

ATTACHMENT 14

Memo

To: Brett Hood, Planner
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From: Greg Akehurst, Director; Tilly Erasmus, Consultant

Date: 8 February 2023

Re: **Resource consent application Northport Ltd – Northport expansion project:
Response to Request for Further Information – Economics**

The purpose of this memo is to provide further information in response to the request for further information under s92 of the Act dated 19 December 2022, received via Reyburn and Bryant, from Whangarei District Council and Northland Regional Council (“the councils”). The further information relates to the economics subject area highlighted under point 62.

Scope

The following sets out the main points in your request as we understand it:

1. To better understand the caveats set out in the report, the councils are seeking more detail on the limitations and assumptions we made through the modelling process.
2. To assist Councils with contextualising the economics of the proposal in the context of the economy in which it operates, Councils’ are requesting additional commentary describing the Northland economy.
3. Councils are seeking clarification on interpreting the results in view of the restrictive assumptions (listed on page 36). The assumptions referred to are:
 - Constant value of trade
 - Constant distribution of trade
 - No capacity constraints in Upper North Island ports
 - No capacity constraints in land transport networkThe question is specifically posed whether the change in freight flows (implicit in the scenarios) would cause these assumptions to become invalid and, if so, how the modelling results would be likely to change as a result.
4. Councils also wish to know how the results might be different if a computable general equilibrium model had been used instead of an input output model.

The following section summarises our response to the request for further information. Each of the key questions above is addressed in turn.

Economic Further Information Responses

1. Modelling assumptions and limitations

Section 1.3 of the economic report presents the most important caveats and limitations of the assessment, and Appendix A contains assumptions (and limitations) of the Multi Region Input-Output modelling process. Listed below are additional assumptions, specifically applicable to the trade task (freight flow) modelling.

In short, the scenarios can be summarised as follows:

- **Business-as-usual Scenario (BAU)** presents a future which assumes that Northport's role continues to be focused on regional trade, so current patterns of trade are continued into the future. That is, recent historical growth patterns are used to project future container growth.
- **North Auckland Imports Scenario (NAI)** presents a 'medium' future which assumes that Northport is able to capture a proportion of the import container trade from the area north of the Auckland isthmus, both in growth demand and some existing demand.
- **North Auckland Growth (NAG)** presents a 'low' future, which assumes that Northport only handles the growth in container trade from the area north of the Auckland isthmus and does not capture any existing trade.
- **Upper North Island Ports Constrained (UNIPC)** presents a 'high' future which assumes that other ports in the Upper North Island become constrained, which results in a larger proportion of trade in Auckland Region being handled at Northport. This scenario is similar to NAI, with half of the growth in containerised trade expected in the Auckland isthmus and Southern Auckland being handled by Northport.

Assumptions for Container Demand (driven by population projections):

	% of Northland growth in demand	% of North Auck. growth in demand	% of Rest of Auck. growth in demand	Base (% of the existing demand)
Starting Year	2026	2026	2026	Current
NAI	100%	100%	0%	30% of Northland 30% of Nth Auck.
NAG	100%	100%	0%	30% of Northland
UNIPC	100%	100%	50%	30% of Northland 30% of Nth Auck.
Containers per capita (annual)	0.79 TEU			
Ave weight	10 tonne per TEU			
Other	Historical import/export data (goods by sector and port) was obtained from Stats NZ and used to estimate the sectoral distribution and value of containerised trade.			

2. The Northland Economy

In addition to the overview of the Whangarei and Rest of Northland economies, provided in section 2.6 of the M.E report, this section presents commentary on the regional economy in terms of GDP, employment and growth.

Based on the latest population estimates published by Stats NZ, around 201,500 people currently¹ reside in Northland, half of which live within the Whangarei District. Northland's population account for around 4% of New Zealand's population. Since the 2018 census, on average, the resident population in Northland increased by 2.1% per annum, compared with 1.1% per annum across the country as a whole. While Whangarei accounted for the largest share of the growth, Kaipara District had the strongest average annual rate (3.5%).

Population growth is important, because it not only adds to household demand for goods and services, but it also suggests the potential workforce is growing, i.e. households supply labour. Currently, there are 23,240 businesses located in Northland, employing 78,960 workers. This accounts for approximately 3% of the national workforce. Since 2019, Northland employment have increased at 1.7% per annum on average, compared with a growth rate of 1.4% across NZ as a whole. This suggests the impact on of COVID-19 on employment was less pronounced in Northland than across the rest of the country. Examining employment growth over the longer term, reveals employment growth in Northland has been similar to the rest of NZ (on average 1.6% per annum between 2001 and 2022), but lagging the rest of the Upper North Island, which reported an average annual increase in workers of 2% over the same period. It is acknowledged the Upper North Island (UNI) area, which includes Northland, Auckland, Waikato and Bay of Plenty regions, includes some of the strongest growing economies in New Zealand. This area also has over half of New Zealand's population and three of the five biggest cities in New Zealand.

While accounting for 3% of the national workforce, according to provisional GDP² figures released by Stats NZ for the September Quarter, Northland accounts for 2.6% of the national total. This suggests a relatively high concentration of employment in sectors that generate lower levels of GDP. Stats NZ reports Northland Regional GDP in 2021 at \$8.6b, compared with \$32.7b for the country as a whole. Estimates by Infometrics are somewhat higher, with provisional GDP estimates for Northland estimated at \$9.2b in 2021³, and \$9.3bn in 2022, an increase of 1.3%. With the global pandemic affecting economic activity over the past three years, it would be more prudent to look at Northland's economic growth over a longer horizon.


Based on the GDP estimates published by Stats NZ, over the past two decades (2001-2022) Northland's GDP increased at an average annual rate⁴ comparable with the national average (5.1%).

¹ 2022. Source: Stats NZ Subnational population estimates at 30 June 2018-2022.

² Production based Gross Domestic Product measures. Measured in 2021 dollar terms.

³ Year End September.

⁴ Compound annual growth rate.



However, when compared with the rest of the Upper North Island⁵, Northland falls behind, with Northland's GDP growing on average at 5.1% p.a. between 2001 and 2021 compared with 5.5% p.a. across the rest of the Upper North Island.

As pointed out in the report, approximately half of business and employees are based in Whangarei District, with employment concentrated in sectors that do not generate much trade activity, such as Healthcare and social assistance and Construction. However, across the rest of Northland, there is larger concentration of employment in industries that rely on trade. Agriculture, Forestry and Fishing, Retail and Manufacturing are in the top 6 largest sectors (in terms of employment). Notwithstanding, there is still strong concentration of employment in service industries, Health Care and Social Assistance and Education and training.

Looking over the longer term (2001-2022), reveals strong employment growth (in absolute numbers) in Northland, in Construction and Health care and social assistance, adding on average 240 and 260 jobs per year, respectively. In annual percentage terms, employment in the Public administration and safety sector grew slightly faster than the Construction sector i.e., 4% p.a. on average, compared with 3.8% p.a. Sectors reliant on trade activity, such as Manufacturing, Retail and Wholesale trade have also been growing. The primary sector (Agriculture, Forestry and Fishing) has been shedding jobs over time, while increasing the GDP per job it generates. This suggests increased mechanization and improved productivity in the sector, pointing to economic growth in the sector despite needing fewer workers.


To conclude, Whangarei District is Northland's largest urban centre, with around half of the population resident there. Consequently, employment in the region is largely dominated by sectors that provide products and services to households (e.g. Healthcare and social services, Education and training, Public Administration and safety, Retail trade, etc.). Similar to the nationwide trend, the Construction sector continues to show strong growth. Despite the decline in jobs, the primary sector (Agriculture, forestry and fishing) remains a key sector in the region, employing around 7,500 workers currently (9.5% of Northland's jobs). While Northland's growth has historically been lagging the rest of the Upper North Island, significant effort is being made (by both local and central government) to enable growth.

3. Interpreting results when assumptions are breached

All economic modelling is based on assumptions, as there are no models that are able to predict the future. Therefore it is important to understand the effect of relaxing assumptions and being able to interpret the effects of that relaxation on the modelling outputs. Council have requested additional information concerning the effect of relaxing (or allowing the model to breach) 4 assumptions;


- a) Constant value of trade

⁵ Auckland, Waikato and Bay of Plenty regions.

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- b) Constant distribution of trade
 - c) No capacity constraints in Upper North Island ports
 - d) No capacity constraints in land transport network
- a) Constant value of trade means that the price international consumers pay per unit of export product is held constant. In reality, the price paid for New Zealand's exports are set in international markets. New Zealand producers are price takers as we represent such a small volume of global production. For the purposes of this report, it was not possible to develop a global trade price model that would generate future prices for New Zealand's exports. Therefore the most conservative path is to assume a constant value of trade position as an input to the model.

It is not the case that changes in freight flows to and from the port would have any impact on the value of trade. If (globally), there was a significant shift in preferences either towards or against goods traded through Northport, then there may be a rise (or fall) in the value of trade, which would most likely induce more of that trade to occur (or a drop). This would lead to a greater or smaller number of containers through the port than modelled. Given that the report presented a mid-point, with a high and low scenario presented alongside, changes would need to be significant to sit outside the range presented.

- b) Constant distribution of trade: means that the distribution or mix of goods traded is held constant. As with the constant value of trade assumption, it was beyond the scope of this report to model changing preferences of New Zealand consumers and how that might alter the mix of goods that are moved through the port. The conservative approach is to assume the future looks like the recent past so this has been held constant. As with making changes to the value of trade, by changing the distribution of trade or the mix of trade would have to occur at a significant rate in order for the actual outcomes to sit outside the range presented in the report.
- c) No capacity constraints in the Upper North Island ports: this means that the model assumes that the other existing North Island ports do not have capacity constraints. There is a significant modelling effort required to generate estimates of the capacity at other NI ports, which (again) was beyond the scope of this assessment. By assuming that the ports are not capacity constrained actually is a conservative stance to take, as if that assumption was to be relaxed, more trade traffic would flow through Northport, increasing its trade task. The change in freight flows implicit in the model are driven by population growth and not by other changes in the trade environment. While the report does capture a high scenario designed to reflect the "Upper North Island Ports Constrained" situation, it is not taken through the EIA process.
- d) No capacity constraints in land transport network: this means that the model has assumed that there are no constraints in terms of taking containers to and from the port. In reality, there are likely to be constraints on the roading network. As with the above, it is beyond the scope of this report to quantify potential capacity on the road network. However, capacity constraints would reduce the ability of the port to cater for customers across the North Island,



so would reduce the trade task and result in a reduced economic footprint. As with the above responses, if this were modelled, it would result in a lower economic impact. Given a low economic result is reported, it would need to be significant to sit outside of the range of results presented.

4. Computable General Equilibrium vs Input-Output modelling


CGE and IO models are of the same ‘family’ of modelling, namely structural multisectoral models. Like IO models, CGE modelling is a static, structural model that has input-output tables at its core. CGE models capture both substitution and scale effects while IO models concentrate on scale effects. CGE models address some of the limitations of an IO model, for example introducing supply-side limitations and consequent pricing parameters, but this comes at a price. CGE modelling is a costly (and complex) process, and the cost usually outweighs the marginal benefit to be gained from overcoming the limitations of IO models. Due to their cost and difficulty to develop and maintain, CGE models are often focused on large policy changes and assessing the effects of economy-wide changes in demand, supply or large scale shocks.

In my view, it is not necessary to develop and model the changes proposed at Northport using a CGE model.

From experience with similar assessments in the past, the economic impacts (on GDP) estimated using CGE modelling are lower than those estimated using IO modelling. The ability of a CGE to incorporate price changes and substitution effects are the main reasons for the difference. However, there are caveats on CGE models that include, the model assumes full knowledge and information flow and full mobility and substitutability of the factors of production. It is almost always the case that markets are not as free as the model may assume, and therefore substitution may not occur as quickly as the model assumes. CGE models also assume that firms seek to minimise costs and consumers maximise utility and that the direction of technological change is exogenous to the model. Again, this is at least partially inconsistent with empirical studies.

The scale of difference in the results largely depends on the application, data available, underlying assumptions about elasticities, etc. I acknowledge that conventional multiregional IO models may overestimate the impacts, but using CGE modelling (in this instance) would not have changed the conclusion of the report, that from an economic perspective, expansion of Northport has a positive impact on the regional and national economies. To illustrate this, 80% of the estimated impact (as reported), would suggest, the marginal difference in Northport’s role between the BAU and NAI scenario, would be equivalent to \$86m more GDP in the Northland economy, in 2050 if NAI scenario occurs, and \$2.7b in the New Zealand economy. Recall, the IO model estimates the marginal differences as \$107m and \$3.3b, respectively.

CGE models are reasonably opaque, in that the functions that drive production and the interconnections between sectors and regions are not obviously expressed. They also assume that the economy is in equilibrium at the start of the process – and returns to equilibrium at the end of the



shock. This is rarely the case. CGE models are especially useful when the structure of an economy is expected to change significantly as the result of the proposal (shock) being assessed. In other words large policy shifts or significant economic shocks. The expansion of the Port is not expected to significantly change the structure of the regional (or national) economy, but rather to redistribute freight volumes, i.e. attract more of the volume to Northland. It is our view, that the multi-region IO model which was used, is sufficiently robust for this assessment.

Kind Regards,

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