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Sent: Wednesday, 3 July 2019 3:22 PM
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Subject: UNI Ports Report - DRAFT MASTER v18 COPY TO USE.docx
Attachments: UNI Ports Report - DRAFT MASTER v18 COPY TO USE.docx

Hi Wayne

Attached is a work in progress draft. Wanted to share as soon as we had a degree of confidence in the numbers and have the core conclusions available.

We still have more content to go in the next couple of days – so it is possible the numbers may move around a little. We have the usual differing views between QS's and architects on costs and hope to bottom them out tonight. We will also have the wider economic impacts available tomorrow, which will materially add to the Northport option.

The basic result is we get very large benefit cost ratios for the partial move a BCR of 25 for partial move to Northport and 15 to TGA. The full move to Northport generates a BCR of 2.7. No other full move option generates a positive BCR – we actually ended up running the full BCRs for the full TGA move and the Superport. Full move to TGA is 0.3 and Superport is 0.2..

There are two key drivers of the results:

- The avoided costs of developing Auckland (land side and port side) are really critical to the results, especially when combined with the alternate land use
- Mode choice is critical. We are running at 70% rail for the Northport options. If we just used current mode splits as per POAL, the BCR wouldn't get close to 1

Happy to discuss

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Economic Analysis of Upper North Island Supply Chain Scenarios

DRAFT

3 July 2019

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Transmittal letter

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Executive Summary

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

In May 2019 the Ministry of Transport appointed a consortium led by Ernst & Young Limited (EY) to perform an economic evaluation of potential UNI port configurations. This report examines a range of potential scenarios for 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 (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 can either be referred to as the "UNISCS Working Group" or the "Working Group".

The Working Group is entrusted with the responsibility of developing a plan for an efficient freight network (ports, land and rail and road networks) for the UNI region that will deliver the best long-term outcomes for New Zealand. The planning will focus on designing an efficient supply chain network to ensure smooth movement of cargo and containers across the regions. Additionally, the Working Group is tasked with assessing the existing landside network infrastructure (rail, roads, and inland freight terminals), potential upgrades and new infrastructure requirements as well as optimising land use to ensure greater returns to all the stakeholders, particularly the government and the community.

In pursuit of its objectives, the Working Group has come up with a three-stage approach, at the end of which the Working Group intends to submit a comprehensive recommendation to the government for a holistic development of the UNI supply chain network, this also includes the socio-economic impact of the UNI region. This report is one sub-part of one stage of the three-stage approach where the Working Group seeks to assess the development of UNI supply chain (UNISC) scenarios as well as undertake an economic evaluation of those supply chain scenarios.

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

This report uses a conventional economic assessment, using a combination of multicriteria analysis (to help shortlist options and identify non-monetisable impacts) and benefit cost 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 approach uses a combination of a bespoke model built for this study, and EY's existing multimodal freight model, which has been used regularly by the Ministry of Transport, NZTA and KiwiRail in the last few years.

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

Scenarios have been developed looking at a combination of 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 the one of the most critical and fixed origins and destinations for freight in the region.

The use of scenarios, as distinct from options, is also critical. The purpose of this study is to evaluate a high level the potential different outcomes that could be achieved for the UNI supply chain. 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.**

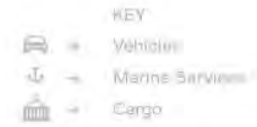
Scenarios were developed that offer a mix of:

- ▶ **Ports:** Consideration have been given to Northport, Port of Tauranga, a combination of both and potentially a "Super 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 Move of the Ports of Auckland. Within each of these headline scenarios, different locations were considered, as shown in the diagram below:

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OPTION SUMMARY



EXISTING CONDITION

NO INTERVENTION

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

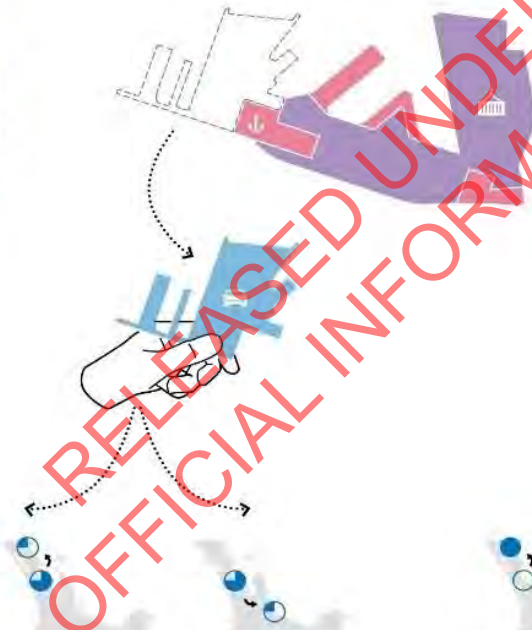


EXISTING CONDITION
Auckland

OPTION 1

PARTIAL INTERVENTION

- Establish port alternative location
- Partial removal of port functions (probably at western end)
- Phased POA land development at Western end



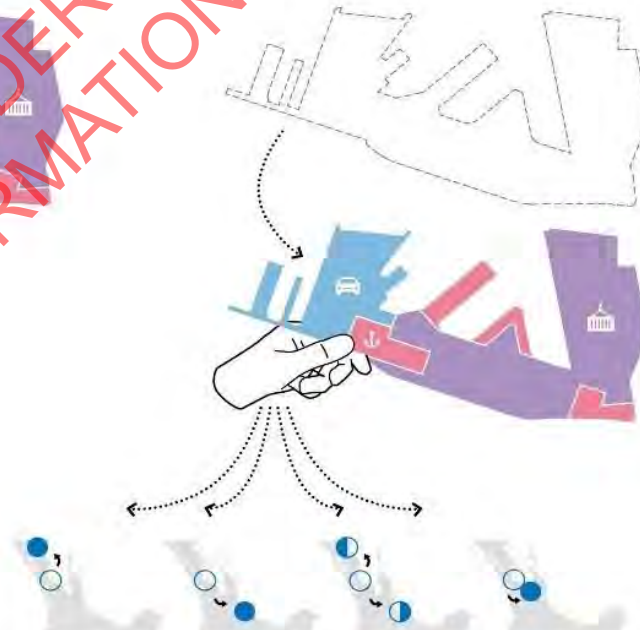
OPTION 1.1
Northport

OPTION 1.2
Tauranga

OPTION 2

FULL INTERVENTION (EXCEPT CRUISE FACILITY)

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



OPTION 2.1
Northport

OPTION 2.2
Tauranga

OPTION 2.3
Northport & Tauranga

OPTION 2.4
Superport
Firth of Thames
Region

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

Analysis of freight flows, and investment needs concluded that scenarios that moved towards reliance on a single port, with the supporting logistics and supply chain, produced the worst outcomes. This includes the consideration of the Port of Tauranga undertaking the majority of the UNI port tasks, and the development of a Super Port, separate from the three current ports.

These scenarios produced the highest costs, and reduced the resilience of the UNI supply chain. Both scenarios also involved the highest proportion of investment in new assets and failed to leverage the capacity of the northern Auckland and Northland region.

....but in the short to medium term, material improvements can be made through integrating the region’s three ports into a high performing land-side supply chain

The “Partial Move” scenarios looked at the potential gains from easing pressure on the Ports of Auckland in the short to medium term. Economic benefits in the short term from the scenarios are derived from three key features:

- Leveraging latent capacity in both land-side and port side through a number of comparatively low-cost investments
- The ability to defer major investment in port capacity at the Ports of Auckland, and the supporting land-side infrastructure that connects the port to the wider UNI logistics and supply chain
- The resultant freeing up of a part of the Ports of Auckland footprint to alternative, significantly higher value land use.

The benefit cost ratios of these scenarios, compared to the status quo scenario is 25 if the partial move is directed to Northport, and 15 if directed to Tauranga

Over the long term, better outcomes can be achieved by building a more integrated logistics and supply chain with a reduced focus on the Auckland CBD.....

The performance of the “Partial Move” scenarios flow through into the longer term scenario modelling. Notably, the reduced investment to add freight capacity to a POAL-reliant logistics and supply chain, combined with the alternative land use for the POAL footprint are significant.

However, a full move scenario is only economically viable should the costs of infrastructure and the economic impact (monetisable time/freight cost, emissions, congestion etc) of any lengthening of the logistics and supply chain be materially less than the benefits gained through a reduced reliance on a central Auckland location

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

The scenario modelling of a “Full move” to Northport, with associated land side investment results in a benefit cost ratio of 2.7. The “Full Move” scenarios shared between Tauranga and Northport does not generate net economic benefits. This is shown in the table below:

Summary Results

Relative to Base Case, Net Present Value, \$ million nominal terms

			Scenario 2.3 - Full move to Northport and Tauranga
Scenario 1.2 - Cars to Northport	Scenario 1.3 - Cars to Tauranga	Scenario 2.1 - Full move to Northport	

Total Costs	12	13	1,443	1,811
Total Benefits	311	190	3,877	1,336
Net Benefits	298	177	2,433	-475
Benefit Cost Ratio	25.0	15.0	2.7	0.7

Diversification results in improved outcomes for Auckland....

Auckland benefits from a full move in a number of ways.

Firstly, Auckland Council and ratepayers benefit from the switch of the Port to an alternate land use. Presently, POAL delivers a dividend to the Auckland Council of around \$50 million per annum. An alternative land use for the port footprint has the potential to generate both rates income for the council. In addition, if waterfront land is leasehold, as it is with the majority of the Auckland CBD waterfront (Viaduct and Wynyard Quarter), significant leasehold income could also be expected to accrue to Council.

The analysis has considered two potential masterplan scenarios (one full, one partial) for an alternate land use that look at a mix of commercial, residential and recreational land use. The table below shows the potential returns to the Auckland ratepayer from an alternate land use:

	Current dividend	Alternative Rates income	Alternative leasehold income	Net annual financial benefit/(loss) to ratepayers
Partial Move	\$50m	\$7m	\$13m	N/A ¹
Full move	\$50m	\$42m	\$56m	\$48m

The quantification of additional income does not include the potential value uplifts of the areas surrounding the port, from the alternative land use.

It is also important to note that no scenario involves the closure of the Ports of Auckland. Most notably, POAL will still service the rapidly growing cruise industry, which is an important part of Auckland's tourist economy. POAL would still provide tugs, berth space, and ship servicing to this industry, and a range of other maritime uses. As such, it is possible that POAL will continue to provide a dividend to Council. A critical part of this is also POAL's shareholdings in Marsden Maritime Holdings and North Tugz, both of which benefit from a Northport move.

Auckland also benefits from the alternative land use on the POAL footprint. The hypothetical masterplan includes significant recreational spaces for the people of Auckland, as well as a material net increase in Auckland's developable land supply for both commercial and residential use, which could be expected to cascade into the wider Auckland region.

The analysis is based on the traditional freight hubs of South Auckland maintaining a critical role in the logistics and supply chain, but also envisages additional employment and investment in Auckland's Northwest with the development of a major freight hub in that area.

¹ 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.

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

...and Northland.....

Northland benefits materially from all modelled scenarios. While port employment is expected to be at the margins (due to the likely investment in high efficiency handling options as part of any expansion), wider employment opportunities are significant – given the relative size of the Northland economy.

First-order employment comes through additional investment in logistics, warehousing and distribution hubs. It is also expected that a proportion of those who work in the sector (e.g. some truck drivers) would 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 employment 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.

.....and Tauranga.

Tauranga also benefits from all scenarios. **This is firstly because while the scenarios discuss “full moves”, they are designed not based on a prediction of where freight will go, but based on providing enabling infrastructure.** As such, under all scenarios, Tauranga can expect an uplift in freight demand.

Employment impacts are expected to be less than Northland moves. While nominal changes may be broadly the same, the direct and flow-on impacts to the Bay of Plenty economy are less, because of the relative size of the economy.

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

As noted above, 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.

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

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 determining 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 status quo. 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.

....and alternative land use.

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.

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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 its goods to the world as well as to access the many manufactured commodities it does not produce domestically. **New Zealand's freight volumes are expected to grow significantly over the medium and long term which is going to have a drastic impact across the supply chain. 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.**

Ports allow local producers to reach larger markets overseas, and local consumers to access imported goods. The presence or absence of a port has a significant effect on the cost of doing business and the cost of living within a region. Furthermore, ports also act as a vital source of employment which adds significant value to New Zealand regions and communities.

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 can either be referred to as the "UNISCS Working Group" or the "Working Group".**

The Working Group is entrusted with developing a plan for an efficient freight network (ports, land and rail and road networks) for the UNI region that will deliver the best long-term outcomes for New Zealand. The planning will focus on designing an efficient supply chain network to ensure smooth movement of cargo and containers across the regions. Additionally, the Working Group is tasked with assessing the existing landside network infrastructure (rail, roads, and inland freight terminals), potential upgrades and new infrastructure requirements as well as optimising land use to ensure greater returns to all the stakeholders, particularly the government and the community.

In pursuit of its objectives, the Working Group has come up with a staged approach, at the end of which the Working Group intends to submit a comprehensive recommendation to the government for a holistic development of the UNI supply chain network. This includes the socio-economic impact of the UNI region. This report is one part of the staged approach where the Working Group seeks to assess the development of UNI supply chain (UNISC) scenarios as well as undertake an 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 planning².

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 of³:

- ▶ 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.

² <https://www.transport.govt.nz/multi-modal/keystrategiesandplans/upper-north-island-supply-chain-strategy/questions-and-answers/>

³ <https://www.transport.govt.nz/multi-modal/keystrategiesandplans/upper-north-island-supply-chain-strategy/questions-and-answers/>

- ▶ Potential priorities for transport-related infrastructure investment from a national economic and regional development perspective
- ▶ 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 this review in three stages. Each stage will involve preliminary reports and the final strategy recommendations will be communicated to Ministers, stakeholders, media and public⁴.

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, 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

1.3.4 Key Findings to Date

The Working Group have been provided with a terms of reference⁵ 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 further 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, to work in conjunction with other transport mechanisms. In addition to this, the working group fundamentally believes that there is no point making further investment in Northport without investment in, and development of an upgraded train line from Northland to Auckland.

The working group engaged with 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-port freight system, as well as 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.

⁴ UNISCS Working Group Interim Report

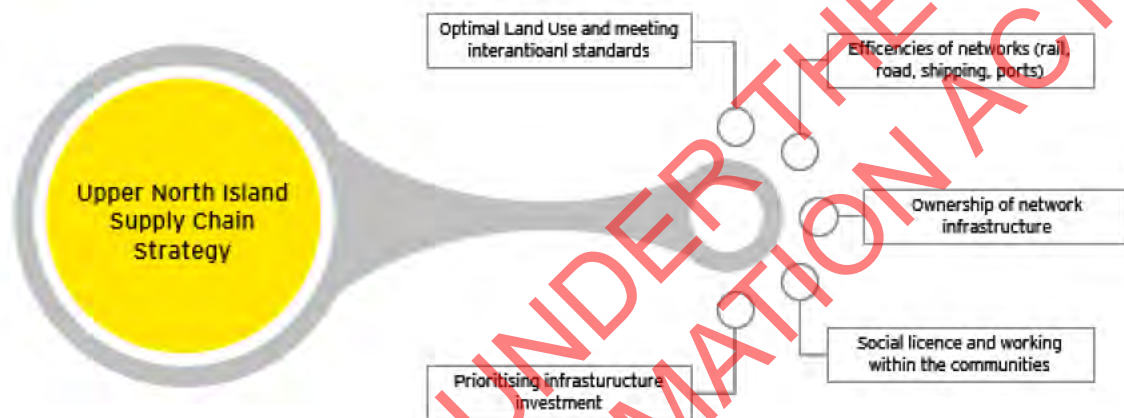
⁵ https://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/cc9d34704a/UNI-Cabinet-Paper-and-Terms-of-Reference_no-redactions.pdf

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 think 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. It was indicated that 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 1 - XXX



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

In May 2019 the Ministry of Transport has appointed a consortium led by Ernst & Young Limited (EY)⁶ to perform an economic evaluation of potential UNI logistics and supply chain. This report examines a range of potential scenarios for supply chain investment, taking account of regional development impacts as well as transport outcomes, in line with the Working Group's Terms of Reference.

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 ordered in line with answering the key questions of evaluating the potential supply chain scenarios. 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 all 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

⁶ The consortium includes professional services consultancy Advisian, architects, Warren and Mahoney and Quantity Surveyors WT Partnership.

3. The Base Case and Understanding the Pressure for Change
4. Scenario Description
5. Results

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2. Approach to Analysis

The approach to the analysis is based on evaluating scenarios as per a number of principles outlined 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 to this, two timing scenarios have also been taken into consideration as this has allowed the Working Group to understand the impact of time and scope of a partial move and provide a more sophisticated understanding of the key scenarios. 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 benefit cost 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 over and above the standard economic evaluation approach include:

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

This analysis takes into consideration conventional development economics where a dollar spent in the regions has more stimulus value than that same dollar spent in an urban environment.

2. The deployment of the new dynamic land use approach

A procedure for valuing alternate land use was developed for the Working Group's options generated. This alternative land use value was the single biggest component was ironed out technical land-side value of time issues associated with a potential lengthening of the logistics and supply chain for some of the goods imported or exported from Northport.

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 analysis on how benefits can be maximised and costs minimised through different mode splits in the logistics and supply chain, including congestion, emissions, maintenance and safety. Additionally, the model is also takes into consideration full land-side freight analysis. The model itself fully reviewed and accepted by Treasury, MoT and NZTA.

4. Use of the new Resilience assessment framework

Until recently, there has been limited ways through which resilience could be factored into project analysis. In 2016, EY was commissioned by NZTA to undertake a year-long study into how this could be better done. The new resilience analysis approach was taken into account for this analysis which had a material impact on the effects of watch of the scenarios.

3. The Upper North Island Logistics and Supply Chain – Current and Future

3.1 Country Overview

The freight sector in New Zealand is wide ranging, and impacts a number of complementary sectors including retail, manufacturing, agriculture, forestry, etc. The freight sector plays a different role across various industries. For example, approximately 20% of all inputs into the petroleum and coal manufacturing sector consist of freight 'costs', compared with life insurance representing 1%. 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.⁷

On a global scale, New Zealand has the 57th largest, and 41st most complex economy according to the Economic Complexity Index (ECI). In 2017, New Zealand exported US\$37.3 billion and imported US\$36.3 billion, resulting in a positive trade balance of US\$988 million.

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).⁸

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.

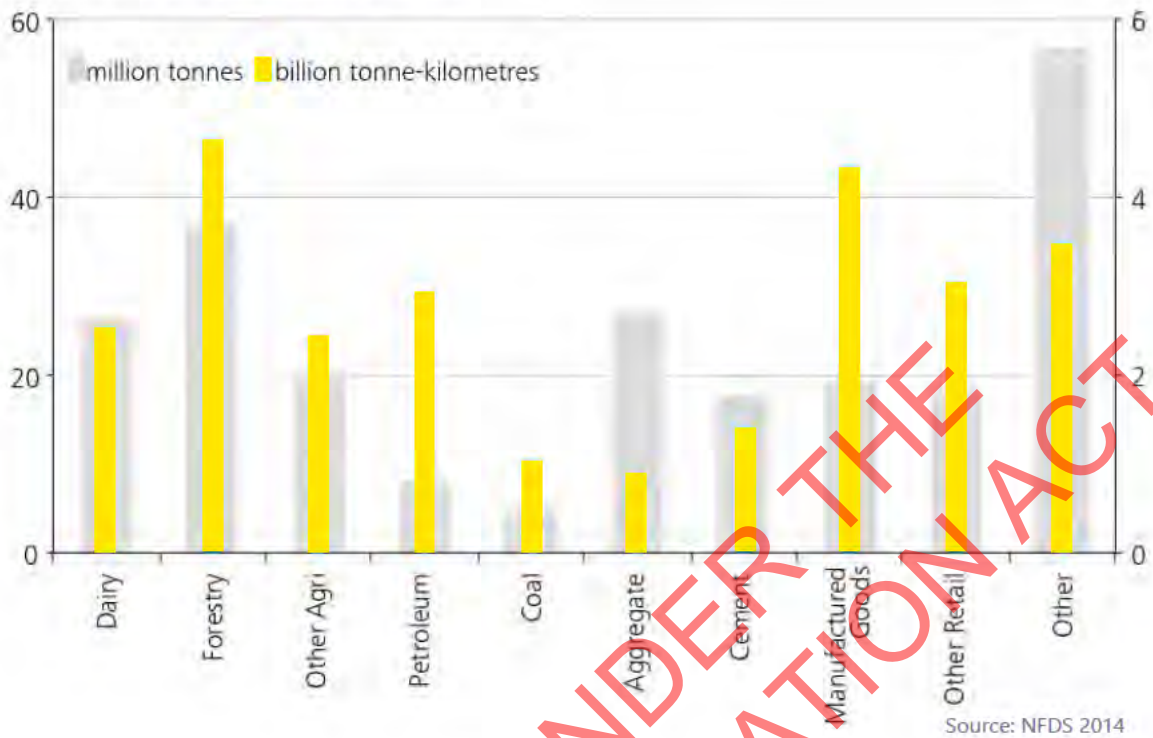
Forestry has grown as a result of favourable export conditions and a buoyant construction sector. Dairy exceeds the tonnage of all other agricultural commodities, including livestock, meat, wool, horticulture, grains, and fish.

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.

⁷ *Identifying freight performance and contextual indicators*, NZ Transport Agency research report 651 (December 2018)

⁸ The Observatory of Economic Complexity 2017: <https://atlas.media.mit.edu/en/profile/country/nzl/>

Figure 2 New Zealand Freight Generated by Commodity

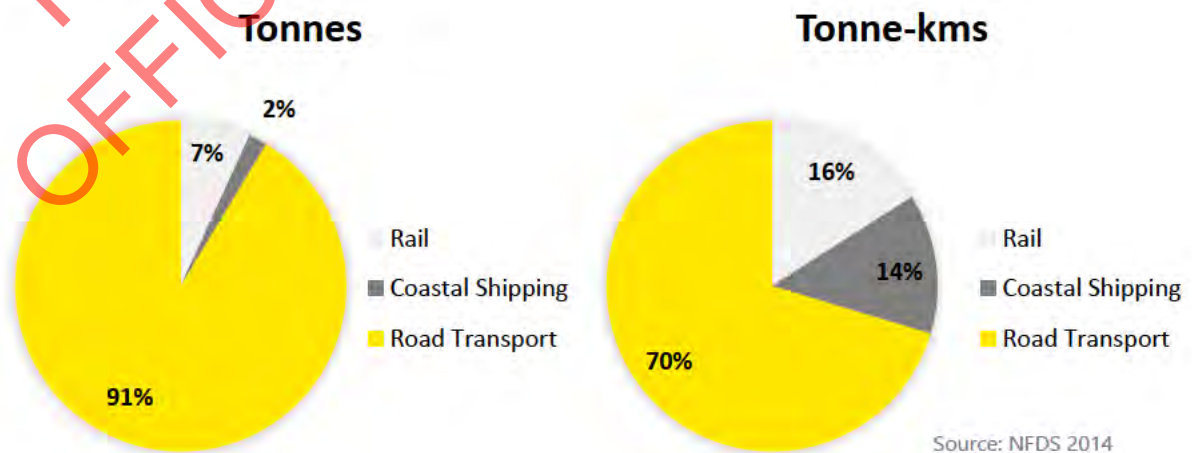


3.1.2 National Freight Task

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

Figure 3 Overview of Freight Task by Mode



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

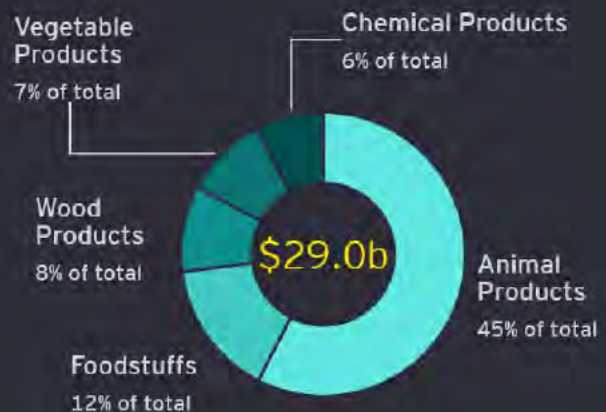
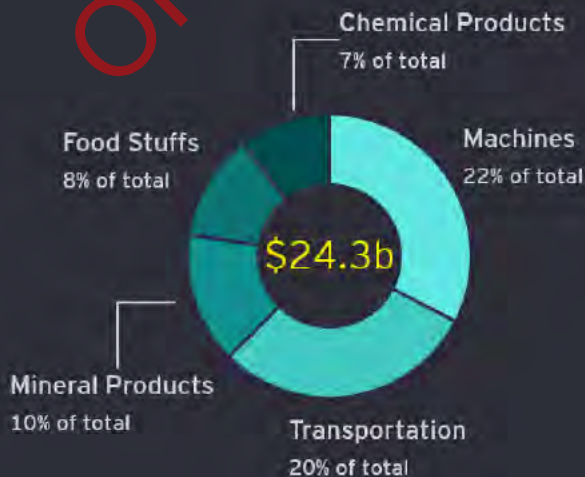
\$0.37b
Chile, Peru, Brazil

\$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 Flows⁹

3.2.1 Regional Freight Generation

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. The most dominant freight generator in the South Island is Canterbury, which produces 15% of the national freight task¹⁰.

Figure 4 Commodities by Region



The primary sector is largely located in the Waikato, Taranaki, Manawatu, and Southland 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.

Coal production on the West Coast is principally exported from Lyttelton, whereas Waikato coal production serves the domestic market in the UNI. However, the low cost and environmental impact is leading to decreased demand for coal.

Northland and the West Coast both have cement manufacturing plant that distribute cement via coastal shipping and then road and rail. However, the West Coast plant is being superseded by direct import. The Tiwai Point Aluminium Smelter in the South Island (Southland) accounts for approximately 10% of the region's total freight flows, while largely generating direct import/export flows.

3.2.2 Modal Share

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

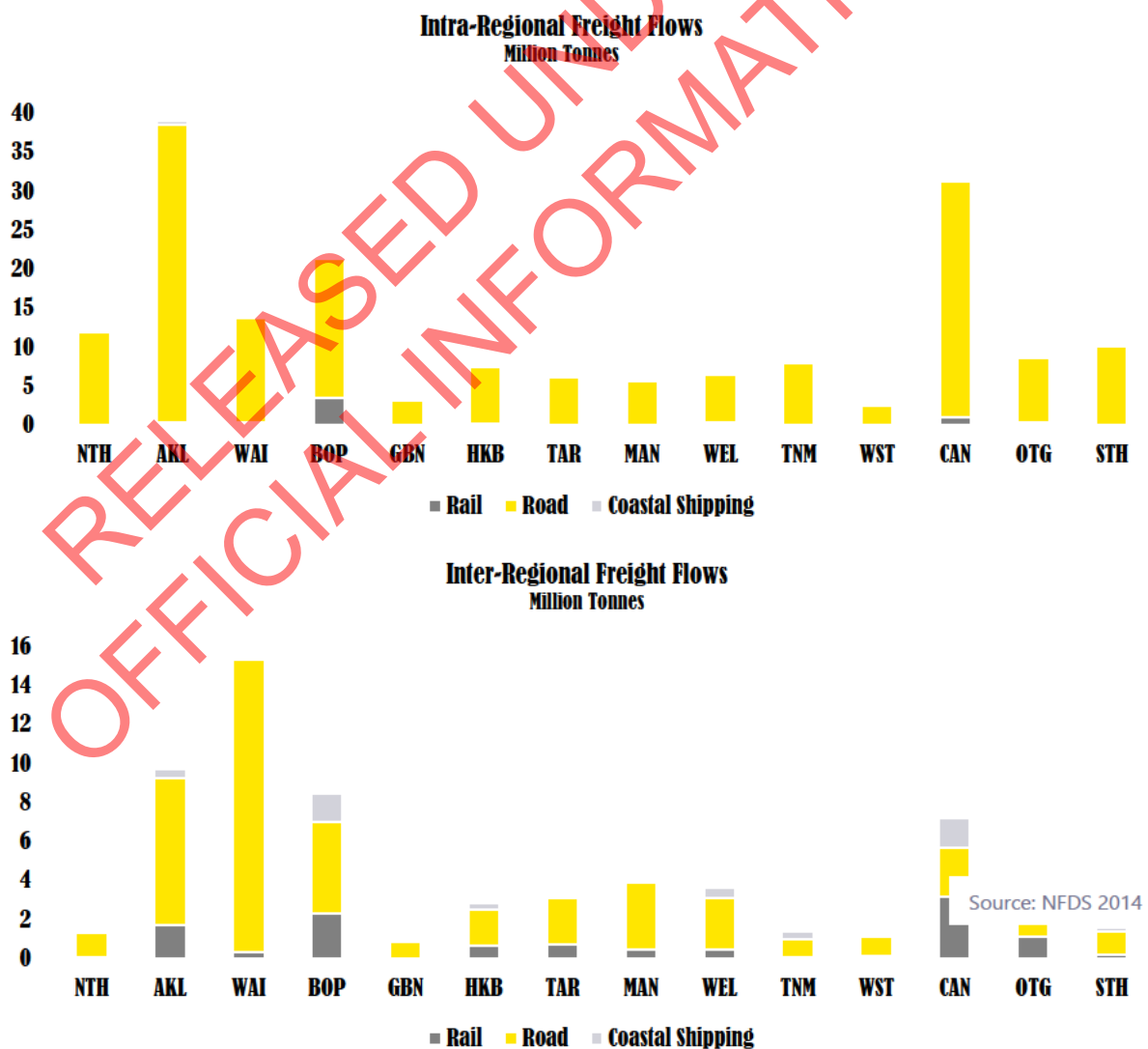
⁹ Information from this section is largely based on the Deloitte New Zealand Ports and Freight Yearbook 2016

¹⁰ Information from this section is largely based on the Deloitte New Zealand Ports and Freight Yearbook 2016

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%.¹¹

Modal share competition is more pronounced over longer distances, as can be seen in the inter-regional freight flows (see Figure 6 and Figure 6). Despite this, road remains the most dominant form of transport. This could be attributed to the ease of use of road transport. Road services offer greater flexibility and can be requested on demand. New Zealand's roading network is also more expansive than the country's rail and port options. As such, road can service greater areas. Rail and coastal shipping offer greater environmental benefit, however, and greater align with strategic objectives to reduce adverse environmental impact outlined in the Government Policy Statement (GPS). Rail and coastal shipping also offer cost advantages as distance increases, and may be more suitable for the transportation of long-haul or repetitive freight tasks.

Figure 7 Inter- and Intra-Regional Freight Flows



¹¹ Deloitte Ports and Freight Yearbook, 2016

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 GDP¹²—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.

New Zealand's three leading ports are Tauranga, Auckland, and Lyttelton, with Wellington, Napier, and Otago also performing highly. Combined, POAL and POT handle 62% of New Zealand's total TEU (full and empty container inclusive). While POT is New Zealand's largest port by volume, POAL accounts for 35% of total import TEU. However, POAL's export volumes are relatively low at only 6% of New Zealand's total exports in the year ended June 2018.¹³ An overview of container handling for the six most significant New Zealand ports has been provided below.

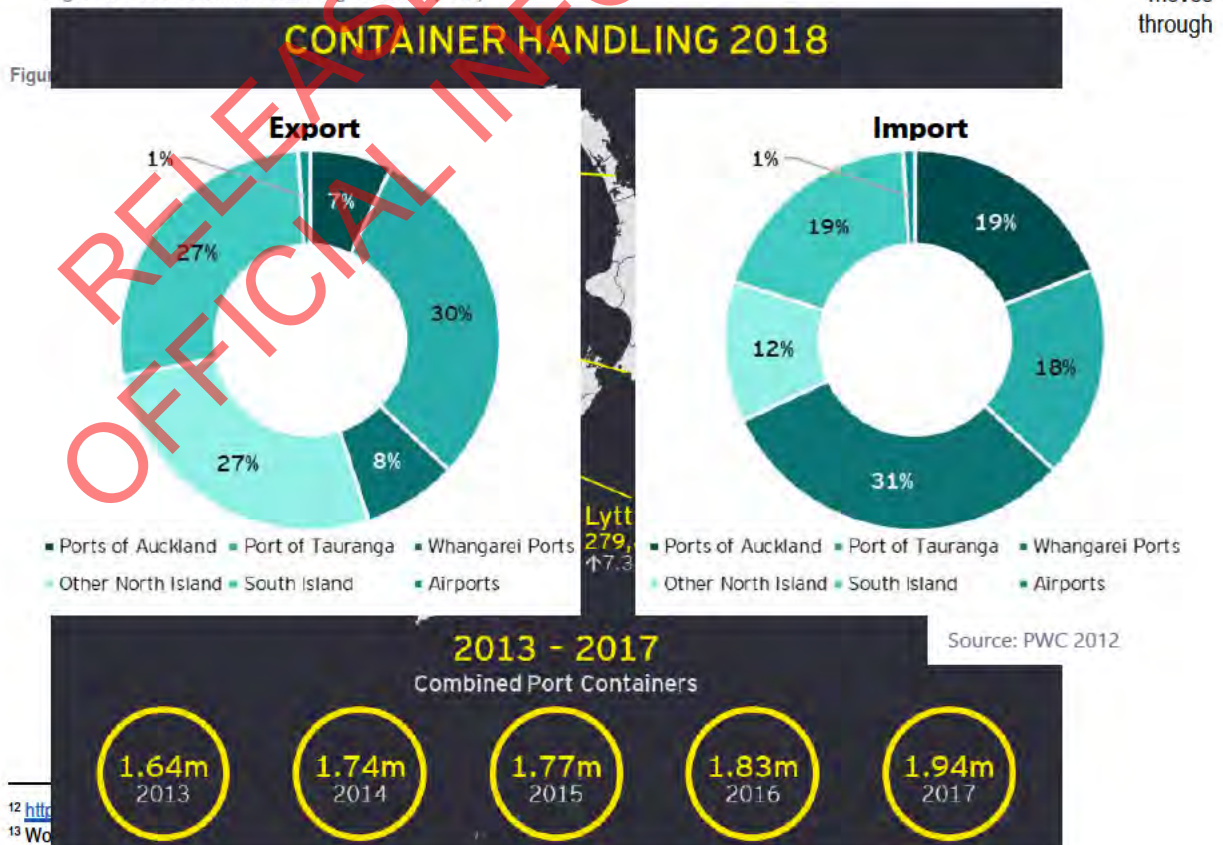
Figure 8 New Zealand Ports



3.2.3.1 The Role of the UNI Supply Chain

In 2014, the three UNI supply chain 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 Whangarei'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

Figure 9 Annual Container Handling Statistics (2017)



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Source: Champion Freight

Advisian

Auckland International Airport. As such, it is evident ports are critical to New Zealand's economy and prosperity.

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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 investment 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 investment objectives:

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

4.1 Developing the Base Case

Ahead of assessing the change scenarios, a fundamental requirement is to provide a comparator of what might be expected in the absence of introduction of any different overall strategy or central decisions about the priorities or roles of different parts of the supply chain.

The base case sets out potential outcomes relating to levels of growth of the freight task through different parts of the supply chain, infrastructure investment to respond to that growth, and the likely impacts of the changes/increases in freight patterns.

4.1.1 Northland [note – more to come in this section and reorient past Northport to the entire L&SC]

Northport is located in Whāngārei and neighbours the Marsden Refinery and Golden Bay Cement manufacturing plant. These two entities import oil, fertilizer, clinker, gypsum and coal¹⁴.

24 percent of Northland region businesses are categorised as agriculture, forestry and fishing¹⁵. This is reflected at Northport, where exports mostly consist of bulk logs. Log exports are likely to remain unchanged over the next 30 years as recently harvest trees are replanted.

Horticulture is increasing in Northland with the number of hectares of avocado orchards consistently increasing over the past few years¹⁶. Northport has also begun expanding port operations to include containerised kiwifruit exports. This expansion provides a cheaper alternative to transporting local kiwifruit south to Port of Tauranga via rail or road.¹⁷

4.1.1.1 Northport Import and Export Tonnage

	2014	2015	2016	2017	2018
Total exports	3,254,000	3,224,000	3,554,000	3,483,000	3,102,000
Bulk	3,254,000	3,223,000	3,434,000	3,480,000	3,092,000
Logs	2,551,000	2,602,000	2,767,000	2,893,000	2,572,000

¹⁴ <https://northport.co.nz/aboutus>

¹⁵ <https://ecoprofile.infometrics.co.nz/Northland%2bRegion/Businesses>

¹⁶ Stats NZ reference

¹⁷ https://www.nzherald.co.nz/the-country/news/article.cfm?c_id=16&objectid=12093844

	2014	2015	2016	2017	2018
Containers	0	1,000	120,000	3,000	10,000
Total imports	5,359,000	5,600,000	5,644,000	5,820,000	5,953,000
Bulk	5,350,000	5,597,000	5,629,000	5,814,000	5,946,000
Containers	9,000	3,000	16,000	6,000	7,000

Imports move directly to Marsden Refinery, Golden Bay Cement and are in this study not considered Northport imports...

4.1.1.2 Northport Current Port Infrastructure

Northport's current infrastructure is shown in the figure below and consists of the following:

- ▶ 570 m land backed berth face
- ▶ Berth pocket levels of -13 to -14.5 m CD
- ▶ Work three vessels simultaneously on main wharf
- ▶ Deep channel access
- ▶ 20 Ha of log storage area
- ▶ Radial loading arm and feeder system (for woodchip)
- ▶ 1.3 Ha of FCL yard
- ▶ 1.3 Ha of MT and Reefer yard
- ▶ One MHC
- ▶ 68 Ha of land zoned for the Port
- ▶ Convert into car area or staging areas
- ▶ 630 Ha of commercially zoned land
- ▶ On dock intermodal terminal

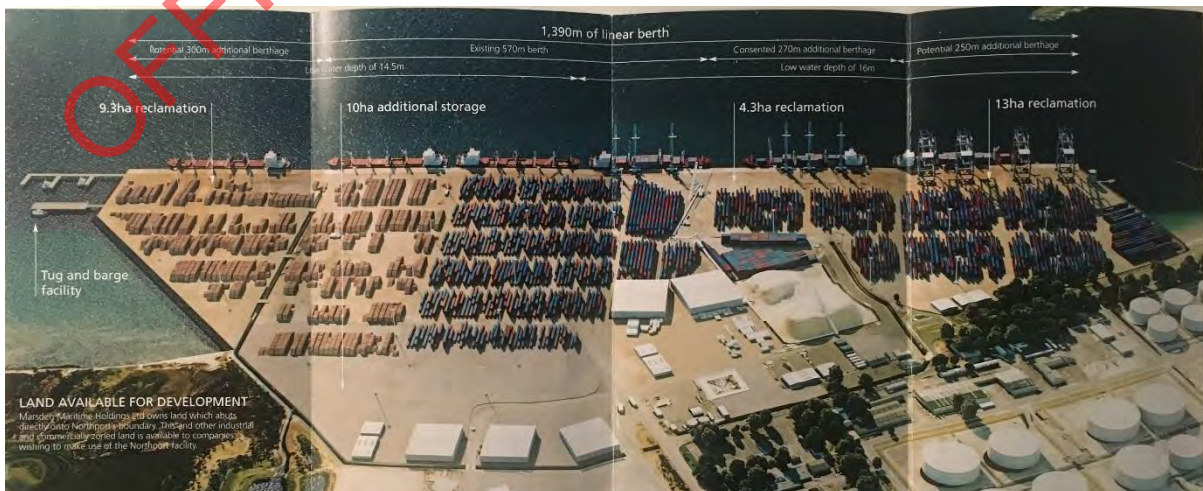
Two bulk liquid berths are located adjacent to Northport and operated by Refining NZ.

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Northport are developing a port master plan named 'Vision 4 Growth' that is show in the figure below and consists of the following expansion activities:

- ▶ 870m of additional berthage (total 1,390m)
- ▶ Berth pockets levels of -14.5 to -16m CD.
- ▶ 26.6 ha of reclamation directly behind the additional berth face and 10 ha of hardstand currently under development (total storage area 46.6 ha)
- ▶ Four container cranes
- ▶ Six reach stackers



4.1.1.3 Northport Road and Rail Infrastructure

Northport relies on road infrastructure to move imports and exports. Whilst the current rail connection from Whāngārei to Swanson is open, due to the poor condition of the line the state highway network is the faster and more efficient when moving freight¹⁸.

NZTA recently published a business case for upgrading the North Auckland Train Line. The Business Case includes reconnecting moth-balled parts of the line, along with creating a rail connection directly to Northport (Marsden Spur). The North Auckland Train Line Business Case identifies the following cost and benefits of upgrading the North Auckland Line and connecting Northport to rail.

All costs and benefits (PV), additional to the status quo

	<i>Rail Connected Port (the preferred way forward)</i>	<i>Upgrade NAL</i>	<i>Rail Connected Port + Tourism</i>
Decongestion	\$158 m	\$30 m	\$158 m
Net user benefit	\$41 m	\$7 m	\$41 m
Crash cost savings	\$20 m	\$3 m	\$20 m
CO ₂ cost savings	\$16 m	\$2 m	\$16 m
Tourism expenditure			\$123 m
Total benefits	\$236 m	\$42 m	\$359 m
Total Rail costs	\$1,259 m	\$451 m	\$1,381 m
Total avoided road operating and maintenance costs	\$530 m	\$62 m	\$530 m
Net costs (rail costs - avoided road costs)	\$729 m	\$389 m	\$851 m
Benefit Cost Ratio (BCRn) National	0.32	0.11	0.42

Source: Deloitte and NZTA analysis

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State highway network from Northport to Auckland has seen consistent growth over the past five years in terms of Average Annual Daily Traffic (AADT). This can partly be attributed to the sprawl of urban Auckland areas. State highways 1, 16, and 18 are the key freight corridors between Northland and Auckland.

A number of NZTA projects are currently planned or under construction. Of note the Ara Tuhono Puhoi to Wellsford project, set to be completed in late 2021 is expected to improve freight movements across state highway one. The project second part of this project (Warkworth to Wellsford) is being re-evaluated.

4.1.2 Auckland [More to come and discuss entire L&SC]

Ports of Auckland Limited (POAL) is located within the Auckland CBD. As the population of Auckland has increased by 22 percent since 2011²⁰, there is increasing competing perspectives of how the land within the CBD should be used.

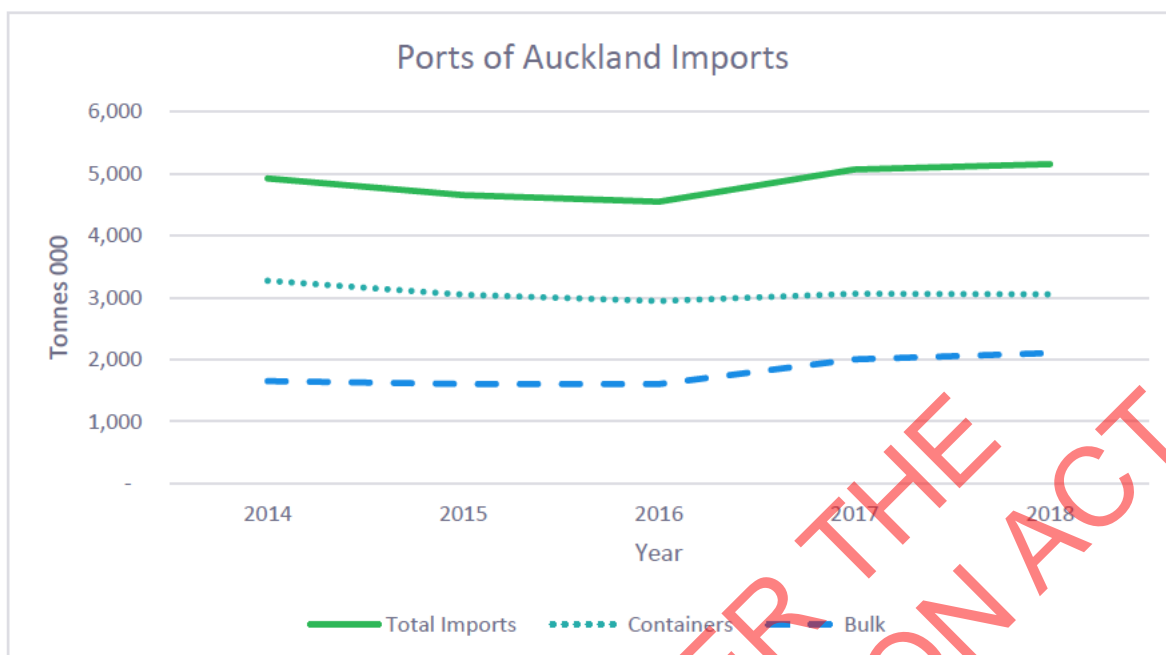
POAL primarily imports various goods for distribution within the Auckland region. POAL is also the central importer of cars in the North Island, importing 297,678 cars in the 2018. Also of note is the cruise industry, benefiting from the CBD location of the Port. 2018 saw 108 ships with 272,060 visitors arrive at the Port.²¹

¹⁸ <https://www.transport.govt.nz/assets/Import/Uploads/Our-Work/Documents/3d86ba755b/Northland-Rail-BC.pdf> page 108

¹⁹ <https://www.transport.govt.nz/assets/Import/Uploads/Our-Work/Documents/3d86ba755b/Northland-Rail-BC.pdf> page

²⁰ <http://www.portfuturestudy.co.nz/docs/pfsconsultantsreport072016.pdf> page 2

²¹ POAL Annual Report page 28



4.1.2.1 POAL Import and Export Tonnage

	2014	2015	2016	2017	2018
Car units*	207,591	243,801	248,065	297,383	297,678
Total exports	3,123,000	2,290,000	2,199,000	2,134,000	2,544,000
Total imports	4,919,000	4,650,000	4,546,000	5,064,000	5,152,000
Bulk	1,649,000	1,605,000	1,603,000	2,002,000	2,104,000
Containers	3,271,000	3,045,000	2,943,000	3,062,000	3,049,000

*Car units figure taken from Annual Reports. Imports figures include car volumes. All other data taken from the Freight Information Gathering System

4.1.2.2 POAL Current Port Infrastructure

POAL current infrastructure is shown on the figure below and consists of the following:

- ▶ Fergusson Terminal – 630m of total berth face, 580m considered operating berth face (-13.0 to -13.5m CD) for two berths, and 19Ha available for storage. Dedicated container terminal with five modern container cranes, capable of handling up to 6,500 TEU vessels.
- ▶ Bledisloe Terminal – 820m of total berth face, 520m considered operating berth face (-10 to -12.5m CD), and 11Ha available for storage. Handles general cargo vessels via Lo-Lo and Ro- Ro operations. Has three older container cranes not currently in use. Berth face not used for operations used as tie-up berths.
- ▶ Freyberg Wharf – 430m of total berth face, all considered operating berth face (-11.5m CD), and 3Ha available for storage. Mostly bulk cargo, some break bulk and containerised cargo.
- ▶ Jellicoe Wharf - 670m of total berth face, all considered operating berth face (-11 to -11.5 m CD), and 3.5Ha available for storage. Break bulk and vehicle carriers, and containers.
- ▶ Captain Cook Wharf – 465m of total berth face, 200m considered operating berth face (western side, -10m CD.), and 1.7Ha available for storage. Ro-Ro operations and vehicle storage. Berth face not used for operations used as tie-up berths.
- ▶ Marsden Wharf - 240m of total berth face, no operating berth face and shallow, and 0.5Ha available for storage. Partially demolished and used for vehicle storage. Berth face used as tie-up berths.
- ▶ Landside Storage (behind Fergusson Terminal, Freyberg Wharf and Jellicoe Wharf) - ~17Ha, mainly containers.
- ▶ Queens Wharf and Princes Wharf are cruise ship berths and not considered for this study.
- ▶ Wynyard wharf accommodates bulk liquids and is not considered for this study.



Ports of Auckland released a 30 Year Port Master Plan in 2017 looking to establish how the Port will be able to cope with increasing throughput. For 2019 milestones in the Master Plan is shown on the figure below and includes the following:

- ▶ Fergusson Terminal
 - ▶ New Container 300m berth on the end of including 3 additional cranes and 10 Ha of reclamation – timing by 2020
 - ▶ Container terminal automation – timing 2019
 - ▶ Deepening of new container berth – timing within 10 years
 - ▶ Subsequent 30m extension of new container berth for longer ships – timing when required
- ▶ Bledisloe Wharf
 - ▶ Remove multistorey car park – timing within 10 years
 - ▶ Remove part of B1 wharf to extend B2 wharf to 246m – timing within 10 years
 - ▶ New 330m berth on the end of Bledisloe Wharf – timing within 5 years
 - ▶ Removal of cranes – late 2018
 - ▶ Reconstruct Bledisloe South wharf (opposite Marsden Wharf)
 - ▶ New 5 storey car handling building – within 5 years
 - ▶ New Hotel and rooftop park– 5 to 10 years
- ▶ Removal of Marden wharf – within 10 years
- ▶ Captain Cook -Cruise berth on east side – timing after removal of Marden Wharf
- ▶ Landside behind Fergusson Terminal, Freyberg Wharf and Jellicoe Wharf
 - ▶ Relocate Head Office Building - timing within 10 years
 - ▶ Permanent Engineering Workshop – within 5 years



4.1.2.3 POAL 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 route²². Currently clip-on lanes are open to 50-tonne maximum heavy vehicles. Heavier vehicles are only able to use the truss bridge lanes²³.

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 pace²⁴.

Notable rail investments in Auckland include City Rail Link. City Rail Link when completed will increase the proportion of freight arriving/leaving POAL by rail and reduce congestion on the roads. Depending on the outcome of the North Auckland Rail Line Business Case, truck movements.

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.

4.1.3 Tauranga and the Western Bay of Plenty [more to come to make it not just ports]

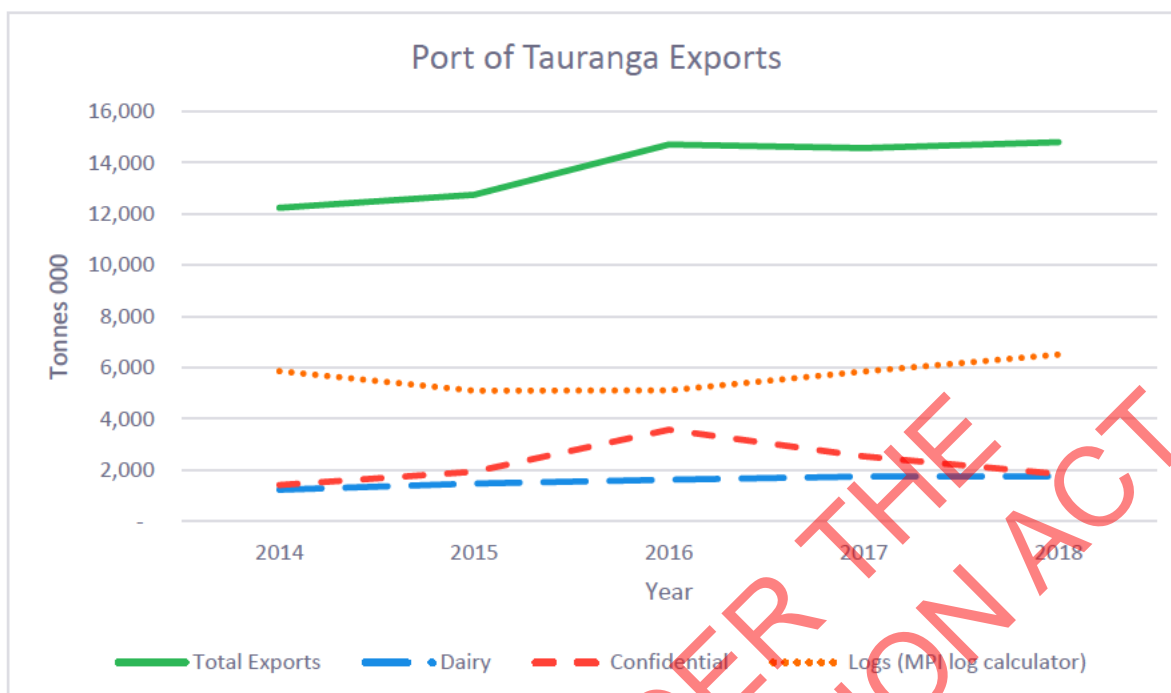
Port of Tauranga (POT) has locations in both Mount Maunganui and Tauranga. Port of Tauranga handles the highest volume of freight of all New Zealand ports. Port of Tauranga is driven by exports, with a high volume of logs and dairy leaving the port. The Port has seen an increase in dairy exports after making a deal with Kotahi, the logistics company owned by Fonterra Cooperative Group and Silver Ferns Farms²⁵. **Now the Port handles most of the North Island's dairy exports.**

²² <https://www.nzta.govt.nz/commercial-driving/high-productivity/full-hpmv-network-map/>

²³ <https://www.newstalkzb.co.nz/news/national/auckland-harbour-bridge-strengthened-against-risk-of-catastrophic-failure/>

²⁴ Page 12.

²⁵ <https://www.nbr.co.nz/article/port-tauranga-ties-97-north-island-dairy-exports-after-coda-deal-b-177636>



4.1.3.1 POT Export and Import Tonnage

	2014	2015	2016	2017	2018
Total exports	12,243,000	12,747,000	14,718,000	14,580,000	14,805,000
Bulk	8,097,000	7,923,000	9,428,000	9,018,000	9,038,000
Logs	5,860,000	5,103,000	5,120,000	5,856,000	6,513,000
Dairy	1,237,000	1,485,000	1,631,000	1,760,000	1,763,000
TEUs	4,146,000	4,824,000	5,290,000	5,562,000	5,767,000
Total imports	4,731,000	4,263,000	4,391,000	5,137,000	5,231,000
Bulk	1,746,000	1,532,000	1,984,000	2,072,000	2,163,000
TEUs	2,985,000	2,731,000	2,407,000	3,065,000	3,067,000

4.1.3.2 POT Current Port infrastructure

In 2016 Port of Tauranga completed a five-year expansion plan, costing \$350 million. Improvements included deepening and widening shipping channels to enable increased freight movement²⁶.

- ▶ Ability to service 9,500 TEU vessels (350 m * 43 m)
- ▶ Extended the container wharf and demolished existing buildings in container yard
- ▶ No change to bulk infrastructure
- ▶ 5 general cargo berths (<https://www.port-tauranga.co.nz/services-facilities/port-map/>)
 - ▶ Sufficient land and berth area for volumes
- ▶ 6 log berths
 - ▶ Current log area is 36 Ha

²⁶ <https://www.port-tauranga.co.nz/port-tauranga-completes-major-five-year-expansion-programme-targets-140-million-capital-return-shareholders/>

- ▶ Require 65 Ha
- ▶ 3 container berths
 - ▶ 38.6 Ha hardstand area
 - ▶ Require 38.6 Ha (meaning at capacity)
 - ▶ Require 3 berths to meet throughput
- ▶ 1 liquids berth
 - ▶ Unknown if sufficient berth and tank storage is available

4.1.3.3 POT Road and Rail Infrastructure

Port of Tauranga in comparison to Ports of Auckland and Northport 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.

Port of Tauranga may in future face congestion problems similar to that of Ports of Auckland. The following map from the 2013 *Tauranga Urban Network Study* projects future areas of congestion²⁷.

The central state highway corridors for Port of Tauranga 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.

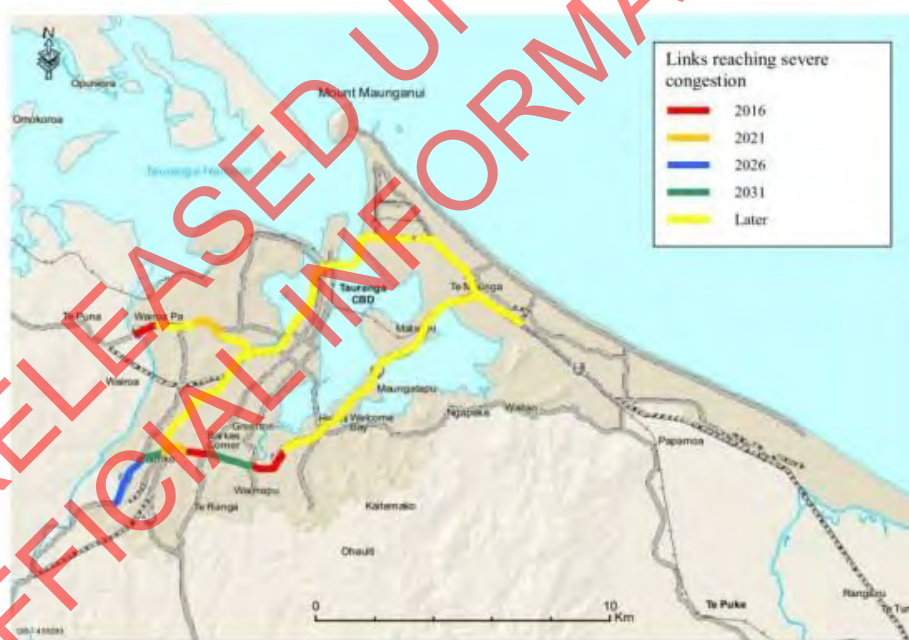


Figure 4-9: Links reaching severe congestion on the TUNS network

4.2 Freight Projections for the Upper North Island

The Freight Information Gathering System (FIGS) has been used to compile the current outlook, as it provides a consistent measure across all three ports. FIGS data is based off trade data collected by Statistics New Zealand. Some values may be lower than expected as port annual reports tend to report higher figures. This has been supplemented with import data on cars from the Ports of Auckland annual report.

²⁷ Page 53...reference to be updated

4.2.1 Assumptions

This base case is an extension/update of previous studies and projections undertaken by various agencies. The PwC 2012 technical study *How can we meet increasing demand for ports in the Upper North Island?* (The Technical Study) has been centrally used as this study provides the most comprehensive view of all three ports.

Where previous projections are no longer applicable new forecasts have been used. Where appropriate, previous forecasts have been extended by seven years (projecting out to 2049, as opposed to 2042) and has updated the base year to 2018.

Assumptions have been updated where the Technical Study assumptions were no longer valid. These are detailed for each of the ports below.

4.2.2 Northland

As forestry is a major driver of exports at Northport, forecasts for 2019 to 2049 was therefore updated using the latest data to reflect the harvest cycle of Northland Forests²⁸.

There is no available information on TEU at Northport, container imports and exports are negligible (in 2018 10,000 and 7,000 tonnes were exported and imported, respectively, in containers). Advisian has assumed that an import TEU is 11 tonnes and an export TEU is 15 tonnes, this has given a proximate TEU for Northport compare with PoT and PoAL.

In 2018, Northport introduced a direct shipping service between Whangarei, Brisbane and Singapore. Customers that signed up for the fortnightly service included Kiwifruit exporter, Zespri, that previously shipped pallets of Kiwifruit by road to Auckland, then rail to the Port of Tauranga to be exported at a cost of about \$102, the Northport service is about \$36.

Fruit exports from Northport increased from zero to 5,000 tonnes, this has been held at a growth rate of one per cent over the forecast period, however, it may be higher as other growers take advantage of the service. **Fruit exports are not a major driver of Northport's exports so it is appropriate that Advisian has not adopted an increased growth rate from an increase in demand from horticulture in the forecasts.**

4.2.3 Auckland

Drivers of Port activity in Auckland are car and other imports.

The compounding annual growth rate used to forecast number of cars imported has been estimated²⁹. This is due to Advisian requiring the number of cars, as opposed to the weight of all cars imported used in the Technical Study. The data on the current number of cars Ports of Auckland import have been extracted from the 2018 Annual Report and therefore is not comparable with the Ministry of Transport Freight Information Gathering System data.

Dairy exports are forecast to continue to decline as the Port of Tauranga has an agreement with Kotahi, the logistics company owned by Fonterra Cooperative Group and Silver Ferns Farms³⁰ to export dairy products.

4.2.4 Western Bay of Plenty

Logs are a major driver of exports at Port of Tauranga. We have therefore applied an updated compounding annual growth rate for log export³¹ and assumed that all wood available in the central North Island is exported by the Port of Tauranga.

²⁸ Northport Wood Availability Forecast, 2018.

²⁹ NZIER study, Ports Study 2

³⁰ <https://www.nbr.co.nz/article/port-tauranga-ties-97-north-island-dairy-exports-after-coda-deal-b-177636>

³¹ Ministry of Primary Industries wood availability forecast

Dairy is another 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).³² Advisian has assumed that imports of coal will cease in 2025, which results in a 500 thousand tonne decrease³³ in bulk imports into Tauranga from 2025.

Rail and road trips to and from each port

- ▶ For PoT and PoAL FIGS³⁴ TEU data has been used to determine the number of road and rail trips from each port.
- ▶ At present a percentage of total port throughput will enter/leave the port by boat and will not go through the port gate. FIGS TEU categories that transhipped, domestic, and re-exported are assumed to remain within the port and are not moved on the rail and road network.
- ▶ Outside port cargo (i.e. cargo that passes through the port gate) is assumed to be freight moving on the road and rail network. This includes FIGS TEU categories that are imported, exported, and null (assumed exported).
- ▶ The percentage of TEU outside port cargo to all TEU throughput for the Port of Tauranga and the Port of Auckland has been used to estimate the total outside port cargo and is held constant over the forecast period.
- ▶ FIGS data gives the percentage of freight travelling on rail and road, this has been held constant at 2018 road and rail share over the forecast period. The gate in rate has been applied to imports and the gate out has been assumed to be exports. The total TEU and tonnes bulk cargo that travels on road and rail is obtained by multiplying the outside port cargo by the rail share.
- ▶ All trucks carrying cargo are assumed to be at maximum capacity. A high productivity motor vehicle (HPMV) can carry 50-tonnes³⁵ all bulk cargo on the road is assumed to be transported in an HPMV at full capacity of 50-tonnes. This gives a conservative estimate for the number of truck trips. It is also assumed an average of 1.5 TEU per truck.
- ▶ It is assumed that the number of TEU per train is 105.
- ▶ There is no transshipment data for Northport, transshipment has been assumed to be zero and all port throughput will be transported via the road and rail network.
- ▶ Northport does not have a rail service. It has been assumed that until 2034 there will not be a rail network to Northport however in 2050 the North Auckland Rail Network will connect to Northport and that the rail road split for Northport will be 50/50.

Cars

- ▶ The number of cars on a truck has been assumed to be eight. The number of cars on a purpose built rail car is assumed to be 10, with 20 purpose built rail cars per locomotive.
- ▶ It has been assumed that cars are not transhipped.


³² <https://www.rnz.co.nz/news/national/350390/genesis-energy-to-phase-out-huntly-coal-use>

³³ 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/>

³⁴ <https://www.transport.govt.nz/mot-resources/freight-resources/figs/>

³⁵ https://www.natroad.co.nz/Category?Action=View&Category_id=432

4.2.5 2034 Forecasted Base Case

Freight volumes 	<p>POAL</p> <p>Freight volumes through Ports of Auckland</p> <p>TEU throughput will increase to a total of between 1.2 million and 1.4 million for the 2034 year. Imports will make up the majority of total throughput, which is forecast to increase to between 844,000 and 971,000 TEU in 2034, an increase of between 45 to 67 per cent from 2018. Exported TEU will increase by between 26 and 45 per cent by 2034 in comparison to 2018. This equates to between 335,000 and 386,000 in expected TEU exports in 2034.</p> <p>Both bulk imports and exports will increase over the next 15 years. Bulk imports will increase by 35 to 42 per cent to 2034. This equates to between 2.8 million and 3 million tonnes for the 2034 year. Bulk exports will increase by 35 to 42 per cent in comparison to 2018 numbers. This equates to between 1.8 to 1.9 million tonnes of bulk exports in 2034, significantly less than bulk imports.</p>																																							
	<p>Ports of Auckland 2034 forecast throughput</p> <table border="1"> <thead> <tr> <th colspan="2"></th> <th>2018 (actual)</th> <th colspan="2">2034 (forecast)</th> </tr> <tr> <th colspan="2"></th> <th></th> <th>Low</th> <th>High</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Exports</td> <td>TEU</td> <td>266,289</td> <td>335,000 (26%)</td> <td>386,000 (45%)</td> </tr> <tr> <td>Bulk (tonnes)</td> <td>1,328,000</td> <td>1,800,000 (35%)</td> <td>1,900,000 (42%)</td> </tr> <tr> <td rowspan="2">Imports</td> <td>TEU</td> <td>581,043</td> <td>844,000 (45%)</td> <td>971,000 (67%)</td> </tr> <tr> <td>Bulk (tonnes)</td> <td>2,104,000</td> <td>2,800,000 (35%)</td> <td>3,000,000 (42%)</td> </tr> </tbody> </table> <p>The number of cars imported to the Ports of Auckland are projected to increase between 27 and 46 per cent (between 378,000 and 435,000 cars) by 2034 in comparison to 2018. <i>Note that these projected figures use Ports of Auckland 2018 Annual Report number and therefore will not align with bulk imports, as Ports of Auckland and the Ministry of Transport, Statistics New Zealand data.</i></p> <p>Ports of Auckland forecast car throughput</p> <table border="1"> <thead> <tr> <th></th> <th>2018 (actual)</th> <th colspan="2">2034 (forecast)</th> </tr> <tr> <th></th> <th></th> <th>Low</th> <th>High</th> </tr> </thead> <tbody> <tr> <td>Car units</td> <td>297,678</td> <td>378,000 (27%)</td> <td>435,000 (46%)</td> </tr> </tbody> </table>			2018 (actual)	2034 (forecast)					Low	High	Exports	TEU	266,289	335,000 (26%)	386,000 (45%)	Bulk (tonnes)	1,328,000	1,800,000 (35%)	1,900,000 (42%)	Imports	TEU	581,043	844,000 (45%)	971,000 (67%)	Bulk (tonnes)	2,104,000	2,800,000 (35%)	3,000,000 (42%)		2018 (actual)	2034 (forecast)				Low	High	Car units	297,678	378,000 (27%)
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Road and rail trips

Ports of Auckland should expect to see the following number of truck and train trips in to and out of the Port in 2034. Assuming the truck and train trips are spread evenly over the year, we estimate approximately 2,400 truck trips and 3 train trips into and out of the port every day in 2034.

Number of truck and train trips to and from the Ports of Auckland

	2018 (estimate based on actual values)	2034 (forecast)
Truck trips	615,800	876,600 (42%)
Train trips	780	1,100 (41%)

Based off low throughput forecast

In the absence of reported data we have made assumptions about the number of trips in and out of the port. We have removed transshipped volumes and applied existing road/rail splits and estimates of TEU/tonnes per truck or train trip to estimate total impact on surrounding land transport infrastructure.

Port of Tauranga

Freight volumes through Port of Tauranga

Total TEU throughput at the Port of Tauranga is forecast to reach between 1.7 and 1.8 million in total for the 2034 year. Exported TEU will make up the majority of TEU throughput, increasing to between 1 and 1.1 million in total. This is an expected increase of between 61 and 76 per cent in comparison to 2018 numbers. Imported TEU will increase to between 677,000 and 743,000 in 2034, an increase of between 47 and 61 per cent.

Bulk exports will grow by between 23 and 26 per cent (between 11.1 and 11.4 million tonnes) in 2034 due to a relatively flatter growth rate for log exports (19 per cent) over the period. Dairy growth (a bulk export) is also forecast to remain relatively low over the forecast period. The growth in bulk import is relatively low (between 12 and 24 per cent) in comparison to the growth in container import. A driver of this is reduced demand for coal at the Huntly Power Station from 2025.

Port of Tauranga 2034 forecast exports and imports

		2018 (estimate based on actual values)	2034 (forecast)	
			Low	High
Exports	TEU	650,000	1,000,000 (61%)	1,100,000 (76%)
	Bulk	9,000,000	11,100,000 (23%)	11,400,000 (26%)
	Logs	6,500,000	7,800,000 (19%)	
Imports	TEU	460,000	677,000 (47%)	743,000 (61%)
	Bulk	3,100,000	3,400,000 (12%)	3,800,000 (24%)

Road and rail trips

Port of Tauranga should expect to see the following number of truck and train trips in to and out of the Port in 2034. Assuming the truck and train trips are spread evenly over the year, we estimate approximately 2,300 truck trips and 29 train trips into and out of the port every day in 2034.

Number of truck and train trips to and from the Port of Tauranga

	2018 (estimate based on actual values)	2034 (forecast)
Truck trips	558,900	835,600 (50%)
Train trips	6,900	10,500 (52%)

Based off low throughput forecast

In the absence of reported data we have made assumptions about the number of trips in and out of the port. We have removed transshipped volumes and applied existing road/rail splits and estimates of TEU/tonnes per truck or train trip to estimate total impact on surrounding land transport infrastructure

Northport

Freight volumes through Northport

Both imported and exported TEU throughput is forecast to increase by 17% in 2034 relative to 2018 figures. This 17 percent increase equates to an estimated 780 exported and 740 imported TEU in 2034. This will be a relatively low container throughput in comparison to Ports of Auckland and Port of Tauranga.

Bulk exports at Northport are forecast to remain relatively flat (increase of 0.1 per cent) between 2019 and 2034. This is because exports at Northport are driven predominantly by logs and the availability of harvested logs over the period decreases slightly. Imports are forecast to increase by approximately 17 per cent over the 15-year period.

Northport 2034 forecast exports and imports


	2018 (estimate based on actual values)	2034 (forecast)
Exports	TEU	667
	Bulk (tonnes)	3,092,000
Imports	TEU	627
	Bulk (tonnes)	5,946,000
	Logs (tonnes)	2,572,000
		780 (17%)
		3,100,000 (0.1%)
		2,500,000 (-3%)
		740 (17%)
		7,000,000 (17%)

As Northport is not considered a container port, TEU figures have be derived by using a conversion rate and FIGS container tonnage data. Northport bulk imports include Marsden Refinery and Golden Bay Cement.

Road and rail trips

Northport should expect to see the following number of truck and train trips in to and out of the Port in 2034. Assuming the truck and train trips are spread evenly over the year, we estimate approximately 770 truck trips (170 export truck trips) and no train trips into and out of the port every day in 2034.

Number of truck and train trips to and from Northport

	2018 (estimate based on actual values)	2034 (forecast)
Truck trips	238,700*	280,000*
Export truck trips (assumed full)	62,300	62,400
Train trips	0	0
<i>Based off low throughput forecast</i>		
<p>*Freight movements include movements to/from Marsden Refinery and Golden Bay Cement and freight tonnage moving through pipeline (jet fuel to Auckland) as these movements are unable to be distinguished therefore this number may be overestimated. Export truck trips have also therefore been reported.</p> <p>In the absence of reported data we have made assumptions about the number of trips in and out of the port. We have removed transhipped volumes and applied existing road/rail splits and estimates of TEU/tonnes per truck or train trip to estimate total impact on surrounding land transport infrastructure.</p>		
Port Infrastructure (including Logistics hubs/ distribution centres) 	POAL Containers: Forecast increase of containers of 407,000 TEU to 1.227 M TEU. <ul style="list-style-type: none"> ▶ Insufficient land available at the port to achieve forecast throughput using current container handling operations (assuming 30,000 TEU/Ha as per Future Freight Scenarios Study Nov 2014 by Ministry of Transport NZ) by 7.9Ha <ul style="list-style-type: none"> ○ Sufficient hardstand is available assuming full automation (ie ARMG (automated rail mounted gantry) also known as Automated Stacking Cranes (ASC)) utilising ASC (assuming 53,000 TEU/Ha). ○ Implementation of a fully automated terminal will require the partial closure of the existing terminal for 1-2 years for each stage, interrupting current throughput capacities. The upgrade would occur in stages to minimise impacts on port operations. <ul style="list-style-type: none"> ▪ Alternate berth and hardstand area may be available at Bledisloe wharf pending demolition of wharf currently housing multistory car park and hire/purchase of Mobile Harbour Cranes ▶ An off-port intermodal is not required to accommodate forecast container volumes as there is sufficient terminal space (ASC Terminal) at the port (note that an intermodal would be required for containers transported from the port by rail). However the intermodal terminal will enable less congestion in the terminal as containers can be staged outside the port ▶ Existing 3 berths are sufficient to handle increase throughput (assuming no larger vessels are serviced, and third berth is commissioned) ▶ Container terminal infrastructure requires 23Ha of upgraded hardstand for ASC mode of operation <ul style="list-style-type: none"> ○ This assumes that the current pavement is close to exceeding its life and therefore needs to be replaced Logs and woodchips: No forecasted logs or woodchips imports or exports Cars: Forecast increase in cars by 108,000 units to 406,000 cars <ul style="list-style-type: none"> ▶ Assuming current port layout with one multi-story car parking facility ▶ No additional storage area is required (assuming 77,000 cars/Ha), require 7Ha where 14.8Ha is available ▶ No additional berth space required 	

Liquids and other bulk: Other bulk, including liquids, are forecast to grow 142,000 t to 543,000 t

- ▶ Assumed liquids berths and storage are adequate to handle increase in cargo
- ▶ Adequate berth length for other bulk assuming larger vessels are not serviced

Other issues:

- ▶ Port is restricted in expansion area, with no further reclamation permitted
- ▶ Plan to have two separate container “terminals” results in reduced terminal efficiency due to:
 - Limited plant sharing (ie Quay cranes)
 - Potential customs and quarantine issues
 - **Segregated berths don't allow for smooth cargo flow and operations**
 - Scattered general operations throughout port

Costs:

- ▶ Key assumptions:
 - The mode of operation is required to change from straddle to ASC (this is the cost shown below)
 - All existing hardstand is to be replaced additional cranes are based off the
 - Number of quay cranes are in addition to the 5 shown on google earth imagery dated 6/11/17

Below are the raw costs, no contingency, engineering and PM allowances have been included and are in AUD

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OFFICIAL INFORMATION ACT

		Assume full automation							
POAL Base Case 2034									
	Item	Amount	Total						
Port	Dredging	-	\$ -						
	Reclamation	0	\$ -						
	Quay Wall	-	\$ -			Sufficient Berth space			
	Rail	0	\$ -						
Container Facilities	Pavement and utilities	23.1	\$ 126,865,954			Pavement is at end of design life - high accuracy for automated terminals			
	Quay Cranes	4	\$ 86,400,000						
	ASC	14	\$ 141,400,000						
	AutoStrad	0	\$ -			Assume current fleet is sufficient			
Log Facilities	Pavement	0	\$ -			No Logs			
Car Facilities	Pavement	-	\$ -			Sufficient Area and Berths			
Liquids	Pipeline	0	\$ -			Sufficient Area and Berths			
		Total	\$ 354,665,954						

► Tauranga

Containers: Forecasted growth of containers by 561,000 TEU to 1.719M TEU

- Insufficient land available at the port to achieve forecast throughput using current container handling operations (assuming 30,000 TEU/Ha as per Future Freight Scenarios Study Nov 2014 by Ministry of Transport NZ) by 18.7Ha
 - Sufficient hardstand is available assuming full automation utilising ASC (assuming 53,000 TEU/Ha) by 6Ha.
 - Implementation of a fully automated terminal will require the partial closure of the existing terminal for 1-2 years for each stage, interrupting current throughput capacities. The upgrade will occur in stages to minimise impacts on port operations.
 - There are no alternative berths/hardstand area the can be efficiently utilized during the upgrade
- At least one additional berth is required especially as larger container vessels will call this port
 - Two areas have been identified by Tauranga Port as south of existing quay (continuous quay line) or on the northern breakwater

Logs: Forecasted growth of logs of 1.27M t to 7.78M t

- Sufficient number of berths and storage area

Woodchips: No woodchip exports forecasted on available data

Cars: No car imports forecasted

Liquids and other bulk: Other bulk and liquids expected to increase by 164,000 t to 835,000 t

- ▶ Reduction in coal imports as coal power stations are ramping down
- ▶ Assumed sufficient berth and land area for liquids and bulk cargo

Tauranga Port is forecasted to exceed capacity for container trade by 2034 unless significant investment is made. Options are listed below:

- ▶ Require automating yard to increase container density through ASC's, **however quayside is the chokepoint**
- ▶ This transition will impact current throughput which will need to be handled by a different port
- ▶ Require constructing an additional container berth to the south of existing container berths (this places the edge of the wharf Approx. 200m from runway flight path. It is doubtful that standard superpost panamax container cranes will be allowable in this proximity (eg Sydney airport flight path restrictions at Port Botany container terminal))
- ▶ Alternatively, construct additional container berth on northern breakwater, however, this is exposed to large currents, and the wharf will be operationally isolated from existing quay line. This also requires moving channel which may have many environmental flow on effects

Alternatives to Automation/reduce congestion in the terminal are to:


- ▶ Reduce dwell time in port
 - Currently the shipper receives 5 days free at Tauranga + 5 free days at MetroPort. Reduce the free period to prevent shippers storing cargo at port
- ▶ Invest in intermodal facilities for containers
 - MetroPort currently services up to 312,000 TEU per annum (6*105TEU trains/day) [Ref: MetroPort Overview]
 - Future capacity of 917,000 TEU per Annum (12 trains per day) [Ref: MetroPort Overview]
 - This capacity seems excessive due to limited rail infrastructure and limited sidings at the port and intermodal terminal
 - Build an additional intermodal terminal nearby to the port to act as a receiving port (eg plans for Somerton Vic) to ease congestion at port.
 - Model at Somerton was to make this an extension to the Port, allowing shippers to deliver their freight here with the same deadline as to the port, this reduces trucks around the port and can be situated near to distribution centres outside of the city
- ▶ Move empty containers offsite and have empty runs while vessel is working (as done in Australia)

Cost:

- ▶ Key assumptions:
 - The mode of operation is required to change from straddle to ASC (this is the cost shown below)
 - All existing hardstand is to be replaced
 - Additional container berth required south of existing berths
 - Will need to confirm impact on airport
 - Number of quay cranes are in addition to the 6 shown on google earth imagery dated 4/9/18 assuming the smaller 2 will be decommissioned
 - Below are the raw costs, no contingency, engineering and PM allowances have been included **and are in AUD**

Tauranga Base Case : Assume full automation			
	Item	Amount	Total
Port	Dredging	334,400	\$ 8,360,000
	Reclamation	0	\$ -
	Quay Wall	380	\$ 30,400,000
	Rail	0	\$ -
Container Facilities	Pavement and utilities	32.3	\$ 177,768,371
	Quay Cranes	6	\$ 129,600,000
	ASC	20	\$ 202,000,000
	AutoStrad	0	\$ -
Log Facilities	Pavement	0	\$ -
Car Facilities	Pavement	-	\$ -
Liquids	Pipeline	0	\$ -
		Total	\$ 548,128,371

▶ Northport
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: No future plans 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
Therefore no port modifications are required

 Rail Infrastructure

▶ North Auckland Line:
The recently completed NAL Business Case considered a number of options for upgrading the route. While the tangible benefit cost ratios of the options considered are low, investment in the NAL is considered to strongly contribute to Government objectives of improving transport access (especially for regions), improving modal choice, lowering carbon emissions and improving road safety. While the Government has not committed to upgrading the line, Minister Jones in particular has made a number of positive statements about developing the line. Further the Budget 2019 included an allocation of \$1B to KiwiRail, with Minister Twyford noting the development of a national rail plan later this year, with the goal to “have a stronger rail network that sees more freight moved by rail and fewer heavy trucks on our roads, as well as better public transport options to give commuters choice.”

Minister Twyford also noted that further investment in KiwiRail would be considered in Budget 2020. Finally, Budget 2019 committed more than \$1B to KiwiRail, including \$331M for various upgrades, and an estimated \$300M from the Provincial Growth fund. Given the above positive statements, and an assumption that this government – or future governments – would not contemplate letting the line deteriorate to the point that it no longer operates, our expectation is that an upgrade of the NAL and the Spur line to Marsden Pt will be undertaken in the study period. The question is the scale of the investment, and whether this is in the first 15 years or the second 15. The Business Case considered a number of options, and favoured a Rail Connected Port option, which includes upgrading the rail line between Auckland and Kauri, together with constructing the branch line to Marsden Point and reopening the line between Kauri and Otiria. This option would include enlarging tunnels and strengthening structures where required to provide for high-cube shipping containers. The conservative assumption is that this would be undertaken in the second 15 years, with the Spur line being developed in the first 15, along with a portion of the expenditure required to improve the operation condition of the route (Full costs from the NAL business case for the improvement in operating condition were \$451M).

▶ North Island Main Trunk:

The infrastructure upgrades described below are primarily needed to enable 10-minute clockface passenger service frequencies south of Westfield. While this has been achieved elsewhere on the network, at Westfield passenger trains compete with scheduled and unscheduled rail freight services including POAL shuttles to Wiri (2x return strips per weekday), POT trains between Mt Maunganui and MetroPort in Onehunga (5x return services per day), rail freight services to Wellington, as well as a mix of local shunt services from private sidings to the Port and Westfield. ATAP contains a combined \$940M in the ten-year period, including:

- ▶ Track upgrades between Wiri and Quay Park including a third main rail line between Wiri and Westfield, an upgrade to Westfield junction and access improvements to POAL (Quay Park junction)
- ▶ Electrification of passenger network from Papakura to Pukekohe
- ▶ Rail network resilience improvements
- ▶ 8 of the top 10 level crossings prioritized for grade separation or closure are on the NAL (no individual cost estimates available)..

We can find no plans for upgrading the line any further South than Pukekohe.

▶ Onehunga Line:

- ▶ Passenger line only infrastructure investment for passenger growth only
- ▶ East Coast Main Trunk – Tauranga to Hamilton: Expect ongoing growth in freight services to continue to put pressure on most of track which is single line. Assume growth will be managed incrementally with additional passing loops, improved signalling meaning it will not reach capacity by 2034. (Tauranga Urban Network Study 2014 assumed capacity could be managed this way out to 2041.

Summary of Significant investments of relevance in the period:

- ▶ Spur line to Marsden Pt and limited NAL upgrade: \$329M + \$225M (half of the NAL upgrade cost of \$451m)
- ▶ Total Auckland Rail Network spend \$940M
- ▶ Additional Passing Loops/sections of double tracking on ECMT (4 x simple (one train stationary) crossing loops at estimated \$10M per loop)

Road Infrastructure

- ▶ Auckland to Northland:



- ▶ Significant urban growth is expected in north Auckland between Albany and Warkworth. This, combined with wider Auckland growth, and new capacity only between Puhoi and Warkworth will mean increasing congestion and longer travel times between Auckland and Northland. With no significant plans for improving HCV access to POAL by extending SH16, congestion around the Port will also get worse.

This may drive further HCV use outside peak hours, with some adverse social and environmental effects [PWC Report, Nov 2012, Page 141, Section 5.2.6]

Assumed investments

- ▶ Despite significant growth there are no significant capacity improvements to Northern Motorway expected between Central Motorway junction and Puhoi meaning congestion will continue to get worse.
- ▶ Completion of extension of SH1 Northern motorway from Puhoi to Warkworth (PPP Net Present cost \$709.5m nx2 group website), safety improvements in Dome Valley (due to open late 2021), (21,000 vehicles per day 2016 – NZTA Whangarei to Auckland Programme Business Case)
- ▶ Assume no further extension of the Northern Motorway from Warkworth to Wellsford other than route protection and no 4-laning of SH1 Whangarei to Marsden highway.
- ▶ SH1 – Dome Valley – Wellsford to Warkworth safety improvements, due 2021, \$35 million, (19,000 vehicles per day 2016 – NZTA Whangarei to Auckland Programme Business Case)
- ▶ SH1 Brynderwyn Hills: safety improvements south of Whangarei \$17m-\$18m, due for completion soon 9,000 vehicles per day 2016 – NZTA Whangarei to Auckland Programme Business Case)
- ▶ SH1 Loop Road safety and freight efficiency improvements – part of inland freight route which crosses SH1 south of Whangarei. Key connection for forestry sector to Northport at Marsden Point. Due 2020, no costs, (19,000 vehicles per day, HCVs 13 percent)
- ▶ SH1 Wellsford to Whangarei Safety improvements – from late 2019 starting with Whangarei to Port Marsden Highway \$30 million estimated cost. Vehicles per day 11,000 Brynderwyns -25,000 Whangarei vehicles per day 2016 – (NZTA Whangarei to Auckland Programme Business Case)
- ▶ SH1 Whangarei improvements completion of 6 minor projects along 6km of SH1 through Whangarei (\$47m-\$49m) due for completion in April 25,000 vehicles per day 2016 – NZTA Whangarei to Auckland Programme Business Case)
- ▶ Whangarei to Te Hana – TBC Improve safety, improve freight movements from Northland to Auckland, including key freight connections (Northport), improved resilience, enhance Northland economy and <https://www.nzta.govt.nz/assets/projects/whangarei-to-te-hana/Whangarei-to-Warkworth-recommended-programme-of-works-2018.pdf>
- ▶ Assume ongoing unspecified safety improvements to SH1, say an additional \$500m over the 15 years

Total capital costs around \$1.3 billion (NB: includes full NPC of Puhoi to Warkworth).

AADT for SH1 Whangarei – Auckland AADT 2018 data “as at May 2019”

	2018		2034		2049	
	AADT	HCV (%)	AADT	HCV (count)	AADT	HCV (count)
Port Marsden Highway between Bens View Rd & Rama Rd	4,500	19.2	9,371	1,799	18,641	3,579

Western Hills Drive about 350m north of Selwyn Avenue Whangarei	27,378	5.7	52,351	2,984	96,130	5,479
Otakia Rd N of Raumanga Valley Rd 100m S of Tarewa Rd Whangarei	27,652	4.9	49,343	2,418	84,919	4,161
Nth of Uretiti Rd about 2.5km S of Ruakaka	12,862	10.6	32,983	3,496	79,744	8,453
Sth of Centennial Park Rd (Sth of Wellsford)	12,124	9	23,881	2,149	45,087	4,058
SH1 Grand Dr Overpass	5,439	2.4	10,224	245	18,474	443
ALPURT - Telemetry Site 95 SB Lanes	10,432	8.6	28,003	2,408	70,772	6,078
Auckland Harbour Bridge - centre Span only	83,174	5.7	142,041	8,096	234,593	6,232

NOTES:

- Forecast AADT assumes linear growth based on Average Annual Growth Rate 2014-2018.
- HCV (count) assumes that the %HCV does not change overtime.
- Average Annual Growth Rate for 'SH1 Grand Dr Overpass' is 2015-2018 due to missing 2014 data.

Auckland to Hamilton (and other areas)

The completion of the Waikato Expressway in 2020 or 2021 will provide sufficient additional capacity between Pokeno and Cambridge) to prevent congestion on this part of SH1 between Auckland and Hamilton. Investment in additional capacity between Manukau and Papakura will alleviate congestion on this section but, with ongoing growth, congestion on the rest of the Auckland section of SH1 (the southern motorway) is set to get considerably worse. Most of this is driven by urban greenfields growth in south Auckland

Assumed investments:

- ▶ Southern Corridor Improvements - Manukau to Papakura motorway widening, expected to be complete by the end of 2019, cost \$268 million
- ▶ Papakura to Bombay – Stage 1 Papakura to Drury – motorway widening (six-laning) construction start planned for 2020 (no costs assume \$200m, Drury to Bombay \$250m)
- ▶ Mill Road Stage 1 - \$500m (will take pressure off SH1)
- ▶ Bombay to Hampton Downs – safety improvements \$22m, due to open soon
- ▶ Waikato expressway – (4-laning from Auckland to Cambridge) – the last (Hamilton) section is expected to be complete by late 2020 Total assumed investment \$795 million but these are multi-year projects about to finish.

Total capital costs: approximately \$800m.

SH16 Grafton Gully some minimal improvements planned only (ATAP). Not extension of SH16 Northwestern motorway from Grafton Gully to the Port.

SH20 Onehunga – Mangere – Manukau Southwest Gateway Programme – 20Connect project focus on improving public transport choice and freight reliability between Manukau, the airport and Onehunga (SHs 20B, 20A and 20). Expected to commence late 2019 – 20-year programme, no costs.

In the areas adjacent to the POAL (Beach Road, Fanshawe Street for example) there will only be minimal road improvements given the heavily built-up and sensitive (to the growing local community) location. Roads that are already heavily congested will only become more so, which will lead to the need for more and more late night activity to and from POAL.

AADT for SH1 Auckland – Hamilton AADT 2018 data “as at May 2019”:

	2018		2034		2049	
	AADT	HCV (%)	AADT	HCV (count)	AADT	HCV (count)
SH1 Sth Eastern Hwy Off Ramp to Mt Wellington Hwy Off Ramp SB - Virtual	55,120	7.2	52,955	3,813	81,857	5,566
SH1 Southwestern On Ramp to Hill Rd Off Ramp SB - Virtual	63,334	9.6	83,085	8,552	51,002	3,672
SH1 Service Centre On Ramp to Drury Off Ramp SB - Virtual	34,721	9.2	51,916	4,776	122,664	11,776
TAUPIRI - Telemetry Site 19 - Nth of Gordonton Rd	26,823	10.4	56,928	5,921	75,698	6,964
50m East of Cobham Dr Bridge	31,745	8.3	56,304	4,673	115,271	11,988

NOTES:

- Forecast AADT assumes linear growth based on Average Annual Growth Rate 2014-2018. NB: South Eastern highway numbers may be down due to Waterview
- HCV (count) assumes that the %HCV does not change overtime.
- Average Annual Growth Rate for 'SH1 Grand Dr Overpass' is 2015-2018 due to missing 2014 data.

Connections to Bay of Plenty

SH2 Auckland (Waikato) – Tauranga nothing significant planned – other than Pokeno to Maungatarata safety improvements. In design phase.

SH27 – part of Auckland to Tauranga alternative route nothing significant planned

SH29 Hamilton to Tauranga (including 29A from the Port) SH29 is classified as a national high volume route which should provide a reliable and resilient freight route between Auckland, Hamilton and Tauranga. Approximately 40% of road freight to and from the Port of Tauranga travels on SH29 from the Waikato (north and south) and Auckland. The NZTA's strategy is to provide for long distance traffic on SH1/29, taking advantage of investment in the Waikato Expressway. The main investment in the period to 2034 is likely to be under the Tauriko Network Plan (Western Corridor Growth Management). A programme business case has been prepared, with investment between \$320M and \$650M over that period. Assume \$200M included first 15 years (detailed scope is not determined). The BOP RLTP also sets priorities for SH29 Piarere – Tauriko (including Kaimai Summit to Tauriko), SH29 Barks-Poike Urban access, and improvements to key SH intersections, including Takitimu Drive and Barks Corner. Funding for these projects is in many cases yet to be committed.

4.2.6 2049 Forecasted Base Case

Understandably, there is more uncertainty around which infrastructure investments will take place/be required between 2034 and 2049.



Freight volumes

▶ Ports of Auckland

Freight volumes through Ports of Auckland

TEU throughput will increase to a total of between 1.7 million and 2.2 million for the 2049 year. 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 2049, an increase of between 104 to 168 per cent from 2018. Exported TEU will increase by between 77 and 132 per cent by 2049 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.

Ports of Auckland 2049 forecast throughput

		2018 (actual)	2049 (forecast)	
			Low	High
Exports	TEU	266,289	471,800 (77%)	619,000 (132%)
	Bulk (tonnes)	1,328,000	2,380,000 (79%)	2,600,000 (96%)
Imports	TEU	581,043	1,188,000 (104%)	1,558,000 (168%)
	Bulk (tonnes)	2,104,000	3,770,000 (79%)	4,130,000 (96%)

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 472,00 and 621,000 cars in 2049. *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 Ministry of Transport, Statistics New Zealand data.*

Ports of Auckland 2049 forecast car throughput

		2018 (actual)	2049 (forecast)	
			Low	High
Car units		297,678	472,000 (59%)	621,000 (109%)

Road and rail trips to/from the Ports of Auckland

Ports of Auckland should expect to see the following number of truck and train trips in to and out of the Port in 2049. Assuming the truck and train trips are spread evenly over the year, we estimate approximately 3,300 truck trips and 4 train trips into and out of the port every day in 2049.

Number of truck and train trips to and from the Ports of Auckland

	2018 (estimate based on actual values)	2049 (forecast)
Truck trips	615,800	1,213,000 (97%)
Train trips	780	1,500 (92%)

Based off low throughput forecast

In the absence of reported data we have made assumptions about the number of trips in and out of the port. We have removed transshipped volumes and applied existing road/rail splits and estimates of TEU/tonnes per truck or train trip to estimate total impact on surrounding land transport infrastructure.

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4.3 Conclusion from Base Case

The Base Case critically hinges on the assessment of whether the Ports of Auckland 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 of Auckland can remain on its current footprint as a port, but may have its total handling capacity capped.
2. 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.
3. **As freight continues to grow (in line with the growth trends outlined in the National Freight Demand Study), Auckland's** 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 POAL remaining on its current site, 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 at POAL 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 major port development, without the offsetting benefits from an alternative land use. An unconstrained base case would require the value of the alternative land use in the modelled Scenarios to be greater than the costs of a lengthening of the logistics chain and the additional infrastructure investment.

[concluding comment]

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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 outlined 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 UNI supply chain 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, Port of Tauranga, a combination of both and potentially a “Super 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 Move of the Ports of Auckland.

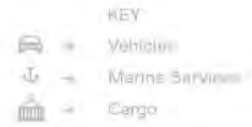
A Partial move involves consideration of the movement of the car imports in a short- to medium term horizon to either the Northport or Port of Tauranga.

The Full move scenarios mirror this approach, but also include a combination of the Ports, as well as a new Super 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.

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

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OPTION SUMMARY



EXISTING CONDITION

NO INTERVENTION

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



EXISTING CONDITION
Auckland

OPTION 1

PARTIAL INTERVENTION

- Establish port alternative location
- Partial removal of port functions (probably at western end)
- Phased POA land development at Western end



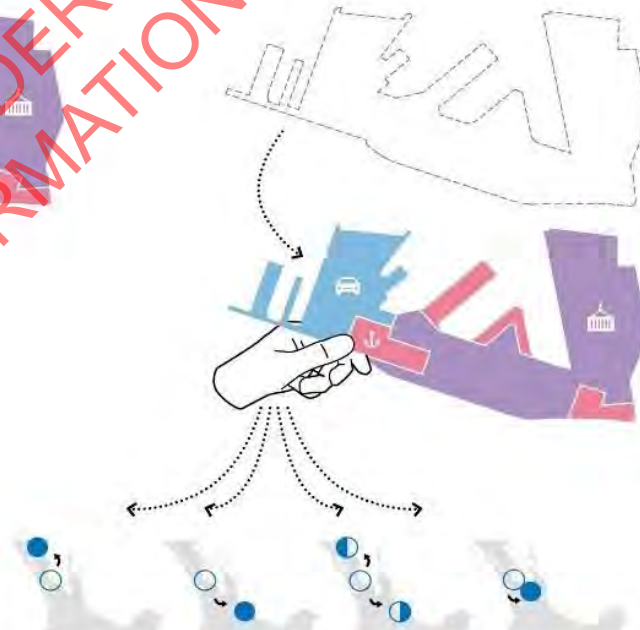
OPTION 1.1
Northport

OPTION 1.2
Tauranga

OPTION 2

FULL INTERVENTION (EXCEPT CRUISE FACILITY)

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



OPTION 2.1
Northport

OPTION 2.2
Tauranga

OPTION 2.3
Northport & Tauranga

OPTION 2.4
Superport
Firth of Thames
Region

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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 for a fully monetised assessment.

5.2.1 Multicriteria 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.

	Base Case	Scenario 1.1 - Northport, cars Only	Scenario 1.2 - Tauranga, cars only	Scenario 2.1 – Northport, full move	Scenario 2.2 - Tauranga, full move	Scenario 2.3 - Northport & Tauranga, full move	Scenario 2.4 - New Port in Firth of Thames
Multi-Criteria Analysis Score: Weighted	-148%	68%	-28%	247%	10%	205%	15%
Multi-Criteria Analysis Score: Unweighted	-142%	73%	-17%	233%	6%	188%	-6%
Estimated capital cost: Port (\$m)		3 - 5	3 - 5	500 - 600	300 - 400	400 - 500	5,000 - 5,200
Estimated capital cost: Supporting infrastructure (\$m)		40 - 50	40 - 50	2,400 - 2,500	3,800 - 4,000	3,100 - 3,300	2,200 - 2,500
Estimated capital cost: Total (\$m)		40 - 60	40 - 60	2,900 - 3,100	4,100 - 4,400	3,500 - 3,800	7,200 - 7,700

[NOTE TABLE NEEDS TO BE UPDATED WITH ADVISIAN LATEST NUMBERS. ALSO QUERY WHETHER WE USE PERCENTAGES OR THE NOMINAL SCORES]

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?

On this logic, the “Full Move - Tauranga Only” and the Super Port scenarios were not taken forward to a short list.

Full Move - Tauranga Only

The Tauranga Only scenario effectively entailed an increased reliance on a logistics and supply chain focussed on meeting **the Upper North Island's needs through an almost exclusively Sothern solution. This reduced resilience in the UNI Supply Chain**, 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.

Super Port Scenario

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

- ▶ A Super 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 costs of development of a brand new port serviced by a land side logistics and supply chain are significantly higher than 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 Port of Tauranga 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 this scenario is not a discounting of this as an option. Ownership structures mean that a decision to advance a Super Port could be made by port owners. 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

Scenario 1.1: Partial move to Northport

	Infrastructure	Costs (\$000,000, non-discounted)	
Port Infrastructure and Logistics Hubs/Distribution Centres 	<ul style="list-style-type: none"> Limited investment to provide yard space for cars at NorthPort Assume that used cars go on rail and new cars on trucks - will need to enhance one of the freight hubs/distribution centres in Auckland to transfer the used cars from rail to trucks for wider distribution <p>Constraints:</p> <ul style="list-style-type: none"> Will have to develop wharf to accommodate RoRo vessel and vehicle operations Develop dedicated road access from wharf to vehicle staging area (doubtful use of public roads will be possible due to customs, security and congestion) <ul style="list-style-type: none"> Will require shuttle to transport stevedores back to vessel 	Yard re-organisation both ports	\$15M (estimate)
		Additional cost at NorthPort to provide rail connection for cars	\$2M (estimate)
		Limited expansion at one of the hubs in Auckland to provide for transfer of cars from rail	\$2.5M (estimate)
Rail Infrastructure 	<ul style="list-style-type: none"> No additional investment (assume that rail spur and some (limited) level of investment to upgrade the NAL is undertaken in the period in the base case) 	By 2034, 90 specifically - tailored railcars at \$500k each (could be as low as \$300k each)	\$45M (estimate from Advisian Australian experience)
Road Infrastructure 	<ul style="list-style-type: none"> Assume no additional costs to base case 		
TOTAL COST			\$64.5M

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Scenario 1.2: Partial move to Tauranga

	Infrastructure	Costs (\$000,000, non-discounted)	
Port Infrastructure and Logistics hubs/Distribution Centres 	<ul style="list-style-type: none"> Port Annual Report highlights 40 hectares of available space. Only very limited cost expected Some limited expansion and reorganisation at MetroPort to provide for cars Assume new cars on trucks, used cars on rail <p>Constraints:</p> <ul style="list-style-type: none"> Potential of limited berth and staging availability on general bulk berths due to existing operations and cruise vessels Will have to develop wharf to accommodate RoRo vessel and vehicle operations Develop dedicated road access from wharf to vehicle staging area (doubtful use of public roads will be possible due to customs, security and congestion) <ul style="list-style-type: none"> Will require shuttle to transport stevedores back to vessel 	Yard re-organisation at POT	\$15M 2034 (estimate)
		Limited expansion at MetroPort to provide for cars, and possibly longer trains	\$2.5M (estimate)
Rail Infrastructure 	<ul style="list-style-type: none"> No additional (associated with this option) upgrade assumed, expect that passing loop development on ECMT will be sufficient for additional/length of trains Rail used cars to West Auckland MetroPort and then distribution, on dedicated rolling stock. 	By 2034, 90 specifically - tailored railcars at \$500k each (could be as low as \$300k each)	\$45M (estimate from Advisian Australian experience)
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 		
TOTAL COST			\$62.5M

Scenario 2.1: Full Move (Except Cruise) to Northport

Port Infrastructure and Logistics hubs/Distribution Centres	Infrastructure	Costs (\$000,000, non-discounted)	
	<ul style="list-style-type: none"> Significant increase at Northport, NorthPort from POAL volumes - NorthPort has very little growth of the current volumes Will have to cater for Postpanamax vessels (+9,000 TEU) to be future proof Significant investment in infrastructure required for 2034 volumes: <ul style="list-style-type: none"> Require 3 container berths, 1 log berth, and 1 car berth 23.1ha for containers, 2 Ha for logs, 2.3 for woodchips, 5.3ha for cars and 6.93 for other bulk (inc. liquids, coal imports would have reduced) Assumed current liquids facilities are adequate and can handle bulk cargo also 	Northport upgrade to full 1.4km berth length	<ul style="list-style-type: none"> \$717M excluding pipeline 2034 \$2.337B including pipeline 2034 \$277M for expansion to 2049
	<ul style="list-style-type: none"> By 2049 (cargo and infrastructure increased from 2034 numbers): 	Logistics hub northwest of Auckland	
	<ul style="list-style-type: none"> Minor reduction in log exports of 75,000 t therefore no change in berths or land area Increase of containers by 507,000 TEU to 1.735M TEU <ul style="list-style-type: none"> Requires an additional 9.5ha of land and 1 additional berth Increase of cars by 136,000 to 542,000 cars <ul style="list-style-type: none"> Requires an additional 1.7ha of land and no additional berth Increase of other bulk and liquids of 210,000 t to 1.025M t Assume existing facilities are adequate as woodchips remain constant Development of Road/Rail hubs around upgraded rail lines in Northland Expect the need for development of an inland multi-modal hub in North/West of Auckland - refer to Moorebank example 	Development of small hubs around upgraded rail lines in Northland (5 x)	\$5M

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	Infrastructure	Costs (\$000,000, non-discounted)	
<p>Road Infrastructure </p>	<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 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. 	<p>Localised upgrades around new hub in NW Auckland</p>	
		<p>Completion of 4 laning from Whāngārei to Auckland</p>	
<p>TOTAL COST</p>		<p>\$4.7B (Estimated)</p>	

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

		Infrastructure	Costs (\$'000,000, non-discounted)			
<ul style="list-style-type: none"> ▶ Significant investment required at both Ports. Detailed plan to split cargoes and timeframes for deployment to be developed ▶ Insufficient capacity at Tauranga to accommodate additional cargo from POAL (reasons stated above in Section 3.5) ▶ Sufficient area at NorthPort ▶ Cost estimate below indicates required infrastructure (similar level of investment required as above options) 						
Option 1.4 - Full POAL to NorthPort 2014						
Port	Item	Rate	Unit	Amount	Total	
	Dredging	\$ 400,000	m3	110,000	\$ 44,000,000	No car wedge
	Reclamation	\$ 250,000	m2	100,000	\$ 25,000,000	No car wedge
	Quay Wall	\$ 400	m	43,750	\$ 17,500,000	No car wedge
	Rail					
Container Facilities	Pavement	\$ 63,583,633	Ha	1.1	\$ 63,583,633	Pavement is at end of design life - High accuracy for automated terminals
	Quay Crane	\$ 108,000,000	ea	1	\$ 108,000,000	
	ASC	\$ 26,700,000	ea	1	\$ 26,700,000	
	Autostrack	\$ 82,200,000	ea	1	\$ 82,200,000	Need to confirm this
Log Facilities	Pavement	\$	Ha	0	\$	Sufficient Area and berths
Car Facilities	Pavement	\$ 7,340,268	Ha	1.4	\$ 7,340,268	Assume use existing general cargo wharf but require car park
Liquids	Pipelines	\$ 1,500,000,000	km	100	\$ 1,500,000,000	150km pipelines to supply Auckland - Sufficient Area and berths
			Total w/ berths		\$ 2,100,023,882	
			Total w/out berths		\$ 805,023,882	
Assume Full Automation						
Full Closure of POAL - Full to Tauranga 2014						
Port	Item	Rate (\$/Hr)	Unit	Amount	Total	
	Dredging	\$ 400,000	m3	21,450	\$ 8,580,000	Assume north and south berths
	Reclamation	\$	m2	0	\$	
	Quay Wall	\$ 400	m	200,000	\$ 80,000,000	
	Rail					
Container Facilities	Pavement	\$ 241,201,548	Ha	1	\$ 241,201,548	Pavement is at end of design life - High accuracy for automated terminals
	Quay Crane	\$ 217,900,000	ea	1	\$ 217,900,000	
	ASC	\$ 262,600,000	ea	1	\$ 262,600,000	
	Autostrack	\$	ea	0	\$	Assume current fleet is sufficient
Log Facilities	Pavement	\$	Ha	0	\$	Sufficient Area and berths
Car Facilities	Pavement	\$ 13,680,536	Ha	2.5	\$ 13,680,536	Assume use existing general cargo wharf but require car park
Liquids	Pipelines	\$	km	0	\$	Sufficient Area and berths
			Total		\$ 805,211,884	

Port Infrastructure and Logistics hubs/Distribution Centres



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Port Infrastructure and Logistics hubs/Distribution Centres



Infrastructure

Costs (\$'000,000, non-discounted)

Option 1.6 - Half PGAL to Northport 2038

Item	Rate	Unit	Amount	Total	
Port					
Dredging	100	m3	18,750,000	\$ 18,750,000	
Reclamation	700,000	m2	18,750,000	\$ 18,750,000	
Quay Wall	1,000	m	27,200,000	\$ 27,200,000	
Container facilities					
Pavement	100	m2	26,238,323	\$ 26,238,323	Pavement is at end of design life - high economy for automated terminals
Quay Crane	100	ea	42,000,000	\$ 42,000,000	
ASC	100	ea	30,500,000	\$ 30,500,000	
AutoTrack	100	ea	13,800,000	\$ 13,800,000	Need to construct this
Log facilities					
Pavement	100	m2		\$	Sufficient Area and Berths
Car facilities					
Pavement	100	m2	2,482,768	\$ 2,482,768	Assume use existing general cargo wharf but require car park
Liquids					
Pipeline	100	m		\$	Sufficient Area, Berths and pipeline
Total				\$ 280,886,138	

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Assume full automation

Full Closure of PGAL - half to Tararua 2038

Item	Rate	Unit	Amount	Total	
Port					
Dredging	100	m3	2,442,000	\$ 2,442,000	Assume none for bulk berths
Reclamation	100	m2		\$	
Quay Wall	100	m	43,200,000	\$ 43,200,000	
Rail				\$	
Container facilities					
Pavement	100	m2	242,202,588	\$ 242,202,588	Pavement is at end of design life - high economy for automated terminals
Quay Crane	100	ea	22,600,000	\$ 22,600,000	
ASC	100	ea	182,800,000	\$ 182,800,000	
AutoTrack	100	ea		\$	Assume current fleet is sufficient
Log facilities					
Pavement	100	m2		\$	Sufficient Area and Berths
Car facilities					
Pavement	100	m2	1,400,536	\$ 1,400,536	Assume use existing general cargo wharf but require car park
Liquids					
Pipeline	100	m		\$	Sufficient Area and Berths
Total				\$ 652,222,884	

Rail Infrastructure

Road Infrastructure

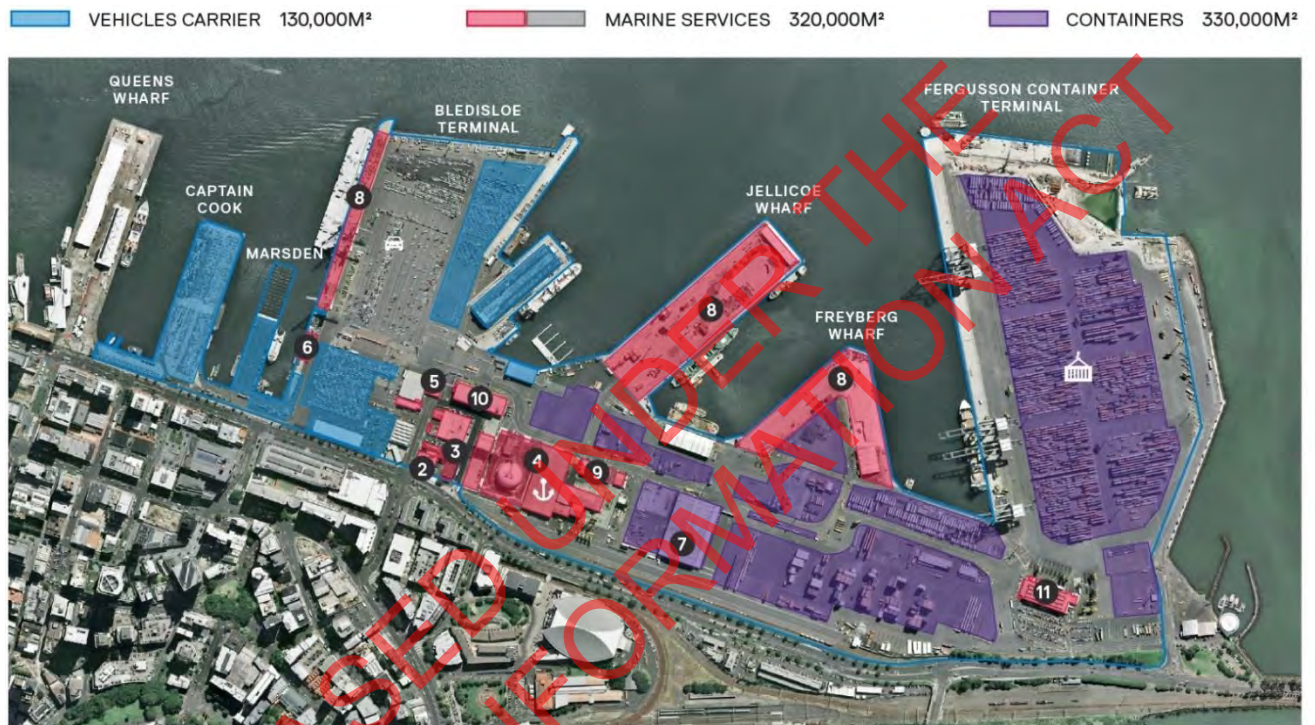
TOTAL COST

5.4 POAL Alternative Land Use Masterplan

A critical part of the scenarios involves consideration of whether a higher and more desirable use (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:

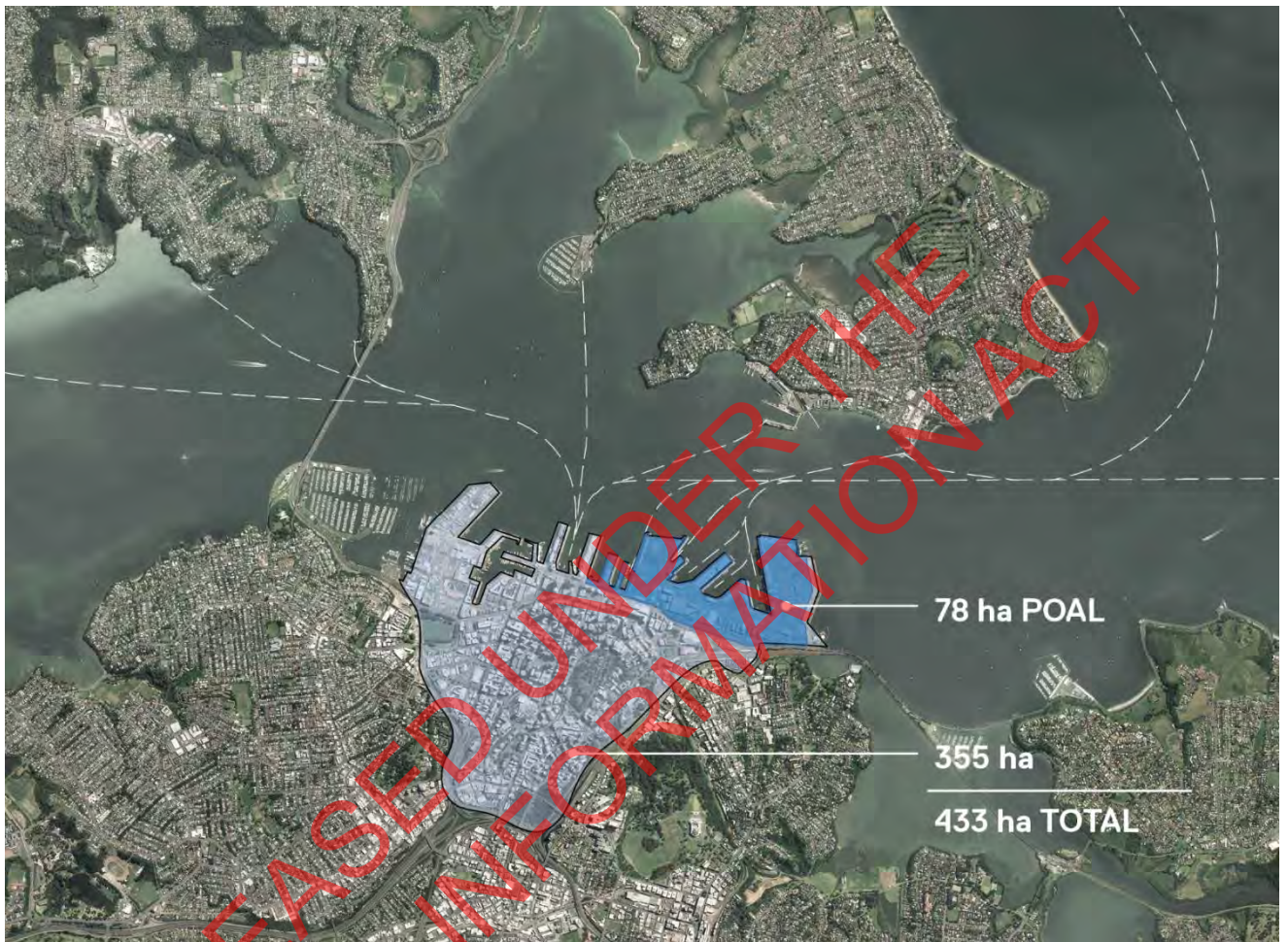
Figure 11 Source: <http://POAL.maps.arcgis.com/apps/View/index.html>



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

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 xxx below). It also suggests the opportunity for alternative land use for POAL at this scale is feasible and potentially appropriate.

Figure 12 Source of area shown below: https://en.wikipedia.org/wiki/Auckland_CBD, <https://www.ccrq.org.nz/history-structure>



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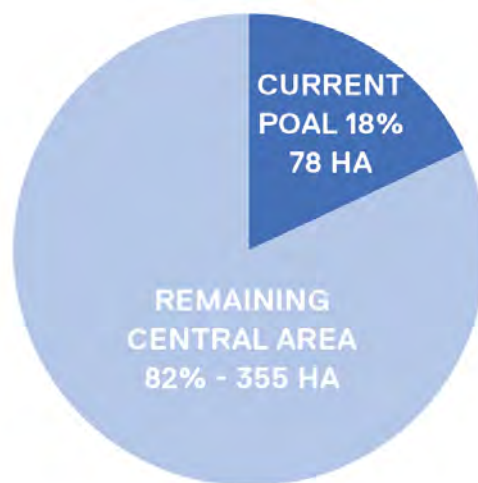


Figure 13 Local context scale comparison (Source: Wynyard Quarter - Urban Design Framework – June 2007)



Two POAL Masterplan options (considering partially and fully decommissioned POAL) 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 GFA totals in tables below show GFA yield of 200,000m² and 1,300,000m² for Option 1 and 2 respectively.

Figure 14 Option 1: Partially decommissioned POAL, GFA 200,000m²

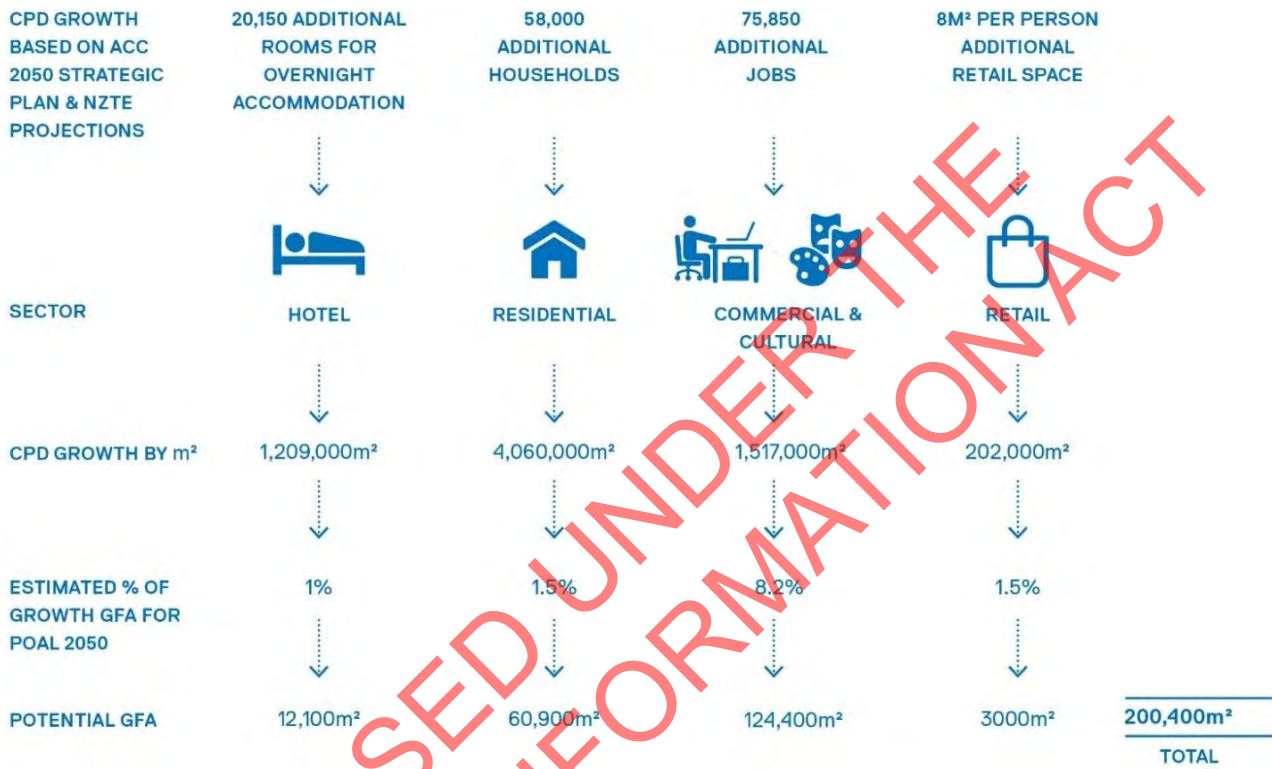






Figure 15 Option 2: Fully decommissioned POAL, GFA 1,300,000m²

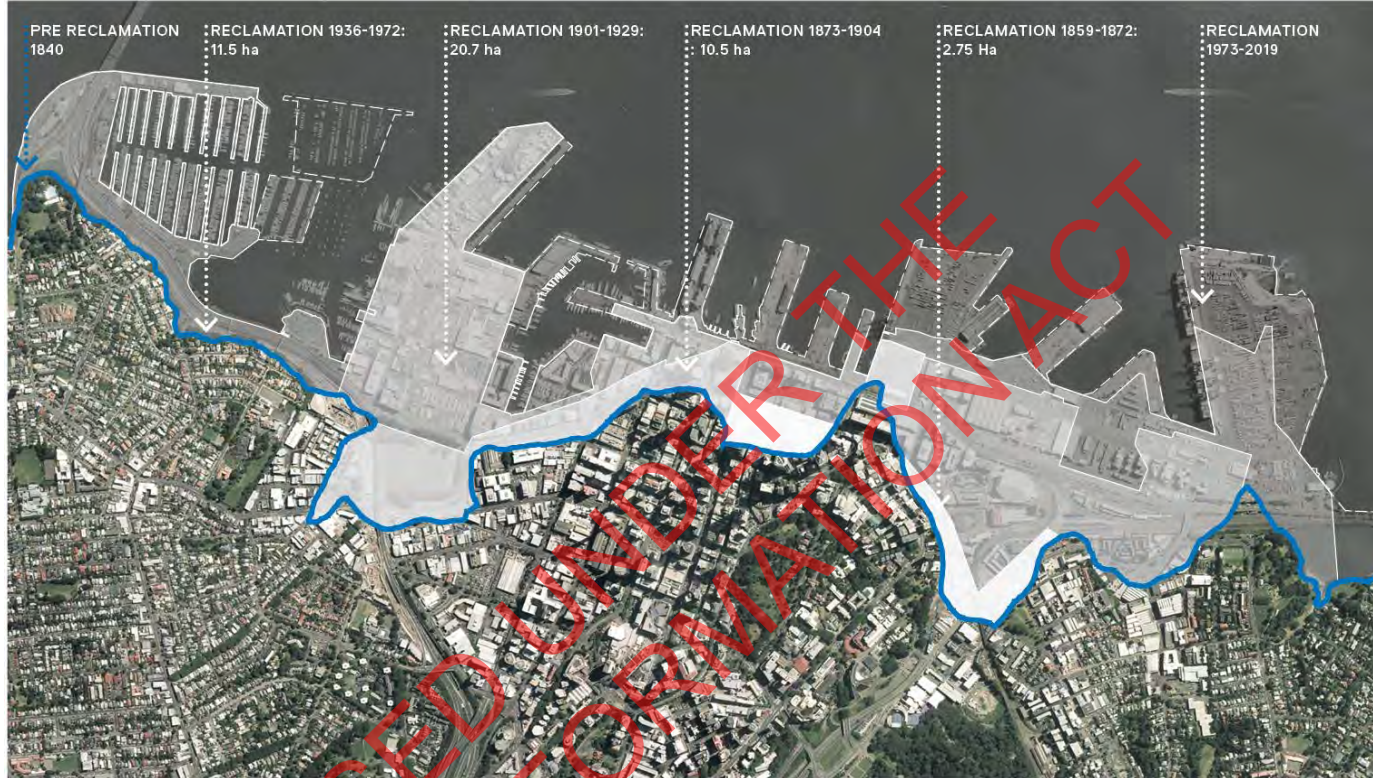
CPD GROWTH BASED ON ACC 2050 STRATEGIC PLAN & NZTE PROJECTIONS	20,150 ADDITIONAL ROOMS FOR OVERNIGHT ACCOMMODATION	58,000 ADDITIONAL HOUSEHOLDS	75,850 ADDITIONAL JOBS	8M ² PER PERSON ADDITIONAL RETAIL SPACE	
					
SECTOR	HOTEL	RESIDENTIAL	COMMERCIAL & CULTURAL	RETAIL	
CPD GROWTH BY m ²	1,209,000m ²	4,060,000m ²	1,517,000m ²	202,000m ²	
ESTIMATED % OF GROWTH GFA FOR POAL 2050	3%	15%	42%	10%	
POTENTIAL GFA	36,270m ²	609,000m ²	637,140m ²	20,200m ²	1,302,600m²
					TOTAL

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.



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 16 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 17 Masterplan Option 1) Port function is partially decommissioned and phased land development occurs at Western end of POAL site

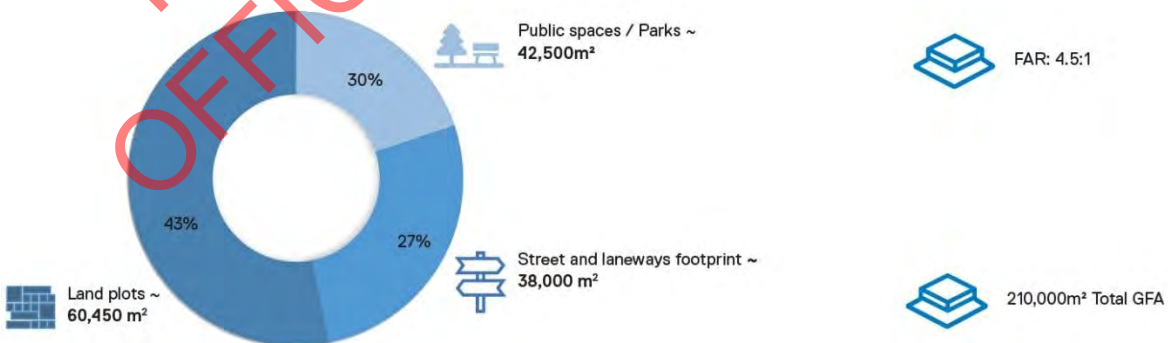
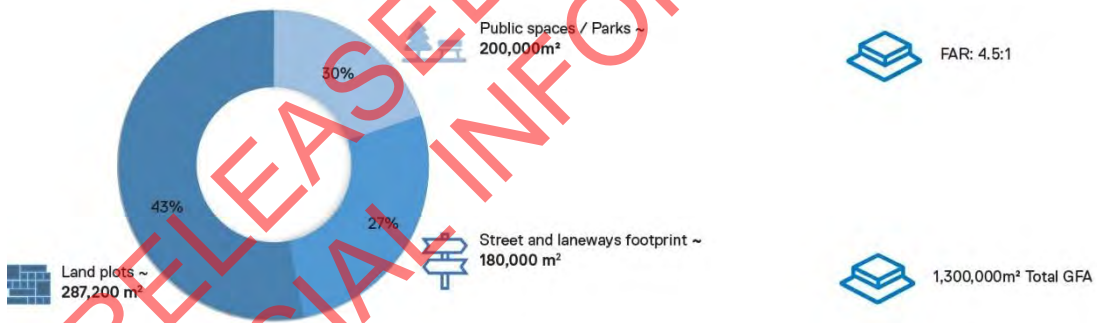


Figure 18 Masterplan Option 2) Port function is fully decommissioned



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 additional ongoing employment as a direct result of any scenario. This is because:
 - Port investment is likely to continue to focus on high-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 are expecting this to be a stepped change whereby the larger corporates would continue their relocation from the mid-town parts of Auckland to newly available land at the waterfront, which in turn leads to movement into mid-town from CBD fringe, and others such as the University of Auckland and AUT, continuing their progressive expansion
- ▶ While first-order impacts on employment are neutral, the location of employment will change in each scenario in terms of logistics and supply chain jobs. It is assumed that the majority of jobs, including rail and road, will relocate over time to the area of focus in the scenario.
 - 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.
 - The only potential risk to this assumption is whether there are sufficient opportunities for spouses of employees
- ▶ The impact of the relocation of employment is assessed on the basis of the percentage change in the size of the regional economy as a result of the quantum of the move. As an example, the relocation of 500 employees from Auckland will have a negligible impact on the economic shape and size of Auckland, while those same 500 employees will have a material impact on the size of the Northland economy
- ▶ Flow-on impacts from this spatial reallocation of employment into the focus regions is considered, and again, is a function of the relative sizes of the economy. Any reduction in Auckland is highly unlikely to result in a reduction in the need for services associated with the change. However, a material first-order increase in employment in a smaller area such as Whangarei will result in the need for additional services in areas such as education, health etc.
- ▶ Small positive impacts from land use change in Auckland are assumed. This is associated with an increase in economies of scale and move to more productive jobs associated with agglomeration impacts of greater density and focus in the CBD

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 Multicriteria 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 monetizable benefit cost analysis.

A benefit cost analysis 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 North Auckland Line.

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

Examples of the considerations to be explored within Cost Benefit 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 Benefit Cost Analysis is the deployment of the new procedure around Dynamic Wider Economic Benefits, and in particular, the land value uplift from alternative land use at the Port of Auckland site.

6.1 Benefit Cost Analysis

The results of the benefit cost analysis are as follows:

Summary Results

Relative to Base Case, Net Present Value, \$ million nominal terms

	Scenario 1.2 - Cars to Northport	Scenario 1.3 - Cars to Tauranga	Scenario 2.1 - Full move to Northport	Scenario 2.3 - Full move to Northport and Tauranga
Total Costs	12	13	1,443	1,811
Total Benefits	311	190	3,877	1,336
Net Benefits	298	177	2,433	-475
Benefit Cost Ratio	25.0	15.0	2.7	0.7

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 status quo
- 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 Auckland Port 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 status quo. 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.

6.2 Other Non Monetisable Impacts

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

[Table to discuss each of the options against the criteria]

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6.3 Financial offset of dividends from the Ports of Auckland

The benefit cost analysis, as noted above, includes a full net economic impact 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 economic analysis subsumes 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. It is assumed that annual leasehold income from a fully developed POAL footprint is assessed at \$56m million per year

Rates income from a fully developed site, based on the mix of uses and gross floor area as outlined in the scenarios is assessed at \$42 million per year.

These two income streams combined (\$98 million) compare to an annual average dividend of \$50m

6.4 Regional Economic Development

The Regional Economic Development impacts are discussed in the Scenario section in terms of the approach. The impact of each option is listed in the table below and are in addition to the impacts of the benefit cost analysis above.

[Results to come]

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7. Appendices

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From: Wayne Brown <biznewz@xtra.co.nz>
Sent: Wednesday, 3 July 2019 8:13 PM
To: Chris Money
Cc: Dan Jenkins; Shane Vuletich; Vaughan Wilkinson; Greg Miller; Susan Krumdieck
Subject: Re: UNI Ports Report - DRAFT MASTER v18 COPY TO USE.docx

Hi Chris

Thanks for this, can you please share it with my colleagues, as I am offshore it hasn't downloaded well enough to send on.

The general scenario of moving the whole port needs to be outlined in a way that doesn't lead just to the car move only. Please add in the fuel supply to Auckland that I mentioned where the Refinery are looking to site a tank farm out west as back up to the pipe and in itself this makes the Northland Rail upgrade work.

Dan, in our outline I want to talk a bit about vision in contrast to business plans.

I have just visited the port in Dubai and that was a result of the vision of the UAE leadership who also started Emirates. Ports of Dubai now own over 50 ports worldwide.

NZ lacks any big picture of where it is going and if Auckland is to be the most liveable city we need to mention that. Tauranga port came from a vision as did the move from Whangarei to Marsden Point

A move of the whole port to Northland would be transformational. We need to highlight the export growth coming from the north and remind readers that Auckland is an import city that is a drain on the economy, not its engine

Keep going

Wayne

Sent from my iPad

On 3/07/2019, at 4:22 AM, Chris Money <Chris.Money@nz.ey.com> wrote:

Hi Wayne

Attached is a work in progress draft. Wanted to share as soon as we had a degree of confidence in the numbers and have the core conclusions available.

We still have more content to go in the next couple of days – so it is possible the numbers may move around a little. We have the usual differing views between QS's and architects on costs and hope to bottom them out tonight. We will also have the wider economic impacts available tomorrow, which will materially add to the Northport option.

The basic result is we get very large benefit cost ratios for the partial move a BCR of 25 for partial move to Northport and 15 to TGA. The full move to Northport generates a BCR of 2.7. No other full move option generates a positive BCR – we actually ended up running the full BCRs for the full TGA move and the Superport. Full move to TGA is 0.3 and Superport is 0.2..

There are two key drives of the results:

- The avoided costs of developing Auckland (land side and port side) are really critical to the results, especially when combined with the alternate land use
- Mode choice is critical. We are running at 70% rail for the Northport options. If we just used current mode splits as per POAL, the BCR wouldn't get close to 1

Happy to discuss

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From: Wayne Brown <biznewz@xtra.co.nz>
Sent: Thursday, 4 July 2019 3:18 AM
To: Chris Money
Cc: Dan Jenkins; Shane Vuletich; Vaughan Wilkinson; Greg Miller; Susan Krumdieck
Subject: Re: UNI Ports Report - DRAFT MASTER v18 COPY TO USE.docx

Hi Chris

There is a lot in here and it will require some tidying, focussing and pruning which I am sure you are busy with now. My team members will all have a look and add constructively.

A few notes from my read.

Please add fuel to Northport as it goes into the same Harbour but has different ownership, but fuel is a significant part of the upper north island freight task and its ready availability underpins the freight task. The pipe is a lack of diversity so increased tank storage at Auckland West is relevant

I note Envision are not including horticulture product growth in Northland as significant. This confuses weight with value. NZ is better serviced by the upcoming growth in Northland horticulture than more plastic junk thru the Warehouse.

In the roading section AADT in north Whangarei greater than south. If you check SH1 north of Whangarei this is also true so the cost of upgrading north of Whangarei which has higher truck percentages than around Warkworth is also relevant and needs noting.

The report assumes no rail upgrade in Northland until 2034 yet our best scenario has it in 5 years, please amend to 2024

Regards

Wayne

Sent from my iPad

On 3/07/2019, at 9:13 AM, Wayne Brown <biznewz@xtra.co.nz> wrote:

Hi Chris

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Happy to discuss

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From: Shane Vuletich <shane@freshinfo.co.nz>
Sent: Thursday, 4 July 2019 12:13 PM
To: Wayne Brown
Cc: Chris Money; Dan Jenkins
Subject: UNISCS Report

Hi Wayne,

I've discussed with Chris the idea of removing the partial move options from the report as I think they're clouding the issue. The full move stacks up and I think we should focus on that. The partial move isn't really an option – I see it as the first stage of a full relocation process. Are you happy with the report being re-cut to reflect that? Chris is happy with this as it makes a few problems go away (including insanely high BCRs for the partial move). Thanks,

Shane

Shane Vuletich
Managing Director



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From: Wayne Brown <biznewz@xtra.co.nz>
Sent: Thursday, 4 July 2019 6:06 PM
To: Shane Vuletich
Cc: Chris Money; Dan Jenkins
Subject: Re: UNISCS Report

I think you are right and all we need to say is that a first step in the move is the cars which also has a positive BCR and gets the rail upgrade positive sooner

WB

Sent from my iPad

On 4/07/2019, at 1:12 AM, Shane Vuletich <shane@freshinfo.co.nz> wrote:

Hi Wayne,

I've discussed with Chris the idea of removing the partial move options from the report as I think they're clouding the issue. The full move stacks up and I think we should focus on that. The partial move isn't really an option – I see it as the first stage of a full relocation process. Are you happy with the report being re-cut to reflect that? Chris is happy with this as it makes a few problems go away (including insanely high BCRs for the partial move). Thanks,

Shane

Shane Vuletich
Managing Director

<image001.png>

+64 9 378 1022 | www.freshinfo.co.nz

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From: Chris Money <Chris.Money@nz.ey.com>
Sent: Monday, 8 July 2019 9:00 PM
To: Wayne Brown; Shane Vuletich; Greg Miller; 'Susan Krumdieck'; Vaughan Wilkinson
Cc: Dan Jenkins; Stephanie Dorne
Subject: RE: Uniscs Report
Attachments: UNI Ports Report - DRAFT MASTER to Working Group Monday 8 July.docx

Follow Up Flag: Follow up
Flag Status: Flagged

Hi all

Please find attached a comment-ready draft.

A couple of outstanding items we will be working through in advance of receiving comments:

1. There are a number of outputs in this report that are absolutely critical to the analysis (avoided POAL development costs, freight costs and mode share and leasehold/rates income to Auckland Council from alternative land use). I am asking my team to triple check and confirm with me that they are happy with each of these and are willing to stand by them. The analysis is very sensitive to changes in these key assumptions and I am confirming that these are based on each team member's industry leading knowledge.
2. I will go through a process of reconciling all the Working Group's comments over the last few weeks to make sure we have them covered off. There are some work-
ons in this regard:
 - a. While we reference the Colmar Brunton work as underpinning the MCA work and the WG's scoring, we've not included the detailed findings. Suggest we either leave as is or put in an appendix
 - b. We've got the qualitative and non monetised impacts in there, but really keen to test whether they are seen as sufficient (Vaughn's view critical here). I'd suggest that with a strong benefit cost ratio (2.0 for Northport), the multicriteria analysis, plus the wider economic impacts, and the Warren and Mahoney visuals, there is enough in there.
 - c. The "interim step", plus the 5/15 year strategy is not reflected strongly enough. You'll note much of the analysis still references 30 years – which is appropriate to define the key issues, but we then need to reconcile back to the 5/15 year approach – clearly stating that the key issues are actually addressed by a rapid move – namely a large part of the value is driven by removing the need to invest in POAL, and then moving progressively to an alternate land use.
3. Appendices to be added – these will be detail and not material to your commentary. You will note we do not have the detailed MCA scoring in the body of the report. I will include this in the appendix, along with other detail.
4. We need to do a final check reconciling the numbers in every table. The core BCR is correct, but at least one table still mentions NAL as part of the base case (which its not). I've deliberately not included the Total numbers in the scenario summary tables until this final line by line reconciliation is done.
5. Some formatting (consistent color scheme) and spelling and grammar, and correct footnoting an figure references (done it several times already but still not satisfied).

Dan – the more I look at the freight story in here, the more I'd like the update of the NFDS to be incorporated, as I feel it would be a shame not to have 2019 NFDS figures in preference to 2014. It won't change the conclusions, but as you note, there are some changes, and some areas where the Ministry has a view (e.g. Cars – Ministry vs POAL projections).

Chris

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Economic Analysis of Upper North Island Supply Chain Scenarios

DRAFT

8 July 2019

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Transmittal letter

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Executive Summary

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

In May 2019 the Ministry of Transport appointed a consortium led by Ernst & Young Limited (EY)¹ to perform an economic evaluation of potential Upper North Island (UNI) supply chain configurations. 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.

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 (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 can either be referred to as the "UNISCS Working Group" or the "Working Group".

The Working Group is entrusted with the responsibility of developing a plan for an efficient freight network (ports, land and rail and road networks) for the UNI region that will deliver the best long-term outcomes for New Zealand. The planning will focus on designing an efficient supply chain network to ensure smooth movement of cargo and containers across the regions. Additionally, the Working Group is tasked with assessing the existing landside network infrastructure (rail, roads, and inland freight terminals), potential upgrades and new infrastructure requirements as well as optimising land use to ensure greater returns to all the stakeholders, particularly the government and the community.

In pursuit of its objectives, the Working Group has come up with a three-stage approach, at the end of which the Working Group intends to submit a comprehensive recommendation to the government for a holistic development of the UNI supply chain network, this also includes the socio-economic impact of the UNI region. This report is one sub-part of one stage of the three-stage approach where the Working Group seeks to assess the development of UNI supply chain (UNISC) scenarios as well as undertake an economic evaluation of those supply chain scenarios.

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

This report uses a conventional economic assessment, using a combination of multicriteria analysis (to help shortlist options and identify non-monetisable impacts) and benefit cost 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 approach uses a combination of a bespoke model built for this study, and EY's existing multimodal freight model, which has been used regularly by the Ministry of Transport, NZTA and KiwiRail in the last few years.

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

Scenarios have been developed looking at a combination of 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 the one of the most critical and fixed origins and destinations for freight 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 UNI supply chain. 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.



Scenarios were developed that offer a mix of:

- ▶ **Ports:** Consideration have been given to Northport, Port of Tauranga, a combination of both and potentially a "Super 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

¹ The consortium includes Advisian, Warren&Mahoney and WT Partnership.

This has resulted in the initial development of two headline scenarios of a Partial Move and a Full Move of the Ports of Auckland. Within each of these headline scenarios, different locations were considered, as shown in the diagram below:

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 → Vehicles
 → Cargo / Marine Services

BASE CASE

NO INTERVENTION

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



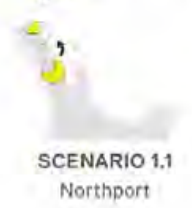
SCENARIO 1

PARTIAL INTERVENTION

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



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SCENARIO 2

FULL INTERVENTION (EXCEPT CRUISE FACILITY)

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



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

Analysis of freight flows, and investment needs concluded that scenarios that moved towards reliance on a single port, with the supporting logistics and supply chain, produced the worst outcomes. This includes the consideration of the Port of Tauranga undertaking the majority of the UNI port tasks, and the development of a Super Port, separate from the three current ports.

These scenarios produced the highest costs, and reduced the resilience of the UNI supply chain. Both scenarios also involved the highest proportion of investment in new assets and failed to leverage the capacity of the northern Auckland and Northland region.

.....but the long term, better outcomes can be achieved by building a more integrated logistics and supply chain with a reduced focus on the Auckland CBD.....

Over the long term, the analysis of a range of potential scenarios demonstrates that a logistics chain that is supported by a greater reliance on Northland produces positive net benefits.

However, a full move scenario is only economically viable should the costs of infrastructure and the economic impact (monetisable time/freight cost, emissions, congestion etc) of any lengthening of the logistics and supply chain be materially less than the benefits gained through a reduced reliance on a central Auckland location.

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

The scenario modelling of a “Full move” to Northport, with associated land side investment results in a benefit cost ratio of 2.0. The “Full Move” scenarios shared between Tauranga and Northport does not generate net economic benefits, mainly due to the much higher land-side infrastructure requirements. This is shown in the table below:

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	3,611	509	701	1,336
Net Benefits	1,835	-3,017	-2,717	-2,034
Benefit Cost Ratio	2.0	0.1	0.2	0.4

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 latent capacity in both land-side and port side through a number of comparatively low-cost investments
- The ability to defer major investment in port capacity at the Ports of Auckland, and the supporting land-side infrastructure that connects the port to the wider UNI logistics and supply chain
- The resultant freeing up of a part of the Ports of Auckland footprint to alternative, significantly higher value land use.

The benefit cost ratios of these scenarios, compared to the status quo scenario is 6.8 if the interim move is directed to Northport, and 4.1 if directed to Tauranga.

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

Auckland benefits from a full move in a number of ways.

Firstly, Auckland Council and ratepayers benefit from the switch of the Port to an alternate land use. Presently, POAL delivers a dividend to the Auckland Council of around \$50 million per annum. An alternative land use for the port footprint has the potential to generate both rates income for the council. In addition, if waterfront land is leasehold, as it is with the majority of the Auckland CBD waterfront (Viaduct and Wynyard Quarter), significant leasehold income could also be expected to accrue to Auckland Council.

The analysis has considered two potential masterplan scenarios (one full, one partial/interim) for an alternate land use that looks at a mix of commercial, residential and recreational land use. The table below shows the potential returns to the Auckland ratepayer from an alternate land use:

	Current dividend	Alternative Rates income	Alternative leasehold income	Net annual financial benefit/(loss) to ratepayers
Interim Move	\$50m	\$7m	\$13m	N/A ²
Full move	\$50m	\$42m	\$56m	\$48m

The quantification of additional income does not include the potential value uplifts of the areas surrounding the port from the alternative land use.

Additionally, no scenario involves the closure of the Ports of Auckland. Most notably, POAL will still service the rapidly growing cruise industry, which is an important part of Auckland's tourist economy. POAL would still provide tugs, berth space, and ship servicing to this industry, and a range of other maritime users. As such, it is possible that POAL will continue to provide a dividend to Council.

POAL's shareholdings in Marsden Maritime Holdings and North Tugz, as well as their holdings in inland ports would all also benefit from a full move scenario to Northport.

Auckland also benefits from the alternative land use on the POAL footprint. The hypothetical masterplan includes significant recreational spaces for the people of Auckland, as well as a material net increase in Auckland's developable land supply for both commercial and residential use, which could be expected to cascade into the wider Auckland region.

The scenario analysis is based on the traditional freight hubs of South Auckland maintaining a critical role in the logistics and supply chain, but also envisages additional employment and investment in Auckland's Northwest with the development of a major freight hub in that area.

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

...and Northland.....

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

First-order employment comes through additional investment in logistics, warehousing and distribution hubs. It is also expected that a proportion of those who work in the sector (e.g. some truck drivers) would relocate from Auckland to the

² 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.

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 employment 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, an additional economic impact to the Northland economy drive an additional 2,000 jobs and a net economic benefit over 30 years of \$200 million

.....and Tauranga.

Tauranga benefits from all scenarios. This is firstly because while the scenarios discuss “full moves”, they are designed, not based on a prediction of where freight will go, but on providing enabling infrastructure. As such, under all scenarios, Tauranga can expect an uplift in freight demand.

Employment impacts are expected to be less than Northland moves. While nominal changes may be broadly the same, the direct and flow-on impacts to the Bay of Plenty economy are less, because of the relative size of the economy.

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

As noted above, 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, not the Working Group have assumed the ability to “direct” freight forwarder preferences for ports.

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

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 lengthening of the logistics and supply chain.

The Working Group took a pragmatic approach towards determining 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 status quo. 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.

....and alternative land use.

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.

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	○ All scenarios increase transport costs and environmental impacts relative to the status quo	81
	• These costs are offset by two critical dynamics that are mutually inclusive:	81
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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 its goods to the world as well as to access the many manufactured commodities it does not produce domestically. **New Zealand's freight volumes are expected to grow significantly over the medium and long term which is going to have a drastic impact across the supply chain. 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.**

Ports allow local producers to reach larger markets overseas, and local consumers to access imported goods. The presence or absence of a port has a significant effect on the cost of doing business and the cost of living within a region. Furthermore, ports also act as a vital source of employment which adds significant value to New Zealand regions and communities.

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 can either be referred to as the "UNISCS Working Group" or the "Working Group".**

The Working Group is entrusted with developing a plan for an efficient freight network (ports, land and rail and road networks) for the UNI region that will deliver the best long-term outcomes for New Zealand. The planning will focus on designing an efficient supply chain network to ensure smooth movement of cargo and containers across the regions. Additionally, the Working Group is tasked with assessing the existing landside network infrastructure (rail, roads, and inland freight terminals), potential upgrades and new infrastructure requirements as well as optimising land use to ensure greater returns to all the stakeholders, particularly the government and the community.

In pursuit of its objectives, the Working Group has come up with a staged approach, at the end of which the Working Group intends to submit a comprehensive recommendation to the government for a holistic development of the UNI supply chain network. This includes the socio-economic impact of the UNI region. This report is one part of the staged approach where the Working Group seeks to assess the development of UNI supply chain (UNISC) scenarios as well as undertake an 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 planning³.

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 of⁴:

- ▶ 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.

³ <https://www.transport.govt.nz/multi-modal/keystrategiesandplans/upper-north-island-supply-chain-strategy/questions-and-answers/>

⁴ <https://www.transport.govt.nz/multi-modal/keystrategiesandplans/upper-north-island-supply-chain-strategy/questions-and-answers/>

- ▶ Potential priorities for transport-related infrastructure investment from a national economic and regional development perspective
- ▶ 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 this review in three stages. Each stage will involve preliminary reports and the final strategy recommendations will be communicated to Ministers, stakeholders, media and public⁵.

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, 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

1.3.4 Key Findings to Date

The Working Group have been provided with a terms of reference⁶ 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 further 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, to work in conjunction with other transport mechanisms. In addition to this, the working group fundamentally believes that there is no point making further investment in Northport without investment in, and development of an upgraded train line from Northland to Auckland.

The working group engaged with 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-port freight system, as well as 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.

⁵ UNISCS Working Group Interim Report

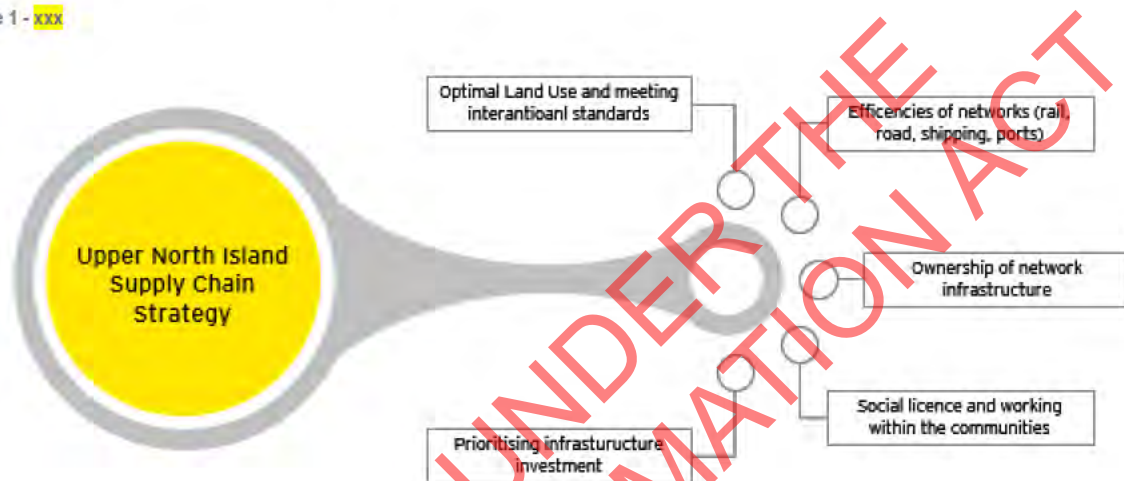
⁶ https://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/cc9d34704a/UNI-Cabinet-Paper-and-Terms-of-Reference_no-redactions.pdf

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 think 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. It was indicated that 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 1 - XXX



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

In May 2019 the Ministry of Transport has appointed a consortium led by Ernst & Young Limited (EY)⁷ to perform an economic evaluation of potential UNI logistics and supply chain. This report examines a range of potential scenarios for supply chain investment, taking account of regional development impacts as well as transport outcomes, in line with the Working Group's Terms of Reference.

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 ordered in line with answering the key questions of evaluating the potential supply chain scenarios. 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 all 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

⁷ The consortium includes professional services consultancy Advisian, architects, Warren and Mahoney and Quantity Surveyors WT Partnership.

3. The Base Case and Understanding the Pressure for Change
4. Scenario Description
5. Results

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2. Approach to Analysis

The approach to the analysis is based on evaluating scenarios as per a number of principles outlined 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 to this, two timing scenarios have also been taken into consideration as this has allowed the Working Group to understand the impact of time and scope of a partial move and provide a more sophisticated understanding of the key scenarios. 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 benefit cost 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 over and above the standard economic evaluation approach include:

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

This analysis takes into consideration conventional development economics where a dollar spent in the regions has more stimulus value than that same dollar spent in an urban environment.

2. The deployment of the new dynamic land use approach

A procedure for valuing alternate land use was developed for the Working Group's options generated. This alternative land use value was the single biggest component was ironed out technical land-side value of time issues associated with a potential lengthening of the logistics and supply chain for some of the goods imported or exported from Northport.

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 analysis on how benefits can be maximised and costs minimised through different mode splits in the logistics and supply chain, including congestion, emissions, maintenance and safety. Additionally, the model is also takes into consideration full land-side freight analysis. The model itself fully reviewed and accepted by Treasury, MoT and NZTA.

4. Use of the new Resilience assessment framework

Until recently, there has been limited ways through which resilience could be factored into project analysis. In 2016, EY was commissioned by NZTA to undertake a year-long study into how this could be better done. The new resilience analysis approach was taken into account for this analysis which had a material impact on the effects of watch of the scenarios.

3. The Upper North Island Logistics and Supply Chain – Current and Future

3.1 Country Overview

The freight sector in New Zealand is wide ranging, and impacts a number of complementary sectors including retail, manufacturing, agriculture, forestry, etc. The freight sector plays a different role across various industries. For example, approximately 20% of all inputs into the petroleum and coal manufacturing sector consist of freight 'costs', compared with life insurance representing 1%. 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.⁸

On a global scale, New Zealand has the 57th largest, and 41st most complex economy according to the Economic Complexity Index (ECI). In 2017, New Zealand exported US\$37.3 billion and imported US\$36.3 billion, resulting in a positive trade balance of US\$988 million.

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).⁹

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.

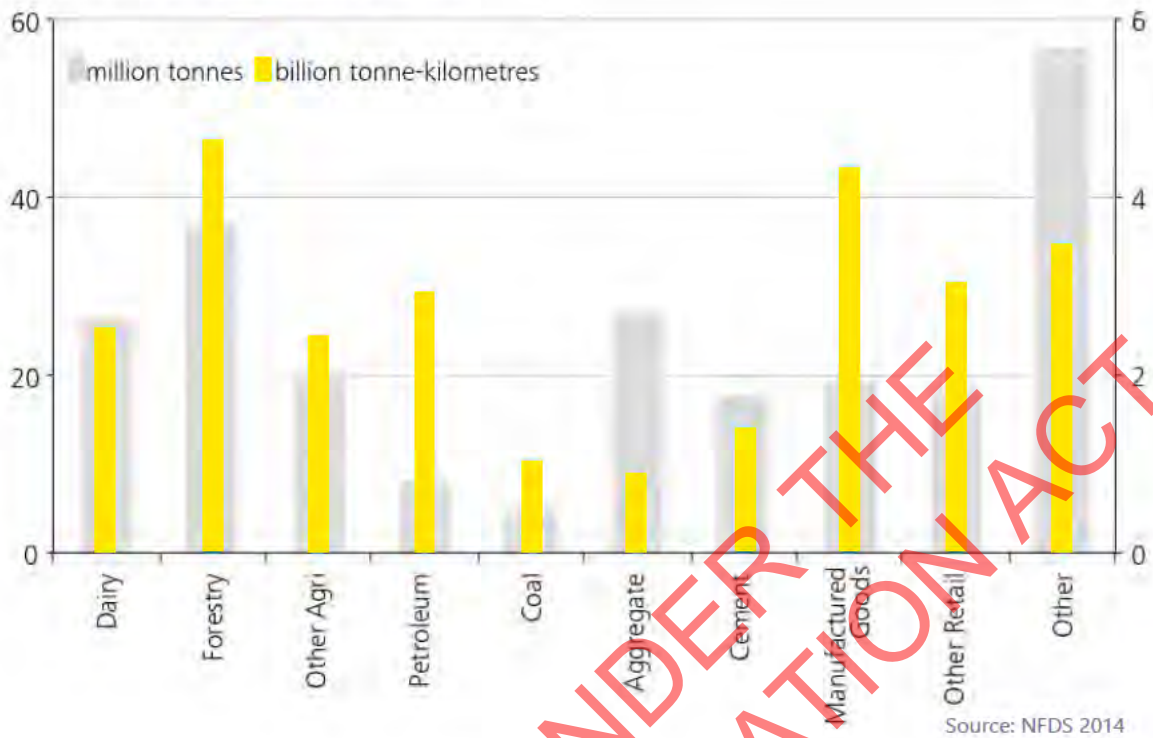
Forestry has grown as a result of favourable export conditions and a buoyant construction sector. Dairy exceeds the tonnage of all other agricultural commodities, including livestock, meat, wool, horticulture, grains, and fish.

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.

⁸ *Identifying freight performance and contextual indicators*, NZ Transport Agency research report 651 (December 2018)

⁹ The Observatory of Economic Complexity 2017: <https://atlas.media.mit.edu/en/profile/country/nzl/>

Figure 2 New Zealand Freight Generated by Commodity

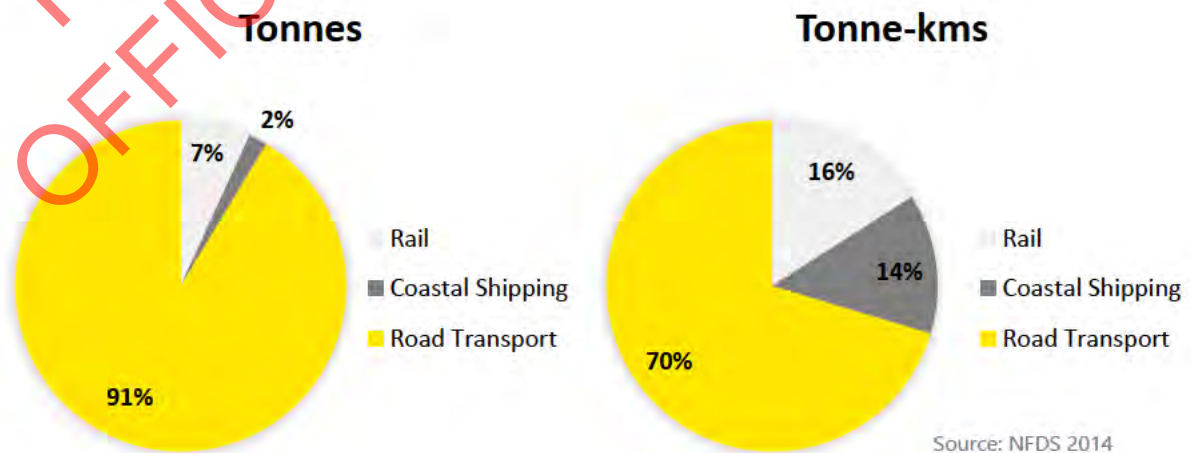


3.1.2 National Freight Task

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

Figure 3 Overview of Freight Task by Mode



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

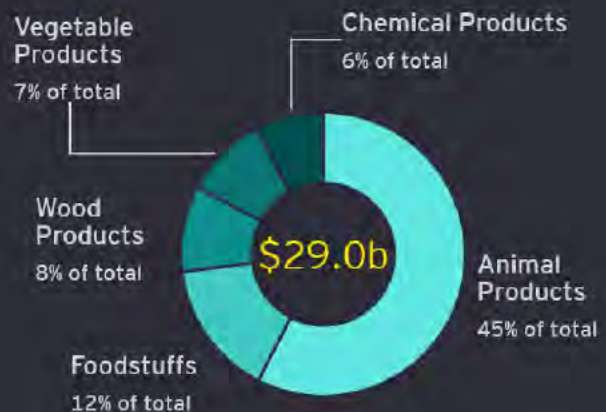
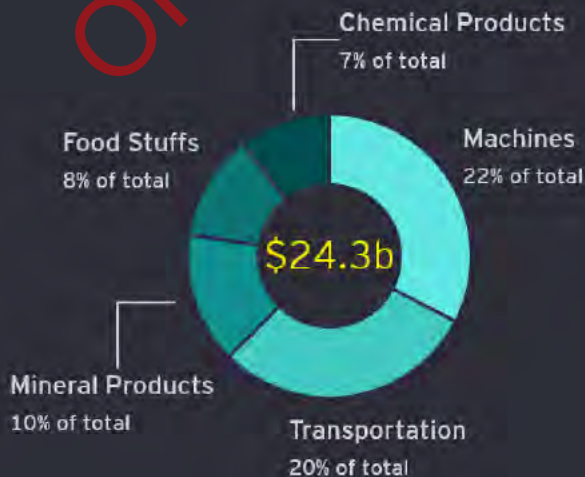
\$0.37b
Chile, Peru, Brazil

\$0.21b
South Africa, Ghana, Morocco

\$1.4b
Algeria, Nigeria, South Africa

2017 USD values sourced from the OEC

Key Products



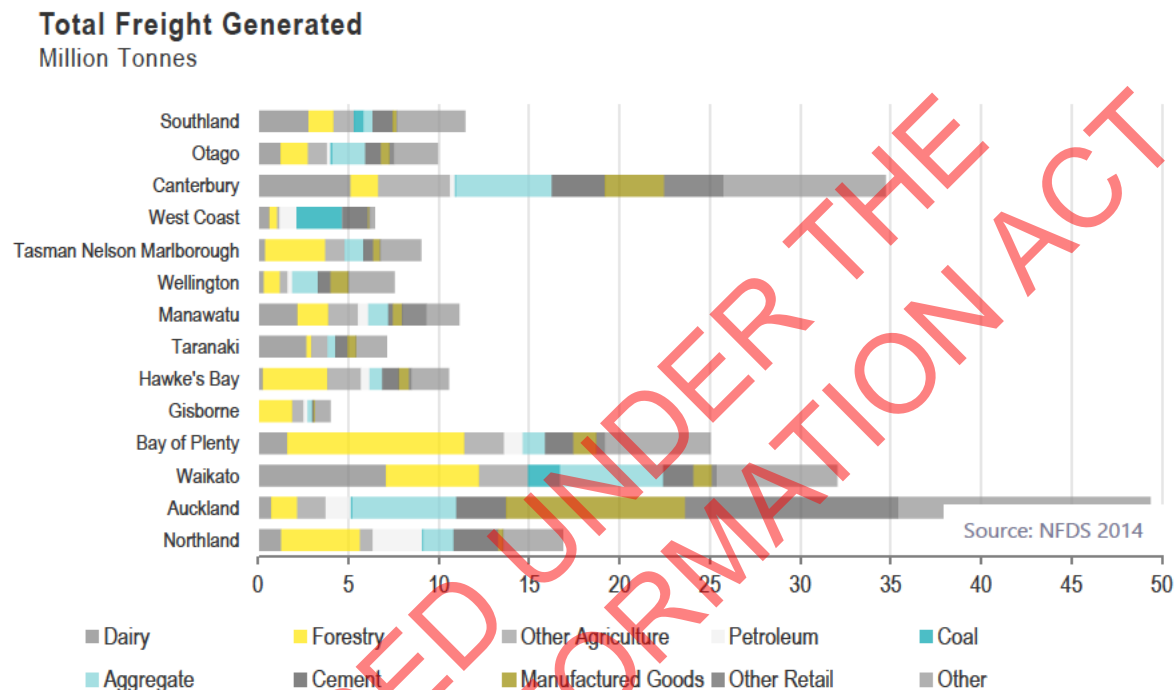
All amounts in USD
Source: The Observatory of Economic Complexity 2017

3.2 Regional Freight Flows ¹⁰

3.2.1 Regional Freight Generation

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. The most dominant freight generator in the South Island is Canterbury, which produces 15% of the national freight task ¹¹.

Figure 4 Commodities by Region



The primary sector is largely located in the Waikato, Taranaki, Manawatu, and Southland 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.

Coal production on the West Coast is principally exported from Lyttelton, whereas Waikato coal production serves the domestic market in the UNI. However, the low cost and environmental impact is leading to decreased demand for coal.

Northland and the West Coast both have cement manufacturing plant that distribute cement via coastal shipping and then road and rail. However, the West Coast plant is being superseded by direct import. The Tiwai Point Aluminium Smelter in the South Island (Southland) accounts for approximately 10% of the region's total freight flows, while largely generating direct import/export flows.

3.2.2 Modal Share

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

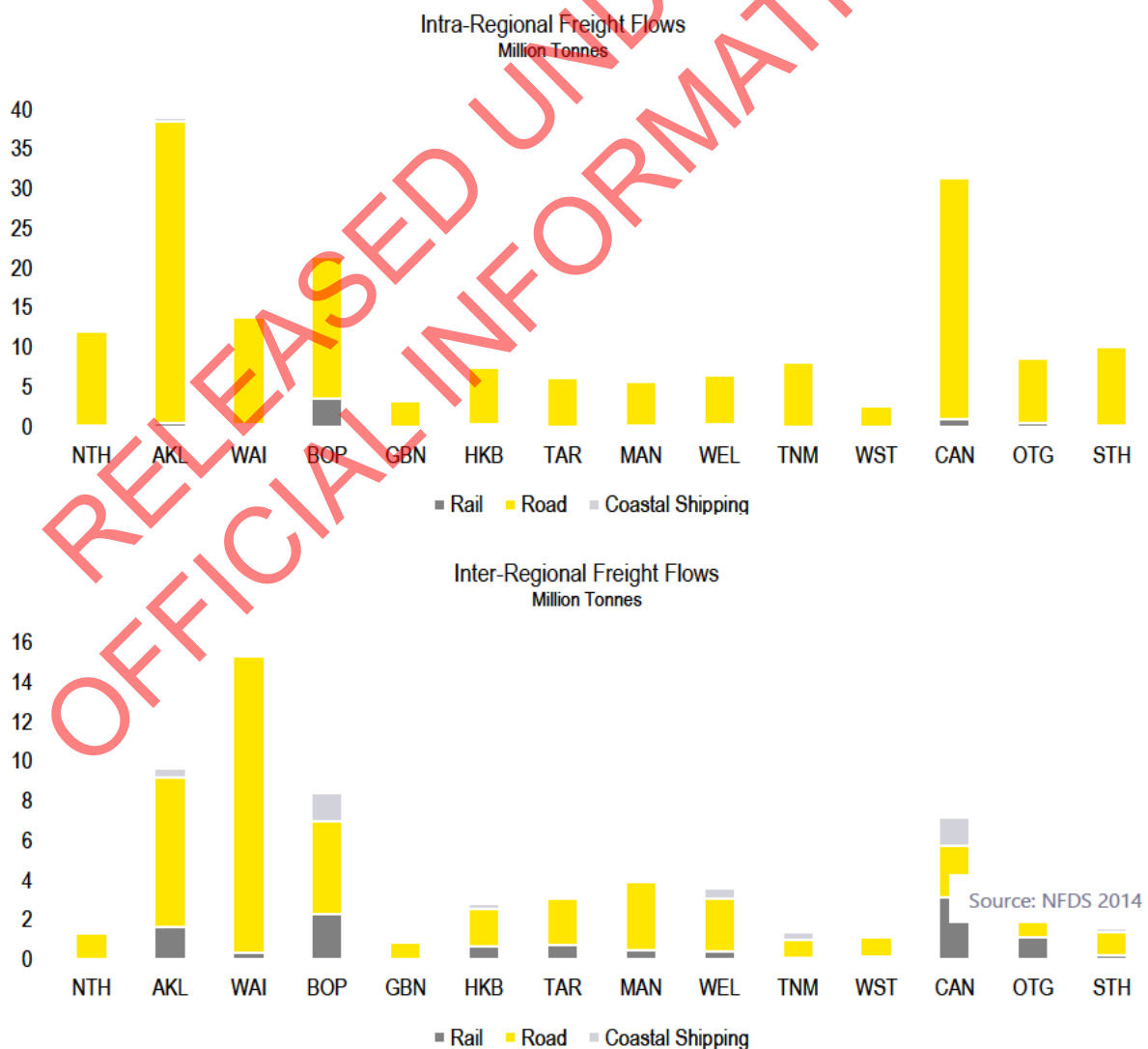
¹⁰ Information from this section is largely based on the Deloitte New Zealand Ports and Freight Yearbook 2016

¹¹ Information from this section is largely based on the Deloitte New Zealand Ports and Freight Yearbook 2016

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%.¹²

Modal share competition is more pronounced over longer distances, as can be seen in the inter-regional freight flows (see Figure 6 and Figure 6). Despite this, road remains the most dominant form of transport. This could be attributed to the ease of use of road transport. Road services offer greater flexibility and can be requested on demand. New Zealand's roading network is also more expansive than the country's rail and port options. As such, road can service greater areas. Rail and coastal shipping offer greater environmental benefit, however, and greater align with strategic objectives to reduce adverse environmental impact outlined in the Government Policy Statement (GPS). Rail and coastal shipping also offer cost advantages as distance increases, and may be more suitable for the transportation of long-haul or repetitive freight tasks.

Figure 7 Inter- and Intra-Regional Freight Flows

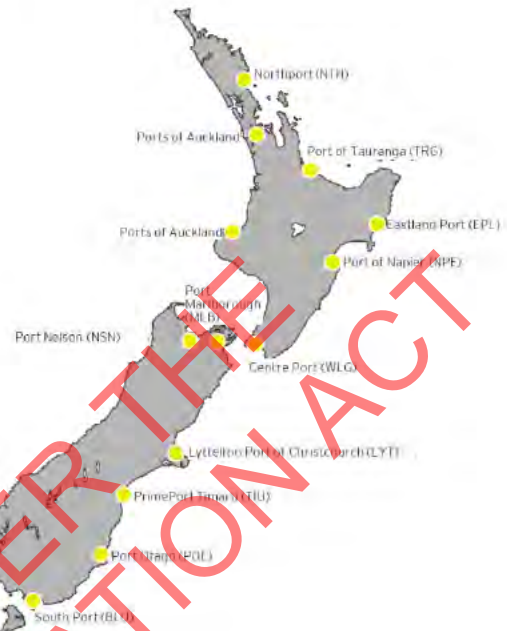


¹² Deloitte Ports and Freight Yearbook, 2016

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 GDP¹³—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 8 New Zealand Ports

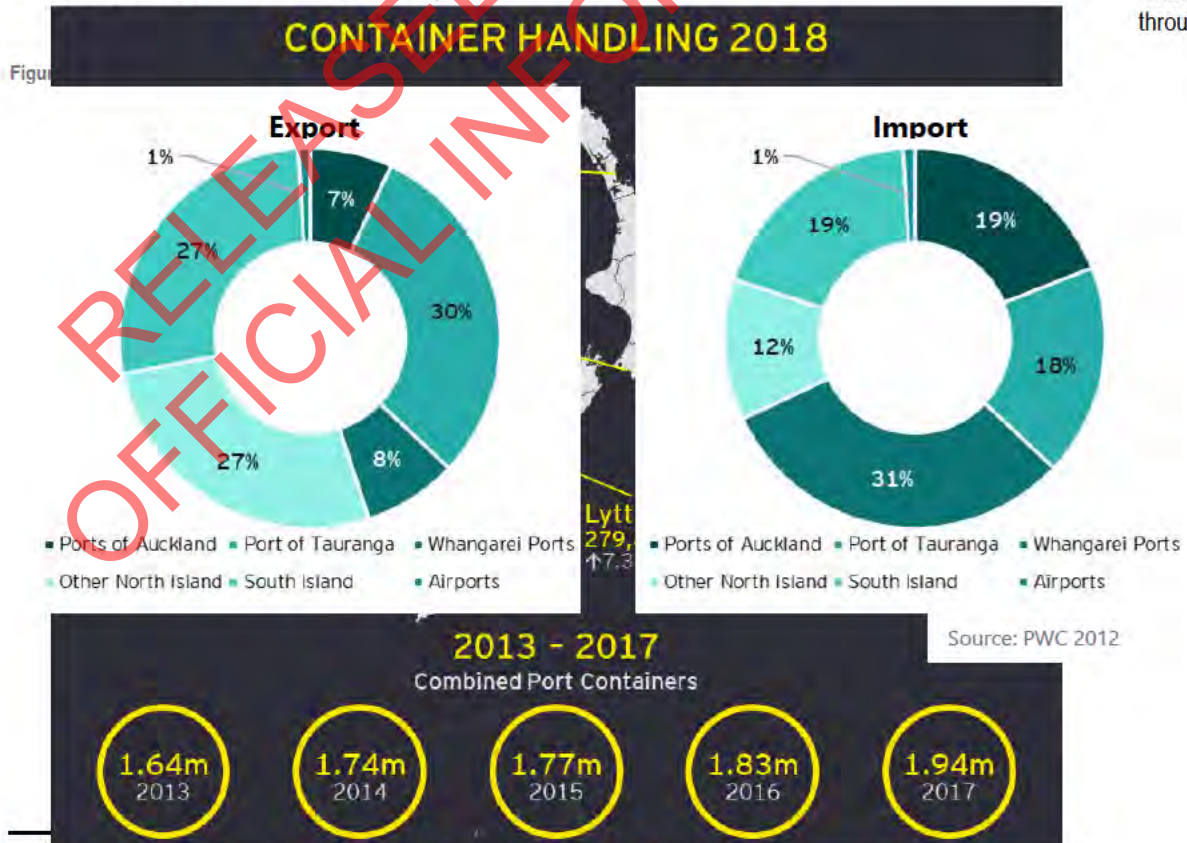


New Zealand's three leading ports are Tauranga, Auckland, and Lyttelton, with Wellington, Napier, and Otago also performing highly. Combined, POAL and POT handle 62% of New Zealand's total TEU (full and empty container inclusive). While POT is New Zealand's largest port by volume, POAL accounts for 35% of total import TEU. However, POAL's export volumes are relatively low at only 6% of New Zealand's total exports in the year ended June 2018.¹⁴ An overview of container handling for the six most significant New Zealand ports has been provided below.

3.2.3.1 The Role of the UNI Supply Chain¹⁵

In 2014, the three UNI supply chain 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 Whangarei'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

Figure 9 Annual Container Handling Statistics (2017)



¹³ <https://www.transport.govt.nz/mot-resources/research-papers/containerproductivitynzports/>

¹⁴ Working Group Interim Report

¹⁵ The following sections are based on the 2014 National Freight Demand Study. This Study is presently being updated.

Source: Champion Freight

Auckland International Airport. As such, it is evident ports are critical to New Zealand's economy and prosperity.

3.3 Northland

3.3.1 Current situation

Northland has a diverse economy with manufacturing being the largest industry followed by 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 over by 2042, around 1.1% per annum.

Northland has a forest cover of high quality pine which is suitable for a wide range of end uses. With over 190,000 hectares of planted forest, Northland has one of the largest pine resources available in New Zealand for processing. **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.

The boom in horticulture in Northland, such as growth in the production of gold kiwifruit, and manuka honey, means that the local economy has benefited significantly. In Northland 3.6 million trays of green and gold kiwifruit are grown annually. Another major exporting crop is avocado, of which 45% is being exported globally. With over 40 vineyards producing award-winning wines and Northland being the largest area in New Zealand for kumara growing.

Figure 1 shows the freight volume by route from Northland to other UNI Regions.

Figure 11 Northland Freight Volume by route

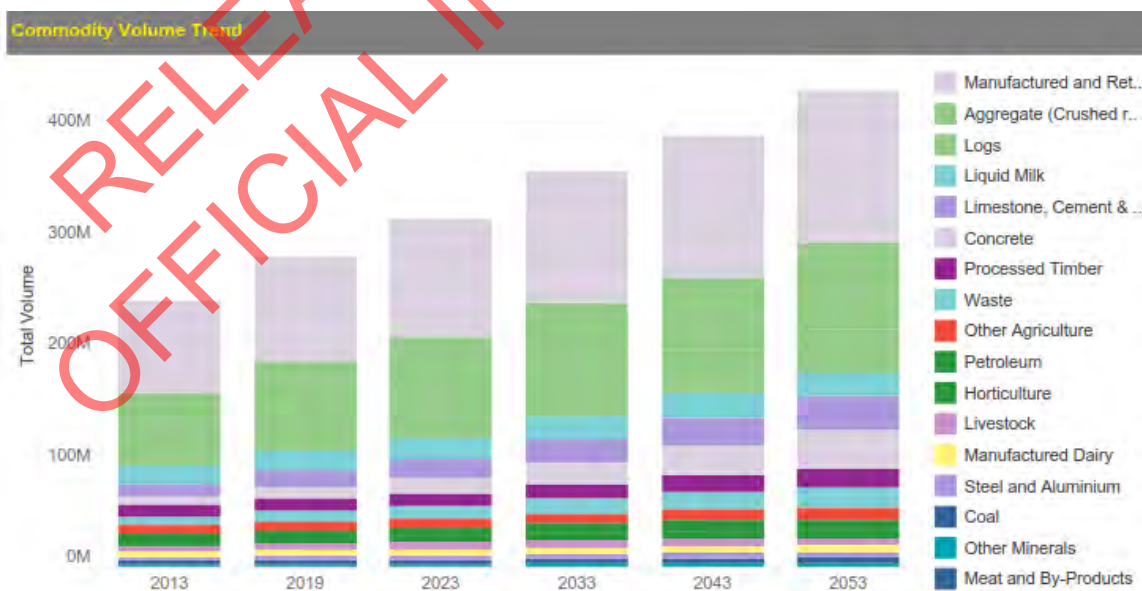


Annually, 8 million tonnes of inbound and 10 million tonnes of outbound freight movement happens between Northland and other major UNI regions as shown in the data figures below –

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. As forestry is a major driver of exports at Northport, forecasts for 2019 to 2049 were therefore updated using the latest data to reflect the harvest cycle of Northland Forests¹⁶. 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.



3.3.3 Impact on the mode of transport in Northland

¹⁶ Northport Wood Availability Forecast, 2018.

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.

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 Northland. 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) 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**.

3.4 Auckland

3.4.1 Current Situation

The Auckland region accounts for 35% of the New Zealand population, 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 operations¹⁷.

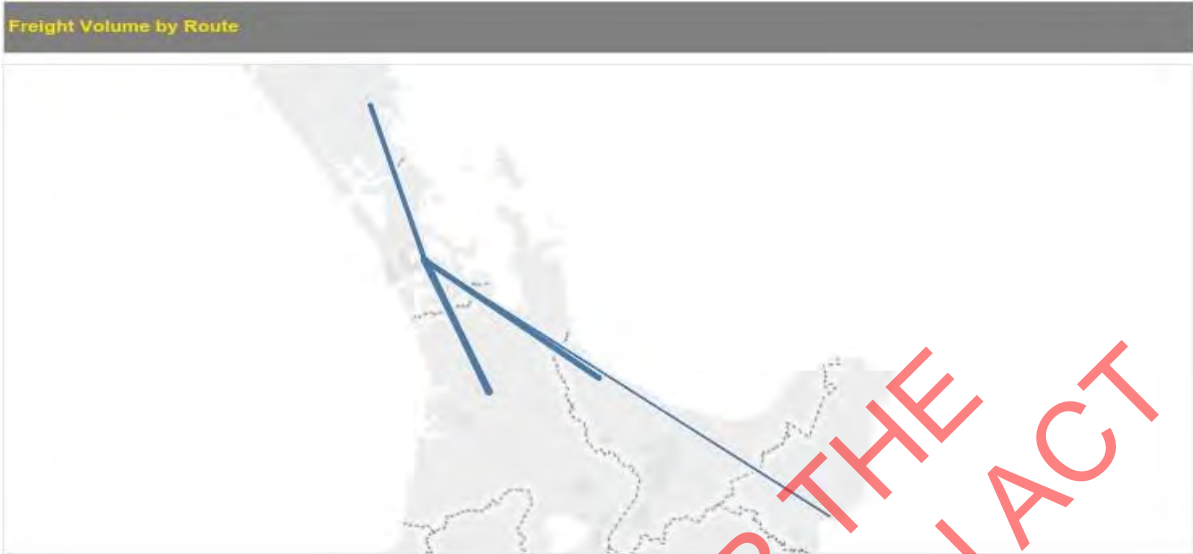
POAL is import dominant **in large part due to their proximity to New Zealand's largest consumer market, Auckland. All of POAL's freight hubs are strategically located next to rail and are at the centre of current and planned freight generation and consumption areas.**

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

Figure 12 Auckland Freight Volume by route

¹⁷ UNISCS Working Group Interim Report



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

Inbound Volume	Outbound Volume	Total Volume
33M T	30M T	64M T

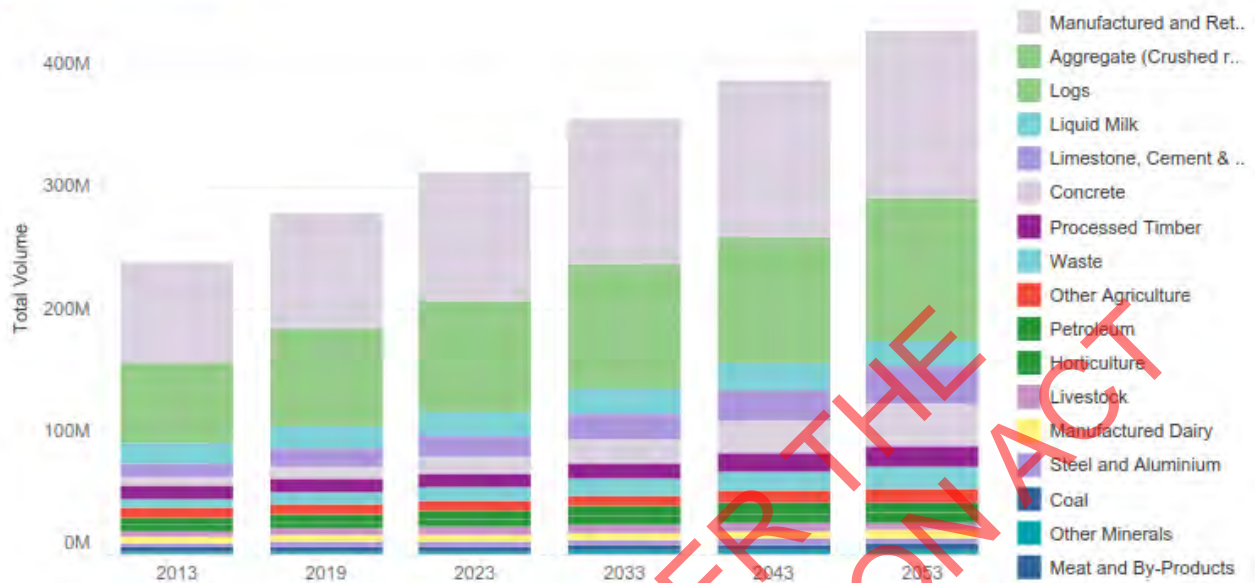
Volume Summary Between Auckland and Listed Location			
Location	Total Volume	Inbound Volume	Outbound Volume
Auckland	46,169,090	23,084,545	23,084,545
Waikato	7,971,997	2,802,156	5,169,841
Bay of Plenty	5,846,685	3,326,473	2,520,213
Northland	3,470,238	1,005,883	2,464,354
Gisborne	238,600	155,735	82,865

3.4.2 Future trends - Auckland

The chart below indicates the potential growth in the sector wise growth scenario 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 Port of Tauranga has an agreement with Kotahi, the logistics company owned by Fonterra Cooperative Group and Silver Ferns Farms to export dairy products.

Commodity Volume Trend



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 472,00 and 621,000 cars in 2049.¹⁸

3.4.3 Impact on the mode of transport in Auckland

The combination of increased freight activity within Auckland and significant growth in population (10% between 2014 and 2018) has led to congestion problems in Auckland where there has been a rapid increase in the demand for travel. It has been observed that over 700 additional cars are being registered in Auckland every week, the city has also witnessed a record growth in the public transport use as well, with annual public transport boarding increasing by almost 30 percent over the last four years between 2014 and 2018¹⁹.

The majority of POAL trade volumes are distributed via the road network (see Figure 3). PWC's 2012 report for the Strategic Alliance²⁰ 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.

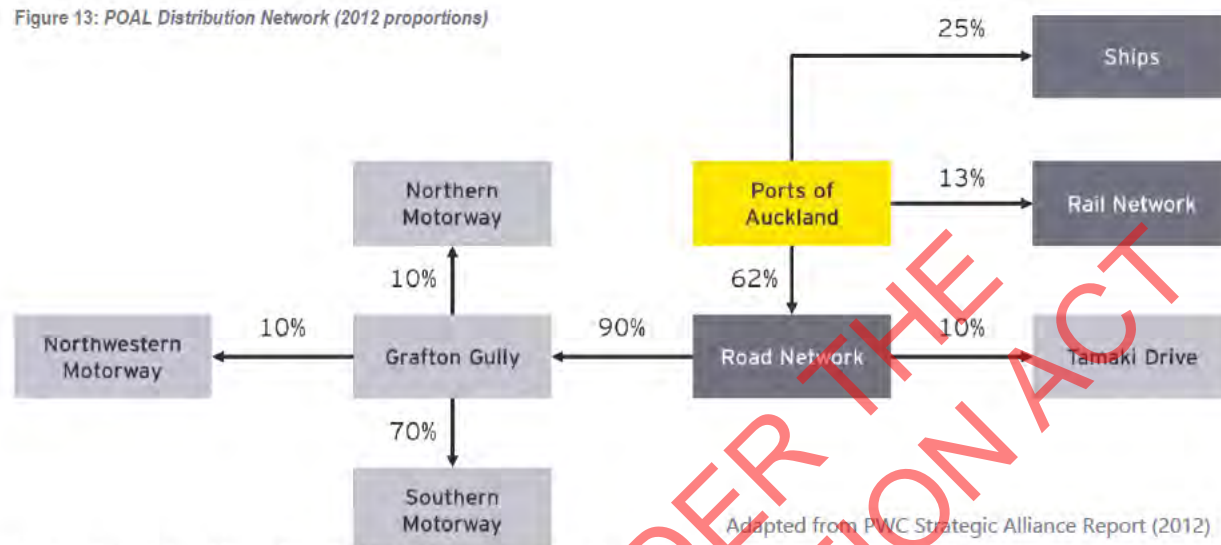
¹⁸ Note that these projected figures use Ports of Auckland 2018 Annual Report figures and therefore will not align with the import tonnage, as Ports of Auckland and the Ministry of Transport, Statistics New Zealand data

¹⁹ <https://www.transport.govt.nz/land/auckland/the-congestion-question/>

²⁰ *How Can We Meet Increasing Demand for Ports in the Upper North Island*, A report for the Upper North Island Strategic Alliance, PWC 2012.

Similarly, rail traffic from POAL is projected to increase between 78% to 94%⁵³ by 2041. Future demand for passenger services 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.

Figure 13: POAL Distribution Network (2012 proportions)



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 this line.²¹ 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.

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 route²². Currently clip-on lanes are open to 50-tonne maximum heavy vehicles. Heavier vehicles are only able to use the truss bridge lanes²³.

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 pace²⁴.

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

Port of Tauranga, 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 2016 and 2017 its exports and imports increased by 8.0% and 13.7% respectively,

²¹ *Wiri to Westfield, The Case for Investment*, WSP & Parsons Brinckerhoff, December 2016.

²² <https://www.nzta.govt.nz/commercial-driving/high-productivity/full-hpmv-network-map/>

²³ <https://www.newstalkzb.co.nz/news/national/auckland-harbour-bridge-strengthened-against-risk-of-catastrophic-failure/>

²⁴ Page 12.

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.²⁵

Just over half of all cargo volumes are either transhipped (transferred from one ship to another), transported by rail or carried via pipeline. Nearly 45% of all forestry exports arrive at the port by rail. 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'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 8.0% in volume to 14.2 million tonnes and imports increased 13.7% in volume to 8.0 million tonnes. Much of the increase is attributable to the large increase in total TEUs handled, from 954,006 in 2016 to 1,085,987 in the 2017 financial year²⁶. This large increase in total TEU's handled was mainly driven by a surge in log and forestry exports²⁷.

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)²⁸.

Figure 4 shows the freight volume by route from Bay of Plenty to other UNI Regions.

Figure 14 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 –

²⁵ UNISCS Working Group Interim Report

²⁶ Port of Tauranga Annual Report 2017. [Online] 2017. <https://www.port-tauranga.co.nz/download/mPau131b8dTk3/>

²⁷ <https://www.port-tauranga.co.nz/about-port-of-tauranga/commodities/>

²⁸ <https://www.noted.co.nz/money/economy/tauranga-boom-times-in-the-bay/>

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 - Bay of Plenty

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).²⁹ Advisian has assumed that imports of coal will cease in 2025, which results in a 500 thousand tonne decrease³⁰ in bulk imports into Tauranga from 2025.

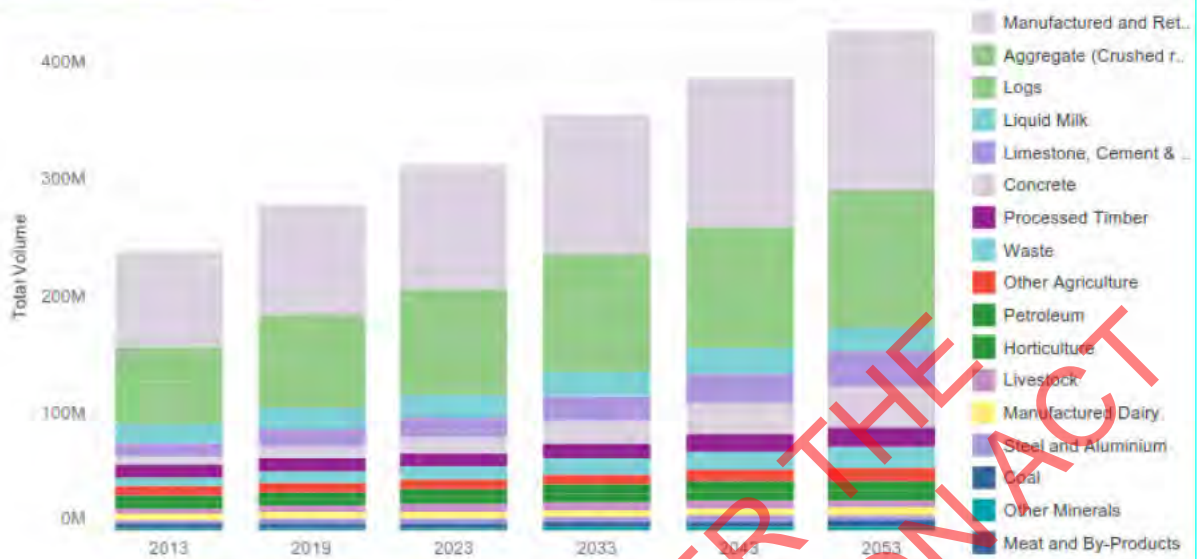
The stacked chart below indicates the potential growth in the sector wise growth scenario between 2013 and 2053 indicating that manufacturing sector will still be having a major proportion to the contribution of the BOP economy.

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²⁹ <https://www.rnz.co.nz/news/national/350390/genesis-energy-to-phase-out-huntly-coal-use>

³⁰ 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/>

Commodity Volume Trend



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

POT in comparison to POAL and Northport 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.

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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 investment 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 investment objectives:

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

4.1 Developing the Base Case

Ahead of assessing the change scenarios, a fundamental requirement is to provide a comparator of what might be expected in the absence of introduction of any different overall strategy or central decisions about the priorities or roles of different parts of the supply chain.

The base case sets out potential outcomes relating to levels of growth of the freight task through different parts of the supply chain, infrastructure investment to respond to that growth, and the likely impacts of the changes/increases in freight patterns.

4.1.1 Base Case Road and Rail Investments

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

These use a 15 and 30 year timeframe.

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Base case 2034

BASE CASE 2034		
RAIL		
Significant investments/developments	Costs (\$M)	Comment
Spur line to Marsden Pt	\$329	From NAL Business Case
Limited NAL upgrade	\$225	Assumed half of the line upgrade cost from the NAL business case
Auckland upgrades - 3rd main Wiri-Westfield, Upgrade Westfield Junction, Quay Park Junction, Electrification Papakura - Pukekohe, Various resilience and level crossing projects	\$940	From ATAP
Passing loops on East Coast Main Trunk Line	\$40	Simple loops requiring one train to stop. Assumed \$10M each
TOTAL	\$ 1,534	
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
Allowance for limited safety improvements SH29	\$ 200	Assume \$20M/yr for 10 years for corridor
TOTAL	\$ 1,685	

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Base case 2049

BASE CASE 2049		
RAIL		
Significant investments/developments	Costs (\$M)	Comment
Balance of NAL full rail connected port	\$650	Estimate based on total estimated spend of \$1.2B, less \$550M spent to 2034
Auckland upgrades - 4th main between Westfield and Wiri, 3rd and 4th main Wiri-Papakura, 3rd main Papakura-Pukekohe	\$800	Figure from ATAP
Further ECMT upgrades	\$120	Estimate - upgrade crossing loops to eliminate need to stop. Broad estimate of 4
Additional Waitemata Harbour Crossing - recent update favours LRT crossing, with road pricing implemented	\$3,000	Very high level estimate
TOTAL	\$ 4,570	
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	

4.1.2 Base Case Port Development

4.1.2.1 Northland

24 percent of Northland region businesses are categorised as agriculture, forestry and fishing³¹. This is reflected at Northport, where exports mostly consist of bulk logs. Log exports are likely to remain unchanged over the next 30 years as recently harvest trees are replanted.

Horticulture is increasing in Northland with the number of hectares of avocado orchards consistently increasing over the past few years³². Northport has also begun expanding port operations to include containerised kiwifruit exports. This expansion provides a cheaper alternative to transporting local kiwifruit south to Port of Tauranga via rail or road.³³

Freight volumes through Northport

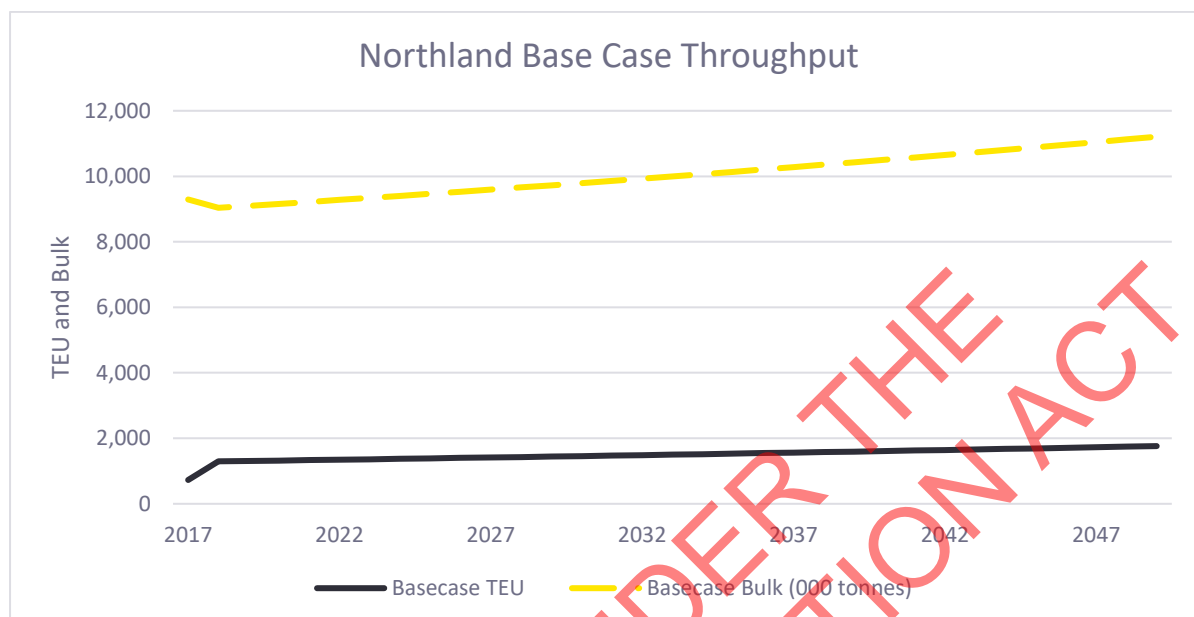
Both imported and exported TEU throughput is forecast to increase by 17% in 2034 relative to 2018 figures. This 17% increase equates to an estimated 780 exported and 740 imported TEU in 2034 (note that Northport reported 7,000 TEU in 2018 – the reason for the difference is that for reasons of consistency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

³¹ <https://ecoprofile.infometrics.co.nz/Northland%2bRegion/Businesses>

³² Stats NZ reference

³³ https://www.nzherald.co.nz/the-country/news/article.cfm?c_id=16&objectid=12093844

Bulk exports at Northport are forecast to remain relatively flat (increase of 0.1 per cent) between 2019 and 2034. This is because exports at Northport are driven predominantly by logs and the availability of harvested logs over the period decreases slightly. Imports are forecast to increase by approximately 17 per cent over the 15-year period.



Port side investments

In the base case for Northland, given forecasted throughput at Northport, no significant investments or modifications to the port are required through to 2049.

2025 investments:

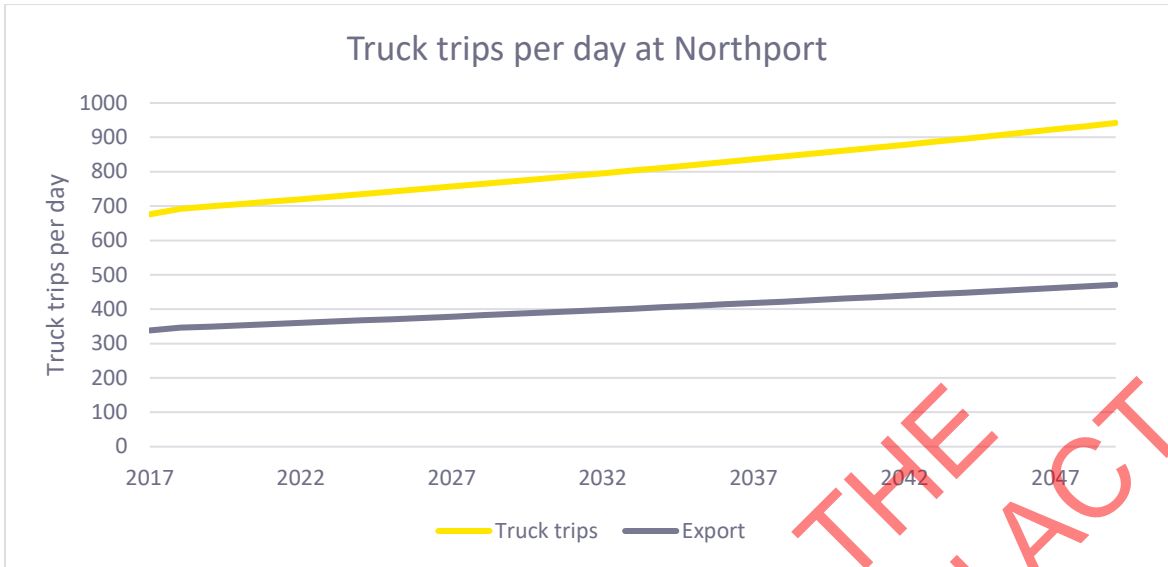
- Containers: Due to minimal forecasted container growth to 1,456 TEU, no additional land or wharf space is required
- Logs: Due to the additional 10 Ha currently being constructed, no additional land is required
- Due to minimal forecasted reduction of logs from 2.572 M t to 2.48 M t, no additional 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 investments:

- 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 North Auckland Train Line 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

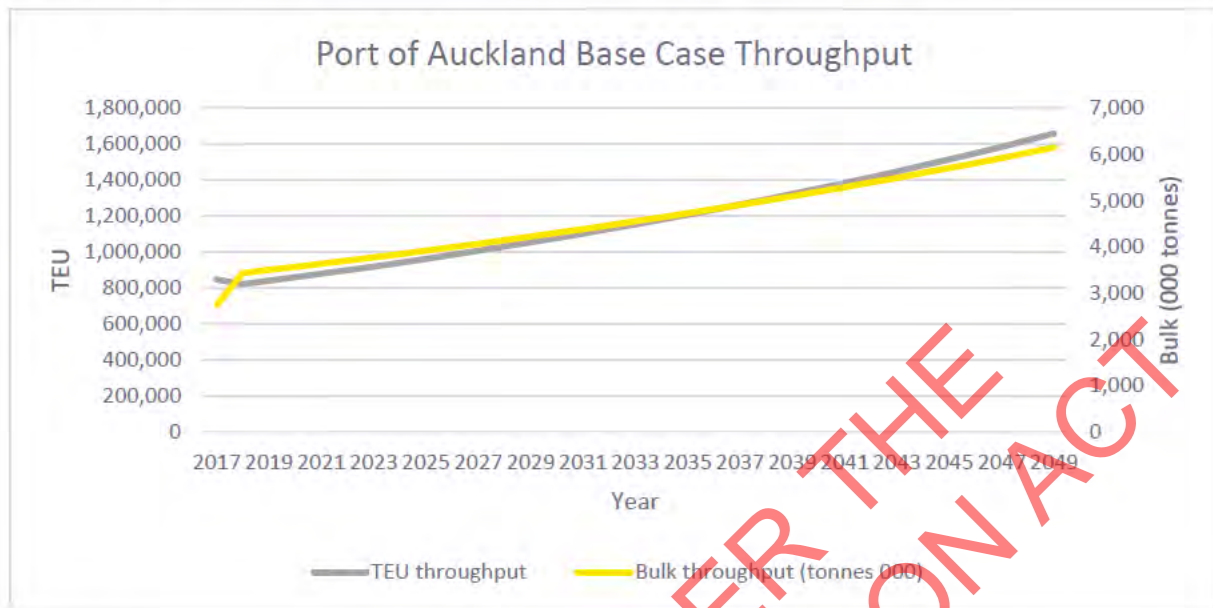
The logistics and supply chain in Auckland is dominated by a port located in the CBD, and major freight hubs to the south of the city. The North-South strategic transport network comprises State Highway 1, State Highway 20 and 16, the North Island Main Trunk railway line and the North Auckland Railway 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.³⁴

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³⁴ POAL Annual Report page 28

Freight volumes



Port investments

- Below plot shows the forecast container growth with the terminal limitations highlighted
- 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
- Note: Fourth berth capacity does not take into account operational inefficiencies associated with a split terminal

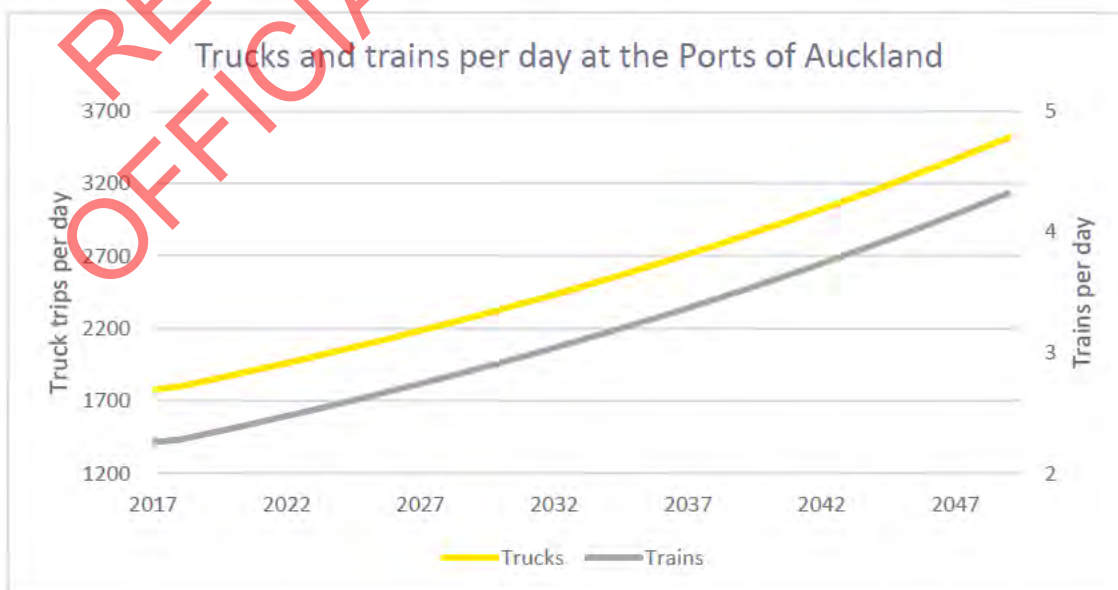


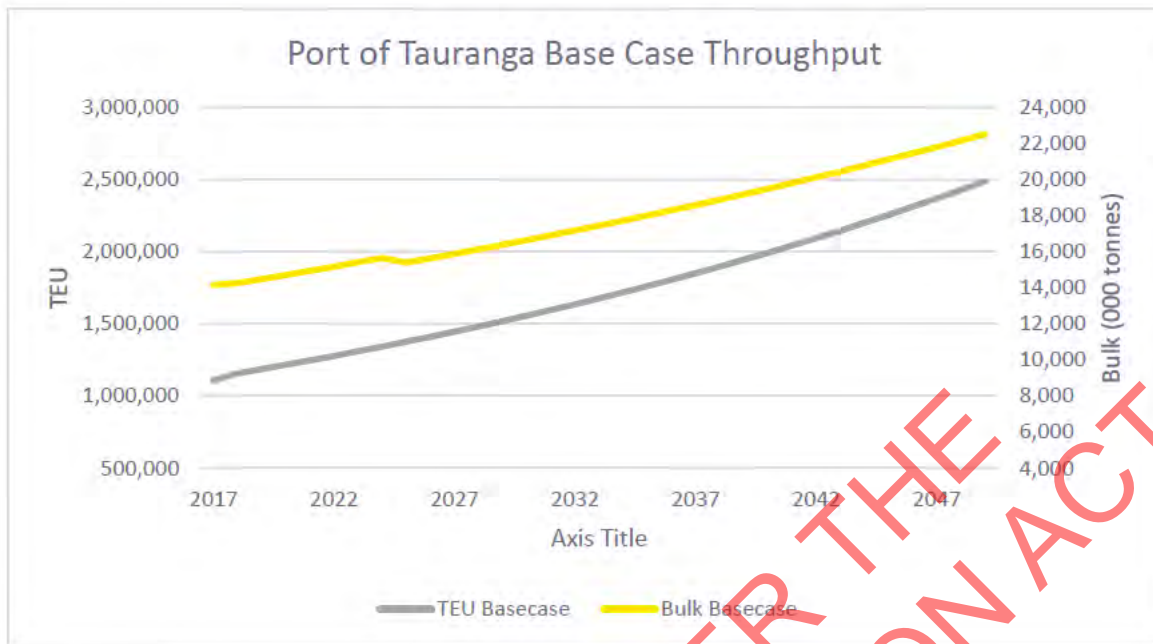
Cost estimates for port development

Ports 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	\$ 133,209,251.98
	Quay Cranes	ea	4	\$ 90,720,000
	ASC	ea	14	\$ 296,940,000
	AutoStrad	ea	0	\$ -
				\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
				\$ -
				\$ -
			Total	\$ 520,869,252

Ports of Auckland Base Case 2049				
	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3	-	\$ -
	Reclamation	m3	0	\$ -
	Quay Wall	m	300	\$ 29,925,000
				\$ -
Container Facilities	Pavement and utilities	Ha	9.5	\$ 55,048,441
	Quay Cranes	ea	4	\$ 90,720,000
	ASC	ea	6	\$ 127,260,000
	AutoStrad	ea	0	\$ -
				\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
				\$ -
			Total	\$ 302,953,441

The road and rail network





Port investments

- 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)
- The construction of the Northern Breakwater wharf provides a larger throughput due to the available length allowing for multiple vessels to berth. However, there is a possibility even construction of this wharf may not provide enough throughput capacity by 2049.

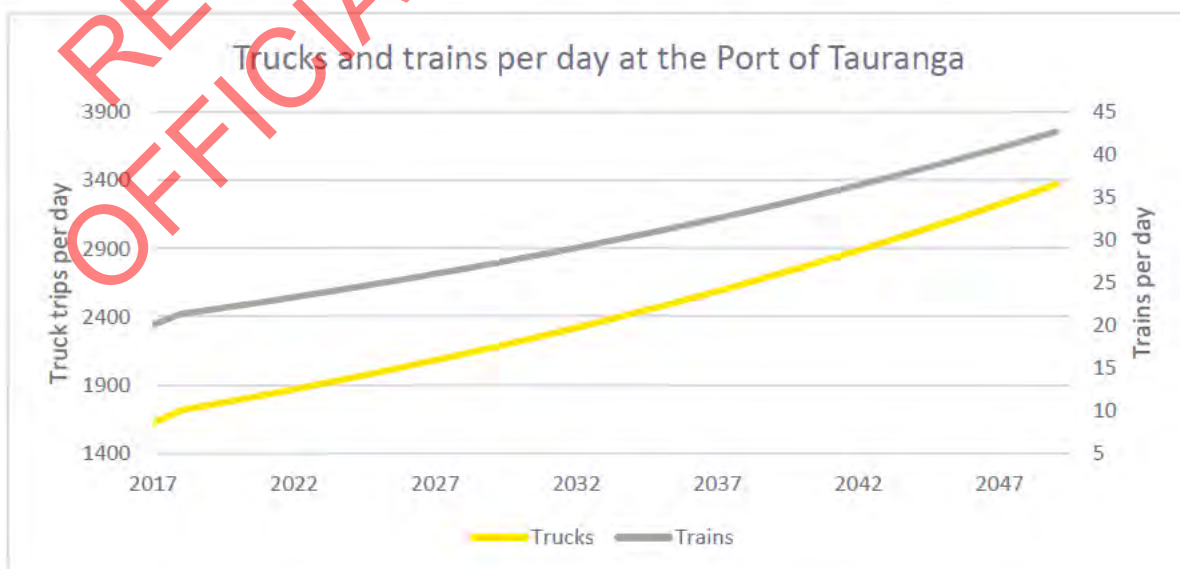


Cost estimates for port development

Tauranga Base Case 2034				
	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3	334,400	\$ 8,778,000
	Reclamation	m3	0	\$ -
	Quay Wall	m	380	\$ 36,645,000
	Rail		0	\$ -
Container Facilities	Pavement and utilities	Ha	32.3	\$ 186,656,790
	Quay Cranes	ea	6	\$ 136,080,000
	ASC	ea	20	\$ 424,200,000
	AutoStrad	ea	0	\$ -
				\$ -
				\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
				\$ -
				\$ -
			Total	\$ 792,359,790

Tauranga Base Case 2049				
	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3	750,000	\$ 19,687,500
	Reclamation	m3	0	\$ -
	Quay Wall	m	460	\$ 43,365,000
				\$ -
Container Facilities	Pavement and utilities	Ha	14.5	\$ 83,677,905
	Quay Cranes	ea	6	\$ 136,080,000
	ASC	ea	9	\$ 190,890,000
	AutoStrad	ea	0	\$ -
				\$ -
				\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
				\$ -
				\$ -
			Total	\$ 473,700,405

The road and rail network



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).

Based off the 30,000 TEU/Ha metric, POAL will reach maximum capacity at 2026, therefore implementation of ASC should occur prior to then³⁶. 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 \$800M at POAL over the next 30 years would be required to deal with growth.



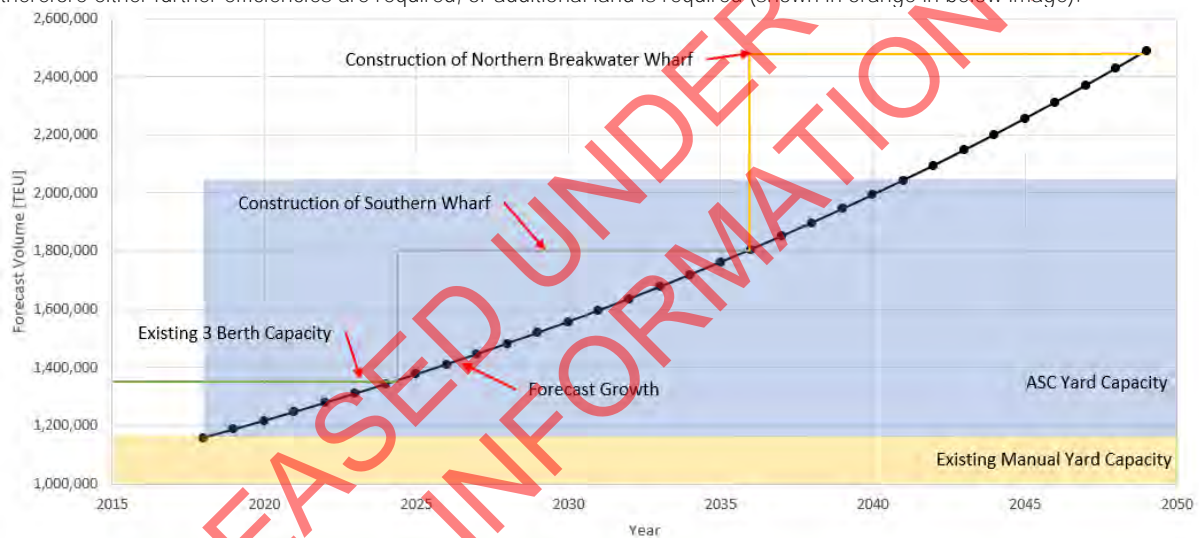
³⁶ From the POAL masterplan website, POAL appear to have invested in Automated straddles which can stack containers 4 high as opposed to 3 high. This will increase the container density in the yard, however no further information could be gathered, therefore the 30,000 TEU/Ha assumption was still utilised. Note: Fourth berth capacity does not take into account operational inefficiencies associated with a split terminal

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.

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.

The Port of Tauranga 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).



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 Port of Tauranga will need to spend more than \$1.2B over the next 30 years to keep up with forecast growth.

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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 outlined 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 UNI supply chain 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, Port of Tauranga, a combination of both and potentially a “Super 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 Move 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 Port of Tauranga.

The Full Move scenarios mirror this approach, but also include a combination of the Ports, as well as a new Super 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 scenarios were 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:

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🚚 → Vehicles
⚓ → Cargo / Marine Services

BASE CASE

NO INTERVENTION

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



BASE CASE
Auckland

SCENARIO 1

PARTIAL INTERVENTION

- 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

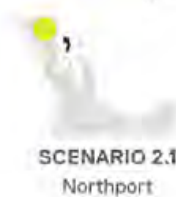


SCENARIO 1.2
Tauranga

SCENARIO 2

FULL INTERVENTION (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

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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 for a fully monetised assessment.

5.2.1 Multicriteria 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.

	Base Case	Scenario 1.1 - Northport, cars Only	Scenario 1.2 - Tauranga, cars only	Scenario 2.1 – Northport, full move	Scenario 2.2 - Tauranga, full move	Scenario 2.3 - Northport & Tauranga, full move	Scenario 2.4 - New Port in Firth of Thames
Multi-Criteria Analysis Score: Weighted							
Multi-Criteria Analysis Score: Unweighted							
Estimated capital cost: Total (\$m)		65	68	1,776	3,526	3,417	3,370

The full scoring of the Multicriteria analysis is included in Appendix 1.

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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?

On this logic, the “Full Move - Tauranga Only” and the Super Port scenarios were not taken forward to a short list.

Full Move - Tauranga Only

The Tauranga Only scenario effectively entailed an increased reliance on a logistics and supply chain focussed on meeting **the Upper North Island's** needs through an almost exclusively Sothern solution. This reduced resilience in the UNI Supply Chain, 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.

Super Port Scenario


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

- ▶ A Super 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 costs of development of a brand new port serviced by a land side logistics and supply chain are significantly higher than 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 Port of Tauranga 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 this scenario is not a discounting of this as an option. Ownership structures mean that a decision to advance a Super Port could be made by port owners. 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

Scenario 1.1: Partial move to Northport



	Infrastructure	Costs (\$000,000, non-discounted)	
<p>Port Infrastructure and Logistics hubs/Distribution Centres</p> 	<ul style="list-style-type: none"> ▶ Limited investment to provide yard space for cars at NorthPort ▶ Assume that all cars go on rail <p>Constraints:</p> <ul style="list-style-type: none"> ▶ Will have to develop wharf to accommodate RoRo vessel and vehicle operations ▶ Develop dedicated road access from wharf to vehicle staging area (doubtful use of public roads will be possible due to customs, security and congestion) <ul style="list-style-type: none"> ▶ Will require shuttle to transport stevedores back to vessel ▶ Have assumed new car hardstand is required to reduce interference with existing port operations 	<p>Construction of car hardstand at Northport</p>	<p>\$28.8M (estimate)</p>

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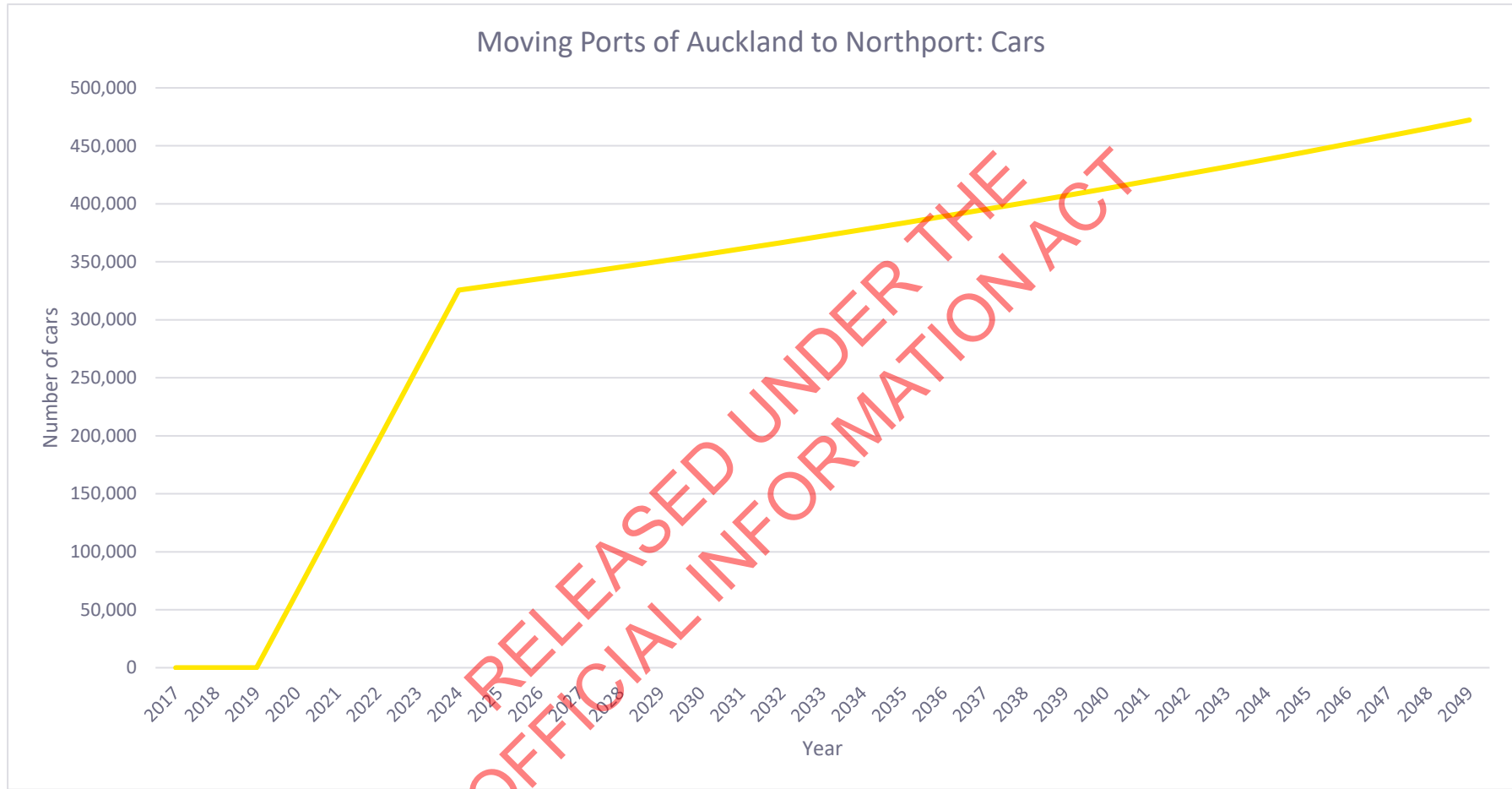
Port Infrastructure
and Logistics
hubs/Distribution
Centres



Infrastructure					Costs (\$000,000, non-discounted)	
Moving cars to Northport 2034						
		Base case		Costs of moving cars to Northport		
	Unit	Amount	Total cost	Amount	Total cost	
Port						
Dredging	m3	0 \$	-	0 \$	-	
Reclamation	m3	0 \$	-	0 \$	-	
Quay Wall	m	0 \$	-	0 \$	-	
Container Facilities						
Pavement and utilities	Ha	0 \$	-	0 \$	-	
Quay Cranes	ea	0 \$	-	0 \$	-	
ASC	ea	0 \$	-	0 \$	-	
AutoStrad	ea	0 \$	-	0 \$	-	
Log Facilities						
Pavement	Ha	0 \$	-	0 \$	-	
Car Facilities						
Pavement	Ha	0 \$	-	5.3 \$	28,770,000	
Total cost					\$ 28,770,000	
Marginal cost					\$ 28,770,000	
Moving cars to Northport 2049						
		Base case		Costs of moving cars to Northport		
	Unit	Amount	Total cost	Amount	Total cost	
Port						
Dredging	m3	0 \$	-	0 \$	-	
Reclamation	m3	0 \$	-	0 \$	-	
Quay Wall	m	0 \$	-	0 \$	-	
Container Facilities						
Pavement and utilities	Ha	0 \$	-	0 \$	-	
Quay Cranes	ea	0 \$	-	0 \$	-	
ASC	ea	0 \$	-	0 \$	-	
AutoStrad	ea	0 \$	-	0 \$	-	
Log Facilities						
Pavement	Ha	0 \$	-	0 \$	-	
Car Facilities						
Pavement	Ha	0 \$	-	1.8 \$	9,770,000	
Total cost					\$ 9,770,000	
Marginal cost					\$ 9,770,000	

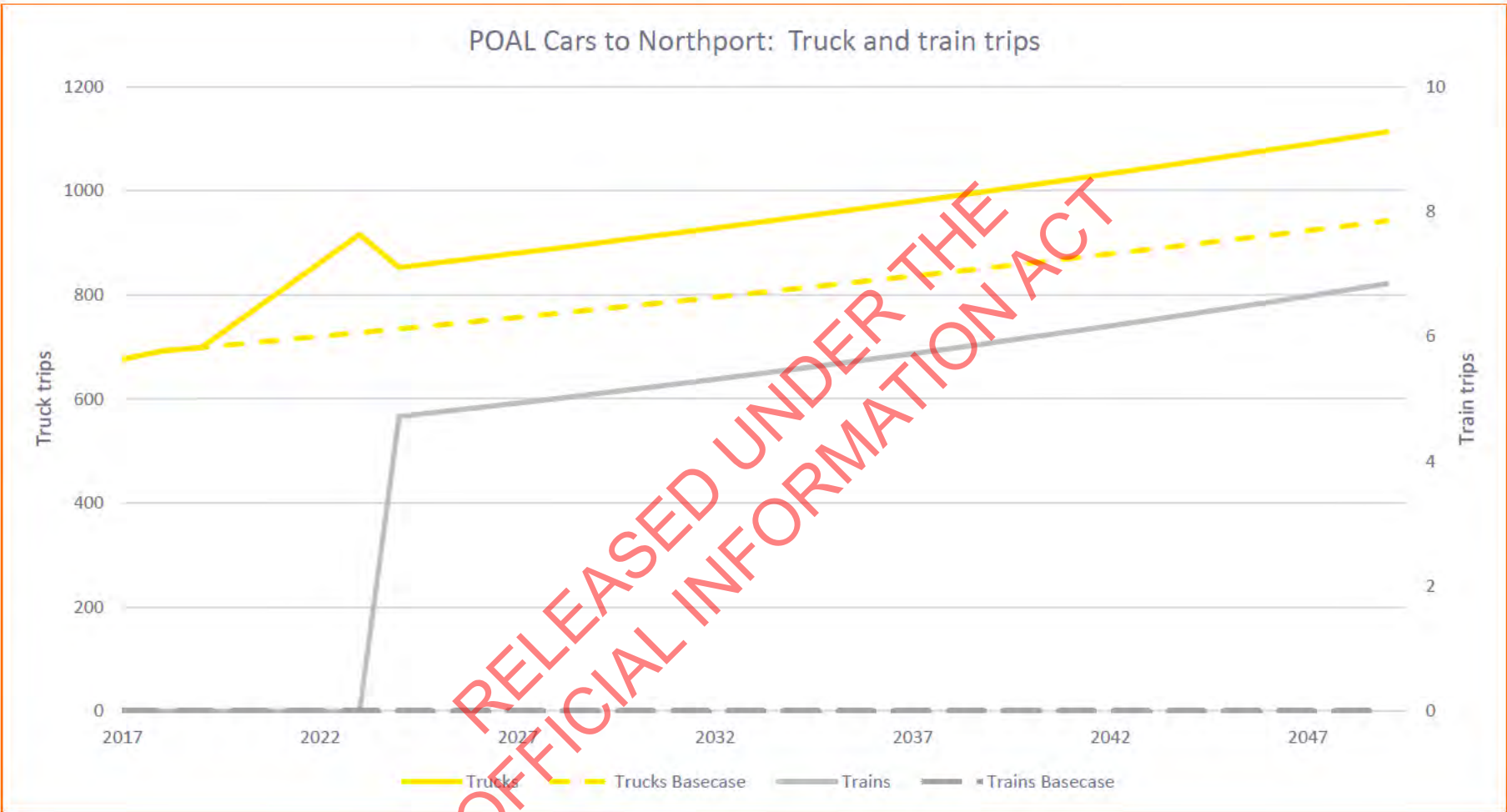
	Infrastructure	Costs (\$000,000, non-discounted)	
Rail Infrastructure 	▶ No additional investment (assume that rail spur and some (limited) level of investment to upgrade the NAL is undertaken in the period in the base case)		
Road Infrastructure 	▶ Assume no additional costs to base case		
TOTAL COST			\$28.8M

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Truck and train trips to/from the port

POAL Cars to Northport: Truck and train trips



Scenario 1.2: Partial move to Tauranga

Infrastructure	Costs (\$000,000, non-discounted)	
<p>▶ Port Annual Report highlights 40 hectares of available space. Only very limited cost expected</p> <p>▶ Will require 5.3Ha of land to stockpile the cars</p> <p>▶ Some limited expansion and reorganisation at MetroPort to provide for cars</p> <p>▶ Assume new cars on trucks, used cars on rail</p> <p>Constraints:</p> <p>▶ Potential of limited berth and staging availability on general bulk berths due to existing operations and cruise vessels</p> <p>▶ Therefore, have assumed that the car hardstand will not be located on the general bulk hardstands but offsite which will require a new pavement. However, have not costed land acquisition or demolition of existing structures</p> <p>▶ Will have to develop wharf to accommodate RoRo vessel and vehicle operations</p> <p>▶ Develop dedicated road access from wharf to vehicle staging area (doubtful use of public roads will be possible due to customs, security and congestion)</p> <p>▶ Will require shuttle to transport stevedores back to vessel</p>	Yard re-organisation at POT	\$28.8M 2034 (estimate)
	Limited expansion at MetroPort to provide for cars, and possibly longer trains	\$2.5M (estimate)

Port Infrastructure and Logistics hubs/Distribution Centres



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Port Infrastructure
and Logistics
hubs/Distribution
Centres

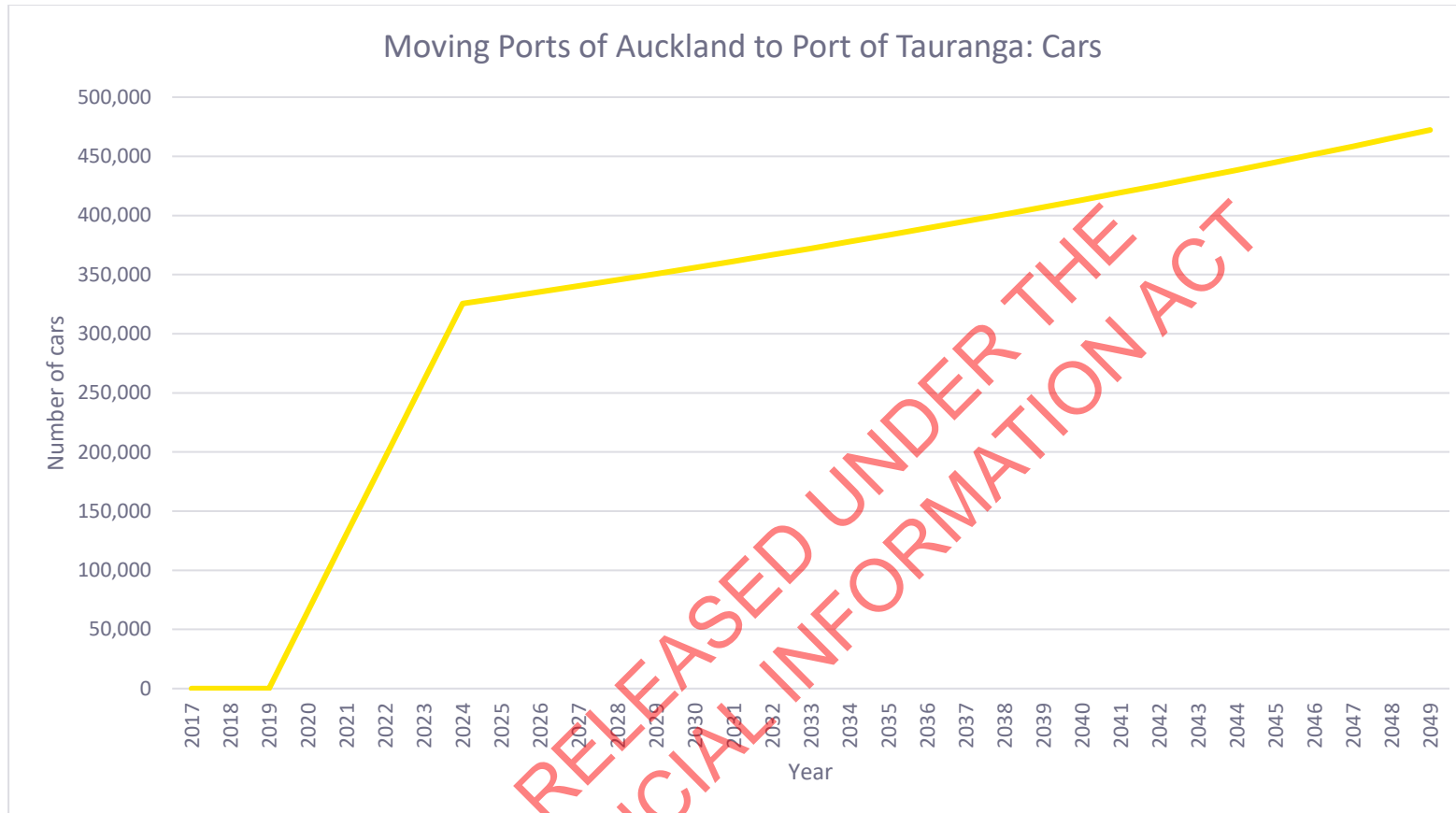


Infrastructure					Costs (\$000,000, non-discounted)				
Moving cars to Port of Tauranga 2034									
		Base case			Costs of moving cars to Port of Tauranga				
	Unit	Amount	Total cost	Amount	Total cost	Amount	Total cost		
Port									
Dredging	m3	334,400	\$ 13,960,000	334,400	\$ 13,960,000				
Reclamation	m3	0		0	\$ -				
Quay Wall	m	380	\$ 126,920,000	380	\$ 126,920,000				
Container Facilities									
Pavement and utilities	Ha	32.3	\$ 215,760,000	32.3	\$ 215,760,000				
Quay Cranes	ea	6	\$ 158,400,000	6	\$ 158,400,000				
ASC	ea	20	\$ 528,000,000	20	\$ 528,000,000				
AutoStrad	ea	0	\$ -	0	\$ -				
Log Facilities									
Pavement	Ha	0	\$ -	0	\$ -				
Car Facilities									
Pavement	Ha	0	\$ -	5.3	\$ 28,770,000				
Total cost			\$ 1,045,040,000		\$ 1,071,810,000				
Marginal cost			\$ -		\$ 28,770,000				
Moving cars to Port of Tauranga 2049									
		Base case			Costs of moving cars to Port of Tauranga				
	Unit	Amount	Total cost	Amount	Total cost	Amount	Total cost		
Port									
Dredging	m3	750,000	\$ 31,310,000	750,000	\$ 31,310,000				
Reclamation	m3	0		0	\$ -				
Quay Wall	m	460	\$ 153,640,000	460	\$ 153,640,000				
Container Facilities									
Pavement and utilities	Ha	14.5	\$ 96,860,000	14.5	\$ 96,860,000				
Quay Cranes	ea	6	\$ 158,400,000	6	\$ 158,400,000				
ASC	ea	9	\$ 237,600,000	9	\$ 237,600,000				
AutoStrad	ea	0	\$ -	0	\$ -				
Log Facilities									
Pavement	Ha	0	\$ -	0	\$ -				
Car Facilities									
Pavement	Ha	0	\$ -	1.8	\$ 9,770,000				
Total cost			\$ 677,810,000		\$ 687,580,000				
Marginal cost			\$ -		\$ 9,770,000				

	Infrastructure	Costs (\$000,000, non-discounted)	
Rail Infrastructure 	<ul style="list-style-type: none"> No additional (associated with this option) upgrade assumed, expect that passing loop development on ECMT will be sufficient for additional/length of trains Rail used cars to West Auckland MetroPort and then distribution, on dedicated rolling stock. 	By 2034, 90 specifically - tailored railcars at \$500k each (could be as low as \$300k each)	\$45M (estimate from Advisian Australian experience)
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 		
TOTAL COST			\$76.3M

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Port of Tauranga car throughput



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Port of Tauranga truck and train trips to/from the port

TO BE FILLED

Scenario 2.1: Full Move (Except Cruise) to Northport

SCENARIO 2.1
FULL INTERVENTION TO NORTHPORT ONLY



ESTIMATED BOOM	COST \$M
7 KM ROAD OVERLAPS	\$
7 BRIDGES	\$\$
7 BRIDGES	\$\$\$
7 KM DOUBLE TRACKING	\$
7 KM TUNNEL	\$\$\$
7 BRIDGES	\$\$
7 CIVIL INFRASTRUCTURE	\$
84 PORTS FROM AUCKLAND	\$\$\$ \$
EXPORTS FROM AUCKLAND AND NLD	\$\$\$ \$
1300,000 M2 OFA	\$\$\$ \$ \$
75 REVENUE FROM THE LAND USE	\$\$\$ \$ \$

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Port Infrastructure
and Logistics
hubs/Distribution
Centres



Infrastructure	Costs (\$000,000, non-discounted)	
<ul style="list-style-type: none"> ▶ Significant increase at Northport. ▶ NorthPort from POAL volumes - NorthPort has very little growth of the current volumes ▶ Will have to cater for Postpanamax vessels (+9,000 TEU) to be future proof ▶ Significant investment in infrastructure required for 2034 volumes: <ul style="list-style-type: none"> ▶ Require 3 container berths, 1 log berth, and 1 car/bulk berth <ul style="list-style-type: none"> ▶ Similar berth length as identified in masterplan ▶ Require 23.1ha of hardstand for containers, and 5.3ha of pavement for cars ▶ Existing sufficient storage for logs, woodchips and other bulk (Inc. liquids, coal imports would have reduced) ▶ By 2049 (cargo and infrastructure increased from 2034 numbers): <ul style="list-style-type: none"> ▶ Minor reduction in log exports of 75,000 t therefore no change in berths or land area ▶ Increase of containers by 507,000 TEU to 1.735M TEU <ul style="list-style-type: none"> ▶ Requires an additional 9.5Ha of land and 1 additional berth ▶ Increase of cars by 136,000 to 542,000 cars <ul style="list-style-type: none"> ▶ Requires an additional 1.7Ha of land and no additional berth ▶ Increase of other bulk and liquids of 210,000 t to 1.025M t ▶ Assume existing facilities are adequate as woodchips remain constant ▶ Development of Road/Rail hubs around upgraded rail lines in Northland ▶ Expect the need for development of an inland multi-modal hub in North/West of Auckland <ul style="list-style-type: none"> ▶ Construct "on-dock" intermodal terminal similar to DPW London Gateway to reduce the requirement for trucks (not costed) ▶ Costs: <ul style="list-style-type: none"> ▶ Key assumptions: <ul style="list-style-type: none"> ▶ The mode of operation is ASC (this is the cost shown below) ▶ All existing hardstand is to be replaced ▶ Below are the raw costs, no contingency, engineering and PM allowances have been included. 	Northport upgrade to full 1.4km berth length	\$1.602B (2034) detailed costs shown below
	Logistics hub northwest of Auckland	
	Development of small hubs around upgraded rail lines in Northland (5 x)	\$5M

Port Infrastructure
and Logistics
hubs/Distribution
Centres



Infrastructure				Costs (\$000,000, non-discounted)	
Moving Ports of Auckland to Northport 2034					
			Base case		Costs of moving cars to Port
	Unit	Amount	Total cost	Amount	Total cost
Port					
Dredging	m3	0 \$	-	2,150,000	\$ 89,760,000
Reclamation	m3	0 \$	-	2,150,000	\$ 178,000,000
Quay Wall	m	0 \$	-	900	\$ 300,600,000
Container Facilities					
Pavement and utilities	Ha	0 \$	-	28.0	\$ 187,040,000
Quay Cranes	ea	0 \$	-	9	\$ 237,600,000
ASC	ea	0 \$	-	14	\$ 369,600,000
AutoStrad	ea	0 \$	-	28	\$ 73,920,000
Log Facilities					
Pavement	Ha	0 \$	-	9.6	\$ 52,100,000
Car Facilities					
Pavement	Ha	0 \$	-	7.0	\$ 37,990,000
Other					
Service/admin/worksh op buildings/sundry structures	m2	0 \$	-	10,000	\$ 75,000,000
Total cost					\$ 1,601,610,000
Marginal cost					\$ 1,601,610,000
Moving Ports of Auckland to Northport 2049					
			Base case		Costs of moving cars to Port
	Unit	Amount	Total cost	Amount	Total cost
Port					
Dredging	m3	0 \$	-	542,000	\$ 22,630,000
Reclamation	m3	0 \$	-	542,000	\$ 58,500,000
Quay Wall	m	0 \$	-	300	\$ 100,200,000
Container Facilities					
Pavement and utilities	Ha	0 \$	-	5.4	\$ 36,070,000
Quay Cranes	ea	0 \$	-	4	\$ 105,600,000
ASC	ea	0 \$	-	6	\$ 158,400,000
AutoStrad	ea	0 \$	-	12	\$ 31,680,000
Log Facilities					
Pavement	Ha	0 \$	-	0	\$ -
Car Facilities					
Pavement	Ha	0 \$	-	1.8	\$ 9,770,000
Other					
Service/admin/worksh op buildings/sundry structures	m2	0 \$	-	4,000	\$ 30,000,000
Total cost					\$ 552,850,000
Marginal cost					\$ 552,850,000

Rail Infrastructure



Infrastructure	Costs (\$000,000, non-discounted)	
<ul style="list-style-type: none"> ▶ Bring forward (assume immediate start on design and construction) the completion of the upgrade to the North Auckland Line (and spur to Northport) ▶ 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 cars (150 units)	\$75M
	Spur line to Marsden Point	\$329M
	Limited NAL upgrade	\$225M
	Avondale - Southdown	\$1B (KiwiRail response to OIA request from 2017)
	Swanson to Avondale upgrade?	Detailed assessment

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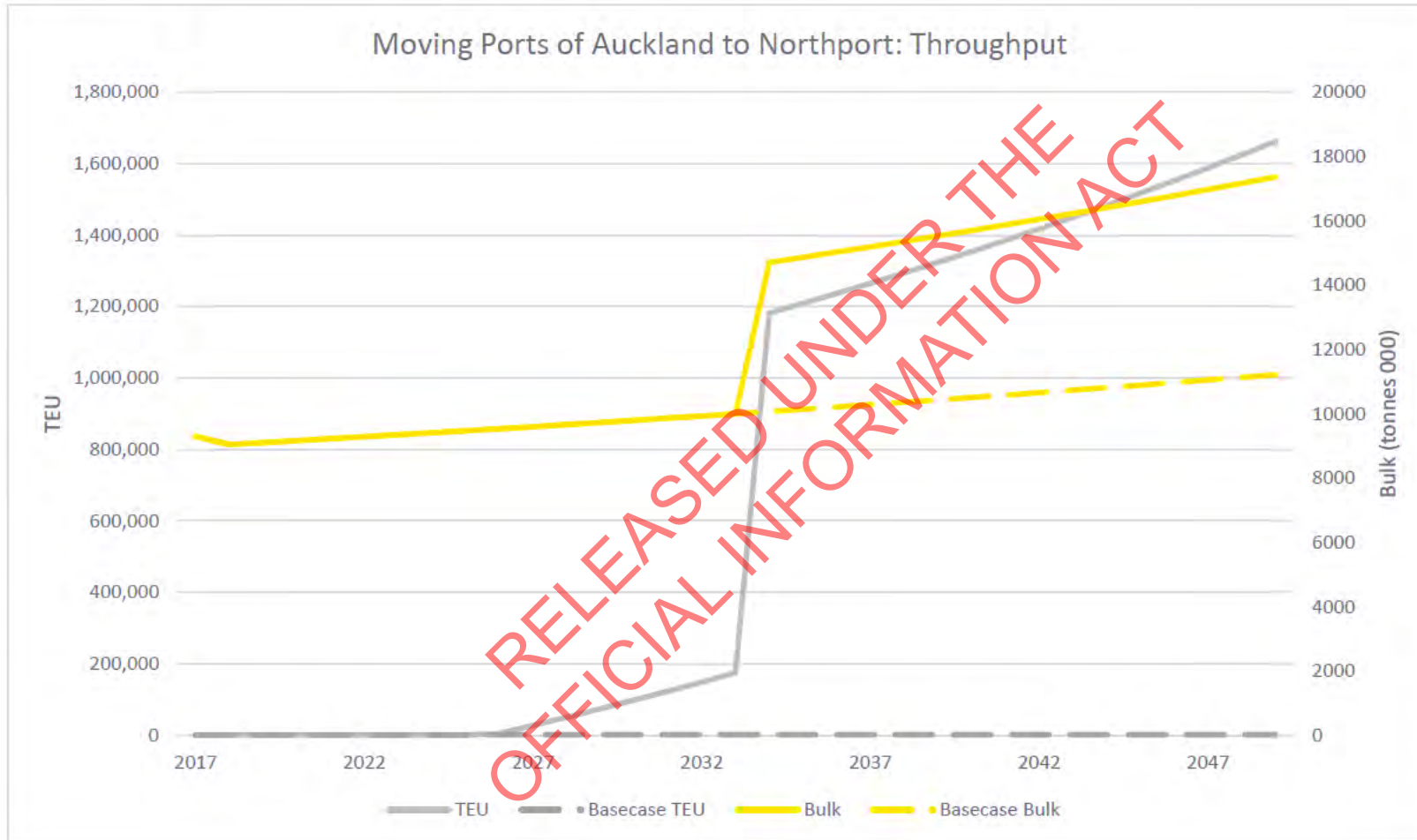
Infrastructure	Costs (\$000,000, non-discounted)	
<p>▶ Widening/signal upgrades to provide for increased traffic around the projected multi-modal hub in the northwest of Auckland would be required to provide for the truck traffic necessary for distribution of the freight coming on the rail from Northport</p> <p>▶ 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.</p>	Localised upgrades around new hub in NW Auckland	TBC
	Completion of 4 laning from Whāngārei to Auckland	TBC
	Various upgrades SH1 North Auckland/Northland, in particular Brynderwyn western bypass, improvements to Te Hana, Toetoe-Oakleigh	\$1.2B
	Bring forward the SH16-18 upgrades noted as part of the list of ATAP future priorities	\$1B
TOTAL COST	\$5.436B	

Road Infrastructure

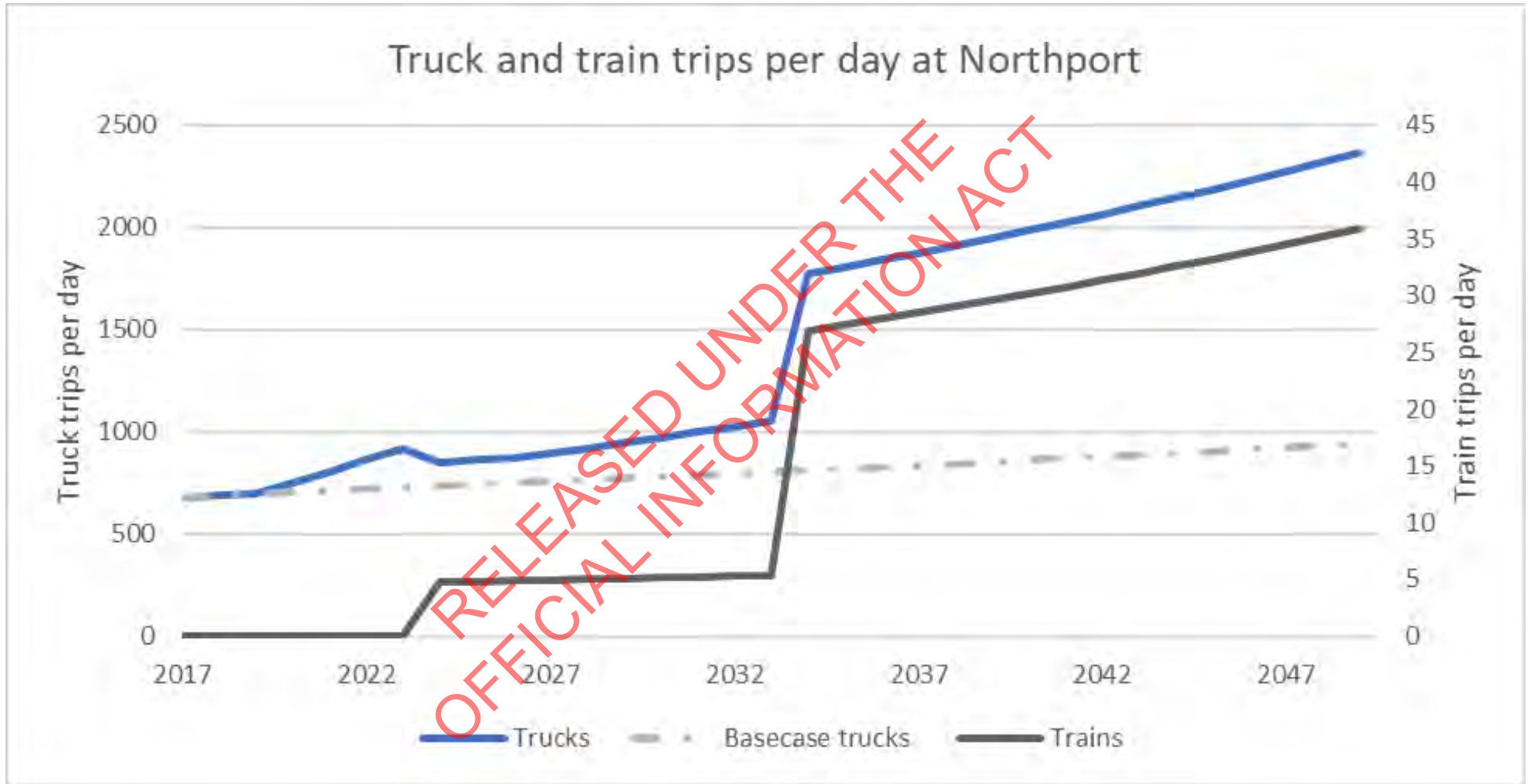


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Northport Throughput

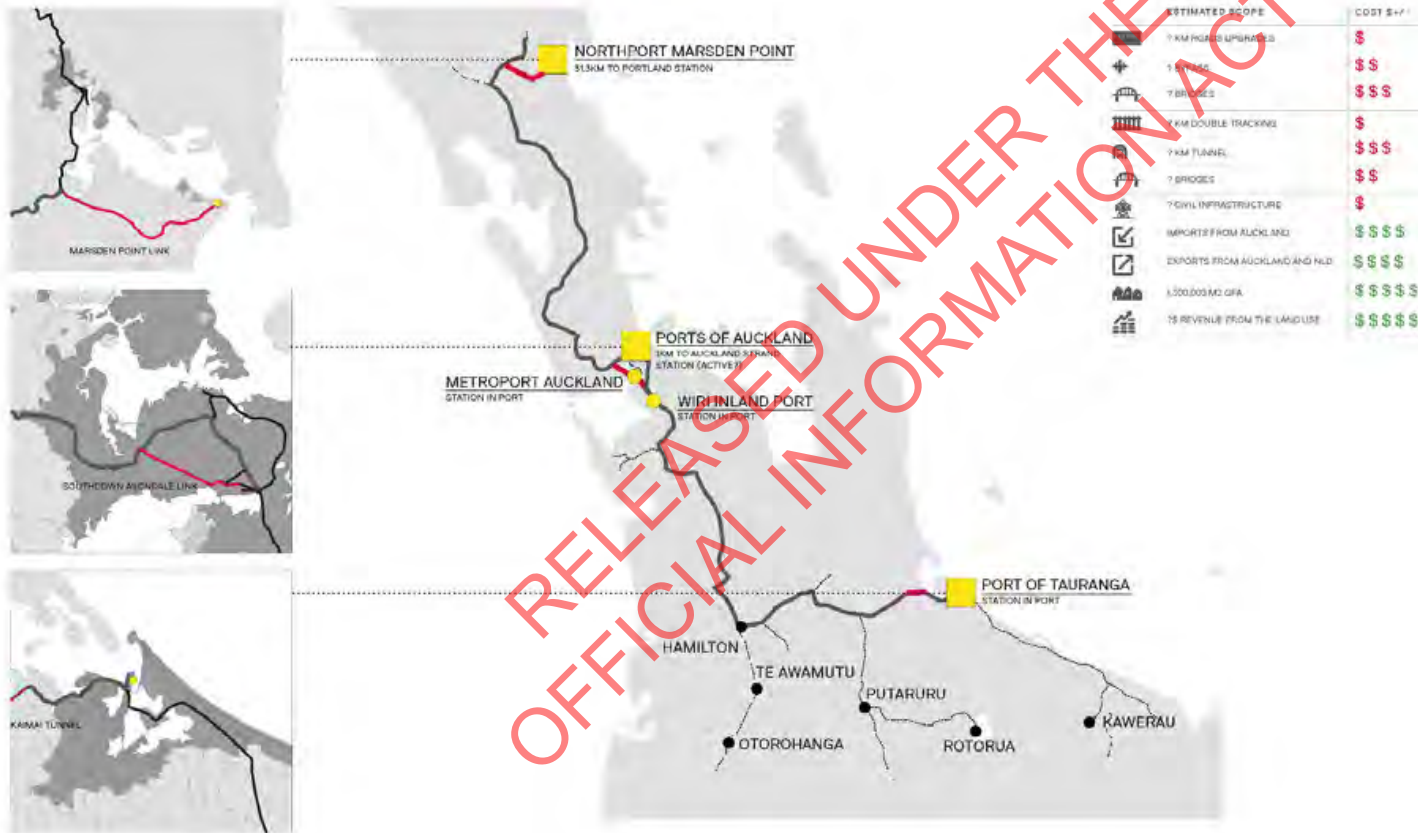


The number of truck and train trips to/from Northport



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

SCENARIO 2.3
FULL INTERVENTION TO NORTHPORT AND TAURANGA



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Port Infrastructure
and Logistics
hubs/Distribution
Centres





Infrastructure	Costs (\$000,000, non-discounted)	
<ul style="list-style-type: none"> ▶ Significant investment required at both Ports. Detailed plan to split cargoes and timeframes for deployment to be developed ▶ Insufficient capacity at Tauranga to accommodate additional cargo from POAL (reasons stated above in Section 3.5) ▶ Sufficient area at NorthPort ▶ Cost estimate below indicates required infrastructure (similar level of investment required as above options) ▶ Costs: <ul style="list-style-type: none"> ▶ Key assumptions: <ul style="list-style-type: none"> ▶ The mode of operation is ASC (this is the cost shown below) ▶ All existing hardstand is to be replaced for containers and cars ▶ Below are the raw costs, no contingency, engineering and PM allowances have been included. ▶ Please note that these costs have not been compared to a concept port plan, therefore may not reflect future estimates, as Tauranga will exceed available land and wharf capacity with POAL cargo 	<p>Various required port investments at Northport and Port of Tauranga</p>	<p>\$1.336B (2034 estimate excluding base case costs)</p>

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Port Infrastructure and Logistics hubs/Distribution Centres

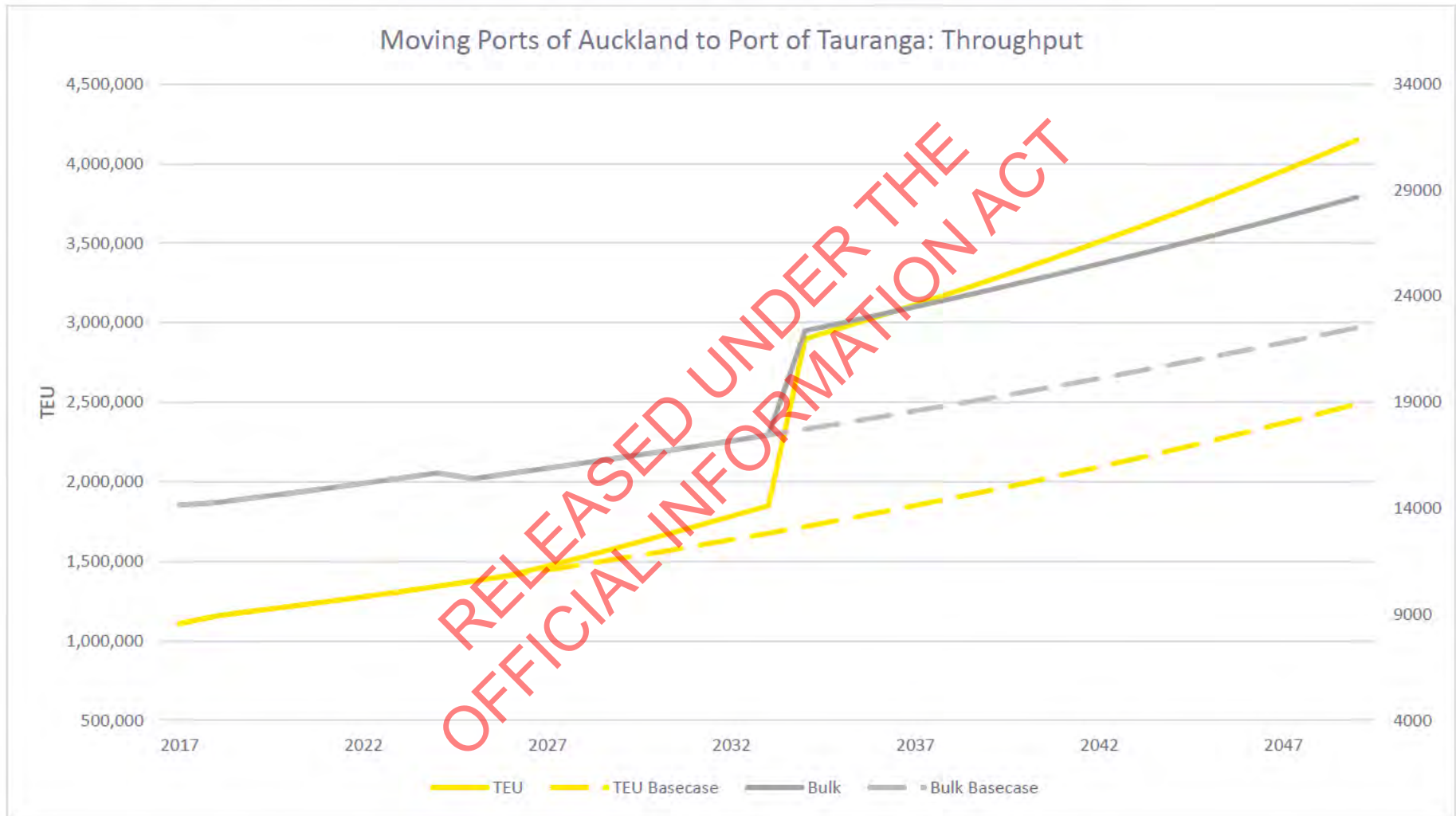


Infrastructure										Costs (\$'000,000, non-discounted)	
Moving Ports of Auckland to Northport and Port of Tauranga 2034											
Northport				Port of Tauranga							
		Base case		Costs of moving part of Ports of Auckland to Northport				Base case		Costs of moving part of Ports of Auckland to Port of	
	Unit	Amount	Total cost	Amount	Total cost	Unit	Amount	Total cost	Amount	Total cost	
Port						Port					
Dredging	m3	0 \$	-	1,400,000 \$	58,450,000	Dredging	333,400 \$	13,960,000	1,445,200 \$	31,310,000	
Reclamation	m3	0 \$	-	1,400,000 \$	99,000,000	Reclamation	0 \$	-	0 \$	-	
Quay Wall	m	0 \$	-	410 \$	136,940,000	Quay Wall	380 \$	126,920,000	790 \$	263,860,000	
Container Facilities						Container Facilities					
Pavement and utilities	Ha	0 \$	-	11.6 \$	77,490,000	Pavement and utilities	32.3 \$	215,760,000	43.9 \$	293,250,000	
Quay Cranes	ea	0 \$	-	5 \$	132,000,000	Quay Cranes	8 \$	158,400,000	11 \$	290,400,000	
ASC	ea	0 \$	-	7 \$	184,800,000	ASC	20 \$	528,000,000	26 \$	686,400,000	
AutoStrad	ea	0 \$	-	14 \$	36,960,000	AutoStrad	0 \$	-	0 \$	-	
Log Facilities						Log Facilities					
Pavement	Ha	0 \$	-	0 \$	-	Pavement	0 \$	-	0 \$	-	
Car Facilities						Car Facilities					
Pavement	Ha	0 \$	-	2.6 \$	14,110,000	Pavement	0 \$	-	2.6 \$	14,110,000	
Other						Other					
Service/admin/worksh op buildings/sundry structures	m2	0 \$	-	4,000 \$	30,000,000	Service/admin/worksh op buildings/sundry structures	0 \$	-	4,000 \$	30,000,000	
Total cost		\$	-	\$	769,750,000	Total cost	\$	1,043,040,000	\$	1,609,330,000	
Marginal cost		\$	-	\$	769,750,000	Marginal cost	\$	-	\$	566,290,000	
Moving Ports of Auckland to Northport and Port of Tauranga 2049											
Northport				Port of Tauranga							
		Base case		Costs of moving part of Ports of Auckland to				Base case		Costs of moving part of Ports of Auckland to Port of	
	Unit	Amount	Total cost	Amount	Total cost	Unit	Amount	Total cost	Amount	Total cost	
Port						Port					
Dredging	m3	0 \$	-	750,000 \$	31,310,000	Dredging	750,000 \$	31,310,000	0 \$	-	
Reclamation	m3	0 \$	-	750,000 \$	56,500,000	Reclamation	0 \$	-	0 \$	-	
Quay Wall	m	0 \$	-	340 \$	113,560,000	Quay Wall	460 \$	153,640,000	690 \$	230,460,000	
Container Facilities						Container Facilities					
Pavement and utilities	Ha	0 \$	-	4.8 \$	32,060,000	Pavement and utilities	14.5 \$	96,860,000	19.3 \$	128,320,000	
Quay Cranes	ea	0 \$	-	2 \$	52,800,000	Quay Cranes	6 \$	158,400,000	8 \$	211,200,000	
ASC	ea	0 \$	-	3 \$	79,200,000	ASC	9 \$	237,600,000	12 \$	316,800,000	
AutoStrad	ea	0 \$	-	6 \$	15,840,000	AutoStrad	0 \$	-	0 \$	-	
Log Facilities						Log Facilities					
Pavement	Ha	0 \$	-	0 \$	-	Pavement	0 \$	-	0 \$	-	
Car Facilities						Car Facilities					
Pavement	Ha	0 \$	-	0.9 \$	4,880,000	Pavement	0 \$	-	0.9 \$	4,880,000	
Other						Other					
Service/admin/worksh op buildings/sundry structures	m2	0 \$	-	1,350 \$	10,000,000	Service/admin/worksh op buildings/sundry structures	0 \$	-	1,350 \$	10,000,000	
Total cost		\$	-	\$	396,150,000	Total cost	\$	677,810,000	\$	902,260,000	
Marginal cost		\$	-	\$	396,150,000	Marginal cost	\$	-	\$	224,450,000	

	Infrastructure	Costs (\$000,000, non-discounted)	
Rail Infrastructure 		Avondale - Southdown	\$1,000M
		3rd and 4th Main Wiri-Papakura	\$85M
		3rd and 4th Main Wiri-Papakura	\$85M
		ECMT upgrades, including urban Tauranga	\$500M
Road Infrastructure 		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
		Various upgrades SH1 North Auckland/Northland, in particular Brynderwyn western bypass, improvements to Te Hana, Toetoe-Oakleigh	\$1,200M
		Bring forward the SH16-18 upgrades noted as part of the list of ATAP future priorities	\$1,000M
		TOTAL COST	

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Port of Tauranga throughput



The number of truck and train trips to/from Port of Tauranga

Train and truck trips per day at the Port of Tauranga

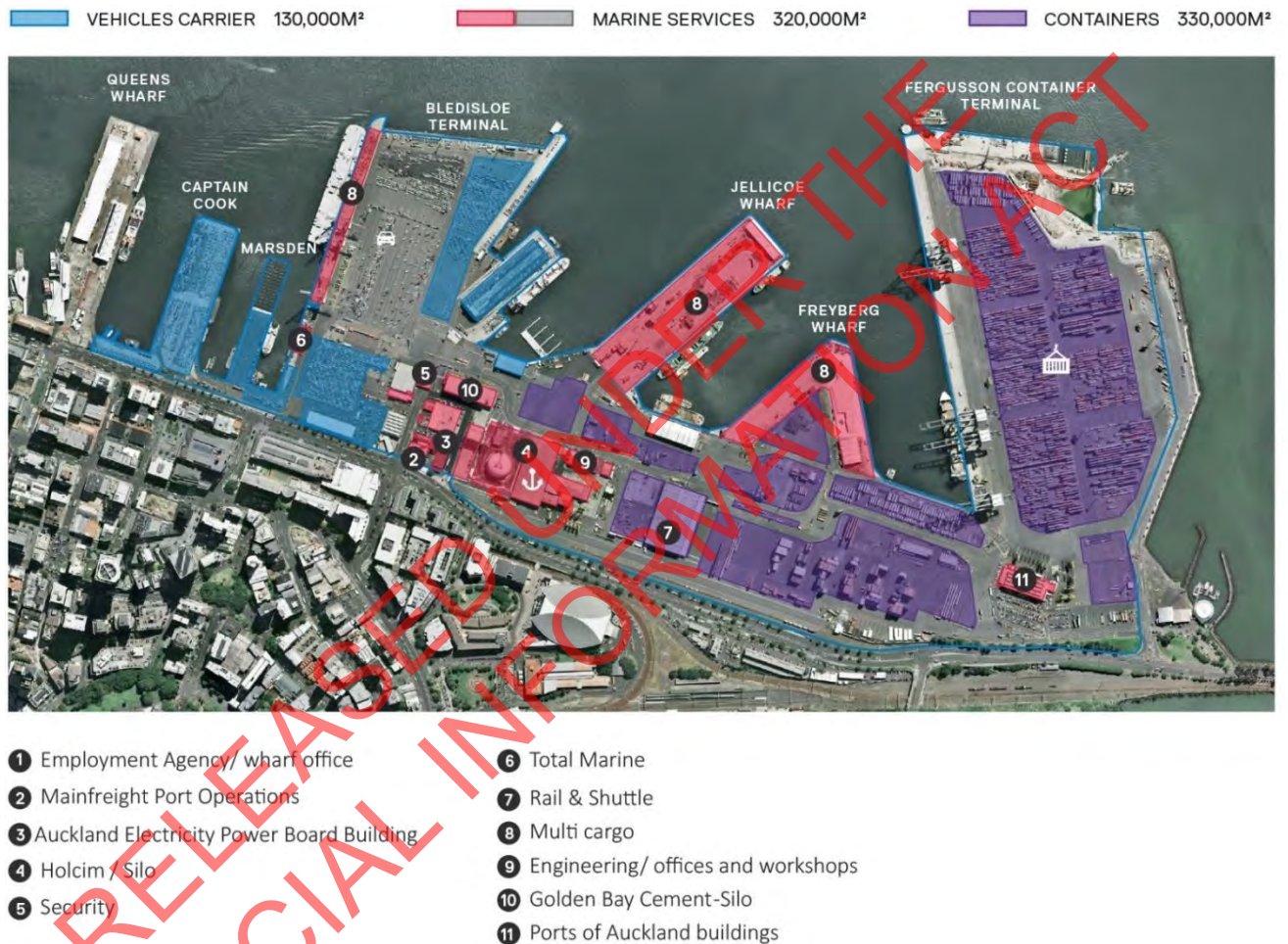


5.4 POAL Alternative Land Use Masterplan

A critical part of the scenarios involves consideration of whether a higher and more desirable use (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 15 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 xxx below). It also suggests the opportunity for alternative land use for POAL at this scale is feasible and potentially appropriate.

Figure 16 Source of area shown below: https://en.wikipedia.org/wiki/Auckland_CBD, <https://www.ccrq.org.nz/history-structure>

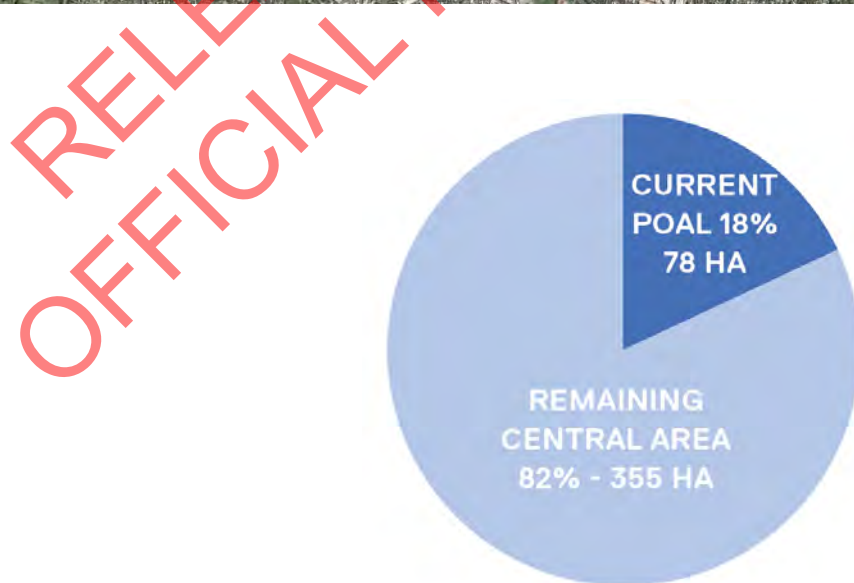
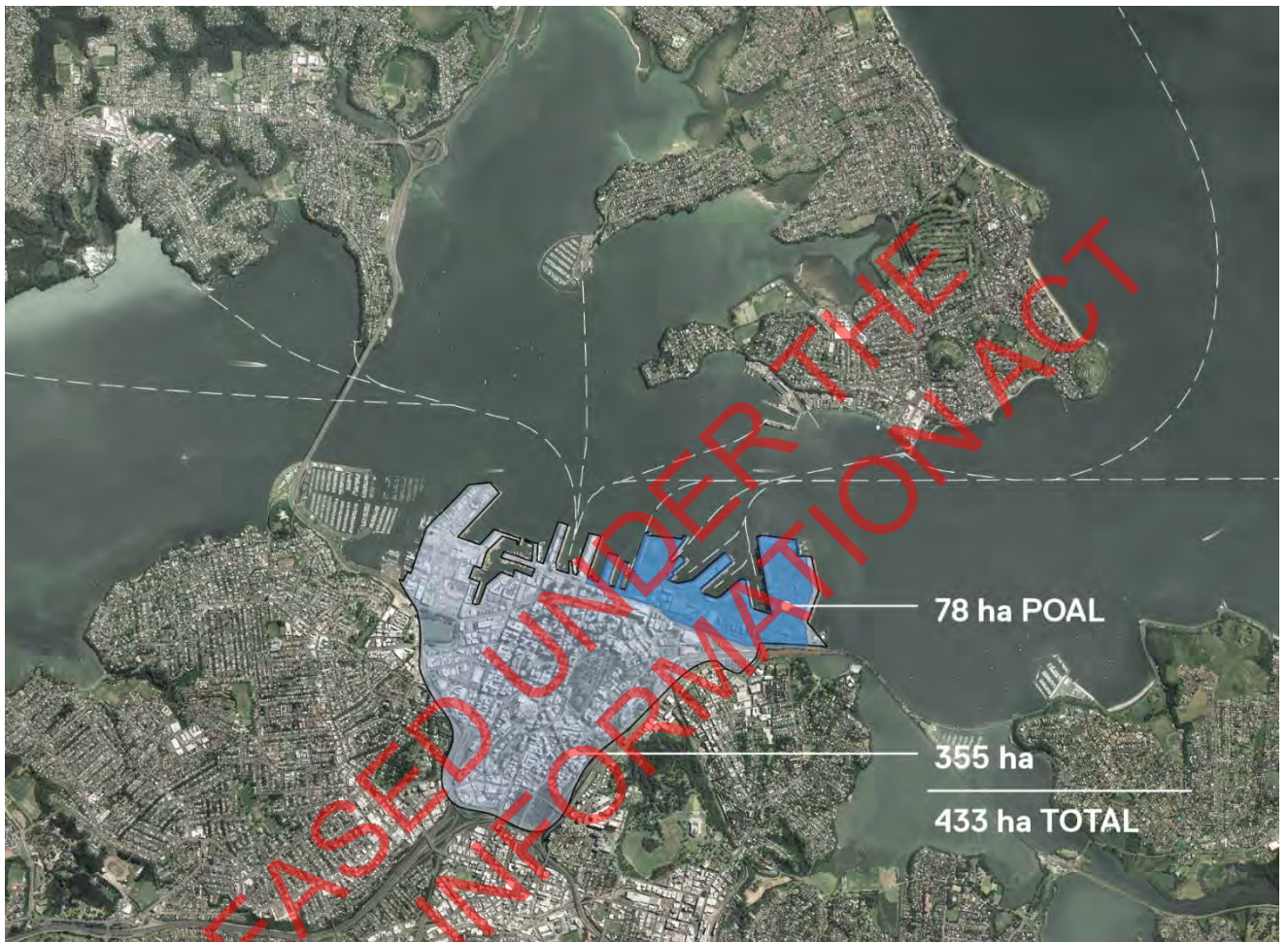
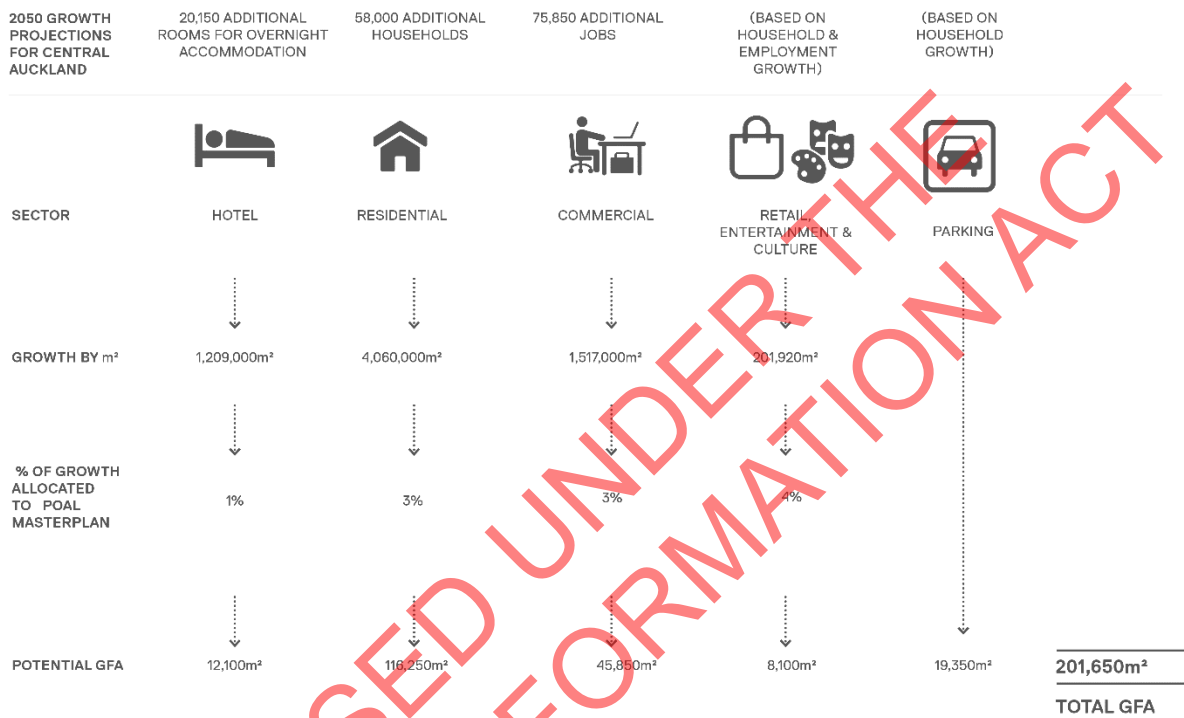


Figure 17 Local context scale comparison (Source: Wynyard Quarter - Urban Design Framework – June 2007)








Two POAL Masterplan options (considering partially and fully decommissioned POAL) 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 GFA totals in tables below show GFA yield of 200,000m² and 1,300,000m² for Option 1 and 2 respectively.

Figure 18 Scenario 1: Partially decommissioned POAL, GFA 200,000m²



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Figure 19 Scenario 2: Fully decommissioned POAL, GFA 1,300,000m²

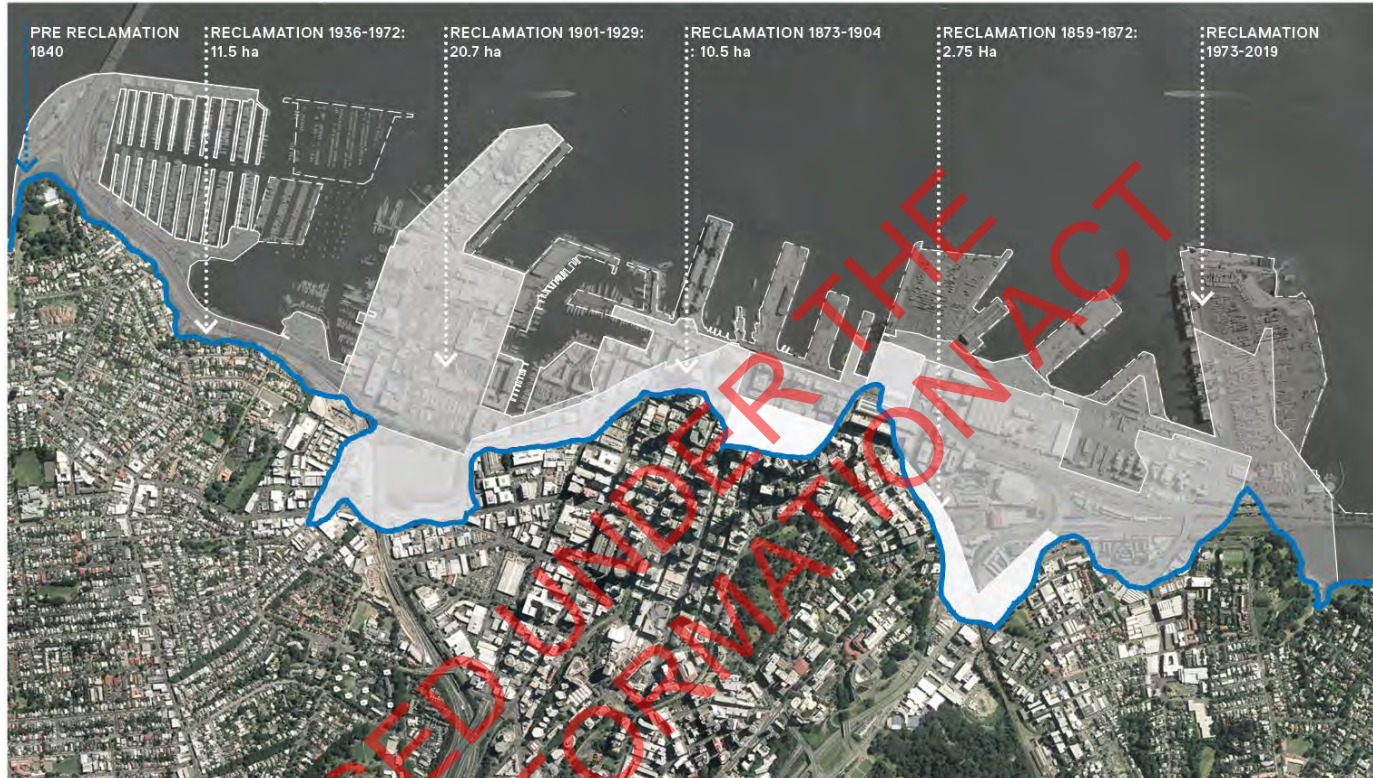
2050 GROWTH PROJECTIONS FOR CENTRAL AUCKLAND	20,150 ADDITIONAL ROOMS FOR OVERNIGHT ACCOMMODATION	58,000 ADDITIONAL HOUSEHOLDS	75,850 ADDITIONAL JOBS	(BASED ON HOUSEHOLD & EMPLOYMENT GROWTH)	(BASED ON HOUSEHOLD GROWTH)
					
SECTOR	HOTEL	RESIDENTIAL	COMMERCIAL	RETAIL, ENTERTAINMENT & CULTURE	PARKING
GROWTH BY m ²	1,209,000m ²	4,060,000m ²	1,517,000m ²	201,920m ²	
% OF GROWTH ALLOCATED TO POAL MASTERPLAN	3%	19%	20%	27%	
POTENTIAL GFA	36,300m ²	775,050m ²	305,650m ²	54,000m ²	129,000m ²
					1,300,000m²
					TOTAL GFA

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.



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 20 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 21 Masterplan Option 1) Port function is partially decommissioned and phased land development occurs at Western end of POAL site

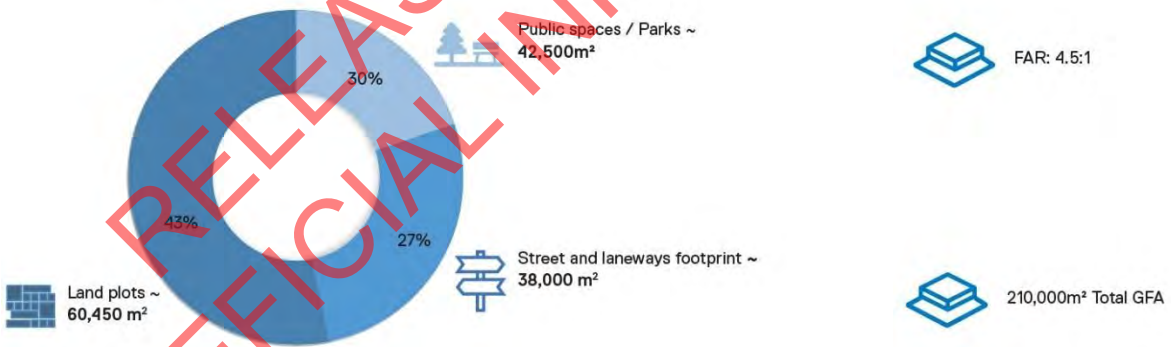


Figure 22 Masterplan Option 2) Port function is fully decommissioned

