28 May 2021

Palmerston North City Council
Private Bag 11034
Palmerston North

Attention: Anita Copplestone

By email: anita@perceptionplanning.co.nz, craig.auckram@pncc.govt.nz

Dear Anita

KiwiRail Regional Freight Hub – Notice of Requirement - Response to Further information request pursuant to section 92 of the Resource Management Act 1991 – Issues raised by submitters

We refer to your letter of 7 May 2021 requesting further information under section 92 of the Resource Management Act 1991 (RMA) in relation to KiwiRail Holdings Limited's Notice of Requirement for the Regional Freight Hub.

Please find enclosed KiwiRail's response to the further information request in relation to issues raised by submitters. KiwiRail's response comprises a number of documents as technical input was required to respond to a number of the questions. For ease of reference, we attach an index that outlines each document and the questions it responds to.

KiwiRail also intends to develop and respond to matters raised in submissions in further detail in its evidence to be filed on 9 July 2021 in accordance with the Hearing Panel's directions.

If you have any queries regarding the information contained in this response, please do not hesitate to contact the undersigned.

Yours faithfully,

Pam Butler
Senior RMA Advisor
KiwiRail Holdings Limited

www.kiwirail.co.nz | 0800 801 070
Wellington Railway Station, Bunny Street, Wellington 6011
PO Box 593, Wellington 6140

S92 RESPONSE INDEX

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Rail Operations	
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Transport and Traffic Effects, Hydrogeological Effects, and Effects on Utilities	
Attachment 5	Questions 8,9,12,13,14, and 15
Noise and Vibration Effects	
Attachment 6	Questions 10 and 11

www.kiwirail.co.nz | 0800 801 070
Wellington Railway Station, Bunny Street, Wellington 6011
PO Box 593, Wellington 6140

Question 1 : Please provide the modelling and associated input data and assumptions used to generate the economic impact estimates provided in Appendix A of Attachment 8a to KiwiRail's s92 response, including the modelling behind the forecast rail freight volumes that underpin the economic impacts.

1 Introduction

This response sets out the details of the modelling used to assess the potential freight volumes which would benefit in one way or another from the proposed Regional Freight Hub. In order to provide a comprehensive assessment, this includes some material already included in attachment 8a to KiwiRail's s92 response dated 15 February 2021.

The response considers three main groups of traffic -

- The traffic potentially using enhanced container terminal facilities at the Freight Hub site.
- Traffic to Palmerston North in general which would also include the container traffic and which would benefit from the introduction of longer trains.
- Rail traffic passing through Palmerston North between external destinations benefitting from the use of longer trains.

In developing this detailed approach, some assumptions made in Attachment 8a to KiwiRail's s92 response dated 15 February 2021 have been updated with regard to:

- The share of electric locomotives in the movement of freight between Hamilton and Palmerston North which affects the environmental benefits.
- The total volume of KiwiRail traffic in 2018/19 where KiwiRail have provided a revised tonne-km figure. This replaces the figure derived from the Ministry of Transport FIGS website which is believed to be incorrect. This figure of the total volume of rail freight is used to estimate the average cost of movement by rail.
- The split of traffic benefitting from longer trains between the movements to/from Palmerston North and the other longer distance traffic following further examination of the material available, this reduced the movements to and from Palmerston North with a compensating increase in the volumes of longer distance traffic.

While these changes do result in a reduction in the level of benefits estimated, these do not materially affect the conclusions of this response and the response of Attachment 8a to KiwiRail's s92 response dated 15 February 2021. Where relevant, the changes to the earlier tables and figures are identified below.

2 Traffic volumes affected by the increase in container capacity with the Regional Freight Hub

The forecast future freight volumes have been estimated using the base estimates for 2017/18 provided by the National Freight Demand Study published in 2019[1] and the application of the Ministry of Transport Freight outlook model[2] for traffic to and from the Manawatu-Whanganui region to give the forecasts of growth factors for future years. The key forecasts are based on the movement of manufactured and retail goods for which an extract from the MOT model as developed by the consultants for use in other studies and covering the period from 2017/18 to 2052/53 is attached (Worksheet **Model estimates and forecasts in Spreadsheet Extracts from MoT Freight Futures model**). The growth for future years is based on the population and regional GDP projections embodied in the model which are set out in the Worksheet **Assumptions (GDP and pop),** also attached as part of the spreadsheet**.** These projections which are embodied in the MoT model are based on forecasts by Statistics NZ and the Treasury.

The modelling provides estimates of the modal shares for commodity movements based on a BAU approach and therefore do not take into account any future measures that would increase the share of rail traffic relative to road traffic, in line with the Government's aspirations to address the environmental impacts of road freight transport.

The volumes by rail are included in the attached spreadsheet and these have been used to develop appropriate growth factors for the movements through the terminal. Because of recent fluctuations in traffic, these growth factors have been applied to the average of the observed manufactured goods traffic through the container terminal for 2017/18 and 2020 to give the estimated pattern of demand over time. This was set out in Table 1 of Appendix A to Attachment 8a of KiwiRail's first s92 response, which is repeated here.

Table 1
Total estimates and forecasts of demand for manufactured freight traffic by rail into Palmerston North
(m tonnes pa)

	2017 (Est)	2020 (Est)	2022	2030	2032	2042	2052	2062
Total demand for containerised traffic (m tonnes pa)	0.28	0.26	0.28	0.30	0.31	0.33	0.34	0.35

The review of the operations of the current container handling facility at the Existing Freight Yard at Tremaine Avenue has indicated that the capacity of this may be reached with a movement of about 0.3 million tonnes per year. On the basis of the growth set out in Table 1 this is expected to be reached by about 2030. This would leave an increasing shortfall of capacity for firms wishing to use the container terminal facilities. This is set out in Table 2. However, there is the potential for demand and the resulting shortfall to be much higher if future measures increase rail traffic relative to road traffic, such as a greater proportion of Government investment into rail rather than road infrastructure.

[1] National Freight Demand Study 2017/18 https://www.transport.govt.nz/sitesearch/SearchForm?Keyword=national+freight+demand+study
[2] https://www.transport.govt.nz/statistics-and-insights/transport-outlook/sheet/updated-future-state-model-results

Table 2 Forecasts of capacity shortfall for the existing container terminal facilities in the Existing Freight Yard in Palmerston North (m tonnes pa)					
Year	2030	2032	2042	2052	2062
Total shortfall in demand for containerised traffic through the Existing Freight Yard in Palmerston North (m tonnes pa)	0.004	0.010	0.029	0.043	0.057

3 Unit cost factors

3.1 Introduction

This section describes the approaches used to assess the key unit cost factors used in the assessment of the economic benefits from the increased container handling capacity provided new Regional Freight Hub. These include:-

- Transport charges
- Emissions costs
- Crash cost savings
- Congestion costs
- Impact of heavy vehicles on the costs of maintenance and management of the road network

Each of these is discussed in the sections below.

3.2 Transport charges

For the traffic forced to divert to road because of the shortage of capacity at the existing container terminal, it is assumed that the costs of transport would increase by about $0.075 per tonne-km. This is based on the difference between the typical cost of transport of about $0.165 per tonne-km for road transport and $0.090 per tonne-km for rail. The charges for road transport are based on the cost parameters set out in the Waka Kotahi Monetarised Benefits and Costs Manual (MBCM). The charges for rail are based on the average costs per tonne-km based on an analysis of information from the KiwiRail Annual Report for 2019[3] giving total annual revenues for freight of $402.7m and figures supplied by KiwiRail giving total rail freight volumes of 4.4 bn tonne-kms for the same period.

3.3 Emissions costs

As well as the additional monetary costs of transport, there would be additional environmental and safety costs associated with movement by road rather than rail. The emission costs associated with road transport are based on the emission rates and unit costs in the Waka Kotahi Economic Evaluation Manual (EEM 2018[4]). The emission rates are set out in Table A9.6 (assuming a speed of 80 km-h and a gradient of 2 per cent) and the emissions unit costs in Table A9.1. These are summarised below in Table 3.

[3] KiwiRail's Evolution KiwiRail Annual Integrated Report 2019
[4] NZTA Economic Evaluation Manual (EEM) 2018

Table 3 Emission factors for heavy vehicles (gms per veh-km) (1)				
	Emission type			
	PM10	NOx	CO	HC
Average	0.21	6.1	1.6	0.15
Urban	0.40	11.52	2.83	0.28
Rural	**0.15**	**4.27**	**1.05**	**0.10**

Notes (1) Assumes 2% gradient 80 kph for calculation of emission factors
Source : EEM Table A9.6 urban conditions

The unit costs for emission factors are set out in Table 4.

Table 4 Environmental damage costs for use in project evaluations $/tonne (as at June 2016)		
Pollutant	**Costs in NZD/tonne**	**Value Base Date**
PM10	$460,012	2016
NOX	$16,347	2016
CO	$4.13	2016
HC	$1,310	2016

Source: EEM Table A9.1

For the assessment of the savings in environmental (and also crash and congestion costs) for the traffic able to travel by rail with the increased capacity at the expanded container terminal in the new Freight Hub, the position has focussed on the movement between Auckland and Palmerston North, which would account for almost all this traffic. This movement is assumed to include 47 kms through urban areas and 453 kms through rural areas. Applying the cost factors set out above and an estimate for greenhouse gas emissions based on vehicle operating costs as referenced in the EEM would give a total cost for the journey of about $9.00, split broadly equally between air quality elements and greenhouse gas. This would give a total cost of $0.018 per tonne-km.

Rail emission costs have been estimated using preliminary unpublished data being developed as part of the Domestic Transport Costs and Charges Study being undertaken for the Ministry of Transport. These are divided into air quality costs and greenhouse gas costs, with separate figures for urban and rural operation and for diesel and electric locomotives.

These give average costs of emissions per net tonne-km for urban and rural areas as set out in Table 5.

Table 5 Emission costs for rail freight transport (c per net tonne-km)			
	Air quality	Greenhouse gases	Total
Urban	0.0187	0.0035	0.0222
Rural	0.0055	0.0029	0.0084

The rail journey between Auckland and Bunnythorpe was divided into urban and rural sections and between electrified and non-electrified sections and assuming that 75 per cent of the trains on the electrified section were operated using electric locomotives. The costs for the urban sections which were assessed using the average urban costs are set out in Table 4. The costs for the rural sections took into account the split of the route between the distances operated by diesel and electric locomotives. Overall this gave an emissions cost combining air quality and greenhouse gas of about $2.85 per tonne for the full rail journey or about $0.005 per net tonne-km.

The movement by rail would also involve the movement by road to and from rail terminals. For example, a typical movement from the main Countdown distribution centre in Favona in Auckland to the site being developed in Alderton Drive in the NEIZ in Palmerston North would add about $0.25 per tonne in emissions costs from road movements using an approach similar to that for the through road movements but assuming a slower speeds. This would give a total cost for the through movement of $2.85 per tonne or the equivalent of $0.005 per tonne-km. This can be compared to the road figure of $0.018 per tonne-km to get an average emission costs saving of $0.012 per tonne-km for the end to end movement.

The total emission cost by road for a through movement between Auckland and Palmerston North would be about $9.00 per tonne compared to the through cost by rail including road connectors of $3.10.

3.4 Crash cost savings

Crashes by type for heavy vehicles have been extracted from the CAS database for the 5 years from 2014/15 to 2018/19. The average crashes recorded and the factors used to increase these to allow for non-recording based on the MBCM Table A18 are set out in Table 6.

Table 6
Crash rates and costs for heavy vehicles

Year	Recorded crashes by type		
	Fatal	**Serious**	**Minor injury**
2014/2015	48	109	376
2015/2016	44	103	306
2016/2017	69	122	398
2017/2018	43	114	408
2018/2019	50	150	402
Total	**254**	**598**	**1890**
Average per year	50.8	119.6	378
Adjustment factor to allow for under-recording	1	1.7	3.6
Total estimated per year	**50.8**	**203.32**	**1360.8**
Crash costs			
Unit cost ($)	4750000	505000	28000
Update factor	1.09	1.09	1.09
Total annual cost ($m)	263.0	111.9	41.5

This gives a total annual average cost of injury accidents for heavy vehicles of $416.4m.

The Ministry of Transport figures for the average annual kms travelled on State Highways by heavy vehicles over the period from 2014/15 to 2018/19 is 2261.99m veh-kms. On this basis the average crash costs for a heavy vehicle amount to $416.5/2261.99 or $0.18 per veh-km. On the basis of the average payload of 20 tonnes, this gives a cost of $0.009 per tonne-km.

The crash costs of rail are very small and have been excluded from this analysis.

3.5 Congestion costs

The diversion of freight traffic away from the road network will reduce the level of congestion on the network. The assessment of the effects of this is based on parameters for Auckland as the main area where congestion would be reduced and for which estimates of the benefits of reducing congestion are available from the MBCM. In Table 42, the MBCM sets out the reduction in costs with the diversion of traffic away from the road network.

The key elements of the assessment are set out in Table 7.

Table 7 Steps in the estimation of average congestion costs per tonne-km	
Saving per veh-km (taken to be passenger car km) removed from road network in Auckland at peak times $ per veh-km in 2008 prices	$1.56 MBCM Table 42
Update factor to 2019	1.54
Savings per veh-km in current prices	$2.40
PCU factor for heavy vehicles	4
Proportion of traffic in peak period	40%
Average congestion cost per heavy vehicle km	$2.40*40%*4=$3.84
Average congestion cost per peak tonne-km in congested area	$0.192
Area of potential congestion	37kms (7.4 per cent of total distance Auckland-NEIZ)
Average congestion cost per total tonne-km	$0.014

3.6 Impact of heavy vehicles on the costs of maintenance and management of the road network

It is assumed for this analysis that the road user charges paid by heavy vehicles would match the costs imposed by these vehicles on the costs of maintenance and management of the road network. In this respect therefore the diversion of traffic from road to rail would be cost neutral. As a consequence this has not therefore been considered further.

3.7 Summary of additional costs of transport by road

The additional unit costs of transport by road as compared to rail are summarised in Table 8

Table 8 Summary of additional costs of road transport compared to rail for movements between Auckland and Palmerston North ($ per tonne-km)	
Freight charges	$0.075
Environmental costs (air quality and greenhouse gas)	$0.012
Crash costs	$0.009
Congestion costs	$0.014
Total savings	**$0.110**

4 Cost savings with additional terminal capacity

Based on the tonnages identified in Table 2, the distance travelled between Auckland and Palmerston North and the unit costs set out in Table 8, the reduction in total costs including the costs to society with the expanded capacity of the container terminal are set out in Table 9 and their breakdown in Figure 1. The transport and environmental cost saving differ slightly from those set out in Table 2 of Appendix A to attachment 8a of KiwiRail's s92 response dated 15 February 2021, reflecting the updated assumptions about the transport costs of movement by rail and the use of electric locomotives as described at Section 1 above.

Table 9
Transport and environmental cost savings from increased rail container handling capacity in Palmerston North ($m pa)

Year	Transport cost savings	Environmental cost savings	Crash cost reduction	Congestion benefits	Total savings
2032	0.4	0.1	0.0	0.1	0.5
2042	1.1	0.2	0.1	0.2	1.6
2052	1.6	0.3	0.2	0.3	2.4
2062	2.1	0.3	0.3	0.4	3.2

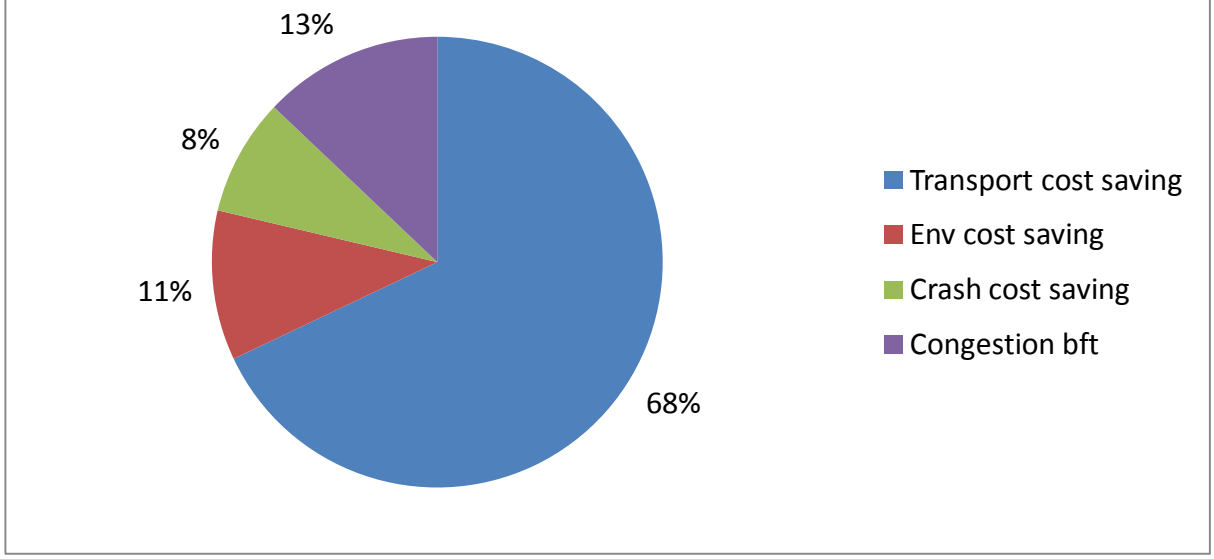

Figure 1
Breakdown of benefits from additional container handling capacity for existing traffic demands at the Regional Freight Hub (per cent of total in 2062)

Of the total cost savings over two-thirds are in respect of the reduction in the costs of transporting the freight as highlighted in the second column of Table 9. The other factors included in the table however are also important accounting for almost a third of the total quantified benefits.

In addition to these benefits which have been quantified, the new facility is likely to provide for more efficient and reliable movement of containers with the new Freight Hub allowing more efficient and potentially faster handling with consequent further benefits to users. These benefits while real are difficult to quantify in monetary terms, but would increase the attractiveness of the Freight Hub for existing and also potential new users.

5 Potential benefits from the use of longer more efficient trains

5.1 Introduction

As well as providing additional capacity for container handling, the proposed Regional Freight Hub would also allow the operation of longer and more efficient trains. The introduction of these has only been considered at a conceptual level and for capacity reasons they may not be required until the latter half of the century, unless the demand for rail travel increases faster than expected. This could occur, for example, by the encouragement of a shift from the movements of freight from road to rail in order to meet broader environmental and social objectives currently promoted by the Government including the additional funding announced in the recent budget.

A separate analysis included as the response to Question 2 has examined the potential for cost savings in detail and has identified the potential savings to lie in the range of 9 - 12 per cent which may encourage the early adoption of longer trains even before capacity issues become critical. For this analysis an average of 10 per cent has been assumed.

On the assumption that these cost savings are passed on to customers by KiwiRail, this would give rise to considerable benefits to existing rail users in Palmerston North. By reducing costs this is also likely to result in a further transfer to rail as transporters take advantage of the reduced charges. There would also be benefits to longer distance traffic passing through Palmerston North. However because of the infrastructure and demand constraints facing the use of longer trains on other routes away from the NIMT between Auckland and Palmerston North, especially for routes to Hawke's Bay and Taranaki, the benefits per tonne-km are likely to be smaller and we have assumed that these would be half those for traffic between Palmerston North and areas further north.

5.2 Direct benefits from reduced costs to existing traffic

5.2.1 Introduction

The reduced costs associated with the longer trains will benefit existing base-line traffic flows. For this we have considered the position for:-

- The main traffic between Palmerston North and the north
- Other longer distance traffic

Each of these is considered below.

5.2.2 Cost savings to existing Palmerston North and other Manawatu-Whanganui traffic

Benefits to Palmerston North traffic from the introduction of longer trains are focussed on the movements of manufactured and retail goods to and from Auckland and Waikato. The forecasts of the total volumes of traffic to and from Palmerston North expected to benefit from the use of longer trains has again been estimated from the output of the MoT Freight Futures model. These forecasts are set out in Table 10.

Table 10
Forecasts of total flows of manufactured and retail goods between Manawatu-Whanganui and Auckland/Waikato (m tonnes pa)

Year	Southbound flows	Northbound flows	Total flows
2032	0.26	0.07	0.32
2042	0.27	0.07	0.34
2052	0.28	0.07	0.36
2062	0.30	0.08	0.38

The reduction in the costs of travel (10 per cent of the average cost of $0.106 per tonne-km) will benefit this traffic directly. These benefits are set out in Table 11. These differ from the figures in Table 3 of Appendix A of Attachment 8a to KiwiRail's the S92 response dated 15 February 2021 to reflect the changes described at Section 1 above.

Table 11
Cost savings for traffic (1) to and from Manawatu-Whanganui with the use of longer trains

Year	Total tonne-kms affected (m)	Savings with reduced costs ($m pa)
2032	161.4	1.5
2042	171.7	1.6
2052	179.5	1.6
2062	187.6	1.7

Notes (1) Based on the movements of all manufactured goods between Manawatu-Whanganui and Auckland/Waikato

5.2.3 Cost savings to existing long distance through traffic

The volumes of long-distance rail traffic that passes through Palmerston North likely to benefit from the introduction of longer trains have again been estimated from the MoT Freight Futures Model and again attention has been focussed on the movements of manufactured and retail goods. Based on the individual movements, the average distance travelled by this traffic is about 940 kms. The total volume of traffic in terms of tonnes and tonne-kms is set out in Table 12. The differences compared to Table 5 of Appendix A of Attachment 8a of KiwiRail's Section 92 response dated 15 February 2021 to reflect the changes described at Section 1 above.

Table 12
Long distance rail traffic passing through Palmerston North (manufactured and retail goods only)

Year	m tonnes pa			Bn tonne-kms
	S bound	N bound	Total	
2032	0.87	0.46	1.33	1.26
2042	0.95	0.49	1.45	1.37
2052	1.02	0.52	1.54	1.46
2062	1.09	0.55	1.64	1.55

Not all of these services will be able to be operated by longer trains because of route or demand constraints. It has therefore been assumed that the average cost saving is 50 per cent of the total possible, giving an average saving of $0.0053 per tonne-km. The savings that result are set out in Table 13 below. The differences compared to Table 6 of Appendix A of Attachment 8a of KiwiRail's S92 response dated 15 February reflect the changes described in Section 1 above.

Table 13
Cost savings from longer trains - Long distance rail traffic passing through Palmerston North (manufactured and retail goods only)

Year	$m pa
2032	5.8
2042	6.3
2052	6.7
2062	7.1

5.3 Traffic generation effects

In addition to benefitting existing rail traffic flows, the reduction in the costs of moving freight by rail is likely to attract traffic from road. Information has been taken from the MBCM on the elasticity of rail freight movements, the extent to which the volumes of rail traffic change as the costs change. For this analysis it has been assumed that the response will be based on the elasticity figures in the MBCM Table 99. These give a range of observed elasticities for "food and kindred products" from -1.04 to -2.58 and the Manual also states:

"In New Zealand, where intermodal competition is likely to be significant, it is considered that freight price elasticities would more likely be at the higher end of the ranges identified above."

The greater the magnitude of the elasticity, the higher is the response to a change in price.

Given this evidence, an elasticity of -2, towards the lower end of the range identified above, was considered appropriate for this analysis. This use of this would mean that a 10 per cent reduction in cost would lead to an increase in demand of 20 per cent and a 5 per cent reduction in cost would lead to an increase in demand of 10 per cent. These factors would be applied for the Palmerston North traffic and the other longer distance traffic respectively.

Using this approach the traffic diverting to rail is set out in Table 14. The differences from Tables 4 and 5 of Appendix A of Attachment 8a of KiwiRail's S92 response dated 15 February 2021 reflect the changes described at Section 1 above.

Table 14
Rail traffic generated in response to reduced costs

Year	Palmerston North traffic		Other long distance through traffic	
	Base tonne-kms (m)	Generated tonne - kms (m)	Base tonne-kms (m)	Generated tonne - kms (m)
2032	161	32	1258	126
2042	172	34	1366	137
2052	179	36	1456	146
2062	188	38	1552	155

The benefits from this diversion would flow in part to those switching their traffic from road to rail reflecting the lower costs, and in part to the community in general as rail with its lower environmental, safety and congestion costs is substituted for the movement by road with its greater environmental and safety impacts.

The environmental costs estimated for rail assume the substantial use of electric locomotives between Te Rapa and Bunnythorpe[5] with diesel used for the remainder of the journey.

This gives an average environmental cost of $0.006 per tonne-km for rail compared to $0.018 per tonne-km for road for traffic to and from Palmerston North. For the longer distance traffic, a higher proportion of the route would use diesel locomotives so the environmental costs per tonne-km would be slightly higher at $0.008 per tonne-km giving a saving of $0.010 compared to road. The benefits from crash cost savings and reduced congestion are based on the parameters described above in Sections 3.4 to 3.6.

The benefits for the traffic switching to rail in response to the lower costs to and from Palmerston North are set out in Table 15. The differences in the figures in this table compared to those in Table 4 of Appendix A of Attachment 8a of KiwiRail's S92 response reflect the changes described at Section 1 above.

[5] Given the likely availability of electric locomotive capacity, it has been assumed that 75 per cent of trains between Te Rapa and Bunnythorpe would be operated using electric locomotives.

Table 15 Benefits from Palmerston North traffic switching to rail because of reduced costs							
Year	**Base traffic (m t-kms)**	**Generated traffic (m tonne-kms)**	**Transport cost benefits ($m)**	**Environ-mental benefits ($m)**	**Crash cost reduction ($m)**	**Congestion benefits ($m)**	**Total ($m)**
2032	161	32	0.1	0.4	0.3	0.5	1.3
2042	172	34	0.2	0.4	0.3	0.5	1.4
2052	179	36	0.2	0.4	0.3	0.5	1.5
2062	188	38	0.2	0.4	0.3	0.5	1.5

The equivalent figures for the longer distance through traffic are set out in Table 16. The differences in the figures in this table compared to those in Table 7 of Appendix A of Attachment 8a of the S92 response dated 15 February 2021 reflect the changes described at Section 1 above.

Table 16 Benefits from longer distance traffic switching to rail because of reduced costs							
Year	**Base traffic (m t-kms)**	**Generated traffic (m tonne-kms)**	**Transport cost benefits ($m)**	**Environ-mental benefits ($m)**	**Crash cost reduction ($m)**	**Congestion benefits ($m)**	**Total ($m)**
2032	1258	126	0.3	1.2	1.2	1.8	4.5
2042	1366	137	0.3	1.3	1.3	1.9	4.8
2052	1456	146	0.3	1.4	1.3	2.1	5.2
2062	1552	155	0.4	1.5	1.4	2.2	5.5

6 Total benefits

The total benefits arising from the provision of additional capacity at the Palmerston North container terminal and the introduction of longer trains facilitated by the new terminal are set out in Table 17. The differences in the figures in this table compared to those in Table 8 of Appendix A of Attachment 8a of KiwiRail's S92 response dated 15 February 2021 reflect the changes described at Section 1 above.

Table 17 Quantified benefits with the new Regional Freight Hub ($m pa)				
Benefit type	**2032**	**2042**	**2052**	**2062**
Benefits to PN users				
Increased container handling capacity	0.4	1.1	1.6	2.1
Reduced train costs				
Existing traffic	1.5	1.6	1.6	1.7
Generated traffic	0.1	0.2	0.2	0.2
Total benefits to PN users	2.0	2.8	3.4	4.0
Benefits to longer distance traffic				
Reduced train costs				
Existing traffic	5.8	6.3	6.7	7.1
Generated traffic	0.3	0.3	0.3	0.4
Total benefits to longer distance users	6.0	6.6	7.0	7.5
Environmental benefits				
Increased container handling capacity	0.1	0.2	0.3	0.3
Longer trains - PN traffic	0.4	0.4	0.4	0.4
Longer trains - other traffic	1.2	1.3	1.4	1.5
Total environmental benefits	1.7	1.9	2.1	2.3
Crash reduction benefits				
Increased container handling capacity	0.0	0.1	0.2	0.3
Longer trains - PN traffic	0.3	0.3	0.3	0.3
Longer trains - other traffic	1.2	1.3	1.3	1.4
Total crash reduction benefits	1.5	1.7	1.9	2.0
Congestion benefits				
Increased container handling capacity	0.1	0.2	0.3	0.4
Longer trains - PN traffic	0.5	0.5	0.5	0.5
Longer trains - other traffic	1.8	1.9	2.1	2.2
Total congestion benefits	2.3	2.6	2.9	3.1
Total benefits				
Reduced costs	8.0	9.4	10.4	11.5
Environmental benefits	1.7	1.9	2.1	2.3
Crash cost reduction benefits	1.5	1.7	1.9	2.0
Congestion benefits	2.3	2.6	2.9	3.1
Total benefits	13.5	15.6	17.2	19.0

In summary, assuming the continuation of existing traffic trends, the provision of the new Regional Freight Hub would potentially generate quantified benefits to users and the community of about $13m per year in 2030, generally increasing from this to about $19m in 2062. Of these, about 20 per cent would represent the direct benefit in terms of costs savings to users in Palmerston North and the Manawatu-Whanganui region through increased container handling capacity and reductions in train costs and almost 40 per cent benefits to the wider community through reductions in environmental and safety costs and the reduction in congestion.

These figures do not take into account further measures to encourage the movement of freight by rail in support of the Government's policy to reduce the environmental and community costs of this traffic, and therefore may be regarded as representing the lower bound of the results which might eventuate over the future.

17. Manu-Retail-NES by Mode
2017/18

Start Row for this Commodity: 331 (In Mode Split Share sheets) Updated : 42907
Start Column for Road 2
Start Column for Rail 19
Start Column for Shipping 36

Total Road Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	1.54	0.25	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.00	0.00	1.85
	Auckland	0.77	38.81	2.54	0.53	0.20	0.53	0.58	1.42	1.14	0.12	0.06	0.36	0.05	0.20	47.33
	Waikato	0.01	0.80	3.57	0.16	0.00	0.01	0.01	0.01	0.02	0.00	0.00	0.06	0.00	0.00	4.66
	Bay of Plen	0.02	0.00	0.15	4.28	0.01	0.02	0.02	0.09	0.06	0.00	0.00	0.00	0.00	0.00	4.64
	Gisborne	0.00	0.03	0.00	0.03	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56
	Hawke's Ba	0.01	0.34	0.02	0.04	0.00	1.48	0.01	0.10	0.04	0.00	0.00	0.00	0.00	0.00	2.04
	Taranaki	0.00	0.22	0.01	0.05	0.00	0.00	0.96	0.01	0.01	0.00	0.00	0.03	0.00	0.00	1.28
	Manawatu	0.00	0.35	0.02	0.07	0.02	0.23	0.07	2.43	0.87	0.00	0.00	0.03	0.00	0.00	4.10
	Wellington	0.01	0.83	0.04	0.01	0.00	0.09	0.01	0.14	2.38	0.00	0.00	0.05	0.00	0.00	3.56
	TNM	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12	0.00	0.04	0.00	0.00	1.17
	West Coast	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.06	0.00	0.00	0.28
	Canterbury	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.66	0.13	12.99	0.66	0.30	15.32
	Otago	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.24	1.57	0.02	1.93
	Southland	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.18	0.00	1.34	1.63
	Total	2.36	42.35	6.36	5.18	0.73	2.37	1.66	4.24	4.54	1.91	0.40	14.09	2.29	1.87	90.35

Total Rail Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	Auckland	0.00	0.41	0.01	0.96	0.00	0.01	0.03	0.20	0.11	0.06	0.01	0.24	0.13	0.03	2.20
	Waikato	0.00	0.01	0.02	0.03	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.03	0.00	0.00	0.14
	Bay of Plen	0.00	1.37	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	1.43
	Gisborne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hawke's Ba	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.01	0.01	0.01	0.00	0.06	0.00	0.00	0.20
	Taranaki	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	Manawatu	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.05	0.01	0.00	0.00	0.01	0.00	0.00	0.14
	Wellington	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.08
	TNM	0.00	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.11
	West Coast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01
	Canterbury	0.00	0.13	0.02	0.00	0.00	0.01	0.00	0.02	0.04	0.01	0.01	0.14	0.09	0.04	0.52
	Otago	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.03	0.01	0.14
	Southland	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.05	0.11
	Total	0.03	2.17	0.07	1.04	0.00	0.14	0.04	0.30	0.22	0.10	0.02	0.61	0.27	0.13	5.15

	PN	Through		Average distance	Through	
Total SB through PN	0.92	0.21	0.71	843.70	513.03	945.46
Total NB though PN	0.44	0.06	0.38	843.72		
	0.48	0.27	0.54			

Total rail in	To MW	From MW	
From North	0.22	0.06	
From south	0.03	0.03	
From HB+T	0.01	0.01	
	0.25	0.09	0.34

Total Coastal Shipping Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Auckland	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.16	0.00	0.23	0.22	0.00	0.62
	Waikato	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bay of Plen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.22	0.03	0.00	0.26
	Gisborne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hawke's Ba	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	Taranaki	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Manawatu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Wellington	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.02
	TNM	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
	West Coast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Canterbury	0.00	0.06	0.00	0.08	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.19
	Otago	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.05
	Southland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.09	0.00	0.17	0.00	0.02	0.01	0.00	0.02	0.19	0.00	0.48	0.24	0.00	1.22

Total All Mode Movements

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	1.55	0.26	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.00	0.00	1.87
	Auckland	0.78	39.22	2.56	1.50	0.20	0.54	0.61	1.62	1.25	0.34	0.07	0.83	0.39	0.24	50.15
	Waikato	0.01	0.81	3.59	0.19	0.00	0.01	0.01	0.03	0.04	0.00	0.00	0.09	0.00	0.00	4.79
	Bay of Plen	0.02	1.38	0.15	4.30	0.01	0.03	0.02	0.09	0.06	0.01	0.00	0.24	0.03	0.00	6.34
	Gisborne	0.00	0.03	0.00	0.03	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.56
	Hawke's Ba	0.01	0.34	0.02	0.09	0.00	1.59	0.01	0.11	0.05	0.01	0.00	0.06	0.00	0.00	2.29
	Taranaki	0.00	0.23	0.01	0.06	0.00	0.00	0.96	0.01	0.01	0.00	0.00	0.03	0.00	0.00	1.32
	Manawatu	0.00	0.40	0.03	0.08	0.02	0.23	0.07	2.48	0.88	0.00	0.00	0.04	0.00	0.00	4.24
	Wellington	0.01	0.87	0.04	0.03	0.00	0.09	0.01	0.15	2.39	0.00	0.00	0.07	0.00	0.00	3.66
	TNM	0.00	0.10	0.00	0.02	0.00	0.00	0.00	0.00	0.00	1.12	0.00	0.05	0.00	0.00	1.31
	West Coast	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.07	0.00	0.00	0.30
	Canterbury	0.00	0.71	0.02	0.08	0.00	0.02	0.01	0.06	0.07	0.69	0.13	13.13	0.75	0.35	16.02
	Otago	0.00	0.14	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.31	1.60	0.03	2.12
	Southland	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.21	0.01	1.39	1.75
	Total	2.39	44.62	6.43	6.39	0.73	2.53	1.71	4.55	4.78	2.19	0.42	15.19	2.80	2.00	96.72

Total Road Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	1.64	0.27	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.00	0.00	1.98
	Auckland	0.85	44.03	2.85	0.59	0.22	0.55	0.63	1.52	1.25	0.13	0.07	0.41	0.05	0.21	53.36
	Waikato	0.01	0.88	3.82	0.17	0.00	0.01	0.01	0.02	0.02	0.00	0.00	0.07	0.00	0.00	5.01
	Bay of Plen	0.02	0.00	0.18	4.60	0.02	0.03	0.02	0.09	0.06	0.00	0.00	0.00	0.00	0.00	5.01
	Gisborne	0.00	0.03	0.00	0.03	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.58
	Hawke's Ba	0.01	0.37	0.02	0.05	0.00	1.57	0.01	0.13	0.05	0.00	0.00	0.00	0.00	0.00	2.20
	Taranaki	0.00	0.24	0.01	0.05	0.00	0.00	1.00	0.01	0.01	0.00	0.00	0.03	0.00	0.00	1.34
	Manawatu	0.00	0.37	0.03	0.08	0.02	0.23	0.07	2.50	0.91	0.00	0.00	0.03	0.00	0.00	4.24
	Wellington	0.01	0.89	0.04	0.01	0.00	0.09	0.01	0.15	2.53	0.00	0.00	0.06	0.00	0.00	3.78
	TNM	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	0.00	0.04	0.00	0.00	1.23
	West Coast	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.07	0.00	0.00	0.29
	Canterbury	0.00	0.56	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.70	0.13	14.36	0.71	0.31	16.83
	Otago	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.26	1.71	0.02	2.09
	Southland	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.19	0.00	1.40	1.72
	Total	2.54	47.86	6.95	5.59	0.77	2.49	1.76	4.44	4.84	2.03	0.41	15.56	2.47	1.94	99.67

Total Rail Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	Auckland	0.00	0.46	0.01	1.08	0.00	0.01	0.03	0.21	0.12	0.07	0.01	0.26	0.14	0.03	2.45
	Waikato	0.00	0.01	0.02	0.03	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.03	0.00	0.00	0.15
	Bay of Plen	0.00	1.82	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	1.88
	Gisborne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hawke's Ba	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.01	0.01	0.01	0.00	0.06	0.00	0.00	0.22
	Taranaki	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	Manawatu	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.05	0.01	0.00	0.00	0.01	0.00	0.00	0.15
	Wellington	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.09
	TNM	0.00	0.08	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.12
	West Coast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01
	Canterbury	0.00	0.15	0.02	0.00	0.00	0.01	0.00	0.02	0.04	0.02	0.01	0.16	0.09	0.04	0.56
	Otago	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.03	0.01	0.15
	Southland	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.05	0.12
	Total	0.03	2.70	0.07	1.17	0.00	0.15	0.05	0.32	0.23	0.10	0.03	0.68	0.29	0.14	5.95

	PN	Through
Total SB through PN	1.01	0.23	0.77
Total NB though PN	0.48	0.06	0.41

Total rail in	To MW	From MW	
From North	0.23	0.06	
From south	0.03	0.03	
From HB+T	0.01	0.01	
	0.27	0.10	0.37

Total Coastal Shipping Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Auckland	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.18	0.00	0.25	0.24	0.00	0.68
	Waikato	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bay of Plen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.24	0.03	0.00	0.28
	Gisborne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hawke's Ba	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
	Taranaki	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Manawatu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Wellington	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.03
	TNM	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
	West Coast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Canterbury	0.00	0.07	0.00	0.09	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.20
	Otago	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.05
	Southland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.10	0.00	0.18	0.00	0.02	0.01	0.00	0.02	0.20	0.00	0.53	0.27	0.00	1.33

Total All Mode Movements

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
	Northland	1.66	0.28	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.00	0.00	2.00
From:	Auckland	0.85	44.49	2.86	1.68	0.22	0.56	0.67	1.74	1.37	0.38	0.08	0.92	0.43	0.25	56.49
	Waikato	0.01	0.89	3.85	0.20	0.00	0.01	0.01	0.03	0.04	0.00	0.00	0.10	0.00	0.00	5.15
	Bay of Plen	0.02	1.82	0.18	4.63	0.02	0.03	0.02	0.09	0.06	0.01	0.00	0.26	0.03	0.00	7.17
	Gisborne	0.00	0.03	0.00	0.03	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.58
	Hawke's Ba	0.01	0.37	0.02	0.10	0.00	1.69	0.01	0.13	0.05	0.01	0.00	0.06	0.00	0.00	2.46
	Taranaki	0.00	0.25	0.01	0.06	0.00	0.00	1.00	0.01	0.01	0.00	0.00	0.03	0.00	0.00	1.39
	Manawatu	0.00	0.43	0.03	0.08	0.02	0.23	0.08	2.55	0.92	0.00	0.00	0.05	0.00	0.00	4.39
	Wellington	0.01	0.94	0.04	0.03	0.00	0.10	0.01	0.15	2.54	0.00	0.00	0.08	0.00	0.00	3.90
	TNM	0.00	0.11	0.00	0.02	0.00	0.00	0.00	0.00	0.00	1.18	0.00	0.06	0.00	0.00	1.38
	West Coast	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.07	0.00	0.00	0.30
	Canterbury	0.00	0.77	0.02	0.09	0.00	0.02	0.01	0.06	0.08	0.73	0.14	14.51	0.80	0.35	17.59
	Otago	0.00	0.15	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.34	1.74	0.03	2.30
	Southland	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.23	0.02	1.45	1.84
	Total	2.57	50.67	7.02	6.94	0.77	2.66	1.82	4.76	5.10	2.33	0.43	16.76	3.03	2.08	106.94

17. Manu-Retail-NES by Mode
2032/33

Total Road Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	1.78	0.30	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.00	0.00	2.15
	Auckland	0.96	51.98	3.32	0.69	0.24	0.58	0.72	1.68	1.41	0.14	0.07	0.47	0.06	0.22	62.54
	Waikato	0.01	0.99	4.21	0.19	0.00	0.01	0.01	0.02	0.02	0.00	0.00	0.08	0.00	0.00	5.54
	Bay of Plen	0.02	0.00	0.23	5.08	0.02	0.04	0.02	0.09	0.06	0.00	0.00	0.00	0.00	0.00	5.55
	Gisborne	0.00	0.04	0.00	0.04	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.61
	Hawke's Ba	0.01	0.41	0.02	0.05	0.00	1.71	0.01	0.16	0.05	0.00	0.00	0.00	0.00	0.00	2.42
	Taranaki	0.00	0.26	0.01	0.06	0.00	0.00	1.08	0.01	0.01	0.00	0.00	0.03	0.00	0.00	1.45
	Manawatu	0.00	0.41	0.03	0.09	0.03	0.23	0.08	2.59	0.97	0.00	0.00	0.03	0.00	0.00	4.44
	Wellington	0.01	0.98	0.04	0.01	0.00	0.10	0.01	0.15	2.76	0.00	0.00	0.06	0.00	0.00	4.13
	TNM	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.27	0.00	0.04	0.00	0.00	1.33
	West Coast	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.07	0.00	0.00	0.29
	Canterbury	0.00	0.62	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.76	0.14	16.33	0.77	0.31	19.01
	Otago	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.29	1.89	0.02	2.31
	Southland	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.21	0.00	1.49	1.84
	Total	2.79	56.24	7.86	6.21	0.82	2.68	1.93	4.73	5.31	2.20	0.42	17.68	2.72	2.05	113.62

Total Rail Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
	Auckland	0.00	0.55	0.02	1.25	0.00	0.01	0.04	0.24	0.13	0.08	0.01	0.30	0.16	0.04	2.82
	Waikato	0.00	0.01	0.03	0.03	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.03	0.00	0.00	0.16
	Bay of Plen	0.00	2.53	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	2.60
	Gisborne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hawke's Ba	0.00	0.01	0.00	0.00	0.00	0.13	0.00	0.01	0.01	0.01	0.00	0.07	0.00	0.00	0.24
	Taranaki	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	Manawatu	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.05	0.01	0.00	0.00	0.01	0.00	0.00	0.16
	Wellington	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.10
	TNM	0.00	0.09	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.13
	West Coast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01
	Canterbury	0.01	0.17	0.02	0.00	0.00	0.01	0.00	0.02	0.05	0.02	0.01	0.18	0.10	0.04	0.62
	Otago	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.03	0.01	0.17
	Southland	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.05	0.13
	Total	0.03	3.54	0.08	1.35	0.00	0.16	0.05	0.35	0.26	0.12	0.03	0.77	0.32	0.14	7.19

	PN	Through
Total SB through PN	1.13	0.26	0.87
Total NB though PN	0.53	0.07	0.46

Total rail in	To MW	From MW	
From North	0.26	0.07	
From south	0.03	0.03	
From HB+T	0.01	0.01	
	0.29	0.10	0.40

Total Coastal Shipping Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Auckland	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.20	0.00	0.29	0.26	0.00	0.77
	Waikato	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bay of Plen	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.26	0.03	0.00	0.30
	Gisborne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hawke's Ba	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
	Taranaki	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Manawatu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Wellington	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.03
	TNM	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
	West Coast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Canterbury	0.00	0.08	0.00	0.10	0.00	0.01	0.01	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.22
	Otago	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.06
	Southland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.12	0.00	0.20	0.00	0.02	0.01	0.00	0.03	0.23	0.00	0.59	0.30	0.00	1.48

Total All Mode Movements

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
	Northland	1.80	0.30	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.00	0.00	2.18
From:	Auckland	0.96	52.52	3.33	1.95	0.24	0.60	0.75	1.91	1.55	0.42	0.08	1.07	0.48	0.26	66.14
	Waikato	0.01	1.00	4.23	0.23	0.00	0.01	0.01	0.03	0.05	0.00	0.00	0.11	0.00	0.00	5.70
	Bay of Plen	0.02	2.54	0.23	5.10	0.02	0.04	0.02	0.09	0.07	0.01	0.00	0.28	0.03	0.00	8.45
	Gisborne	0.00	0.04	0.00	0.04	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.61
	Hawke's Ba	0.01	0.42	0.02	0.11	0.00	1.83	0.01	0.17	0.06	0.01	0.00	0.07	0.00	0.00	2.71
	Taranaki	0.00	0.27	0.01	0.07	0.00	0.00	1.08	0.01	0.01	0.00	0.00	0.04	0.00	0.00	1.50
	Manawatu	0.00	0.47	0.03	0.09	0.03	0.23	0.08	2.64	0.98	0.00	0.00	0.05	0.00	0.00	4.60
	Wellington	0.01	1.03	0.04	0.03	0.00	0.11	0.01	0.16	2.77	0.00	0.00	0.08	0.00	0.00	4.25
	TNM	0.00	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	1.27	0.00	0.06	0.00	0.00	1.49
	West Coast	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.08	0.00	0.00	0.31
	Canterbury	0.01	0.87	0.02	0.10	0.00	0.02	0.01	0.06	0.09	0.80	0.14	16.51	0.87	0.36	19.86
	Otago	0.00	0.17	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.37	1.92	0.03	2.54
	Southland	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.25	0.02	1.54	1.97
	Total	2.82	59.89	7.94	7.76	0.82	2.86	1.99	5.08	5.59	2.54	0.44	19.03	3.33	2.19	122.30

17. Manu-Retail-NES by Mode
2042/43

Total Road Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	1.88	0.32	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.05	0.00	0.00	2.28
	Auckland	1.04	58.49	3.71	0.77	0.26	0.61	0.78	1.79	1.54	0.16	0.08	0.53	0.07	0.23	70.05
	Waikato	0.01	1.08	4.51	0.21	0.00	0.01	0.01	0.02	0.02	0.00	0.00	0.08	0.00	0.00	5.96
	Bay of Plen	0.02	0.00	0.27	5.44	0.02	0.04	0.02	0.09	0.06	0.00	0.00	0.00	0.00	0.00	5.97
	Gisborne	0.00	0.04	0.00	0.04	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.62
	Hawke's Ba	0.01	0.44	0.02	0.06	0.00	1.80	0.01	0.19	0.05	0.00	0.00	0.00	0.00	0.00	2.57
	Taranaki	0.00	0.28	0.01	0.06	0.00	0.00	1.13	0.01	0.01	0.00	0.00	0.03	0.00	0.00	1.53
	Manawatu	0.00	0.43	0.03	0.09	0.03	0.23	0.08	2.63	1.01	0.00	0.00	0.04	0.00	0.00	4.55
	Wellington	0.01	1.04	0.04	0.01	0.00	0.11	0.01	0.15	2.95	0.00	0.00	0.07	0.00	0.00	4.40
	TNM	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33	0.00	0.05	0.00	0.00	1.39
	West Coast	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.07	0.00	0.00	0.29
	Canterbury	0.00	0.68	0.00	0.00	0.00	0.00	0.00	0.05	0.03	0.81	0.14	17.99	0.82	0.32	20.83
	Otago	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.31	2.03	0.02	2.49
	Southland	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.23	0.00	1.54	1.92
	Total	2.98	63.07	8.60	6.68	0.85	2.80	2.06	4.92	5.67	2.31	0.42	19.45	2.92	2.11	124.85

Total Rail Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total Exports by Sourc
From:	Northland	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
	Auckland	0.00	0.62	0.02	1.40	0.00	0.01	0.04	0.25	0.14	0.08	0.01	0.34	0.17	0.04	3.13
	Waikato	0.00	0.01	0.03	0.04	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.04	0.00	0.00	0.17
	Bay of Plen	0.00	3.16	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	3.23
	Gisborne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hawke's Ba	0.00	0.01	0.00	0.00	0.00	0.13	0.00	0.01	0.01	0.01	0.00	0.08	0.00	0.00	0.25
	Taranaki	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.04
	Manawatu	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.05	0.01	0.00	0.00	0.02	0.00	0.00	0.16
	Wellington	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.02	0.00	0.00	0.10
	TNM	0.00	0.09	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.14
	West Coast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01
	Canterbury	0.01	0.18	0.02	0.00	0.00	0.01	0.00	0.02	0.05	0.02	0.01	0.20	0.11	0.05	0.67
	Otago	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.04	0.01	0.18
	Southland	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.05	0.13
	Total	0.03	4.27	0.09	1.51	0.00	0.17	0.05	0.37	0.28	0.12	0.03	0.84	0.34	0.15	8.25

	PN	Through
Total SB through PN	1.22	0.27	0.95
Total NB though PN	0.56	0.07	0.49

Total rail in	To MW	From MW
From North	0.27	0.07
From south	0.03	0.03
From HB+T	0.01	0.01
	0.31	0.11	0.42

Total Coastal Shipping Movement

		To Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Auckland	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.22	0.00	0.33	0.29	0.00	0.85
	Waikato	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bay of Plen	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.27	0.03	0.00	0.32
	Gisborne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hawke's Ba	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
	Taranaki	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Manawatu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Wellington	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.03
	TNM	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	West Coast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Canterbury	0.00	0.08	0.00	0.11	0.00	0.01	0.01	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.24
	Otago	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.06
	Southland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.13	0.00	0.22	0.00	0.02	0.01	0.00	0.03	0.24	0.00	0.64	0.32	0.00	1.61

Total All Mode Movements

		To Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
	Northland	1.90	0.33	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.05	0.00	0.00	2.30
From:	Auckland	1.04	59.11	3.73	2.18	0.26	0.62	0.82	2.04	1.69	0.46	0.09	1.19	0.53	0.27	74.02
	Waikato	0.01	1.09	4.54	0.25	0.00	0.01	0.01	0.03	0.05	0.00	0.00	0.12	0.00	0.00	6.13
	Bay of Plen	0.02	3.17	0.27	5.47	0.02	0.05	0.02	0.09	0.07	0.01	0.00	0.30	0.03	0.00	9.52
	Gisborne	0.00	0.04	0.00	0.04	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.62
	Hawke's Ba	0.01	0.45	0.02	0.12	0.00	1.93	0.01	0.20	0.06	0.01	0.00	0.08	0.00	0.00	2.88
	Taranaki	0.00	0.29	0.01	0.07	0.00	0.00	1.14	0.01	0.01	0.00	0.00	0.04	0.00	0.00	1.58
	Manawatu	0.00	0.49	0.03	0.09	0.03	0.23	0.08	2.68	1.02	0.00	0.00	0.05	0.00	0.00	4.72
	Wellington	0.01	1.10	0.04	0.03	0.00	0.11	0.01	0.16	2.96	0.00	0.00	0.09	0.00	0.00	4.53
	TNM	0.00	0.13	0.00	0.03	0.00	0.00	0.00	0.00	0.00	1.33	0.00	0.07	0.00	0.00	1.56
	West Coast	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.08	0.00	0.00	0.30
	Canterbury	0.01	0.94	0.02	0.11	0.00	0.02	0.01	0.07	0.09	0.84	0.15	18.19	0.93	0.36	21.74
	Otago	0.00	0.18	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.40	2.07	0.03	2.73
	Southland	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.27	0.02	1.59	2.05
	Total	3.01	67.47	8.68	8.41	0.85	2.99	2.12	5.29	5.98	2.68	0.45	20.93	3.58	2.26	134.70

17. Manu-Retail-NES by Mode
2052/53

Total Road Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	1.95	0.34	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.05	0.00	0.00	2.37
	Auckland	1.11	64.26	4.04	0.84	0.28	0.62	0.84	1.88	1.65	0.17	0.08	0.57	0.07	0.24	76.64
	Waikato	0.01	1.15	4.76	0.22	0.00	0.01	0.01	0.02	0.02	0.00	0.00	0.09	0.00	0.00	6.30
	Bay of Plen	0.02	0.00	0.30	5.74	0.03	0.05	0.02	0.09	0.07	0.00	0.00	0.00	0.00	0.00	6.31
	Gisborne	0.00	0.04	0.00	0.04	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.63
	Hawke's Ba	0.01	0.46	0.02	0.06	0.00	1.85	0.01	0.21	0.05	0.00	0.00	0.00	0.00	0.00	2.68
	Taranaki	0.00	0.29	0.01	0.06	0.00	0.00	1.18	0.01	0.01	0.00	0.00	0.03	0.00	0.00	1.60
	Manawatu	0.00	0.45	0.03	0.09	0.03	0.22	0.08	2.63	1.03	0.00	0.00	0.04	0.00	0.00	4.61
	Wellington	0.01	1.09	0.05	0.01	0.00	0.11	0.01	0.16	3.09	0.00	0.00	0.07	0.00	0.00	4.60
	TNM	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.37	0.00	0.05	0.00	0.00	1.43
	West Coast	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.08	0.00	0.00	0.28
	Canterbury	0.00	0.72	0.00	0.00	0.00	0.00	0.00	0.05	0.03	0.84	0.14	19.43	0.86	0.32	22.39
	Otago	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.33	2.15	0.02	2.63
	Southland	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.24	0.00	1.57	1.96
	Total	3.12	69.09	9.22	7.08	0.87	2.88	2.16	5.04	5.96	2.39	0.41	20.98	3.08	2.15	134.43

Total Rail Movement

		To: Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total Exports by Sourc
From:	Northland	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
	Auckland	0.00	0.68	0.02	1.53	0.00	0.01	0.04	0.26	0.15	0.09	0.01	0.37	0.19	0.04	3.39
	Waikato	0.00	0.01	0.03	0.04	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.04	0.00	0.00	0.18
	Bay of Plen	0.00	3.73	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	3.80
	Gisborne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hawke's Ba	0.00	0.01	0.00	0.00	0.00	0.14	0.00	0.01	0.01	0.01	0.00	0.08	0.00	0.00	0.26
	Taranaki	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.05
	Manawatu	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.05	0.01	0.00	0.00	0.02	0.00	0.00	0.17
	Wellington	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.02	0.00	0.00	0.11
	TNM	0.00	0.10	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.14
	West Coast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01
	Canterbury	0.01	0.19	0.02	0.01	0.00	0.01	0.00	0.02	0.05	0.02	0.01	0.21	0.11	0.05	0.71
	Otago	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.01	0.19
	Southland	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.02	0.05	0.14
	Total	0.03	4.93	0.09	1.64	0.00	0.18	0.06	0.38	0.29	0.13	0.03	0.90	0.36	0.15	9.17

	PN	Through
Total SB through PN	1.31	0.28	1.02
Total NB though PN	0.59	0.07	0.52
	0.46	0.26	0.51

Total rail in	To MW	From MW	
From North	0.28	0.07	
From south	0.03	0.03	
From HB+T	0.01	0.01	
	0.33	0.11	0.44

Total Coastal Shipping Movement

		To Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
From:	Northland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Auckland	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.23	0.00	0.36	0.31	0.00	0.91
	Waikato	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bay of Plen	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.29	0.03	0.00	0.34
	Gisborne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hawke's Ba	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
	Taranaki	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Manawatu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Wellington	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.03
	TNM	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	West Coast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Canterbury	0.00	0.09	0.00	0.11	0.00	0.01	0.01	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.26
	Otago	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.06
	Southland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.14	0.00	0.23	0.00	0.02	0.01	0.00	0.03	0.26	0.00	0.69	0.34	0.00	1.71

Total All Mode Movements

		To Northland	Auckland	Waikato	Bay of Plen	Gisborne	Hawke's Ba	Taranaki	Manawatu	Wellington	TNM	West Coast	Canterbury	Otago	Southland	Total
	Northland	1.97	0.34	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.05	0.00	0.00	2.40
From:	Auckland	1.11	64.94	4.07	2.37	0.28	0.64	0.88	2.14	1.81	0.48	0.09	1.30	0.56	0.28	80.94
	Waikato	0.01	1.17	4.79	0.27	0.00	0.01	0.02	0.04	0.05	0.00	0.00	0.13	0.00	0.00	6.49
	Bay of Plen	0.02	3.74	0.31	5.77	0.03	0.05	0.02	0.10	0.07	0.01	0.00	0.32	0.03	0.00	10.46
	Gisborne	0.00	0.04	0.00	0.04	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.63
	Hawke's Ba	0.01	0.47	0.02	0.12	0.00	1.99	0.01	0.22	0.06	0.01	0.00	0.08	0.00	0.00	3.00
	Taranaki	0.00	0.31	0.01	0.08	0.00	0.00	1.18	0.01	0.02	0.00	0.00	0.04	0.00	0.00	1.65
	Manawatu	0.01	0.51	0.03	0.10	0.03	0.23	0.09	2.68	1.04	0.00	0.00	0.05	0.00	0.00	4.77
	Wellington	0.01	1.15	0.05	0.04	0.00	0.12	0.02	0.16	3.10	0.00	0.00	0.10	0.00	0.00	4.74
	TNM	0.00	0.13	0.00	0.03	0.00	0.00	0.00	0.00	0.00	1.37	0.00	0.07	0.00	0.00	1.61
	West Coast	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.08	0.00	0.00	0.30
	Canterbury	0.01	1.00	0.02	0.12	0.00	0.02	0.01	0.07	0.10	0.87	0.15	19.64	0.97	0.36	23.35
	Otago	0.00	0.19	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.42	2.19	0.03	2.88
	Southland	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.28	0.02	1.62	2.10
	Total	3.15	74.15	9.32	8.95	0.87	3.07	2.23	5.42	6.28	2.78	0.44	22.56	3.78	2.30	145.31

Assumptions (GDP and pop)

Assumed New Zealand Population

Fiscal Year - Red=Actual, Blue=Projection

	2012/13	2017/18	2022/23	2027/28	2032/33	2037/38	2042/43	2047/48	2052/53	Growth 2017/18 to 2052/53
Northland region	164700	176100	183300	188600	192500	195100	196700	197633	197938	1.124
Auckland region	1493200	1699900	1859300	1990100	2112000	2222700	2326200	2426169	2522380	1.484
Waikato region	424600	467200	493500	514600	533000	548500	562100	574061	584411	1.251
Bay of Plenty region	279700	303500	318400	329800	339400	346900	353100	358178	362173	1.193
Gisborne region	47000	48500	49400	50000	50300	50200	49900	49432	48812	1.006
Hawke's Bay region	158000	164100	167400	169900	171200	171400	170800	169618	167909	1.023
Taranaki region	113600	119100	122500	125500	127800	129500	130800	131660	132104	1.109
Manawatu-Wanganui region	231200	240500	244600	247500	248900	248800	247600	245561	242763	1.009
Wellington region	486700	515200	532500	546200	557400	565600	571300	575078	577039	1.120
TMN	142200	149100	153600	157000	159400	160700	161000	160755	160007	1.073
West Coast region	33000	32500	32500	32300	31900	31300	30600	29813	28954	0.891
Canterbury region	562900	623200	664200	694300	721700	745800	767300	786712	804048	1.290
Otago region	208800	225800	236000	242700	248300	252700	256100	258656	260405	1.153
Southland region	96000	99200	100100	100600	100600	100000	99000	97674	96059	0.968
Total, New Zealand by region	4441600	4863900	5157300	5389100	5594400	5769200	5922500	6061000	6185000	1.272

Assumed New Zealand Real GDP - Million 2009 NZ Dollars

Fiscal Year - Red=Actual, Blue=Projection

	2012/13	2017/18	2022/23	2027/28	2032/33	2037/38	2042/43	2047/48	2052/53	
Northland	5126	6006	6795	7509	8200	8923	9701	10515	11303	1.882
Auckland	74067	91702	109030	125339	142313	160790	181468	204181	227832	2.484
Waikato	17523	20425	23452	26265	29106	32155	35536	39152	42778	2.094
Bay of Plenty	10837	12340	14073	15656	17237	18914	20761	22719	24656	1.998
Gisborne	1495	1670	1849	2010	2163	2318	2484	2655	2814	1.685
Hawke’s Bay	5951	6562	7276	7932	8551	9191	9876	10581	11242	1.713
Taranaki	8299	8473	9474	10424	11357	12355	13457	14613	15737	1.857
Manawatu	8256	9079	10038	10909	11737	12595	13517	14462	15345	1.690
Wellington	28562	32215	36195	39874	43536	47426	51659	56098	60414	1.875
TNM	5823	6711	7516	8251	8962	9700	10480	11289	12059	1.797
West Coast	1513	1486	1615	1724	1822	1919	2023	2127	2217	1.492
Canterbury	26668	32216	37324	41904	46602	51700	57360	63446	69595	2.160
Otago	8889	10263	11661	12879	14097	15403	16833	18341	19818	1.931
Southland	4699	5025	5512	5950	6366	6793	7252	7719	8148	1.621
Total - All Regions	207709	244174	281810	316626	352050	390182	432409	477897	523956	2.146

Assumed World Real GDP - Billion 2010 US Dollars at Purchasing Power Parity

	2012/13	2017/18	2022/23	2027/28	2032/33	2037/38	2042/43	2047/48	2052/53
	Fiscal Year - Red=Actual, Blue=Projection								
World	79155.83	94023.02	111318.9	128436	146732.4	165879.7	185852	206988.2	229772.1

source: OECD Economic Outlook No 103 - July 2018 - Long-term baseline projections
https://stats.oecd.org/Index.aspx?DataSetCode=EO103_LTB#

Question 3 : Appendix A, section 3 of Attachment 8a to the s92 response states that "the introduction of [longer trains] has only been considered at a conceptual level and for capacity reasons they may not be required until the latter half of the century, unless demand for rail increases faster than expected". We understand the modelling has assumed the benefits of longer trains will be realised from 2032. Please calculate the economic benefits based on 1500m long trains being introduced post 2050.

The benefits set out in Appendix A Section 3 assume as a possible hypothetical case that the benefits of longer trains will be realised from 2030 concurrently with the provision of the additional container handling capacity. If however this element is delayed until 2050, the benefits evaluated over the 60 year period from 2030 to 2090 would be reduced to about $190m reflecting the exclusion of the benefits in earlier years. The streams of benefits illustrating this are set out in Table 1.

Table 1
Benefit profiles for Regional Freight Hub ($m)

	Total Benefits - expanded container terminal and longer trains from 2030 ($m)	Benefits with longer trains delayed until 2050	
Year		Benefits from expanded container terminal from 2030 ($m)	Benefits from longer trains from 2050 ($m)
2030	13.1	0.3	
2031	13.3	0.4	
2032	13.5	0.5	
2033	13.7	0.6	
2034	13.9	0.7	
2035	14.1	0.8	
2036	14.3	1.0	
2037	14.6	1.1	
2038	14.8	1.2	
2039	15.0	1.3	
2040	15.2	1.4	
2041	15.4	1.5	
2042	15.6	1.6	
2043	15.8	1.7	
2044	15.9	1.7	
2045	16.1	1.8	
2046	16.3	1.9	
2047	16.4	2.0	
2048	16.6	2.0	
2049	16.8	2.1	
2050	16.9	2.2	14.7
2051	17.1	2.3	14.8
2052	17.2	2.4	14.9
2053	17.4	2.4	15.0
2054	17.6	2.5	15.1
2055	17.8	2.6	15.2
2056	17.9	2.7	15.3
2057	18.1	2.8	15.4
2058	18.3	2.8	15.4
2059	18.5	2.9	15.5
2060	18.6	3.0	15.6
2061	18.8	3.1	15.7
2062	19.0	3.2	15.8
2063	19.1	3.2	15.9
2064	19.3	3.3	16.0
2065	19.5	3.4	16.1
2066	19.7	3.5	16.2
2067	19.8	3.6	16.3
2068	20.0	3.6	16.4
2069	20.2	3.7	16.5
2070	20.4	3.8	16.5
2071	20.5	3.9	16.6

2072	20.7	4.0	16.7
2073	20.9	4.0	16.8
2074	21.0	4.1	16.9
2075	21.2	4.2	17.0
2076	21.4	4.3	17.1
2077	21.6	4.4	17.2
2078	21.7	4.5	17.3
2079	21.9	4.5	17.4
2080	22.1	4.6	17.5
2081	22.3	4.7	17.6
2082	22.4	4.8	17.6
2083	22.6	4.9	17.7
2084	22.8	4.9	17.8
2085	22.9	5.0	17.9
2086	23.1	5.1	18.0
2087	23.3	5.2	18.1
2088	23.5	5.3	18.2
2089	23.6	5.3	18.3
Total	1111	176	660
NPV at 4%	376	46	**145**
Total benefits with Container facility from 2030 and longer trains from 2050			**191**

It should be noted that KiwiRail are actively considering the use of larger trains which while not as large as 1500m would still be constrained by the capacity of the Existing Freight Yard. For example, the Freight Hub will enable benefits from trains longer than 900m the demand for which may arise even where 1500m long trains are delayed until 2050. As a result, while the full benefits from extending trains to 1500m may not be achieved immediately on the opening of the new facility, benefits from longer trains could be achieved at a much earlier date than 2050.

Question 2: Please provide justification for the assumption that the introduction of longer trains would reduce operating costs by 10%, as stated in Appendix A of Attachment 8a to KiwiRail's s92 response.

While this question is asked, and answered, in terms of cost savings, in reality these are better conceived of as efficiencies, as savings are likely to be reinvested in the operation (or reduced freight rates), allowing growth in the use of rail.

Trains can benefit from economies of scale as they get heavier. The marginal tonne added to an existing train will cost less to haul than the average tonne on the train. In New Zealand, the loading gauge and axle load limit in existing infrastructure restricts the additional amount that can be carried on an individual wagon. For example, tunnels and overbridges (and the track gauge) mean that double-stacking of containers on a wagon, a technique used successfully in the US and Australia, cannot be used here to increase train weight. Given the constraints of wagon height and track gauge in New Zealand, the way to make trains heavier is to add more wagons, i.e. run longer trains.

At present the de facto limit (through crossing siding lengths) is 900m.[1] 1500m is a 67% increase on 900m. Therefore for every five 900m trains, only three would be required at 1500m, a saving of 40% of the trains. During the week (7 days), about 67 trains run through the Palmerston North - Hamilton section,[2] so a saving of this nature is feasible. If all were currently 900m long and in future 1500m, only 40 trains would be required per week. As well as cost savings, the improvements in efficiency will create more capacity on the route for future growth, both reflecting the background growth in freight demand and also moves by the government and users to increase the share of rail to achieve the environmental benefits.

Running a train incurs direct operating costs for fuel, other operating costs, and wagon and locomotive maintenance. Of these, savings from longer trains are unlikely in the maintenance area, as these costs are likely to be linear with volume (and not affected by how that volume is organised). That leaves efficiencies in fuel and other operating costs.

Other operating efficiencies

With fewer trains there will be other operating efficiencies, meaning these costs will be 40% lower. On the basis of the direct costs, these costs make up 30%. Reducing them by 40% would save 12% overall in direct operating costs.

Fuel cost savings

Fuel costs are not linear with train weight, as for much of the journey the locomotive is not working hard, and may be idling. On the steepest sections the fuel use will be closer to a direct relationship with changes in the load, but these are not a high proportion of the route.[3] In the UK, a recent report noted:

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1 The likely section to use 1500m trains is north of Palmerston North, not south. 69% of crossing loops on the Palmerston North - Hamilton section are 900m or more long. The longest is currently 998m, but two loops at Taumarunui could be used end to end to give a potential 2100m length.

2 As at 15 November 2020. Includes trains between Auckland and Palmerston North, Auckland and Wellington, and Tauranga and Palmerston North (in both directions). Does not include trains travelling only part of the Palmerston North – Hamilton route, which serve particular industrial sites.

3 About 10% of the route southbound has grades steeper than 1 in 70. Southbound is the critical direction.

> Heavier freight trips have lower emissions per tonne-mile for all three pollutants. There is strong evidence that heavier freight loadings are more fuel and emissions efficient. Heavier (longer) freight trains are more emissions efficient which assists cases for potential infrastructure improvements to permit longer freight trains where not limited by available traction power or gradients on routes but by other features such as passing loop length or siding length at origin or destination.[4]

A recent New Zealand study gives a quantification of the fuel saving. It notes as an emission reduction opportunity "operate longer trains as standard to minimise fuel use/tonne of freight". It assumes a 9% reduction in fuel use is available for 50% of the fleet.[5] The study concludes as a "key take away" that "increased utilisation and lengthened trains will drive reduced carbon intensity of freight movements."

The 50% availability means that on half of the routes, longer trains are not feasible because there is not the traffic to sustain them. That is not the case for the NIMT north of Palmerston North because this is a high demand route with more traffic and so it is reasonable to assume that the NIMT north of Palmerston North will benefit from a 9% reduction in fuel use from longer trains. This saving is based on a train length increase of 25%, rather than 67% (which is the increase of 900m to 1500m), making the number conservative in this context. On that basis the benefits realised by 1500m trains have the potential to be higher than this in terms of fuel efficiency.

The New Zealand study worked on a relationship between fuel and load (length) of 6% increase in fuel use for a 10% increase in load (using the formula of fuel use in watt hours per kilometre=315*weight to the power of 0.6, derived from an international study).[6] Applying this to an increase of length from 900 to 1500m (and assuming constant weight per metre) shows a saving of approximately 18%.

The data in Figure 48 of the UK report (reproduced below) show approximately a 25% reduction in CO_2 (and hence fuel) for a train weight increase from 1500t to 2500t, ie 67%.

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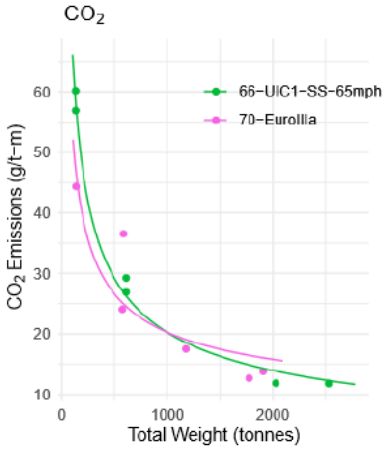
4 G Mansell, R Brook, N Grennan-Heaven and M Gibbs *CLEAR: Fleet-Wide Assessment of Rail Emissions Factors; Emissions Scenarios Report,* London, Rail Safety and Standards Board, 2020, p 71

5 D Taylor, C Comendant, T Stevenson *Low carbon freight pathway,* Sustainable Business Council, Wellington, 2020, pp 31-34.

6 D Taylor, Deta Consulting, pers com; Institute for Energy and Environmental Research, "Energy savings by light-weighting; Final Report" Heidelberg 2003, p 36. The use of 6% fuel increase for 10% load increase may be conservative: the report also notes 5% in the context of North American freight trains (pp 36, 42). We have discussed the use of and extension to Taylor's work with him.



This is higher than the fuel savings estimated by the New Zealand study and is considered as an upper range of the potential fuel saving efficiencies for larger trains.

In terms of fuel costs as a proportion of operating costs, the fuel accounts for 33% of the direct train operating costs. Saving 9% would mean a saving on direct costs of 3%, and an 18% saving in fuel would save 6% of direct costs. 25% would save 8%.

This means that the fuel and the other operating efficiencies provide a total saving of between 15 - 20%.

This is a reasonable expression of the savings (what is saved from actually operating fewer, longer trains). When considering the overall cost of moving freight by rail on the Palmerston North - Hamilton section, including for example the cost of sales, of planning, and terminals that need to be added, the overall saving could be between approximately 9-12% of the total operating costs.

Memorandum

To:	Pam Butler (KiwiRail)	From:	Fraser Colegrave
Date:	Monday, 24 May 2021	Page:	2 (including this page)
Subject:	Response to Third Further Information Request for Regional Freight Hub		

This memorandum responds to questions four and five in the third further information request for the proposed regional freight hub (Freight Hub) in Palmerston North dated 7 May 2021.

Question Four: Please provide estimated construction costs that inform the estimated economic impacts of construction provided in section 4 of Attachment 8b to KiwiRail's section 92 response.

with the following estimates of construction costs were obtained from KiwiRail. This was based on the activities required to prepare the site for future development. The table below summarises this information.

Table 1: One-off Construction and Development Costs Supplied by KiwiRail

Item	Hub Development Areas	Area (hectares)	Investment ($M)
1	Arrival/Departure Yard	4.5	$79.20
2	Marshalling Yard	20.0	$283.10
3	Wagon Storage Yard	1.2	$20.30
4	Container Terminal	15.1	$150.70
5	Rail Facilities: RSAS & Network Services	16.6	$193.30
6	Freight Forwarding Sidings:		
6.1	- Prime Facilities	10.6	$151.40
6.2	- Secondary Facilities	7.8	$107.80
7	Log Loadings	2.9	$30.30
8	Common Areas (incl. enabling works)	98.3	
	TOTAL	**177.0**	**$1,016.10**

As explained in section 4 of "*Responses to Economic Matters Raised in Section 92 Request for Proposed Regional Freight Hub*" dated 15 February 2021 (Attachment 8B of the first further Information request), I mapped these expenditures to sectors of the north island economy based on my understanding of the underlying works for the Freight Hub. Following this, I calculated the associated economic impacts by overlaying the corresponding multipliers. The resulting estimates of economic impact are set out in tables 2 and 3 of that report.

These figures are approximate, and final figures will be influenced by various factors such as detailed design, site conditions, labour and material prices, and availability.

Question Five: A figure of 1,000 jobs is cited on page 13 of Attachment 8b to KiwiRail's section 92 response. It is not clear what this relates to (e.g. whether this is the amount of jobs at the existing rail yard, at the new rail yard, or the expected difference between the two). To clarify, please

provide the number of FTE's employed at the existing rail yard and an estimate of the number of FTE's expected to be employed at the new facility once fully operational.

The following indicative estimates of likely future employment at the proposed Freight Hub were obtained from KiwiRail. These estimates were based on (i) current employment at the existing freight yard at Tremaine Avenue, and (ii) the scope for greater employment facilitated by the proposed new Freight Hub's larger footprint. The table below summarises that information.

Table 2: KiwiRail Actual and Projected Future Employment (including Partners)

Existing Employment at Tremaine Avenue	**Employees**
Tenant 1	100
Tenant 2	43
Tenant 3	95
KiwiRail - Tremaine Avenue	305
Total	**543**
Projected Future Employment - Stage 1	
Freight partners	280
KiwiRail (based on Tremaine Avenue)	305
Total	**585**
Projected Future Employment - All Stages	
Freight partners	700
KiwiRail	305
Total	**1005**

Table 2 shows that there are currently 543 people employed at the existing freight yard in Tremaine Avenue, 305 of which are KiwiRail workers, and the rest of which are employed by freight partners. Total employment is projected to increase to 585 in stage 1 of the Freight Hub, and just over 1,000 at completion. However, as noted in my previous report, this may be conservative because it does not allow for any increase in KiwiRail employment requirements as the Freight Hub reaches its full operating capacity, and so there is potential for this figure to be significantly higher.

Question 6: Please clarify and/or provide additional information regarding the design requirement to accommodate trains of 1,500 m in length, including:

a. whether there has been any planning to increase network capacity to accommodate trains longer than 900 m beyond the Palmerston North Terminal.

There are both planning and physical works being undertaken to develop track and technology to achieve train lengths greater than 900m. KiwiRail's business planning is focussed on growing the capacity and resilience of the railway network (one component of which will be the Freight Hub). Examples of enhancements across the network range from:

- triple tracking in the Auckland metro network to provide for both freight and passenger service movements;
- double tracking in Wellington metro;
- bridge replacements;
- crossing loops; and
- easing curves throughout the network.

Any projects to improve the rail network should consider maximise opportunities to extend capacity as part of their implementation. The PGF funding for the Freight Hub is one component of a broader company-wide long-term strategy to improve the resilience and capacity of the national rail network.

Key operational objectives of enabling longer trains include:

- taking advantage of the economies of scale of running bigger trains (which have a lower unit cost per tonne);
- increasing rail's competitive advantage over other transport modes;
- future proofing major infrastructure developments for growth;
- adding network capacity/flexibility; and
- reducing New Zealand's carbon emissions from transport.

The circumstances that will enable KiwiRail to operate trains longer than 900m in the Central North Island are:

- demand due to high levels of freight traffic;
- long enough tracks at freight yards and/or hubs;
- long crossing loops. 70% of the crossing loops between Palmerston North and Hamilton are 900m long or more. The NIMT currently has 13 loops that are more than 900m long between Wellington and Hamilton. Some parts of the rail network have crossing loops even higher than this. For example, Kawerau has a departure loop of 1456m;
- north of Hamilton and south of Waikanae the routes are largely double tracked, which can easily accommodate 1500m trains or longer; and
- more powerful locomotives.

For rolling stock, as couplings are now stronger, further weight can be added to the train without the trains being pulled apart by the locomotive. Currently the maximum weight of a train on the NIMT is 1700t. An increase is being investigated, to 2000t, which is an 18% increase. If that were applied to the current 900m length (all other things being equal), a length of 1060m would result. The latest announcement about improvements to the Hillside workshops to manufacture more wagons are also part of growing rail's capacity to haul more and heavier loads – including on longer trains. This demonstrates that trains longer than 900m are capable of being developed as technology improves and broader upgrades are made, and KiwiRail must enable capacity for up to 1500m trains to future proof the rail network.

KiwiRail does not have any internal organisational or operational constraints that prevent it from operating trains longer than 900m, but there are a number of operating standards that must be updated and physical corridor limitations which must be addressed to achieve better network interoperability. These include:

- Total length (1200m) of trains are restricted by current standards (Railway Operating Code) regarding the weight in descending challenging gradients. The technology already exists to provide for this but is yet to be implemented in New Zealand.
- Regional network bottlenecks (such as areas with steep gradients and curves), but corridor upgrades are consistently sought to address these issues. Other solutions to address bottle necks include improving train power and the distribution of that power across the length of the train.

KiwiRail expects further incremental extensions in train length over the life of the Freight Hub. For example, trains south of Blenheim (with much the same freight as moves through Palmerston North) already have had their load increased to 2100t. As well, loops at Taumarunui could already cross two opposing 1500m trains. As crossing sidings become too short, then it is usually relatively simple and cheap to extend them. It is much more expensive, if indeed possible, to increase the length of existing terminal hubs, such as the Existing Freight Yard, which is why the construction of the Freight Hub should provide for future capacity when it is constructed.

b. a rationale for why the requirement to accommodate trains 1,500 m long is reasonably necessary, in relation to the Project objectives.

The requirements under the RMA

When the Council is making its recommendation under section 171(1)(c), it must have particular regard to whether the works and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought.

The need to accommodate 1,500 m long trains has informed the works required and the Designation Extent. However, the Council is not required to determine whether the accommodation of 1,500 m long trains is reasonably necessary in its assessment under section 171.

In response to this question KiwiRail provides further detail below as to how the accommodation of 1,500 m long trains aligns with its objectives in developing the Freight Hub.

KiwiRail's Objectives

As set out in the Notice of Requirement, KiwiRail's objectives in developing the Freight Hub are to:

- increase its operational capacity to efficiently accommodate projected regional and national freight growth and support wider regional development;
- enable rail to be integrated with, and connected to, other transport modes and networks; and
- improve the resilience of the regional and national freight transport system over time.

How 1500m trains contribute to achieving the objectives of the Freight Hub

Larger trains are an efficient and effective way to improve freight movement capacity to meet growing demand. The analysis of future demand is outlined at section 3.2 of the Master Plan report (Appendix D to the NoR), section 10.3.1 of the AEE, Technical Report K of the NoR, attachment 8a of KiwiRail's section 92 response dated 15 February 2021, and KiwiRail's section 92 response dated 28 May 2021.

In summary, demand will exceed the capacity of the existing site at Tremaine Avenue by 2030 with increased container traffic. The key operational objectives of enabling 1500m trains are outlined in the response question 6a above. It is not possible for KiwiRail to lengthen trains in the Existing Freight Yard without increasing the amount of handling and movements of trains while at the yard and using the NIMT itself to assist in the assembly of trains. This increases the length of time that specific freight is stationary, making the use of rail inefficient and unattractive to those waiting for and sending freight and also prevents the use of the NIMT for direct through trains. Increased movement numbers also result in increased noise levels, impacting on those living and working around the Existing Freight Yard.

As the Existing Freight Yard is unable to accommodate 1500m trains, the ability of the Freight Hub to provide for these longer trains to meet increasing demand, in addition to the various other benefits of the Freight Hub, is an important means by which the Freight Hub will achieve KiwiRail's objective to *increase its operational capacity to efficiently accommodate projected regional and national freight growth*.

As outlined in the response to question 2 of KiwiRail's section 92 response dated 28 May 2021, 1500m trains are more fuel efficient and benefit from economies of scale. This means that movement of freight by longer trains results in lower fuel costs and carbon emissions per freight tonnage. With the broader government agenda towards emissions reductions and investment in a low-carbon transport network, together with the price of carbon expecting to increase over time, the ability of the Freight Hub to accommodate 1500m trains is also an important means by which the Freight Hub will achieve KiwiRail's objective to *improve the resilience of the regional and national freight transport system over time*.

Question 7 : Has capacity modelling been carried out to confirm that the marshalling yard has the capacity to accommodate the future forecast operational needs of the Freight Hub? If not, when will this occur and how might this affect the arrangement of on-site facilities?

Capacity modelling was undertaken as part of preparation of the Masterplan. This work informed the final form and extent of the Freight Hub. This information was provided in Sections 3 and 4 of Appendix D Masterplan report lodged with the NoR. This work included:

- Identifying forecasted changes in national and regional freight - growth and in particular analysis of the type and volume of inbound and outbound commodities in relation to Palmerston North (frequency of trains and during peak periods) - Section 3.2

- Identifying and sizing the physical components to accommodate the forecasted freight growth – Section 4.

Once the size of the relevant components was determined, the arrangement of the onsite facilities was considered in order to ensure efficient and safe access to the marshalling yard from the NIMT and from the other components of the Freight Hub (such as the container terminal; freight distribution areas; and the log handling yard). The arrangement of onsite facilities was also informed by the 24/7 operation of the marshalling yard in order to understand potential effects of the proposed layout, including lighting and noise effects. While a number of factors may inform the final onsite arrangement through detailed design, the concept design for the Freight Hub has been informed and developed considering future forecasted operational needs.

Stantec

Response on Questions 8, 9, 12-15, section 92 request from Palmerston North City Council for further information dated 5 May 2021

This disclaimer shall apply notwithstanding that the report may be made available to KiwiRail and other persons for an application for permission or approval or to fulfil a legal requirement.

Question 8

Please confirm whether or not the Freight Hub will impact on Council's delivery of the shared pathway between Bunnythorpe and Palmerston North, including the Council's committed timeframe for delivery of the shared path, and how any adverse effects will be mitigated.

The timing of wider transport network upgrades relative to the development of the Freight Hub are yet to be determined, so there is a possibility that the works related to delivering the Freight Hub could impact on the shared pathway. As set out in Proposed Conditions 43 to 46, KiwiRail is required to prepare a Road Network Integration Plan. The Road Network Integration Plan will consider the location, timing and form of any changes and upgrades to pedestrian walkways, cycleways and public transport facilities, including any new walkways, cycleways to be shown through the Road Network Integration Plan. KiwiRail will work with Palmerston North City to identify opportunities to integrate roading upgrades and connections required for construction and operation of the Freight Hub with the work being undertaken in the wider transport network.

If the shared path has been constructed by the Council before the Road Network Integration Plan is submitted then KiwiRail will need to provide an alternative route during construction and/ a permanent replacement for any section of the shared pathway that is directly affected, in order to manage transport effects.

Question 9

Please identify and demonstrate an option to maintain safe access to the Foodstuffs site via each of its driveways, taking into account the operational needs of site and the interaction of the accesses with the operation of the existing building. This needs to be understood in the context of the forecast changed traffic condition along the Roberts Line frontage to the site and the proximity of the site to Railway Road.

The potential impact of the changes to Railway Road on Foodstuffs were outlined in the first section 92 response (provided on 15 February 2021), in section 2.3.2 of Attachment 9 (Transport). KiwiRail is committed to working with Foodstuffs to provide an option that meets Foodstuff's access requirements to its site. It would be inappropriate for KiwiRail to include an option as part of this response without working through this with Foodstuffs to ensure its needs are met.

Conditions 43-46 (Road Network Integration Plan) and 54-57 (Construction Traffic Management Plan) will ensure that an appropriate access solution for Foodstuffs will be provided for during both construction of the Freight Hub, and its operation to manage any transport related effects that the Freight Hub will have on Foodstuffs.

Question 12

Submission 72 is concerned about potential effects on groundwater. Figure 5-9 in the AEE shows the location of a number of water bores within and near the designation extent. Will there be discharges to groundwater during earthworks, construction or operation of the Freight Hub which might affect:

a. Water quality within potential receiving environments, e.g. surface water bodies or bores?

b. Compliance with the drinking water standards in the Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007?

To date there has been no project specific ground investigation and there is limited existing ground investigation on the site that can be called on. KiwiRail is mindful of the use of groundwater and in particular the presence of the Council's bore to the immediate south of the site.

Section 3.2.1 of Technical Report I Contamination lodged with the Notice of Requirement considered the existing groundwater takes. The potential for discharge to groundwater during construction and operation will be better understood once the underlying conditions have been investigated and an appropriate methodology developed for construction and operation. Measures to prevent infiltration during construction would depend on this further investigation. It is KiwiRail's expectation that any existing groundwater bores on site would need to be made safe, structurally stable, backfilled or sealed (grouted up e.g., with bentonite) prior to any earthworks to prevent potential for direct groundwater pollution. As outlined in response to Question 172 of Attachment 5(Contaminated Land) to the first section 92 response dated 15 February 2021, active monitoring will need to be undertaken during construction and preventative measures in terms of the use of clay or synthetic liners across the whole site and the introduction of controls related to the bunding of specific areas of the Freight Hub may be necessary to ensure that contaminants are not released from the site. With the implementation of such measures water quality within potential receiving environments is unlikely to be affected and compliance with drinking water standards is expected to be achieved.

Question 13

What, if any, regional council consents will be required for potential discharges to groundwater or to land where contaminants may enter groundwater?

Rule 14-28 of the One Plan sets out the permitted standards for Discharges of contaminants onto or into land that may enter water. These standards amongst other matters include:

- separating discharges from bores;
- surface water and artificial water bodies; and
- that there is no surface ponding in the area of discharge^, or run-off of any contaminant^ into a surface water body^ or its bed or artificial watercourse.

The design of the Freight Hub will need to comply with the permitted activity standards or a Discretionary Activity resource consent under Rule 14-30 will be required. This will be assessed at the time regional consents are sought.

Question 14.

Given the proposed creation of impervious surfaces, stormwater collection and management and the piping of existing waterways, please assess any potential effects of those changes on groundwater recharge and consequential effects on existing groundwater takes.

As the impact on groundwater recharge and consequential effects on existing groundwater takes has not been investigated at this early stage, specific data is not available.

In terms of effects on groundwater recharge and existing groundwater takes, the loss of rainfall infiltration is unlikely to be a more than minor effect due to the relative to the size of the catchments that drain through the site and by comparison the small amount of new impervious surface area introduced by the of the Freight Hub.

The effects of stormwater collection and management associated with the Freight Hub on groundwater recharge and consequential effects on existing groundwater takes will be minimal as it is proposed to design and manage stormwater in a comprehensive way to balance all the requirements. If required, the detention ponds can be lined to reduce contaminants entering groundwater and the use of vegetation will assist to capture potential contaminants.

The use of on-site practices to limit contaminant generation and isolation and treatment of high contaminant generating areas and diversion of stormwater from some areas to wastewater or similar as outlined in the description of operational activities in Section 6.2 of Technical Report G and in the first s92 response to question 88) iii) in Attachment 6 (Stormwater) will reduce the contaminants entering the ponds in the first instance.

The effects on groundwater recharge and existing takes from piping some of the existing waterways under or through the Freight Hub, and from diversion and reestablishment are anticipated to be minimal as where possible the diverted watercourses will be designed to enable fish passage (with unlined bottoms where appropriate) and will be planted and buffered by planting and swales to reduce pollutants entering the watercourses.

Question 15.

Noting the matters raised in Transpower's submission [Submission 67], please provide an assessment of effects of the proposed construction works, permanent structures and landscaping on the National Grid, and provide details of any mitigation or management measures proposed to address any identified adverse effects.

No adverse effects are anticipated in relation to the parts of the National Grid located within the Designation Extent, as no new buildings or permanent structures are proposed in the vicinity of the National Grid. While there would be a five-metre-high earth bund formed under a short section of overhead transmission lines, the nature of the proposed works, being earthworks to construct the bund and landscaping, are not expected to have any adverse effect on the National Grid as no earthworks are proposed around the pylon located in the proposed designation. While some taller specimen trees are proposed as mitigation for visual effects for residents on Maple Street, these can be located away from the pylon and the overhead transmission lines.

The pylon and relative height of the bund and the landscaping is shown in Appendix C, Cross Section 1 as lodged with the NoR. An extract included below shows the proximity of the earth bund to the existing pylon.

The other potential effect is related to the need for Transpower to access the pylon and obtain permission from KiwiRail for works in its designation. As noted in the AEE, KiwiRail works with Transpower across the country either where works are undertaken near the National Grid or Transpower's infrastructure crosses a KiwiRail rail corridor. KiwiRail is committed to working with Transpower to ensure that any access Transpower needs to the pylon or the transmission lines are ensured, and that any earthworks within the outer edge of the pylon are undertaken consistently with Transpower's guidance on development near National Grid Assets.

MEMORANDUM

From: Stephen Chiles, Chiles Ltd

To: Pam Butler, KiwiRail

Date: 20 May 2021

Subject: KiwiRail Regional Freight Hub - Response to third request for information relating to noise and vibration

This memorandum responds to questions 10 and 11 of the third request for further information dated 7 May 2021.

Question 10

In response to the Ministry for Education's request [Submission 92], please provide further assessment of the potential noise effects arising from operational road traffic and maintenance of trains/carriages on Bunnythorpe school.

Response

The Freight Hub should not alter traffic using Baring Street past the school.[1] Other roads where there may be changes in traffic flow due to the Freight Hub are over 100 metres from Bunnythorpe School and are largely screened from the school by intervening buildings. Therefore, I consider that operational road traffic should have a negligible noise effect on Bunnythorpe School.

Maintenance of trains and carriages would primarily be undertaken in the workshop building. For all operational sources on site, including the workshop, indicative noise contours with mitigation are shown in Figure 12 of Technical Report D.[2] As shown in this figure, the predicted 45 dB $L_{Aeq(1h)}$ contour reaches Bunnythorpe School, indicating a level at the school of approximately 46 dB $L_{Aeq(1h)}$. This is a lower sound level than the existing daytime ambient noise measured in the general area, as set out in Section 3 of Technical Report D. Therefore, while operational noise from the site may be audible at the school, it would be at a level that should not cause disturbance and should be compatible with the existing environment.

Question 11

Question 21 in the December s92 request sought noise measurements or predictions for shunting rolling stock (including the short term impulsive noise of the freight wagon couplings on small shunts). Attachment 7 of KiwiRail's s92 response states that no trains were observed being assembled, so sound levels are not available. Given the intended marshalling function of the Freight Hub, please monitor and model train assembly noise and advise whether any impact noise generated is likely to have an effect at night? Please provide predictions of noise management boundaries for the Regional Freight Hub.

Response

The noise contours are dominated by locomotive noise and explicit inclusion of train assembly is not anticipated to materially alter the noise contours. However, to address this question an additional survey is being arranged to capture this specific source. Results are expected to be provided in evidence.

[1] Further detail regarding this point will be addressed in Transport Evidence.

[2] An enlarged section of that figure is shown in Figure 2 of Attachment 7 to KiwiRail's response to the first section 92 request dated 15 February 2021.