APPENDIX O

HAWKE'S BAY ECONOMIC IMPACTS OF NAPIER PORT OPERATIONS

NAPIER PORT

Hawke's Bay Economic Impacts of Port of Napier Operations

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Contents

Executive Summary

- This report provides economic impact assessment results for the Hawke's Bay region in relation to a number of different aspects of the operation of the Port of Napier. The specific aspects addressed in the report are the annual Port operation (including Port based stevedoring operations, capital expenditures and flow-on impacts of cruise ship visits to the Port) for the financial year ending September 2015, Port export and import user sectors in Hawke's Bay, construction of the proposed major new wharf at the facility and forecast Port annual operating revenues incorporating the impact of the new wharf over the 2016-2025 planning period. Other potential significant regional economic flow-ons of the new wharf are also indicated in the report.

- **Table A** below summarises the results of the detailed economic impact assessment provided in the main body of the report. Figures are only provided in this summary for the key Value Added/GRP (Gross Regional Product) and Employment economic impact measures. The results indicate the total economic impacts for these measures including direct and flow-on/multiplied impacts and have been derived using a December 2015 industry economic impact model specifically for the Hawke's Bay area. It is noted that Value Added/GRP best measures the true economic impact within the region of the various Port related revenue/expenditure items listed in the table.

Table A: Hawke's Bay Total Economic Impacts of Port of Napier Related Business Operations 2015 and 2025

Port of Napier Operational Activity	Total Hawke's Bay Multiplied Economic Impacts	
	Value Added/GRP ($M)	Employment (Persons/Labour Years)
2015 Year		
Annual Port Company Revenue Operation	68.5	526
Port Capital Spend/Port Based Stevedore Operations/Cruise Ship Visits	48.8	791
HB Port User Export/Import Sectors	3,327.4	26,499
Total	**3,444.7**	**27,816**
New Wharf Construction Period		
Proposed New Wharf Construction	9.5	126
2025 Year		
Forecast Ann Port Coy Revenue Operation	106	809
Port Capital Spend/Port Based Stevedore Operations/Cruise Ship Visits	57	821
HB Port User Export/Import Sectors	4,609	35,087
Total	**4,772**	**36,717**

- The total regional Value Added/GRP impact of the listed Port of Napier related items for the 2015 year is $3,447.7 million which means that Port activities are directly and indirectly associated with approximately 51% of total Hawke's Bay GRP at the present time. The total regional employment contribution, at 27,816, is 38%. Taking into account the estimated Hawke's Bay based 10% share of the presently estimated total construction cost for the proposed new wharf, the total short-term regional GRP impact for this factor is $9.5 million with an associated total employment impact of 126 labour-years. By 2025, the Port is forecast to be associated with a total regional GRP impact of $4,772 million or an estimated 52% of total Hawke's Bay GRP. The total employment impact increases over the forecast period by an estimated 8,901 or 32%, compared to the overall GRP gain of approximately 39%.

1- Introduction

1.1 As part of its long-term services planning to meet the future needs of Hawke's Bay (and other region) exporters/importers and in turn assist in strengthening the overall economic performance and resilience of the regional economy, the Port of Napier is currently progressing its proposal to construct a new wharf and undertake associated dredging at the Port. More specifically, the proposal is closely linked to the forecast significant growth in cargo volumes using the Port over the longer-term, the berthage requirements of the larger container and other cargo vessels expected to use the Port in the future, and the continuing need for the Port to provide more efficient and cost-effective services to exporters and importers.

1.2 The Port of Napier is currently in the process of developing a range of appropriate background technical and other information documents relating to the new wharf proposal. As part of these, the Port has requested the provision of this report indicating the potential economic impacts and economic benefits for the Hawke's Bay region of both the current annual Port operation and the forecast future annual revenue flows associated with the impact of the proposed new wharf.

1.3 The specific matters covered in the report's analysis, are as follows:

- The economic impact gains generated within the Hawke's Bay region by the existing annual Port operation, reflecting the operation for the year ending September 2015.
- The regional economic impact gains arising from the annual production activities of the various Hawke's Bay industry sectors using the Port of Napier during the year.
- The regional economic impact gains flowing from the Hawke's Bay based development expenditure for the new wharf.
- The regional economic impact gains associated with the forecast growth in total Port operating revenues over the 2016-2025 planning period, incorporating the impact of the new wharf operation.
- The regional economic impact gains associated with the forecast growth in other Port based business activities and in the production levels of Hawkes Bay based export/import industries using the Port, over the 2016-2025 planning period.
- The regional economic benefits envisaged to flow from the operation of the new wharf.

1.4 This report focuses on the regional economic impact gains and economic benefits for the different aspects of the Port operation listed in section 1.3 above. Specific factors relating to the new wharf development and related future operation of the Port are the subject of separate technical assessments. Any potential economic impact implications resulting from these assessments (e.g. noise and transport factors) are not addressed at this stage in this report.

1.5 Following discussions with the Port Company, it was agreed that the assessment of the economic impacts of the operation of the proposed new wharf should be considered as an integral part of the forecast significant growth in overall Port of Napier trading activity over the longer-term. The two factors are closely intertwined. The positive growth outlook for

the Port reflects in turn underlying trends in Port usage and the anticipated further growth, development and investment in Hawke's Bay's primary production and processing export sectors over the period. The beneficial impact of this on overall economic growth in the region together with ongoing upgrading of regional transportation linkages to the Port, should encourage further significant utilisation of its facilities and services.

1.6 The key information sources used for the report have been the Port of Napier's Annual Report for the year ended September 2015, detailed financial and other statistics provided by the Port Company in response to a specific information request from ESL, economic impact modelling results provided on a sub-contracted basis to ESL by Dr Warren Hughes, specialist economic impact modelling consultant of Auckland, and Statistics New Zealand Port trade data. The detailed modelling results are contained in **Appendix 1** to the report, with **Appendix 2** providing a brief resume of the academic and economic consultancy work experience of Dr Hughes.

1.7 The next section of the report comments further on the nature of the economic impact assessment methodology used for the purposes of the report, with the following sections then addressing, in turn, the various aspects covered in section 1.3 above.

2- Economic Impact Assessment Methodology

2.1 Economic Impact Assessment (EIA) quantifies the total multiplied economic impacts for a specific geographical area (local/regional/national) of a significant existing or new revenue/ expenditure operation, development or activity in the area.

2.2 The total economic impacts comprise the initiating direct expenditure or revenue/turnover impact associated with the activity and the flow-on or 'multiplied' economic impacts.

2.3 The flow-on impacts incorporate both production and consumption impacts. The production impacts comprise the flow-on gains for businesses supplying goods and services to the initial expenditure or revenue activity, whilst the consumption impacts comprise the additional household spending of employees working directly in the activity and also in the businesses supplying inputs to the activity.

2.4 Economic impacts are traditionally measured using four different variables, these being Total Revenue/Gross Output (the total value of the economic impact including the value of any imported items), Net (Disposable) Household Income (after removing taxation, savings, superannuation, etc.), Total Employment (measured in terms of labour-years for construction activity and persons/jobs for operational activity) and Total Value Added/Gross Domestic Product GDP (or Gross Regional Product GRP for sub-national areas).

2.5 The GRP impact is considered to best measure the true multiplied gain in total economic activity in an area as a result of an initial expenditure or revenue project/change, as it excludes the value of imported items required for the project (payments for which flow out of the region to externally based suppliers of goods and services).

2.6 An economic impact or input-output table/model for a particular region or district is required in order to calculate multiplied economic impacts for the area. As noted earlier, **Appendix 1** contains the detailed results of the economic impact modelling work undertaken for ESL by Dr Hughes. The economic impact results presented in this report are based on the latest available (year ended December 2015) Hawke's Bay multiplier results for relevant sectors within an 88-sector economic impact model of the regional economy. This model was initially developed by Butcher Partners Ltd (Christchurch), based on the latest 2007 national model produced by Statistics New Zealand. The Butcher Partners model has then been updated by Dr Hughes using employment data for the year ended December 2015. It is noted that the various multiplier results presented in the report reflect Type II multipliers which include both production and consumption flow-on economic impacts.

3- Economic Impacts of Annual Port Operation 2015

3.1 This section indicates the Hawke's Bay economic impacts of the Port of Napier annual operation for the year ended September 2015. The results reported in this section are based on the *Section 2 analysis in Appendix 1*. The base financial indicators used for the modelling analysis were total direct operating revenue for the Port Company ($72 million) and Port based stevedores ($23.4 million) for the year and Port Company capital expenditure for the period ($10.5 million assuming that 30% of the Port's total capital expenditure involves the purchase of machinery/plant/equipment/other resources from Hawke's Bay based suppliers).

3.2 **Table 2** below summarises the regional economic impacts of the above figures, based on the more detailed results provided in *Table 2 in Appendix 1.*

Table 2: Hawke's Bay Economic Impacts of Port of Napier Annual Operation 2015

Economic Impact Components	Economic Impact Measures			
	Revenue ($M)	Net Household Income ($M)	Employment (Persons)	Value Added/ GRP ($M)
Initiating Total Port Based Operating Revenue and Capital Expenditure	**105.9**			
Total Direct Economic Impacts	105.9	20.8	354	50.2
Total Flow-on Production and Consumption Economic Impacts	121.6	16.9	414	46.4
TOTAL HAWKE'S BAY ECONOMIC IMPACTS	**227.5**	**37.7**	**768**	**96.6**

3.3 The key results to note from the table are as follows:

i) For the operating year being considered, the Port of Napier had a total Revenue impact within Hawke's Bay of $227.5 million. This comprised the initial direct Revenue impact of $105.9 million and the flow-on/multiplied Revenue impact of $121.6 million (the overall multiplier value inferred by these results is 2.15);

ii) A total regional Net Household Income impact of $37.7 million, comprising a direct Income impact of $20.8 million and a flow-on/multiplied Household Income impact

of $16.9 million. The total income figure above represents the total additional Net Household Income generated within Hawke's Bay during the year by the overall Port operation, including multiplier impacts (overall multiplier value of 1.81);

iii) A total regional Employment impact of 768 persons/jobs, comprising a direct Employment impact of 354 persons (including the 243 people employed by the Port Company) and a flow-on/multiplied Employment impact of 414 persons (overall multiplier value of 2.17); and

iv) A total **Value Added or GRP** (Gross Regional Product) economic impact for the Hawke's Bay region of $96.6 million, comprising a direct GRP impact of $50.2 million and a flow-on/multiplied GRP impact of $46.4 million (overall multiplier value of 1.92). The total GRP economic impact figure indicates the real level of the contribution of the total Port operation itself to overall economic activity in Hawke's Bay, for the year.

3.4 The Port of Napier plays a vital role in the ongoing performance of the Hawke's Bay cruise ship tourism sector. A 2015 report from the Cruise New Zealand organisation, entitled '*Summary Report Economic Impact of the 2014-2015 Cruise Sector in New Zealand and Forecasts to 2017*', indicates a total Value Added/GRP impact for the Hawke's Bay cruise sector over the 2014/15 cruise season of $20.7 million and a total multiplied employment impact of 549 persons. These results are additional to the regional economic impacts of the overall Port operation indicated in section 3.3 above.

4- Economic Impacts of Hawke's Bay Port User Sectors

4.1 This section indicates the Revenue and Value Added/GRP economic impacts for the Hawke's Bay region of the combined annual operations of firms within the major export/import sectors in the region which use the Port of Napier for their exporting and importing requirements.

4.2 Within the Hawke's Bay economic impact model, these sectors are described as horticulture and fruit; forest, logs and wood products; pulp and paper; and meat processing (all export sectors) and fertiliser/petrol/chemicals (import sector). The listed export sectors last year collectively accounted for 63% of the total fob ('free on board') value of exports passing through the Port of Napier, as recorded by Statistics New Zealand. The remaining value of exports, referred to in Table 3 in Appendix 1 as 'All Other Exports', comprise a wide range of other export sector categories using the Port. All imports through the Port other than fertiliser/petrol/chemicals are included in the table in the 'All Other Imports' group.

4.3 *Table 3 in Appendix 1* firstly details the annual Port of Napier fob ('Free On Board') export and import values in 2015 for the sectors mentioned in 4.1 above. The results are sourced from Statistics New Zealand Port cargo data and relate only to international export/import trade (i.e. they do not include cargo movements between New Zealand ports). The Hawke's Bay economic impact model was then used to determine independently of these trade values the total direct Revenue/Output and Value Added/GRP values associated with each of the

sector export/import categories. The term 'direct' refers to the initial or first-time impact for these indicators before any flow-ons occur.

4.4 On the basis of the Revenue/Output results in the table, total Port exports direct to international markets account for 73% of total Hawke's Bay Port-user export industry Revenue, with the figure for the 'Top 5' export sectors being approximately 70%. The comparable 'all imports' and fertiliser/petrol/chemical imports ratios are 79% and 72% respectively.

4.5 The total direct Value Added/GRP results for the various sector export categories last year represented, respectively, 32% of the total direct Revenue/Output value for the top five export group, 28% for the 'all other exports' group and 31% for the total export sector group. The proportion for the fertiliser/petrol/chemical import sector was 17% and for the total import sector group 16%.

4.6 The regional economic impact model was then further used in order to identify the regional Value Added multiplier figures for each of the main export and import sectors; these figures were then combined with the direct sector Value Added totals for the 2015 year in order to determine the total multiplied Value Added/GRP economic impacts for the year (last column of Table 3 in Appendix 1).

4.7 **Table 3** below summarises the total export/import fob values, direct Revenue/Output and multiplied Value Added/GRP economic impact results for the various Port of Napier export and import user sectors, in 2015. The total export/import fob value is $4.2 billion and total direct Revenue value approximately $5.7 billion. The associated total Value Added/GRP economic impact for all sectors as a group is approximately $3.3 billion.

Table 3: Port of Napier Export/Import User Sectors Total Economic Impact Results 2015

Export/Import Sectors	Total Export Value (FOB $M)	Total Sector Direct Revenue ($M)	Total Value Added/GRP Economic Impact ($M)
Horticulture/Fruit	561.5	688.8	603.9
Forest/Log/Wood Products	286.8	318.6	251.0
Pulp and Paper	264.0	316.8	246.0
Meat Processing	922.1	1,192.2	660.2
Other Food Manufacturing	249.5	726.4	455.5
All Other Exports	*1,323.5*	*1,691.3*	*935.1*
Total for Exports	***3,607.4***	***4,934.1***	***3,151.7***
Fertiliser/Petrol/Chemicals	65.7	90.9	25.6
All Other Imports	*527.2*	*656.5*	*150.1*
Total for Imports	***592.9***	***747.4***	***175.7***
Total Exports/Imports	**4,200.3**	**5,681.5**	**3,327.4**

4.8 Thus, the Port of Napier is closely linked to Hawkes Bay export and import sectors which collectively, through their various business operations, represent a considerable element of total economic activity within the Hawkes Bay region.

4.9 It is noted that the combined total Value Added/GRP impact of the annual Port of Napier operation (including cruise ship tourism flow-ons) and the various Hawke's Bay Port user

export/import sectors, at $3,444.7 million, represents approximately 51% of total annual Hawke's Bay Value Added/GRP at the current time. The total multiplied employment impact is 27,816 persons or 38% of total Hawke's Bay employment. These results are indicated in *Table 4 of Appendix 1*.

4.10 *The Port of Napier thus makes a very significant direct and indirect contribution to the overall economic scale and performance of the Hawke's Bay regional economy.*

5- Economic Impacts of Proposed New Wharf Construction

5.1 This section indicates the regional economic impacts of the construction/development stage for the proposed new wharf. As this involves a significant level of new expenditure activity, it will have short-term flow-on economic impacts within the Hawke's Bay area. The comments in this section are based on the modelling analysis provided in *Section 5 of Appendix 1*.

5.2 The Port of Napier has advised for the purposes of this report an initial 'best estimate' new wharf development cost figure of $92.75 million. This covers the construction of the new wharf facility and stage 1 of the associated dredging requirements. The duration of the construction period is projected at 18 months to two years. The Hawke's Bay proportion of the above cost figure is estimated at $8.64 million or just over 9%, comprising both labour and other input costs (e.g. materials/fuel/accommodation/hospitality costs). The balance of the total development cost is estimated to be paid to input suppliers based outside the region and therefore does not add to economic activity within Hawke's Bay.

5.3 **Table 4** indicates the regional economic impacts over the construction period of the above Hawke's Bay based wharf development cost figure. These are based on the *Table 6* results *in Appendix 1.* The results in that table have been rounded to the nearest whole figure for the purposes of Table 4 below.

Table 4: Hawke's Bay Economic Impacts of New Wharf Development Cost for Construction Period

Economic Impact Components	Economic Impact Measures			
	Revenue ($M)	Net Household Income ($M)	Employment (Labour-Years)	Value Added GDP ($M)
HB Based Construction Cost	**8.6**			
Total Direct Economic Impacts	8.6	3.8	93	6.1
Total Flow-on Economic Impacts	9.0	1.2	33	3.4
Total Direct Plus Flow-on Economic Impacts	**17.6**	**5.0**	**126**	**9.5**
Annual Impacts for Period	**8.8**	**2.5**	**63**	**4.8**

5.4 The key results to note from the table for the full development or construction period are as follows:

i) A Total Revenue impact of $17.6 million. This includes a direct industry Revenue impact of approximately $8.6 million and a flow-on Revenue impact of approximately $9 million, inferring an overall Revenue multiplier value of 2.04;

ii) A total Net Household Income impact of $5 million, comprising a direct Household Income impact of approximately $3.8 million and a flow-on Household Income impact of approximately $1.2 million, inferring an overall Net Household Income multiplier value of 1.30;

iii) A total Employment impact of 126 labour-years, comprising a direct Employment impact of 93 and a flow-on Employment impact of 33 labour-years. The associated Employment multiplier value is 1.35; and

iv) A total regional **Value Added/GRP impact of $9.5 million**, comprising a direct GRP impact of $6.1 million and total industry linkage impact of $3.4 million. The associated Hawke's Bay Value Added multiplier is 1.56.

5.5 It is noted that any further dredging work required in the future in relation to the new wharf, annual maintenance expenditure on the wharf and any significant wharf upgrading work over the long-term, will also generate positive flow-on economic impacts for the region.

6- Economic Impacts of Forecast Port Annual Operating Revenues 2016-2025

6.1 In order to quantify the regional economic impacts of the Port of Napier's future activity over the longer-term planning period 2016-2025, ESL has utilised total annual operating revenue forecasts for the period provided by the Port. It is noted that the forecasts assume the availability of the required wharf infrastructure at the Port and the absence of any significant constraints or limitations on shipping or cargo movements arising from a lack of available Port infrastructure.

6.2 Total Port Company operating revenue is estimated to grow to approximately $111 million in 2025, in current dollar terms. This result indicates an overall nominal terms revenue growth rate of 53.5% or annual average growth of approximately 4.4%, for the full planning period.

6.3 The regional economic impacts for the forecast revenue growth path have been calculated on the same multiplier basis as in *Table 2 of Appendix 1* referring though to just the actual Port of Napier Company operation economic impacts at the beginning of the table. The economic impact results for each year of the forecast period were scaled upwards in line with the annual increases in forecast total Port Company operating revenue.

6.4 Over the forecast period, the total Hawkes Bay Revenue impact increases from approximately $156 million in 2015 to $240 million in year 2025. The total Net Household Income impact increases from approximately $27 million to $41 million. The total Value Added/GRP impact increases from approximately $69 million to $106 million. The total Employment impact increases from 526 to 809 persons/jobs; however, it is noted that further improvements in work practices and increased technology application at the Port, and the labour productivity gains associated with these factors, could potentially reduce the scale of this employment gain over the forecast period.

6.5 **Table 5** summarises the key Value Added and Employment economic impact results for the Port operation, for the forecast period. The results for the other aspects of the operation covered in the report are also indicated.

6.6 Further capital expenditures (aside from the new wharf development) undertaken at the Port over the forecast period, ongoing annual cruise ship visits to the Port and Port based stevedoring operations, will also continue to generate positive flow-on economic impacts in the Hawke's Bay region during the forecast period. These have been calculated at a total Value Added impact by year 2025 of $57 million and a total employment impact of 821. The main assumptions underpinning these figures are stevedoring revenues growing at the same rate over the forecast period as Port Company revenue operations, Port Company annual average capital expenditure (over and above the new wharf spend) of $12.5 million and an annual average cruise ship tourism regional Value Added impact of $20 million.

6.7 Over the planning period, the total regional Value Added impact of the Hawkes Bay based export/import sectors using the Port of Napier is forecast to increase by approximately $1,282 million or 39% to a level of $4,609 million in 2025. This trend is based on a comparison of the overall Value Added/GDP growth trend for the 2000-2013 period for Hawkes Bay's combined primary production and primary manufacturing sectors (as indicated by Statistics New Zealand regional industry GDP figures) with the growth during the period in the total fob value of export/import trade through the Port (also Statistics New Zealand figures).

6.8 The comparison indicates the total value of Port of Napier international trade and associated GDP impacts, growing at a higher rate than the GDP impacts for the combined primary production/primary manufacturing sectors. Hence, the rate of total GDP growth used for the forecast period for the Hawkes Bay export/import sectors is lower than the growth figure for the Port of Napier revenue operation.

6.9 At the same time, total employment for the sectors as a whole is forecast to increase by an estimated 8,588 or 32%, up to a level of 35,087. This result incorporates an estimated level of anticipated labour productivity gain during the period for the sectors as a group, which is evident from a comparison of annual GDP and employment growth results for the sectors in Hawkes Bay over the period since 2000.

Table 5: Hawke's Bay Total Economic Impacts of Port of Napier Related Business Operations 2015 and 2025

Port of Napier Operational Activity	Total Hawke's Bay Multiplied Economic Impacts	
	Value Added/GRP ($M)	Employment (Persons/Labour Years)
2015 Year		
Annual Port Company Revenue Operation	68.5	526
Port Capital Spend/Port Based Stevedore Operations/Cruise Ship Visits	48.8	791
HB Port User Export/Import Sectors	3,327.4	26,499
Total	**3,444.7**	**27,816**
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HB Port User Export/Import Sectors	4,609	35,087
Total	**4,772**	**36,717**

7- Regional Economic Benefits

It is considered that the proposed new wharf and its integration with the rest of the Port of Napier operation should generate a number of opportunities for (other) significant regional economic flow-on benefits to be realised in Hawke's Bay, in addition to the economic impact gains quantified in earlier sections of this report. The benefits briefly include as follows:

a) Consolidation and strengthening of the Port's roles as a key component of the Hawke's Bay industry transport and distribution infrastructure, and as the largest seaport in central New Zealand and the fourth largest container terminal in the country;

b) New Zealand Transport Agency figures (Freight Information Gathering System or FIGS) indicate that the total annual number of TEU containers handled at the Port of Napier has remained above the 200,000 level since 2013 and has been increasing steadily from that point. Last calendar year, the number of containers handled at the Port (at 247,627) was up 20.2% on the number handled during 2013; the comparable New Zealand 'all Ports' result was 11%.

c) Increased overall operating efficiencies at the Port with flow-on benefits for both existing and new export/import industries in the region and elsewhere;

d) Encouragement of ongoing upgrading of regional roading linkages to/from the Port with resulting benefits for industry, residential and other road users;

e) Supporting and encouraging increased export production within the region from both existing and new industries;

f) In terms of new industries, these could include new enterprises attracted to the region by the international shipping (including larger vessels) serviced by the proposed new wharf development. The wharf and services accompanying it should strengthen regional efforts to promote and attract increased business development and investment in the Hawke's Bay region;

g) Possible attraction of more Port related importing industries to the region;

h) Further strengthening of the primary production/primary product processing and support industry sectors in the Hawke's Bay region and increased use of the existing resource base (including available zoned land and buildings) for these sectors; and

i) Via all the above channels, facilitation of increased economic growth and development in Hawke's Bay.

Postscript

Since this report was prepared, the Port of Napier has recorded an unplanned and sudden increase in container volumes as a result of trade diversion from Centreport Wellington whose operations have been adversely affected by the major Kaikoura based earthquake in November 2016. The increased container based activity has led to increased utilisation rates along with additional costs and investment to develop elements of the Port's capacity within a short timeframe. The Port of Napier is presently expecting the increased volume of previously Centreport based container trade to continue for the short to medium term, with the actual timeframe depending on the timing and degree to which Centreport's operations are redeveloped. It is possible though that the Port of Napier may retain a portion of the increased trade volumes diverted from Centreport, over the longer-term. In terms of the economic impacts of the forecast growth in Port of Napier operating revenue over the 2016-2025 period, as covered by the analysis in section 6 of the report, the current boost in trade activity at the Port remains within overall forecast parameters but has effectively accelerated the Port along the forecast growth track.

1. INTRODUCTION

Financial and other data from the Port of Napier Limited (PON) for the year ended September 2015 has been utilised to estimate the Port's current annual impact on the Hawke's Bay regional economy. The model used to calculate these impacts is an 88-sector Input/Output model of the Hawke's Bay economy for the year ended December 2015. The regional model uses employment data as at February 2015 (the latest available currently for the 88 sectors in the model). The Hawke's Bay model is based on a 2007 national NZ model produced by **Statistics NZ** and then regionalised by consulting economists Butcher Partners Limited of Christchurch. This model was then updated by Hughes Economics using employment data for the year ended December 2015. The regional and national models are updated each year according to changes in employment in the sectors as estimated for February in each year. Further data from **Statistics NZ** relating to exports and imports from all NZ ports has also been utilised. Annual impacts have been calculated using the latest and most up-to-date data available from all relevant sources as in the September year for the Port of Napier and the December year for the economic models. Key base results for NZ and the Hawke's Bay economies are summarised in Table 1 below. These results will be utilised subsequently in the analysis as in percentages for economic impacts for the Hawke's Bay regional economy.

TABLE 1: VALUE ADDED OR GDP/GRP AND EMPLOYMENT DATA FOR THE DECEMBER 2015 YEAR

Economic Measure	New Zealand	Hawke's Bay	Hawke's Bay as Percent of NZ
GDP/GRP* $ millions	246,086.2	6724.8	2.7%
Employment Count persons**	2,045,640	73,082	3.6%
Value Added per employee	$120,298	$92,017	76.5%

*GDP is gross domestic product for NZ and GRP is the equivalent or gross regional product for Hawke's Bay ** Feb 2015.

2. IMPACTS FOR THE HB ECONOMY FROM PON OPERATIONAL & CAPITAL SPEND

Economic impacts resulting from Port operational revenue and capital expenditure are shown in Table 2 below.

TABLE 2: PON OPERATING REVENUE & CAPITAL EXPENDITURE IMPACTS FOR YEAR ENDED SEPTEMBER 2015

Economic Impact Source	Revenue $ millions	Net Household Income $ millions	Employment Persons	Value Added or GRP $ millions
Port of Napier Company Operations				
Direct Revenue from PON Operations	72.0	14.7	243	36.3
Flow-ons into Related Sectors	84.0	11.8	283	32.2
TOTAL IMPACTS FROM PON OPERATIONS	**156.0**	**26.5**	**526**	**68.5**
Multipliers	*2.2*	*1.8*	*2.2*	*1.9*
Port Based Stevedore Operations				
Direct Revenue from Stevedores	23.4	4.8	80	11.8
Flow-ons into Related Sectors	27.8	3.8	93	10.9
TOTAL IMPACTS FROM STEVEDORES	**51.2**	**8.6**	**173**	**22.7**
TOTAL OPERATIONAL IMPACTS PON	**207.2**	**35.1**	**699**	**91.2**
Port of Napier Capital Expenditure				
Direct (30% of total of $35.1 m)	10.5	1.3	31	2.1
Flow-ons into related sectors	9.8	1.3	38	3.3
TOTAL CAPITAL EXPENDITURE IMPACTS	**20.3**	**2.6**	**69**	**5.4**
Multipliers	*1.9*	*2.0*	*2.2*	*2.6*
TOTAL PON IMPACTS Y/E SEPT 2015	**227.5**	**37.7**	**768**	**96.6**

Only 30% of the total capital expenditure for the September year is used in the model as this represents the estimated input from Hawke's Bay based businesses. Equipment purchases such as pilot boats will likely be imported from overseas with little or no impact for the region and NZ.

Note that the total Value Added or GRP impact including capital expenditure into Hawke's Bay sectors is $97 million for the September 2015 year. This represents 1.4% of Hawke's Bay GRP as noted from Table 1.

The multipliers in Table 2 summarise the impacts the PON has on the Hawke's Bay regional economy. For example, every job at the PON (243 at PON and 80 associated stevedores or 323 total direct jobs) induces another 1.2 jobs (i.e. 2.2 – 1) somewhere in the Hawke's Bay region. These flow-on jobs will be in sectors such as *Electricity*, *Petrol Chemical Metal Wholesaling*, *Financial Services*, *Air Services & Storage*, *Vehicle & Equipment Hire* and *Other Business Services* (marketing, consulting, employment, security, packing). Multipliers for the other impact measures as in Revenue, Net Household Income and Value Added can be similarly explained.

Note that the capital expenditure multipliers are generally higher than those for the Port's operating revenue. Typically, more expensive operations with higher skilled labour than usual are required for capital expenditure installation and maintenance than is the case for normal business operations.

Cruise ship impacts comprise the impacts resulting from visiting passenger and crew expenditures whilst ships are in the Port. These have been uplifted from the website cruisenewzealand.org.nz and show only the **total** impacts (i.e. direct plus flow-ons) for the Employment and Value Added impact measures. These are Employment 549 persons and Value Added $20.7 million.

3. IMPACTS FROM ALL EXPORTERS AND IMPORTERS UTILISING THE PORT OF NAPIER

The impact of the PON's own annual operations on the Hawke's Bay economy increases materially above 1.4% when account is also taken of Port use by Hawke's Bay's exporting and importing sectors. These impacts are summarised in Table 3 below. Note that the major exporting and importing sectors are identified individually in Table 3. These comprise some of Hawke's Bay's most valuable producing industries. Remaining exporters and importers are grouped into 'All Other Exports' and 'All Other Imports'. All export and imports values are FOB values sourced from **Statistics New Zealand.**

TABLE 3: REGIONAL VALUE ADDED FOR HAWKE'S BAY FROM ALL EXPORTERS & IMPORTERS USING THE PORT

Relevant Sectors from the total of 88 in the Model	Value Through Port $ millions	Sector Direct Economic Impact Values for Hawke's Bay $m		Value Added Multiplier	Hawke's Bay Total Value Added $ m
		Revenue/Output	Value Added		
Exports					
Horticulture & Fruit	561.5	688.8	280.9	2.15	603.9
Forest Log Wood Products**	286.8	318.6	103.3	2.43	251.0
Pulp & Paper*	264.0	316.8	85.4	2.88	246.0
Meat Processing	922.1	1192.2	340.3	1.94	660.2
Other Food Manufacturing	249.5	726.4	216.9	2.10	455.5
Top 5 Exporters	**2283.9**	**3242.8**	**1026.8**	**2.16**	**2216.6**
All Other Exports	1323.5	1691.3	482.0	1.94	935.1
Totals for Exports	**3,607.4**	**4934.1**	**1508.8**	**2.09**	**3151.7**
Imports					
Fertiliser Petrol Chemicals	65.7	90.9	15.6	1.64	25.6

All Other Imports	527.2	656.5	101.4	1.48	150.1
Totals for Imports	**592.9**	**747.4**	**117.0**	**1.51**	**175.7**
Total Regional Value Added Associated with Port of Napier from all Exporting & Importing Sectors					**3,327.4**

*_Pulp & Paper_ is the designated sector in the 88-sector model but only pulp is produced in the Hawke's Bay.
** Three sectors _Forestry_, _Logging_, _Wood & Wood Product_ have been aggregated into one sector for this calculation.

The first exporting sector in Table 3 is *Horticulture & Fruit Growing.* Total FOB exports through the PON for 2015 for this sector are approximately $562 million. Total direct output for this sector from the Hawke's Bay economic model is $689 million with an associated direct Value Added of $281 million. To account for the Value Added flow-ons from this production, we use the Hawke's Bay multiplier of 2.15 as calculated for the *Horticulture & Fruit Growing* sector from the regional model. Applying the 2.15 multiplier to the $281 million, we derive the total Value Added generated for the region (i.e. direct plus flow-ons) from this level of production as $604 million as shown in Table 3. The total Value Added impact for the other sectors shown in Table 3 is derived in the same way using the appropriate sector multipliers. Note that these impacts are **total** impacts and include both the direct impact in the sector identified in Table 3 plus flow-ons from inputs from other sectors as well as consumption expenditures by workers in the direct and flow-on sectors. In Table 2, the Value Added multipliers for PON operations and capital spending were 1.9 and 2.6 respectively. Capital expenditure typically involves major equipment purchases with high value added during installation and maintenance resulting in a higher multiplier and higher flow-ons.

In Table 3, the major exporters and importers are identified by individual sector. The total revenues for these sectors are greater than exports or imports through the PON although it is clear from the values that the majority (74% overall) of output from these sectors is exported or imported through the PON. The parameters (i.e. direct revenue, direct value added and the value added multipliers) for calculating the associated total Value Added for each sector come from within the regional economic model itself and are shown specifically in Table 3.

For the remaining exports and imports (i.e. 'All Other Exports' and 'All Other Imports' in the table), a slightly different approach has been used to calculate estimated total value added for each of these groups; It would be too difficult to calculate the combined total revenue for the industries involved as they are numerous and only small amounts are involved in some cases. Hence, in order to estimate the economic impacts for these industries, 90% of the direct revenue multiplier value for the major exporters and importers (that is, $3,242.8m/$2,283.9m=1.42 for the major exporters group and the comparable value of 1.38 for the main import category) is used for 'All Other Exports' and 'All Other Imports' respectively, in calculating the direct Value Added associated with the PON for these two sectors. 90% of 1.42 equals 1.28 and 90% of 1.38 equals 1.24. The 90% figure used reflects the fact that these sectors are not as large as the major sectors shown individually in Table 3 and will therefore not achieve the same economies of scale enjoyed by these sectors. It is further noted that the Value Added multipliers that scale up to the total Value Added impacts in Table 3 are also approximated at 90% of the Value Added values for the major export and import industries.

From Table 3, the total Value Added or GRP associated with all exports and imports using the port has been estimated at $3,327 million or 49% of Hawke's Bay GRP for 2015 (Table 1). A similar calculation for Employment shows a total of 26,499 persons in exporting and importing associated with the PON which is 36% of total regional employment. Note that the February 2015 total Employment Count of 73,082 persons shown in Table 1 reflects the count during the month of February when all casual labour involved with fruit picking and packing would be included in the total. Accordingly, this 36% percentage would be closer to the 49% Value Added percentage when these employees were not working after the fruit season and would then be excluded from the regional Employment Count.

The above exports are those using the PON and destined for overseas markets. Other production from these sectors will be "exported" out of Hawke's Bay to other regions in New Zealand. For *Horticulture & Fruit Growing*, approximately 82% of total production is exported overseas directly from the Port. Clearly the

profitability of this and other major exporting sectors will depend to a large extent on overseas demand, the exchange rate and the efficiency of the PON. Furthermore, these major users of the Port require large volume services year after year whereas other Port users may only have intermittent demands. As a result, the total of Value Added across these intensive port-using major export/import sectors, including overseas and domestic exports, will be vital for the continued prosperity of the Hawke's Bay region.

4. SUMMARY OF PORT OPERATION AND INDUSTRY ECONOMIC IMPACTS

In Table 4, the various Employment and Value Added impacts for the Port are summarised for the 2015 year.

TABLE 4: TOTAL EMPLOYMENT & VALUE ADDED IMPACTS FOR PORT OF NAPIER IN 2015 FROM ALL SOURCES

Economic Measure & Source of Impact for 2015	Employment in Persons	Value Added $ m
Hawke's Bay Region Aggregates for 2015*	**73,082**	**6,724.8**
Port Company Annual Operations	526	68.5
Port Based Stevedore Operations	173	22.7
Port Capital Expenditure	69	5.4
Cruise Ship Visits at PON**	549	20.7
TOTALS FOR ACTIVITIES AT THE PORT 2015	**1,317**	**117.3**
Percent of Hawke's Bay Aggregates*	1.8%	1.7%
Impacts from Exporters & Importers at PON***	26,499	3,327.4
TOTAL FOR ALL ACTIVITIES ASSOCIATED WITH PON	**27,816**	**3,444.7**
Percent of Hawke's Bay Aggregates*	38%	51%

*From Table 1.
**Sourced from cruisenewzealand.org.nz. ***From Table 3 with a similar analysis for Employment showing an exporter/importer Employment impact of 26,499 persons.

Table 4 shows the PON to be associated with at least 51% of total Hawke's Bay Value Added or GRP in 2015. Data for Cruise Ships is publicly available as in data at cruisenewzealand.org.nz. It would be expected that the Employment percentage impact at 38% would be somewhat lower than the Value Added percentage at 51%. The major exporting and importing sectors using the Port comprise large scale business enterprises that exploit their economies of scale with profitable exporting to global markets. Typically, Value Added per employee in these sectors is much larger than for other port-using sectors comprising smaller business enterprises such as *Furniture Manufacturing.* The 2015 Employment Count for Hawke's Bay in *Furniture Manufacturing* for 2015 was 220 which compares with 5,650 for *Horticulture & Fruit Growing* and 2,830 for *Meat Processing.*

5. ECONOMIC IMPACTS FROM PROPOSED WHARF CONSTRUCTION/DEVELOPMENT

The initial total capital cost of the proposed wharf development has been estimated at $92.75 m spread over two years. Of this total, $21.2 million is allocated to dredging. For this development work, the following allocations have been made for demands on the supplying sectors in the Hawke's Bay economy.

TABLE 5: ALLOCATIONS OVER HAWKE'S BAY SECTORS FOR WHARF DEVELOPMENT CAPITAL COST

Sector Direct Impacts	$ millions
Labour cost for Hawke's Bay employees @ 5% of total construction cost	4.6
Goods & Services Supplied from Hawke's Bay Businesses:	
Building Supplies	2.0
Petrol Chemical & Metal Wholesaling	1.0
Accommodation	0.5
Restaurants & Bars	0.5

Total Direct Impacts for Hawke's Bay Employees & Sectors	**8.6**

The goods and services will include building supplies such as lime, cement etc. and fuel for the dredging vessels involved in those operations. Accommodation and food etc. will also be supplied for workers on the development. From Table 5 it can be concluded that most of the direct construction costs for the wharf development of $92.8 million will occur outside the Hawke's Bay regional economy. For the direct Hawke's Bay impacts summarised in Table 5, the total impacts will be spread over the construction period of two years. Annual impacts are therefore derived as Total divided by two. Table 6 summarises the economic impacts from the Port development.

TABLE 6: ECONOMIC IMPACTS FROM PORT OF NAPIER WHARF DEVELOPMENT FOR HAWKE'S BAY ECONOMY

Economic Impact Source	**Revenue $ m**	**Net Household Income $ millions**	**Employment Persons**	**Value Added/GRP $ millions**
Impact of PON Employees in Construction	4.6	3.2	75	4.6
Goods & Services from Hawke's Bay firms	4.0	0.6	18	1.5
Total Direct Impacts from Hawke's Bay	**8.6**	**3.8**	**93**	**6.1**
Flow-ons from Direct Impacts into HB sectors	9.0	1.2	33	3.4
TOTAL IMPACTS FOR HAWKE'S BAY REGION	**17.6**	**5.0**	**126**	**9.5**
Hawke's Bay Multiplier	*2.04*	*1.30*	*1.35*	*1.56*
ANNUAL IMPACTS OVER 2 YEARS	**8.8**	**2.5**	**63**	**4.8**

Quite possibly the above total impacts as in the Revenue impact of $17.6 million could be higher in the first year than the second year, depending on the intensity and length of construction at the time. The Employment impact indicates that there could be the equivalent of 63 persons working for two years on the wharf development although not necessarily the same persons working for both years.

6. PROJECTED IMPACTS OF PORT OF NAPIER ANNUAL OPERATIONS OUT TO 2025

Recent trade figures from **Statistics NZ** for the June 2016 year show total merchandise exports nationwide at $49.34 billion and representing a 2% gain over the previous year (2014/15). Fruit exports at $2.63 billion were up 31% for the year while dairy exports at $11.16 billion were down 7.3%. Fruit is now the fourth largest export commodity from NZ, and PON is an important national gateway for this commodity as evidenced in Table 4.

PON's total operating revenue for the 2014/2015 September year was approximately $72 million. Forecast revenue for 2025 in 2016 dollars is estimated at $110.6 million which represents an annual average growth rate of 4.4% p.a. for the forecast period. Using this growth rate as a base, the forecasts for total economic impacts (direct plus flow-ons) for Revenue, Net Household Income, Employment and Value Added are respectively: $239.5 million, $40.7 million, 809 persons and $106.2 million. These correspond to the values in Table 2 at $156 million, $27 million, 526 persons and $69 million respectively for the 2015 year.

Quite possibly, the use of larger cargo vessels and improved cargo handling practices out to 2025 could see the Employment impact currently estimated at 809 persons reduced with lower direct employment at the Port.

Further capital expenditures (aside from the new wharf development) undertaken at the Port over the forecast period, ongoing annual cruise ship visits to the Port and Port based stevedoring operations, will also continue to generate positive flow-on economic impacts in the Hawke's Bay region during the forecast period. These have been calculated for Value Added and Employment as shown in Table 7 below.

TABLE 7: ESTIMATED HB ECONOMIC IMPACTS FROM PORT OF NAPIER OPERATIONS 2025

Port Activity	Value Added or GRP $ millions	Employment Persons
Port Company Operations	106	809
Port Company Capital Expenditure	2	25
Stevedoring Operations	35	266
Cruise Ship Tourism	20	530
Port User Export/Import Sectors	4,609	35,087
Totals	**4,772**	**36,717**

The base assumptions underpinning the growth forecasts for the period are:

- Port Company operating revenue growing at an annual average 4.4% over the period.
- Port Company annual average capital expenditure (over and above the new wharf spend) of $12.5 million (with 30% of this occurring within the HB region).
- Stevedoring operating revenue growing at the same rate as Port Company revenue.
- An annual average cruise ship tourism regional Value Added impact of $20 million and an associated total employment impact of 530.

Over the planning period, total regional Value Added of the Hawkes Bay based export/import sectors using the Port of Napier is forecast to increase by approximately $1,282 million or 39% to a level of $4,609 million in 2025. This reflects total operating revenue for the sectors as a whole growing at a lower rate over the forecast period compared to total Port Company revenue. At the same time, total employment for the sectors as a whole is forecast to increase by 8,588 or 32% up to a level of 35,087. This result incorporates a level of anticipated labour productivity gain during the period, within the sectors.

7. SOME LIMITATIONS OF ECONOMIC IMPACT ANALYSIS USING INPUT/OUTPUT MODELS

The impacts estimated above utilised an 88-sector Input/Output model of the Hawke's Bay regional economy based on economic activity in the region for the year ended December 2015. In the present case, the technology of the year ended March 2007, the base year for the current model, is still seen as applicable in 2016. The base NZ model is updated about every 10 years and a new model is scheduled for 2017 but will be based on purchasing patterns for the year ended March 2013. There is always a time lag in model construction and we simply have to accept this situation. In the present case, the global financial crisis that commenced in 2008 has to some extent frozen the world economy into a holding pattern as of that year and only recently has world growth started to increase again. Currently, however, slower-than-expected growth is forecast by institutions such as the IMF partly as a result of the Brexit. In short, technology in 2016 will not be too much different from that reflected in the base 2007 year so the calculations arising out of the model can be used with considerable confidence. A further assumption involves constancy of prices with the assumed activity (port activity in this case) being of "usual" magnitude and not sufficient to significantly affect prices for electricity and other goods and services utilised in Port operations.

8. CONCLUSION

The above analysis indicates the Port of Napier to be a significant facility for the Hawke's Bay regional economy. While Port and related stevedoring operations contribute $207 million annually to regional

production revenue, ongoing capital and maintenance expenditure contributes another $20 million annually (Table 2). Furthermore, directly and indirectly about 770 Hawke's Bay employees can be attributed to Port related operations alone. When account is taken of all exporters and importers utilising the Port facilities, approximately 38% of Hawke's Bay employment is associated with the Port.

If the proposed new wharf development at the Port is completed, the Port Company's operations will directly and indirectly raise its Employment impact from 526 currently to between an estimated 700 and approximately 810 by 2025, depending on the level of actual resource productivity gains in Port operations over the next ten years. The development will also guarantee the most efficient service for all the region's exporters and importers. This means, PON is then able to service all future requirements from the region ensuring exporters and importers do not need to utilise any out-of-region facilities.

APPENDIX 2

Dr WARREN R HUGHES – AUTHOR PROFILE

The author is Cambridge, NZ born and a graduate of the University of Auckland and Indiana University in the USA, where he completed his doctorate in Business Economics and Public Policy in 1970.

Since that time, he has taught in the areas of econometrics, forecasting, financial economics and managerial strategy at The University of New South Wales in Sydney (1970 – 1978) and most recently at The University of Waikato (1978 – 2007). At various times, he has taught in MBA programmes at the University of Florida in Gainesville and in the Graduate School of Management at the University of California at Irvine. Dr Hughes retired from the University of Waikato in 2007 and was appointed an Honorary Fellow in Economics in 2008. At the present time, he works as an independent economic consultant based in Auckland.

The author has published extensively, mainly as single-authored articles in international journals such as *Decision Sciences*, *Theory and Decision*, *The Journal of Business*, *Mathematical & Computer Modelling*, *Environment & Planning*, *Australian Journal of Management*, *Forest Science, Australasian Journal of Regional Studies* and, most recently in April 2009, *OMEGA*, the international journal of management science and again in September 2010 in the *Chinese Business Review*. Other articles on theoretical and applied economics have been published by the author in *NZ Economic Papers* and Australia's *Economic Record*. He is a former member of the Advisory Board for the Wiley journal *Managerial and Decision Economics* and maintains a continuing interest in the latest developments in economic theory as it relates to management and business. The author has developed a particular expertise in the area of impact and regional analysis. He was the Editor/Manager of the *Regional Economic Bulletin*, which focused on topical issues relevant to the business and wider communities, mainly but not exclusively, in the Waikato and Bay of Plenty regions. The *Bulletin,* which was a complimentary publication of the University of Waikato, ceased publication in 2008.

The author has acted as a consulting economist for *Economic Solutions Limited*, *Environment Waikato, Carter Holt Harvey Limited, Contact Energy, Norske Skog Tasman Limited, Port of Tauranga Limited, Port of Napier, Feltex Carpets Limited, Man'O War Farm Limited, Refining NZ Limited, Zespri International, Waikato Innovation Park, Property Council of NZ, Creative Napier*, *Katolyst*, *Priority One BOP*, *Vision Manawatu, Enterprise Franklin, Venture Taranaki,* various District Councils in the Waikato, Bay of Plenty, Hawke's Bay and other regions and for events such as Tauranga's *Montana Jazz Festival*, Hamilton's *Balloons Over Waikato* and Napier's *Art Deco Weekend.*

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