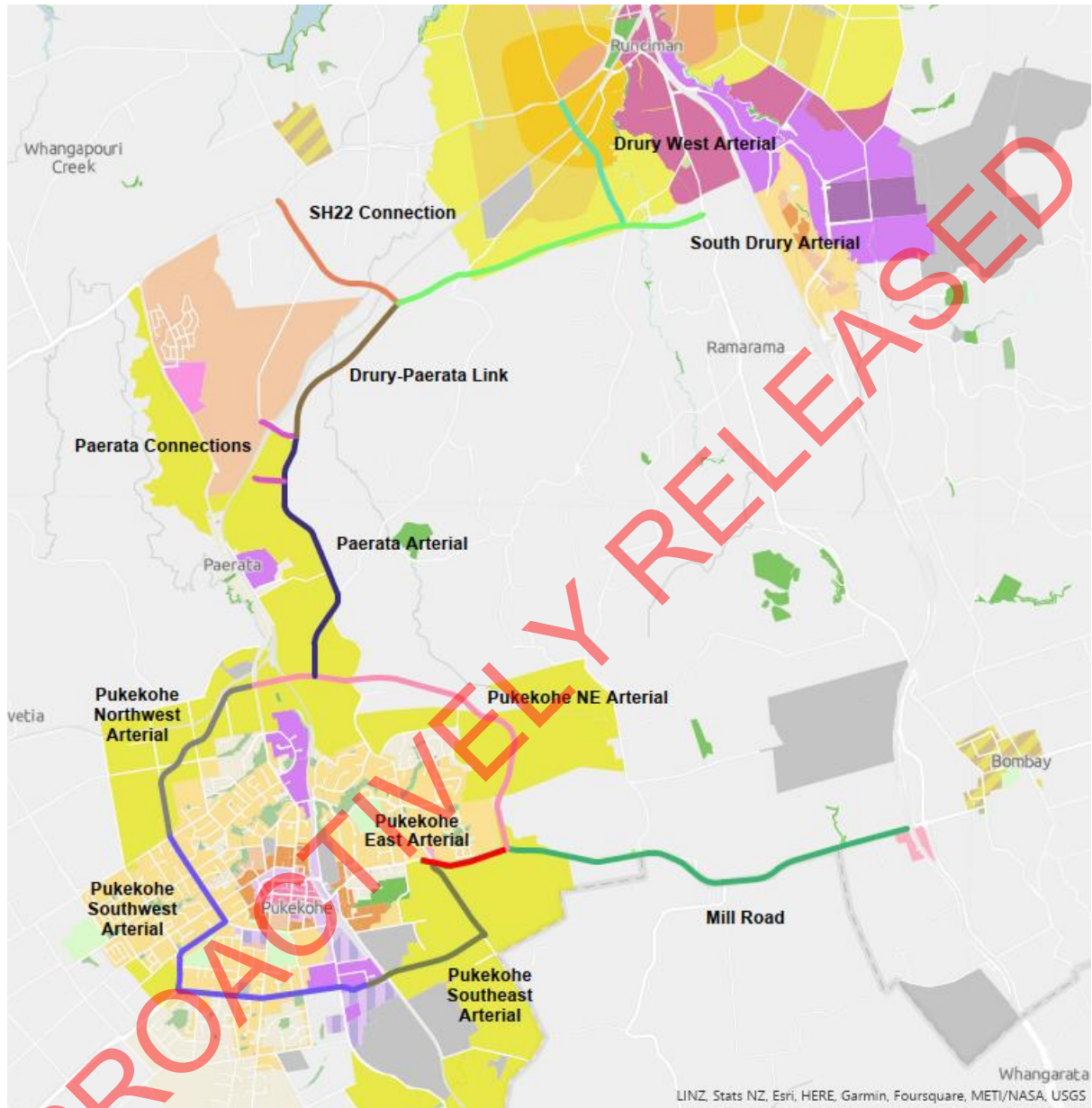
The expected timeframes for the future land use roll-out in the Pukekohe growth areas have initially been guided by Auckland Council's Future Urban Supply Strategy, released in July 2017 (FULSS), and the Pukekohe Structure Plan, adopted in 2019.

It should be noted that at the time of preparing this document, Auckland Council are developing an updated Future Development Strategy which is currently under consultation. While this document is yet to be approved, it has been reviewed internally and confirmed that any amendments to development timing will not have a negative impact on the Pukekohe DBC, and in some situations will align better. Therefore, it is not expected that the future release of this document will introduce a material change on Pukekohe DBC outcomes.

1.3 Scope of Projects

The corridors considered in the Pukekohe DBC are shown in Figure 1-1:

Figure 1-1 Pukekohe DBC Map



2 Land Use Sequencing

2.1 Future Urban Land Supply Strategy and Pukekohe Structure Plan

The Future Urban Land Supply was prepared by Council in 2017 and its primary purpose is to identify the sequencing and timing of future urban land for development readiness over 30 years. For the Pukekohe growth area this staging is shown in Figure 2-1.

Figure 2-1: Future Urban Land Supply Strategy (2017)

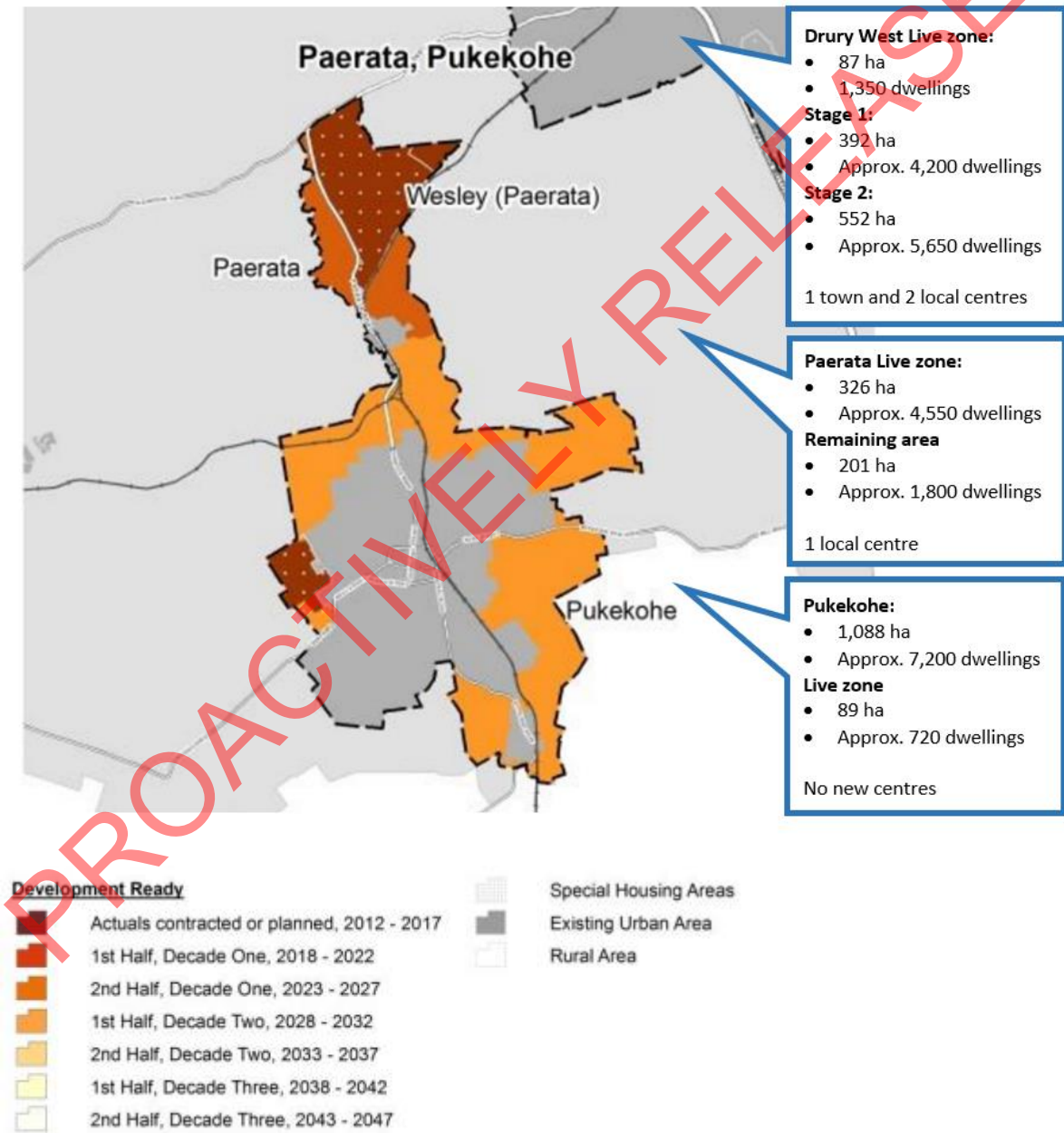


Table 2-1 compares the assumed staging of transport infrastructure for the Pukekohe growth areas based on the FULSS with the staging assumptions used to inform the transport modelling for the Pukekohe.

Table 2-1: Anticipated yield Comparison between Future Urban Land Supply Strategy and the Pukekohe-Paerata Structure Plan

Development Ready Date	Future Urban Land Supply Strategy (2017)	Pukekohe-Paerata Structure Plan (2019)
2017	5,270 dwellings	5,270 dwellings
From 2022	1,800 dwellings 1 local centre	Yields slightly lower than FULSS 2017 as a result of detailed assessments for structure plan 2019
From 2028	7,200 dwellings	Yields slightly lower than FULSS 2017 as a result of detailed assessments for structure plan 2019
Total	14,270 dwellings	12,522 dwellings

As part of the Structure Plan process a review of development staging was undertaken. In particular, Council gave consideration to land release timing for each area. Overall, no areas were identified to be bought forward. This was due to significant infrastructure funding issues combined with the wider Auckland compact city focus on redevelopment of brownfield areas and the higher priority greenfield areas in Auckland that would take any additional greenfield infrastructure funding before Pukekohe. These forecasted release periods are the same as that proposed in the Pukekohe Indicative Business Case.

2.2 Auckland Future Development Strategy

As mentioned above, Auckland Council are developing an updated Future Development Strategy which is currently under consultation. This document will supersede the existing Auckland Plan 2050 Development Strategy (2018) and the FULSS (2017). This document reviews Auckland's Development Strategy in relation to zoning and expected timeframes for development, resulting in associated amendments and impacts on programme.

There are five key strategic principles being considered as part of the strategy:

- Support greenhouse gas reduction
- Adapt to the impacts of climate change
- Make efficient and equitable infrastructure investments
- Protect and restore the natural environment
- Ensure sufficient capacity for growth in the right place and at the right time

The scope of development and associated programme have been reviewed and changed in accordance with one of the below:

- **Removal:** rezoning of areas to an appropriate non-urban zoning

- **Further investigation:** Areas with moderate exposure to hazards, infrastructure capacity issues, unlikely to support VKT reduction. Further analysis is needed to confirm the appropriate land use response
- **Delay:** to timing of anticipated development (compared to the previous Future Urban Land Supply Strategy)

This document has been reviewed internally in relation to the Pukekohe DBC package and confirmed that any amendments to development zoning and/or timing will not have a negative impact on the Pukekohe DBC, and in some situations will align better with the proposed staging principles. Therefore, it is not expected that the future release of this document will introduce a material change on Pukekohe DBC outcomes.

2.3 Modelled Land Use Forecasts

The transport modelling for the Pukekohe DBC has been informed by the i11 version 6 land use forecasts agreed with Auckland Council. These have informed the transport modelling using the regional transport model (the Macro Strategic Model (MSM)), as well as the Strategic Active Modes Model (SAMM) used for the assessment of the active modes demands. The outputs from the MSM have then been used as inputs to the SATURN based traffic models, which have more specifically considered the traffic effects.

A key input to the models is regional land use forecasts, which influence the future quantum and location of travel. Regionally agreed land use forecasts are prepared by Auckland Council via the Auckland Forecasting Centre (AFC), with the most recent available forecasts (at the time of this assessment), referred to as Scenario I11.6. Those forecasts are based on regional population forecasts from Statistics NZ, with spatial allocation to individual spatial areas based on the AFC's land use model and known detail around specific land use planning processes.

Error! Reference source not found. and **Error! Reference source not found.** summarise the assumed residential population and employment forecasts for the Pukekohe growth areas from i11v6. This included a 2048+ forecast year, which represents the 'full' build out of the growth areas sometime beyond 2048, depending on the longer term rate of growth.

Table 2-2: i11v6 Population Forecasts - Pukekohe Growth Areas

Population	2018	2028	2038	2048	2048+
Drury West	566	538	5,457	10,890	13,717
Paerata	449	7,063	12,821	14,065	22,525
Pukekohe	23,554	30,250	34,785	36,626	45,147
Other South	1,840	2,783	3,736	4,177	4,617
Total	26,409	40,634	56,798	65,757	86,006
% of 2048+	31%	47%	66%	76%	100%

Table 2-3: i11v6 Employment Forecasts - Pukekohe Growth Areas

Employment	2018	2028	2038	2048	2048+
Drury West	372	452	1,234	2,145	2,613
Paerata	285	770	1,269	1,337	2,113
Pukekohe	8,778	10,180	11,996	12,942	14,484
Other South	901	991	1,187	1,292	1,384
Total	10,336	12,393	15,685	17,715	20,594
% of 2048+	50%	60%	76%	86%	100%

It is acknowledged that land use forecasts have inherent uncertainty, in terms of the rate of new growth in specific areas. Currently, there is additional uncertainty around the likely outcomes and rate and location of higher-density development sought through central Government policies such as the National Policy Statement on Urban Development (NPS-UD) and Auckland Council's Plan Change 78. A key intent of those policies is to enable higher density development, especially around high-quality public transport systems. The specific planning response to those policies is currently being progressed by Auckland Council, and revised land use forecasts reflecting any expected changes were not available at the time of preparing this assessment. Generally, it is considered that this Project is not inconsistent with such policy direction, regarding supporting higher density urban development via more sustainable travel modes. Given this context, the use of those available I11.6 forecasts is considered acceptable for this assessment. Also, it is noted that the forecast sequencing is generally consistent with that of the Future Urban Land Supply Strategy and the Pukekohe Structure Plan.

Overall, the proposed transport infrastructure identified in the recommended network is expected to be sufficient to accommodate the projected growth and is flexible enough to respond to changes in land use projections including increased density and changes in timing. It is noted that increased housing density will further support the viability of bus and train services across Pukekohe-Paerata.

2.4 Auckland Regional Land Transport Plan (RLTP)

The Regional Land Transport Plan (RLTP) is a parallel workstream, with a 10-year investment programme for transport in Auckland, developed by Auckland Transport (AT) together with the New Zealand Transport Agency (NZTA) and KiwiRail to respond to growth and challenges facing Auckland over the next decade.

The RLTP acknowledges Auckland's challenges linked to accommodate rapid population growth that requires accelerating the construction of housing and business development including the Drury/Pukekohe/Paerata areas. The RLTP includes an investment programme staged between 2018– 2028.

2.5 New Zealand Upgrade Programme (NZUP)

The New Zealand Upgrade Programme is a parallel workstream that reflects the Government's balanced transport policy with \$6.8 billion being invested across road, rail, public transport and walking and cycling infrastructure across New Zealand. The upgrade programme includes transport

infrastructure in six main growth areas – Auckland, Waikato, Bay of Plenty, Wellington, Canterbury, and Queenstown.

The package provides for more frequent and better public transport and building safe, new walking and cycling paths. The committed planned transport networks relevant to Pukekohe DBC can be summarised as follows:

- Proposed rail stations in Drury West and Paerata. These rail stations are included in the New Zealand Upgrade Programme (NZUP) and construction is planned to start in 2023 and be completed by late 2024/25.
- SH1 Papakura-to-Bombay Upgrade providing more north-south regional capacity. The South Auckland Package includes upgrades on Waihoehoe Road and SH22 to support the urbanisation in Drury West and Drury East.

The New Zealand Upgrade Programme will trigger a range of different considerations linked to growth. More notable, accelerating the 'development ready' status of the future planned urban zones.

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3 Transport Staging Considerations

3.1 Principles

Due to the uncertainty regarding the timing and form of specific land use activities, a principle-based approach is regarded as the best way to manage and deliver the desired transport and land use outcomes consistently. This recognises that staging in many cases will either be determined by regional, inter-regional and local priorities, which rely on the scale and rate of growth.

A set of key principles has therefore been applied, which links staging to broader strategic goals regarding travel demand management and modal shift. These principles will ultimately deliver the following desired transport and land use outcomes for Pukekohe:

- Immediate shift to more sustainable travel choices by integrating with and prioritising public transport (new stations and PT routes) and active mode interventions early.
- Manage adverse impacts of development on the wider system.
- Support the desired urban form, in particular higher density, quality urban environments.
- Recognise the need to support both place and movement function.
- Provide affordable staging plans that match expected land development.
- Protects space for longer terms needs.

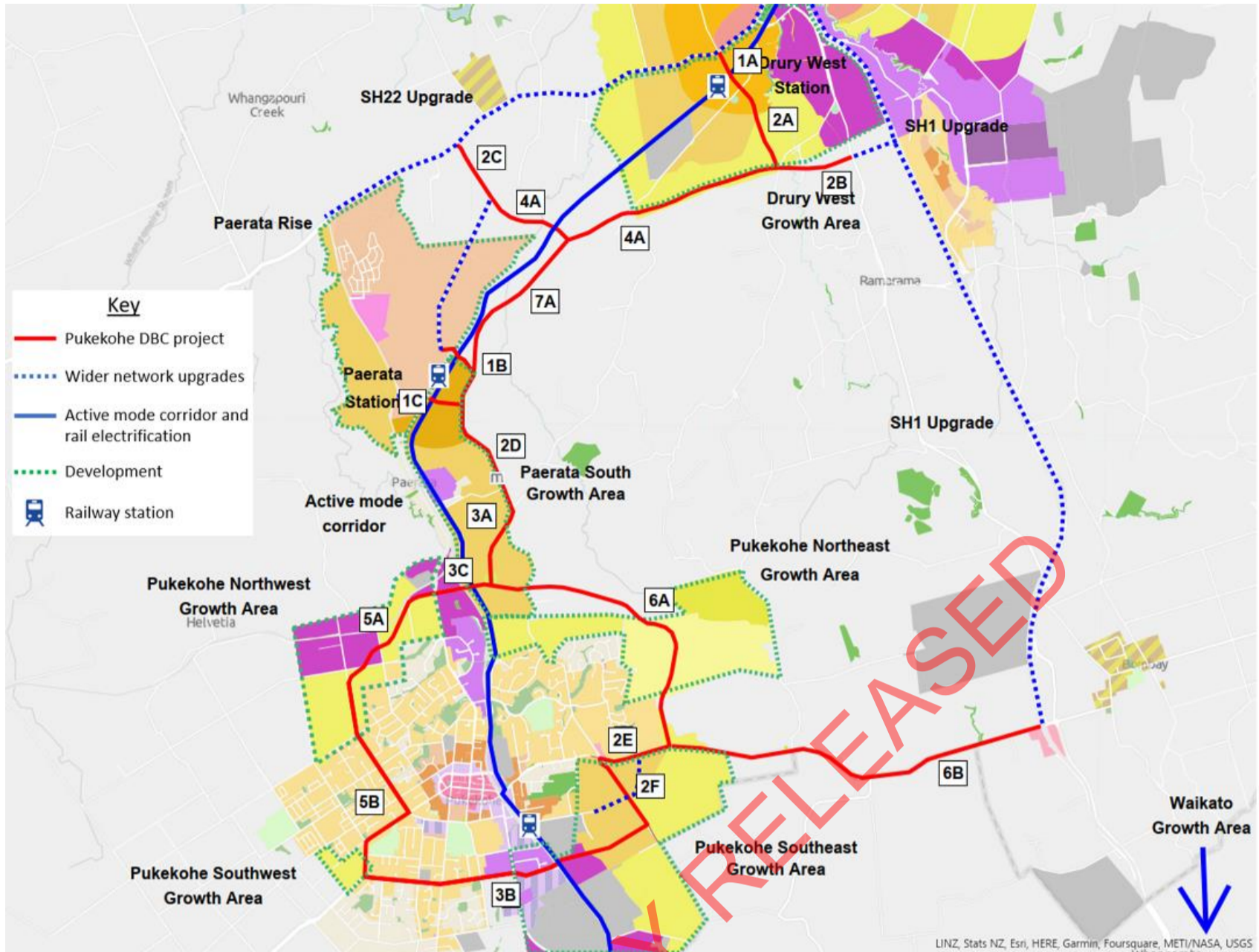
The suggested principles for staging are:

- Prioritise facilities that are on existing, brownfield corridors to enable the network to immediately receive and connect with the new greenfield developments.
- Programme public transport and active mode facilities and services from the start of urban development to support a shift to more sustainable travel.
- Consider potential interrelationships between transport projects to achieve overall outcomes.
- Consider potential interrelationships with surrounding growth areas.
- Consider staging of elements of a project to match likely development stages and system needs, whilst also considering pathways to achieve the full built elements.
- Consider the needs to support place function, not solely movement function.
- Provide safe travel by all modes.
- Staging that can respond to the timing, scale and form of urban development.

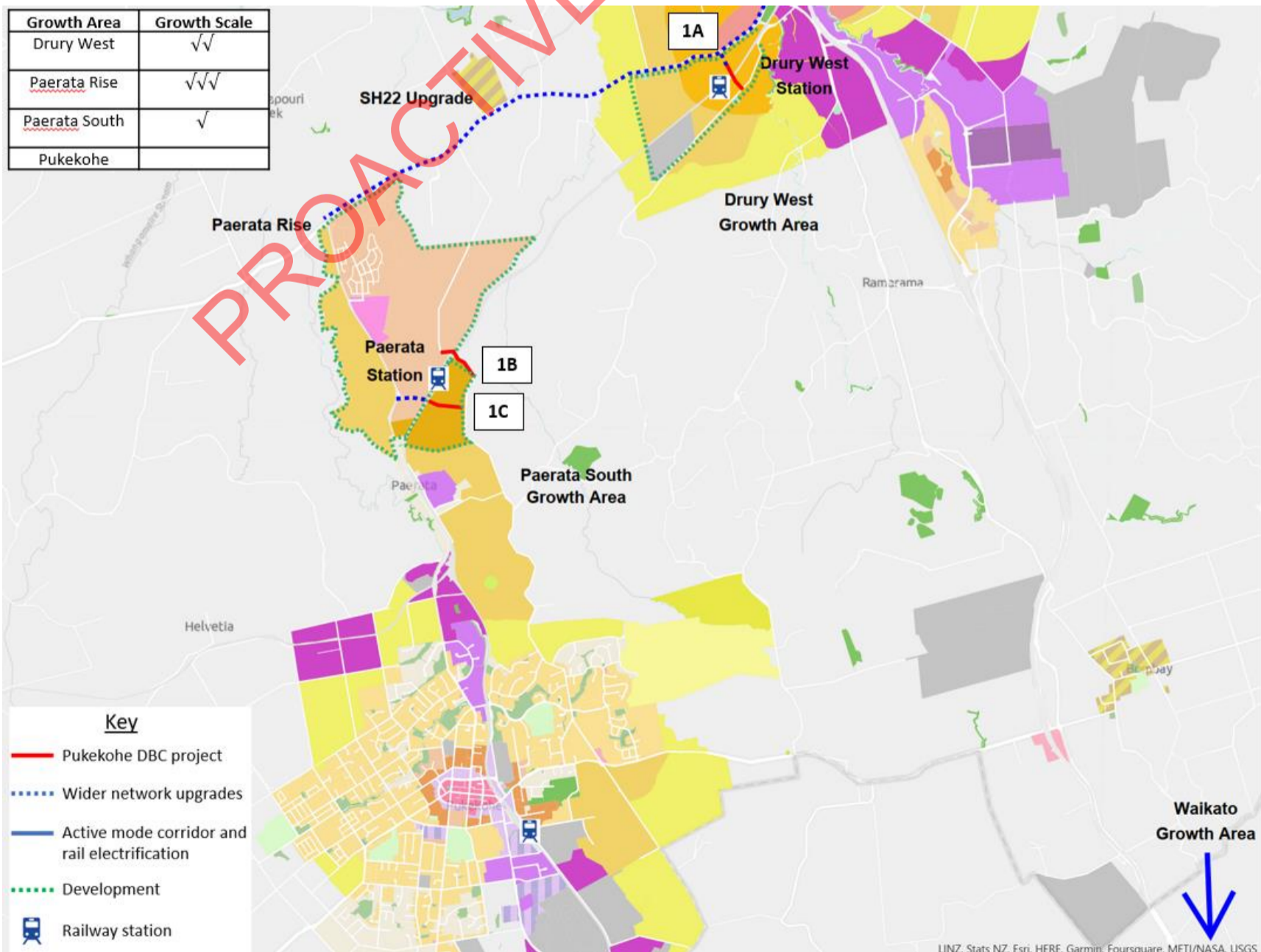
3.2 Proposed Staging

The proposed staging is illustrated in the following plans and followed by Table 3-1 which details the intended implementation timeframe, rationale and associated risks and opportunities. The proposed staging has been reflected in the transport modelling undertaken to inform the economics analysis and will also be used within the financial case of the Pukekohe DBC. The staging was considered with Auckland Transport and Waka Kotahi team members to ensure that any identified wider organisational considerations were accommodated. Overall, the land use staging is generally consistent with earlier work completed as part of the Future Urban Land Supply Strategy and the Pukekohe Structure Plan. The implementation and staging of transport projects within these forecasted timeframes have been adjusted to take advantage of opportunities to support desired outcomes.

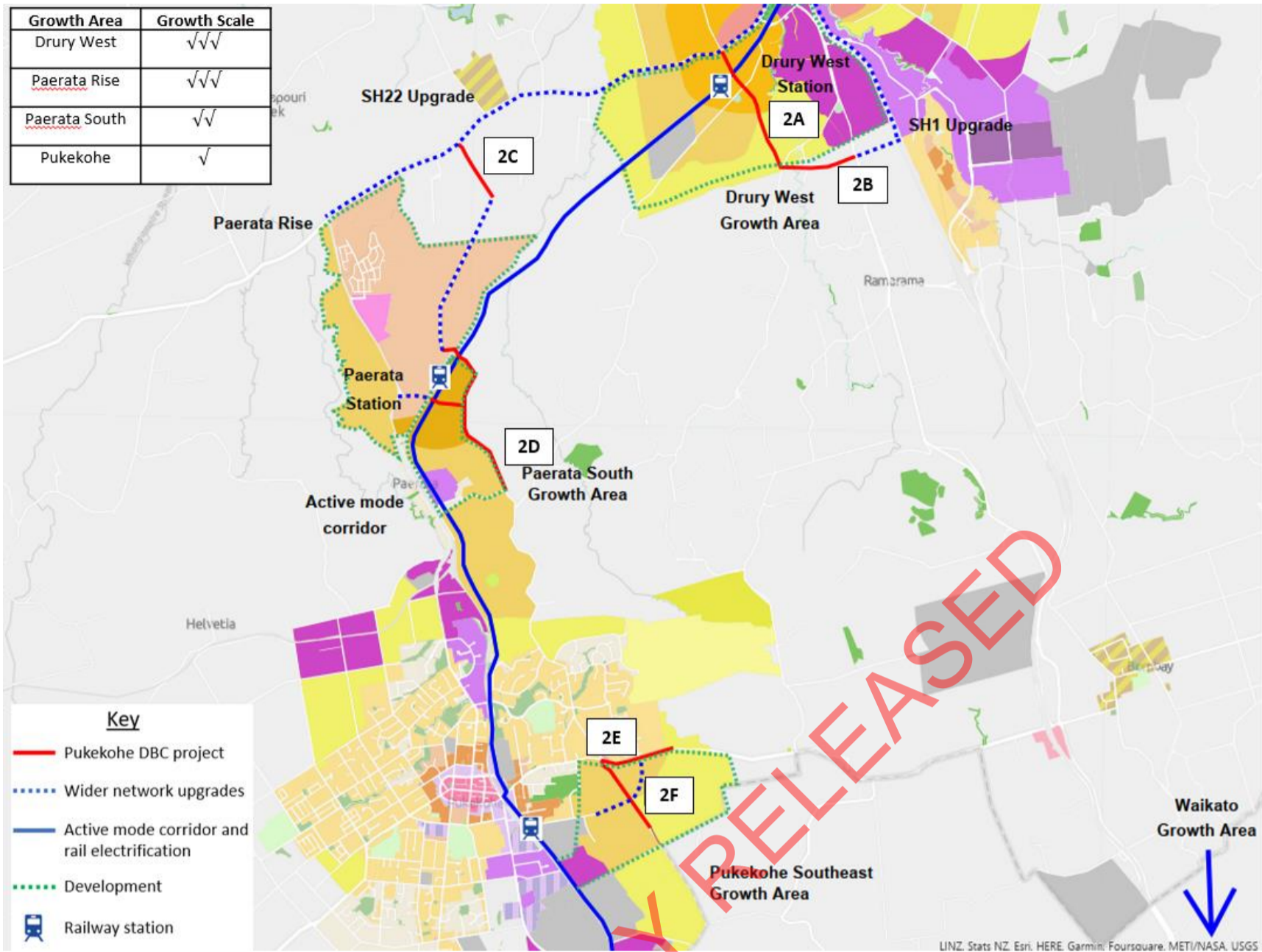
Overview



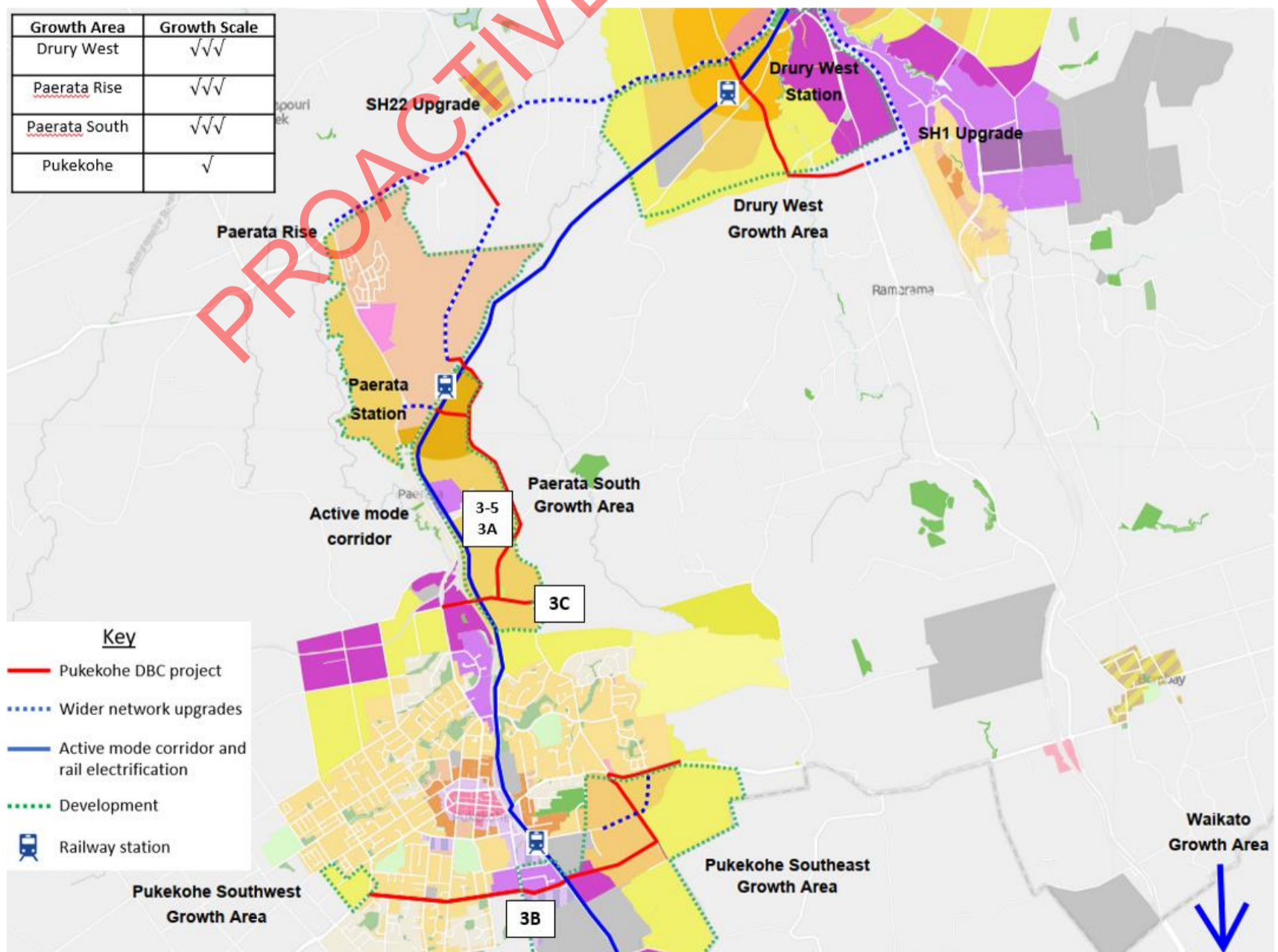
Stage 1



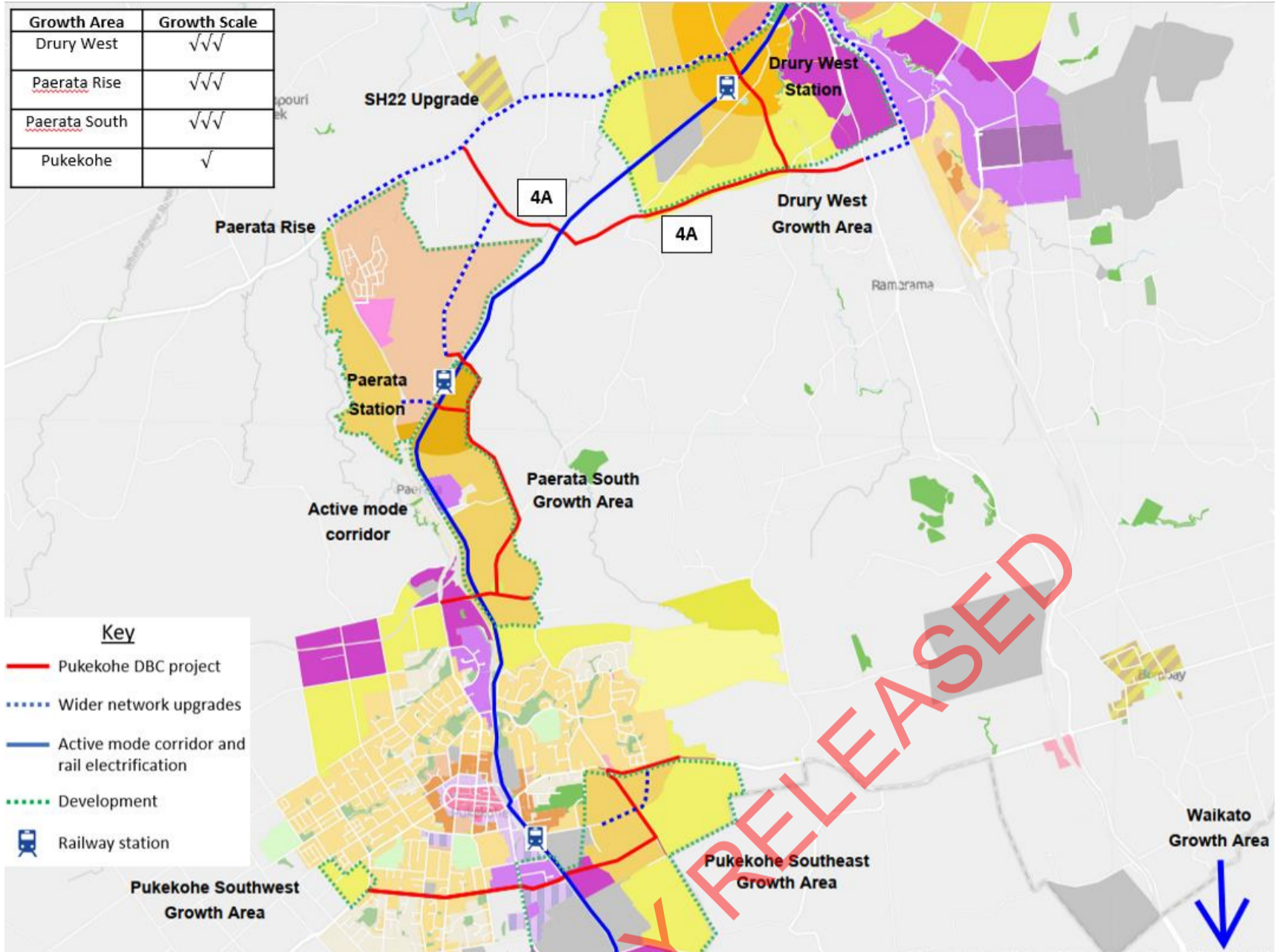
Stage 2



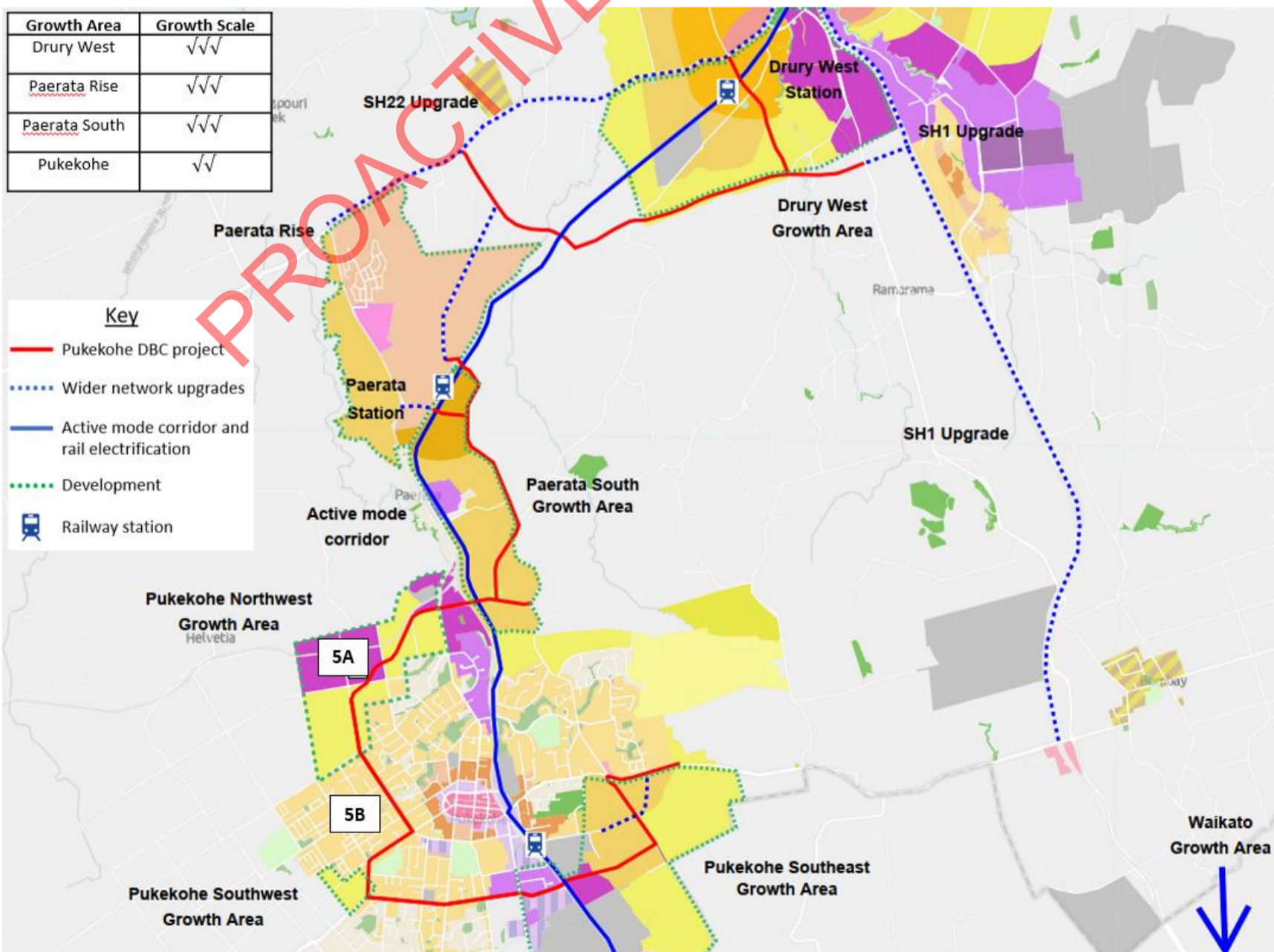
Stage 3



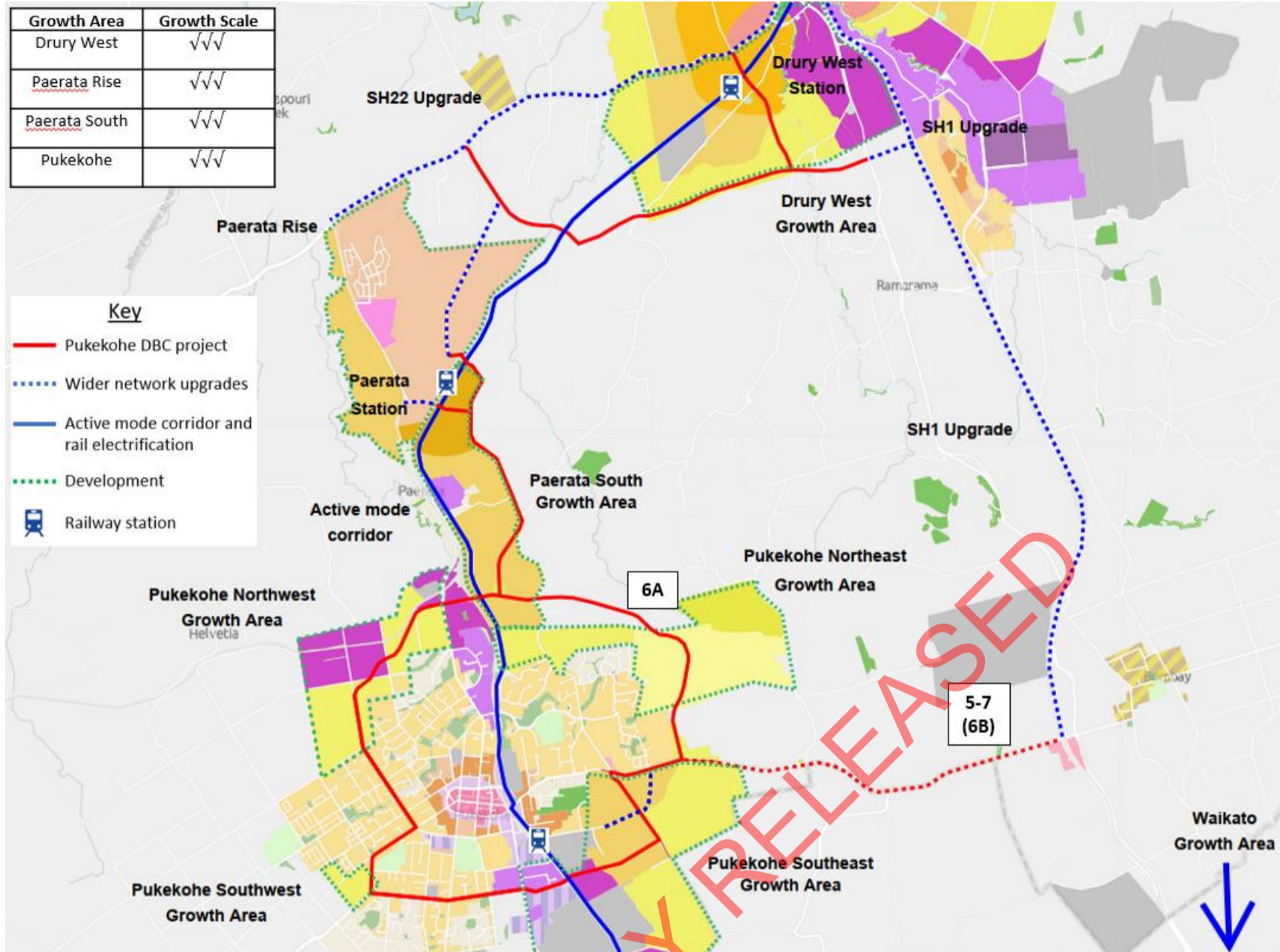
Stage 4



Stage 5



Stage 6



Stage 7

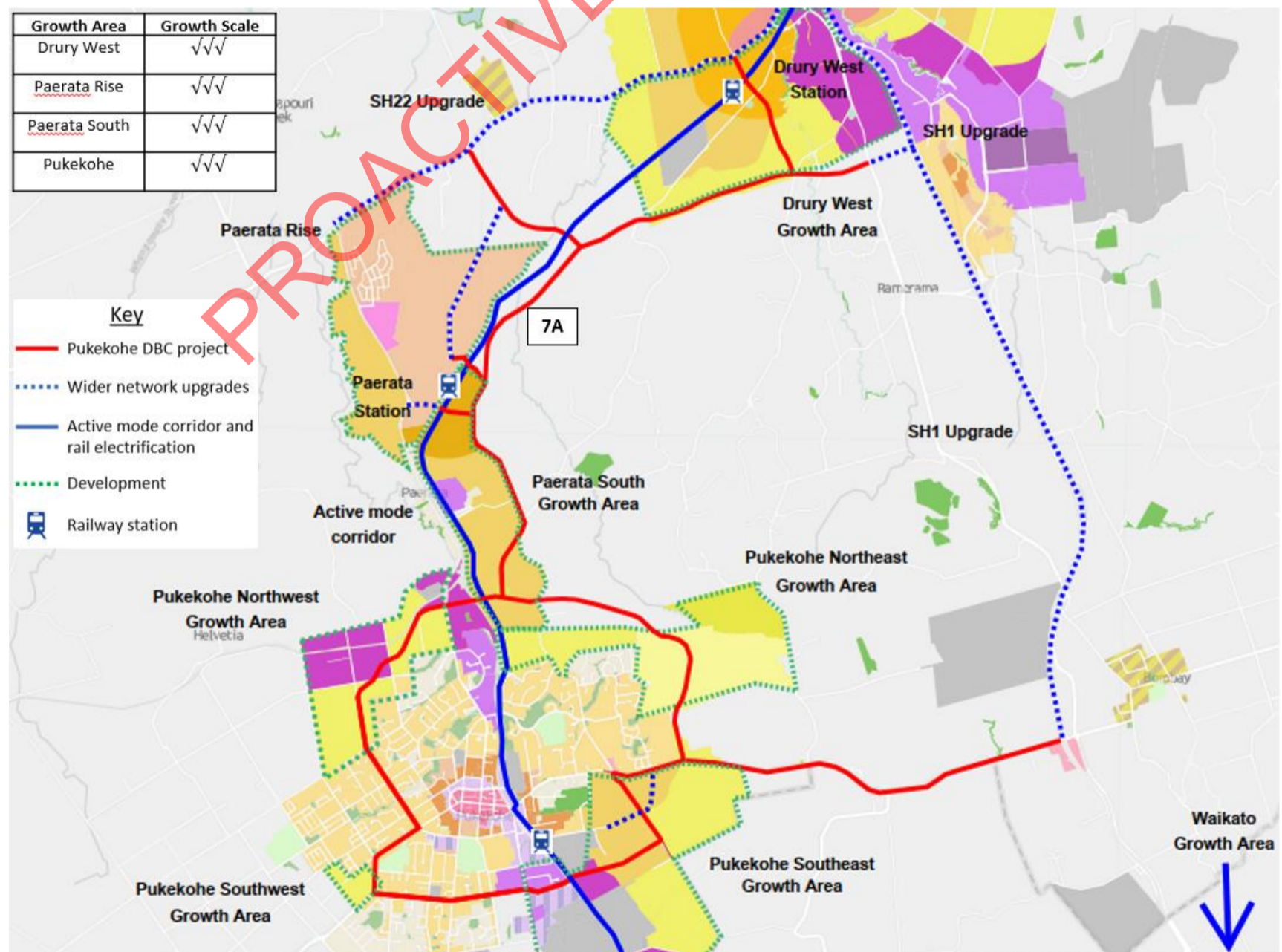


Table 3-1 summarises the staging of the Pukekohe projects as well as the intended implementation timeframe, rationale and associated risks and opportunities, with each ID corresponding to Figure 3-1 below.

Table 3-1 Proposed staging for Pukekohe DBC

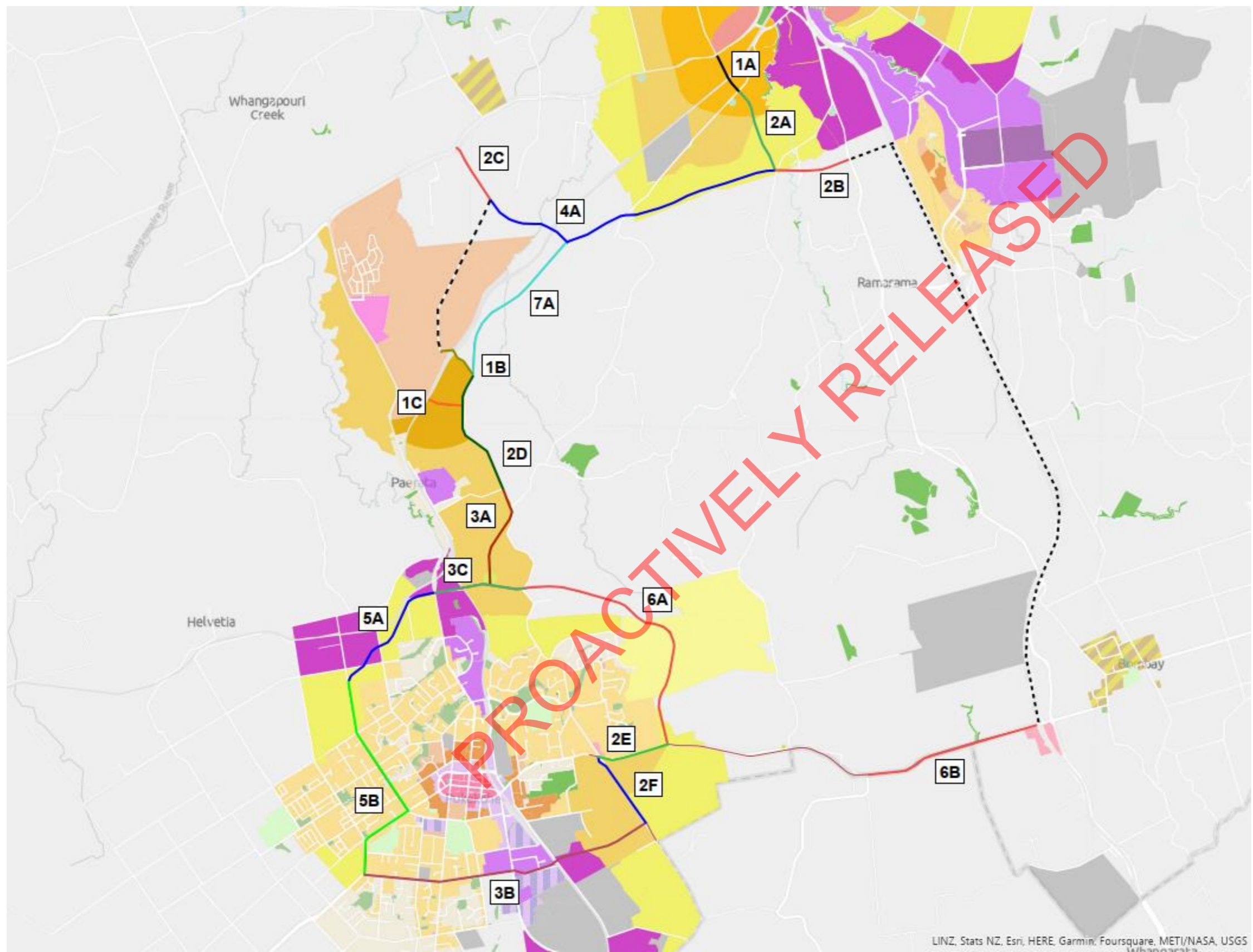
Transport Project	ID	FULSS / Pukekohe Structure Plan Staging	Pukekohe DBC Model Scenario	Implementation	Rationale	Risks/Opportunities
Stage 1						
Drury West Arterial (from Jesmond Road intersection to Burt Road incl. Drury West park n' ride intersection and Burt Road roundabout)	1A	2028 - 2032	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to the release of land in Drury West. Follows implementation of the Drury West Rail Station and park and ride. The early implementation supports emissions reduction by enabling efficient PT network and mode shift from outset of development. Support a shift to more sustainable travel. 	<ul style="list-style-type: none"> Delayed or early land release would influence staging of the Drury West Arterial and affect access to the proposed Drury West station Opportunity for integration with developer or Plan Change plans to require infrastructure as part of the suite of mitigation effects Project completion subject to NZUP funding Station Access Benefits
Sim Road to Sim Road connection / bridge	1B	2018 - 2022	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to the completion of Paerata Rise and the release of some land in Paerata South. Follows implementation of the Paerata Rail Station. Support a shift to more sustainable travel by improved station access. Completes a Sim Road to Sim Road across the NIMT to increase connectivity over the NIMT to improve station access, provide an additional crossing and relieve future vehicle through movements past the Paerata Rail Station and connect directly to the Paerata Rise development. Relieves urbanised areas from strategic traffic, enhancing resilience and allows alternative mode facilities to be enhanced and safety improved. 	<ul style="list-style-type: none"> Early implementation will be highly beneficial to the road network and supporting planned communities, particularly active transport connections. Delay in implementation could have significant impacts on access to Public Transport and local centres as well as additional congestion on SH22.
Paerata Station Road to Sim Road (including roundabout at Sim Road)	1C	2023 - 2027	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to the completion of Paerata Rise and the release of some land in Paerata South. Follows implementation of the Paerata Rail Station. Support a shift to more sustainable travel by improved station access. Completes a connection from SH22 to Sim Rd, connecting to Paerata station, Paerata Rise Development and local centres. Relieves urbanised areas from strategic traffic, enhancing resilience and allows alternative mode facilities to be enhanced and safety improved. 	<ul style="list-style-type: none"> Delayed or early land release would influence staging of the Drury-Pukekohe Link and affect access to the proposed Paerata station and the planned Paerata Rise development Opportunity for integration with developer or Plan Change plans to require infrastructure as part of the suite of mitigation effects Project completion subject to NZUP funding
Stage 2						
Drury West Arterial (from Burt Road roundabout to Runciman Road)	2A	2028 - 2032	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to the completion more development in Drury West. Follows implementation of the Drury West Rail Station and park and ride. The early implementation supports emissions reduction by enabling efficient PT network and mode shift from outset of development. 	<ul style="list-style-type: none"> Delayed or early land release would influence staging of the South Drury Arterial (from Great South Road to Runciman Road) Early implementation subject to completion of the Waka Kotahi project linking SH22 to Great South Road

Transport Project	ID	FULSS / Pukekohe Structure Plan Staging	Pukekohe DBC Model Scenario	Implementation	Rationale	Risks/Opportunities
South Drury Arterial (from Great South Road, excluding GSR roundabout, to Runciman Road)	2B	2028 - 2032	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to the completion of development in Drury West. Follows implementation of the Drury West Rail Station and park and ride. The early implementation supports emissions reduction by enabling efficient PT network and mode shift from outset of development. Completes SH22 Connection / South Drury Arterial link to Great South Road and future SH1 interchange at Drury South delivered through P2B Stage 2. 	<ul style="list-style-type: none"> Subject to implementation of both Drury West Arterial and the Waka Kotahi project linking SH22 to Great South Road Delayed or early land release would influence staging of the South Drury Arterial (from Runciman Road to Burt Road)
SH22 Connection (from Sim Road to Drury Paerata Link)	2C	rural	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to Paerata Rise and the release of land in Paerata South. Follows implementation of the Paerata Rail Station. Enhance resilience and improved safety. 	<ul style="list-style-type: none"> Rely on Paerata Rise development, creating an opportunity for integration with developer to require infrastructure as part of the suite of mitigation effects Opportunity to alleviate congestion off SH22 by improving connectivity for local trips, however it is interdependent on the provision of a link between the Sim Roads.
Paerata Arterial (from roundabout at Sim Road to roundabout at Cape Hill Road)	2D	2028 - 2032	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to the completion of Paerata Rise and the release of land in Paerata South. Follows implementation of the Paerata Rail Station. Completes north-south link between Sim Road and Cape Hill Road Support adjacent urbanisation 	<ul style="list-style-type: none"> Early implementation will be highly beneficial to the road network and supporting planned communities Delay in implementation could have significant impacts on the planned development surrounding Paerata Opportunity for integration with Paerata station to improve accessibility and integration while encouraging mode shift from private vehicles Opportunity for integration with developer or Plan Change plans to require infrastructure along western edge as part of the suite of mitigation effects
Pukekohe East Road upgrade (Golding Road to NE arterial)	2E	2028 - 2032	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to development in Southeast Pukekohe. Existing arterial section from the north-eastern ring road to Belgium Road. High east-west function for general traffic and freight and will accommodate buses and active modes. The early implementation supports emissions reduction by enabling efficient PT network and mode shift from outset of development. Support adjacent urbanisation and improved access to Pukekohe Station 	<ul style="list-style-type: none"> Opportunity for integration with developer or Plan Change plans to require infrastructure as part of the suite of mitigation effects Implementation supports emissions reduction by enabling efficient PT network and active mode network causing mode shift from outset of development. Opportunity to enhance freight resilience and connectivity
South-east arterial (Golding Road)	2F	2028 - 2032	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to development in Southeast Pukekohe. Creates link between the new connection over the rail bridge and Pukekohe East Road via Golding Road Plays an important role in connecting current and future light industry zones around south Pukekohe, as well as freight through traffic, to SH1 at Bombay Support adjacent urbanisation and improved access to Pukekohe Station 	<ul style="list-style-type: none"> Opportunity for integration with developer or Plan Change plans to require infrastructure as part of the suite of mitigation effects Implementation supports emissions reduction by enabling efficient PT network and mode shift from outset of development. Provision of this link will enhance freight resilience and connectivity
Stage 3						

Transport Project	ID	FULSS / Pukekohe Structure Plan Staging	Pukekohe DBC Model Scenario	Implementation	Rationale	Risks/Opportunities
Paerata Arterial (from Cape Hill Road roundabout to roundabout at north-east arterial)	3A	2028 - 2032	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to development in Paerata South. Completes north-south link between Sim Road and Cape Hill Road, providing access for all modes. This link provides good strategic access, connectivity and resilience, particularly for general traffic and freight. 	<ul style="list-style-type: none"> Early implementation will be highly beneficial to the road network and supporting planned communities Delay in implementation could have significant impacts on the planned development surrounding Paerata Opportunity for integration with developer or Plan Change plans to require infrastructure along western edge as part of the suite of mitigation effects Rely on project 3C below to provide continuous access to Pukekohe East and West.
South-west arterial (Puni Road to Golding Road, including new railway bridge)	3B	2028 - 2032	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to more development in Southeast Pukekohe. Links Golding Road to Puni Road in Pukekohe. It is a primary east-west road which helps in detracting general traffic and freight away from the town centre. Allows alternative mode facilities to be enhanced and safety improved. Provides a new bridge across the railway line, improving connectivity and resilience 	<ul style="list-style-type: none"> Implementation supports emissions reduction by enabling efficient active mode and PT network and mode shift. Provision of this link will enhance freight resilience and connectivity Opportunity for integration with developer or Plan Change plans to require infrastructure as part of the suite of mitigation effects in proximity to the southwest growth area
North-east Arterial (from SH22 to Cape Hill Rd)	3C	2028 - 2032	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to 3A and development in South Paerata, Pukekohe East Growth areas. Completes a link between SH22 and Cape Hill Road, allowing for improved access to Drury-Pukekohe link and the surrounding growth. Provides a new bridge across the railway line, improving connectivity and resilience for all modes. 	<ul style="list-style-type: none"> Opportunity for integration with developer or Plan Change plans to require infrastructure as part of the suite of mitigation effects Implementation will be highly beneficial to the road network and supporting planned communities Provision of this link will enhance freight resilience and connectivity for all modes Delay in implementation could have negative impacts relating to climate change Rely on project 3A below to provide continuous access to Pukekohe East and Paerata.
Stage 4						
South Drury Arterial (from Runciman Road to (and including) SH22 Connection up to Sim Road.	4A	2028 - 2032	2038	2028 - 2038	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to the release of land in Drury West, Paerata Rise and Paerata South. Eases demand along SH22 through Drury West, along with enhanced safety and greater promotion of active modes. Completes SH22 Connection / South Drury Arterial link to Great South Road and future SH1 interchange at Drury South delivered through P2B Stage 2. Improve connectivity and resilience for general traffic and freight. 	<ul style="list-style-type: none"> Opportunity for integration with developer or Plan Change plans to require infrastructure as part of the suite of mitigation effects Subject to implementation of both Drury West Arterial and the Waka Kotahi project linking SH22 to Great South Road This link is only viable if the wider road network and associated growth is in place Opportunity to alleviate congestion off SH22, however if it is implemented too early it may encourage car usage and increase VKT Opportunity to alleviate congestion off SH22 and improve connectivity to the Paerata rise developments
Stage 5						
North-west arterial (Gun Club Road to SH22)	5A	2028 - 2032	2038	2038 - 2048	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to development in Northwest Pukekohe growth area and the need to provide better connectivity with existing and planned growth areas. Completes east-west link between SH22 and Gun Club Road, providing direct access to the proposed north-western industrial area 	<ul style="list-style-type: none"> Opportunity for integration with developer or Plan Change plans to require infrastructure as part of the suite of mitigation effects Implementation will be highly beneficial to the road network and supporting planned communities Provision of this link will enhance freight resilience and connectivity Delay in implementation could have negative impacts relating to climate change

Transport Project	ID	FULSS / Pukekohe Structure Plan Staging	Pukekohe DBC Model Scenario	Implementation	Rationale	Risks/Opportunities
					<ul style="list-style-type: none"> Improve access for all modes to access the strategic network and reducing congestion and VKT for general traffic and heavy vehicles. 	<ul style="list-style-type: none"> Risk with connection being implemented too early (where there is not significant enough population or pressure on the road network) resulting in increased private vehicle mode share and VKT
North-west arterial (Gun Club Road to Ward St)	5B	2028 - 2032	2038	2038 - 2048	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to development in Northwest Pukekohe and the need for a more connected multimodal transport network. Completes the north-western arterial link between Gun Club Road and Ward St Provides an alternative link for general traffic and freight to access SH22 but is also an essential active mode and public transport corridor. 	<ul style="list-style-type: none"> Opportunity for integration with developer or Plan Change plans to require infrastructure as part of the suite of mitigation effects Implementation will be highly beneficial to the road network and supporting planned communities, particularly the active mode networks Provision of this link will enhance freight resilience and connectivity Delay in implementation could have negative impacts relating to climate change
Stage 6						
North-east arterial (from Cape Hill Rd to Pukekohe East Rd)	6A	2028 - 2032	2038	2038 - 2048	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to development in Northeast Pukekohe, as well as in Northwest Pukekohe and the need for better local access and more efficient general traffic and freight journeys. Completes a link between SH22 to Pukekohe East Road Relieves urbanised areas from strategic traffic, enhancing resilience and freight reliability and allowing alternative mode facilities to be enhanced and safety improved. 	<ul style="list-style-type: none"> Opportunity for integration with developer or Plan Change plans to require infrastructure as part of the suite of mitigation effects Implementation will be highly beneficial to the road network and supporting planned communities Provision of this link will enhance freight resilience and connectivity Risk with connection being implemented too early (where there is not significant enough population or pressure on the road network) resulting in increased private vehicle mode share and VKT
Mill Road upgrade	6B	2028 - 2032	2038	2038 - 2048	<ul style="list-style-type: none"> Strongly linked to wider growth in Pukekohe northeast, Pukekohe northwest, Pukekohe southeast, Pukekohe southwest and Waikato). Reliant on the completion of the SH1 upgrade being complete. Upgrades link between Pukekohe town centre and SH1 Integrates with the proposed SH1 upgrade to create a cohesive and resilient local and regional road network Relieves safety pressure on rural roads 	<ul style="list-style-type: none"> Opportunity for integration with developer or Plan Change plans to require infrastructure as part of the suite of mitigation effects at western end Implementation will be highly beneficial to the road network and supporting planned communities Provision of this link will enhance freight resilience and connectivity Risk with connection being implemented too early (where there is not significant enough population or pressure on the road network) resulting in increased private vehicle mode share and VKT
Stage 7						
Drury Paerata Link (SH22 Connection roundabout to Sim Road roundabout)	7A	rural	2048	2048+	<ul style="list-style-type: none"> Follows the completion of all associated development and highway upgrades in Pukekohe, Drury West and Paerata. Completes north-south link between Pukekohe, Paerata, Drury West, SH1 and Drury-Opaheke. Final connection staged to drive early mode shift and optimised use of existing infrastructure. Relieves significant safety pressure on rural roads 	<ul style="list-style-type: none"> Implementation reliant on all other projects being in place This link is only viable if the wider road network and associated growth is in place Opportunity to alleviate congestion off SH22 and the wider network Risk with connection being implemented too early (where there is not significant enough population or pressure on the road network) resulting in increased private vehicle mode share and VKT

Figure 3-1 Transport Projects



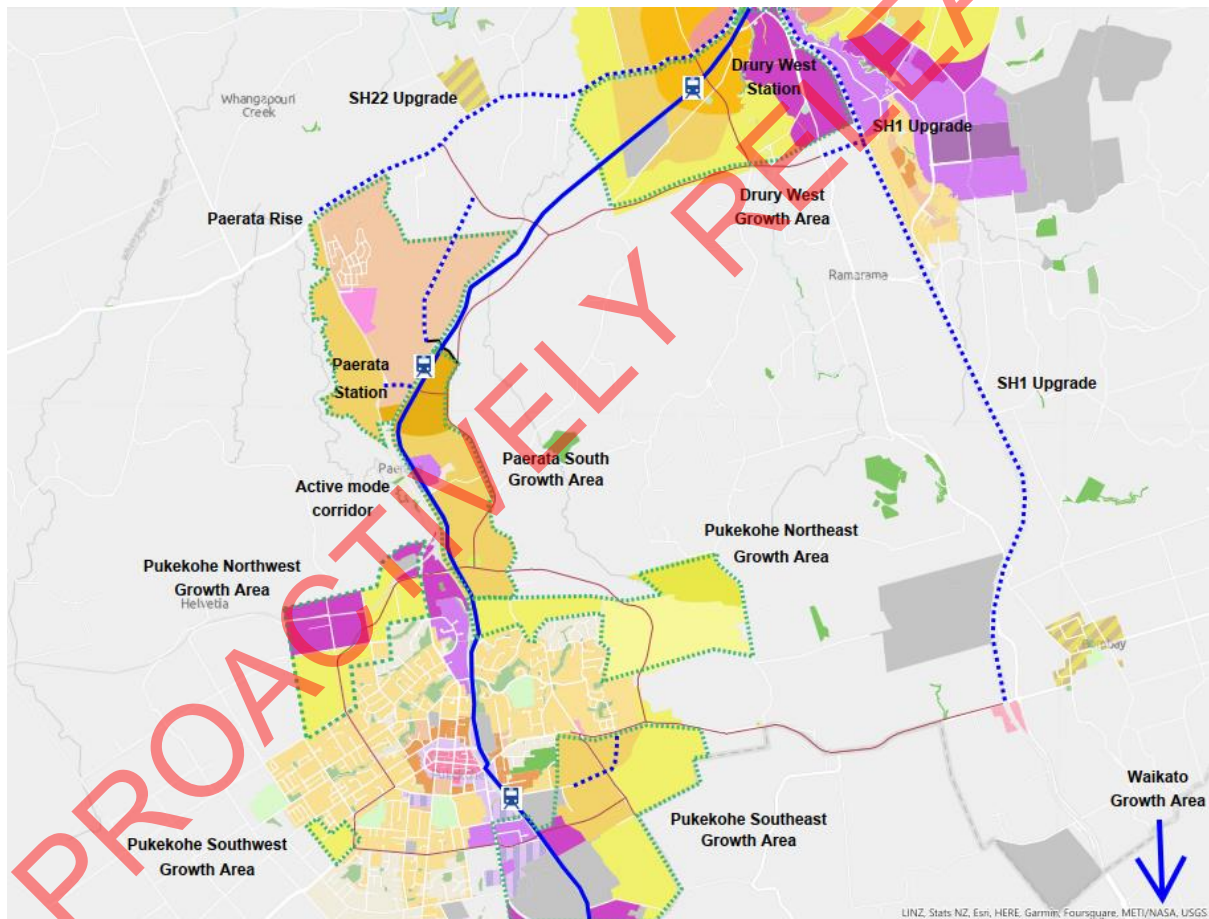
3.3 Staging Implications and Interdependencies with other projects

Given the scale transport infrastructure to be delivered in the next 30+ years of growth in South Auckland and wider regional growth, Pukekohe DBC has several interdependencies with other projects, particularly functional overlaps and staging considerations that influence effectiveness of transport and land use integration.

The sections below provide an overview of the interdependencies and relationships between Pukekohe projects and other Te Tupu Ngātahi and AT / Waka Kotahi Projects to provide clarity about short- and long-term integrated project planning.

The primary transport projects impacting Pukekohe DBC are shown in Figure 3-2 below.

Figure 3-2 Transport Projects Impacting Pukekohe DBC



3.3.1 Upgrades to Existing Corridors

There are several Waka Kotahi upgrades planned for the Paerata and Pukekohe area. These corridors will form key links to the proposed network and have the potential to shift travel patterns and have an impact of mode share. It is important that the Pukekohe DBC staging considers these projects, integrating their interdependencies into the overall strategy. These corridors include:

- SH1 Upgrade (SH22 South Interchange to Great South Road)

- SH1 Upgrade (Great South Road to Bombay Mill Road)
- SH1 to Great South Road link
- SH22 Upgrade

This investment is also less exposed to land use staging uncertainties as any investment in these corridors will provide significant benefit to existing communities, regardless of the timing of wider growth.

3.3.2 New Transport Interchanges at Paerata and Drury West

KiwiRail is working with partner agencies Auckland Transport and Waka Kotahi on creating a cohesive transport network in Southern Auckland for the anticipated population growth. Combined with KiwiRail's project to extend of electrification from Drury to Pukekohe, the three new stations are proposed between Paerata and Pukekohe. Two of these stations are located within the Pukekohe DBC project area:

- Paerata Station; and
- Drury West Station.

These stations will play an important role in improving public transport accessibility for the existing and future residents of Pukekohe, helping drive a mode shift away from private vehicles. It is vital that any projects which connect with these stations (mainly Paerata Connections and Drury West Arterial) and prioritised within the staging strategy to allow for improved accessibility and integration.

3.3.3 Proposed Future Urban Zone Areas

Future Urban Zones surround a large portion of the proposed network for Pukekohe DBC, primarily comprising of residential developments, some of which are already live zoned. These growth areas have been grouped as following:

- Drury West Growth Area
- Paerata Rise
- Paerata South Growth Area
- Pukekohe Northeast Growth Area
- Pukekohe Northwest Growth Area
- Pukekohe Southwest Growth Area
- Pukekohe Southeast Growth Area

It is important that the staging of the Pukekohe transport projects are linked to the release of available land to ensure maximum integration of transport facilities with the planned development. This will provide an opportunity to benefit from developer contributions to facilities and ensure mode shift from the onset.

3.3.4 Waikato Growth Areas

Along with the planned growth within Pukekohe, there will also be significant growth in existing urban communities in North Waikato. As a number of the projects within the Pukekohe DBC play a strategic, inter-regional role, it is likely that growth occurring in North Waikato will have an impact on these and therefore should be staged accordingly to provide for the additional inter-regional trips.

3.3.5 Regional Active Mode Corridor (AMC)

The South Auckland DBC recommended a strategic active mode corridor to achieve a high level of integration with existing and future land use and provide connectivity between new railway stations and the wider regional cycle network.

The preferred alignment of this corridor runs from Pukekohe to Drury East, including interfaces with existing and proposed railway stations along the alignment.

The functional intent of this project is to provide a safe, direct, attractive and viable AMC which connects the future urban areas of Pukekohe, Paerata and Drury, as well as integrate with the wider walk and cycle network.

It is important that the staging of the Pukekohe transport projects, particularly the active mode elements are aligned with the provision of the AMC to ensure a cohesive and attractive facility that encourages mode shift. Active mode catchment and connectivity will be greatly enhanced by this corridor being implemented as early as possible, further justifying the rationale for the intended active mode upgrades on Pukekohe DBC corridors. Therefore, it should be a priority to have this corridor in place prior to development rollout.

3.3.6 Rail Electrification

Funding as part of NZUP has been allocated for an additional 15 electric trains to enable electric rail services to be extended to Pukekohe and to provide additional capacity on the rail network. Additionally, this will include outlining space for concrete platforms, forming the basis for the South Stations implemented through NZUP.

Rail electrification will remove the need for passengers to change trains at Papakura, increasing the attractiveness of public transport in the South. This has a direct interrelationship with station upgrades and four tracking and will imminently improve connectivity and transport choices imminently within the Pukekohe growth area.

It is important that the staging of the Pukekohe transport projects is staged in accordance with the rail electrification in order to provide for the increased train patronage associated with improved connectivity and travel time.

3.3.7 Pukekohe DBC Interdependencies

As shown above, the scale transport infrastructure to be delivered in the next 30+ years of growth in South Auckland and wider regional growth results in Pukekohe DBC having several interdependencies with other projects, particularly functional overlaps and staging considerations that influence effectiveness of transport and land use integration.

Table 3-2 provides an overview of the interdependencies and relationships between the Pukekohe DBC projects.

Table 3-2 Pukekohe DBC Project Interdependencies

Transport Projects	1A	2A	2B	4A	2C	7A	1B	1C	2D	3A	5A	5B	3B	2F	2E	6A	6B	3C
Location	Drury West Arterial	Drury West Arterial	South Drury Arterial	South Drury Arterial	SH22 Connection	Drury Paerata Link	Sim Road Connection	Paerata Connection	Paerata Arterial	Paerata Arterial	North-west Arterial	North-west Arterial	South-west Arterial	South-east Arterial	Pukekohe East Road	North-east Arterial	Mill Road	North-east Arterial
[1A] Drury West Arterial (from Jesmond Road intersection to Burt Road incl. Drury West park n' ride intersection and Burt Road roundabout)		√	√															
[2A] Drury West Arterial (from Burt Road roundabout to Runciman Road)	√		√															
[2B] South Drury Arterial (from Great South Road, excluding GSR roundabout, to Runciman Road)	√	√																
[4A] South Drury Arterial (from Runciman Road to (and including) SH22 Connection up to Sim Road.	√	√	√		√													
[2C] SH22 Connection (from SH22 to Sim Road)				√			√											
[7A] Drury Paerata Link (SH22 Connection roundabout to Sim Road roundabout)	√	√	√	√	√		√	√	√	√	√	√				√	√	√
[1C] Sim Road to Sim Road connection / bridge					√	√			√									
[1C] Paerata Station Road to Sim Road (including roundabout at Sim Road)									√									
[2D] Paerata Arterial (from roundabout at Sim Road to rbt at Cape Hill Road)							√	√										
[3A] Paerata Arterial (from Cape Hill Road roundabout to roundabout at north-east arterial)							√	√	√									√
[5A] North-west arterial (Gun Club Road to SH22)												√	√					
[5B] North-west arterial (Gun Club Road to Ward St)											√		√					
[3B] South-west arterial (Puni Road to Golding Road, including new railway bridge)												√		√	√			
[2F] South-east arterial (Golding Road)													√		√			

Transport Projects	1A	2A	2B	4A	2C	7A	1B	1C	2D	3A	5A	5B	3B	2F	2E	6A	6B	3C
[2E] Pukekohe East Road upgrade (Golding Road to NE arterial)														√	√	√		
[3C] North-east arterial								√	√	√	√	√				√	√	
[6B] Mill Road upgrade													√	√	√	√		√
[3C] North-east Arterial (from SH22 to Cape Hill Rd)								√	√	√	√					√		

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4 Alternative Staging Considerations

Careful consideration has been given to the development of an alternative staging scenario for the Pukekohe growth area.

The development of an alternative staging scenario is typically created in response to known funding constraints and to inform the feasibility and deliverability of land use release projections. The greatest benefit of testing alternative staging scenarios exists where large, strategic infrastructure has the ability to create significant liabilities to asset owners. This could include implications on property liability or peak cashflow demands for capital expenses. These have large consequences for planning and policy documents such as the Regional Land Transport Plan, Regional Public Transport Plan and the National Land Transport Plan.

While there are wider known funding constraints in the Auckland context, no alternative staging has been proposed for Pukekohe for the following reasons:

- Growth in Pukekohe has been sequentially staged and there appears to be a reasonable distribution of land use release across the projected growth periods to 2048, therefore no significantly critical funding pinch points have been identified.
- The staging principles discussed previously have enabled proposed staging to be congruent with climate change principles, land use release implications and project interdependencies.

Overall, it is considered that the proposed staging scenario provides a realistic assumption of likely staging outcomes, and as such has been used to inform transport modelling, transport economics and financial forecasting within the Pukekohe DBC.

5 Summary

In reality there are a range of different drivers, parallel workstreams and triggers that will influence how the network staging will be delivered.

Due to the uncertainty regarding timing and form of specific and use activities, it is not feasible to develop a detailed stage by stage implementation plan. Further, this is not required for this Business Case, given its focus on identifying preferred long term corridors, which will be subject to separate implementation decisions and project specific implementation business cases in the future.

Therefore, a principle based approach is regarded as the best way to manage and deliver the desired transport and land use outcomes consistently. There are ongoing land use development pressures in Pukekohe, which may in turn influence land use staging. As such, this report provides a summary of potential staging considerations, and reflects our limited current knowledge of land use activities. Therefore, the inherent nuances linked to interdependencies with other projects, longitudinal staging and land use activities should be frequently evaluated (with every modified Structure Plan, Plan Change etc) to ensure that optimum transport and land use integration is being achieved in the short, medium and long term. To assist in this process, an overview of key project interdependencies has been provided.

In summary, while the overall land use staging is consistent with earlier work completed as part of the Future Urban Land Supply Strategy and the Pukekohe Structure Plan, the implementation and staging of transport projects within these forecasted timeframes have been adjusted to take advantage of opportunities to support desired outcomes. In particular this assessment demonstrates that:

- There are opportunities to reinforce wider climate change and mode shift outcomes. In particular, a later implementation of Drury Paerata Link, combined with earlier delivery of active mode and walking and cycling focused projects can assist in driving change while managing for potential increases in private vehicle demands.
- There are a number of projects such as the links to both the Drury West and Paerata stations and the Sim-Sim link over the NIMT that are considered to be required earlier due to current live zoned land adjacent to the projects and imminent increased density provisions (Paerata Rise). As such planning to secure funding for these projects is considered a practical next step.

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