MITEZ 50-YEAR FREIGHT INFRASTRUCTURE PLAN / FINAL REPORT / MAY 2012

MITEZ

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All reasonable attempts have been made to ensure the accuracy of the information contained in this report, but Juturna Consulting reserves absolute discretion in updating or amending this document.

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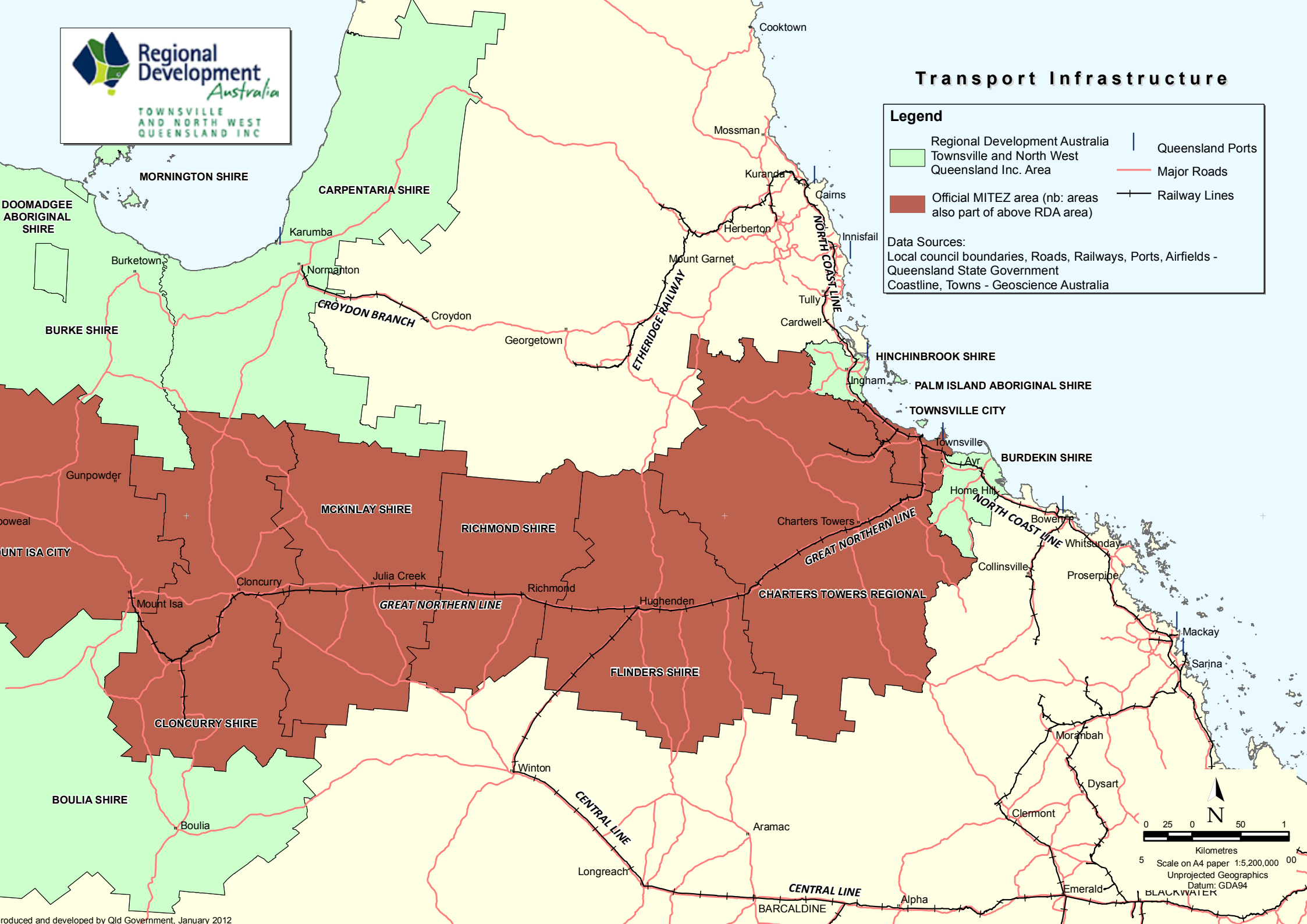
This inaugural 50-year freight infrastructure plan has been delivered within around 12 months of a challenge being put to the Mount Isa-Townsville Economic Zone (MITEZ) by Infrastructure Australia; in 2011 MITEZ was challenged to bring all parties in the infrastructure supply chain - road, rail and port owners and operators, as well as many mining, agricultural and manufacturing freight customers and the local communities of the region - together to examine openly the future demand for and supply of crucial freight infrastructure in this supply chain, for the long term.

The result of those efforts is this document. It offers a series of recommendations which in the opinion of this group, will lay the foundations for much more transparent, coordinated and timely planning and investment in this nationally-significant supply chain for the decades ahead.

The process has been challenging, rigorous and transparent throughout. The plan's authors would like to take this opportunity to thank Infrastructure Australia for its ongoing support for these efforts, as well as Queensland Treasury, which has offered generous encouragement and coordination for the plan's work throughout.

Finally, this document acknowledges the collegiate and positive contributions of the MITEZ membership itself, particularly the 50-year plan working group. The questions and issues posed by this plan have been confronting to many, but the development process has always been characterised by goodwill and a shared desire to work towards joint outcomes for the long-term benefit of this region and its community.


Regional Development Australia
TOWNSVILLE AND NORTH WEST QUEENSLAND INC
Transport Infrastructure
Legend
Regional Development Australia Townsville and North West Queensland Inc. Area
Official MITEZ area (nb: areas also part of above RDA area)
Queensland Ports
Major Roads
Railway Lines
Data Sources:
Local council boundaries, Roads, Railways, Ports, Airfields - Queensland State Government
Coastline, Towns - Geoscience Australia
MORNINGTON SHIRE
CARPENTARIA SHIRE
DOOMADGEE ABORIGINAL SHIRE
BURKE SHIRE
MCKINLAY SHIRE
RICHMOND SHIRE
CLONCURRY SHIRE
FLINDERS SHIRE
CHARTERS TOWERS REGIONAL
HINCHINBROOK SHIRE
PALM ISLAND ABORIGINAL SHIRE
TOWNSVILLE CITY
BURDEKIN SHIRE
BOULIA SHIRE
Cooktown
Mossman
Kuranda
Cairns
Innisfail
Herberton
Mount Garnet
Karumba
Burketown
Normanton
Croydon
CROYDON BRANCH
ETHERIDGE RAILWAY
NORTH COAST LINE
Tully
Cardwell
Georgetown
Ingham
Townsville
Ayr
Home Hill
Bowen
Whitsunday
Collinsville
Proserpine
Mackay
Sarina
Gunpowder
Mount Isa
Cloncurry
Julia Creek
Richmond
Hughenden
Charters Towers
GREAT NORTHERN LINE
GREAT NORTHERN LINE
Winton
CENTRAL LINE
Boulia
Aramac
Longreach
CENTRAL LINE
BARCALDINE
Alpha
Emerald
Clermont
Dysart
Moranbah
BLACKWATER
N
0 25 0 50 1
Kilometres
Scale on A4 paper 1:5,200,000
Unprojected Geographics
Datum: GDA94
roduced and developed by Qld Government, January 2012

introduction/

Prompted by a challenge issued by Infrastructure Australia to produce a long-term, integrated plan for the key freight infrastructure in the region's supply chain, the Mount Isa Townsville Economic Zone commissioned Juturna Infrastructure to produce:

'A 'plain English', integrated, regional supply chain master plan, driven by accurate regional freight estimates'

The Interim Report identified the strategic issues facing the region's industries and its freight supply chain through stakeholder interviews, thorough economic analysis of the region's commodities and world demand for these products and reference to acknowledged best practice examples of freight supply chain planning and investment.

Drawing on the public submissions received in response to this report and with the benefit of further detailed economic modelling of this supply chain's economy, this inaugural 50-year plan lays foundations to secure the most timely supply chain planning and investment priorities for now and the future. It is intended that this inaugural plan will also bring the Mount Isa to Townsville Supply Chain to much greater prominence, thereby attracting a level of investor and public policy attention perhaps more in keeping with this nationally-significant freight task.

The MITEZ group, which is an alliance of local industries and communities, has driven this plan. *This is therefore a plan for the region, by the region.* It is also a plan that seeks to partner with higher governments to best effect. Throughout the development process, the proponents have received valuable support and engagement from many aspects of the Queensland Government, including the Treasury, the Office of Economic and Statistical Review, The Geological Survey of Queensland and the former Department of Employment, Economic Development and Innovation. Nationally, Infrastructure Australia has provided an ongoing role in auspicing the project's efforts to promote compliance with best practice intermodal freight infrastructure planning. In addition, groups such as Agforce and the Queensland Resources Council have offered input to the development of the inaugural plan.

This plan is a beginning. It lays the foundations for future revisions, which it is hoped will benefit from this first attempt to take an unconstrained view of the supply chain, of the region's commodity production potential and demand trends for the same. The MITEZ group is confident that the steps taken in this process have opened the possibility of a much more coordinated and efficient approach to freight infrastructure planning, investment and regulation in the region. With this in mind, it is hoped that the recommendations that are collated at the end of this first plan will be embraced by the region's communities and industries. In particular, it is hoped that higher governments will show support for the strategic work already completed by funding where necessary the targeted recommendations in this plan.

structure of plan, relationship to interim report/

This final report ('the plan') is intended to build on the context, analysis and six strategic issues raised in the Interim Report. It seeks to offer productive recommendations - in the form of practical structures and actions - that should be implemented to lead to better outcomes in light of the identified strategic challenges. It is hoped that this final plan therefore complements the Interim Report rather than replaces it; the Interim Report stands as a reference document for providing context for the recommendations in this plan.

Findings and recommendations

The 6 strategic or 'pivot' issues for the Mount Isa to Townsville supply chain raised in the Interim Report are revisited for closer discussion in the light of public submissions on these topics. The key findings from each of these discussions, which draw on public submissions, are summarised at the start of each of these six sections. Practical recommendations are offered at the end of each of these strategic or 'pivot' issue discussions; all recommendations are then collated at the end of the document. Also towards the end of the document, some additional road and rail-specific recommendations arising directly from the Interim Report are offered.

Led by locals, *facilitated* by higher governments: the plan's approach to partnerships

The Interim Report devoted some time to a discussion of this region and its freight task as a *natural supply chain, with historical reference.* This description attracted some comment and deserves clarification.

For over a century the 'Mount Isa to Townsville supply chain' – even if that precise term was not always employed - described a pastoral, agricultural and minerals freight task from north-western Queensland, culminating at the manufacturing, military base and port city of Townsville. In this sense, the present users and providers of this port, road and rail network - and especially their customers and communities - have a very strong and practical inherited sense of the freight task that confronts them. In other places around the country, this is not always the observed case. Some places in Australia have a less clear sense of the freight supply chain that underpins their communities, or perhaps they have lost some of this sense over time. In such situations, it can be tempting for State and Federal governments – acting on the best intentions - to construct and bestow artificial 'planning zones', 'regions' or 'strategies' on such communities, in the hope that this will improve higher government planning and funding outcomes for these areas. But this plan considers that the most productive approach for higher governments to take in the Mount Isa to Townsville supply- chain is simply to partner with informed and coordinated locals – miners, pastoralists, freight providers and operators and local communities acting in a coordinated structure – to best deliver targeted planning and investment and regulatory reform.

Equally, some local community expectations of higher government infrastructure assistance can at times be unrealistic: it is not always easy for higher governments to know exactly what local industries or communities want or need, amidst many competing plans and investments. This plans seeks to avoid those unrealistic expectations by showing leadership: it sees the higher governments' role in this supply chain more as a facilitator to agreed local objectives rather than expecting state and federal governments to be the creator and leader of all planning and investment through state and federal plans and pipelines; often such higher government schemes are not always fully-funded, can lack local insight and may not always represent the best order of investment.

Feedback has reinforced this view – almost all submissions raised the theme of greater transparency and joint local behaviour in infrastructure planning and investment being of great value. QR National:

'..supports the thrust in the MITEZ (Interim) Report that the local industries and communities have a role in development of supply chain initiatives with government acting as a partner to these efforts.' (QR National Submission).

The opportunity for local communities and industries to identify robust, timely and sustainable investments has also been a prominent theme in this report's discussions with the Queensland Treasury. Like all governments in Australia, Queensland government faces significant fiscal constraints. Feedback from this quarter (via the Treasury) suggests that this final report will be expected to offer an holistic and ordered view of the supply chain planning and investments on offer to the region and how they might best be approached, and importantly, in what order, so as to make all investments of public or private finance as timely as possible. The State Department of Transport and Main Roads is also enthusiastic about this partnered approach:

'Transport and Main Roads is supportive of the groundbreaking collaborative work being undertaken by MITEZ in developing a Northern and North-West

50-year Infrastructure Plan. The initiative presents a new step in the long-range planning for the region. We commend you for acceptance of the Infrastructure Australia challenge to undertake this complex body of works.' (Queensland Department of Transport and Main Roads (Rail, Ports and Freight) submission)

This theme of local industry and community initiative and drive for the right plans and projects - with higher governments acting as an active but ultimately facilitating partner to local community and industry preferences - forms an important context to the recommendations in this final report.

The Interim Report public submission process

As already discussed, the MITEZ group has been committed from the beginning of this process to seeing the challenges and objectives for the region's supply chain debated and planned first and foremost by the communities and industries of the region themselves. At the launch of the Interim Report in Townsville in February 2012, interested parties were invited to produce written submissions in response to the report's discussion and analysis, and particularly in response to the 6 strategic or 'pivot' questions that it was agreed were defining issues for stakeholders in the supply chain to consider. At time of publication the MITEZ executive had received the following formal submissions:

- Queensland Rail
- QR National
- Port of Townsville Limited
- Guildford Coal Limited
- Cudeco Limited
- Blackwood Corporation
- Metallica Minerals Limited
- JJJ Transport Services Pty Ltd
- Department of Defence (provisional, pending coordinated response)
- Regional Development Australia Townsville and North Queensland Inc.
- North Queensland Bulk Ports
- Pacific National
- Legend International (Paradise Phosphate)
- Former Department of Employment, Economic Development and Innovation
- Department of Transport and Main Roads – Rail Ports and Freight

Treatment of submissions in this report

These submissions were all considered in developing the discussion and recommendations that follow. Parts of some submissions are quoted through the final report where relevant. A small number of submissions have indicated that there are some commercially-sensitive aspects of their submissions which they would prefer to remain confidential between the chair and consultant author of the report. This has been respected in the drafting of this final report.

The MITEZ working group met with Infrastructure Australia and the report author on 18 April 2012 to consider a final draft of this report including discussion of submissions received. The final recommendations therefore incorporate the views of the 50-year plan working group taking into account formal submissions received.

A note on terminology

The Interim Report used several terms to refer to the region represented by MITEZ ('The Mount Isa to Townsville Economic Zone') and the road, rail and port supply chains that service it. A valuable submission from North Queensland Bulk Ports points out that this changing use of terms is confusing:

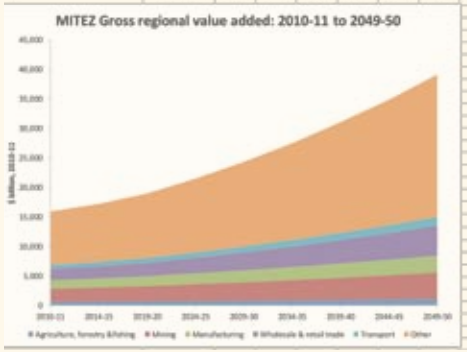
'The report in a number of places refers to the land and sea corridor, road and rail freight corridor, Mt Isa corridor, Mt Isa to Townsville corridor, Mt Isa to Townsville supply chain and a number of other names/ titles. Whilst generally understood what is being portrayed it can be confusing in many respects and lead to misunderstandings about what is being said/ inferred. Clear definition around the supply chain is required to ensure consistency in discussing the issues.' (NQBP submission)

The understanding of the MITEZ group at the inception of this report was to deliver a long-term, demand-driven freight infrastructure plan for the 'MITEZ region', which is based on 7 Local Government Areas (being Townsville, Charters Towers, Flinders, Richmond, McKinlay, Cloncurry and Mount Isa). However, the Interim Report introduced complexity to this historically well-established supply chain by introducing the proximity of the bulk deepwater port at Abbot Point, 200km south of Townsville, as a possible destination to complement this supply chain's shifting and growing freight task in future.

With that complexity acknowledged, this final report will limit itself to referring to the Mount Isa to Townsville Supply Chain, with the understanding that this predominantly refers to the road rail and port infrastructure across the MITEZ local government areas and the mining and other commodities and industries that are within or proximate to these boundaries, or which otherwise rely on this supply chain, while acknowledging that in future there may be new linkages made to the existing supply chain.

an unparalleled view of this supply chain's wealth

A foundation of this plan is its comprehensive view of the commodities on offer in this supply chain. The database of minerals and other commodities that has been built by this plan allows for analysis of demand for the region's products and should act as a catalyst for much more open and coordinated infrastructure planning and investment in the region in future.



regional commodity analysis: a narrative of demand/

Key Points:

- Forecasting demand for an entire complex supply chain is not designed to be an accurate, investment-grade decision-making tool 'in and of itself'. Rather, its merit lies in informing all stakeholders in the supply chain as to the most likely growth levels that the supply chain will experience, so that more transparent and coordinated joint behaviour can occur to capture the maximum available growth opportunities on offer in line with demand for the region's commodities and services;
- A reasonable assumption to draw from this plan's various analyses is that the region is likely to see the current $15 billion gross regional value-added economy grow to around $40 billion in the four decades to 2049-50 in real dollars;
- This figure represents a more conservative view than the "high-case" long-term demand forecast offered in the Interim Report, but the lower figure is more representative of the results of several different approaches to forecasting, including more detailed 'stand-alone' modelling of the supply chain and its region that has been possible since the launch of the Interim Report.
- The Queensland Government's Office of Economic and Statistical Review (OESR) has been apprised of the nature of these demand forecasting and commodity database efforts by the Queensland Treasury. Post publication of this plan, the OESR proposes to maintain, update and expand on the Mount Isa to Townsville supply chain commodity demand model. This will facilitate more accurate information and analysis about timely future public and private sector investments in this supply chain; and
- Ongoing investment in development of this supply chain commodity demand model to allow for a dedicated general equilibrium model to be built for the region will afford the supply chain with a very powerful tool for the future and this work should be pursued via OESR.

An economic snapshot of the Mount Isa to Townsville supply chain

By drawing on Australian Bureau of Statistics data for the approximate statistical divisions of this supply chain, this plan can paint a picture of the MITEZ region as an agricultural and high-value minerals supply chain of great significance:

Table 1. A snapshot of the Mount Isa to Townsville supply chain (FY10-11, ABS data)

MITEZ Gross value added 2010-11 ($ billion)	15,854	Area occupied (heactares)	30,012,538
MITEZ employment 2010-11 (FTE)	11,568	Number meat cattle	2,625,288
Number mine sites	411	Number of sheep	109,721
Operating mines	58	Hectares broadacre crops	13,336
Active prospect mine sites (no)	248	Tonnes sugar cane cut for crushing	
Number farming establishments	1,996	N.B - Agricultural data relates to 2009-10 for the northern and north-western ABS statistical divisions	

Examining the supply chain in light of world demand for it products

This plan has sought to examine the commodity riches of this region in the context of the most robust and internationally-accepted views on world demand for the region's range of commodities over a long forward time horizon: both computational general equilibrium modelling and econometric analysis of the world economy and its demand for the commodities of the Mount Isa to Townsville region was generated, in order to give several perspectives on this long-term demand. From these perspectives, the authors offer what appears the most likely reasonable broad growth outlook for the region.

The limits of applying world demand projections to this region's commodities

It has been noted by some stakeholders to this 50-year project that there is unlikely to be any strict positive correlation between world demand for the resources in decades hence and 'real-time' decisions to invest in specific freight infrastructure in the Mount Isa to Townsville region. In extended and valuable discussions with the Queensland Resources Council, for example, the point has been well made that individual mining actors in the Mount Isa to Townsville supply chain are hard-pressed to look much beyond 10-year forward assessments of actual likely production, and even then, the globalised nature of corporate mining may mean that freight infrastructure investments by global miners are just as likely to eventuate at mines owned in other parts of the world, perhaps at times at the expense of similar potential developments in the Mount Isa supply chain. Added to this complexity are significant historical difficulties experienced in attracting and retaining mining and freight operations personnel to the Mount Isa to Townsville supply chain, given strong demand for these skills in many other parts of Australia and the world.

The 2009 Queensland Rail Network Masterplan raised similar concerns over the complexity of forecasting demand projections in this region:

'Forecasting is a problematic exercise. This is particularly the case where demand growth is not necessarily linked to a single key 'driver', e.g. gross domestic product, and/or where demand can be activated because of triggers such as price points(prices on world markets) for particular commodities. Minerals and commodity prices are unpredictable and unstable by nature...added to this are 'local' factors such as costs of extraction on or near site processing/semi –processing and land transport for export and/or further processing'.

(QR Network Mt Isa Corridor Masterplan 2009 'Demand Forecasts', p. 12)

Given these concerns, one might argue there is no value in considering likely long-term demand trends for the commodities of this region and by extrapolation, little value in seeking to make significant infrastructure investments in the region. However, this report does see genuine value inherent in assessing likely long-term global demand for what the region has to offer. Most importantly, it sees this value emanating from its ability to drive more awareness, transparency, joint discussion and planning and investment behaviour in the region's freight infrastructure.

How does 'unparalleled prospectivity' lead to realised investment and increased exports?

The rich mineral prospectivity of the Mount Isa region is generally acknowledged to be of global significance. Not long ago the Geological Survey of Queensland stated that the broader North West Queensland Minerals and Energy Province that is centered upon the Mount Isa region. The region:

'is Australia's largest copper, lead, zinc and silver producer. This resource-rich region hosts almost 30 percent of the world's lead-zinc reserves and continues to produce new world-class discoveries such as the Merlin Copper-Gold-Molybdenum-Rhenium deposit. The discovery of Merlin, as well as the Kalman Copper-Molybdenum-Rhenium-Gold deposit, heralds potential for more diversity in the range of commodities in the region, which will soon produce for the first time in its history magnetite iron ore, molybdenum and rhenium. North-West Queensland also has significant energy potential, including non-traditional sources such as geothermal and shale gas.'

(Geological Survey of Queensland website discussion of Mt Isa Inlier data package 2009)

Since that statement was made, magnetite iron ore processing is well underway, as are molybdenum and rhenium extractions. To this picture of mineral wealth could be added large reserves of rock phosphate (the input mineral to fertiliser and therefore an underpinning of global food security), haematite ore and shale oil as well as coal in the North Galilee basin, alongside cattle and sugar production of continuing significance and nickel ore and sulphur processing roles in the region; nickel ore imports, for example, represent over a third of all Port of Townsville annual tonnage)

All of this might lead one to assume that the region's great prospectivity will all be realised rapidly. But a glance at the historical growth of this region over more than one hundred years suggests otherwise: in addition to labour attraction and retention challenges there are geographic challenges to this supply chain: 1,000 kilometres lies between Mount Isa and Port of Townsville and the region suffers from challenging tropical heat and monsoonal flood episodes, so that both transport and energy input costs to commodity production have always been high in relative terms.

Transparency and joint behaviour is the most significant basis for future improvement

It has been raised or acknowledged by almost all stakeholders that have been interviewed or have provided written submissions to this planning process that historically the legacy of the region has been one of a lack of coordinated and cooperative group behaviour in the supply chain. This is concerning, given that unlike some other privately-built and operated supply chains (such as some iron ore supply chains of the Pilbara, for example - where a miner might own or control mine, rail and port) the rail, road and port infrastructure that the Mount Isa to Townsville commodities have relied upon are all public-owned and operated monopolies, access to which is shared by all users. On such general access assets, transparent and coordinated behaviour by many users through the provider is likely to offer the greatest efficiencies.

However inadvertently, any lack of coordinated behaviour on the Mount Isa to Townsville road rail and port assets has almost certainly reduced the potential efficiency of this supply chain and thereby increased the transport cost inputs and opportunity costs to doing business in the region.

Strong world demand for the region's products should drive more joint behaviour

This plan recommends a more open discussion between industry, government, potential infrastructure investors and the community about the unparalleled prospectivity of this minerals province – and the likely world demand levels for this region's bounty in the decades to come – as drivers of more collaborative and coordinated freight infrastructure efficiency. Any decision to invest around freight infrastructure assets that are public-owned and multi-user in their nature is complex. The diverse nature of products in this supply chain makes sensible investment an even more complex and challenging task. A better general understanding of world demand for the products of the region coupled with recognition of the benefits of transparency and joint behaviour on public infrastructure is the best chance for greater and more targeted freight infrastructure efficiency to flow in the Mount Isa to Townsville supply chain.

World demand projections for the products of the Mount Isa Supply Chain should therefore be viewed not as a conclusive end in itself and basis for investment decisions, but rather as a worthwhile context for considering much greater openness in pursuing more timely and optimised freight infrastructure planning and investment in the region in future.

Longer-term thinking will support more significant freight infrastructure investments

The 50-year horizon and its narrative of the broad infrastructure trends that are likely to be driven by this demand is also intended as a spur to all supply chain participants to examine longer-term infrastructure investment and planning needs.

One of the historical challenges of this region is that mining interests in particular have been unable and perhaps also unwilling to provide the sort of longer-term contracting certainty that builders of and investors in freight infrastructure need to make worthwhile investments. Above-rail operator Pacific National agreed with this objective:

'Pacific National endorses the proposal to increase understanding of the range of demand scenarios, particularly given the long term nature of investment in both infrastructure and assets using it' (Pacific National submission).

Energy and water infrastructure: similar long-term, coordinated and transparent planning?

The approach of this plan has the same application to a more profitable approach to the long-term planning and investment in the region's remaining economic infrastructure – most importantly its energy and water needs. All of these input costs to business and community can be optimised and timely and efficient investments can be found with greater consideration to joint behaviour and more transparency in supply chain coordination.

Commodity profile and forecasts: creating a comprehensive regional economic picture

While the MITEZ region is known to rely heavily on minerals and agricultural production it also has a significant manufacturing sector. The mining, agricultural and manufacturing sectors are in turn served by a strong services sector that supplies essential inputs to these industries (and, of course, relies upon them). This mix of the region's economy and its value is shown below (NB the services sector is included in the 'other' category in Table 2 next page).


JEWEL OF NIPPON

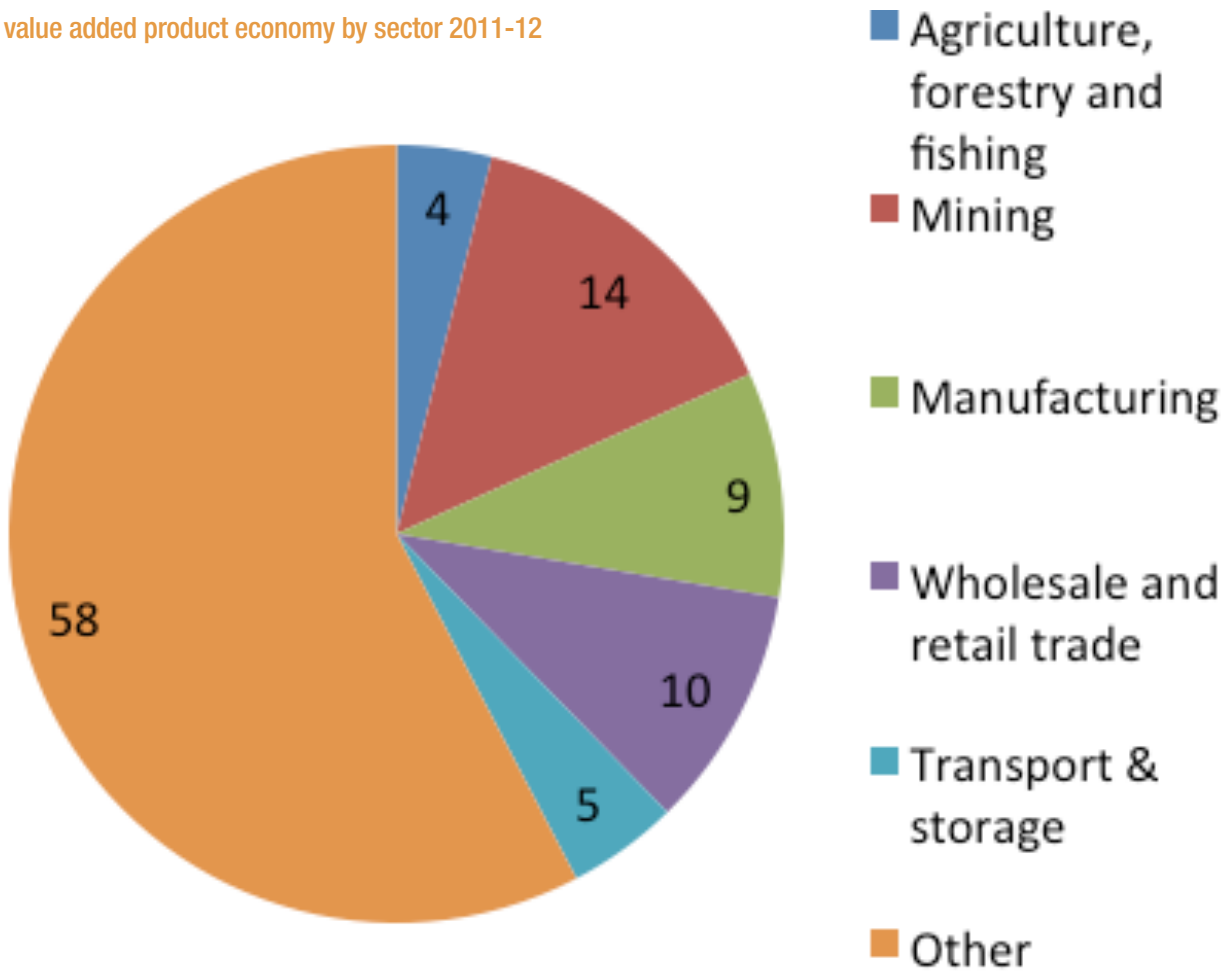
Chart 1: Mount Isa - Townsville region's $15 billion gross value added product economy by sector 2011-12

Within the mining sector, data provided by the Department of Employment, Economic Development and Innovation indicates that mineral sites within the MITEZ are not fully exploited. Of 411 sites at which up to 24 minerals are either produced or available, 58 were classified as active mines while 258 sites were classified by the Department of Employment, Economic Development and Innovation (DEEDI) as active prospect mines:

Source of the regional economy estimate at right:

1. Updated estimates provided by the North Australia Research Group of the estimates provided in: The North Australia Research Group 2010, 'Input – Output Analysis and Modelling of the regional economies of northern Queensland, modified national data model September, pp.29 -31.

2. The updated estimates of value added provided by the North Australia Research Group were calculated using estimates of employment by place of work data as suggested by the Office of Economic and Statistical Research. However, the revised estimates of gross value added by sector still differ somewhat from the gross regional product estimates prepared by the Office of Economic and Statistical Research. Further research is required to reconcile the alternate estimates of gross regional product by sector. However, these figures, while perhaps to be considered somewhat interim, are nevertheless useful for representative purposes.



NB the services sector is included in the 'other' category in chart 1 above. This large category also includes products such as government services and entertainment.

Table 2. Sites identified in the DEEDI data base

Major commodity produced/ available at site	Total sites (No)	Operational mines (no)	Active prospect sites (no)	Other sites (no)	Major commodity produced/ available at site	Total sites (No)	Operational mines (no)	Active prospect sites (no)	Other sites (no)
Copper	91	12	69	10	Tugsten	6	1	4	1
Gold	105	7	66	32	Earthy lime	3	2	0	1
Silver	6	2	2	2	Gemstones	2	2	0	0
Zinc	16	5	9	2	Stone etc	18	17	0	1
Tin	73	0	35	38	Gypsum	1	1	0	0
Nickel	8	0	8	0	Vadium oxide	4	0	4	0
Antimony	6	0	4	2	Perlite & silica sands	2	2	0	0
Limestone	9	5	3	1	Oil shale	2	0	2	0
Phosphate rock	15	1	10	4	Flourite	8	0	4	4
Lead	3	0	3	0	Diatomite	2	0	2	0
Iron	6	0	4	2	Other	6	0	3	3
Magnetite	2	1	0	1	Total all DEEDI sites	411	58	248	105
Uranium	17	0	16	1					

NB: Coal was not modelled from the geological survey database held by the Queensland Government and projections for this commodity in the North Galilee basin have been estimated separately, with the assistance of information supplied by coal proponents in their formal submissions to the Interim Report

3. The North Australia Research Group 2010, 'Input – Output Analysis and Modelling of the regional economies of northern Queensland, modified national data model, September, pp.29 -31..

Dynamic modelling of demand for the region's output

The report forecasts were developed using a bespoke version of the Deloitte Access Economics model of the world economy. The model has three regions and in each region production of 23 commodities was allowed for. The model tracks the demand and supply of the 23 commodities in the modelled economies over the period 2012 to 2050.

As detailed in the draft report forecasts of growth in value added by industry were generated by simulating changes in each region in regional gross domestic product, regional labour supply/working age population and regional population.

The gross regional value-added forecasts for the supply chain were then derived by applying the growth in value-added, by industry, (estimated for QLD in the Deloitte Access Economics dynamic general equilibrium model for the world economy) to data on value added for the MITEZ region obtained from work undertaken by the North Australia Research Group.

The Queensland Office of Economic and Statistical Research (OESR) highlighted several areas where the modelling framework could be improved. These suggestions were largely adopted for this final report.

What was assessed in developing a model of the supply chain economy?

This plan developed a model of the region's commodity that focussed on the most freight-relevant parts of that economy. Accordingly, 23 discrete industries were modelled within the supply chain, across the 7 local government jurisdictions that make up the MITEZ region:

Table 3. Discrete aspects of the economy considered in the current MITEZ model

REGIONS

Queensland, Rest of Australia, Rest of the World

COMMODITIES

Sugar cane, sugar beet
Other crops
Cattle
Other animal products
Fishery & forestry
Coal
Oil
Gas
Other minerals
Meat products
Other Processed food
Manufacturing
Electricity
Water
Construction
Trade
Transport
Communications
Finance and insurance
Other business services
Recreation & other services
Govt services
Ownership of dwellings

How were these economies modelled for growth?

The above 23 discrete industries within the supply chain were modelled in 5 year increments, to FY 2049-50 – at this point the modelling has stopped, but a mature model would be able to extend this projection out for a full 50 years.

The modelling presented in the Interim Report has been enhanced in two important respects. First, reflecting the input provided by the Queensland Office of Economic and Statistical Research, the North Australia Research Group were commissioned to provide updated estimates of value added for the MITEZ region in 2005-06 and to provide a more robust methodology to update these estimates to the 2010-11 year.[5] Second, the growth forecasts that the modelling relies upon have been revised. In particular, the growth forecasts for Queensland and the rest of Australia built into the modelling forecast are now based on relevant data provided in a recently released Productivity Commission report. Growth forecasts for the rest of the world were obtained from the Centre *d'Etudes Prospectives et d'Informations Internationale* (CEPII).

Latest Productivity Commission data has also been employed

The Productivity Commission work that the current study utilises examined the economic effects of various COAG reforms by simulating the reforms in the MMRF model of the Australian Economy developed by the Centre for Policy Studies at Monash University. As part of this work a base case was developed that tracks the impact of developments in the world economy on industry growth in each Australian

4.The North Australia Research Group 2010, 'Input – Output Analysis and Modelling of the regional economies of northern Queensland, modified national data model, September, pp.29 -31.
5. North Australia Research Group prepared two updated models. One model used data on place of employment by industry in 2010-11 to update the 2005-06 estimates of gross regional value added. The North Australia Research Group has indicated that the updated model based on employment by industry data is 'prone to producing unreliable results' because the labour force data used in the update are based on ABS data derived from limited sample surveys that at regional level have a high probability of sampling error. For this reason this study utilised the updated model based on the assumption of a common increase in employment by industry. Further, the model was also run using the North Australia Research Group estimates using 2010-11 employment by industry data this model generated an estimate of regional output in 2049-50 of approximately $36 billion.

state and territory up to the year 2049-50. The modelling framework developed by the Productivity Commission has the potential to provide detailed industry output results for Queensland. However, to date only results for broad industry aggregates are provided. It is understood that the detailed industry results generated in the Commission's work will not be released until the end of May 2012.

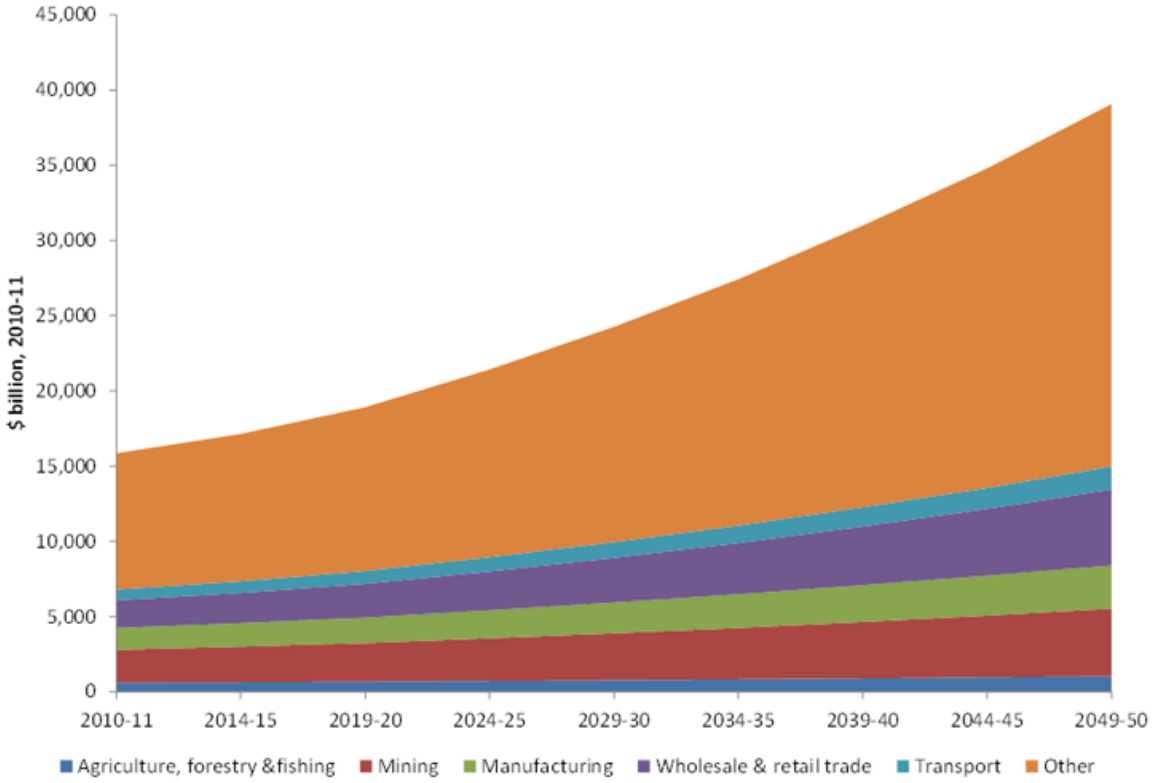
Pending the release of the Commission's detailed modelling results, which will provide growth projections to the year 2049-50 for approximately 60 commodities for each Australian state and territory, the updated modelling framework was used to provide a broad indication of the likely development of the Mount Isa to Townsville supply chain and its region, assuming that the Queensland economy responded to developments in the world economy as modelled by the Productivity Commission.

Supply chain demand projection– where is this economy headed?

MITEZ is forecast to grow from an estimated $15 billion gross regional value added in 2010-11 to approximately $40 billion gross regional value added in 2049-50; the following chart offers a broad view of this forecast and more detailed commodity results are provided in table 4 (following).

This final forecast, which has benefitted from more extensive modelling and which has been reviewed by the Office of Economic and Statistical Review, is close to the low case growth scenario of $44 billion by FY49-50 outlined in the Interim Report. This growth estimate appears broadly consistent with the Queensland Resource Council's verbal advice on its expectations of growth for the region, which were more conservative than the Interim Report's higher case scenario.

Chart 2: The supply chain's forecast gross regional value added economy 2010-11 to 2049-50



As indicated, around $40 billion gross regional value added by FY2049-50 should be interpreted as a broad indication of the overall development of the MITEZ and also a broad indication of the likely sectoral development within MITEZ.

Lowering input costs to business offers even greater growth potential to the supply chain

It is important to recognise that achieving higher growth than these figures is not out of the question, but it rests heavily on reducing the input costs that face new industry development in this supply chain - particularly mine development costs. The recommendations that follow in this report are aimed squarely at achieving these lower input costs. For this reason the MITEZ group has every reason to expect that implementation of the recommendations in this inaugural edition of its 50-year plan will promote even greater development of the region than the above graphs indicate.

6. Productivity Commission 2012, Economy-wide Modelling of Impacts of COAG Reforms: Business Regulation and VET, Supplement to the discussion paper, 17 February.

7. Foure, Benassy-Quere and Fontagne - *The World Economy in 2050: A Tentative Picture* CEPII (Centre d'etudes prospectives et d'informations internationale No 2010 27 December.

More robust forecasts for MITEZ could be developed through the development of a general equilibrium model that included the MITEZ as a fully-modelled region. Such a model could be developed using the TERM model developed by the Centre of Policy Studies at Monash University. If such model were developed it would be possible to replicate the work undertaken by the Productivity Commission. That is, the impact of developments in the world economy on industry growth in the MITEZ region would be able to be explicitly simulated. It would also be possible to build into the forecasts particular projects expected to take place in the MITEZ and other regions of Australia.

How are discrete industries within the supply chain forecast to grow?

Applying the aforementioned methodology and assumptions, the following table disaggregates the $39 billion gross value-added growth forecasts for the most freight-reliant industries within this economy: Table 4 explains.

Table 4: Discrete industry growth forecasts for the supply chain to FY 2049-50

Industry	2010-11	2014-15	2019-20	2024-25	2029-30	2034-35	2039-40	2044-45	2049-50
Sugar cane	103	112	121	132	145	159	175	191	210
Other Crops	256	269	282	297	314	332	353	376	403
Cattle	203	214	224	238	252	269	289	310	335
Other animal products	12	13	13	15	16	17	19	21	23
Fishery and Forestry	32	35	39	44	49	54	61	68	76
Coal	14	15	16	18	19	21	23	25	27
Oil	14	15	14	14	14	13	12	11	11
Gas	0	0	0	0	0	0	0	0	0
Other minerals	2,168	2,337	2,537	2,803	3,083	3,384	3,717	4,065	4,452
Meat Products	64	69	73	78	83	88	94	101	108
Other Processed Food	265	289	317	352	391	432	476	523	575
Other manufacturing	1,112	1,202	1,300	1,433	1,572	1,717	1,874	2,028	2,192
Electricity	336	364	395	437	482	530	581	634	691
Water	106	115	125	141	157	175	194	215	237
Construction	1,117	1,127	1,205	1,381	1,599	1,849	2,142	2,452	2,810
Wholesale & retail trade	1,846	2,009	2,249	2,583	2,971	3,407	3,906	4,441	5,046
Transport & storage	711	771	845	941	1,044	1,153	1,271	1,392	1,522
Communications	264	284	311	349	390	434	483	533	589
Finance and Insurance	771	843	942	1,080	1,236	1,412	1,612	1,828	2,071
Other Business Services	1,427	1,535	1,694	1,925	2,190	2,485	2,821	3,177	3,577
Recreation & Other Services	418	460	516	591	675	770	877	992	1,121
Govt Services	2,769	3,027	3,414	3,945	4,562	5,260	6,058	6,922	7,902
Ownership of dwellings	1,857	2,043	2,291	2,636	3,028	3,467	3,959	4,494	5,094
Total	15,864	17,147	18,923	21,432	24,270	27,429	30,997	34,800	39,072

A single accurate and public commodity model of the supply chain will maximise growth

To enable the commodity forecasts to be refined and extended, any funding request by the Queensland Office of Economic and Statistical Research to enable the modelling framework using the TERM model described above to be built would be a valuable investment in the planning capacity and regulatory oversight of the supply chain. In addition, greater group behaviour by the mining sector in particular can lend greater accuracy to the commodity profile of the region. Private research conducted by mining interests offers even greater accuracy around the mineral wealth of this supply chain. As Legend International noted:

'There are more specific mineral-specific forecast tools to estimate regional production. These are likely to be more accurate in determining regional growth in the next 10 years' (Legend International (Paradise Phosphate) submission).

Noting the very real limits of commercial confidentiality for any miner, a move to maximising the currency and depth of public information in this report's demand model of the region would be of great assistance in allowing a future supply chain coordinator group and government to identify more timely and efficient intermodal investments in this supply chain.

Coordination with Queensland's Office of Economic and Statistical Review (OESR)

As a part of this model's development, the Queensland Government agrees that in the longer term, the commodity picture and analysis developed for this freight infrastructure plan should be maintained and updated to allow for future analysis (such as the development of partial equilibrium models for parts of the supply chain, or macro analysis such as the effects of changing China or India commodity demand levels on this supply chain) to be undertaken in the interests of making more timely and efficient investment decisions.

The report authors therefore submitted this report's analysis and data to OESR for scrutiny OESR has indicated that the modelling framework developed, which modelled 23 discrete industries in the region, was not sufficiently robust to support detailed financial analysis of particular investments in the supply chain – the OESR advises that it models 109 discrete economies for its analysis. Accordingly, upon handover of this model, the Government will be in a position to expand the current demand model to develop forecasts that could support financial analysis of particular infrastructure investments. For now, the modelling framework produced to date should be viewed as the basis of a well-informed master narrative of how the Mount Isa to Townsville supply chain may develop over the coming 50 years.

Building a 'narrative' of freight demand in the corridor for the short to long term

All of this modelling and forecasting activity can be overplayed. Looking across a 50-year time horizon, the main benefits of such forecasts and models are to allow freight users, operators and builders, as well as public policy planners, communities and potential investors in the region to have a better understanding of how the region's likely growth path will shape the infrastructure needs across the short, medium and long term.

On this basis, the plan offers the following 'narrative' for the commodities and freight infrastructure of this supply chain:

- **In the short to medium term -** both available commodity and world demand would suggest that the region will continue to see a consistent if unspectacular growth in high-value ore concentrates such as gold, copper, lead and zinc. This has implications for ensuring that the efficiency of this task is increased over time, and the presence of new players in this mining field suggests that there should be a focus on reducing barriers to entry in this field as much as possible. The continued presence of high value ore concentrates is likely to be reinforced by a potential trend to move away from refining, such as is seen by Xstrata's announced decision to close its Mount Isa refinery and rail unrefined ore to port in the years ahead;

- **In the short term -** The refinement of nickel ore currently accounts for over a third of all tonnage at the Port of Townsville. This refining activity (significant amounts of unrefined nickel ore are shipped to Townsville and refined for export) is by function of its size a very important underpinning of the overall health of the region's supply chain and economy. This task relies on ongoing efficiency and competitiveness in order to remain in Townsville for the long-term. With this in mind, the freight efficiency afforded the nickel ore processing industry in Townsville should be considered a strategic input into the overall development and health of this supply chain.

- **In the short to medium term -** The potential for an imminent advent of coal extraction from the North Galilee basin will place significant tonnages of low value, high volume product in play on the region's freight infrastructure. There are questions surrounding how this logistics task will be managed, specifically in terms of which rail/stockpile/port destination is most efficient and appropriate for the task, as well as the medium to long term implications of increased tonnages of coal, which is a matter canvassed in discussion of the interaction of the Abbott Point and Townsville ports; and

- **In the short to medium term –** the region is likely to also see the development of increased movements of both rock phosphate and magnetite, which, given the potential for large tonnages in the longer-term, may require a somewhat greater bulk commodity focus in freight infrastructure.

- **In the medium to long term –**The great mineral prospectivity of the region combined with constant advances in technology suggests that the region will increase its extraction and refinement of extremely rare metals. This will contribute to the overall wealth produced by the region and will support growth in the mining and services sectors but the small tonnages and high values involved in these classes of commodity will not impact markedly on the freight infrastructure of the region.

- **In the longer term –** it would be prudent to assume that the region may see a much more noticeable evolution in its logistics task to a bulk products rail-to-stockpile model, given that the region has known fields of magnetite and haematite ore and shale oil and gas, and bearing in mind likely longer-term global demand for these products. This shift, should it eventuate, would require investment in a heavier, 'rail-to-stockpile' bulk commodity infrastructure model than presently exists in the Mount Isa to Townsville supply chain.

- **From the short through to the long-term –** A significant cattle and sugar industry will very likely continue to operate in the region for the foreseeable future. Growth in these agricultural commodities is expected to be steady, but to facilitate this growth both sectors would benefit from more efficient freight infrastructure planning and investment over time to ensure that the transport input costs to production remain low and thereby promote competitive products on world markets. For livestock in particular, the move away from transport by rail towards an overwhelming reliance on increased heavy road transport that has been seen over the past decades should be reflected in a commensurate targeting of efficient road infrastructure for this task.

- **From the short through to the long term –** Defence interests in the region should be considered both strategic and of significance to national security across the 50-year planning period. Although Defence's freight infrastructure footprint might be considered minor compared with its mining sector equivalent, Defence – Navy, Army and Air Force and civilian components - is a major employer and contributor to the region's service economy and therefore does much to underpin the region's prosperity. For this reason Defence freight infrastructure demands need to be afforded strategic importance in long-term infrastructure planning and investment.

This narrative of the likely freight infrastructure demand trends that may be facing the region and its supply chain form the backdrop for considering the six strategic or 'pivot' questions asked in the Interim Report.

Discrete recommendations relating to the maintenance of this economic model for the supply chain and the possibility of extending this planning approach to energy and water infrastructure are offered as additional recommendations at the end of this plan.

strategic or 'pivot' issues for the supply chain/

Does the lack of coordination mean the region is still a 'supply chain' in name only?

Key findings

- There is significant fragmentation and lack of transparent information across the many different stakeholders in the supply chain and between transport modes and this is constraining the overall efficiency of the supply chain;
- Given the great diversity of this supply chain, there is commensurate value to be gained in developing a transparent and joint supply chain process, led by an independent coordinator and involving all stakeholders to the freight task, including local communities;
- The Hunter Valley's Independent Coal Chain Coordination model should be employed as a template for this outcome. Work should begin to adapt the Hunter Valley model sympathetically to the unique Mount Isa to Townsville context;
- Confidence in an independent supply chain coordinator and the level of joint and transparent behaviour observed will rest heavily on the structures put in place for managing the commercial confidentialities and proprietary intentions of individual stakeholders to the coordination process. Developing an appropriate structure for managing these matters is an early priority for a supply chain coordination model.
- Following guidance from Infrastructure Australia, some work has begun to develop supply chain coordination meetings. This needs to continue apace to a mature and independent state, involving a much broader membership which includes infrastructure users; and
- A mature independent supply chain coordinator, working with transparent data with all stakeholders in the supply chain, would be in a powerful and unique position to examine the efficiency on offer in the current supply chain via a detailed commodity-by-commodity masterplan across the supply chain that could recommend priority investments, planning requirements to remove bottlenecks and protect key aspects of land use for the future.

The bulk of stakeholder interviews and subsequent written submissions to this process have spoken of the need for far greater coordination of what is an extremely complex and fragmented supply chain, with a great many discrete product lines and logistics solutions contributing to the overall freight task – a task perhaps best represented in the figure of over $8 billion dollars of trade through the port of Townsville in FY 2011-12.

Cudeco Limited perceived a current lack of sufficient coordination between all parties in this supply chain:

'Cudeco remains committed to investing significantly in the region, to facilitate the production and export of its minerals. However the company is restricted from doing so due to (amongst other things) the lack of clarity surrounding accessing capacity and contractual agreements'. (Cudeco Submission)

For its part, Queensland Rail, the below-rail owner, also saw value in a more comprehensive coordination function, citing lost efficiency from the current levels of fragmentation in the supply chain:

'Queensland Rail recognises the degree of fragmentation across the supply chain and supports the principle of developing greater supply chain coordination in order to achieve increased efficiency and system throughput and to potentially reduce the level of investment needed by making better use of existing infrastructure. Queensland Rail has experienced the effect of uncoordinated maintenance in different parts of the supply chain affecting utilisation of the line' (Queensland Rail submission).

While QR National, an above-rail operator, similarly saw value in greater transparency and coordination:

'A key requirement to (success for all commercial clients) is the transparency of information. As such, QR National is supportive of the publication of information that facilitates the identification of feasible options in relation to future opportunities on a timely basis'. (QR National submission).

This notion of coordination and transparent flow of information and preferences extends to these regional communities themselves. Guildford Coal made the point that:

'There is a need to recognise in planning that port and infrastructure development will never occur in isolation to the community. There is a need moving forward to ensure that the community of north and north-west Queensland are made aware of and educated about the economic opportunities associated with the development of resources, and involved in the design and construction of our supply chain'. (Guildford Coal Submission)

The City of Townsville's informal feedback similarly pointed to the need for broader land planning and port and rail-specific developments to be pursued transparently in knowledge of each other's objectives, so that ongoing port efficiency and competitiveness can meet the right balance with sustainable community amenity, particularly at crucial early planning stages.

Legend International saw a circular dilemma occurring in the supply chain which was inadvertently harming maximised efficiency and transparent joint behaviour:

'The main source of lack of coordination is that most players see a supply chain that although willing to expand – is limited by its current capacity. This lack of capacity makes all players a little paranoid and forces companies to disclose the minimum amount of information – this includes QR and the Port of Townsville' (Legend International (Paradise Phosphate) submission).

As a result of such concerns, the plan turned to examining best-practice approaches to complex freight supply chain coordination.

Use of 'best-in-class' supply chain examples as a template for reducing fragmentation

The Interim Report examined best practice coordination of road, rail and port supply chains in an Australian regulatory context. This work focussed on best-in-class master-planning and supply chain coordination work that had occurred over the past decade in some of Australia's coal chains as a response to the significant increases in demand for this product – and by extrapolation, the increased value that would flow from more transparent and coordinated decisions across these supply chains, in the field of berthing, train movements, maintenance schedules and maximised product flows.

Hunter Valley Supply Chain Coordinator – Success in coordinated, transparent behaviour

The best available example of a large and complex supply chain becoming more coordinated and transparent lies in the decade of achievement of the Hunter Valley Coal Chain Coordinator, which services the world's largest coal export port at Newcastle.

From simple beginnings – which were aimed at simply introducing the key parties to each other, building working relationships and laying ground for regular dialogue and exchange of information - the coordinator has evolved in 2012 to offer a fully-integrated, sophisticated daily monitoring and improvement process across the multiple freight tasks and proponents of the Hunter Valley coalfields, railroads, port facilities at Newcastle and the ships that service this port. The coordinator is now an independent and funded role in itself, which manages and monitors efficiency in the chain in cooperation with all parties. A public-access website makes available key information on aggregate and rolling tonnage projections for the chain, provides high visibility of all train and ship movements, schedules and delays, and synchronises maintenance and other 'downtime' through the supply chain to ensure that productivity loss is minimized.

The Hunter's port and rail operations rely heavily on the transparency and cooperation brought about by the coordinator – and not just for day-to-day operations: the ARTC's 2011 *Hunter Valley Corridor Capacity Strategy* notes that:

'The Hunter Valley Coal Chain Coordinator is responsible for the coordination of coal chain planning on both a day-to-day and long-term basis. It is continuously developing a Hunter Valley Master Plan that deals with the optimisation of capacity requirements across all elements of the coal chain with a view to providing an integrated planning road map for the logistics chain'.

(Australian Rail Track Corporation 2011-2020 Hunter Valley Corridor Capacity Strategy Consultation Document pp. 7-8)

Such a coordination role holds great promise for the Mount Isa to Townsville supply chain, and it might even be argued that the dividends on offer from such coordination might be even greater than the significant gains made by coordination in the Hunter, given the even more diverse and fragmented product lines that make up the Port of Townsville's overall trade.

A coordinator must reflect the unique aspects of the Mount Isa to Townsville freight task

The Hunter Valley Supply Chain Coordination model is therefore of significant value as an example, but several submissions to this plan also made the important point that any supply chain coordination model needs to be a tailored outcome for the Mount Isa to Townsville supply chain, rather than merely a facsimile of a model that may have worked well elsewhere, under quite different circumstances. In this respect, Pacific National submitted that:

'...in establishing such a group, note needs to be taken of some significant differences between the situation in the Hunter Valley and that on the Mount Isa – Townsville corridor:

The Hunter Valley coal export trade is substantially more homogenous in unit value, consignment size, vessel and operating model than exports on the Mount Isa corridor. There is therefore a greater likelihood of an alignment of interests amongst traffic-originating stakeholders;

- *While non-coal traffics use the Hunter Valley, they:*
    - *Are a 'given' for the HVCCC, rather than under their control; and*
    - *Use significant additional infrastructure not part of the coal network.*
- *The operation of the HVCCC forms part of a broader regulatory framework governing operation of the port and rail network which is currently less significant on the Mount Isa – Townsville corridor'.*

Summing the parts to a whole: 'commodity-by-commodity' supply chain analysis

These complexities will require significant initial coordination and planning, to ensure that all of the varied groups possessing a stake in more efficient and effective freight infrastructure are represented in a workable structure.

In this respect, there is attraction in a new Mount Isa to Townsville supply chain coordinator considering discrete commodity supply chains and their specific operations, needs and risks in detail, working closely with all relevant parties for each significant port import and export commodity (copper, zinc, nickel, lead, cattle, sugar, etc) so that over a time a complete and transparent picture can be established of supply chain planning and investment. All of these different and diverse supply chains face unique challenges and different infrastructure solutions. Only a ground-up assessment will capture this discrete, varied detail, to the benefit of overall decision-making.

Blackwood Corporation - elements of whose senior management team have direct experience of the Hunter Valley Coal Chain independent coordination process - have strongly endorsed an interim report recommendation to establish such a body on the Mount Isa to Townsville supply chain:

'The use of a central supply chain coordinator has been identified in the interim report as a potential solution to (the challenges of capital requirements and coordination of the supply chain). Blackwood strongly supports this body being established' (Blackwood submission).

Positive steps towards a supply chain coordination model

Since the Interim Report was released, the Port of Townsville Limited and Queensland Rail network, assisted by Infrastructure Australia, have made early progress in establishing the basis for greater transparency in supply chain coordination. At time of writing, two meetings of a fledgling Mount-Isa-Townsville Supply Chain Coordination Group had occurred since late February.

From an information technology perspective, one of the defining features of the mature Hunter Valley Coal Chain Coordinator is the presence of a CSIRO-designed computational algorithm for the optimisation of timing and 'pathing' for the many complex daily freight movements in the Hunter Valley supply chain. It is encouraging that the Department of Transport and Main Roads in Townsville has already engaged CSIRO to develop a similar model for estimation of freight flows in the Mt Isa to Townsville supply chain. The presence of James Cook's University's mathematics faculty may represent a further opportunity to bring local modelling expertise to this supply chain in future and in turn offer the faculty an applied research and development outcome.

While this start is promising, the recommendations at the end of this report foreshadow a more structured approach to developing a fully-fledged and independent supply chain coordinator - developed along the lines of the Newcastle model and learning from these experiences, but suitably tailored to reflect the diversity of the Mount Isa to Townsville supply chain.

The membership of this supply chain will work best where all relevant stakeholders have representation

and visibility across key performance indicators and emerging challenges for the supply chain. This includes miners and agricultural interests, above and below rail operators, road agencies and road freight operators, port operators, warehousing specialists, stevedores, shipping agents, shippers and at times public land planners from the affected communities.

Coordinator treatment of stakeholder information and approaches to confidentiality

Of equal importance, a final coordination structure should allow for a truly independent coordinator role to exist above all of these stakeholder groups – a coordinator which perhaps, as in the Hunter Valley example, does not have the power to compel information, but which nevertheless works collaboratively across the supply chain by general agreement of all parties, will be of great benefit to the ongoing reduction of fragmentation in this nationally-significant supply chain.

In this context, the independent coordinator's access to and terms of use of participant data and other information is an area that deserves close attention, given the highly varied nature of the chain and the commercial sensitivities of individual actors in that chain. Pacific National noted this sensitivity in stating that:

'...formalisation of such an engagement (an independent supply chain coordinator) needs some care, given the commercial and access issues particularly with new entrants, where

- *Stakeholders may be unable or unwilling to share commercial plans and growth forecasts with potentially competing stakeholders ie other mining companies*
- *The operational needs and rights of new entrants and existing stakeholders may also need to be equitably addressed as demand grows on the corridor'*

(Pacific National submission).

Clearly the sensitivities involved will mean that a supply chain coordinator for Mount Isa to Townsville will not be able to make all matters transparent at all times; clear rules and operating procedures will need to exist to define how stakeholder information will be treated, to ensure probity and consistency. However, joint behaviour – in so far as it is practical – should remain the guiding principal of the supply chain coordination process. It will therefore be very important that the construction of the independent coordinator gives due attention to creating a structure wherein all stakeholders feel comfortable to volunteer a reasonable amount of information.

Taking the coordination role further: A detailed road/rail/port masterplan?

The principal motivation of the establishment of the Hunter Valley Coal Chain Coordinator was perhaps to reduce the waste and lost opportunities that come from insufficient transparency and accountable, informed behaviour in a complex supply chain. But much of its overall value lies in the fact that once established, in addition to promoting important day-to-day efficiencies, it affords the group with a far more strategic view of the commodity supply chain. This is of great benefit to long-term infrastructure planning and investment.

Once established, a fully-mature independent supply chain coordination process for Mount Isa to Townsville could build on the discrete, commodity-by-commodity assessments of the supply chain discussed earlier, to deliver an 'aggregated' picture of efficiency and capacity issues and priority investments across the chain in the interests of contributing more to national productivity.

This first plan lays the ground for a detailed and seamless intermodal freight masterplan

This report sees itself as laying the foundations for that mature and coordinated masterplanning outcome. Guildford Coal noted that:

'Given the opportunity for new trades, new entrants to the market and a requirement from existing users to grow their trades, Guildford would support the development of an updated masterplan that helped port users consider their investments in relation to the overall development of the port into the future' (Guildford submission).

While Legend International (Paradise Phosphate) argued that for the Mount Isa to Townsville supply chain:

'More transparency is needed in terms of access committed, versus utilisation and available capacity' (Legend International (Paradise Phosphate) submission).

A commodity-by-commodity approach will drive a total port/road/rail masterplan

Only a 'ground-up', commodity-by-commodity assessment of the supply chain infrastructure, involving all parties, will be able to arrive at a sound and aggregated view of total port and rail access, utilisation and capacity and trends or risks for the future. This work is therefore an essential first step for a Mount Isa to Townsville supply chain coordinator.

Recommendations - Does the lack of coordination mean the region is still a 'supply chain' in name only?

1. An independent supply chain coordination body and process should be established for the Mount Isa to Townsville supply chain. This should draw on the best practice example of the Hunter Valley's Independent Supply Chain Coordinator, but should be constructed to reflect and benefit the unique and diverse nature of the multi commodity Mount Isa to Townsville supply chain.
2. The Independent Supply Chain Coordination structure should encourage all commercial, government and community stakeholders to contribute to efficient and timely planning an investment outcomes. As such, the powers and scope of an independent supply chain coordinator should be closely defined and developed in consultation with all stakeholders. The resulting structure needs to build particularly strong processes and policies surrounding the management of commercial confidentialities and proprietary knowledge of individual stakeholders in order to encourage the maximum joint and transparent behaviour from all users and operators in the supply chain.
3. Once established, a first role for the coordinator should be an examination of supply chain efficiency and capacity challenges (and any resulting planning and investment priorities) on a 'commodity-by-commodity' basis for all of the major commodities of the supply chain, in order to create a sound aggregated view of supply chain capacity, efficiencies on offer and a transparent hierarchy of timely, efficient and sustainable plans and investments for the entire supply chain

The region is facing a changing freight commodity mix in future, with differing freight tasks

Key findings

- The 'narrative' of demand and production of the region's commodities suggests that this commodity profile will shift in emphasis over time, with a likely greater presence of some low-value, high-volume commodities in the medium to longer term. Some of these commodities, such as coal and magnetite, are already emerging in the supply chain;
- This shift forces the supply chain to confront challenging investment choices, as large-scale bulk commodity investments often operate on a rail-to-stockpile infrastructure arrangement that is somewhat different to what is required for the more traditional high-value, low-volume commodities of this supply chain;
- The prospect of coal being transported from the North Galilee coalfields for export from Townsville has occurred only recently and has produced significant shifts in supply chain investment planning and thinking. This has diverted planning attention from the existing rail and port alignment that handles over $8 billion in imports and exports. Consequently there has been little strategic effort dedicated to examining how existing commodity flows might be either enhanced or transitioned to new port, rail and warehousing infrastructure over time.
- A significant driver for considering all of these questions is the matter of the management and development of the Townsville State Development Area (TSDA) which is the logical expansion zone for the supply chain, but which has suffered from a lack of coordination and resolve over the past decade and the notable absence of customer influence over its long-term development.
- A coordinated government, industry and community plan for the TSDA in light of emerging infrastructure challenges would advance the efficiency and capacity of the current supply chain and future investments in a timely and holistic fashion.

The region's commodity base, and its likely production trends in response to world demand (as outlined earlier in this report) suggests that the traditional profile of exports from this region – that is, predominantly high value, low-volume mineral ores and concentrates such as copper, lead and zinc – will shift over time. For many decades now the principal low-value high volume presence in the Port of Townsville has been that of nickel ore, which is imported for refinement and re-export. But recent years and a changing global demand picture have seen the advent of a larger scale of other lower-value, higher-volume commodities such as rock phosphate and magnetite.

The discovery of coal in the North Galilee basin, an area proximate to the Mt Isa to Townsville rail corridor, now raises the possibility of the flow of significant coal tonnages through the Port of Townsville. In the longer-term, demand analysis suggests that significant reserves of magnetite and haematite iron ore, rock phosphate and shale oil production will see a progression to much more significant bulk commodities in future.

Coal and its infrastructure challenges have arrived suddenly

The scale and rapidity of the change that coal development has driven, and its implications for the supply chain, is best seen in the *quantum* shift in tonnage projections being advanced by the region's rail infrastructure provider, Queensland Rail. In the space of 3 years, the below-rail provider's high-case metric tonne *per annum* throughput estimates for the Mt Isa – Townsville rail corridor have increased by 150 percent in 3-years, predominantly reflecting the arrival of coal as a large-scale export product in the supply chain:

Table 5: QRN Comparative Peak Tonnage Forecasts from Isa line masterplans 09 & 12

	Low case (mtpa)	Medium case (mtpa)	High case (mtpa)	Comment
2009 masterplan	7.5	12.5	20	Coal is not discussed in 09 demand forecasts, magnetite increases foreshadowed as a potential growth driver
2012 masterplan	8	20	50+	Medium and high cases foreshadow 10+ - 30+ mtpa of coal flowing to Townsville from Hughenden
% shift in 3 years	6	60	150	

Large volumes of coal will necessitate 'rail to stockpile' logistics investments

The Interim Report noted that this significant shift in the commodity profile of the supply chain has implications for the sort of infrastructure required to support a changed freight task: specifically, a move to a greater low-value, high-volume bulk commodities freight task in future would require investment in greater rail-to-stockpile infrastructure – such infrastructure is not necessarily available in the present supply chain, which has traditionally been characterised by high-value, low volume minerals concentrates whose higher values mean that stockpiling is not efficient, and which instead rely on efficient and timely access to tipplers and berths for ship loading.

At this stage, clear thinking is needed about four matters:

1. **The existing rail and port alignment – its capacity, its efficiency and enhancement opportunities;**

2. **Development of new and improved rail and port alignments and port precincts that will cope with larger capacities and accommodate a range of port users in the longer term;**

3. **Transition risks, opportunity costs and optimal user timings for current commodities and their berthing and rail alignments to be shifted to new precinct and rail alignments; and**

4. **The role of the Townsville State Development Area in any future development and expansion, the administration of this process and the extent to which market demand drives timely and efficient developments**

The existing rail and port alignment – its capacity, its efficiency and its future

The incremental freight efficiency needs of and opportunities for the 'traditional' commodity clients of the port - such as copper, lead, zinc, nickel, cement, sugar, phosphate, sulphuric acid, cars and machinery and (more recently) magnetite, need to be considered in greater detail as a part of broader considerations on the timeliness of major new infrastructure investments – such as those foreshadowed in the Townsville Eastern Access Rail Corridor (TEARC) evaluation. These 'traditional' commodities continue to rely on the existing rail alignment, existing berths and existing warehousing arrangements, whereas newer infrastructure expansions might force such commodities to alter these arrangements. Planning to date is silent on matters of transition timing for these products to new rail and port alignments, or transition risks and opportunity costs involved. Current analysis is also silent on whether two rail alignments would be operated concurrently as a result.

A renewed focus beyond coal and any other future bulk commodities served by TEARC is important for the simple reason that it is the traditional commodities that to date have generated the $8.6 billion *per annum* port throughput - and which thereby have delivered (and in the case of most of these commodities, will most likely continue to deliver) value to this region. It is vital that the infrastructure needs of these customers are not overlooked.

Several stakeholder interviews conducted for the Interim Report suggested that there is latent efficiency and capacity within the existing rail and port alignment. This current alignment is not employed by the Townsville Eastern Access Rail Corridor, which would bring longer trains into the port from the east, across the Townsville State Development Area (TSDA). It appears that unlocking considerable latent capacity in existing port and rail infrastructure for existing product lines lies not in significant investment, but rather in better intermodal supply chain capacity and coordination as well as targeted investments and upgrades at key choke points, once identified.

In this respect, it is worth noting two facts about the current rail alignment into the port, which throw into question an assumption that is perhaps implicit in wider investment planning that existing infrastructure at the port has reached capacity:

- ***Inefficient ore tippling is creating avoidable congestion for rail access to the port:*** The port has two privately-operated ore tipplers (ie rail wagon unloaders) available for most ore concentrates, both of which permit some level of third-party access. These tipplers loom as a chokepoint to higher throughput. One tippler is old technology and according to GHD's TEARC Preliminary Evaluation takes 10 hours to unload a 50-wagon ore train; this is exacerbated by the lack of a return balloon loop for this tippler. A similar train can be unloaded at the other tippler in 3.5 hours. It does not appear that either tippler is operating at full capacity.

Cudeco Limited has submitted that it proposed construction of a third multi-user facility over 2 years ago when similar inefficiencies were in evidence, but that this proposal has not to date been adopted.

- ***Unloading technology for bulk dry products is very slow by world standards:*** Stakeholder interviews suggest that due to outdated port unloading infrastructure, bulk dry commodities such as mineral concentrates, sulphur, cement and fertiliser can only be unloaded at rates sometimes as low as 200 tonnes per hour, while world standards with modern unloading technology can offer rates well in excess of 1,000 tonnes per hour. This inefficiency will be exacerbated with expected changes such as increased sulphur imports resulting from closure of the Xstrata refinery and development of the Nornico nickel, cobalt and scandium project (Metallica submission). These delays can in their turn have 'knock-on' effects for berth occupancy and ship queuing delays, which themselves are magnified in Townsville by the fact that many of the port's ship berths are multi-user by necessity, rather than sole product berths that have been divided into distinct and dedicated 'precincts'.

- ***Port of Townsville has no comparator port relationships or measurements in place.*** Establishing comparator port relationships allows ports to measure themselves against best-in-class systems and innovations in ports in other parts of the world where similar commodities are handled, or challenges faced. The Port of Townsville cannot therefore benefit from the technology and knowhow transfer and benchmarking knowledge acquisition that flow from such relationships. The GHD preliminary evaluation of the Townsville Eastern Rail Access Corridor notes that the Port of Townsville's overall berth occupancy level for FY10-11 was 51% (GHD TEARC Preliminary Evaluation, p. 8). However, Port of Townsville's Annual Report for the same period shows actual berth utilisation of 38% (Port of Townsville Annual Report 2010/2011, p.23). Regardless of the precise figure, the low range that these two occupancy rates suggest reveals that there are significant efficiencies on offer from unravelling the road/rail/warehousing/loading/unloading/berthing processes for individual commodities at the traditional port alignment.

Cudeco Limited's submission asserts that these inefficiencies on the existing rail and port access alignment are material risks to their success:

'The MITEZ Freight Infrastructure 50-Year Plan is incredibly pertinent to Cudeco's Rocklands project – being the supply chain which will link the mine's copper, cobalt, magnetite and other mineral products to our global buyers...The greatest impediment the company faces in building a world-class mineral production and export operation, and clearly the most unproductive aspect to date, remains access to appropriate capacity along the supply chain from mine site to export markets via Townsville Port' (Cudeco submission).

This problem is symptomatic of a supply chain that might have more capacity available, but which is so fragmented that different parties – all acting with the best intentions, but limited in their access to data relating to the whole of the supply chain – cannot individually be certain as to what full capacity really looks like.

The development of this plan noted many examples of the difficulties encountered in establishing true capacity across the supply chain. In one case, the below rail provider advised an access applicant that some parts of the port rail infrastructure were too constrained for the applicant's desired access request – a request that had in turn been made to an above rail provider. But given the loading and unloading infrastructure shortcomings discussed above, the actual problem may lie elsewhere, with constrained rail paths being a symptom of another bottleneck, entirely, at unloading, which might be creating avoidable congestion on the rail loops in the port. The rail provider has little monitoring available for its trains once they proceed on to the port rail balloons and sidings and leave the network track proper, meaning it is not possible for this party in the supply chain to gain a complete perspective on true capacity, or where capacity might be 'pinched'. Whatever the actual answer in this case, nothing is helped by the fragmented and non-transparent nature of the supply chain, and this leads to confusion and frustration.

This is an example of a legacy issue that is not any one party's fault, but which inhibits the discovery of full efficiency and capacity in the chain. As discussed earlier, greater transparency in full supply chain coordination might well unlock greater efficiency from this existing infrastructure.

This is a review task that could easily form part of the commodity-by-commodity supply chain review task of a coordinated supply chain coordination group, as outlined earlier.

Development of new and improved rail and port alignments and port precincts that will cope with larger capacities and accommodate a range of port users in the longer term

Both the port and rail monopoly providers in this supply chain appear to have addressed the anticipated surge in coal through planning for investment in a Townsville Eastern Rail Access Corridor (TEARC), which would bring an 8 kilometre rail line for 1,400 metre trains into the port's newer precinct and allow for the greater rail activity that might be expected with a rail to stockpile system for large tonnages of coal. Importantly for social amenity considerations, the TEARC would remove the potential of coal being brought in through the city of Townsville itself on the current rail and port berth alignment, which in any event is restricted to shorter train lengths. This is of significance in considering the social amenity issues around coal, as the TEARC is further removed from the residential areas of Townsville than the traditional rail alignment of the port.

A preliminary evaluation of the TEARC sees the project, including consequential works to upgrade the rail line beyond the port and some port and channel investment, valued at $915 million, which, it is asserted, is $325 million more than a base case of retaining existing rail alignments (see GHD Preliminary Evaluation of TEARC *Capital Investment Costs p.13)*.

TEARC's present driver is coal

Through stakeholder interviews and public submissions, it has been made clear to the 50-year planning process that the TEARC investment is largely concerned – at

least initially - with accommodating an anticipated surge of new coal operations from the North Galilee basin. Given the existing range of established commodity operations on the existing port rail alignment, and noting the potential public amenity issues on coal transport in urban areas, it seems unlikely that large tonnages of coal could be accommodated on the current alignment – so understandably, a longer term, more efficient bulk solution has been considered, being TEARC. The Preliminary Evaluation of TEARC (*GHD, Townsville Eastern Access Rail Corridor Preliminary Evaluation January 2012*) makes no mention of targeted arrangements for other commodities to benefit immediately from this investment, and the tonnage projections for the TEARC capacity suggest strongly that the bulk of this capacity would indeed be given over to coal. While greater analysis over potential usage patterns for TEARC would perhaps shed more sophistication to these assumptions, it seems safe to conclude in broad terms that TEARC, at least in its initial conception, is an investment aimed at bulk coal operations.

Coal is certainly an emerging bulk commodity in the region. Providing an effective transport and export solution for this coal will contribute to regional as well as natural productivity. However, little planning has been done to date to consider what other discrete commodities would benefit from TEARC, and how they would transition, and when would be the best timing for that transition.

Transition risks, opportunity costs and optimal user timings for current commodities and their berthing and rail alignments to be shifted to new precinct and rail alignments

In discussing major new infrastructure investments such as TEARC, the Interim Report raised the established principle that for any significant new infrastructure investments to go ahead, investors – whether public or private, would first wish to be assured that current infrastructure usage and efficiency is being maximised. If it is not, expensive new investments risk being built on poor foundations – that is, any future efficiency gains extracted from existing infrastructure may in years ahead undermine the tenancy attractiveness and therefore the ongoing viability of costly new investments.

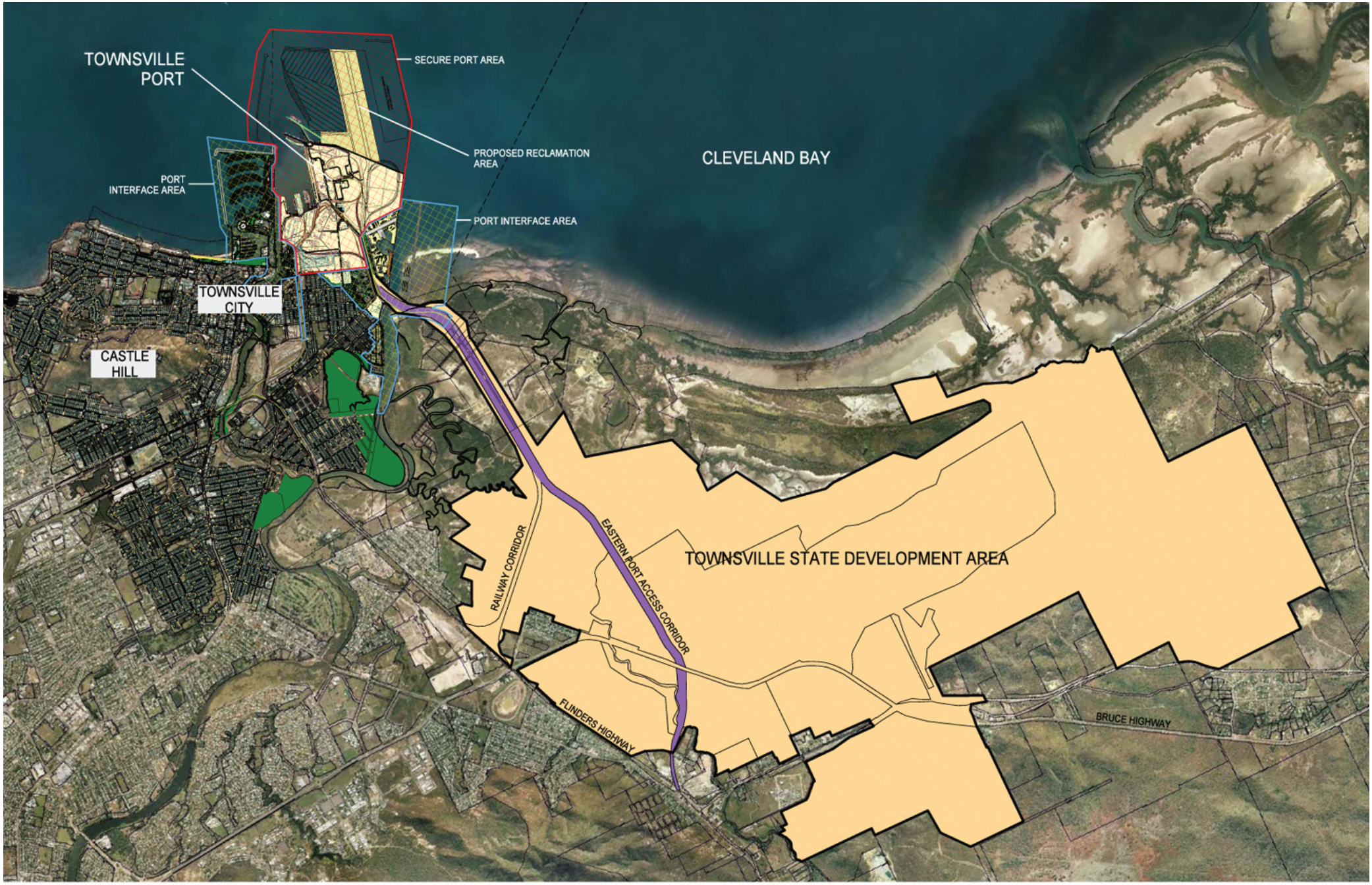
In summary then, the commodity profile of the region is indeed changing, but new products are arriving to complement well-established product lines – not necessarily to replace them. At least in the short-term and perhaps beyond, many of these 'traditional' commodities will still make a significant contribution to the overall value of the port.

It would seem prudent then that, while infrastructure plans for coal's development via TEARC might continue, a separate and targeted review of the potential to extract greater efficiency from the existing rail-port alignment – in a way that addresses urban amenity matters directly - is considered, particularly in the short to medium-term interests of the many 'traditional' commodity lines that have driven the value proposition for the Port of Townsville and its supply chain to date. As the Interim Report commented, competing investments in low-value, high tonnage rail to stockpile infrastructure and higher-value, lower tonnage commodities such as concentrates incur opportunity costs and force decisions on more traditional commodities that are not always easy to see.

It is clear that the infrastructure needs of both sides of a changing commodity mix will need to be catered for in a balanced way in future. As Guildford Coal has noted:

'Simply, the commodities with the lowest margin (for example coal) cannot be forced into an existing fixed-cost margin business model based on higher value products. This approach cannot be sustained and will not allow the development of mineral and rail assets to their full potential, with the resultant loss in medium and long-term income to the state and region' (Guildford Coal submission).

This need for balance would appear to be a strong driver for a closer examination of existing capacity on current alignments for traditional commodities, while further development of the TEARC with a predominant focus as a coal solution could proceed concurrently.



CONTEXT PLAN - TOWNSVILLE, THE PORT OF TOWNSVILLE AND THE TOWNSVILLE STATE DEVELOPMENT AREA

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Department of Infrastructure

Transparent and dedicated analysis of the opportunities for efficiency on existing alignments and the costs, risks and timeframes involved of transition to new port, warehousing and rail alignments - such as those on offer in TEARC and TSDA – are very worthwhile tasks for the supply chain to undertake.

The role of the Townsville State Development Area in any future development and expansion, the planning structures and administration of this process and the extent to which freight user preferences drive timely and efficient developments in the TSDA

The Townsville State Development Area (TSDA) was declared by the State Government in 2003 as a zone for industrial, manufacturing and logistics expansion. It occupies over 4,900 hectares of land within a close proximity to the port and major road and rail links. A major road access to the port has already been built to connect this area to the port and any future Townsville Eastern Rail Access Corridor would also run through this area.

It seems clear that given anticipated urban expansion, alternative land use preferences in and around the city over time, and with the amenity of the growing Townsville community in mind, the port and its customers will look to develop the TSDA much more comprehensively. The extra land offered by the TSDA aligns well with the fact that modern large-scale ports seek to be developed with separate and distinct commodity 'precincts' to reduce congestion and aid efficiency. The TSDA is particularly important looking ahead to a shift in commodity profile to stockpiled bulk commodities, as it is much better placed to handle stockpiles of commodities than the existing rail alignment.

The Port of Townsville will eventually expand to the greater land availability and ease of road and rail access and operations offered by the TSDA. However, for many existing commodity lines in this port, the focussing question will be when that investment and change needs to be made, and the relative value or opportunity cost in pursuing targeted and cost-effective efficiencies in the current rail and port alignment in the meantime.

Feedback from several stakeholders has suggested that there has been little movement in the planning and investment of TSDA in the decade since it was declared. A realignment of rail, warehousing and berthing would be required for many traditional port users to take advantage of this expansion, yet little if any economic benefit-cost analysis has occurred with commodity customers on how any transition would be managed, and when this transition might prove most timely for different commodities.

Planning and coordination structures for TSDA need improvement

The planning and coordination structures around TSDA appear to be a particular shortcoming of current efforts to develop this area – and this impacts on the wider opportunities open to the supply chain as it faces a changing commodity mix and resulting pressures to change infrastructure investments over time.

Closer investigation of the current TSDA structure and discussions with some stakeholders suggests some important shortcomings:

The steering committee process has lost significance: the initial steering committee in 2003 was to be chaired by Queensland's Coordinator-General, but feedback suggests that this role was quickly delegated, thereby reducing the importance of this task; similarly, feedback suggests that other members of the steering committee have delegated their presence on this committee over time.

Industry user preferences are not sufficiently represented: in the planning and coordination process – initial questioning suggests that the TSDA steering committee process has been largely left to local and state government bureaucracies, with little direct and consistent involvement from major potential users of the site on their preferences. This appears to be consistent with the wider lack of coordinated user involvement in the port and road and rail planning and investment processes as discussed in the Interim Report.

There is no obvious pathway for private investment or user development proposals: feedback suggests that there is little structure or visibility around the process for applying for development and access to the site, or questions of ownership or regulation of multiple users on the TSDA. Again, this is consistent with the wider lack of transparency found in the supply chain, with a number of verbal and written submission pointing to confusion over agreed processes for access, development and planning of freight infrastructure expansions or enhancements.

Without industry leadership, current TSDA planning risks repeating past shortcomings

The aforementioned shortcoming need to be addressed if the supply chain is to embark on a more user driven and structured strategic development of the TSDA. Until these more open, representative and higher priority structures are put in place, current efforts for planning the TSDA look set to experience the same difficulties as previous efforts. The 2011 Townsville Futures Plan signals 'turbocharger' actions for the TSDA as follows:

- *'Confirm the strategic role and function of the Townsville State Development Area, including but not limited to consideration of transport and logistic uses*
- *Undertake a detailed planning study to identify land use and development parcels*
- *Identify infrastructure requirements including cost apportionment and funding mechanisms for the future development of the Townsville State Development Area*
- *Fast track processes to establish a framework to facilitate privately owned industrial land within the Townsville State Development Area to be development ready*
- *Continued project attraction and facilitation to support and encourage the establishment and expansion of industries within the Townsville State Development Area'*

(Townsville Futures Plan 2011 p.27)

Coordinated industry involvement is needed more than further plans

Feedback suggests that much of these objectives have already been established, and that what is needed now is the right structure, driven strongly by industry users, acting in a coordinated fashion, to progress real and timely plans and investments, rather than further bureaucratic planning. This user driven approach can in turn only occur when current port users have been consulted on the costs and risks associated with a transition from current rail, port and warehousing requirements. An effective Mount Isa to Townsville supply chain coordination process is the right vehicle through which to pursue such practical, market-oriented objectives.

Recommendations - The region is facing a changing freight commodity mix in future, with differing freight tasks

4. The Mount Isa to Townsville supply chain delivers well over $8 billion per annum in trade through the Port of Townsville. While new rail and berth alignments are under active consideration, the majority of wealth being created through the port arrives on an existing rail and berth alignment. Separate from discussions of any new port and rail alignment investments that might be pursued to address a changing commodity task in the supply chain, the independent supply chain coordinator should examine available further efficiencies and latent capacity on the existing Port of Townsville rail, warehousing and berth alignment, working in consultation with all affected parties
5. Work should continue on planning for a new Townsville Eastern Rail Access corridor via the Townsville State Development Area, as there is general agreement that this is a logical expansion zone that will benefit public amenity in the city of Townsville while also offering greater space for the development of dedicated commodity 'precincts' an potential stockpiles that might be required as the supply chain experiences a shift to more bulk commodities in future. However, this planning work should give active consideration to the transition costs and risks associated with any disruption that existing port users might face in moving to this new port alignment, and what might be the optimal timing for this eastern development in the context of these potential costs and risks.
6. The efficient and timely development of the Townsville State Development Area (TSDA) is of vital importance to the viability of any new rail and berth alignments at the Port of Townsville and it has a potentially important role to play in adapting the Pot of Townsville to anticipated future increases in bulk commodities from this supply chain. But the administration of the TSDA has languished over the past decade, with little involvement from industry itself in this planning and development process. The administration of the TSDA, including how access and development preferences from industry can be best facilitated, requires immediate review. The TSDA should be afforded higher priority by governments in seeking the best sustainable growth outcomes for this supply chain.


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The supply chain best be served in future by two ports rather than one?

Key findings

- A long-term regional supply chain strategy should consider the merits of all efficient and available options for freight shipping;
- This should be balanced and placed in context by recognition of the fact that the coal industry that is seeking to emerge in the North Galilee coalfields requires an effective transport solution and Townsville is under active consideration as a destination port for this coal. It is important for national productivity that an efficient and sustainable freight solution is found for this coal as soon as possible;
- The Port of Abbott Point is open to considering a connection of its rail link to the Mount Isa line in the future to allow the commodities in this region access to a deepwater bulk port. This extends to an active consideration for fitting of this line to dual or standard gauge track, in line with national rail network objectives;
- The below-rail provider advises that it can provide the infrastructure to rail coal in the anticipated volumes to Port of Townsville (TEARC), but questions of social amenity remain to be considered; and
- The first order question for coal operations at Townsville is whether shipping cost profiles from Townsville can be sustainably cost-effective for coal clients, noting the shipping depth restrictions of the port, and consequently the possibility of higher costs for shipping coal from this port compared with a specialised deepwater port such as Abbott Point. Close analysis of this question is of critical importance to the ability to form an educated view on the proprietary risk of coal operations at Townsville in particular and the prospect of bulk operations of any description at Townsville in future.
- Resolving the coal and bulk commodity question at Townsville provides the only effective and responsible context for considering the two seaport strategy.

As discussed in the Interim Report and in both the demand section of this report and immediately above, the Mount Isa to Townsville supply chain's mix of mineral commodities is changing. A notable change has been the emergence of significant quantities of coal in the North Galilee basin, which is close by to the Mount Isa to Townsville rail corridor. As Blackwood noted in its submission:

'New commodities such as coal bring very different dimensions to the corridor' (Blackwood submission).

One of these new dimensions is the high tonnages and intensive operations implied by the presence of a large coal freighting operation. The coal of the North Galilee is a significant resource that if linked to an efficient freight infrastructure solution would generate significant wealth for not only its proponents but the State of Queensland and nationally. In this sense, finding a freight infrastructure solution for this emerging commodity should be considered of first order importance.

The Interim Report raised the proximity of the deepwater coal port of Abbott Point, less than 200km south of Townsville, as a potential complement to the Port of Townsville's emerging freight task, noting that as more bulk commodities might appear in future (for example, shale oil; coal; haematite; rock phosphate and magnetite in larger quantities) that a connection of the Mount Isa rail corridor with Abbott Point via the Galilee Basin may offer a more competitive solution for low value, high-volume bulk products that the Port of Townsville and its rail approaches. Feedback on this matter reflects a range of views. North Queensland Bulk Ports (NQBP), the port authority for Abbott Point, indicated that it:

'Commends and supports the proactive approach taken to prepare a long term infrastructure plan for the Mount Isa to Townsville Economic Zone (MITEZ). NQBP believes there is a basis for the Port of Abbott Point to be considered a viable port facility to service the MITEZ and therefore strongly supports a two seaport strategy being included in this infrastructure plan...Port of Abbott Point is a natural deep water port with a capacity of 50 million tonnes per annum (mtpa). Planning is already well advanced and the approvals process completed and awaiting Australian Government final approval, which will see the port's capacity increase to 385 mtpa' (North Queensland Bulk Ports submission).

The NQBP further raises the prospect of the conversion of such a link to either dual or standard gauge rail in the longer term, in line with national rail network objectives.

Guildford Coal, however, submitted that:

'While Guildford supports (supply chain development through scenario planning around the best available evidence) and understands the will to examine a two seaport strategy, it should not interfere with the reality that the current supply chain can more than adequately handle the development of projects such as Guildford's Hughenden and White Mountain mines. Given the timeline of the Guildford project it is critical for stakeholders to maintain a focus on the existing supply chain, and ensure that any impediments to the development of similarly sound projects are cleared' (Guildford Coal submission).

The matters raised therefore seem to fall into two categories – there is a broad question of whether connecting Abbott Point to the Mount Isa rail corridor would be of value, given what is known about the high tonnage, low value nature of some of the likely emerging products in the region. This issue appears to be less contentious. The second matter is to what extent a linkage to Abbott Point would put at risk the development of a bulk coal supply and shipping investment at Townsville.

Efficiency in coal infrastructure – a matter of rail and port optimisation

The efficient movement of low-value, high-volume commodities such as coal relies heavily on the economies of scale and reliability of land and sea transport. On the land side Queensland Rail and the Port of Townsville, through the rail masterplan and the TEARC process, suggest that landside solutions can be developed for efficient bulk commodity movement products. However, even assuming that efficient railing to coal stockpiles is available at Townsville, and further assuming that community amenity concerns over coal stockpiling near the city of Townsville can be satisfied, the relative efficiency of the coal freight task from this port would rest heavily on the precise capacity of bulk carriers that would be servicing the stockpiles.

The Interim Report noted the confusion that appeared to surround current safe berth and channel depths at the Port of Townsville. While the term 'a Panamax port' (describing a port which can accommodate a 'Panamax' vessel with a typical freight and supplies tonnage of around 60-80,000 tonnes) has at times been applied to Port of Townsville, the Interim Report's enquiries, which included consultation with shipping agents at the port, the Townsville Harbourmaster and Maritime Safety Queensland data, suggest that Panamax access to the port is actually quite limited and that the port certainly cannot fully load a Panamax-class vessel – the largest fully-laden vessel available to the port being of the 'Handymax' class ('Handymax' denoting a vessel with a maximum freight and supplies tonnage of only up to around 50,000 tonnes).

Given that the nearby Port of Abbott Point can accept the larger style of 'Capesize' ore carriers (ie 200,000 tonnes of freight and supplies and upwards), an obvious question for coal proponents and investors in Townsville to ask is 'will the sea freight of coal be

competitive from Townsville?' To date, this quantifiable analysis – which is based on asking simple freight competitiveness questions - does not appear to be available in current planning and investment documentation, including the TEARC preliminary evaluation. The questions are simple enough:

- **What is the precise tonnage capacity for coal carriers at Townsville now, and what scale of cost and timeline would be involved in dredging the port to accommodate fully loaded Panamax-class coal carriers and beyond?**

- **Are the consignments of coal that are proposed to be shipped from Port of Townsville via TEARC intended for the same or competing destination ports as the consignments of coal that are leaving Port of Abbott Point? If so, what would this mean for the cost competitiveness of the Port of Townsville as a coal port over time?**

- **Is coal from the Port of Townsville intended to be shipped to destination ports with shallower depths (ie destinations where its shipping solution will not be competing 'head to head' with the far larger and more efficient ships on offer at Abbott Point – and if so, does this create a viable and sustainable 'niche' coal trade for Townsville into the future?**

What are the implications for the Townsville Eastern Rail Access Corridor (TEARC)?

These focus questions are of direct relevance to the plans to develop the Townsville Eastern Access Rail Corridor to accommodate the coal trade from the North Galilee coalfields. A considerable part of the overall competitiveness and sustainability of a coal port development at Townsville – or put another way, the relative risk of developing stranded assets - lies in the detailed cost profile of North Galilee coal shipments from this port, relative to Abbott Point in particular. In the interests of providing clarity and certainty for coal proponents, port and rail planners, investors and the community, targeted analysis around these questions of cost-competitiveness and sustainability should be carried out as soon as possible.

Would such a shipping study merely be 'doubling up' on existing port analysis?

At his point, it is worth noting that the Port of Townsville's submission to the final report considers further study on the question of Panamax-class access to Townsville to be redundant, given internal port studies on Panamax ship access that are presently being pursued:

'The (Interim Report') suggestions (for pursuing efficiency opportunities at the Port – p.43 of Interim Report) are generally ill-informed. For example the Port Expansion Environmental Impact Statement is addressing the issue of Panamax ship access.' (Port of Townsville submission).

However, what is being argued for in relation to TEARC in this report is not simply for a study to be done to explain 'how much it would cost and how long it might take' to prepare the port for full Panamax operations, as sought by the Port EIS. Rather, an assessment of coal shipping cost profiles of existing Handymax and any future full-load Panamax or larger vessels from Port of Townsville is recommended as a first-principle piece of risk analysis through which lessons can be drawn about the fundamental price-competitiveness of this commodity being shipped from Townsville in the first place.

The motivator is therefore not simply a 'double-up' of the port's own internal expansion efforts, but rather might be viewed as an important piece of due diligence, embarked upon in the interest of lowering the 'stranded asset' or proprietary risk of Townsville as a sustainable coal export port. This study should be undertaken and made openly available across the supply chain to inform all stakeholders on this important matter.

There are also significant broader environmental risks and costs associated with dredging of the Port of Townsville to accommodate larger vessels in order to present a more competitive bulk commodities freight solution to the supply chain. These matters are dealt with in more detail in the fifth of the strategic or 'pivot' questions for the supply chain, further below.

Whole of supply chain capabilities must drive major infrastructure investment thinking

Queensland Rail Network's submission also raises the importance of understanding the capabilities of the entire supply chain when examining investment viability:

'As the interim report describes it (p.33), a challenge for determining an appropriate strategic direction lies in the determination of the most appropriate destination for the different products. The best destination depends on a number of factors including the volume and characteristics of the products themselves and the forward supply chain' (Queensland Rail Network submission).

For these reasons, this report does not in any way seek to pass comment on whether or not a coal logistics in Townsville is viable or sustainable, on the basis that the detailed key input work surrounding relative coal shipping cost profiles from this port are not yet established, and have not been compared transparently with their equivalents at Abbott Point, making the forming of a view on viability impossible at this time. Commissioning such work as a matter of priority would quickly bring some clarity to this strategic matter for the Mount Isa to Townsville supply chain.

Recommendations - Could the supply chain best be served in future by two ports rather than one?

7. The viability or otherwise of a two seaport strategy for the Mount Isa to Townsville supply chain rests heavily on the question of the Port of Townsville as a viable seaport for the cost-effective sea transport of large volumes of bulk commodities like coal. Accordingly, a detailed analysis of the relative cost profiles of coal shipping capabilities at the ports of both Townsville and Abbott Point should be conducted as a matter of high priority, noting that the cost effectiveness of coal shipment or otherwise from the Port of Townsville plays a central role in further informing studies on the viability of a coal rail to stockpile investment at that port. Specifically, a relative cost profile analysis of coal shipments from both ports should consider the following questions:
    - What is the precise tonnage capacity for coal carriers at Townsville now, and what scale of cost and timeline would be involved in dredging the port to accommodate fully loaded Panamax-class coal carriers and beyond?;
    - Are the consignments of coal that are proposed to be shipped from Port of Townsville via TEARC intended for the same or competing destination ports as the consignments of coal that are leaving Port of Abbott Point? If so, what would this mean for the cost competitiveness of the Port of Townsville as a coal port over time?; and
    - Is coal from the Port of Townsville intended to be shipped to destination ports with shallower depths (ie destinations where its shipping solution will not be competing 'head to head' with the far larger and more efficient ships on offer at Abbott Point – and if so, does this create a viable and sustainable 'niche' coal trade for Townsville into the future?
8. These findings should be made public and – depending upon the results – could drive a wider discussion, held via the supply chain coordination process, of the merits of the Mount Isa to Townsville rail corridor being 'opened' to the deepwater port of Abbott Point, either via freight redirection via the existing track through Townsville and south along the northern line, or via the construction of a linking railway between Abbott Point and the Mount Isa line via the North Galilee basin. This discussion and analysis might include comparative pricing of rail options to both ports to lend clarity to supply chain decisions in the future.
9. Any available existing analysis that might consider the costs and risks of an Abbott Point rail linkage should be made available for open and transparent and discussion by the stakeholders of the Mount Isa to Townsville supply chain, via the supply chain coordinator process.

Have we fully accounted for Defence's strategic interests in the Port of Townsville?

Key findings

- Defence's interests in the Port of Townsville and the infrastructure links to allow for amphibious operations at this port are of a strategic nature and this status can be expected to be maintained, if not increased in relative importance, over the longer term;
- Defence and therefore Australia's national security interests will benefit from a more strategic engagement with the supply chain planning and investment process. In this sense, Defence should be brought into the Mount Isa to Townsville supply chain coordination process; and
- Defence is preparing a formal submission to this pivot question, which coordinates the views of all three arms of the service. This response will be of value to the independent supply chain coordinator.
- Defence's interests in the port and supply chain need to be made clear, as they represent in some cases a competing interest to other high-value port and supply chain plans and potential investments. These other port interests – and therefore the whole supply chain - will benefit from an early and thorough appreciation of Defence preferences.

The Interim Report raised to greater prominence the truly strategic nature of Townsville, as port and associated transport infrastructure vital to national security interests. Townsville is a military garrison of long standing and importance; it is one of only two northern ports of strategic significance to the Australian Defence Force for mounting amphibious operations from northern Australia (the other being Darwin). In regard to the latter capability, Defence (Navy) has advised the MITEZ planning process that the imminent arrival of the Canberra-class Landing Helicopter Dock (LHD) vessels (ie amphibious lift ships), at an overall length of some 230 metres, could provide operational challenges to the port, and that this and other related infrastructure planning matters, such as naval supply and the ability to load and unload taskforces of personnel, supplies and armour fluidly into and out of the port while minimising disruption to wider port activities, was seen as of great importance.

The Interim Report was provided to the Vice Chief of the Defence Force, as the nominal owner and operator of all Defence infrastructure, along with a formal invitation to engage in and comment on the

report findings. At time of writing, a formal response has not yet been received, but an interim response from Defence indicates that the MITEZ 50-year freight infrastructure plan has afforded Defence an opportunity to better consider its long-term infrastructure requirements for Townsville in a more strategic and coordinated fashion with the region. For the region, the involvement of Defence in supply chain coordination matters, where deemed relevant, seems of great benefit. The Port of Townsville and the region should act early to maximise the benefits that come from the employment and wealth generated by a growing Defence presence.

It has also been raised in the working group process to this plan that many of the infrastructure needs for Defence amphibious operations bear similarities to the sort of infrastructure typical in marine support operations to the offshore mining sector. The opportunity for commonality in investment in this field is an area that it is felt would be worthy of further exploration through the wider supply chain coordination process.

Early and complete Defence involvement minimises costs to other infrastructure users

As the Interim Report illustrated, the freight task that is concentrated through the Port of Townsville is of national significance. The many different port users or potential users, via a supply chain coordination process, will best add value to this freight task by better understanding the full range of planning and investment pressures facing the port and its landside infrastructure, such as roads, rail and warehousing. This includes a close understanding of Defence intentions, and how they might shape the long term opportunities and constraints for other port users.

Having Defence objectives enunciated clearly and early in the process to inform other port users and drive considered land use and planning decisions will be an essential step to maximising the port and city's value as both wealth generator and national security asset.

Recommendations - Have we fully accounted for Defence's strategic interests in the Port of Townsville?

10. Defence views the Port of Townsville and its infrastructure links as a strategic asset in the national security interest. Accordingly, future Defence infrastructure planning and investment preferences of the Port and its landside connections should be accommodated by having a coordinated Defence presence within the supply chain coordinator process. Part of this process should consider the common benefits that might be derived for the port and Defence in the field of amphibious lift infrastructure and offshore mining industry support capabilities.

Do the regulatory approval processes across the chain support private infrastructure investors?

Key findings

- The slow pace, complexity and perceived lack of consistency in the many regulatory approval processes for this supply chain is a major source of frustration to all stakeholders and acts as a significant barrier to optimising efficiency;

- The current process whereby Queensland's Coordinator General manages many of the approval processes for significant projects has its critics: there is a sense from the feedback of some stakeholders that the involvement of the Coordinator-General is not sufficiently strategic, instead being dragged down to the oversight of many 'piecemeal' projects. This seems to be another symptom of the lack of coordination and strategy across the supply chain;

- Publishing a register of regulatory approval processes and beginning the task of measuring and analysing the length of approvals processes and their complexity is a simple means for the supply chain to begin to improve the situation over time; the transparency involved in a register of approval processes would drive more accountable behaviour and allow for specific adverse trends in the regulatory approvals process to be identified and remediated over time;

- Given that the Mount Isa to Townsville supply chain is of national significance, a separate streamlined and prioritised approvals process for the proposals considered of strategic importance to the supply chain could be considered;. oversight of these proposals by a supply chain case manager might allow for active identification of the most efficient path to overall decision for complex proposals, where multiple processes are involved;

- The establishment of a strategic approvals process for the most important developments in the supply chain will only maximise benefits if the supply chain itself is driven by an effective coordination group. It seems a reasonable quid pro quo that a special regulatory process for the most strategic supply chain development be made contingent on the establishment of a working independent supply chain coordinator as previously outlined in this plan.

- Given that the supply chain and other important growth areas of northern Queensland have suffered from a perceived lack of regulatory attention when compared to the South East corner of Queensland, the State government could deliver greater priority attention to the more significant projects of the Mount Isa to Townsville supply chain – and indeed other areas – by giving an undertaking that the Deputy Coordinator-General would spend a certain amount of time in the supply chain and surrounding growth areas of far north, north and central Queensland. The intention would not be to add to the resource requirements of this office, but simply to ensure more on the ground attention from senior regulatory officials for the projects of significance in the region.

- One of the most contentious areas for regulatory approval in this supply chain is the maritime environment adjacent the Great Barrier Reef, as it relates to the need to dredge for improved port operations. This aspect of the development approvals and regulatory process presents very significant cost, time and social licence risks to supply chain development.

- A strategic relationship should be established between the Mount Isa to Townsville supply chain and the Great Barrier Reef Marine Park Authority (GBRMPA) to allow for a proprietor driven but transparent cumulative impact research to be carried out, so that future dredging and related activities occur in the context of a transparent and close relationship with environmental stakeholders and a body of cumulative research can be developed. The North Queensland Bulk Ports engagement and planning strategy around similar matters offers a good template for a supply chain coordination group to pursue with GBRMPA in this respect.

The Interim Report received feedback from the great majority of the stakeholders that it interviewed, to the effect that the process and timing of regulatory approvals acted as a significant brake on the productivity potential of the supply chain. In addition, the Interim Report also raised the prospect of the time horizons for some regulatory approvals, such as development approvals, not being synchronised with the typically long repayment periods facing investors in freight infrastructure. It was asserted that this could have the effect of dissuading future strategic investments in the supply chain on the grounds of proprietary risk, particularly in relation to port and channel deepening and other dredging activities at the Port of Townsville.

Submissions to the final report strongly reiterated the concerns felt by stakeholders about the length and multitude of regulatory processes facing any development in the supply chain. Metallica Minerals Limited, a miner of nickel, cobalt and the extremely rare earth scandium oxide near Greenvale (and one of only four commercial extraction-class scandium deposits in the world) listed 'environmental approval and mining lease approval' as hurdles to project development.

Cudeco Limited cited difficulties in:

- 'The lack of clarity surrounding process, approvals, timing and access in relation to doing business...(and) no clear avenue of appeal to a higher authority or independent ombudsman in conditions or decisions made by DERM, Port of Townsville or QR Network'.

For its part, the Port of Townsville itself pointed to shifting public approvals processes and timeframes that reduced the certainty in the approvals process:

'The (approval) processes are constantly changing with a very large impact on cost and time of process. The processes should be defined and there should be statutory timeframes on regulators providing response at each stage of the process. Without these requirements it is nothing for approvals processes to blow out by a couple of years' (Port of Townsville submission).

Submissions from other parties made similar points. As far as solutions to the complexity of process and time delays are concerned, the Port of Townsville noted that:

'The bi-lateral agreement between the State Coordinator-General and Commonwealth was supposed to provide this coordinated approach to approvals. This process has completely broken down, to the point of being useless. A review should be undertaken as to why it has failed prior to attempting to reinstate' (Port of Townsville submission).

Regulatory approval reform is challenging, but it is increasingly important

Beyond isolated reviews, the matter of how to improve regulatory process and timeframe is particularly complex. It is not a matter confined to the Mount Isa to Townsville supply chain: numerous regulatory review processes have been conducted across Australia over recent years. The OECD has noted that:

'As traditional barriers to trade have fallen, the impact of domestic regulations on international trade and investment has become more apparent than ever before. In a global economy, regulations need to be market-oriented and friendly toward trade and investment' (OECD Review of Regulatory Reform: Australia 2010 p. 185)

Recently, Infrastructure Australia produced a review of approval processes for major infrastructure *(Building Australia's Future: A Report to the Infrastructure Working Group of the Council of Australian Governments* June 2009) that looked at Australian and international examples to determine a better way forward for approvals. While there were many conclusions drawn from these comparisons and analyses, one matter stands out for discussion in this plan: under arrangements in Queensland:

'the most consistently used process consists of the significant project declaration for environmental assessment and one of the planning assessment methods, determined by the type and scale of the project....if this is done, the Coordinator-General then manages the Environmental Impact Statement (EIS) component of the approvals process' (Infrastructure Australia - Building Australia's Future p.83).

The current Coordinator-General regulatory oversight approach may be overstretched

While there may be merits in this approach in theory, the Port of Townsville's comments about the shortcomings of the current Coordinator-General processes as observed in practice point to a need to attack this problem differently. These comments are consistent with the informal comments of many individuals interviewed in the course of developing this plan: many passed comment to the effect that the great diversity of the Mount Isa to Townsville supply chain, and the many diverse projects within it, was resulting in a small Coordinator-General presence being 'run off its feet' juggling many different projects, which in turn limited this body's ability to plan and act strategically across the supply chain.

A greater 'on the ground' presence by senior regulatory approvals executives is required

The working group discussions around the final report reflected on the lack of profile that regulatory approvals in the Mount Isa to Townsville supply chain can suffer from, given their remoteness from the seat of state government in Brisbane, in far south east Queensland. One approach advanced for bridging this remoteness and affording key issues in Mount Isa to Townsville greater prominence might be to increase the number of days that the most senior regulatory officials spend in the region. While the plan does not advocate for a net increase in bureaucracy associated with the work of the Coordinator General, it would be worthwhile to stipulate that the Deputy Coordinator General at least was to spend a certain amount of time in the supply chain dealing with regulatory issues each year; in this regard it is also worth noting that the Deputy Coordinator General appears to have been based in Townsville during the mid-late 1990's.

Making approvals timeframes public would drive more accountability

While perhaps not an immediate solution to all criticisms, one simple improvement to the process would surely come from measuring and reporting on the timeframes of the approval processes in the supply chain, wherever this was deemed achievable. Over time, the results would allow for powerful trend analysis to be carried out and this in turn would allow government to better target resources and attention to the most critical failure points in the broader approvals process. The value of such 'measure to manage' approaches lies in their transparency: information collected should be readily available to inform analysis by all parties and build more accountability into the approvals system. This information would be of great relevance to the Independent Supply Chain Coordinator and stakeholders in the supply chain, for example.

A nationally-significant supply chain deserves case managed regulatory processes for the most strategic planning and investment proposals

The Interim Report also asserted that the Mount Isa Supply Chain, with its gross regional value-added contribution to the national economy of $15 billion last year (source: ABS data), was of national significance.

Another step to improving the approvals and general regulatory outcomes of this supply chain could lie in creating a special category of approval processes for projects deemed of special significance to this supply chain. Such a process might afford significant project applications immediate attention by a central point of contact for all approvals, which, rather than simply acting as a 'one stop shop' would take on something of a 'case manager' role, actively analysing a critical time path analysis for complex proposals, so that the most efficient path to decision could be put in place for the applicant; equally, the 'case manager' for the most critical proposals in the supply chain might be expected to identify which of the often many 'default' processes that all applications must travel through could be dispensed with, where in the 'case manager's' opinion the default process is not relevant to the application and as such represents only further delay to the process. In this respect, North Queensland Bulk Ports submitted an alternative approach to strategic infrastructure approvals across its supply chain:

'This 'streamlined' or 'whole of site' approach provides both certainty and clarity for proponents together with effective cost and project management. This is an important lesson for the Mount Isa to Townsville supply chain in understanding the regulatory approvals process and how it can be effectively managed/ coordinated by a central body or group of key stakeholders/agencies to ensure a 'whole of supply chain methodology can be adopted and implemented' (North Queensland Bulk Ports submission).

Can targeted 'foundation research' now improve approval outcomes for the future?

Finally, the notion of extending approval time horizons is worth examining, particularly in relation to the environmental approvals for dredging and other maritime development at the Port of Townsville. Such activity is of vital importance to the supply chain, and such project investments can have long repayment periods, requiring longer approval certainty to reduce the otherwise significant proprietary risks involved.

Reducing dredging and other maritime approvals risk through early and strategic supply chain coordination with Great Barrier Reef Marine Park Authority (GBRMPA) and the Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPaC)

One of the costliest elements of the supply chain for approvals can be the matter of dredging and other linked activities around a seaport. In Townsville, the risks associated with these activities, and the expectations placed on development from a 'social license' perspective are understandably heightened due to the proximity of the Great Barrier Reef Marine Park.

For the Port of Townsville and supply chain stakeholders to shape this maritime infrastructure efficiently and sustainably in the decades ahead, the community and environmental stakeholders must be considered direct partners in the supply chain - and afforded an early role in comprehensive planning for these needs.

The Federal Government Great Barrier Reef Marine Park Authority is the body charged with protecting the future of the reef. Another key stakeholder is the regulatory authority, (SEWPaC). Accordingly, these authorities will need to be built into a supply chain coordination process in areas of relevance, for discussing the port dredging and related needs, both short and (anticipated) long-term, so that planning developments can occur in partnership.

In addition to engaging with GBRMPA and SEWPaC, the Mount Isa to Townsville supply chain would benefit from developing *cumulative impact assessment research* – that is, a thorough body of reference science on Townsville's maritime environment, to form a more productive context for all future maritime infrastructure developments. This approach is currently being undertaken by North Queensland Bulk Ports, which is investing considerable effort in concert with SEWPaC and state and federal agencies to build environmental science knowledge for its ports.

Much of this work is not 'applied' science, undertaken to inform specific investments, but rather 'foundation' science, undertaken to establish agreed common ground for considering all future development proposals and governance structures in a much swifter fashion. Such an approach sat present represents best practice for reducing the proprietary risks and costs associated with all individual maritime development approvals in the future.

A similar commitment to cumulative impact assessment research, undertaken by the Port of Townsville and other relevant supply chain members, drawing on the lessons learned in the North Queensland Bulk Ports experience, and perhaps drawing on the academic capabilities of James Cook University's Environmental Science research faculty, would be of great value in this respect.

Recommendations - Do the regulatory approval processes across the chain support private infrastructure investors?

11. There is an overwhelming view amongst stakeholders to the Mount Isa to Townsville supply chain that the current regulatory approvals process is complex, inconsistent, subject to change with little notice and no clarity on available appeals arrangements. As such the current regulatory approvals process should be seen as a very significant brake on potential investment and enhanced operations in this nationally significant supply chain.
12. One means of improving these arrangements over time would be to publish a register of development applications for the supply chain and monitor and analyse the timelines and costs of such approvals over time to better determine where most delays are occurring and why, and implement remedial actions. This should be implemented for the Mount Isa to Townsville supply chain and the data made transparent to the independent supply chain coordinator.
13. The shortcomings of the current system extend to the role of the Coordinator-General's office in taking the lead on approvals for significant projects. This process should be viewed as failing, as the current work of this office is seen as too piecemeal by many supply chain stakeholders.
14. As a supply chain of national significance, the region would be better served by a distinct process which allocated a regulatory approval 'case manager' to major value or otherwise highest-significance development proposals in this supply chain. The case manager would actively seek to minimise the timeframe and number of approvals processes required for such major proposals.
15. The regulatory process should be enhanced significantly by the presence of an independent supply chain coordination process. As such, the establishment of a major supply chain proposals case manager could be made conditional on the prior effective establishment of the independent supply chain coordinator.
16. Many stakeholders felt that the Mount Isa to Townsville supply chain has suffered in the past from its great distance from the state capital. It is recommended that to alleviate the risks of this distance from the centre of government might cause, Queensland's Coordinator-General or Deputy Coordinator General be required to spend an agreed amount of time in the supply chain annually.
17. Marine environmental science and its relationship to marine dredging and associated port and shipping activities stands as one of the most significant regulatory approval risks to the supply chain in terms of time, cost and social licence. Accordingly, both the Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) and the Great Barrier Reef Marine Authority (GBRMPA) should be brought into the supply chain coordination process.
18. Drawing on observed best practice in these matters being practised by North Queensland Bulk Ports, the Mount Isa to Townsville supply chain, including both SEWPaC and GBRMPA, should begin work on cumulative impact assessment research on the Townsville marine environment (which would include collating work completed to date) to establish an agreed 'foundation body of knowledge' that can be drawn upon to assist in creating consensus - and therefore reducing areas of dispute and approval timeframes - around future port development application processes.

Are the supply chain's port and rail monopolies adding to infrastructure supply chain inefficiencies?

Key findings

- The three key transport modes of the Mount Isa to Townsville supply chain – port, rail and road – are all government-owned and operated monopolies;
- Of the three monopolies, only the below-rail network is subject to regulation by the Queensland Competition Authority. The Port of Townsville is unregulated and as such is not bound to publish information about its infrastructure asset costs, conditions or pricing strategies. As for the rest of Australia, the supply chain's road network is not open to third party access and improvement regimes for freight operators because unlike rail and ports, roads have not been subject to competition reform;
- A lack of scrutiny over these monopolies has been claimed to have caused inefficiencies and inequities in the provision and operation of the supply chain's infrastructure;
- While greater oversight and transparency in these matters is warranted, a sensible first step may be to permit the independent supply chain coordinator and stakeholders to access the infrastructure cost and condition information of both roads and port, as is available for rail. This may achieve much of the necessary transparency in this supply chain without resorting to the heavier touch of formal regulatory scrutiny; and
- • Whatever future approach might be taken, it is preferable that road rail and port monopolies are considered as a single supply chain, rather than considering modes in isolation. This may also prove beneficial for questions of competitive neutrality. pricing in road/rail.

The Interim Report noted that all of the key pieces of freight infrastructure in the Mount Isa to Townsville supply chain – the roads, the rail and the port of Townsville – were government owned and operated monopolies. This posed the question of whether the supply chain was also suffering from the traditional drawbacks of monopolies, such as inappropriate access pricing, or an under or overinvestment in the asset, or high barriers to entry for new market entrants, or perhaps investments made in the wrong areas at the wrong times.

Public infrastructure monopolies are not in and of themselves a problem; in fact, they are inevitable where some major pieces of infrastructure such as roads, rail and port would not be efficient for the private sector to replicate. However, such monopolies can generate inefficiencies. A submission by Cudeco Limited raised its concerns in this respect:

'Cudeco…is restricted from investing significantly in the region by (amongst other things) big established mining companies holding monopolies over the current limited infrastructure, including potential new mines being viable projects' (Cudeco Limited submission).

Similarly, JJJ Transport Services provided a considered reflection on the adverse effects of perceived monopoly and near-monopoly arrangements in the chain to date, and the longer term consequences that such arrangements can have in the failure to generate optimal revenues for infrastructure reinvestment over time:

'There has been what could be considered monopoly or at the very least a comfortable duopoly trading arrangements in place in various transport sectors and the associated industrial giants (of the supply chain) over the years, with the remainder of players basically frozen out of the equation through either volume or incentive rates that they as minor players found hard to compete with, and service levels unfairly balanced and favouring the major players…while (these arrangements) may have been enthusiastically welcomed by some of these sectors in the past, the result has been that infrastructure maintenance, improvements and increases simply have simply not actually been allowed to happen or be completed either to funding shortfalls…generally there may have been enough money to perhaps 'patch up' issues, but not enough to either increase infrastructure or rectify the

problems associated with hard assets or associated critical infrastructure within all three of the transport modes associated with this corridor' (JJJ Transport Services submission).

Such comments are not unusual in complex supply chains. While it is hard to ascertain where the 'truth' might lie in all situations, the surest path to greater efficiency is through transparency across the supply chain, brought about in an atmosphere of trust and cooperative behaviour.

Regulated rail, an unregulated port, unreformed road with no third-party access

The Queensland Treasury sought clarification on the extent of regulatory involvement in the supply chain at present. This revealed that while Queensland Competition Authority was the nominal regulator of the rail access undertaking for the rail infrastructure, there was no regulatory oversight of the Port of Townsville's infrastructure pricing, planning or investment decisions.

Roads are an even less straightforward matter. Unlike ports and railways, which have been subject to competition reforms in the 1990s, there is no ability at present for road operators to gain improved access for road freight, or to carry out their own improvements under regulated third party access arrangements, as for ports and rail. This holds back road freight's potential, particularly as a complement to mining activity. It is dealt with in a separate discussion (see below).

Regulatory oversight across the whole supply chain does not occur at present

It is clear that transparency over the pricing, condition and planning and investment of road and rail and port in the supply chain is not what it might be, although rail at least is a regulated asset. Queensland Rail raised this point, cautioning that an unintended consequence of the involvement of greater regulatory scrutiny may be that:

'a recalculation of access charges to provide a regulated return on a Depreciated Optimised Replacement Cost of the Mount Isa line ..would likely result in a significant increase in access charges' (Queensland Rail submission).

However, it is unclear how this comment is to be reconciled against the immediately preceding comment in Queensland Rail's submission that:

'Although restricting infrastructure supply by a monopoly owner is possible, there has been no suggestion that this has occurred in relation to the Queensland Rail Network. In fact, Queensland Rail has outlined, in the Mount Isa Rail Infrastructure Master Plan, a detailed plan for the asset renewals and capacity enhancements that would be required to meet a number of demand growth scenarios for the Mount Isa line' (Queensland Rail Network submission).

In any event, whole of supply chain coordination and joint behaviour will, alongside opening greater investment opportunities, also most likely create transition challenges in cases where historical asset pricing and renewal is subsequently found to be sub-optimal.

A better system would offer 'whole of supply chain' regulation

Regardless, what can be said with confidence is that greater initial transparency to all parties of the major freight infrastructure costs and condition of existing road rail and port assets would be of great benefit to the supply chain and would almost certainly drive a

more cogent overall investment strategy for the supply chain. In this respect, Queensland Rail Network's 2007 submission to the Review of Current Port Competition and Regulation in Queensland has great merit: in this submission, QR Network argued – using the Goonyella coal chain as an example - that regulatory scrutiny and infrastructure assessment and investment analysis should occur at the whole of supply chain level, rather than focussing only on regulating rail or port or road assets in isolation:

'...the commercial risks associated with QR's investment decisions (in rail infrastructure) are influenced by the pricing and allocation decisions in other parts of the supply chain. At present, the Goonyella system is the only case where below-rail and port elements of the supply chain are subject to access regulation by the Queensland Competition Authority (with only one of two ports in this system being regulated). However, the current approach to regulation tends to consider each element (rail and ports) in isolation to the others. This runs the risk of having regulatory arrangements in place that send conflicting signals to the market and fail to provide incentives to optimise the efficiency of the whole supply chain' Queensland Rail submission to the Review of Current Port Competition and Regulation in Queensland dated 19 October 2007).

A 'whole of chain' regulatory approach could expand as the supply chain expands

This statement aptly describes some of the inefficiencies and inconsistencies seen in port and rail planning on the Mount Isa to Townsville supply chain, where the Port of Townville is not regulated at all, meaning that investment and planning decisions have no particular requirement to be considered in terms of consistency with long-term rail infrastructure planning and investment. It is would certainly be sensible for any future regulatory attention on the Mount Isa to Townsville supply chain to consider the rail and port infrastructure holistically. This could even extend to considering the road monopoly relationship to rail in this supply chain as well, as competitive neutrality (ie balanced pricing between road and rail transport): this was raised in public submissions by both a rail operator and the road provider as a matter that does require more regulatory attention on this corridor:

'QR National believes there is significant value in reviewing road and rail price parity and whether the current price for road infrastructure incentivises the development of optimal logistics solutions for the Mount Isa corridor' (QR National submission);

'Of particular note, Transport and Main Roads acknowledges the need to improve deed arrangements for road users. One area this can be maximised is for TMR and road users to examine road freight impacts to pavements and structures (and)...the direct relationship between freight and accelerated 'wear and tear" (Transport and Main Roads submission).

Indeed, QR National proposed that an even more holistic approach to regulation in supply chain would consider introducing 'competitor-port' comparative pricing analysis, perhaps reflecting the possibility of an eventual two-seaport strategy for the region's freight, and the need to provide transparency to potential users and investors in this respect:

'QR National believes there is significant value the availability of comparative pricing for substitutable ports such as the Port of Townsville and the Port of Abbott Point to facilitate the development of opportunities' (QR National submission).

Could an independent supply chain coordinator fill some regulatory roles?

There may be benefit in considering a less drastic option than close regulatory involvement in this supply chain. This plan already recommends the development of an independent supply chain coordinator to bring all stakeholders together and promote transparency and performance monitoring of operations.

Such a body could perhaps go a little further, by also considering asset plans and coordinating transparent discussions about investment and planning proposals in the supply chain. Such a role would need to occur with the consent of all parties, and particularly with the support of the Queensland Government, which is the owner of the below rail and port services for the supply chain. As in the Hunter Valley Coal Chain coordination model, the independent coordinator would not have any power to 'compel' information. But as a step short of regulatory oversight, an independent supply chain coordinator may play a very useful role in promoting transparent discussion around the supply chain's infrastructure cost and condition, and raise issues to prominence that, if not resolved by general agreement, could then be elevated for regulatory scrutiny as necessary.

In its submission to this report, Guildford Coal raised a similar prospect, and perhaps even went further, suggesting a supply chain coordinator could take on some of the traditional roles associated with a regulator:

'Guildford strongly believes that one central, and independent coordinator, could ensure decisions are made in relation to the overall supply chain that are of greatest benefit to the state and region, both in the short and long term. Further, this role would monitor and advise government on pricing across the network to ensure that it reflected industry standards and was not anti-competitive and could also be expected to have input on the appropriateness of returns levied on different future and existing customers' (Guildford Coal submission).

This suggestion would appear to go beyond the independent supply chain coordination model as it appears in the Hunter, where the coordinator has no power to 'compel' information from infrastructure owners or users. In the Hunter Valley, the coal chain is regulated by the State and National regulators, being IPART and ACCC.

However, at one step back from a regulator, an independent coordinator that could consolidate and publish indicative infrastructure costs and prices and coordinate open consideration of new investments would offer a valuable first option – offering perhaps a 'lighter touch' approach than moving straight to close and frequent involvement of the state regulator in the supply chain.

Recommendations - Are the supply chain's port and rail monopolies adding to infrastructure supply chain inefficiencies?

19. The supply chain does appear to be experiencing some of the adverse effects that are associated with monopoly infrastructure ownership and management of roads, rail and ports in the supply chain. In the first instance, it is expected that the lack of transparency and capacity for over or underinvestment in the asset, or poorly-timed investments, will be significantly reduced by the establishment of an independent supply chain coordinator. This is therefore another justification for the early establishment of an effective independent Mount Isa to Townsville supply chain coordination process.
20. In the first instance, a sensible first step towards optimising the management and investment in road rail and port infrastructure – a step less drastic than increased formal regulation - would be for basic asset condition and cost reports for the key roads, rail and the port to be made available to all stakeholders via the independent supply chain coordinator, so that the plans and investments in this public-owned and operated infrastructure can benefit from third party scrutiny and the feedback of commercial proponents in the supply chain. In any event, whatever approach is chosen to matters of regulation, it is vital that such efforts take a whole of supply chain, intermodal view to regulation, rather than focussing on port, roads or rail in isolation to each other

additional recommendations/

The following recommendations are additional to the key findings of the report discussed earlier in this report. These additional recommendations largely stem from findings advanced in the Interim Report which either have not been challenged, have found specific endorsement in the public submission process, or do not sit neatly within the discussion of the previous six strategic or 'pivot' questions for the supply chain.

Recommendations

21. Road: The findings of the Interim Report relating to the use of much higher productivity road freight vehicles, operating under third party access arrangements, most likely in a 'hub and spoke' task to the Port of Townsville itself or to loading points along the Mount Isa rail corridor, should be enacted by calling for commercial trials of such operations, coordinated with the Transport and Main Roads Queensland and auspiced by Infrastructure Australia, which is leading policy reform in this field.
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23. Rail: In a similar vein, a review process should be established to examine the current pathing entitlements of the Inlander rail service, considering whether this can be restructured to deliver greater path availability to the minerals transport task, while maintaining the community service obligations and tourism objectives of the current Inlander service.
24. Private infrastructure financing and promoting greater supply chain investment – following publication of this final report, the MITEZ 50-year plan working group should work under the auspices of the Infrastructure Australia's Infrastructure Finance Working Group to hold a seminar in Sydney of leading private infrastructure investment representatives and key Queensland Treasury officials, to discuss both immediate investment opportunities in the supply chain as well as how the 50-year plan recommendations might promote greater investor interest and certainty in the region's freight infrastructure plans and investments.
25. Economic modelling of the Mount Isa to Townsville Supply Chain: The Queensland Government should take advantage of the unprecedented economic picture of the region created by this 50-year plan by funding the Office of Economic and Statistical Review to maintain and update the commodity profile of the region. Funding to create a complete and distinct computational general equilibrium model of this supply chain will allow future potential investors in the region access to much more robust analysis of the relative merits of any given investment, and should encourage greater coordinated investment behaviour.
26. Overlays of water and energy infrastructure: building on the foundation created by this 50-year freight infrastructure plan, and noting that both energy and water inputs are very significant costs and risks to further development and prosperity of this supply chain, work should begin to establish an energy and water infrastructure plan along similar lines to this plan, to create a more holistic planning and investment picture.


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Recommendations

1. An independent supply chain coordination body and process should be established for the Mount Isa to Townsville supply chain. This should draw on the best practice example of the Hunter Valley's Independent Supply Chain Coordinator, but should be constructed to reflect and benefit the unique and diverse nature of the multi commodity Mount Isa to Townsville supply chain.
2. The Independent Supply Chain Coordination structure should encourage all commercial, government and community stakeholders to contribute to efficient and timely planning an investment outcomes. As such, the powers and scope of an independent supply chain coordinator should be closely defined and developed in consultation with all stakeholders. The resulting structure needs to build particularly strong processes and policies surrounding the management of commercial confidentialities and proprietary knowledge of individual stakeholders in order to encourage the maximum joint and transparent behaviour from all users and operators in the supply chain.
3. Once established, a first role for the coordinator should be an examination of supply chain efficiency and capacity challenges (and any resulting planning and investment priorities) on a 'commodity-by-commodity' basis for all of the major commodities of the supply chain, in order to create a sound aggregated view of supply chain capacity, efficiencies on offer and a transparent hierarchy of timely, efficient and sustainable plans and investments for the entire supply chain.
4. The Mount Isa to Townsville supply chain delivers well over $8 billion per annum in trade through the Port of Townsville. While new rail and berth alignments are under active consideration, the majority of wealth being created through the port arrives on an existing rail and berth alignment. Separate from discussions of any new port and rail alignment investments that might be pursued to address a changing commodity task in the supply chain, the independent supply chain coordinator should examine available further efficiencies and latent capacity on the existing Port of Townsville rail, warehousing and berth alignment, working in consultation with all affected parties
5. Work should continue on planning for a new Townsville Eastern Rail Access corridor via the Townsville State Development Area, as there is general agreement that this is a logical expansion zone that will benefit public amenity in the city of Townsville while also offering greater space for the development of dedicated commodity 'precincts' an potential stockpiles that might be required as the supply chain experiences a shift to more bulk commodities in future. However, this planning work should give active consideration to the transition costs and risks associated with any disruption that existing port users might face in moving to this new port alignment, and what might be the optimal timing for this eastern development in the context of these potential costs and risks.
6. The efficient and timely development of the Townsville State Development Area (TSDA) is of vital importance to the viability of any new rail and berth alignments at the Port of Townsville and it has a potentially important role to play in adapting the Pot of Townsville to anticipated future increases in bulk commodities from this supply chain. But the administration of the TSDA has languished over the past decade, with little involvement from industry itself in this planning and development process. The administration of the TSDA, including how access and development preferences from industry can be best facilitated, requires immediate review. The TSDA should be afforded higher priority by governments in seeking the best sustainable growth outcomes for this supply chain.

Recommendations

7. The viability or otherwise of a two seaport strategy for the Mount Isa to Townsville supply chain rests heavily on the question of the Port of Townsville as a viable seaport for the cost-effective sea transport of large volumes of bulk commodities like coal. Accordingly, a detailed analysis of the relative cost profiles of coal shipping capabilities at the ports of both Townsville and Abbott Point should be conducted as a matter of high priority, noting that the cost effectiveness of coal shipment or otherwise from the Port of Townsville plays a central role in further informing studies on the viability of a coal rail to stockpile investment at that port. Specifically, a relative cost profile analysis of coal shipments from both ports should consider the following questions:
    - What is the precise tonnage capacity for coal carriers at Townsville now, and what scale of cost and timeline would be involved in dredging the port to accommodate fully loaded Panamax-class coal carriers and beyond?;
    - Are the consignments of coal that are proposed to be shipped from Port of Townsville via TEARC intended for the same or competing destination ports as the consignments of coal that are leaving Port of Abbott Point? If so, what would this mean for the cost competitiveness of the Port of Townsville as a coal port over time?; and
    - Is coal from the Port of Townsville intended to be shipped to destination ports with shallower depths (ie destinations where its shipping solution will not be competing 'head to head' with the far larger and more efficient ships on offer at Abbott Point – and if so, does this create a viable and sustainable 'niche' coal trade for Townsville into the future?
8. These findings should be made public and – depending upon the results – could drive a wider discussion, held via the supply chain coordination process, of the merits of the Mount Isa to Townsville rail corridor being 'opened' to the deepwater port of Abbott Point, either via freight redirection via the existing track through Townsville and south along the northern line, or via the construction of a linking railway between Abbott Point and the Mount Isa line via the North Galilee basin. This discussion and analysis might include comparative pricing of rail options to both ports to lend clarity to supply chain decisions in the future.
9. Any available existing analysis that might consider the costs and risks of an Abbott Point rail linkage should be made available for open and transparent and discussion by the stakeholders of the Mount Isa to Townsville supply chain, via the supply chain coordinator process.
10. Defence views the Port of Townsville and its infrastructure links as a strategic asset in the national security interest. Accordingly, future Defence infrastructure planning and investment preferences of the Port and its landside connections should be accommodated by having a coordinated Defence presence within the supply chain coordinator process. Part of this process should consider the common benefits that might be derived for the port and Defence in the field of amphibious lift infrastructure and offshore mining industry support capabilities.
11. There is an overwhelming view amongst stakeholders to the Mount Isa to Townsville supply chain that the current regulatory approvals process is complex, inconsistent, subject to change with little notice and no clarity on available appeals arrangements. As such the current regulatory approvals process should be seen as a very significant brake on potential investment and enhanced operations in this nationally significant supply chain.

Recommendations

12. One means of improving these arrangements over time would be to publish a register of development applications for the supply chain and monitor and analyse the timelines and costs of such approvals over time to better determine where most delays are occurring and why, and implement remedial actions. This should be implemented for the Mount Isa to Townsville supply chain and the data made transparent to the independent supply chain coordinator.
13. The shortcomings of the current system extend to the role of the Coordinator-General's office in taking the lead on approvals for significant projects. This process should be viewed as failing, as the current work of this office is seen as too piecemeal by many supply chain stakeholders.
14. As a supply chain of national significance, the region would be better served by a distinct process which allocated a regulatory approval 'case manager' to major value or otherwise highest-significance development proposals in this supply chain. The case manager would actively seek to minimise the timeframe and number of approvals processes required for such major proposals.
15. The regulatory process should be enhanced significantly by the presence of an independent supply chain coordination process. As such, the establishment of a major supply chain proposals case manager could be made conditional on the prior effective establishment of the independent supply chain coordinator.
16. Many stakeholders felt that the Mount Isa to Townsville supply chain has suffered in the past from its great distance from the state capital. It is recommended that to alleviate the risks of this distance from the centre of government might cause, Queensland's Coordinator-General or Deputy Coordinator General be required to spend an agreed amount of time in the supply chain annually.
17. Marine environmental science and its relationship to marine dredging and associated port and shipping activities stands as one of the most significant regulatory approval risks to the supply chain in terms of time, cost and social licence. Accordingly, both the Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) and the Great Barrier Reef Marine Authority (GBRMPA) should be brought into the supply chain coordination process.
18. Drawing on observed best practice in these matters being practised by North Queensland Bulk Ports, the Mount Isa to Townsville supply chain, including both SEWPaC and GBRMPA, should begin work on cumulative impact assessment research on the Townsville marine environment (which would include collating work completed to date) to establish an agreed 'foundation body of knowledge' that can be drawn upon to assist in creating consensus - and therefore reducing areas of dispute and approval timeframes - around future port development application processes.
19. The supply chain does appear to be experiencing some of the adverse effects that are associated with monopoly infrastructure ownership and management of roads, rail and ports in the supply chain. In the first instance, it is expected that the lack of transparency and capacity for over or underinvestment in the asset, or poorly timed investments, will be significantly reduced by the establishment of an independent supply chain coordinator. This is therefore another justification for the early establishment of an effective independent Mount Isa to Townsville supply chain coordination process.

Recommendations

20. In the first instance, a sensible first step towards optimising the management and investment in road rail and port infrastructure – a step less drastic than increased formal regulation - would be for basic asset condition and cost reports for the key roads, rail and the port to be made available to all stakeholders via the independent supply chain coordinator, so that the plans and investments in this public-owned and operated infrastructure can benefit from third party scrutiny and the feedback of commercial proponents in the supply chain. In any event, whatever approach is chosen to matters of regulation, it is vital that such efforts take a whole of supply chain, intermodal view to regulation, rather than focussing on port, roads or rail in isolation to each other.

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