

DISCUSSION PAPER

TERRITORY-WIDE LOGISTICS MASTER PLAN



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INTRODUCTION

This discussion paper has been prepared to help guide the development of the Territory-wide Logistics Master Plan.

In conjunction with the Northern Territory's Economic Development Framework, Infrastructure Strategy and 10 Year Infrastructure Plan, the master plan will provide the NT Government's vision for the transport and logistics sector, support private sector growth, and drive the Territory's economic and social development.

The master plan aims to identify priority supply chains and unlock the Territory's economic potential by continuing to support Darwin as Northern Australia's logistics hub and gateway to Asia. The master plan will also aim to ensure the Territory's remote and regional centres are serviced by an efficient, resilient and adaptable logistics network which promotes economic opportunity and social development.

The proposed objectives of the master plan are to:

- support the development of new and existing freight networks and precincts
- ensure that the productivity, safety, workforce, and regulation of our freight networks and supply chains are appropriate and improve as the economy grows and diversifies
- underpin a healthy and growing economy by enabling the efficient supply of goods at a competitive cost to business and consumers.

Question

Do you agree with the aim and objectives of the master plan?



BACKGROUND

The Northern Territory has resource rich regions, well developed primary industries, a growing supply and service sector and a strong defence presence, all of which rely on an efficient freight and logistics network to remain competitive with, and provide access to, international and domestic markets.

The master plan will focus on the movement of freight into and around the Territory, across the road, rail, port and airport network. While the Territory is a net importer of general freight, Territory businesses are dependent on logistics networks both in the Territory and other states to access markets.

Approximately two thirds of the Territory's interstate land freight is moved on the road network. The north-south road and rail corridor accounts for 70 per cent of the Territory's interstate land freight.

The Territory's key advantage is our strategic location and close proximity to Asia. Within five hours air travel north of the Territory there are 485 million people, eight capital cities, 36 trading ports and 69 international airports. Our distance by air and sea to key growing Asian markets is considerably shorter than the distance from the eastern seaboard.

The Territory's small population is spread across more than 1.3 million square kilometres, with a large proportion of people living in remote and

regional areas. Improving network resilience and developing infrastructure to meet growing demand is costly. A low infrastructure base, extreme climatic and geographic conditions, and the lack of economies of scale provide challenges that contribute to higher per capita labour, construction and maintenance costs.

The Territory's national highway network is fully sealed; however, 75 per cent of the remaining road network is unsealed and vulnerable to wet weather. Some Top End communities may not have road access for up to six months each year due to flooding and road damage in the wet season. This impacts on accessibility, as it often cuts supply chains and increases the need for network repairs and maintenance and the costs associated with moving freight into remote communities.

Freight operators face a number of unique challenges when moving freight across the Territory. The master plan must identify the challenges and recommend ways to address them and maximise key supply chain potential.

Individual consumers are often unaware of the freight task required to bring products to the Territory. The business sector, however, often places the cost of freight at the forefront of investment decisions and planning. Life in many remote coastal communities functions around the weekly barge schedule, while fresh fruit and vegetables in urban supermarkets are soon in short supply if the rail connection fails.

A number of major infrastructure projects, such as the Darwin Port and Adelaide to Darwin Railway, have been completed in the Territory to support and enable the logistics industry. Further, significant investment in infrastructure, such as the Darwin Ship Lift and Marine Industry Park, is in the pipeline.

The Territory has a regulatory environment that minimises the burden on industry, enables productivity and ensures safety. For example, some of the safest and most productive vehicles in Australia operate on the Northern Territory road network, with “as-of-right” road train access and Higher Mass Limits allowed on 100 per cent of the network.

Strategic land use planning in the Territory has allowed intermodal connections and freight precincts to develop without the ‘last mile’ access issues that plague other freight precincts around the nation.

Questions

Are there other new opportunities for the Northern Territory?

How can we maximise our strengths?

Are there other challenges within the Northern Territory logistics supply chain?

How can we address our challenges?



POLICY CONTEXT

Northern Australia is emerging as a new economic development priority for Australia, and the Northern Territory is at the centre of this national agenda. One of the key initiatives of the agenda is to drive growth, including enhanced air, land and sea transport links, to, from and within the north.

Developing Northern Australia

By positioning itself as the gateway to Asia, the Territory can take advantage of future opportunities in the region. As governments move to increase access to regional markets, it will be easier for Australian businesses and those from other nations to establish themselves in Asian countries. This will provide an opportunity for increased exports from the Territory.

With over 40 per cent of Northern Australia subject to Aboriginal land rights under native title, pastoral lease ownership and Aboriginal reserves or management, developing the north requires close engagement with Aboriginal people.

Economic Development Framework; Infrastructure Strategy; and 10 Year Infrastructure Plan.

The Economic Development Framework forms the basis for long-term decision making to ensure the Territory is moving towards a shared vision for the future.

The framework provides the overarching structure for the Northern Territory Infrastructure Strategy, the 10 Year Infrastructure Plan and other government and industry plans, strategies and policies.

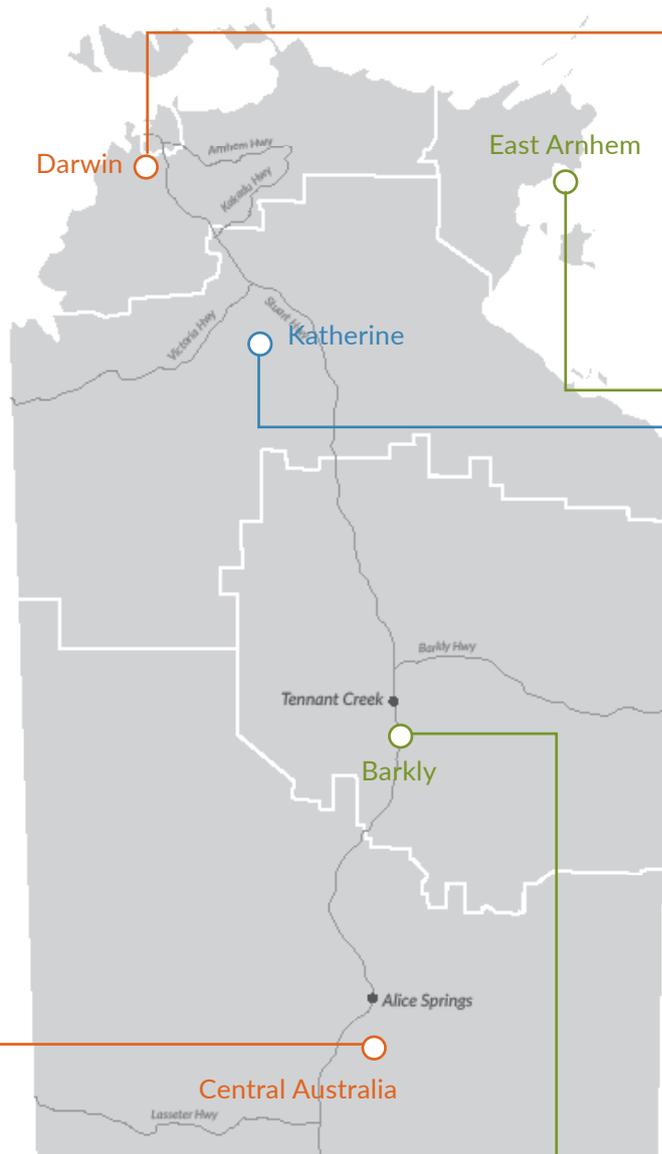
Inquiry into National Freight and Supply Chain Priorities

In November 2016, the Australian Government committed to the preparation of a National Freight and Supply Chain Strategy. An inquiry is underway to support the national strategy development and a draft report is expected to be published in May 2018.

The national strategy is being undertaken in the context of a growing Australia and the need for a freight system that boosts the nation's prosperity and meets community expectations for safety, security and environmental amenity into the foreseeable future.

The Territory is participating in the drafting of the national strategy, and the development of the Territory-wide Logistics Master Plan will inform its input into the national strategy.

REGIONAL PROFILES



Central Australia

Population: 39 718 people – 16.2 per cent of the Territory's population

Main industries: Pastoral, tourism, defence, Aboriginal arts and culture, mining, and oil and gas exploration

Main driver of economic activity and employment: Mineral production and exploration

Percentage of the Territory's businesses: approx. 14 per cent

Key Freight Issues:

- Lack of availability of land / strategic land planning
- Need for hardstand and storage areas for freight laydown
- Lack of freight-rail interface at Brewer Industrial Estate
- Cost of freight prohibitive due to lack of scale
- Need for network improvements
- High cost of infrastructure maintenance and construction
- Need for improved fatigue infrastructure across the freight network

Barkly

Population: 6241 people – 2.5 per cent of the Territory's population

Main industries: Pastoral, tourism, Aboriginal arts and culture, mining activities

Percentage of the Territory's businesses: approx. 1.5 per cent

Key Freight Issues:

- Lack of industrial land
- Need for rail connections
- High cost of freight prohibitive due to lack of scale
- Need for network improvements
- High cost of infrastructure maintenance and construction
- Need for improved fatigue infrastructure across the freight network

● Greater Darwin Region/Top End Rural

Population: 145 916 people – 66.8 per cent of the Territory's population (85 326 Darwin; 35 667 Palmerston; 24 923 Litchfield; 18 216 Top End Rural)

Main industries: Retail, construction, defence, public administration, tourism, education, aquaculture, horticulture, cattle, crocodile farming, and liquefied natural gas and helium production

Percentage of the Territory's businesses: approx. 74.6 per cent across the Greater Darwin region including Palmerston and rural areas

Key freight issues:

- Limited air freight capacity and cold storage
- Need for improved fatigue infrastructure across the freight network
- Cost of freight is prohibitive to economic development due to lack of scale
- Cost of infrastructure maintenance and construction

● East Arnhem

Population: 14 802 people – 5.5 per cent of the Territory's population

Main industries: Mining and oil and gas exploration, and tourism

Percentage of the Territory's businesses: approx. 1.3 per cent

Key freight issues:

- Lack of reliability of freight for remote communities
- Sustainability of the air freight route
- Utilisation of jetty facilities for sea freight
- Lack of land tenure
- Need for network improvements / All year access
- Cost of freight prohibitive due to lack of scale
- Cost of infrastructure maintenance and construction
- Need for improved fatigue infrastructure across the freight network

● Katherine

Population: 22 158 people – 9 per cent of the Territory's population

Main industries: Pastoral, tourism, defence, agriculture, mining, and oil and gas exploration

Percentage of the Territory's businesses: approx. 6.3 per cent

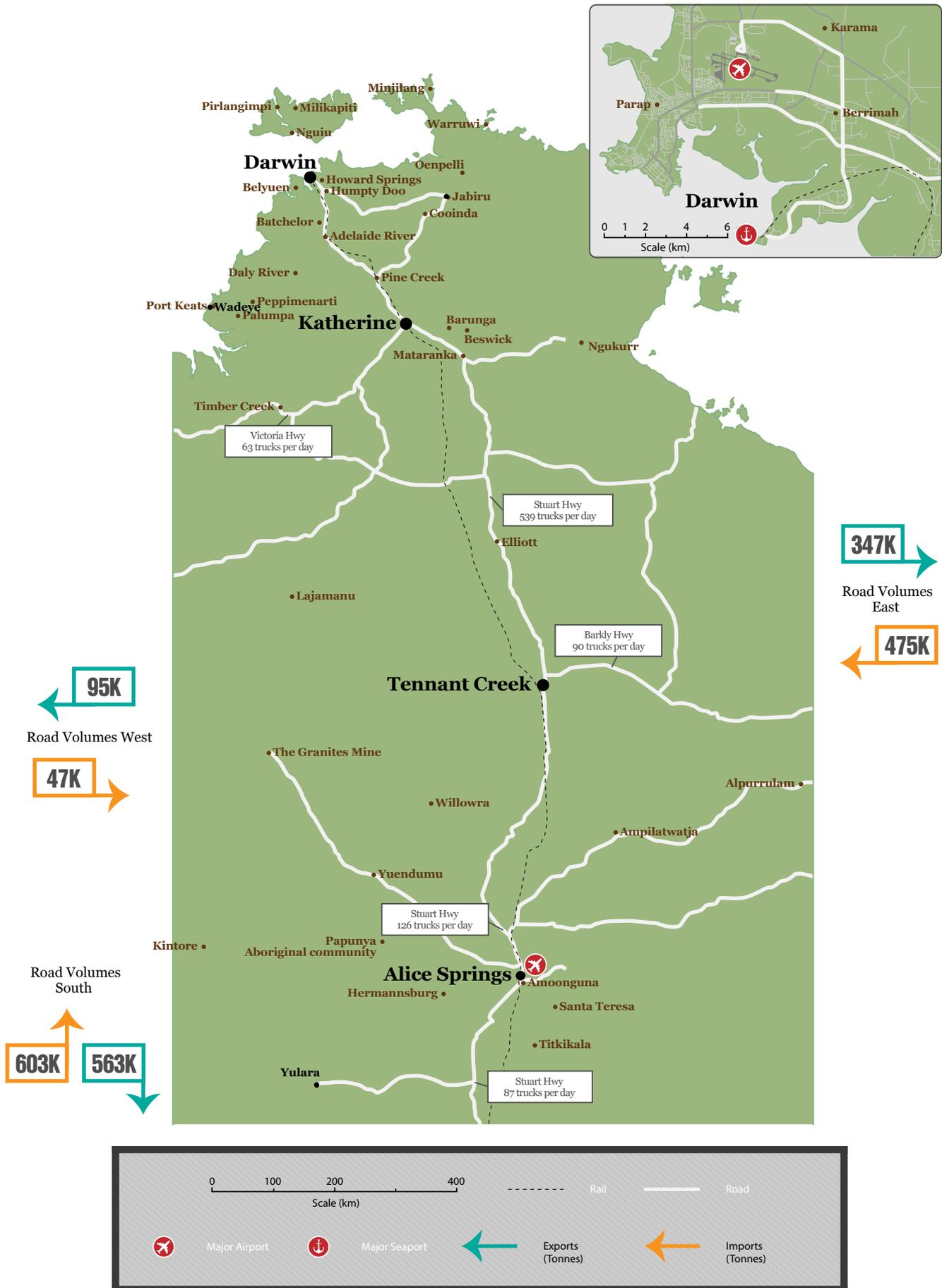
Key Freight Issues:

- Lack of industrial land
- Need for improved fatigue infrastructure across the freight network
- Cost of freight prohibitive due to lack of scale
- Need for network improvements / All year access
- High cost of infrastructure maintenance and construction

Question

Are there specific regional logistics issues that need to be considered in the development of the Master Plan?

Key freight routes and interstate road freight movements (tonnes)



Source: ABS 2014

NT GOVERNMENT PRIORITY PROJECTS

The NT Government is partnering with industry, business and the community to grow and diversify the economy sustainably, and has recently released its Economic Development Framework, Infrastructure Strategy and 10 Year Infrastructure Plan.

Priority transport and logistics projects for the Northern Territory include:

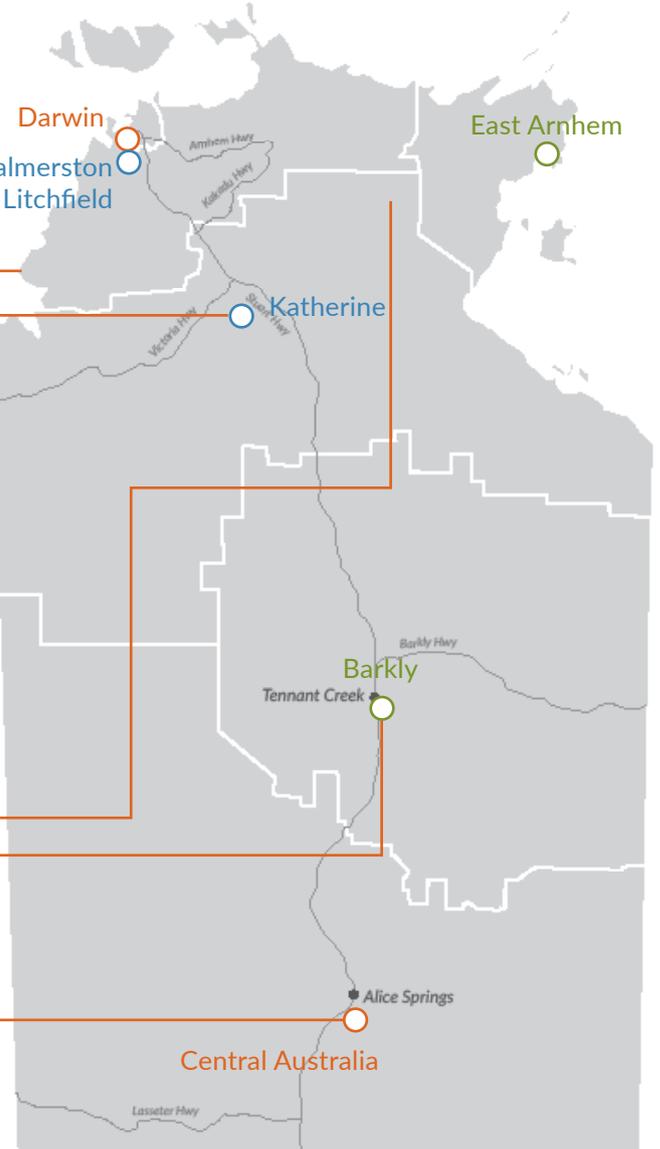
Improving Beef Roads - progressively upgrading cattle roads to increase reliability and subsequently economic development and productivity for the pastoral industry.

Developing Katherine as a logistics and agribusiness hub - Katherine is strategically positioned at the junction of national highways and the rail line, and is surrounded by productive pastoral and horticultural land.

Sealing Central Arnhem Road - supporting regional growth, particularly in a number of large Aboriginal communities and the important regional hub at Gove, through productivity improvements flowing from improved access.

Investigating Mount Isa to Tennant Creek Rail and other possible rail links - undertaking feasibility studies to understand the requirements for any future development and de-risk the project for potential private sector investment.

Sealing Tanami Highway - providing a nationally significant road connection from south-eastern Australia to the Western Australia Kimberley region (this project is a priority for Infrastructure Australia).



- **Improving other priority access** - roads for the Northern Territory including:
 - Gunn Point Road and Bynoe Road, connecting to the Project Sea Dragon
 - Port Keats Road
 - Maryvale Road
 - Roper Highway
 - Nathan River Road and
 - Port Roper Access Road.



INTEGRATED LOGISTICS AND LAND USE PLANNING

Freight volumes in the Northern Territory are expected to grow in the future. It is important that planning activities continue to protect key corridors and freight precincts.

Integrated logistics and land use planning activities are critical for protecting existing freight corridors as well as identifying future industrial land opportunities with effective road, rail and port links. To date, sound planning in the Territory has avoided first/last mile issues seen in other jurisdictions and has assisted with the alignment of future industrial land with road, rail and port links.

The NT Government, through its land planning activities, will continue to preserve key transport corridors. This is critical to facilitate efficient freight movement to and from growing markets and promoting broader economic development opportunities.

Increasing attention will also be necessary to ensure adequate protection of the following types of freight precincts:

- shipping ports and barge ramps
- intermodal rail terminals
- industrial supply bases
- transport and logistics hubs.

Significant planning has already commenced to transform Katherine into the Territory's logistics and agribusiness hub for the region. Improving access to productive land and strategically managing inputs, such as water and infrastructure, are critical to the agribusiness sector.

The Northern Territory, Queensland and Australian governments are currently undertaking studies to understand the preferred corridor alignment of any future development of the Mount Isa to Tennant Creek Railway.

INFRASTRUCTURE MODES

Freight and Logistics Hubs

Freight and logistics hubs, precincts and terminals are vital to supporting effective and efficient supply chains by linking the movement of freight between road, rail, air and sea transport modes. The Territory's major freight and logistics precinct is located in Darwin and is supported by regional freight centres in Alice Springs, Tennant Creek and Katherine.

Road

More than 36 000 km of national highway, arterial, secondary and local roads make up the Territory road network. The NT Government is responsible for just over 22 000 km of this network, which is characterised by long distances and unsealed roads.

The NT Government is committed to improving the quality of regional roads. Freight movements are a key consideration in prioritising regional road infrastructure.

Rail

The Adelaide to Darwin Railway line started operating in 2004 and includes 1737 km of standard gauge rail line from the South Australia–Northern Territory border to the Darwin Port. The railway is an important connection to the national rail network and to the growing economies of Asia through the Darwin Port.

Approximately six freight services operate on the network each week, transporting general freight to and from the Northern Territory. The Ghan passenger service operates on a weekly basis during the wet season and twice weekly during the peak tourist season.

Additional services operate to transport minerals and ore from remote and regional mining sites across the Territory.

Mount Isa to Tennant Creek Railway

The Queensland, Northern Territory and Australian governments have agreed to work together on the preliminary planning required to determine if a multimodal transport corridor linking Queensland and the Territory is required and viable. These governments are investigating where targeted investment, including linking existing transport corridors, will support the development of Northern Australia.

The governments have provided funding for freight and rail feasibility analysis and development of proposals for future investment planning.

An initial trial route alignment between Tennant Creek and Mount Isa has been established. This will enable the Territory and Queensland jurisdictions to undertake a technical assessment program in order to de-risk the project engineering and associated cost estimates.

The economic viability of a Mount Isa to Tennant Creek Railway is being considered by consultants engaged to prepare a strategic options paper for the NT Government. The paper will generate options to advance the railway, detail how it could transform Northern Australia and enhance understanding of the economics of the Townsville to Darwin supply chain and transport corridor.

Air

Air transport has a key role in the Territory. It is a major means of access to the Territory's regional and remote areas, and national and international destinations such as major trading partners in Asia, including China. Air services are particularly important where roads are regularly impassable during the wet season: sometimes air is the only way to move people and essential freight to isolated communities.

Building airfreight capacity can also support domestic and international tourism because it can make a route more economically viable for an airline, in turn growing the Territory economy. For export airfreight to be attractive for airlines and viable for producers, seasonal peaks will need to flatten and cargoes will need to include a mix, such as high value seafood and possibly chilled meat through to fresh horticulture.

The NT Government assists in maintaining 70 strategic remote and regional aerodromes, which provide air logistics to many remote communities across the Territory. In addition to supporting freight, these aerodromes support medical evacuation and other essential service delivery.

Sea

Darwin has a clear geographical advantage. It is closer to major Asian cities than any other Australian capital. For example, shipping time from Shanghai to

Darwin is 8.5 days and to Sydney is 14.5 days.

Maritime freight movements in the Northern Territory include dry bulk, livestock, natural gas and general consumables.

In addition to the Darwin Port, major ports in the Northern Territory include Bing Bong near Borroloola, Alyangula on Groote Eylandt, Nhulunbuy on the Gove Peninsula and Port Melville on the Tiwi Islands. These ports export raw and processed minerals and forestry product to overseas and interstate markets.

Coastal barge landings are essential transport infrastructure assets that allow continuous provision of supplies to remote communities, including food, fuel (including fuel for power generation), construction materials and other goods. The NT Government maintains 14 of these coastal barge landings, all of which are on Aboriginal land managed by land councils or the Office of Township Leasing. Of these, nine are on island communities with no alternative means of land transport. The other five service coastal communities, where roads are generally closed for the duration of the wet season, totally or largely depend on barges for freight.

Darwin continues to grow and develop as a major multimodal transport and logistics hub in Northern Australia, combining sea and land transport infrastructure through the Darwin Port's East Arm Wharf and the Adelaide to Darwin Railway.

Darwin Port

Darwin Port now has the capacity to handle up to 250 refrigerated containers after an \$11 million upgrade by its private operators, Landbridge. The 2.3 ha paved handstand area was made operational in January 2017, and will eventually have the capacity to handle 2000 refrigerated containers. The handstand is a major infrastructure addition targeted at food exports including meat and seafood, although the space could handle goods such as vehicles.

Darwin Port's facilities predominantly serve the following shipping and cargo markets:

- livestock exports
- dry bulk imports and exports
- petroleum, avgas and bulk liquids
- motor vehicle and machinery imports
- container and general cargo
- cruise and naval vessels
- offshore oil and gas rig services
- defence
- Marine Supply Base

Darwin Port has ships departing every 14 days to Kaohsiung (Taiwan), Shanghai, Port Kelang

(Malaysia), Singapore, Jakarta and Port Moresby.

A service goes to Dili (East Timor) and Singapore every 10 days and there are monthly services to Jakarta, Singapore, Port Moresby, New Caledonia, Fiji and New Zealand.

Questions

- Which infrastructure or mode of transport do you use, or operate, in your current supply chain or operations?
- What is working well within the current supply chain?
- What can be improved in the current supply chain?
- What is required into the future?

Northern Territory Beef Roads

The Australian Government's \$100 million Northern Australia Beef Roads Program targets upgrades to key roads necessary for transporting cattle. The aim is to improve the reliability, productivity and resilience of cattle supply chains in Northern Australia, thereby reducing freight costs and strengthening links to markets.

The Barkly Stock Route is a major rural road which connect the Stuart and Tablelands Highways, servicing a number of cattle producers in the area. The project involves reconstruction, widening and upgrading works on a section of the Barkly Stock Route to improve efficiency for heavy vehicles.

The project will support the transportation of livestock in the region by improving road safety and regional productivity, reducing travel times and increasing road reliability during the wet season.

MAJOR INFRASTRUCTURE PROJECTS

Darwin Port / East Arm Logistics Precinct Completed Project

The East Arm Wharf was opened in 2000 and provides 754 m of wharf line. The facility can accept vessels up to 80 000 tonnes and comprises a bulk liquids berth, a common user facility, a container facility and a bulk loading berth. A container berth is served by a rail mounted portainer crane with a heavy lifting capacity of 70 tonnes at 10 metre outreach. This berth is also used as a common user berth to discharge or load break bulk cargo.

Common User Facility / Multi User Barge Ramp Completed Project

Comprising a multi user barge ramp and 9 ha of secure hardstand area, the Common User Facility at East Arm provides a safe and secure hardstand area well suited for fabrication, assembly, commissioning, maintenance and repair activities as well as excellent load-in/load-out facilities.

Adelaide to Darwin Railway Completed Project

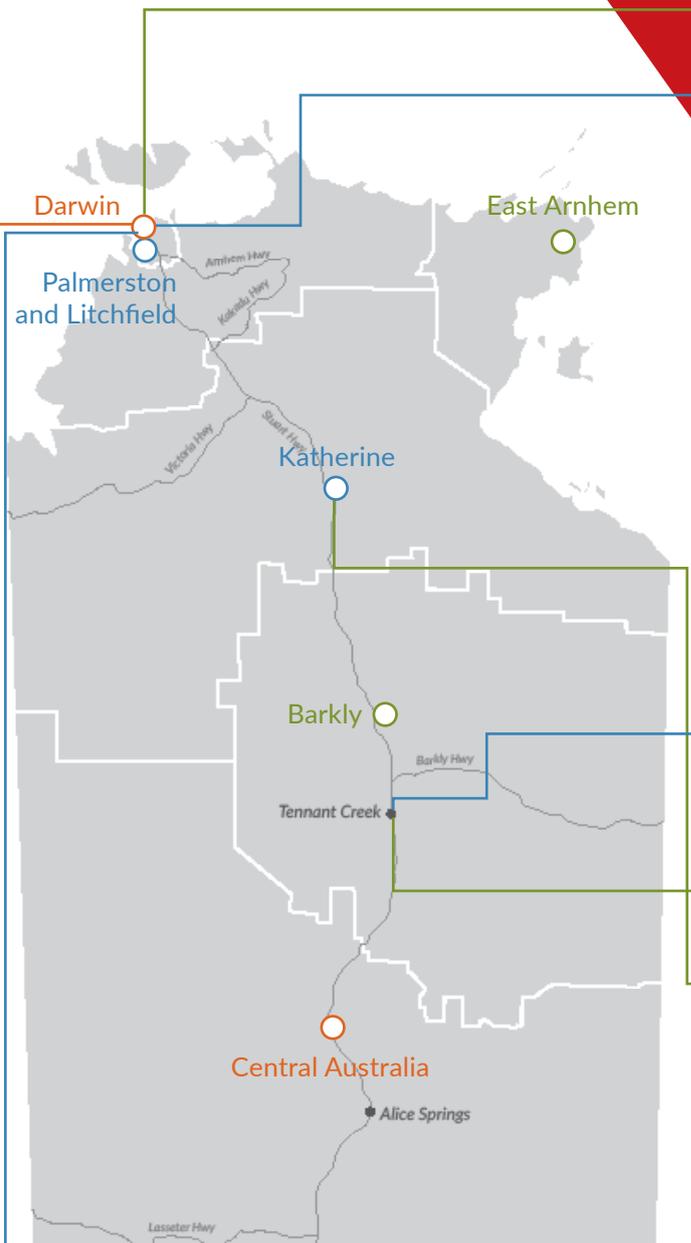
Construction of the final section of the Adelaide to Darwin Railway was the last link in a national railway network, built as governments increased their focus on critical rail infrastructure around the country. The project is a build, own, operate and transfer back scheme, with lease arrangements to operate for 50 years before the railway is handed back to the Northern Territory and South Australian governments.

Darwin Ship Lift and Marine Business Park Current Project

The NT Government has committed \$100 million for the project, creating a new industry for the Territory by enabling the maintenance and servicing of defence and Australian Border Force vessels as well as the Territory's and our neighbours' shipping fleets. The project will provide a ship lift and common user facility that will cater for wet and dry dock ship maintenance and support Darwin's position as a growing logistics and marine services hub.

A project development agreement has been signed between the NT Government and the Paspaley Group to deliver the project.

The NT Government provided \$10 million from Budget 2017 to service land next to the ship lift and for due diligence on the project. In addition, \$100 million has been committed over the next four years towards building the ship lift. The agreement sets out the next steps for the design, development, construction and operation of the facility. This includes a commitment for the parties to undertake a nine month program of detailed technical site-specific works (front-end engineering design works).



● Transport Industry Precinct – “Truck Central”

Current Project

The Land Development Corporation is to develop a 90 ha transport industry precinct (industrial estate) bounded by the major heavy transport routes of Tiger Brennan Drive, Berrimah Road and Wishart Road in Darwin. Planning is also underway to construct a heavy vehicle inspection facility.

● Berrimah Export Yards (BEY)

Current Project

The Berrimah Export Yards at Darwin’s East Arm Logistics Precinct will soon be able to process cattle year-round after the NT Government fast-tracked a \$4.1 million election commitment to upgrade facilities. The new investment in the facility includes the construction of two significant shed structures that will hold 4000 head of cattle and address concerns around mud and shade and improved animal welfare.

● Landbridge Industry and Logistics Park

Current Project

On 4 November 2016 the NT Government announced that the privately owned Chinese Landbridge Group will develop a 34 ha industry and logistics park for port and trade related logistic activities at Darwin’s East Arm Logistics Precinct. This development will take place over the next 12 years, providing a potential site for cold stores and warehouses to support Landbridge’s activities connected with their long-term lease of the Darwin Port.

● Defence Support Hub

Current Project

The Defence Support Hub is a 53 ha strategic industrial precinct for businesses that provide services and support to the Australian Defence Force.

● Northern Gas Pipeline

Current Project

Jemena has been selected by the NT Government to build, own and operate the Northern Gas Pipeline. The 622 km pipeline will link Tennant Creek in the Territory to Mount Isa in Queensland, unlocking the next phase of economic growth for the Territory and help build a stronger Northern Australia.

● Katherine Logistics and Agribusiness hub

Future Planning

The Katherine region is one of the Territory’s brightest economic hotspots with international interest in agribusiness from soybeans through to the region’s historical cattle industry.

● Tennant Creek Mining and Mining Services Centre

Future Planning

The NT Government’s commitment to developing the mining services industry in Tennant Creek will be given a boost with a commitment to the feasibility study into building a common user mine and processing facility in the town.

● Glyde Point

Future Planning

Investigations have been undertaken in relation to potential port sites at Glyde Point, east of Gunn Point, as the preferred site for further major gas based industrial development outside Darwin Harbour. This recognises that the availability of large areas of land, potentially suitable for strategic industry, will maximise opportunities for developing the port to serve that industry.

● Mount Isa to Tennant Creek Railway corridor planning

Future Planning

The NT Government (together with Queensland and Australian governments) is currently investigating the feasibility of a Mount Isa to Tennant Creek Railway to connect the existing Adelaide to Darwin Railway with the Great Northern Line operating from Mount Isa to Townsville.

The Economic Development Framework identified the Territory's major growth sectors in the short to medium-term. The NT Government is working with these sectors on specific industry plans. The following section of this discussion paper focusses on the growth sectors with a strong reliance on freight, logistics and supply chains. These include energy and minerals, agriculture and defence investment.

ENERGY AND MINERALS

Mining and construction are the largest contributors to the economy of the Northern Territory. The production of gold, bauxite, manganese, uranium, zinc, lead and petroleum products (oil and gas) has made a significant contribution to regional employment and growth. In 2016-17, the mining and petroleum extraction industries contributed \$3.04 billion to the Gross State Product.

Currently this contribution is being driven by the construction of the US \$34 billion INPEX LNG plant at Bladin Point near Darwin. Construction is scheduled to be completed in 2018 and the plant will service the Ichthys gas and condensate fields in the Browse basin. The LNG processing trains will have the capacity to produce 8.9 million tonnes of LNG per annum, 1.6 million tonnes of LPG per annum and 100 000 tonnes of condensate per annum.

The Territory currently has five world class mines: The Granites Callie gold mine, Gove bauxite mine, Groote Eylandt manganese mine, Ranger uranium mine and McArthur River zinc-lead mine. There are 11 operational medium to large mines in the Territory, and 17 projects that have commenced government approval processes. These projects involve a capital expenditure of over \$6 billion and approximately 4000 jobs in construction and 3000 jobs during production. All projects are in regional areas and many have a mine life of over 20 years.

The projects currently in approvals processes are likely to require an estimated 2 million tonnes of imports through Darwin Port and an estimated 5 million tonnes of product to be transported to Darwin Port (and a small amount to South Australian ports) for export.

The Nolan's rare earth project, Mount Peake vanadium titanium project, Chandler salt and storage project, Jervois base metals project, Ammaroo phosphate project and Wonarah phosphate project are all in advanced approvals stages and may commence construction within the next few years.

With much of the Territory considered highly prospective and under-explored, there is enormous upside to potential resource based developments in the future. The majority of the prospective areas currently being targeted for exploration are remote and difficult to access. The challenge is therefore to provide efficient year round heavy vehicle road access, and ensure capacity is not constrained within the north-south supply chain connection.

The completion of the Adelaide to Darwin Railway in 2003 resulted in substantial changes to the previous logistics chains in the Territory. It led to significant transport savings to remote and semi-remote projects and directly contributed to the opening of the Bootu Creek manganese mine and Frances Creek iron ore mine. The railway has a significant economic influence on six proposed mining projects in the central and southern Territory that have been awarded NT Government 'Major Project Status'.

Questions

What are the logistics issues for the energy and minerals industry generally, or specifically to your business or operations?

Are infrastructure and supply chains in the Territory limiting factors for potential developments (particularly for junior companies)?

How can government assist in identified or future industry requirements?

Northern Gas Pipeline

Jemena's \$800 million Northern Gas Pipeline project is under construction between the Territory's Tennant Creek and Queensland's Mount Isa. With a focus on local contracting and employment, the 622 km pipeline will facilitate economic growth in the region and build a stronger Northern Australia. Jemena's Northern Gas Pipeline will, for the first time, allow gas produced in the Territory to flow into the east coast gas market, via Queensland. This will strengthen the east's gas industry and help to solve the east coast gas crisis. First gas is scheduled to flow through the new pipeline in late 2018.

Wingellina Nickel Project

Metals X is an Australian copper and tin producer, developing and operating mines and processing plants across various states and territories.

Metals X owns the Wingellina nickel-cobalt project in the Central Musgrave region of Western Australia where the Northern Territory – South Australia border meets the Western Australia border. Although the Wingellina project is based in Western Australia, a 2016 Economic Impact Assessment calculated that the projected impact of Wingellina on Territory output would be \$7.6 billion over 40 years with employment impact of 462 jobs during construction (three years) and 395 jobs once operational.

The project pre-feasibility study indicates that the preferred supply route is through Darwin, then by rail to Alice Springs, then by truck to Wingellina. This supply chain will involve approximately 500 000 tonnes of inbound goods per year and 200 000 tonnes of outbound goods per year. The project will have significant impact on the Territory's infrastructure and logistics networks.



ENERGY AND MINERALS SNAPSHOT



11 major operating mines in 2016
plus minor mines, quarries and extractive operations

About 30 potential mining operations under feasibility studies



5600 jobs
in the mining and resources sector

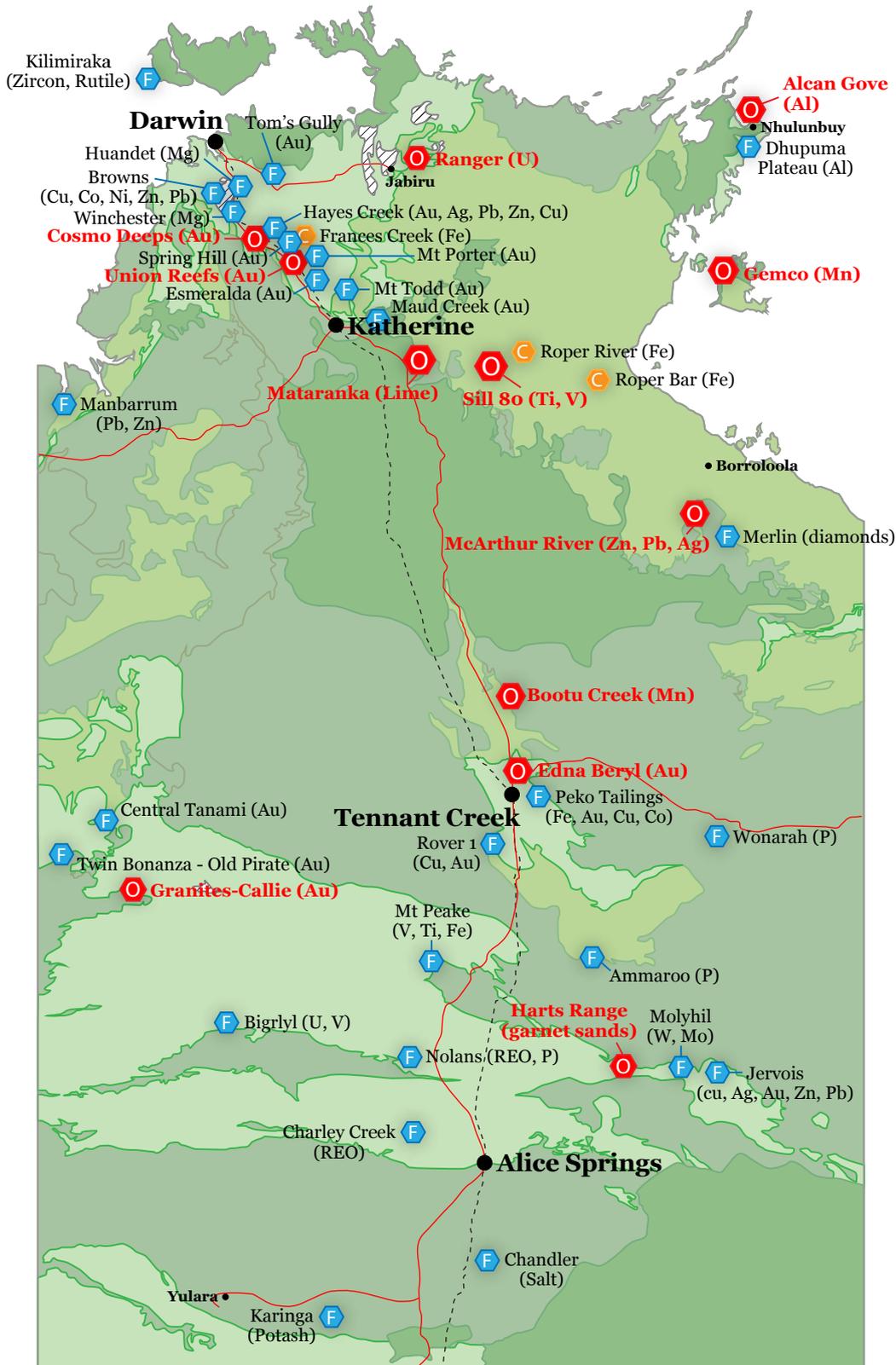


\$3.04 billion

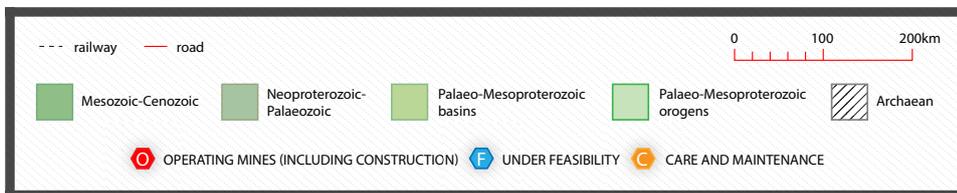
value of the mining, energy and resource manufacturing sector in 2016/2017



Mineral Projects of the Northern Territory



ZR	Zirconium (also Zircon)
TiO2	Rutile
Mg	Magnesium
Au	Gold
Cu	Copper
Co	Cobalt
Ni	Nickel
Zn	Zinc
Pb	Lead
Ag	Silver
Al	Aluminium
Fe	Iron
P	Phosphorus
C	Diamond
V	Vanadium
Ti	Titanium
U	Uranium
W	Tungsten
Mo	Molybdenum
REO	Rare Earth Oxides
Na	Sodium (also Salt)
-	Potash



AGRICULTURE

The agricultural sector has a vital and growing role in the Northern Territory economy and is a significant employer in regional areas. In 2016-17, the combined value of the Territory agriculture sector exceeded \$762 million, accounting for nearly three per cent of the Territory's Gross State Product.

The Territory agricultural sector includes cattle (interstate and live export), other livestock (buffalo, crocodiles, and goats), horticulture (fruit, vegetables, nurseries, cut flowers and turf), mixed farming (field crops, hay and seeds and forestry) and harvesting of bush foods and medicines. The fisheries industry comprises harvesting of wild catch (including the Northern Prawn Fleet) and aquaculture.

The agricultural sector has significant links to other sectors of the Territory economy such as manufacturing, transport and storage, retail and wholesale trade. These industries are vital in regional areas, providing economic stimulus and employment for approximately 26 000 people in November 2017.

Livestock

The live cattle export trade (mainly to Indonesia) and the sale of cattle in interstate markets (mostly Queensland and South Australia) dominate agricultural production in the Territory. In 2016-17, cattle movement and live exports accounted for nearly one million head of cattle being transported along Territory roads.

In 2015-16, the pastoral industry estimated value of production for the cattle industry was \$324.4 million, contributing 44.1 per cent of the total of the Territory agriculture production value. The industry is a major contributor to incomes in regional areas of the Territory. The pastoral industry also generates considerable flow-on benefits to other industries, particularly transport and storage, business to business services and retail trade services.

The Territory has 223 pastoral leases, covering an area of approximately 44 per cent of the Territory and running a total herd of approximately 2.2 million head of cattle. Livestock transport by road is a challenging aspect of the pastoral industry in the Territory: long distances, road conditions and

seasonal variability contribute to challenging logistics for pastoralists. According to the Northern Territory Cattlemen's Association the average distance from stations to port is approximately 1135 km and significant wet season rainfall events can isolate the majority of Top End pastoral properties, making them accessible only by air or small boat.

The Australian Agricultural Company's Livingstone Processing Facility, 50 km south of Darwin has the capacity to process 225 000 head of cattle per year, at full development, which requires transport of livestock 11 months of the year.

Other minor livestock industries in the Territory have historically included crocodiles, poultry, buffalo, horses, camels, deer, pigs and goats, exported overseas or sent to domestic markets. Crocodiles are the largest other livestock industry exporting skins to Japan, France, Italy and other Asian countries, with these products also sold domestically to meet an emerging domestic demand.

Operations to farm camel and donkey for meat production are currently being explored. Growth in key Asian markets, supported by recent trade agreements, will likely increase demand for cattle and other livestock.



Plants

The Territory's plant industries include fruit, vegetables, nurseries, cut flowers, turf and other field crops. In 2015-16, the value of Territory plant production was \$253.2 million, 30.5 per cent of the total value of the Territory's agriculture production.

In 2015-16, 62 per cent (\$157.1 million) total value of production was derived from fruit. The main fruits produced in 2015-16 were mangoes, melons and table grapes with 26 500, 51 000 and 2000 tonnes produced respectively.

The majority of the Territory's horticulture production is exported to interstate markets via road and rail transport. Direct exports from Darwin continue to be explored. A number of field crops are currently grown in small quantities in the Territory including legumes, grass and sorghum for stock feed. There is potential for expansion and diversification of stock feed and food crops such as rice, peanuts and soybean.

Plantation forestry is the second largest production land use in the Territory after beef grazing, with more than 47 000 ha currently growing forest products. Plantation operations include production of African mahogany as a cabinet timber, black wattle for pulp and sandalwood for oil.

Export of black wattle wood chips from Port Melville, Tiwi Islands, to Japan commenced in 2006, and the plantation is likely to produce 200 000 and 400 000 green metric tonnes of wood chip each year. As other forestry trees mature and reach harvesting age, transport requirements will need to be addressed.

While the volumes are expected to be small, the developing bush food industry has the potential to make a significant positive contribution to remote Aboriginal communities. Transport and logistics will need to be developed to support these endeavours.

Hancock Pastoral

In October 2017, Hancock Prospecting Pty Ltd and Shanghai CRED entered a joint venture company, Australian Outback Beef Pty Ltd (AOB) (owned 67 per cent by Hancock and 33 per cent by Shanghai CRED). AOB acquired the S Kidman & Co Ltd cattle business which included 19 individual properties operated as 12 enterprises, being 10 cattle stations, a bull breeding stud farm and a feedlot. The Kidman pastoral leases cover 101 000 square kilometres across Northern Australia.

Hancock Prospecting has recently reached a strategic cooperation agreement with a Chinese joint venture company that would secure a beef supply chain from its Australian cattle properties to Chinese consumers.

The non-binding agreement is with Zhejiang Aozhou Cattle Industry Co Ltd, which will develop a feedlot and processing centre for imported cattle on Jintang Island in north-eastern China. Under the agreement 150 000 cattle a year, rising to 300 000, would be shipped primarily from northern Australian ports including Darwin Port.

Fisheries

The Territory fishing industry encompasses the commercial, recreational and traditional Aboriginal sectors. The commercial sector includes the harvesting of wild catch fisheries and aquaculture, as well as the processing, trade and retailing of seafood. In 2015-16, the total value of the Territory fishing production was \$124.3 million, 16.9 per cent of the total value of the Territory's agriculture production.

Wild caught fisheries include barramundi, salmon, shark, various snapper and other reef species, as well as mud crab, prawns and trepang. Fish is exported, frozen, from Darwin to markets such as South Korea. Trepang is exported in dried form to Asian markets via a processing facility in southern Australia.

The anticipated growth of aquaculture in the coming years will increase reliance on transport networks. Humpty Doo Barramundi is now Australia's largest producer of barramundi with 2400 tonnes of product per year being marketed in Australia. Initial trial exports have been made to the United States, China, Japan and the European Union, presenting potential new markets for airfreighting of chilled fish.

Project Sea Dragon is a significant new aquaculture project that will require improved all-weather road access to ensure that product can get to market and vital feed stocks, supplies and services can be provided (see case study on following page).



Northern Territory Mango Industry

The mango industry represents a key freight task for the Territory, with potential growth linked to substantial interstate and international exports.

Annual mango production in the Territory is expected to increase to 50 000 tonnes by 2022, and land use mapping in 2008 suggested that horticultural and agricultural activity was increasing (particularly fruit growing) around the Darwin, Katherine, Douglas-Daly and Ti-Tree areas. During peak season, up to 220 vehicles per week transport 4000 tonnes of mangos from the Darwin, Pine Creek and Katherine regions to southern markets and to consolidation points for export.

Project Sea Dragon

The NT Government signed a project development agreement with Seafarms Group in September 2017 to develop one of the world's largest aquaculture projects.

The US\$1.5 billion Project Sea Dragon will deliver the world's largest integrated aquaculture development and at full scale will have the capacity to produce over 100 000 tonnes of black tiger prawns a year for export. Stage 1 of Project Sea Dragon at Legune Station consists of 1120 ha of land-based production ponds, 324 ha of internal recycling ponds and infrastructure that will ultimately produce 14 000 tonnes of prawns each year.

At full production, it is estimated that Project Sea Dragon will create about 700 jobs for local people on the ground at Legune Station, 300 jobs at a Darwin based hatchery and breeding facilities and around 500 jobs in Kununurra, Western Australia.

Pending successful financing of the project and regulatory obligations being met, the NT Government has committed:

- \$40 million to upgrade Gunn Point Road to a two lane sealed standard to the entrance of the project site at Gunn Point
- \$15 million to provide an access road to the Point Ceylon, Bynoe Harbour site
- \$17.5 million to upgrade the Keep River Plains Road. The Australian Government has committed \$40 million and the Western Australia Government \$16.7 million. The upgrades will enable for all year access between Kununurra and Legune Station.

Logistics Planning for Agribusinesses

A number of interdependent variables impact on logistics planning for agribusinesses. These are all important considerations when enabling valuable Territory produce to get to market. They are briefly described below.

Remoteness	Production areas are in remote and regional locations, long distances from domestic markets and export facilities. This provides a challenge for the length of infrastructure that needs to be maintained to a suitable standard for heavy vehicle traffic.
Climatic conditions	Flooding associated with monsoonal rains presents a challenge for providing suitable access for year-round movement of livestock and produce by road and rail.
Seasonality of supply	Seasonal produce such as mangoes requires the ramping up of logistics chains for a short six to eight week period every year. Some other products have a long lead time, for example African mahogany plantations in the Territory have a predicted rotation period of 17 to 22 years. Depending on the operational plans of agribusiness, this infrastructure may only be required for five to 10 years.
Perishability	Once harvested, many agricultural products need to be handled carefully to control for temperature and physical damage. Perishability also means that logistics chains need to be timed to ensure the product reaches the market in good condition and with maximum shelf life.
Markets and competition	Agricultural products are typically 'spot traded' and price sensitive. Small variations in logistics costs or price can result in a change of market destination. Logistics chains can be challenged by the need to respond to these changes at short notice.
Technical market access	Technical market access requirements, both interstate and export, can be difficult for agribusinesses to navigate. There can be production, post-harvest technical, verification and documentation requirements. The logistics pathway is often an integral part of technical market access requirements, which vary with product and destination and can place a compliance obligation on the logistics operator.

Questions

What are the logistics issues for the agriculture industry generally, or specifically for your business or operation?

Are infrastructure and supply chains in the Territory limiting factors to trade and industry development?

Are there bottlenecks in current infrastructure?

How can government assist in identified or future industry requirements?

DEFENCE AND NATIONAL SECURITY

The Northern Territory is home to approximately eight per cent of Australia's permanent defence force personnel, in addition to approximately 1100 United States Marine Corps on rotation.

The defence industry continues to make a substantial contribution to the Territory's economy, with expenditure exceeding \$1.5 billion each year.

Annual defence exercises also contribute to the Territory economy. Talisman Sabre, a major Australian and United States military training exercise conducted in 2017, was a major logistics task involving up to 30 000 personnel.

Defence operates a large number of facilities established for different purposes across the Territory. They are located across a large geographical area making access and movement of personnel and equipment critical. Personnel and facilities also need to be moved between defence establishments in the Territory and the rest of Australia.

Improved maritime infrastructure will also be required to support the increasing defence presence and activity in the region. The Marine Industry Park being developed next to the East Arm Wharf will provide significant maritime maintenance capability. The recently completed multi user barge ramp facility, which was jointly funded by the NT

Government's Land Development Corporation and Australian Department of Defence, will provide important defence capability. When defence is not using the facility, commercial operators will be able to use it for up to 300 days per annum.

Recognising increasing demand for marine industry services from defence, Australian Border Force, the offshore oil and gas and commercial sectors, the NT Government is investing up to \$100 million to develop a common user ship lift and marine industries facility. The facility will target expanded marine maintenance and repair work and will require the logistics networks to support this role.

Question

What is required from the Territory freight and logistics network to support defence activities?



WORKFORCE DEVELOPMENT

The Northern Territory has recently experienced high labour force growth, low unemployment and high participation rates.

The Territory has a relatively young and skilled workforce, characterised by low unemployment and a high participation rate. The distribution of jobs is skewed towards major centres and labour shortages can be exacerbated by major projects in the Territory.

Over the past decade, the participation rate for the Territory has been higher than the national participation rate. The Territory participation rate has ranged between about 66 per cent and 79 per cent over the last 25 years, but has shown an upward trend over the past 10 years. The participation rate in the Territory is now the highest of all Australian jurisdictions at 76.6 per cent in December 2017.

The transport, postal and warehousing industry increased by 1.7 per cent in the year to November 2017 to about 6900 workers. Employment in the industry comprises five per cent of total Territory employment, compared to the national figure of 5.1 per cent.

New technology and changing economic activity are reshaping how our logistics supply chains operate; this requires ongoing workforce training and development. Changing consumer preferences, including growth in online shopping, mean the logistics industry requires a multiskilled and adaptive workforce.

The NT Government publishes a Skilled Occupation Priority List, which currently includes a number of occupations relating to the logistics industry: pilot, ship's engineer/master/officer, truck driver, supply and distribution manager, store person and forklift driver.



Questions

Is the logistics industry well positioned to deal with workforce requirements into the future?

What needs to be considered to develop the logistics workforce?

REGULATION AND SAFETY

Governments have an important role in balancing economic outcomes with environmental, community amenity and social outcomes. Governments influence the movement of freight through a number of mechanisms, including regulation.

The NT Government remains focused on ensuring the level of regulatory burden for our logistics industry is minimised, while ensuring that regulation in the Territory is fit for purpose and safety is assured. The safety of the logistics workforce and the general public as they interact with the freight task remains a priority, whether it is on roads, at rail crossings or on water.

As part of the Seamless National Economy agenda, the Council of Australian Governments agreed to national transport regulation reforms, including the establishment of national rail, marine and heavy vehicle regulators.

National Rail Regulation

The Office of the National Rail Safety Regulator (ONRSR) administers a single National Rail Safety Law. Primary functions include accreditation, compliance monitoring, promoting safety and technology and conducting research.

ONRSR receives funding from industry through fees and from State and Territory governments, including the Northern Territory, during a phased approach to full cost recovery.

National Maritime Regulation

The Australian Maritime Safety Authority (AMSA) is the national marine safety regulator for domestic commercial vessels. Since 2013, the states and territories have regulated maritime safety requirements on behalf of the AMSA. From 1 July 2018, AMSA will deliver all national services and will certify vessels and seafarers and ensure they comply with safety standards.

The Territory continues to work with the Australian Government and the other jurisdictions in transitioning to the national regulator, including impacts on local industry in relation to pricing and cost recovery.

National Heavy Vehicle Regulation

The National Heavy Vehicle Regulator (NHVR) is the regulator for all vehicles over 4.5 tonnes gross vehicle mass in participating jurisdictions. The NHVR was established as an independent statutory authority.

While the Heavy Vehicle National Law has commenced in the Australian Capital Territory, New South Wales, Queensland, South Australia, Tasmania and Victoria on 10 February 2014, the Territory and Western Australia have not commenced the Heavy Vehicle National Law and are not NHVR participating jurisdictions.

A business case to establish the NHVR found that the estimated economic benefits across industry, safety and the environment arising from the implementation of the NHVR in the Territory would have been as little as \$1.3 million over 21 years.

However, the Territory continues to work with both the NHVR and Western Australia, to harmonise regulations where practical to facilitate seamless operation across state and territory borders.

The Territory will not commence the Heavy Vehicle National Law until the benefits to regional and remote areas and industry in the Territory can be clearly demonstrated.

Ports Management in the Northern Territory

The NT Government retains a range of oversight and regulatory functions over the recently leased Darwin Port. This includes the regional harbourmaster role and responsibility for price and access regulation through the independent Utilities Commission.

The *Ports Management Act* and associated regulations are being reviewed in 2018-19. The first phase will assess the operational efficiency of the Act and reduce unnecessary red tape and regulatory burden. The second phase will assess the framework for the access and pricing regime.

Questions

Is the level of regulation applied in the Northern Territory appropriate?

Are there any regulatory bottlenecks (red tape) in your industry you would like to remedy?

Where could logistics safety or regulation be improved?



WE WANT YOUR INPUT

This discussion paper has been prepared to help guide the development of the Territory-wide Logistics Master Plan.

Submissions are welcome by email or post, to the following addresses:

policy.transport@nt.gov.au

Submission to Territory-wide Logistics Master Plan Discussion Paper

Department of Infrastructure, Planning and Logistics

GPO Box 1680

DARWIN NT 0801



APPENDIX A

Region	Freight and Logistics Projects 10 year Infrastructure Plan	Est Cost \$M	2017-18	2018-19	Med Term	Long Term	AG	NTG	LG	PRIV	Key Driver
Barkly	Barkly Highway upgrades	8			•	•	✓	✓			Economic enabler and key national freight route between the Territory and Queensland
Barkly	Tablelands Highway - improve the road standard	100	25	•	•	•	✓	✓			Support economic development of the cattle industry
Barkly	Barkly Stock Route - improve the road standard	230	13	•	•	•	✓	✓			Support economic development of the cattle industry
Barkly	Northern Gas Pipeline between Tennant Creek and Mount Isa	800	•	•						✓	Connect the Northern Territory to the east coast gas market
Central Australia	Tanami Road - upgrade to a sealed standard (including WA section)	680	3	•	•	•	✓	✓		✓	Support economic development of the mining industry
Central Australia	Plenty Highway, Outback Way - Connecting Queensland through the Territory to Western Australia - reconstruct various sections and widen single lane to two lane seal	320	31	•	•	•	✓	✓			Economic enabler for the mining, pastoral, cattle and tourism industries
Central Australia	Larapinta Drive - capacity improvements and upgrades including completion of Mereenie Inner Loop	36	2		•	•	✓	✓			Improve road safety and visitor experience
Central Australia	Lasseter Highway - improve the road standard	34	4		•	•	✓	✓		✓	Support economic development of the tourism, cattle and resource industries
Central Australia	Tjukurauru Road (Outback Way) - improve the road standard	25	10	•	•	•	✓	✓			Economic enabler for the mining, pastoral, cattle and tourism industries
Central Australia	Sandover Highway - sealing selected sections	100	5		•	•		✓			Supports community access and the cattle industry
Central Australia	Santa Teresa - sealing selected sections	50			•	•		✓			Support delivery of essential services to regional and remote communities
Central Australia	Maryvale Road - improve the road standard	150	5			•	✓	✓		✓	Support delivery of essential services to regional and remote communities
Central Australia	Luritja Road - improve flood immunity	8			•			✓			Support tourism and local cattle industry
Darwin	Berrimah Road - capacity improvements	100				•	✓	✓			Improve network capacity and safety for increased traffic into the port
Darwin	Tiger Brennan Drive - Woolner Road intersection overpass	89				•	✓	✓			Improved network connection

Region	Freight and Logistics Projects 10 year Infrastructure Plan	Est Cost \$M	2017-18	2018-19	Med Term	Long Term	AG	NTG	LG	PRIV	Key Driver
Darwin	Barneson Boulevard Link	40	40	•	•		✓	✓	✓		Provide commuters with a new option to enter/exit the Darwin CBD
Darwin	Ship Lift Facility.	100+	•	•				✓		✓	Provide a common user facility for the general maritime sector and Department of Defence
East Arnhem	Nhulunbuy Port upgrades	15			•			✓		✓	Underpin the development of the agribusiness industry and service the community and export markets
East Arnhem	Central Arnhem Road - improve the road standard	600		•	•	•		✓			Improve regional and remote connectivity and support the cattle and tourism industries
East Arnhem	Numbulwar Road - improve the road standard including Phelp River crossing	10				•		✓			Support delivery of essential services to regional and remote communities
Katherine	Carpentaria Highway - progressively widen, seal from one lane to two lanes and improve flood immunity	25			•	•		✓			Support economic development of the mining, cattle, and tourism industries and improve community access
Katherine	Buntine Highway - improve the road standard	250	40		•	•	✓	✓			Support economic development of the cattle and tourism industries
Katherine	Roper Highway - sealing selected sections	202	4		•	•	✓	✓			Support economic development of the cattle, mining and mineral exploration industries
Katherine	Wollogorang Road - improve the road standard	25	5		•	•		✓			Support economic development of the cattle industry
Katherine	Lajamanu Road - capacity improvements and upgrades	13	8		•	•		✓			Support delivery of essential services to regional and remote communities
Katherine	Nathan River Road - improve flood immunity	10			•	•		✓			Improve access to support the tourism industry
Katherine	Victoria Highway - Little Horse Creek and Big Horse Creek upgrades	35	35				✓	✓			Improve flood immunity
Katherine	Katherine Civilian Airport - upgrades to the apron and terminal	2		•	•			✓	✓	✓	Support economic development of the agribusiness sector
Palmerston /Litchfield	Weddell Freeway - construct new two lane link from Tiger Brennan Drive to Kirkland Drive	40		•	•		✓	✓			Support future land development
Palmerston /Litchfield	Gunn Point Road - upgrade and seal various sections	40		•	•		✓	✓			Improve connectivity and unlock the potential for future development

Region	Freight and Logistics Projects 10 year Infrastructure Plan	Est Cost \$M	2017-18	2018-19	Med Term	Long Term	AG	NTG	LG	PRIV	Key Driver
Palmerston /Litchfield	Cox Peninsula Road - upgrade intersections to improve capacity and safety	14			•	•		✓			Support development of the extractive industry
Palmerston /Litchfield	Litchfield Park Road - including constructing the Lower Finnis River bridge	27	27	•			✓	✓			Improve access to support the tourism industry
Territory Wide	Stuart Highway - new works and upgrades, including Pinelands Industrial Precinct access	215	6	•	•	•	✓	✓			Economic enabler and key national freight route. The only road transport supply line to Darwin
Territory Wide	National Highway Programs - flood immunity improvements, road safety initiatives, strengthening widening and Black Spot	474	40	•	•	•	✓	✓			Economic enabler and key interstate freight route
Territory Wide	Territory Roads Programs- strengthening and widening, Black Spot, road safety initiatives	567	24	•	•	•	✓	✓	✓		Support connectivity and regional development through improved key arterial and secondary roads
Territory Wide	Beef Roads - upgrade secondary local roads not listed separately	72		•	•	•		✓			Support economic development of the cattle industry and improve community connectivity
Territory Wide	Aerodrome upgrades - Batchelor, Bathurst Island Milingimbi and others	68	9	•	•	•	✓	✓			Improve all weather access to support future growth
Territory Wide	Road Transport - weighbridge upgrades	10			•	•		✓			Support economic development
Territory Wide	Mount Isa to Tennant Creek railway - investigations	•	•		•		✓	✓		✓	Connect the Alice Springs to Darwin railway with the line between Mount Isa and Townsville
Territory Wide	Regional Roads Productivity Package	36	36	•			✓	✓			Support delivery of essential services to regional and remote communities
Territory Wide	Marine - barge landing and jetty upgrades	136	11	•	•	•		✓			Support economic development by improving all weather access and goods handling facilities
Territory Wide	Barge and aerodrome access roads	100			•	•	✓	✓	✓	✓	Improve all weather access to support growth and improve community safety
Top End Rural	Port Keats Road upgrades - Yellow Creek and Saddle Rail Creek crossings, improved community connections between Wadeye, Palumpa and Peppimenarti	180	23	•	•	•	✓	✓			Support economic development of the tourism and potential cattle and gas industries and improve community access
Top End Rural	Arnhem Highway - upgrades (other than Adelaide River Floodplain)	109		•	•	•	✓	✓			Support economic development of the tourism, defence, mining, extractive and livestock industries

Region	Freight and Logistics Projects 10 year Infrastructure Plan	Est Cost \$M	2017-18	2018-19	Med Term	Long Term	AG	NTG	LG	PRIV	Key Driver
Top End Rural	Arnhem Link Road - improve road standard	290	5		•	•	✓	✓			Improve regional and remote community connectivity -alternate route to Nhulunbuy
Top End Rural	Douglas - Daly Roads - new works and upgrades	58			•	•	✓	✓			Support economic development of agribusiness industries
Top End Rural	Kakadu Highway - improve the road standard	55				•		✓			Improve access to support the tourism industry
Top End Rural	Tiwi Roads - improve the road standard	73			•	•	✓	✓			Support economic development of the timber industry and improve community access
Top End Rural	Project Sea Dragon - aquaculture farm proposed for Legune Station	2100	•	•	•		✓	✓		✓	Enable long term economic growth
Top End Rural	Keep River Plains Road upgrade	80	58	•			✓	✓			Support Project Sea Dragon (proposed aquaculture farm at Legune station) and Ord River Stage 3 project
Top End Rural	Arnhem Highway Adelaide River floodplain	78	•	•			✓	✓			Improve flood immunity at the Adelaide River crossing





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