



TE TUPU NGĀTAHI
SUPPORTING GROWTH

Warkworth 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	Warkworth Detailed Business Case
Do-min	Do-Minimum Option
FUZ	Future Urban Zone
FULSS	Future Urban Land Supply Strategy
IBC	Warkworth 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 Warkworth Detailed Business Case (DBC) and sets out considerations relating to the potential phasing of the transport projects identified in the Warkworth DBC. This report will inform the development of the Financial Case for the Warkworth DBC.

1.2 Background

The considerations relating to the implementation of the Warkworth DBC transport projects are primarily driven by assumptions around the land use roll-out. Additional factors that are considered are detailed further below. The expected timeframes for the future land use roll-out in the Warkworth growth areas has initially been guided by Auckland Council's Future Urban Supply Strategy, released in July 2017 (FULSS), and the Warkworth Structure Plan, adopted in 2019.

2 Land Use Sequencing

2.1 Future Urban Land Supply Strategy and Warkworth 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 Warkworth growth area this staging is shown in Figure 1.

Figure 1: Future Urban Land Supply Strategy (2017)

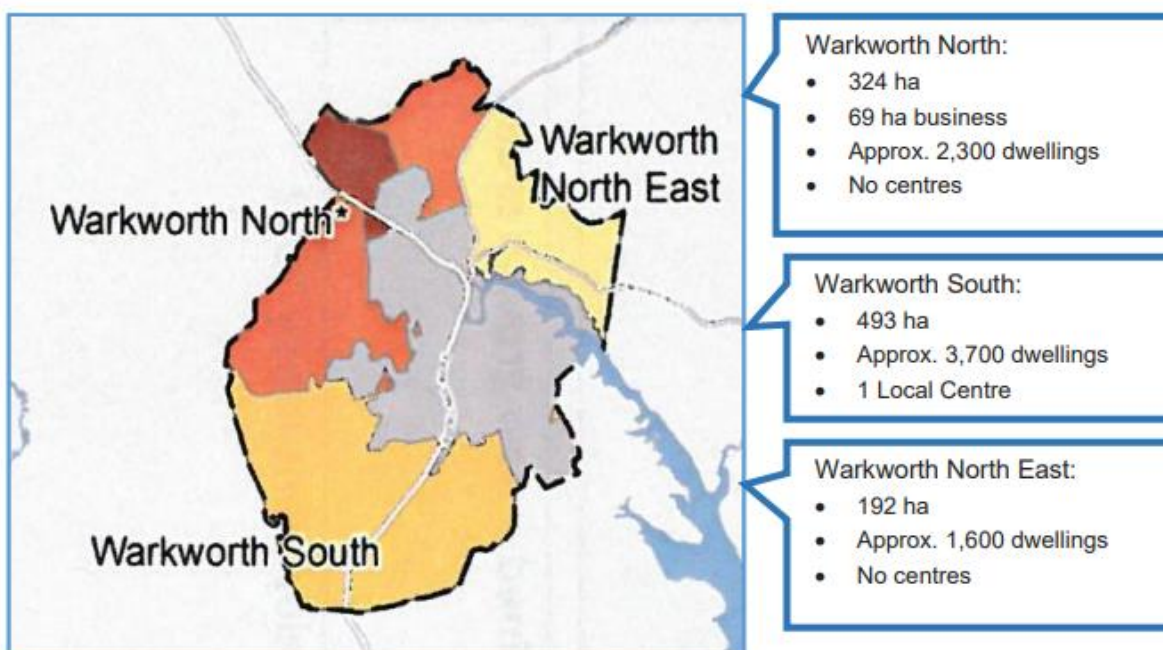




Table 2-1 compares the assumed staging of transport infrastructure for the Warkworth growth areas based on the FULSS with the staging assumptions used to inform the transport modelling for the Warkworth.

Table 2-1: Anticipated yield Comparison between Future Urban Land Supply Strategy and the Warkworth Structure Plan (as per Warkworth Structure Plan 2017)

Development Ready Date	Future Urban Land Supply Strategy (2017)	Warkworth Structure Plan (2019)
2017	69ha Business	69ha business ('live' zoned)
From 2022	Approx 2,300 dwellings	25ha industrial land Approx 2,200 dwellings
2028 – 2032	Approx 3,700 dwellings 1 Local centre	Approx. 4,100 dwellings 1 Local centre 40ha industrial land
2033 - 2037	Approx 1,600 dwellings	Approx 1,200 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 Warkworth. These forecasted release periods are the same as that proposed in the Warkworth Indicative Business Case.

Overall, no further information or funding priority changes have occurred since the completion of the Warkworth Structure Plan that would result in a change in these findings.

2.2 Modelled Land Use Forecasts

The transport modelling for the Warkworth 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 AFCS land use model and known detail around specific land use planning processes.

Table 2-2 and Table 2-3 summarise the assumed residential population and employment forecasts for the Warkworth 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 - Warkworth Growth Areas

Population	2018	2028	2038	2048	2048+
Warkworth North	905	1,811	2,733	2,769	4,324
Warkworth South	307	366	5,763	7,989	8,479
Warkworth North East	324	789	1,108	1,174	2,833

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

Employment	2018	2028	2038	2048	2048+
Warkworth North	202	1,020	1,993	2,103	2,512
Warkworth South	149	150	741	1,591	1,797
Warkworth North East	86	95	127	154	318

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 Warkworth 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 services within this compact town.

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 Warkworth:

- Immediate shift to more sustainable travel choices.
- 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 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 following table provides an overview of the transport projects identified in the Warkworth DBC, and the proposed staging for implementation. 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 Warkworth 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 Warkworth 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 and are summarised in Table 3-1 below.

Table 3-1 Proposed staging for Warkworth DBC

Transport Project	Adjacent Land use FULSS/Warkworth Structure Plan Staging	NW DBC Model Scenario	Implementation (5-year bracket)	Rationale	Risks/Opportunities
Northern Public Transport Interchange and Park and Ride	2022	2038	2028 – 2033	<ul style="list-style-type: none"> The implementation of the PT interchange is timed to leverage from the land development programmed to occur from 2022. The implementation of an interim PT Interchange delivered by the Local Board, can be utilised to address immediate constraints within the Warkworth Town Centre. The permanent larger solution to support growth is then programmed to occur from 2028. The early implementation of public transport infrastructure supports emissions reduction by enabling efficient PT network and mode shift outcomes. Interrelationship with Western Link Road northern extents. Rooding network required to provide access to the Public Transport hub. 	<ul style="list-style-type: none"> Implementation required earlier should the interim PT Interchange land be required back by the Rodney Local Board Integration with the Tūhono ki Tai intersection and NX2 operational performance
New Southern Public Transport Hub	2028-2032	2038	2033 – 2038	<ul style="list-style-type: none"> Follows land release. The requirement for this infrastructure is strongly linked to the release of land in South Warkworth. Follows implementation of the northern PT hub The early implementation supports emissions reduction by enabling efficient PT network and mode shift from outset of development Implementation will be linked to the Wider Western Link Road, as access to the PT interchange is contingent on this roading infrastructure 	<ul style="list-style-type: none"> Delayed or early land release would influence staging of the Southern Public Transport Interchange and the Wider Western Link. Opportunity for integration with developer or Plan Change plans to require infrastructure as part of the suite of mitigation effects
New Southern Interchange on Ara Tūhono Puhoi to Warkworth Motorway	2028- 2032	2048	2043 – 2048	<ul style="list-style-type: none"> Leverage existing assets and limit support for private vehicles to grow public transport ridership Long term opportunity to reducing VKT via integrating land use planning, urban development and transport planning and transport investments to reduce transport emission Less requirement for infrastructure in short term, longer term will support wider network efficiencies particularly on local road networks Reduced implementation complexities with the NX2 PPP contracting reaching the end of its operational life 	<ul style="list-style-type: none"> Early release of industrial land use could place increased pressure for earlier implementation of the interchange Opportunity for earlier implementation depending on funding Consideration of delivery with Ara Tūhono Warkworth to Wellsford project and potential interactions Delayed implementation and industrial land use could result in liveability impacts on residential communities
Existing State Highway 1 Upgrade (Hudson Street to Fairwater)	2028- 2032	2028	2022 – 2028	<ul style="list-style-type: none"> Staged for earlier implementation to enable effective connections to Warkworth Town centre for existing communities Support climate change and mode shift targets by early implementation of walking and cycling infrastructure Earlier sequencing due to opportunity for reallocation of road space and limited property implications 	<ul style="list-style-type: none"> Integration with Hill Street Upgrade Project and connections Opportunity to integrate projects with wider utilities upgrades

Transport Project	Adjacent Land use FULSS/Warkworth Structure Plan Staging	NW DBC Model Scenario	Implementation (5-year bracket)	Rationale	Risks/Opportunities
Existing State Highway 1 Upgrade (Fairwater to Edge of FUZ)	2028- 2032	2038	2028 – 2033	<ul style="list-style-type: none"> The requirement for this infrastructure is strongly linked to the release of land in South Warkworth. Upgrading active mode spine to connect key land use activities including Mahurangi College, Warkworth Town Centre and employment opportunities Supports climate with active mode upgrade only with limited provision for additional private vehicle capacity 	<ul style="list-style-type: none"> Could be delivered through iterative upgrades delivered by land developers Interrelationship with Waka Kotahi revocation process. If this process is delayed, an Auckland Transport project within a Waka Kotahi controlled corridor could have greater implementation difficulties
Woodcocks Road Upgrade (SH1 to Mansel Drive)	2028- 2032	2028	2022 – 2028	<ul style="list-style-type: none"> Staged for earlier implementation to enable effective connections to Warkworth Town centre Supports climate change response and mode shift targets by early implementation of walking and cycling infrastructure Earlier sequencing due to opportunity for reallocation of road space and limited property implications 	<ul style="list-style-type: none"> Opportunity to support land use activities – Mahurangi College Link between Mahurangi college and
Woodcocks Road Upgrade (Mansel Drive to Edge of FUZ)	2028- 2032	2038	2028 – 2033	<ul style="list-style-type: none"> Follows land release. The requirement for this infrastructure is strongly linked to the release of land in South Warkworth. Upgrading active mode spine connecting to key land use activities including Mahurangi College, Warkworth Town Centre and employment opportunities Supports climate response with active mode upgrade only with limited provision for additional private vehicle capacity Interrelationship with Wider Western Link Road 	<ul style="list-style-type: none"> Could be delivered through iterative upgrades delivered by land developers
Matakana Road Upgrade	2033 – 2037	2038	2028 - 2033	<ul style="list-style-type: none"> Upgrade brought forward to early part of the 2028-2038 decade in response to land use changes in Warkworth North and around Tūhonohono ki Tai – Matakana Link. Surrounding infrastructure upgrades result in interrelationship and connectivity opportunity for wider network between Hill Street Upgrade and Tūhonohono Ki Tai - Matakana link. Enables connection for residential development at Tūhonohono Ki Tai intersection to Warkworth Town Centre Support climate change and mode shift targets by early implementation of walking and cycling infrastructure Supports climate with active mode upgrade only with limited provision for additional private vehicle capacity 	<ul style="list-style-type: none"> Opportunity for Hill Street integration and connection to Matakana Link Road to create high level of connectivity for active modes to the Warkworth Town Centre.
Sandspit Road Upgrade	2033 -2037	2048	2038 – 2043	<ul style="list-style-type: none"> North East Warkworth is the latest planned land release Fragmented land ownership likely to support assumption of slower land release 	<ul style="list-style-type: none"> Early land development out of sequence could place pressure for early implementation FUZ land both sides of the road which could assist in delivering the proposed upgrades.
New Western Link Road – North (2 lanes)	2022	2028	2024 – 2028	<ul style="list-style-type: none"> Staged earlier than Northern Public Transport Interchange, as the interchange is dependent on this connection for connectivity. Supports Climate Change response through completion of the active mode network and connection of buses to the land use to provide local and interregional travel choice. Initial 2 lane is to provide access to the growth area. However, the multimodal corridor will provide access from the residential land use 	<ul style="list-style-type: none"> Opportunity for developer delivered connection within AT designation Integration risk with Tūhonohono ki Tai intersection and NX2 operational requirements

Transport Project	Adjacent Land use FULSS/Warkworth Structure Plan Staging	NW DBC Model Scenario	Implementation (5-year bracket)	Rationale	Risks/Opportunities
				and local centre to a high frequency local bus network. North section of this alignment will support reliability for access to the PT Hub and Park and Ride facilities. 4 Lanes would only be required if the reliability for buses is compromised.	
New Western Link Road - (4 lanes)	2022	2038	2033 – 2038	<ul style="list-style-type: none"> Delivery timed later than Northern Public Transport Interchange to occur when traffic demands likely to be increasing on corridor and public transport priority becomes necessary 	<ul style="list-style-type: none"> Space for four laning is provided for within the Warkworth North Precinct –opportunity for implementation to be timing based on traffic demands to maximise public transport benefits
New Western Link Road – Central	2022	2028	2024 – 2028	<ul style="list-style-type: none"> Staged for earlier implementation to enable effective connections to Warkworth Town centre and the new local town centre in Warkworth North. Earlier sequencing due to opportunity for reallocation of road space and limited property implications Support climate change and mode shift targets by early implementation of walking and cycling infrastructure 	<ul style="list-style-type: none"> Opportunity to delay given there are some existing facilities (shared paths) on the route, resulting in reduced urgency for implementation. However, an integrated network would offer wider connectivity benefits.
New Western Link Road – South	2028 – 2032	2038	2028 – 2033	<ul style="list-style-type: none"> Follows land release. The requirement for this infrastructure is strongly linked to the release of adjacent land Upgrading active mode spine connecting to key land use activities including Mahurangi College, new education facilities and employment opportunities Interrelationship with Woodcocks Road and SH1 	<ul style="list-style-type: none"> Delayed land development from landowners results in unconnected network Intersection connection with SH1 needs to be implemented with significant works on SH1 to address sight distance limitations
New Wider Western Link Road	2028 – 2032	2038	2033 – 2038	<ul style="list-style-type: none"> Follows land release. The requirement for this infrastructure is strongly linked to the release of land in South Warkworth. Upgrading active mode spine connecting to key land use activities including Mahurangi College, Warkworth Town Centre and employment opportunities Interrelationship with Woodcocks Road and SH1 and Southern Interchange with Ara Tūhono 	<ul style="list-style-type: none"> Development triggers requirement for this corridor. Should development be delayed then requirement for the corridor can be delayed. Opportunity to stage construction to align with developer programmes.
New Sandspit Link Road	2033 - 2037	2048	2038 – 2043	<ul style="list-style-type: none"> Follows land release. The requirement for this infrastructure is strongly linked to the release of adjacent land Plays a resilience role in Hill Street intersection Upgrades which are programmed for implementation and are expected to operate satisfactorily in the short term. 	<ul style="list-style-type: none"> Later implementation to integrate with future rehabilitation of quarry site. Risk that the quarry operations extend for longer or finish sooner than expected.

3.3 Staging Implications and Interdependencies with other projects

3.3.1 Upgrades to Existing Corridors

The overall approach to existing brownfield corridors in the existing Warkworth area, is to programme the upgrades to occur prior to greenfield development. This is to achieve an integrated networks outcome, in particular supporting active mode connectivity to key land uses. By focusing the initial investments on existing road corridors, this will support Warkworth to be ready to receive anticipated growth to the north and south of the urban area and minimise “gaps” in the network. These corridors include:

- Western Link Road – Central.
- SH1 between Hudson Road and Fairwater Drive.
- Woodcocks Road between SH1 and Western Link Road Central.

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 Southern Interchange with Ara Tūhono

The Southern Interchange has been phased towards the end of the Warkworth growth projects. A number of factors have led to this decision, including climate change outcomes and implementation feasibility.

The implementation of the Southern Interchange needs to be balanced against the climate change outcomes, and in particular making sure that public transport and active mode transport choices are available prior to the provision to the interchange to enable early behaviour changes for new residents. Ensuring that we “sweat” existing assets also supports a lower embodied carbon impact for Warkworth.

The Ara Tūhono corridor is being delivered by a Public Private Partnership between Waka Kotahi and the Northern Express Group (NX2). The current contractual arrangements mean that Waka Kotahi will commit to making debt payments for up to 25 years once the motorway is available to traffic and continues to meet the prescribed outcomes. These payments will be made through the National Land Transport Fund. The private sector, in this case NX2, becomes the long-term financier, designer, builder, manager and maintainer of the highway rather than just being the builder of that highway¹. The result of this arrangement is that implementation of additional works such as the southern interchange will be complex within the next 25 years. As such, the phasing of the interchange has been allocated towards the end of this period.

There is also an interrelationship between the interchange and the Wider Western Link corridor, as without the Wider Western link Road there will be no arterial roading connection for the interchange. Accordingly, the interchange needs to be staged subsequent to the Wider Western Link corridor.

¹ <https://nx2group.com/frequently-asked-questions>

The southern interchange has an interrelationship with the viability of the adjacent industrial land. The implementation of the interchange is expected to support long term aspirations for employment opportunities locally within Warkworth.

3.3.3 Northern Public Transport Interchange /Western Link

The Northern Public Transport Interchange in the long term is projected to support significant residential and commercial growth in the northern growth area. In to enable this growth, a connection to the intersection with Tūhonohono ki Tai is required. This connection not only enables growth, but also provides a connection for the wider bus services to Northern Public Transport Interchange. These two projects are inherently linked and therefore timing is linked. There is a potential opportunity for the road connection to occur earlier than the Northern PT interchange, particularly if the interim Local Board PT Hub has a longer life cycle than expected.

The key opportunity with staging for this project is the implementation of a project that will enable mode shift, and intercept private vehicles with the implementation of a larger Park and Ride facility.

The four laning of the Western Link Road is phased to occur later in the programme for Warkworth. This is consistent with objectives to leverage the use of existing infrastructure, and delay infrastructure construction until such time as they provide the most benefit to the network.

3.3.4 Southern Public Transport Interchange

The Southern Public Interchange is inherently linked to the timing of the growth in the Southern growth cell. It is also linked with the provision of the Wider Western Link, as this corridor is targeted at providing connectivity to SH1. Therefore, the provision of this Interchange cannot occur until such time that the Wider Western Link is delivered.

This facility is linked to the delivery of land use, and with delivery timed to occur alongside growth offers a significant opportunity to support early behaviours change outcomes for new residents within this area.

3.3.5 Hill Street and Sandspit Link Road

The Hill Street intersection is a current significant pinch point within the Warkworth network. This is particularly apparent during peak summer seasons and a Detailed Business Case was completed in 2019 to consider options to resolve these issues. This design is now underway and detailed design and preimplementation is expected to be completed by early 2023.

There is a significant opportunity to stage delivery of this project with other adjacent improvements on SH1 and Matakana Road to provide improved connectivity on Matakana Road, between the intersection with Tuhonohono ki Tai in the north and with Hill Street in the south.

A key interrelationship within the Warkworth network is the Sandspit Link Road and the influence that this corridor has on the performance of Hill Street. Based on current designs, the Hill Street intersections are expected to have reduced levels of service from 2038 onwards, which is not unexpected given that this coincides with higher levels of growth in the North East growth cell. As such, timing the Sandspit Link Road for implementation at this point enables the Sandspit Road

corridor to support growth in this area, while also maximising performance of the Hill Street intersections.

3.3.6 Warkworth to Wellsford

Designations for Warkworth to Wellsford were lodged by Waka Kotahi in March 2020 as part of the second stage of Ara Tūhono. At the time of this DBC, several appeals have been filed with the Environment Court and were proceeding via the standard Environment Court process.

The staging assessment and analysis completed in this DBC has not included the Warkworth to Wellsford project for the following reasons

- No confirmed funding for this project has been identified, and indications from Waka Kotahi are that no works are anticipated on this corridor in the next decade.
- The objectives of the Warkworth to Wellsford project are focused on the provision of an alignment that is safer, more resilient and results in an enhanced economic outcome for Northland through improved accessibility. These outcomes are distinct from the growth considerations of Warkworth.
- Transport movements within Warkworth will have no effect the Warkworth to Wellsford project. This is due to no proposed changes to access, in that vehicles wishing to travel to northward will still travel to the roundabout at the current terminus of Ara Tūhono.
- The Southern Interchange when implemented will reduce traffic volumes at the roundabout located at the terminus of Stage 1 of Ara Tūhono, however both Ara Tūhono Stage 1 and Stage 2 have been developed without the provision of the southern interchange and therefore this can be considered as a stand-alone project.
- Given the long-term delivery programme for Stage 2 Warkworth to Wellsford, there remains an ongoing opportunity for integration of the Southern Interchange with the Stage 2 project prior to implementation.

4 Alternative Staging Considerations

Careful consideration has been given to the development of an alternative staging scenario for the Warkworth 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 Warkworth for the following reasons:

- There is no clear evidence of any significant change to forecasted land use sequencing
- Growth in Warkworth 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.
- Warkworth infrastructure requirements are predominately based on upgrades to existing roads. For new local arterial connections, these are intrinsically linked to land release and unlikely to proceed in advance of development. It is noted that these new local corridors, offer the largest opportunity for co-delivery with developers which reduces financial impacts should land use timing change.
- The staging principles discussed previously have enabled proposed staging to be cognisant of 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 Warkworth 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 Warkworth, 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 Warkworth 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 the southern interchange, 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 existing corridors such as parts of the existing State Highway 1 corridor, the eastern extents of Woodcocks Road and the central section of the Western Link Road (Evelyn Street, Mansell Drive) that are considered to be required earlier due to current live zoned land adjacent to the projects and imminent increased density provisions within current urban areas (PC78). As such planning to secure funding for these projects is considered a practical next step.