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Ministry of **Transport**
TE MANATŪ WAKA

Economic Analysis of Upper North Island Supply Chain Scenarios

9 August 2019

WM WARREN AND MAHONEY®

WT PARTNERSHIP



Advisian

WorleyParsons Group

Transmittal letter

Wayne Brown
Chair of Upper North Island Supply Chain Strategy Working Group – Ministry of Transport

9 August 2019

Economic Analysis of Upper North Island Supply Chain Scenarios

Dear Wayne

We have completed our engagement to deliver an economic analysis of Upper North Island Supply Chain Scenarios under the Agreement dated 2 May 2019 between Ernst & Young Transaction Advisory Services Limited (“we” or “EY”) and Ministry of Transport, and the Consultancy Services Order dated 2 May 2019 (together, the “Agreement”).

Scope of our work

As set out in the Agreement, we have performed Services since 2 May 2019 for the Upper North Island Supply Chain Strategy Working Group use. This report was prepared on your instructions solely for the purpose of assessing the economic impact of the Upper North Island Supply Chain Scenarios and should not be relied upon for any other purpose.

Results of our work

During the course of performing these Services, we provided you with a draft and final economic analysis report and a draft operating budget for project team use. Our Services, and our advice, recommendations were based on information provided by you or on your behalf. We have used existing available data which includes data sourced from the 2014 National Freight Demand Study (NFDS). We understand an updated of the NFDS is currently being finalised which will cause the total values to change with this update but the key trends and direction of travel will remain the same.

Next Steps

We appreciate the cooperation, guidance and assistance you and the Working Group provided to us during the course of our work and we thank you for the opportunity to assist you with this engagement.

If you have any questions, please call me at 027 592 1364.

Yours sincerely



Chris Money
Partner
Ernst and Young Transactions Advisory Services Limited

Executive Summary

This report investigates the economic, social, cultural and environmental impacts of a range of Upper North Island Supply Chain Scenarios

In May 2019 the Ministry of Transport (MoT) appointed a consortium led by Ernst & Young Transaction Advisory Services Limited (EY)² to perform an economic evaluation of potential Upper North Island (UNI) supply chain. This report examines the economic impact on a range of Scenarios for land-side and port investment, taking account of regional development impacts as well as transport outcomes.

It is part of a wider investigation by the Government into the optimal configuration and strategy for delivering improved freight performance for the UNI region

In September 2018, Cabinet appointed a Working Group to review the freight and logistics sector in the Upper North Island, and to develop a Supply Chain Strategy for the region. This review is formally known as the 'Upper North Island Supply Chain Strategy' (UNISCS). The Working Group is referred to as the "UNISCS Working Group" and the "Working Group" interchangeably throughout this report.

The Working Group is responsible for the strategy of the freight network (including ports, rail and road) for the UNI region that will deliver the best long-term outcomes for New Zealand. An efficient supply chain network will ensure smooth movement of cargo and containers across the region. Additionally, the Working Group is tasked with assessing the existing land-side network infrastructure (rail, roads and inland freight terminals), potential upgrades and future requirements as well as optimising land use to ensure better services for all stakeholders, particularly the central and local government and the community.

The Working Group released an interim report in April 2019. This interim report involved a number of site visits, including visits to Northport and Ports of Auckland, supported by stakeholder engagement and initial analysis and advice to gain an understanding of the current system. The Working Group have since also visited Port of Tauranga and met with a number of other stakeholders.

A number of key themes emerged during the Working Group's discovery phase that guided them in their review. These include:

- **inefficiencies** of the network, encompassing rail, road, ports, inland ports and freight hubs
- **complex and inefficient owner relations** between the ports, network infrastructure and assets
- the importance of **social licence** and working within the communities that the network is there to serve, particularly in Auckland but also in Tauranga
- **infrastructure investment** by different parties and their rationales
- the **wider context** within which the Upper North Island Supply Chain Strategy is being conducted, with a particular emphasis on **optimal land use**.

The Working Group developed a range of strategic principles to assist in the evaluation of options for a future supply chain:

1. Cost efficiency in moving freight

Moving freight is critical to the New Zealand economy and the Working Group believe that they must present a future supply chain that allows the costs of moving freight to be kept as low as possible. This is particularly important in considering any reconfiguration of the supply chain, as the Working Group do not have the ability to direct freight. Freight will flow in the most cost-efficient way possible as the market allows.

2. Maintaining the level of competition in the supply chain

The Working Group do not consider a strategy that promotes monopolism to be in the best interests of New Zealand. Healthy competition between ports and transport providers in the supply chain is a good driver of innovation and cost effectiveness. The Working Group think that preserving the current level of competition in the Upper North Island Supply Chain, particularly in relation to the number of ports, is critical for the success of the supply chain.

3. Reducing the 'friction' between freight and passenger movements

It is important that the strategy reduce friction between freight and people as much as possible. The Working Group therefore have considered a future supply chain that favours the provision of infrastructure that limits the degree to which freight activity impinges on public areas, and reduces the interaction between freight and passenger movements, particularly in congested areas. The Working Group are therefore prioritising freight modes such as rail, and coastal shipping where possible, and place particular emphasis on optimal land use.

² The consortium includes Advisian, Warren and Mahoney, and WT Partnership.

4. Maintaining or improving the resilience of the supply chain

The Working Group believe the strategy must provide confidence that the Upper North Island supply chain has the ability to continue moving freight in the event of a natural disaster or other events that impact areas of the Upper North Island. The Working Group therefore think that as a minimum, a two-port system is needed for the Upper North Island. Given the significance of the Upper North Island supply chain to the rest of the country, the Working Group do not think that a strategy that relies on one port is in the best interests of New Zealand.

5. Contributing to overall government objectives

The Working Group are committed to developing a strategy that contributes to overall government objectives. The Working Group are therefore giving priority to a future supply chain with focus on road safety, reducing CO₂ emissions, and economic development of the regions (in particular Northland).

A range of Scenarios have been investigated using best practice economic evaluation techniques

This report provides a conventional economic assessment of UNISC Scenarios, using a combination of multi-criteria analysis (to help shortlist Scenarios and identify non-monetised impacts) and Cost Benefit Analysis (CBA). Inputs include MoT Freight forecasts, parameter values from the New Zealand Transport Agency's Economic Evaluation Manual and infrastructure cost estimates.

The CBA uses a bespoke model developed for this study, as well as building on EY's existing multimodal freight model, which has been applied to studies commissioned by the MoT, NZTA and KiwiRail in recent years. The CBA model is limited to monetisable costs and benefits such as travel time, congestion and safety impacts. The inclusion of more holistic impacts, for example environmental and amenity benefits, would likely increase the benefit-cost ratio of the Full Move scenarios.

The modelled Scenarios are wide-ranging and consider a number of different infrastructure configurations

The Working Group has developed a set of strategic Scenarios based on different investment profiles. While the focus of this work is the entire Upper North Island logistics and supply chain, the Scenarios are necessarily "port-centric" as ports represent one of the largest drivers for freight demand in the region.

The use of Scenarios, as distinct from options, is also critical. The purpose of this study is to evaluate the potential different outcomes that could be achieved for the UNISC. While the Scenarios are specified in sufficient detail to allow meaningful evaluation, they are representative of a range of different approaches and would require significant additional development to the point where they could be considered "investment ready" options.

The strategic scenarios the Working Group have considered are:

1. Maintaining the current status-quo, whereby the UNI region is serviced by Port of Tauranga (POT) and Ports of Auckland Limited (POAL), and Northport to a lesser extent;
2. Managed closure of the POAL freight operations³, Northport develops to a capacity equivalent to the Ports of Auckland, including appropriate levels of landside infrastructure and capacity to grow as levels of freight increase. Port of Tauranga continues its planned development.
3. Managed closure of the POAL freight operations, Port of Tauranga expands capacity to be able to accept the freight of the Ports of Auckland in addition to its own, including appropriate levels of landside infrastructure and capacity to grow as levels of freight increase. No major development at Northport.
4. Managed closure of the POAL freight operations, both Northport and Port of Tauranga expand capacity to be able to accept the freight of the Ports of Auckland, in addition to their own, including appropriate levels of landside infrastructure and capacity to grow as levels of freight increase.
5. Managed closure of the POAL freight operations, a new port in the Upper North Island is built that can handle the Ports of Auckland freight task, along with appropriate landside infrastructure and capacity to grow as levels of freight increase.

Scenarios were developed that offer a mix of:

³ The Working Group assumes that Cruise Liner operations will remain at POAL

- ▶ Port capacity: Investment in Northport, POT, a combination of both and a new port in the Firth of Thames, independent of the existing 3 ports
- ▶ Freight types: The impact of relocating car freight facilities from POAL as well as relocating all cargo freight facilities from POAL
- ▶ Time: The speed at which any relocation of facilities away from POAL could be undertaken.

Two headline Scenarios were developed, consisting of a Partial Move and a Full Move of the freight currently processed by POAL (refer to Section 5.1 for further details). In all Scenarios, it is assumed that POAL itself would remain as an operational port, providing services to the cruise ship industry. Within each of these headline Scenarios, different locations for the freight load were considered. The diagram below, for example, explains what a move to Northport would involve:

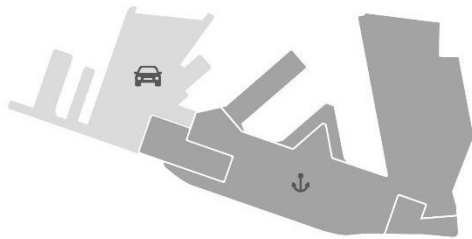
Figure 1 Developed Scenarios



BASE CASE

NO MOVE

- Establish maximum capacity and growth
- Establish ongoing costs
- Managing POA's growth elsewhere

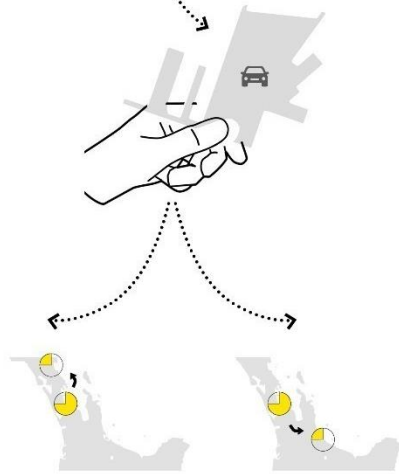
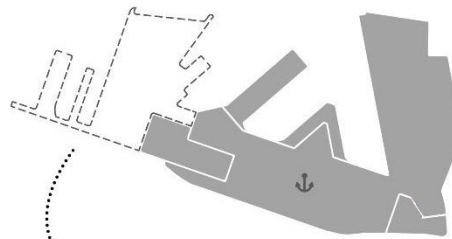


BASE CASE
Auckland

SCENARIO 1

PARTIAL MOVE

- Establish Container terminal at Northport
- Partial removal of port functions (probably at western end)
- Phased POA land development at Western end



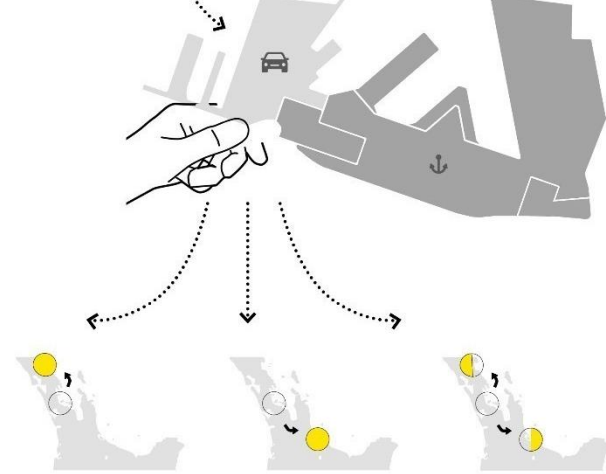
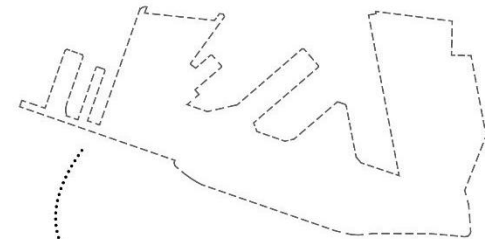
SCENARIO 1.1
Northport

SCENARIO 1.2
Tauranga

SCENARIO 2

FULL MOVE (EXCEPT CRUISE FACILITY)

- Simultaneous development of Northport, decommissioning of POA and POA land development



SCENARIO 2.1
Northport

SCENARIO 2.2
Tauranga

SCENARIO 2.3
Northport & Tauranga

A range of West Auckland Infrastructure requirements have also been taken into consideration

The Working Group is considering long-term infrastructure requirements such as an inland port in West Auckland and a vehicle importing and servicing centre at Northport⁴. In addition to this, the Working Group is considering a potential new rail line out west of Auckland to avoid congestion in the Auckland public transport rail network and connect through to the current inland freight terminals; and the establishment of new inland freight terminals.

The analysis concludes that the UNISC is complex and cannot be optimised by focusing on a single region.....

Analysis of freight flows and investment needs concludes that Scenarios involving reliance on a single port are likely to produce the worst outcomes. This includes the POT undertaking the majority of the UNI port task, as well as the development and prioritisation of a new port.

These two Scenarios involved the highest capital costs and reduce the resilience of the UNISC. Furthermore, both Scenarios would fail to leverage the existing capacity of the northern Auckland and Northland region.

.....and better long-term outcomes can be achieved through an integrated logistics and supply chain with a reduced focus on the Auckland CBD.....

Analysis of a range of potential Scenarios demonstrates that a UNISC supported by two ports produces the largest net benefits in the long-term: The POT, which maintains its current and forecast freight task; and Northport, developed to a capacity that enables it to accommodate the full freight task of the Ports of Auckland.

Any of the Full Move Scenarios require infrastructure investment and cooperative governance at scale, particularly in rail and ports, including transport infrastructure in West Auckland. This report will specifically focus on metro port expansion and West Auckland infrastructure required to support the full move. However, these investments when combined with releasing the value of the Auckland CBD site provide not only economic benefits in excess of the cost, but would also have flow-on benefits to social and cultural development through the wider activity stimulated.

....which is enabled through investment in Northport, Auckland to Northland rail and supporting infrastructure in West Auckland and Northland.

The modelling of a Full Move to Northport, with associated land-side investment requirements, results in a benefit cost ratio of 2.0. The “Full Move” scenario with POAL freight flows shared between Tauranga and Northport does not generate positive net economic benefits, mainly due to the significantly higher land-side infrastructure investment required in the Bay of Plenty. This is summarised in the table below:

Table 1: Summary Results 2020 to 2050 - Relative to Base Case, Net Present Value, \$ million nominal terms

	Scenario 2.1 - Full Move to Northport	Scenario 2.2 - Full Move to Tauranga	Scenario 2.3 - Full Move to Firth of Thames	Scenario 2.4 - Full Move to Northport & Tauranga
Total Costs	1,776	3,526	3,417	3,370
Total Benefits	3,464	362	553	1,913
Net Benefits	1,688	-3,164	-2,864	-1,457
Benefit Cost Ratio	2.0	0.1	0.2	0.6

Diversification of the logistics and supply chain results in improved outcomes for Auckland....

Auckland would benefit from a relocation of its Port freight facilities in a number of ways.

Auckland Council and ratepayers would be financially better off if the Port site was redeveloped. Presently, POAL delivers a dividend to the Auckland Council of around \$50 million per annum. An alternative land use for the port site has the potential to generate rates and leasehold⁵ income in excess of the current POAL dividend.

⁴ https://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=12226059

⁵ Assuming that the waterfront land is leasehold, as it is with the majority of the Auckland CBD waterfront (Viaduct and Wynyard Quarter). Table values are based on 2019 land values, and reflect the potential annual income following completion of construction and leading processes.

This analysis has considered two potential developments at the POAL site (one for a Full Move, one for a Partial Move). Each development involves a mix of commercial, residential and recreational land use. The available land will be smaller under a Partial Move scenario, reflecting that the majority of POAL freight facilities will remain in place. The table below summarises the potential returns to the Auckland ratepayer from these developments:

Table 2: Potential value of development at the POAL site, per annum

	Dividend	Alternative rates income	Alternative leasehold income	Net annual financial benefit/(loss) to ratepayers
No Move	\$50m	N/A	N/A	N/A
Partial Move	\$40m	\$7m	\$13m	N/A ⁶
Full Move	\$10m ⁷	\$42m	\$56m	\$48m

The quantification of additional income does not include any uplift to the value of the areas surrounding the port, for example the buildings on Quay St, Beach Road and Customs Street that overlook POAL freight facilities, as such effects are difficult to forecast accurately. These benefits could be significant in the long term, further improving the net benefits of the Full Move scenarios.

POAL would still provide tugs, berth space and shipping support, as well as a range of other maritime services. As such, it is possible that POAL will continue to provide a dividend to Council albeit reduced in magnitude.

The people of Auckland would also see non-financial benefits from an alternative use of the POAL site. Both developments analysed in this report include significant recreational space. A material increase in Auckland's supply of land for commercial and residential use could also be expected to cascade into benefits for the wider region.

Some relocation of Auckland employment to other regions, particularly in the land-side freight and logistics sector, is expected. Direct employment impacts at POAL will likely be minor because the port is already moving to automate many of its functions, and other activities such as tug operations will remain.

....and the cost of staying in Auckland is significant....

Value of POAL land

POAL reports that the 77 ha site on which it operates has a book value of approximately \$737m. This equates to an average land value of approximately \$533 per square metre. This value can be further broken down into land, pavement, and wharf value (see Table 1).

Table 3 POAL reported land value

Type	Capital Value	Area	Land Value
Land	\$343.35m	64.44 ha	\$532.78/m ²
Pavements	\$75.47m	64.44 ha	\$117.11/m ²
Wharves	\$316.14m	12.56 ha	\$2,517.90/m ²

Source: UNISCS Working Group Interim Report

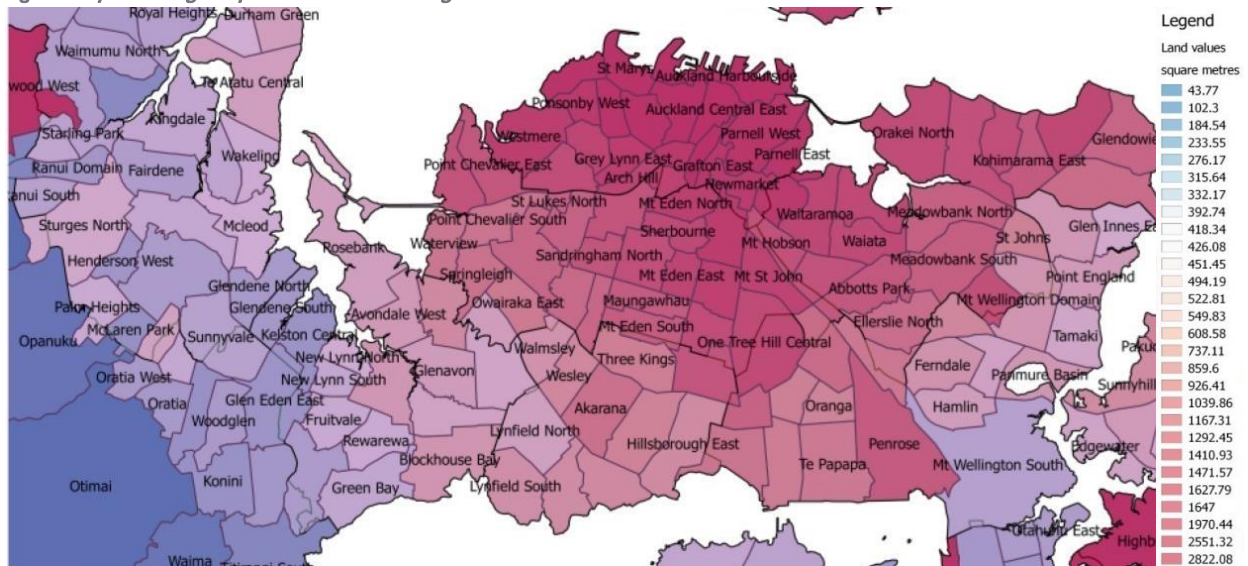
⁶ Proportionate reduction in dividend income from a partial move has not been calculated due to the large number of variables and commercial information required from POAL to enable this assessment.

⁷ POAL borrowings were approximately \$75m in 2019

The Capital Value reported by POAL is materially lower than that of comparable land located within Auckland's CBD. However, the true value for POAL land lies in the value derived from utilising the land for an alternate purpose. In 2013, the New Zealand Institute of Economic Research (NZEIR) conducted a study in which land prices throughout New Zealand were estimated and analysed. In this study, NZEIR estimated central CBD harbour side unimproved land values at \$3,000/m². However, it is important to note that significant variation around this value is likely.

In 2013, Coldwell Banker Richard Ellis (CBRE) Limited was engaged to estimate alternative uses for the 77-ha site POAL

Figure 2. Map illustrating land price discontinuities throughout Auckland



Source: NZEIR The Price is Right Study

occupies. CBRE worked backwards from the sale of a benchmarked development. It was assumed the land would be available for mixed use; commercial and residential development. CBRE estimated the total land value between \$300m to \$600m for the land occupied by the port. The median estimate range is \$584/m², which is higher than the current POAL total land estimate value of \$533/m². Estimated 'built out' value of development would also likely exceed \$10 billion.

The most recent estimate of alternative land use scenarios was carried out in 2016 for the Port Future Study. This followed a similar approach to CBRE, and worked backwards from a notional development to estimate alternative use land value. The assumptions for this modelling were slightly different. Developable land area was lower, and developable GFA was higher than assumed by CBRE. The undeveloped POAL land value in the Future Port study was estimated at \$1,400/m², with a total value just exceeding \$1 billion.

These significantly different values indicate the speculative nature of estimating alternative land use values. Additionally, these estimates fail to account for the massive social, cultural and environmental that would be achieved by transforming POAL land into a globally iconic waterfront development. However, the consensus between these two reports indicates the value of land is likely greater than previously reported by POAL.

Amenity benefits must also be considered when considering land value. People are willing to pay more for downtown residential living when it is associated with open park spaces, sea views, transit services (close to Britomart), and entertainment than they would for other sites without such amenity services.

The proximity of the port to the city centre was important in the past, when the city was small and freight mobility was limited. As Auckland has grown, transport connections have improved and become more widespread. As such the link between city centre and port has become less critical, opening pathways to speculate better or alternative uses for the land.

The high land value that is required to continue operations at the POAL site means that Auckland ratepayers are potentially missing out on subsidies approximately worth \$5b to \$6b.

Auckland Road and Rail Infrastructure

The state highways that carry freight into and out of the Auckland Region are 1, 16, 20 and 20A. The Auckland Harbour Bridge (part of State Highway 1) is not classified as a 'high performance motor vehicle' capable route⁸. Currently clip-on lanes are open to 50-tonne maximum heavy vehicles. Heavier vehicles are only able to use the truss bridge lanes⁹.

Congestion in Auckland is a pressing issue in terms of road network performance including the efficiency of freight movements. A 2012 study, *City Centre Future Access Study*, notes that by 2041 average vehicle speeds will drop to 5kph during the morning peak period, equivalent to a walking pace¹⁰.

Notable rail investments planned for Auckland include City Rail Link, when completed, will increase the proportion of freight arriving and leaving POAL by rail and reduce congestion on the roads.

...and Northland....

Northland benefits materially from Scenarios that place a greater reliance on Northland for meeting the UNI freight task. While direct port employment growth is expected to be marginal (due to the likely investment in high efficiency handling options as part of any expansion), wider employment opportunities could be significant – given the size of the Northland economy.

First-order employment impacts arise through investment in logistics facilities, warehousing and distribution hubs. A proportion of those who work in the road freight sector (e.g. some truck drivers) would potentially relocate from Auckland to the Northland region. While this relocation impact is minor for Auckland (due to the size of the Auckland economy), it has a disproportionate impact on the Northland economy.

This dynamic is also likely to flow through to additional demands for employment, to service the expansion in the economy, in areas such as education and health. Overall, a Full Move to Northport is expected to generate an additional 2,000¹¹ jobs per year and a net economic benefit of \$200 million over 30 years.

.....and Tauranga.

Tauranga benefits from all scenarios, for example through new infrastructure that will improve supply chain efficiency. Tauranga can expect an uplift in freight demand due to its continued focus on efficient port operation and land-side connection via rail to the North Island and coastal shipping to the rest of New Zealand. A Full Move to Northport is not expected to materially affect the trajectory of employment and economic growth in Tauranga. The Working Group recognises that road traffic congestion is a city-wide problem in Tauranga, and the forecast growth in both passenger and freight travel is likely to exacerbate this issue over time. POT in comparison to POAL and Northport has almost 50% higher volume of freight entering and exiting the port via rail.

Outcomes are, however, highly dependent on freight forwarder port preference.....

As noted above, the Scenarios are premised on providing infrastructure to support efficient freight movements. The modelling assumes that the majority of freight will respond to the enabling investment due to improved reliability and reduced cost. Neither the consultant team, nor the Working Group have assumed the ability to "direct" freight forwarder preferences for ports.

..... and mode choice....

Modelling results are sensitive to assumptions about freight mode choice, following investment in UNI infrastructure. In particular, it is assumed that 70% of the "Full Move to Northland" freight task will be covered by rail. This change would significantly remediate the costs associated with a lengthened logistics and supply chain. Rail has experienced declining mode share over the past decades. However, the Working Group has heard evidence from stakeholders across the sector that with modern logistics operations management and data systems, freight forwarders will be able to take full advantage of new and improved rail capacity.

The Working Group took a pragmatic approach towards determining the mode split under each of the Scenarios. A move to Northport implies that freight and logistics hubs will be further from Auckland than POAL. With a greater reliance on rail, however, fewer truck trips will be required compared to the status quo. The working assumption is that road will continue to

⁸ <https://www.nzta.govt.nz/commercial-driving/high-productivity/full-hpmv-network-map/>

⁹ <https://www.newstalkzb.co.nz/news/national/auckland-harbour-bridge-strengthened-against-risk-of-catastrophic-failure/>

¹⁰ Page 12.

¹¹ The Full Move potentially increases jobs by 4,500 per Annum and \$2.7B value added over 30 years

handle the most time-sensitive goods, but with a fixed number of trucks able to undertake fewer journeys, rail's net timeliness significantly improves, and will manage the majority of the key trips to the main inland hubs.

....and alternative land use.

Lastly, the benefits of the Partial and Full Move Scenarios are reliant on the ability of alternate land use at the POAL site to deliver value to Auckland ratepayers. This will be a function of the commercial strategy adopted to support the port move, the approach to releasing land, the decisions made on how the land will be developed and market demand at the time.

A progressive transition as part of a full move scenario also produces high value interim improvements

Two “Partial Move” Scenarios were looked at, both as stand-alone Scenarios and as part of a full move transition. Economic benefits in the short term from the Scenarios are derived from three key features:

- ▶ Leveraging existing capacity in both land-side and port side through a number of comparatively low-cost investments
- ▶ The supporting land-side infrastructure that connects the UNI ports to the wider UNI logistics and supply chain provides for growth in more efficient regional export and new opportunities for industrial and housing locations along the rail corridors.
- ▶ The resultant freeing up of a part of the POAL footprint to alternative, significantly higher-value land use provides opportunities for economic development as well as increased amenity value for surrounding areas.

The benefit cost ratios of these Scenarios are 6.8 if the interim move is directed to Northport, and 4.1 if directed to Tauranga.

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1. Introduction

1.1 National Context - Significance of the Logistics and Supply Chain to New Zealand Economy

New Zealand is a small country in the South Pacific that is heavily reliant on trade. The New Zealand economy is predominantly service-based with the majority of exports being agricultural in which animal, food, vegetable and wood products represent over 70% of export value.

Freight is a key enabler of domestic and international trade, and New Zealand relies on an efficient logistics and supply chain to connect our goods to the world as well as to access the manufactured commodities not produced domestically. New Zealand's freight industry is expected to grow significantly over time which will have significant impacts on road and rail infrastructure. Understanding the drivers of, and uncertainties around, future freight and logistics demand is critical to ensure that New Zealand's supply chain is fit for purpose in the longer-term.

1.2 Background to this Report

In September 2018, Cabinet appointed a Working Group to review the freight and logistics sector in the Upper North Island (UNI), and to develop a Supply Chain Strategy for the region. This review is formally known as the 'Upper North Island Supply Chain Strategy' (UNISCS). The Working Group is referred to as the "UNISCS Working Group" and the "Working Group" interchangeably throughout this report.

The Working Group is responsible for the strategy of the freight network (including ports, rail and road) for the UNI region that will deliver the best long-term outcomes for New Zealand. An efficient supply chain network will ensure smooth movement of cargo and containers across the region. Additionally, the Working Group is tasked with assessing the existing land-side network infrastructure (rail, roads and inland freight terminals), potential upgrades and future requirements as well as optimising land use to ensure better services for all stakeholders, particularly the central and local government and the community.

In pursuit of its objectives, the Working Group has followed a staged approach, resulting in a recommendation to the Government for holistic development of the UNI Supply Chain (UNISC) network through a comprehensive strategy. This includes the socio-economic impact of potential investments in the UNI region. This report is one part of the staged approach where the Working Group assesses a range of UNISC Scenarios including economic evaluation of those supply chain Scenarios.

1.3 UNISCS Working Group and review

1.3.1 Members and Expertise

The members of the Working Group have expertise in the following areas: economics and business development; and regional development transport and logistics, including freight infrastructure management, investment and planning¹².

1.3.2 Scope of review

The review will consider actions that contribute towards national and regional economic development results and transport priorities. It will set out the independent Working Group's joint view of¹³:

- ▶ The current and future drivers of freight and logistics demand, including the impact of technological change
- ▶ A potential future location or locations for Ports of Auckland, with serious consideration to be given to Northport
- ▶ Supporting priorities for other transport infrastructure, across road, rail and other modes and corridors such as coastal shipping
- ▶ Potential priorities for transport-related infrastructure investment from a national economic and regional development perspective

¹² <https://www.transport.govt.nz/multi-modal/keystrategiesandplans/upper-north-island-supply-chain-strategy/questions-and-answers/>

¹³ <https://www.transport.govt.nz/multi-modal/keystrategiesandplans/upper-north-island-supply-chain-strategy/questions-and-answers/>

- ▶ The optimal regulatory settings, and planning and investment frameworks across government to give effect to the findings of the review.

The review will also identify future challenges for which government and industry will need to work together, and will set out any key actions to be taken over the next five years.

1.3.3 Approach for Working Group's review

The Working Group is approaching development of the UNISCS in three stages. Each stage will involve preliminary reports and the final strategy recommendations will be communicated to Ministers, stakeholders, media and public¹⁴.

Stage 1 – Review the history and current UNISC issues and opportunities

- ▶ Fact finding and gaining a practical understanding of the supply chain
- ▶ Stakeholder engagement
- ▶ State of the UNISC
- ▶ Interrelationships – land use, urban form, and regional economic development.

Stage 2 – Practicalities, Costs and Benefits

- ▶ Options development – developing a strategic vision, articulating a case for change, exploring Scenarios for development and the effects on freight efficiency, land use, resilience, capacity and wellbeing for all New Zealanders
- ▶ Strategy and recommendations – articulating the findings on the strategy and reasons for recommendations
- ▶ Implementation of chosen Scenarios.

Stage 3 – Recommendation for the UNISC Strategy

- ▶ Articulation of the roles of national and local government bodies as well as commercial operators in the realization of the UNISC Strategy.
- ▶ Identification of specific designs of infrastructure and policy needed for the implementation of the UNISC Strategy
- ▶ Recommendations for research, education and commercial development to support the full realisation of the strategy and best outcomes of the national investments.

1.3.4 Key Findings to Date

The Working Group have been provided with a terms of reference¹⁵ which guides them in reviewing New Zealand's freight and logistics sector, and in the development and delivery of a freight and logistics supply chain strategy for the UNI region. It also asks the Working Group to consider the feasibility of moving the Auckland Port, with serious consideration given to Northport, and to advise on priorities for investment in rail, roads and other supporting infrastructure. It asks the Working Group to consider a range of impacts including transport, land use and urban planning, as well as national and regional economic growth.

To date, the Working Group has been in a discovery phase. During this time, the Working Group has been gaining a practical understanding of the current system through site visits and discussion with relevant supply chain sectors. This practical understanding has been supported by initial analysis of available freight and economic data, reading background materials and reports, and extensive stakeholder engagement.

The Working Group published Stage 1 of the review on 27 April 2019. This interim report highlighted that there was unanimous support given to rail infrastructure to support the UNI ports connectivity, in a fully modern intermodal and coordinated system.

¹⁴ UNISCS Working Group Interim Report

¹⁵ https://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/cc9d34704a/UNI-Cabinet-Paper-and-Terms-of-Reference_no-redactions.pdf

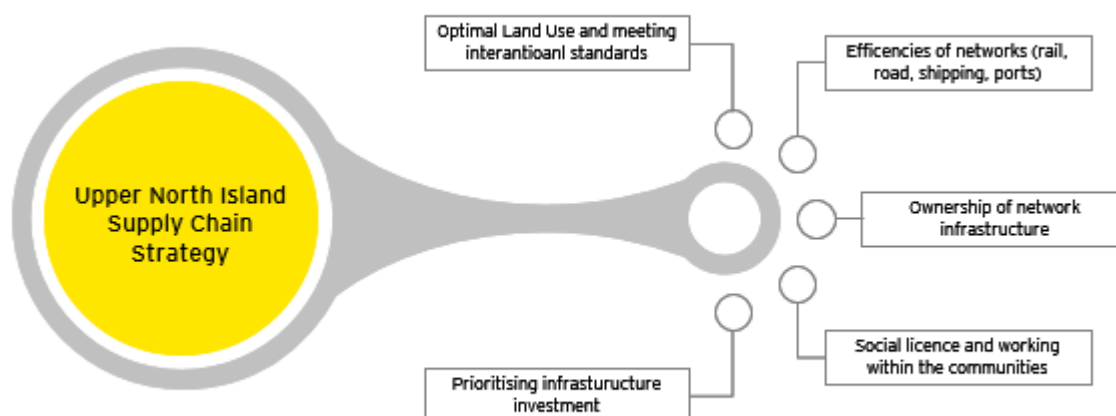
In addition to this, the working group fundamentally believes that further investment in Northport must be coordinated with investment in, and development of an upgraded train line from Northland to Auckland and associated intermodal and freight handling facilities.

The working group engaged with all interested stakeholders and key interest groups, including representatives from the three UNI ports, port company shareholders, the road freight industry, the shipping industry, commercial interests, cargo interests and other interested parties. These stakeholders provided feedback on the strengths and weaknesses of the UNI's current three-ports, exiting rails and roads, and highlighted the inefficiencies and failure to operate as a system. The working group explored the main opportunities and threats over the next 10, 25 and 50 years. There was feedback on the ownership structures of the three ports as well and the extent to which the three ports are influencing freight outcomes for the UNISC.

The stakeholders had a range of views on the scope of what should be considered, from ensuring that Waikato is included when thinking about the UNI region to thinking about the North Island or even New Zealand as a whole when making decisions about ports, roads and rail in the upper North Island. Their overall view was that the impacts were far-reaching and so should be grounded in robust evidence. The stakeholders also made it clear that the behaviours and types of freight handlers and logistics organisations have equally important influence on the effectiveness and outcomes of the supply chain. Cost is a big driver of behaviour and there was a universal interest in the cost of moving freight.

The different considerations emerging from stakeholder meetings were categorised under five main themes as illustrated in the diagram below:

Figure 3: Key emerging stakeholder themes



The interim report went to Cabinet who agreed with the Working Group on the following key points:

- ▶ The Working Group continue its work on the UNISCS, taking a strategic and investment based approach supported by analysis of the supply chain
- ▶ The Working Group to deliver a report in June 2019 to provide the results of the evaluation of different port locations (including Northport as an alternative location for the Ports of Auckland), freight flows and infrastructure options and Scenarios; and a final report in September 2019 containing the Working Group's conclusions.

1.4 Purpose of this Report

The Working Group sought to commission an economic evaluation of potential Upper North Island supply chain configurations. Accordingly, in May 2019 the MoT appointed a consortium led by Ernst & Young Limited (EY) to perform this task. This report examines a range of potential Scenarios for land-side and port investment, taking account of regional development impacts as well as transport outcomes

1.5 Structure of this Report

This report has been written on the basis that it is an input into the wider deliberations of the Working Group. As such the document has been sequenced in line with key issues related to supply chain scenario evaluation. Background information such as a description of the regions, the context in which the ports operate and the freight flows that underpin the analysis are included as Appendices. The report is structured as follows:

1. Approach to the Analysis
2. An Overview of the Upper North Island Logistics and Supply Chain, and Future Trends
3. The Base Case and Understanding the Pressure for Change
4. Scenario Description
5. Results

2. Approach to Analysis

This report evaluates UNISC Scenarios in light of a set of principles agreed and directed by the Working Group. These principles consist of the following:

- ▶ Resilience of the supply chain
- ▶ Cost efficiency in moving freight
- ▶ Maintaining, if not enhancing, levels of competition in the UNISC
- ▶ Reducing 'friction' between freight and other modes/areas
- ▶ Contributing to overall government objectives.

The principles stated above are further explained in section 3. In addition, two timing Scenarios have been explored as this has allowed the Working Group to understand the implications of a Partial Move and provide a more sophisticated understanding of potential impacts. Additional modelling runs were conducted after the report was completed to enable optimisation any given scenario.

This report uses a conventional economic assessment, using a combination of multicriteria analysis (to help shortlist options and identify non-monetisable impacts) and cost benefit analysis. The approach uses the standard NZ Transport Agency approach to benefit cost analysis as its base, but then adds emerging best practice analysis around valuations of alternate land use.

The key features of the economic evaluation include:

1. The use of a high-level economic impact assessment in conjunction with cost benefit analysis

This analysis takes economic development into consideration, such that employment and investment activity is viewed as valuable stimulus irrespective of what is achieved by this expenditure of labour and capital resources. Regional Input Output tables are incorporated to reflect the difference between economic environments in Auckland and Northland. Economic impacts are measured and reported separately from the core cost benefit analysis results (e.g. benefit cost ratios) throughout this report.

2. Estimating the value of alternative land use

Advisian, Warren and Mahoney, and WT Partnership provided expert input as to alternative uses for the POAL site and the associated value to Auckland. As described in section 5.4, it is likely that leasehold and rates income from a new development would outweigh the \$50m annual dividend currently paid by POAL.

3. The deployment of an externalities model

The Value of Rail model developed by the EY in 2017 was fully utilised in this economic assessment. It provided a baseline methodology for cost and benefit measurement, including congestion, emissions, maintenance and safety. Transport modelling parameters, for example for the value of time, are drawn from the NZ Transport Agency Economic Evaluation Manual.

3. Overview of the Upper North Island Logistics and Supply Chain and Future Trends

The purpose of this section is to take into consideration the advancement of scenario development and the compelling case to investigate the UNISC. We conclude that the pressures and continued growth in freight demand will place on the UNI region confirm the need to investigate alternative Scenarios.

This section has been prepared using existing available data which includes data sourced from the 2014 National Freight Demand Study (NFDS). We understand an updated of the NFDS is currently being finalised which will cause the total values to change with this update but the key trends and direction of travel will remain the same.

3.1 Country Overview

The freight sector in New Zealand is wide ranging, and supports a number of primary, manufacturing and services industries including retail, manufacturing, agriculture, forestry, etc. Some of these industries are more dependent on freight, and more sensitive to changes in freight pricing, than others. For example, approximately 20% of all inputs into the petroleum and coal manufacturing industry consist of freight fees, compared with 1% of inputs in the life insurance industry. All sectors and supply chains are mutually inclusive of freight, which fundamentally enables producers and consumers alike to access the goods and markets they need.¹⁶

On a global scale, New Zealand has the 57th largest, and 41st most complex economy according to the Economic Complexity Index (ECI) In 2018, New Zealand exported NZ\$57.25 billion, and imported \$63.41 billion, resulting in a negative trade balance of NZ\$6.16 billion¹⁷.

The top exports of New Zealand are Concentrated Milk (US\$5.34 billion), Sheep and Goat Meat (US\$2.36B), Butter (US\$2.33 billion), Rough Wood (US\$2 billion) and Frozen Bovine Meat (US\$1.79 billion), using the 1992 revision of the HS (Harmonised System) classification. Its top imports are Cars (US\$3.81 billion), Crude Petroleum (US\$1.95 billion), Refined Petroleum (US\$1.4 billion), Delivery Trucks (US\$1.35 billion) and Broadcasting Equipment (US\$1.02 billion).¹⁸

3.1.1 Commodities

The primary sector is New Zealand's key generator of domestic freight, much of which is destined for export. Flows are from source (e.g. farm gate or plantation forest) either directly to ports (e.g. logs), or via an intermediate processing industry (e.g. dairy factories) for both domestic consumption and/or export.

Forestry has grown as a result of favourable export conditions and a buoyant construction sector. Dairy exceeds the tonnage of all other agricultural commodities, including livestock, meat, wool, horticulture, grains, and fish.

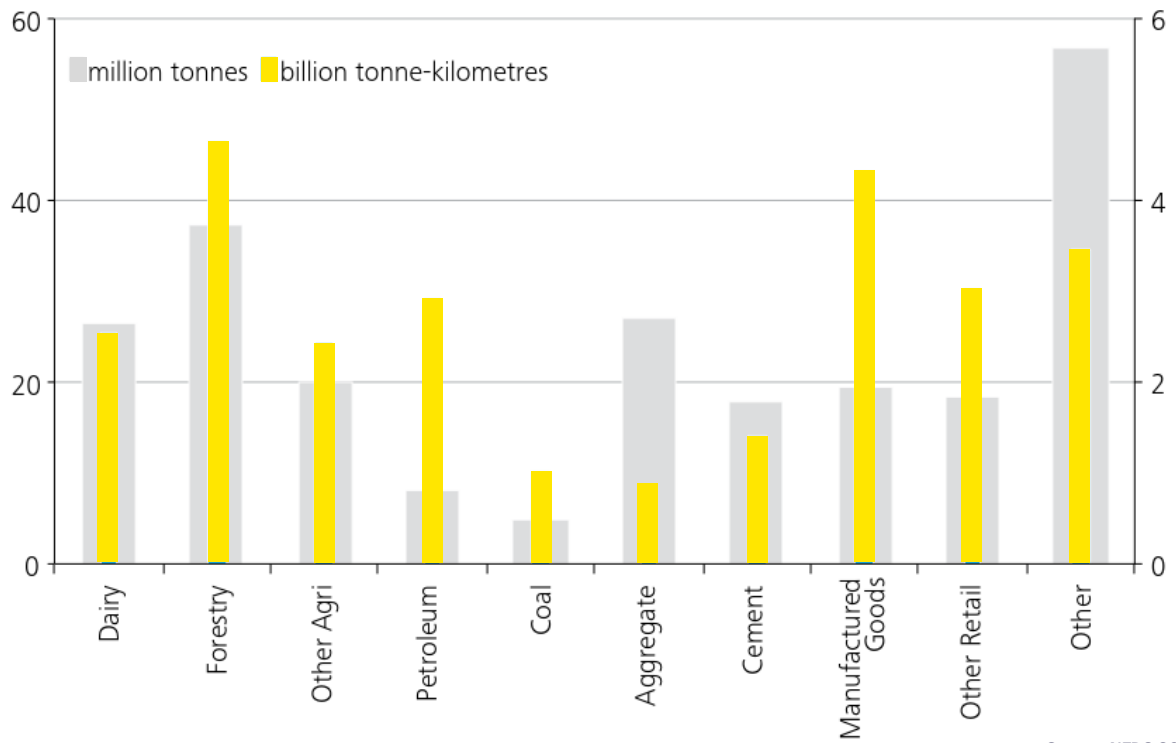
Non-foodstuff exports are concentrated in a few key regions. Coal resources are located and extracted from the West Coast and Waikato, and petroleum is imported and refined in Taranaki or Northland. Construction materials are produced (in relatively high volumes) close to domestic markets (i.e. low tonne-kms) due to their bulk and relatively low unit value. Manufactured retail goods are usually smaller and of greater unit value, and so are more feasibly transported over longer distances. This is true for both domestically made and imported goods.

¹⁶ *Identifying freight performance and contextual indicators*, NZ Transport Agency research report 651 (December 2018)

¹⁷ Stats NZ: <https://www.stats.govt.nz/topics/imports-and-exports>

¹⁸ The Observatory of Economic Complexity 2017: <https://atlas.media.mit.edu/en/profile/country/nzl/>

Figure 4 New Zealand Freight Generated by Commodity



Source: NFDS 2014

An overview of New Zealand's import/export activity in 2017 has been provided overleaf.

3.1.2 National Freight Task

The freight task in New Zealand is substantial, and moves the equivalent of 50 tonnes per capita each year. A number of factors affect the freight task, some of which are a result of the domestic market, and some are driven by the international market:

- ▶ Increasing population
- ▶ E-commerce
- ▶ Automation
- ▶ Video analytics
- ▶ Improved data/information systems
- ▶ Congested urban roads
- ▶ Environmental impacts
- ▶ Driverless/autonomous vehicles
- ▶ Increased demand for agricultural and dairy products

Imports

Exports

\$20.1b
China, Japan, Thailand

\$19.9b
China, Japan, South Korea

\$6.89b
Germany, U.K., Italy

\$4.42b
Germany, U.K., Italy

\$4.6b
Australia

\$6.59b
Australia, Fiji

\$4.06
U.S., Canada, Mexico

\$4.63b
U.S., Canada, Mexico

\$0.47b
Argentina, Brazil, Chile

\$0.37b
Chile, Peru, Brazil

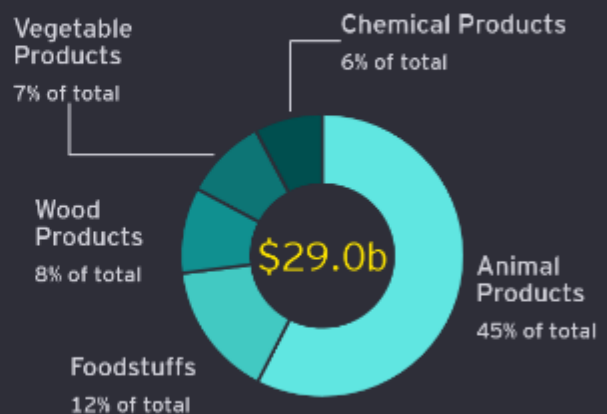
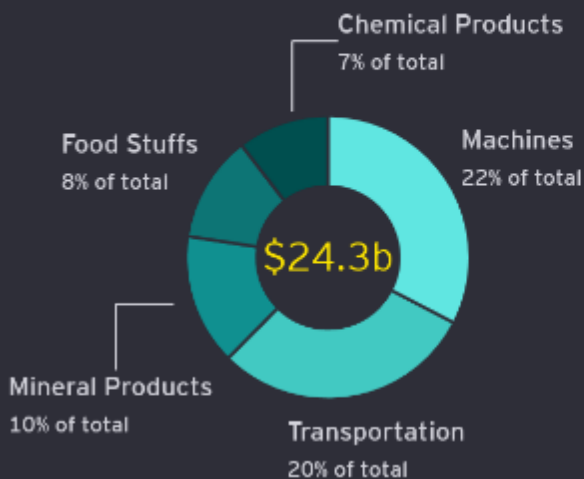
\$0.21b
South Africa, Ghana, Morocco

\$1.4b
Algeria, Nigeria, South Africa



2017 USD values sourced from the OEC

Key Products



All amounts in USD
Source: The Observatory of Economic Complexity 2017

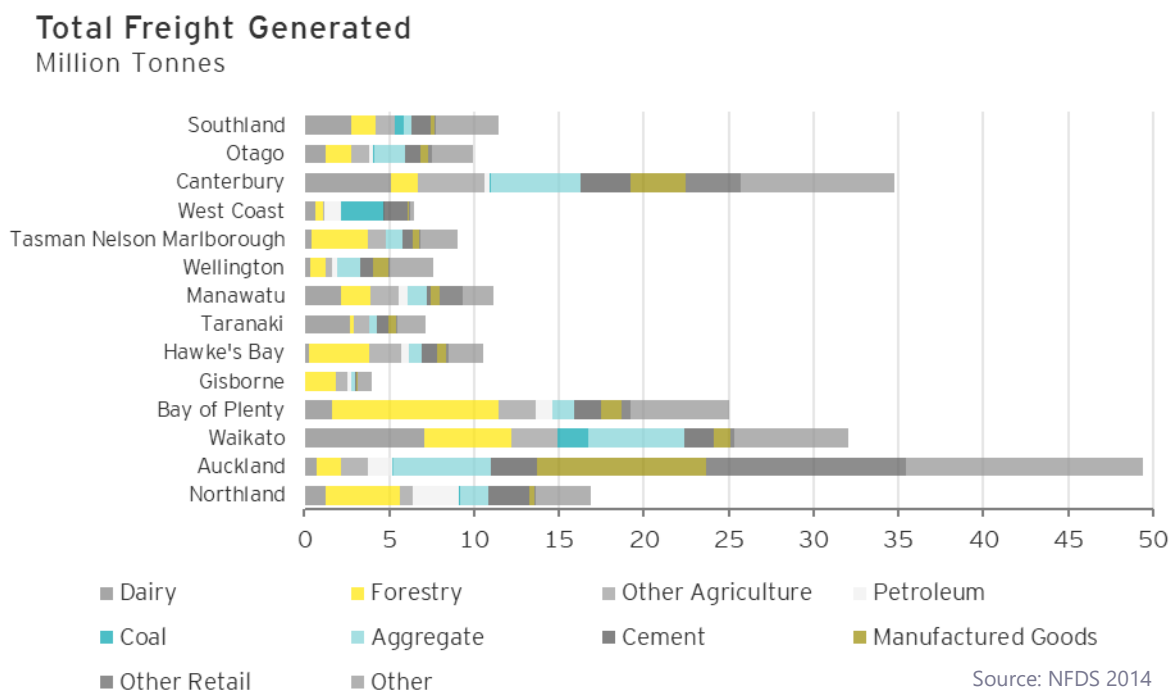
3.2 Regional Freight Flows¹⁹

3.2.1 Regional Freight Generation

Understanding the origins of freight is critical of designing an efficient supply chain strategy. The primary sector is largely located in the Waikato, Taranaki, Manawatu, and Canterbury regions due to their favourable climate, topography, and soil. These regions are well-suited to dairy production which accounts for 20% of freight within these regions. This is similar for forestry, which has a substantial presence in Northland, Waikato, Bay of Plenty, Gisborne, Hawke's Bay, and Tasman/Marlborough/Nelson due to the warm climates and lower value land. Forestry accounts for over 35% of freight in these regions (excluding Waikato at 16% and Northland at 26%).

Crude oil flows are directly exported from Taranaki or imported to the Marsden Point refinery. Domestic petroleum product transport is primarily from the Northland refinery to coastal distribution, and then by truck to the nation's service stations. Waikato coal production serves the domestic market in the UNI.

Figure 5 Commodities by Region



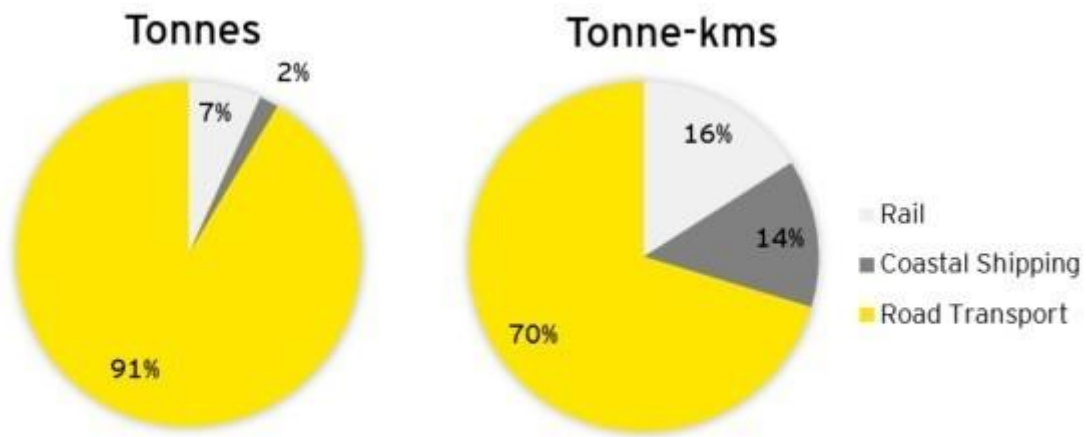
As population is a significant driver of both consumption and manufacturing activity. The UNI region accounts for over 45% of all freight tonnage produced in New Zealand.

3.2.2 Modal Share

The freight task in New Zealand is substantial, and moves the equivalent of 50 tonnes per capita each year

¹⁹ Information from this section is largely based on the Deloitte New Zealand Ports and Freight Yearbook 2016

Figure 6 Overview of Freight Task by Mode

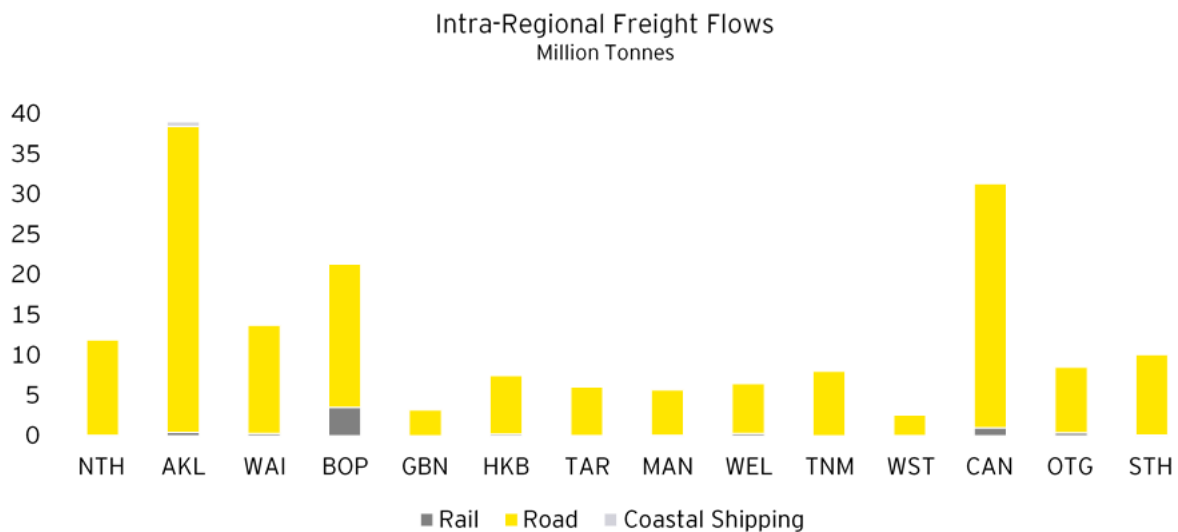


Source: NFDS 2014

Road is the most dominant mode of transport for both inter- and intra-regional freight transport. In most regions, road has over 95% of the market share for intra-regional freight flows. The Bay of Plenty region is an exception at 83% given logs are transported to Tauranga for export via rail. Roads hold a 68% market share (by tonnage) of inter-regional freight flows, with rail accounting for 21%, and coastal shipping accounting for the remaining 11%.²⁰

Modal share competition is more pronounced over longer distances, as can be seen in the inter-regional freight flows (see Figure 7 and Figure 8). New Zealand’s roading network is more expansive compared to rail and port options, and as such dominates the mode choice. In regions such as Auckland and the Bay of Plenty where rail networks link to ports, rail capacity is more heavily utilised for freight transport, suggesting intermodal capacity dominates mode choice.

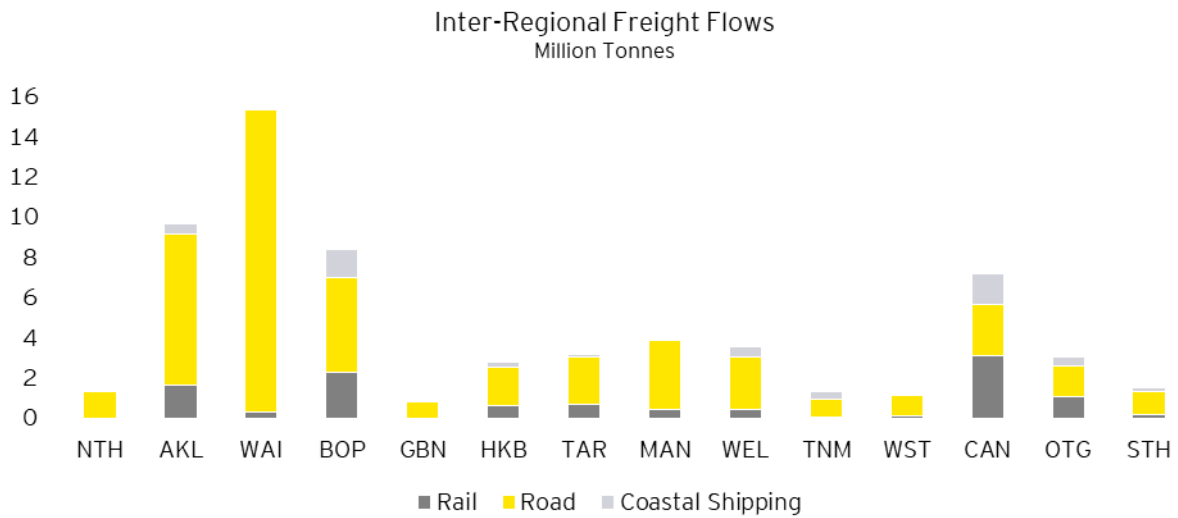
Figure 7 Intra-Regional Freight Flows



Source: NFDS 2014

²⁰ Deloitte Ports and Freight Yearbook, 2016

Figure 8 Inter-Regional Freight Flows

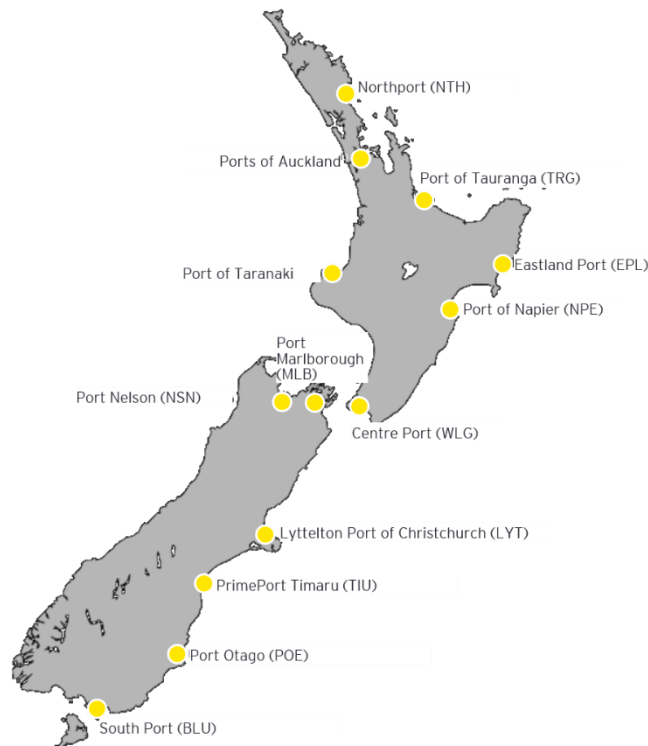


Source: NFDS 2014

3.2.3 New Zealand Ports as a contributor to the logistics and supply chain

New Zealand has had over 150 ports in operation throughout history, but only a handful were able to adapt to evolving shipping requirements and demand changes. Presently, New Zealand’s ports provide a vital link for 99.5% of the country’s trade with international markets. Merchandise exports are 21% of New Zealand’s GDP²¹—the majority of which passes through ports. In general, New Zealand’s ports have become more efficient and disciplined, allowing trade volumes to remain steady over time.

Figure 9 New Zealand Ports

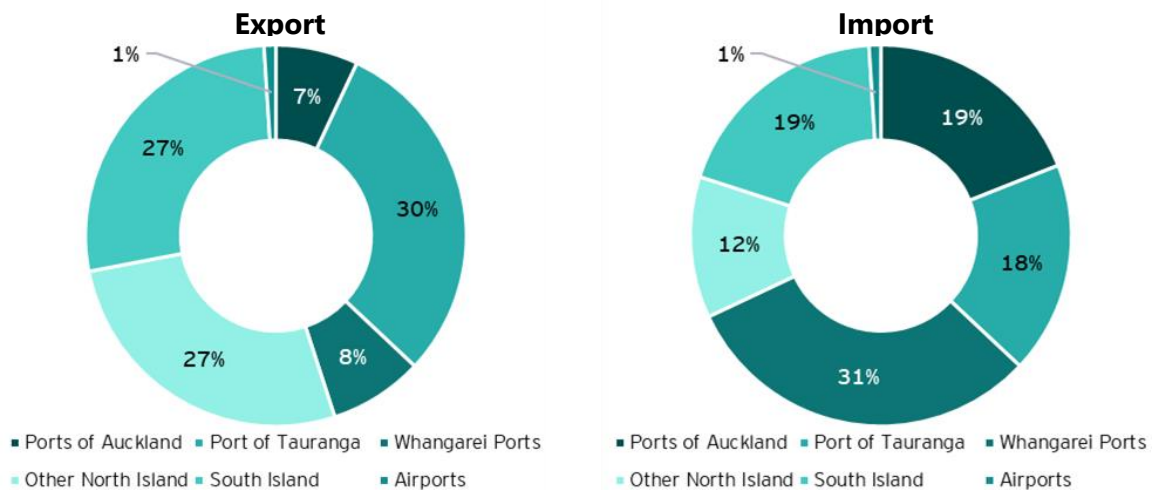


²¹ <https://www.transport.govt.nz/mot-resources/research-papers/containerproductivitynzports/>

3.2.3.1 The Role of the UNISC²²

In 2014, the three UNISC accounted for 45% of New Zealand’s total freight export weights. POT alone shipped 30% of national export weights. More significantly, the three UNI ports handled 68% of total national import weights in 2012, and Whāngārei’s ports (including Marsden Point refinery’s oil terminal) accounted for 31% of the import weights. Only 1% of import and export weights are transported by air—the majority of which moves through Auckland International Airport. As such, it is evident ports are critical to New Zealand’s economy and prosperity.

Figure 10 UNI Dominate Import and Export Freight



Source: PWC 2012

3.3 Northland Supply Chain

3.3.1 Current situation

Northland has a diverse economy with manufacturing being the largest industry followed by tourism, agriculture, forestry and fishing, then business and property services. The Northland economy is underpinned by sectors that harness natural advantages based around land, water, climate and cultural assets.

Horticulture and Fruit Growing industry in Northland creates approximately \$200m in exports and constitutes 8.1% of the total exports share of the region. Dairy production is increasing, with 30,000 containers being transported every year. Northland is responsible for about 7% of national road freight, much of which is generated by its primary industries. According to the 2014 National Freight Demand Study, freight in the region is forecast to increase by almost 40% in the region by 2042, around 1.1% per annum.

Northland has a plantation forest industry with over 190,000 hectares of planted. Northland’s exotic timber harvest grew from 2.6 million m³ in 2011 to 4.2 million m³ in 2015. This growth is expected to continue before levelling out at about 3 million m³ in 2023.

Northland is experiencing agricultural growth. In Northland 3.6 million trays of green and gold kiwifruit are grown annually. 45% of Northland avocado crop is being exported. Over 40 vineyards produce award-winning wines, and Northland is the largest area in New Zealand for kumara.

Figure 11 shows the freight volume by route from Northland to other UNI Regions.

²² The following sections are based on the 2014 National Freight Demand Study. This Study is presently being updated.

Figure 11 Northland Freight Volume by route



Annually, 8 million tonnes of inbound and 10 million tonnes of outbound freight movement happens between Northland and other major UNI regions as shown in the data figures below -

Figure 12 Freight volume summary between Northland and listed locations

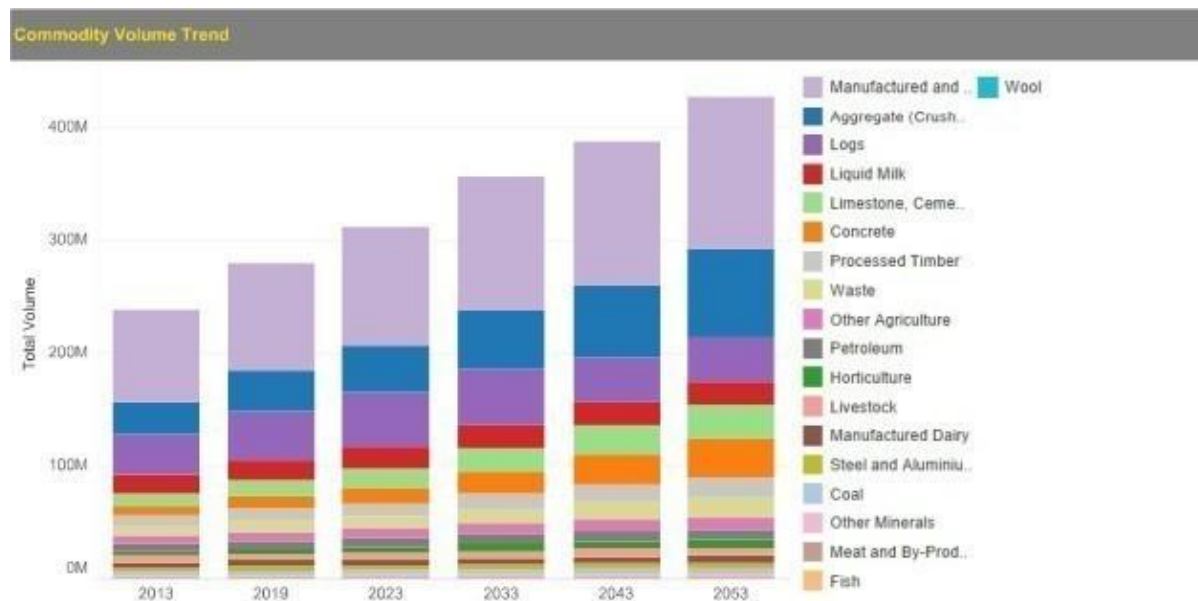
Inbound Volume	Outbound Volume	Total Volume
8M T	10M T	18M T

Volume Summary Between Northland and Listed Location			
Location	Total Volume	Inbound Volume	Outbound Volume
Northland	13,174,526	6,587,263	6,587,263
Auckland	3,470,238	2,464,354	1,005,883
Bay of Plenty	1,111,715	933,200	178,516
Waikato	263,493	121,817	141,676
Gisborne	2,995	1,519	1,476

3.3.2 Future Trends - Northland

The chart below indicates the potential growth in freight between 2013 and 2053. At present, 33% of logs are processed locally and there is economic potential in the areas of wood processing and manufacturing finished products, including logging, saw-milling, wood-chipping, veneer and plywood manufacture. Lower land costs (\$6,004 per hectare compared to New Zealand national average of \$6,744 per hectare) coupled with reliable availability of skilled labour in Northland, presents a case for potential economic development going forward.

Figure 13 Commodity Volume Trend - Northland



3.3.3 Impact on the mode of transport in Northland

According to the 2014 National Freight Demand Study, freight in the region is forecast to increase by almost 40% in the region over the 30 years between 2012 and 2042, around 1.1% per annum. In response to the growing needs for heavy freight transport in the area, the NZTA developed proposals to invest in the upgrading of required structures. There are approximately 30,000 Northland export containers trucked to Auckland then railed to Tauranga which is both inefficient and comes at a significant cost to export producers.

The increased demand in freight to Northland has resulted in existing roads in the region becoming congested and damaged due to heavy vehicle movements. Road transport remains the main means of moving freight and people.

The alternative is to develop the rail infrastructure connecting to Auckland and rest of New Zealand. At present, there is no connectivity between Northport and the rest of the rail network. With the closure of Port Whāngārei there has been a reduction in the rail freight from other regions to Northland²³. While there was around 1 million tonnes of rail freight transported in the year 2000, the number has reduced to approximately 20,000 tonnes in 2013 as per the National Freight Demand Study. The absence of rail network is one of the biggest challenges which, if addressed, will have material impact on the development of Northport and Northland region as well as helping maintain other transport infrastructure, especially roads.

The Northland region does have an existing rail network (the North Auckland Line – NAL); however, it has been under maintained, and has seen no significant investment in the last 50 years. Consequently, the line is no longer fit for purpose and cannot meet modern requirements for transportation of freight and passengers. Restricted tunnel heights prevent Northland exporters from utilising rail to move modern high-cube containers to and from Auckland. Furthermore, lack of maintenance and the aging of structures and tracks has forced speed reductions. Additionally, older, less reliable trains and equipment have to be used on the line due to weight restrictions, further lengthening transport timeframes and increasing inefficiencies. In 2002, the network lost port connectivity when operations were moved to Marsden Point. Northport is now one of the only ports in New Zealand without a rail connection.

These conditions and restrictions have necessitated the transference of over a million tonnes of freight to road transport per annum. Rail is currently an infeasible option for businesses to move freight in or out of Northland. Investment and renewal of the North Auckland Line (NAL) (which is currently being subjected to a separate MoT business case) and Northport connective link has the potential to substantially alter freight flows within the UNI, support a portion of the trade from international markets to and from Auckland, and bolster the nation's international trade growth.

²³ Port Whāngārei – Refers to the old port at Whāngārei which closed commercial operations in 2007 - <http://www.wdc.govt.nz/PlansPoliciesandBylaws/Plans/SustainableFutures/Documents/Sustainable%20Infrastructure/30-50-Port-of-Whangarei.pdf>

3.4 Auckland Supply Chain

3.4.1 Current Situation

The Auckland region accounts for 35% of the New Zealand population, the region itself is not an export producing area and POAL has a correspondingly significant imports volume. Conversely, export volumes are relatively low and account for only 6% of New Zealand’s total export volumes (as at 30 June 2018). POAL largely handles containers, and bulk and break-bulk volumes (including cars), and is the largest container importer in New Zealand. Additionally, Auckland is the point of entry for over 67% of New Zealand’s vehicle imports (a 43% increase from 2014 to 2018), and serves 37% of national import demand. Increasing import volumes are straining POAL resources and placing pressures on other port operations²⁴.

POAL is import dominant, in large part due to their proximity to New Zealand’s largest consumer market, Auckland. All of POAL’s freight hubs are strategically located next to rail and are at the centre of current and planned freight generation and consumption areas. POAL purchased 33ha of industrial land at Northgate Business Park in February 2016 to develop the Waikato Freight Hub which will form a key connection in their national supply chain network. The Northgate Business Park has attracted a number of import/export customers due to its outstanding road and rail access. The Waikato Freight Hub is due to open in the first half of 2019 once the OCD facility and a new road connection have been built. When fully complete, the freight hub is expected to generate around 300 jobs directly and facilitate many thousands more by acting as an economic catalyst.

Figure 14 shows the freight volume by route from Auckland to other UNI Regions.

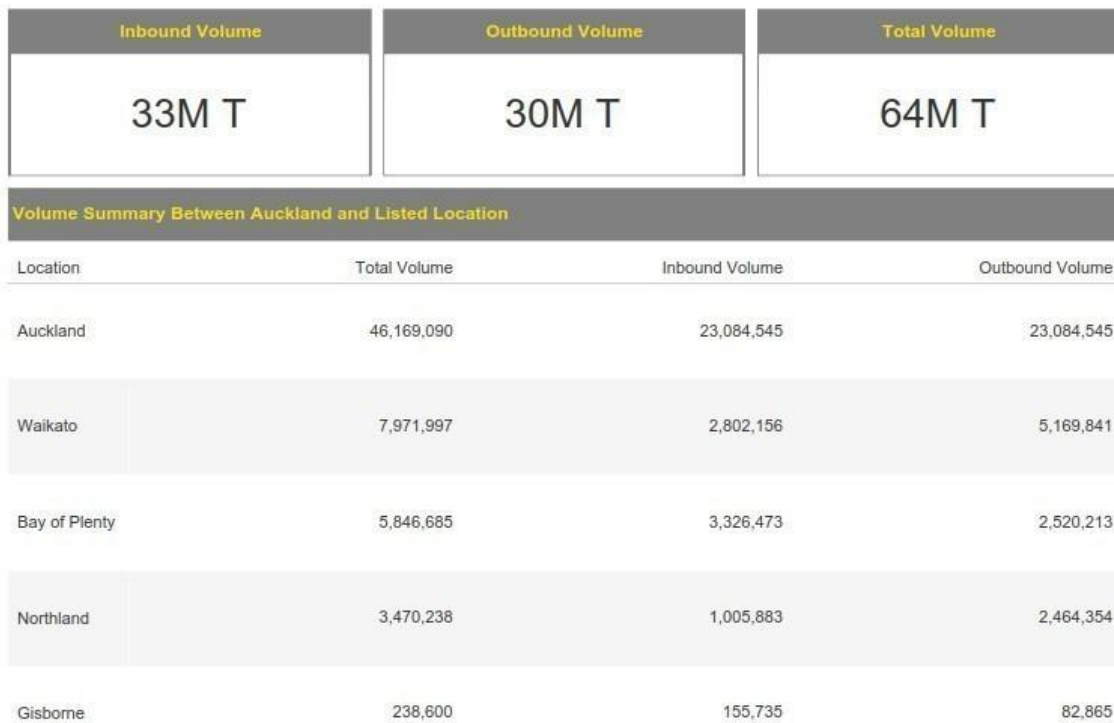
Figure 14 Auckland Freight Volume by route



Annually, 33 million tonnes of inbound and 30 million tonnes of outbound freight movement happens between Auckland and other major UNI regions as shown in the data figures below -

²⁴ UNISCS Working Group Interim Report

Figure 15 Freight Volume summary between Auckland and listed locations

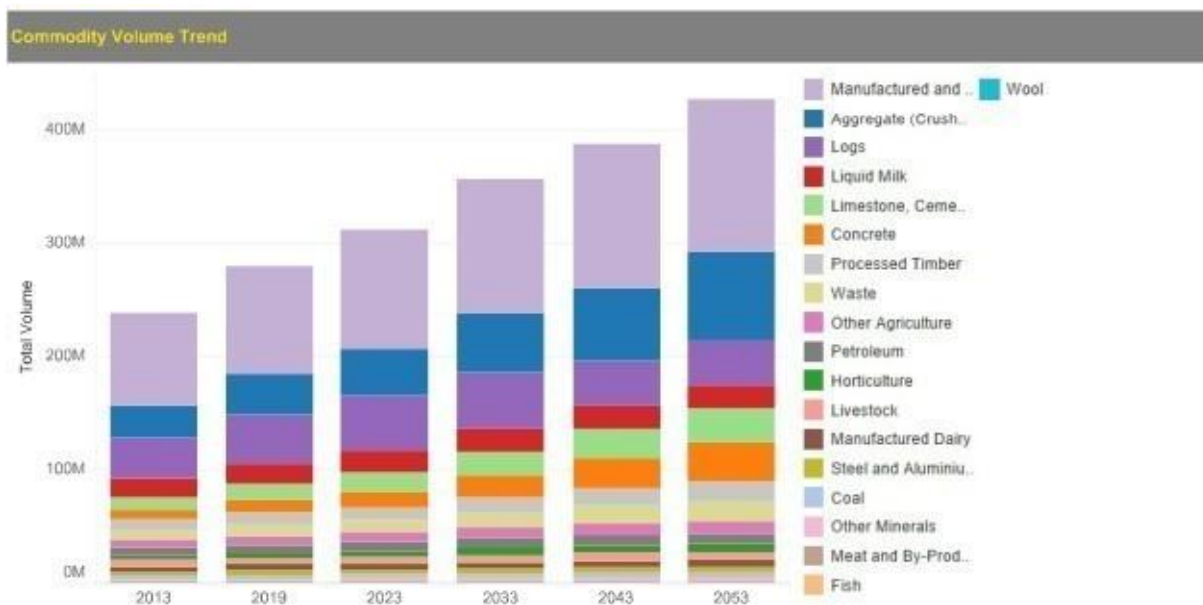


3.4.2 Future trends - Auckland

The chart below indicates the potential growth across different sectors between 2013 and 2053. The manufacturing sector will remain the primary contributor to the economy.

Dairy exports are forecast to continue to decline as the POT has an agreement with Kotahi, the logistics company owned by Fonterra Cooperative Group and Silver Ferns Farms to export dairy products.

Figure 16 Commodity Volume Trend - Auckland



TEU throughput is expected to increase to a total of between 1.7 million and 2.2 million in the next 30 years. Imports will make up the majority of total throughput, which is forecast to increase to between 1.2 million and 1.6 million TEU in the same period,

an increase of between 104 to 168 per cent from 2018. Exported TEU will increase by between 77 and 132 per cent in next 30 years in comparison to 2018. This equates to between 471,000 and 619,000 in expected TEU exports in 2049.

Bulk imports will increase by 79 to 96 per cent by 2049 in comparison to 2018. This equates to between 3.8 million and 4.1 million tonnes for the 2049 year. Bulk exports will increase by 79 to 96 per cent in comparison to 2018 numbers. This equates to between 2.4 million tonnes to 2.6 million tonnes of bulk exports in 2049, significantly less than imports

The number of cars imported to the Ports of Auckland are projected to increase between 59 and 109 per cent by 2049 in comparison to 2018. Car imports are forecast to be between 472,000 and 621,000 cars in 2049²⁵.

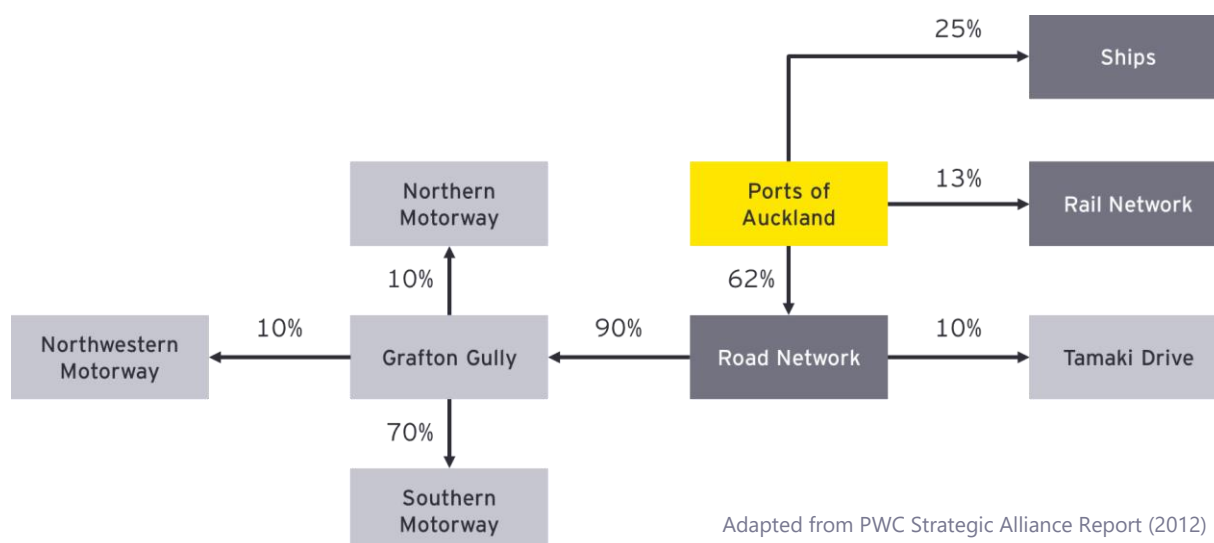
3.4.3 Impact on the mode of transport in Auckland

The combination of increased road freight activity within Auckland and significant growth in population (10% between 2014 and 2018) has led to congestion problems in Auckland. Over 700 additional cars are being registered in Auckland every week, and the city has witnessed a record growth in the public transport use as well, with public transport use increasing by almost 30 percent over the last four years (between 2014 and 2018)²⁶.

The majority of POAL trade volumes are distributed via the road network (see Figure 17). The 2012 report for the Strategic Alliance²⁷ projected a modest increase in port traffic through Grafton Gully by 2041. However, the same report indicated non-port traffic would increase significantly. Grafton Gully is unlikely to have capacity to support this increase, and the resulting congestion and diversions from upgrades would directly impact freight movement, leading to material delays and cost increases.

Similarly, rail traffic from POAL is projected to increase between 78% to 94%²⁰ by 2041. Future demand for passenger services

Figure 17 Commodity Volume Trend - Auckland



is also projected to increase substantially. The Eastern Line should be able to accommodate the anticipated increase; however, it runs on a “tight” schedule. Even minor delays to freight trains could therefore have considerable consequences for train passengers.

The South Auckland Wiri to Westfield (W2W) section of the North Island Main Trunk provides a critical passenger link, and is a major conduit for the movement of goods across New Zealand. The twin track configuration has reached its maximum operational capacity and is a significant bottleneck. The 3rd Main Line Project has been proposed to increase capacity along

²⁵ Note that these projected figures use Ports of Auckland 2018 Annual Report figures and therefore will not align with the import tonnage, as Ports of Auckland and the MoT, Statistics New Zealand data

²⁶ <https://www.transport.govt.nz/land/auckland/the-congestion-question/>

²⁷ *How Can We Meet Increasing Demand for Ports in the Upper North Island*, A report for the Upper North Island Strategic Alliance, PWC 2012.

this line.²⁸ However, as the line will support both passenger and freight operations, friction issues are still likely. Freight trains are much longer and slower than the electric passenger rail units, and will cause considerable knock on effects for passengers.

As signalling headways are also reaching capacity, freight may be required to move to off-peak periods or overnight. The impact this could have on POAL operations is uncertain, but there is an increasingly unfavourable public opinion towards increasing freight rail traffic throughout Auckland's eastern suburbs. Changes in freight scheduling may conflict with residential amenity or liveability along freight corridors and result in public backlash.

Congestion in Auckland is a pressing issue in terms of the road network and efficiency of freight movements. A 2012 study, *City Centre Future Access Study*, notes that by 2041 average vehicle speeds will drop to 5kph during the morning peak period which is the equivalent to walk pace²⁹.

Significant road investments include the 20Connect project, improving access to freight hubs around the airport and Onehunga. This project is expected to be completed in 2021. The Waikato Expressway (along with various Southern Corridor Improvement projects) will also reduce travel time, congestions and increase capacity between Auckland and Waikato. The Waikato Expressway projects will cost over \$500 million in total and should be completed in 2021. The Western Ring Project along State Highway 16, to be completed this year, will also improve reliability and travel times to freight hubs in Auckland.

3.5 Bay of Plenty Supply Chain

3.5.1 Current Situation

POT, located in the Bay of Plenty, is New Zealand's fastest growing and most productive port, rated as one of the 10 most efficient ports in the world. Between 2017 and 2018 its exports and imports increased by 8.2% and 13.7% respectively, however POT has an import-export imbalance where its import volumes are less than two thirds of its export volumes. As a result, POT has a significant empty container generation.³⁰

POT's fast-growing productivity is contributing to the Bay of Plenty's strong economic growth and is estimated to be associated with 43% of the region's Gross Domestic Product (GDP). Exports grew 8.2% in volume to 15.4 million tonnes and imports increased 13.7% in volume to 9.0 million tonnes. Much of the increase is attributable to the large increase in total TEUs handled, from 1,085,987 in 2017 to 1,182,147 in the 2018 financial year³¹.

The Port has guaranteed freight load for 10 years from Kotahi, the Fonterra-Silver Fern Farms-owned freight venture, and its harbour dredging, taking it to a consented low-water draught of 14.5m. This means it can accommodate the Aotea Maersk, the biggest container ship ever to visit New Zealand, with a capacity of 9500 containers. POT also welcomed the SBI Maia, an ultramax class bulk carrier that collected the biggest-ever log and lumber shipment from New Zealand at 53,000 JASM (Japanese Agricultural Standard cubic metres)³².

Figure 18 shows the freight volume by route from Bay of Plenty to other UNI Regions.

²⁸ *Wiri to Westfield, The Case for Investment*, WSP & Parsons Brinckerhoff, December 2016.

²⁹ *City Centre Future Access Study*, Auckland Council, 2012

³⁰ UNISCS Working Group Interim Report

³¹ Port of Tauranga Annual Report 2018 - <http://www.port-tauranga.co.nz/investors/financial-information/download-annual-report/>

³² <https://www.noted.co.nz/money/economy/tauranga-boom-times-in-the-bay/>

Figure 18 Bay of Plenty Freight Volume by route



Annually, 21 million tonnes of inbound and 18 million tonnes of outbound freight movement happens between BOP and other major UNI regions as shown in the data figures below –

Figure 19: Freight Volume summary between Bay of Plenty and listed locations

Inbound Volume	Outbound Volume	Total Volume
21M T	18M T	39M T

Volume Summary Between Bay of Plenty and Listed Location			
Location	Total Volume	Inbound Volume	Outbound Volume
Bay of Plenty	25,004,947	12,502,474	12,502,474
Waikato	6,323,050	2,473,815	3,849,235
Auckland	5,846,685	2,520,213	3,326,473
Northland	1,111,715	178,516	933,200
Gisborne	300,800	129,159	171,641

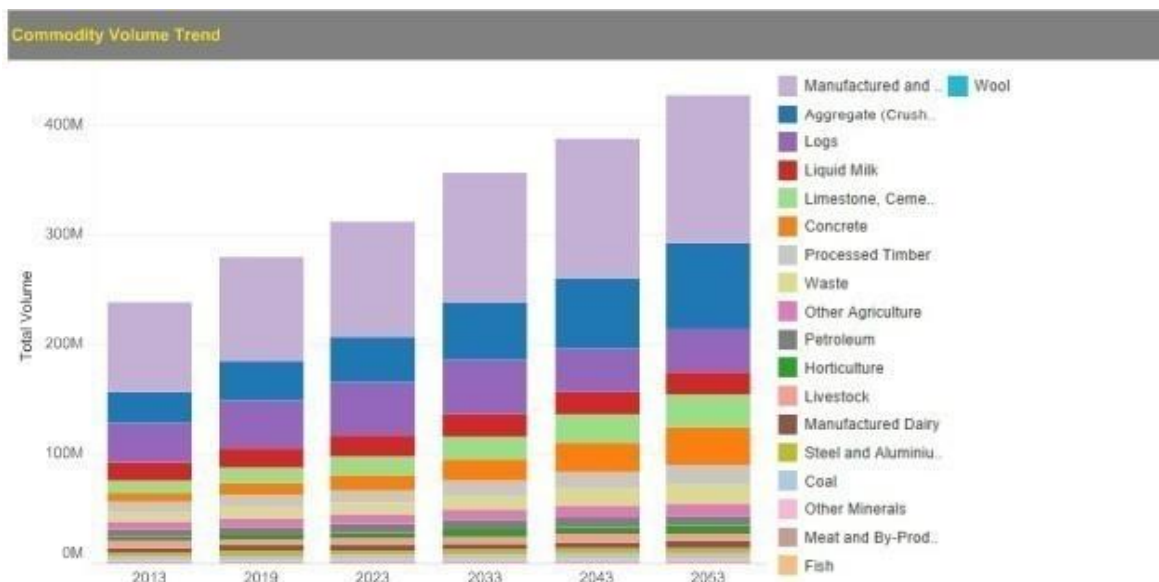
3.5.2 Future trends

Dairy is a major driver of exports in Tauranga, growth in dairy is expected to remain relatively flat over the forecast period because much of the available land for dairy has already been converted and further productivity growth for the sector is likely to be low.

In 2025, imports into the Ports of Tauranga are likely to decrease as Genesis energy has pledged to stop using coal to generate electricity at Huntly power station (in extreme circumstances by 2025, and completely by 2030).³³ Advisian has assumed that imports of coal will cease in 2025, which results in a 500 thousand tonne decrease³⁴ in bulk imports into Tauranga from 2025.

The stacked chart below indicates the potential growth in the sector wise growth scenario between 2013 and 2053 indicating that manufacturing sector will still be having a major proportion to the contribution of the BOP economy.

Figure 20: Commodity Volume Trend – Bay of Plenty



3.5.3 Impact on the mode of transport in the Bay of Plenty

Road traffic congestion is nevertheless a city-wide problem in Tauranga, and the forecast growth in both passenger and freight travel is likely to exacerbate this issue over time. POT in comparison to POAL and Northport has a high volume of freight entering and exiting the port via rail, at nearly 50 percent. This can be accounted for by a rail link from Metroport (Auckland freight hub) and the East Coast Main Trunk Line which carries imports and exports to and from the Port.

There are 4,460 kilometres of roads in the region, most of which are sealed. Meanwhile, the rail network totals 229 kilometres, linking the port to the Waikato and Auckland and the major forestry centres to the east and south. New data shows congestion on Bay of Plenty roads is worsening faster than most other North Island regions. Contributing to this, the region has started to experience port driven road congestion issues. POT has seen a significant increase in traffic relating with regards to moving goods around the Tauranga (traffic flows in Tauranga City increased 5.7% in 2018) and the wider Bay of Plenty region.

³³ <https://www.rnz.co.nz/news/national/350390/genesis-energy-to-phase-out-huntly-coal-use>

³⁴ Average coal imports 2013-2018, accessible from <https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/coal-statistics/>

4. The Current Situation and Understanding the Pressure for Change

The Government has indicated a strong interest in the future direction of New Zealand's ports, freight services and coastal shipping. The Government recognises these networks are critical to lifting the economic wellbeing of New Zealanders. In the context of the UNI region, the Working Group has developed three primary Supply Chain objectives:

- ▶ Developing efficient and effective transport and logistics infrastructure that works in the national interest
- ▶ Promoting opportunities for regional development and employment
- ▶ Ensuring the best use of scarce resources such as land, especially in metropolitan areas.

The Working Group have identified four key barriers to achieving these objectives for the supply chain:

- ▶ Differing port ownership models preventing a coherent Upper North Island supply chain strategy
- ▶ Material capacity limitations of the land-side transport infrastructure to support the Ports of Auckland and future growth
- ▶ A lack of rail infrastructure and port connectivity in Northland.

The Base Case, Partial move and Full Move scenarios all use a 15 and 40 year timeframe.

4.1 Developing the Base Case

Ahead of assessing future Scenarios, a fundamental requirement is to assess what might be expected in the absence of a UNISC strategy, including central decisions about the priorities and roles of different parts of the supply chain.

The Base Case sets out the implications of current locations and investment profiles, including the congestion, safety and environmental costs associated with growth in road freight necessary to support forecast containing shipping. Some degree of capital cost is included in the base case, representing POAL maintenance and upkeep that will be required irrespective of long-term plans for the sector.

4.1.1 Base Case Road and Rail Investments

In order to meet the freight demands as identified in Section 3 above, the following investments have been assumed. These are based on current Regional Transport Plans, approved investments and clearly indicated commitments from either local or central government.

4.1.2 Base Case Port Development

4.1.2.1 Northland Base Case

24 percent of Northland region businesses are categorised as agriculture, forestry and fishing³⁵. Exports at Northport currently mostly consist of bulk logs. Log exports are likely to remain unchanged over the next 30 years as recently harvested trees are being replanted.

The kiwifruit and avocado horticultural sector in Northland is currently experiencing a period of rapid investment growth. Substantial new plantings of both avocado and kiwifruit orchards have either occurred in recent years or are planned for the near future. Northport has also begun expanding port operations to include containerised kiwifruit exports. This expansion provides a cheaper alternative to transporting local kiwifruit south to POT via rail or road³⁶.

In the base case, low forecast growth in throughput means there are no constraints on Northport through to 2049. It is assumed the port infrastructure is able to manage the forecast increase in throughput.

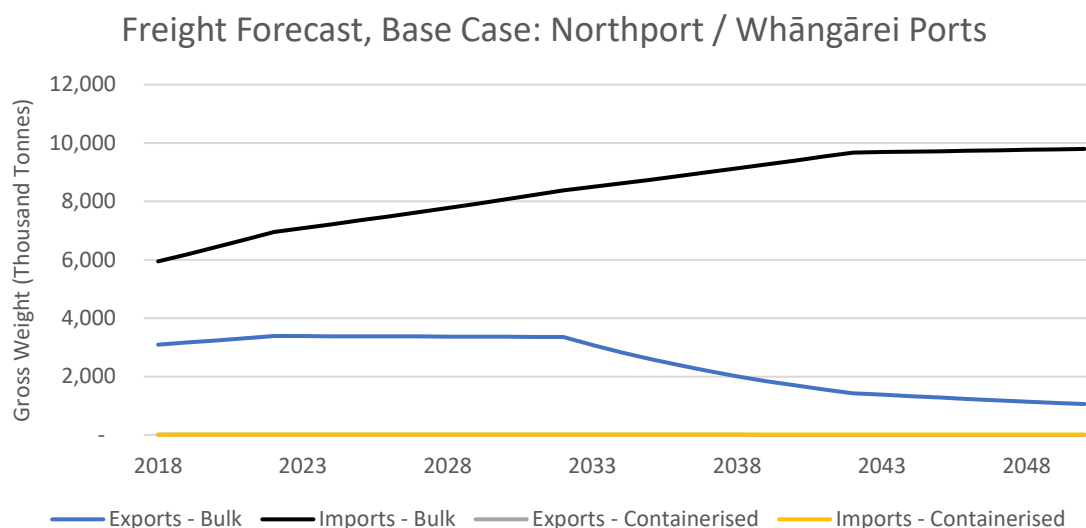
Freight volumes through Northport

³⁵ <https://ecoprofile.infometrics.co.nz/Northland%2bRegion/Businesses>

³⁶ https://www.nzherald.co.nz/the-country/news/article.cfm?c_id=16&objectid=12093844

Both imported and exported TEU throughput is forecast to increase by 17% in 2034 relative to 2018 figures, based on Ministry of Transport forecasts. This 17% increase equates to an estimated 780 exported and 740 imported TEU in 2034 (note that Northport reported 7,000 TEU in 2018 – the reason for the difference is that for reasons of consistency we have used MOT freight forecasting data. Nevertheless, this will be a relatively low container throughput in comparison to Ports of Auckland and Port of Tauranga.

Figure 21 Freight Forecast – Northport / Whāngārei Ports



Port side Developments

In the base case for Northport, given relatively low growth in throughput, no significant investments or modifications to the port are required through to 2049.

2034 developments:

- ▶ **Containers:** Due to minimal forecasted container growth to 1,456 TEU, no additional land or wharf space is required
- ▶ **Logs:** Due to the additional 10 Ha currently being constructed, no additional land is required. Due to minimal forecasted reduction of logs from 2.572 M t to 2.48 M t, no additional berth space is required
- ▶ **Woodchips:** Due to no forecasted woodchip growth, no additional land or wharf space is required
- ▶ **Cars:** Northport in the Base Case are not expected to import cars
- ▶ **Liquids and other bulk:** Minor growth forecasted to 271,000 t as coal plants are planned on being ramped down, future of liquids imports currently unknown

2049 developments:

- ▶ **Containers:** Due to minimal forecasted container growth to 1,677 TEU, no additional land or wharf space is required
- ▶ **Logs:** Due to minimal forecasted reduction of logs from 2.48 million tonnes to 2.4 million tonnes. No additional berth space or hardstand are required
- ▶ **Woodchips:** Due to no forecasted woodchip growth of 198,000 t, no additional land or wharf space is required
- ▶ **Cars:** Northport in the Base Case are not expected to import cars
- ▶ **Liquids and other bulk:** Minor growth forecasted to 273,000 t, future of liquids imports currently unknown

The road and rail network

Truck trips are expected to increase over the next 15 and 30 forecasted periods. Whilst the NAL is assumed to be upgraded to national standard, without a shift in what the ports are handling, we have assumed that the road network will still handle the vast majority of imports and exports travelling between the Northland and Auckland region.

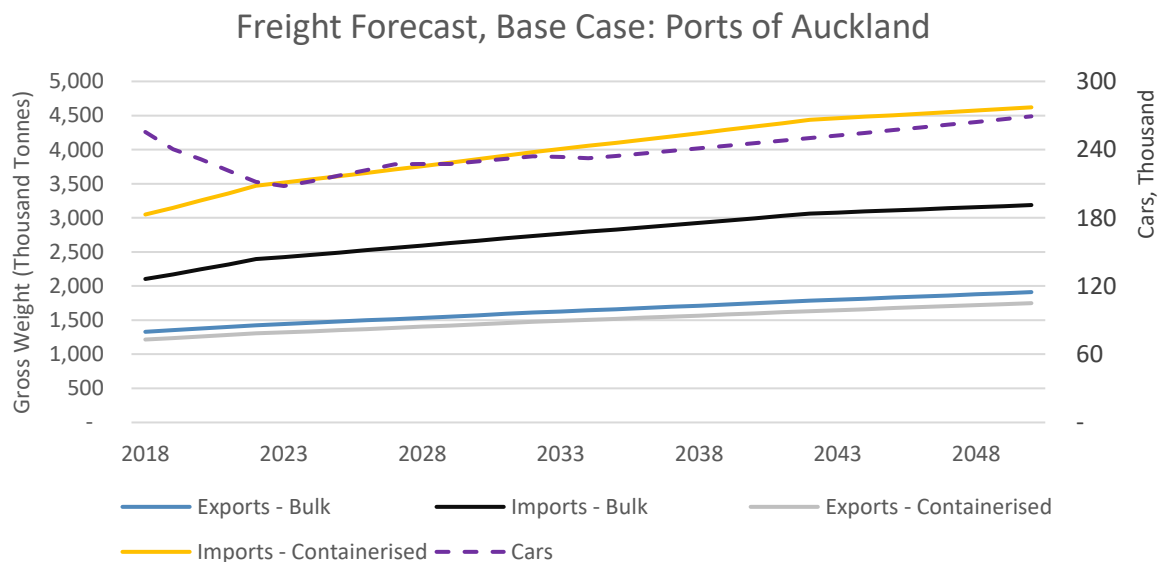
4.1.2.2 Auckland Base Case

The logistics and supply chain in Auckland is dominated by a port located in the CBD, and major freight hubs to the south of the city. The North-South strategic transport network comprises State Highway 1, State Highway 20 and 16, the North Island Main Trunk railway line and the North Auckland Railway Line. This land-side network is supported by a number of key East-West routes and strategic connections.

From a ports perspective, POAL primarily imports various goods for distribution within the Auckland region. POAL is also the central importer of cars in the North Island, importing 297,678 cars in the 2018. Also of note is the cruise industry, benefiting from the CBD location of the Port. 2018 saw 108 ships with 272,060 visitors arrive at the Port.³⁷

Freight volumes through Port of Auckland

Figure 22 Freight Forecast - Port of Auckland



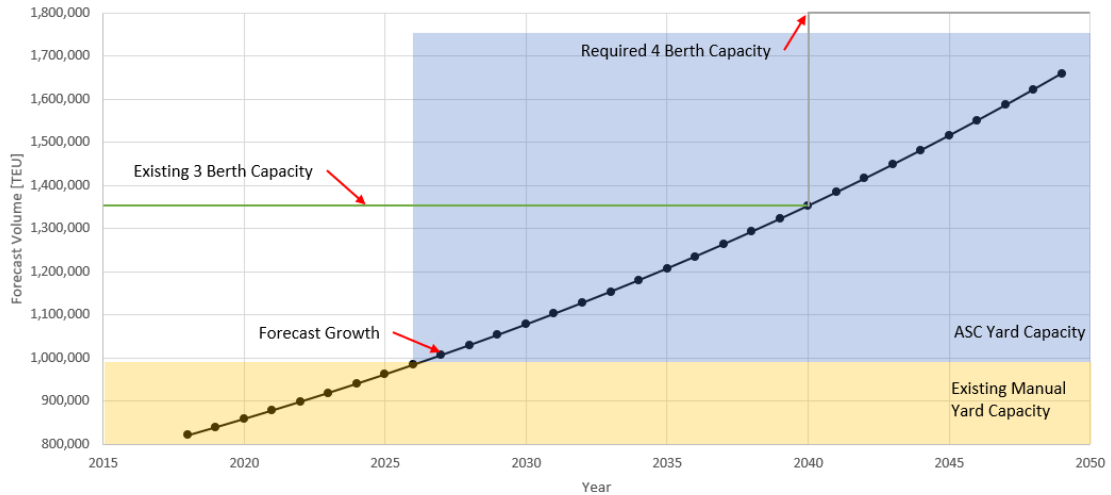
Port side Developments

- ▶ The diagram below plot shows the forecast container growth with the terminal limitations highlighted

³⁷ POAL Annual Report 2018

- ▶ This shows that there is sufficient terminal area (shown in blue above) to cope with the volumes if the mode of operations changes to ASC
- ▶ Based off the 30,000 TEU/Ha metric, POAL will reach maximum capacity at 2026, therefore implementation of ASC should occur prior to then, or cargo relocated elsewhere.
- ▶ From the POAL masterplan website, POAL appear to have invested in Automated straddles which can stack containers 4 high as opposed to 3 high. This will increase the container density in the yard, however no further information could be gathered, therefore the 30,000 TEU/Ha assumption was still utilised

Figure 23 Forecast container growth with terminal limitations - POAL



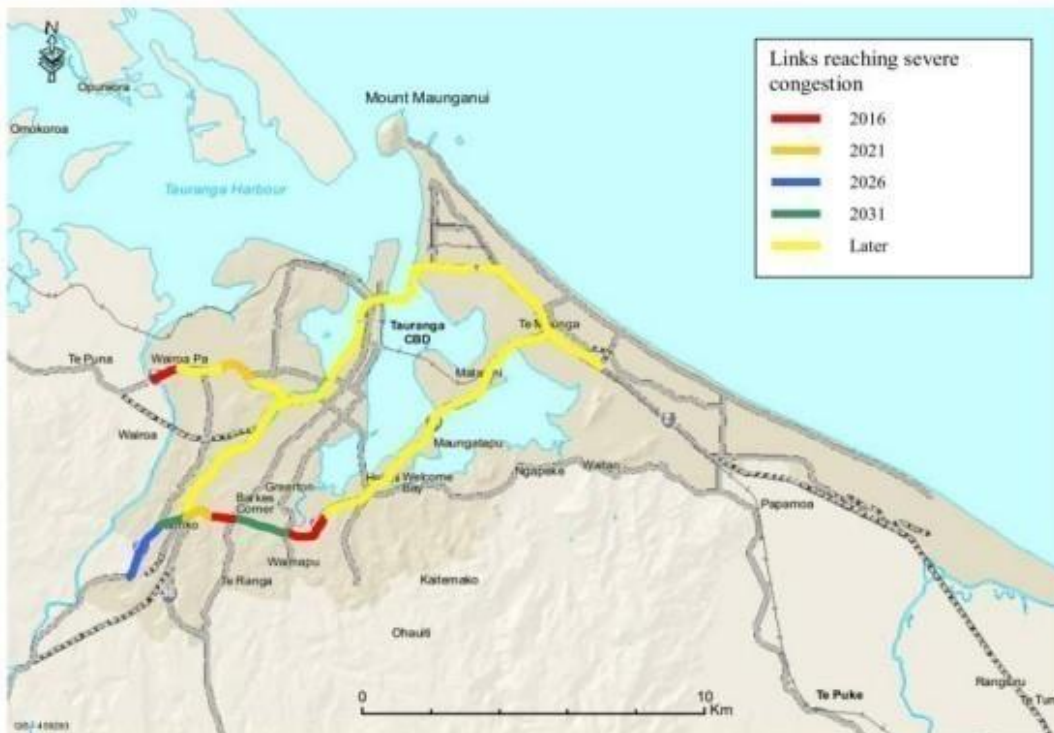
Cost estimates for port development for this Base Case are further detailed in Appendix B.

4.1.2.3 Tauranga and the Western Bay of Plenty Base Case

Tauranga in comparison to Auckland and Whāngārei has a comparatively high volume of freight entering and exiting the region (and port) via rail, at nearly 50 percent in terms of port entry. This can be accounted for by a rail link from Metroport (Auckland freight hub) and the East Coast Main Trunk Line which carries imports and exports to and from the Port.

Tauranga may in future face freight-driven congestion problems similar to that of Auckland. The following map from the 2013 Tauranga Urban Network Study projects future areas of congestion.

Figure 24: Links reaching severe congestions on the TUNS network



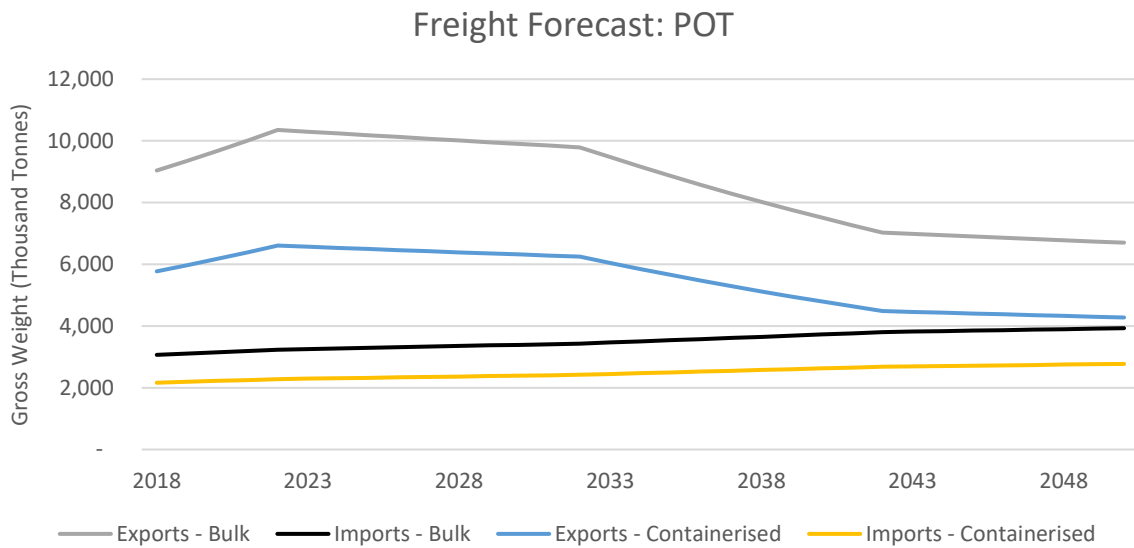
The central state highway corridors for POT freight movements are 1, 2, 26, 27, 29 and 29A. Planned improvements on these state highways include the Tauriko Network Plan. The Business Case plans to maintain a freight travel time of 10 minutes on State Highway 29 to Omanawa Road to 2030.

POT (POT) has locations in both Mount Maunganui and Tauranga. POT handles the highest volume of freight of all New Zealand ports. POT is driven by exports, with a high volume of logs and dairy leaving the port. The Port has seen an increase in dairy exports after making a deal with Kotahi, the logistics company owned by Fonterra Cooperative Group and Silver Ferns Farms³⁸. Now the Port handles most of the North Island's dairy exports.

Freight volumes through POT

³⁸ <https://www.nbr.co.nz/article/port-tauranga-ties-97-north-island-dairy-exports-after-coda-deal-b-177636>

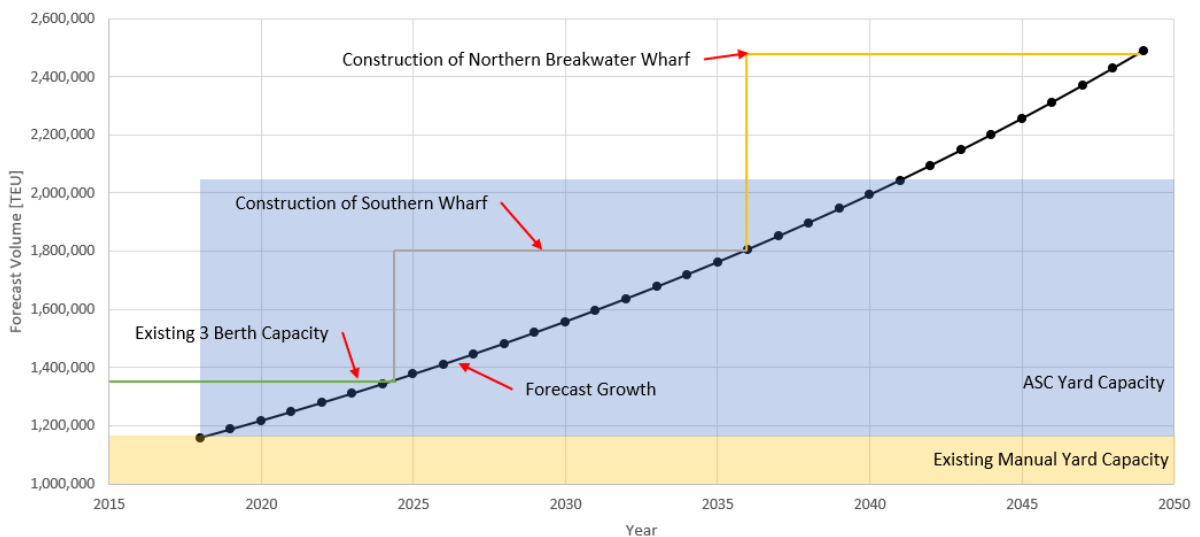
Figure 25: Freight Forecast- POT



Port Side developments

- ▶ The figure below shows the forecast container growth with the terminal limitations highlighted
- ▶ This shows that terminal is operating close to maximum throughput (excluding any efficiencies gained by intermodal terminals) and that investment in automation should already be occurring
- ▶ Even with the mode of operations changed to ASC, the forecasted throughput will still exceed available land, therefore either further efficiencies are required as mentioned in 2034, or additional land is required (shown in orange in above image). Detail of the port and infrastructure upgrades associated with the scenarios are outlined from page 50.

Figure 26: Forecast container growth with terminal limitations - POT



Cost estimates for port development for this Base Case are further detailed in Appendix B.

4.2 Conclusion from Base Case

The Base Case critically hinges on the assessment of whether critical parts of the logistics and supply chain, in any part of the Upper North Island region will reach capacity, either on the port-side, land-side or a combination of both. Should this be the case then the Base Case effectively delivers the following scenario:

1. Ports can remain on their current footprints but may have their total handling capacity capped.
2. A significant additional port investment, with supporting land-side infrastructure, outside of a constrained location will need to be made to take marginal freight growth over and above any capacity cap.
3. As freight continues to grow (in line with the growth trends outlined in the National Freight Demand Study), the affected locations share of the total freight task will diminish and other UNI ports will grow.
4. Opportunity costs will be material:
 - a. The Base Case entails all ports remain on their current sites, so no potential value uplift from alternative land use will occur.
 - b. Investment in the land-side transport network to support the growth of freight up to the cap would continue to be required.

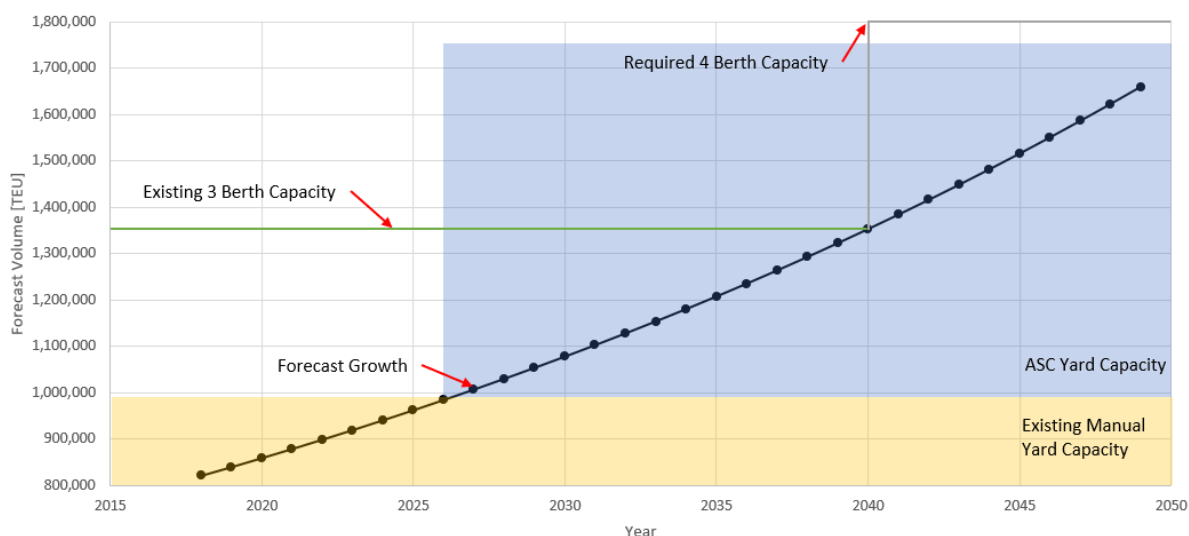
The assumption around capacity is demonstrably material to the outcome of the analysis around the Scenarios. Effectively a constrained Base Case results in all the costs of a land-side and port development, without any offsetting benefits. An unconstrained Base Case would require the value of the any offsetting benefits in the modelled Scenarios to be greater than the costs of a lengthening of the logistics chain and the additional infrastructure investment.

The analysis undertaken shows that the main (in some cases sole) driver of the need for capacity to deal with growth at the UNI ports is growth in containers.

For Auckland, the analysis shows that there is sufficient terminal area (shown in blue in the figure below) to cope with growth in the study period if the mode of operations changes to ASC (automation).

It is estimated that POAL would need to spend circa \$500M to upgrade to the level of automation required to cope with the TEU growth, prior to 2026. Our estimate is that a total spend of more than \$1B at POAL over the next 30 years would be required to deal with growth.

Figure 27 Forecast container growth with terminal limitations - POAL



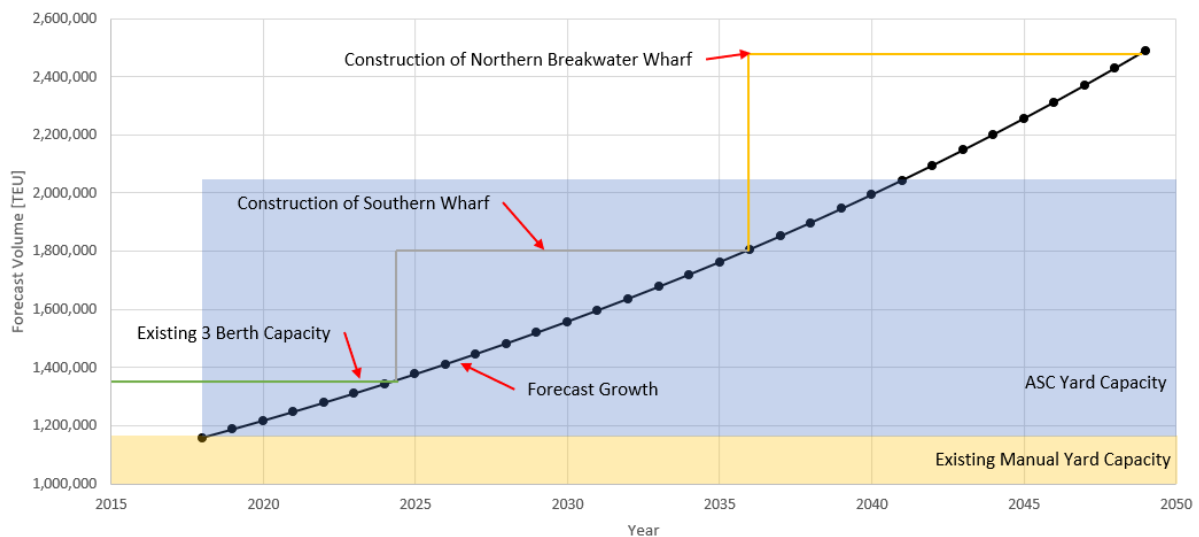
However, the major constraint with in Auckland is landside. The increase in volumes through the port (more than doubling truck trips over the next 30 years) will have land-side transport impacts on a part of the network that is already congested, becoming more congested, and increasingly subject to plans and designs to create routes that favour pedestrians, cyclists and public transport.

Even in 2034, the growth equates to 2.6 truck trips per minute, or one every 23 seconds (one every 16 seconds in 2049). Notwithstanding the difficulties in getting all these vehicles in and out of the Port gates, and assuming that the heavy haul industry is prepared to work through the night, these are unrealistic volumes on networks that are only becoming more congested. While the role of rail at POAL could be increased, given the relatively conservative assumptions made around the ratios between freight volumes and trips, it is clear that certainly in the second 15 years, if not prior to 2034, through no fault of its own the Port of Auckland will hit a hard capacity constraint on movement of freight to and from the port with implications for the rest of the UNISC

It is highly unlikely that the land connections to the Port of Auckland can be upgraded sufficiently in order to keep up with the productivity improvements at the Port. Particularly given both road and rail – services components have a high degree of friction with non-freight travel. This non-freight travel demand is also forecasted to grow strongly.

The POT is already operating close to theoretical maximum throughput (excluding any efficiencies gained by intermodal terminals) and investment in automation is becoming an imminent necessity. The summary diagram below shows that even with the mode of operations changed to ASC, the forecasted throughput will still exceed available land, therefore either further efficiencies are required, or additional land is required (shown in orange in below image).

Figure 28 Forecast container growth with terminal limitations - POT



The construction of the Northern Breakwater wharf provides a larger throughput due to the available length allowing for multiple vessels to berth. We estimate that the POT will need to spend more than \$1.2B over the next 30 years to keep up with forecast growth.

5. Scenario Descriptions

Scenarios have been developed to test a range of potential economic, social and environmental impacts for alternative logistics and supply chains in the Upper North Island. It is important to stress that these Scenarios are materially distinct from what would traditionally be referred to as an “Option” in that they are representative of a range of possible permutations in what is a complex and responsive freight, transport and land use environment where there are a range of owners, investors, users and stakeholders.

The Working Group have agreed and directed a number of principles to be taken into account in designing the Scenarios. The main principle is that the role of the Working Group is not to ‘decide where the freight goes’, but instead to provide guidance on the development of infrastructure and organisational frameworks that would enable the freight to move differently than it does now. Success will be a strategy for investment in and development of UNISC infrastructure that improves freight outcomes as well as social, cultural and economic outcomes.

In this context, the following priorities have guided the development of the Scenarios:

- ▶ **Resilience of the supply chain:** The strategy must provide confidence that the UNISC has a built-in ability to continue to move freight as required in the event of a natural disaster or other event that impacts one or more areas in the UNI.
- ▶ **Cost efficiency in moving freight:** NZ’s economy is highly dependent on moving freight both internally and externally, and as such the strategy must create an environment that over time seeks to keep the costs of moving that freight as low as possible (while ensuring that all costs are covered).
- ▶ **Maintaining, if not enhancing, levels of competition in the UNISC:** One of the best drivers of innovation and cost effectiveness is a competitive market, and the Working Group is conscious that appropriate levels of competition between different providers in the supply chain need to be preserved – but also note that this needs to be balanced against the risk of over-provision of costly infrastructure in our relatively small country.
- ▶ **Reducing ‘friction’ between freight and other modes/areas:** For reasons of both amenity and efficiency, the strategy will where possible favour the provision of infrastructure that removes freight traffic from impacting on public areas and reduces the interaction between freight vehicles and private vehicles.
- ▶ **Contributing to overall government objectives,** with a particular focus on priority for the development of rail, improving road safety outcomes, contributing to achievement of the net zero greenhouse emissions reduction targets and economic development of the regions, and in particular Northland (in line with the Terms of Reference).
- ▶ **The potential to increase the efficiency of capital** for the owners of port and land-side infrastructure through optimisation of both the supply chain and land use.

5.1 Long list scenario development

Within these principles, Scenarios were developed that offer a mix of:

- ▶ **Ports:** While this assessment is about the entire logistics and supply chain, the Scenarios have used a port-centric approach as an organising principle. Consideration have been given to Northport, POT, a combination of both and potentially a new port independent of the existing 3 ports
- ▶ **Freight types:** The impact of both a Full and Partial Move
- ▶ **Time:** The speed at which any move could be undertaken.

This has resulted in the development of two headline Scenarios of a Partial Move and a Full Move³⁹ of the Ports of Auckland:

- ▶ A Partial Move involves consideration of the movement of the car imports in a short- to medium term horizon to either the Northport or POT.
- ▶ The Full Move Scenarios mirror this approach, but also include a combination of the two Ports, as well as a new port. While a Full Move is discussed, a critical assumption is the Ports of Auckland will continue to exist and Auckland will continue to have a working waterfront. The activities of POAL would be focussed on servicing the cruise industry and potentially a range of other maritime activities.

Due to the Base Case conclusion, the Working Group directed that Scenarios are to be investigated and modelled on the basis of a rapid response of 5 and 15 years.

Within each of these headline Scenarios, different locations were considered, as shown in the diagram below:

³⁹ A Full Move entails moving the entire operations (including freight) from POAL to Northport (except cruise ships).

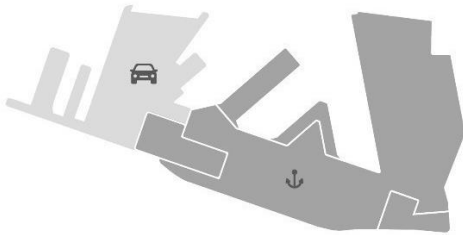
Figure 29 Scenario Overview



BASE CASE

NO MOVE

- Establish maximum capacity and growth
- Establish ongoing costs
- Managing POA's growth elsewhere

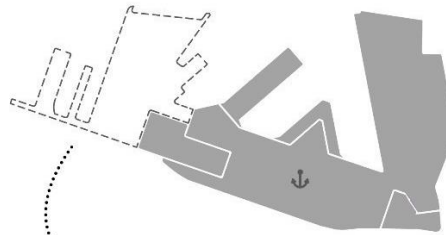


BASE CASE
Auckland

SCENARIO 1

PARTIAL MOVE

- Establish Container terminal at Northport
- Partial removal of port functions (probably at western end)
- Phased POA land development at Western end



SCENARIO 1.1
Northport

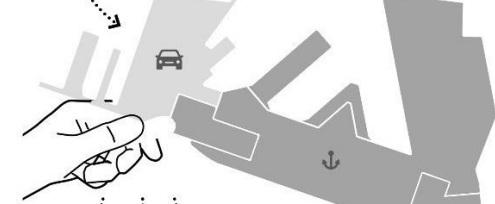
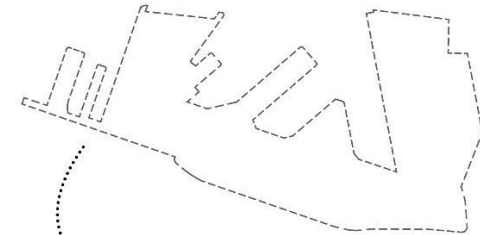


SCENARIO 1.2
Tauranga

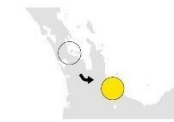
SCENARIO 2

FULL MOVE (EXCEPT CRUISE FACILITY)

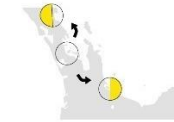
- Simultaneous development of Northport, decommissioning of POA and POA land development



SCENARIO 2.1
Northport



SCENARIO 2.2
Tauranga



SCENARIO 2.3
Northport & Tauranga

5.2 Long list to short list of Scenarios

In considering the long list a combination of multicriteria analysis and intervention logic were deployed. The intention of this process is to take the long list of Scenarios down to a smaller number to support cost benefit analysis and assessment of wider economic impacts.

5.2.1 Multi-criteria Analysis

The Working Group performed Multi-Criteria Analysis (MCA) on the Scenarios above, examining the economic, social, cultural and environmental impacts of each. The use of MCA is a standard tool for shortlisting from a long list to a short list. This MCA included consideration of contemporary research, including the results of a Colmar Brunton survey commissioned by the Working Group earlier this year. Scores were given for the impact of each scenario on:

- ▶ Employment opportunities
- ▶ Investment returns
- ▶ Congestion, reliability and friction between modes
- ▶ Supply chain resilience
- ▶ Public amenity and friction between infrastructure users
- ▶ Attractiveness for visitors, residents and workers
- ▶ Quality of urban form and design
- ▶ Support for iwi, hapu and other cultural values
- ▶ Consistency with the Principles of the Treaty of Waitangi
- ▶ Contribution to Treaty Settlements (current and future)
- ▶ Marine and land pollution
- ▶ Noise and visual pollution
- ▶ Contribution to climate change objectives (e.g. Greenhouse Gas Emissions)
- ▶ Sensitive environmental areas (e.g. protected biodiversity).

This qualitative analysis was complemented by a high-level assessment of capital cost, highlighting significant differences in the fiscal impacts of each scenario.

This qualitative exercise made clear that some Scenarios were much more desirable than others. Sensitivity testing confirmed that this result was robust to a number of assumptions, including different weightings across factors and two different time horizons. The results, as presented below were the results of the Working Group's feedback, but the sensitivity testings have confirmed that while the quantum of the scoring can change, the relativities between the options do not from a qualitative perspective

A key finding was that the 'Base Case' of POAL continuing to operate freight, cars and cruise facilities at its current site performed worse than most of other alternative Scenarios considered. Significant capital investment will be required under this approach, both to maintain downtown Auckland, and to develop other Auckland sites should POAL reach capacity.

Scoring method:

Table 4: Scoring Method

Score	Description	Score	Description
xx	Performs very weakly against criterion	- / ✓	Slightly positive performance against criterion
x	Performs weakly against criterion	✓	Performs strongly against criterion
- / x	Slightly negative performance against criterion	✓✓	Performs very strongly against criterion
-	Neutral performance against criterion	✓✓*	Performed most strongly against criterion

MCA Qualitative evaluation of Scenarios:

Table 5: MCA Qualitative evaluation of Scenarios

	Base Case	Scenario 1.1 - Northport, Partial Move	Scenario 1.2 - Tauranga, Partial Move	Scenario 2.1 - Northport, Full Move	Scenario 2.2 - Tauranga, Full Move Full Move	Scenario 2.3 - Full Move, New Port in Firth of Thames	Scenario 2.4 - Northport & Tauranga, Full Move Full Move
Multi-Criteria Analysis Score: Weighted	xx	- / ✓	- / x	✓✓*	- / ✓	✓	- / ✓
Multi-Criteria Analysis Score: Unweighted	xx	- / ✓	- / x	✓*	- / ✓	✓	- / x
Estimated capital cost: Total (\$m)	\$9,513	\$9,554	\$9,593	\$10,300	\$13,096	\$12,898	\$12,912

The full scoring of the Multicriteria analysis is included in Appendix A.

5.2.2 Applying an Investment Logic to Shortlist Scenarios

Following this MCA the options were shortlisted using a simple investment logic:

1. Can the scenario realistically deliver a workable alternative logistics and supply chain from both the port side and land-side perspective?
2. Can the scenario deliver such an alternative within an acceptable time period?
3. Is the scenario able to deliver the alternative at a capital cost that represents better value for money than other Scenarios?

As a result of this approach, the Full Move to Tauranga and the new port Scenarios were not taken forward.

Full Move - Tauranga Only

The Tauranga Only scenario effectively entailed increased reliance on a logistics and supply chain with a locus south of Auckland. This reduced resilience in the UNISC, compared to the current situation, and was materially more expensive than options that diversified the supply chain. This was due to the need to invest in the land-side infrastructure to address the significantly increased freight volumes through the Bay of Plenty, Waikato and South Auckland.

New Port Scenario

The New Port scenario was discounted from detailed consideration and further development for the following reasons:

- ▶ A new port would only be required if it was considered that the combination of existing, established ports could not deliver on the requirements for the logistics and supply chain in the Upper North Island. There is no evidence to suggest that the combination of existing ports could not meet the supply chain needs
- ▶ The cost of developing a brand-new port is significantly higher than the equivalent for all alternative Scenarios. The high capital costs apply to both the development of a new port (\$5+ billion) and new land-side road and rail links (\$2+ billion)
- ▶ There are likely to be challenges around gaining resource consent to develop a new port in the Firth of Thames. Any development would require a coastal permit, with consideration of the impacts of reclaiming part of the foreshore or seabed, constructing a structure in, on, under, or over any foreshore or seabed, disturbing the seabed (e.g. by excavation or dredging) and the occupation of part of the common marine and coastal area. Consent for up to 50km of new road and rail corridor (some of which would traverse the Tapapakanga Regional Park) would be required, along with careful consideration of iwi cultural values and concerns relating to the site (although there would potentially be trade-offs with the potential freeing up of the current Waitemata Harbour site, which is of high significance). Also of strong concern would be shipping impacts on established (and growing) marine farm developments in the Hauraki Gulf and Firth of Thames. This consideration would take place in an environment in which alternatives such as developing Northport or expanding the POT exist, potentially at lower cost than developing a new port. Whether or not consent would be attainable is uncertain, but what is certain is that the process would be long and costly.




The non-progression of either scenario is not a discounting of these as options. Ownership structures mean that a decision to advance a new port could be made by port owners combined with the local councils, NZTA and Kiwirail. It has been discounted as a scenario to be modelled as it is felt that other Scenarios are sufficient to understand whether there is the potential to deliver an economically better-performing logistics and supply chain (with associated economic development impacts) approaches.

5.3 Shortlisted Scenario Analysis Overview

The following sections summarise the key features in terms of infrastructure investment and capability to make each Scenario workable in terms of the Working Group objectives.

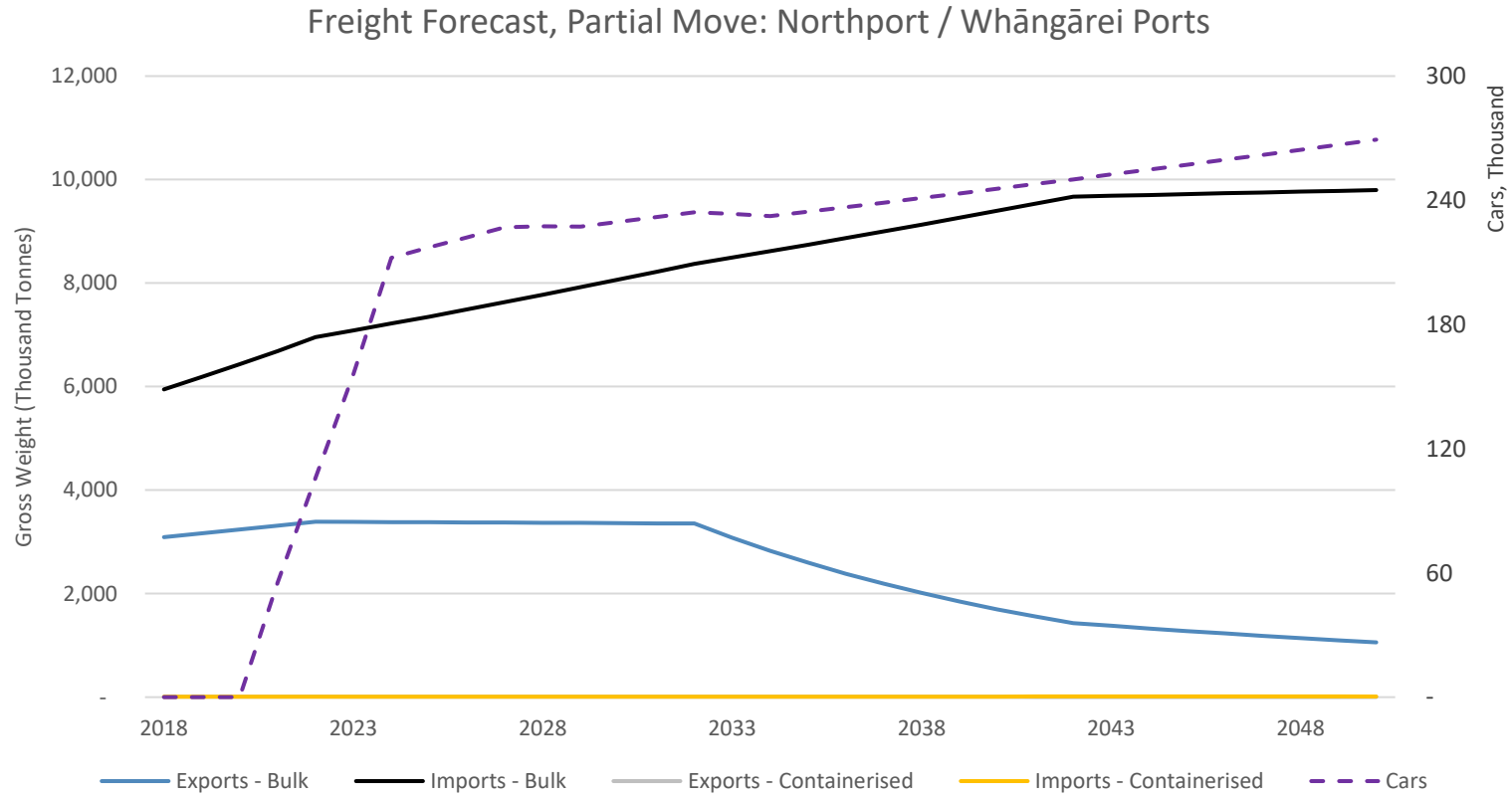
5.3.1 Scenario 1.1: Partial Move to Northport

Figure 30 Partial move to Northport

	Infrastructure	Costs (non-discounted)	
Port Infrastructure and Logistics hubs/Distribution Centres 	<ul style="list-style-type: none"> ▶ The Port will require the construction of 5.3Ha of hardstand to stockpile cars. Limited expansion and reorganisation at an Auckland freight hub to cater for cars would also be required. ▶ Northport would also need take into consideration the following infrastructure investments: <ul style="list-style-type: none"> ▶ Reconfigure the wharf to accommodate RoRo vessel and vehicle operations. ▶ Develop dedicated road access from the wharf to the vehicle staging area (note this would also allow for growth of other commodities at the Port). ▶ Road access will require shuttle(s) to transport stevedores back to vessel. 	Estimated Port Costs (incl. Dredging, Reclamation, Quay Wall, Pavement and Utilities etc.)	\$38.54M (Based on \$200 for pavements / 3 waters, 18% P&G, 10% Margin, 11% Fees, 1% consents and 15% Contingency)
Rail Infrastructure 	<ul style="list-style-type: none"> ▶ Assumed no additional investment (it is also assumed that the rail spur and (limited) level of investment to upgrade the NAL is undertaken in the same period as in the base case). 	90 x specialty rail rolling stock for moving used cars	\$36M (estimate from Australian experience - \$300-\$500k each unit)
Road Infrastructure 	<ul style="list-style-type: none"> ▶ Assumed no additional investment to the base case. 	Limited expansion at one of the Auckland freight hubs to allow for cars	\$2.5M (Assume no additional land required)
TOTAL COST			\$77.04M





Freight Forecast - Northport

Figure 31: Freight Forecast, Partial Move: Northport / Whāngārei



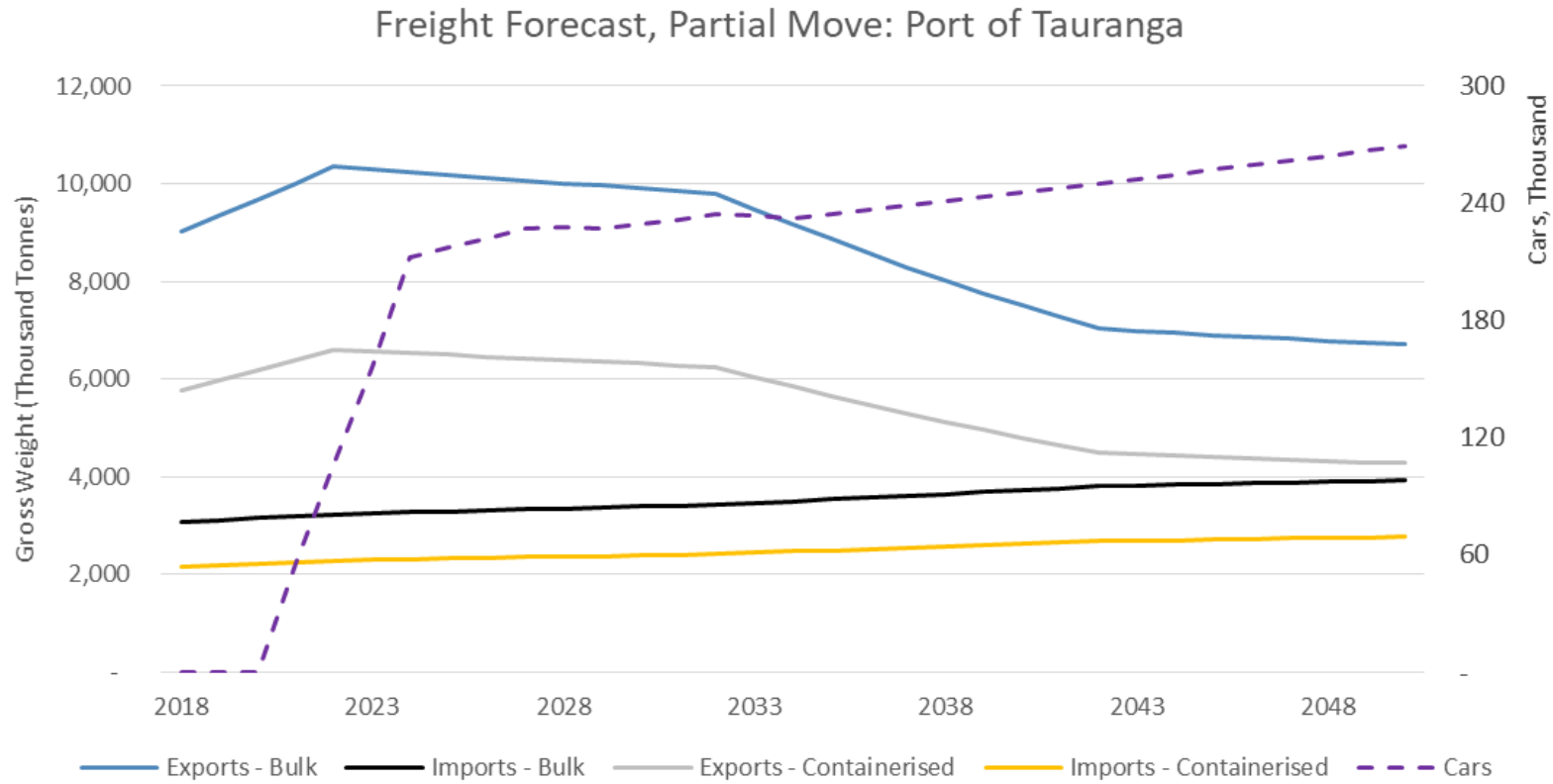
5.3.2 Scenario 1.2: Partial Move to Tauranga

Figure 32: Partial Move to Tauranga

	Infrastructure	Costs (\$000,000)	
Port Infrastructure and Logistics hubs/Distribution Centres 	<ul style="list-style-type: none"> ▶ The Port will require the construction of 5.3Ha of hardstand to stockpile cars. Limited expansion and reorganisation at MetroPort to accommodate car imports would also be required. ▶ There is potentially limited berth and staging availability on general bulk berths due to existing operations and cruise vessels. Therefore, we have assumed that the car hardstand will not be located on the general bulk hardstands but offsite which will require a new pavement. Note we have not costed land acquisition or demolition of existing structures. ▶ Consequently, we expect the Port will need to do the following; <ul style="list-style-type: none"> ▶ Develop a wharf to accommodate RoRo vessel and vehicle operations ▶ Develop dedicated road access from the wharf to the vehicle staging area (this is due to low likelihood of using public roads due to customs, security and congestion) ▶ Establish the required shuttle(s) to transport stevedores back to vessel 	Estimated Port Costs (incl. Dredging, Reclamation, Quay Wall, Pavement and Utilities etc.)	\$41.51M (by 2049)
Rail Infrastructure 	<ul style="list-style-type: none"> ▶ There is no additional (associated with this option) upgrade assumed. We expect that the passing loop development on the ECMT will be sufficient for additional/length of trains. ▶ As we expect used cars to travel on the rail network, dedicated rolling stock would be required. This would also likely require limited expansion at West Auckland MetroPort. 	90 x specialty rail rolling stock for moving used cars	\$36M (estimate from Australian experience - \$300-\$500k each unit)
Road Infrastructure 	<ul style="list-style-type: none"> ▶ There will be some impacts on already congested networks close to the Port, but an additional 60 per day is assumed to be manageable 	Limited expansion at one of the Auckland freight hubs to allow for cars	\$2.5M (Assume no additional land required)
TOTAL COST			\$80M

Freight Forecast - Tauranga

Figure 33: Freight Forecast, Partial Move: POT



5.3.3 Scenario 2.1: Full Move (Except Cruise) to Northport

Figure 34 Full intervention to Northport only

SCENARIO 2.1
FULL INTERVENTION TO NORTHPORT ONLY

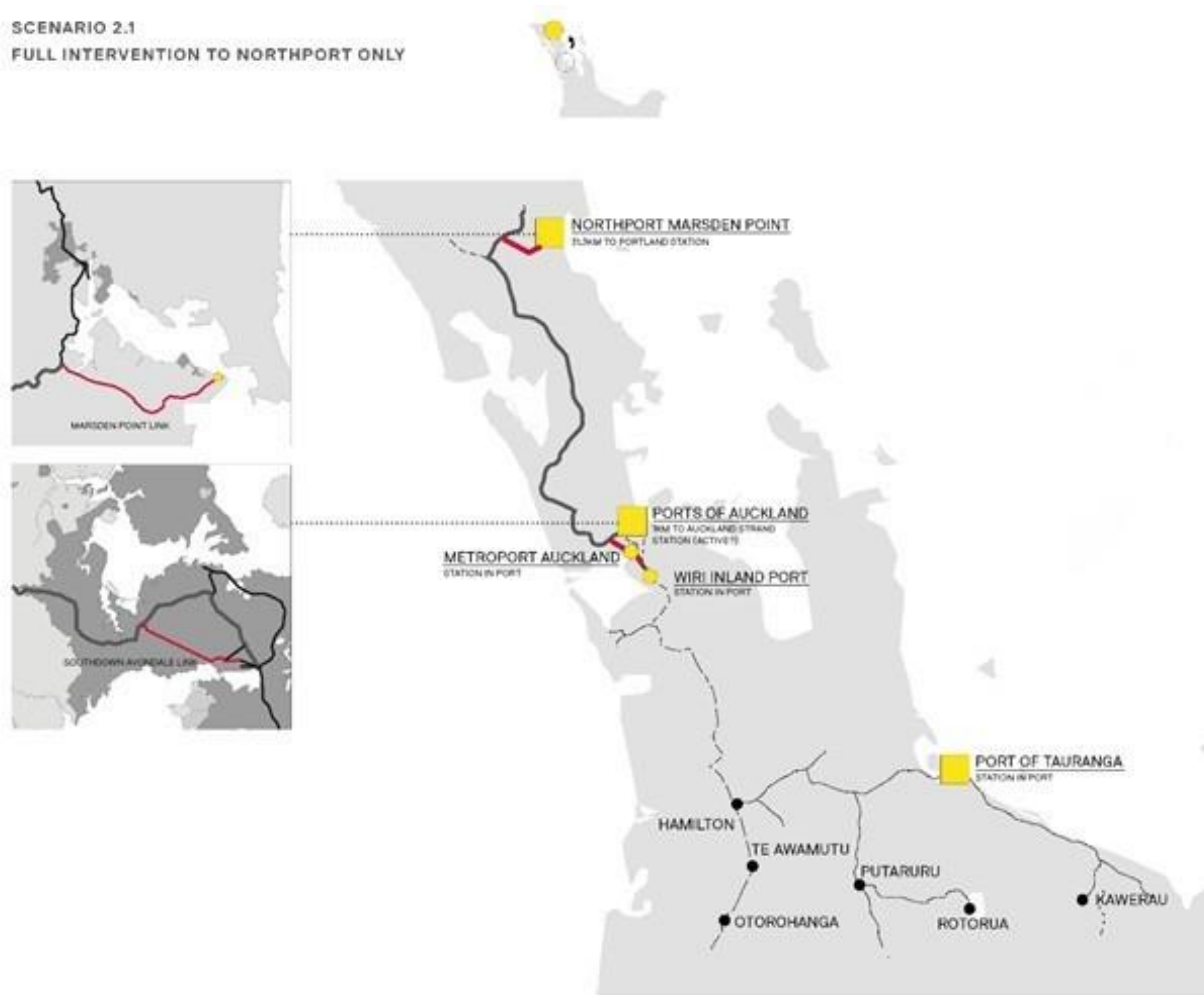





Figure 35 Full move (Except Cruise) to Northport




Port Infrastructure and Logistics hubs/Distribution Centres



Infrastructure	Costs (non-discounted)	
<ul style="list-style-type: none"> ▶ Given the forecasted freight volume in the Northport base case, the addition of POAL cargo significantly increases throughput at Northport. A new container terminal will have to cater for Postpanamax vessels (+9,000 TEU) to be future proof, which will require deeper and longer berths, and larger cranes. ▶ An inland port in west Auckland and a vehicle importing and servicing centre at Northport are among a dozen potential transport investments a working group is considering to improve freight handling in the upper North Island. ▶ Road/Rail hubs around upgraded rail lines in Northland would be expected to be developed. The Port would likely need for an inland multi-modal hub in North/West of Auckland. This intermodal would likely need to be an "on-dock" intermodal terminal similar to DPW London Gateway to reduce the requirement for trucks (note this is not costed). ▶ 2034 Concept layout: 	<p>Estimated Port Costs (incl. Dredging, Reclamation, Quay Wall, Pavement and Utilities etc.)</p>	<p>\$2.15B (by 2049)</p>

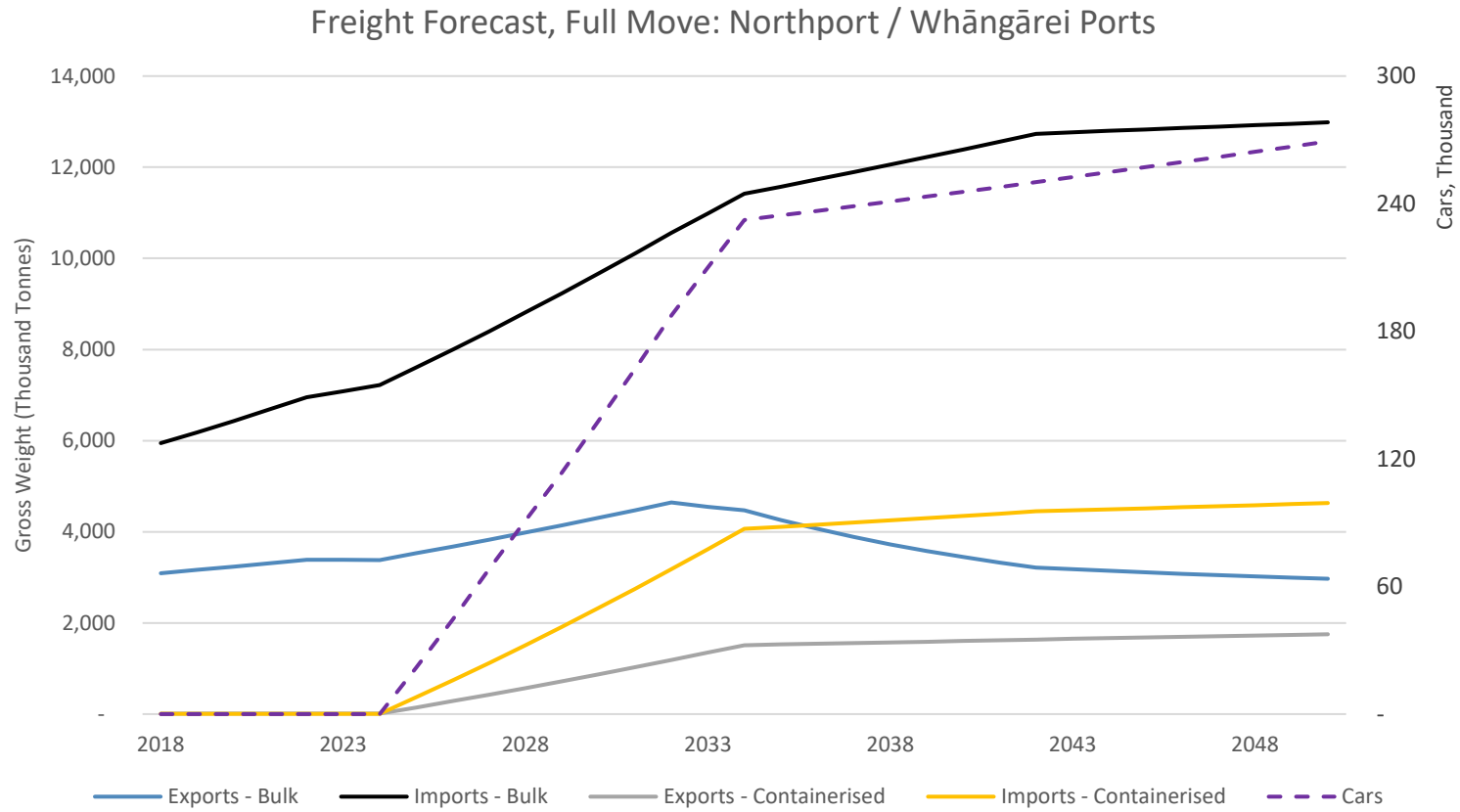


Infrastructure	Costs (non-discounted)	
<p>▶ The following additions shown in the 2034 concept plan include:</p> <ul style="list-style-type: none"> ▶ An additional 900 m of quay to support containers (blue) and logs/bulk/cars (green) <ul style="list-style-type: none"> ▶ Assumes current wharf can support cars and container trades ▶ 23.1 Ha of container hardstand <ul style="list-style-type: none"> ▶ 8 Ha is shown in blue as more area is required for both the quay line and future expansion for 2049 ▶ 7 Ha of car pavement required, including roadway <ul style="list-style-type: none"> ▶ Cars have been placed away from the quay to allow the port to grow without impacting car space, this also allows the car yard to expand to the south as required ▶ Excess log yard space by due to the requirement for wharf space <ul style="list-style-type: none"> ▶ This allows for additional stockpiling of logs if required ▶ Costed paved area is behind wharf only, assumed current pavement is in good condition and not near end of life ▶ The assumption that ASC are installed from Day 1 ▶ Due to small volumes of cars and woodchips, it has been assumed that the two trades can share a berth <p>▶ 2049 Concept layout:</p> 	<p>Estimated Port Costs (incl. Dredging, Reclamation, Quay Wall, Pavement and Utilities etc.)</p>	

	Infrastructure	Costs (non-discounted)	
Port Infrastructure and Logistics hubs/Distribution Centres 	<ul style="list-style-type: none"> ▶ Assuming required investment for 2034 is completed, by 2049 Northport would also require; <ul style="list-style-type: none"> ▶ An additional 300 m of quay to support containers ▶ 5.4 Ha of additional container hardstand <ul style="list-style-type: none"> ▶ Total container hardstand is the minimum required for forecast 2049 volumes ▶ 1.8 Ha additional car pavement <ul style="list-style-type: none"> ▶ Cars would be placed away from the quay to allow the port to grow without impacting car space, this also allows the car yard to expand to the south as required ▶ Excess log yard space by due to the requirement for wharf space <ul style="list-style-type: none"> ▶ Allows for additional stockpiling of logs if required ▶ Costed paved area is behind wharf only, assumed current pavement is in good condition and not near end of life ▶ Due to small volumes of cars and woodchips, it has been assumed that the two trades can share a berth 	Estimated Port Costs (incl. Dredging, Reclamation, Quay Wall, Pavement and Utilities etc.)	
Rail Infrastructure 	<ul style="list-style-type: none"> ▶ North Auckland Line and spur to Northport bought forward (assume immediate start on design and construction). ▶ The likelihood is that the freight task for South/East Auckland and further south will continue to be distributed from the MetroPort/Wiri inland hubs, so the expectation is that the Avondale-Southdown rail link would need to be developed to avoid long truck trips from the northwest hub. The mix of investment (scale of the hub in the northwest vs expenditure required to reach and enhance the existing southern hubs needs more detailed analysis. It is also like that the Swanson - Newmarket route will need to be upgraded to reduce conflict between freight and passenger rail (especially when CRL volumes increase). Detailed assessment not undertaken. 	Rolling stock for moving cars Balance of NAL full rail connected port Avondale - Southdown	\$60M (Based on 400k each unit) \$650M (Estimate based on total estimated spend of \$1.2B, less \$550M spent to 2034 - Assume advanced by 15 years) \$1B (KiwiRail response to OIA request from 2017)
Road Infrastructure 	<ul style="list-style-type: none"> ▶ Widening/signal upgrades to provide for increased traffic around the projected multi-modal hub in the northwest of Auckland would be required to provide for the truck traffic necessary for distribution of the freight coming on the rail from Northport. ▶ As not all freight will be able to be carried on rail, and there will be a requirement to complete the 4 laning on SH1 to the north, ahead of schedule. 	Various upgrades SH1 North Auckland/Northland, in particular Brynderwyn western bypass, improvements to Te Hana, Toetoe-Oakleigh Bring forward the SH16-18 upgrades noted as part of the list of ATAP future priorities	\$1,200 (Estimate of \$880M to \$1.43B from NZTA programme business case. Assume advanced by 15 years) \$1,000 (Assume half of the programme advanced by 15 years)
TOTAL COST			\$6.06B

Freight Forecast - Northport

Figure 36: Freight Forecast, Full Move: Northport / Whāngārei



5.3.4 Scenario 2.3: Full Move (Except Cruise) to Northport and Tauranga

Figure 37: Full Intervention to Northport and Tauranga

SCENARIO 2.3

FULL INTERVENTION TO NORTHPORT AND TAURANGA

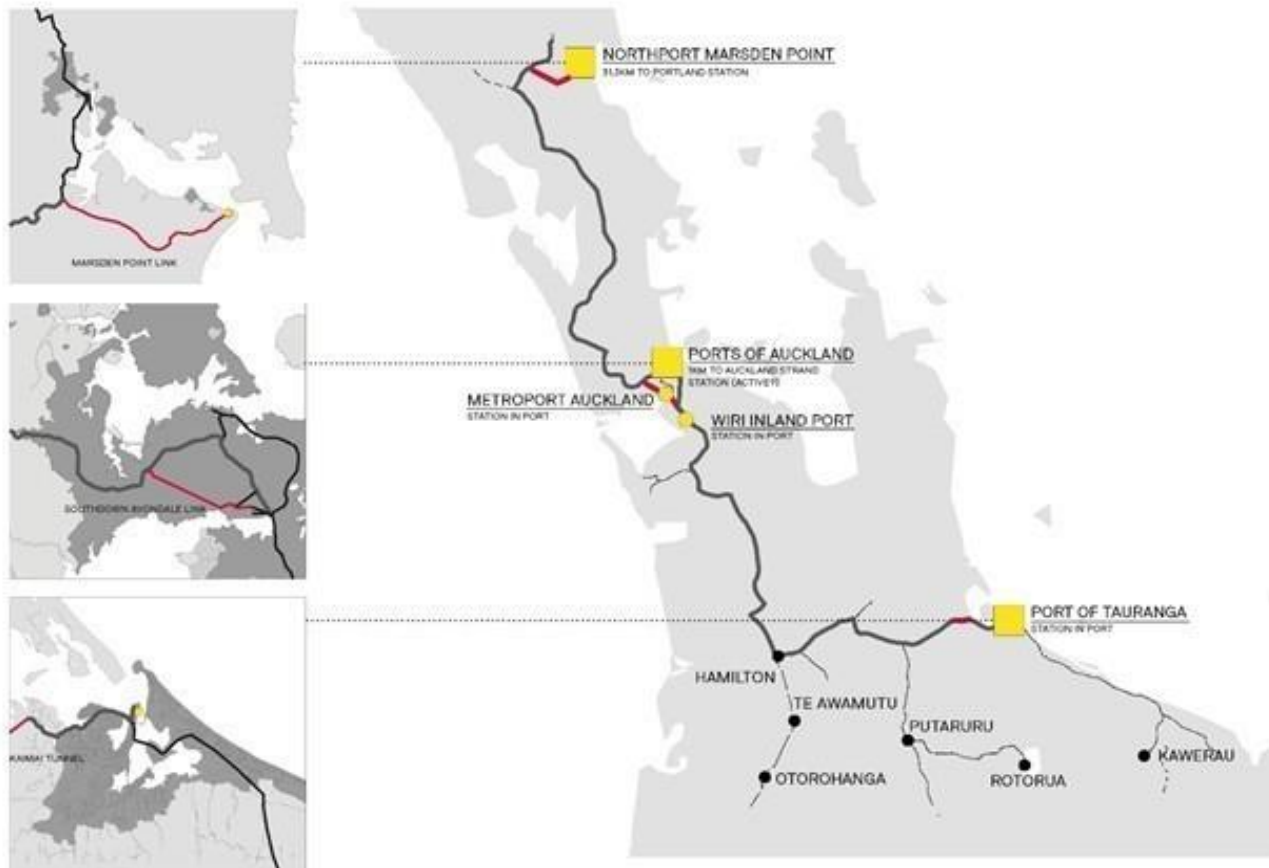




Figure 38: Full move (Except Cruise) to Northport and Tauranga

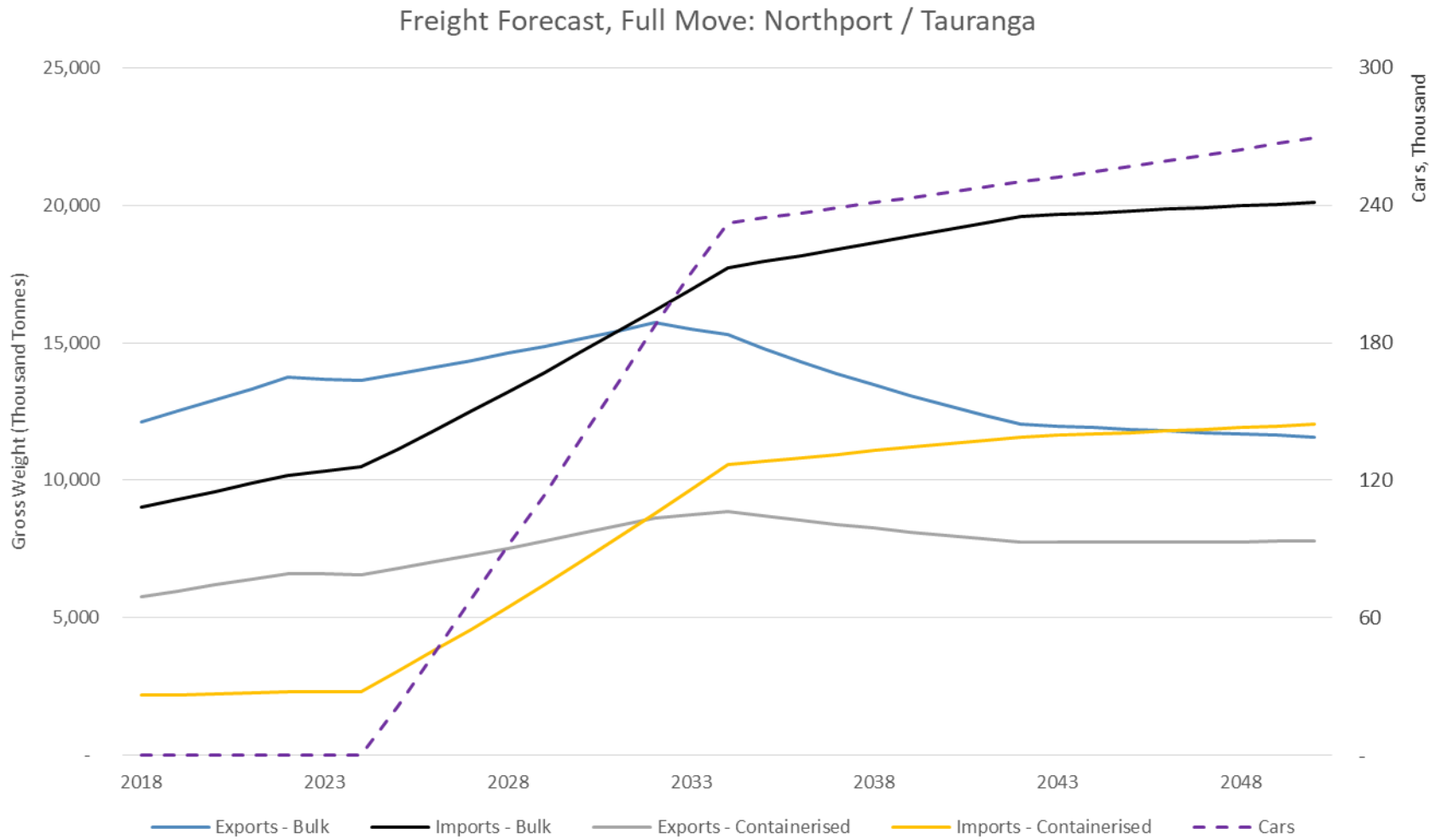
	Infrastructure	Costs (non-discounted)													
Port Infrastructure and Logistics hubs/Distribution Centres 	<ul style="list-style-type: none"> ▶ Significant investment is required at both ports should POAL freight be imported and exported from PoT and Northport. A detailed plan to split cargoes and timeframes for deployment would need to be developed. ▶ There is insufficient capacity at PoT to accommodate additional cargo from POAL. As shown in the full move to Northport scenario, there is sufficient area at Northport to cater for POAL. 	Various required port investments at Northport and Port of Tauranga	\$1.98B (by 2049)												
Rail Infrastructure 	<ul style="list-style-type: none"> ▶ Northport: <ul style="list-style-type: none"> ▶ North Auckland Line and spur to Northport brought forward (assume immediate start on design and construction) ▶ The likelihood is that the freight task for South/East Auckland and further south will continue to be distributed from the MetroPort/Wiri inland hubs, so the expectation is that the Avondale-Southdown rail link would need to be developed to avoid long truck trips from the northwest hub. The mix of investment (scale of the hub in the northwest vs expenditure required to reach and enhance the existing southern hubs) needs more detailed analysis. It is also likely that the Swanson - Newmarket route will need to be upgraded to reduce conflict between freight and passenger rail (especially when CRL volumes increase). Detailed assessment not undertaken. ▶ PoT: <ul style="list-style-type: none"> ▶ The 3rd and 4th main lines Wiri- Papakura and 3rd main Papakura-Pukekohe, while in the base case, would need to be constructed earlier (estimated 10 years). Additional capacity upgrades would also be required on the ECMT line. 	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Avondale - Southdown</td> <td style="text-align: right;">\$1,000M</td> </tr> <tr> <td>Balance of NAL full rail connected port</td> <td style="text-align: right;">\$650M (estimate)</td> </tr> <tr> <td>Rolling stock for moving cars</td> <td style="text-align: right;">\$60M (Based on 400k)</td> </tr> <tr style="background-color: #92d050;"> <td>3rd and 4th Main Wiri-Papakura</td> <td style="text-align: right;">\$85M</td> </tr> <tr style="background-color: #92d050;"> <td>3rd Main Papakura - Pukekohe</td> <td style="text-align: right;">\$85M</td> </tr> <tr> <td>ECMT upgrades, including urban Tauranga</td> <td style="text-align: right;">\$500M</td> </tr> </table>	Avondale - Southdown	\$1,000M	Balance of NAL full rail connected port	\$650M (estimate)	Rolling stock for moving cars	\$60M (Based on 400k)	3rd and 4th Main Wiri-Papakura	\$85M	3rd Main Papakura - Pukekohe	\$85M	ECMT upgrades, including urban Tauranga	\$500M	
Avondale - Southdown	\$1,000M														
Balance of NAL full rail connected port	\$650M (estimate)														
Rolling stock for moving cars	\$60M (Based on 400k)														
3rd and 4th Main Wiri-Papakura	\$85M														
3rd Main Papakura - Pukekohe	\$85M														
ECMT upgrades, including urban Tauranga	\$500M														

Road Infrastructure



Infrastructure	Costs (\$000,000, non-discounted)	
<p>▶ Northport:</p> <ul style="list-style-type: none"> ▶ As not all freight will be able to be carried on rail there will be a requirement to bring forward various improvements on SH1 to the North, ahead of schedule. <p>▶ PoT:</p> <ul style="list-style-type: none"> ▶ With increased rail volumes coming into MetroPort, the road network for distribution from South Auckland will come under increasing pressure. East West link, while most likely programmed for post 2034, would need to be brought forward. ▶ Similarly, the large increase in volumes coming out of the Port in Tauranga would, notwithstanding the desire to get as much of the freight on rail as possible, require the acceleration of the Tauriko network plan to improve access through the Barkes/Corner Tauriko area. ▶ Rapid development of the Tauriko - Piarere upgrade plan would also be required. With relatively little detailed planning on this route we have just allowed an estimate of \$400M for Tauranga urban and SH29 upgrades. Further detailed assessment would be required to refine this number. ▶ Similar to the 'Tauranga' scenario, the reality is that not all freight will be carried on rail, and there will be a requirement to complete the 4 laning on SH1 to the north, ahead of schedule. 	East West Link	\$800M
	Estimated SH29 upgrades - mainly alignment improvements over Kaimai's and improvements of intersections with SHs 24, 27 and 28	\$500M
	Balance of Tauriko Upgrade Package	\$450M
	Additional Tauranga Urban upgrades adjacent to Port	\$400M
	Bring forward the SH16-18 upgrades noted as part of the list of ATAP future priorities	\$1,200M
	Various upgrades SH1 North Auckland/Northland, in particular Brynderwyn western bypass, improvements to Te Henua, Toetoe-Oakleigh	\$1,000M
TOTAL COST	\$8.68B	

Figure 39 Freight Forecast - Full move (Except Cruise) to Northport and Tauranga

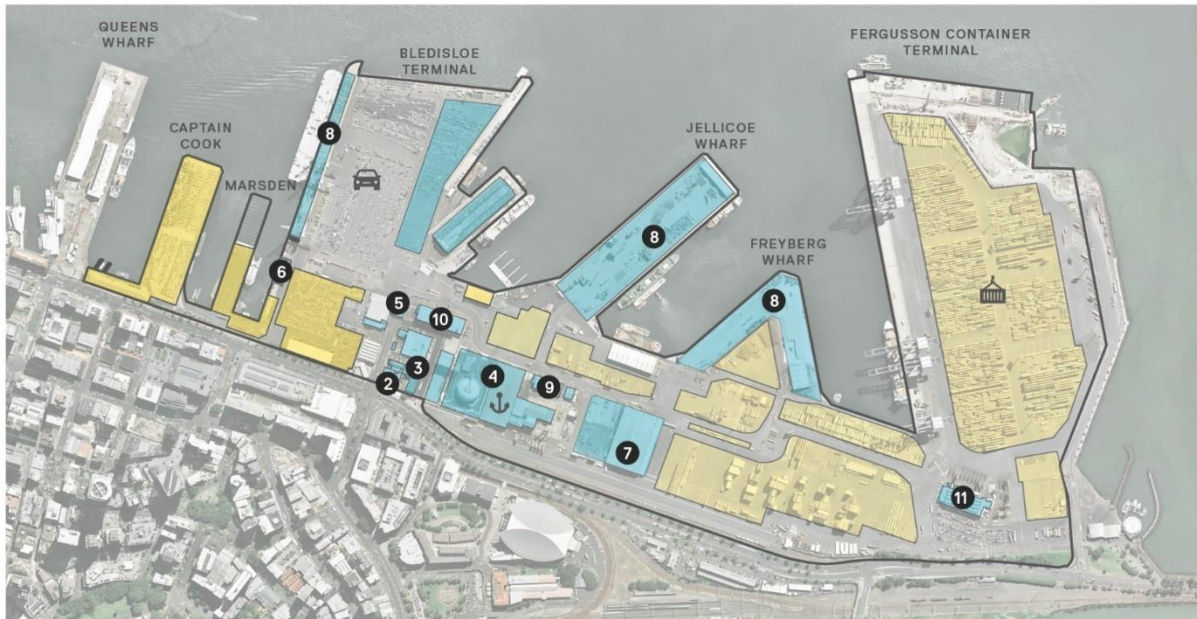
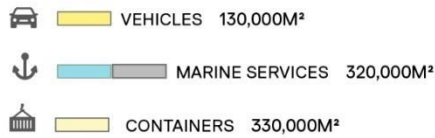


5.4 POAL Alternative Land Use Masterplan

A critical part of the Scenarios involves consideration of whether a higher and more desirable outcome (for both the NZ economy and the owners of the Ports of Auckland) could be achieved through an alternative use of the port land. Architects, Warren and Mahoney have developed a hypothetical masterplan to enable analysis of the potential economic and financial benefits to Auckland Council and the Auckland region as a whole from any potential change in use of the port land.

The current configuration of the port is shown below:

Figure 40 POAL alternative land use masterplan

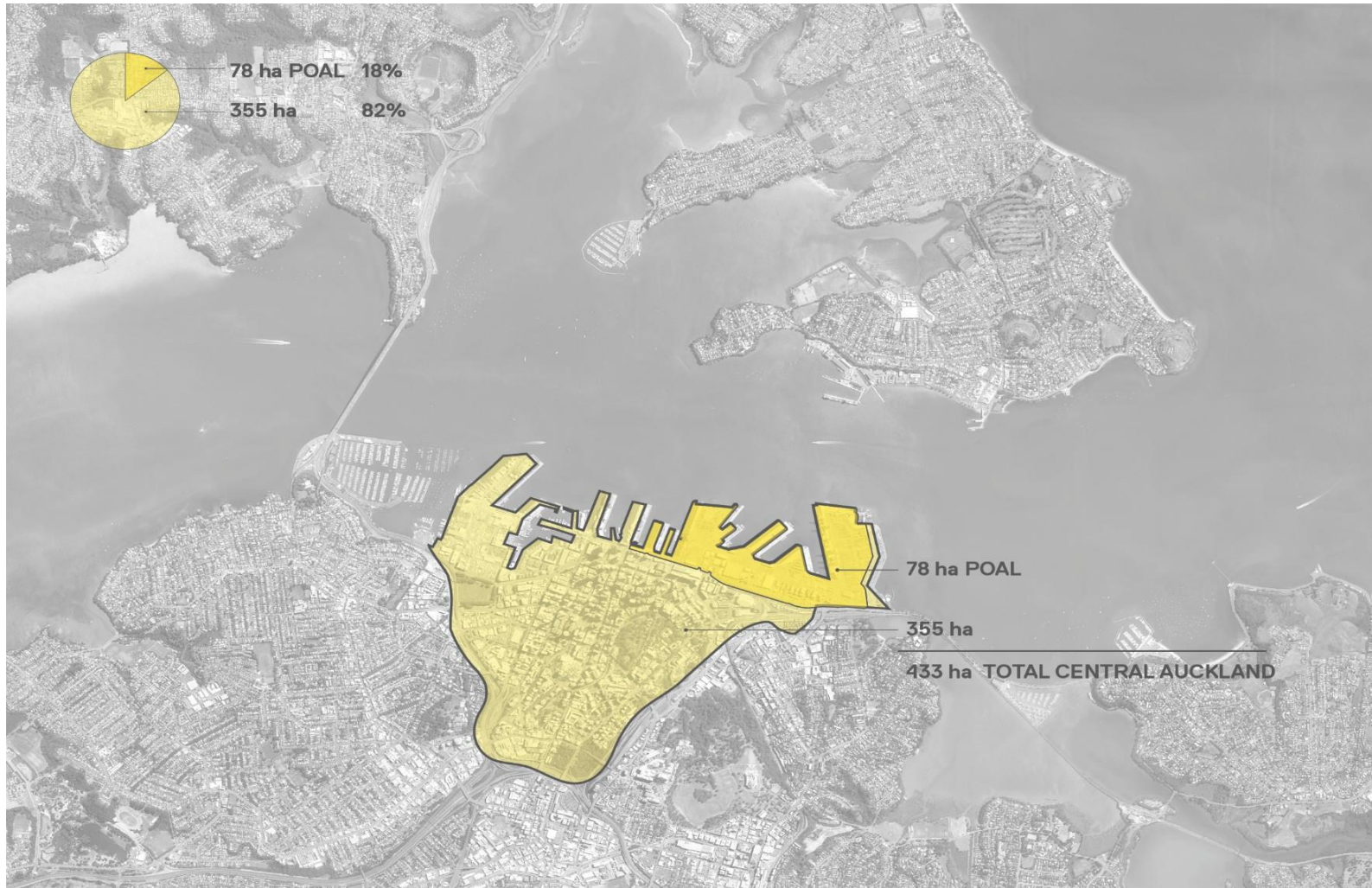


- | | |
|---|--------------------------------------|
| 1 Employment Agency/ wharf office | 6 Total Marine |
| 2 Mainfreight Port Operations | 7 Rail & Shuttle |
| 3 Auckland Electricity Power Board Building | 8 Multi cargo |
| 4 Holcim / Silo | 9 Engineering/ offices and workshops |
| 5 Security | 10 Golden Bay Cement-Silo |
| | 11 Ports of Auckland buildings |

Source: <http://POAL.maps.arcgis.com/apps/View/index.html>

The current POAL is a significant area occupying approximately 18% of the Central Auckland region and is comparable internationally in scale and context (refer to diagrams Figure 41 below). It also suggests the opportunity for alternative land use for POAL at this scale is feasible and potentially appropriate.

Figure 41 POAL current area of occupancy



of area shown below: https://en.wikipedia.org/wiki/Auckland_CBD, <https://www.ccr.org.nz/history-structure>

Source

Figure 42 Local context scale comparison (Source: Wynyard Quarter - Urban Design Framework - June 2007)



Two POAL Masterplan options (considering partially and fully decommissioned POAL for freight) have been coordinated with the anticipated growth of Auckland over a thirty-year period and the related accommodation demands for core sectors. The following diagrams summarise the projected growth for central Auckland and the estimated proportion of that growth allocated to the POAL Masterplan. The Gross Floor Area (GFA) totals in tables below show GFA yield of 200,000m² and 1,300,000m² for Option 1 and 2 respectively.

Figure 43 Scenario 1: Partially decommissioned POAL, GFA 200,000m²






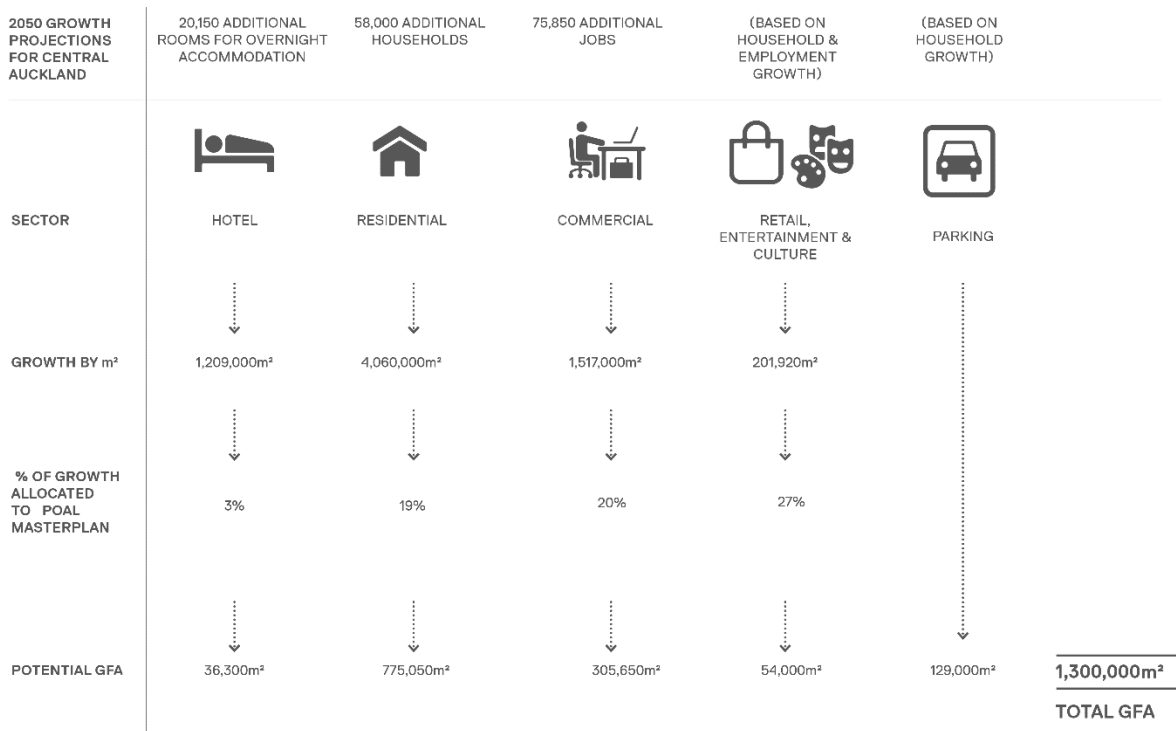
2050 GROWTH PROJECTIONS FOR CENTRAL AUCKLAND	20,150 ADDITIONAL ROOMS FOR OVERNIGHT ACCOMMODATION	58,000 ADDITIONAL HOUSEHOLDS	75,850 ADDITIONAL JOBS	(BASED ON HOUSEHOLD & EMPLOYMENT GROWTH)	(BASED ON HOUSEHOLD GROWTH)
					
SECTOR	HOTEL	RESIDENTIAL	COMMERCIAL	RETAIL, ENTERTAINMENT & CULTURE	PARKING
GROWTH BY m ²	1,209,000m ²	4,060,000m ²	1,517,000m ²	201,920m ²	
% OF GROWTH ALLOCATED TO POAL MASTERPLAN	1%	3%	3%	4%	
POTENTIAL GFA	12,100m ²	116,250m ²	45,850m ²	8,100m ²	19,350m ²
					201,650m²
					TOTAL GFA

Figure 44 Scenario 2: Fully decommissioned POAL, GFA 1,300,000m²



The Masterplan has been conceived to complement the wider urban vision for the Auckland Waterfront and the long-term ambition of creating an accessible city for all.

Figure 45: Auckland waterfront blueprint



The diagrams presented below illustrate the key concepts which underpin the Masterplan framework and its narrative. The initial step for the POAL Masterplan draws an idea of ‘declamation’ where selected areas of the port are ‘declaimed’ or restored to the harbour. The diagram directly below shows the geometric overlays of the reclamation areas over a 100-year period and these historic configurations are alluded to in the form of the ‘declaimed’ areas of the proposed Masterplan.

Figure 46 showing the history of reclamation along Auckland Waterfront (Source: The Auckland Waterfront Heritage Study – Port Development – 22 July 2011)



The two illustrated Masterplans shown below combines the six concepts coordinated with a set of broad urban design principles namely:

- ▶ An estimated spatial allocation for streets/laneways, public/open spaces, and building plots based on successful waterfront developments of similar scale
- ▶ Primary development controls determined by the Museum view shaft and floor area ratios based on anticipating future growth
- ▶ Pedestrian scaled blocks and building plots sizes framed by a street network and a hierarchy of varying widths

Figure 47 Masterplan Option 1) Port function is partially decommissioned and phased land development occurs at Western end of POAL site



Figure 48: Proportion of land plots, street and laneways & public spaces for Masterplan Option 1

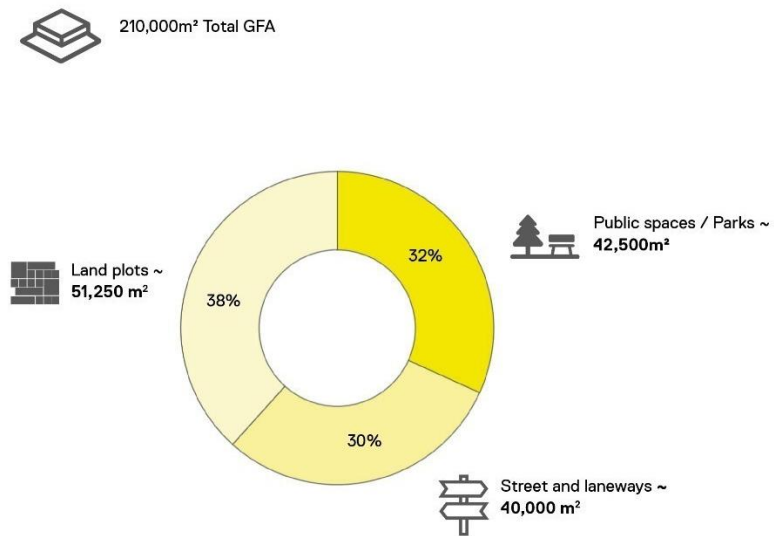
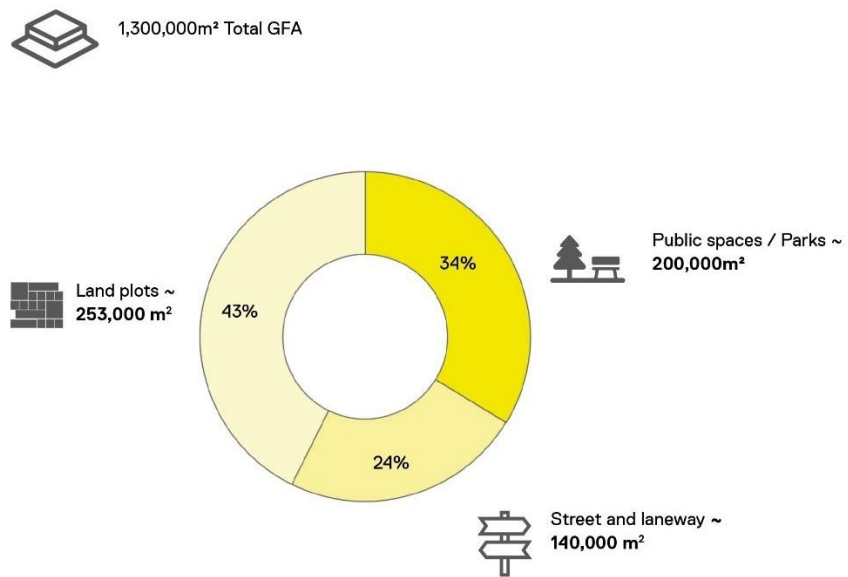


Figure 49 Masterplan Option 2) Port function is fully decommissioned



Figure 50: Proportion of land plots, street and laneways & public spaces for Masterplan Option 2



5.5 Economic Development impacts of Scenarios

Consideration of the regional economic development impacts of the Scenarios has been undertaken at a high level with the following principles:

- ▶ There is no net increase in employment as a direct result of any scenario. This is because:
 - Port investment is likely to continue to focus on progressive productivity solutions through automation. All Scenarios assume an acceleration of automation through the investment in new port capacity
 - While automation leads to a reduction in port employment, most Scenarios require additional steps in the logistics and supply chain (e.g. new inland ports and more rail). It is assumed that any employment reductions through automation at ports, is offset by employment increases in the wider supply chain. Both are, however, at the margins.
- ▶ Alternate land use at the Ports of Auckland site in terms of commercial activity will lead to an intra-regional relocation of employment in Auckland. We expect this to be a cascading effect whereby some firms would relocate from mid-town Auckland to newly available land at the waterfront, which in turn leads to movement into mid-town from the CBD fringe, and so on, until a new equilibrium is reached.
- ▶ While first-order impacts on employment are neutral, the location of employment will change in terms of logistics and supply chain jobs. It is assumed that 50% of road freight jobs will relocate over time:
 - This assumption is made on the basis that employees will locate closest to the area that they will start and finish their day, and wherever possible, take advantage of lower costs of living associated with regional New Zealand.
 - We recognise that opportunities for the spouses of road freight employees would influence this figure, but believe that a 50% relocation assumption is sufficient to account for this affect.
- ▶ The impact of the relocation on employment is based on Regional Input Output Tables, supplied by Statistics New Zealand. These tools estimate the output, value added and employment multipliers associated with economic activity in Northland.
- ▶ In addition to port staff and driver salaries, the other source of economic stimulus considered is capital investment in port and transport infrastructure. A full move to Northport, for example, involves over \$3.5 billion over the next 30 years, with significant implications for heavy and civil engineering construction firms.

6. Results

Evaluation of the Scenarios has been focussed on a mixed approach of qualitative and quantitative analysis. The qualitative analysis has been focussed on a best-practice Multi criteria Analysis (MCA), which contributed to the shortlisting of the Scenarios, but also enabled discussion of qualitative aspects of the Scenarios, not adequately captured by the quantitative cost benefit analysis (CBA).

A CBA has been undertaken to assess the quantitative impacts of the Scenarios.

This is in accordance with the NZ Transport Agency Economic Evaluation Manual, which enables the analysis to be integrated with other critical and complementary analysis, in particular the recent business case for the NAL.

In addition to the above approach, the flow on economic development impacts, with a focus on the regions is also included

Examples of the considerations to be explored within Cost Benefit Analysis:

Table 6: Impact Considerations for Cost Benefits Analysis

	Category	Form of Assessment	Scenario
Direct Impacts	Benefits	Quantitative	Port revenues
	Costs	Quantitative	Port operating costs
Indirect Impacts	Transport infrastructure	Quantitative	Costs of additional road and rail infrastructure
	Freight operators	Quantitative	Cost to freight operators of meeting the additional trade task
	Transport users	Quantitative	The impact of congestion from additional trucks on the road
	Land use benefits	Quantitative	Land value of the old port site in highest and best use
	Land use costs	Quantitative and Qualitative	The impact of intensified port operations on surrounding residential areas; opportunity cost of land at Port (alternate land use)
	Wider economic benefits (WEBs)	Quantitative	Agglomeration impacts - the impact of economic density at new port site and from redevelopment at previous port site
	Environment	Quantitative and Qualitative	The impact on the environment of port operations
Social Impacts	Qualitative	Impact on liveability, employment, public access, recreational use, and community health and wellbeing at both new port site and existing port site, as a result of port moving to a new location	

A critical feature of the CBA is the deployment of the new procedure around Wider Economic Benefits, and in particular, the land value uplift from alternative land use at the Port of Auckland site.

6.1 Cost Benefit Analysis (CBA)

The results of the benefit cost analysis that assessed all Scenarios are as follows:

Table 7: Summary results - Relative to Base Case, Net Present Value, \$ million nominal terms

	Scenario 2.1 - Full Move to Northport	Scenario 2.2 - Full Move to Tauranga	Scenario 2.3 - Full Move to Firth of Thames	Scenario 2.4 - Full Move to Northport & Tauranga
Total Costs	1,776	3,526	3,417	3,370
Total Benefits	3,464	362	553	1,913
Net Benefits	1,688	-3,164	-2,864	-1,457
Benefit Cost Ratio	2.0	0.1	0.2	0.6

The analysis summarises a set of complex interactions. In essence:

- ▶ A lengthening of the logistics and supply chain applies to all options. This is reflected in increased transport costs for users and consumers of products. This is combined with environmental impacts and the capital costs of additional infrastructure.
 - All Scenarios increase transport costs and environmental impacts relative to the Base Case
- ▶ These costs are offset by two critical dynamics that are mutually inclusive:
 - The deferral or elimination of infrastructure costs associated with ensuring the medium to long-term operability of a logistics and supply chain that relies on a central Auckland location. This is both land-side investments and port investments.
 - The application of a different land use to the parts of the Ports of Auckland footprint that are made available.

As such, these outcomes highly dependent on freight forwarder port preference, mode choice and alternative land use

The Scenarios are premised on providing infrastructure to support alternative freight movements and the modelling critically assumes that the majority of freight will follow the enabling investment.

Neither the consultant team, nor the Working Group have assumed the ability to “direct” freight forwarder preferences for ports.

The modelling is extremely sensitive to mode choice. In particular, it is assumed that 70% of the “Full Move to Northland” freight task is covered by rail. This substantially drops the economic impact of the significant lengthening of the logistics and supply chain.

The Working Group took a pragmatic approach towards determine the mode split. In particular the working assumption is the same amount of Vehicle Kilometres from the trucking sector will apply. However, the key freight and logistics hubs are further away, so fewer (but longer) truck trips are made compared to the Base Case. The working assumption is that road will continue to handle the most time-sensitive goods, but with a fixed number of trucks able to undertake fewer journeys, rail’s net timeliness significantly improves, and will manage the majority of the key trips to the main inland hubs.

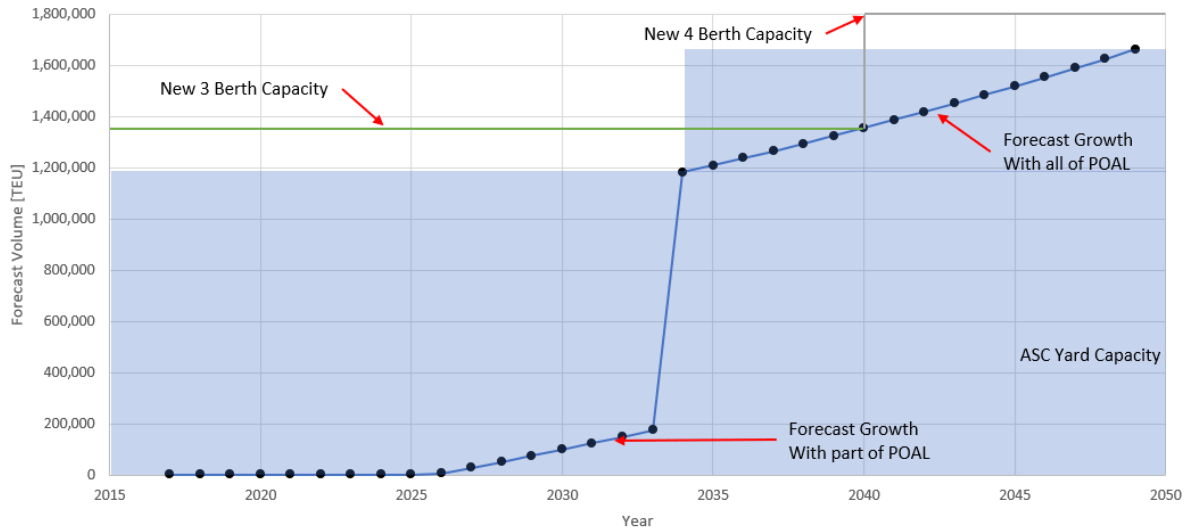
Lastly, the Scenarios are reliant on the ability of the alternate land use for the POAL site to deliver value to the ratepayer and the city. This will be a function of the commercial strategy adopted in terms of any port move, the release of land, the decisions made on how the land will be development, and the market demand at the time.

The Partial Move Scenarios also delivered benefit cost ratios above 1 at 6.8 (Northport) and 4.1 (Tauranga) respectively. A Partial Move scenario demonstrates a value as a potential interim approach to a Full Move scenario. It could have also been considered, should a Full Move scenario not deliver a viable benefit cost ratio (which Scenario 2.1 does).

6.2 Technical outcomes

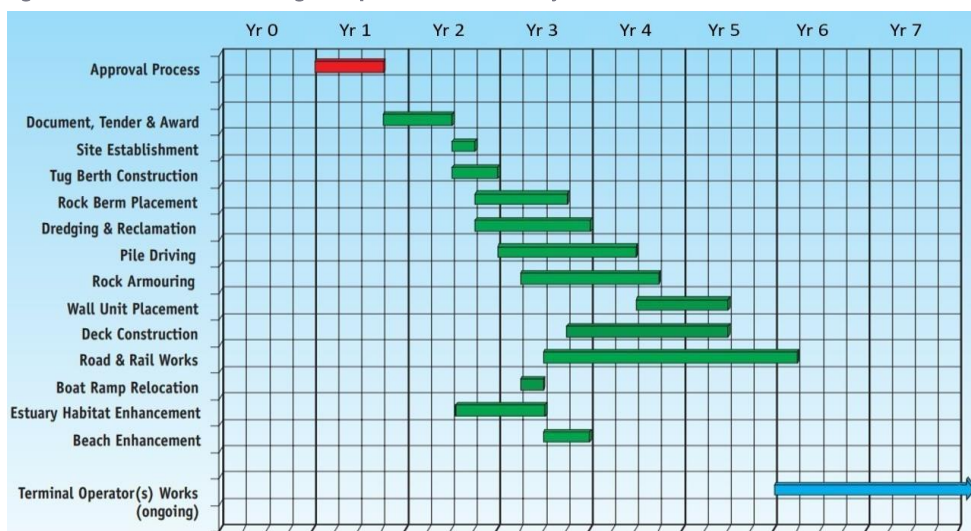
At a high level the assessment showed that development of significant capacity increases at POT (above already forecasted growth) would be difficult. The scenario where it is assumed that all the freight currently coming through POAL was instead assumed to come through Northport appeared more promising. The expected volumes compared to planned capacity (assuming investment) are shown in the figure below.

Figure 51: Forecast container growth with terminal limitations - Northport



It is estimated that the cost to develop Northport to this extent would be in the order of \$1.35B over the next 30 years. Based on benchmarking similar developments around Australasia, the development required could be undertaken within the next 15 years if desired, and in fact depending on the time for approvals the work could be complete within 7 years, as shown in the figure below.

Figure 52: Australasian benchmarking developments between 7 to 15 years.



Taking the above into account, and considering the strategic direction being developed by the Working Group, the following are drawn:

- ▶ It should be recognised that a hard constraint will be reached in the ability to move freight by road or rail to and from POAL, and therefore its 'capacity' will be reached, and freight will have to go elsewhere.
- ▶ Given the above, any investment in improving productivity inside POAL should be carefully scrutinised against the probable longevity of the port operations.
- ▶ If it was decided that the strategy (among other things) was to develop Northport and the associated land transport networks to connect it to Auckland and the rest of the country, then it would be prudent to develop Northport at a scale and in a timeframe that would avoid the estimated \$500M to be spent prior to 2026 to implement automation at POAL.
- ▶ It would be possible to transition in stages, by closing POAL to cars first, and then gradually implementing changes for containers and bulk commodities. A detailed transition plan would need to be developed.

6.3 Other Qualitative Impacts

It is considered that the multicriteria analysis provides a sound proxy for the qualitative benefits in particular the impact of the options is as follows:

Table 8: Qualitative Impacts Table

Description	Economic	Environmental	Social	Cultural
Base Case				
<ul style="list-style-type: none"> ▶ The Base Case allows for POAL to increase capacity and efficiency in its current area through technological advances, but does not allow for any expansion via land reclamation other than the reclamation that has already been consented. 	<ul style="list-style-type: none"> ▶ A significant additional port investment, with supporting land-side infrastructure, outside of the current POAL footprint will need to be made to take all of Auckland's marginal freight growth over and above any capacity cap. ▶ There are growing impacts on local transport network, particularly road congestion 	<ul style="list-style-type: none"> ▶ No change to coastal processes as port maintains the same footprint. ▶ Impact on Auckland Harbour traffic will remain the same, albeit with an increased number of vessels. ▶ No additional impact on marine ecology. ▶ As throughput increases, a steady increase in carbon footprint over time is anticipated. ▶ Increased noise effects may occur in line with throughput increases and in particular additional machinery, equipment and truck movements. 	<ul style="list-style-type: none"> ▶ No opportunities for enhanced public access to the waterfront and local recreation. ▶ There will be a negative impact on the quality of urban form and design for Auckland as a growing city that has emphasis around its waterfront. As a result, Auckland's reputation as the "most liveable city in the world" is negatively impacted. 	<ul style="list-style-type: none"> ▶ There remain outstanding Treaty of Waitangi questions concerning title, foreshore and harbour management and the appropriate recognition of rights and responsibilities stemming from the interests and relationships held by mana whenua iwi. Resolving these questions are extant matters for consideration as part of the Waitematā harbour settlements.
Description	Economic	Environmental	Social	Cultural

Scenario 1.1 & 1.2 - Partial Move (Cars Only) - Northport and Tauranga Respectively

- ▶ A Partial Move involves movement of the car import facilities to either Northport or the POT (POT). These Scenarios also involve investment in Northport and / or Taranga transport infrastructure in order to support a new supply chain model for the UNI, in line with design principles.
 - ▶ Tauranga already has major congestion issues, this may worsen with this Partial Move of cars to POT as it involves more freight travel (due to distance) and road congestion (due to mode share). In comparison to POT, Northport has less freight travel and road congestion.
 - ▶ Marginal improved effects on biodiversity for both Northport and POT.
 - ▶ There will be amenity benefits for these transferred workers if Northport or Tauranga provides an improved lifestyle and better access to affordable housing.
 - ▶ No Cultural impact for both Northport and POT.
-

Description	Economic	Environmental	Social	Cultural
Scenario 2.1 – Northport, Full Move				
<ul style="list-style-type: none"> ▶ A Full Move to Northport entails moving the entire operations from POAL to Northport (except cruise ships). This scenario also assumes a very large mode shift towards rail. 	<ul style="list-style-type: none"> ▶ Northport has the potential to be a catalyst for economic development across Northland, delivering direct and indirect benefits to the local area, industries and communities. Available industrial land near the new Northport site could be used to develop industrial parks and production facilities, stimulating additional economic growth in the local area. ▶ An upgraded NAL means that local businesses within the region have easier and faster access to regional, inter-regional, and international markets. 	<ul style="list-style-type: none"> ▶ GHG emissions are decreased by diverting road freight from Northland to Auckland roads onto rail. ▶ Given the rural nature of Northland, noise pollution would be minimal. Redeveloping the POAL site would create significant improvements for the Auckland environment. Rail freight causes less noise pollution than road as rail freight can be consolidated to operate less frequently (due to higher per trip capacity). 	<ul style="list-style-type: none"> ▶ Promote employment opportunities for Northport where there will be demand for a skilled logistics workforce. ▶ An improved rail line could bring cruise ship passengers docked in Auckland further north, improving their experience and bringing money to Northland. 	<ul style="list-style-type: none"> ▶ Investment in Northland infrastructure would have a positive cultural impact as this will support Māori enterprises across forestry, agriculture and fishing sectors, as well health and community services.

Description	Economic	Environmental	Social	Cultural
Scenario 2.2 – POT, Full Move				
<ul style="list-style-type: none"> ▶ A Full Move to Tauranga entails moving the entire operation of POAL to POT, with the exception of except cruise ship facilities 	<ul style="list-style-type: none"> ▶ Investment is required in the land-side infrastructure to address the significantly increased freight volumes through the Bay of Plenty, Waikato and South Auckland. ▶ Tauranga already has major congestion issues, this is likely to worsen under this Full Move to POT 	<ul style="list-style-type: none"> ▶ Increased freight movement will result in increased dredging activities and hence adverse impact on the biodiversity environment. 	<ul style="list-style-type: none"> ▶ Promote employment opportunities for POT where there will be demand for a skilled logistics workforce. ▶ The movement of freight operations to POT will result in increased stress on the existing social infrastructures of Tauranga such as hospitals, housing etc. and therefore this may result in an unplanned expansion of the city; 	<ul style="list-style-type: none"> ▶ The three iwi groups of Tauranga Moana (Tauranga Harbour): Ngāti Ranginui, Ngāi Te Rangī and Ngāti Pūkenga may have concerns due to implications for treaty settlements within the area. ▶ A Full Move to POT would involve upgrades to the Kaimai Tunnel, which is in close proximity to land of cultural significance to Ngāti Hinerangi. This upgrade of the Kaimai Tunnel is likely to cause further distress for the iwi and hapū of the Ngāti Hinerangi. The Kaimai tunnel is in close proximity to Māori land which is of great cultural significant to Ngāti Hinerangi.

Description	Economic	Environmental	Social	Cultural
Scenario 2.4: Build a super new port in a new location – Firth of Thames				
<ul style="list-style-type: none"> ▶ A Full Move of freight operations from POAL to a new port in the Firth of Thames (except cruise ships). 	<ul style="list-style-type: none"> ▶ A new port could open up land for development and have negative impacts on road freight. However these benefits are outweighed by the capital costs and land-side road & rail link costs associated with a brand-new port which are significantly higher than all alternative Scenarios. 	<ul style="list-style-type: none"> ▶ Gaining resource consent will be a significant challenge. Any development would require a coastal permit, with consideration of the impacts of reclaiming part of the foreshore or seabed, constructing a structure in, on, under, or over any foreshore or seabed, disturbing the seabed (e.g. by excavation or dredging) and the occupation of part of the common marine and coastal area. ▶ A new Port in the Firth of Thames would potentially result in a slightly increased carbon footprint. Whilst accessible to SH1 and the south and east of the North Island, the travel distance from SH1 to the ports landside activities increases emissions from heavy vehicle travel. 	<ul style="list-style-type: none"> ▶ The social impacts of a new port within the Firth of Thames would need to be comprehensively assessed as part of a Social Impact Assessment, should this option be carried forward for further evaluation. The effect on amenity of communities that overlook the proposed site and those who are affected by the rail and road access corridors through the Clevedon valley would need to be a key focus of any assessment. 	<ul style="list-style-type: none"> ▶ There are a number of mana whenua iwi who hold interests in the Hauraki Gulf and would consider themselves affected by a new port being built in the Firth of Thames including the members of the Marutuahu confederation of iwi and Waikato Tainui. ▶ The Hauraki Gulf area holds significant historical, cultural and spiritual meaning for tangata whenua within the area. The proposed Firth of Thames sites will have an impact on the tangata whenua relationship to the Hauraki Gulf. This impact will require consideration.

6.4 Financial offset of dividends from the Ports of Auckland

The benefit cost analysis, as noted above, includes a high-level analysis of the alternative land use for the Ports of Auckland site. This is focussed on a benchmark annual rate of return expected for the mixed use commercial and residential gross floor area. This includes the impact of rates and leasehold income from the POAL site.

A critical consideration in terms of any move is, however, the potential financial impact on the owners of the Ports of Auckland, and whether any alternative land use leaves the Auckland Council, and Auckland ratepayers better, or worse off as a result of decreased dividends from the POAL.

A first consideration is that under all Scenarios, POAL continues to operate, but it transitions its focus to the cruise industry and associated servicing. As such, there is still the potential for POAL to provide a financially sustainable, albeit smaller operation on the Waitemata. A secondary consideration is that POAL's shareholding in Marsden Maritime Holdings, their landholdings around Northport, and their ownership of the Northport tug operation, position them to offset lost income at the POAL site on Scenarios that expand Northport.

A forecast of these ongoing income streams, relative to the current POAL dividend has not been undertaken.

What has been assessed is the potential for Council income through rates and leases as a result of more intensive commercial and residential activity on the POAL site to offset the POAL dividend.

It is assumed that Auckland Council would take a similar approach to the POAL site as they have with the Wynyard Quarter, namely maintaining the land in public ownership, but operating 120 year leases. The results are as follows:

Table 9: Potential developments at POAL site annually

	Dividend	Alternative rates income	Alternative leasehold income	Net annual financial benefit/(loss) to ratepayers
No Move	\$50m	N/A	N/A	N/A
Partial Move	\$40m	\$7m	\$13m	N/A ⁴⁰
Full Move	\$10m ⁴¹	\$42m	\$56m	\$48m

6.5 Regional Economic Development

The Regional Economic Development impacts are discussed in the Scenario section in terms of the approach.

The potential wider economic impact of reorienting the logistics and supply chain is derived principally from additional investment in land-side freight handling (e.g. new inland ports and warehousing). As we note in previous sections, changes in employment at the ports themselves are unlikely to be material, given the long-term shift towards automation.

The wider economic impacts also include with the net economic impact of a minor relocation of existing employment, where the differential impact on a smaller economy such as Northland is greater than the corresponding offset in a much larger economy such as Auckland.

An input-output analysis of the potential changes finds that reorientation of the logistics and supply chain that involves a refocusing on Northland results in an additional \$200m to the Northland economy over 30 years (discounted NPV) in direct, indirect and induced economic impacts. This results in around 2,000 additional sustained jobs (i.e. not employment associated with the construction of the required infrastructure).

⁴⁰ Proportionate reduction in dividend income from a partial move has not been calculated due to the large number of variables and commercial information required from POAL to enable this assessment.

⁴¹ POAL borrowings were approximately \$75m in 2019

6.6 Conclusion

The scenarios are premised on providing infrastructure to support efficient freight movements. The modelling assumes that the majority of freight will respond to the enabling investment due to improved reliability and reduced cost. Neither the consultant team, nor the Working Group have assumed the ability to “direct” freight forwarder preferences for ports.

The modelling of a “Full Move” to Northport, with associated land-side investment requirements, results in a benefit cost ratio of 2.0. The “Full Move” scenario with POAL freight flows shared between Tauranga and Northport does not generate positive net economic benefits, mainly due to the significantly higher land-side infrastructure investment required in the Bay of Plenty.

The benefits of the Partial and Full Move scenarios are reliant on the ability of alternate land use at the POAL site to deliver value to Auckland ratepayers. This will be a function of the commercial strategy adopted to support the port move, the approach to releasing land, the decisions made on how the land will be developed and market demand at the time.

7. Appendix A - MCA Criteria and Scoring Scale

A Multi-Criteria Analysis (MCA) tool is used to show decision-makers how a project aligns in with the defined objectives. This enables a consistent analysis of the opportunities and constraints on a qualitative basis for a group of Scenarios. These scored Scenarios against the predetermined criteria will then have a weighting applied to them that reflect the priorities of the project, and a scenario ranking will be formed. The MCA is to be used as one of a catalogue of tools as part of the decision-making process. For example, a Cost Benefit Analysis (CBA) of the Scenarios was also undertaken to consider the wider economic impacts in the decision-making process.

For the Upper North Island Supply Chain Strategy (UNISCS) project, an MCA was developed and used to appraise and rank each of the Scenarios which have been outlined in Section 5 – Scenario Descriptions.

Assessing the relative merits of each scenario against non-monetary values allows for consideration of a range of social, cultural and environmental impacts, including those difficult to capture within a standard CBA. An MCA also helps differentiate between options that have similar capital costs.

The MCA evaluation criteria were developed with the Working Group based on the design principles outlined in Section 2 – Approach to Analysis. This considered their knowledge of the Upper North Island (UNI), the effectiveness of the UNISC and opportunities for economic development in the region. As well as this, there was also included consideration of contemporary research such as the results of a Colmar Brunton survey commissioned by the Working Group earlier this year (2019). The MCA criteria and weightings are summarised as follows:

Table 10: MCA Components and Weightings

MCA Criteria Group	Component	Weighting
Economic	<ul style="list-style-type: none"> ▶ Employment opportunities ▶ Investment returns ▶ Congestion, reliability and friction between modes ▶ Supply chain resilience 	40%
Social	<ul style="list-style-type: none"> ▶ Public amenity and friction between infrastructure users ▶ Attractiveness for visitors, residents and workers ▶ Quality of urban form and design 	20%
Cultural	<ul style="list-style-type: none"> ▶ Support for iwi, hapu and other cultural values ▶ Consistency with the Principles of the Treaty of Waitangi ▶ Contribution to Treaty Settlements (current and future) 	20%
Environmental	<ul style="list-style-type: none"> ▶ Marine and land pollution ▶ Noise and visual pollution ▶ Contribution to climate change objectives (e.g. Greenhouse Gas Emissions) ▶ Sensitive environmental areas (e.g. protected biodiversity) 	20%

A five-point scoring scale (+2 to -2) agreed with the working group was applied to the Scenarios.

Each score from the MCA assesses how outcomes would change by the end of the analysis period, relative to today. For the base case, this compared the status quo to potential outcomes at the end of the assessment period (2050). The Scenarios were scored based on both the effect on the current port location (POAL), and the new port location over the same time period.

For example, within Scenario 1.1 (Northport – Partial Move), the Base Case Supply Chain Resilience is expected to be a major challenge in the future and has thus been scored -2. If Scenario 1.1 is implemented the negative effect of this will be lessened, but will still be worse in absolute terms relative to present operation, and therefore has been scored -1.

The effect on the new proposed locations in the different Scenarios was assessed comparatively to the current situation at these locations. For example, using Scenario 1.1 again, the proposed option will result in an increase in Supply Chain

Resilience by 2050 when compared to the existing. This is due to the proposed improvements, and thus has been given a score of +1.

The rationale for scores against the Base Case is summarised in Table 11.

Once the assessment against the criteria was complete, the scores were then aggregated to provide a final (ranked) score of between +2 and -2.

Table 11: Rationale for Scoring

-2	-1	0	1	2
Significant decrease on existing performance at end of analysis period.	Decreased on existing performance at end of analysis period.	Compared to existing (2020) performance, the criteria maintain a similar performance at the location at the next of the analysis period (2050).	Improvement on existing performance at end of analysis period.	Significant improvement on existing performance at end of analysis period.

The following assumptions were used during the MCA scoring:

- ▶ The Analysis period is 2020 – 2050
- ▶ As explained above, the analysis sought to capture absolute impacts, as opposed to performance relative to the base case. Each score assesses how outcomes would change by the end of the analysis period, relative to today
- ▶ The full move Scenarios assume a new rail package, realistic level of investment in local infrastructure and redevelopment of Auckland Port. More detail can be found in [Section 5] of the report.
- ▶ Criteria groupings (e.g. economic, environmental) have been applied to account for overlap between individual criteria
- ▶ Capital costs were not taken into consideration for the MCA analysis, instead forming part of the Benefit Cost Ratio (BCR) calculations within the CBA, which feeds into the results alignment section below.

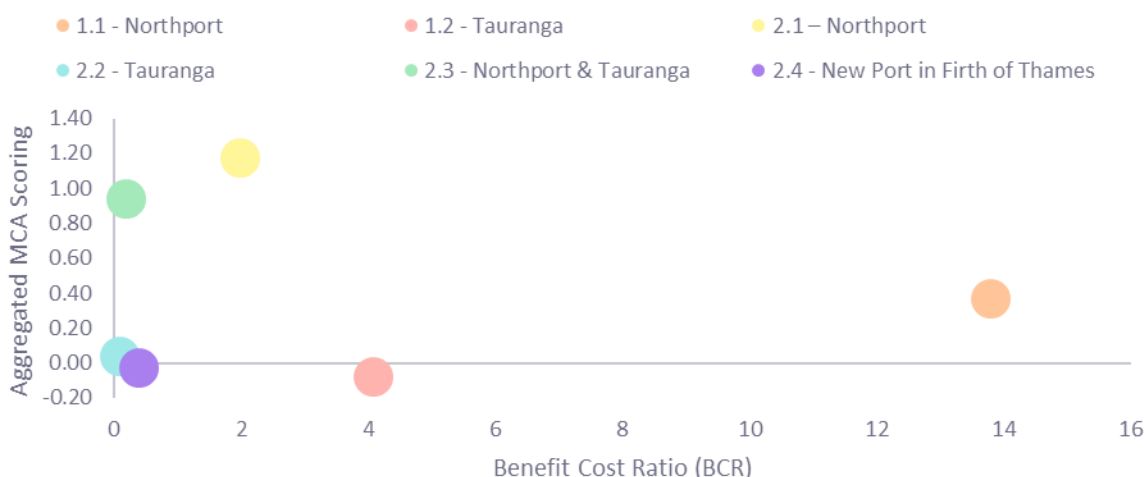
Output from MCA scoring

The output of the Longlist assessment is shown in Section 5.2.1 Multi Criteria Analysis. The values shown in this section are based on an output from the aggregated scoring against the criteria (+2/-2).

Results Alignment

High level costings and BCRs were produced for each of the shortlisted options to build on the existing qualitative analysis. From this, a results alignment assessment could be undertaken, which looks at both the effectiveness of the proposal against the defined criteria, and the BCR. This is presented in Figure 53, and from this a preferred option can be justified.

Figure 53 Results Alignment



Sensitivity Analysis

To ensure the assessment is robust, sensitivity analysis was undertaken. For this, three sensitivities were tested looking at different weightings for the criteria groups. These can be summarised as follows:

- ▶ Base Weighting – The agreed weightings defined with the working group, prioritising economic impact
- ▶ High Prioritisation Approach – Additional weighting applied to economic impact
- ▶ Neutral Approach – No prioritisation of criterion.

The weightings are summarised in Table 12, with the results of the assessment (ranking) shown in Table 13. To differentiate between similar scoring options, an eight-tier scoring system was applied to the aggregated scores.

Table 12: Criteria group weightings for sensitivity analysis

	Economic Impact	Social Impact	Cultural Impact	Environmental Impact
Base Weightings	40%	20%	20%	20%
High Prioritisation Approach	70%	10%	10%	10%
Neutral Approach	25%	25%	25%	25%

Table 13: Sensitivity analysis results

	Base Case (Status Quo)	1.1 - Northport	1.2 - Tauranga	2.1 - Northport	2.2 - Tauranga	2.3 - Northport & Tauranga	2.4 - New Port in Firth of Thames
Base Weighting	7	3	6	1	5	2	4
High Prioritisation Approach	7	4	6	1	5	2	3
Neutral Approach	7	3	6	1	4	2	5

8. Appendix B - Base Case Cost Tables

Table 14: Base Case 2034

BASE CASE 2034		
RAIL		
Significant investments/developments	Costs (\$M)	Comment
Limited NAL upgrade	\$200	Assumed half of the line upgrade cost from the NAL business case
TOTAL	\$ 200	
ROAD		
Significant investments/programmes	Costs (\$M)	Comment
No significant capacity increases to SH1 between Central Motorway Junction and Puhoi		
Completion of Puhoi to Warkworth		Costs already expended
Various planned safety improvements SH1 - Wellsford-Warkworth, Brynderwyn Hills, Whangarei (6 minor projects)	\$ 135	From NZTA Whangarei to Auckland Programme Business Case
Allowance for further safety improvements on SH1 North Auckland that are not current programmed	\$ 200	Assume \$20M/yr for 10 years for entire corridor
Completion of Waikato Expressway		Already committed
Manukau - Papakura Widening		Already committed
Papakura - Bombay Widening	\$ 450	Estimate - approximately 20km of widening
Mill Road Stage 1	\$ 500	Estimate - approximately 9km, multi-modal corridor. Will take pressure of SH1
No significant improvements SH2 Auckland - Tauranga or SH 27.		
SH29 Corridor, early stages of Tauriko Network Plan	\$ 200	Estimate - approx 30% off total planned \$650M spend over 30 years from NZTA Programme Business Case
Allowance for limited safety improvements SH29	\$ 200	Assume \$20M/yr for 10 years for corridor
TOTAL	\$ 1,685	

Table 15: Base Case 2049

BASE CASE 2049		
RAIL		
Significant investments/developments	Costs (\$M)	Comment
TOTAL	\$ -	
ROAD		
Significant investments/programmes	Costs (\$M)	Comment
No significant upgrades expected in/around the Port		ATAP notes the sensitivity of the area and likely high costs
Various ATAP Future Priorities - Upgrade to SH16/SH18 interchange, Capacity upgrades on outer part of the motorway network, New strategic roads to Kumeu and Pukekohe (investigations to be undertaken to protect corridors – no costs available), Mill Road (Phase 2)	\$ 2,000	Cost estimates, if available at all, are very high level. Very high level estimate
East West Link	\$ 800	While not programmed, likely to come at end of period. Cost estimate for 'reduced scope' option from ATAP
Various upgrades SH1 North Auckland/Northland, in particular Brynderwyn western bypass, improvements to Te Hana, Toetoe-Oakleigh	\$ 1,200	Estimate of \$880M - \$1.43B from NZTA programme business case
Estimated SH29 upgrades - mainly alignment improvements over Kaimais and improvements of intersections with SHs 24, 27 and 28	\$ 400	Estimate from SH29 Piarere to Tauriko Programme Business Case, with programme of \$325-\$530M over 30 years
Balance of Tauriko Upgrade Package	\$ 450	Balance from Tauriko Network Programme Business Case
TOTAL	\$ 4,850	

Table 16 & Table 17 shows that until 2049 over \$1B in capital costs is forecasted for development of POAL.

Table 16: Port of Auckland Base case 2034

	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3	-	\$ -
	Reclamation	m3	0	\$ -
	Quay Wall	m	-	\$ -
	Rail		0	\$ -
Container Facilities	Pavement and utilities	Ha	23.1	\$ 154,310,000.00
	Quay Cranes	ea	4	\$ 105,600,000
	ASC	ea	14	\$ 369,600,000
	AutoStrad	ea	0	\$ -
				\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
			Total	\$ 629,510,000

Table 17: Port of Auckland Base Case 2049

	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3		\$ -
	Reclamation	m3	0	\$ -
	Quay Wall	m	300	\$ 100,200,000
Container Facilities	Pavement and utilities	Ha	9.5	\$ 63,460,000
	Quay Cranes	ea	4	\$ 105,600,000
	ASC	ea	6	\$ 158,400,000
	AutoStrad	ea	0	\$ -
				\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
			Total	\$ 427,660,000

Table 18 & Table 19 shows that until 2049 over \$1.7B in capital costs is forecasted for development of POT.

Table 18: Taranga Base Case 2034

	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3	334,400	\$ 13,960,000
	Reclamation	m3	0	
	Quay Wall	m	380	\$ 126,920,000
	Rail		0	
Container Facilities	Pavement and utilities	Ha	32.3	\$ 215,760,000
	Quay Cranes	ea	6	\$ 158,400,000
	ASC	ea	20	\$ 528,000,000
	AutoStrad	ea	0	\$ -
				\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
			Total	\$ 1,043,040,000

Table 19: Tauranga Base Case 2049

	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3	750,000	\$ 31,310,000
	Reclamation	m3	0	
	Quay Wall	m	460	\$ 153,640,000
Container Facilities	Pavement and utilities	Ha	14.5	\$ 96,860,000
	Quay Cranes	ea	6	\$ 158,400,000
	ASC	ea	9	\$ 237,600,000
	AutoStrad	ea	0	\$ -
				\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
			Total	\$ 677,810,000