Government of South Australia
Department of Planning, Transport and Infrastructure

In reply please quote 2019/03141/01

PEOPLE AND BUSINESS DIVISION

77 Grenfell Street
Adelaide SA 5000

GPO Box 1533
Adelaide SA 5001

Telephone: 08 8343 2222
Facsimile: 08 8204 8740

ABN 92 366 288 135

Senator Rex Patrick
Level 2
31 Ebenezer Place
ADELAIDE SA 5000

Dear Mr Patrick,

NOTICE OF DETERMINATION - REQUEST FOR ACCESS TO DOCUMENTS UNDER THE FREEDOM OF INFORMATION ACT 1991

I refer to your application made under the *Freedom of Information Act 1991* (the Act) which was received by the Department of Planning, Transport and Infrastructure on 05 March 2019.

You have requested access to:

> *"It is understood that the South Australian Department of Planning, Transport and Infrastructure (DPTI) and the rail operator, Genesee & Wyoming Australia (GWA) jointly commissioned engineering consultancy, SMEC, to undertake an Eyre Peninsula Freight Strategy in 2017, with the final report provided to SA Transport Minister, the Hon. Stephan Knoll MP, late in 2018.*
> *I seek access to this report."*

There is one document within the scope of your application.

I have determined that partial access to this document is granted in accordance with section 20(1) and Clause 6(1) of the FOI Act which states;

20—Refusal of access

(1) An agency may refuse access to a document—
(a) if it is an exempt document

6—Documents affecting personal affairs

(1) A document is an exempt document if it contains matter the disclosure of which would involve the unreasonable disclosure of information concerning the personal affairs of any person (living or dead).

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The document contains information that this department considers to be the personal affairs of individuals (i.e. names, direct phone / mobile numbers and email addresses). Pursuant to Clause 6(1) of the Act, this information is exempt from disclosure and has been removed or 'marked out' from the report.

Attached is an explanation of the provisions of the Act which details your rights to review this determination, and the process to be followed.

In accordance with Premier and Cabinet Circular PC045, if you are given access to documents as a result of this FOI application, details of your application, and the documents to which access is given, will be published in the agency's disclosure log within 90 days from the date of this determination. Any private information will be removed. A copy of PC045 can be found at http://dpc.sa.gov.au/what-we-do/services-for-government/premier-and-cabinet-circulars. If you have any objection to this publication, please contact us within 30 days of receiving this determination.

Should you have any enquiries concerning your application please contact [redacted] Freedom of Information Officer, on telephone [redacted]

Yours sincerely

Sam Rodrigues
Accredited Freedom of Information Officer

1 April 2019

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INTERNAL REVIEW

If you are dissatisfied or concerned with the decision of this Agency regarding access to documents or the request for amendment to your personal records, you can apply for an Internal Review of that decision.

To apply for an Internal Review you must write a letter addressed to the Principal Officer or lodge an Internal Review application form with the Principal Officer of this Agency. The legislated application fee must accompany all applications, unless the fee was waived in the original Freedom of Information application, in which case there would be no fee payable for the application. The application must be lodged within 30 days after being notified of the decision.

The Agency will undertake the Internal Review and advise you of its decision within 14 days of receipt of the application.

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You are unable to apply for an Internal Review regarding a decision to extend the time limit for dealing with an application but you can apply for an External Review.

EXTERNAL REVIEW BY THE OMBUDSMAN

If the Agency does not deal with your Internal Review application within 14 calendar days (or you remain unhappy with the outcome of the Internal Review) you are entitled to an External Review by the Ombudsman SA.

You may also request an External Review by the Ombudsman if you have no right to an Internal Review.

The application for review by the Ombudsman should be lodged within 30 days after the date of a determination. The Ombudsman's Office, at their discretion, may extend this time limit.

Investigations by the Ombudsman are free. Further information is available from the Office of the Ombudsman by telephone on 8226 8699 or toll free 1800 182 150 (within SA).

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If you are still dissatisfied with the decision made by this Agency after an Internal Review or after a review by the Ombudsman, you can request a review from SACAT.

You must exercise your right of review to SACAT within 30 calendar days after being advised of the determination or the results of any other Internal or Ombudsman Review. Any costs will be determined by SACAT, where applicable. For more information, contact;

South Australian Civil and Administrative Tribunal (SACAT)
Phone: 1800 723 767
Email: sacat@sacat.sa.gov.au

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SCHEDULE OF DOCUMENTS - FREEDOM OF INFORMATION APPLICATION NUMBER				Determination	2019/03141/01
Document Number	**Description of Document**	**Date of Document**	**Author**	Release / Refuse Access	**Schedule Clause Applied**
1	Eyre_Peninsula_Freight_Study_-_SMEC_2017	26-September-2018	DPTI & Genesee and Wyoming Australia - SMEC INTERNAL	Partial Release	6(1) Personal affairs

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Eyre Peninsula Freight Study

Eyre Peninsula Freight Study

Reference No. 3005591
Prepared for The Department of Planning, Transport and Infrastructure
and Genesee and Wyoming Australia

Document Control

Document:	Eyre Peninsula Freight Study
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Revision History

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SMEC Company Details

Approved by:	6(1) Personal affairs		
Address:	Level 4, 19 Grenfell Street, Adelaide SA 5000		
Signature:			
Tel:	6(1) Personal affairs	Fax:	08 8225 9850
Email:	6(1) Personal affairs	Website:	www.smec.com

Important Notice

This report is confidential and is provided solely for the purposes of assisting the Department of Planning, Transport and Infrastructure (DPTI) and Genesee and Wyoming Australia (GWA) to plan future freight management on the Eyre Peninsula. This report is provided pursuant to a Consultancy Agreement between SMEC Australia Pty Limited ("SMEC") and The Department of Planning, Transport and Infrastructure and Genesee and Wyoming Australia, under which SMEC undertook to perform a specific and limited task within the allocated budget for The Department of Planning, Transport and Infrastructure and Genesee and Wyoming Australia. This report is strictly limited to the matters stated in it and subject to the various assumptions, qualifications and limitations in it and does not apply by implication to other matters. SMEC makes no representation that the scope, assumptions, qualifications and exclusions set out in this report will be suitable or sufficient for other purposes nor that the content of the report covers all matters which you may regard as material for your purposes.

This report must be read as a whole. The executive summary is not a substitute for this. Any subsequent report must be read in conjunction with this report.

The report supersedes all previous draft or interim reports, whether written or presented orally, before the date of this report. This report has not and will not be updated for events or transactions occurring after the date of the report or any other matters which might have a material effect on its contents or which come to light after the date of the report. SMEC is not obliged to inform you of any such event, transaction or matter nor to update the report for anything that occurs, or of which SMEC becomes aware, after the date of this report.

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Executive Summary

SMEC has been engaged by the Department of Planning, Transport and Infrastructure (DPTI) and Genesee & Wyoming Australia (GWA) to undertake a high-level review of the freight task on the Eyre Peninsula. This report will be used to define potential next steps and/or assist investment decision making for the region.

While the study is defined as a general freight study, the primary focus is on the future use of the existing rail network.

The Study identified two key problems for the progression of an Eyre Peninsula freight strategy as follows;

> **Problem 1 (Rail)** – The existing rail network infrastructure requires capital investment to remain reliable and competitive with road transport. Equally, any significant capital investment on the rail infrastructure may result in an increase in rail charges such that the rail rates may not be competitive with road transport.
>
> **Problem 2 (Demand)** – Potential infrastructure changes on Eyre Peninsula may change the demand for use of existing rail, road and port infrastructure.

The Study process was guided by a Steering Committee comprising representatives of DPTI, GWA and PIRSA, and informed by a reference Group comprising a range of key stakeholders.

An assessment of the Strategic context for freight in the region was undertaken considering National, State and Local Strategic Planning documents. The existing and potential future freight tasks were assessed along with the use and condition of existing road, rail and ports infrastructure.

The Study Objectives and Outcomes were endorsed by the Steering Committee as follows;

OBJECTIVE	OUTCOME
Productivity – Economic	Optimal Grain transport network providing net positive benefits
Productivity – Financial	Sustainable positive financial outcome for private and public sector
Social – Safety	No net increase in crashes
Social – Amenity	Minimise impact of grain transport on residential communities
Environmental – Harmful Emissions	Minimise harmful emissions from grain transport on EP
Environmental – Climate Change	Minimise CO^2 emissions from grain transport on EP

The Base Case was established for the region as a point of comparison for determining the monetised and non-monetised benefits and costs for each project case / option. The Base Case was established as the 'most likely' scenario in the absence of any 'project' intervention that might result from this study. At the time of commencing this study it was recognised that GWA would be unlikely to commit to investment in capital upgrades of the rail network without suitable commitment from Viterra to an ongoing contract. Equally, Viterra are unlikely to commit to an ongoing contract unless there is confidence that the necessary capital upgrades will occur to support an efficient and productive freight task. Accordingly, it was determined that the most likely scenario, in the absence of any alternative outcomes from this study, would be the closure of the rail network resulting in all grain transport on road. This was therefore adopted as the Base Case.

A series of possible alternative Project Cases (Options) were identified and assessed against the Base Case to determine which options would be likely to better achieve the Objectives and Outcomes at a holistic level for the Region. This assessment process considered Monetised Cost comparisons (Net Present Value), Non-Monetised assessment criteria and High-Level Supply Chain considerations. Importantly, this assessment process also considered a number of Sensitivity Cases reflecting potential changes for the region – most notably, the potential for new grain Port Facilities at Lucky Bay and Cape Hardy.

The assessment process identified the following key points;

- All options which retain some segment/s of the existing rail network will provide better benefit / cost outcomes than the defined base case. This is determined on a holistic regional economic basis only and does not consider the individual financial assessments of key stakeholders including the State Government, Councils, GWA and Viterra. Individual economic assessments by these parties on their own financial positions with these options

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would need to be undertaken and would be expected to result in differing perspectives on the preferred long-term approach.

- Options which result in the majority of freight from the eastern side of Eyre Peninsula being transported by truck will increase the number of heavy vehicles travelling through the City of Port Lincoln. This issue is potentially managed in the future once the Lucky Bay and or Cape Hardy Grain receival facilities are operational.
- A number of Stakeholder Reference Group members expressed a preference to retain some or all of the rail network as an operational railway. This outcome is perceived as best protecting the flexibility and responsiveness of the grain supply chain. On this basis, it is considered likely that options which retain some rail functionality are likely to be better received by the community. It is expected however that the broader community will ultimately be engaged on this.
- Stakeholders will be concerned about any change to existing operations which result in a material increase in road freight on the existing network. There will be a stakeholder expectation of a level of road upgrade commensurate with the change and some time may need to be allowed to undertake at least some of these works ahead of a material change in freight transport task.
- Options which rely on significant rail freight from areas likely to also be serviced by Lucky Bay and/or Cape Hardy in the future are not likely to be sustainable. The potential port facilities at Lucky Bay and/or Cape Hardy may result in a significant portion of the grain that may otherwise use the eastern rail leg between Kimba and Cummins or between Rudall and Cummins using the alternative port.
- Closure of the section of rail corridor between Rudall and Kimba is considered to be an appropriate short-term decision given the potential future ports at Lucky Bay and Cape Hardy, and given that this section of the rail network is one of the sections in poorest condition, currently only carrying 20% of the grain delivered to Kimba.
- There is both risk and opportunity associated with the supply chain cost impacts of each option. In broad terms it is expected that options which retain larger portions of the existing rail network are likely to achieve supply chain cost benefits in higher production grain seasons, whereas the opposite is likely to be the case in lower production grain seasons. Given the involvement of GWA and Viterra in this study it is reasonable to expect that increasing road freight transport is unlikely to have a material detrimental impact on supply chain costs over a period of time. However, if it is deemed appropriate to better define these costs, additional specialist detailed assessment could be undertaken and/or formal advice could be sought from Viterra ahead of progressing with any change.

A short-list of three Project Options was selected and assessed against the project objectives. Each of these however, has a key area of risk in either the short or longer term depending on the timing of future mobilisation at Lucky Bay and Cape Hardy. Option 5, which retains rail between Cummins and Port Lincoln is identified as the likely best 'long-term' option once these additional Port facilities are operational.

The next steps recommended are summarised as follows;

1. GWA and Viterra undertake their own assessment of the long-term viability of Option 5. While the assessment described in this report identifies Option 5 as a potential optimal long term sustainable option for the region, this assessment is provided on a holistic regional basis, rather than on the consideration of the financial suitability for each individual key stakeholder. It is therefore recommended that GWA and Viterra each consider if this option will be viable from their individual perspectives. As a part of this process GWA should specifically further consider the viability of retaining 16 tonne axle load locomotives.
2. Consider if funding scenarios exist which might enable a staged approach to the transition of the Eyre Peninsula grain freight task to one of increased road freight and reducing rail freight. An option for this is identified in the report.
3. Further engage with GWA and Viterra to seek greater clarity on the likely supply chain cost impact / benefits of the staged and long-term freight approach. While it is understood that this is complex and dependent on a number of influencing factors, it is considered important that there is alignment between DPTI, GWA and Viterra on the likely outcomes ahead of progression with any changes. It will be important to be able to present this aligned expectation to the Stakeholder Reference Group as well as the broader community. An alternative, or possibly parallel approach, would be to engage an independent party to undertake a specialist independent assessment of this aspect. This latter approach could draw-on the recent release of the ESCOSA draft report titled; '*Inquiry into the South Australian bulk grain export supply chain costs*'.
4. Undertake broader stakeholder and community engagement to discuss the potential changes to freight movement on the Eyre Peninsula.

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1 Introduction

1.1 Purpose of this document

SMEC has been engaged by the Department of Planning, Transport and Infrastructure (DPTI) and Genesee & Wyoming Australia (GWA) to undertake a high-level review of the freight task on the Eyre Peninsula. This report will be used to define potential next steps and/or assist investment decision making for the region.

While the study is defined as a general freight study, the primary focus is on the rail grain freight network and the future use of this existing network.

The specific terms of reference are for the study to consider;

- the current and future freight task;
- modal mix options;
- the viability of options to rejuvenate the Eyre Peninsula rail network and whether or not these options have economic benefit.

1.2 Study Area

The study considers the Eyre Peninsula Region broadly defined by the Eyre Peninsula Local Government Association boundary between Whyalla and Ceduna as shown in Figure 1.

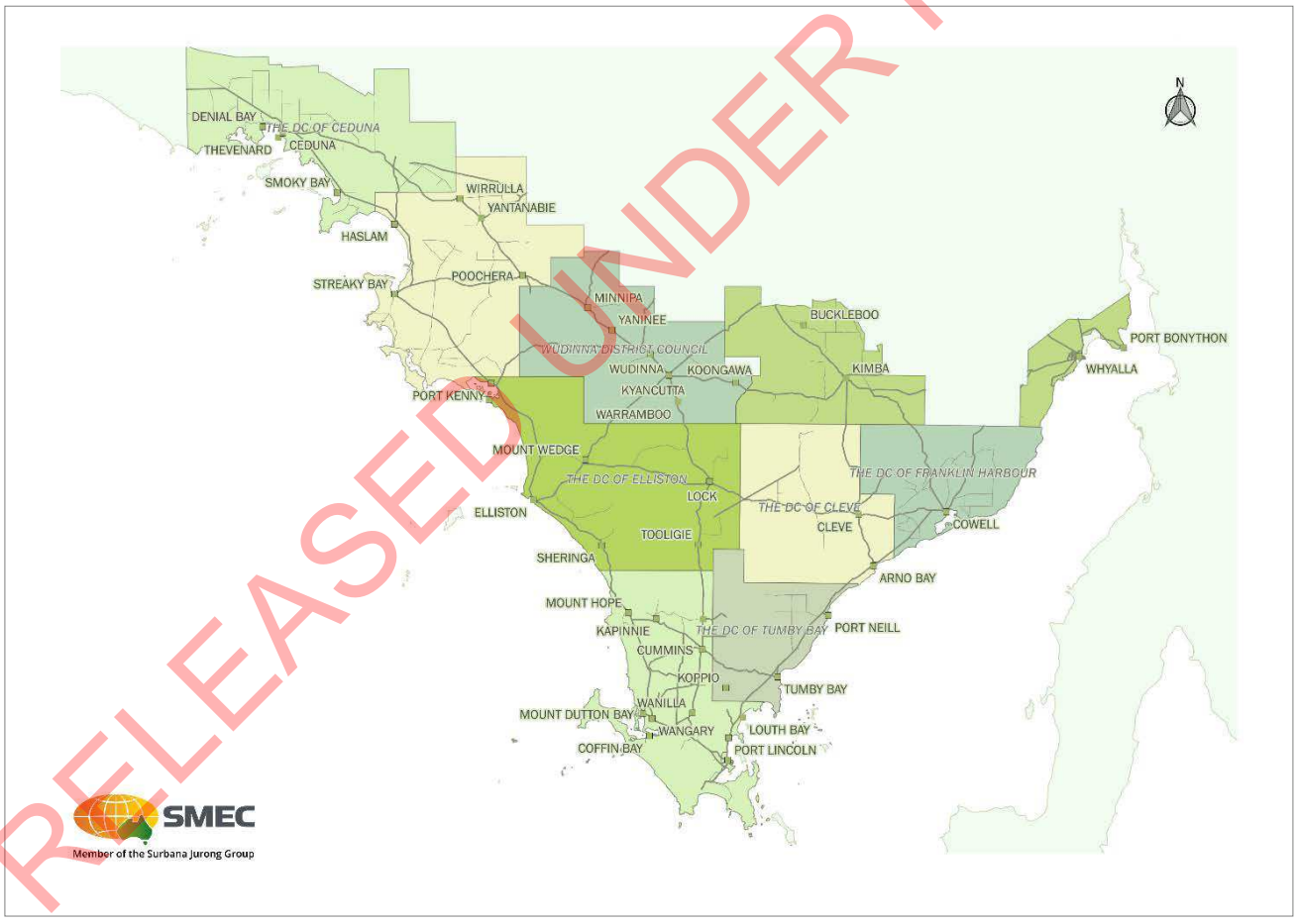

Figure 1: Study Area

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1.3 Data Provided

The Study has been supported by the provision of various data from stakeholders. This comprises:

- Rail asset condition information and associated speed restrictions
- Road asset condition information
- Historical costs for routine and periodic road maintenance
- Estimated costs for various extents of rail asset upgrade
- Forecast draft road investment programs
- Records of grain harvest transport volumes by road and rail

Much of this information has been provided subject to confidentiality agreements. Therefore, while used in the assessment process, this is not included in the report.

1.4 Previous Reports

DPTI provided the following reports for background/ context:

- Eyre Peninsula Grain Transport Issues Paper – October 2002

This paper consolidated various representations received from the grain industry on the Eyre Peninsula. The paper considers the overall Eyre Peninsula grain industry, with key issues raised at the time including:

  - Grain product diversification in different climate conditions, leading to changes in the grain transport task.
  - Continued growth in grain production and concerns over capacity of the transport system.
  - Operational efficiency of Eyre Peninsula rail leading to transport constraints.
  - Security in grain supply to export shipping based on capacity to service ports.
  - True cost of road transport based on road vs rail transport solutions.
  - Co-operation in a networked industry related to co-dependence in the industry, investment and capital risk associated with operations.
  - Structural deficiencies of the Eyre Peninsula grain export industry based on concentration of market share, barriers to entry (i.e. high costs / lack of competition) and inefficient access regimes.
  - Sustainable grain transport options.

It is recognised that a number of changes have occurred since the timing of this paper. Nevertheless, many of the issues raised remain relevant to this study.

- Eyre Peninsula Grain Logistics Rail Network Upgrade – Report to the Public Works Committee – February 2006

This Public Works Committee report summarised the Eyre Peninsula Grain Logistics Rail Network Upgrade Project at the time. The approved project comprised:

  - Curtailment of 200km of grain train operations on the rail network at Kimba on the eastern line and Wudinna on the western line and closing the Kapinnie line (dormant state) – refer to Figure 2.
  - Sleeper, rail line, ballasting and other minor works.
  - Upgrades to grain handling facilities/rail interface at key port and up-country silo sites.

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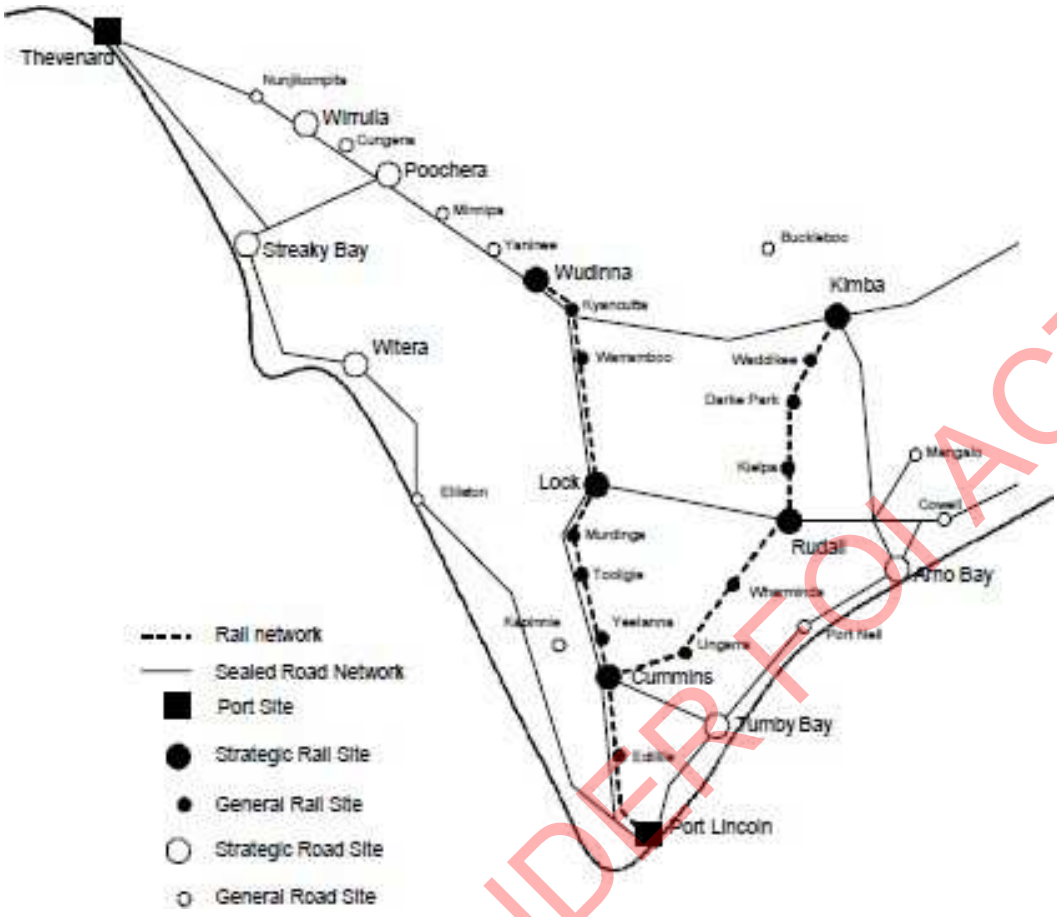

Figure 2: Operating rail network Post 2006

This project represents the latest major upgrade of the Eyre Peninsula rail system.

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2 Study Methodology

The Study methodology adopted in this report is consistent with the Australian Transport and Assessment Planning (ATAP) Framework, and is summarised in Figure 3.

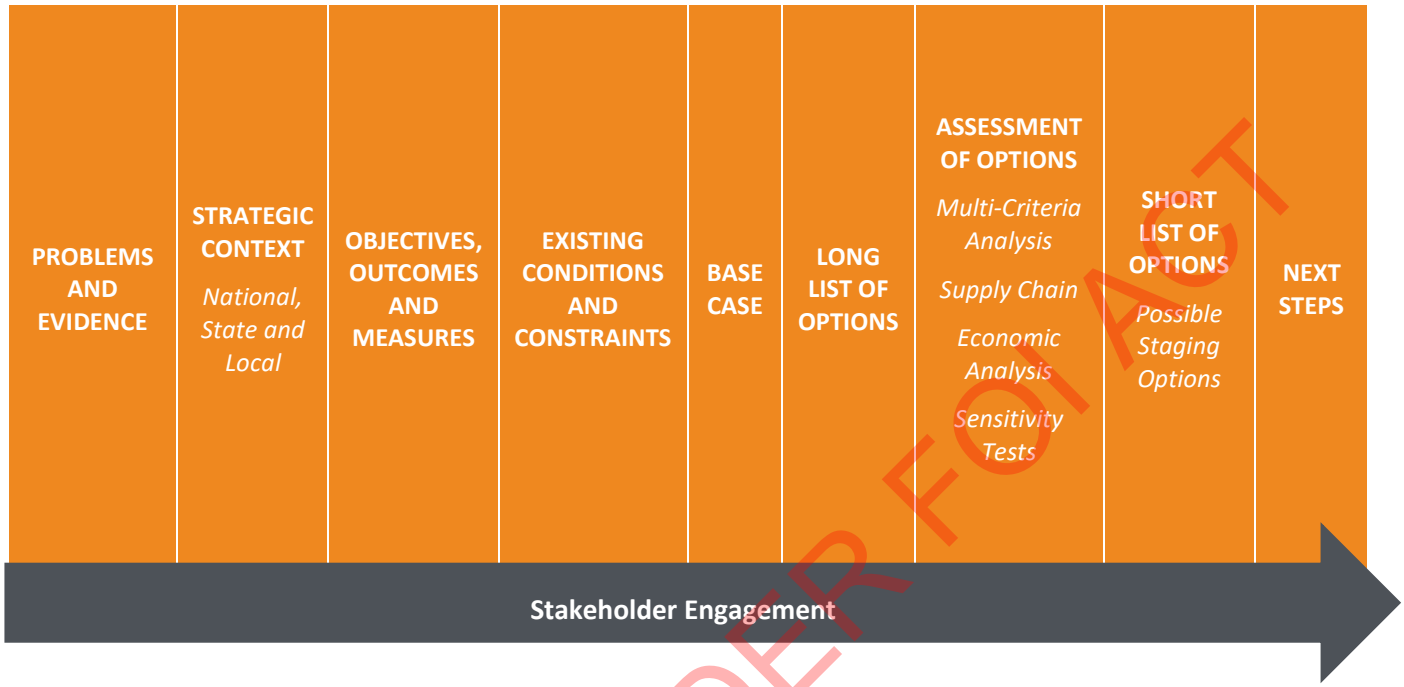

Figure 3: Study Methodology

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3 Stakeholder Engagement

3.1 Stakeholder Engagement Plan

A Stakeholder Management and Communications Plan was established for the study and endorsed by the Steering Committee.

The Stakeholder Management and Communications Plan outlines the Project Governance Structure, details the nominated members of the Stakeholder Reference Group and outlines the communication processes.

3.1.1 Steering Committee

A Steering Committee was established to provide guidance to the project team during the study, including:

- Executive leadership, monitoring and guiding progress;
- Direction on escalated issues and risks;
- Resolution of issues outside the authority or control of the project manager such as priority setting, decision-making and resource commitments that cross organisational boundaries and require agreement from senior stakeholders;
- Oversight of stakeholder management.

The Steering Committee comprised representatives of DPTI, GWA and PIRSA.

3.1.2 Stakeholder Reference Group

A Stakeholder Reference Group was established to provide business and subject matter input to the study process.

The Stakeholder Reference Group comprised representatives of the following organisations;

- Grain Producers SA
- Eyre Peninsula LGA
- Flinders Ports
- Viterra
- Regional Development Australia, Whyalla and Eyre peninsula
- SA Freight Council
- South Australian Road Transport Association
- Livestock and Rural Transporters Association of SA Inc
- Department of Premier and Cabinet SA
- DPTI Heavy Vehicle Industry Liaison

3.2 Initial Stakeholder Input

3.2.1 Questionnaire

Members of the Stakeholder Reference Group were invited to provide initial input to the study via the questionnaire provided in Figure 4.

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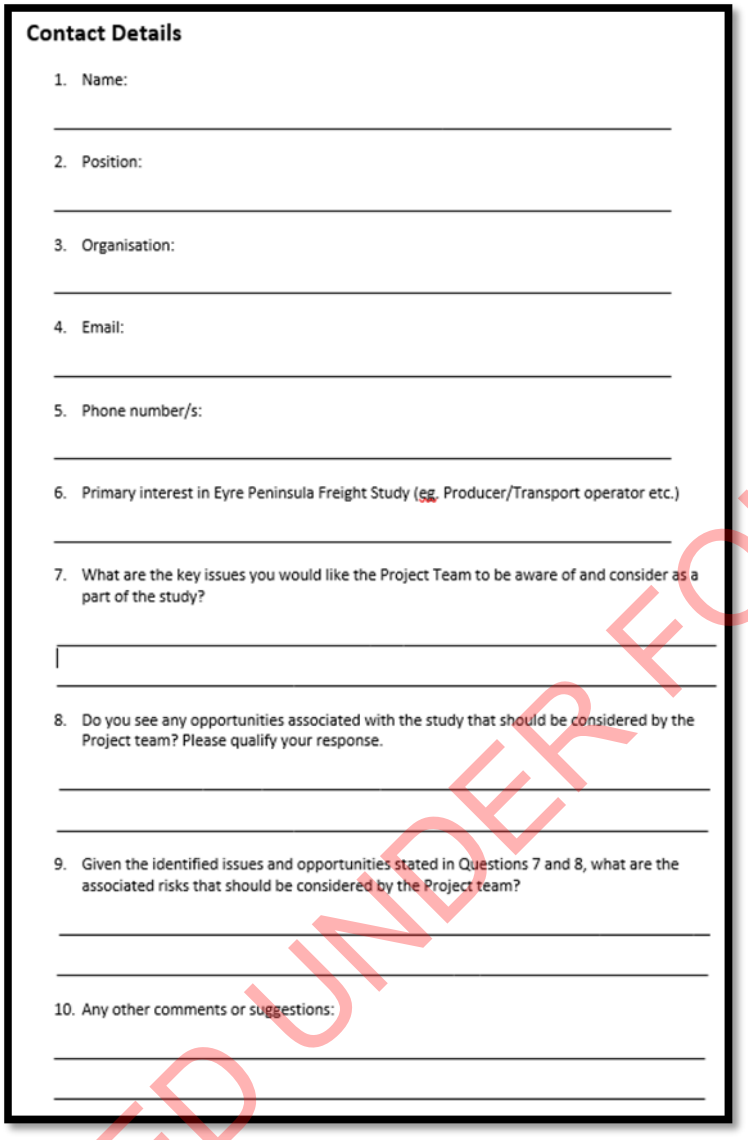

Contact Details

1. Name:

2. Position:

3. Organisation:

4. Email:

5. Phone number/s:

6. Primary interest in Eyre Peninsula Freight Study (eg. Producer/Transport operator etc.)

7. What are the key issues you would like the Project Team to be aware of and consider as a part of the study?

8. Do you see any opportunities associated with the study that should be considered by the Project team? Please qualify your response.

9. Given the identified issues and opportunities stated in Questions 7 and 8, what are the associated risks that should be considered by the Project team?

10. Any other comments or suggestions:

Figure 4: Stakeholder Reference Group Questionnaire

A total of 12 responses were received and copies are provided in Appendix D. Key themes repeated through this input were;

- Concern about costs to growers
- The future direction must be sustainable
- Recognition that the rail network is very sensitive to grain leakage
- Options that increase road traffic must consider road upgrade and maintenance needs as well as road safety
- Options must consider social impacts
- Options must consider proposed future Port developments

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4 Understanding the Problem

The problems, with supporting evidence, leading to undertaking this study were defined in consultation with the project team members incorporating stakeholder inputs as follows:

PROBLEM	CAUSE	EVIDENCE
Problem 1 (Rail) – The existing rail network infrastructure requires capital investment to remain reliable and competitive with road transport. Equally, any significant capital investment on the rail infrastructure may result in an increase in rail charges such that the rail rates may not be competitive with road transport.	• Deteriorating condition of rail and sleepers • Deteriorating condition of wagons and locomotives • Improving road transport efficiency via use of B-triples and AB-Triple Road Trains (using the PBS Level 3A network).	Viterra, as the only client of the subject section of the GWA network, currently have a contract with GWA for grain transport until March 2019. Viterra have advised they may not be willing to enter a further contract unless they have suitable confidence that the rail network can provide an efficient service which is competitive with road freight. The majority of the corridor is under speed (over 99%) restriction due to the deterioration of track geometry, sleeper and rail joint conditions. A total of 600 minutes is lost in speed restrictions for a complete combined up and down passage of the existing network between Wudinna and Port Lincoln and between Kimba and Port Lincoln. Reduced reliability of locomotives and wagons given their age. Some wagons were removed from service in 2017 due to major cracking, rendering them unsafe.
Problem 2 (Demand) – Potential infrastructure changes on Eyre Peninsula may change the demand for use of existing rail, road and port infrastructure	• Forecast projects on the Eyre Peninsula. • Potential for changes to existing farm practices.	Central Eyre Iron Project (CEIP) has been declared as a Major Development incorporating a deep-sea port approximately seven kilometres south of Port Neill on the Eyre Peninsula East Coast. The Port (Cape Hardy) would receive Capesize vessels and be a multi-commodity Port able to accommodate grain. The inclusion of Cape Hardy as a grain port option would potentially (grain marketers still need to assess options) significantly impact the use of the rail network. The timing for construction of the Central Eyre Iron project is unknown. T- Ports investment are developing a new transhipment grain port facility at Lucky Bay. The facility is proposed to accommodate grain storage of 430,000 tonnes at Lucky Bay as well as 150,000 tonnes at Lock. While the most recent announcement states that the facility will be operational for the 2018/19 harvest, this would need to be verified. As for the CEIP, this has the potential to significantly impact the use of the rail network. During Engagement for this study, members of the Stakeholder Reference Group identified the potential of a growing trend for farmers to increase their on-farm storage capacity and also to purchase their own road freight transport vehicles. This has the potential to change the timing and mode of some of the grain freight transport task.

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5 Strategic Context

5.1 Overview

Appendix A provides an overview of the National, South Australian and Local Government strategies relevant to this Freight Study.

This Strategic Context considers the following policy documentation and discusses key elements for this study:

National

- Infrastructure Australia
  - Australian Infrastructure Audit Report – Volume 1
  - Infrastructure Priority List and Eyre Infrastructure Project (Iron Road) Business Case Evaluation
- Australian Government
  - Road and Rail Freight: Competitors or Complements
  - Road Safety Strategy – National
  - Australia's 2030 Emission Reduction target

South Australian Strategic Context

- State Policy Framework
- State Policy Framework – Top Level
  - Seven Strategic Priorities
  - South Australia Strategic Plan
  - State Government's 10 Economic Priorities
- State Policy Framework – Secondary level
  - The Integrated Transport and Land Use Plan
- State Policy Framework – Third Level
  - Strategic Infrastructure Plan for South Australia
  - Region Overview – Eyre and Western
  - Eyre and Western Region Plan (April 2012)
- Road Safety Strategy – State Government
  - South Australia's Road Safety Strategy – Towards Zero Together
- Other State
  - Regional Mining and Infrastructure Planning project – Eyre and Western Region
  - Climate Change

Local

- Regional Plan 2014-16
- Overarching Regional Roads Strategy

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6 Project Objectives and Assessment Criteria

6.1 Establishment of Project Objectives

The study objectives were established by reviewing the problems and the various strategic plans describing the strategic direction for the Eyre Peninsula Region as related to freight.

6.2 Study Objectives

The Study objectives were endorsed by the Executive Steering Group, as follows;

Social

Minimise any change to the existing impact of grain transport on residential areas.

Maximise the employment opportunities associated with grain transport on Eyre Peninsula.

Safety

No net increase in road crashes on the Eyre Peninsula because of any change in grain transport.

Productivity

Grain sector of the economy is commercially sustainable with efficient supply chain costs at a regional level.

Economic benefits

The transport networks provide a net benefit exceeding the investment required to construct, operate, and maintain over to 2045.

Financial sustainability

Private sector and public sectors have a positive financial outcome to ensure the ongoing viability of the grain transport logistics network.

6.3 Study Outcomes and Assessment

The following intended study outcomes and approach to assessment were also endorsed by the Executive Steering Group:

OBJECTIVE	OUTCOME	MEASURE/ ASSESSMENT	TARGET
Productivity – Economic	Optimal Grain transport network providing net positive benefits	NPV comparison of Options Assessment of Supply Chain cost impacts	Optimal NPV Minimise Supply Chain Costs
Productivity – Financial	Sustainable positive financial outcome for private and public sector	*	*
Social – Safety	No net increase in crashes	Monetised as part of NPV	No net increase in crashes
Social – Amenity	Minimise impact of grain transport on residential communities	Non-monetised assessment as MCA criterion	-
Environmental – Harmful Emissions	Minimise harmful emissions from grain transport on EP	Monetised as part of NPV	-
Environmental – Climate Change	Minimise CO^2 emissions from grain transport on EP	Monetised as part of NPV	-

* Assessment considers net Financial elements only – not broken down to sectors

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7 Existing Conditions and Constraints

7.1 Introduction

The Eyre Peninsula region covers an area of approximately 44,000 square kilometres from the regional centre of Whyalla on the north-east coast of the Eyre Peninsula to just west of the Port of Thevenard near Ceduna. The region has a population of approximately 60,000 people across 11 Council areas including the Cities of Whyalla (23,000 residents) and Port Lincoln (15,000 residents).
The regional economy is heavily invested in the industries of agriculture (approximately 33% of the States grain harvest) and aquaculture (90% of the States seafood). Other significant employment sectors include health and social care, manufacturing, retail, education and training, and construction. Tourism and mining are identified as sectors with significant potential for future growth.[1]

7.2 Key Freight Industries

7.2.1 Grain

Overview

The Department of Primary Industries and Regions (PIRSA) submitted an overview on the South Australian Grain Industry in May 2017 for the ESCOSA Grain Supply Chain Cost Inquiry.

This document provides an overview of the grain industry in South Australia (SA). The report provides a summary of strategic context of the industry, storage methods, distribution and export methods, key stakeholders and current regulations around grain handling in SA.

Key points are as follows:

- Australia usually ranks as about the fifth largest grain exporter behind Canada, US, France, and Germany
- On an average 85% of the grain produced in SA is exported (less in drought years) however increases to more than 90% in large production years.
- The typical South Australian crop is winter grown (sown commencing April – May, harvest commencing late September) and includes cereal, pulses, and oilseeds.
- Wheat and Barley are SA's largest crops. Around 59% of SA crop is wheat, 20% barley, and remainder made up of canola, pulses, lupins and other cereal crops.

Eyre Peninsula

Eyre Peninsula produces a range of crops most significantly comprising Wheat, Canola, Barley and Lentils, with an average total production of approximately 2.2 million tonnes/annum over the last 19 years. Production can vary significantly though with a range over this period from 1 million tonnes to 3.5 million tonnes. The lowest production year was in 2006-07 (drought year) and highest production in 2016-17. See Figure 5 for details of production in tonnes.

Table 1 Main South Australian Crops - High and Low (drought) production years (tonnes). Source: PIRSA Crop and Pasture Report.

	2006-07 Production (Low Year)[2]					2016-17 Production (High Year - State record)[3]				
DISTRICT	Wheat[1]	Barley	Canola	Lentils	All Crops[4]	Wheat[1]	Barley	Canola	Lentils	All Crops[4]
Western Eyre Peninsula	262,650	77,490	1,782	100	354,785	955,000	138,000	12,000	3,000	1,153,080
Lower Eyre Peninsula	204,468	107,714	23,918	540	375,077	553,000	233,000	150,000	7,200	1,031,500
Eastern Eyre Peninsula	215,543	74,200	1,000	0	300,140	1,019,000	195,000	19,000	6,000	1,274,690
Total Eyre Peninsula	682,660	259,404	26,700	640	1,030,002	2,527,000	566,000	181,000	16,200	3,459,270

Table 2 Averages main Crops by district - 5 year average and 10 year State total (tonnes). Source: PIRSA Crop and Pasture Report.

	5 Year Average (2012 - 2017)					10 year average - all crops	
DISTRICT	Wheat[1]	Barley	Canola	Lentils	All Crops[4]	2007- 2017	% State Production
Western Eyre Peninsula	758,100	111,000	7,400	600	905,200	832,700	10.8%
Lower Eyre Peninsula	450,700	220,900	102,400	3,700	840,400	800,900	10.4%
Eastern Eyre Peninsula	762,300	154,800	10,900	1,200	952,000	830,800	10.7%
Total Eyre Peninsula	1,971,100	486,700	120,700	5,500	2,697,600	2,464,400	31.9%

Figure 5: Eyre Peninsula Grain Production (tonnes)

[1]Regional Development Australia, Whyalla and Eyre Peninsula, Regional Plan 2014-16

[2]PIRSA Eyre Peninsula Grain Production Trends: 5 and 10 years

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Areas under crop have been gradually declining from a peak at around 1.45m Hectares in 2007/08 as shown in Figure 6.

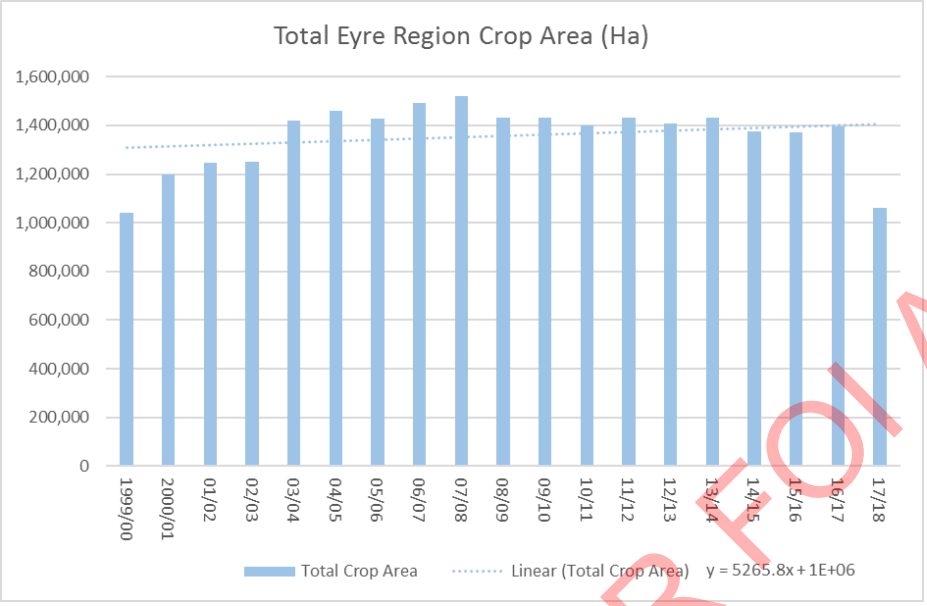

Figure 6: Total Eyre Region Crop Areas

Total Eyre Peninsula Crop yields have been variable (Refer Figure 7) with a peak season in 2016/17 producing an average 2.48 tonnes/hectare.

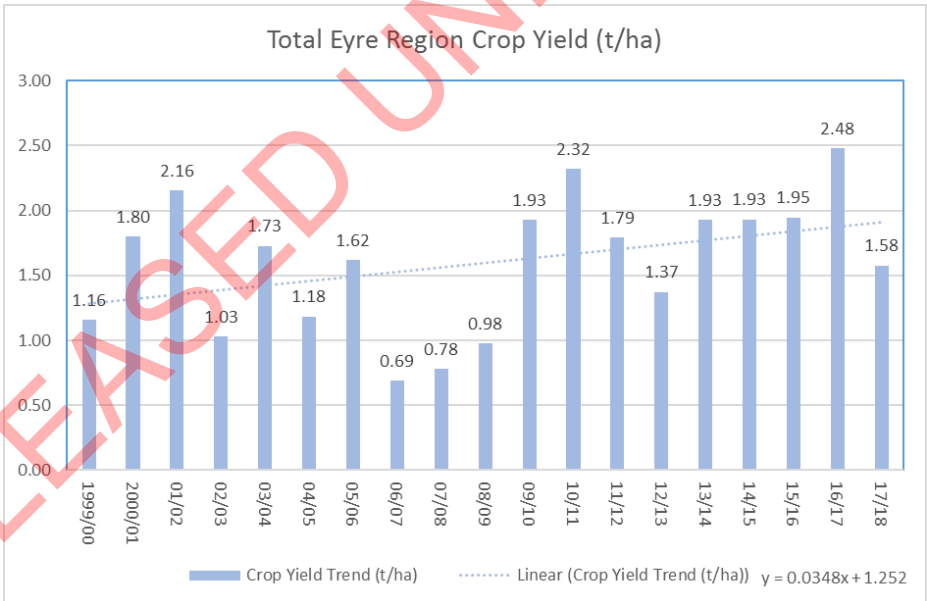

Figure 7: Total Eyre Region Crop Yields

A detailed breakdown of production by product by year and split between Western Eyre Peninsula, Lower Eyre Peninsula and Eastern Eyre Peninsula has been provided by PIRSA and is included as Appendix B.

Additionally, Appendix B includes a summary report assessing grain production trends across the Eyre Peninsula. This report forecasts a slight reduction on recent trends from an average 2.24 million tonnes per annum by 2023 to 1.98 million tonnes per annum by 2028. The report identifies the significant potential for variability and also notes potential higher (2.76 million tonnes per annum) and lower (1.66 million tonnes per annum) outcomes.

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Transport and Storage

Viterra operates most of the grain storage and grain handling capacity in SA. Viterra's storage is currently more than 11 million tonnes, located around 90 operational grain receival sites state-wide. Viterra is the main grain storage and grain handling organisation in the Eyre Peninsula, with growers delivering to one of 34 silo locations between Thevenard and Whyalla. Figure 8 shows an excerpt from Viterra's website showing grain delivery locations on Eyre Peninsula.

Other bulk handlers include Cargill, KI Pure Grain Pty Ltd, San Remo and FREE Eyre. FREE Eyre has previously operated a grain receival and storage site at Taragoro on Eastern Eyre Peninsula, however this is currently not operational.

Grain is currently transported on the Eyre Peninsula via a combination of road and rail modes. Of the 1.9 million tonnes delivered to Port Lincoln in 2017, 816,000 tonnes were delivered by rail. This leaves approximately 1.1 million tonnes delivered by road. This is made up as a portion of the grain delivered to road/rail sites along the rail corridors as well as 100% of the grain delivered to road only sites.

Viterra's contract with GWA for rail grain delivery currently expires in March 2019.

Figure 8: Grain Delivery Locations on Eyre Peninsula

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Figure 9 provides a schematic representation of the total grain volumes at each of the delivery sites along the rail corridors as well as the average percentage of this delivered by rail over the last three years.

Figure 9: Average grain volumes from each silo over the last 3 years

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7.2.2 Mining

Current operating mines within or impacting the Eyre Peninsula comprise:

- Iluka's Jacinth and Ambrosia heavy mineral sands deposits. In 2017, 460,000 tonnes of Mineral Sands were exported through the Port of Thevenard with all transport to the Port by road.
- Gypsum. In 2017, 1.55 million tonnes of Gypsum was exported through Thevenard. All transport to the Port is via GWA's rail corridor between Kevin and Thevenard,
- SIMEC's (formally Arrium) ongoing Middleback Ranges Iron Ore operations. All transport is via separate rail corridor to Whyalla.

In addition to the above there are a total of 13 other mining projects recognised by the Department of Premier and Cabinet. A summary of all recognised mining projects and their status is provided in Table 1:

Table 1: Mining Activity in the Eyre and Western Region

MINE	OPERATOR	STATUS	TARGET COMMODITY
Middleback Ranges (includes Iron Chieftain)	SIMEC Mining	Major Mine - Operating	Iron
Wilgerup	SIMEC Mining	Approved	
Fusion	Wisco	Second PFS undertaken. Advanced Exploration Stage	
Central Eyre Iron Project (Warramboo, Kopi)	Iron Road	Approved	
Gum Flat	Lincoln Minerals	Developing Project	
Bungalow + Minbrie	Baoyang	Prospect	
Carrow	Wisco	Prospect	
Greenpatch		Prospect	
Bald Hill + Charlton Gully		Prospect	
Jacinth/ Ambrosia	Iluka	Major Mine -Operating	HM
Tripitaka		Developing Project	
Atacama/ Typhoon /Sonoran		Prospect	
Paris	Investigator Resources	Prospect	Ag
Uley	Strategic Graphite	Historical Mine – Care and Maintenance	Graphite
Carey's Well (Poochera)	Mintoaur and Andromeda	Prospect	Kaolin

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Figure 10 shows the approximate location and type of the mines..

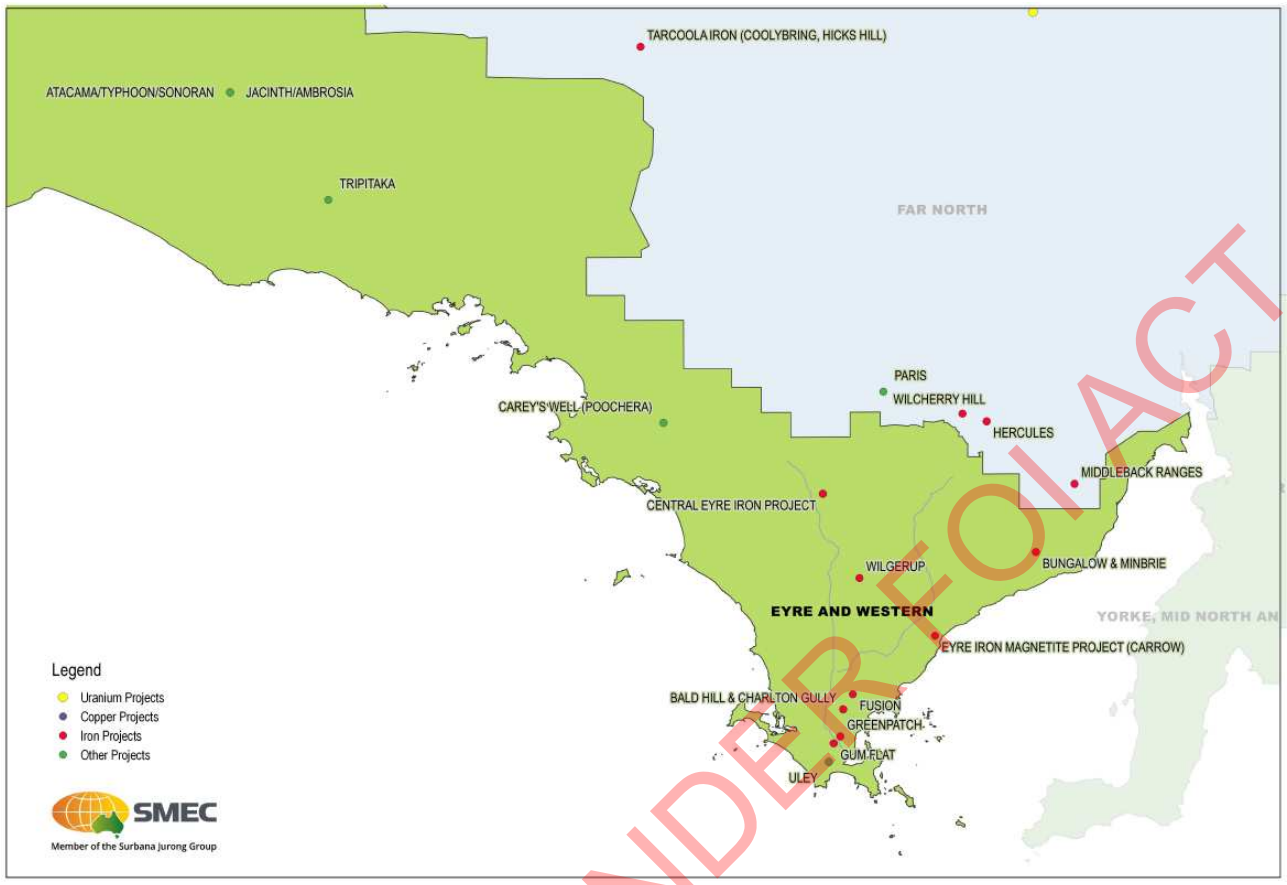

Figure 10: Eyre Peninsula Mine locations

The potential additional freight task from the above is significant, particularly in association with the Central Eyre cluster (Central Eyre Iron Project, Wilgerup and Eyre Iron) which has a combined forecast potential of up to 45 million tonnes per annum. The proposed Central Eyre Iron project, is the largest of these, and is proposing key freight infrastructure changes in association with the mine. These include the provision of a new multi-user deep-water Port facility at Cape Hardy and the construction of a standard gauge railway between the mine site and the new Port facility as shown in Figure 11.

As a part of the Mining Proposal submitted for the project, a separate chapter has been prepared on Traffic (refer http://www.ironroadlimited.com.au). This defines the forecast impacts and associated proposed mitigations for the road network.

Figure 11: Central Eyre Iron Project Infrastructure

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7.3 Existing Infrastructure

7.3.1 Road Network

The region is serviced by 11 Councils who maintain over 13,000km of local roads within the Eyre Peninsula with approximately 94% of these roads unsealed. The remainder of the road network is maintained by the Department of Planning Transport and Infrastructure (DPTI). Roads throughout the Eyre Peninsula are a combination of National Highway (Eyre Highway), state arterial roads and local roads.

Key DPTI arterial roads include;

- Lincoln Highway – connects Whyalla with Port Lincoln along east coast of the Eyre Peninsula
- Tod Highway – runs north/south and links Eyre Highway and Flinders Highway
- Flinders Highway – connects Ceduna and Port Lincoln along the west coast of the Eyre Peninsula
- Birdseye Highway – runs east/west and connects Elliston on the west coast to Cowell on the east coast. The road intersects with the Tod Highway at Lock.

Many roads, as detailed in the DPTI online RAVNet system, are currently gazetted for a range of Restricted Access Vehicles, including: 32 and 36.5m road trains, B-double, AB-triples (PBS level 3A) and Higher mass limit (HML) vehicles. In addition, a number of roads are also used for over-dimension and over-mass freight movements.

Typical existing traffic volumes and percentage of freight vehicles are available on the 'Average Annual Daily Traffic Estimates' diagrams prepared by DPTI and shown in Figure 12.

Figure 12: Annual Average Daily Traffic Estimates (24-hour two-way flows)

Grain movement is currently the key freight task with over 10,000 road train movements made to Port Lincoln typically each year.

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Recent work by the Eyre Peninsula Local Government Association has included identification of key local freight routes connecting to/from the DPTI arterial and National Highway routes as shown in Figure 13 .

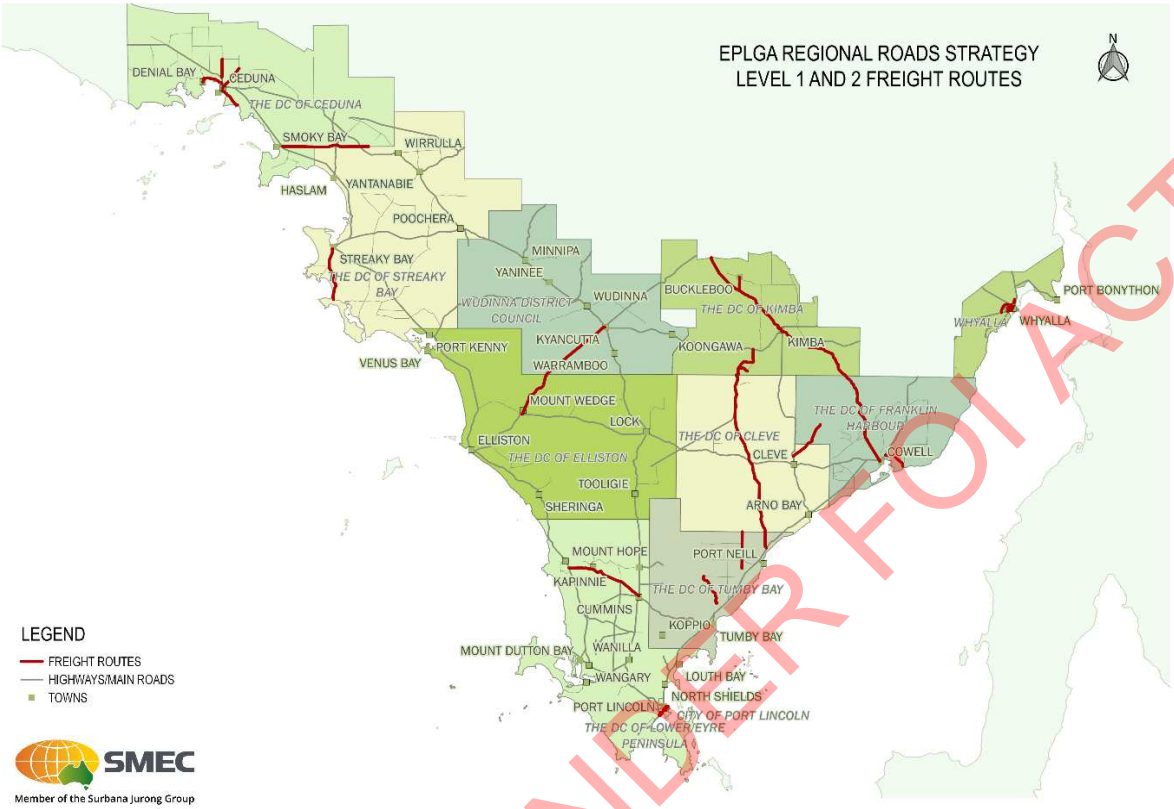

Figure 13: Regional Road Network showing Key Local Government Freight Routes from the Regional Transport Study

7.3.1.1 Road Condition

DPTI maintains a database of collected road condition data and ultimately allocates segments of road to either of the following classification categories; 'Very Good', 'Good', 'Fair', 'Poor' or 'Very Poor'.

The Eyre Peninsula Local Government Association has established a Regional Roads Database which identifies whether or not Level 1 (Regionally Significant) or Level 2 (Locally Significant) road segments across the Eyre Peninsula meet the 'Fit-for-purpose' requirements of the road, and if not whether or not the deficiency/s are classified as major or minor.

In addition, the RAA has provided information from the 'Risky Roads Survey' where road users identify roads or intersections they find confusing or that make them feel unsafe. While no roads or intersections from the Lower Eyre Peninsula were nominated within the top 10 sites, there had been several nominations of roads in the area. Particular interest was placed to Lincoln Highway, Bratten Way and Tod Highway due to different issues such as lack of overtaking opportunities, narrow road, lanes or bridges and pot holes among others (RAA, 2017).

The above data is used throughout this report.

7.3.1.2 Crash History

Crash data is available for the last five years across the Eyre Peninsula. This data is used throughout this report. Heavy vehicles are involved in approximately 20% of all fatality injuries in SA and 7% of all serious injury crashes. Of these crashes, less than 25% are caused by the heavy vehicle.

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7.3.2 Ports

The Eyre Peninsula contains four of the State's nine major export ports as shown in Figure 14 below.

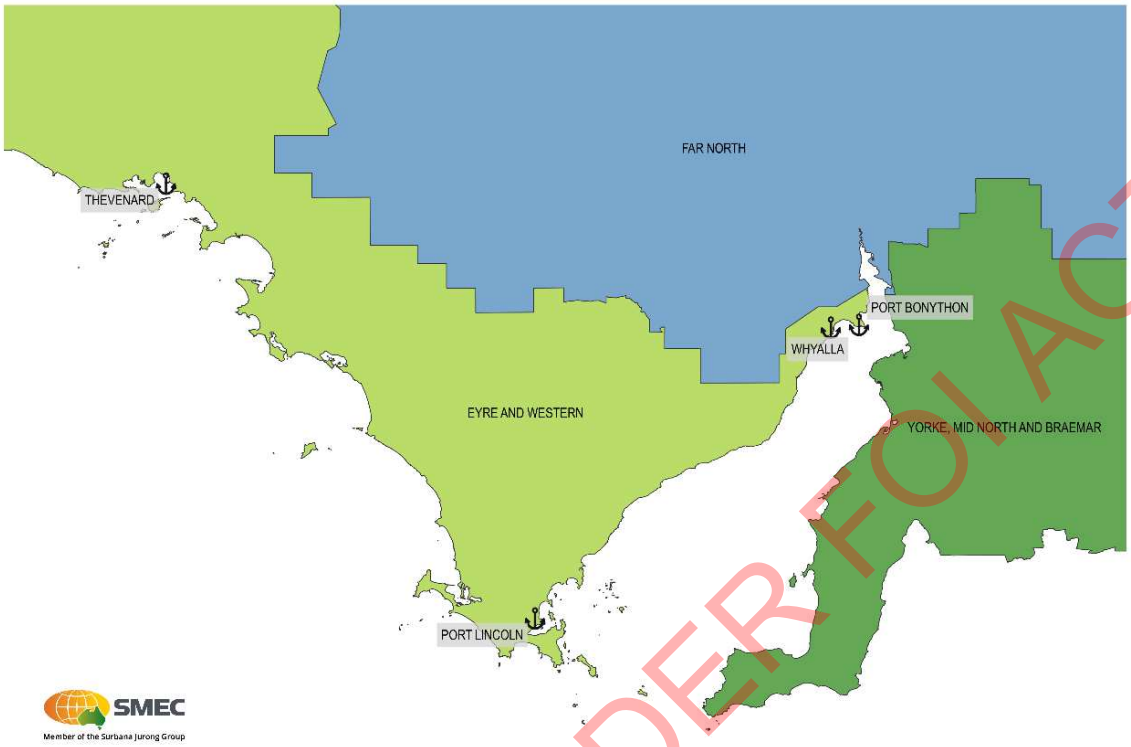

Figure 14: Existing Eyre Peninsula Port Locations

- Thevenard – which accommodates approximately three million tonnes per annum, comprising Gypsum, Mineral Sands and grain. This port is operated by Flinders Ports.
- Port Bonython – is owned by the South Australian Government and is currently solely operated by Santos exporting approximately 250,000 tonnes per annum (approximately 30 ships per year), including naphtha, crude oil, propane and butane. This port also receives incoming fuels.
- Port Lincoln – is managed by Flinders Ports and typically exports 1-3 million tonnes of product, depending on the grain harvest. Port Lincoln has naturally deep water (15.2m) and caters for post-Panamax and small Capesize ships.
- Whyalla – is owned and operated by SIMEC (formerly Arrium/OneSteel). The port operates using barges to two transhipment points (one for Panamax vessels and one for Capesize vessels) up to 12km from the port. The port facilities were recently expanded to enable a capacity of 12Mtpa.

In addition to the existing Port facilities, a further private facility is under development at Lucky Bay, and is proposed at Cape Hardy. The locations of these are shown in Figure 15.

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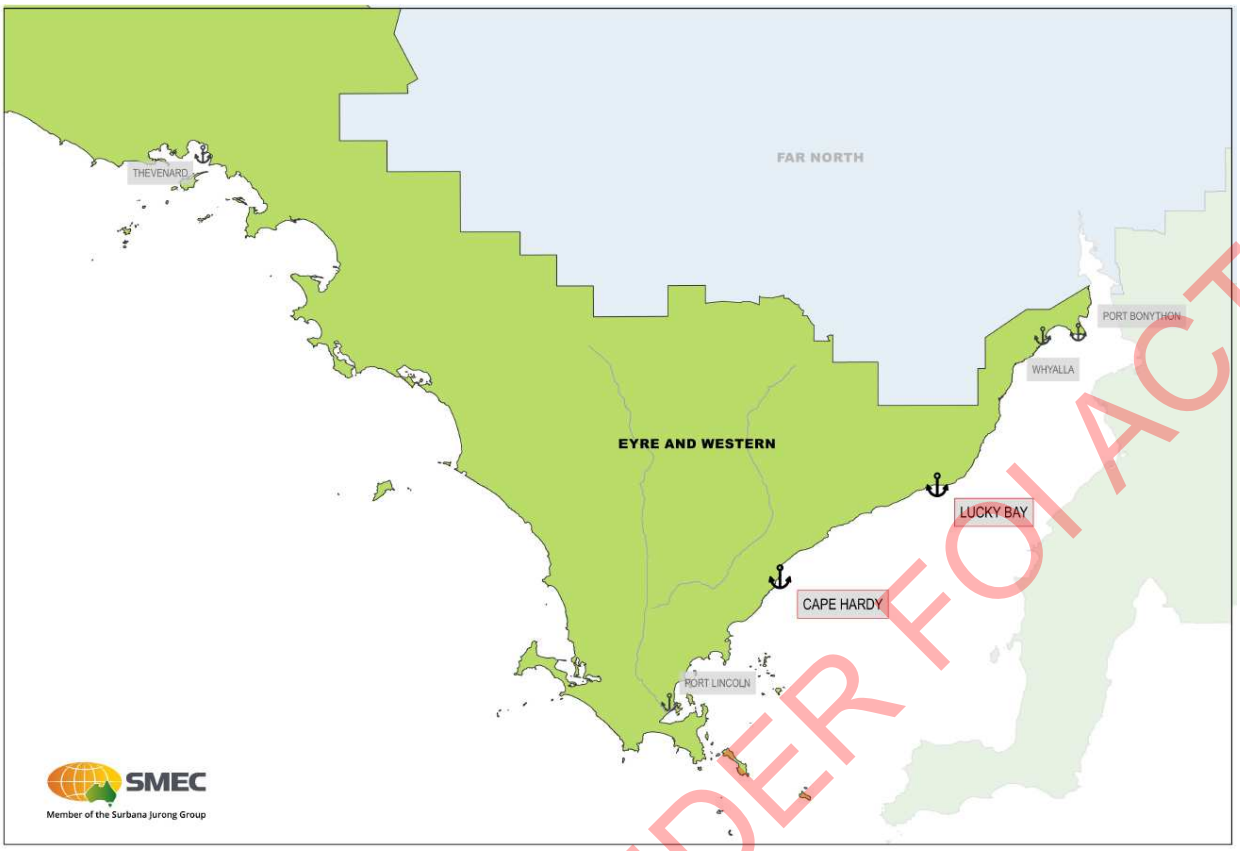

Figure 15: Proposed new Port Locations

1. **Lucky Bay**
   In March 2018, developer 'T-Ports' announced a proposed new transhipment grain port facility at Lucky Bay. The facility is proposed to accommodate grain storage of 430,000 tonnes at Lucky Bay as well as 150,000 tonnes at Lock. While earlier announcements stated that this facility will be operational for the 2018/19 harvest, more recent announcements (4 September 2018) advise that the bunkers at Lucky Bay and Lock will be able to receive grain for the 2019 harvest.
2. **Cape Hardy**
   As a part of the Central Eyre Iron Project a new deep-water port catering for Panamax and Capesize vessels with a bulk export capacity of 70 million tonnes per annum is proposed at Cape Hardy. The facility is intended to be multi-commodity. Timing will be dependent on timing for the progression of the overall Central Eyre Iron Project.

Figure 16: Representation of Cape Hardy (Source: Central Eyre Iron Project Environmental Impact Statement)

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7.3.3 Rail Network

The rail network within the Eyre Peninsula region includes the following components as also shown in Figure 17.

1. Narrow gauge line between Port Lincoln and Buckleboo (with the section between Buckleboo and Kimba currently closed but not dismantled).
2. Narrow gauge line between Port Lincoln and Thevenard (with the section between Wudinna and Thevenard used for rollingstock maintenance traffic only).
3. Narrow gauge line between Kevin and Thevenard used for Gypsum haulage only
4. Narrow gauge lines between Iron Knob, Iron Duke (via Iron Baron) and Whyalla
5. Standard gauge rail line between Port Augusta and Whyalla

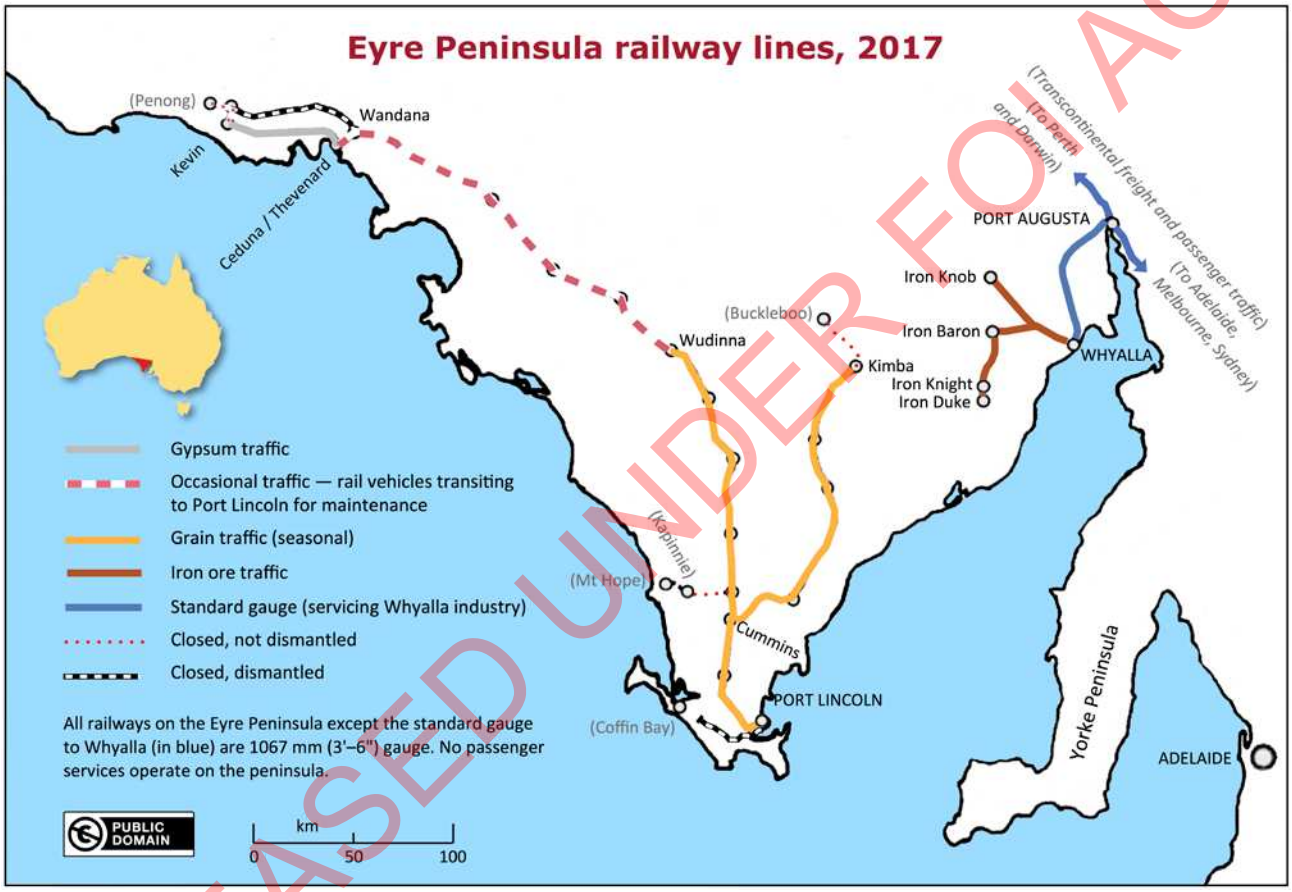

Figure 17: Overview of existing rail lines in the Eyre and Western region (Courtesy DPC website)

The narrow-gauge network between Wudinna and Port Lincoln and between Kimba and Port Lincoln is an isolated operating network that is owned, operated and maintained by Genesee and Wyoming Australia (GWA), and is principally used to carry grain to Port Lincoln. One train consist operates on this network (reduced from two in 2014/15) with a maximum axle load of 16 tonnes. The consist comprises 64 wagons and a total capacity of approximately 2,750 tonnes. Rollingstock maintenance is undertaken in Port Lincoln.

The narrow-gauge links between Iron Knob, Iron Duke (via Iron Baron) and Whyalla are owned by SIMEC Mining and are operated and maintained by GWA. The corridor from Iron Duke through to Whyalla has been upgraded to a 25-tonne axle load to carry up to 12Mpta.

In addition to the above, there are plans for a possible 145km rail link for the Central Eyre Iron Project (Iron Road Mine) standard gauge connection from Warramboo to Cape Hardy. Approvals are in place for this however timing will be dependent on the timing of overall mine progression.

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7.3.3.1 Rail Condition

The existing narrow-gauge network between Wudinna and Port Lincoln and Kimba and Port Lincoln typically has limited axle loads at low operating speeds. The track is in 'fit for purpose' condition for the reduced operating speeds and limited axle loads, although efficiency is compromised under these arrangements. The section between Cummins and Port Lincoln was upgraded in 2007. GWA has provided a detailed breakdown of existing speed limited sections across the network as well as scope and cost forecasts to bring each section of the network up to a consistent 60km/h for 16 tonne axle loads speed standard. This data has been used throughout this report.

7.3.3.2 Crash History

There has been one reported crash involving rail on the Eyre Peninsula within the last 5 years. This was a property damage crash within the township of Ceduna. There have been no reported crashes involving rail for the corridors between Kimba and Port Lincoln and Wudinna and Port Lincoln.

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8 Base Case

8.1 Establishing the Base Case

The Base Case forms a central part of the analysis and constitutes the situation without a project intervention against which all project options are compared. The base case is the point of comparison for determining the monetised and non-monetised benefits and costs for each project/option case.

It is understood that Viterra's existing contract with GWA expires in March 2019. In advance of this date Viterra and GWA will both need to make informed decisions about the preferred approach for grain transportation beyond September 2019. Irrespective of the preferred approach sufficient time needs to be allowed for infrastructure preparations associated with either continued use of the rail network and/or expanded use of the road network.

At the time of commencing this study it is recognised that GWA would be unlikely to commit to investment in capital upgrades without suitable commitment from Viterra to an ongoing contract. Equally, Viterra are unlikely to commit to an ongoing contract unless there is confidence that the necessary capital upgrades will occur to support an efficient and productive freight task.

Accordingly, it has been determined that the most likely scenario, in the absence of any alternative outcomes from this study, would be the closure of the rail network resulting in all grain transport on road. This has therefore been adopted as the Base Case.

An analysis of the roads likely to carry the additional road freight has been undertaken and the outcomes of this are shown diagrammatically in Figure 18 and in Table 2.

Figure 18: Road Network impacted by rail closure

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Table 2: Road Network impacted by rail closure

ROAD	FROM	TO	CURRENT TOTAL VOLUME (AADT)	CURRENT FREIGHT VOLUME
Eyre Hwy	Wudinna Stn	Kyancutta Stn	1010	300
Tod Hwy	Kyancutta Stn	Warramboo Stn	250	70
	Warramboo Stn	Lock Stn	260	90
	Lock Stn	Murdinga Stn	280	70
	Murdinga Stn	Tooligie Stn	240	40
Tod Hwy	Tooligie Stn	Yeelanna Stn	240	40
	Yeelana Stn	Cummins	610	110
	Cummins	Edillilie	910	260
	Edillilie	Flinders Hwy	760	190
Flinders Hwy	Flinders Hwy	Western Approach Road	2170	290
Cleve Rd	Kimba	Mangalo Road	250	60
	Mangalo Road	Cleve	410	60
Unamed Road	Waddikee	Balumbah-Kinnard Rd	200	30
Balumbah-Kinnard Rd	Road	Darke Peak	200	30
	Darke Peak	Kielpa	200	30
	Kielpa	Rudall	200	30
	Rudall	Lincoln Hwy	200	30
Birdseye Hwy	Rudall	Cleve	360	60
Arno Bay Rd	Cleve	Arno Bay	420	80
Lincoln Hwy	Arno Bay	Balumbah-Kinnard Rd	860	150
	Balumbah-Kinnard Rd	Wharminda Road	890	160
Wharminda Road	Wharminda	Lincoln Hwy	100	20
Lincoln Hwy	Wharminda Road	Tumby Bay	850	150
	Tumby Bay	Louth Bay	1620	280
	Louth Bay	Richardson Road	3780	460
	Richardson Road	Happy Valley Road	5050	360
	Happy Valley Road	Normandy Place	8280	390
	Normandy Place	Flinders Hwy	8790	360
	Flinders Hwy	New W Road	11310	410
	New W Road	Porter St (Port Access)	13740	390
Flinders Hwy	Flinders Hwy	Lincoln Hwy	3640	330
West Approach Road	Flinders Hwy	New W Road	1720	290
	New W Road	Pine Freezers Road	1920	420
	Pine Freezers Road	Anne Street	3430	330
	Anne Street	Mortlock Terrace	6870	360
	Mortlock Terrace	Dublin Street	11310	560
	Dublin Street	Porter St (Port Access)	6160	430

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Key identified roads are currently gazetted for use by 36.5m Road Trains and AB-Triples (PBS Level 3a) as per DPTI's RAV Network which is shown in Figure 19 and Figure 20.

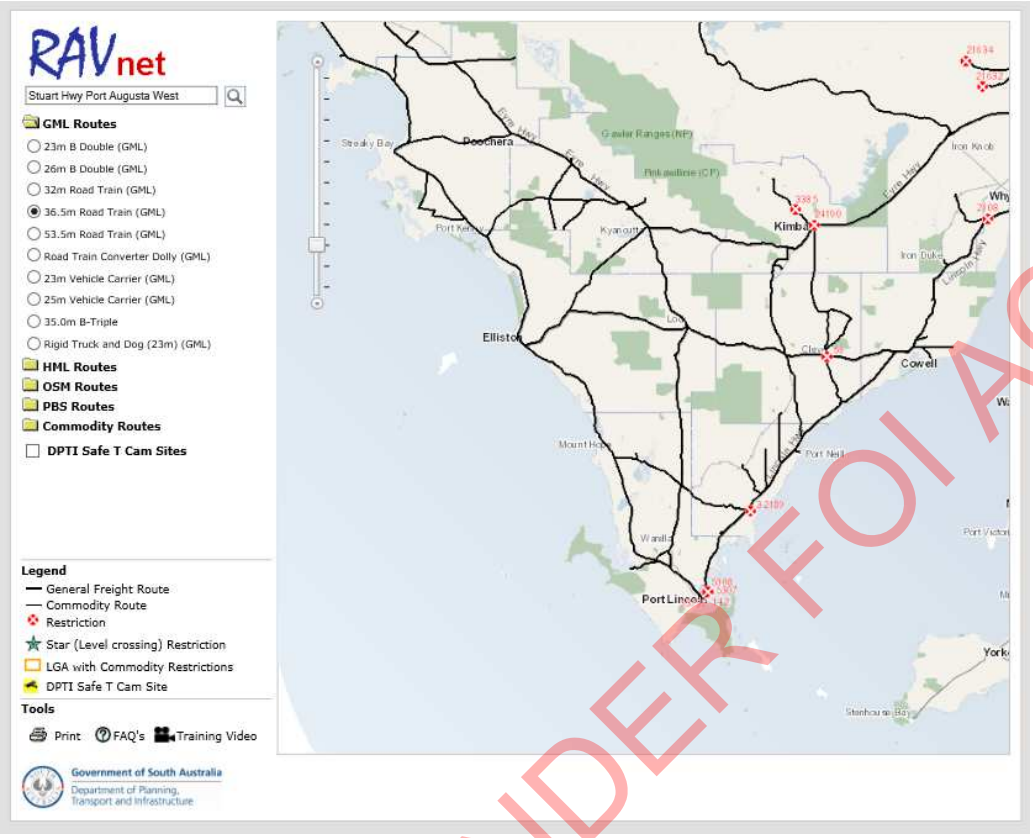

Figure 19: DPTI RAVNet network for 36.5m B-triple vehicles

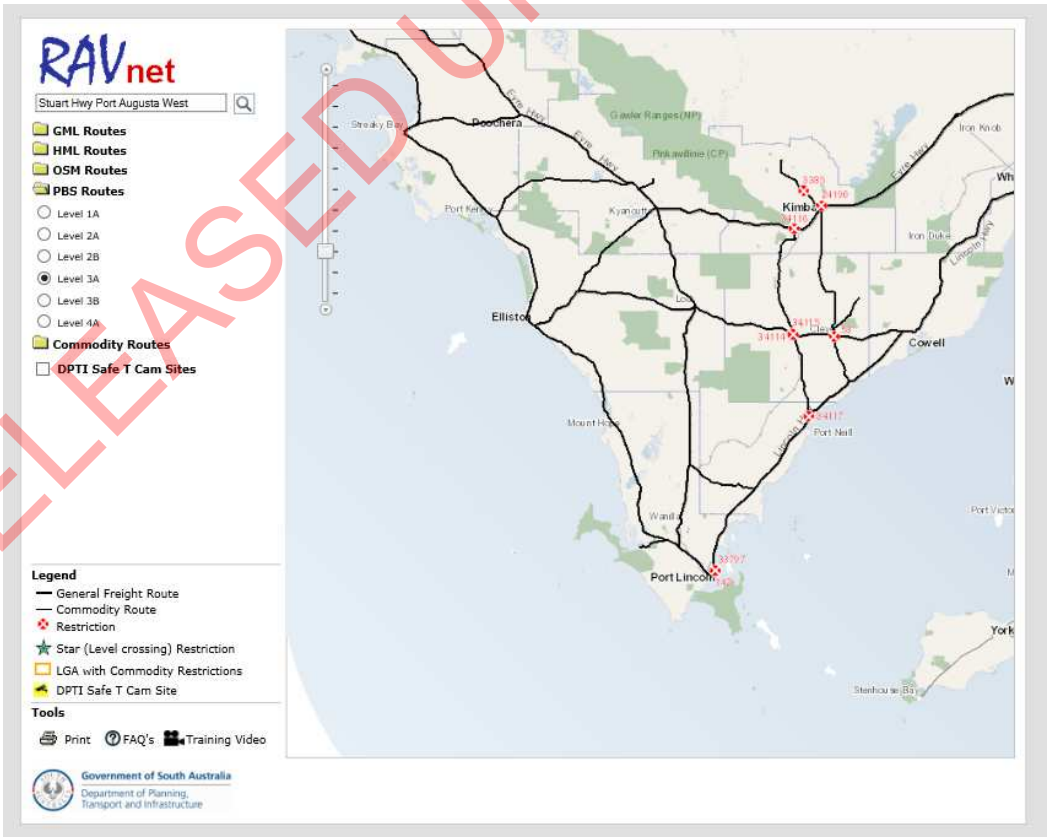

Figure 20: DPTI RAVNet network for PBS Level 3A

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8.2 Base Case Scope

The Base Case scope was defined to comprise the following;

8.2.1 Roadworks

General

For each impacted segment of Road, an assessment was made of the likely increase in grain freight tonnage and therefore the additional number of freight vehicles on the road resulting from the base case. The table provided in Appendix C calculates the increase in freight vehicles based on a maximum legal payload of 78tonnes/vehicle (AB-triple Road Train). Following subsequent discussion, this was reduced to an average payload of 70tonnes/vehicle to be representative of a mixture of road fleet vehicles. This conversion from 78 tonnes to 70 tonnes is included later in the cost analysis calculations.

The pro-rata freight percentage increase calculated by the above method is used to inform the scope quantities for Capital Works and Operating costs below.

Capital Works

The following roadworks capital components were identified;

- Ongoing road upgrade works to continue minor improvements to the impacted network in accordance with existing practices. This comprises curve widening, shoulder sealing, median treatments and minor intersection upgrades. DPTI have an existing draft 20-year program for these works based on sections of road identified as higher risk for 'Run-off Road', 'Head-on' or 'Intersection crashes'. This program was used as the basis for defining the base case scope of work, with a level of acceleration in response to the increased road freight use.
- Additional Road Upgrade works in accordance with other DPTI programs. This includes Overtaking lanes and Rest Areas. The assumed program for overtaking lanes focussed on sections of road nearing or exceeding 1,000 vehicles per day and on sections with limited overtaking opportunities. The number of future rest areas was based on discussions with DPTI personnel, resulting in an assumed approach of providing eight rest areas.
- Road rehabilitation works as defined by DPTI's Asset Management section to achieve a Pavement Health Index rating of 'Fair' across the impacted roads. This data was applied on a 'pro-rata' basis for the road segments impacted by the base case.
- Sealing of unsealed Council road segments has been allowed where these segments are expected to attract additional freight traffic in the base case

In recognition of the increase in freight traffic on the existing road network through Port Lincoln, an allowance has been included for safety improvements within the City. Examples of such improvements include; intersection upgrades, improved signage and delineation or improved truck marshalling or parking arrangements.

Operating

Ongoing road maintenance is incorporated at the historical expenditure rate provided by DPTI factored up on a pro-rata basis in accordance with the percentage freight increase resulting from the Base Case. This has been split into 'routine and annual specific maintenance' and 'renewals'.

8.2.2 Other Works

Capital Works

Through the stakeholder engagement process it is identified that the base case scenario change to transporting all grain to Port Lincoln by road will require a number of other capital works changes over and above Roadworks. These are identified to comprise;

- Modifications to shed receival facilities within the Port Lincoln portside delivery area. The existing road receival capacity will be inadequate and rail unloading facilities will require structural strengthening and height modifications to be suitable for use by trucks.
- Modifications to load sampling and truck marshalling arrangements within Port Lincoln, and
- Modifications to other (not Port Lincoln) loading facilities to accommodate a sole truck loading capability instead of truck and rail capability. It is envisaged that relatively minor capital expenditures at some sites (eg; Rudall or

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Cummins) might optimise the use of existing infrastructure to achieve productivity improvements. Examples might include changes to convert existing rail loading to road loading, or additional storage.

8.2.3 Rail

Operating

In the absence of ongoing rail operations, the existing rail corridor will need to be maintained to manage fire risk and pest plants. Allowance for this cost has been included in the base case.

8.2.4 Summary, Cost Estimates and Cash Flow

Table 3 provides a consolidated summary of the above-described base case scope, along with definition of the basis for the cost data applied to each item.

Table 3: Base Case Definition

BASE CASE DEFINITION	
Capital	Cost Basis
• Shoulder sealing and curve widening in accordance with current draft program, but accelerated to be undertaken over 10 years, and then continued at the draft program rate/annum to 2045.	• Independent Estimator advice on nominal rates /km
• Overtaking Lanes – 1 per year first two years, 1 every two years for next 10 years, 1 every 3 years for next 15 years.	• Independent Estimator advice on typical cost / overtaking lane
• Rest Areas – 8 in 5 years	• Independent Estimator advice on typical rest area incorporating deceleration and acceleration lanes
• Intersection and delineation improvements	• Nominal allowance of $14m by 2045
• Median treatments	• Nominal allowance of $10m by 2045
• Safety improvements within Port Lincoln	• Nominal allowance of $10m by 2030
• Sealing of impacted Council unsealed roads	• Independent Estimator advice on rate / km for pavement upgrade and two-coat spray seal
• Additional road rehabilitation to provide impacted roads to 'fair' condition in accordance with DPTI condition gradings in the first 2 years.	• In accordance with cost advice provided by DPTI
• Replacement or strengthening of two existing rail discharge sheds within the Port Lincoln Port precinct to accommodate trucks	• Independent Estimator advice
• New sampling platform in Port Lincoln	• Independent Estimator advice
• Expanded truck marshalling area in Port Lincoln	• Independent Estimator advice
• Modifications to non-Port Lincoln rail loading facilities to better support increased truck loading	• Nominal allowance of $2m
Operating	Cost Basis
• Maintain rail corridor (vegetation management)	• Advice from GWA
• Road Maintenance in accordance with average actual scope provided by DPTI, increased on a pro-rata basis in accordance with the percentage increase in freight traffic.	• In accordance with historical cost evidence provided by DPTI, increased on a pro-rata basis in accordance with the percentage increase in freight traffic
• Renewals in accordance with average actual scope provided by DPTI, increased on a pro-rata basis in accordance with the percentage increase in freight traffic	• In accordance with historical cost evidence provided by DPTI, increased on a pro-rata basis in accordance with the percentage increase in freight traffic
• Road rehabilitation to maintain 'fair' road condition.	• In accordance with cost advice provided by DPTI, increased on a pro-rata basis in accordance with the percentage increase in freight traffic.

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This data has then been further broken down to a nominated cash flow for use in the Economic Assessment as shown in Table 4.

Table 4: Base Case costs and cash flow

	INVESTMENT COSTS	$M BY 2020	$M BY 2030	$M BY 2045
Rail	Nil			
	Nil			
Road	12 x Overtaking lanes	4	10	10
	208km of seal widening	4.5	20.3	17
	29km of road sealing*	17.5		
	8 x rest areas	4.5	2	
	Intersection Delineation improvements - allowance	4	4	6
	Median treatments -allowance	2	4	4
	Traffic Upgrades - Port Lincoln - allowance	5	5	
	Backlog Rehab	15.5		
	Truck purchase	Incl in Supply chain		
Other	Port Lincoln Port shed modifications	2		
	New Sampling platform in Port Lincoln	0.5		
	Expanded truck marshalling area in Port Lincoln	3		
	Modification to non-Pt Lincoln rail loading facilities for truck loading	2		
	Operating Costs	**$m/annum**		
Rail	Maintain rail corridor	0.4		
Road	Routine and Annual Specific	0.81		
	Renewals	1.64		
	Increase to avoid backlog	1.5		
Other	N/A			

* Local Road Network

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8.2.5 Review

The approach defined above was initially reviewed by DPTI's Senior Economic Evaluation Officer on the 15 March 2018. This review clarified the following agreements;

- Residual life of assets is not to be considered for road or rail
- Rollingstock depreciation is included in fixed rail rates charged by GWA (this was subsequently confirmed by GWA)
- No costs to be incorporated for de-railments. This occurs rarely and is a minor rectification cost
- Sensitivity testing to be done for alternative methods of assessing crash costs and Greenhouse gas costs

A further review was undertaken on 4 April 2018, resulting in subsequent endorsement of the approach to defining the Base Case and project cases.

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9 Development of a Long List of Options

9.1 Overview

The study team developed an initial long list of project options that could be considered as alternatives to the Base Case in response to the identified problems and resultant project objectives. A summary of these options is provided in Table 5 below.

Table 5: Long list of Options

OPTION NUMBER	OPTION DESCRIPTION
Base Case	Full existing rail corridor closed. Road upgrades undertaken to sections of road identified to carry additional freight traffic. Modifications to various grain handling facilities and receival facilities at Port Lincoln.
1	Full existing operational rail corridor retained between Port Lincoln and Wudinna and between Cummins and Kimba.
2	Rail corridor retained between Port Lincoln and Wudinna and between Cummins and Rudall. Road links to carry additional traffic to replace rail corridor use between Rudall and Kimba.
3	Rail corridor retained between Port Lincoln and Wudinna. Road links to carry additional traffic to replace rail corridor use between Cummins and Kimba.
4	Rail corridor retained between Port Lincoln and Lock. Road links to carry additional traffic to replace rail corridor use between Cummins and Kimba, and between Lock and Wudinna.
5	Rail corridor retained between Port Lincoln and Cummins. Road links to carry additional traffic to replace rail corridor use between Cummins and Kimba, and between Cummins and Wudinna.
6	Rail corridor retained between Port Lincoln and Lock and between Cummins and Kimba. Road links to carry additional traffic to replace rail corridor use between Lock and Wudinna.
7	Rail corridor retained between Port Lincoln and Lock and between Cummins and Rudall. Road links to carry additional traffic to replace rail corridor use between Lock and Wudinna and between Rudall and Kimba.
8	Rail corridor retained between Port Lincoln and Kimba. Road links to carry additional traffic to replace rail corridor use between Cummins and Wudinna.
9	Rail corridor retained between Port Lincoln and Rudall. Road links to carry additional traffic to replace rail corridor use between Cummins and Wudinna and between Rudall and Kimba.

A diagrammatic representation of each option is included in Appendix D.

9.2 Option Definition – Process

For each of the above options the more detailed scope definition has been determined in a similar way to the Base Case. The detailed description for Project Case, Option1 is provided below. Given that the Base Case represents a *'no-rail'* outcome, and Project Case, Option1 represents a *'continue to use the full existing rail network'* outcome, all other Project Options represent a range of intermediate cases where the same principles for detailed scope allocation apply, albeit with different combinations of road, rail and other expenditure.

9.3 Option Definition – Project Case Option 1 (full existing rail network retained)

The Project Case, Option 1 scope was deemed to comprise the following;

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9.3.1 Roadworks

Capital Works

The following roadworks capital components are included;

- Ongoing road upgrade works to continue minor improvements to the impacted network in accordance with existing practices. This comprises curve widening, shoulder sealing, median treatments and minor intersection upgrades. DPTI's existing draft 20-year program for these works has been applied unamended.
- Additional Road Upgrade works in accordance with other DPTI programs. This includes Overtaking lanes and Rest Areas. The assumed program for overtaking lanes focussed on sections of road nearing or exceeding 1,000 vehicles per day and on sections with limited overtaking opportunities. The number of future rest areas was based on discussions with DPTI personnel.
- Road rehabilitation works as defined by DPTI's Asset Management section to achieve a Pavement Health Index rating of 'Fair' across the impacted roads. This defined scope of works is applied as a linear progression of the works over the full 27-year period of assessment for this study.

Operating

Ongoing road maintenance is incorporated at the historical expenditure rate provided by DPTI. This has been split into 'routine and annual specific maintenance' and 'renewals'.

9.3.2 Rail

Capital

Necessary rail track upgrades comprising ballast, re-railing, sleeper replacements, turnout upgrades and level crossing upgrades necessary to provide 16 tonne axle loads at the defined network speeds have been defined by rail segment by GWA and are applied to the project case.

Operating

No allowance is made for rail corridor maintenance, track maintenance and rollingstock maintenance in the project cases, as these costs are incorporated in the user charges provided by GWA for the provision of rail services.

Similarly, no allowance is made for costs associated with replacing / upgrading rollingstock on this same basis. While this approach is confirmed with GWA, it is recognised that there is a risk the forward costs of this item are not fully covered within the existing user charges and therefore a requirement to replace / upgrade rollingstock may have a flow-on impact to future user charges. This in-turn may impact Supply Chain costs under scenarios where this cost is incurred.

9.3.3 Summary, Cost Estimates and Cash Flow

Table 6 provides a consolidated summary of the above-described Project Case, Option 1, along with definition of the basis for the cost data applied to each item.

Table 6: Project Case Option 1 Definition

PROJECT CASE OPTION 1 DEFINITION	
Capital	Cost Basis
• Shoulder sealing and curve widening in accordance with current draft program.	• Independent Estimator advice on nominal rates /km
• Overtaking Lanes – 10 in total over 27 years	• Independent Estimator advice on typical cost / overtaking lane
• Rest Areas – 1 every 5 years	• Independent Estimator advice on typical rest area incorporating deceleration and acceleration lanes
• Intersection and delineation improvements	• Nominal allowance of $10m until 2045
• Median treatments	• Nominal allowance of $6m until 2045

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PROJECT CASE OPTION 1 DEFINITION	
• Additional road rehabilitation to provide impacted roads to 'fair' condition in accordance with DPTI condition gradings in the first 2 years.	• In accordance with cost advice provided by DPTI
• Rail track upgrade to achieve 16t axle load at defined operating speed	• In accordance with cost advice and cash flow provided by GWA
Operating	Cost Basis
• Road Maintenance in accordance with average actual scope provided by DPTI.	• In accordance with historical cost evidence provided by DPTI
• Renewals in accordance with average actual scope provided by DPTI.	• In accordance with historical cost evidence provided by DPTI
• Road rehabilitation to maintain 'fair' road condition.	• In accordance with cost advice provided by DPTI.

This data has then been further broken down to a nominated cash flow for use in the Economic Assessment as shown in Table 7.

Table 7: Project Case Option 1 costs and cash flow

	INVESTMENT COSTS	$M BY 2020	$M BY 2030	$M BY 2045
Rail	Rail Upgrade to enable 16t at 60km/h for network by 2020	42	38	25
	Rollingstock purchase	incl in Supply Chain		
Road	10 x Overtaking lanes		8	12
	151km of seal widening	2	11.3	17
	5 x rest areas		1.5	2
	Intersection and Delineation improvements - allowance		4	6
	Median treatments - allowance		2	4
	Rehab to 'fair' condition	1	6	8.5
	Truck purchase	incl in Supply Chain		
Other	Nil			
	OPERATING COSTS	**$M/ANNUM**		
Rail	Track Maintenance	incl in Supply Chain		
	Rollingstock maintenance	incl in Supply Chain		
	Corridor maintenance	incl in Supply Chain		
Road	Routine and Annual Specific	0.64		
	Renewals	1.3		
	Rehab Maintenance	1.19		
Other	N/A			

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9.4 Option Definition – Project Case Options 2 – 9 inclusive

As identified in Part 9.2 above, the Base Case and then Project Case Option 1 were defined as the 'book-ends' for the future rail network configurations. Options 2 to 9 inclusive represent a range of intermediate configurations. The detailed scope for each of these was developed in the same manner as described above for the Base Case and Option 1, with amendments to represent the variances in road, rail and other works scope. The detailed Option data sheets for all Options are provided in Appendix E, including associated forecast road freight increases by road segment.

9.5 Review Process

9.5.1 Stakeholder Review Group

On the 27 February 2018, a workshop was held with the study team along with government and community stakeholder representatives in Table 10. The purpose of the workshop was to;

- Keep stakeholders informed of the study progress
- Present the identified list of Options and seek feedback
- Present the proposed Option assessment criteria and seek feedback.

The workshop was attended by representatives of the following stakeholders;

Table 8: Stakeholder Review Attendees 27 February 2018

ATTENDEES	
SMEC (including Mott MacDonald and EconSearch)	Grain Trading
DPTI	Emerald Grain
EPBCH	SAFC
Iron Road	RAA
GPSA	SARTA
PIRSA	GWA
DPC SA	BNJ Consultants
Flinders Ports	L & RTA SA
Viterra	Sea Trans
SACOME	

A second video / phone link workshop was held on 9 March 2018 for those who were unable to participate in the initial workshop. Stakeholders represented were as follows;

Table 9: Stakeholder Review Attendees 9 March 2018

ATTENDEES	
SMEC	EPCBH
DPTI	Cargill
Eyre and Western Regional Development	GWA
City of Port Lincoln	PIRSA

A summary of key points of feedback is as follows;

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Options

- Possibility of Higher Productivity Road Vehicles should be considered.
- Recognition that there will be a critical mass needed for any form of rail infrastructure option to be viable
- Possibility of using the rail corridor through Port Lincoln for road transport
- Possibility of a road freight bypass of Port Lincoln to bring grain in via the rail corridor or western access – although it was noted that the costs may not make this worthwhile
- Ensuring allowance is made for upgrading loading facilities where necessary
- 19 tonne axle loads should be considered as an option

Assessment Criteria

- Consider impacts of increasing road freight through Port Lincoln - in particular, the eastern road access
- Amenity considerations need to recognise that road freight will be a slower process through Port Lincoln and therefore longer transport and loading hours will be associated
- Need to ensure Viterra can respond to variable (often short response time) shipping needs
- The possibility of moving other products by rail needs to be considered e.g.; Canola, fertiliser
- Road infrastructure requirements, safety, environmental aspects and employment contribution all need to be considered.
- Impacts on Supply Chain costs to be considered – cost to farmer is a key consideration
- Need to consider impacts of changing farm practices, particularly in relation to potential increased farm storage capacities and trends for farmers to own their own trucks
- Assessment needs to recognise the fluctuations that occur from season to season
- Concern about the possibility of 'wasted' infrastructure (i.e.; residual value of infrastructure not used)

Options

Following the Review processes no changes were made to the long list of Options presented, however a number of sub-options were identified that may be further considered in association with the short-listed or preferred approaches. These include;

- Infrastructure upgrade to 19 tonne axle load capability
- Use of the existing rail corridor for road freight
- A road bypass of Port Lincoln

Non-Price Assessment Criteria

Using the inputs from the review processes, the following Non-price assessment criteria list was finalised;

Table 10: Non-Price Assessment Criteria

CATEGORY	SUB-CATEGORY
Environmental	Noise Impacts
Environmental	Impact on Vegetation
Social	Impact on Employment
Social	Impact on Land use / development
Social	Amenity
Reliability	Reliability and Response time to shipping
Flexibility to integrate with….	Cape Hardy
Flexibility to integrate with….	Lucky Bay
Flexibility to integrate with….	Changing farm practices

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10 Assessment of the Long List of Options

10.1 Overview of Assessment process

The assessment process comprises three components;

1. **Non-Price Multi-Criteria Assessment**

   This considers key environmental, social and other performance aspects that are not incorporated in the economic comparison. This also includes qualitative consideration of 'sensitivity' cases for potential changes and how these might impact on the sustainability of each option. The identified list of non-price multi-criteria assessments is provided in Table 11.

2. **Supply Chain Analysis**

   This considers what impact the network changes may have on the Supply Chain cost to farmers

3. **Cost Effectiveness Evaluation**

   This considers the direct costs until the year 2045 of the road, rail and other capital and operating infrastructure costs. This also includes the monetised costs of safety and greenhouse gas improvements or impacts. This component compares the Net Present Value of each option against the base case.

These components each contribute to the overall assessment of project options against the project objectives as summarised in Table 11.

Table 11: Assessment process aligned to Study Objectives

OBJECTIVE	OUTCOME	ASSESSMENT PROCESS
Productivity – Economic	Optimal Grain transport network providing net positive benefits	Cost Effectiveness Evaluation - Net Present Value (NPV) comparison of Options Assessment of Supply Chain cost impacts Sensitivity assessment as part of Non-Price MCA
Productivity – Financial	Sustainable positive financial outcome for private and public sector	Assessment of Supply Chain cost impacts Sensitivity assessment as part of Non-Price MCA ** Assessment for individual stakeholders not undertaken as a part of this study.*
Social – Safety	No net increase in crashes	Monetised as part of NPV
Social – Amenity	Minimise impact of grain transport on residential communities	Non-monetised assessment as MCA criterion
Environmental – Harmful Emissions	Minimise harmful emissions from grain transport on EP	Monetised as part of NPV
Environmental – Climate Change	Minimise CO^2 emissions from grain transport on EP	Monetised as part of NPV

* Assessment considers net Financial elements only – not broken down to sectors

10.2 Non-Price Multi-Criteria Analysis

10.2.1 Assessment

The non-price multi-criteria assessment items were assessed by members of the study team and included input from members of the Stakeholder Representative group where appropriate. Each criteria was assessed for each Project option. A score was allocated in accordance with Table 12 rating the project Option relative to the base case. In each case, commentary was documented providing key reasoning for the score.

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Table 12: Non-monetised assessment rating levels

Rating Level		Description
Highly Beneficial		Major positive impacts resulting in substantial and long term improvements or enhancements
Moderately Beneficial		Moderate positive impact, possibly of short, medium or longer-term duration. Positive outcome may be in terms of new opportunities or outcomes which enhance or improve on current conditions.
Slightly Beneficial		Minimal positive impact, possibly only lasting over the short-term. May be confined to a limited area
Neutral		No discernible or predicted positive or negative impacts
Slightly Detrimental		Minimal negative impact, probably short-term, able to be managed or mitigated and will not cause substantial detrimental effects. May be confined to a small area.
Moderately Detrimental		Moderate negative impact. Impacts may be short, medium or long term, and impacts will most likely respond to management actions.
Highly Detrimental		Major negative impacts with serious, long-term and possibly irreversible effects leading to serious damage, degradation or deterioration of the physical, economic or social environment. Requires a major re-scope of concept, design, location, justification, or requires major commitment to extensive management strategies to mitigate the effect.

The outcomes of this assessment are provided in Table 13 below.

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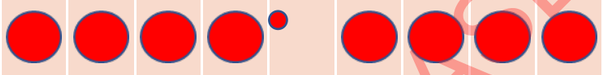
Table 13: Non-monetised assessment outcomes

	CATEGORY	SUB-CATEGORY	OPTIONS									COMMENTS
			1	2	3	4	5	6	7	8	9	
1	Environmental	Noise										Base Case avoids rail loading at Cummins and Kimba. This is a negative noise outcome for rail options. Base Case places more heavy traffic through Port Lincoln – western approach passes through some residential areas - eastern approach passes through North Shields and main street. Base Case will also result in a need for extended trucking hrs through Port Lincoln to load ships at night. Options which avoid these impacts will have significantly reduced noise impacts. Where traffic volumes are limited from the west but increased from the east, the benefit is rated as moderate. GWA don't currently get complaints about rail noise through Pt Lincoln.
2	Environmental	Vegetation										GWA still required to maintain vegetation, primarily for fire mitigation Infrastructure works will require some vegetation clearance. Therefore, slight benefit if less road infrastructure works undertaken
3	Social	Impact on Employment										Base Case – increases employment opportunities for; road construction, road maintenance, additional truck drivers, truck maintenance – estimate in the order of 20-30 jobs (excluding construction). Noted that opportunity is for this increased employment in local towns. Base Case – decreases employment for; loading resources (rail requires more personnel), rail upgrade construction works, track and rollingstock maintenance, tramming truck drivers and train drivers - estimate in the range of 20-35 jobs. Given the closeness of these high-level estimates – agreed as a negligible impact overall
4	Social	Impact on Land use / development										No material opportunities for material land use development identified for any options.
5	Social	Amenity										Amenity described as impact on Living and working environment Base Case; disadvantages within Port Lincoln – additional traffic through residential and business districts; perceived safety, business / car park access and egress, traffic congestion risk (including risk of queuing on the road approach to Port Lincoln silos)
6	Reliability / Response time to shipping											Rail preferred to get larger volumes in more quickly – this may enable better pricing for the grain. For shorter rail schemes there would be less locos e.g.; 3 instead of 5 – not a big impact. Risk reduced by shorter distances and newer r/stock. Weather – buckling risk over 35degrees. Upgraded track will reduce this risk.
7	Flexibility to integrate with….	Cape Hardy										Not all marketers will use Cape Hardy. Creates uncertainty about commercial outcomes – therefore inability to commit to rail fixed costs Road has greater ability to respond to changes
8	Flexibility to integrate with….	Lucky Bay										As above, however less risk than Cape Hardy as the Facility is further north and transhipment operating costs will be greater than a direct bulk load facility
9	Flexibility to integrate with….	Changing farm practices										More on-farm storage would decrease the amount of grain on rail

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10.2.2 Discussion

The two key factors evident from the above assessment are summarised as follows;

Port Lincoln Social impacts

The base case will result in a significant increase in the road freight transport task through the City of Port Lincoln. Additionally, grain transport by road only is a slower task and would be expected to result in longer trucking hours as well as longer handling and ship loading hours. These combined changes will impact noise, safety, traffic access and congestion within the City of Port Lincoln. This is therefore identified as a significant factor in the consideration of options. Accordingly, options which best mitigate this outcome (i.e.; Options which retain use of the rail corridor from at least Rudall to Port Lincoln) score the most positively in this area.

Sensitivity Cases – Future Port Facilities

A key consideration for the future of the Eyre Peninsula road and rail freight configuration, is the potential future use of new grain handling port facilities at Cape Hardy and/or Lucky Bay.

Figure 20 on the following page shows that new facilities at each of these locations has, based on proximity to growers, the potential to attract a substantial portion of the existing grain catchment of Port Lincoln. The extent to which these facilities would impact the share of grain for Port Lincoln will ultimately depend on the commercial arrangements available at each site.

Given the uncertainty around timing for these facilities, it is necessary for the preferred option to continue to be sustainable with these new facilities in operation. The base case, using truck freight for all grain, provides maximum flexibility for cartage to either of the port facilities. Options with risk of significant volumes transferring from rail to road for access to either Cape Hardy or Lucky Bay may not be sustainable and therefore scored 'detrimentally'.

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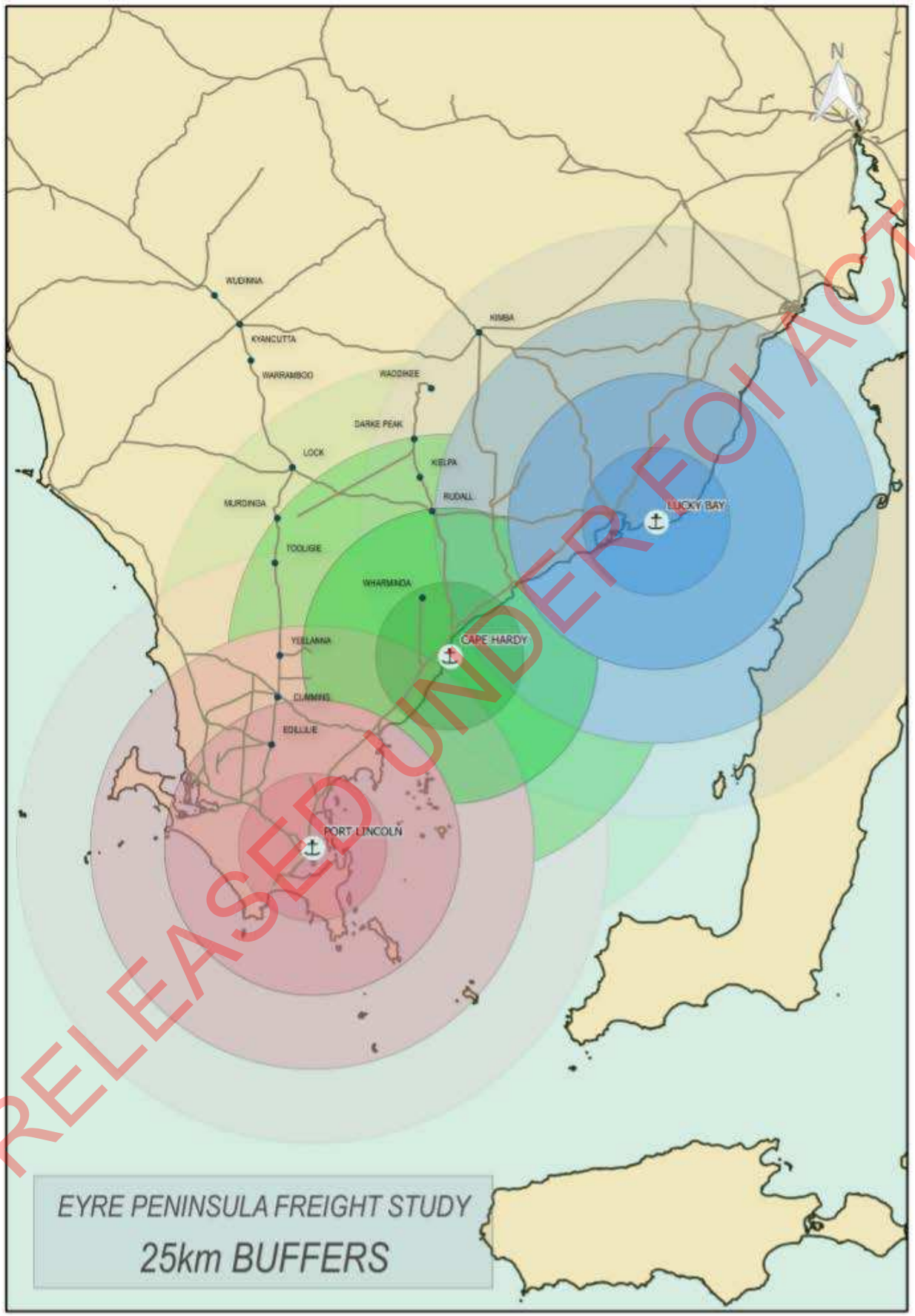

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Figure 21: Regional proximity to Port Locations

10.3 Supply Chain Analysis

A high-level consideration of the potential impacts of the changes associated with each option on Supply Chain costs was undertaken.

The analysis considered potential comparative costs between Road and Rail freight paths from each of Wudinna, Lock, Cummins, Kimba and Rudall. The process considered the published rail freight rates from Viterra, Road freight rates from BITRE Information Sheet 90, *'Freight Rates in Australia'*, and the Receival, storage, outturn, port in-loading, vessel booking and port handling and shipping fees from Viterra Schedule A *'Storage and Handling charges 2017/2018'*. A level of 'ranging' was applied to trucking rates in particular to reflect the variability in this market. The analysis also considered draft information available from the Australia Export Grains Innovation Centre (AEGIC) prepared for the Essential Services Commission of South Australia (ESCOSA).

The assessment showed that the two forms of freight transport have similar total costs with the potential for either mode to be theoretically cheaper depending on a range of factors. It is recognised however that the assessment undertaken for this study can only be based on 'published' rates and does not necessarily reflect a full and transparent cost comparison. The rates provided by Viterra will necessarily vary from 'true' costs in order to support the delivery practices which enable Viterra to effectively manage the delivery and shipping of the various grain types and qualities across the Eyre Peninsula as a whole.

Any changes to the distribution of freight between rail and road as a result of the project options considered can have a number of potential positive and detrimental effects on the overall supply chain costs. Key potential influencing factors are;

- Upgrade of the rail infrastructure resulting in increased rail speeds may achieve a supply cost saving. This will however depend on the resultant 'turnaround' times and whether or not 'additional' runs could be achieved within a shift. This will vary from site to site.
- Retaining the rail network (or part thereof) maintains competitive market tension between rail and road freight transport options which is likely to assist lower transport pricing. Particularly in high grain production years, the bulk carrying capacity of rail is likely to benefit overall freight transport costs.
- Retaining the rail network (or part thereof) enables the existing facilities at Port Lincoln (and some other sites) to function suitably avoiding capital expenditure which would be passed through the supply chain costs.
- Rail requires an up-front commitment in the form of a 'fixed rail' cost. This covers the cost of maintaining the rail network infrastructure and support staff in a 'ready for use' state and is paid irrespective of the extent to which the infrastructure is used. Retaining the rail network retains this cost which needs to be recovered by Viterra. Particularly in low production years, there is potential for this cost to have an impact on the competitiveness of rail transport compared to road transport.
- The existing rollingstock, including locomotives and wagons, currently in use on the Eyre Peninsula is nearing the end of its functional life. While it is understood that there is some allowance for the ongoing capital cost of rollingstock within the fixed rail rates developed by GWA, it is not known whether this allowance is adequate for the shorter-term identified rollingstock needs. It is therefore possible that this requirement results in a future increased cost as a part of the fixed rail fee.
- The slower handling processes associated with increased truck receivals at Port Lincoln are likely to result in extended operating hours. This may have an impact on overall operating costs.

Given the complexity and variability (i.e.; from season to season) of the above impacts, it has not been possible within the scope of this study to definitively quantify the likely net resultant supply chain cost advantages or disadvantages of each option. Anecdotally, on the basis that Viterra is raising operating cost concerns with the current arrangement, it is assumed that there is an expectation of the potential to reduce costs if road freight is used more heavily. However, this has not been able to be validated and is likely to vary from year to year in any case.

Prior to finalising a preferred direction, it may be appropriate to seek further advice from Viterra on their expectations in this regard.

Based on the above, this aspect has been treated as a 'neutral' element of the assessment.

10.4 Economic Comparison

These notes describe the method, data and assumptions used to undertake the cost benefit analysis (CBA) of the project options.

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10.4.1 Method

The key characteristics of the CBA method employed in this study included the following;

- The CBA includes a base case or counterfactual scenario, that is, the benchmark against which the 'EP rail freight' Options were compared.
- The CBA was conducted over a 27-year time period (2019 – 2045) and results were expressed in terms of net benefits, that is, the incremental benefits and costs of the Option relative to those generated by the base case scenario.
- Costs and benefits were specified in real terms (i.e. constant 2018 dollars). Future values were converted to present values by applying a discount rate.
- In order to account for uncertainty, sensitivity analysis has been undertaken using a range of values for key variables.
- The evaluation criterion employed in the analysis was net present value (NPV) .

10.4.2 Costs Assessed

The following costs were assessed in the long-list analysis:

- Infrastructure investment costs
  - Rail
  - Road
  - Other
- Infrastructure maintenance costs
  - Rail
  - Road
  - Other
- Crash costs
- GHG emission costs
  - Rail
  - Road
- Harmful emission costs
  - Rail
  - Road

Freight operating (supply chain) costs are excluded.

10.4.3 Data and Assumptions

Discount rate: 7 per cent. Based on recommended discount rate in Infrastructure Australia (2017).

Infrastructure investment costs

Determined as described in section 9 and detailed in Appendix E, for rail, road and other; for time periods 2019-2020, 2021-2030, 2031-2045. Investment costs for truck purchase (road freight component), locomotive and rolling stock purchase (rail freight component) are excluded on the basis that these costs are amortised within the freight operating costs. Costs have been spread evenly across the years within each period.

Infrastructure maintenance costs

Determined as described in section 9 and detailed in Appendix E. This included road maintenance costs and rail corridor maintenance where this is not able to be included in the rail operating costs. This excludes truck, locomotive and rolling stock maintenance costs.

Crash costs

Crash data was obtained for the subject sections of road from Location SA viewer for the last 5 years as summarised in Figure 21 and broken down further in Table 14.

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Figure 22: Crash History (last 5 years)

Table 14: Crash data over the last 5 years

ROAD	FROM	TO	PDO CRASHES	INJURY CRASHES	FATALITY CRASHES
Eyre Hwy	Wudinna Stn	Kyancutta Stn	1	0	0
Tod Hwy	Kyancutta Stn	Warramboo Stn	0	0	0
	Warramboo Stn	Lock Stn	5	1	0
	Lock Stn	Murdinga Stn	3	4	0
	Murdinga Stn	Tooligie Stn	0	2	0
Tod Hwy	Tooligie Stn	Yeelanna Stn	4	6	0
	Yeelana Stn	Cummins	1	2	0
	Cummins	Edillilie	4	1	0
	Edillilie	Flinders Hwy	0	0	1
Flinders Hwy	Flinders Hwy	Western Approach Road	2	3	0
Cleve Rd	Kimba	Mangalo Road	4	5	0
	Mangalo Road	Cleve	0	1	0
Unamed Road	Waddikee	Balumbah-Kinnard Rd	0	0	0
Balumbah-Kinnard Rd	Road	Darke Peak	0	0	0
	Darke Peak	Kielpa	0	1	0
	Kielpa	Rudall	1	0	0
	Rudall	Lincoln Hwy	1	0	0
Birdseye Hwy	Rudall	Cleve	1	5	0
Arno Bay Rd	Cleve	Arno Bay	3	1	0
Lincoln Hwy	Arno Bay	Balumbah-Kinnard Rd	2	5	0
	Balumbah-Kinnard Rd	Wharminda Road	1	1	0
Wharminda Road	Wharminda	Lincoln Hwy	0	0	0
Lincoln Hwy	Wharminda Road	Tumby Bay	9	4	0
	Tumby Bay	Louth Bay	2	4	0
	Louth Bay	Richardson Road	7	6	1
	Richardson Road	Happy Valley Road	2	2	0
	Happy Valley Road	Normandy Place	0	1	1
	Normandy Place	Flinders Hwy	13	0	0
	Flinders Hwy	New W Road	4	3	0
	New W Road	Porter St (Port Access)	48	15	0
Flinders Hwy	Flinders Hwy	Lincoln Hwy	6	1	0
West Approach Road	Flinders Hwy	New W Road	4	2	0
	New W Road	Pine Freezers Road	0	2	0
	Pine Freezers Road	Anne Street	2	1	0
	Anne Street	Mortlock Terrace	13	7	0
	Mortlock Terrace	Dublin Street	7	2	0
	Dublin Street	Porter St (Port Access)	10	6	0

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The estimated additional number of crashes applied to each option was determined by multiplying forecast freight growth per option by the historical crash rates. The estimated cost of additional crashes was determined by applying ATAP (2016)[1] dollar values for property damage only, casualty and fatality categories, updated to 2018 dollars.

These crash rate estimates were adjusted by the road safety treatments that apply to each option, using crash reduction factors in Austroads (2010)[2].

Greenhouse gas emission costs

Greenhouse gas emission costs are;

- Based on Australian Transport Council (2006) guidelines[3], volumes 5 (method) and 3 (parameter values), as recommended by TIC (2016b)[4].
- Based on freight task (tonnes-km). Assumed rail freight task (in tonne-km) is the remainder of the task not undertaken by road. Road and rail tasks are split into urban and rural.
- Estimated annual emission costs by applying ATC dollar values for road and rail freight by urban and rural categories, updated to 2018 dollars (Table 15) to freight task.

Table 15: Greenhouse gas emission costs, cents/tonne-km (2018 dollars)

	Urban	Rural
Rail	0.04	0.04
Road	0.09	0.09

Harmful pollutant emission costs

Harmful pollutant emission costs are;

- Based on Australian Transport Council (2006) guidelines, volumes 5 (method) and 3 (parameter values), as recommended by TIC (2016b). Combined estimates for carbon monoxide, oxides of nitrogen, particulate matter (PM10) and total hydrocarbons.
- Based on freight task (tonnes-km), as per GHG emission estimates.
- Estimated annual emission costs by applying ATC dollar values for road and rail freight by urban and rural categories, updated to 2018 dollars (Table 16), to freight task.

Table 16: Harmful pollutant emission costs, cents/tonne-km (2018 dollars)

	Urban	Rural
Rail	0.437	0.005
Road	1.286	0.013

10.4.4 Outcomes

The outcomes of the above analysis are presented below in Table 17 and Table 18.

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[1]Transport and Infrastructure Council 2016a, Australian Transport Assessment and Planning Guidelines: T2 Cost Benefit Analysis, August.

[2]Austroads 2010, Road Safety Engineering Risk Assessment Part 6: Crash Reduction Rates, January.

[3]Australian Transport Council (2006) National Guidelines for Transport System Management in Australia.

[4]Transport and Infrastructure Council (TIC) 2016b, Australian Transport Assessment and Planning Guidelines: PV2 Road Parameter Values, Commonwealth of Australia, August., Table 16.

Table 17: Present Value (PV) cost of Base Case and Options

	PV ($m)									
	Base	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
Costs										
Infrastructure investment costs										
Rail	0.00	72.78	53.56	36.54	22.76	7.70	59.29	40.07	43.61	24.53
Road	95.54	38.71	49.77	72.35	83.88	90.37	47.78	61.64	56.92	65.95
Other	7.25	0.00	0.48	0.97	1.45	1.93	0.48	0.97	0.97	0.97
Infrastructure maintenance costs										
Rail	5.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Road	50.66	40.14	42.71	44.76	48.10	50.02	43.35	45.92	45.40	47.84
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crash costs	1.77	0.00	0.32	0.59	0.97	1.33	0.47	0.70	0.87	1.09
GHG emission costs										
Rail	0.00	0.60	0.48	0.37	0.22	0.12	0.45	0.33	0.35	0.23
Road	1.40	0.00	0.29	0.55	0.90	1.13	0.35	0.64	0.58	0.87
Harmful emission costs										
Rail	0.00	0.38	0.31	0.23	0.17	0.12	0.32	0.25	0.26	0.20
Road	1.11	0.00	0.19	0.43	0.60	0.77	0.18	0.37	0.34	0.53
Total PV Costs ($m)	***162.87***	**152.62**	**148.10**	**156.77**	**159.05**	**153.49**	**152.68**	**150.89**	**149.31**	**142.21**

Table 18: Economic Comparison outcomes

	PV ($m)								
	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
Incremental benefits	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total incremental benefits	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
Incremental costs									
Infrastructure investment costs									
Rail	72.78	53.56	36.54	22.76	7.70	59.29	40.07	43.61	24.53
Road	-56.83	-45.78	-23.19	-11.66	-5.17	-47.76	-33.90	-38.63	-29.59
Other	-7.25	-6.77	-6.29	-5.80	-5.32	-6.77	-6.29	-6.29	-6.29
Infrastructure maintenance costs									
Rail	-5.13	-5.13	-5.13	-5.13	-5.13	-5.13	-5.13	-5.13	-5.13
Road	-10.52	-7.95	-5.90	-2.57	-0.64	-7.31	-4.75	-5.26	-2.82
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crash costs	-1.77	-1.45	-1.18	-0.80	-0.44	-1.30	-1.07	-0.90	-0.68
GHG emission costs									
Rail	0.60	0.48	0.37	0.22	0.12	0.45	0.33	0.35	0.23
Road	-1.40	-1.12	-0.86	-0.50	-0.27	-1.05	-0.76	-0.82	-0.53
Harmful emission costs									
Rail	0.38	0.31	0.23	0.17	0.12	0.32	0.25	0.26	0.20
Road	-1.11	-0.92	-0.68	-0.51	-0.34	-0.93	-0.74	-0.77	-0.57
Total incremental costs	***-10.26***	***-14.77***	***-6.10***	***-3.82***	***-9.39***	***-10.20***	***-11.98***	***-13.57***	***-20.67***
Net benefits [a]	**10.26**	**14.77**	**6.10**	**3.82**	**9.39**	**10.20**	**11.98**	**13.57**	**20.67**

[a] Net present value (NPV)
Measured as PV(incremental benefits) - PV(incremental costs)
Where incremental benefits = (benefits$_{Option\ i}$ - benefits$_{base\ case}$)
And incremental costs = (costs$_{Option\ i}$ - costs$_{base\ case}$)

The results show that every project case has a higher Net Present Value than the base case i.e. every option that retains some portion of the existing rail network is expected to present a better Benefit Cost outcome than the base case, when considered in a holistic regional sense.

The results also show that each option will achieve crash cost, greenhouse gas emission and harmful gas emission savings by comparison with the base case.

10.4.5 Sensitivity Cases – Alternative Calculations

Crash Costs and Greenhouse Gas Emission Costs

As a part of the process of reviewing the intended assessment approach, it was identified that alternative approaches to assessing crash costs and Greenhouse Gas Emissions can be applied. Accordingly, it was determined that these alternative approaches would be undertaken as sensitivity checks on the initial economic comparison calculations.

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These results are presented as follows;

	PV ($m)								
Crash costs assumptions	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
Expected[a]	10.26	14.77	6.10	3.82	9.39	11.98	13.57	20.67	38.78
Alternative[b]	10.23	14.75	6.08	3.81	9.38	11.97	13.55	20.66	38.79

[a] Hybrid Human Capital approach

[b] Inclusive Willingness to Pay approach

	PV ($m)								
GHG emission costs assumptions	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
Expected[a]	10.26	14.77	6.10	3.82	9.39	11.98	13.57	20.67	38.78
Alternative[b]	13.30	17.19	7.96	4.91	9.98	13.64	15.34	21.82	38.78

[a] Abatement cost estimate approach

[b] Damage cost estimate (the "social cost" of carbon) approach

The results provided demonstrate very minor variance in outcomes associated with alternative crash assessment approaches for this project.

While, more significant variance is associated with the alternative Greenhouse Gas emission costs, this is not significant enough to impact the overall outcomes of the assessment.

Higher Axle loads

As a part of the problem analysis, GWA advised that the rollingstock, comprising locomotives and wagons is nearing the end of its functional life. While suitable upgraded wagons are available, GWA has identified a potential risk with sourcing upgraded 16tonne axle load locomotives. Suitable locomotives are not manufactured as a standard new product and would either need to sourced second hand, or sourced and modified. Converting retained sections of rail to heavier axle load such as 19 or 26 tonne axle load carrying capacity would enable the use of more readily available locomotives.

Additionally, the increased carrying capacity of a higher axle load capacity consist would provide some efficiency and supply chain cost benefits.

Accordingly, a sensitivity test was done on one project case to provide an economic comparison between the retained 16tonne axle load network and a higher axle load (19tonne). Option 5 was chosen for this with infrastructure upgrade costs provided by GWA. The 19-tonne axle load scenario is labelled as Option 5a. Table 18 shows the comparative results.

Table 19: 19 tonne Axle load (Option 5A)

	Option 5	Option 5a
Incremental benefits	0.00	0.00
Total incremental benefits	***0.00***	***0.00***
Incremental costs		
Infrastructure investment costs		
Rail	7.70	29.74
Road	-5.17	-5.17
Other	-5.32	-5.32
Infrastructure maintenance costs		
Rail	-5.13	-5.13
Road	-0.64	-0.64
Other	0.00	0.00
Crash costs	-0.44	-0.44
GHG emission costs		
Rail	0.12	0.12
Road	-0.27	-0.27
Harmful emission costs		
Rail	0.12	0.12
Road	-0.34	-0.34
Total incremental costs	***-9.39***	***12.65***
Net benefits [a]	**9.39**	**-12.65**

[a] Net present value (NPV)

Measured as PV(incremental benefits) - PV(incremental costs)

Where incremental benefits = ($benefits_{Option\ i}$ - $benefits_{base\ case}$)

And incremental costs = ($costs_{Option\ i}$ - $costs_{base\ case}$)

The results demonstrate that the significance of the additional rail investment costs results in a much poorer NPV. In order for this option to achieve the same overall economic outcome as Option 5, the improved rail efficiencies would need to equate to a saving of $3.44/tonne over an assumed 500,000 tonnes per annum over 27 years. This is not assessed as a realistic potential operational saving.

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Sensitivity Case – Do Minimum

A further sensitivity case was undertaken considering a scenario where the rail network is not retained but the extent of road infrastructure upgrade and maintenance is only retained at the same levels as if the full existing rail network continued to operate i.e. no adjustment is made for increased road freight transport.

This scenario produced a Net Present Value of $38.78m. It should be noted however that this was also associated with a significant increase in Crash Costs with an NPV of $1.93m, meaning this scenario does not meet the required project outcome of '*No net increase in crashes*'.

This sensitivity case highlights that outcomes are heavily dependent on assumptions made in relation to road upgrade works for each option, including scope of work and cash flow. This sensitivity case also identifies that option/s exist with a level of road upgrade which is greater than this 'Do Minimum' case, but less than the Base Case, which also achieve the required neutral net crash cost outcome. These option/s are likely to have a better NPV than Option 5, however have not been further addressed in this report in favour of comparing options which target a more consistent basis for standard of road outcome.

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10.5 Outcomes

10.5.1 Discussion

The following key points are summarised from the assessment process:

- All options which retain some segment/s of the existing rail network will provide better benefit / cost outcomes than the defined base case. This is determined on a holistic regional economic basis only and does not consider the individual financial assessments of key stakeholders including the State Government, Councils, GWA and Viterra. Individual economic assessments by these parties on their own financial positions with these options would need to be undertaken and would be expected to result in differing perspectives on the preferred long-term approach.
- Options which do not retain the use of the rail corridor between Cummins and Rudall are not recommended at this point in time as they result in the majority of freight from the eastern side of Eyre Peninsula being trucked through the City of Port Lincoln. This issue is potentially managed in the future once the Lucky Bay and or Cape Hardy Grain receival facilities are operational.
- A number of Stakeholder Reference Group members expressed a preference to retain some or all of the rail network as an operational railway. This outcome is perceived as best protecting the flexibility and responsiveness of the grain supply chain. On this basis, it is considered likely that options which retain some rail functionality are likely to be better received by the community. It is expected however that the broader community will ultimately be engaged on this.
- Stakeholders will be concerned about any change to existing operations which result in a material increase in road freight on the existing network. There will be a stakeholder expectation of a level of road upgrade commensurate with the change and some time may need to be allowed to undertake at least some of these works ahead of a material change in freight transport task.
- Options which retain use of the rail corridor between Cummins and Rudall are not recommended as sustainable long-term options in the event that Lucky Bay and/or Cape Hardy become operational projects. The potential port facilities at Lucky Bay and/or Cape Hardy may result in a significant portion of the grain that may otherwise use the eastern rail leg between Kimba and Cummins or between Rudall and Cummins using the alternative port.
- Closure of the section of rail corridor between Rudall and Kimba is considered to be an appropriate short-term decision given the above, and given that this section of the rail network is one of the sections in poorest condition and currently only carries 20% of the grain delivered to Kimba (i.e.; 80% is already transported by road).
- In the absence of a future additional grain port facility on the east coast, Option 9 is expected to represent the best value for money for the region.
- In the presence of a future additional grain port facility on the east coast, Option 5 is expected to represent the best value for money for the region.
- There is both risk and opportunity associated with the supply chain cost impacts of each option. In broad terms it is expected that options which retain larger portions of the existing rail network are likely to achieve supply chain cost benefits in higher production grain seasons, whereas the opposite is likely to be the case in lower production grain seasons. Given the involvement of GWA and Viterra in this study it is reasonable to expect that increasing road freight transport is unlikely to have a material detrimental impact on supply chain costs over a period of time. However, if it is deemed appropriate to better define these costs, additional specialist detailed assessment could be undertaken and/or formal advice could be sought from Viterra ahead of progressing with any change.

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11 Short List of Options

11.1 Discussion

The following Options are identified as possible short-listed Ultimate Options;

Option 5 - (Retain Operational rail corridor between Cummins and Port Lincoln)

This Option is forecast to have a higher Net Present Value than the Base Case and has the potential to be sustainable in the long-term. It also provides the benefits of retaining a functional portion of the rail corridor which is likely to be positively viewed by the community and avoids the need for major changes at the Viterra Port Lincoln facility.

Key issues or risks with this Option are;

- It does not meet the target outcome of minimising social amenity impacts unless a new east coast port facility (Cape Hardy or Lucky Bay) is operational and attracting sufficient grain to offset the forecast increase in road freight volumes through the Main Street of Port Lincoln.

  A Sub-Option to address the short-term social impacts of this option is to construct a bypass road to divert the additional road traffic from the eastern portion of the Eyre Peninsula across to the western access route. This would however be difficult to justify given the capital cost for likely short-term benefit and given there will still be amenity impacts associated with this traffic entering Port Lincoln from the western access.
- The presence or absence of alternative port facility/s will have a significant impact on the prioritisation of road expenditure in association with this option.
- It is unclear whether or not this option is individually assessed by GWA and Viterra as a financially viable option for their respective businesses.
- It is unclear whether or not this option will have a net positive or detrimental impact on Supply Chain costs for farmers by comparison with the base case.

A summary of how this Option meets the target outcomes is provided in Table 19 below.

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Table 20: Summary of Option 5 achievement against study objectives

OBJECTIVE	OUTCOME	CURRENT MEASURE/ ASSESSMENT	TARGET	COMMENTARY
Productivity - Economic	Optimal Grain transport network providing net positive benefits	NPV comparison of Options Assessment of Supply Chain cost impacts	Optimal NPV Minimise Supply Chain costs	Provides a NPV of $9.39 million in comparison with the Base Case. Neutral – see Section 11.2
Productivity - Financial	Sustainable positive financial outcome for private and public sector	*(Not assessed for individual entities)*	-	Potential to be sustainable in a holistic regional sense until 2045 Assessment for individual stakeholders has not been undertaken as part of this study.
Social - **Safety**	No net increase in crashes	Monetised as part of NPV	No net increase in crashes	Achieved – positive impact with a forecast reduction in crashes of $0.44 million
Social Amenity	Minimise impact of grain transport on residential communities	Non-monetised assessment as MCA criterion	-	Achieved - when Cape Hardy / Lucky Bay are operational. Under this scenario, a significant portion of grain from the eastern part of the Peninsula is assumed to be received at these port/s, reducing the social impacts through North Shields and Port Lincoln Main Street. Grain from the north and western area will continue to be able to sue the rail corridor. **Not Achieved – if Cape Hardy / Lucky Bay are not operational. This would be expected to result in significant social amenity impacts within Port Lincoln.**
Environmental – Harmful Emissions	Minimise harmful emissions from grain transport on EP	Monetised as part of NPV	-	Achieved - positive impact with a forecast net reduction in harmful emissions of $0.22 million
Environmental – Climate Change	Minimise CO_2 emissions from grain transport on EP	Monetised as part of NPV	-	Achieved - positive impact with a forecast net reduction in Greenhouse gas emissions of $0.15 million

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Option 7 – (Retain operational rail corridor between Lock and Port Lincoln and between Rudall and Port Lincoln)

This Option is forecast to have a stronger Net Present Value than Option 5.

Key issues or risks with this Option are;

- It is unlikely to be a sustainable option once a new east coast port facility (Cape Hardy or Lucky Bay) is operational and attracting substantial grain. It is therefore difficult to justify significant expenditure to upgrade the rail corridor between Cummins and Rudall, and between Cummins and Lock when the timing of the operability of these alternative port facilities is unknown.

A summary of how this Option meets the target outcomes is provided in Table 20 below.

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Table 21: Summary of Option 7 achievement against study objectives

OBJECTIVE	OUTCOME	CURRENT MEASURE/ ASSESSMENT	TARGET	COMMENTARY
Productivity - Economic	Optimal Grain transport network providing net positive benefits	NPV comparison of Options Assessment of Supply Chain cost impacts	Optimal NPV Minimise Supply Chain costs	Provides a NPV of $11.98 million in comparison with the Base Case. Neutral – see Section 11.2
Productivity - Financial	Sustainable positive financial outcome for private and public sector	*(Not assessed for individual entities)*	-	**Unlikely to be sustainable in a holistic regional sense until 2045 due to the potential for Cape Hardy / Lucky Bay facilities to draw some of the existing grain volume from Rudall and Lock in particular.** Assessment for individual stakeholders has not been undertaken as part of this study.
Social - Safety	No net increase in crashes	Monetised as part of NPV	No net increase in crashes	Achieved – positive impact with a forecast reduction in crashes of $1.07 million
Social Amenity	Minimise impact of grain transport on residential communities	Non-monetised assessment as MCA criterion	-	Achieved – minimises road freight transport changes through Port Lincoln.
Environmental – Harmful Emissions	Minimise harmful emissions from grain transport on EP	Monetised as part of NPV	-	Achieved - positive impact with a forecast net reduction in harmful emissions of $0.49 million
Environmental – Climate Change	Minimise CO_2 emissions from grain transport on EP	Monetised as part of NPV	-	Achieved - positive impact with a forecast net reduction in Greenhouse gas emissions of $0.43 million

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Option 9 – (Retain operational rail corridor between Rudall and Port Lincoln)

This Option is forecast to have the highest Net Present Value of all Options assessed.

Key issues or risks with this Option are;

- It is unlikely to be a sustainable option once a new east coast port facility (Cape Hardy or Lucky Bay) is operational and attracting substantial grain. It is therefore difficult to justify significant expenditure to upgrade the rail corridor between Cummins and Rudall when the timing of the operability of these alternative port facilities is unknown.

A summary of how this Option meets the target outcomes is provided in Table 21 below.

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Table 22: Summary of Option 9 achievement against study objectives

OBJECTIVE	OUTCOME	CURRENT MEASURE/ ASSESSMENT	TARGET	COMMENTARY
Productivity - Economic	Optimal Grain transport network providing net positive benefits	NPV comparison of Options Assessment of Supply Chain cost impacts	Optimal NPV Minimise Supply Chain costs	Provides a NPV of $20.67 million in comparison with the Base Case. Neutral – see Section 11.2
Productivity - Financial	Sustainable positive financial outcome for private and public sector	*(Not assessed for individual entities)*	-	**Unlikely to be sustainable in a holistic regional sense until 2045 due to the potential for Cape Hardy / Lucky Bay facilities to draw some of the existing grain volume from Rudall in particular.** Assessment for individual stakeholders has not been undertaken as part of this study.
Social - Safety	No net increase in crashes	Monetised as part of NPV	No net increase in crashes	Achieved – positive impact with a forecast reduction in crashes of $0.68 million
Social Amenity	Minimise impact of grain transport on residential communities	Non-monetised assessment as MCA criterion	-	Achieved – minimises road freight transport changes through Port Lincoln.
Environmental – Harmful Emissions	Minimise harmful emissions from grain transport on EP	Monetised as part of NPV	-	Achieved - positive impact with a forecast net reduction in harmful emissions of $0.37 million
Environmental – Climate Change	Minimise CO_2 emissions from grain transport on EP	Monetised as part of NPV	-	Achieved - positive impact with a forecast net reduction in Greenhouse gas emissions of $0.30 million

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11.2 Staged Approach

In recognition of the tensions between the short-listed Options 5, 7 and 9 above, relating to timing of the future operability of new east coast grain port facilities, consideration has been given to the following possible staging approach;

- Upgrade the rail network between Port Lincoln and Cummins to the standard defined by GWA to provide service until 2045
- Continue to maintain the rail corridor to a suitable functional standard between Cummins and Rudall, until such time as sufficient grain is drawn to new port facilities to manage the social aspects of significant additional freight through Port Lincoln.
- Continue to maintain the serviceability of the rail corridor between Cummins and Lock for a shorter period commensurate with optimising the value of the existing infrastructure. This period can be used to assist the transition of the changes with the community and provide additional time to undertake appropriate road upgrade works.

This approach provides the following benefits;

- Optimises the use of existing infrastructure
- Avoids significant short-term expenditure on the rail network, other than that required to maintain a safe functional service, on sections of the corridor that may not have a longer term sustainable future
- Avoids the need to consider short term expenditure on sections of the road network that may not be the highest priority once future port facilities are operational
- Enables flexibility on the timing of future port facilities
- Mitigates the risk of a significant increase in road freight through Port Lincoln ahead of the operation of future port facilities
- Transitions the change in freight movement over a number of steps providing time to plan and implement road and other supporting infrastructure upgrades / changes and assisting community preparedness.

This approach however will require a level of investment on sections of the rail corridor that may not have a long term sustainable future. This investment would be reduced to only that required to maintain a safe functional service for a short-term period.

This Option shown diagrammatically in Figure 22.

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Figure 23: Possible staged approach

12 Next Steps

The following next steps are identified;

1. GWA and Viterra assessment of the long-term viability of Option 5. While the assessment described in this report identifies Option 5 as a potential optimal long term sustainable option for the region, this assessment is provided on a holistic regional basis, rather than on the consideration of the financial suitability for each individual key stakeholder. It is therefore recommended that GWA and Viterra each consider if this option will be viable from their individual perspectives. As a part of this, GWA should validate the assumption that 16 tonne locomotives can be suitably sourced for the long-term application of Option 5.
2. Consider if funding scenarios exist which might enable a 'staged' approach to the transition of the Eyre Peninsula grain freight task to one of increased road freight and reducing rail freight.
3. Further engage with GWA and Viterra to seek greater clarity on the likely supply chain cost impact / benefits of the staged and long-term freight approach. While it is understood that this is complex and dependent on a number of influencing factors, it is considered important that there is alignment between DPTI, GWA and Viterra on the likely outcomes ahead of progression with any changes. It will be important to be able to present this aligned expectation to the Stakeholder Reference Group as well as the broader community. An alternative, or possibly parallel approach, would be to engage an independent party to undertake a specialist independent assessment of this aspect. This latter approach could draw-on the ESCOSA enquiry into Grain freight costs when this is released.
4. Undertake broader stakeholder and community engagement to discuss the potential changes to freight movement on the Eyre Peninsula.

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13 Abbreviations/Glossary

AEGIC - Australia Export Grains Innovation Centre

Ag – Silver

ATAP – Australian Transport Assessment and Planning

ATC – Australian Transport Council

CBA – Cost Benefit Analysis

CEIP – Central Eyre Iron Project

DPC – Department of Premier and Cabinet

DPTI – Department of Planning, Transport and Infrastructure

EPCBH – Eyre Peninsula Co-Operative Bulk Handling

EPLGA – Eyre Peninsula Local Government Association

ESCOSA – Essential Services Commission of South Australia

GHG – Greenhouse Gas

GPSA – Grain Producers South Australia

GWA – Genesee and Wyoming Australia

HM – Heavy Minerals

HML – Higher Mass Limit

L & RTA SA – Livestock and Rural Transport Association

NPV – Net Present Value

PIRSA – Primary Industries and Regions SA

RAA – Royal Automobile Association

RAVNet – Restricted Access Vehicle Network

SA – South Australia

SACOME – South Australian Chamber of Mines and Energy

SAFC – South Australian Freight Council

SARTA – South Australian Road Transport Association

TIC – Transport and Infrastructure Council

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14 References

- Eyre Peninsula Grain Transport Issues paper – October 2002
- Eyre Peninsula Grain Logistics Rail Network Upgrade – Report to Public Works Committee – February 2006
- Regional Mining and Infrastructure Planning project – Eyre and Western Region
- Iron Road website http://www.ironroadlimited.com.au
- Sea Transport website http://www.seatransport.com
- Regional Development Australia, Whyalla and Eyre Peninsula (2012) Regional Plan
- Various publicly available data for mines
- PIRSA Eyre Peninsula Grain Production Trends: 5 and 10 year
- Transport and Infrastructure Council 2016a, Australian Transport Assessment and Planning Guidelines
- Austroads 2010, Road Safety Engineering Risk Assessment Part 6
- Transport and Infrastructure Council (TIC) 2016b, Australian Transport Assessment and Planning Guidelines
- Australian Transport Council (2006) National Guidelines for Transport System Management in Australia.

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Appendix A Strategic Context

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1 National Strategic Context

The following section describes the strategic context from a National Perspective. Much of the focus is associated with Infrastructure Australia documentation, along with additional documents relevant to road/rail/freight prepared by the Federal Government.

1.1 Infrastructure Australia

1.1.1 Australian Infrastructure Audit report – Volume 1

Infrastructure Australia has undertaken an Audit of Australia's national economic infrastructure for the following key sectors:

- Transport
- Energy
- Water
- Telecommunications

The audit takes a strategic approach to assessing our nation's infrastructure needs in relation to the contribution it makes to Gross Domestic Product (GDP) by providing a 'top-down' assessment of the value-add or Direct Economic Contribution (DEC) of infrastructure.

It also considers the future demand for infrastructure over the next 15 years to identify gaps.

The following specific Infrastructure Australia audit findings which are relevant to the Freight Study have been identified:

SUSTAINABILITY CONSIDERATIONS

- Lower investment in the maintenance of some parts of Australia's infrastructure networks, notably in regional Australia, could reduce the ability of those networks to provide reasonable levels of service in the future. The most significant risks are in:
  - Local roads, especially in regional and remote areas where there are large road networks to be maintained and local Councils have limited or declining income bases.
  - Regional rail infrastructure carrying low volumes of grain/and or general freight, especially those with aging timber bridges and timber sleepers.

TRANSPORT SECTOR – SPECIFIC FINDINGS

- The national land freight task is expected to grow by 80 per cent between 2011 and 2031 with a large component of this task expected to be handled by road freight vehicles.
- Accommodating this growth will require a focus on policy reform to enable the wider use of higher productivity heavy vehicles (such as B-triples), and selected investment (such as increasing bridge load limits and targeted safety improvements, aimed at improving the performance of national highway infrastructure).
- Freight rail will need to play a growing role in the movement of goods between ports and inland freight terminals, and in the movement of containers and general freight over longer distances.

Relevance to Eyre Peninsula Freight Strategy

The movement of freight via rail and / or rail corridors is a key consideration for the strategy. There is a need to consider the impacts of the future freight task on the transport network, considering both safety issues and maintenance of infrastructure.

1.1.2 Infrastructure Priority List & Eyre Infrastructure Project (Iron Road) Business Case Evaluation

The Eyre Infrastructure Project (Iron Road) is listed as a Priority Project within the Infrastructure Australia Priority Projects list.

Priority Projects are defined by Infrastructure Australia as 'potential infrastructure solutions for which a full business case has been completed and been positively assessed by the Infrastructure Australia Board. A priority project addresses a 'nationally-significant problem or opportunity'.

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- Eyre Infrastructure Project is listed as a Priority Project (subject to the Central Eyre Iron Project proceeding as proposed by Iron Road Limited).
- The Central Eyre Iron Project is a proposed iron ore mine in Central Eyre Peninsula with an estimated production of 24 million tonnes per annum (mtpa) of 67% iron concentrate ore for export, once fully operational.
- To facilitate export of ore from Central Eyre Iron Project, Iron Road Limited is proposing to develop the Eyre Infrastructure Project which includes:
  - Deep water port at Cape Hardy with 70 mtpa capacity
  - Iron Road Limited stockpile capacity of 660,000 tonnes
  - 148-kilometre heavy haul, standard gauge rail connection between the mine and Cape Hardy
  - Potential of the proposed infrastructure to be available for other uses 'open access', including grain exporters and other mines in the region
  - Potential connection to the National Rail Network
- The Central Eyre Iron Project and Eyre Infrastructure Project are proposed to be fully funded by the private sector.

Relevance to Eyre Peninsula Freight Strategy

The impacts of the potential Iron Road Ltd projects are a significant consideration for option analysis. Particularly, the influence of a new multi-commodity Port at Cape Hardy, which has the potential to significantly change freight movement patterns for the region. As the proposal is not committed for funding from public and private sectors at the time of this study, the impacts of the Central Eyre Iron Project and Eyre Infrastructure Project are to inform the sensitivity tests to be undertaken as part of the study.

1.2 Australian Government

1.2.1 Road and Rail Freight: Competitors or Complements?

This Australian Government document provides an overview of road and rail based freight and how these key modes contribute to Australia's overall freight task.

As per Figure 1, 'bulk' freight in Australia is typically moved by rail or sea modes, with road transport providing for a large percentage of 'non-bulk' freight movement.

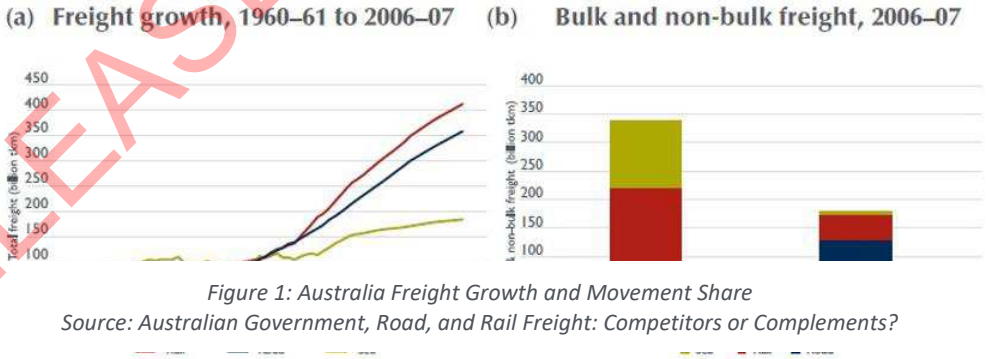

Figure 1: Australia Freight Growth and Movement Share
Source: Australian Government, Road, and Rail Freight: Competitors or Complements?

Note: Air freight activity is too small, in tonne kilometre terms, to be seen in the diagram.
Sources: BITRE (2008a, forthcoming) and BITRE estimates.

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- However, as identified within the document, the transport of grain produce in Australia relies on both road and rail modes as follows:
- Grain destined for bulk export, or supplied to local mills, is generally first consolidated in regional bulk storage facilities, with the road network used for its movement from farm to grain storage facility.
- Rail is then used for bulk haulage to larger regional storage sites to market.
  - Viterra is a major grain storage and handling organisation on Eyre Peninsula. Viterra follows a similar supply chain method as explained above. However, also provides a direct grain delivery option to growers within the local delivery zone for each port, in line with the available segregations[1]

The document goes on to reference GIAC (2004) and Transport SA (2002) reports to identify that:

- Road and rail competition occurs for existing 'branch line' haulage
- Large trucks have reduced freight costs resulting in a trend towards replacing rail services with road transport
- Trends towards separate storage and handling facilities given the emergence of a variety in crop type add to road being an attractive transport mode

Relevance to Eyre Peninsula Freight Strategy

The considerations associated with rail vs road grain transport is a key consideration for the freight strategy, although it is recognised that the Eyre Peninsula Region will have local region considerations that will impact the preferred direction.

1.2.2 Road Safety Strategy – National

National Road Safety Strategy 2011 -2020

The National Road Safety Strategy 2011-2020 is an overarching document that has been prepared by The Australian Transport Council (ATC). The National Road Safety Strategy (NRSS) is based on the Safe Systems Approach (see Figure 2) developed to improve road safety. The strategy is guided by ambitious vision for Australian road safety, backed by challenging but realistic 10-year targets and performance indicators.

Figure 2: Safe Systems Approach
Source: National Road Safety Strategy (NRSS)

[1] Viterra delivery model: http://viterra.com.au/index.php/making-deliveries/

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Targets:

With the vision of Australia's long-term road safety, the strategy has set the following casualty reduction targets to be achieved by the end of 2020:

- To reduce the annual number of road crashes fatalities by at least 30 percent
- To reduce the annual number of serious road crash injuries by at least 30 percent

These target reductions are relative to the average numbers of fatalities and serious injuries in the baseline period of 2008 – 2010. Under the previous strategy (2001-2010) targets were set to reduce the annual rate of road fatalities by 40 percent, however only 24 percent of actual reduction in fatalities was observed.

While previous strategies have set up targets for road fatalities only, this strategy gives greater attention to the serious injury dimension of road trauma. Targets set for NRSS are intended to strike a balance, reflecting the evidence about what can realistically be achieved in the next ten years, but also presenting a challenge that requires commitment and innovation.

Following is a summary of actions to be taken by governments over three years:

- Prioritising investments in infrastructure
- Improving the safety of the Australian vehicle fleet
- Encouraging safer road use
- Advancing the safe system

Figure 3 below indicates the road deaths trend from 2008.

Figure 3: Road Deaths trend, 2008 – present

Source: National Road Safety Strategy (NRSS)

The trend shows the baseline and the actual deaths in comparison with the NRSS targets. Between 2010 and end of 2015 the number of road deaths have been observed to be below the NRSS target. However, the road deaths have increased above the NRSS target from 2016 to present.

National Transport Commission

The National Transport Commission (NTC) is committed to creating and monitoring a positive road safety culture, including encouraging all road users to be safe around heavy vehicles.

The NTC principle complements the National Road Safety Strategy (NRSS). NTC is working with industry, business sectors, governments, and non-profit organisation to reduce road deaths by 30 percent to achieve the NRSS 2011-2020 target.

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Freight makes about 3 percent of the vehicles and about 8 percent of the vehicle kilometres travelled (VKT) on Australian roads. Trucks and buses are involved in 18 percent of total road deaths and the economic cost of heavy vehicle crashes is estimated cost around $3.8 billion per year.

The NTC's role is to research and advise on reforms and recommendations to governments, encourage knowledge sharing opportunities to help industry choose and implement the right safety improvements for their businesses and, importantly, measure and evaluate the outcomes.

Relevance to Eyre Peninsula Freight Strategy

The road safety vision and targets set by National Road Safety Strategy (NRSS) and the National Transport Commission (NTC) play an overarching role on the state and local government road safety strategies. Freight, as explained by National Transport Commission plays a vital role in road safety.

Policy changes nationally affect state legislation on freight movement on the national/ state road network. Therefore, it is essential to understand the strategies nationally to appropriately align the planning study.

1.2.3 Australia's 2030 Emission Reduction Target

The Australian Government has agreed a target of 26-28 per cent below 2005 levels by 2030.

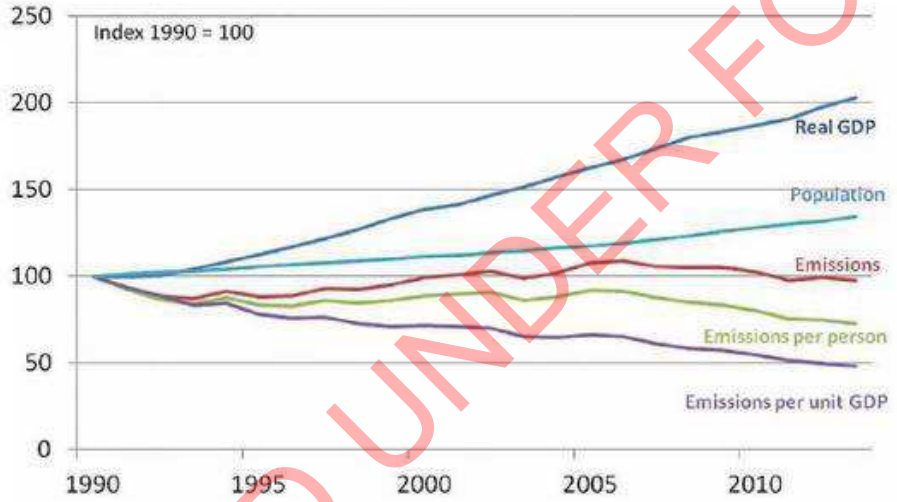

Figure 4: Australia's Historic Emissions

Australia will meet our 2030 target through policies that provide positive incentives to reduce emissions. At the core of Australia's climate change policies are the Emissions Reduction Fund and its Safeguard Mechanism.

The Emissions Reduction Fund supports Australian businesses, communities, and landholders to undertake activities which reduce or avoid greenhouse gas emissions. To date the Emissions Reduction Fund has purchased 47 million tonnes in emissions.

The Emissions Reduction Fund is complemented by the Safeguard Mechanism which will ensure that emissions reductions purchased by the Government are not offset by significant rises in business-as- usual emissions elsewhere in the economy. The Renewable Energy Target helps Australian households and businesses to install solar and other renewable energy technologies, transforming our electricity sector to cleaner and more diverse sources, and supporting growth and employment in the renewable energy sector.

The Renewable Energy Target allows sustainable growth in both small and large scale renewable technologies, delivering to more than 23 per cent of Australia's electricity from renewable sources by 2020.

The National Energy Productivity Plan, including a target to improve Australia's energy productivity by 40 percent between 2015 and 2030, will see improvements in how households and businesses use energy in their homes, offices, and industrial facilities. The Plan will include measures to make energy choices easier and will encourage improvements in the efficiency of appliances, equipment, buildings and transport, as well as wider innovation in energy services. The Plan will be progressed in collaboration with the states and territories through the Council of Australian Governments' Energy Council.

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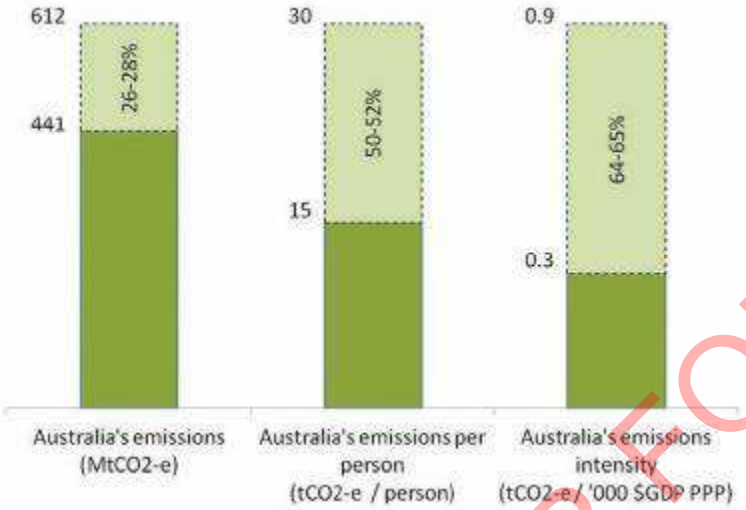
The Government has announced a Ministerial forum to commence work on improving the fuel efficiency of Australia's vehicle fleet. Work has commenced to investigate the implementation of Euro 6 standards, improved fuel quality standards and new measures to address the fuel efficiency of vehicles. In addition, the Government will examine further measures such as incentives and standards to encourage the purchase of more fuel-efficient vehicles.



Data	Units	Number
Australia's Emissions in 2005	$MtCO_2$-e	612
Australia's Emissions Target in 2020	$MtCO_2$-e	533
Australia's Emissions Target in 2030	$MtCO_2$-e	441–453
Australia's Emissions Target 2020	%	-5 per cent on 2000 levels by 2020
Australia's Emissions Target 2030	%	-26% to 28% on 2005 levels by 2030
Reduction in emissions per capita 2005–2030	%	50–52
Reduction in Emissions per unit of GDP 2005–2030	%	64–65
Annual rate of reduction in emissions 2010–2020	%	0.9
Annual rate of reduction in emissions 2020–2030	%	1.6–1.9

Figure 5: Emissions Key Facts

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2 South Australian Strategic Context

This section covers relevant strategic state policy documents.

It considers relevant documents from each tier of the State Policy Framework as shown in the following section:

- Top level (green)
- Secondary Level (blue)
- Third Level (purple)

2.1 State Policy Framework

The South Australian policy framework as defined in the 30-Year Plan for Greater Adelaide (2017 Update) is provided in Figure 6 for overall context.

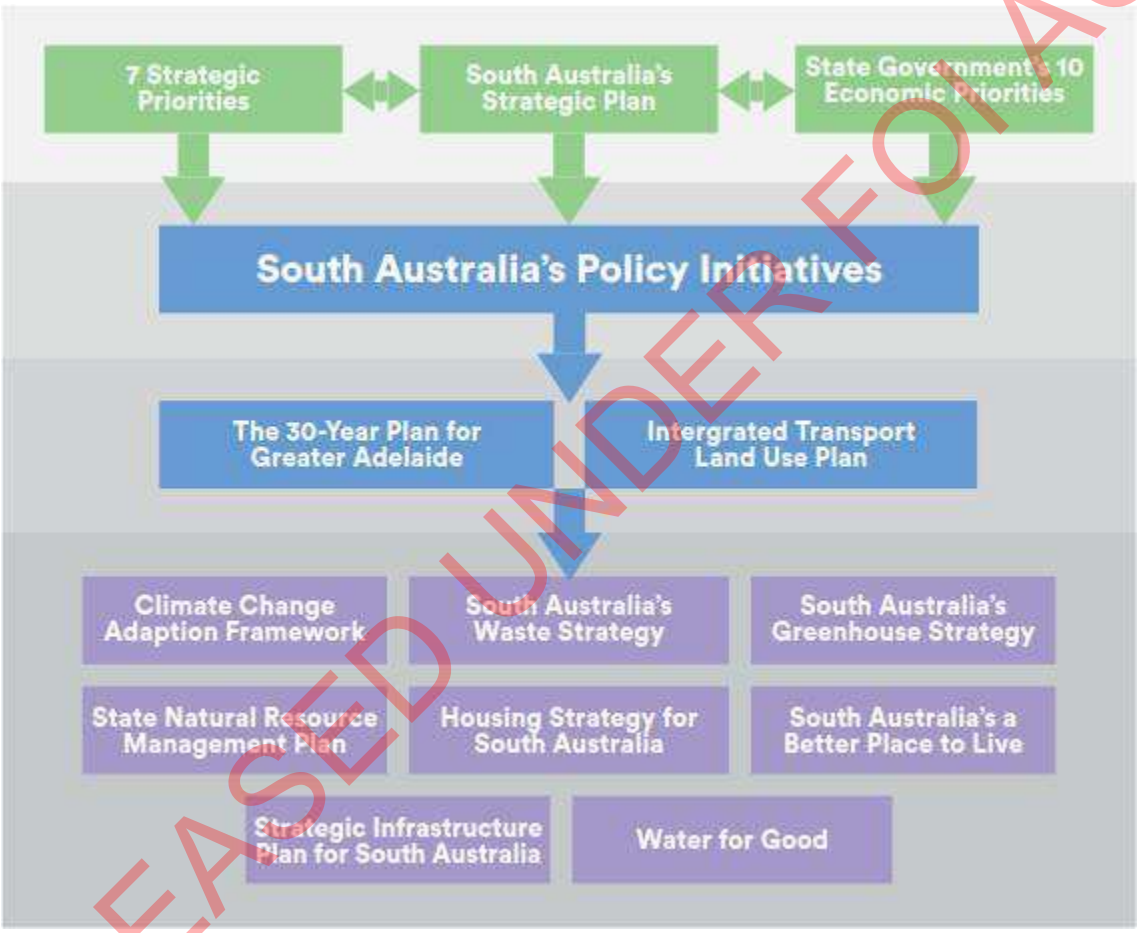

Figure 6: South Australian Planning Framework
Source: The 30-Year Plan for Greater Adelaide (2017 Update)

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2.2 State Policy Framework – Top Level

2.2.1 Seven Strategic Priorities

The State Government has defined the following seven strategic priorities as per Figure 7.

Figure 7: South Australian Seven Strategic Priorities
Source: http://www.priorities.sa.gov.au/

Table 1: Summary of Seven Strategic Priorities

SEVEN STRATEGIC PRIORITIES	DESCRIPTION	VISION FOR FUTURE
Creating a vibrant city	As the state's capital, it is essential that Adelaide competes nationally and internationally for people and investment and thrives as a cultural, economic and social centre of the state.	Adelaide is one of the great small cities of the world. It is the economic and cultural powerhouse of the state where more people choose to live, work, invest and spend time.
An affordable place to live	The quality of life for South Australians is influenced by the rising costs of housing, transport and utilities.	Industries supplying housing, food and utilities are efficient and supply at competitive prices. Homes and neighbourhoods are designed to conserve energy and water to help reduce demand and costs.
Every chance for every child	The greatest determinant of a child's future health, development and happiness is the experience in the first five years of life. By the time a child is three years old, about 85% of their brain has been developed. Gaps in the achievement of children's health, development and learning between groups of children open early and get harder to close with time	South Australia is recognised nationally and internationally as a family and child- friendly state – a great place to live and raise healthy and creative children.
Growing advanced manufacturing	Manufacturing is a critical component of any advanced economy. Each job in manufacturing generates two to five jobs in the rest of the economy.	South Australia's manufacturing industry draws on research, design and innovation to successfully compete internationally and drive growth in the South Australian economy.
Safe communities, healthy neighbourhoods	Our crime rates have fallen significantly over the last decade yet the fear of crime remains high.	South Australia's neighbourhoods are safe and welcoming. People can live active and healthy lives and feel part of the community.
Realising the benefits of the mining boom for all	South Australia is richly endowed with resources in a range of commodities.	South Australia has a thriving resources industry and is a key mining services hub for Australia and the region. All South Australians have the opportunity to benefit from the strong resources sector
Premium food and wine from our clean environment	The South Australian food and wine industry is worth over $17 billion and accounts for 40% of South Australia's total merchandise exports	South Australia is renowned as a producer of premium food and wine from its clean water, clean air and clean soil.

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2.2.2 South Australia Strategic Plan

South Australia's Strategic Plan was released in 2011 and details priorities, visions and goals and targets for the state.

The following extracts from the plan are highly relevant to the Eyre Peninsula Freight Strategy:

- Vision: A strong, sustainable economy that builds on our strengths.
  - Goal: We develop and maintain a sustainable mix of industries across the state.
    - Target 40: Food Industry: Grow the contribution made by the South Australian food industry to $20 billion by 2020.
- Vision: We have a skilled and sustainable workforce.
  - Goal: South Australia has a sustainable population.
    - Target 46: Regional Population Levels: Increase regional populations, outside of Greater Adelaide, by 20, 000 to 320,000 or more by 2020.
- Vision: South Australians think globally, act locally and are international leaders in addressing climate change.
  - Goal: We adapt to the long-term physical changes that climate change presents.
    - Target 62: Climate change adaption: Develop regional climate change adaption plans in all State Government regions by 2016.

2.2.3 State Government's 10 Economic Priorities

The State Government's 10 Economic Priorities have been developed on the vision that 'South Australia is a place where people and business thrive'.

Each economic priority, along with the associated vision statement is summarised in Table 2.

Table 2: Summary of State Government's 10 Economic Priorities

ECONOMIC PRIORITY	VISION STATEMENT
The knowledge state	The smartest thing we can do is to attract a diverse student body and commercialise our research
Premium food and wine	Our future relies on premium food and wine produced in our clean environment and exported to the world
A destination of choice	South Australia – a growing destination choice for international and domestic travellers
Unlocking our resources	Having a dynamic resources sector that's globally competitive will fuel economic development and job creation
Global leader in health and ageing	The changing demographics of our population provide a major economic opportunity
Best place to do business	We'll be quick to address the changing needs of businesses, and build industries that will generate the jobs of the future
Growth through innovation	We need to support companies that are prepared to innovate and reap the rewards of business change
International connections	We need to be open to new people, new ideas, new investment and business partnerships
Vibrant Adelaide	During the past three years there's been a definite shift in the perception of Adelaide for the better
Opening doors for small business	Transition of South Australia's small businesses towards niche, globally competitive opportunities will be accelerated

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State Policy Framework (Top Level) - Relevance to Eyre Peninsula Freight Strategy

An overall key consideration for the freight strategy is the alignment of the options to State objectives. The visions relating to safe communities, supporting the resources and mining sector development and maintaining our reputation for producing high quality food are all relevant to this study.

As an economic focus, employment in the freight and grain logistics industry impacts population growth in the region.

Additionally, changes in climate conditions will influence future crop yields and the way goods are moved in the transport sector has a significant impact to our climate.

While the above are some of the direct strategic considerations, the overall strategy indirectly aligns to many of the state's strategic objectives.

2.3 State Policy Framework - Secondary Level

2.3.1 The Integrated Transport and Land Use Plan

The Integrated Transport and Land Use Plan (ITLUP) ('The Plan') has been developed by the Department of Planning, Transport and Infrastructure (DPTI). It details transport actions, investments, and initiatives to support future transport networks in South Australia(SA).

While the Plan sits at the same hierarchy level as the 30-Year Plan, specific transport solutions and actions are listed, along with associated timeframes for short (next 5 years), medium (5 – 10 years) and long term (15+ years) durations.

The Plan identifies that Regional SA plays a crucial role in the economic development of the state. Therefore efficient, reliable, and safe connections across regional South Australia are essential in supporting vital regional industries and sustaining our country centres.

The central objective of The Plan is to find specific solutions to support the three 'productive and competitive' industries, including:

- Mining and resources
- Advanced manufacturing
- Premium food and wine

The Plan provides a broad range of solutions, however, each region in South Australia has its own set of transport and land use challenges. Collaboration with State Government, local councils and Regional Development Australia is therefore stated as a key requirement to ensure that the transport system matches unique regional needs. Priorities for regional SA, are listed as:

- Support for regional industry
- Expanded 'pit to port' capacity
- Maintaining liveability and appeal to regional towns
- Regional passenger transport and aviation
- Greater freight productivity

FREIGHT AND PORT SOLUTIONS

The Plan provides freight and port solutions for South Australia. Three major solutions that have been identified with relevance to Eyre Peninsula are as follows:

Position the South Australian freight system to support the expansion of the mining sector

Implement outcomes from the Regional Mining Infrastructure Plan:

- Initially focus on the development of high capacity ports, and associated land based links, on the Central Eyre Peninsula, Yorke and Mid North/Braemar, and the Northern Eyre Peninsula. An early priority is to confirm the preferred commercial solutions to bulk mineral export infrastructure on Spencer Gulf.
- Provide a supportive regulatory framework for public and private investment, particularly with respect to protecting multi-use infrastructure corridors and efficient approvals processes.
- Provide leadership and coordination to facilitate mining-related infrastructure development.
- Develop business cases and funding applications under suitable Australian Government programs for infrastructure projects identified as part of the Regional Mining and Infrastructure Plan.

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Maintaining and Optimising the Capacity and Efficiency of Freight Networks

Targeted investment in infrastructure to improve the capacity and efficiency of freight corridors:

- Road - Make targeted upgrades of strategic regional freight roads to achieve High Productivity Vehicle (HPV) standards and improve the safety and consistency of interstate freight routes.
- Rail - Work with the private sector and industry groups to improve understanding of supply chain needs and identify solutions, including potential improvements and storage locations to support the grain industry on the Eyre Peninsula.

Prepare a Freight Strategy and a Ports Strategy for South Australia

- Deliver regulatory reforms and reduce red tape.
- Improve the quality of information on the freight transport system and supply chains to inform planning and delivery of infrastructure.
- Provide for strategically located freight hubs and intermodal facilities. Provide for freight deliveries in urban environment.
- Introduce a program to address potential traffic conflicts and safety issues.
- Work in partnership with the private sector, other levels of government, and Regional Development Australia Associations.

ROAD NETWORK EFFICIENCY

The Plan comprises strategies that aid in improving the road/freight network:

- Actively manage the road network – Implement road development plans to manage and set priorities for future road investment.
- Complete the North South corridor.
- Protect freight routes – Ensure land use policies in SA Planning Policy align with freight and major routes.
- Safe, efficient, and connected road networks – Deliver regional road upgrades including extensive shoulder sealing, overtaking lanes and rest areas across the network – such as Sturt, Riddoch, Eyre, Lincoln, Barrier and Stuart Highway.
- Collect regional travel data – Conduct targeted regional transport surveys that enables better understanding of regional travel patterns.

EYRE AND WESTERN – DELIVERING THE ITLUP PLAN

ITLUP contains individual documents focussing on each of the regional areas. Eyre and the Western Region – Solutions and Actions document explains the key challenges and issues specific to the region:

- Projected population growth of 0.3 percent per annum is anticipated.
- Region produces 30% of the state's grain harvest and 90% of its seafood.
- Growth in the agriculture, aquaculture, mining and tourism industries will stimulate development, particularly in the major centres of Whyalla and Port Lincoln, but also in towns accommodating workers for mining activities on the Eyre Peninsula, such as Tumby Bay and Wudinna.
- Road improvements to support the mining and grain industries will be targeted along the Lincoln, Eyre, Flinders and Tod highways, as well as other important freight and traffic routes.
- The Regional Mining and Infrastructure Plan identifies the need for suitable bulk commodities export port facilities for Central and Southern Eyre mine clusters. These facilities, driven by demand from iron ore mining, will also need to be supported in the medium term by landside heavy vehicle transport links. An early priority is to confirm the preferred commercial solutions to bulk mineral export infrastructure on Spencer Gulf.

An implementation framework has been proposed for Eyre and Western region ITLUP solutions.

Figure 8 shows the implementation framework for the Eyre Peninsula.

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Implementation timeframe*	Short (Next 5 yrs)	Medium (5 to 15 yrs)	Long (15+ years)
Roads			
1. Lincoln Highway – road widening, shoulder sealing, rest areas, overtaking lanes, widening of bridges and intersection upgrades, including intersections in Port Lincoln and Whyalla	■	■	■
2. Eyre Highway – road widening, shoulder sealing and rest areas	■	■	■
3. Flinders Highway – road widening, shoulder sealing and rest areas		■	■
4. Tod Highway – road widening, shoulder sealing and rest areas		■	■
Area-wide solutions			
• Road widening, shoulder sealing and intersection improvements targeted at major freight and traffic routes	■	■	■
• Increase maintenance to improve and sustain the performance of the transport network and make better use of our transport assets	■	■	■
• Continue to implement the *Road Safety Strategy* and address road safety blackspot and higher risk locations	■	■	■
Ports, rail freight, airports and intermodals			
Work with the private sector to ensure port and port developments on the Eyre Peninsula provide for competitive exports and efficient landside connections, with a focus on: (refer 5 and 6)	■	■	■
5. Central Eyre and associated road infrastructure	■	■	
6. Far North Eyre and associated road and rail infrastructure	■	■	
7. Investigate Eyre Peninsula rail improvements to support the grain task	■		
8. Upgrade state owned port facilities at Port Bonython, including jetty, mooring facilities and navigation aids	■	■	
9. Work with local councils to identify upgrades of strategically important local airports and aerodromes, including Ceduna and Whyalla airports and Wudinna and Cleve aerodromes	■		
Local Government			
• Work with local councils and the Local Government Association to implement local transport strategies to complement land use directions of local Development Plans, with a focus on freight movements, tourism and accessible townships:	■		
• Options for local heavy vehicle bypass of affected towns • Road, pedestrian and cycling networks in Port Lincoln and Whyalla to support urban growth, including rail level crossings on local roads where applicable • Regional cycling networks and facilities to support tourism • Create safe and convenient walkable neighbourhoods • Upgrades to support safe and reliable heavy vehicle movements, including last mile access, access to ports and freight facilities, and truck parking facilities, including access to Lucky Bay • Reflect findings of the *Regional Mining and Infrastructure Plan* • Airport master plan – Port Lincoln, Whyalla, Ceduna • Safe and reliable road and cycling networks to support tourism and local travel • Identify and investigate upgrades of strategic boat ramp sites to provide a safe haven for vessels – particularly on the far west coast between Mount Dutton Bay and Streaky Bay • Work with local councils to implement the National Airport Safeguarding Framework for Port Lincoln, Ceduna, Whyalla, Cleve and Wudinna airports			

* These proposed actions will be subject to further investigations and availability of funding.

Figure 8: ITLUP Implementation Framework for Eyre Peninsula

The Plan also provides a snapshot of the solutions across the Eyre and Western Region as identified in Figure 9.

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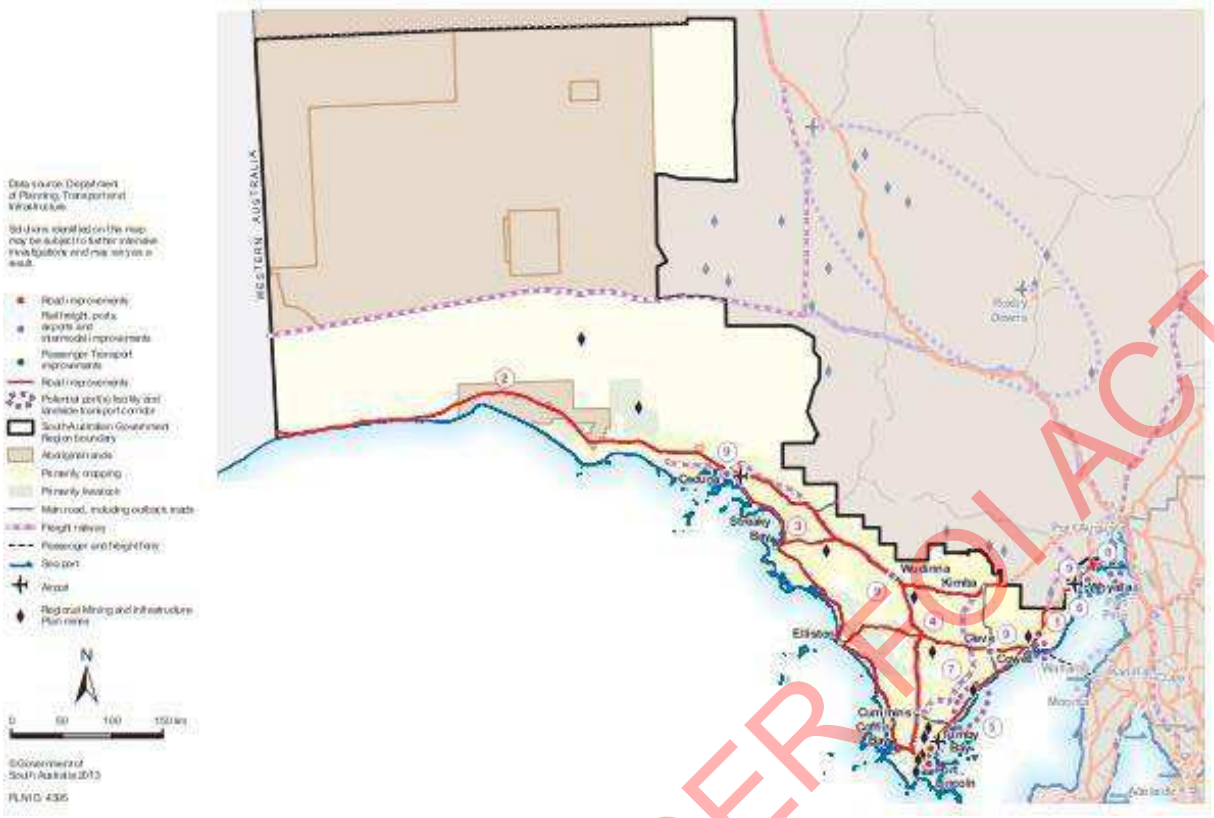

Figure 9: Eyre Peninsula and Western Region ITLUP Solutions

Relevance to Eyre Peninsula Freight Strategy

ITLUP provides both strategic and specific solutions for the Eyre Peninsula transport network. ITLUP has identified the need for improvements to the port and road and rail freight facilities in the Eyre Peninsula to support the mining, agricultural and food industries. All Eyre Peninsula Freight Strategy project solutions are to be aligned with, or complement the ITLUP implementing framework for the region.

2.4 State Policy Framework – Third Level

2.4.1 Strategic Infrastructure Plan for South Australia (SIPSA)

The Strategic Infrastructure Plan for South Australia was first released in 2005 and provided a 5-10-year framework to guide infrastructure development in accordance with the objectives of South Australia's Strategic Plan.

Based on the lifetime of the plan, change in economic conditions, release of the 30-Year Plan for Greater Adelaide and update of the regional volumes in the South Australian Planning Strategy – DPTI has stated that an updated of the plan is needed.

A 2010 Discussion paper has been released which provides future planning for 15 infrastructure sections over the next 10 to 15 years.

The discussion paper contains a regional overview for the Eyre and Western Region (refer section below).

2.4.2 Region Overview – Eyre and Western

The Eyre and Western region covers 230,000 square km from Whyalla to the border with Western Australia. The population of the region is 58,072 people (at 2010) with Whyalla and Port Lincoln as the largest population centres.

The Regional Overview document for the Eyre and Western region summarises the key infrastructure components for the region such as transport, technology, education, emergency services, arts and heritage, health, energy, water, community services and natural assets.

The purpose of the document is to summarise the condition of the infrastructure components. The regional overview document highlights the following important points:

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- Rail lines provide vital transport links for export of grain and minerals through the ports at Port Lincoln and Thevenard. Opportunities for these lines to play a strategic role in supporting the emerging mining activities.
- Principal road routes for the movement of freight and passengers from South Australia and the Eastern states. State strategic and primary and secondary freight routes provide connections to the National Land Transport Network.
- The main commercial ports at Whyalla, Port Bonython, Port Lincoln and Thevenard play a significant role in the transfer of primary produce, seafood, and minerals to other parts of Australia and overseas.
- Rising demand for increase in port capacity due to expanding mining activity in the region.
- There is also a growing demand across the region for suitable wharf facilities to support fishing and aquaculture.

Strategies

Since the plan was originally released in 2005 the region has benefitted from following infrastructure developments.

- Completion of Eyre Peninsula grain transport road and rail upgrades.
- Upgrading of port facilities for OneSteel in Whyalla
- Upgrading of No 1 berth at Port Lincoln for tourism and recreational fishing.
- Intersection improvements on Lincoln Highway, Flinders Highway and Bratten Way.
- Roadside rest area improvement on Flinders Highway and Lincoln Highway.

The document prioritises a need to develop energy and transport infrastructure, including ports, to support economic growth, particularly agriculture, minerals, and tourism sectors.

Relevance to Eyre Peninsula Freight Strategy

The Regional and Western Overview document provides and overview of all the existing infrastructure and explains the importance of the road and rail network in supporting the freight network.

2.4.3 Eyre and Western Region Plan (April 2012)

The Eyre and Western Region Plan (EWRP) is one of the seven regional volumes as part of the South Australian Planning Strategy. The plan identifies the planning priorities, principles, and policies necessary to achieve community and economic targets outlined by the South Australian Government.

Figure 10 shows the links between EWRP and the State Government strategies.

Figure 10: Link to South Australian Planning Framework
Source: Eyre and Western Region Plan 2012

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Key issues listed for the Eyre and Western Region are:

- Environment and sustainability.
- Economic development.
- Population, settlements, and culture.
- Infrastructure and services provision.

Principles of the Eyre and Western Region Plan which are then aligned to respond to the key issues identified above are:

1. Recognise, protect, and restore the region's environmental assets.
2. Protect people, property and the environment from exposure to hazards.
3. Increase the capacity of the region to adapt and become resilient to the impacts of climate change.
4. Protect and build on the region's strategic infrastructure.
5. Protect and strengthen the economic potential of the regions primary production land/
6. Strengthen the economic potential of the regions' mineral and energy resources.
7. Strengthen then commercial fishing and agriculture industries.
8. Reinforce the region as a unique and diverse tourism destination.
9. Provide and protect industrial land to meet projected demand.
10. Ensure commercial development supports town function.
11. Plan and manage township growth, and develop Structure Plans for key growth centres.
12. Design towns to be sustainable and provide safe, healthy accessible, and appealing environments.
13. Provide residential land and diverse, affordable housing to meet current and future needs.
14. Identify and protect place of heritage and cultural significance, and desired town character.

Relevance to Eyre Peninsula Freight Strategy

Many strategic principles relate to infrastructure, the economy, food production and sustainability. The transport system and the consideration of freight movements contributes to these principles to a significant extent.

2.5 Road Safety Strategy – State Government

2.5.1 South Australia's Road Safety Strategy – Towards Zero Together

Towards Zero Together complements and expands on the state's commitment to the National Road Safety Strategy (2011-2020) with contributions from South Australia. This strategy promotes thinking safety and changing behaviour amongst every road user. This cultural change extends to every driver, every motorcyclist, every pedestrian, every cyclist, and promotes respect for each road user.

Towards Zero Together has adopted the safe systems approach (see Figure 11). The Safe System approach to road safety is built on following key principles:

- **Human Factors** – no matter how well we are trained and educated about responsible road use people make mistakes and the road transport system needs to accommodate this.
- **Human Frailty** – the finite capacity of the human body to withstand physical force before a serious injury or fatality can be expected is a core system design consideration.
- **Forgiving Systems** – roads that we travel on, vehicles we travel in, speeds we travel at and communities we live in need to be more forgiving of human error.
- **Shared Responsibility** – everyone has a responsibility to use the road safely with organisations, businesses and communities taking responsibility for designing, managing, and encouraging safe use of road transport system.

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Figure 11: Safe Systems Approach to Road Safety
Source: Towards Zero Together

Targets

The strategy targets at least 30% reduction in serious road casualties by 2020. This matches the target set out in National Road Safety Strategy.

Safety Action Plan

As part of the Strategy a Road Safety Action Plan 2013 – 2016 has been released to achieve the road casualty reduction targets.

The Action Plan highlights 65 actions to be undertaken that fall under six key focus areas:

- Investing in Safer Roads
- Creating Safer Communities and Neighbourhoods
- Encouraging Safer Behaviours
- Continuously Improving the Licensing System
- Using New Technologies
- Better Informed Communities

The introduction of number of initiatives has reduced the annual fatality, however still there is an unacceptable level of fatalities on the road network.

Heavy vehicles

The Action Plan has provided a consolidated factsheet for heavy vehicle drivers. Key highlights from the factsheet are as follows:

- Heavy vehicles travel more than 1.3 billion kilometres each year in South Australia. They represent on an average (2008 – 2012) 16% of fatal crashes and 7% of serious injury crashes on SA roads.
- Speed and fatigue have been identified as key contributors to heavy vehicle crashes.
- Heavy vehicles have limitations when it comes to accelerating and stopping. They also need more room to turn and their blind spots differ to the passenger vehicles.
- By identifying driving behaviours of heavy vehicles and other road users, countermeasures including 'share the road' public education awareness campaigns may help reduce incidence and severity of crashes.
- Heavy vehicle safety could be improved by technologies such as speed adaption, seatbelt monitoring and advanced emergency braking systems. These measures are expected to reduce heavy vehicle crashes.

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- One contributor to truck occupant deaths is low use of seat belts by truck drivers.

Key Actions:

- Investing in safer roads
  - Address fatigue by continuing to upgrade rest areas on interstate freight routes and increase the installation of audio tactile markers where appropriate.
  - Continue to seek opportunities to increase investment in road maintenance.
- Better informed communities
  - Promote the 'sharing the road with heavy vehicles' educational campaign.

Relevance to Eyre Peninsula Freight Strategy

The Eyre Peninsula freight network is affected by the actions outlined in South Australia's Road Safety Strategy. The detailed actions outlined in the strategy would aid in appropriately planning future freight movements on the road network as part of the Eyre Peninsula Freight Strategy.

2.6 Regional Mining and Infrastructure Planning project – Eyre and Western Region – State Government

The objective of the Regional Mining and Infrastructure Planning (RMIP) project was to identify infrastructure solutions that maximise the net benefits to South Australia by improving connectivity from existing mines and infrastructure. The interim report:

- Identifies the infrastructure requirements to support further development of existing mines and new mines located within the Eyre and Western Region.
- Delivers a roadmap, including the respective role of governments and private sector in facilitating the delivery of long term infrastructure solutions.

The transport and logistics infrastructure considers port facilities, road, rail, conveyor systems and slurry pipelines, as well as Service infrastructure such as Electricity, water and gas. The RMIP identified potential 'gaps' in the infrastructure required to support potential mining development and considered a range of project options that might address these issues.

Since the issue of the RMIP, commodity prices have dropped resulting in little development other than progression of exploration and approval processes.

Relevance to Eyre Peninsula Freight Strategy

The Regional Mining Infrastructure Project report helps to understand the condition of existing freight infrastructure in Eyre and Western Region. As the mining demand increases over time, the inadequacy of the existing freight infrastructure will require a range of infrastructure works. The development of the Freight study will need to be undertaken in a way which supports and complements the future infrastructure requirements for Mining.

2.7 Climate Change – State Government

2.7.1 Glimpsing South Australia's Future Climate

The Department of Environment, Water, and Resources (DEWNR), part of Government of South Australia conducts research and produces to inform policies around environmental wellbeing of the state.

Projections for a warming drying climate across South Australia's agricultural zone are a cause for concern, particularly where low soil moisture often presents limitation to plant growth.

An initiative to communicate effects of climate change for wheat and sheep production was undertaken by National Agricultural and Climate Change Action Plan in August 2008[2].

The report provides information on the forecast changes in mean rainfall and the mean temperature for South Australia as summarised below.

[2] https://www.mla.com.au/globalassets/mla-corporate/blocks/research-and-development/sa-future-climate.pdf

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Changes in mean rainfall:

- Annual rainfall is projected to decrease by 2-5 % in 2030 and 5-10 % in 2070.
- Winter and spring rainfall is likely to decrease, whereas changes in summer and autumn rainfall are less certain.
- Natural climate drivers are expected to strongly influence rainfall variability for many decades to come.
- Potential evapotranspiration is projected to increase over South Australia. Climate projections show an increase in daily precipitation intensity and increase in number of dry days.

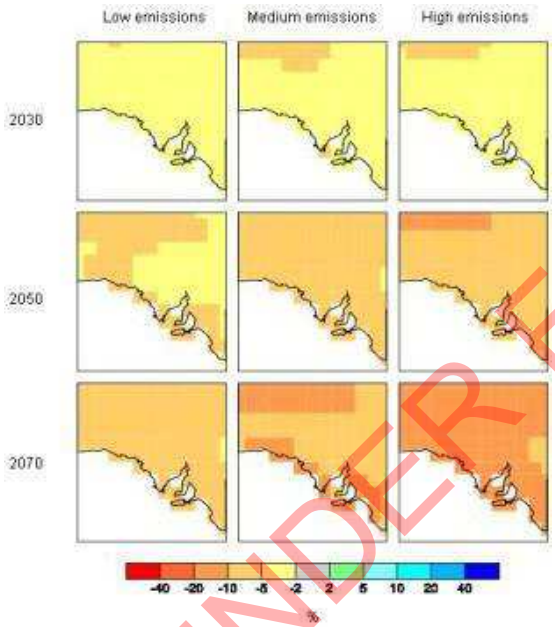

Figure 12: Changes in mean rainfall

Changes in mean temperature

- Annual average temperatures in South Australia are projected to increase by at least 0.6°C in the south and 1°C in the north by 2030 and increase is around 1.5°C across the state by 2070.
- Less warming is expected along the coast. Projected warming for summer, spring and autumn is similar to annual increase.
- Projections indicate that by 2030 Adelaide will experience several more days per year above 35°C.

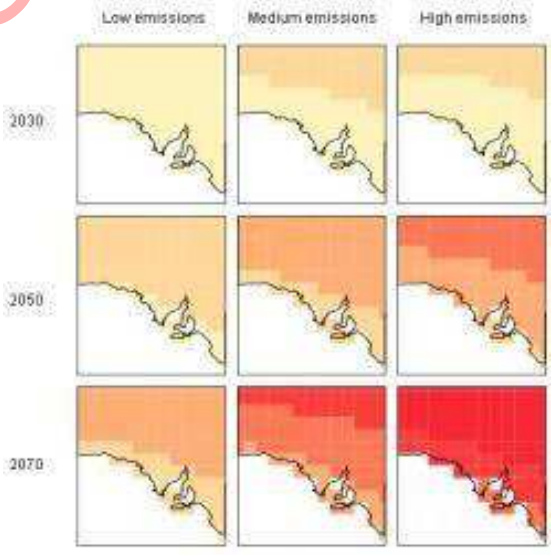

Figure 13: Changes in mean temperature

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Potential general threats for agriculture across Southern Australia include:

- Decline in productivity due to increased droughts and bushfires.
- Crop yields benefitting from warmer conditions and higher carbon dioxide levels, but vulnerable to reduced rainfall.
- Greater exposure of stock and crops.
- Southern migration of some pests.
- Potential increase in the distribution and abundance of some exotic weeds.

2.7.2 Investigating climate change impacts in SA: Climate change, wheat production and erosion risk[3]

A study was conducted by DEWNR examined the potential impacts to wheat grain yields and frequency and severity of wind and water erosion risk due to climate change. This involved linking the crop simulation model 'APSIM' to map key soil properties. Key points for wheat and sheep production are:

- Climate change threatens the productivity of Australia's wheat and sheep industries.
- By 2030, the Lower Eyre Peninsula, Yorke Peninsula and Upper South-East regions are likely to experience an increase in temperature of at least 0.6°C and a decrease in rainfall of at least 2%. By 2070, temperatures could be 1.5-3°C higher and rainfall could be 5-20% lower.
- Climate change is likely to have negative impacts on the South Australian wool and sheep industry.

Factsheets and reports have been produced to inform wider audience about the forthcoming changes that have been projected. The study linking crop simulation modelling with soil and land mapping, indicates that:

- Low rainfall areas will arguably have the greatest need for land managers to adapt to drying climate.
- Adaptive and innovative land management, land use and business strategies will be needed to protect profits, communities, and natural resource base.
- Large or long-term investment decisions will impact on future farming generations. They should factor in the best available climate information.

The report explains that over the longer term, if incremental changes to farming systems do not keep up with climate change, more complex decisions to adopt significantly different land use or land management practices are likely to be made over several years.

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[3]Climate change, wheat production and erosion risk: https://www.environment.sa.gov.au/managing-natural- resources/Land/sustainable-soil-land-management/climate-change-mitigation-adaptation/climate-change-wheat- production-and-erosion-risk

3 Local

3.1 Regional Plan 2014 – 2016

The Regional Plan is prepared by Regional Development Australia for the Whyalla and Eyre Peninsula Region. The Plan defines an overarching Vision for the region and associated issues critical to achieving this vision. These include;

- **Water Security:** A reliable water supply must be found for community and industry use.
- **Economic Development:** Industrial diversity, business capability and product development need to be encouraged to enhance the region's competitiveness.
- **Infrastructure Provision**: Investment attraction is essential because many development opportunities will not be realised without a substantial upgrade of key infrastructure.
- **Workforce Development:** The capacity of human capital needs to be improved to provide skilled and experienced labour. Workforce attraction is also necessary because the regional population is too small to provide the labour force for predicted industry growth.
- **Liveability Enhancement:** Population growth, and workforce attraction and retention, will only succeed if the region's towns and communities have the social infrastructure, services and amenity to enhance the quality of life of workforce families and residents.

The following priorities are provided to support the achievement of the overarching vision;

Develop and retain a skilled workforce

A larger workforce is necessary to meet the employment demand from anticipated mining and industrial growth. This requires the attraction of skilled labour from outside the region, and the ongoing provision of training programs to increase capability and labour force participation.

Build the capacity of the community to grow the regional economy

Training programs to up-skill the region's unemployed and disadvantaged will improve the economic position of vulnerable sectors of the community, and bring flow-on economic benefits to businesses. Programs to improve business capability will strengthen the resilience of the SME sector and bring economic benefits.

Consider the environment when planning regional development

The pristine environment is a regional strength, key tourism attraction, and adds value to community amenity. Best practice environmental management is vital to the sustainability of the primary production sector and the export of premium food product. Initiatives to manage climate change adaption, encourage renewable energy and provide a sustainable water supply, need careful consideration when making economic and employment development decisions. Land use conflicts, such as farming and mining co-existence, need to be resolved in regional strategic planning.

Support development of social and community infrastructure and services to enhance liveability

The liveability and vibrancy of township communities are regional assets. However, health, aged care, child care, recreation, cultural and other services are limited in some towns. This provision is largely cost prohibitive for Local Government and assistance is needed to attract funding to improve services.

Promote investment to develop strategic infrastructure and foster globally competitive business

Regional development opportunities are constrained by the limitations of the existing infrastructure, and will not be realised without significant financial investment from the Government and private sectors for major infrastructure upgrades.

Strengthen, foster and promote the region's business and product diversity

The diversity of the regional economy is a strength. However, the competitiveness of the region can be enhanced by pursuing opportunities for new, value-added and quality products, and promoting the region's unique tourism experiences and international reputation for premium food.

The following activities and Projects are identified in support of the Regional priority to *'Promote investment to develop strategic infrastructure and foster globally competitive business'.*

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NO.	ACTIVITIES	PROJECTS SUMMARY
1.3.1	Support utility and transport infrastructure development.	Numerous projects to upgrade power, water, gas, communications, roads, rail, port and airport infrastructure.
1.3.2	Support the implementation of RMIP infrastructure recommendations where appropriate.	Liaison with the State Government RMIP Taskforce.
1.3.3	Pursue the development of purpose-built fishing industry infrastructure.	Assistance is being provided to develop fishing offloading facilities at Ceduna and Port Lincoln.
1.3.4	Pursue the development of efficient and competitive grain supply chain infrastructure.	Road, rail and port upgrades to support the agriculture industry with grain export.
1.3.5	Pursue the upgrade of Thevenard Port.	Upgrades to expand export capacity, including a new belt loader and channel dredging.
1.3.6	Support the improvement of regional road infrastructure.	Projects to improve the safety and functionality of roads in liaison with the SA Government and EPLGA.
1.3.7	Support export development initiatives.	Projects for seafood and minerals export to Asia.
1.3.8	Support the Regional Mining, Oil and Gas Taskforce.	Facilitate the operation of the Taskforce in liaison with the EPLGA.
1.3.9	Develop a Regional Prospectus	Design the Prospectus to encourage private and Government infrastructure investment.

Relevance to Eyre Peninsula Freight Strategy

The Eyre Peninsula Freight Strategy aligns to this document where relevant.

3.2 Overarching Regional Roads Strategy

The Overarching Regional Roads Strategy was prepared by the Eyre Peninsula Local Government Association in 2015 and serves as 'an overarching plan to support and guide the development of regional road planning at Local, State and Federal levels'.

It provides a strategic level appraisal of the existing transport planning across South Australian Local Government. This has then been used to develop a consistent framework for the application of Regional Transport Plans and the associated interface between State and Federal governments. It also focuses on mechanisms for the identification of more specific Transport Action Plans.

As a strategic document, the intent is to inform both State and Commonwealth Planning Documents and more specific transport plans or strategies.

The strategy developed a concise list of recommendations for the ongoing approach to the development of Regional Road Strategies as follows:

- Consistent terminology between what constitutes a 'strategy' and what constitutes a 'plan'.
- Timeframes for development of plans (current strategies to consider up to year 2030).
- Context, demand assessment and issues identification to consider Federal/State planning directions, key demand drivers and Council/Stakeholder consultation.
- Considering of all modes of transport (i.e. integrated approach).
- Establishment of LGA / Region specific goals for transport.
- Application of a consistent road classification terminology using various existing state guideline documents.
- Identification of 'Regionally Significant Transport Routes' (i.e. Regionally Significant Freight Routes, Tourism Routes or Social Routes). It is emphasised that a consistent approach across Council boundaries is required for this.
- Identification of 'Locally Significant Transport Routes' which relates to those which do not meet the above criteria, yet still warrant higher priority management than most routes within the network.
- Development of a Regional Roads Register.
- Assessment of 'fit for purpose' which relates a consistent approach across all regions.
- Action plans for road upgrades relating to immediate, medium or long-term timeframes (using route definition and fit-for purpose assessments described above).

Relevance to Eyre Peninsula Freight Strategy

The Eyre Peninsula Freight Strategy aligns to this document where relevant. The Freight Strategy has been developed in a collaborative manner to align with the recommended approach for the development of regional strategies as listed above. It is noted that the Eyre Peninsula Freight Strategy is unique in the aspect that both road and rail transport and their interaction for seasonal grain movements must be considered.

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Appendix B Eyre Peninsula Grain Production Trends

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EYRE PENINSULA GRAIN PRODUCTION TRENDS: 5 AND 10 YEARS

(Dataset Source: PIRSA Crop and Pasture Reports, 1999-2018)

EYRE PENINSULA TRENDS

Area

Over the period represented by this dataset, Eyre Peninsula Region crop area increased on average by 5,266 ha per annum.

The first six seasons of the period from 1999 to 2004, crop area increased by nearly 30% from 1.04 million hectares to around 1.42 million hectares, peaking at 1.52 million hectares in 2007/08 season.

However, since 2007/08 season, crop area has been declining at 24,320 ha per annum, with a significant weather related decline in 2017/18 due to the late opening rains affecting farmer crop-area decisions. The 2017/18 season small area should be regarded as an anomaly explained by weather, with the longer-term trend since 2007/8 to be a slower decline in crop area.

On current trend, the crop area will reduce to 1.18 million hectares in 5 years, reverting to that of 1999/2000 season at 1.04 million hectares within 10 years. However, if the decline since long-term trend evident since 1999 continues, the crop area will increase slightly within 10 years to be 1.45 million ha.

Yields

Crop yields in this dataset, as expected, are volatile, varying according to season – the most common driver being crop available moisture (growing season rainfall plus subsoil moisture from summer rainfall).Yields vary between 0.69 tonne/hectare (2006/07 drought) through to a record high 2.48 tonne/hectare in 2016/17. Grain yields for the entire period have trended to increase by 35kg/ha per annum from 1.3 tonne/ha to 1.9tonne/ha. However, for the period since the 2009/10 season, crop yields have been steady at 1.9 tonne/ha. Note that in the period since 2009/10, only 2012/13 was a dry growing season rainfall but crop available soil moisture was supplemented by summer rainfall. With the majority of farmers now using soil moisture conserving crop establishment technologies and timely crop seeding to maximise grain production performance, it could be argued 1.9 t/ha is a new benchmark. However, caution is needed in asserting a new industry performance benchmark at 1.9 t/ha average yield, until tested with a year analogous to the last serious drought seen in SA in 2006.

CONCLUSION PRODUCTION VOLUMES

Based on the trend analysis for crop area and yield above, production outlook for the next five years is likely to be around **2.24 million tonnes** per annum by 2023, further declining to **1.98 million tonnes** by 2028. Should the longer-term upward trend in area (not evident in recent years) continue with persistence of the 1.9 t/ha crop yield produced consistently in each of the last 8 seasons, within 5 years the Eyre Peninsula crop production outlook is estimated at **2.70 million tonnes** and 10 years **2.76 million tonnes**. Should crop yields revert to long term average of 1.60 t/ha and the recent trend of declining crop area continues, within 5 years the production outlook is estimated at **1.89 million tonnes**, and by 10 years **1.66 million tonnes**.

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CROP TRENDS

Wheat

Wheat forms the basis for growth trend in crop area sown across the Region with the wheat area since 1999 growth trends in the EEP and WEP most noted. Of all crops, wheat is the best adapted crop, more tolerant to dryer seasons than all other crops.

Canola

The Canola increase trend across the EP would see the area reach 100,000ha by 2023 had it continued at the average growth rate since 1999. However, the rate of growth in canola area has eased since 2011/12 season with the area unlikely to reach 100,000ha until at least 2028.

Increase most noted in LEP but adoption of the crop is also evident in EEP where annual production has increased from 2000 tonnes to 10,000 tonnes since 1999 (noting poor season start for 2017/18 reducing area sown and production).

Barley

Barley area decline noted across the region in the years since peaking in the 2007/8 season following a period of significant barley area growth.

Lentils

Lentils is the recent emerging crop for the Eyre Peninsula, with significant increase in the area sown in the last two seasons. Current Eyre Peninsula lentil production is below minima for bulk exports from the Peninsula. Eyre Peninsula grown lentils are freighted to the Port Adelaide port zone for export and domestic markets.

Recent developments in India trade policy, implementing significant tariff increases for lentils and other pulses, will change the economics of the crop, particularly on the Eyre Peninsula given the lack of direct bulk exportable volumes and freight costs to the Adelaide region. The recent significant interest in lentil production on the Eyre Peninsula is unlikely sustainable.

Table 1: Eyre Peninsula Production Outlook Ranges (million tonnes per annum)

Scenario	5 Year to 2023	10 Year to 2028
High	2.70	2.76
On recent trends	2.24	1.98
Low	1.89	1.66

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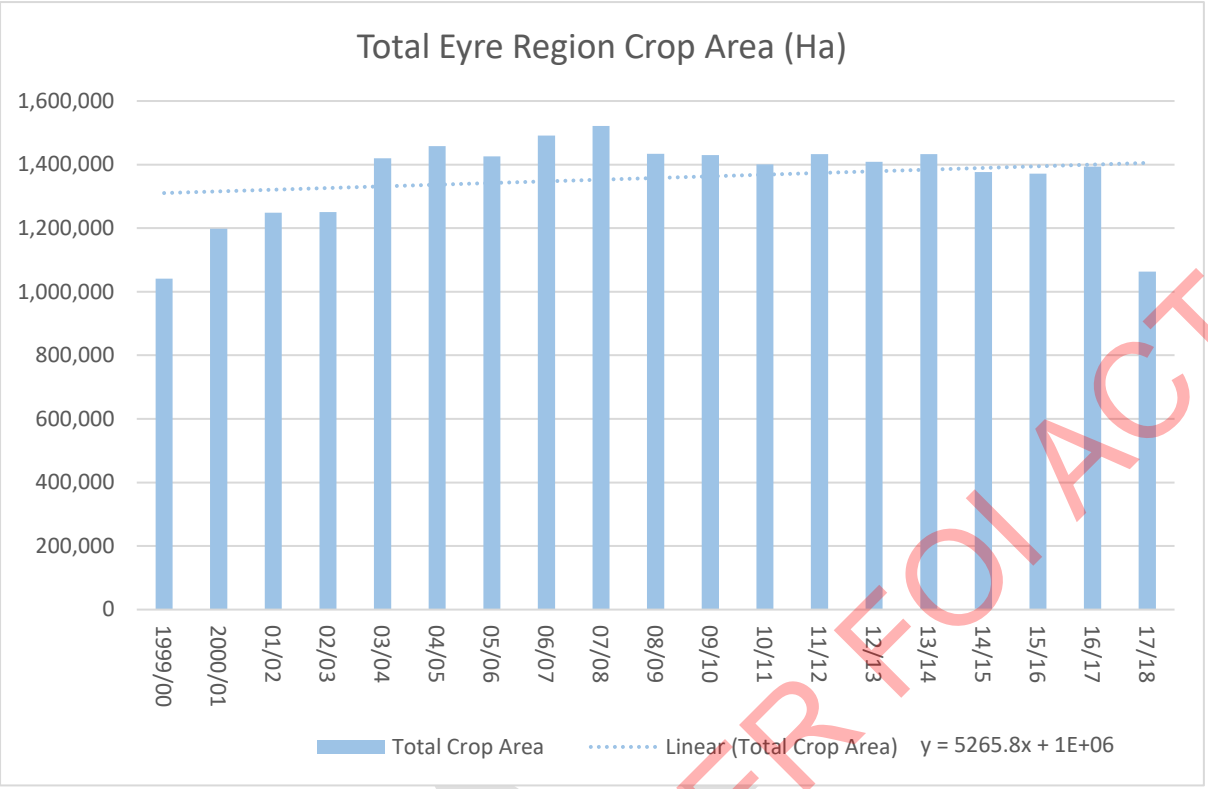

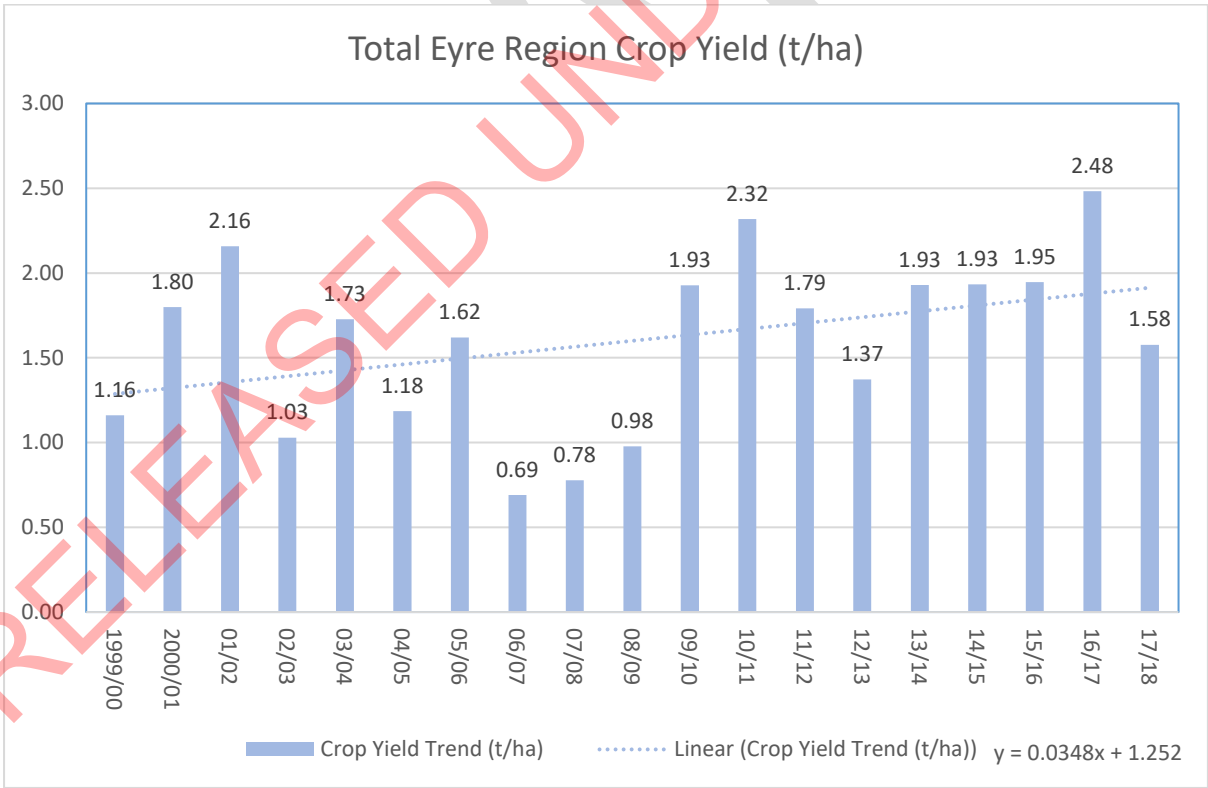

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DISTRICT CONTRIBUTIONS TO REGIONAL PRODUCTION CHANGES

WESTERN EYRE PENINSULA

Recent downward trend in crop area, likely the result of lower grain price outlooks, stronger performance of livestock enterprises, climate risk of drought, concluding that grain production volumes may have peaked.

Should recent downward area trends continue, settling to the historically stable area of near 400,000 ha, and 1.3 long-term average yield persists, grain production expected to settle at around 520,000 tonnes by 2023 and not change out to 2028. If grain yields of recent years of 1.6 t/ha become the benchmark, on basis of area trends, production will average 640,000 tonnes.

However, volatility of grain production in this district not expected to change, with grain production in drought years as low as 300,000 tonne and in good years in excess of 1,000,000 tonnes.

LOWER EYRE PENINSULA

With upward trends in crop area and yield, the overall Eyre Peninsula growth in grain production will be mostly generated by growth in the Lower Eyre Peninsula. This district may reach a ceiling in terms of crop area by 2028, which will be determined by the area currently in pasture that is in time converted to crop production. Climate risk from drought in the lower Eyre Peninsula is significantly less than the Eastern Eyre Peninsula and particularly the Western Eyre Peninsula.

The trend of increasing crop area at the expense of pasture will be governed primarily by the relative profitability of livestock and cropping enterprises. Low returns from grain cropping will limit conversion of pasture to increased crop area. With low grain price outlooks for at least the short term, there is a chance the production contribution from this district will level out, with the only growth coming from yield improvements continuing.

On current trends, annual grain production will average around 930,000 tonnes by 2023, and 970,000 tonnes by 2028. If crop area growth settles by 2023 at 330,000 ha, average production outlook for 2023 is estimated to average 800,000 tonnes and out to 2028 average will be around 880,000 tonnes.

EASTERN EYRE PENINSULA

Based on the trend analysis for crop area and yield within the district, production outlook in five years by 2023 is likely to be around 990,000 tonnes production per annum, further increasing to 1,100,000 tonnes by 2028.

However, should crop yields revert to long term average of 1.60 t/ha and the recent trend of declining crop area continues, within 5 years the production outlook is estimated at 760,000 tonnes, and by 10 years 752,000 tonnes.

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DETAILED DISTRICT AREA AND YIELD TRENDS ANALYSIS

EASTERN EYRE PENINSULA

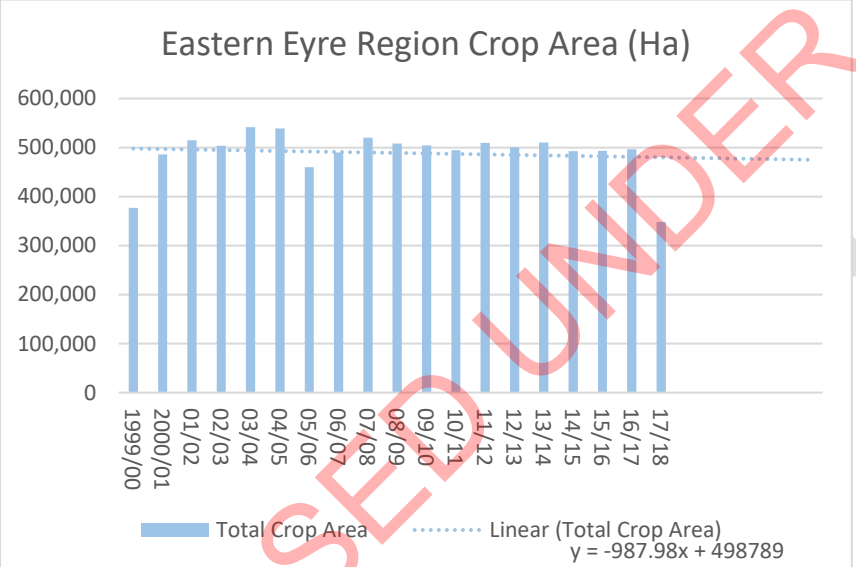
Area

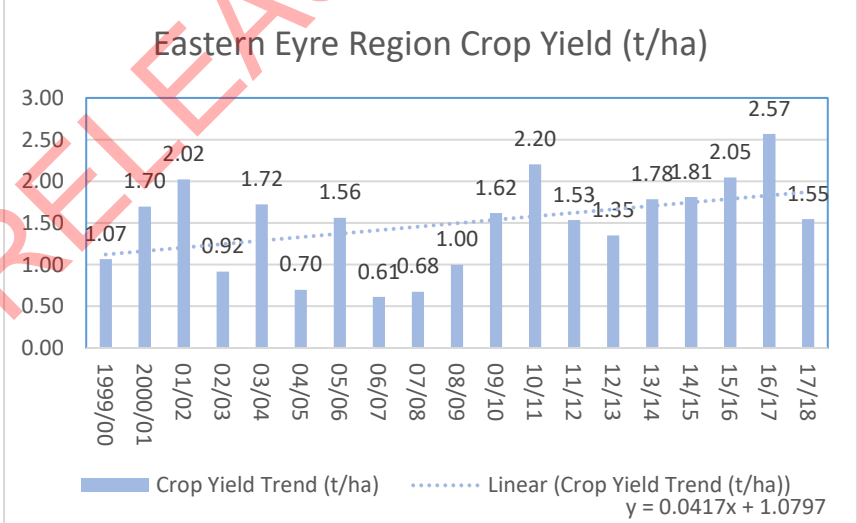
Crop area peaked in 2002/3 and 2003/4 and the trend for shrinking crop area has continued since.

Crop area has a trended decline of 988 ha per season since 1999, with a slight acceleration in the decline to around 1200 ha per season since 2010-11.

Yields

Crop yields, while volatile with season rainfall, has an upward trend overall at 41 kg/ha per annum. However, caution is required in assuming the trend will continue at the current growth out to 2028, where on continuing linear trend, yields will be around 2.3 tonne/ha. As per the Region summary, the last 8 years have been above trend years – with average yield at 1.8 tonnes/ha compared with the long term yield of 1.5 tonne/ha.





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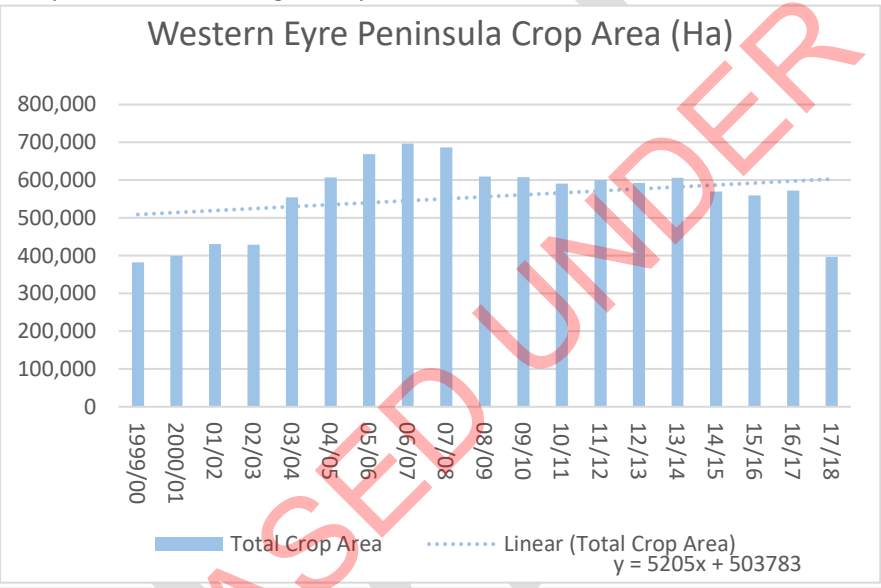
WESTERN EYRE PENINSULA DISTRICT TRENDS

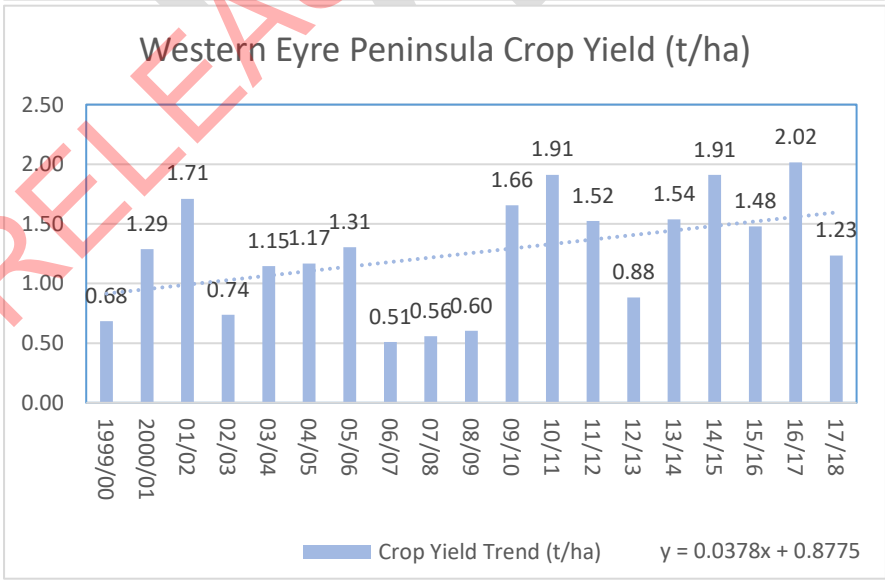
Area

Crop area for the period since 1999 was an overall increasing trend at 5,300 ha per annum. However, crop area peaked in 2006/7 at 698,000 ha with the trend since declining at the rate of around 16,000 ha crop area per season. This district is low rainfall, with high drought frequency and since the 2006/7 drought, farmers have been rebuilding sheep flocks as an alternate enterprise to cropping to better manage drought risk. An assumption that crop area reverts to the historical area of around 400,000 ha is not unreasonable. Current risk conditions of climate, lower grain price outlooks and given recent stronger profit returns from livestock, it is more likely growers will increase area left to pasture to support higher stock numbers.

Yields

Crop yields, while volatile with season rainfall, has a slight upward trend overall at 38kg/ha per annum. However, caution is required in assuming the trend will continue at the current growth out to 2028, where on continuing linear trend, yields will be around 2.0 tonne/ha. As per the Region summary, the last 8 years have been above trend years – with average yield at 1.6 tonnes/ha compared with the long term yield of 1.3 tonne/ha.





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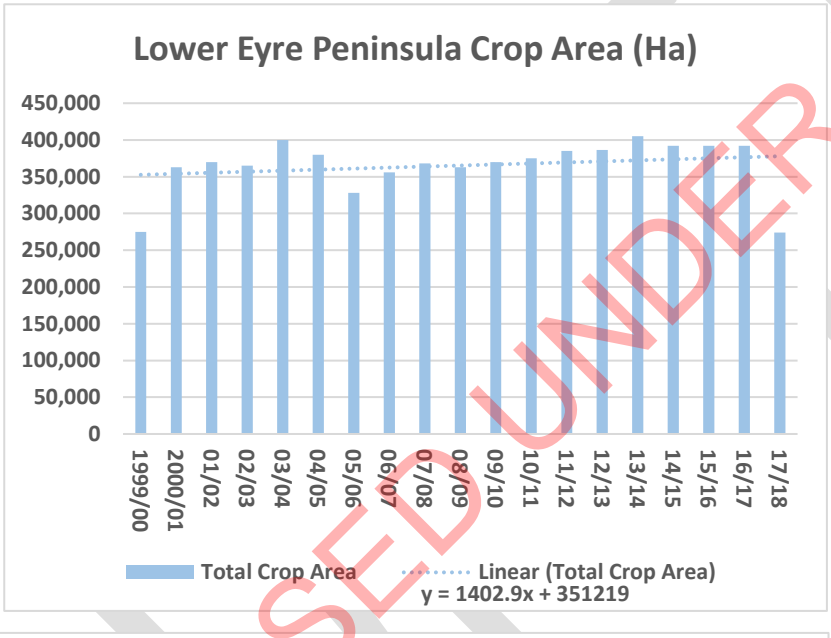
LOWER EYRE PENINSULA DISTRICT TRENDS

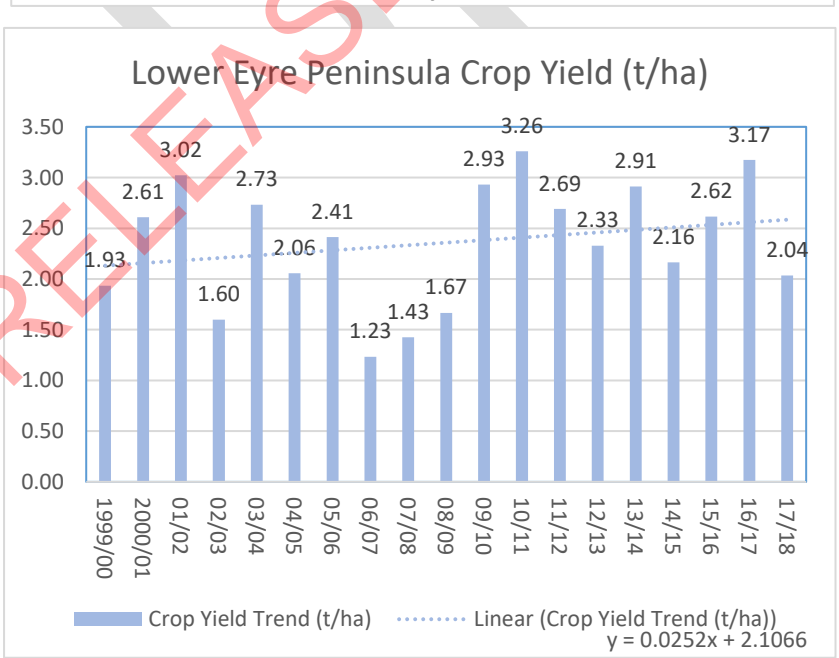
Area

Crop area trend is a growth in crop area since 1999 at the rate of 1000ha per season. Lower Eyre Peninsula is a higher rainfall area with less risk of drought. Unlike the drier districts on the Eyre Peninsula, drought risk being less, cropping enterprises are more reliable so livestock enterprises are less likely to be incorporated as a drought risk mitigation strategy.

Yields

Crop yields vary with season rainfall, but tend to be higher and less volatile than the Eastern and Western Eyre Peninsula districts. Yields have an upward trend overall at 25 kg/ha per annum. However, caution is required in assuming the trend will continue at the current growth out to 2028, where on continuing linear trend, yields will be around 2.8 tonne/ha. As per the Region summary, the last 8 years have been above trend years – with average yield at 2.8 tonnes/ha compared with the long term yield of 2.4 tonne/ha.





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Western Eyre Peninsula

CROP		1999/00	2000/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	
WHEAT	Area	292,000	287,000	310,000	308,000	415,000	459,000	510,000	525,300	525,300	465,000	465,000	470,000	475,000	479,400	503,000	475,000	470,000	477,000	338,000	434157.9
(excl. durum)	Production	200,000	392,000	529,000	215,000	457,000	535,000	649,000	262,650	289,000	274,000	767,000	892,000	760,000	431,500	780,000	926,000	698,000	955,000	435,500	549876.3
	Yield	0.68	1.37	1.71	0.70	1.10	1.17	1.27	0.50	0.55	0.59	1.65	1.90	1.60	0.90	1.55	1.95	1.49	2.00	1.29	1.26091
DURUM	Area	0	200	300	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36.84211
	Production	0	200	600	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52.63158
	Yield	N/A	1.00	2.00	1.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.333333
BARLEY	Area	41,000	57,500	70,000	70,000	102,500	112,400	123,000	129,150	129,150	116,000	110,000	95,000	95,000	85,500	75,000	64,000	59,000	60,000	42,000	86115.79
	Production	36,000	72,000	135,000	62,000	142,200	136,000	185,000	77,490	84,378	81,000	198,000	198,000	123,000	77,000	120,000	125,000	95,000	138,000	55,000	112635.2
	Yield	0.88	1.25	1.93	0.89	1.39	1.21	1.50	0.60	0.65	0.70	1.80	2.08	1.29	0.90	1.60	1.95	1.61	2.30	1.31	1.360517
OATS	Area	31,000	37,000	38,000	38,000	22,200	19,400	13,000	19,500	15,600	12,500	20,000	15,000	15,000	15,000	15,000	16,500	16,500	17,000	10,500	20352.63
	Production	13,500	33,000	57,000	30,400	22,200	22,200	14,000	7,800	5,200	6,000	26,000	25,000	15,000	9,000	19,500	22,500	19,500	34,000	10,500	20647.37
	Yield	0.44	0.89	1.50	0.80	1.00	1.14	1.08	0.40	0.33	0.48	1.30	1.67	1.00	0.60	1.30	1.36	1.18	2.00	1.00	1.024952
RYECORN	Area	500	500	500	500	500	200	500	200	400	400	0	0	0	0	0	0	0	0	0	221.0526
	Production	200	200	250	250	500	250	500	100	200	200	0	0	0	0	0	0	0	0	0	139.4737
	Yield	0.40	0.40	0.50	0.50	1.00	1.25	1.00	0.50	0.50	0.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.655
TRITICALE	Area	1,300	2,200	2,300	2,300	3,000	3,000	1,700	1,700	1,700	1,700	2,000	1,800	1,800	1,500	1,500	400	400	400	400	1636.842
	Production	1,200	3,700	2,900	2,000	2,800	3,200	1,600	680	680	800	2,200	2,700	2,200	1,050	2,100	650	550	680	400	1688.947
	Yield	0.92	1.68	1.26	0.87	0.93	1.07	0.94	0.40	0.40	0.47	1.10	1.50	1.22	0.70	1.40	1.63	1.38	1.70	1.00	1.082596
PEAS	Area	10,000	7,600	6,500	6,500	6,500	6,500	11,000	11,000	8,800	8,800	7,500	6,000	6,000	5,000	5,000	4,000	4,800	3,800	3,000	6752.632
	Production	6,500	8,000	9,200	4,500	6,500	6,500	13,500	3,373	2,640	3,500	9,500	8,000	6,000	2,500	4,750	3,500	4,300	6,000	2,700	5866.491
	Yield	0.65	1.05	1.42	0.69	1.00	1.00	1.23	0.31	0.30	0.40	1.27	1.33	1.00	0.50	0.95	0.88	0.90	1.58	0.90	0.912725
LUPINS	Area	1,300	2,000	500	500	1,165	2,050	2,200	2,200	1,540	1,500	1,200	1,200	1,200	1,200	1,200	1,200	1,500	1,500	1,500	1402.895
	Production	1,100	1,900	400	400	1,118	1,638	2,300	550	440	600	1,200	1,800	1,200	720	1,000	1,000	1,350	2,200	1,000	1153.474
	Yield	0.85	0.95	0.80	0.80	0.96	0.80	1.05	0.25	0.29	0.40	1.00	1.50	1.00	0.60	0.83	0.83	0.90	1.47	0.67	0.838737
BEANS	Area	300	500	260	260	621	1,048	1,200	1,320	924	900	0	0	0	0	0	0	0	100	0	391.2105
	Production	200	400	200	200	517	784	2,000	220	154	300	0	0	0	0	0	0	0	200	0	272.3684
	Yield	0.67	0.80	0.77	0.77	0.83	0.75	1.67	0.17	0.17	0.33	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.00	N/A	0.810826
CHICKPEAS	Area	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.263158
	Production	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.631579
	Yield	0.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.5
LENTILS	Area	0	0	145	0	0	0	440	440	220	200	0	0	0	0	0	0	0	2,000	1,400	255
	Production	0	0	100	0	0	0	560	100	50	70	0	0	0	0	0	0	0	3,000	850	248.9474
	Yield	N/A	N/A	0.69	N/A	N/A	N/A	1.27	0.23	0.23	0.35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.50	0.61	0.696296
VETCH	Area	1,600	1,200	675	700	700	600	200	200	200	200	200	200	200	200	200	800	2,400	2,400	2,400	803.9474
	Production	650	850	400	400	300	300	180	40	40	40	150	200	150	40	100	400	1,200	2,000	500	417.8947
	Yield	0.41	0.71	0.59	0.57	0.43	0.50	0.90	0.20	0.20	0.20	0.75	1.00	0.75	0.20	0.50	0.50	0.50	0.83	0.21	0.523623
CANOLA	Area	3,600	3,900	1,100	2,000	2,000	3,000	5,400	5,940	2,970	2,000	1,500	1,500	6,000	5,100	5,400	8,000	5,300	8,000	1,600	3911.053
	Production	2,100	2,800	1,000	1,000	2,000	2,500	4,300	1,782	990	700	1,500	1,500	7,200	2,550	5,400	9,500	7,500	12,000	1,300	3559.053
	Yield	0.58	0.72	0.91	0.50	1.00	0.83	0.80	0.30	0.33	0.35	1.00	1.00	1.20	0.50	1.00	1.19	1.42	1.50	0.81	0.838865
TOTAL	**Area**	**382,700**	**399,600**	**430,280**	**428,960**	**554,186**	**607,198**	**668,640**	**696,950**	**686,804**	**609,200**	**607,400**	**590,700**	**600,200**	**592,900**	**606,300**	**569,900**	**559,900**	**572,200**	**400,800**	556043.1
	Production	**261,500**	**515,050**	**736,050**	**316,350**	**635,135**	**708,372**	**872,940**	**354,785**	**383,772**	**367,210**	**1,005,550**	**1,129,200**	**914,750**	**524,360**	**932,850**	**1,088,550**	**827,400**	**1,153,080**	**507,750**	696560.8
	Yield	**0.68**	**1.29**	**1.71**	**0.74**	**1.15**	**1.17**	**1.31**	**0.51**	**0.56**	**0.60**	**1.66**	**1.91**	**1.52**	**0.88**	**1.54**	**1.91**	**1.48**	**2.02**	**1.27**	1.257538

RELEASED UNDER FOI ACT

Total Eyre Peninsula

CROP		1999/00	2000/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	#REF!
WHEAT	Area	692,000	810,000	822,000	815,000	960,000	986,000	966,000	1,009,414	1,022,428	957,000	968,000	980,000	995,000	1,000,700	1,050,000	1,007,000	1,007,000	1,014,000	769,000	938,450
(excl. durum)	Production	776,000	1,501,500	1,767,000	806,000	1,572,000	1,133,000	1,496,000	682,660	751,996	878,000	1,798,000	2,232,000	1,825,000	1,317,500	2,020,000	2,029,000	1,962,000	2,527,000	1,262,500	1,491,429
	Yield	1.12	1.85	2.15	0.99	1.64	1.15	1.55	0.68	0.74	0.92	1.86	2.28	1.83	1.32	1.92	2.01	1.95	2.49	1.64	1.58
DURUM	Area	2,000	2,400	2,000	2,700	2,700	1,200	500	500	600	600	0	0	0	0	0	0	0	0	0	800
	Production	3,300	6,000	3,800	3,700	6,100	1,300	600	0	300	350	0	0	0	0	0	0	0	0	0	1,339
	Yield	1.65	2.50	1.90	1.37	2.26	1.08	1.20	0.00	0.50	0.58	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.30
BARLEY	Area	186,000	241,000	276,500	265,000	300,500	318,400	316,000	318,007	338,964	327,000	310,000	276,000	276,000	251,900	221,000	195,000	196,000	187,500	155,000	260,830
	Production	274,000	466,500	663,000	332,000	651,200	426,000	592,000	259,404	330,292	392,000	712,000	738,000	503,000	440,000	518,000	434,000	475,500	566,000	299,000	477,468
	Yield	1.47	1.94	2.40	1.25	2.17	1.34	1.87	0.82	0.97	1.20	2.30	2.67	1.82	1.75	2.34	2.23	2.43	3.02	1.93	1.89
OATS	Area	45,000	44,500	42,000	41,500	26,100	23,000	20,400	27,440	25,890	20,600	28,200	23,200	23,200	23,200	23,200	25,700	25,700	28,200	18,800	28,202
	Production	29,000	40,900	63,500	33,480	27,800	27,100	24,300	11,275	11,413	12,500	38,400	40,500	26,400	18,440	33,500	38,000	36,000	63,300	21,700	31,448
	Yield	0.64	0.92	1.51	0.81	1.07	1.18	1.19	0.41	0.44	0.61	1.36	1.75	1.14	0.79	1.44	1.48	1.40	2.24	1.15	1.13
RYECORN	Area	3,800	1,800	1,800	1,500	1,500	700	1,000	700	900	900	0	0	0	0	0	0	0	0	0	768
	Production	2,940	940	990	450	1,000	350	1,000	300	400	400	0	0	0	0	0	0	0	0	0	462
	Yield	0.77	0.52	0.55	0.30	0.67	0.50	1.00	0.43	0.44	0.44	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.56
TRITICALE	Area	8,700	8,100	11,700	11,300	14,000	13,800	7,100	7,100	7,100	7,100	7,400	7,200	7,200	6,000	6,000	1,400	1,400	1,400	1,400	7,126
	Production	9,700	16,200	21,900	10,300	24,800	13,800	8,300	4,225	4,834	5,900	9,900	13,700	11,000	7,550	10,300	2,700	3,050	3,330	2,050	9,660
	Yield	1.11	2.00	1.87	0.91	1.77	1.00	1.17	0.60	0.68	0.83	1.34	1.90	1.53	1.26	1.72	1.93	2.18	2.38	1.46	1.45
PEAS	Area	21,200	20,600	18,500	19,500	19,200	19,700	25,800	26,148	25,162	23,900	21,600	19,000	18,100	15,500	16,000	13,500	14,800	11,900	9,200	18,911
	Production	19,900	27,700	31,200	11,800	24,800	17,900	39,500	10,372	12,437	16,500	28,300	32,000	18,500	11,550	18,250	12,000	15,300	18,000	10,400	19,811
	Yield	0.94	1.34	1.69	0.61	1.29	0.91	1.53	0.40	0.49	0.69	1.31	1.68	1.02	0.75	1.14	0.89	1.03	1.51	1.13	1.07
LUPINS	Area	21,800	21,500	24,500	24,000	23,665	24,550	29,400	40,200	38,344	30,500	30,200	30,200	28,200	28,300	29,200	24,700	33,000	32,900	21,500	28,245
	Production	30,100	31,400	53,900	23,400	35,418	28,138	53,100	29,830	27,219	27,600	49,200	57,800	32,200	32,450	50,500	34,500	30,850	64,900	6,800	36,806
	Yield	1.38	1.46	2.20	0.98	1.50	1.15	1.81	0.74	0.71	0.90	1.63	1.91	1.14	1.15	1.73	1.40	0.93	1.97	0.32	1.32
BEANS	Area	9,800	10,000	10,560	10,460	11,021	11,048	7,500	8,442	8,046	8,000	7,100	6,800	6,800	6,200	6,200	4,200	6,400	7,000	5,600	7,957
	Production	13,100	17,600	22,000	10,300	17,717	16,284	20,000	4,409	6,456	7,300	15,200	17,300	8,150	8,500	12,200	5,200	8,050	14,000	3,260	11,949
	Yield	1.34	1.76	2.08	0.98	1.61	1.47	2.67	0.52	0.80	0.91	2.14	2.54	1.20	1.37	1.97	1.24	1.26	2.00	0.58	1.50
CHICKPEAS	Area	1,700	500	0	0	0	0	230	230	230	1,500	300	200	200	400	400	400	600	600	600	426
	Production	1,950	500	0	0	0	0	280	0	0	950	400	300	300	300	380	350	640	840	500	405
	Yield	1.15	1.00	N/A	N/A	N/A	N/A	1.22	0.00	0.00	0.63	1.33	1.50	1.50	0.75	0.95	0.88	1.07	1.40	0.83	0.95
LENTILS	Area	800	1,500	2,145	3,000	3,300	500	1,340	1,610	1,480	1,500	1,300	2,000	2,000	2,000	2,000	2,000	2,200	10,000	7,000	2,509
	Production	1,000	2,300	4,100	3,600	4,300	600	2,560	640	950	1,170	2,600	4,000	3,000	2,400	3,300	3,000	2,660	16,200	5,350	3,354
	Yield	1.25	1.53	1.91	1.20	1.30	1.20	1.91	0.40	0.64	0.78	2.00	2.00	1.50	1.20	1.65	1.50	1.21	1.62	0.76	1.35
VETCH	Area	4,800	4,500	4,175	3,200	3,600	4,100	1,450	1,450	1,450	1,400	1,400	1,400	1,700	1,700	2,200	3,400	6,200	6,200	6,900	3,222
	Production	1,900	2,500	1,600	600	1,300	800	1,183	186	248	340	1,150	1,300	1,350	740	1,800	2,400	3,600	4,700	2,100	1,568
	Yield	0.40	0.56	0.38	0.19	0.36	0.20	0.82	0.13	0.17	0.24	0.82	0.93	0.79	0.44	0.82	0.71	0.58	0.76	0.30	0.50
CANOLA	Area	43,400	31,400	32,600	53,200	54,000	55,500	49,400	49,840	50,860	53,500	54,500	54,500	75,000	72,800	76,900	99,500	78,300	94,000	75,800	60,789
	Production	45,100	40,500	61,000	50,600	86,000	62,500	70,800	26,700	37,502	57,800	101,200	110,400	138,200	94,170	96,400	99,500	132,500	181,000	86,100	83,051
	Yield	1.04	1.29	1.87	0.95	1.59	1.13	1.43	0.54	0.74	1.08	1.86	2.03	1.84	1.29	1.25	1.00	1.69	1.93	1.14	1.35
TOTAL	**Area**	**1,041,000**	**1,197,800**	**1,248,480**	**1,250,360**	**1,419,586**	**1,458,498**	**1,426,120**	**1,491,082**	**1,521,455**	**1,433,500**	**1,430,000**	**1,400,500**	**1,433,400**	**1,408,700**	**1,433,100**	**1,376,800**	**1,371,600**	**1,393,700**	**1,070,800**	1,358,236
	Production	**1,207,990**	**2,154,540**	**2,693,990**	**1,286,230**	**2,452,435**	**1,727,772**	**2,309,623**	**1,030,002**	**1,184,048**	**1,400,810**	**2,756,350**	**3,247,300**	**2,567,100**	**1,933,600**	**2,764,630**	**2,660,650**	**2,670,150**	**3,459,270**	**1,699,760**	2,168,750
	Yield	**1.16**	**1.80**	**2.16**	**1.03**	**1.73**	**1.18**	**1.62**	**0.69**	**0.78**	**0.98**	**1.93**	**2.32**	**1.79**	**1.37**	**1.93**	**1.93**	**1.95**	**2.48**	**1.59**	1.60

RELEASED UNDER FOI ACT

Lower Eyre Peninsula																					
WHEAT (excl. durum)	Area	125,000	160,000	142,000	142,000	145,000	147,000	128,000	128,000	128,831	129,000	133,000	135,000	135,000	135,000	142,000	140,000	145,000	145,000	153,000	138833.2
	Production	281,000	456,000	480,000	241,000	435,000	338,000	345,000	204,468	212,779	244,000	439,000	520,000	445,000	364,500	510,000	378,000	448,000	553,000	382,000	382986.7
	Yield	2.25	2.85	3.38	1.70	3.00	2.30	2.70	1.60	1.65	1.89	3.30	3.85	3.30	2.70	3.59	2.70	3.09	3.81	2.50	2.744801
DURUM	Area	500	1,000	500	1,000	1,200	200	0	0	0	0	0	0	0	0	0	0	0	0	0	231.5789
	Production	1,800	4,000	1,200	2,200	4,100	700	0	0	0	0	0	0	0	0	0	0	0	0	0	736.8421
	Yield	3.60	4.00	2.40	2.20	3.42	3.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.186111
BARLEY	Area	80,000	92,000	92,000	85,000	88,000	76,000	87,000	82,857	93,214	93,000	90,000	86,000	86,000	80,000	70,000	60,000	66,000	58,000	64,000	80477.44
	Production	160,000	257,000	290,000	170,000	299,000	190,000	220,000	107,714	158,464	181,000	316,000	310,000	250,000	230,000	253,000	171,000	217,500	233,000	166,000	219983.1
	Yield	2.00	2.79	3.15	2.00	3.40	2.50	2.53	1.30	1.70	1.95	3.51	3.60	2.91	2.88	3.61	2.85	3.30	4.02	2.59	2.767727
OATS	Area	3,000	3,000	2,500	2,000	2,400	2,600	2,700	3,240	3,240	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	4,200	3,500	3051.579
	Production	4,500	5,400	5,500	3,000	4,000	4,400	4,800	3,240	3,863	4,000	6,400	8,000	6,400	5,440	7,000	7,000	8,000	12,500	5,500	5733.846
	Yield	1.50	1.80	2.20	1.50	1.67	1.69	1.78	1.00	1.19	1.25	2.00	2.50	2.00	1.70	2.19	2.19	2.50	2.98	1.57	1.85272
RYECORN	Area	300	300	300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47.36842
	Production	240	240	240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37.89474
	Yield	0.80	0.80	0.80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8
TRITICALE	Area	1,400	1,400	1,400	1,500	1,500	1,300	900	900	900	900	900	900	900	500	500	500	500	500	500	936.8421
	Production	2,500	3,500	4,000	3,300	4,000	2,600	1,600	1,177	1,454	1,500	2,300	2,500	2,500	1,300	1,700	1,250	1,500	1,600	1,000	2172.672
	Yield	1.79	2.50	2.86	2.20	2.67	2.00	1.78	1.31	1.62	1.67	2.56	2.78	2.78	2.60	3.40	2.50	3.00	3.20	2.00	2.378324
PEAS	Area	6,400	6,000	5,000	6,000	5,700	6,200	7,200	7,548	8,129	8,100	8,100	7,000	6,500	5,500	5,500	4,500	4,500	3,600	2,200	5983.022
	Production	9,600	10,200	9,000	4,800	8,300	7,900	15,800	3,832	6,503	8,100	11,000	13,000	8,000	6,050	8,000	5,500	5,500	6,500	2,000	7872.92
	Yield	1.50	1.70	1.80	0.80	1.46	1.27	2.19	0.51	0.80	1.00	1.36	1.86	1.23	1.10	1.45	1.22	1.22	1.81	0.91	1.325897
LUPINS	Area	19,000	15,000	20,000	20,000	19,000	19,500	21,600	32,400	27,284	24,000	24,000	24,000	22,000	22,100	23,000	19,000	26,000	26,000	17,000	22151.8
	Production	28,000	25,500	48,000	22,000	30,400	24,500	44,800	25,920	23,419	24,000	43,000	48,000	26,000	28,730	44,000	28,500	26,500	53,000	4,000	31487.84
	Yield	1.47	1.70	2.40	1.10	1.60	1.26	2.07	0.80	0.86	1.00	1.79	2.00	1.18	1.30	1.91	1.50	1.02	2.04	0.24	1.43379
BEANS	Area	8,000	8,000	9,000	9,000	9,200	9,000	6,300	6,922	6,922	6,900	6,900	6,600	6,600	6,000	6,000	4,000	6,000	6,500	5,200	7002.339
	Production	12,000	16,000	20,000	9,900	16,100	15,000	18,000	4,122	6,222	6,900	15,000	17,000	8,000	8,400	12,000	5,000	7,800	13,000	3,100	11239.18
	Yield	1.50	2.00	2.22	1.10	1.75	1.67	2.86	0.60	0.90	1.00	2.17	2.58	1.21	1.40	2.00	1.25	1.30	2.00	0.60	1.584124
CHICKPEAS	Area	1,600	500	0	0	0	0	230	230	230	700	300	200	200	200	200	200	400	400	400	315.2632
	Production	1,900	500	0	0	0	0	280	0	0	550	400	300	300	200	280	250	500	600	350	337.3684
	Yield	1.19	1.00	N/A	N/A	N/A	N/A	1.22	0.00	0.00	0.79	1.33	1.50	1.50	1.00	1.40	1.25	1.25	1.50	0.88	1.053263
LENTILS	Area	800	1,500	2,000	3,000	3,300	500	900	1,170	1,260	1,300	1,300	2,000	2,000	2,000	2,000	2,000	2,000	4,000	2,800	1885.789
	Production	1,000	2,300	4,000	3,600	4,300	600	2,000	540	900	1,100	2,600	4,000	3,000	2,400	3,300	3,000	2,500	7,200	2,500	2675.789
	Yield	1.25	1.53	2.00	1.20	1.30	1.20	2.22	0.46	0.71	0.85	2.00	2.00	1.50	1.20	1.65	1.50	1.25	1.80	0.89	1.39597
VETCH	Area	700	800	1,000	0	400	1,000	730	730	730	700	700	700	1,000	1,000	1,500	1,800	1,800	1,800	2,500	1031.053
	Production	250	650	200	0	0	100	670	146	146	200	700	700	800	500	1,400	1,500	1,400	1,100	1,000	603.2632
	Yield	0.36	0.81	0.20	N/A	0.00	0.10	0.92	0.20	0.20	0.29	1.00	1.00	0.80	0.50	0.93	0.83	0.78	0.61	0.40	0.551596
CANOLA	Area	34,600	23,000	28,000	48,000	48,000	49,000	42,000	39,900	43,890	48,000	50,000	50,000	60,000	60,000	63,000	79,000	63,000	75,000	67,000	51125.79
	Production	41,000	34,500	56,000	48,000	79,000	58,800	65,000	23,918	35,112	55,000	97,000	105,000	120,000	87,000	82,000	79,000	114,000	150,000	80,500	74254.19
	Yield	1.18	1.50	2.00	1.00	1.65	1.20	1.55	0.60	0.80	1.15	1.94	2.10	2.00	1.45	1.30	1.00	1.81	2.00	1.20	1.443489
TOTAL	**Area**	**281,300**	**312,500**	**303,700**	**317,500**	**323,700**	**312,300**	**297,560**	**303,898**	**314,631**	**315,800**	**318,400**	**315,600**	**323,400**	**315,500**	**316,900**	**314,200**	**318,400**	**325,000**	**318,100**	313073.1
	Production	**543,790**	**815,790**	**918,140**	**507,800**	**884,200**	**642,600**	**717,950**	**375,077**	**448,863**	**526,350**	**933,400**	**1,028,500**	**870,000**	**734,520**	**922,680**	**680,000**	**833,200**	**1,031,500**	**647,950**	740121.6
	Yield	**1.93**	**2.61**	**3.02**	**1.60**	**2.73**	**2.06**	**2.41**	**1.23**	**1.43**	**1.67**	**2.93**	**3.26**	**2.69**	**2.33**	**2.91**	**2.16**	**2.62**	**3.17**	**2.04**	2.358309

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Eastern Eyre Peninsula

WHEAT (excl. durum)	Area	275,000	363,000	370,000	365,000	400,000	380,000	328,000	356,114	368,297	363,000	370,000	375,000	385,000	386,300	405,000	392,000	392,000	392,000	278,000	365458.5
	Production	295,000	653,500	758,000	350,000	680,000	260,000	502,000	215,543	250,217	360,000	592,000	820,000	620,000	521,500	730,000	725,000	816,000	1,019,000	445,000	558566.3
	Yield	1.07	1.80	2.05	0.96	1.70	0.68	1.53	0.61	0.68	0.99	1.60	2.19	1.61	1.35	1.80	1.85	2.08	2.60	1.60	1.513289
DURUM	Area	1,500	1,200	1,200	1,500	1,500	1,000	500	500	600	600	0	0	0	0	0	0	0	0	0	531.5789
	Production	1,500	1,800	2,000	1,300	2,000	600	600	0	300	350	0	0	0	0	0	0	0	0	0	550
	Yield	1.00	1.50	1.67	0.87	1.33	0.60	1.20	0.00	0.50	0.58	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.925
BARLEY	Area	65,000	91,500	114,500	110,000	110,000	130,000	106,000	106,000	116,600	118,000	110,000	95,000	95,000	86,400	76,000	71,000	71,000	69,500	49,000	94236.84
	Production	78,000	137,500	238,000	100,000	210,000	100,000	187,000	74,200	87,450	130,000	198,000	230,000	130,000	133,000	145,000	138,000	163,000	195,000	78,000	144850
	Yield	1.20	1.50	2.08	0.91	1.91	0.77	1.76	0.70	0.75	1.10	1.80	2.42	1.37	1.54	1.91	1.94	2.30	2.81	1.59	1.597807
OATS	Area	11,000	4,500	1,500	1,500	1,500	1,000	4,700	4,700	7,050	4,900	5,000	5,000	5,000	5,000	5,000	6,000	6,000	7,000	4,800	4797.368
	Production	11,000	2,500	1,000	80	1,600	500	5,500	235	2,350	2,500	6,000	7,500	5,000	4,000	7,000	8,500	8,500	16,800	5,700	5066.579
	Yield	1.00	0.56	0.67	0.05	1.07	0.50	1.17	0.05	0.33	0.51	1.20	1.50	1.00	0.80	1.40	1.42	1.42	2.40	1.19	0.959306
RYECORN	Area	3,000	1,000	1,000	1,000	1,000	500	500	500	500	500	0	0	0	0	0	0	0	0	0	500
	Production	2,500	500	500	200	500	100	500	200	200	200	0	0	0	0	0	0	0	0	0	284.2105
	Yield	0.83	0.50	0.50	0.20	0.50	0.20	1.00	0.40	0.40	0.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.493333
TRITICALE	Area	6,000	4,500	8,000	7,500	9,500	9,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,000	4,000	500	500	500	500	4552.632
	Production	6,000	9,000	15,000	5,000	18,000	8,000	5,100	2,368	2,700	3,600	5,400	8,500	6,300	5,200	6,500	800	1,000	1,050	650	5798.338
	Yield	1.00	2.00	1.88	0.67	1.89	0.84	1.13	0.53	0.60	0.80	1.20	1.89	1.40	1.30	1.63	1.60	2.00	2.10	1.30	1.355371
PEAS	Area	4,800	7,000	7,000	7,000	7,000	7,000	7,600	7,600	8,233	7,000	6,000	6,000	5,600	5,000	5,500	5,000	5,500	4,500	4,000	6175.439
	Production	3,800	9,500	13,000	2,500	10,000	3,500	10,200	3,167	3,293	4,900	7,800	11,000	4,500	3,000	5,500	3,000	5,500	5,500	5,700	6071.579
	Yield	0.79	1.36	1.86	0.36	1.43	0.50	1.34	0.42	0.40	0.70	1.30	1.83	0.80	0.60	1.00	0.60	1.00	1.22	1.43	0.996556
LUPINS	Area	1,500	4,500	4,000	3,500	3,500	3,000	5,600	5,600	9,520	5,000	5,000	5,000	5,000	5,000	5,000	4,500	5,500	5,400	3,000	4690.526
	Production	1,000	4,000	5,500	1,000	3,900	2,000	6,000	3,360	3,360	3,000	5,000	8,000	5,000	3,000	5,500	5,000	3,000	9,700	1,800	4164.211
	Yield	0.67	0.89	1.38	0.29	1.11	0.67	1.07	0.60	0.35	0.60	1.00	1.60	1.00	0.60	1.10	1.11	0.55	1.80	0.60	0.893392
BEANS	Area	1,500	1,500	1,300	1,200	1,200	1,000	0	200	200	200	200	200	200	200	200	200	400	400	400	563.1579
	Production	900	1,200	1,800	200	1,100	500	0	67	80	100	200	300	150	100	200	200	250	800	160	437.193
	Yield	0.60	0.80	1.38	0.17	0.92	0.50	N/A	0.33	0.40	0.50	1.00	1.50	0.75	0.50	1.00	1.00	0.63	2.00	0.40	0.798682
CHICKPEAS	Area	0	0	0	0	0	0	0	0	0	800	0	0	0	200	200	200	200	200	200	105.2632
	Production	0	0	0	0	0	0	0	0	0	400	0	0	0	100	100	100	140	240	150	64.73684
	Yield	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.50	N/A	N/A	N/A	0.50	0.50	0.50	0.70	1.20	0.75	0.664286
LENTILS	Area	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	4,000	2,800	368.4211
	Production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	6,000	2,000	429.4737
	Yield	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.80	1.50	0.71	1.004762
VETCH	Area	2,500	2,500	2,500	2,500	2,500	2,500	520	520	520	500	500	500	500	500	500	800	2,000	2,000	2,000	1387.368
	Production	1,000	1,000	1,000	200	1,000	400	333	0	62	100	300	400	400	200	300	500	1,000	1,600	600	547.1263
	Yield	0.40	0.40	0.40	0.08	0.40	0.16	0.64	0.00	0.12	0.20	0.60	0.80	0.80	0.40	0.60	0.63	0.50	0.80	0.30	0.432915
CANOLA	Area	5,200	4,500	3,500	3,200	4,000	3,500	2,000	4,000	4,000	3,500	3,000	3,000	9,000	7,700	8,500	12,500	10,000	11,000	7,200	5752.632
	Production	2,000	3,200	4,000	1,600	5,000	1,200	1,500	1,000	1,400	2,100	2,700	3,900	11,000	4,620	9,000	11,000	11,000	19,000	4,300	5237.895
	Yield	0.38	0.71	1.14	0.50	1.25	0.34	0.75	0.25	0.35	0.60	0.90	1.30	1.22	0.60	1.06	0.88	1.10	1.73	0.60	0.824578
TOTAL	**Area**	**377,000**	**485,700**	**514,500**	**503,900**	**541,700**	**539,000**	**459,920**	**490,234**	**520,020**	**508,500**	**504,200**	**494,200**	**509,800**	**500,300**	**509,900**	**492,700**	**493,300**	**496,500**	**351,900**	489119.7
	Production	**402,700**	**823,700**	**1,039,800**	**462,080**	**933,100**	**376,800**	**718,733**	**300,140**	**351,413**	**507,250**	**817,400**	**1,089,600**	**782,350**	**674,720**	**909,100**	**892,100**	**1,009,550**	**1,274,690**	**544,060**	732067.7
	Yield	**1.07**	**1.70**	**2.02**	**0.92**	**1.72**	**0.70**	**1.56**	**0.61**	**0.68**	**1.00**	**1.62**	**2.20**	**1.53**	**1.35**	**1.78**	**1.81**	**2.05**	**2.57**	**1.55**	1.49656

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Appendix C Base Case Forecast Road Freight Increases

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Base Case freight increases by road segment

Segment ID	Road	From	To	Current total Volume (AADT)	Current Freight Volume	Forecast Freight Growth (daily)	*Forecast Total Volume (AADT)	Forecast Freight Volume
1	Eyre Hwy	Wudinna Stn	Kyancutta Stn	1010	300	10	1020	310
2	Tod Hwy	Kyancutta Stn	Warramboo Stn	250	70	14	270	84
3	Tod Hwy	Warramboo Stn	Lock Stn	260	90	16	280	106
4	Tod Hwy	Lock Stn	Murdinga Stn	280	70	26	310	96
5	Tod Hwy	Murdinga Stn	Tooligie Stn	240	40	28	270	68
6	Tod Hwy	Tooligie Stn	Yeelanna Stn	240	40	30	270	70
7	Tod Hwy	Yeelana Stn	Cummins	610	110	34	650	144
8	Tod Hwy	Cummins	Edillilie	910	260	66	980	326
9	Tod Hwy	Edillilie	Flinders Hwy	760	190	68	830	258
10	Flinders Hwy	Flinders Hwy	Western Approach Road	2170	290	68	2240	358
11	Cleve Rd	Kimba	Mangalo Road	250	60	8	260	68
12	Cleve Rd	Mangalo Road	Cleve	410	60	8	420	68
13	Unamed Road	Waddikee	Balumbah-Kinnard Rd	200	30	2	210	32
14	Balumbah-Kinnard Rd	Road	Darke Peak	200	30	2	210	32
15	Balumbah-Kinnard Rd	Darke Peak	Kielpa	200	30	4	210	34
16	Balumbah-Kinnard Rd	Kielpa	Rudall	200	30	6	210	36
17	Balumbah-Kinnard Rd	Rudall	Lincoln Hwy	200	30	15	220	45
18	Birdseye Hwy	Rudall	Cleve	360	60	5	370	65
19	Arno Bay Rd	Cleve	Arno Bay	420	80	13	440	93
20	Lincoln Hwy	Arno Bay	Balumbah-Kinnard Rd	860	150	13	880	163
21	Lincoln Hwy	Balumbah-Kinnard Rd	Wharminda Road	890	160	28	920	188
22	Wharminda Road	Wharminda	Lincoln Hwy	100	20	2	110	22
23	Lincoln Hwy	Wharminda Road	Tumby Bay	850	150	30	880	180
24	Lincoln Hwy	Tumby Bay	Louth Bay	1620	280	30	1650	310
25a	Lincoln Hwy	Louth Bay	Richardson Road	3780	460	30	3810	490
25b	Lincoln Hwy	Richardson Road	Happy Valley Road	5050	360	30	5080	390
25c	Lincoln Hwy	Happy Valley Road	Normandy Place	8280	390	30	8310	420
26d	Lincoln Hwy	Normandy Place	Flinders Hwy	8790	360	30	8820	390
26a	Lincoln Hwy	Flinders Hwy	New W Road	11310	410	30	11340	440
26b	Lincoln Hwy	New W Road	Porter St (Port Access)	13740	390	30	13770	420
27	Flinders Hwy	Flinders Hwy	Lincoln Hwy	3640	330	0	3640	330
28a	West Approach Road	Flinders Hwy	New W Road	1720	290	68	1790	358
28b	West Approach Road	New W Road	Pine Freezers Road	1920	420	68	1990	488
28c	West Approach Road	Pine Freezers Road	Anne Street	3430	330	68	3500	398
28d	West Approach Road	Anne Street	Mortlock Terrace	6870	360	68	6940	428
28e	West Approach Road	Mortlock Terrace	Dublin Street	11310	560	68	11380	628
28f	West Approach Road	Dublin Street	Porter St (Port Access)	6160	430	68	6230	498

*Note Forecast AADT rounded up to nearest 10 (conservative and in accordance with DPTI format)

RELEASED UNDER FOI ACT

Appendix D Project Options – Sketches

RELEASED UNDER FOI ACT

LEGEND

- ROAD LINKS SUBJECT TO INCREASED TRAFFIC VOLUMES
- RAIL LINKS RETAINED
- RAIL LINKS NOT USED

N

WUDINNA
KYANCUTTA
WARRAMBOO
LOCK
MURDINGA
TOOLIGIE
YEELANNA
CUMMINS
EDILLILIE
PORT LINCOLN
KIMBA
WADDIKEE
DARKE PEAK
KIELPA
RUDALL
CLEVE
ARNO BAY
WHARMINDA
TUMBY BAY

RELEASED UNDER FOI ACT

SMEC
Member of the Surbana Jurong Group

EYRE PENINSULA FREIGHT STUDY
OPTION 1

LEGEND

- ROAD LINKS SUBJECT TO INCREASED TRAFFIC VOLUMES
- RAIL LINKS RETAINED
- RAIL LINKS NOT USED

N

WUDINNA
KYANCUTTA
WARRAMBOO
LOCK
MURDINGA
TOOLIGIE
YEELANNA
CUMMINS
EDILLILIE
PORT LINCOLN
KIMBA
WADDIKEE
DARKE PEAK
KIELPA
RUDALL
CLEVE
ARNO BAY
WHARMINDA
TUMBY BAY

RELEASED UNDER FOI ACT

SMEC
Member of the Surbana Jurong Group

EYRE PENINSULA FREIGHT STUDY

OPTION 2

LEGEND

- ROAD LINKS SUBJECT TO INCREASED TRAFFIC VOLUMES
- RAIL LINKS RETAINED
- RAIL LINKS NOT USED

N

WUDINNA
KYANCUTTA
WARRAMBOO
LOCK
MURDINGA
TOOLIGIE
YEELANNA
CUMMINS
EDILLILIE
PORT LINCOLN
KIMBA
WADDIKEE
DARKE PEAK
KIELPA
RUDALL
CLEVE
ARNO BAY
WHARMINDA
TUMBY BAY

RELEASED UNDER FOI ACT

SMEC
Member of the Surbana Jurong Group

EYRE PENINSULA FREIGHT STUDY

OPTION 3

LEGEND

- ROAD LINKS SUBJECT TO INCREASED TRAFFIC VOLUMES
- RAIL LINKS RETAINED
- RAIL LINKS NOT USED

N

WUDINNA
KYANCUTTA
WARRAMBOO
LOCK
MURDINGA
TOOLIGIE
YEELANNA
CUMMINS
EDILLILIE
PORT LINCOLN
KIMBA
WADDIKEE
DARKE PEAK
KIELPA
RUDALL
CLEVE
ARNO BAY
WHARMINDA
TUMBY BAY

RELEASED UNDER FOI ACT

SMEC
Member of the Surbana Jurong Group

EYRE PENINSULA FREIGHT STUDY
OPTION 4

LEGEND

- ROAD LINKS SUBJECT TO INCREASED TRAFFIC VOLUMES
- RAIL LINKS RETAINED
- RAIL LINKS NOT USED

N

WUDINNA
KYANCUTTA
WARRAMBOO
LOCK
MURDINGA
TOOLIGIE
YEELANNA
CUMMINS
EDILLILIE
PORT LINCOLN
KIMBA
WADDIKEE
DARKE PEAK
KIELPA
RUDALL
CLEVE
ARNO BAY
WHARMINDA
TUMBY BAY

RELEASED UNDER FOI ACT

SMEC
Member of the Surbana Jurong Group

EYRE PENINSULA FREIGHT STUDY
OPTION 5

LEGEND

- ROAD LINKS SUBJECT TO INCREASED TRAFFIC VOLUMES
- RAIL LINKS RETAINED
- RAIL LINKS NOT USED

N

WUDINNA
KYANCUTTA
WARRAMBOO
LOCK
MURDINGA
TOOLIGIE
YEELANNA
CUMMINS
EDILLILIE
PORT LINCOLN
KIMBA
WADDIKEE
DARKE PEAK
KIELPA
RUDALL
CLEVE
ARNO BAY
WHARMINDA
TUMBY BAY

RELEASED UNDER FOI ACT

SMEC
Member of the Surbana Jurong Group

EYRE PENINSULA FREIGHT STUDY

OPTION 6

LEGEND

- ROAD LINKS SUBJECT TO INCREASED TRAFFIC VOLUMES
- RAIL LINKS RETAINED
- RAIL LINKS NOT USED

N

WUDINNA
KYANCUTTA
WARRAMBOO
LOCK
MURDINGA
TOOLIGIE
YEELANNA
CUMMINS
EDILLILIE
PORT LINCOLN
KIMBA
WADDIKEE
DARKE PEAK
KIELPA
RUDALL
CLEVE
ARNO BAY
WHARMINDA
TUMBY BAY

RELEASED UNDER FOI ACT

SMEC
Member of the Surbana Jurong Group

EYRE PENINSULA FREIGHT STUDY
OPTION 7

LEGEND

- ROAD LINKS SUBJECT TO INCREASED TRAFFIC VOLUMES
- RAIL LINKS RETAINED
- RAIL LINKS NOT USED

N

WUDINNA
KYANCUTTA
WARRAMBOO
LOCK
MURDINGA
TOOLIGIE
YEELANNA
CUMMINS
EDILLILIE
PORT LINCOLN
KIMBA
WADDIKEE
DARKE PEAK
KIELPA
RUDALL
CLEVE
ARNO BAY
WHARMINDA
TUMBY BAY

RELEASED UNDER FOI ACT

SMEC
Member of the Surbana Jurong Group

EYRE PENINSULA FREIGHT STUDY

OPTION 8

LEGEND

- ROAD LINKS SUBJECT TO INCREASED TRAFFIC VOLUMES
- RAIL LINKS RETAINED
- RAIL LINKS NOT USED

N

WUDINNA
KYANCUTTA
WARRAMBOO
LOCK
MURDINGA
TOOLIGIE
YEELANNA
CUMMINS
EDILLILIE
PORT LINCOLN
KIMBA
WADDIKEE
DARKE PEAK
KIELPA
RUDALL
CLEVE
ARNO BAY
WHARMINDA
TUMBY BAY

RELEASED UNDER FOI ACT

SMEC
Member of the Surbana Jurong Group

EYRE PENINSULA FREIGHT STUDY
OPTION 9

Appendix E Project Options – Data Sheets

RELEASED UNDER FOI ACT

Summary Sheet - Option 1

	Investment Costs	$m by 2020	$m by 2030	$m by 2045
Rail	Rail Upgrade to enable 16t at 60km/h for network by 2020	42	38	25
	Rollingstock purchase	incl in Supply Chain		
Road	10 x Overtaking lanes		8	12
	151 kms of seal widening	2	11.3	17
	5 x rest areas		1.5	2
	Intersection and Delineation improvements - allowance		4	6
	Median treatments - allowance		2	4
	Rehab to 'fair' condition	1	6	8.5
	Truck purchase	incl in Supply Chain		
Other	Nil			

	Operating Costs	$/annum
Rail	Track Maintenance	incl in Supply Chain
	Rollingstock maintenace	incl in Supply Chain
	Corridor maintenance	incl in Supply Chain
Road	Routine and Annual Specific	0.64
	Renewals	1.3
	Rehab Maintenance	1.19
Other	N/A	

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Summary Sheet - Option 2

	Investment Costs	$m by 2020	$m by 2030	$m by 2045
Rail	Rail Upgrade to remaining network to enable 16t at 60km/h for network by 2020	31	28	18
	70 new rail cars by 2019	incl. in Supply chain cost		
	5 x new locomotoves	incl. in Supply chain cost		
Road	6 x Overtaking lanes	4	8	8
	Seal widening (165kms)	2.6	13.5	17
	5kms of road sealing*	3		
	5 x rest areas		1.5	2
	Intersection and Delineation improvements - allowance	2	2	6
	Median Treatments - allowance		2	4
	Traffic Upgrades - Port Lincoln - allowance	1		
	Rehab to 'fair' condition	4.5	4.5	6.5
	Truck Purchase	incl. in Supply chain cost		
Other	Modifications to improve truck loading facilities - allowance	0.5		
	Operating Costs	**$m/annum**		
Rail	Track Maintenance	incl in Supply Chain		
	Rollingstock maintenace	incl in Supply Chain		
	Corridor maintenance	incl in Supply Chain		
Road	Routine and Annual Specific	0.68		
	Renewals	1.39		
	Rehab Maintenance	1.26		
Other	N/A			

** Local Road Network*

RELEASED UNDER FOI ACT

Summary Sheet - Option 3

	Investment Costs	$m by 2020	$m by 2030	$m by 2045
Rail	Rail Upgrade to remaining network to enable 16t at 60km/h for network by 2020	21	19	13
	70 new rail cars by 2019	incl. in supply chain		
	5 x new locomotoves	incl. in supply chain		
Road	10 x Overtaking lanes	4	8	8
	Seal widening (177kms)	3.1	15.3	17
	29kms of road sealing*	17.5		
	5 x rest areas	2	1.5	
	Intersection and Delineation improvements - allowance	2	2	6
	Median treatments - allowance		2	4
	Traffic Upgrades - Port Lincoln - allowance	5		
	Rehab to 'fair' condition	7.5	3.5	4.5
	Truck Purchase	incl. in supply chain		
Other	Modifications to improve truck loading facilities	1		
	Operating Costs	**$m/annum**		
Rail	Track Maintenance	incl in Supply Chain		
	Rollingstock maintenace	incl in Supply Chain		
	Corridor maintenance	incl in Supply Chain		
Road	Routine and Annual Specific	0.72		
	Renewals	1.45		
	Rehab Maintenance	1.32		
Other	N/A			

** Local Road Network*

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Summary Sheet - Option 4

	Investment Costs	$m by 2020	$m by 2030	$m by 2045
Rail	Rail Upgrade to remaining network to enable 16t at 60km/h for network by 2020	13	12	8
	70 new rail cars by 2019	incl. in supply chain		
	5 x new locomotoves	incl. in supply chain		
Road	11 x Overtaking lanes	4	10	8
	Seal widening (194kms)	3.8	18	17
	29kms of road sealing*	17.5		
	6 x rest areas	2	1.5	2
	Intersection and Delineation improvements - allowance	3	3	6
	Median treatments - allowance	2	2	4
	Traffic Upgrades - Port Lincoln - allowance	5	2	
	Rehab to 'fair' condition	12	1.5	2
	Truck Purchase	incl. in supply chain		
Other	Modifications to improve truck loading facilities	1.5		
	Operating Costs	**$m/annum**		
Rail	Track Maintenance	incl in Supply Chain		
	Rollingstock maintenace	incl in Supply Chain		
	Corridor maintenance	incl in Supply Chain		
Road	Routine and Annual Specific	0.77		
	Renewals	1.56		
	Rehab Maintenance	1.42		
Other	N/A			

** Local Road Network*

RELEASED UNDER FOI ACT

Summary Sheet - Option 5

	Investment Costs	$m by 2020	$m by 2030	$m by 2045
Rail	Rail Upgrade to remaining network to enable 16t at 60km/h for network by 2020	4.5	4	2.5
	70 new rail cars by 2019	incl. in supply chain		
	5 x new locomotoves	incl. in supply chain		
Road	12 x Overtaking lanes	4	10	10
	Seal widening (205kms)	4.3	19.7	17
	29kms of road sealing*	17.5		
	7 x rest areas	3.5	2	1
	Intersection and Delineation improvements - allowance	3	3	6
	Median treatments - allowance	2	4	4
	Traffic Upgrades - Port Lincoln - allowance	5	2	
	Rehab to 'fair' condition	14.5	1	
	Truck Purchase	incl. in supply chain		
Other	Modifications to improve truck loading facilities	2		
	Operating Costs	**$m/annum**		
Rail	Track Maintenance	incl in Supply Chain		
	Rollingstock maintenace	incl in Supply Chain		
	Corridor maintenance	incl in Supply Chain		
Road	Routine and Annual Specific	0.8		
	Renewals	1.62		
	Rehab Maintenance	1.48		
Other	N/A			

** Local Road Network*

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Summary Sheet - Option 6

	Investment Costs	$m by 2020	$m by 2030	$m by 2045
Rail	Rail Upgrade to remaining network to enable 16t at 60km/h for network by 2020	34	31	21
	70 new rail cars by 2019	incl. in supply chain		
	5 x new locomotoves	incl. in supply chain		
Road	10 x Overtaking lanes	4	8	8
	168kms of seal widening	2.7	14	17
	Road Sealing			
	5 x rest areas		1.5	2
	Intersection and Delineation improvements - allowance	2	2	6
	Median treatments - allowance		2	4
	Traffic Upgrades - Port Lincoln - allowance	1		
	Rehab to 'fair' condition	5.5	4	6
	Truck Purchase	incl. in supply chain		
Other	Modifications to improve truck loading facilities	0.5		
	Operating Costs	**$m/annum**		
Rail	Track Maintenance	incl in Supply Chain		
	Rollingstock maintenace	incl in Supply Chain		
	Corridor maintenance	incl in Supply Chain		
Road	Routine and Annual Specific	0.69		
	Renewals	1.4		
	Rehab Maintenance	1.29		
Other	N/A			

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Summary Sheet - Option 7

	Investment Costs	$m by 2020	$m by 2030	$m by 2045
Rail	Rail Upgrade to remaining network to enable 16t at 60km/h for network by 2020	23	21	14
	70 new rail cars by 2019	incl. in supply chain		
	5 x new locomotoves	incl. in supply chain		
Road	11 x Overtaking lanes	4	10	8
	Seal widening (182kms)	3.3	16.1	17
	5kms of sealing*	3		
	5 x rest areas	1	1.5	1
	Intersection and Delineation improvements - allowance	3	4	6
	Median treatments - allowance	2	2	4
	Traffic Upgrades - Port Lincoln - allowance	2		
	Rehab to 'fair' condition	9	2.5	4
	Truck Purchase	incl. in supply chain		
Other	Modifications to improve truck loading facilities	1		
	Operating Costs	**$m/annum**		
Rail	Track Maintenance	incl in Supply Chain		
	Rollingstock maintenace	incl in Supply Chain		
	Corridor maintenance	incl in Supply Chain		
Road	Routine and Annual Specific	0.73		
	Renewals	1.49		
	Rehab Maintenance	1.36		
Other	N/A			

** Local Road Network*

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Summary Sheet - Option 8

	Investment Costs	$m by 2020	$m by 2030	$m by 2045
Rail	Rail Upgrade to remaining network to enable 16t at 60km/h for network by 2020	25	23	15
	70 new rail cars by 2019	incl. in supply chain		
	5 x new locomotoves	incl. in supply chain		
Road	11 x Overtaking lanes	4	10	8
	Seal widening (180kms)	3.2	15.7	17
	Road sealing			
	5 x rest areas	1	1.5	1
	Intersection and Delineation improvements - allowance	3	4	6
	Median treatments - allowance	2	2	4
	Traffic Upgrades - Port Lincoln - allowance	1		
	Rehab to 'fair' condition	8	3	4.5
	Truck Purchase	incl. in supply chain		
Other	Modifications to improve truck loading facilities	1		
	Operating Costs	**$m/annum**		
Rail	Track Maintenance	incl in Supply Chain		
	Rollingstock maintenace	incl in Supply Chain		
	Corridor maintenance	incl in Supply Chain		
Road	Routine and Annual Specific	0.72		
	Renewals	1.47		
	Rehab Maintenance	1.35		
Other	N/A			

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Summary Sheet - Option 9

	Investment Costs	$m by 2020	$m by 2030	$m by 2045
Rail	Rail Upgrade to remaining network to enable 16t at 60km/h for network by 2020	14	13	8.5
	70 new rail cars by 2019	incl. in supply chain		
	5 x new locomotoves	incl. in supply chain		
Road	11 x Overtaking lanes	4	10	8
	Seal widening (193kms)	3.8	17.9	17
	5kms sealing*	3		
	6 x rest areas	2	1	1.5
	Intersection and Delineation improvements - allowance	3	4	6
	Median treatments - allowance	2	3	4
	Traffic Upgrades - Port Lincoln - allowance	1	1	
	Rehab to 'fair' condition	11.5	2	2
	Truck Purchase	incl. in supply chain		
Other	Modifications to improve truck loading facilities	1		
	Operating Costs	**$m/annum**		
Rail	Track Maintenance	incl in Supply Chain		
	Rollingstock maintenace	incl in Supply Chain		
	Corridor maintenance	incl in Supply Chain		
Road	Routine and Annual Specific	0.76		
	Renewals	1.55		
	Rehab Maintenance	1.42		
Other	N/A			

** Local Road Network*

RELEASED UNDER FOI ACT

Option 1 Forecast Road Freight Increases

Segment ID	Road	From	To	Current total Volume (AADT)	Current Freight Volume	Forecast Freight Growth (daily)	*Forecast Total Volume (AADT)	Forecast Freight Volume
1	Eyre Hwy	Wudinna Stn	Kyancutta Stn	1010	300	0	1010	300
2	Tod Hwy	Kyancutta Stn	Warramboo Stn	250	70	0	250	70
3	Tod Hwy	Warramboo Stn	Lock Stn	260	90	0	260	90
4	Tod Hwy	Lock Stn	Murdinga Stn	280	70	0	280	70
5	Tod Hwy	Murdinga Stn	Tooligie Stn	240	40	0	240	40
6	Tod Hwy	Tooligie Stn	Yeelanna Stn	240	40	0	240	40
7	Tod Hwy	Yeelana Stn	Cummins	610	110	0	610	110
8	Tod Hwy	Cummins	Edillilie	910	260	0	910	260
9	Tod Hwy	Edillilie	Flinders Hwy	760	190	0	760	190
10	Flinders Hwy	Flinders Hwy	Western Approach Road	2170	290	0	2170	290
11	Cleve Rd	Kimba	Mangalo Road	250	60	0	250	60
12	Cleve Rd	Mangalo Road	Cleve	410	60	0	410	60
13	Unamed Road	Waddikee	Balumbah-Kinnard Rd	200	30	0	200	30
14	Balumbah-Kinnard Rd	Road	Darke Peak	200	30	0	200	30
15	Balumbah-Kinnard Rd	Darke Peak	Kielpa	200	30	0	200	30
16	Balumbah-Kinnard Rd	Kielpa	Rudall	200	30	0	200	30
17	Balumbah-Kinnard Rd	Rudall	Lincoln Hwy	200	30	0	200	30
18	Birdseye Hwy	Rudall	Cleve	360	60	0	360	60
19	Arno Bay Rd	Cleve	Arno Bay	420	80	0	420	80
20	Lincoln Hwy	Arno Bay	Balumbah-Kinnard Rd	860	150	0	860	150
21	Lincoln Hwy	Balumbah-Kinnard Rd	Wharminda Road	890	160	0	890	160
22	Wharminda Road	Wharminda	Lincoln Hwy	100	20	0	100	20
23	Lincoln Hwy	Wharminda Road	Tumby Bay	850	150	0	850	150
24	Lincoln Hwy	Tumby Bay	Louth Bay	1620	280	0	1620	280
25a	Lincoln Hwy	Louth Bay	Richardson Road	3780	460	0	3780	460
25b	Lincoln Hwy	Richardson Road	Happy Valley Road	5050	360	0	5050	360
25c	Lincoln Hwy	Happy Valley Road	Normandy Place	8280	390	0	8280	390
26d	Lincoln Hwy	Normandy Place	Flinders Hwy	8790	360	0	8790	360
26a	Lincoln Hwy	Flinders Hwy	New W Road	11310	410	0	11310	410
26b	Lincoln Hwy	New W Road	Porter St (Port Access)	13740	390	0	13740	390
27	Flinders Hwy	Flinders Hwy	Lincoln Hwy	3640	330	0	3640	330
28a	West Approach Road	Flinders Hwy	New W Road	1720	290	0	1720	290
28b	West Approach Road	New W Road	Pine Freezers Road	1920	420	0	1920	420
28c	West Approach Road	Pine Freezers Road	Anne Street	3430	330	0	3430	330
28d	West Approach Road	Anne Street	Mortlock Terrace	6870	360	0	6870	360
28e	West Approach Road	Mortlock Terrace	Dublin Street	11310	560	0	11310	560
28f	West Approach Road	Dublin Street	Porter St (Port Access)	6160	430	0	6160	430

*Note Forecast AADT rounded up to nearest 10 (conservative and in accordance with DPTI format)

RELEASED UNDER FOI ACT

Option 2 Forecast Road Freight Increases

Segment ID	Road	From	To	Current total Volume (AADT)	Current Freight Volume	Forecast Freight Growth (daily)	*Forecast Total Volume (AADT)	Forecast Freight Volume
1	Eyre Hwy	Wudinna Stn	Kyancutta Stn	1010	300	0	1010	300
2	Tod Hwy	Kyancutta Stn	Warramboo Stn	250	70	0	250	70
3	Tod Hwy	Warramboo Stn	Lock Stn	260	90	0	260	90
4	Tod Hwy	Lock Stn	Murdinga Stn	280	70	0	280	70
5	Tod Hwy	Murdinga Stn	Tooligie Stn	240	40	0	240	40
6	Tod Hwy	Tooligie Stn	Yeelanna Stn	240	40	0	240	40
7	Tod Hwy	Yeelana Stn	Cummins	610	110	0	610	110
8	Tod Hwy	Cummins	Edillilie	910	260	0	910	260
9	Tod Hwy	Edillilie	Flinders Hwy	760	190	0	760	190
10	Flinders Hwy	Flinders Hwy	Western Approach Road	2170	290	0	2170	290
11	Cleve Rd	Kimba	Mangalo Road	250	60	8	260	68
12	Cleve Rd	Mangalo Road	Cleve	410	60	8	420	68
13	Unamed Road	Waddikee	Balumbah-Kinnard Rd	200	30	2	210	32
14	Balumbah-Kinnard Rd	Road	Darke Peak	200	30	2	210	32
15	Balumbah-Kinnard Rd	Darke Peak	Kielpa	200	30	4	210	34
16	Balumbah-Kinnard Rd	Kielpa	Rudall	200	30	6	210	36
17	Balumbah-Kinnard Rd	Rudall	Lincoln Hwy	200	30	5	210	34.5
18	Birdseye Hwy	Rudall	Cleve	360	60	2	370	61.5
19	Arno Bay Rd	Cleve	Arno Bay	420	80	10	430	89.5
20	Lincoln Hwy	Arno Bay	Balumbah-Kinnard Rd	860	150	10	870	159.5
21	Lincoln Hwy	Balumbah-Kinnard Rd	Wharminda Road	890	160	14	910	174
22	Wharminda Road	Wharminda	Lincoln Hwy	100	20	0	100	20
23	Lincoln Hwy	Wharminda Road	Tumby Bay	850	150	14	870	164
24	Lincoln Hwy	Tumby Bay	Louth Bay	1620	280	14	1640	294
25a	Lincoln Hwy	Louth Bay	Richardson Road	3780	460	14	3800	474
25b	Lincoln Hwy	Richardson Road	Happy Valley Road	5050	360	14	5070	374
25c	Lincoln Hwy	Happy Valley Road	Normandy Place	8280	390	14	8300	404
26d	Lincoln Hwy	Normandy Place	Flinders Hwy	8790	360	14	8810	374
26a	Lincoln Hwy	Flinders Hwy	New W Road	11310	410	14	11330	424
26b	Lincoln Hwy	New W Road	Porter St (Port Access)	13740	390	14	13760	404
27	Flinders Hwy	Flinders Hwy	Lincoln Hwy	3640	330	0	3640	330
28a	West Approach Road	Flinders Hwy	New W Road	1720	290	0	1720	290
28b	West Approach Road	New W Road	Pine Freezers Road	1920	420	0	1920	420
28c	West Approach Road	Pine Freezers Road	Anne Street	3430	330	0	3430	330
28d	West Approach Road	Anne Street	Mortlock Terrace	6870	360	0	6870	360
28e	West Approach Road	Mortlock Terrace	Dublin Street	11310	560	0	11310	560
28f	West Approach Road	Dublin Street	Porter St (Port Access)	6160	430	0	6160	430

*Note Forecast AADT rounded up to nearest 10 (conservative and in accordance with DPTI format)

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Option 3 Forecast Road Freight Increases

Segment ID	Road	From	To	Current total Volume (AADT)	Current Freight Volume	Forecast Freight Growth (daily)	*Forecast Total Volume (AADT)	Forecast Freight Volume
1	Eyre Hwy	Wudinna Stn	Kyancutta Stn	1010	300	0	1010	300
2	Tod Hwy	Kyancutta Stn	Warramboo Stn	250	70	0	250	70
3	Tod Hwy	Warramboo Stn	Lock Stn	260	90	0	260	90
4	Tod Hwy	Lock Stn	Murdinga Stn	280	70	0	280	70
5	Tod Hwy	Murdinga Stn	Tooligie Stn	240	40	0	240	40
6	Tod Hwy	Tooligie Stn	Yeelanna Stn	240	40	0	240	40
7	Tod Hwy	Yeelana Stn	Cummins	610	110	0	610	110
8	Tod Hwy	Cummins	Edillilie	910	260	0	910	260
9	Tod Hwy	Edillilie	Flinders Hwy	760	190	0	760	190
10	Flinders Hwy	Flinders Hwy	Western Approach Road	2170	290	0	2170	290
11	Cleve Rd	Kimba	Mangalo Road	250	60	8	260	68
12	Cleve Rd	Mangalo Road	Cleve	410	60	8	420	68
13	Unamed Road	Waddikee	Balumbah-Kinnard Rd	200	30	2	210	32
14	Balumbah-Kinnard Rd	Road	Darke Peak	200	30	2	210	32
15	Balumbah-Kinnard Rd	Darke Peak	Kielpa	200	30	4	210	34
16	Balumbah-Kinnard Rd	Kielpa	Rudall	200	30	6	210	36
17	Balumbah-Kinnard Rd	Rudall	Lincoln Hwy	200	30	15	220	45
18	Birdseye Hwy	Rudall	Cleve	360	60	5	370	65
19	Arno Bay Rd	Cleve	Arno Bay	420	80	13	440	93
20	Lincoln Hwy	Arno Bay	Balumbah-Kinnard Rd	860	150	13	880	163
21	Lincoln Hwy	Balumbah-Kinnard Rd	Wharminda Road	890	160	28	920	188
22	Wharminda Road	Wharminda	Lincoln Hwy	100	20	2	110	22
23	Lincoln Hwy	Wharminda Road	Tumby Bay	850	150	30	880	180
24	Lincoln Hwy	Tumby Bay	Louth Bay	1620	280	30	1650	310
25a	Lincoln Hwy	Louth Bay	Richardson Road	3780	460	30	3810	490
25b	Lincoln Hwy	Richardson Road	Happy Valley Road	5050	360	30	5080	390
25c	Lincoln Hwy	Happy Valley Road	Normandy Place	8280	390	30	8310	420
26d	Lincoln Hwy	Normandy Place	Flinders Hwy	8790	360	30	8820	390
26a	Lincoln Hwy	Flinders Hwy	New W Road	11310	410	30	11340	440
26b	Lincoln Hwy	New W Road	Porter St (Port Access)	13740	390	30	13770	420
27	Flinders Hwy	Flinders Hwy	Lincoln Hwy	3640	330	0	3640	330
28a	West Approach Road	Flinders Hwy	New W Road	1720	290	0	1720	290
28b	West Approach Road	New W Road	Pine Freezers Road	1920	420	0	1920	420
28c	West Approach Road	Pine Freezers Road	Anne Street	3430	330	0	3430	330
28d	West Approach Road	Anne Street	Mortlock Terrace	6870	360	0	6870	360
28e	West Approach Road	Mortlock Terrace	Dublin Street	11310	560	0	11310	560
28f	West Approach Road	Dublin Street	Porter St (Port Access)	6160	430	0	6160	430

*Note Forecast AADT rounded up to nearest 10 (conservative and in accordance with DPTI format)

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Option 4 Forecast Road Freight Increases

Segment ID	Road	From	To	Current total Volume (AADT)	Current Freight Volume	Forecast Freight Growth (daily)	*Forecast Total Volume (AADT)	Forecast Freight Volume
1	Eyre Hwy	Wudinna Stn	Kyancutta Stn	1010	300	10	1020	310
2	Tod Hwy	Kyancutta Stn	Warramboo Stn	250	70	14	270	84
3	Tod Hwy	Warramboo Stn	Lock Stn	260	90	16	280	106
4	Tod Hwy	Lock Stn	Murdinga Stn	280	70	16	300	86
5	Tod Hwy	Murdinga Stn	Tooligie Stn	240	40	16	260	56
6	Tod Hwy	Tooligie Stn	Yeelanna Stn	240	40	16	260	56
7	Tod Hwy	Yeelana Stn	Cummins	610	110	16	630	126
8	Tod Hwy	Cummins	Edillilie	910	260	16	930	276
9	Tod Hwy	Edillilie	Flinders Hwy	760	190	16	780	206
10	Flinders Hwy	Flinders Hwy	Western Approach Road	2170	290	16	2190	306
11	Cleve Rd	Kimba	Mangalo Road	250	60	8	260	68
12	Cleve Rd	Mangalo Road	Cleve	410	60	8	420	68
13	Unamed Road	Waddikee	Balumbah-Kinnard Rd	200	30	2	210	32
14	Balumbah-Kinnard Rd	Road	Darke Peak	200	30	2	210	32
15	Balumbah-Kinnard Rd	Darke Peak	Kielpa	200	30	4	210	34
16	Balumbah-Kinnard Rd	Kielpa	Rudall	200	30	6	210	36
17	Balumbah-Kinnard Rd	Rudall	Lincoln Hwy	200	30	15	220	45
18	Birdseye Hwy	Rudall	Cleve	360	60	5	370	65
19	Arno Bay Rd	Cleve	Arno Bay	420	80	13	440	93
20	Lincoln Hwy	Arno Bay	Balumbah-Kinnard Rd	860	150	13	880	163
21	Lincoln Hwy	Balumbah-Kinnard Rd	Wharminda Road	890	160	28	920	188
22	Wharminda Road	Wharminda	Lincoln Hwy	100	20	2	110	22
23	Lincoln Hwy	Wharminda Road	Tumby Bay	850	150	30	880	180
24	Lincoln Hwy	Tumby Bay	Louth Bay	1620	280	30	1650	310
25a	Lincoln Hwy	Louth Bay	Richardson Road	3780	460	30	3810	490
25b	Lincoln Hwy	Richardson Road	Happy Valley Road	5050	360	30	5080	390
25c	Lincoln Hwy	Happy Valley Road	Normandy Place	8280	390	30	8310	420
26d	Lincoln Hwy	Normandy Place	Flinders Hwy	8790	360	30	8820	390
26a	Lincoln Hwy	Flinders Hwy	New W Road	11310	410	30	11340	440
26b	Lincoln Hwy	New W Road	Porter St (Port Access)	13740	390	30	13770	420
27	Flinders Hwy	Flinders Hwy	Lincoln Hwy	3640	330	0	3640	330
28a	West Approach Road	Flinders Hwy	New W Road	1720	290	16	1740	306
28b	West Approach Road	New W Road	Pine Freezers Road	1920	420	16	1940	436
28c	West Approach Road	Pine Freezers Road	Anne Street	3430	330	16	3450	346
28d	West Approach Road	Anne Street	Mortlock Terrace	6870	360	16	6890	376
28e	West Approach Road	Mortlock Terrace	Dublin Street	11310	560	16	11330	576
28f	West Approach Road	Dublin Street	Porter St (Port Access)	6160	430	16	6180	446

*Note Forecast AADT rounded up to nearest 10 (conservative and in accordance with DPTI format)

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Option 5 Forecast Road Freight Increases

Segment ID	Road	From	To	Current total Volume (AADT)	Current Freight Volume	Forecast Freight Growth (daily)	*Forecast Total Volume (AADT)	Forecast Freight Volume
1	Eyre Hwy	Wudinna Stn	Kyancutta Stn	1010	300	10	1020	310
2	Tod Hwy	Kyancutta Stn	Warramboo Stn	250	70	14	270	84
3	Tod Hwy	Warramboo Stn	Lock Stn	260	90	16	280	106
4	Tod Hwy	Lock Stn	Murdinga Stn	280	70	26	310	96
5	Tod Hwy	Murdinga Stn	Tooligie Stn	240	40	28	270	68
6	Tod Hwy	Tooligie Stn	Yeelanna Stn	240	40	30	270	70
7	Tod Hwy	Yeelana Stn	Cummins	610	110	34	650	144
8	Tod Hwy	Cummins	Edillilie	910	260	34	950	294
9	Tod Hwy	Edillilie	Flinders Hwy	760	190	34	800	224
10	Flinders Hwy	Flinders Hwy	Western Approach Road	2170	290	34	2210	324
11	Cleve Rd	Kimba	Mangalo Road	250	60	8	260	68
12	Cleve Rd	Mangalo Road	Cleve	410	60	8	420	68
13	Unamed Road	Waddikee	Balumbah-Kinnard Rd	200	30	2	210	32
14	Balumbah-Kinnard Rd	Road	Darke Peak	200	30	2	210	32
15	Balumbah-Kinnard Rd	Darke Peak	Kielpa	200	30	4	210	34
16	Balumbah-Kinnard Rd	Kielpa	Rudall	200	30	6	210	36
17	Balumbah-Kinnard Rd	Rudall	Lincoln Hwy	200	30	15	220	45
18	Birdseye Hwy	Rudall	Cleve	360	60	5	370	65
19	Arno Bay Rd	Cleve	Arno Bay	420	80	13	440	93
20	Lincoln Hwy	Arno Bay	Balumbah-Kinnard Rd	860	150	13	880	163
21	Lincoln Hwy	Balumbah-Kinnard Rd	Wharminda Road	890	160	28	920	188
22	Wharminda Road	Wharminda	Lincoln Hwy	100	20	2	110	22
23	Lincoln Hwy	Wharminda Road	Tumby Bay	850	150	30	880	180
24	Lincoln Hwy	Tumby Bay	Louth Bay	1620	280	30	1650	310
25a	Lincoln Hwy	Louth Bay	Richardson Road	3780	460	30	3810	490
25b	Lincoln Hwy	Richardson Road	Happy Valley Road	5050	360	30	5080	390
25c	Lincoln Hwy	Happy Valley Road	Normandy Place	8280	390	30	8310	420
26d	Lincoln Hwy	Normandy Place	Flinders Hwy	8790	360	30	8820	390
26a	Lincoln Hwy	Flinders Hwy	New W Road	11310	410	30	11340	440
26b	Lincoln Hwy	New W Road	Porter St (Port Access)	13740	390	30	13770	420
27	Flinders Hwy	Flinders Hwy	Lincoln Hwy	3640	330	0	3640	330
28a	West Approach Road	Flinders Hwy	New W Road	1720	290	34	1760	324
28b	West Approach Road	New W Road	Pine Freezers Road	1920	420	34	1960	454
28c	West Approach Road	Pine Freezers Road	Anne Street	3430	330	34	3470	364
28d	West Approach Road	Anne Street	Mortlock Terrace	6870	360	34	6910	394
28e	West Approach Road	Mortlock Terrace	Dublin Street	11310	560	34	11350	594
28f	West Approach Road	Dublin Street	Porter St (Port Access)	6160	430	34	6200	464

*Note Forecast AADT rounded up to nearest 10 (conservative and in accordance with DPTI format)

RELEASED UNDER FOI ACT

Option 6 Forecast Road Freight Increases

Segment ID	Road	From	To	Current total Volume (AADT)	Current Freight Volume	Forecast Freight Growth (daily)	*Forecast Total Volume (AADT)	Forecast Freight Volume
1	Eyre Hwy	Wudinna Stn	Kyancutta Stn	1010	300	10	1020	310
2	Tod Hwy	Kyancutta Stn	Warramboo Stn	250	70	14	270	84
3	Tod Hwy	Warramboo Stn	Lock Stn	260	90	16	280	106
4	Tod Hwy	Lock Stn	Murdinga Stn	280	70	16	300	86
5	Tod Hwy	Murdinga Stn	Tooligie Stn	240	40	16	260	56
6	Tod Hwy	Tooligie Stn	Yeelanna Stn	240	40	16	260	56
7	Tod Hwy	Yeelana Stn	Cummins	610	110	16	630	126
8	Tod Hwy	Cummins	Edillilie	910	260	16	930	276
9	Tod Hwy	Edillilie	Flinders Hwy	760	190	16	780	206
10	Flinders Hwy	Flinders Hwy	Western Approach Road	2170	290	16	2190	306
11	Cleve Rd	Kimba	Mangalo Road	250	60	0	250	60
12	Cleve Rd	Mangalo Road	Cleve	410	60	0	410	60
13	Unamed Road	Waddikee	Balumbah-Kinnard Rd	200	30	0	200	30
14	Balumbah-Kinnard Rd	Road	Darke Peak	200	30	0	200	30
15	Balumbah-Kinnard Rd	Darke Peak	Kielpa	200	30	0	200	30
16	Balumbah-Kinnard Rd	Kielpa	Rudall	200	30	0	200	30
17	Balumbah-Kinnard Rd	Rudall	Lincoln Hwy	200	30	0	200	30
18	Birdseye Hwy	Rudall	Cleve	360	60	0	360	60
19	Arno Bay Rd	Cleve	Arno Bay	420	80	0	420	80
20	Lincoln Hwy	Arno Bay	Balumbah-Kinnard Rd	860	150	0	860	150
21	Lincoln Hwy	Balumbah-Kinnard Rd	Wharminda Road	890	160	0	890	160
22	Wharminda Road	Wharminda	Lincoln Hwy	100	20	0	100	20
23	Lincoln Hwy	Wharminda Road	Tumby Bay	850	150	0	850	150
24	Lincoln Hwy	Tumby Bay	Louth Bay	1620	280	0	1620	280
25a	Lincoln Hwy	Louth Bay	Richardson Road	3780	460	0	3780	460
25b	Lincoln Hwy	Richardson Road	Happy Valley Road	5050	360	0	5050	360
25c	Lincoln Hwy	Happy Valley Road	Normandy Place	8280	390	0	8280	390
26d	Lincoln Hwy	Normandy Place	Flinders Hwy	8790	360	0	8790	360
26a	Lincoln Hwy	Flinders Hwy	New W Road	11310	410	0	11310	410
26b	Lincoln Hwy	New W Road	Porter St (Port Access)	13740	390	0	13740	390
27	Flinders Hwy	Flinders Hwy	Lincoln Hwy	3640	330	0	3640	330
28a	West Approach Road	Flinders Hwy	New W Road	1720	290	16	1740	306
28b	West Approach Road	New W Road	Pine Freezers Road	1920	420	16	1940	436
28c	West Approach Road	Pine Freezers Road	Anne Street	3430	330	16	3450	346
28d	West Approach Road	Anne Street	Mortlock Terrace	6870	360	16	6890	376
28e	West Approach Road	Mortlock Terrace	Dublin Street	11310	560	16	11330	576
28f	West Approach Road	Dublin Street	Porter St (Port Access)	6160	430	16	6180	446

*Note Forecast AADT rounded up to nearest 10 (conservative and in accordance with DPTI format)

RELEASED UNDER FOI ACT

Option 7 Forecast Road Freight Increases

Segment ID	Road	From	To	Current total Volume (AADT)	Current Freight Volume	Forecast Freight Growth (daily)	*Forecast Total Volume (AADT)	Forecast Freight Volume
1	Eyre Hwy	Wudinna Stn	Kyancutta Stn	1010	300	10	1020	310
2	Tod Hwy	Kyancutta Stn	Warramboo Stn	250	70	14	270	84
3	Tod Hwy	Warramboo Stn	Lock Stn	260	90	16	280	106
4	Tod Hwy	Lock Stn	Murdinga Stn	280	70	16	300	86
5	Tod Hwy	Murdinga Stn	Tooligie Stn	240	40	16	260	56
6	Tod Hwy	Tooligie Stn	Yeelanna Stn	240	40	16	260	56
7	Tod Hwy	Yeelana Stn	Cummins	610	110	16	630	126
8	Tod Hwy	Cummins	Edillilie	910	260	16	930	276
9	Tod Hwy	Edillilie	Flinders Hwy	760	190	16	780	206
10	Flinders Hwy	Flinders Hwy	Western Approach Road	2170	290	16	2190	306
11	Cleve Rd	Kimba	Mangalo Road	250	60	8	260	68
12	Cleve Rd	Mangalo Road	Cleve	410	60	8	420	68
13	Unamed Road	Waddikee	Balumbah-Kinnard Rd	200	30	2	210	32
14	Balumbah-Kinnard Rd	Road	Darke Peak	200	30	2	210	32
15	Balumbah-Kinnard Rd	Darke Peak	Kielpa	200	30	4	210	34
16	Balumbah-Kinnard Rd	Kielpa	Rudall	200	30	6	210	36
17	Balumbah-Kinnard Rd	Rudall	Lincoln Hwy	200	30	5	210	34.5
18	Birdseye Hwy	Rudall	Cleve	360	60	2	370	61.5
19	Arno Bay Rd	Cleve	Arno Bay	420	80	10	430	89.5
20	Lincoln Hwy	Arno Bay	Balumbah-Kinnard Rd	860	150	10	870	159.5
21	Lincoln Hwy	Balumbah-Kinnard Rd	Wharminda Road	890	160	14	910	174
22	Wharminda Road	Wharminda	Lincoln Hwy	100	20	0	100	20
23	Lincoln Hwy	Wharminda Road	Tumby Bay	850	150	14	870	164
24	Lincoln Hwy	Tumby Bay	Louth Bay	1620	280	14	1640	294
25a	Lincoln Hwy	Louth Bay	Richardson Road	3780	460	14	3800	474
25b	Lincoln Hwy	Richardson Road	Happy Valley Road	5050	360	14	5070	374
25c	Lincoln Hwy	Happy Valley Road	Normandy Place	8280	390	14	8300	404
26d	Lincoln Hwy	Normandy Place	Flinders Hwy	8790	360	14	8810	374
26a	Lincoln Hwy	Flinders Hwy	New W Road	11310	410	14	11330	424
26b	Lincoln Hwy	New W Road	Porter St (Port Access)	13740	390	14	13760	404
27	Flinders Hwy	Flinders Hwy	Lincoln Hwy	3640	330	0	3640	330
28a	West Approach Road	Flinders Hwy	New W Road	1720	290	16	1740	306
28b	West Approach Road	New W Road	Pine Freezers Road	1920	420	16	1940	436
28c	West Approach Road	Pine Freezers Road	Anne Street	3430	330	16	3450	346
28d	West Approach Road	Anne Street	Mortlock Terrace	6870	360	16	6890	376
28e	West Approach Road	Mortlock Terrace	Dublin Street	11310	560	16	11330	576
28f	West Approach Road	Dublin Street	Porter St (Port Access)	6160	430	16	6180	446

*Note Forecast AADT rounded up to nearest 10 (conservative and in accordance with DPTI format)

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Option 8 Forecast Road Freight Increases

Segment ID	Road	From	To	Current total Volume (AADT)	Current Freight Volume	Forecast Freight Growth (daily)	*Forecast Total Volume (AADT)	Forecast Freight Volume
1	Eyre Hwy	Wudinna Stn	Kyancutta Stn	1010	300	10	1020	310
2	Tod Hwy	Kyancutta Stn	Warramboo Stn	250	70	14	270	84
3	Tod Hwy	Warramboo Stn	Lock Stn	260	90	16	280	106
4	Tod Hwy	Lock Stn	Murdinga Stn	280	70	26	310	96
5	Tod Hwy	Murdinga Stn	Tooligie Stn	240	40	28	270	68
6	Tod Hwy	Tooligie Stn	Yeelanna Stn	240	40	30	270	70
7	Tod Hwy	Yeelana Stn	Cummins	610	110	34	650	144
8	Tod Hwy	Cummins	Edillilie	910	260	34	950	294
9	Tod Hwy	Edillilie	Flinders Hwy	760	190	34	800	224
10	Flinders Hwy	Flinders Hwy	Western Approach Road	2170	290	34	2210	324
11	Cleve Rd	Kimba	Mangalo Road	250	60	0	250	60
12	Cleve Rd	Mangalo Road	Cleve	410	60	0	410	60
13	Unamed Road	Waddikee	Balumbah-Kinnard Rd	200	30	0	200	30
14	Balumbah-Kinnard Rd	Road	Darke Peak	200	30	0	200	30
15	Balumbah-Kinnard Rd	Darke Peak	Kielpa	200	30	0	200	30
16	Balumbah-Kinnard Rd	Kielpa	Rudall	200	30	0	200	30
17	Balumbah-Kinnard Rd	Rudall	Lincoln Hwy	200	30	0	200	30
18	Birdseye Hwy	Rudall	Cleve	360	60	0	360	60
19	Arno Bay Rd	Cleve	Arno Bay	420	80	0	420	80
20	Lincoln Hwy	Arno Bay	Balumbah-Kinnard Rd	860	150	0	860	150
21	Lincoln Hwy	Balumbah-Kinnard Rd	Wharminda Road	890	160	0	890	160
22	Wharminda Road	Wharminda	Lincoln Hwy	100	20	0	100	20
23	Lincoln Hwy	Wharminda Road	Tumby Bay	850	150	0	850	150
24	Lincoln Hwy	Tumby Bay	Louth Bay	1620	280	0	1620	280
25a	Lincoln Hwy	Louth Bay	Richardson Road	3780	460	0	3780	460
25b	Lincoln Hwy	Richardson Road	Happy Valley Road	5050	360	0	5050	360
25c	Lincoln Hwy	Happy Valley Road	Normandy Place	8280	390	0	8280	390
26d	Lincoln Hwy	Normandy Place	Flinders Hwy	8790	360	0	8790	360
26a	Lincoln Hwy	Flinders Hwy	New W Road	11310	410	0	11310	410
26b	Lincoln Hwy	New W Road	Porter St (Port Access)	13740	390	0	13740	390
27	Flinders Hwy	Flinders Hwy	Lincoln Hwy	3640	330	0	3640	330
28a	West Approach Road	Flinders Hwy	New W Road	1720	290	34	1760	324
28b	West Approach Road	New W Road	Pine Freezers Road	1920	420	34	1960	454
28c	West Approach Road	Pine Freezers Road	Anne Street	3430	330	34	3470	364
28d	West Approach Road	Anne Street	Mortlock Terrace	6870	360	34	6910	394
28e	West Approach Road	Mortlock Terrace	Dublin Street	11310	560	34	11350	594
28f	West Approach Road	Dublin Street	Porter St (Port Access)	6160	430	34	6200	464

*Note Forecast AADT rounded up to nearest 10 (conservative and in accordance with DPTI format)

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Option 9 Forecast Road Freight Increases

Segment ID	Road	From	To	Current total Volume (AADT)	Current Freight Volume	Forecast Freight Growth (daily)	*Forecast Total Volume (AADT)	Forecast Freight Volume
1	Eyre Hwy	Wudinna Stn	Kyancutta Stn	1010	300	10	1020	310
2	Tod Hwy	Kyancutta Stn	Warramboo Stn	250	70	14	270	84
3	Tod Hwy	Warramboo Stn	Lock Stn	260	90	16	280	106
4	Tod Hwy	Lock Stn	Murdinga Stn	280	70	26	310	96
5	Tod Hwy	Murdinga Stn	Tooligie Stn	240	40	28	270	68
6	Tod Hwy	Tooligie Stn	Yeelanna Stn	240	40	30	270	70
7	Tod Hwy	Yeelana Stn	Cummins	610	110	34	650	144
8	Tod Hwy	Cummins	Edillilie	910	260	34	950	294
9	Tod Hwy	Edillilie	Flinders Hwy	760	190	34	800	224
10	Flinders Hwy	Flinders Hwy	Western Approach Road	2170	290	34	2210	324
11	Cleve Rd	Kimba	Mangalo Road	250	60	8	260	68
12	Cleve Rd	Mangalo Road	Cleve	410	60	8	420	68
13	Unamed Road	Waddikee	Balumbah-Kinnard Rd	200	30	2	210	32
14	Balumbah-Kinnard Rd	Road	Darke Peak	200	30	2	210	32
15	Balumbah-Kinnard Rd	Darke Peak	Kielpa	200	30	4	210	34
16	Balumbah-Kinnard Rd	Kielpa	Rudall	200	30	6	210	36
17	Balumbah-Kinnard Rd	Rudall	Lincoln Hwy	200	30	5	210	35
18	Birdseye Hwy	Rudall	Cleve	360	60	2	370	62
19	Arno Bay Rd	Cleve	Arno Bay	420	80	10	430	90
20	Lincoln Hwy	Arno Bay	Balumbah-Kinnard Rd	860	150	10	870	160
21	Lincoln Hwy	Balumbah-Kinnard Rd	Wharminda Road	890	160	14	910	174
22	Wharminda Road	Wharminda	Lincoln Hwy	100	20	0	100	20
23	Lincoln Hwy	Wharminda Road	Tumby Bay	850	150	14	870	164
24	Lincoln Hwy	Tumby Bay	Louth Bay	1620	280	14	1640	294
25a	Lincoln Hwy	Louth Bay	Richardson Road	3780	460	14	3800	474
25b	Lincoln Hwy	Richardson Road	Happy Valley Road	5050	360	14	5070	374
25c	Lincoln Hwy	Happy Valley Road	Normandy Place	8280	390	14	8300	404
26d	Lincoln Hwy	Normandy Place	Flinders Hwy	8790	360	14	8810	374
26a	Lincoln Hwy	Flinders Hwy	New W Road	11310	410	14	11330	424
26b	Lincoln Hwy	New W Road	Porter St (Port Access)	13740	390	14	13760	404
27	Flinders Hwy	Flinders Hwy	Lincoln Hwy	3640	330	0	3640	330
28a	West Approach Road	Flinders Hwy	New W Road	1720	290	34	1760	324
28b	West Approach Road	New W Road	Pine Freezers Road	1920	420	34	1960	454
28c	West Approach Road	Pine Freezers Road	Anne Street	3430	330	34	3470	364
28d	West Approach Road	Anne Street	Mortlock Terrace	6870	360	34	6910	394
28e	West Approach Road	Mortlock Terrace	Dublin Street	11310	560	34	11350	594
28f	West Approach Road	Dublin Street	Porter St (Port Access)	6160	430	34	6200	464

*Note Forecast AADT rounded up to nearest 10 (conservative and in accordance with DPTI format)

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