

Discussion Paper: Future Scenarios for the Port of Auckland

Prepared for

Committee for Auckland

Authorship

Alexia Beer, Reuben Irvine, Aaron Schiff and John Small
aaron.schiff@covec.co.nz | (09) 916 2012

© Covec Ltd, 2012. All rights reserved.

Disclaimer

Although every effort has been made to ensure the accuracy of the material and the integrity of the analysis presented herein, Covec Ltd accepts no liability for any actions taken on the basis of its contents.

Contents

Executive Summary	i
Welfare benefits and costs of the transformation scenario	iii
Welfare benefits and costs of the expansion scenario	iv
Comparison of scenarios	v
1 Introduction	1
1.1 Cost-benefit analysis	1
1.2 Cost-benefit analysis versus economic impact analysis	1
1.3 Structure of this report	2
2 Future Scenarios	3
2.1 Context	3
2.2 No change scenario	5
2.3 Transformation scenario	7
2.4 Expansion scenario	10
3 Preliminary Analysis of Costs and Benefits	12
3.1 Geographic scope of the analysis	12
3.2 Overview of welfare costs and benefits	12
3.3 Analysis of the transformation scenario	14
3.4 Analysis of the expansion scenario	25
3.5 Comparison of scenarios	30
3.6 Implications for Auckland	31

Executive Summary

This report considers three scenarios for the future of the cargo port on the Auckland CBD waterfront:

No change: Retention of the cargo port on the CBD waterfront, with no significant change to its current footprint and activities.

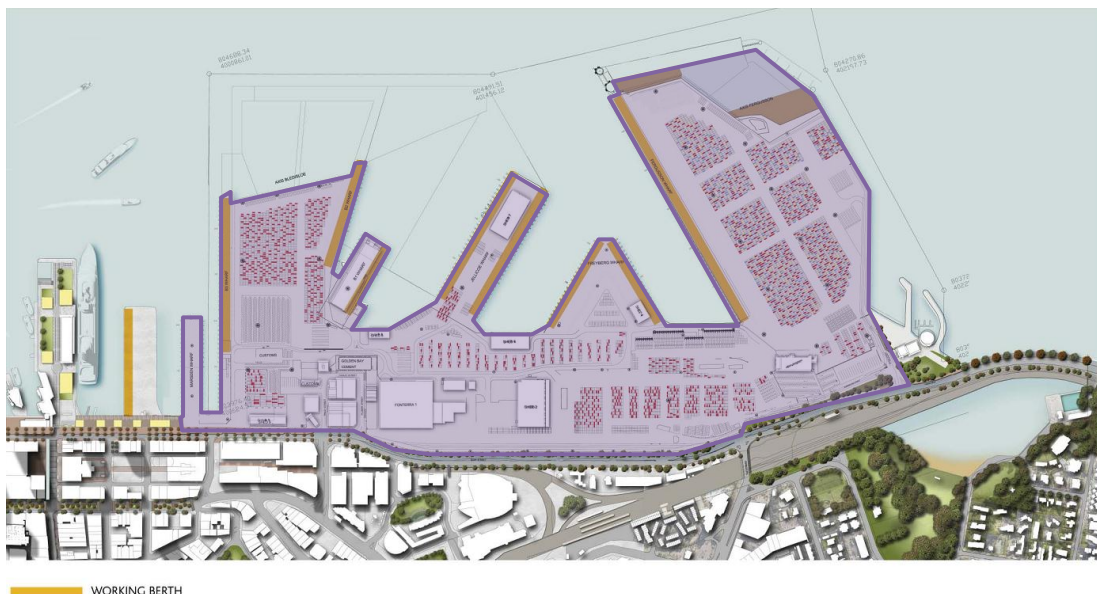
Transformation: Release of the cargo port land in the CBD for alternative uses, such as for public, residential and commercial activities. This would involve use of other ports and infrastructure elsewhere to handle cargo, and/or construction of a new port near to Auckland.

Expansion: A significant increase of the activities and footprint of the cargo port in the Auckland harbour.

We give a preliminary discussion of the welfare (or wellbeing) costs and benefits of the transformation and expansion scenarios *relative* to the no change scenario. Welfare cost-benefit analysis includes changes in economic activity but also allows the consideration of broader effects that are not always reflected in market transactions, such as effects on the environment, human health, and quality of life. The geographical scope of our analysis is the upper North Island region, as decisions about the future of the port in Auckland will have impacts beyond the Auckland region.

The cargo port on Auckland's waterfront currently occupies around 77 hectares of land, increasing to 79 hectares in 2016 following the planned expansion of the Fergusson container terminal and the return of Captain Cook wharf to public use (Figure 1).

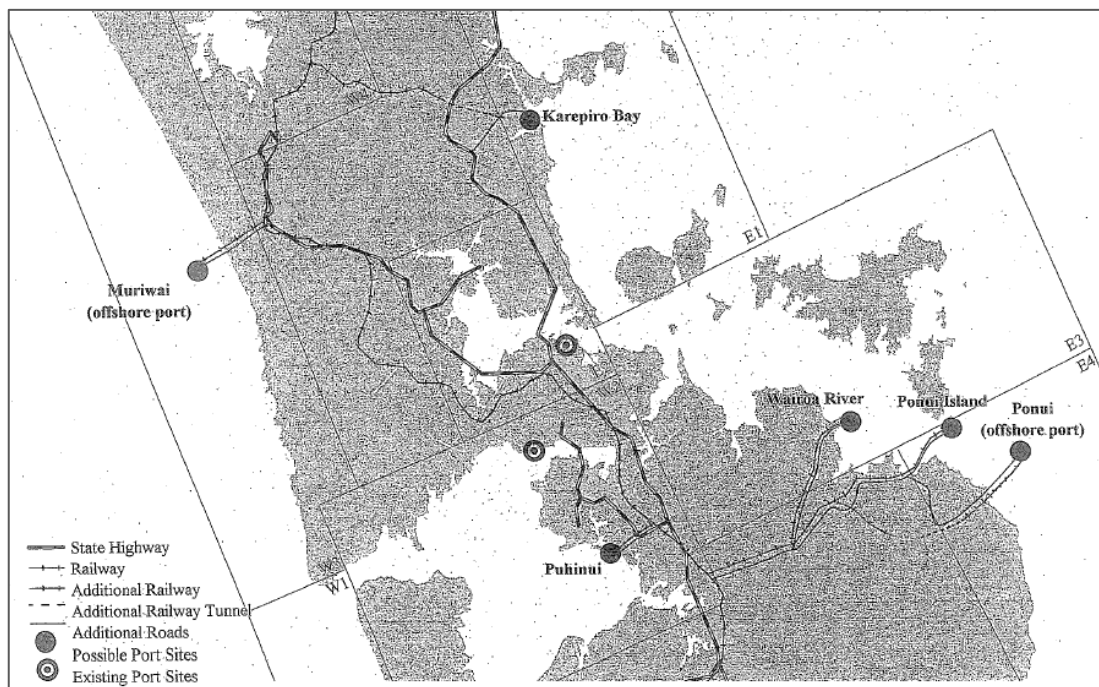
Figure 1 Planned footprint of the cargo port in 2016.



Source: Adapted from *Final Draft Waterfront Plan*, Waterfront Auckland, 15 June 2012, page 25.

The transformation scenario assumes this land would be released for other uses, while alternative infrastructure would be used and/or constructed to handle cargo volumes. This could include use of spare capacity and expanded facilities at the Port of Tauranga and Northport, combined with greater use of road and rail transport to and from Auckland, and/or construction of alternative port facilities (eg Figure 2).

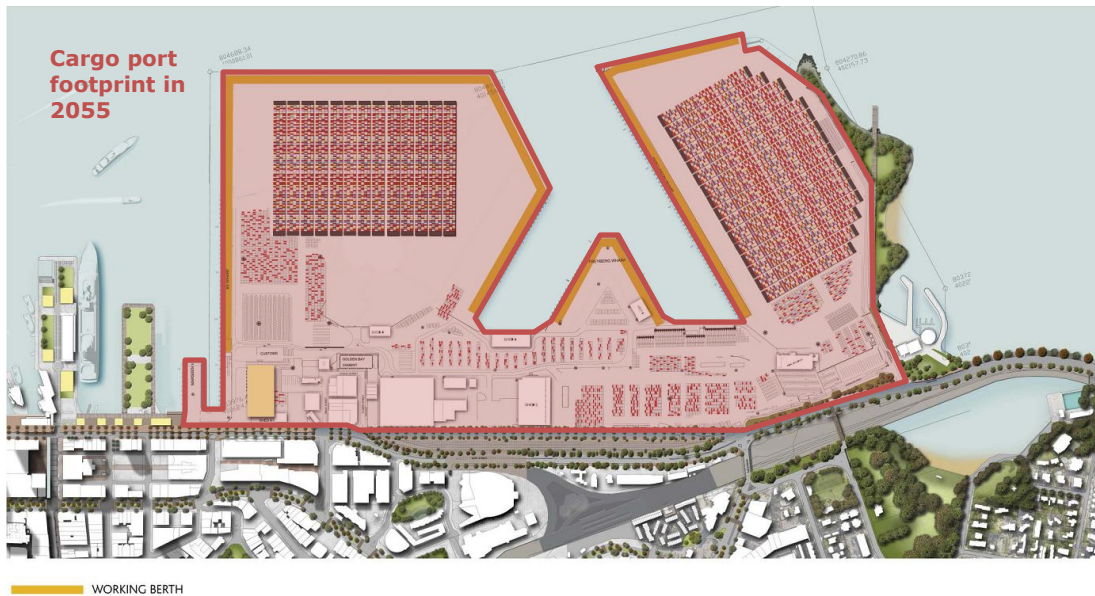
Figure 2 Location of potential alternative port sites considered by POAL, 1999



Source: Ports of Auckland

The expansion scenario is based on plans proposed by Ports of Auckland and involves an expansion of the port's footprint by approximately 25 hectares and a significant increase in cargo handling activity at the site (Figure 3). The expansion scenario would also involve heavier use of road and rail transport infrastructure within Auckland.

Figure 3 Illustration of the port expansion scenario by 2055.



Source: Adapted from

http://www.poal.co.nz/news_media/publications/2011_Port_Development_Concept.pdf.

Welfare benefits and costs of the transformation scenario

The main welfare **benefits** of the transformation scenario relative to the no change scenario are:

Transformation of port land to higher value uses: The value of the port's land in its current use is around \$380 per square metre, but a conservative estimate of its value in alternative use is around \$1,250 per square metre (accounting for the fact that some land may be retained for public use and additional supply of waterfront land could depress land prices). This reflects the true opportunity cost of the port's assets, and means that current returns being earned on these assets are very low (below the risk-free rate of return).

Reduction in negative spillovers: Moving cargo handling activities outside Auckland's CBD is likely to reduce negative spillovers associated with noise, visual amenity, light pollution, air and water pollution, and transport congestion.

More efficient use of labour and capital resources at ports: The cargo port at Auckland operates at relatively low productivity compared to Tauranga and compared to other ports internationally. Moving cargo handling activities from Auckland to other ports could increase productivity and release resources for alternative uses.

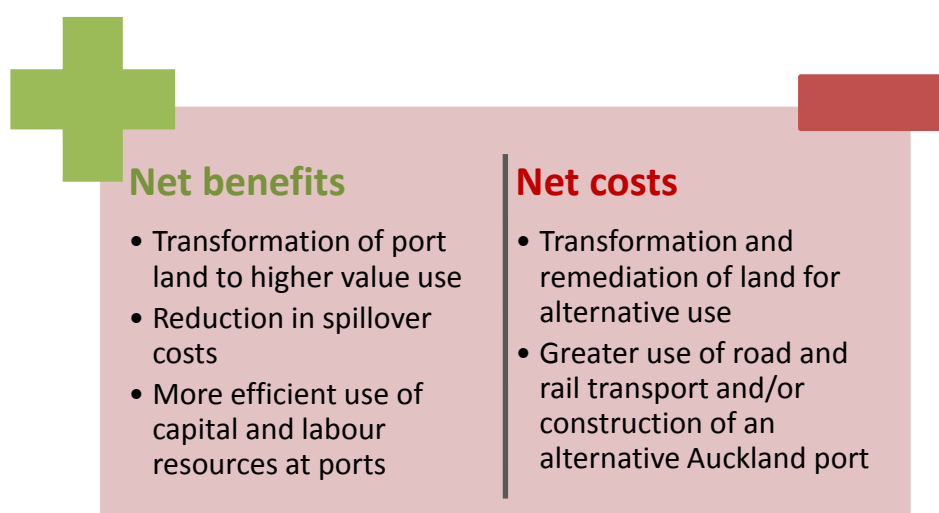
The main welfare **costs** of the transformation scenario relative to no change are:

Port remediation and transformation costs: There may be costs associated with remediating the port land and transforming it to alternative uses. If the transformation scenario involves construction of a new port near to Auckland, then the costs of this would also be relevant.

Additional use of road and rail transport: It is likely that greater use of land transport would be required to move freight between Auckland and ports elsewhere in the North Island, relative to the no change scenario. Existing transport infrastructure has significant spare capacity, however additional investment may be required and importers and exporters may face additional costs. The extent of these costs will depend heavily on the location of alternative port facilities and their proximity to Auckland.

Figure 4 summarises the main net welfare benefits and costs of transformation.

Figure 4 Summary of the key net welfare benefits and costs of the transformation scenario versus the no change scenario.



The transformation scenario may also have effects on international shipping prices, shipping time, and the resilience and flexibility of New Zealand's transport network, however the direction of these effects is ambiguous and the size of these effects is not expected to be large.

Welfare benefits and costs of the expansion scenario

The main potential **benefit** of the expansion scenario relative to no change is less use of road and rail transport to move freight between Auckland and other North Island ports, resulting in cost savings for importers and exporters, although this will depend on the origin/destination of the freight that the expanded Auckland port captures. Offsetting this are the following welfare **costs**:

Port expansion costs: The work involved in expanding the port itself (eg reclamation and construction) will be costly. To some extent this will offset expansion costs at other ports in the upper North Island, however expanding Auckland's port is likely to be more expensive than expanding other ports due to the high cost of creating reclaimed land compared with the price of existing land around the other ports.

Additional transport infrastructure in Auckland: Investment in road and rail infrastructure to and from the downtown port is likely to be required, including an estimated \$1 billion for a motorway extension and \$500 million for a new rail line. In

addition to the construction costs, there will be spillover costs associated with increased transport activity, including reduced opportunities for residential development along transport corridors. This could affect initiatives such as the Orakei Point transport-oriented development (Figure 5).

Figure 5 Overview of the Orakei Point transport-oriented development along the eastern rail line.



Source: <http://www.aucklandcity.govt.nz/council/projects/orakei/default.asp>

Increased spillover costs: As well as the spillovers associated with increased road and rail transport activity, expansion of the port will lead to greater negative effects associated with noise, visual amenity and light, air and water pollution. This will be correlated with a reduction in the size of boating channels in the Hauraki Gulf and reduced views of the Gulf available to people living and working in the city.

Reduced labour and capital productivity: For the same reasons as discussed above, substitution of cargo handling activity from other ports to Auckland could result in lower productivity and inefficient use of resources.

As in the transformation scenario, the expansion scenario may have effects on international shipping prices, shipping time, and the resilience and flexibility of New Zealand's transport network, but these effects are not expected to be significant compared to the other costs above.

Comparison of scenarios

The transformation scenario has potentially significant welfare benefits as well as significant costs. At this stage it is not possible to determine whether the benefits would exceed the costs, but there is a clear case for further investigation and analysis. In contrast, based on our preliminary analysis it seems unlikely that the benefits of the

expansion scenario will exceed the costs. Table 1 summarises the expected costs and benefits of the transformation and expansion scenarios relative to no change.

Table 1 Comparison of expected costs and benefits relative to the no change scenario.

Source	Transformation	Expansion
Use of port land	Benefit	Cost
Transformation and remediation	Cost	No change
Spillover effects	Benefit	Cost
Use of capital and labour resources at ports	Benefit	Cost
Use of road and rail infrastructure	Cost	Ambiguous
International shipping costs and transport time	Ambiguous	Ambiguous
Resilience and flexibility	Ambiguous	No change

Future work

The work in this discussion paper is a preliminary evaluation of the costs and benefits of the two scenarios being considered. It is intended to help inform the debate about options for the future of Auckland's port infrastructure. If a decision is made to conduct a full cost-benefit analysis of the options, this would involve a more detailed examination of the costs and benefits considered in this paper and an attempt to quantify them with more precision.

1 Introduction

This discussion paper provides a preliminary analysis of alternative scenarios for the future of the cargo port on the Auckland waterfront. We outline alternative scenarios of port expansion and transformation, and discuss the costs and benefits of these scenarios relative to the status quo.

Our analysis is based on the standard economic principles of welfare analysis. **Welfare** (or wellbeing) is the **total benefit that people obtain from all that they value**, including but not limited to consumption of goods and services, participation in individual or communal activities, their environment, their health, and overall contentment with their life and actions. Thus evaluating changes in welfare involves broader considerations than changes in economic activity (such as measured by GDP). For example, a welfare analysis can include and value impacts on the environment, health and quality of life, in addition to impacts on measured economic activity.

1.1 Cost-benefit analysis

Welfare, or wellbeing, is the foundation of cost-benefit analysis. A proper cost-benefit analysis estimates the *difference* in welfare between scenarios. Typically this involves comparison of one or more alternative scenarios with a ‘no change’ or ‘business as usual’ scenario. This enables objective decision-making on the basis of net welfare differences, assuming that the goal of decision-makers is to maximise total welfare.

Cost-benefit analysis can also help to identify the welfare impacts on different groups in society. This can aid decision-making to the extent that the distribution of welfare effects across society is a concern for decision-makers, ie cost-benefit analysis can inform decisions based on the equity of alternative options.¹

A key concept underlying cost-benefit analysis is that all decisions have opportunity costs. The opportunity cost of a decision is the value of the next best alternative foregone. Cost-benefit analysis seeks to identify and quantify all opportunity costs. For example, the port land could be put to alternative use, so the value that the land could generate in alternative use is part of the opportunity cost of having a port in the CBD (or indeed anywhere).

Cost-benefit analysis makes explicit exactly what is given up as a result of a decision, including a decision to maintain the status quo. The same is true for all resources used by an activity, including labour and materials that have alternative uses. For this reason, cost-benefit analysis is a crucial input into robust policy decisions.

1.2 Cost-benefit analysis versus economic impact analysis

Cost-benefit analysis differs from “economic impact” analysis in some important ways. First, an economic impact analysis seeks to quantify the total value of market transactions associated with the current level of a particular activity, whereas cost-

¹ However, cost-benefit analysis does not provide a way of determining which scenario is ‘more’ equitable than another – this is a value judgement that must be made by decision-makers.

benefit analysis allows the consideration of broader effects that are not usually reflected in market transactions, such as effects on the environment and human health.

More importantly, by focussing on what is gained or lost (ie opportunity costs) under different scenarios, cost-benefit analysis facilitates objective decision-making based on which scenario is 'better' in a welfare sense. In contrast, most economic impact analysis ignores opportunity cost and does not compare the differences between two realistic scenarios. Such analysis does not take account of the fact that resources used in any given activity often have alternative uses in other activities. While such an analysis would give information regarding the level of activity associated with the port, it says nothing about how total activity would change if the port were bigger or smaller, taking into account the alternative uses of the resources used by the port, and so provides no useful information for determining whether current port activities are the best use of this waterfront site.²

1.3 Structure of this report

The remainder of this report is structured as follows. In section 2 we outline three future scenarios for the future of the port in the Auckland CBD. Then in section 3 we discuss the relative welfare costs and benefits associated with the scenarios, and provide some quantitative evidence of the size of these effects where possible. The scope of this project does not extend to a complete cost-benefit analysis, but we hope that the analysis in this report will provide a useful basis for future work and well-informed discussions about the port's future.

² Economic impact analysis could be improved by comparing scenarios in a disciplined manner, but it would still ignore non-market values.

2 Future Scenarios

We consider three future scenarios for the cargo port in the Auckland CBD:

- **No change:** Retention of the cargo port on the CBD waterfront, with no significant change to its current footprint and activities.
- **Transformation:** Transformation of the cargo port land to alternative uses, such as for public, residential and commercial use. In broad terms, this would involve other infrastructure elsewhere handling cargo, while other port activities including ferries, pleasure boats and the marine and fishing industries would remain in the CBD.
- **Expansion:** A significant increase in the activities and footprint of the cargo port in the Auckland harbour.

These scenarios were chosen as they capture the main possibilities for the port's future. In this section we outline what each of these scenarios could look like.

2.1 Context

Ports of Auckland is one of the largest sea ports in New Zealand, and mainly competes with the ports at Tauranga and Whangarei (Northport) to serve the central and upper North Island. Figure 6 shows the current physical footprint of the cargo port on the Auckland CBD waterfront. This area encompasses approximately 77 hectares of reclaimed land and wharves.³

Figure 7 shows annual activity levels at the three main upper North Island ports. The three ports handle broadly similar import volumes, although Whangarei's import volumes, which include oil, are somewhat higher. Both Auckland and Whangarei handle far lower export volumes than Tauranga. Auckland is an import-oriented port, with higher import volumes than export volumes, and very high value imports relative to other ports.

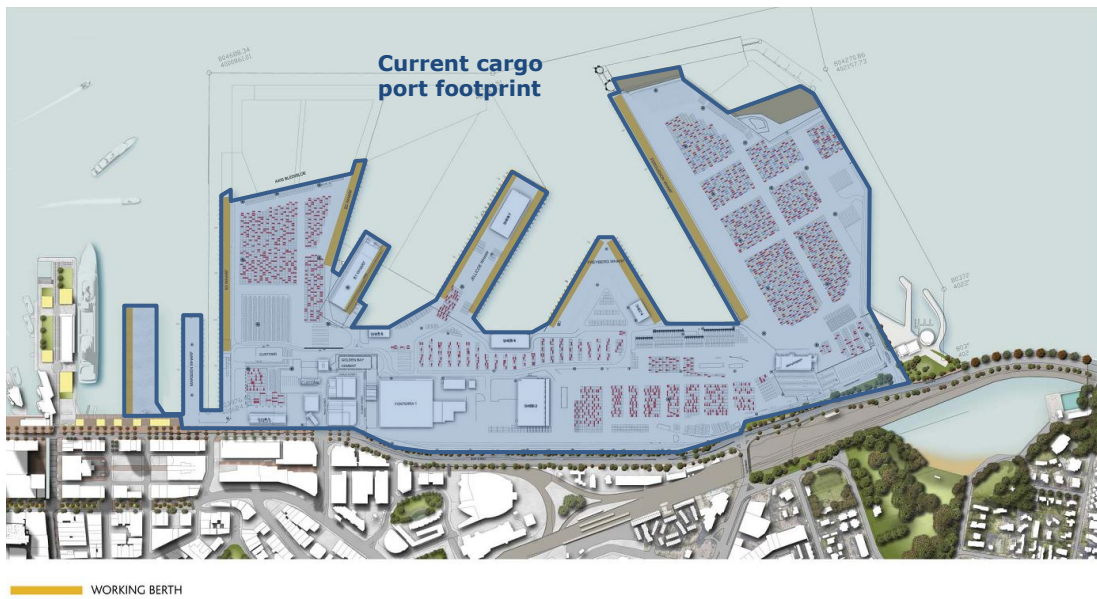
Export volumes are higher through Tauranga, but the total value of exports is similar to Auckland, as a large proportion of Tauranga's exports are logs. A negligible amount of export value is handled by Whangarei, although Whangarei handles the greatest import volume. The volume and value of imports handled by Auckland has grown steadily over time. Export volumes through Auckland have been relatively flat over the past decade, while the real value of exports has slowly increased.⁴

The Port of Tauranga is approximately 230 km by road and rail from Auckland, while Northport in Whangarei is approximately 140 km by road and rail.

³ See eg Auckland Regional Holdings, *Long-Term Optimisation of the New Zealand Port Sector*, October 2009, p. 110.

⁴ Real values were calculated by inflating historic nominal values to current dollars using the consumer price index.

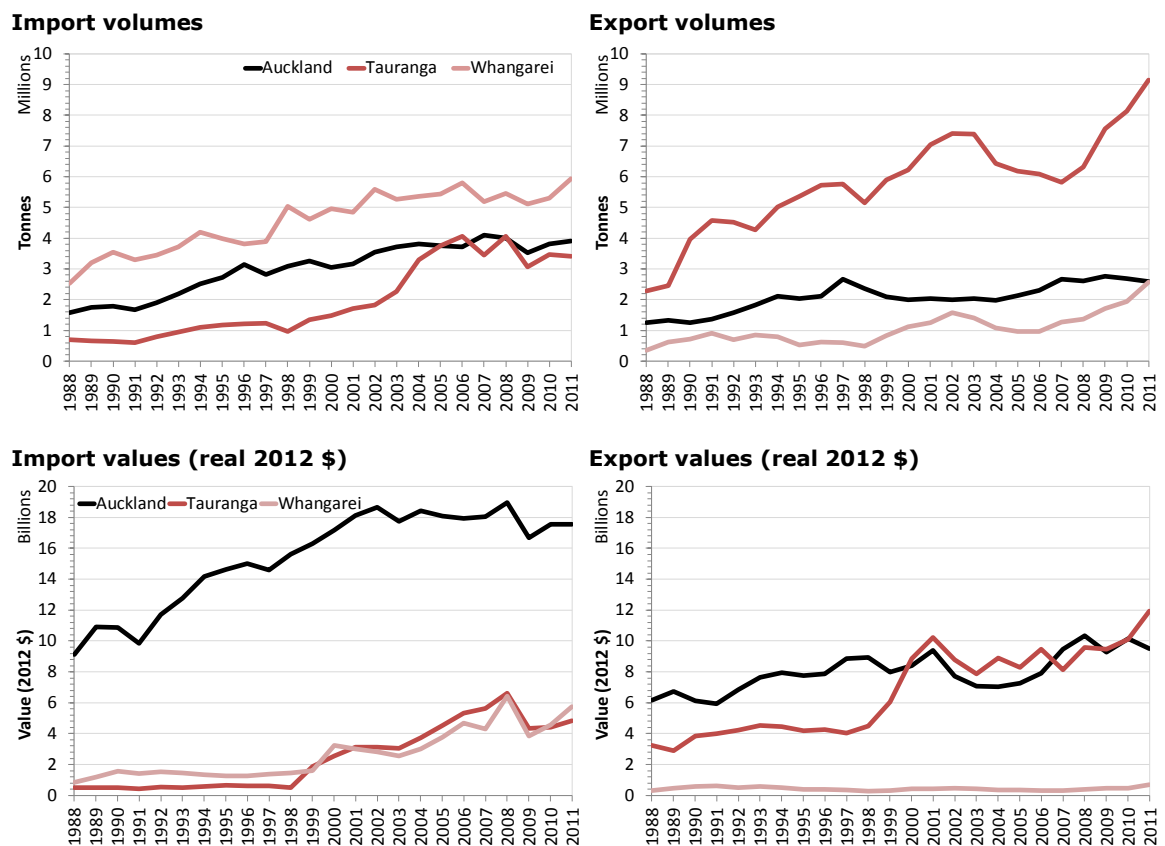
Figure 6 Physical footprint of the cargo port in 2012.



Source: Adapted from

http://www.poal.co.nz/news_media/publications/2011_Port_Development_Concept.pdf.

Figure 7 Annual volumes and real values of freight handled by upper North Island ports.

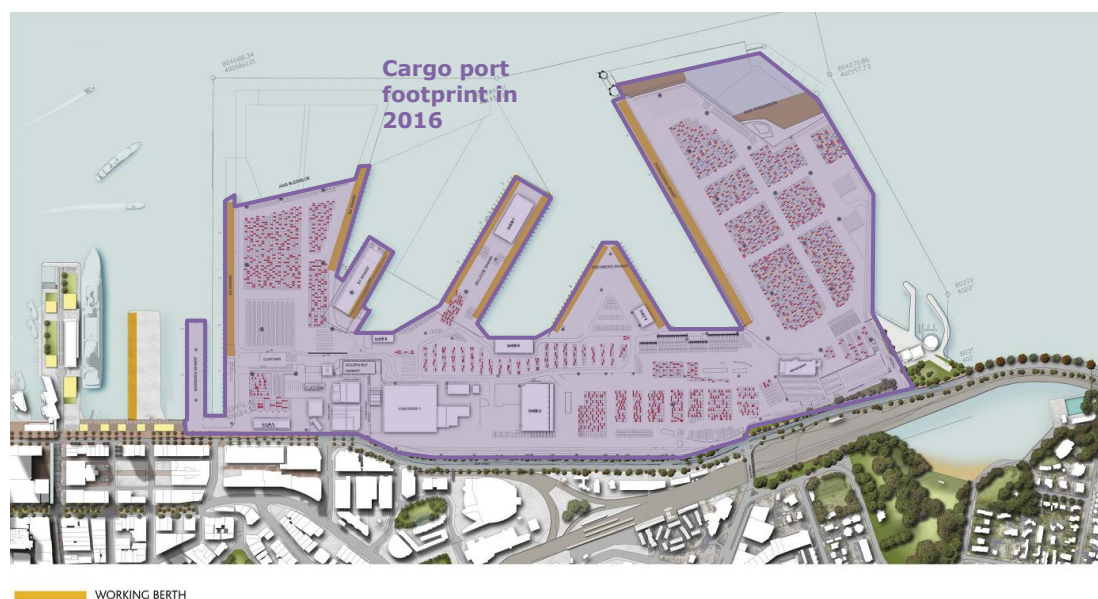


Source: Statistics New Zealand.

2.2 No change scenario

This scenario involves retention of cargo port activities largely in their current locations and at the current scale of operations, but with some additional space. This is the scenario envisaged in the Final Draft Waterfront Plan prepared by Waterfront Auckland,⁵ and is illustrated in Figure 8. The existing footprint of the cargo port to the east of Queens Wharf will be increased somewhat relative to the current footprint, with the expansion of the Fergusson container terminal by 3.6 hectares by 2016,⁶ while Captain Cook wharf may no longer be a working wharf.

Figure 8 Overview of planned development under the Final Draft Waterfront Plan, including expansion of the Fergusson container terminal.



Source: Adapted from *Final Draft Waterfront Plan*, Waterfront Auckland, 15 June 2012, page 25.

The port on Auckland's waterfront presently occupies approximately 77 hectares of land⁷ and in 2016 will occupy approximately 79 hectares, assuming the expansion of the Fergusson container terminal proceeds as planned and Captain Cook wharf is returned to public use.

Ports of Auckland employs approximately 530 full time equivalent (FTE) staff.⁸ Plant and equipment valued at \$88 million is used by Ports of Auckland Limited (POAL) across its three Auckland locations (the waterfront port, POAL's seaport at Onehunga and its inland freight hub at Wiri), with most of this likely to be in use at the downtown cargo port.⁹

⁵ See <http://www.waterfrontauckland.co.nz/wa/media/images/pdf/39347-WAKL-Waterfront-Plan-DRAFT-4.pdf>.

⁶ See http://www.poal.co.nz/facilities_services/facilities/container_terminals.htm.

⁷ See footnote 3

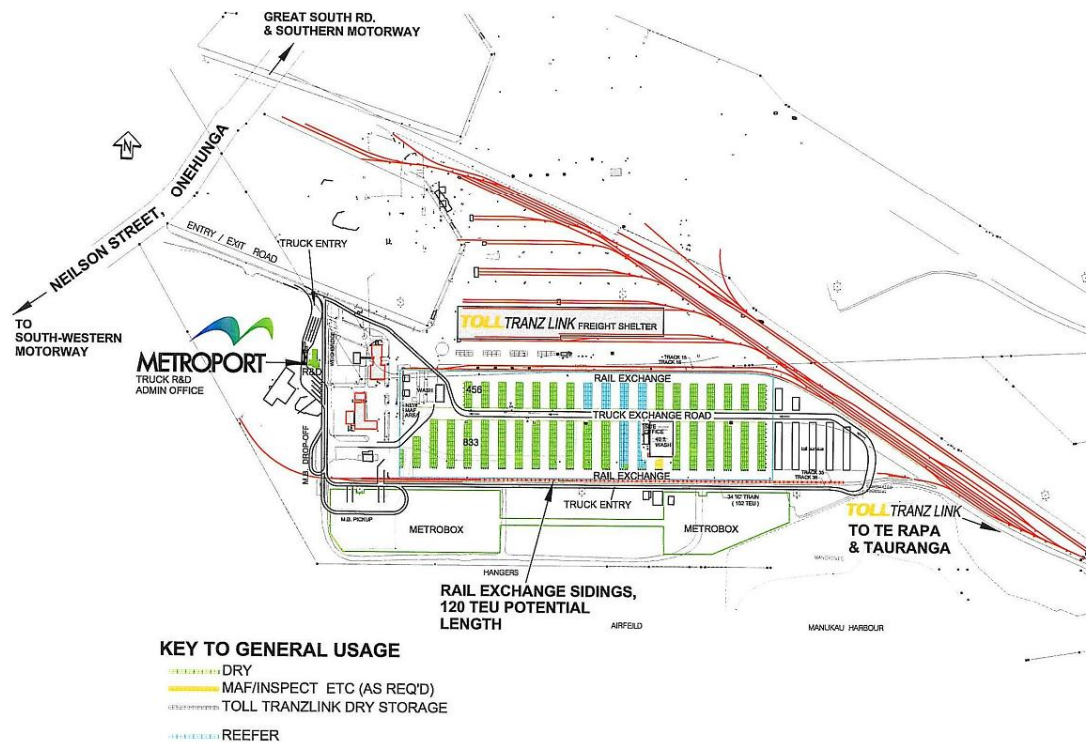
⁸ See Port of Auckland Dispute Fact Sheet <http://www.scoop.co.nz/stories/BU1201/S00070/port-of-auckland-dispute-fact-sheet.htm>.

⁹ Ports of Auckland 2011 Financial Report, p. 24.

Ports of Auckland handled approximately 895,000 TEU (20-foot equivalent units) of containers in the 2010-2011 financial year, as well as 3.5 million tonnes of breakbulk (non-containerised) cargo.¹⁰ The total value of the Port of Auckland's import and export trade in 2011 was \$27.8 billion, which corresponded to 6.7 million tonnes of goods shipped internationally through the Auckland port.

Freight handled by Ports of Auckland is distributed and/or collected inland using a combination of road and rail transport. Since 2010, POAL has operated a 15 hectare freight hub in Wiri, with a rail connection to the downtown seaport. The Port of Tauranga also operates an inland distribution centre in Auckland, which is directly connected to its Tauranga seaport by rail. Tauranga's distribution centre, known as MetroPort (Figure 9), handled 138,000 TEUs of container traffic in 2011.¹¹

Figure 9 Overview of Port of Tauranga's MetroPort facility in Auckland.



Source: <http://www.port-tauranga.co.nz/images.php?oid=3009>

According to Port of Tauranga, its MetroPort rail connection is presently capable of carrying 141,232 TEUs in each direction annually (282,464 TEUs total), and rail capacity is expected to increase with longer trains serving the Auckland-Tauranga route.¹² The Port claims that there is “significant spare capacity” at the MetroPort site itself to allow for future growth, with current volumes at around 50% of capacity.¹³

¹⁰ Ports of Auckland 2011 Annual Review, pp. 3-4.

¹¹ See <http://www.port-tauranga.co.nz/images.php?oid=3822>.

¹² See Port of Tauranga, *MetroPort Overview*, April 2011; Port of Tauranga, *Take a look at Our Future*, 2009 at p.12.

¹³ See footnote 12.

2.3 Transformation scenario

The transformation scenario involves a significant reduction in port activities in the Auckland CBD, so that the 79 hectares of land occupied by the existing cargo port shown in Figure 8 would be released for other uses. This could facilitate Auckland's transformation to a world-class maritime city.

It is likely that the site would need to be remediated and/or strengthened in order to accommodate alternative activities. Likely uses for the land include combinations of:

- Maritime recreation and industry eg yacht building, ferries, cruise ships and fishing
- Public/open spaces
- Residential apartments
- Offices
- Retail shops, restaurants, etc
- Event facilities
- Education and research facilities

Figure 10 Examples of public space, maritime and residential uses on Auckland's waterfront



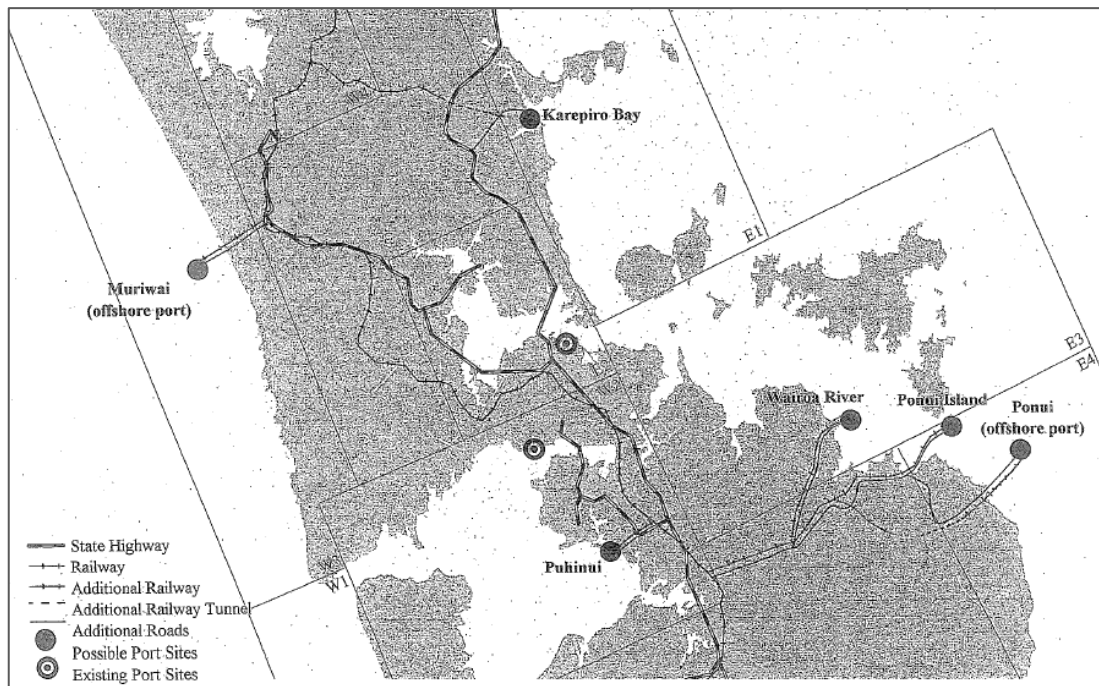
Source: [Images from The Waterfront Plan](#), Waterfront Auckland (2012).

If the current cargo handling facilities were removed from the Auckland CBD waterfront, the freight handled by the port in the no change scenario would need to be handled by alternative facilities. Options for alternative facilities would include expansion of existing upper North Island ports (eg Port of Tauranga and Northport) and new port facilities constructed elsewhere, or some combination of these.

A number of alternative port locations around Auckland have been considered by POAL in the past including Muriwai, Puhinui, Karapiro Bay, Waioa River, and Ponui Island (see Figure 11).¹⁴ We understand that locations in the Firth of Thames may also be viable for a deep water port. The Auckland Council intends to lead a study of port development options for Auckland which takes a “long-term (30-100 year) view” and “may identify as yet unexplored alternative locations for port infrastructure.”¹⁵

Given the uncertainty surrounding the feasibility, cost and location of a new port site, we examine the possibility for the cargo diverted from Auckland under the transformation scenario to be accommodated at existing port facilities in the upper North Island. A more detailed future investigation would provide the opportunity to look more closely at new port options.

Figure 11 Location of potential alternative port sites considered by POAL, 1999



Source: Ports of Auckland

Specifically, we examine a scenario where a combination of the following infrastructure would be utilised in order to accommodate the cargo that is currently handled at the Auckland port:

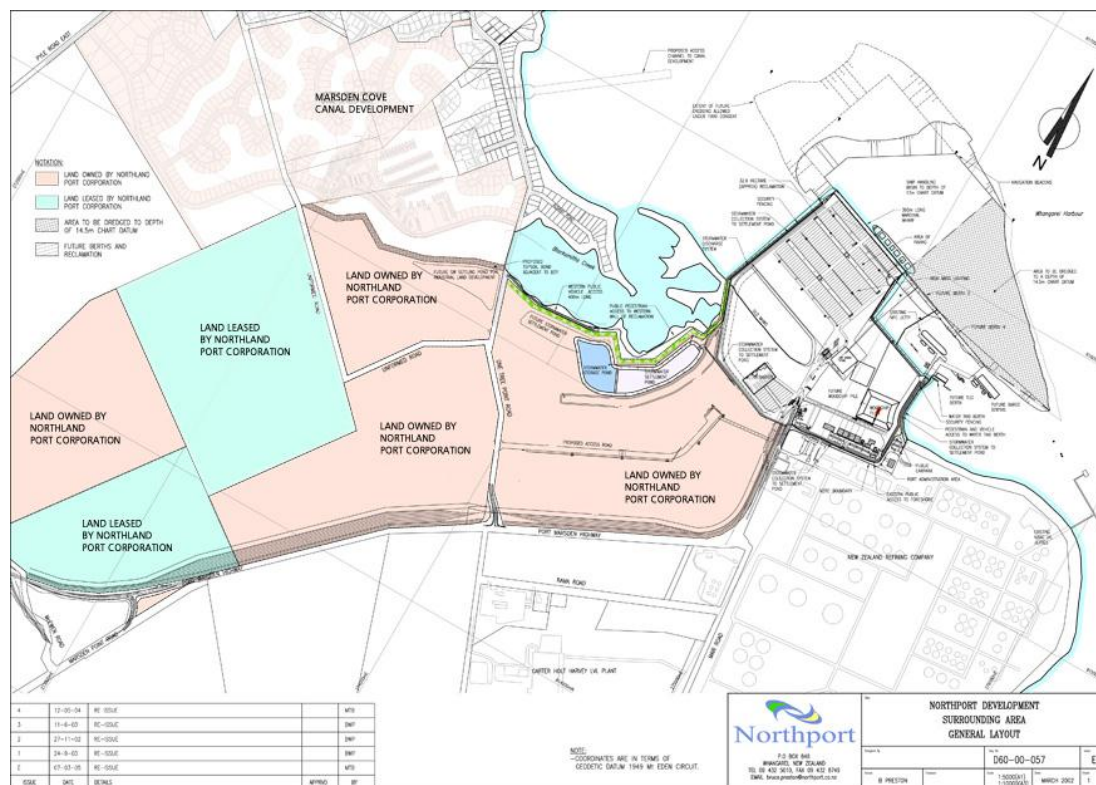
- expansion of activities at the Port of Tauranga and/or Northport;
- increased use of road and rail transport to and from Auckland; and
- expansion of inland ports (freight hubs) in Auckland.

¹⁴ See eg, Port Development Options for the Auckland Region, Ports of Auckland, June 1999.

¹⁵ See, The Auckland Plan, paras 764-765.

It appears that both Port of Tauranga and Northport have the ability to significantly expand their operations.¹⁶ The Port of Tauranga has more than 90 hectares of back-up land available for cargo handling and storage.¹⁷ Northland Port Corporation owns approximately 180 hectares of land directly adjacent to Northport (Figure 12).¹⁸

Figure 12 Land owned or leased by Northland Port Corporation adjacent to NorthPort.



Source: <http://www.northlandportcorp.co.nz/>.

However, at present Northport is predominantly a breakbulk cargo port with only minor volumes of containers handled.¹⁹ It is therefore likely that additional investment in and/or relocation of container facilities would be needed if Northport were to significantly expand its container volumes.

In addition to sea ports, the road and rail networks in the upper North Island would need to accommodate increased freight volumes to and from the Auckland region. Table 2 shows current utilisation rates on the portions of the national rail network that connect Auckland with Whangarei and Tauranga.

¹⁶ However, spillover effects on surrounding areas and the associated consenting issues may be a barrier. We discuss this further in section 3.3.3 below.

¹⁷ See <http://www.port-tauranga.co.nz/About-Us/Facilities/>.

¹⁸ See <http://www.northlandportcorp.co.nz/>.

¹⁹ See Northland Port Corporation submission to Productivity Commission, February 2012, <http://www.productivity.govt.nz/sites/default/files/DR070%20-%20Northland%20Port%20Corporation%20-%20Draft%20Report%20Submission.pdf>.

Table 2 Daily train movements and capacity utilisation for lines connecting Whangarei, Auckland and Tauranga, 2010.

Line	Current no. of trains per day (weekdays)	Current max. trains possible per day	Line capacity utilised
North Auckland Line (Whangarei – Auckland)	4	9	44%
East Coast Main Trunk (Auckland – Tauranga)	32	48	67%

Source: NZ Shippers' Council, KiwiRail

According to KiwiRail, only 44% of the capacity available on the line that connects Auckland and Whangarei (the North Auckland line) was being used in 2010. To connect NorthPort however, there would need to be a new link constructed from Oakleigh to the port. The East Coast Main Trunk line which connects Auckland and Tauranga was the busiest freight line in the country in 2010, at 67% utilisation.²⁰ We understand that KiwiRail is currently upgrading the East Coast Main Trunk line in order to increase its capacity and reliability.²¹

Assuming spare capacity on the Auckland – Tauranga rail line of 16 trains per day, with a typical load of 120 TEU per train, there is spare capacity of around 700,000 TEU per annum. This suggests that up to 75% of the TEU volume currently handled by Ports of Auckland could be accommodated by existing spare capacity on the Auckland – Tauranga rail line. Additional rail infrastructure costs under the transformation scenario therefore may not be very significant.

2.4 Expansion scenario

The expansion scenario involves a significant increase in cargo port activities in the Auckland CBD relative to the no change scenario (and relative to the current state). This would involve additional land reclamation and wharf construction, to increase the physical footprint of the cargo port. For concreteness, we consider the expansion scenario that is currently set out on the Port of Auckland's website.

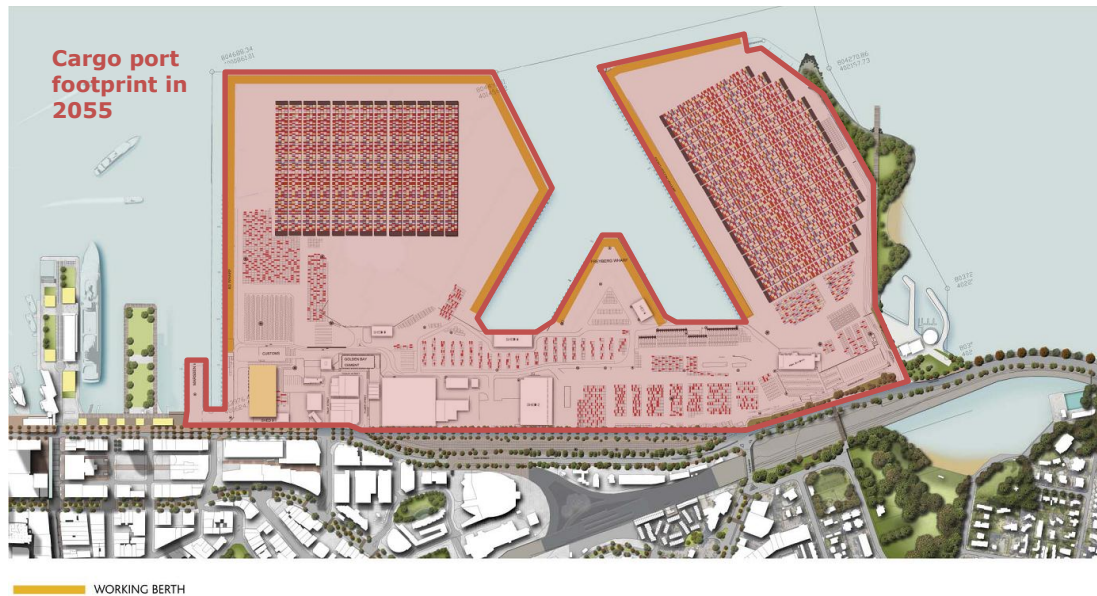
This is illustrated in Figure 13 and involves an expansion of the cargo terminal area between Bledisloe and Jellicoe wharves, increasing the cargo port's footprint by approximately 25 hectares by 2055.²²

²⁰ NZ Shippers Council, *The Question of Bigger Ships – Securing New Zealand's International Supply Chain*, August 2010 at p.63.

²¹ See eg <http://www.bayofplentytimes.co.nz/news/passing-loop-extension-will-boost-rail-capacity/1296918/>.

²² Extension area was estimated based on the concept drawings on Ports of Auckland's website and reproduced in Figure 13.

Figure 13 Illustration of the port expansion scenario by 2055.



Source: Adapted from

http://www.poal.co.nz/news_media/publications/2011_Port_Development_Concept.pdf.

Assuming that Ports of Auckland wins additional cargo volume from other ports as a result of the expansion, the increase in cargo handling activity that would accompany the expansion would utilise additional resources at the Auckland port relative to the no change scenario. The resources required would include labour and capital (plant and equipment), as well as land. The proposed 25 hectare expansion would increase the Port's footprint from 79 hectares in the no change scenario to approximately 104 hectares by 2055. Assuming similar density of employment per hectare on the site as currently, the expansion would increase the labour force at the port from approximately 530 FTEs to 715 FTEs.

We assume that under the expansion scenario, the scale of activity at other ports in the upper North Island would contract relative to the no change scenario.²³ Usage of road and rail infrastructure connecting Auckland and the rest of the upper North Island could increase or decrease relative to the no change scenario, depending on the source and destination of the freight business that is acquired from other ports. If Ports of Auckland captures freight from Port of Tauranga which originates relatively close to Tauranga, this would place heavier demands on the rail link between Tauranga and Auckland relative to the no change scenario. If the freight business captured by Ports of Auckland originated in the Auckland region, the opposite would be true.

In either case, it is likely that there would be heavier demands on the transport links between the Auckland port and its inland freight hub in South Auckland, assuming that POAL is able to capture additional freight volumes in the expansion scenario.

²³ There is a risk that there will be excess port capacity overall, imposing additional costs. We have not estimated the extent of these costs as they would depend on how other ports react to the expansion of the Auckland port.

3 Preliminary Analysis of Costs and Benefits

In this section we discuss the main welfare benefits and costs of the transformation and expansion scenarios *relative* to the no change scenario. Where possible within the scope of this discussion paper, we provide quantitative evidence of these effects.

3.1 Geographic scope of the analysis

The net benefits and costs of the scenarios may differ depending on the physical domain used to assess these effects. For example, under the transformation scenario, other ports in the North Island would need to expand (relative to the no change scenario) to handle the cargo volume formerly handled by Auckland. The cost of such expansion would not be included in the costs of the transformation scenario if the domain of analysis is confined to the Auckland region. However, if the physical domain is New Zealand as a whole, or only the upper North Island region, then these costs would be relevant.

Many of the costs and benefits of the transformation and expansion scenarios relative to the no change scenario extend beyond the Auckland region. This is because changes in the volume of cargo handled by Auckland will affect the volume of cargo handled by other ports in the North Island, and will affect the use of road and rail infrastructure to transport freight within the country.

Given this fact, in our view the upper North Island region (Northland, Auckland, Waikato and Bay of Plenty) is the most appropriate domain for the analysis. Effects on the upper North Island region are expected to be very similar to effects on New Zealand as a whole, given that the most likely alternative ports to Auckland are in this region.

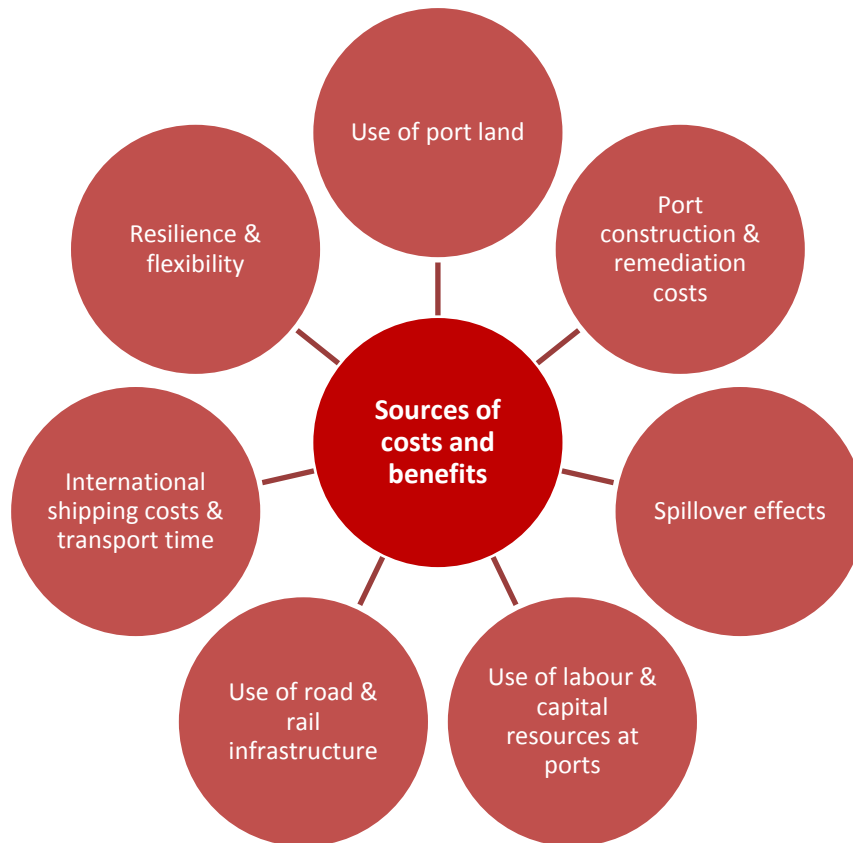
This also suggests a role for central government in decision-making about the future of the cargo port in Auckland, as significant effects will be felt outside Auckland. If decisions are made based only on the effects on the Auckland region, there is a risk that any net benefits to Auckland will be more than outweighed by detriments in other regions. A broader geographic scope is needed to evaluate these tradeoffs.

3.2 Overview of welfare costs and benefits

Figure 14 summarises the main costs and benefits of the transformation and expansion scenarios relative to the no change scenario. The primary causes of the welfare effects are:

- Changes in the use of land and other resources;
- Changes in the use of other transportation infrastructure; and
- Implications for the overall freight transport system in New Zealand.

Figure 14 Summary of the main sources of costs and benefits, relative to the no change scenario.



Use of port land: Both the transformation and expansion scenarios will change the use of land for ports in Auckland and elsewhere in the North Island, resulting in benefits and costs depending on the value of land in alternative use.

There are also likely to be changes to the size of inland port facilities, including Ports of Auckland's freight hub at Wiri and Port of Tauranga's Metroport facility at Penrose, with associated costs and benefits.

Port construction and remediation costs: Changing land to/from use as a port will involve costs. For example, under the transformation scenario there will be costs associated with remediating the land and the wharves may need to be strengthened to support development.

Spillover effects: Changes in land use at the port may also have positive and negative effects on users of land in surrounding areas in the Auckland CBD and around other ports in the upper North Island, due to changes in visual amenity, noise, light pollution, and other externalities.

Use of labour and capital resources at ports: Both the transformation and expansion scenarios will change the use of capital and labour in Auckland and elsewhere in the North Island. The key question is the productivity of these resources at Ports of Auckland versus other ports in the North Island.

Use of road and rail infrastructure: Changes in the use of land transport to deliver freight to/from Auckland may generate additional costs or cost savings.

International shipping costs and transport time: Greater freight volumes through any given port may make investments to support bigger ships more economic, and bigger ships have lower average costs per freight container, which may be passed on (at least in part) to importers and exporters. However this may also lead to less competition between shipping lines, resulting in higher prices. In addition, transport times may increase for importers and exporters, resulting in costs associated with delay.

Resilience and flexibility: Fewer ports may reduce the resilience of the New Zealand international freight system to natural disasters and other significant adverse events, generating additional costs should such an event occur. Fewer ports may also reduce the shipping options available to importers and exporters, particularly if this results in bigger ships with fewer port calls.

3.3 Analysis of the transformation scenario

The transformation scenario will involve a significant reallocation of land, labour and capital resources in Auckland and elsewhere in the North Island.

3.3.1 Use of port land

Up to 79 hectares of CBD waterfront land in Auckland will become available for other uses. The cargo port land is valued by Auckland Council at \$381 per square metre in its current use.²⁴ Similarly, Ports of Auckland valued its land at \$388 per square metre in its 2011 annual report.

In contrast, Table 3 shows land valuations for properties in nearby Auckland waterfront locations, which are in the range of \$2,500 to \$4,000 per square metre.

Releasing the cargo port land for alternative use could increase the supply of commercial and residential waterfront land in Auckland, which may reduce the incremental value of this land relative to current levels.²⁵ However, even at the low end of the range of current valuations (\$2,500), and assuming that only 50% of the port land is made available for private use (with the rest being used for public space, roads and other infrastructure), the value of the cargo port land could be around \$1 billion in alternative use. This compares to around \$280 million in its current use, suggesting a potential gain of around \$700 million in land values once demand for the additional land has been realised and alternative uses are in place.

²⁴ See, <http://maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/>.

²⁵ Equivalently, some of the uses of the port land may be relocation of existing activity, rather than an overall net gain. However, if a business or an individual chooses to relocate to the waterfront, this revealed preference demonstrates that they obtain more value from the new location.

Table 3 Land values around the Auckland CBD waterfront.

Address	Land Use	Value per sqm (\$)
Cargo port		
10 Tooley	Multi-use within transport	381
Wynyard Quarter		
138 Halsey	Multi-use within commercial	2,478
10-26 Jellicoe	Land	2,540
22-32 Jellicoe	Multi-use within industrial	2,350
132 Halsey	Multi-use within commercial	2,959
1-17 Jellicoe	Other industries	2,759
Viaduct Harbour		
18 Viaduct Harbour	Offices	3,685
22 Viaduct Harbour	Offices	4,127
20 Viaduct Harbour	Offices	3,556
10 Viaduct Harbour	Offices	3,716
4 Viaduct Harbour	Offices	4,000
7-9 Fanshawe	Offices	4,050
1 Fanshawe	Offices	4,032
14-18 Pakenham St East	Multi-use within transport	3,960

Source: Calculated from rating values available from the Auckland Council GIS Viewer
<http://maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/>

These calculations also demonstrate the low financial returns being earned by the owners of the port. In 2011, Ports of Auckland reported a \$24 million post-tax profit on assets valued at \$722 million, yielding an apparent return of around 3%.²⁶ However, using the true opportunity cost of Ports of Auckland's land assets (based on the above calculations) yields a post-tax return of around 1.7%, which is lower than could be obtained from investing in risk-free government securities, even at the current historically low interest rates.²⁷ This strongly suggests a suboptimal allocation of resources maintained by the artificially low valuation of the port's land assets.

Transformation of the cargo port in Auckland to alternative uses would likely require additional land to be used for port facilities at Tauranga and Whangarei (or at another location if a new port were developed elsewhere). As noted above, Port of Tauranga has reserve land available. The value of land in alternative use around the Port of Tauranga ranges from approximately \$214 per square metre for recreational reserve land to \$600 per square metre for commercial land (Table 4). This is significantly less than the value of Auckland port land in alternative use, leading to potential net gains of around \$2,200 per square metre of land transformed to alternative use in Auckland.

²⁶ Ports of Auckland Limited and Group Financial Report 2011.

²⁷ Current 10-year government bond rates are around 3.5%, yielding a post-tax return of around 2.5%.

Table 4 Average land values around the Port of Tauranga.

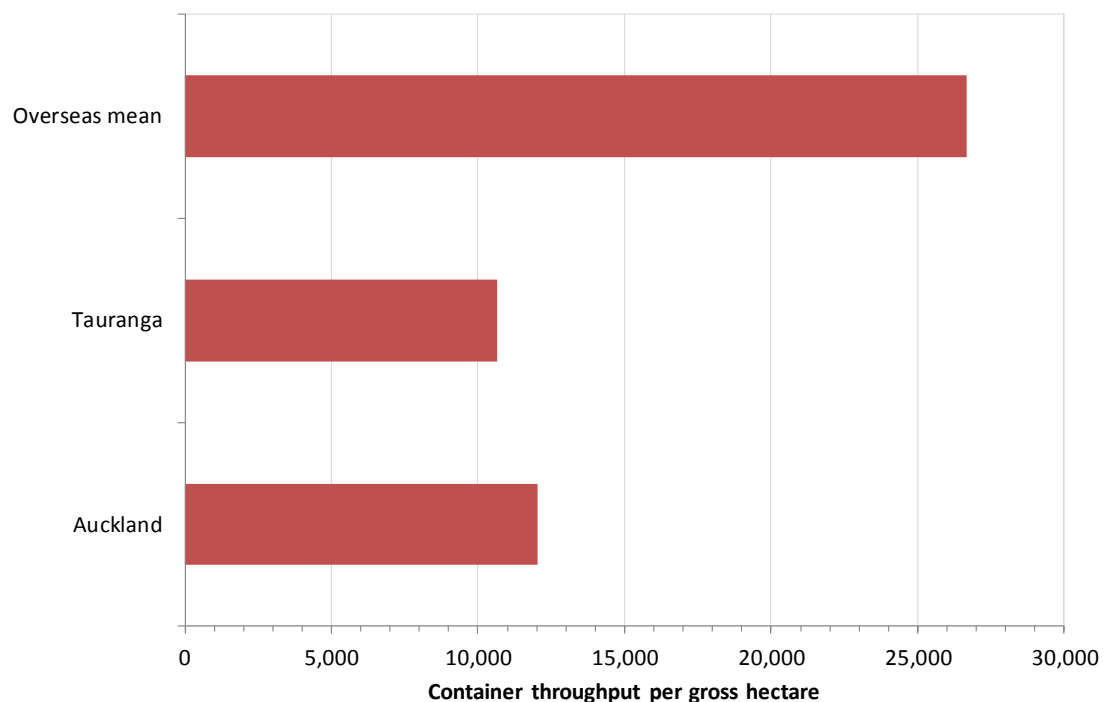
Location	Value per sqm (\$)
South-eastern corner of port (industrial area)	300
Mid-eastern rim of port (recreational reserve & buildings)	214
North-eastern corner of port (commercial area)	601

Source: Tauranga City Council.

Furthermore, intensity of land utilisation at New Zealand ports is relatively low. Figure 15 shows the container throughput per gross hectare at Tauranga, Auckland and a selection of overseas ports, as reported by the New Zealand Productivity Commission.²⁸ Overseas ports are able to handle approximately double the container throughput per hectare relative to the current utilisation rates of New Zealand ports.

Furthermore, Tauranga's intensity of land use is currently lower than Auckland's, suggesting that spare capacity already exists at Tauranga, which would offset the need for its footprint to increase under the transformation scenario to some extent. Therefore, the need for additional land at other ports in the North Island could be significantly less than the land released for alternative use in Auckland under the transformation scenario.

Figure 15 Intensity of land use at sea ports, 2006 – 2008.



Source: New Zealand Productivity Commission.

As an illustration, Figure 16 shows the container handling facilities and berths from Sydney's Port Botany superimposed on the Port of Tauranga. Port Botany handles

²⁸ *International freight transport services inquiry*, New Zealand Productivity Commission, April 2012.

around 2 million TEU per year, while the combined TEU handled by Auckland and Tauranga is around 1.5 million TEU per year. While this map shows only container facilities, and additional facilities would be required for breakbulk handling and supporting infrastructure, it appears that considerable efficiencies can be obtained by more intensive land use at ports in New Zealand.

Figure 16 Container handling facilities from Sydney's Port Botany (red) superimposed on the current footprint of the Port of Tauranga.



Source: Adapted from Google Earth.

Costs would also be incurred in this scenario for expanding cargo handling facilities and associated infrastructure at other ports. Based on the value of Ports of Auckland's non-land fixed assets, these costs would be around \$200 million,²⁹ however it is likely that much of the capital equipment at the cargo port in Auckland (eg cranes and vehicles) could be re-located to another port.

3.3.2 Port construction and remediation

The transformation scenario will require port facilities to be expanded elsewhere in the North Island, generating costs relative to the no change scenario, as described above. Alternatively, a new port could be built at one of the locations shown in Figure 11, and the costs of this construction would have to be taken into account.

In addition, the land used for the cargo port in Auckland will likely need to be remediated to some extent before it can be put to alternative use. This could include the costs of installing utilities infrastructure (eg water, sewer, electricity and

²⁹ Ports of Auckland Limited and Group Financial Report 2011.

telecommunications networks), removing any hazardous materials and contaminated land, and strengthening of wharves to permit additional construction.

The costs associated with remediation and making the port land suitable for alternative use are difficult to estimate without further detailed analysis of the actual work required. However these costs would need to be subtracted from any benefits realised from changing the land to alternative use.

3.3.3 Spillover effects

It is likely that the nature of the activities at the cargo port and associated transport infrastructure generate spillover costs (negative externalities) that affect people's enjoyment of surrounding areas and reduce the value of adjacent land. These spillovers include the effects associated with noise, visual amenity, light pollution, air and water pollution, and congestion on the surrounding streets.

The transformation scenario will reduce some of these effects, to the extent that new activities are quieter, less polluting, more visually appealing and generate less road traffic than the port. This reduction in spillover costs represents a benefit of the transformation scenario relative to the no change scenario.

Additionally under the no change scenario, it is likely that there would continue to be limited public access to the waterfront in the area that is occupied by the port. The removal of the cargo port and diversion of the land into other uses would be expected to improve Auckland's connectivity to its waterfront. This would be a positive spillover effect of the transformation scenario relative to no change.

To some extent, these benefits realised in Auckland will be offset by increased spillover costs at other ports in the North Island, as activity at these ports increases under the transformation scenario. However, we expect the transformation scenario to yield a net gain in terms of reducing spillovers at ports, due to the greater population density in Auckland around the port, relative to Tauranga and Whangarei (Table 5), meaning that a greater number of people are affected by negative spillovers in Auckland relative to other areas.

Table 5 Population densities in area units adjacent to ports

Location	Population	Land area (km ²)	Pop Density (pop/km ²)
Whangarei			
Marsden Point-Ruakaka	2,979	24.9	120
<i>Whangarei average</i>			<i>120</i>
Auckland			
Auckland Harbourside	4,086	1.8	2,241
Auckland Central West	12,267	1.2	10,515
Auckland Central East	9,645	0.9	10,417
St Marys	2,556	0.9	2,732
Parnell West	4,764	2.1	2,261
<i>Auckland average</i>			<i>7,695</i>

Location	Population	Land area (km ²)	Pop Density (pop/km ²)
Tauranga			
Mt Maunganui North	4,677	2.7	1,704
Omanu	5,178	8.7	594
Otumoetai North	3,735	1.7	2,187
Tauranga Central	2,577	2.1	1,235
<i>Tauranga average</i>			<i>1,385</i>

Source: Statistics NZ 2006 Census, Covec

There will also be spillovers associated with transport activity. Under the transformation scenario, additional use of road and rail transport will be needed to transport freight between Auckland and ports elsewhere in the North Island, relative to the no change scenario.³⁰ The increased volumes of freight traveling by road and rail may generate negative spillover effects for people living near transport corridors and for people using the roads. Potential negative spillovers could include increased road congestion, pollution, and noise. These may be offset by reduced transport-related spillovers of road and rail transport to/from the Auckland port in the transformation scenario relative to no change.

3.3.4 Use of labour and capital resources at ports

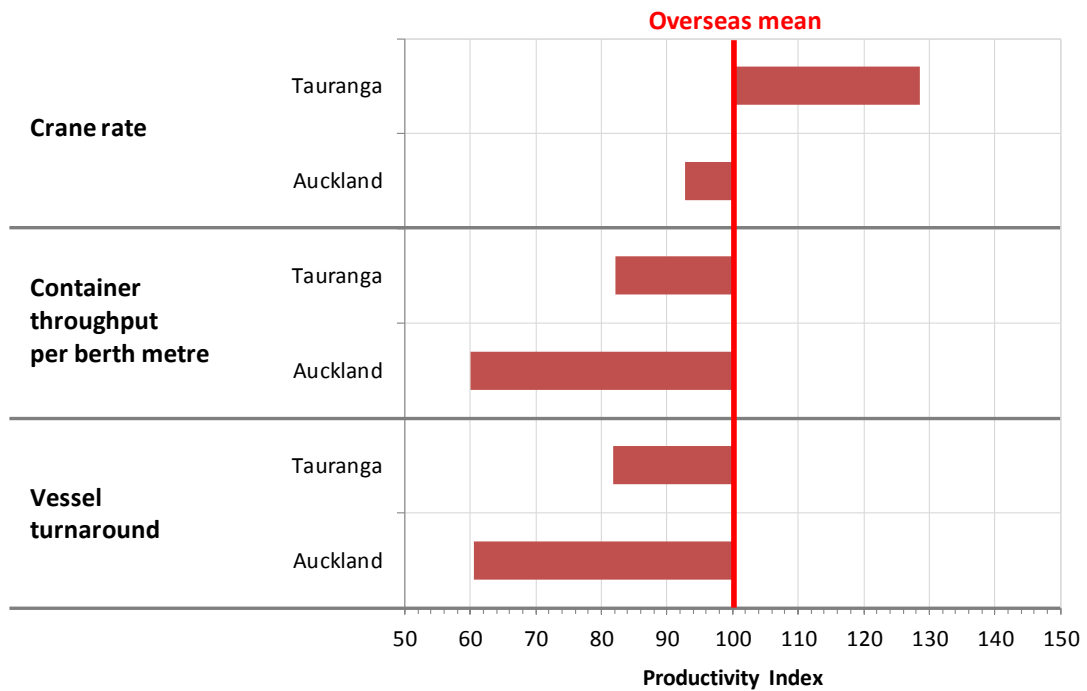
Aside from land, the transformation scenario will result in a re-allocation of labour and capital resources away from the cargo port at Auckland and towards other ports in the North Island. The key issue is the relative productivity of these resources at different locations.

The Productivity Commission's analysis revealed that the cargo port at Auckland operates at relatively low productivity compared to Tauranga and compared to other ports internationally. Figure 17 shows an index of the Productivity Commission's data on crane rate,³¹ container throughput per berth metre, and average vessel turnaround. Tauranga scores better than Auckland on all three measures, with a 39% higher crane rate, 37% container throughput per berth metre, and 15% faster vessel turnaround time. Tauranga also exceeded the overseas mean crane rate by 29%, but both ports performed worse than the international mean for container throughput and vessel turnaround.

³⁰ The need for additional road and rail transport would be lower if the ex-Port of Auckland cargoes were handled by a new port built closer to Auckland instead of the existing upper North Island ports.

³¹ The number of containers a dockside crane moves on or off a container ship in an hour; a measure of capital efficiency.

Figure 17 Index of sea port productivity measures relative to the overseas mean (2010 data).



Source: Calculated from New Zealand Productivity Commission data.

The data in Figure 17 was from 2010. Figure 18 shows data produced by the Ministry of Transport for 2011, including the crane rate and two other port productivity measures. The ship rate is the number of containers moved on and off a container ship in an hour, and the vessel rate is the number of containers moved on and off a container ship in an hour of labour.

Figure 18 Index of New Zealand sea port productivity measures relative to Auckland (2011 data).

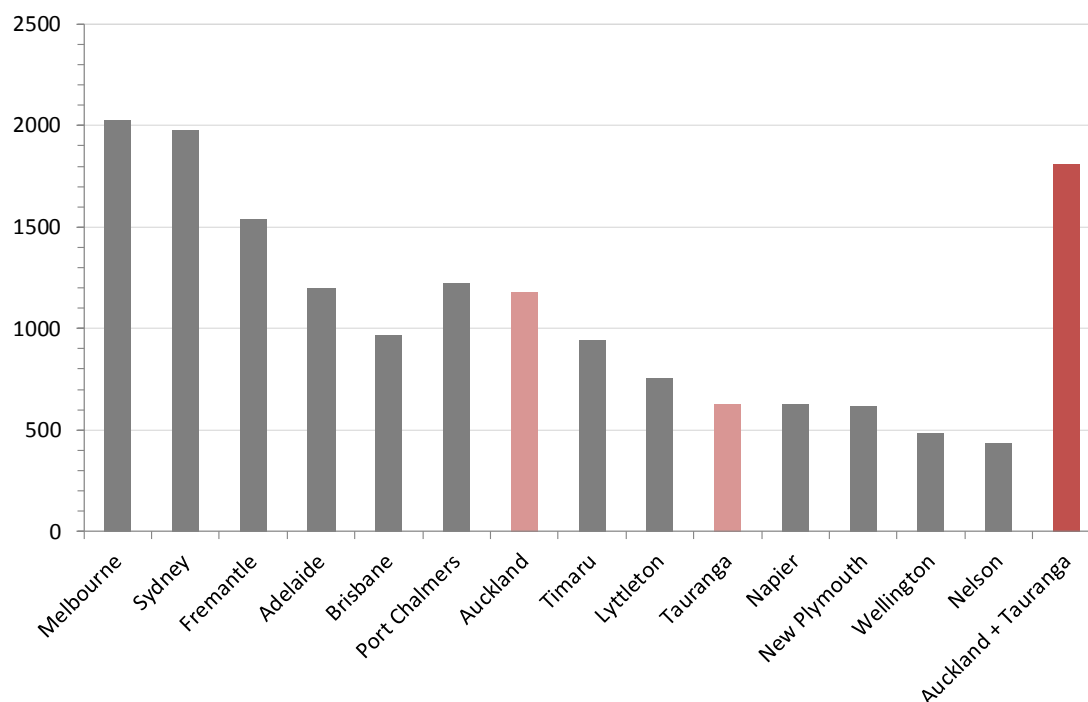


Source: Ministry of Transport (<http://www.transport.govt.nz/ourwork/TMIF/Pages/FT021.aspx>).

The 2011 data shows that Tauranga had approximately a 20% higher crane rate than Auckland, while the vessel and ship rates are approximately the same as Auckland. A possible explanation for this is that labour productivity is higher at Tauranga, leading to more efficient use of capital (ie cranes), while Auckland can achieve a similar vessel rate by using more labour in total. If true, this would imply higher total costs of handling containers at Auckland relative to Tauranga.

The Productivity Commission's analysis also suggests other potential benefits of consolidating container volumes under the transformation scenario. Consolidation would increase the number of containers exchanged per vessel call, allowing the fixed costs of a call at a port to be spread over more cargo. Figure 19 shows the Productivity Commission's data on the average number of containers exchanged (loaded or unloaded) per vessel call at Australian and New Zealand ports. The average number of exchanges is comparatively low at New Zealand ports, meaning the fixed costs of port calls have to be spread over relatively low numbers of containers. In comparison, the combined average of Auckland and Tauranga is similar to the larger Australian ports.

Figure 19 Average containers exchanged per container vessel call.



Source: New Zealand Productivity Commission.

In summary, assuming there is no significant change in the ports' relative productivities, the transformation scenario could shift labour and capital resources from the relatively unproductive Auckland port to the more productive port in Tauranga, leading to an overall increase in port productivity. This would release these resources for other uses, reducing costs relative to the no change scenario.

This reallocation of resources may impose costs on some groups, particularly Auckland port workers who are not re-employed at other ports. It is likely that this unemployment will not be structural, and these workers will find productive employment in other areas of the economy. However, if there are overall gains from the transformation scenario, it should be possible to use some of these gains to compensate people that are affected negatively, so that no one is made worse off overall.

3.3.5 Use of road and rail infrastructure

The transformation scenario will require additional use of road and rail transport to transport freight between Auckland and ports elsewhere in the North Island, relative to the no change scenario.³² To facilitate this additional land transport, it is also likely that inland port facilities in or near to Auckland will need to expand.

³² This assumes that freight which is currently handled at the port of Auckland would be processed at existing upper North Island ports in the transformation scenario. The need for additional road and rail transport would be lower if the ex-Port of Auckland cargoes were handled by a new port developed closer to Auckland.

As noted above, it appears that up to 75% of the TEU volume currently handled by Ports of Auckland could be accommodated on the Tauranga – Auckland rail line within the rail network’s existing capacity. However, the need to transport increased volumes of freight between Tauranga and Auckland by road or rail would incur additional costs relative to the no change scenario. Indicative estimates of these costs are in the range of \$480-540 million per year for delivery by rail and \$590 million per year for delivery by road (see Table 6).

Table 6 Estimated delivery costs for road and rail transport between Tauranga and Auckland

	By Rail (terminal to terminal overnight by 7:30am)	By Rail (terminal to terminal next day by 4pm)	By Road (door-to-door)
POT-Akld distance (km)	246	246	220
Delivery cost per TEU (\$)33	600	540	660
POAL TEUs in 2011	895,000	895,000	895,000
Total delivery cost (\$m)	537	483	590

These estimates assume that the Auckland Port’s entire container volume would need to be transported between Tauranga and Auckland; in reality some of the freight that passes through Auckland’s port at present has an origin or destination outside Auckland and may be closer to Tauranga. The estimates for freight in Table 6 are likely to overstate the additional transport costs under the transformation scenario relative to the no change scenario to the extent that they include charges for pickup and delivery from the major terminal locations. Local delivery charges such as these would already be incurred under the no change scenario.

Under the transformation scenario, it is likely that Port of Tauranga’s Auckland-based MetroPort distribution centre, or similar facilities, would need to expand. MetroPort handled 138,000 TEUs of container traffic in 2011 and occupies a land area of 3.5 hectares.³⁴ MetroPort claims that “significant spare capacity has been built in” to its infrastructure to allow for future growth,³⁵ suggesting that at least some of the additional container volume from Auckland could be accommodated at MetroPort without the need for significant investment in the transformation scenario.

An upper estimate of the expansion required at MetroPort under the transformation scenario can be made by assuming that land would be added at MetroPort in proportion to the current density of land-use there. Currently, approximately 39,400 TEUs are handled per hectare of land at MetroPort. On this basis, a maximum of approximately 22.7 hectares of additional land would be required at MetroPort in order to accommodate container volumes from the Port of Auckland (see Table 7).

³³ Price estimates were obtained from KiwiRail (<http://www.kiwirailfreight.co.nz/pricing.aspx>) and Rockpoint Corporate Finance Ltd., *Coastal Shipping and Modal Freight Choice*, July 2009.

³⁴ See <http://www.port-tauranga.co.nz/images.php?oid=3822>; Port of Tauranga, *MetroPort Overview*, April 2011

³⁵ See footnote 34.

Table 7 Maximum additional land required at MetroPort to accommodate Auckland volumes.

Current TEUs processed at MetroPort	138,000
Add Auckland TEUs	895,000
Total TEUs to be processed at MetroPort	1,033,000
<hr/>	
Current MetroPort land area (ha)	3.5
MetroPort land-use density (TEUs/ha)	39,400
Additional land required to accommodate Auckland TEUs (ha)	22.7

Land adjacent to MetroPort is valued by Auckland Council at approximately \$300 per square metre. On this basis, the value of 22.7 hectares in the area surrounding MetroPort is approximately \$68 million.

3.3.6 International shipping prices and transport time

Consolidation of cargo volumes through fewer ports may advance the date at which it would become economic for one or more ports to invest in the infrastructure needed to support bigger ships. Bigger ships have higher total operating costs but lower average costs per container if volumes are sufficiently high. To the extent that shipping lines pass on these cost savings to importers and exporters, there will be benefits under the transformation scenario relative to the no change scenario.

Figures provided by the Productivity Commission suggest bigger ships could result in cost savings of around \$200 per TEU.³⁶ If all of the TEU currently handled by Ports of Auckland were handled on bigger ships in the transformation scenario, this would result in cost savings of around \$180 million per year. However, not all cost savings may be passed on by shipping lines to importers and exporters.

A potential offsetting factor is that bigger ships may be associated with fewer shipping lines competing on New Zealand routes (or greater sharing of vessels among lines). This would weaken the incentive to pass through cost reductions, and could even increase prices faced by importers and exporters, however the size and likelihood of these effects are difficult to quantify.

Similarly, consolidation of freight volumes in the transformation scenario may lead to increased economies of scale at sea ports. However, this may be offset to some extent by reduced competition between ports.

In addition, transport times for imports and exports may increase under the transformation scenario, due to additional land transport required, and if sea freight services are provided by bigger ships at lower frequencies. A paper by Hummels (2007)

³⁶ See figure 9.3 of *International Freight Transport Services Inquiry*, New Zealand Productivity Commission, April 2012. The \$200 saving is based on a change from 2,600 TEU to 6,500 TEU vessels.

provides estimates of the costs of delay in proportion to the value of freight.³⁷ These estimates range from zero to 2% of the value of trade per day. The cost estimates are lowest for the types of goods that are typically carried by sea freight, such as crude oil (0%), fertilisers (0%), footwear (0.2%), textiles (0.6%) and apparel (0.7%). Assuming an average delay cost of 0.2% of the value of trade, each additional day of average transport time for freight currently handled through Auckland (around \$27 billion in value) will increase costs to importers and exporters by around \$54 million per annum.

3.3.7 Resilience and flexibility

Having one fewer cargo port in the North Island may reduce the overall resilience of the New Zealand transport system to natural disasters or other events that have significant local effects. This is because there may be fewer options for re-routing freight in the event of a disaster that significantly affects one of the ports. If so, this is a cost of the transformation scenario relative to no change (assuming that a new port is not developed as part of this scenario). The size of this cost will depend on the probability of such events and the impact on international trade if such an event occurred with one less port available than in the no change scenario.

Importers and exporters may also lose some flexibility if the transformation scenario leads to fewer overall vessel calls using larger vessels. This, combined with the expected increase in transport times discussed above, will mean that exporters and importers will need to hold higher overall inventory levels, with associated costs and risks.

However, the significance of these effects is unclear. As noted above, Northport is currently mainly a breakbulk port, with limited container handling facilities. Under the transformation scenario, Northport's container facilities may expand, offsetting the reduction in resilience and flexibility under the transformation scenario. Furthermore, if the transformation scenario involves construction of a new port near to Auckland, resilience and flexibility will be unchanged.

3.4 Analysis of the expansion scenario

The expansion scenario involves increasing the footprint of the cargo port in the CBD by 25 hectares relative to the no change scenario, by 2055.

3.4.1 Use of port land

Relative to the no change scenario, the expansion scenario will mean more cargo port land on the Auckland CBD waterfront and less port land at other ports in the upper North Island. In Auckland, the additional port land will be reclaimed, so there is no value of this land in alternative use in the no change scenario.³⁸ However, there will be costs associated with constructing reclaimed land and making this suitable for port operations. Based on estimates developed by Auckland Regional Holdings in 2009 these costs may be up to \$1,000 per square metre.³⁹ Reclamation costs can vary widely

³⁷ Hummels, D. (2007). Calculating tariff equivalents for time in trade. USAID research paper March 2007.

³⁸ However, reclaiming land from the sea may have spillover effects – see section 3.4.3 below.

³⁹ See Auckland Regional Holdings, *Long-Term Optimisation of the New Zealand Port Sector*, October 2009.

however, depending on factors such as the availability of fill material, depth of water and the cost of obtaining resource consent.

At other ports in the North Island, land could be available for alternative uses (relative to no change) and this will generate benefits. As discussed in section 3.3.1 above, land near the Port of Tauranga is valued at around \$200 - \$600 per square metre.

The key question is therefore the cost of creating reclaimed land in Auckland versus expansion at other ports in the upper North Island. The exact cost of land reclamation in Auckland is unknown, however it is likely that reclaiming additional land for port use in Auckland will be more expensive than existing land around the Port of Tauranga.

3.4.2 Transformation and remediation costs

The costs associated with land transformation and remediation under the expansion scenario relative to no change are expected to be minimal. Land will be reclaimed in Auckland (with associated costs, as discussed above) but the existing port land will remain in its present use. In the expansion scenario, land around other ports in the North Island may divert to alternative uses, rather than being used for port facilities in the no change scenario, thus remediation of port land for alternative use at other ports may be required.

3.4.3 Spillover effects

Relative to the no change scenario, the expansion scenario will involve greater cargo port activity in the Auckland CBD and less activity at other ports in the North Island. This will cause greater spillover costs in Auckland and a reduction in spillovers at other ports.

Increased spillover costs in Auckland will include the negative effects associated with noise, visual amenity and light, air and water pollution, as well as increased congestion in the streets surrounding the port and the impacts of heavier use of the rail lines connecting the port with its inland freight hub.

A number of the suburbs adjacent to Auckland's eastern rail corridor (see Figure 20) have been earmarked for residential and commercial development by the Auckland Council. The noise associated with increased freight train movements along this rail corridor would be a spillover cost of the expansion scenario relative to the no change scenario, and may deter residential development in these areas.

Figure 20 Map of suburbs along Auckland's eastern rail corridor (in yellow)



Source: http://www.maxx.co.nz/media/70239/east_tt_web.pdf

An example of a potentially affected development is the Orakei Point transport-oriented development along the eastern rail line (Figure 21). Another example is the Tamaki Edge project, which involves town centre revitalisation and new housing projects.⁴⁰

⁴⁰ See, <http://www.aucklandcity.govt.nz/council/projects/tamakiedge/default.asp>.

Figure 21 Overview of the Orakei Point transport-oriented development.



Source: <http://www.aucklandcity.govt.nz/council/projects/orakei/default.asp>

The extension of the cargo port's footprint into the sea under the expansion scenario would also be expected to decrease the size of the boating channels in the Hauraki Gulf and reduce the views of the Gulf that are available to people living, working and recreating in the city. These are additional spillover costs associated with the expansion scenario relative to the no change scenario.

The increases in spillover costs described above in relation to Auckland are likely to be offset by decreasing spillover costs at the other North Island ports to some extent. As discussed in section 3.3.3 above, we expect the additional spillover costs in Auckland to exceed the spillover cost savings at other ports, due to greater population density around the Auckland port and the relatively higher value of maritime and land-based activities around the Auckland port that will be affected by spillovers. Therefore we expect the spillover effects under the expansion scenario to be a net cost relative to the no change scenario.

3.4.4 Use of labour and capital resources at ports

The expansion scenario will involve increased use of labour and capital resources at Ports of Auckland, and reduced labour and capital resources at other ports in the North Island, relative to the no change scenario. As discussed in section 3.3.4, this will represent a shift of these resources from relatively productive port operations to less productive operations.⁴¹ Assuming there is no significant change to the ports' relative

⁴¹ Normally, in competitive markets we would expect equalization of productivity across ports to occur. However, this may not have occurred due to the artificially low price of land at the Auckland

productivities, this is likely to lead to an increase in the total resource cost of handling sea cargo, resulting in a net economic cost of the expansion scenario relative to the no change scenario.

3.4.5 Use of road and rail infrastructure

The expansion scenario will mean fewer imports and exports to/from the Auckland region will use road and rail transport to other sea ports in the upper North Island, resulting in land transport cost savings relative to the no change scenario. However extra freight to/from other regions in the North Island will likely be handled by Auckland (relative to the no change scenario), resulting in increased land transport costs.

The expansion scenario will also significantly increase the use of road and rail transport in and out of the Auckland CBD to distribution points in South Auckland. Plans are underway for an extension to the Grafton Gully motorway at the port end to improve access to the port. The cost of this project was estimated at \$1 billion in a draft version of the Auckland Plan, however no cost estimate appears in the final plan.⁴² We understand that a third rail line between the port and South Auckland is also being investigated, at an estimated cost (per the final Auckland Plan) of \$500 million.⁴³ To the extent that these projects would be needed only in the expansion scenario (and not in the no change scenario), they represent an additional cost of the expansion scenario.

Overall the impact of the expansion scenario on the use of road and rail freight relative to the no change scenario is ambiguous. The overall effect depends on the type and origin/destination of cargo that the expanded Auckland port is able to capture in the market.

3.4.6 International shipping prices and transport time

The types of effects on international shipping prices and transport times under the expansion scenario are similar to those discussed in section 3.3.6 above. Relative to no change, it is unclear whether the expansion scenario will lead to the earlier introduction of bigger ships to New Zealand international shipping routes. There will be relatively greater volumes through Auckland but lower volumes through other North Island ports, but the increase in volume on any given route may not be sufficient to advance the introduction of bigger ships.

The expansion scenario may also make it economic for Ports of Auckland to invest in facilities to support bigger ships, but the economic case for investment by Tauranga would weaken, and the overall effect on the availability of infrastructure to support bigger ships is unclear.

port. This may be helping Ports of Auckland to compete with other ports even though its labour and capital resources are less productive.

⁴² See, The Draft Auckland Plan, Figure 12.2.

⁴³ See, The Auckland Plan, Box 13.5 & Map 13.2 and The Auckland Plan Implementation Addendum, Table 3 (Transport).

The same reasons mean that the effect on competition between shipping lines under the expansion scenario relative to the no change scenario is ambiguous. Overall, it is unclear whether international shipping prices would rise or fall in the expansion scenario.

Depending on the geographic distribution of freight within the North Island, transport times may be unchanged or may decrease if less freight to/from Auckland needs to use land transport to other ports in the North Island.

Overall, the net costs and benefits of international shipping prices and transport time of the expansion scenario relative to the no change scenario are expected to be ambiguous.

3.4.7 Resilience and flexibility

The resilience and flexibility of the sea cargo transport system depend largely on the number of operational cargo ports. There will be no difference in the number of ports in the expansion scenario relative to the no change scenario, and therefore the welfare benefits associated with resilience and flexibility will be unchanged between these two scenarios.

3.5 Comparison of scenarios

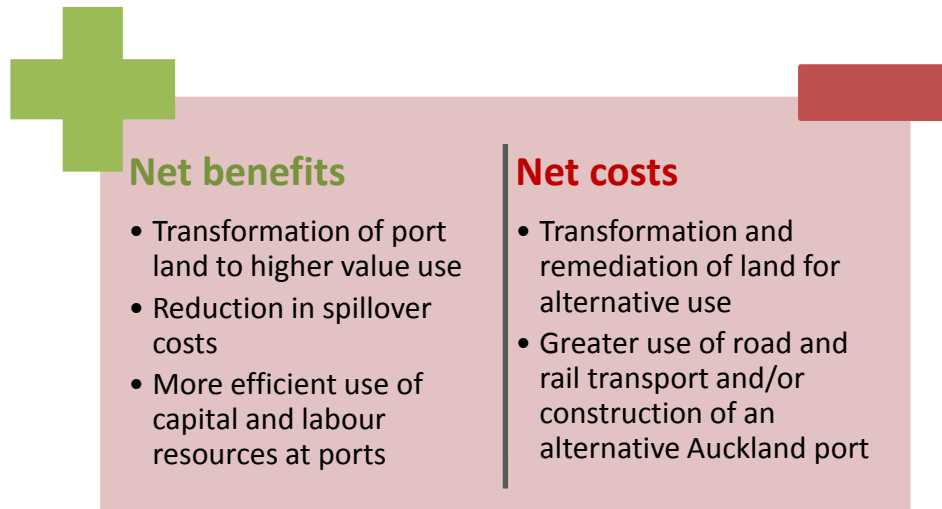
Table 8 compares the expected benefits and costs of the transformation and expansion scenarios relative to the no change scenario. In our view, it is unlikely that expansion will pass a cost-benefit test relative to no change, as there are clear net welfare costs while the potential benefits are ambiguous at best.

Table 8 Comparison of expected costs and benefits relative to the no change scenario.

Source	Transformation	Expansion
Use of port land	Benefit	Cost
Transformation and remediation	Cost	No change
Spillover effects	Benefit	Cost
Use of capital and labour resources at ports	Benefit	Cost
Use of road and rail infrastructure	Cost	Ambiguous
International shipping costs and transport time	Ambiguous	Ambiguous
Resilience and flexibility	Ambiguous	No change

In contrast it is possible that the transformation scenario would generate a net increase in welfare, although further detailed work will be needed to confirm this. Figure 22 summaries the main cost and benefit trade-offs of the transformation scenario relative to the no change scenario. The key issues are the more efficient use of land, labour and capital resources and reduction in spillover costs, relative to the costs of remediation and increased use of land transport.

Figure 22 Summary of the key net welfare benefits and costs of the transformation scenario versus the no change scenario.



It is also important to note that the welfare effects of transformation will be un-evenly distributed, with some groups in society being made better off while others may be made worse off. In addition, some of the benefits are intangible (eg the reduction in spillover costs) and will not generate cash flows that can be used to compensate those made worse off. Therefore, while the transformation scenario could generate significant net welfare benefits, there may be challenges in structuring this scenario in such a way that costs on particular groups are minimised. The following section discusses this in more detail, from an Auckland perspective.

3.6 Implications for Auckland

The above analysis focuses on costs and benefits for the upper North Island region, as we have argued that the welfare effects of transformation or expansion of the Auckland cargo port will have significant effects outside the Auckland region. However, Auckland Council wholly owns Ports of Auckland, and the Council is likely to only consider the impacts on the Auckland region when making decisions about the future of the port in Auckland. Therefore, in this section we briefly consider the costs and benefits of the transformation and expansion scenarios from an Auckland perspective.

3.6.1 The transformation scenario

For the Auckland region, the key welfare benefits of the transformation scenario relative to the no change scenario will be:

- Transformation of the cargo port land on the CBD waterfront to alternative, more valuable uses, enabling Auckland's transformation to a great maritime city; and
- Reduced spillover costs associated with activity at the cargo port.

There may also be benefits from bigger ships and more efficient use of labour and capital resources to the extent that these efficiencies flow through to the prices faced by

Auckland-based importers and exporters for international freight services. Offsetting these benefits will be costs to importers and exporters arising from increased use of land transport, including potentially greater expenditure on road and rail transport, expanded inland port facilities, and/or construction of an alternative port.

Auckland Council could lose the profits it receives from its port investment, however as we have demonstrated above, the return on investment is poor (ie below normal market returns). Therefore, Auckland Council could obtain higher returns from investing the capital it has invested in the cargo port and putting this into other investments. Alternatively, Auckland Council could use the capital released by selling port land for other purposes, such as investing in a joint venture with another port, and continue to share in port profits, construction of an alternative port near to Auckland, or by using it to invest in other public infrastructure.

The transformation scenario may also generate some job losses in the Auckland region, however these job losses are not likely to be long term, and the affected workers would be expected to find alternative employment in the region. Equity considerations may mean there is a case for compensating affected workers for their temporary losses.

Overall, in our view it is possible that the net welfare benefits of the transformation scenario relative to no change could be positive for the Auckland region, but further work is required to determine this.

3.6.2 The expansion scenario

For the Auckland region, the welfare benefits of the expansion scenario relative to no change are some cost savings for importers and exporters due to reduced use of road and rail transport for international freight. Offsetting this will be the costs of the port expansion, increased spillovers and implications for development along road and rail corridors near to the CBD, and increased capital and labour costs.

The expansion scenario would also require further capital investment in an activity that is yielding low returns, while the funds invested could generate higher returns in alternative investments with less risk.

Overall, in our view it is unlikely that the net welfare benefits of the expansion scenario will be positive for the Auckland region.