

North–South Corridor

The 10 year Strategy

SCOPING a Strategy for the Investment and Implementation of the non-stop North-South Corridor in 10 Years (“The Strategy”)



Australian Government

BUILDING OUR FUTURE



Government of South Australia

Department of Planning,
Transport and Infrastructure

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PREFACE

Background

Adelaide's North-South Corridor runs between Gawler and Old Noarlunga and connects the rapidly expanding industrial and residential growth areas in the north and the south, providing new opportunities for economic development. It is one of Adelaide's most important transport corridors and is the major route for north and south bound traffic (including freight vehicles) running between Gawler and Old Noarlunga at a distance of 78km. The current roadway is not capable of handling projected land use and transport growth and the number of vehicles that need to use the road or the size of freight carriers travelling along it. In response, the Australian and South Australian Governments have indicated their desire to expand the route by creating a dedicated 'non-stop' North-South Corridor. Once completed (subject to detailed planning and funding allocations), the 78 kilometre corridor will comprise of the following road links:

- The Northern Expressway;
- The Proposed Northern Connector;
- An upgraded South Road;
- The Southern Expressway.

Currently 44km's of non-stop motorway on the North-South Corridor is completed. A funded program of works is already underway to eliminate the worst bottlenecks along the remaining 34km's of the North-South corridor. This currently funded program of works comprises two distinct projects:

- Torrens Road to River Torrens (to be completed by end of 2018);
- Darlington Upgrade Project (to be completed by end of 2018).

A program of internal works includes upgrades on South Road in advance of the future non-stop motorway to address the congestion and road safety at these locations as short term initiatives.

- South Road / Ashwin Parade Intersection [\$6.8m] (to be completed by April 2015);
- South Road / James Congdon Drive Intersection [\$8.8m] (to be completed by October 2015);
- South Road / Richmond Road Intersection [\$11m] (to be completed by October 2015).
- Park Terrace / Fitzroy Terrace / Torrens Road Intersections and Midblock;
- South Road / James Congdon Drive Intersection;
- Marion Road / Sturt Road Intersection.

The Strategy's Focus

➤ A Non-Stop North-South Corridor

South Australian and Australian Governments recognise South Road is strategically important and acknowledge problems exist for its entire length that inhibit the road from performing its role and function in a safe, efficient and reliable manner.

The North South Corridor will provide a fully upgraded non-stop motorway to provide a reliable free flowing transport 'spine' that connects the expanding industrial areas in the north and south. This will support freight transport productivity, improve access to freight distribution and improve accessibility to employment, leisure and service opportunities.

➤ Improving our business

The Strategy's focus is on investment and implementation program management strategies that will be effective and efficient in upgrading the non-stop North-South Corridor. This focuses on a whole-of-corridor approach.

➤ Looking forward a decade to 2025

In May 2014, the Australian Government announced its aspiration to deliver the North-South Corridor within a decade. The South Australian Government has identified the North-South Corridor be implemented within the Integrated Transport and Land Use Plan (ITLUP) timeframe.

So what is The Strategy?

The Strategy, through evidence based investigation, considers the requirements to effectively invest and implement the fully upgraded Non-Stop North-South Corridor in 10 Years.

The Strategy identifies:

- the implementation of the remaining 34km of non-stop motorway as a continuous program of works;
- the separation of the remaining corridor into projects that sit within the program of works;
- the delivery order of projects;
- associated work projects to support the delivery of the North-South Corridor;
- level and intervention of funding required within the program of works;
- flexible options to fund and procure the North-South Corridor;
- early funding of planning, design, approvals and construction activities (including services);
- early funding and streamlining of the land acquisition process;
- early engagement of the community;
- strategic management of traffic during construction;
- strategic resource management.

What underpins and guides The Strategy

The Strategy is underpinned by:

- investigation to support the foundation of The Strategy;
- realising economic productive infrastructure in priority order;
- integration with 'other' land use and transport initiatives (ITLUP);
- corridor preservation and property acquisition strategies;
- effective management of third party utility services;
- wider road network upgrades and promoted detour routes;
- minimising infrastructure redundancy and rework;
- procurement opportunities to enhance the program of works;
- community, industry and other stakeholder engagement;
- consistency in approach to corridor functionality, operation and standards.

The Strategy is guided by:

- government's strategic framework of policies and plans;
- infrastructure solutions and costs identified from North-South Corridor planning studies;
- timing constraints associated with minimum durations to scope, develop and implement the infrastructure solutions within the program;
- opportunities to innovate and use best practices for programming, construction, strategic procurement and transport analysis;
- broad consultation within the South Australian Governments Department of Planning, Transport and Infrastructure.

What The Strategy recommends

- The final recommendations of the strategy will be agreed and subject to community and stakeholder engagement.

How can The Strategy be used moving forward?

- The Strategy sets the scene for the next 10 years to assist the efficient and effective development, implementation and resourcing of the non-stop North-South Corridor. It provides a framework to guide future investment and decision making by both the Australian and South Australian Governments;
- The Strategy also provides government with an understanding of future workforce capacity needs for both the State government and industry to deliver the North-South Corridor;
- The Strategy should be the catalyst to:
 - identify and encourage stakeholder engagement and commitment to the long term benefits of the North-South Corridor as a significant transport initiative for the movement of vehicles and freight throughout the State;
 - implementing change of existing practices where required to ensure a modern, inclusive, transparent and accountable approach;
 - ensure individual projects are delivered in a consistent manner in line with the Strategy;
 - promote collaboration between all levels of government and service utility authorities to proactively forward plan the North-South Corridor infrastructure requirements;
 - consider and investigate ways to reduce impacts to business and the community by exploring the optimal construction staging within individual projects.

ROADMAP TO REPORT

Context, background and approach (Sections 1-6) describing:

- the purpose and objectives of the strategy;
- background to the North-South Corridor and future directions;
- position within the state-wide planning framework;
- current corridor infrastructure solutions, costs and functionality;
- project methodology.

Investigations to develop the Strategy (Sections 7-15) including:

- identification of road and associated work projects;
- assessment and prioritisation of road project sections;
- effective management of land acquisition and services;
- identification of the program of works and cash flows;
- identification of risk and opportunities.

The Strategy (Section 16):

Why (**The Focus**)

What (**Infrastructure Solutions**)

- Road Projects
- Associated Works Projects
- Early Works Projects

When (**The Program**)

- Project Delivery Order
- The Program of works
- The Funding Interventions / cash flows

How (**Effective Delivery of the Strategy**)

- Management of Procurement and Funding Submissions
- Management of Land acquisition and Preservation
- Management of Services
- Management of Traffic
- Management of Resources
- Management of the Community and Stakeholders

Actions (section 17):

- The next steps

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CONTEXT, BACKGROUND AND APPROACH

(Sections 1 to 6)

Purpose:

- Describe the purpose and objectives of the strategy
- Provide background to the North-South Corridor and future directions
- Explain the strategies position within the state-wide planning framework
- Describe the current corridor infrastructure solutions, costs and functionality
- Describe the approach to this scoping strategy project (methodology)

Outcome:

- Clear understanding of the rationale and objectives of the strategy
- A project methodology

1 Introduction

1.1 The Purpose of The Strategy

The purpose of The Strategy is to make recommendations on how to effectively invest and implement the fully upgraded non-stop North-South Corridor in 10 years.

1.2 The Objective of The Strategy

The objective of The Strategy is to provide evidence based investigation to demonstrate how to efficiently and effectively deliver the North-South Corridor infrastructure solutions in 10 Years.

The Strategy shall consider:

- integration with 'other' land use and transport initiatives (ITLUP);
- corridor preservation and property acquisition strategies;
- effective management of third party utility services;
- wider road network upgrades and promoted detour routes;
- minimising infrastructure redundancy and rework;
- procurement opportunities to enhance the program of works;
- community, stakeholder and industry engagement;
- consistency in approach to corridor functionality, operation and standards;
- yearly cash flows associated with a program of works.

The Strategy shall be guided by:

- government's strategic framework of policies and plans;
- infrastructure solutions and costs identified from planning studies;
- timing constraints associated with minimum durations to scope, develop and implement the infrastructure solutions within the program;
- opportunities to innovate and use best practices for programming, construction, strategic procurement and transport analysis.

The Strategy shall balance transport, strategic and practical considerations to determine optimal solutions.

2 Background

2.1 North-South Corridor

The North-South Corridor is Adelaide's most important transport corridor extending 78 kilometres between Gawler in the north and Old Noarlunga in the south and passing through both urban and rural environments.

The transport corridor serves multiple functions and the relative importance of these varies along its length with changing abutting land use and the areas it services. Between Gawler and Dry Creek, it passes through land used for predominantly horticultural and agricultural purposes and links regional and interstate markets with Port Adelaide and intermodal freight centres. At the northern end of South Road, it serves the key industrial areas of north-west Adelaide. Through the areas to the west of the city it provides access to the Adelaide airport and surrounding complementary light industry, warehouses, technology and aviation businesses. At the southern end, it links outer suburbs of Adelaide with employment centres and is the gateway to the southern regional wine growing areas.

Refer to Figure 1 for industry/employment areas and international gateways and freight hubs.

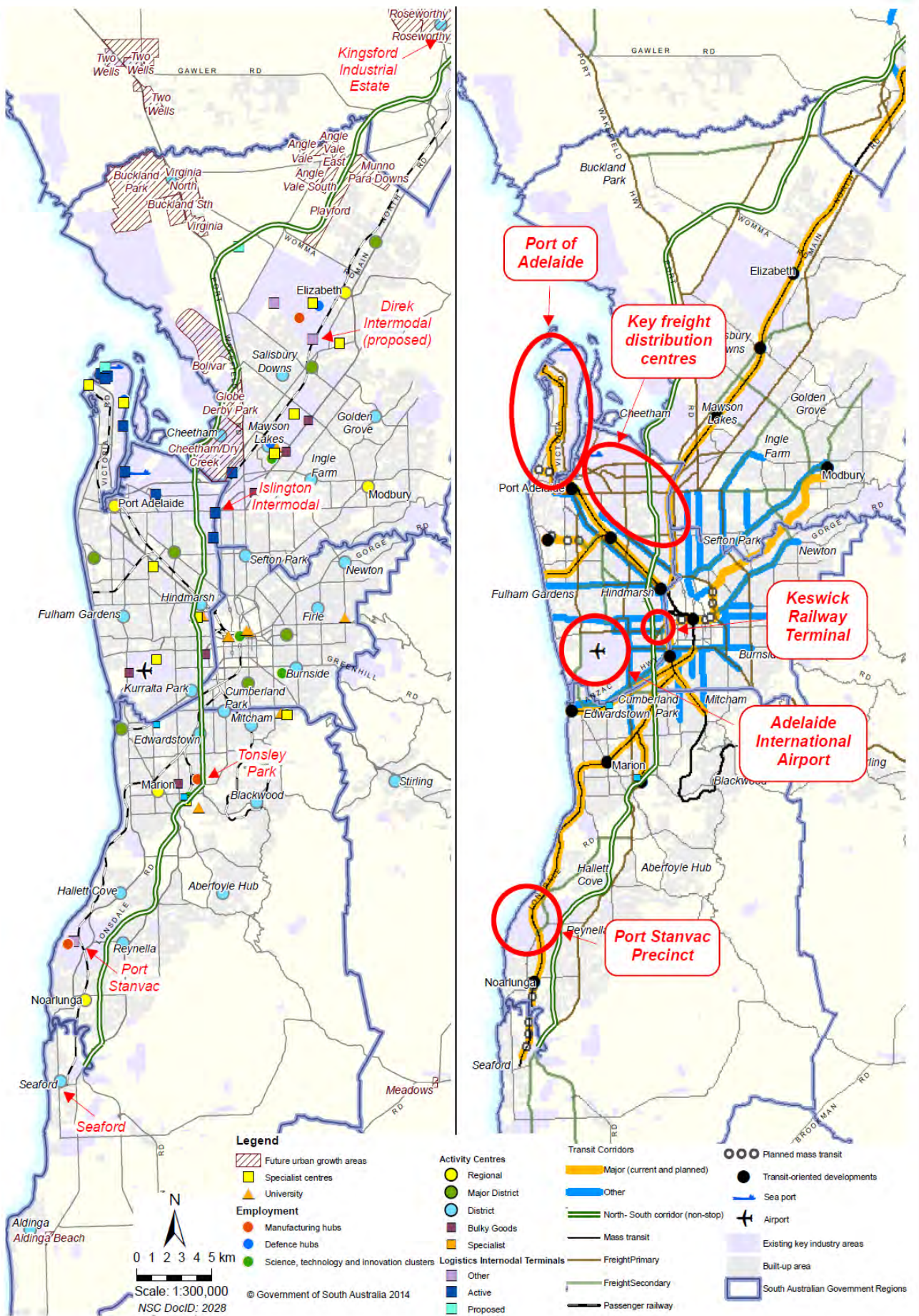


Figure 1: Industry/employment areas and international gateways and freight hubs.

The corridor is subjected to significant traffic demands (including heavy freight, service vehicles, private business, commuter and public transport trips). At various times of the day and at various locations along the corridor, these demands manifest themselves in congestion resulting in delays to road users, increased and unpredictable travel times and higher risk of crashes. These “problems” are evident on a regular basis and are worse at some locations than others.

Projections of population and employment in the Adelaide region and the resultant increase in traffic demands will exacerbate these performance issues if not addressed. In response, the Australian and South Australian Governments have indicated their desire to expand the route by creating a dedicated ‘Non-Stop’ North-South Corridor. Once completed (subject to detailed planning and funding allocations), the 78km corridor will comprise of the following road links:

- The Northern Expressway;
- The Proposed Northern Connector;
- An upgraded South Road;
- The Southern Expressway.

2.2 Current Funded Projects

Currently, 44km of non-stop motorway on the North-South Corridor is completed. A funded program of works is underway to upgrade further sections of the corridor and eliminate two of the worst problem areas along the remaining 34km of the North-South Corridor. This funded program of works comprises of two distinct projects:

- Torrens Road to River Torrens (to be completed by end of 2018);
- Darlington Upgrade Project (to be complete by end of 2018).

The funded program of works also includes intersection upgrades on South Road in advance of the future non-stop motorway to address congestion and road safety at the following locations as short term initiatives:

- South Road and Ashwin Parade [\$6.8m] (to be completed by April 2015);
- South Road and James Congdon Drive [\$8.8m] (to be completed by October 2015);
- South Road and Richmond Road [\$11m] (to be completed by October 2015);
- Park Terrace / Fitzroy Terrace / Torrens Road;
- James Congdon Drive;
- Marion Road and Sturt Road.

2.3 Future Direction

Beyond the current funded program of works, the Australian Government has an aspiration to see the completion of the fully upgraded non-stop North-South Corridor by 2025. Achievement of this will provide a reliable free flowing transport 'spine' that improves the linkages between the freight gateways and expanding industrial areas in the north with the Port Adelaide, improves connectivity to the industrial areas in the north and north west and to Adelaide Airport and improves access to the industrial and business areas to the west and to south of the State.

In May 2014, the Australian Government announced its aspiration to deliver the North-South Corridor within a decade. The South Australian Government has identified the North-South Corridor be implemented within the Integrated Transport and Land Use Plan (ITLUP) timeframe.

2.4 The Benefits and Challenges of Implementing within 10 Years

The Australian Government's aspiration to deliver the North-South Corridor within a decade has the potential to offer economic, social and environmental benefits over longer delivery timeframes.

The possible **benefits** of a 10 year implementation timeframe are listed below:

- unlocks economically productive infrastructure earlier (brings forward in time attainment of significant economic and social benefits);
- earlier stimulus to the South Australian economy by providing jobs and new employment for the State, hence attracting business investments and population growth;
- improves freight productivity and access to freight gateways earlier;
- improves access to employment, leisure and services earlier;
- generates confidence in the business community to invest and expand.

The challenges of a 10 year implementation are listed below:

- Ongoing disruption to road users and local businesses and community due to a significant volume of works being undertaken on a continuous basis over a ten year period;
- Availability of suitable workforce to undertake the program of works;
- Managing community expectations and ensuring ongoing effective stakeholder involvement.

2.5 Economic Evaluation of implementing a 10 year program

Work has been undertaken to complete an economic evaluation of the North South Corridor. This work is in progress and subject to review by Infrastructure Australia. Work to date indicates that the corridor has a Benefit:Cost Ratio (BCR) greater than 1.

2.6 What is the Fully Upgraded Non-Stop Corridor?

Adelaide's North-South Corridor will consist of a high speed non-stop managed motorway supported by a parallel surface arterial South Road. The non-stop motorway is intended to cater for the unimpeded flow of longer distance northbound and southbound trips, while the surface arterial South Road will cater for shorter distance and local trips.

The non-stop motorway will consist of:

- a continuous controlled access road comprising an urban motorway that caters for high speed free flowing traffic;
- strategically placed interchanges with on and off ramp facilities for road users to access or leave the motorway;
- grade separated road crossings of major east-west routes and train, tram and pedestrian/cycle paths crossings with the non-stop motorway generally passing over or under these roads.
- A motorway does not provide at-grade traffic signals, intersections, junctions or property accesses which cause vehicles to slow down or stop.

The surface arterial South Road will:

- generally run parallel to the non-stop motorway (with one carriageway either side of it or both on the same side);
- provide access to abutting properties, local neighbourhoods and east-west arterial roads and cater for pedestrian and cycle traffic. It will operate similar to the existing South Road.

3 Strategic Context

3.1 State-Wide Strategic Framework of Policies and Plans

The 10 Year Strategy is Volume I of a library of 'North South Corridor Strategy' (NSCS) documents in development. The NSCS sits under the State-wide strategic framework of policies and plans that work together as a comprehensive, long-term strategy for South Australia. The NSCS will form part of a series of second tier documents that sit under the Integrated Transport and Land Use Plan (ITLUP), that are corridor specific 'sectoral transport' strategies or initiatives.

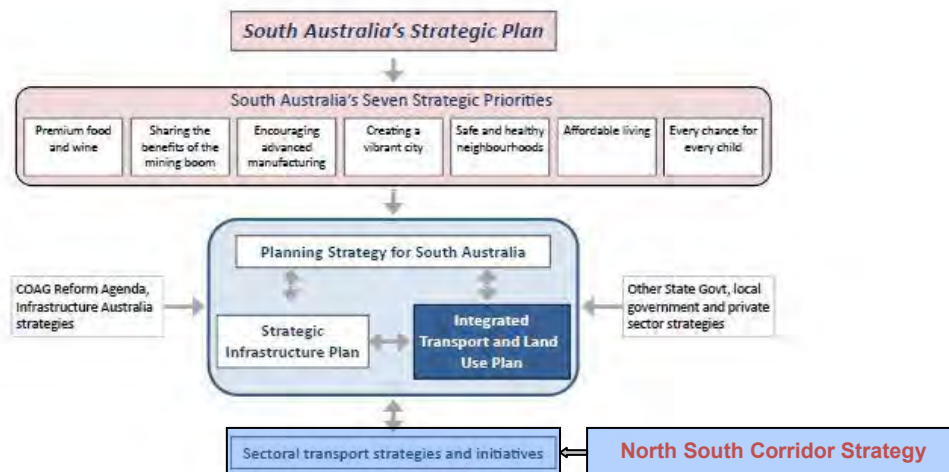


Figure 2: State-wide Strategic Framework

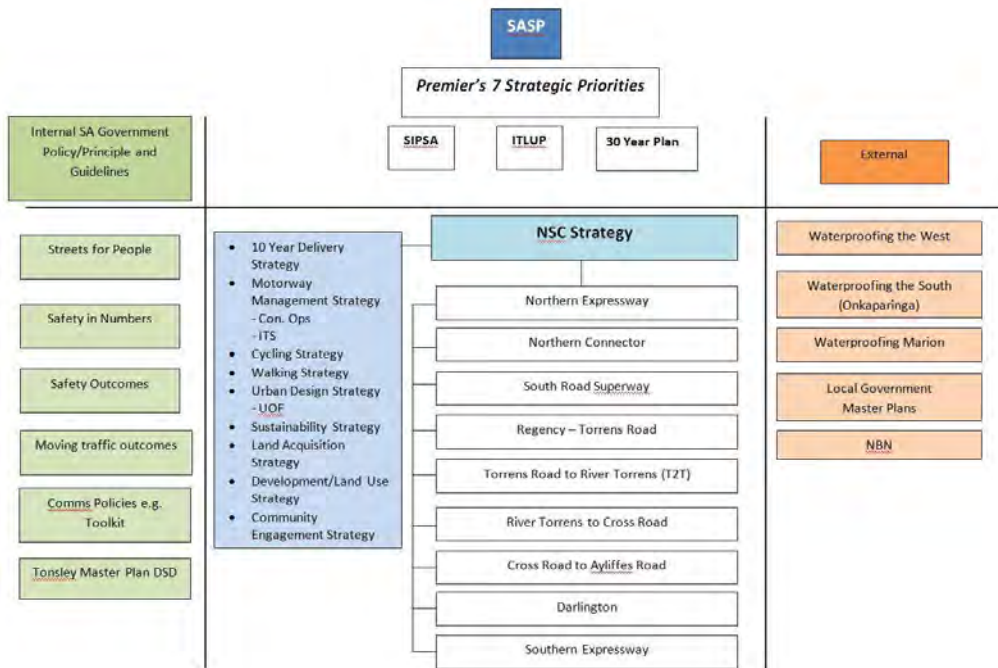


Figure 3: The North South Corridor Strategy (NSCS)

3.2 South Australia's Strategic Plan (SASP)

South Australia's Strategic Plan (SASP) is the overarching plan for the State of South Australia. It provides a comprehensive statement of what our State's future can be. SASP is the major direction-setting policy document for the State and directs South Australia's planning and transport strategies. It incorporates 100 targets aligned to six priorities. An important target regarding key infrastructure is Target 56 "Ensure the provision of key economic and social infrastructure accommodates population growth."

The Premier has also nominated seven strategic priorities for action to focus and guide the government's work in delivering the Strategic Plan.

In relation to land use and transport, there are two other important planning documents – the South Australian Planning Strategy and the Strategic Infrastructure Plan for South Australia.

These three strategies together create a comprehensive and coordinated suite of plans for land use, infrastructure and transport planning and investment over the next 30 years.

3.3 The South Australian Planning Strategy

The South Australian Planning Strategy provides the framework for land use development across the State. The Planning Strategy defines how the State will balance population and economic growth with the need to protect the natural environment and the heritage and character of our communities, while also considering the infrastructure and services we will need.

The Planning Strategy comprises the 30-Year Plan for Greater Adelaide ("the 30-Year Plan") plus seven regional volumes. The 30-Year Plan has a vision of creating a more compact city in the future, in order to fulfil overlapping objectives: liveability, competitiveness, sustainability and climate change resilience. The 30-Year Plan proposes providing for non-stop travel along the strategic North–South Corridor, by linking the Northern Expressway, the proposed Northern Connector, South Road and the Southern Expressway.

3.4 The Strategic Infrastructure Plan for South Australia (SIPSA)

The 2005-2015 Strategic Infrastructure Plan for South Australia SIPSA provides a framework for the provision and delivery of infrastructure by both the State and the private sector. SIPSA sets out priorities for infrastructure until 2015 across fourteen industry sectors, including transport. With 80 per cent of priority projects now completed or underway, SIPSA is currently being updated.

3.5 The Integrated Transport and Land Use Plan (ITLUP)

The Integrated Transport and Land Use Plan (ITLUP) is the outcome of South Australia's integrated state wide planning system. It identifies seven key challenges and seventeen priorities for responding to those challenges. It creates a vision for the future development of South Australia's transport system with a focus on connecting people to places and businesses to markets. For Greater Adelaide, the core aim is to enhance liveability, create a more vibrant, compact city and support growth in the city's successful industries.

ITLUP recognises the need for an increased role for public transport and active transport modes in conjunction with the continuing need for car travel, together with the critical need to provide efficient movement of freight (by both road and rail) and business travel.

For Adelaide, the North-South Corridor is the most important corridor for freight and businesses. The concentration of most of Adelaide’s industry in the northern, north-western and western parts of the city has led to large-scale freight route patterns that sweep from north to south and converge to the west of central and inner Adelaide to connect with the Port of Adelaide and the north-west.

To cater for the freight demand, avoid widespread heavy vehicle use across the Adelaide road network and to ensure maximum efficiency of freight movements, the SASP and the 30-Year Plan for Greater Adelaide identify the need for a designated, uninterrupted freight corridor stretching from Gawler to Old Noarlunga. ITLUP proposes building on the strategic investment on the North-South Corridor in recent years to complete the non-stop route between Gawler and Old Noarlunga as a non-stop motorway.

3.6 A Functional Hierarchy for South Australia’s Land Transport Network

A functional hierarchy approach has been adopted by the State Government in accordance with the ITLUP and is defined in ‘A Functional Hierarchy for South Australia’s Land Transport Network’.

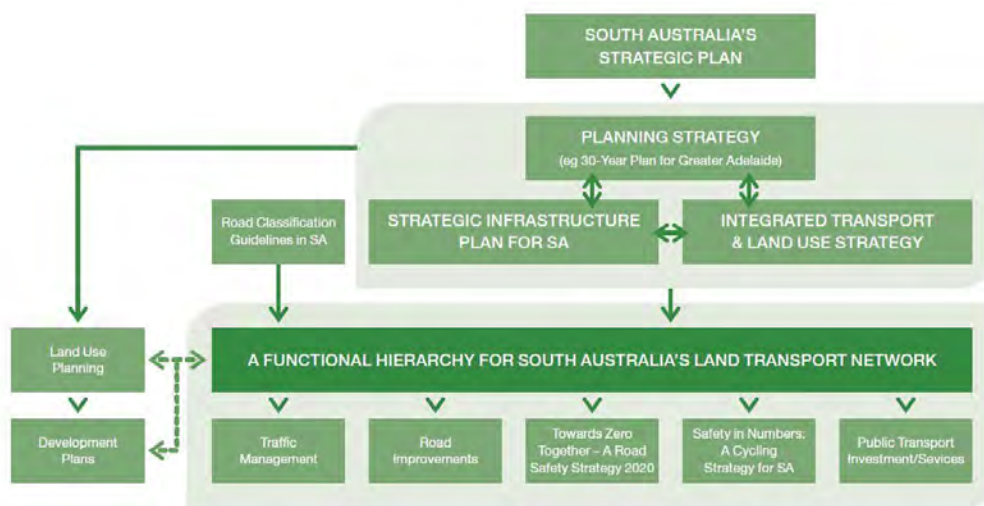


Figure 4: The Functional Hierarchy

The functional hierarchy describes the functions of each transport corridor. The functions for the metropolitan transport network are:

- public transport corridors;
- cycling routes;
- pedestrian access areas;
- major traffic routes;
- freight routes;
- peak hour routes.

The functional hierarchy provides a clearer picture of individual corridor roles in achieving the broader goals and targets identified in the SIPSA, the Planning Strategy for South Australia (including the 30-Year Plan) and SASP.

The urban form and nature of activities adjacent to transport corridors influence, and are affected by, the functional hierarchy. By recognising the different roles of corridors, the hierarchy is intended to shape the development and use of land along each corridor and flag what kind of land use policy is needed to support the function of the corridor. A Functional Hierarchy for South Australia's Land Transport Network should be read in conjunction with the relevant Development Plan for an area when specific land development proposals are considered.

The North-South Corridor's highly important strategic role in Adelaide's overall road network is reflected in its route classifications. It is classified as a freight route, major traffic route and major cycle route or greenway for its entire length (from Gawler to Old Noarlunga). Its role as a public transport corridor is only of real significance between Anzac Highway and Sturt Road where it is classified as a high frequency corridor. The only designated high activity pedestrian area is in the vicinity of the Castle Plaza Shopping Centre on South Road at Edwardstown.

4 ITLUP as a Foundation

4.1 Guidance from the DRAFT ITLUP

The North South Corridor Strategy (NSCS) is closely linked to the recently released DRAFT Integrated Transport and Land Use Plan (ITLUP) which identifies the state's future transport needs to create new and enhanced transport links to connect people to places and businesses to markets.

The DRAFT ITLUP identifies the NSCS as a sectoral transport strategy and provides the following guidance for the implementation of the non-stop North-South Corridor:

- *'We will deliver strategic investments in the North-South Corridor and other key road corridors in Adelaide to pave the way for future economic development' (page 4);*
- *'The Plan will continue with investment into the North-South Corridor to complete the non-stop route between Gawler and Old Noarlunga' (page 9);*
- *'Completion of the North-South Corridor and targeted road upgrades will give greater certainty to business and industry in moving goods and freight across the city, while still providing safe, timely access for motorists' (page 15);*
- *'Giving businesses the efficient, reliable transport connections they need to deliver goods and services around the city and to interstate and international markets – a well-targeted package of investment in the North-South corridor, Inner and Outer Ring Routes and intersection and road upgrades' (page 40);*
- *'Road investment has focused on keeping traffic moving along Greater Adelaide's important North-South Corridor, including the Northern Expressway, the South Road Superway, the Southern Expressway duplication and the Gallipoli Underpass' (page 41);*
- *'The construction of the North-South Corridor will encourage greater use of Cross Road by freight traffic to help achieve this' (page 53);*
- *'For Adelaide, there is no more important corridor for freight and business travel than the North-South Corridor' (page 55);*
- *'Ongoing implementation of the Managed Motorway Network, which will continue to be installed on the South Eastern Freeway, and will ultimately be rolled out along the North-South Corridor and the Port River Expressway in a network of high speed, free flowing roads that incorporate intelligent information, communication and control systems, such as lane use management' (page 56);*
- *'In its entirety, the uninterrupted 78 kilometre North-South Corridor will comprise:*
 - *Northern Expressway from Gawler to Port Wakefield Road;*
 - *A proposed Northern Connector from Port Wakefield Road to the Port River Expressway;*
 - *South Road from Port River Expressway to the Southern Expressway;*
 - *Southern Expressway from Darlington to Old Noarlunga;*
 - *The South Road Superway is on track for completion by the end of 2013, the Southern Expressway is on track for completion by 2014 and a proposal for the Northern Connector has been made to Infrastructure Australia' (page 56).*
- *'In the longer term, South Australia's managed motorway network will comprise the South Eastern Freeway, Northern Expressway, Northern Connector, South Road (Wingfield to Darlington), the Southern Expressway, and the Port River Expressway' (page 59).*

4.2 Solutions and Actions from the DRAFT ITLUP

The DRAFT ITLUP also recommends the following solutions and actions:

Priorities for Greater Adelaide:

- *'Complete the North-South Corridor, upgrade the Inner and Outer Ring Routes, targeted improvements to intersections and road sections.'* (page 84)

Road Network Solutions for Greater Adelaide:

- *'The critical function of the North-South Corridor means that a continued focus on this corridor will be required to provide a high standard, reliable and efficient traffic route through Adelaide.'* (page 93)

Solutions – Road Network Efficiency:

- *'Complete the 78km non-stop North-South Corridor to provide a high standard, non-stop transport connection for freight and business travel:*
 - *Torrens Road to River Torrens;*
 - *Regency Road to the Southern Expressway (remaining sections);*
 - *Northern Connector (Road and freight rail)'* (page 94).

Solutions – Maintaining and Optimising the Capacity and Efficiency of Freight Networks:

- *'Complete the 78 kilometre non-stop North-South Corridor and make targeted upgrades to the Inner and Outer Ring Routes in Greater Adelaide.'* (page 104)

Solutions and Actions – Central and Inner Adelaide:

- *'South Road will remain the principal north-south route for freight and business, freeing up parts of the network to allow for better east-west connectivity and efficient movement to key locations such as Adelaide International Airport and the Port of Adelaide.'* (page 115)
- *'Progressively upgrade South Road as part of a strategy to develop the non-stop North-South Corridor, including grade separation with key east-west arterial routes and provision of at-grade service roads (refer 13 and 14);*

13. North-South Corridor – Torrens Road to River Torrens (SHORT TERM)

14. North-South Corridor – Regency Road to Southern Expressway (excluding Torrens Road to River Torrens) (MEDIUM AND LONG TERM)* (page 116)

* Since the release of the DRAFT ITLUP, Darlington has become a Short Term initiative.

Solutions and Actions – Middle Adelaide:

- *'The North-South Corridor upgrade works will be critical in ensuring the efficient connectivity of north-south freight and business movements through the middle of Adelaide. In addition to the upgrade of the North-South Corridor, the expansion of the use of Intelligent Transport Systems along both the North-South corridor and the South Eastern Freeway will assist in more efficient traffic flows.'* (page 120)

- *'Progressively upgrade South Road as part of a strategy to develop the non-stop North-South Corridor, including grade separation with key east-west arterial routes and provision of at-grade service roads: (refer 11 and 12)*
 - 11. *Complete the North-South Corridor – Northern Connector, road and rail connection to the port (MEDIUM TERM)*
 - 12. *Complete the North-South Corridor – Anzac Highway to Southern Expressway (SHORT, MEDIUM AND LONG TERM)' (page 121)*
- *'18. Complete the North-South Corridor – including rail connections to the port (MEDIUM TERM)' (page 121)*

Solutions and Actions – Outer Adelaide:

- *'The progressive upgrade of the North-South Corridor, including grade separation of key east-west arterial roads, intersection improvements and links to the Outer and Inner Ring Routes, will enhance the efficiency and safety of freight movements into Adelaide Airport, Keswick and Islington intermodal terminals and Port Adelaide and support the growth of industry (including primary industry) and business across the southern region.'* (page 123)
- *'6. Complete the North-South Corridor – Northern Connector road connection to the port (MEDIUM TERM)' (page 125)*
- *'22. Complete the North-South Corridor – including rail connections to the port (MEDIUM TERM)' (page 126)*

Final ITLUP - road solutions

Intersection solutions

- 1-5 yrs
- 1-30 yrs
- 6-15 yrs
- 6-15 & 16-30 yrs
- 16-30 yrs
- 30+ yrs

Midblock solutions

- 1-5 yrs
- 1-30 yrs
- 6-15 yrs
- 16-30 yrs
- North- South corridor (non-stop)

- Main road
- Other road
- Passenger railway
- Tramway
- O-Bahn
- Freight railway
- Significant retail areas
- Existing key industry areas
- Built-up area
- Sea port
- Airport

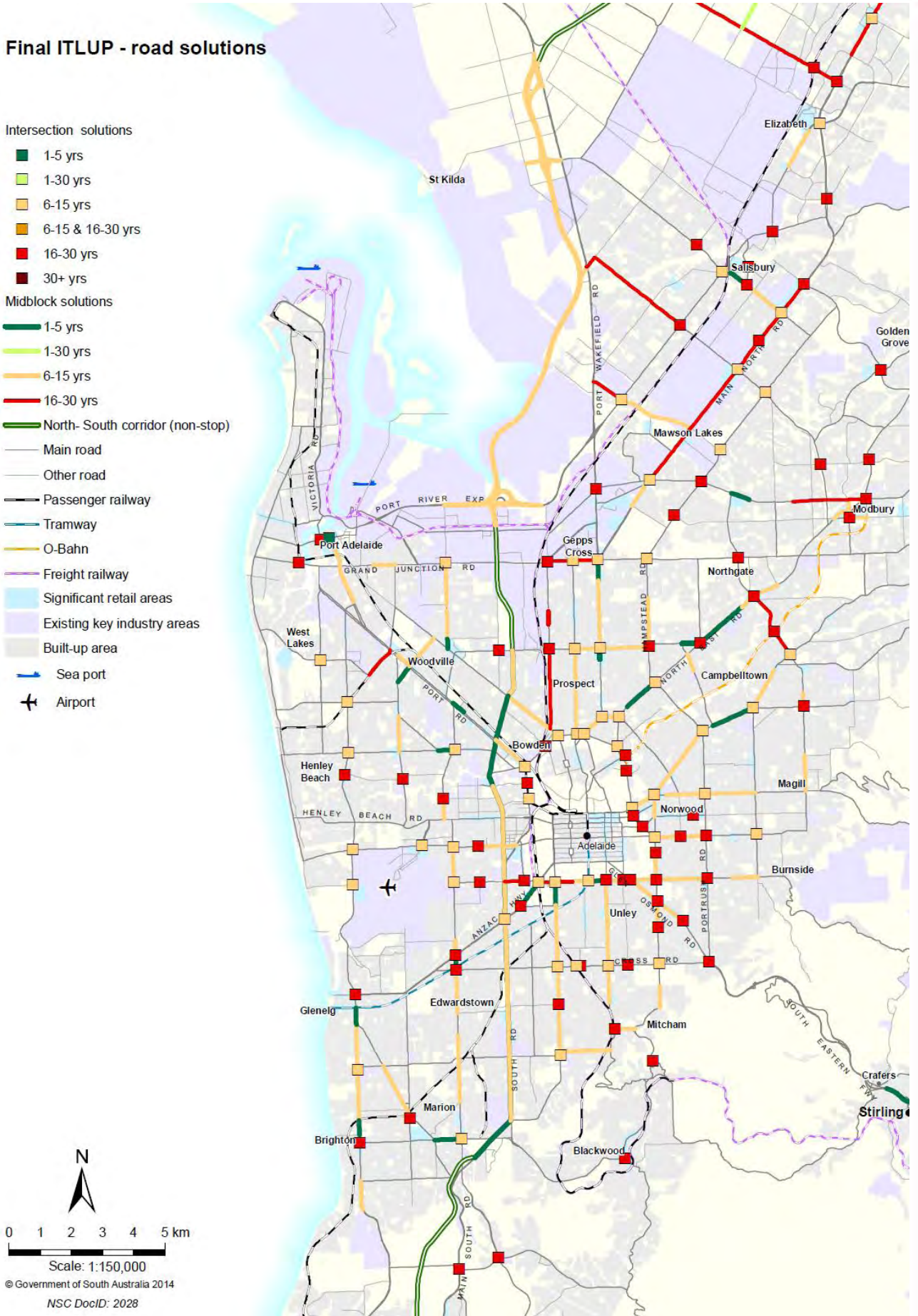


Figure 5: ITLUP Solutions Map

5 Methodology

5.1 Project Management Plan

The following approach was adopted by the project team to deliver the 10 Years Strategy:



Figure 6: Project Management Plan

6 Planned North-South Corridor Solutions & Costs

This section describes both principles and philosophies which have guided the planning and development of the concepts for the fully upgraded North-South Corridor. It summarises some of the key outcomes from the completed planning studies including discussion on costs and associated works (e.g. upgrades to intersections as part of detour routes).

6.1 Current Status of The Fully Upgraded North-South Corridor

The completion status of the fully upgraded non-stop North-South Corridor is defined in Figure 7 and Table 1 below:

Major Components	Status	Design Status			Geographic Extents
		Source	Yr	%	
Northern Expressway	Completed	N/A	N/A	N/A	Sturt Highway to Pt Wakefield Road
Northern Connector: Stage 1	Planning	Northern Connector PS	2010	5%	NEXY to Bolivar Road
Northern Connector: Stage 2	Planning	Northern Connector PS	2010	5%	Bolivar Road to PREXY
Northern Connector: Stage 3 (Rail)	Planning	Northern Connector PS	2010	5%	NEXY to PREXY
North-South Motorway (Superway)	Completed	N/A	N/A	N/A	PREXY to Regency Road
Superway to Anzac Highway:					
• Area 1	Planning	Northern PS	2013	5%	Regency Road to Pym Street
• Area 2	Planning	T2T Project	2014	5%	Pym Street to William Street
• Area 3 (T2T Project)	Funded	T2T Project	2014	30%	William Street to Grange Rd/Manton St
• Area 4	Planning	T2T Project	2014	5%	Grange Rd/Manton St to Ashwin Parade
• Area 5	Planning	Northern PS	2012	5%	Ashwin Parade to Anzac Highway
Gallipoli Underpass & Glenelg Tram Overpass Projects	Upgraded to interim	N/A	N/A	N/A	Intersection with Anzac Highway and railway line*
Anzac Highway to Southern Expressway:					
• Area 6	Planning	Southern PS	2014	5%	Anzac Highway to Ayliffes Road*
• Area 7 (Darlington Project)	Funded	D Project	2014	30%	Ayliffes Road to Southern Expressway
• Southern Expressway	Completed	N/A	N/A	N/A	South Rd Bedford Park to Old Noarlunga

Table 1: Non-Stop North-South Corridor Status

Notes:

PS = Planning Study

D Project = Darlington Project

*Anzac Highway interchange and Seaford Rail Grade Separation are likely to be considered as separate projects in advance of road section upgrades.

North-south corridor 'status' map

- North-south corridor (non-stop) Completed
- Funded
- Planning

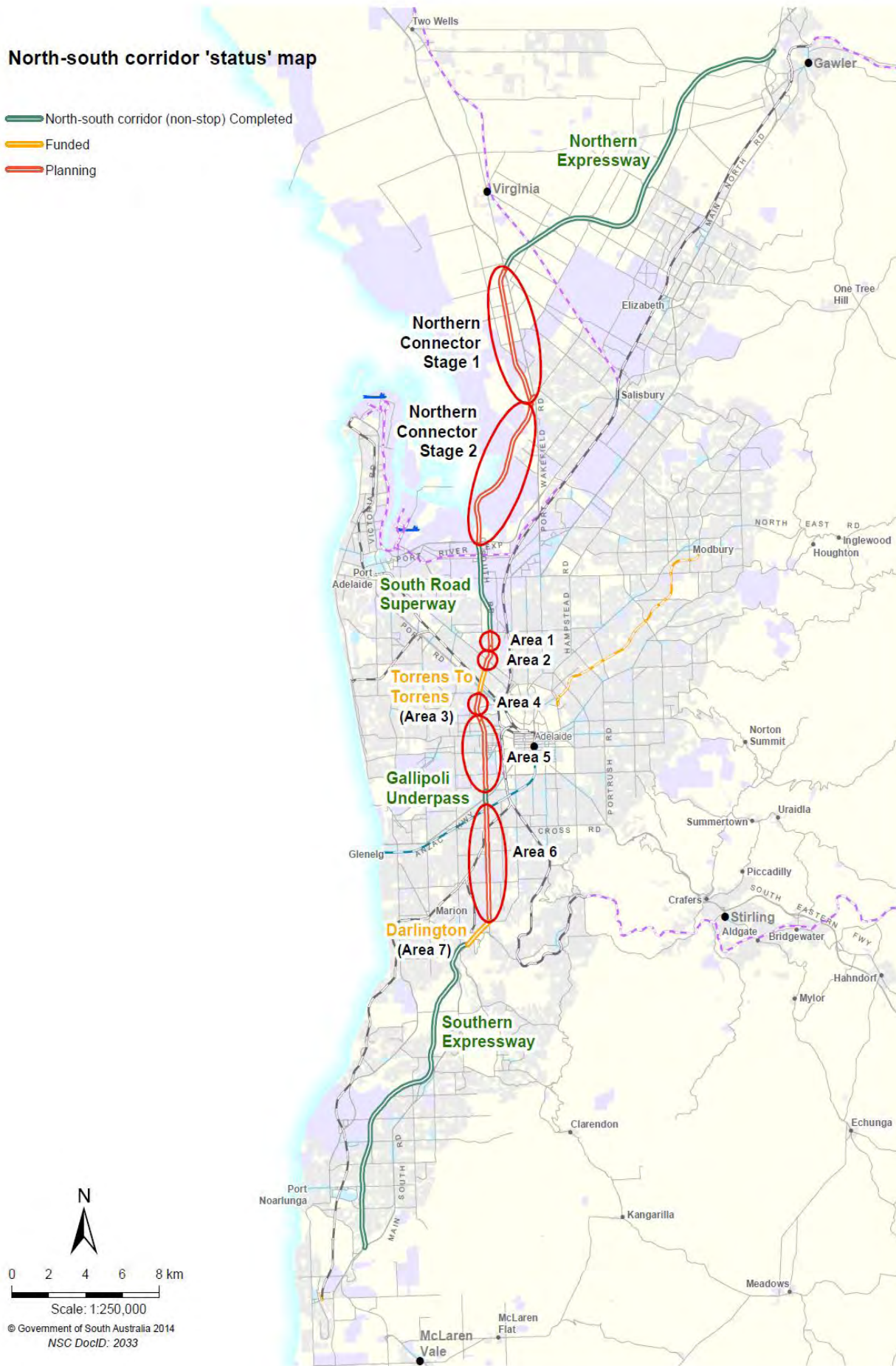


Figure 7: North-South Corridor 'Status' Map

The strategy has adopted the infrastructure solutions from the most recent or most appropriate planning investigations to date. The Strategy is designed to be robust and flexible to accommodate changes to infrastructure solutions due to further planning and external influences such as stakeholder and community feedback.

6.2 Non Stop North-South Corridor - Infrastructure Solutions from Planning Studies

6.2.1 North-South Corridor Functionality

The infrastructure solutions identified from the planning investigations have been based on the following corridor functionality requirements.

6.2.1.1 Non-Stop Motorway

The North-South Corridor's primary function is to provide for non-stop travel between Gawler in the north and Old Noarlunga in the south. The location of interchanges has been determined by the existing road network layout and the connectivity provided takes into consideration the role of the intersecting roads in accordance with the "Functional Hierarchy for South Australia's Land Transport Network", Table 2 below.

FUNCTIONAL HIERARCHY OF THE FREE FLOWING (NON-STOP MOTORWAY) COMPONENT OF THE NORTH – SOUTH CORRIDOR

ROAD	FREIGHT	MAJOR TRAFFIC	PUBLIC TRANSPORT FREQUENCY			MAJOR CYCLING	PEAK HOUR
			Priority	High	Standard Go Zone		
North-South Corridor Free Flowing (Non-Stop Motorway) Component	✓	✓					
North -South Corridor At Grade (Fronting Road) Component	✓	✓	✓ Anzac Hwy to Sturt Rd		✓ Henley Beach Rd to Anzac only	✓	

FUNCTIONAL HIERARCHY OF INTERSECTING EAST-WEST ARTERIAL ROADS

ROAD	FREIGHT	MAJOR TRAFFIC	PUBLIC TRANSPORT FREQUENCY			MAJOR CYCLING	PEAK HOUR
			Priority	High	Standard Go Zone		
Regency Road	✓ East of South Rd	✓			✓	✓	✓
Torrens Road				✓		✓	✓
Port Road	✓	✓		✓		✓	
Grange Road/Manton Street				✓			✓

Henley Beach Road (Future tram route ITLUP)			✓			✓	
Sir Donald Bradman Drive	✓	✓			✓	✓	
James Congdon Drive	✓	✓					
Richmond Road (east of South Road Inner Ring Route)	✓	✓		✓		✓	
Cross Road (east of South Road Outer Ring Route)	✓	✓			✓	✓	
Dawes Road						✓	
Ayliffes Rd				✓			
Shepherds Hill Road		✓				✓	
Sturt Road		✓		✓	✓	✓	
		West of South Rd		West of South Rd	East of South Rd		

Table 2: Functional Hierarchy for the non-stop North-South Corridor

The non-stop Motorway component of the North-South Corridor will be directly connected to intersecting arterial roads via interchanges located at Regency Road, Port Road/Grange Road/Manton Street, Sir Donald Bradman Drive/James Congdon Drive, Anzac Highway, Cross Road, Ayliffes Road /Shepherds Hill Road and Sturt Road.

The non-stop Motorway component requires provision for operation as a managed Motorway with an Intelligent Transport System (ITS) that provides full CCTV coverage, lane control, speed control, automatic incident detection and traveller information. Ramp geometrics and ducts need to be designed to cater for future ramp metering.

There are to be no north-south public utilities laid beneath the non-stop Motorway carriageways or any inspection pits on the Motorway carriageways.

The North-South Motorway is to:

- provide for the predicted 2031 traffic volumes (intersections, ramps and mid block);
- enable non-stop movement along the North-South corridor;
- prohibit uncontrolled movements across the corridor;
- cater for Restricted Access 'freight' vehicles;
- be posted at a speed limit of 80 km/h (design speed is 90 km/h to urban motorway standard) for the section between Regency Road and Darlington;
- maximum of 3 through lanes in each direction for free flow traffic.

Typical cross-sections for non-stop motorway are illustrated in Figure 8.

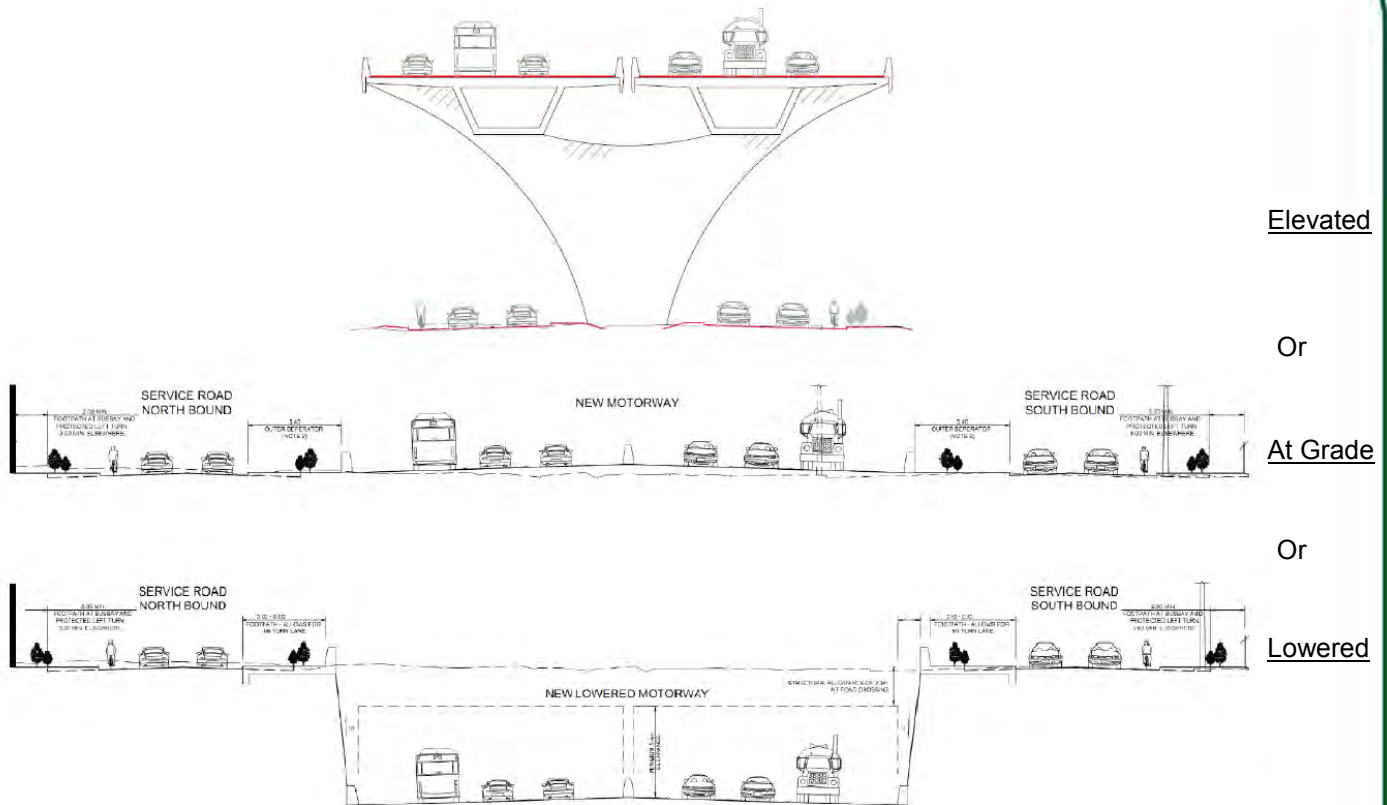


Figure 8: Typical Cross Section

6.2.1.2 Interchange Connectivity

The general design philosophy for the placement of interchanges on the North-South Corridor is to provide strategic and safe on/off access for road users while keeping local traffic movements off the non-stop motorway. The functional hierarchy of intersecting routes determines their priority for connection. In areas such as the inner suburbs to the west of the Central Business District, the spacing of the intersecting east-west arterial road system is too close to allow for interchanges at each intersection; nor would it be desirable to connect each of the arterial roads.

Entry and exit ramps generate weaving manoeuvres that create some disturbance to the traffic flow and the effects of this disturbance is experienced for a distance both upstream and downstream of the ramps. Therefore the spacing of interchanges can affect the ability of traffic to undertake weaving with subsequent impacts on the capacity of that section of motorway. The location of interchanges is based on the functional hierarchy of the intersecting roads, the physical limitations of the sites, an analysis of future safety and traffic operating conditions and the economic benefits that are delivered.

The planning studies for the non-stop North-South Corridor identified the appropriate level of connectivity and were influenced by the following factors:

Regency Rd Interchange

- Provides strategic access to the North-South Corridor for freight vehicles from surrounding industry and access to the intermodal terminal at Kilburn.

Port Rd/Grange Rd Interchanges

- Port Rd and Grange Rd are located in close proximity, so best functionality is to provide split diamond interchange.

Sir Donald Bradman Drive and James Congdon Drive Interchange

- The arrangement utilises James Congdon Drive for access to the city.

Anzac Highway and Cross Road Interchanges

- Functionality is provided by the split diamond interchange between the two intersections enabling access between strategic freight, national land link and key feeder roads.

Tonsley Park/Ayliffes Rd/Shepherds Hill Road Interchange

- Tonsley Park to become major centre with 25,000 trips per day using the interchange.

Southern Expressway (SEXY)/Flinders Drive Interchange

- Enable connections between North-South Corridor and key educational and medical precincts.

6.2.1.3 At-Grade South Road

All intersecting arterial roads and key local collector roads need to be connected to the arterial South Road:

- 2-lanes in each direction;
- designed for 70km/h;
- posted at 60km/h.

It is highly desirable that the existing number of local accesses are maintained and the local traffic pattern changes are kept to a minimum. This includes retaining existing movements at current signalised intersections with South Road. Local access provision needs to cater for freight and delivery vehicles and should not result in an increase in levels of freight and large vehicle movements through residential areas. Fronting properties will be provided with safe and efficient access to the at-grade arterial.

Bus priority is to be provided at signalised intersections where appropriate so that peak hour delays to buses are no more than two signal cycles. There is to be minimal impact from stationary buses with indented bus stops on the far side of signalised intersections, preferably with no layovers or timing points. Provision for on street parking is only to be provided where existing adjacent land uses do not have sufficient space for off-street parking.

In urban settings, continuous segregated north-south cycling lanes are to be provided along both sides of the North-South Corridor, connecting to adjoining local roads and bicycle networks. The segregation can be by either vertical or horizontal displacement and must be in accordance with Austroads, Cycling Aspects of Austroads Guidelines 2014 (Section 4.4.3 Page 38 Separated Bicycle Lanes). No cycling lanes are to be within the non-stop motorway.

For walking in these settings, continuous footpaths that are connected to existing footpath networks are to be provided along both sides of the North-South Corridor. In rural settings, a continuous cycling and walking path that is connected to adjoining roads, bicycle and walking networks are to be provided on at least one side of the North-South Corridor.

It's desirable that no new north-south public utilities are laid beneath the fronting at-grade road carriageways or any inspection pits installed on these carriageways.

6.2.2 North-South Corridor – Safety and Sustainability

6.2.2.1 Safety

Towards Zero Together – South Australia's Road Safety Strategy 2020 requires a "safe systems" approach to the design and operation of the road network. A key principle in achieving a safe system is that roads are designed and operated in a way that is more forgiving of human error. It recognizes that while roads serve a variety of functions, all roads need to be managed with the safety of the road users as a priority.

This new approach also recognises the entire road environment as the essential building block for a safe road transport system. A relevant key strategy to deliver safer roads is to integrate safety into all stages of urban/rural and transport/corridor planning processes. It also requires consideration of the safety of all road users including drivers and passengers, motor cyclists, people riding bicycles and those walking.

6.2.2.2 Sustainability

To demonstrate commitment to economic, social and environmental sustainability, DPTI will seek to adopt the principles of the Infrastructure Sustainability Council of Australia (ISCA) and their Infrastructure Sustainability (IS) Rating tool for projects undertaken within the corridor.

ISCA is the peak industry body for advancing sustainability in Australia's infrastructure. It is a member-based, not-for-profit industry (public and private) council. The IS Rating tool and rating scheme was developed and is administered by ISCA. It is Australia's only comprehensive rating scheme for evaluating sustainability across design, construction and operation of infrastructure.

The ISCA ratings can be sought for the planning/design phase, the construction phase and the operation phases of projects as shown in the Figure 9.

DPTI, in partnership with construction contractors will seek to apply the both the design and as built rating for all projects undertaken within the corridor. At completion of all projects within the corridor consideration should be given to an operational rating for the full corridor to assess the combined sustainability rating of all projects once completed.

The IS Rating tool drives projects to embed economic, social and environmental sustainability at all levels into each project phase. This is achieved by focussing effort to incorporate and assess outcomes in six themes and 15 Categories. These are shown in the Figure 10.

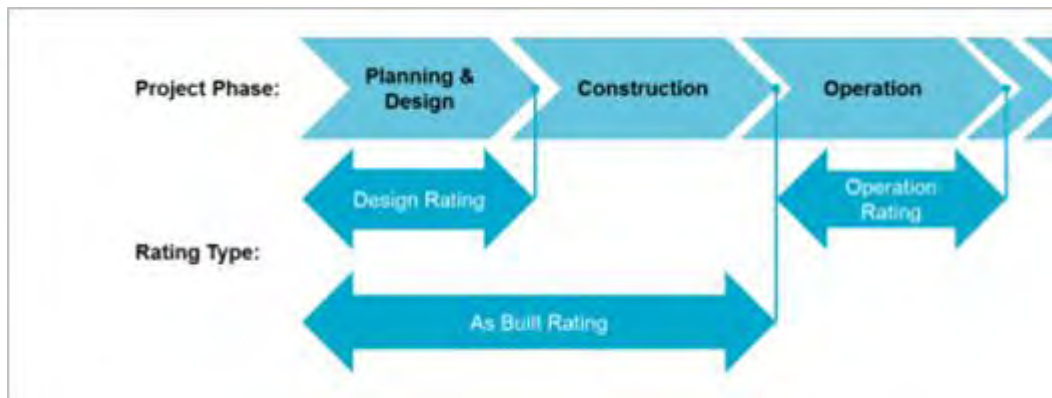


Figure 9: ISCA Ratings for Different Phases of Projects

Theme	Category	Theme	Category
Management & Governance	Management Systems	Ecology	Ecology
	Procurement & Purchasing	People & Places	Community Health, Wellbeing & Safety
	Climate Change Adaptation		Heritage
Using Resources	Energy & Carbon		Stakeholder Participation
	Water	Urban & Landscape Design	
	Materials	Innovation	Innovation
Emission, Pollution & Waste	Discharges to Air, Land & Water	Economic Performance*	Future Development
	Land	Workforce*	Future Development
	Waste		

Figure 10: Infrastructure Sustainability Rating Framework

All North-South Corridor projects will utilise the ISCA Rating framework to ensure sustainability is considered at all phases of the North-South Corridor implementation.

6.2.3 The North-South Corridor Design

The design of the North-South Corridor was based on the functionality requirements and the principles detailed in Section 6.2.3.1 to 6.2.3.8.

6.2.3.1 Interfaces with other corridors

The non-stop component of the North South Corridor provides grade separated interfaces with east-west crossing road, rail, pedestrian and cycling corridors. The corridors cross the non-stop road either above or below the non-stop motorway.

6.2.3.2 At-Grade sections of the non-stop motorway

Sections of the non-stop motorway are designed at-grade to provide a transition section of road between elevated and lowered roads. Where a section of the North-South Corridor has already been

upgraded as elevated road (Superway) or lowered road (Gallipoli), the North-South Corridor design provides a section of at-grade roads either side to prevent redundancy.

6.2.3.3 Grade Separated Sections of Non-Stop Motorway

Multi-criteria analysis at a strategic level has been used to determine the most appropriate option at each location along the corridor.

6.2.3.4 Western or Eastern Alignment

The determination of which side of the existing South Road carriageway should be widened to accommodate the North-South Corridor has been based on an evaluation that considered the following principles:

Land Ownership: to fully utilise DPTI owned land and minimise land acquisition from residential/businesses properties.

Heritage Sites: to minimise/avoid impacting heritage sites (state and local)

Developments: to assess the quality, scale and importance (locally or regionally) of the existing developments along the roadway

Services: to minimise impacts to existing utility services

Infrastructure: to provide continuity/match into existing infrastructure (e.g. Gallipoli, Superway)

Vegetation: to reduce/avoid impacts to trees of significance

6.2.3.5 Urban Design

To ensure consistent amenity for the North-South Corridor, DPTI has commissioned an Urban Design Framework to be prepared.

The framework ensures projects on the corridor have a consistent standard of urban design. It outlines urban design principles to be applied to all corridor projects and provides detailed guidance on common urban, landscape and engineering elements for the planning, construction and operational phases.

The framework guides the project to achieve:

- an integrated corridor;
- a memorable corridor;
- an accessible corridor;
- a green corridor;
- a consistent corridor.

6.2.3.6 Walking

Important guiding principles to be considered in developing a high quality built environment that both provides for and encourages walking along and in the vicinity of the North-South Corridor are:

- Safe, sufficiently wide, continuous footpaths connected to local walking networks;
- High quality walking surfaces that provide for all the community including children, older adults and people with disabilities;
- Safe road crossings located at pedestrian desire lines;
- Minimised waiting times at signalised pedestrian crossing points;
- Minimised vehicle crossovers across footpaths.

6.2.3.7 Cycling

Important guiding principles to be considered in developing the high quality bicycle routes required along the North-South Corridor are:

- facilities that are continuous and connected to adjoining regional and local bicycle networks;
- safe and sufficient width for bicycles to operate;
- bicycles are separated from moving and parked vehicles;
- bicycles have a smooth surface and ability to maintain speed;
- safe road crossings;
- minimised crossing times at signalised crossings;
- minimised crossings of bicycle facilities by motor vehicles.

6.2.3.8 Design constraints and considerations

The following constraints and considerations by geographical location guided the design solutions:

Lowered road section (South of Daws Road to Ayliffes Road)

- Predominantly residential area with a parallel local road network enabling alternative connections to be developed;
- A lowered road provides greater flexibility for connections to Tonsley Park and major intersections at Ayliffes Road / South Road intersection, given their proximity to each other;
- Major services and drainage structures can be incorporated in bridge structures over North-South Corridor.

Elevated structure (North of Edward Street to South of Daws Road)

- This area is predominantly industrial/commercial and includes known contaminated soils that would require expensive remediation/disposal if disturbed;
- Lots of side road connections including East-West movements that service local area and facilities that do not need to interact onto the N-S Corridor;

- Minimal loss to visual amenity due to duplicating the existing elevated roadway over the rail corridor at Cross Road;
- Shallow groundwater along this road section leading to ongoing maintenance effort if an alternative treatment was selected;
- Greater flexibility for future rail/road separation as part of Emerson crossing upgrade.

Lowered road (South of Ashwin Parade to North of Anzac Highway)

- Predominantly residential area;
- Cut and cover tunnel under James Congdon Drive minimises land acquisition of adjacent businesses;
- Short tunnel at Sir Donald Bradman Drive is required to minimise footprint of the intersection and not impact state heritage buildings;
- Short tunnel at Henley Beach Road minimises land acquisition in the area and eliminates the need to encroach on St George College.

Elevated structure over the River Torrens

- To allow a narrower footprint and enables clearance to the adjacent shopping and community centres. The elevated structure also traverses the River Torrens;
- An at-grade option over River Torrens has also been considered however its viability requires further investigation.

Lowered road (North of Pym Street to North of the River Torrens)

- Predominantly residential area;
- Improved access for local roads to cross the non-stop corridor.

Elevated road over Regency Road

- Mostly commercial/industrial area with some residential properties;
- North-South Corridor over Regency Road requires less land acquisition than other options considered.

At-Grade for the entire length of Northern Connector

- Built on an embankment of fill close to current surface levels to provide appropriate drainage.

6.3 Non Stop North-South Corridor - Costs from Planning Studies

Cost estimates based on the infrastructure solutions were completed as a part of the previous Northern Connector and northern and southern planning studies and produced P50 and P90 estimate values relevant to the respective sections of the fully upgraded North-South Corridor. The estimates were prepared at the time of the respective planning studies and for comparison purposes have been escalated to reflect real dollars as at July 2014. Table 3 summarises the fully upgraded North-South Corridor estimates.

Planning Study	Section	Costs (Real 2014 Dollars)*	
		P50	P90
Northern Connector	Northern Connector	\$760m	\$800m
	Northern Connector Rail (Land Preservation Only)	\$20m	\$20m
Northern	North of Regency Road to South of Torrens Road	\$680m	\$730m
	Torrens to Torrens (funded)	\$630m	\$680m
	North of River Torrens to Anzac Highway	\$2300m	\$2500m
Southern	Anzac Highway to Albert Street	\$650m	\$670m
	Albert Street to Norrie Ave	\$730m	\$760m
	Norrie Ave to Ayliffes Road	\$590m	\$600m
	Darlington (funded)	\$430m	\$500m
Corridor Total		\$6790m	\$7260m

Table 3: Summary of North-South Corridor estimates

*Costs are rounded to the nearest \$10m.

Note: Since the northern planning study, further planning investigations have been undertaken resulting in new infrastructure solutions, as described in Section 5.1, Table 1. The estimates and infrastructure solutions that do not match are detailed in Table 4, however the estimates are highly likely to remain valid with this level of accuracy.

Major Component (new infrastructure solution with old estimate)
Northern Planning Study – Section from Pym Street to William Street updated.
Northern Planning Study – Road section from Grange Rd/ Manton St to Ashwin Parade updated.

Table 4: Major Component (new infrastructure solution with old estimate)

The ITLUP report produced estimated costs to fully upgrade the North-South Corridor.

6.4 Associated Works – Infrastructure Solutions from Planning Studies

The currently planned network upgrades for the North-South Corridor are described in Sections 6.4.1 and 6.4.2:

6.4.1 Churchill Road/Regency Road Intersection

This intersection has been investigated as part of the Torrens Road to Torrens River (T2T) Project. During its construction, traffic is expected to divert from South Road and travel along Regency Road, Churchill Road, Torrens Road and onto Park Terrace. The intersection has been investigated but no recommended treatment has been identified at this time. To assist traffic detouring due to the construction of T2T, it was identified that the right turn lane from Regency Road (west approach) to Churchill Road (south) could potentially be duplicated.

6.4.2 Western Detour

The Western Detour (Regency Road/Torrens Road/David Terrace, Kilkenny Road/Port Road/East Ave, East Avenue/Grange Road/Holbrooks Road and Holbrooks Road/Henley Beach Road/Marion Road intersections) was investigated as part of Torrens Road to Torrens River Project as the routes provide the most direct arterial road west of South Road. The investigation recommends upgrades at each intersection that can be delivered with minimal or no land acquisition.

6.5 Traffic Operations and Infrastructure

The South Australian Government is progressively developing the North-South Corridor into a non-stop motorway standard facility between Gawler and Old Noarlunga. This goal is a key element of the Integrated Transport and Land Use Plan (ITLUP), which states:

“Ongoing implementation of the Managed Motorway Network, which will continue to be installed on the South Eastern Freeway, and will ultimately be rolled out along the North-South Corridor and the Port River Expressway in a network of high speed, free flowing roads that incorporate intelligent information, communication and control systems, such as lane use management” (page 56)

The Australian Government has published an ITS Policy Framework (*Policy Framework for Intelligent Transport Systems in Australia, Standing Council of Transport and Infrastructure*), which has a key principle that ITS development and implementation must deliver demonstrable benefits to individual, community and businesses. This principle is a driver for the development of a “Concept of Operation” for the North-South Corridor, so that the level of ITS needed for managing the motorway is commensurate with the benefits provided in terms of safety and traffic efficiency/throughput, particularly for freight.

The current level of 'active management' utilising Intelligent Transport Systems (ITS) on the upgraded sections of the North-South Corridor is described in Table 5 (*Reference from North-South Corridor ITS/Managed Motorway Development of a Concept of Operation Tender Document*).

Section	ITS	Roles	Level of ITS
Northern Expressway (110km/h)	Full CCTV coverage; Loop pairs at ~ 500m intervals; VMS; CMS on Expressway; CMS on arterials including on alternative routes	Incident Management	Base
North-South Motorway (Port River Expressway – Regency Road) – (South Road Superway Project) (90km/h)	Full CCTV coverage; TIRTLs at~500m intervals; Video incident detection; LUMS; VMS on motorway and arterials CMS on Motorway CMS on arterials including on alternative routes	Incident and Speed Management	2
Gallipoli Underpass (currently 60km/h)	Full CCTV coverage	Incident Monitoring	Base
Southern Expressway (duplicated), (80-100km/h)	Full CCTV coverage; Loop pairs at ~500m intervals; VSL (northbound Majors Road to Main South Road); VMS on Expressway; CMS; VMS (RC3) on arterials; Weather Stations	Incident and Speed Management	1

Table 5: Intelligent Transport Systems (ITS) on the upgraded sections of North-South Corridor

Note:

- The level of ITS in Table 6 is referenced from Figure 12;
- CCTV – Closed-circuit television;
- VMS – Variable Message Signs;
- CMS – Common Management System;
- TIRTL – Infra-Red Traffic Logger;
- LUMS – Lane Use Management Systems
- VSL – Variable Speed Limits

The successful delivery of the ITS Strategy rests on the 5 pillars as shown below.



Figure 11: Pillars supporting the Delivery of the ITS Strategy

The elements of a Managed Motorway are as follows:

- **Lane Use Management Systems (LUMS)** – manages lane use in the event of an incident without total loss of motorway capacity;
- **Hard Shoulder Running** – where emergency break down lanes are used as supplementary lanes during peak periods. As traffic flows approach 1,800 veh/lane/hour, the potential for flow breakdown increases, even if VSL and ramp metering are implemented as the physical capacity of the road is reached. At this point, the implementation of hard shoulder running can provide valuable additional capacity during peak periods. The hard shoulder running infrastructure would include VSLS mounted over the hard shoulder on existing gantries, emergency stopping bays, hard shoulder pavement strengthening, additional loops, CCTV and VMS depending upon the existing provision. Another approach is not to provide breakdown lanes (e.g. effectively have hard shoulder running at all times with lane controls);
- **Ramp Metering** – coordinated use of traffic lights on motorway on-ramps to control the rate which vehicles merge with the main motorway traffic stream (ramp signals). Vehicles generally proceed individually on a green light. Once traffic flows downstream of entry ramps reach around 1,700 veh/lane/hour, the use of ramp metering can assist in preventing flow breakdown by controlling the entry of vehicles to the motorway. The ramp metering infrastructure would include ramp signals, warning signs, additional loops, if not installed with the supporting infrastructure;
- **Variable Speed Limits (VSL)** – supported by VMS to prevent the occurrence of further (secondary) incidents after an initial crash, to improve safety during hard shoulder running, and/or during extreme weather events. The first building block in Managed Motorway is VSL to provide congestion management until such time as hard shoulder running is required. Traffic flow triggers for the installation of VSL are around 1,500 veh/lane/hour. This infrastructure would include gantry mounted variable speed limit signs over each lane at approximately 1,000 metre spacing, and supporting VMS. The location of VSLS on entry ramps should consider the future implementation of ramp metering;

- **Incident detection** – using closed circuit television (CCTV) cameras, webcams, weather monitoring stations and emergency telephones;
- **Automatic number plate recognition (ANPR)** – to monitor/ compliance freight movements;
- **Traffic and traveller information services** – such as Variable Message Signs (VMS) with real-time advice about travel times and/or current speed;
- **Speed enforcement** – using speed cameras;
- **Supporting ITS Infrastructure** - Communications backbone, vehicle detectors and power.

These measures can be implemented in stages (Figure 12), depending on individual needs of the road and building up the “smart” capability of the motorway. It is expected that the level of ITS varies along the full corridor, generally at a lower level towards the north and south ends, and highest level in the central part.

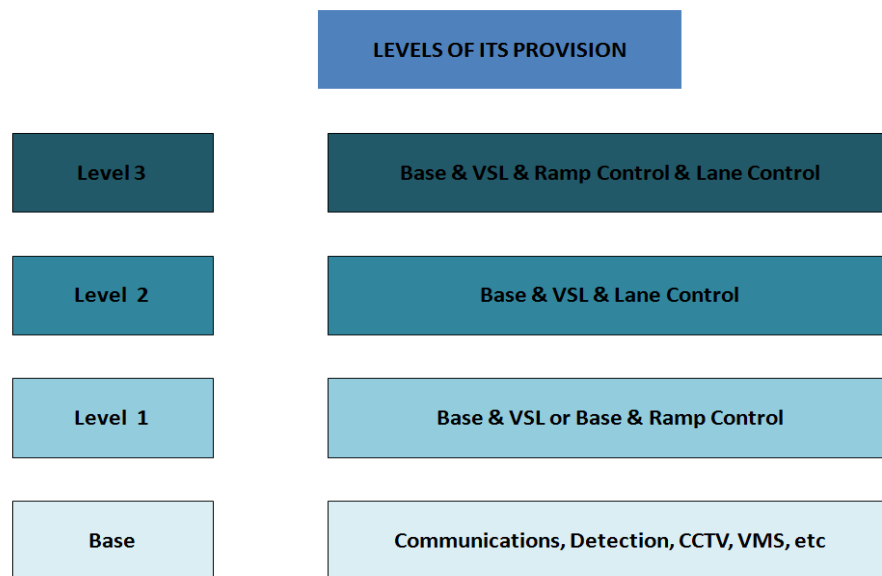


Figure 12: Levels of ITS Provision

The Department of Planning, Transport and Infrastructure (DPTI) operates a Traffic Management Centre (TMC) that utilises the STREAMS system as the overarching Traffic Management and Control System to manage the current ITS infrastructure of the current road network. The traffic signals are monitored and controlled using SCATS which interfaces with STREAMS.

DPTI is also progressively implementing a dedicated Metropolitan Area Broadband Network (MABN) that will provide optical fibre telecommunications between key ITS nodes including the TMC. Austroads has been undertaking a project to develop Australian National ITS Architecture, and after researching international architectures, is recommending the adoption/adaption of the European FRAME ITS architecture.

Over the development period for the North-South Corridor, and in subsequent operational years, it is anticipated that Cooperative ITS systems will be progressively deployed in vehicles and infrastructure which supports the central systems. Cooperative Intelligent Transport Systems (C-ITS) refers to real time information sharing between vehicles and roadside infrastructure, and a new generation of applications that cooperatively work together to improve safety, productivity, efficiency and environmental outcomes for the transport system.

6.5.1 Traffic Management Centre

The Traffic Management Centre (TMC) at Norwood currently lacks the space to expand its operations to meet the demands of managing the Adelaide metropolitan network. There is a proposal to rearrange the existing TMC to meet the continued demands of monitoring and managing the Adelaide network. However, the proposal is only an interim measure to cater for some of the current deficiencies of the existing centre. These deficiencies are: -

- Compatibility of New ITS Equipment
 - Concerns that new equipment is not compatible with STREAMS. This would counter the TMC's goal of one operating platform (STREAMS), interfacing all systems with this single, preferred management system;
 - The current TMC is operating at or near capacity.
- Traffic Management Centre Staffing
 - The staffing levels at the TMC present a number of operational risks and challenges;
 - Some tasks currently performed by the TMC operators and management could be undertaken by the back room teams (e.g. alleviate the pressure).
- Traffic Management Centre IT Support Requirements
 - The number of IT support staff required to manage the traffic communication network and all servers is identified as a high level risk as the North-South Corridor is developed and as more new ITS systems are installed.
- Traffic Management Centre Operating Platform
 - Adelaide TMC is using STREAMS as the global Traffic Management Control System and all new devices are required to be STREAMS compatible. The configuration and testing of STREAMS is a significant undertaking considering all of the other activities required as part of the management of the TMC.
- Traffic Management Centre Business Planning
 - As the demands on the TMC grow with the addition of new ITS equipment and possible Managed Motorways in the future, a reliable back-up TMC needs to be established.
- Connectivity to STREAMS
 - A consistent approach to the selection of ITS equipment to STREAMS will maintain the goal of having a single operating platform and streamlined operation;
- Connectivity to Existing ITS Infrastructure
 - The TMC is connected to all on-street ITS equipment via a dedicated traffic network. The primary network connection is provided via microwave, with a secondary back-up network connection provided by fibre optics and managed by third parties (e.g. Telstra and SILK);
 - The primary communication network is maintained by the IT support staff at TMC;
 - The current support team does not cater for the ITS network grow.

- Adapting for Bus Priority

- Any bus priority system in Adelaide will have minimal impact on the current TMC. However, the decision to locate the servers and data centres may have some impact on the IT support staff at the TMC.

- Other DPTI Business Planning

- It is required to increase the number of maintenance staff in order to ensure a high level of reliability of ITS and ensure a rapid response to any incidents or failure of equipment;

Potential Solutions for TMC has been identified:

- Option 1 (Do Nothing Approach – Leaving the TMC and analogue vision in its current state);
- Option 2 (Upgrade the TMC and replace the analogue vision with digital vision);
- Option 3 (Move into another location that can be better accommodate the future needs of the TMC);
- Option 4 (Construct a purpose built TMC).

INVESTIGATIONS

(Section 7 to 15)

Purpose:

- Identification of road and associated work projects
- Assessment and prioritisation of road project sections
- Effective management of land acquisition and services
- Identification of the program of works and cash flows
- Identification of risk and opportunities

Outcome:

- A program of works and associated cash flows

7 The Project Components

The delivery of a major Infrastructure Road Project (R) involves four major work components: project planning, detailed design, pre-construction and construction.

In modern construction management, smaller low cost projects involving network modifications, public transport and traffic operation initiatives are generally implemented in the pre-construction stage before the successful contractor builds the road project. These types of projects are categorised as Associated Works Projects (AW) and have an important role in supporting the delivery of the road project.

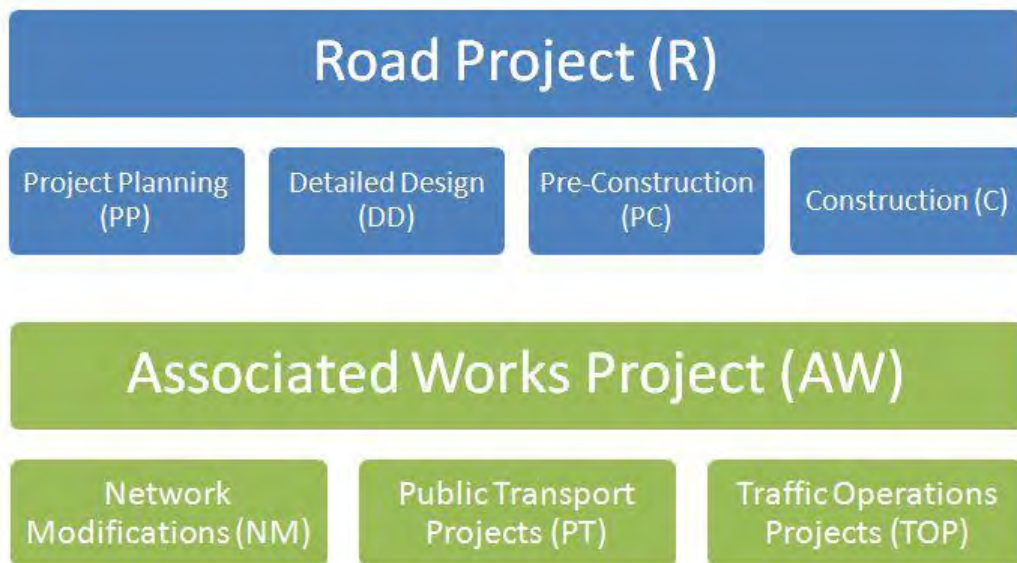


Figure 13: Road Project (R) & Associated Works Project (AW)

The strategy will consider undertaking early work activities separately and in advance of the road project to test if it will be effective in expediting the delivery of the fully upgraded North-South Corridor.

The activities that form the Early Works (EW) Projects include:

- early planning of the road corridor to an advanced concept design stage (notionally 30%);
- undertake all utility services, environmental and geotechnical investigations;
- seek Public Works and Cabinet approval for early works (i.e. services, land acquisition and associated works projects);
- commence community engagement in the areas of the early works projects;
- undertake property acquisition and demolition to accommodate the future road project;
- undertake service relocations for offline services (i.e. services that can be relocated to a local road or outside the ultimate road corridor);
- implement associated works projects (network modifications, public transport and traffic operations projects) to support the implementation of future road projects.

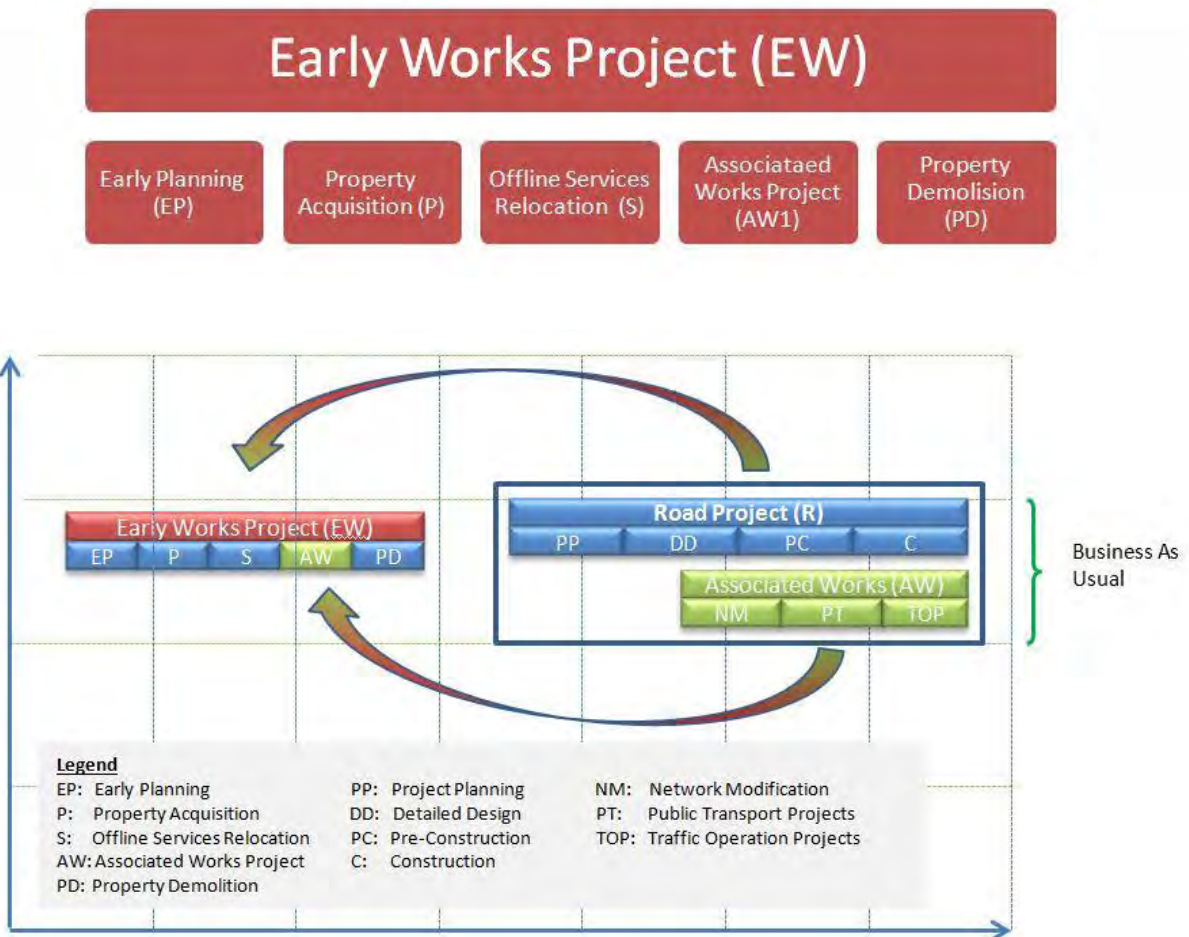


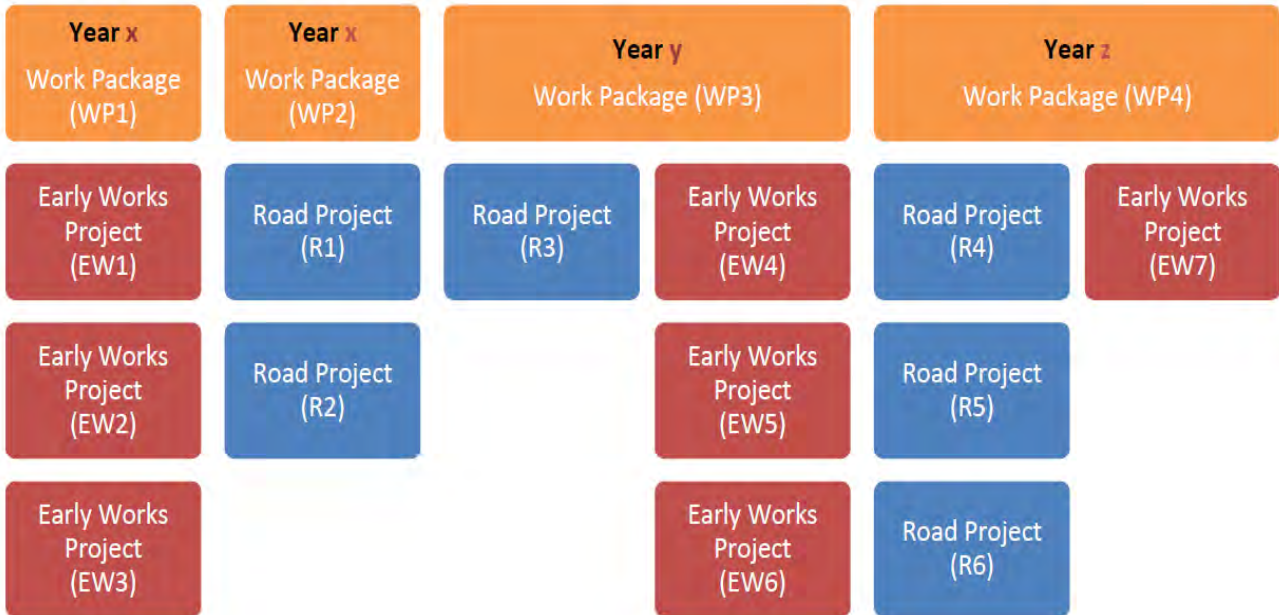
Figure 14: Early Work Project (EW)

Strategic Program Management Approach

The strategy will adopt delivering the North-South Corridor as a Program of Works (Strategic Program Management Approach) which provides many opportunities to effectively deliver the non-stop North-South Corridor. The entire number of road projects, associated work projects and early work projects (if viable) can be integrated from a delivery and funding approach.

The Strategic Program Management Approach provides flexibility to bundle projects as work packages to best suit funding submissions (investments) and procurement strategies (delivery).

The Program of Works



The Program of Works

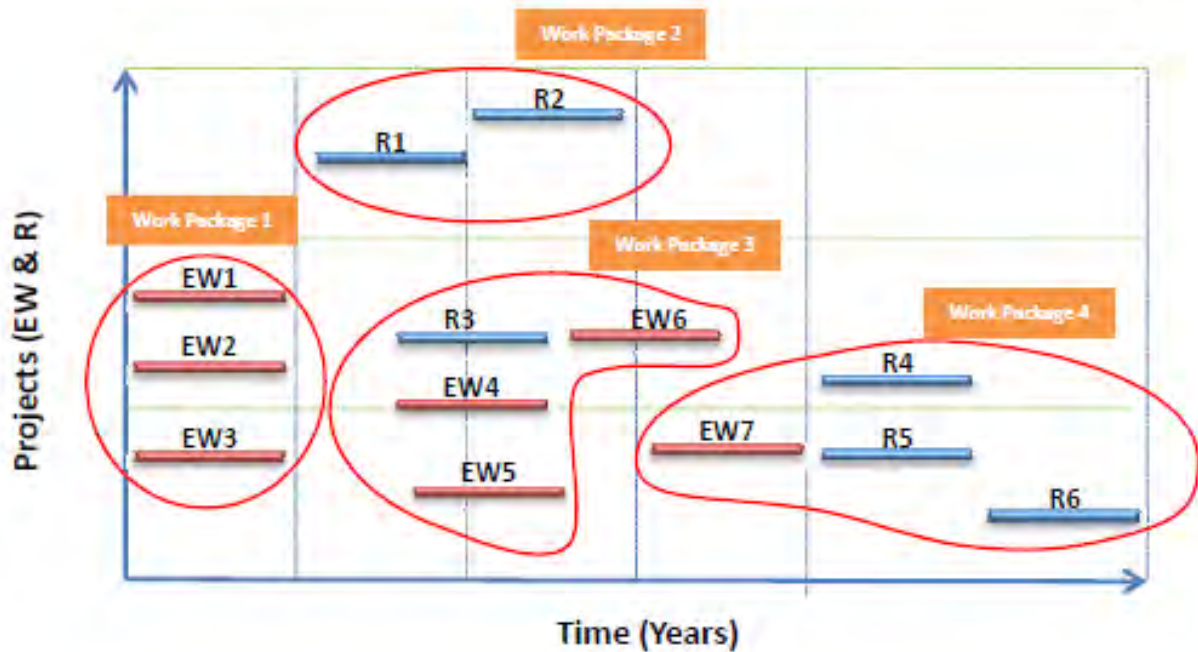


Figure 15: Example of Program of Works

7.1 Road Projects

Based on the outcomes of the previous planning studies, the remaining unconstructed North-South Corridor is broken down into 'notional' project sections. These sections are listed in Table 6.

Unfunded Sections	Section Description
S1	Northern Expressway to Bolivar Road intersection
S2	Bolivar Road intersection to Superway
S3	Superway to south of Hawker Street junction
S4	south of Grange Road intersection to Sir Donald Bradman intersection
S5	Sir Donald Bradman intersection to Anzac Highway
S6	Anzac Highway to south of Daws Road intersection
S6	south of Daws Road intersection to south of Ayliffes Road intersection

Table 6: Unfunded Sections

For the purpose of this report, the unfunded sections relate to the remaining parts of the North South Corridor that are required to be funded and implemented to complete the non-stop motorway.

7.1.1 Road Project Sections

A process was adopted to determine how the unfunded sections in Table 8 could be split up into the smallest number of project sections (without incurring a major redundancy cost and time penalty). This process facilitates a flexible approach to prioritise the delivery of the North-South Corridor and bundling of projects for funding submissions and procurement strategies.

- Step 1:** Prepare a schematic plan showing the horizontal and vertical profile of the remaining unfunded corridor;
- Step 2:** Show intersection locations that will become an interchange or tunnel along the ultimate non-stop corridor;
- Step 3:** Overlay previous notional project sections on the same plan;
- Step 4:** Review the notional project sections and adjust the sections based on 'redundancy minimisation' guiding principles;
- Step 5:** Undertake a workshop with across DPTI representation seeking input to consider and refine the approach;
- Step 6:** Finalise the project sections based on workshop outcomes.

7.1.2 Project 'Redundancy Minimisation' Guiding Principles

The Australian and South Australian Governments have responsibility to demonstrate value for money and due diligence to minimise redundancy works and transport impacts along the corridor as construction is rolled out progressively over the program of works.

By definition, redundancy refers to the "state of being not or no longer needed or useful". For the North-South Corridor, this is particularly important as the higher the level of redundancies, the higher the costs and time penalty for reworking the projects, which will in turn affect the time, quality and cost of the overall program.

In order to minimise redundancy, the process considered the current design to determine what type of design features were best suited as project interfaces, so that if adjacent projects were not delivered concurrently or sequentially (due to different delivery priorities) there would be limited rework in the future.

The key redundancy minimisation guiding principles are:

- Principle 1:** Project section to start and finish at grade;
- Principle 2:** Elevated structures to be delivered in one section;
- Principle 3:** Tunnels or lowered road to be delivered in one section.

The above guiding principles will still experience some level of redundancy at the interfaces, but limited to horizontal interfaces only (Refer to Figure 16). However, if not applied, a greater level of redundancy would occur by needing to split lowered or elevated road sections. (Refer to Figure 17)

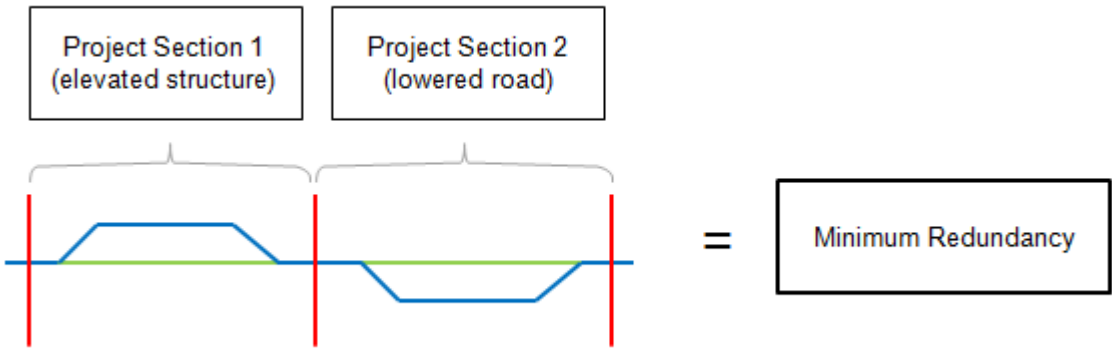


Figure 16: Redundancy Minimisation Approach

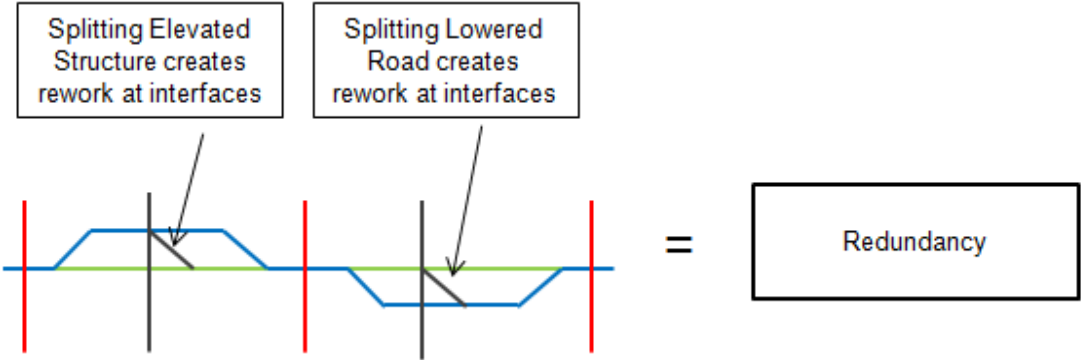


Figure 17: Introduction of Redundancy

Based on the guiding principles, seven (7) project sections (between Superway and Darlington) were identified. Northern Connector sections were not considered because the sections have been predetermined and already aligned to the guiding principles.

Project	Section Description
R1	Superway to South of Regency Road
R2	South of Regency to South of Torrens Road (T2T)
R3	T2T to South of Ashwin Parade
R4	South of Ashwin Parade to South of Glenelg Tram Overpass
R5	South of Glenelg Tram Overpass to South of Cross Road
R6	South of Cross Road to South of Daws Road
R7	South of Daws Road to Darlington

Table 7: Project Sections (Pre Workshop)

7.1.3 Project Delivery Packages Workshop

A workshop was held on 17 September 2014. At the workshop, participants (DPTI) were generally in acceptance of the redundancy minimisation approach as a broad guiding principle, however, some participants did caution that other factors such as traffic impacts, economics, funding constraints and extensions to current contracts should also come into play in the decision making process.

It was also raised that some redundancies may be necessary or justified to unlock other economic, strategic or transport benefits, but the group also agreed that the benefits for such redundancies will need to be clearly demonstrated during the project planning and design stage (i.e. the benefits would have to outweigh the redundancy time and cost penalty to the program of works).

The workshop participants were divided into three groups, provided with a roll plan displaying the seven project sections, and asked to present their recommended project sections. The key feedback was:

- General agreement with the R1 and R2 project sections, however, there is a preference to bundle R1 and R2 as a single project as the grade separation of Torrens Road was perceived to have a low benefit cost ratio (BCR) as a standalone project;
- R2 could be added to the Torrens to River Torrens project if funding permits;
- Delivering R3 as a standalone project was perceived to have a low BCR as Ashwin Parade is only a local connector route;
- There are two short tunnels proposed at Henley Beach Road and Sir Donald Bradman Drive intersection. It was considered that there should be delivered at the same time;
- The length of R4 was too long for delivery. This would need to be broken down into two sections with a division in the proximity of Sir Donald Bradman Drive Interchange;
- R5 is a complicated project due to the intersection of Cross Road and the interface with the Seaford Rail. This can be a standalone project;
- No objections to R6 and R7.

7.1.4 Road Project Sections – Post Workshop Outcomes

A process was adopted to finalise the project sections following the workshop.

Step 1: Display and overlay each groups ‘recommended project sections’ on a roll plan;

Step 2: Compare the sections to identify which were the same and which differ;

Step 3: Normalise and finalise the project sections.

The following observations were noted:

- Project sections for R1, R2, R3, R6 and R7 are similar across the board;
- Project section R4 was split up into two new sections.

R4 was split into two road project sections as it appeared too large and costly (significantly greater than \$1B) to deliver as one project. An approximate midpoint was chosen between the split diamond interchange of James Congdon Drive and Sir Donald Bradman Drive. Splitting R4 at this location also unlocks transport benefits for each of the new road project sections by connecting major crossing arterial roads to the motorway.

The final project sections (including the two predetermined Northern Connector sections) are described in Table 8 and Figure 17.

Project	Length (km)	Section Description
NC1	7.1	Northern Expressway to Bolivar Road intersection
NC2	8.4	Bolivar Road intersection to Superway
R1	1.3	Superway to South of Regency Road
R2	1.84	South of Regency to South of Hawker Street junction
R3	1.0	South of Grange Road intersection to south of Ashwin Parade intersection
R4	2.13	South of Ashwin Parade to South of Sir Donald Bradman Drive intersection
R5	2.58	South of Sir Donald Bradman to South of Glenelg Tram Overpass
R6	1.6	South of Glenelg Tram Overpass to south of Cross Road intersection
R7	2.6	South of Cross Road intersection to south of Daws Road intersection
R8	1.8	South of Daws Road to south of Ayliffes Road intersection

Table 8: Recommended Project Sections – Post Workshop

It should be noted there would be a preference to deliver the two short tunnels as part of road project R4. Additionally, if R4 and R5 are delivered at separate times, the tunnels underneath James Congdon Drive and Sir Donald Bradman Drive should only be built as part of the second project.

North-south corridor project sections

— North-south corridor (non-stop)

— Funded

— Unfunded -

NC1 (7.1 km) Northern Expressway to Bolivar Road intersection

NC2 (8.4 km) Bolivar Road intersection to Superway

R1 (1.3 km) Superway to south of Regency Road

R2 (1.84km) south of Regency Road to south of Hawker Street junction

R3 (1.0 km) south of Grange Road intersection to south of Ashwin Parade intersection

R4 (2.13km) south of Ashwin Parade to south of Sir Donald Bradman Drive intersection

R5 (2.58km) south of Sir Donald Bradman Drive to south of Glenelg tram overpass

R6 (1.6 km) south of Glenelg tram overpass to south of Cross Road intersection

R7 (2.6 km) south of Cross Road intersection to south of Daws Road intersection

R8 (1.8 km) south of Daws Road to south of Ayliffes Road intersection

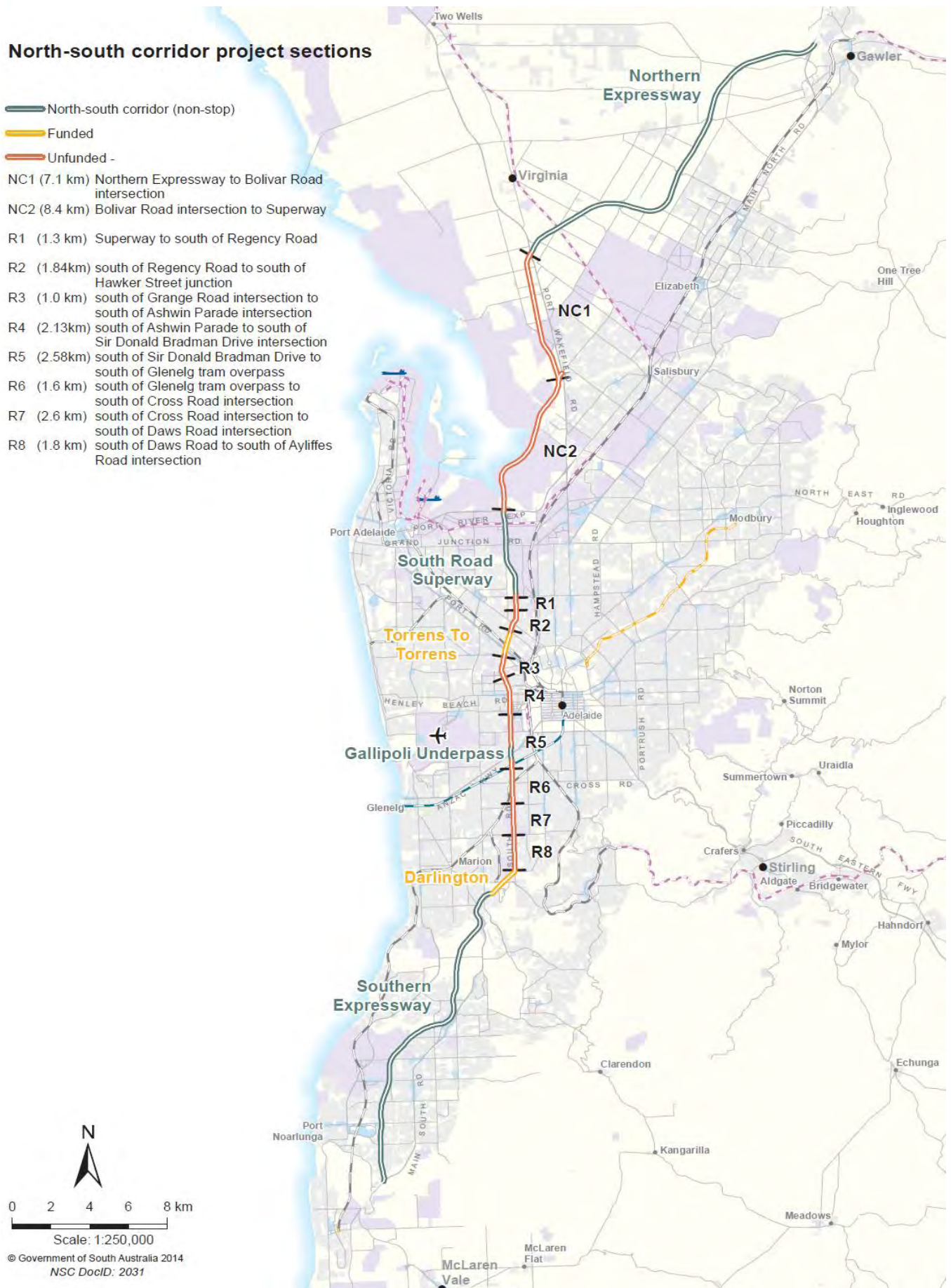


Figure 18: North-South Corridor Recommended Project Sections

A final review of the project sections determined that the final ten road project sections considered the maximum number of projects that should be created to allow flexibility in analysing the priority order of delivering sections of the North-South Corridor without creating significant redundancy if two adjacent sections are delivered years apart. The ten road project sections have formed the basis for the Strategy whilst providing flexibility for bundling of road project sections into Work Packages to be effective in securing funds and procuring the delivery of the fully upgraded North-South Corridor.

7.2 Road Project Costs

The Strategy has estimated the indicative costs of the 10 unfunded road projects based on the planned schemes for Northern Connector and the Northern and Southern Planning Studies. The Northern Connector projects (NC1 and NC2) and the Southern Planning projects (R6 to R8) aligned to sections previously estimated from the planning studies, and did not require further work. However the remaining 5 unfunded road project sections (R1 to R5) could not be broken down unless undertaking another detailed planning estimate, which was considered too detailed for a strategy investigation.

The Strategy adopted a process to determine the costs for each project section (R1 to R5) with the summation of the five projects equalling the original planning study estimates.

The process is outlined below:

Step 1: Obtain independent high level “cost opinions” from recognised external estimating specialists

Step 2: Review and compare the cost opinions;

Step 3: Determine the cost differences between cost opinions and the percentage differences relative to the planning study estimates;

Step 4: Adjust the project costs for R1 to R5 to align with planning estimates.

The “adjustment” figures for R1 to R5 are shown in Table 9.

	R1	R2	R3	R4	R5	Comments
Estimate A	\$187m	\$408m	\$167m	\$908m	\$971m	Sourced from Estimators
Estimate B	\$369m	\$353m	\$312m	\$1030m	\$1245m	
Estimate A %	31%	69%	8%	44%	47%	% difference of estimator cost with the planning estimate
Estimate B %	51%	49%	12%	40%	48%	
Estimate A	\$228m	\$498m	\$204m	\$1109m	\$1185m	Adjusted cost to be compatible with the planning estimates
Estimate B	\$371m	\$355m	\$301m	\$995m	\$1202m	
Average Cost	\$299m	\$427m	\$253m	\$1052m	\$1194m	Cost average
Average %	41%	59%	10%	42%	48%	
Planning Estimate	\$726m		\$2499m			

Table 9: Adjustment figures for R1 to R5

A summary of the project section costs in 2014 real dollars are shown in Table 10.

Road Project Section	Total (2014 Real Dollars)*
NC1	\$240m
NC2	\$580m
R1	\$300m
R2	\$430m
R3	\$250m
R4	\$1050m
R5	\$1200m
R6	\$670m
R7	\$760m
R8	\$600m
Total Unfunded	\$6080m
Torrens to Torrens (Funded)	\$680m
Darlington (Funded)	\$500m
Total Corridor (Unfunded & Funded)	\$7260m

Table10: Final project section indicative costs (2014 real dollars)

*Costs are rounded to the nearest \$10m.

7.3 Associated Work Projects

7.3.1 Network Modifications

A process was adopted to identify network modifications to enable the promotion of 'detour routes' that minimise north-south and east-west travel time delays during the construction of North-South Corridor. In addition to the network modifications, the process identifies real time traveller information and transport interchange upgrades to allow community and businesses to make informed route and mode choice decisions.

Step 1: Data collection and assessment: Bluetooth, Metropolitan Intersection Road Network Performance – Degree of Saturation (Red Dot Map), Heavy Vehicles Routes, Public Transport Routes and ITLUP;

Step 2: Consultation with DPTI's stakeholders (Metropolitan Region, Public Transport Services and Strategic Transport & Infrastructure Planning);

Step 3: Undertake a workshop with representatives from across DPTI to seek input to identify the location and scale of capacity improvements at intersections and midblock on alternative (detour) routes to cater for the traffic diversion associated with the construction of the unfunded sections of North-South Corridor;

Step 4: Refine infrastructure upgrades based on consultation with Metropolitan Region and overview assessment comparing workshop feedback, ITLUP/Metropolitan Adelaide Road Development Plan (MARDP) proposals and previous studies;

Step 5: Identify possible infrastructure upgrades and high level cost estimates (Level 1, Cost Range).

The Northern Connector was not considered as part of this assessment as it will be constructed offline with minimal impact to the existing adjacent arterial roads of Port Wakefield Road and Salisbury Highway.

7.3.1.1 Detour Routes & Network Modifications - Pre Workshop Assessment

DPTI has over 280 Bluetooth receivers continuously collecting travel time data for over 900 arterial road segments covering nearly 700km of arterial road network. Using AdInsight Software 2014, Bluetooth data was used to identify the key origins and destinations for both north-south movements and the major east-west movements across South Road. The origin and destination data in combination with operational knowledge and transport analysis identified 'preliminary' detour routes for discussion at the stakeholder workshop.

The Bluetooth data used in this analysis:

- AM (6-10am) and PM (3-7pm) peak traffic periods;
- Tuesdays, Wednesdays and Thursdays during the whole of May 2014 (no public and school holidays in May).

North-South Segments

South Road was considered as six north-south segments:

- Regency Road to Torrens Road;
- River Torrens to Sir Donald Bradman Drive;
- Sir Donald Bradman Drive to Anzac Highway;
- Anzac Highway to Daws Roads;
- Daws Road to Ayliffes Road;
- Ayliffes Road to Southern Expressway.

All segments were assessed individually in each direction during both the AM and PM peak traffic periods. Bluetooth data was used to identify the origin and destination travel paths of the vehicles that were detected travelling the entire length of a segment. The travel paths were plotted for the vehicles on the key approaches (incoming and exit – outgoing), shown as a percentage of the total vehicles detected travelling the entire length of a segment. Figure 18 illustrate an AM Peak plot for the north-south movements between Anzac Highway to Sir Donald Bradman Drive. The percentages shown entering and exiting each segment do not equal to 100% as only the main Bluetooth links are displayed on the plan. Furthermore, a number of vehicles, which although travelling the entire length of the segment, were not detected at the Bluetooth receiver located immediately adjacent the segment and consequently were not included in the link total.

Based on these travel paths, an assessment was made for the percentage of trips detected that could divert along alternate routes (diverted percentages) assuming the segments were under construction.

These diverted percentages were determined by the:

- percentage of vehicles at the decision points where motorists were able to easily choose an alternate route without travelling significantly further;
- motorists' final destination.

East-West Segments

A similar process was conducted for the arterial east-west roads, where the travel paths for all detected vehicles entering South Road were plotted from both the east and the west directions separately. Turning traffic from South Road onto these east-west links were also considered, with an assessment of what percentage of traffic on each South Road approach could potentially divert at the adjacent east-west arterial road from previous intersection.

The key east-west movements were analysed for the following roads intersecting with South Road:

- Regency Road;
- Torrens Road;
- Henley Beach Road;
- Sir Donald Bradman Drive;
- Richmond Road;
- Cross Road;
- Daws Road.

Workshop Materials

Materials prepared for the workshop were as follows:

- 6 Bluetooth Link Assessment Plans
 - Six plans summarising the diverted percentages for each project extent (both peak traffic periods) were produced for the workshop. These diverted percentages are a simple indication of the preference level for each of the alternative routes. It does not consider the capability (i.e. capacity) of alternative routes to accommodate the additional traffic. The diverted percentages are an upper limit of vehicles that currently travel through the particular segment which have the potential to easily divert along the alternate routes during the construction of the North-South Corridor.
- Existing Network Plan
 - Information containing Red Dot Map – Metropolitan Intersection Road Network Performance: Degree of Saturation (DOS), Annual Average Daily Traffic (AADT), Functional Road Hierarchy, previous studies and funded projects.
- ITLUP Proposed Projects
 - Priorities and proposed timeframe.
- Proposed Diversion Routes
 - Project team assessment.

7.3.1.2 Detour Routes & Network Modifications Workshop

A workshop was held on the 22 September 2014. At the workshop, participants (DPTI) were divided into five groups and provided maps displaying materials discussed in the previous section. The participants were then asked to discuss and review the project teams suggested 'detour routes' and based on operational knowledge of the network, identify the location and scale of capacity improvements at intersections and midblock along the detour routes to cater for the traffic diversions associated with the construction of the North-South Corridor.

The key feedback was:

- General agreement with the Project Team proposed western (Marion Road, Holbrooks Road, East Avenue and Kilkenny Road/David Terrace) and partial eastern detour routes (studies and works part of T2T Project – Park Terrace, James Congdon Drive) as primary detour routes;
- Other diversion routes (e.g. Tapleys Hill Road, Goodwood Road) were identified as requiring ITS/traffic management (e.g. information on construction and detour routes) only. Noted that Goodwood Road, subsequently the southern ring route does not have the capacity to cater for additional traffic and major costs would be associated with the upgrades;
- Any upgrades should coincide with ITLUP (the priority/sequence of the ITLUP would have to be modified);
- General agreement with the extent of "Diversion Routes" of 80%/20% (e.g. 80% of traffic is likely to travel within the proposed diversion zone while 20% of traffic is likely to travel outside the proposed diversion zone);
- Opportunity to promote public transport modes (e.g. bus, train and tram).

7.3.1.3 Detour Routes & Network Modifications - Post Workshop Outcomes

A process was adopted to finalise the 'promoted' detour routes and network modifications following the workshop.

- Step 1:** Compare workshop outcomes with ITLUP/MARDP and previous studies;
- Step 2:** Consult and refine solutions in consultation with DPTI stakeholders (Metropolitan Region, Public Transport Services and Sustainable Transport Planning);
- Step 3:** Produce high level estimates (Level 1, Cost Range) for identified infrastructure upgrades;
- Step 4:** Recommend 'promoted' detour routes and network modifications.

Metropolitan Traffic and Roads Operations (MeTRO) Section of DPTI was consulted to gain insight and to confirm possible solutions (interim/long term) to improve the efficiency at each identified location.

Public Transport Services Division & Strategic Transport and Infrastructure Planning of DPTI were also consulted to discuss impacts and opportunities (bus and rail) to assist through the construction of the North-South Corridor.

The identified possible solutions for detour routes network upgrades were then compared to the solutions identified in the Integrated Transport and Land Use Plan (ITLUP) and Metropolitan Adelaide Road Development Plan (MARDP) to determine the compatibility of solutions, and to adjust the ITLUP/MARDP timeframe delivery, if required.

ITLUP has identified short, medium and long term solutions (represented in Figure 5). The table below lists the locations (and ITLUP delivery timeframe) where both the ITLUP and North-South Corridor network modifications coincide.

No	ITLUP Network Upgrades	ITLUP Time Frame Delivery
1	Ashley Street/Holbrooks Road Intersection +	6-15 Years
	Holbrooks Road (Ashley Street to Henley Beach Road)	16-30 Years
2	East Avenue/Grange Road Intersection +	6-15 Years
	Grange Road/Holbrooks Road Intersection	
3	Holbrooks Road /Henley Beach Road Intersection	26-30 Years
4	Marion Road/Henley Beach Road Intersection	16-20 Years
5	Marion Road/Sir Donald Bradman Drive Intersection	6-15 Years
6	Marion Road/Richmond Road Intersection	6-15 Years
7	Marion Road/Anzac Highway Intersection	6-15 Years
8	Marion Road/Cross Road Intersection	6-15 Years
9	Marion Road (Anzac Highway to Cross Road)	1-5 Years
10	Churchill Road/Regency Road Intersection	6-15 Years
11	Port Road/Park Terrace/Adam Street Intersection	6-15 Years

Table 11: Summary of ITLUP Networks Upgrades Locality similar to North-South Corridor Detour Routes

Four locations (1, 3, 4 and 9) were identified to have upgrades compatible with the North-South Corridor Detour Routes strategy. Adjustment of ITLUP delivery timeframe for the 4 locations is recommended to coincide with the delivery of the detour routes network upgrades. For the other locations, more investigation and consultation are required to deliver the upgrades to minimise/prevent re-work in the future.

The locations of the Variable Message Signs (VMS) were assessed (for all movements) and identified at key nodes across the wider network to proactively assist the commuters during the construction (including supporting incident) of the North-South Corridor. The VMS signs will provide real time traveller information to allow community and businesses the flexibility to make informed route choice decisions during construction.

The final recommendation for the 'promoted' detour routes and network modifications is presented in Figures 20 and 21. The recommended detour routes are linked to the funded works that are part of T2T (South Road/James Congdon Drive, Park Terrace/Fitzroy Terrace/Torrens Road), Darlington (Marion Road/Sturt Road) and North South Corridor (South Road/Richmond Road). Figure 21 shows the locations of the network modifications required along the promoted detour routes and also the supporting incident and travel time routes (including VMS locations).

PROMOTED DETOUR ROUTES (NORTH-SOUTH)

Marion Road

Holbrooks Road

East Avenue

Kilkenny Road/David Terrace

PROMOTED DETOUR ROUTES (EAST-WEST)

Daws Road

Cross Road

Anzac Highway

Richmond Road

Sir Donald Bradman Drive

NETWORK MODIFICATIONS

Hanson Rd/Torrens Rd

David Tce/Torrens Rd/Regency Rd

Midblock (Btw Torrens Rd & Henley Beach Rd)

Kilkenny Rd/Port Rd

East Ave/Port Rd

East Ave/Grange Rd

Holbrooks Rd/Grange Rd

Holbrooks Rd/Henley Beach Rd

Marion Rd/Henley Beach Rd

Marion Rd/Sir Donald Bradman Dve

Marion Rd/Richmond Rd

Marion Rd/Anzac Hwy

Midblock (Btw Anzac Hwy & Cross Rd)

Marion Rd/Cross Rd

Marion Rd/Raglan Rd

Marion Rd/Daws Rd





















Churchill Rd/Regency Rd

Port Rd/Park Tce/Adam St

Port Rd/James Congdon Dve

Figure 20: Promoted Detour Routes and Network Modifications

Detour Route Strategy - Investment

-  Intersection Upgrades
-  Midblock Upgrades
-  VMS Travel Choice Signal
-  North-South Routes For Incident And Travel Time Management
-  West-East Routes For Incident And Travel Time Management
-  Promoted North - South Detour Routes
-  Promoted West - East Detour Routes
-  North- South corridor (non-stop)
-  Promoted Public Transport
-  Main road
-  Other road
-  Passenger railway
-  Tramway
-  O-Bahn
-  Freight railway
-  Significant retail areas
-  Existing key industry areas
-  Built-up area
-  Sea port
-  Airport



Travel Time To Bowden:
Via Cross Rd = X mins
Via Goodwood Rd = X mins

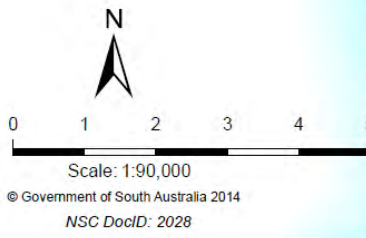


Figure 21: Promoted detour routes

7.3.2 Public Transport Projects

Investment in public transport projects would have a major role in the success of delivering the detour routes during the construction of North-South Corridor. It provides the community an opportunity to make travel options for their journey and subsequently help reduce traffic pressure across the network.

A process was adopted to identify the potential public transport projects that would assist in delivering the North-South Corridor.

Step 1: Consultation with DPTI's stakeholders (Integrated Transport Services – buses and Sustainable Transport Planning – rail) to identify public transport projects, potential impacts to existing bus network and the benefits in promoting public transport during the construction of North-South Corridor.

Step 2: Identify public transport projects cost, including associated operational costs for bus detours.

Step 3: Recommend public transport projects as part of the detour routes and network modifications for North-South Corridor.

7.3.2.1 Integrated Transport Services (Buses)

- North-South: keep the corridor open during the construction to minimise/prevent detour of buses
- East-West: keep the adjacent intersections open during the construction to minimise/prevent detour of buses.
- The predominant bus movements along the North-South Corridor are:
 - South of Sir Donald Bradman Drive: North-South Bus Services.
 - North of Sir Donald Bradman Drive: East-West Bus Services.
- Detours to buses during construction - distance and time differences to the current bus schedules will require funding.
- Opportunity to provide incentives (e.g. free bus ride) before 7AM to assist reducing car travel during peak periods.

7.3.2.2 Sustainable Transport Planning (Rail)

- Tonsley Park Public Transport Project
 - Located at the south-west corner of Main South Road/Sturt Road, adjacent to Tonsley Railway Station (possible name change to Sturt Interchange);
 - The proposal:
 - New Park & Ride – 4000 car parks;
 - Bus Interchange;
 - Extension of Flinders Drive to connect Sturt Road/Birch Crescent Intersection;
 - Upgrade existing Tonsley Railway Station;
 - Rail track (between Daws Road and Lanark Ave – Tonsley Railway Station) was upgraded to provide 15mins train services;

- Rail track (between Ascot Park Station and Daws Road) was upgraded (duplicated) to provide 15 mins train services.
- The benefits: -
 - Reduce traffic travelling along North-South corridor (inc surrounding network) especially during the construction along the corridor;
 - Improve bus travel time (reduce normal bus services but increase express bus services between Darlington and the City) as the majority (60-70%) of patronage from south-east of Darlington will be attracted to use the interchange (rail).
- Park & Ride at Morphettville Racecourse, adjacent to Morphett Road Tram Stop
 - The proposal:
 - Provide 500 car park spaces at Morphettville Racecourse to cater and offer commuters direct access to the tram services (Stop 12).
 - The benefits:
 - To attract the south-west catchment (e.g. Morphettville, Warradale, Oaklands Park, Seaview Downs, Seacliff Park) to use tram services to CBD. If the project goes ahead, the tram services will be increased to cater for the demand;
 - To reduce traffic travelling along North-South Corridor (including surrounding network) especially during the construction along the corridor.

7.3.2.3 Emerson Rail Crossing

- Investigated as part of South Road Corridor Upgrade, *referenced from Anzac Highway to Southern Expressway Planning Study*.
- Public Transport Services intend to increase the frequency of passenger rail services on the Seaford Line in both the AM and PM peak periods. This would result in increased closures of the rail crossing (up to 20 minutes in the peak hour), with associated increased delays and queue lengths on the off-ramps from South Road (as well as Cross Road). The extensive delay will create both safety and operational/capacity issues on the overpass as the queue lengths on the ramps are almost extending into the through lanes of South Road;
- There is potential that modifications to the Corridor could adversely impact on the future options for treatment/upgrade of the intersection of Cross Road and the at-grade railway line (serving the Seaford and Tonsley passenger services);
- Short (within 5 years) and long term options are recommended dependant on the timeframe of North-South Corridor Upgrade;
- Short Term Improvements (Minor Works):
 - Changing lane allocation to favour the predominant turning movement;
 - Separating the right turn from the left and through traffic on the ramp;
 - Modifications to signals to provide improved efficiency.
- Short Term Improvements (other options):
 - Provision of an additional left turn lane on the ramps;
 - Provision of three through lanes on Cross Road.

- Long Term Improvements:
 - Option 3 is to retain the rail (lowered) within the existing rail corridor;
 - Option 4 (Rail lowered, off line) and 5 (Rail elevated, off line);
 - Option 5 is reliant on the design for the South Road Corridor returning to ground level south of the Emerson Crossing (which will enable an elevated rail crossing of the South Road Corridor to be constructed);
 - Option 6 (Rail as is, Cross Road lowered offline).
- Recommendations:
 - Short term options are investigated if the upgrade to the North-South Corridor and to Emerson Crossing are not planned to start within 5 years;
 - Option 4 and 5 are to be examined in greater detail to determine if they can be developed to provide an acceptable solution from a technical, social and economic point of view;
 - No preferred option has been provided in the planning study.

7.3.3 Traffic Operations (ITS)

A tender process is currently in place to produce the “Concept of Operation” for North-South Corridor ITS/Managed Motorway Development. The objective is to gain a corridor-wide definition of the intended managed operations of the corridor as a non-stop motorway facility, including the methods of traffic monitoring, control and traveller information provision utilising appropriate levels of ITS and field response for various broad sections of the corridor. The Concept of Operations will be the primary input to develop the ITS functional requirements and the high level design.

A new Traffic Management Centre (TMC) is favourable to cater/fully managed North-South Corridor motorway due to the current TMC capacity discussed in Section 6.5.1. The justification for the TMC will be based on the outcome of the “Concept of Operation”.

7.4 Associated Work Project Costs

7.4.1 Network Modifications

To determine costs, a high level treatment identification process was adopted for road upgrades proposed along the promoted detour routes. These are based on engineering opinion in combination with the outcomes of previous planning studies and are yet to be tested/ modelled to determine their full viability. Opinions were sought from DPTI’s Metropolitan Traffic & Road Operations area.

The suggested upgrades were estimated using a high level estimating tool (Level 1) and categorised as follows:

- *Minor:* \$10K - \$100K (Modified Traffic Signal Operation/Traffic Management)
- *Moderate:* \$100K - \$5m (Minor Infrastructure Upgrades within Existing Road Corridors)
- *Major:* \$5m - \$30m (Significant Infrastructure Upgrades (e.g. Land Acquisition))

The associated work costs for the detour routes upgrade is summarised in Table 12.

Location	Suggested Upgrades	Cost Estimate (\$, P90)
Regency Rd/Torrens Rd/David Tce	<u>David Tce/Torrens Rd/Regency Rd</u> Torrens Rd (NW) - Duplicate Right turn lane David Tce - construct left turn lane <u>Hanson Rd/Torrens Rd</u> Torrens Rd (SE) - Duplicate Right turn lane	Major. \$14.5m
Western Detour Midblock	<u>Kilkenny Road/David Tce, East Ave & Holbrooks Rd (Midblock)</u> Duplicate through lanes within existing corridor & construct solid median 24HR clearways 7am-7pm Everyday Minimise rail closure times at rail crossing by upgrading system inputs	Moderate. \$4.1m
Kilkenny Rd/Port Rd/East Ave	<u>Port Rd</u> Extend Right Turn Lanes on Approach to Kilkenny Rd Extend Right Turn Lanes on Approach to East Ave Extend U-Turn Storage	Moderate. \$3.4m
East Ave/Grange Rd/Holbrooks Rd	<u>Grange Rd (W)</u> - Duplicate right turn lane (inc modify Holbrooks Rd Exit lane - Remove east island)	Major. \$6.9m
Marion Rd/Henley Beach Rd	<u>Henley Beach Road</u> - Duplicate right turn lanes into Holbrooks Rd and Marion Rd	Major. \$12.7m
Holbrooks Rd/Henley Beach Rd	<u>Holbrooks Rd</u> - Duplicate Left Turn lane at approach Requires double exit lane on Marion Rd	
Marion Rd/Sir Donald Bradman Drive	Duplicate Right Turn Lanes on Marion Road Approaches and control right turn movements from Marion Road	Moderate. \$3.7m
Marion Rd/Richmond Rd	<u>Marion Rd (S)</u> - Duplicate Right Turn Lane and construct short Left Turn slip lane	Moderate. \$2.6m
Marion Rd/Anzac Hwy	<u>Anzac Hwy (NE & SW)</u> - Ban Right Turn U-turn facilities to be extended for extra storage	Moderate. \$0.8m
Marion Rd/Cross Rd	<u>Marion Rd (S)</u> - Duplicate right turn lane	Moderate. \$3.6m
Marion Rd Midblock (Anzac Hwy - Cross Rd)	Rationalise median opening + control tram performance (stop tram for traffic)	Minor. \$0.034m
Marion Rd/ Raglan Rd	<u>Raglan Rd</u> - Modify phasing for east and west approaches and alter lane configuration (1-through lane and 1-right turn lane).	Minor. \$0.020m
Marion Rd/Daws Rd/Oaklands Rd	<u>Marion Rd (N & S)</u> -Increase phase times (Reduce phase time for Daws Rd & Oaklands Rd) <u>Oaklands Rd & Daws Rd</u> - Extend Right turn lanes on approaches Increase Clearway times	Moderate. \$0.6m
Churchill Rd/Regency Rd	Regency Rd (W): Second right turn lane on the western approach by removing the continuous left turn lane on the exit	Moderate. \$1.5m
Port Rd/Park Tce/Adam St	Signalling operation traffic management treatments	Minor. \$0.015m
Port Rd/James Congdon Drive	Increase intersection performance through traffic signalling operation changes	Minor. \$0.015m

Table 12: Cost Summary for Network Modifications (Detour Routes)

The cost of Variable Message Signs (VMS) at key nodes across the network to support the detour routes is summarised in Table 15.

For the purpose of the strategy, the suggested VMS treatments at key nodes across the network were estimated using a high level estimation tool and categorised as follows:

- *Strategic Node: \$200K*
- *Network Node: \$100K - \$5m (Minor Infrastructure Upgrades within Existing Road Corridors)*
- *Arterial Node: \$5m - \$30m (Significant Infrastructure Upgrades (e.g. Land Acquisition))*

Note: Further investigations are required to determine and confirm the costs of implementing VMS.

	Location	Cost Estimate (\$)
VMS	Strategic Node	\$2.0m
	Network Node	\$1.0m
	Arterial Node	\$0.3m

Table 13: Summary of identified nodes that required VMS

7.4.2 Public Transport Projects

The associated work costs for the public transport projects are summarised in the Table 14.

Projects	Treatments	Cost Range
Tonsley Park Public Transport Project	New Park & Ride	\$1M
	Bus Interchange	\$1M
	Extension of Flinders Drive to connect Sturt Road/Birch Crescent Intersection	\$10M
	Upgrade existing Tonsley Railway Station	\$3M
Parking at Morphetville Racecourse, adjacent to Morphet Road Tram Stop	New Park & Ride	\$3M
Emerson Rail Crossing	Grade Separation	\$280M

Table 14: Summary of Public Transport Projects & associated costs

Note:

No preferred option is recommended for Emerson Rail Crossing in the current study. Until this is known, Option 3 has been included in the Strategy as the estimated cost is representative of an average of the five options.

7.4.3 Traffic Operations (Projects)

Traffic Management Centre (TMC)

As discussed in Section 7.3.3, the cost of a new TMC can only be known once the “Concept of Operation” for North-South Corridor ITS/Managed Motorway Development is completed.

ITS

The ITS component of the North-South Corridor is estimated approximately \$50m - \$70m (does not include contingent and inherent risk). The estimated cost is sourced from the previous planning studies.

8 Project Prioritisation

The following section describes the project prioritisation approach and framework that adopts the principles of a multi criteria analysis and a strategic merit test to prioritise the importance of the road project sections.

Quantification and assessment of road network problems and strategic considerations supported by evidence is a key principle of Infrastructure Australia's assessment process.

The project prioritisation approach follows a process of:

- **Rating the severity** of current operational problems along the road project sections within the corridor. The rating of project sections is based on the relative severity of evidence based-problems;
- **Rating the strategic importance** of sectors of the corridor (each including two or more road project sections). The rating of project sections is based on their relative importance in contributing to the attainment of higher order strategic outcomes;
- **Prioritisation** of the defined road project sections based on consideration of both problem severity and strategic importance.

The project prioritisation process is focussed at the road project section level (ten projects, excluding Torrens Road to Torrens River and Darlington projects). These road project sections are:

- **NC1** Northern Connector (Northern Expressway and Port Wakefield Road merging to Bolivar Road intersection)
- **NC2** Northern Connector (Bolivar Road intersection to Superway);
- **R1** North of Regency Road intersection to south of Pym Street junction;
- **R2** South of Pym Street junction to south of Hawker Street junction;
- **R3** South of Grange Road intersection to south of Ashwin Parade intersection;
- **R4** South of Ashwin Parade intersection to south of Sir Donald Bradman Drive intersection;
- **R5** South of Sir Donald Bradman Drive to pedestrian actuated crossing (PAC) near Pleasant Avenue at Black Forest (including Gallipoli underpass);
- **R6** PAC to south of Edward Street intersection (including Cross Road overpass);
- **R7** South of Edward Street intersection to south of Daws Road intersection;
- **R8** South of Daws Road intersection to south of Ayliffes Road.

Road Projects R1-R8 are prioritised based on the problem and strategic characteristics of South Road and environs, whereas the Northern Connector road projects (NC1 and NC2) are prioritised based on the problem characteristics of Salisbury Highway and Port Wakefield Road and the strategic characteristics of the broader environs.

8.1 Rating of Project Sections by Problem Severity

A process was adopted to rate the severity of the problems along the road project sections within the corridor.

Step 1: Define high level problem statements;

Step 2: Identify problem indicators relevant to the high level problem statements;

Step 3: Gather and analyse data to define and quantify problems by individual intersections and mid-block road segments;

Step 4: Define and quantify problems by road project section;

Step 5: Rate project sections by order of problem severity.

8.1.1 High Level Problem Statement

Considerable planning analysis has been undertaken as part of the North-South Corridor planning studies. These studies identified high level problem statements attributed to different sectors of the corridor. The sources of the high level problem statements are as follows:

- Northern Connector Problem Assessment (August 2012, KNET 6744415);
- South Road Planning Study (Regency Road to River Torrens): Problem Identification and Assessment (August 2012, KNET #6815249);
- Darlington Precinct, Preliminary Concept Planning Report Anzac Highway to Southern Expressway (September 2014, KNET #8539720).

The high level problem statements are reported by geographic sector aligned to the planning studies:

- **Northern Sector** Northern Expressway to Port River Expressway (including Port Wakefield Road and Salisbury Highway);
- **Central Sector** Port River Expressway to Anzac Highway;
- **Southern Sector** Anzac Highway to Southern Expressway.

The high level problem statements are summarised in Table 15.

Sector	High Level Problem (HLP) Statement
Northern	<p>FREIGHT EFFICIENCY</p> <p>Inhibits freight access to/from Port Adelaide.</p> <p>SAFETY AND AMENITY</p> <p>Poor safety performance due to the mix of vehicle types and speeds;</p> <p>Noise and traffic volumes;</p> <p>Number of rail level crossings in northern area- high risk of incidents.</p> <p>ACCESSIBILITY</p> <p>Residential land development constrained by congestion;</p> <p>Dispersed origins and destinations hard to serve with public transport;</p> <p>Constrained development of industrial land – high access costs.</p>

Section	High Level Problem (HLP) Statement
Central	<p>RELIABILITY/COST OF TRAVEL</p> <p>Congestion results in increased travel costs for business and reduced liveability.</p> <p>EAST-WEST ACCESSIBILITY</p> <p>Poor east-west access increasing travel costs for business and reduced liveability.</p> <p>SAFETY/INCIDENTS</p> <p>High crash and incident rate increasing travel costs</p>

Section	High Level Problem (HLP) Statement
Southern	<p>ECONOMIC</p> <p>Poor accessibility, increasing travel time, and reduced reliability for business through, and adjacent to South Road is imposing additional costs on business constraining current and future development in the State.</p> <p>SOCIAL</p> <p>The Southern “Outer Adelaide” area is characterised by limited “blue collar” industrial employment opportunities and limited access to wider recreational and social opportunities. Relative isolation and increasing congestion on key north-south transport routes will lead to further social disadvantage. The at-capacity network contributes to reduced local amenity and severance in “Middle Adelaide” areas.</p> <p>CAPACITY</p> <p>The current Southern road network is at capacity and any disruption (such as crashes, incidents) has a widespread impact across the rest of the local network.</p>

Table 15: High level problem statements

8.1.2 Problem Indicators

The high level problem statements in Table 18 have provided guidance to determine a consistent set of 'problem indicators' to be used systematically and consistently in quantifying problems along the corridor in order to rate the severity of current problems by road project section. i.e. matching the problem indicators to a high level problem statement.

It was not possible to identify a problem indicator for each of the high level problem statements because some problems are not directly attributed to the performance characteristics of the road corridor or was a broader issue. For these issues, upgrading the corridor is only a part of the solution.

The indicators were determined for problems that exist along and across the corridor. The problem indicators are categorised as follows:

- **Travel speeds and reliability** for north-south travel in peak and inter-peak periods;
- **Indicator 1** TRAVEL SPEED & RELIABILITY (Peak Travel Speed & Reliability for All Vehicles);
- **Indicator 2** TRAVEL SPEED & RELIABILITY (Off-Peak Travel Speed & Reliability for All Vehicles).

- **Travel delay** to commercial (including buses) and passenger vehicles for all movements:
- **Indicator 3** DELAY (All Commercial Vehicles Northbound and Southbound);
- **Indicator 4** DELAY (All Passenger Vehicles Northbound and Southbound);
- **Indicator 5** DELAY (All Vehicles Eastbound and Westbound).

- **Casualty crashes** (for the 5 year period between 2008 and 2013) involving commercial and passenger vehicles along mid-block road sections and at intersections:
- **Indicator 6** CRASHES (Total Commercial Vehicles Crashes over 5 years);
- **Indicator 7** CRASHES (Total Passenger Vehicles Crashes over 5 years).

The above indicators are intended to provide the evidence in support of the high level problem statements. Table 16 illustrates how the problem indicators have been matched to the high level problem statements.

	High Level Problem (HLP) Statement	Problem Indicator	Source
Northern Section	FREIGHT EFFICIENCY Inhibits freight access to/from Port Adelaide	TRAVEL SPEED & RELIABILITY (Peak Travel Speed Reliability for All Vehicles)	Northern Connector Project, Problem Assessment August 2012
		TRAVEL SPEED & RELIABILITY (Off-Peak Travel Speed Reliability for All Vehicles)	
		DELAY (All Commercial Vehicles Northbound and Southbound)	
	SAFETY AND AMENITY Poor safety performance – mix vehicles and speeds	CRASHES (Total Commercial Vehicles Crashes over 5 years)	
	Noise and traffic volumes	Broader Issue	
	Number of rail level crossings in northern area- high risk of incidents	Broader Issue	
	ACCESSIBILITY Residential land development constrained by congestion	DELAY (All Passenger Vehicles Northbound and Southbound)	
	Dispersed origins and destinations hard to serve with public transport	Broader Issue	
Constrained development of industrial land – high access costs	Broader Issue		
Central Section	RELIABILITY/COST OF TRAVEL Congestion results in increased travel costs for business and reduced liveability	TRAVEL SPEED & RELIABILITY (Peak Travel Speed Reliability for All Vehicles)	South Road Planning study (Regency Park to Anzac Highway): Technical Paper Summary 7 AH-2-Sexy - Revised problems South Road - Regency Road to River Torrens) Appendix C Problem Identification and Assessment
		TRAVEL SPEED & RELIABILITY (Off-Peak Travel Speed Reliability for All Vehicles)	
		DELAY (All Passenger Vehicles Northbound and Southbound)	
	EAST-WEST ACCESSIBILITY Poor east-west access increasing travel costs for business and reduced liveability	DELAY (All Vehicles Eastbound and Westbound)	
		Total East-West Bus Patronage	
SAFETY/INCIDENTS High crash and incident rate increasing travel costs	CRASHES (Total Passenger Vehicles Crashes over 5 years)		
Southern Section	ECONOMIC Poor accessibility, increasing travel time, and reduced reliability for business through, and adjacent to South Road is imposing additional costs on business constraining current and future development in the State.	TRAVEL SPEED & RELIABILITY (Peak Travel Speed Reliability for All Vehicles)	Darlington Precinct, Preliminary Concept Planning Report Anzac Highway to Southern Expressway (24 September 2014) Southern Adelaide Transport Study Discussion Paper
		TRAVEL SPEED & RELIABILITY (Off-Peak Travel Speed Reliability for All Vehicles)	
		DELAY (All Passenger Vehicles Northbound and Southbound)	
		DELAY (All Commercial Vehicles Northbound and Southbound)	
	SOCIAL The Southern “Outer Adelaide” area is characterised by limited “blue collar” industrial employment opportunities and limited access to wider recreational and social opportunities. Relative isolation and increasing congestion on key north-south transport routes will lead to further social disadvantage. The at-capacity network contributes to reduced local amenity and severance in “Middle Adelaide” areas.	Broader Issue	
		CAPACITY The current Southern road network is at capacity and any disruption (such as crashes, incidents) has a widespread impact across the rest of the local network.	
	CRASHES (Total Passenger Vehicles Crashes over 5 years)		

Table 16: High Level Problem Statement and Problem Indicators

8.1.3 Problem Indicators by Intersection and Mid-block

Data was collected and calculated to determine the values of the problem indicators for all signalised intersections and mid-block road sections (including crossing sections) along the length of the corridor. In addition to the problem indicators supporting information was also sourced to assist in interpreting and analysing the problem, being;

- Traffic volumes (AADT)
- Commercial vehicle volumes (AADT)
- Posted speed limits
- Bus patronage

8.1.4 Problem Indicators by Road Project Section

The calculated problem indicators at the intersection and midblock level were used as a building block to aggregate the data to determine the problem indicators by road project section. This allowed the problems of the ten road project sections to be compared against each other.

In order to compare problems by section a process was adopted whereby like problems were combined to represent the total (holistic) problem by road project section, as follows;

Travel Speed and Reliability:

Peak travel speed reliability **and** inter-peak travel speed reliability

Delay:

Passenger vehicle delay **and** commercial vehicle delay **and** total east-west delay

Crashes:

Passenger vehicle casualty crashes **and** commercial vehicle casualty crashes

The problem indicators by road project section are presented in a consistent manner whereby the higher the value (higher the bar or line) the greater the problem. To achieve consistency, the travel speed indicators presented in the intersection and midblock graphs were changed to represent “travel speed performance” representing the difference between the posted speed limit and the average travel speed.

The following sections describe the analysis and interpretation of the problems by intersection & midblock and the problem by road project section.

8.1.5 Problem Assessment – Speed and Reliability

Mid-Block and Intersection Analysis

Travel speed and reliability indicators were determined for both peak and inter-peak periods at the mid-block/intersection level. At the individual mid-block/intersection level, the plot of average speeds (red and blue solid lines) shows the variation in speed along the corridor due to delays at intersections (primarily) and mid-block congestion. The plot also shows the extent of the difference between the average speeds and the posted speed limit (green line).

The plot of travel time “reliability” (red and blue dotted lines) shows the variance in travel speed on a day to day basis for trips in the same time period on different days. Wide variations in travel times result in poor adherence to schedules and poor community perceptions.

The average peak travel speed (solid red line) is generally and expectedly lower than the average inter-peak travel speed (solid blue line) and both are significantly lower than the posted speed limit (solid green line).

By observation, travel speeds are low and highly variable along South Road (worst through the funded T2T project section and the section from Grange Road to Richmond Road) and higher and much less variable along Port Wakefield Road/Salisbury Highway. Notably, the average speeds along the grade separated sections of the corridor on the Superway and at Gallipoli are close to the posted speed limit.

Road Project Section Analysis

The travel speed and reliability indicators were determined for both peak and inter-peak periods for the ten road project sections (making the appropriate adjustment to show difference in travel speed and posted speed limit). The project section travel speed indicators represent the average speed of traffic over the length of the project section. It does not show the variation in speed along the section but allows for comparison of overall average speeds with other project sections.

From a speed and reliability perspective, it can be seen by observation that project sections R2, R3 and R7 are performing worse than other project sections.

Upgrading of the corridor to provide non-stop sections of motorway will:

- Allow north-south traffic to travel at speeds closer to the posted speed limit (assume generally higher for the motorway section than the existing sections of South Road)
- Reduce the variability in travel speeds/times because of the reduced conflicts with other vehicles at intersections and mid-block congestion

Future Problem Analysis

The problem severity approach assessed in detail the average and variability in travel times and travel speeds for the ten project sections based on actual travel times recorded in Year 2014.

Consideration was also given to forecast travel times along the project sections. The intention was to identify project sections which the rate of increase in travel time due to traffic growth was significantly higher than other project sections.

Forecasts of modelled peak hour travel times along the North-South Corridor (derived from MASTEM) were compared for 2016 and 2026 (being the last year of the ten year period) assuming no improvements to the corridor. The comparison showed only moderate and consistent rates of increases in travel time along the length of the corridor. The exception was along Salisbury Highway between Port Wakefield Road and Port River Expressway (outer northern sector equivalent to project sections NC1/NC2) where the rate of increase was notably higher than for all other sections. This is expected since traffic growth in the corridor can be distributed across a number of arterial roads south of the Port River Expressway but there are no alternatives to the Salisbury Highway route. Accordingly, higher traffic flows per lane and increased in congestion are likely.

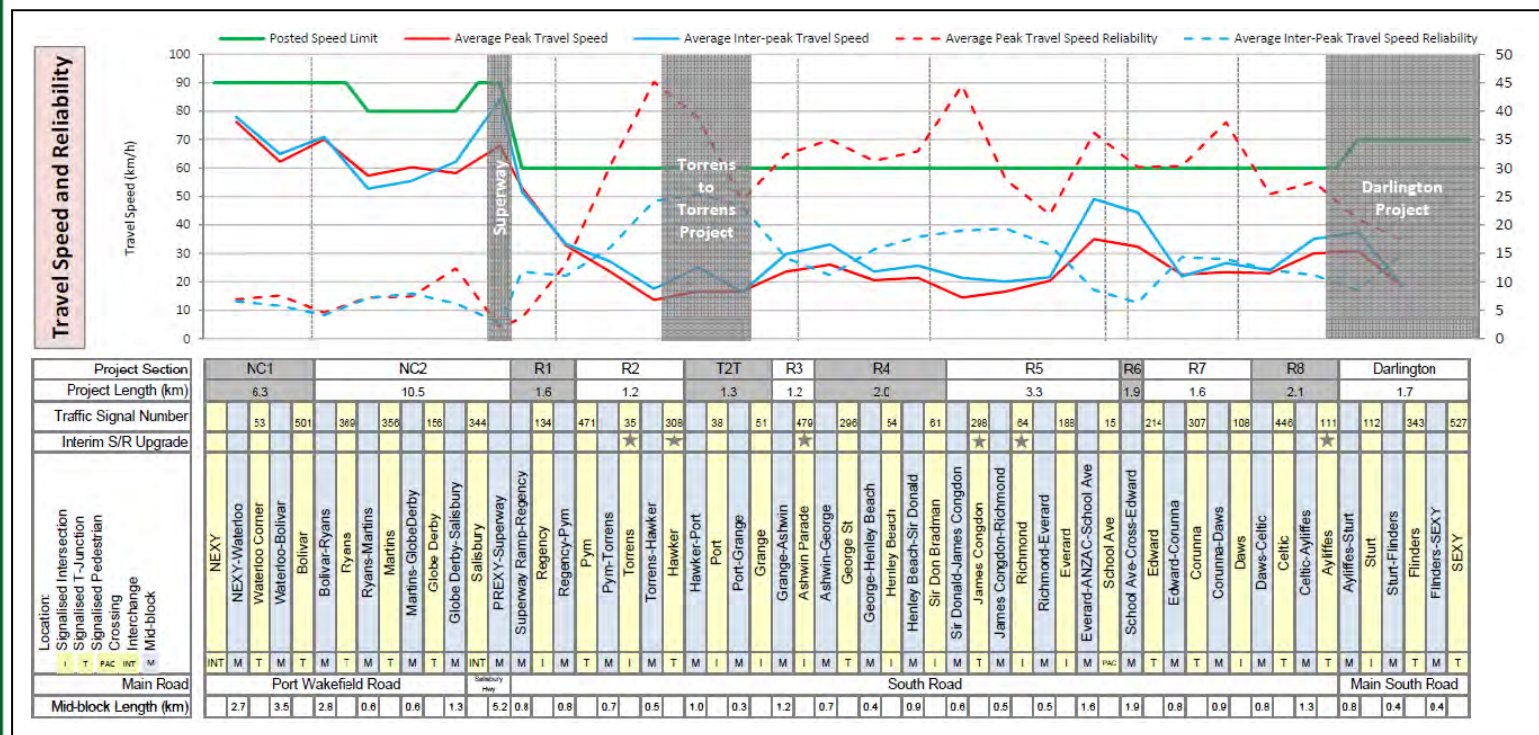


Figure 22: Intersection and Mid Block

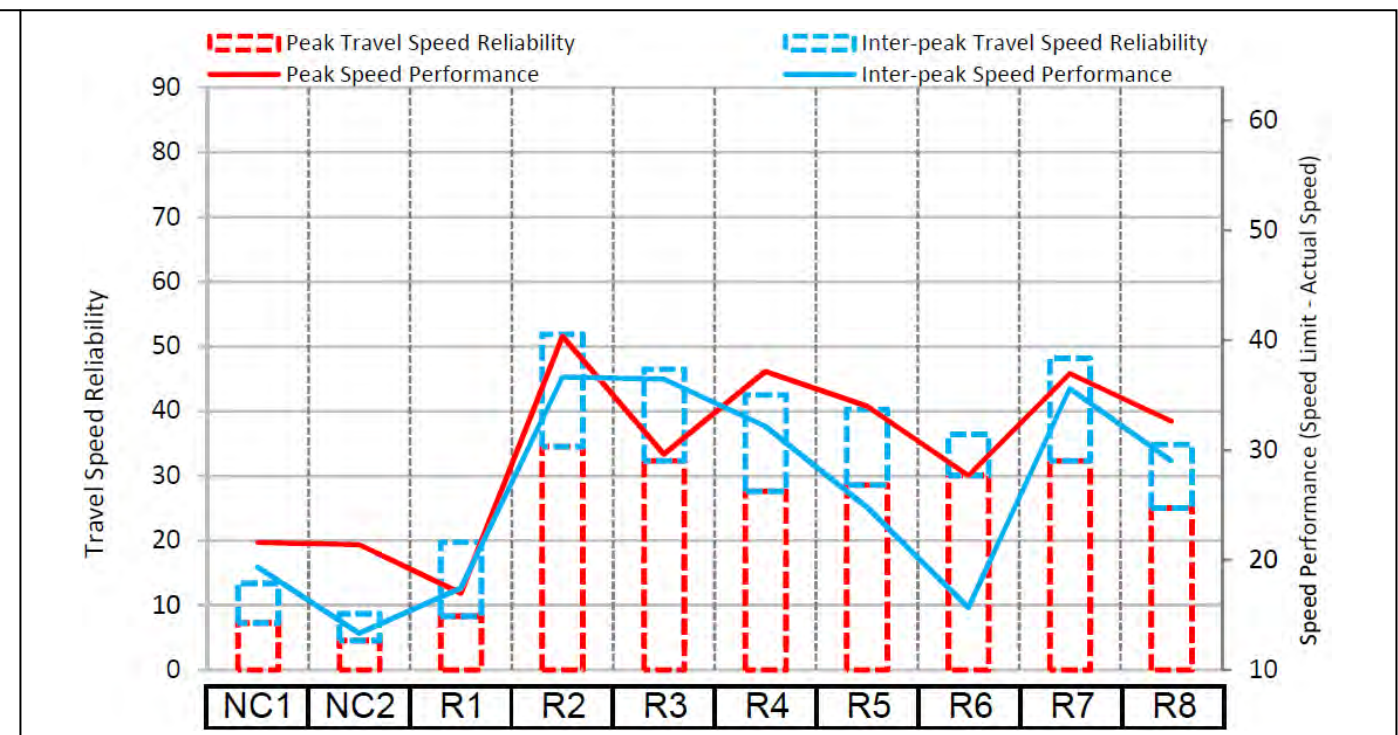


Figure 23: Road Project Section Analysis

8.1.6 Problem assessment – delay

Mid-Block and Intersection Analysis

Vehicle delay indicators (representing weighted total delay for peak and off peak periods) were determined for each mid-block/intersection along the length of the corridor.

Delay is derived from the difference in posted speed limit and peak and off-peak travel speeds, project section length and traffic volume. It represents a weighted indicator of performance over the whole day.

At the individual mid-block and intersection level, the plot of delays (purple and green bars) shows the delays to commercial vehicles and all vehicles respectively resulting from travelling mid-block at speeds lower than the posted speed limit and stops at intersections. The variations in delay along the corridor are also related to the variations in traffic volumes and the length of the midblock sections. The orange dots indicate the delays to all traffic crossing the corridor. The yellow histograms show the numbers of bus passengers crossing the corridor. AADT for all traffic is shown in the blue continuous line and AADT for commercial vehicles is shown in the purple line. The problems for east-west bus movements are inferred by comparing patronage against total east-west delays.

By observation:

- Daily traffic volumes are highest at the northern end (Port Wakefield Road/Salisbury Highway) and southern end (Darlington)
- Commercial vehicle volumes are highest along Port Wakefield Road/Salisbury Highway
- Delay (all vehicles) is highest along South Road (Grange-Ashwin Parade, Sir Donald Bradman Drive to Richmond Road and Edward Street to Daws Road)
- Delays to traffic crossing the corridor is highest at Grange Road, Henley Beach Road and Sir Donald Bradman Drive

- Henley Beach Road also carries the highest number of bus passengers (and buses) impacted by congestion at the intersection with South Road.

Road Project Section Analysis

Vehicle delay indicators were determined for the ten road project sections by summing the delays for the relevant component mid-block and intersections. The project section delays represent the total delay to traffic (peak and off peak) over the length of the project section. It does not show the variations in delays at individual intersections but allows for comparison of total delays with other project sections.

In the figure below, the green histogram represents delays to vehicles other than commercial vehicles and the purple histogram represents the delay to commercial vehicles. The orange histogram represents the total delay to all traffic crossing the project section at one or more intersections.

An interesting observation of the problem indicators is that whilst the traffic volumes along the corridor are lower through the central section than the northern and southern ends, the delays are higher for both north-south traffic and traffic crossing the corridor.

From a delay perspective, it can be seen by observation that project sections R4 and R5 exhibit higher delays to north-south traffic (all vehicles) than other project sections. R4 also exhibits high delays to crossing traffic. Delays to CV's are highest at the northern end of the corridor.

Upgrading of the corridor to provide non-stop sections of motorway will:

- Reduce delays to north-south traffic by increasing travel speeds and eliminating intersections
- Reduce delays to traffic crossing the corridor by removing significant volumes of conflicting north-south traffic travelling through at-grade intersections
- Improve reliability of on-road bus services travelling across the corridor

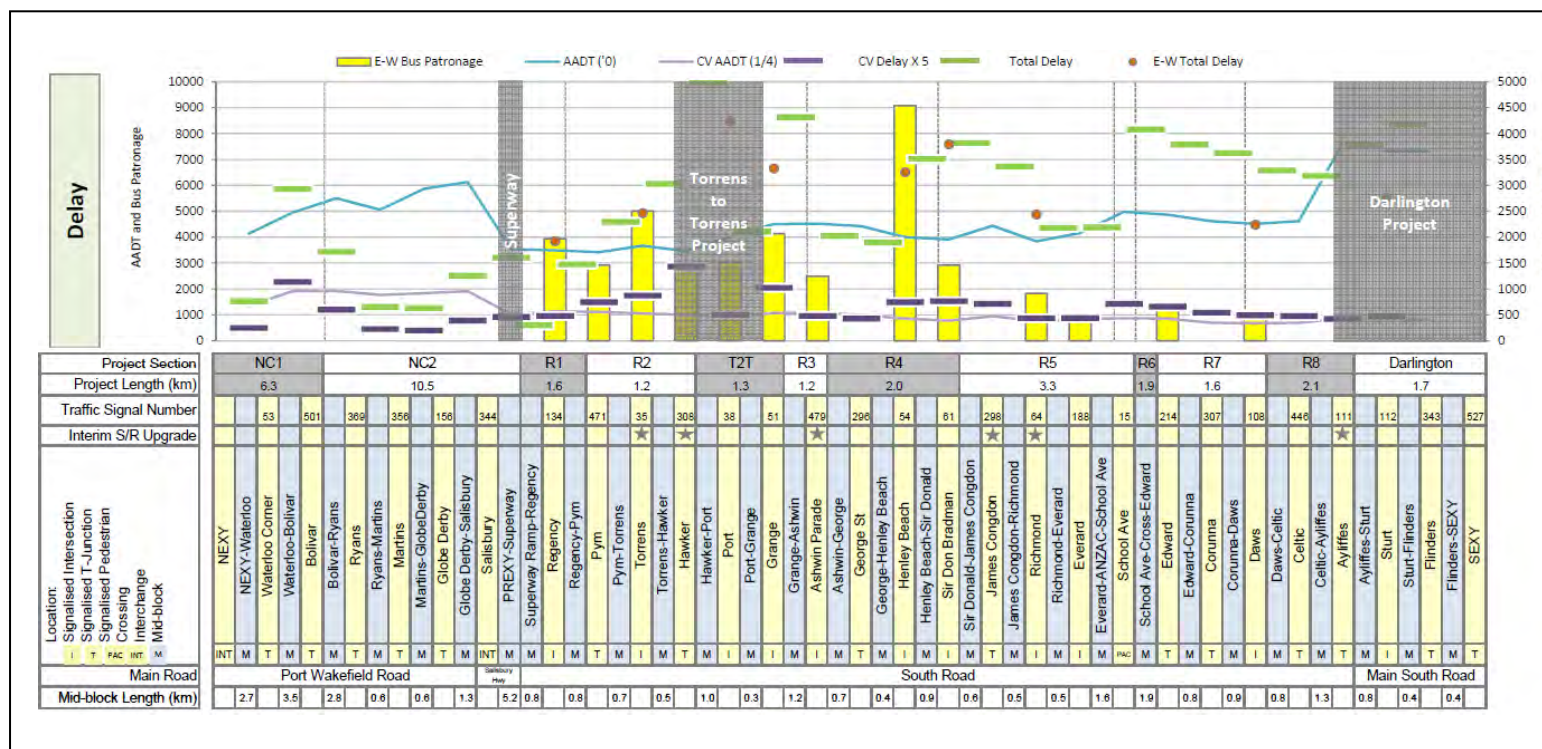


Figure 24: Intersection and Mid Block

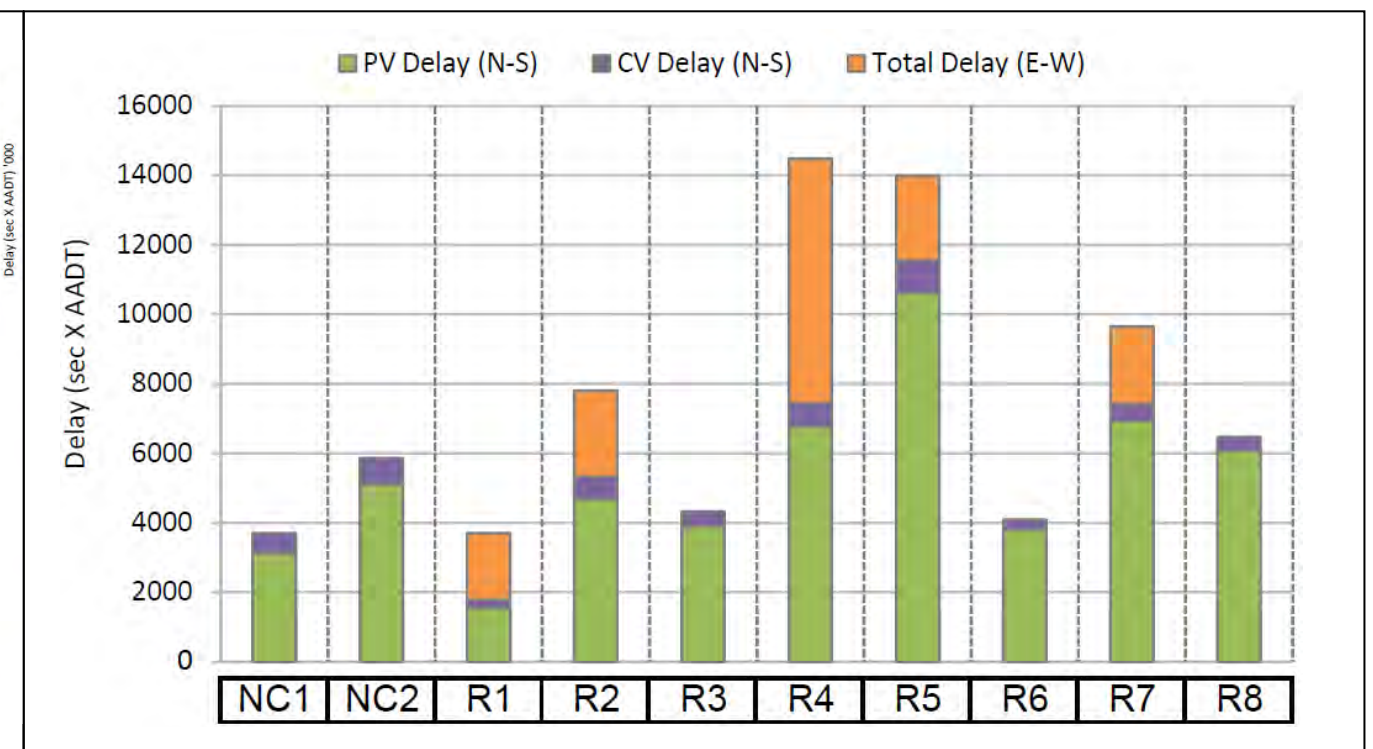


Figure 25: Road Project Section

8.1.7 Problem Assessment – Crashes

Mid-Block and Intersection Analysis

Casualty crash indicators were determined for each mid-block and intersection. The indicators represent all casualty crashes (over the period 2008 to 2013) involving one or more commercial vehicles (blue bar) and casualty crashes (grey bar) involving no commercial vehicles.

The indicator is simply a presentation of the number of casualty crashes recorded along each road section or at each intersection. At intersections, the number of crashes includes crossing and turning traffic.

At the individual mid-block and intersection level, the plot of crashes by vehicle type quickly identifies locations exhibiting the highest record of crashes.

By observation the concentration of casualty crashes is clearly at intersections. The worst performing intersections are on South Road at Torrens Road (to be partially addressed as part of the T2T road project upgrade) and Grange Road. Other high ranking intersections include Port Wakefield Road/Waterloo Corner Road, South Road/Regency Road and South Road/Henley Beach Road. The mid-block section exhibiting the highest number of casualty crashes is south of Cross Road to Edward Street. Crashes involving CV's are highest along Port Wakefield Road (at intersections with Waterloo Corner Road, with Bolivar Road and with Globe Derby Road and between Bolivar Road to Ryans Road) and on South Road (Torrens Road– Hawker Street).

These road sections carry higher volumes of commercial vehicles than the rest of the corridor and the Port Wakefield Road/Salisbury Highway sections are significantly longer than other sections along South Road.

Road Project Section Analysis

The casualty crash indicators were also determined for the ten road project sections by summing the crashes for the component mid-block/intersections. The project section crashes represent the total number of crashes over the length of the project section. It does not show the variations in crashes at individual intersections and mid-block road sections but allows for comparison of total delays with other project sections.

From a crash perspective, it can be seen by observation that project sections NC1 and NC2 (representing Port Wakefield Road and Salisbury Highway), R2, R4 and R5 exhibit higher numbers of crashes than other project sections. The road project sections exhibiting the worst casualty crash problem involving commercial vehicles are the two Northern Connector projects representing Port Wakefield Road and Salisbury Highway.

Upgrading of the corridor to provide non-stop sections of motorway will significantly reduce casualty crashes by:

- Reducing conflicts through grade separation at key intersections
- Reducing conflicts at minor intersections and junctions along mid-block sections
- Reducing congestion along mid-block sections
- Providing separation between long distance traffic (including commercial vehicles) and local traffic movements

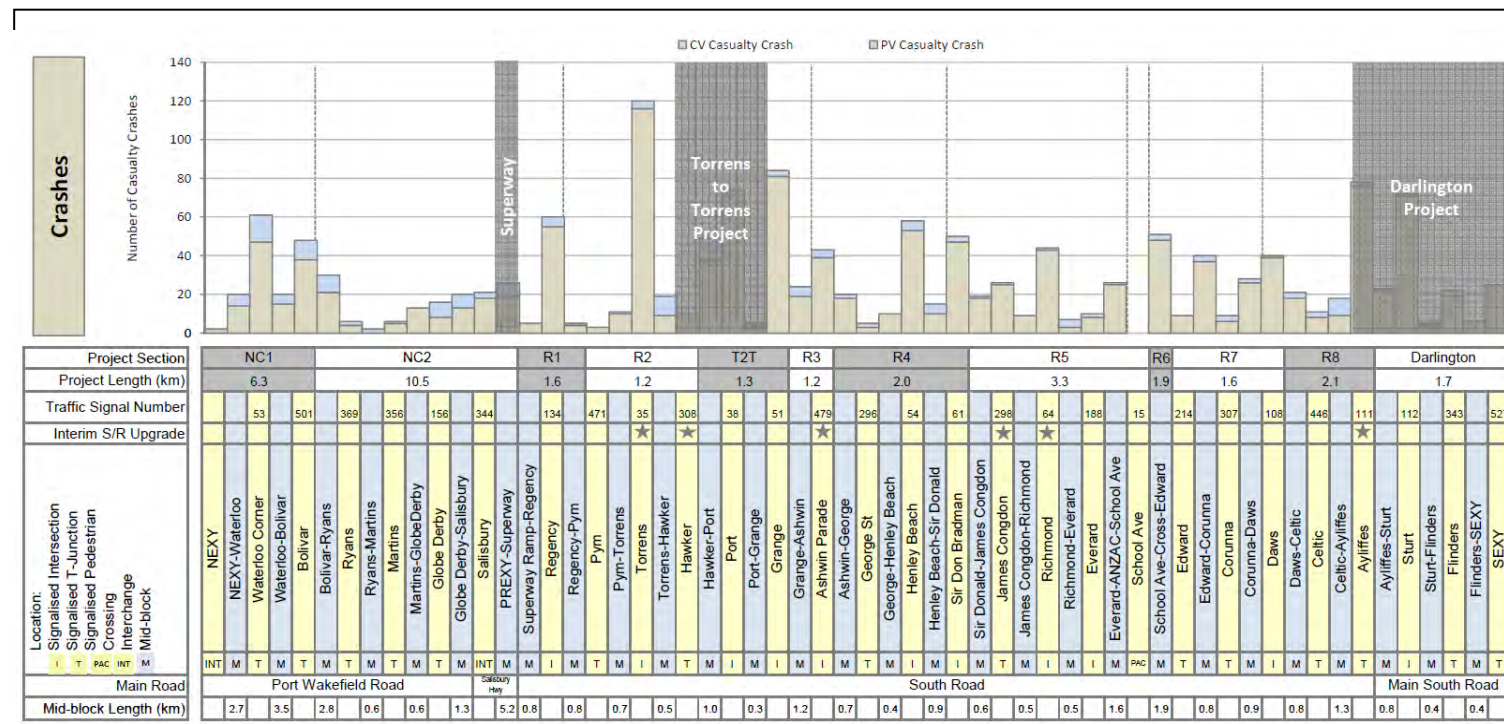


Figure 26: Intersection and Mid Block

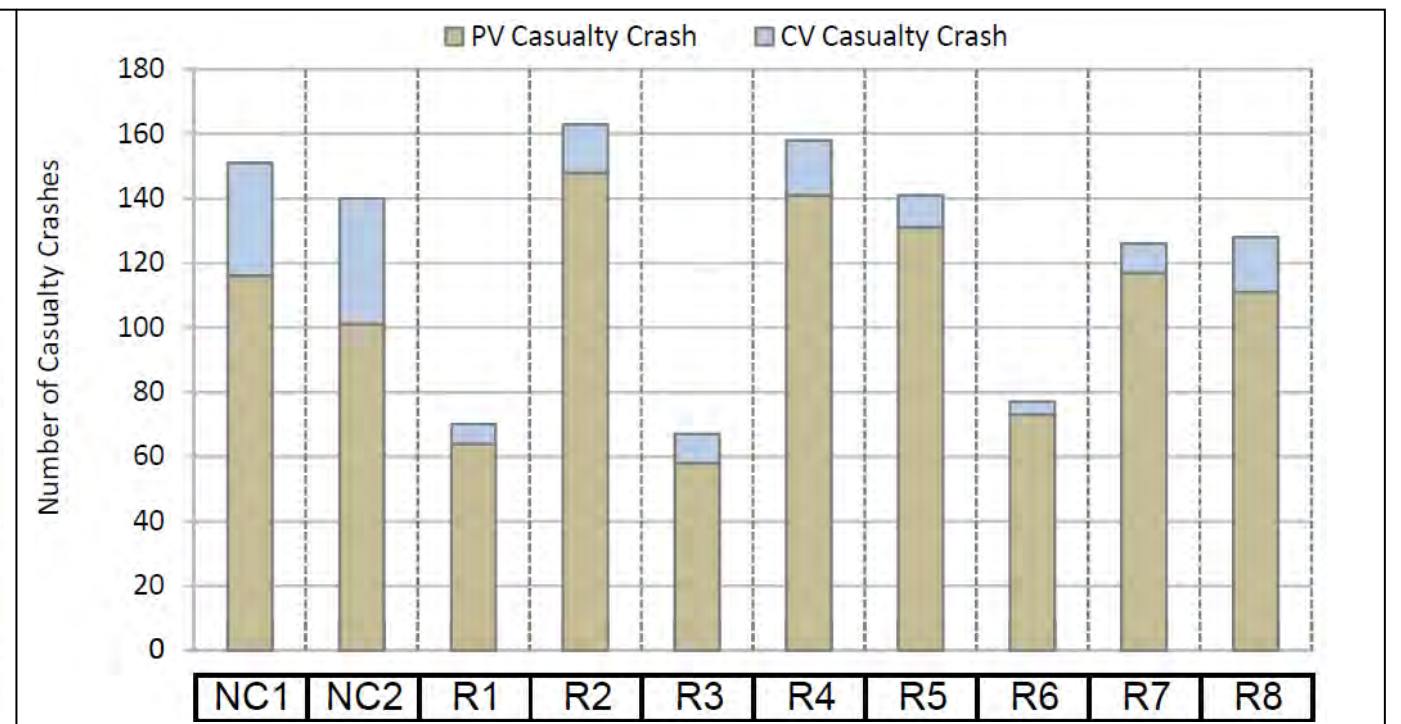


Figure 27: Road Project Section Analysis

8.1.8 Rating of Road Project Sections by Problem Severity

The individual road project sections were rated separately based on the relativity of problems using the three holistic problem indicators (travel speed & reliability, delay and crashes). The ratings consist of high (H), medium (M) and low (L) and represent an indicator of problem severity relative to other road project sections. Refer to Figure 28.

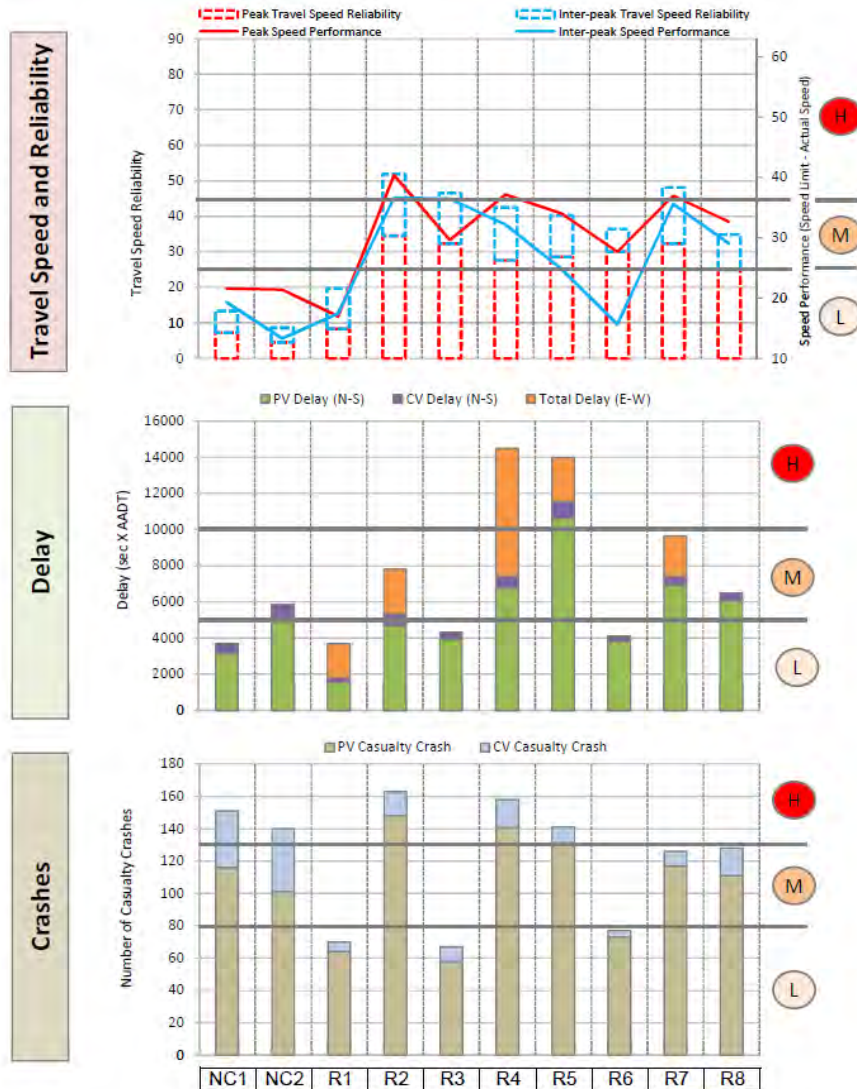


Figure 28 – Rating Problem Severity by Banding

To assist in assessing the relativity and rating of problem severity, the problem indicators were also normalised. The normalised indicator was used to demonstrate how much bigger or smaller the problem severity is relative to the average problem severity for all road project sections. In the example (Figure 29), the delay problem for project section R5 is significantly worse than for all other project sections.

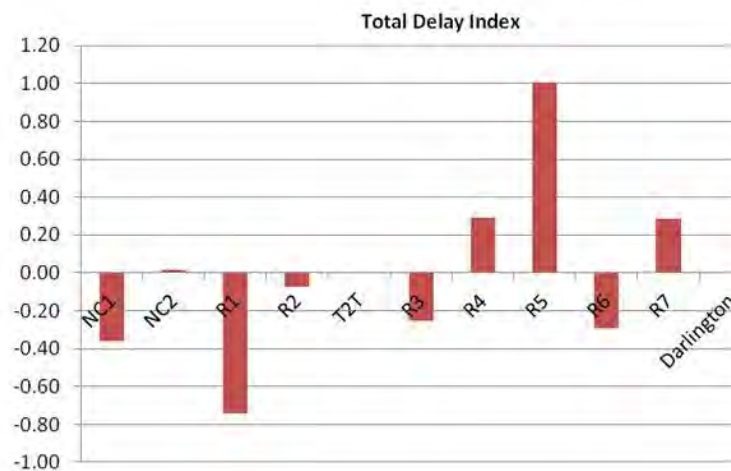


Figure 29: Total Delay Index

An overall problem severity rating by road project section was then derived considering the three holistic problem indicators. The combined overall ratings are shown in Table 17.

Problem Category	Road Project Section and Rating									
	NC1	NC2	R1	R2	R3	R4	R5	R6	R76	R8
Travel Speed & Reliability	L	L	L+	H	H	M+	M	M	H	M
Delay	L	M-	L	M	L	H	H	L	M	M
Crashes	H	H	L	H	L	H	H	L	M+	M+
Overall	L-M	L-M	L	M-H	L-M	H	H	L-M	M-H	M

Table 17: Overall Problem Rating by Road Project Section

By comparison of all of the problem indicators, project sections R4 and R5 (together representing the section of South Road from Ashwin Parade to south of Gallipoli underpass) rated highly indicating severe problems with respect to reliability, efficiency and safety. These two sections exhibit:

- low average speeds in peak and inter-peak (range 15-30 kph, 20-35kph respectively);
- high variability in travel times in both peak (predominantly) and inter-peak;
- high delays including delays for traffic crossing South Road at Henley Beach Road, Sir Donald Bradman Drive and Richmond Road;
- impediments to buses and passengers crossing the route;
- a poor safety record (nearly 300 casualty crashes over 5 years).

The next two highest rated problem sections are R2 (Pym Street to Hawker Street located between Superway and T2T) and R7 (Edward Street to Daws Road incorporating Castle Plaza). These sections exhibit:

- highly variable travel speeds;
- high delays to north-south traffic but to a lesser extent to east west traffic crossing the corridor;
- a poor crash history (over 160 and 120 casualty crashes over 5 years respectively).

8.2 Rating of Project Sections by Strategic Importance

The objective of rating project sections by strategic importance is to rate the importance of the road project sections based on their respective strategic merits.

Given the high level (broad) nature of this assessment, it was conducted for four sectors of the North-South Corridor rather than for individual project sections. These are:

- Outer north (Northern Expressway to north of Regency Road) incorporating project sections NC1 and NC2;
- Northern (north of Regency Road to south of Hawker Street) incorporating project sections R1 and R2;
- Middle (south of Grange Road to Anzac Highway) incorporating project sections R3 to R5;
- South (south of Anzac Highway to Ayliffes Road) incorporating project sections R6-R8.

The rating by strategic importance approach involved the following steps:

- Step 1:** Identify the “State” and “Australian” strategic policies and strategies (i.e. strategic considerations) that influence or will be influenced by the delivery of the North South Corridor
- Step 2:** Gather and assess data relevant to the strategic considerations and rate the importance of the upgraded north-south corridor in contributing to these;
- Step 3:** Provide an overall rating of the sector and apply the rating to the road projects sections that sit within sector.

8.2.1 State Strategic Considerations

The following strategic considerations (criteria) were determined in accordance with ‘State’ strategic policies and plans. Each criterion was counted or rated to demonstrate its alignment to strategic goals in the four sectors.

Functional Hierarchy

The extent to which all or part of the corridor in the sector performs the following functions:

- Public transport corridor;
- Cycling route;
- Pedestrian access areas;
- Major traffic route;
- Freight route;
- Peak hour route;

The process counted the number of strategic road functions the North South Corridor provides in each sector and the number of crossing roads that have a strategic road function. The higher count the higher the strategic importance.

Road Safety (Towards Zero)

The extent to which all or part of the corridor in the sector currently presents at-grade conflicts between major through traffic and:

- Rail corridors;
- Cycle paths;
- Intersecting roads;
- Crossing roads;
- Pedestrian actuated crossings;
- Uncontrolled pedestrian crossings;
- Direct property/business access.

The process counted the number of conflict points by criteria along the North South Corridor for each sector. The higher count the higher the strategic importance to resolve the conflicts.

Alignment to State Strategic Policies and Plans

The extent to which all or part of the corridor in the sector provides access to:

- Future green field development
- Future in-fill development
- Current and future industrial/business precincts
- Current and future domestic and international gateways and freight hubs

The process rated the importance (High, Medium and Low) of how upgrading the respective sectors of North South Corridor would improve connections and access to strategically important land use. The higher the rating the higher the strategic importance.

8.2.2 National Strategic Considerations

The following strategic considerations (criteria) were determined in accordance with 'National' strategic policies and plans. Each criterion was counted or rated to demonstrate its alignment to strategic goals in the four sectors.

National Land Transport Network

The corridor in all sections contributes to the objectives of the National Land Transport Network.

National Road Safety Strategy 2011-2020

Each sector was assessed by counting the number of casualty crashes along the sector.

Alignment by improved connectivity and access

The extent to which all or part of the corridor in the sector provides access to:

- Interstate and international gateways;
- Interstate and international intermodal;
- Transforming our cities.

The process rated the importance (High, Medium and Low) of how upgrading the respective sectors of North South Corridor would improve connections and access to strategically important land use. The higher the rating the higher the strategic importance.

8.2.3 Rating Sectors & Road Project Sections by Strategic Importance

The outcome of the strategic merit test for each of the sectors resulted in the following ratings, as described in Table 18:

North South Corridor Sector	Overall Rating (Strategic Importance)
Outer North	Medium to High (M-H)
North	Medium to High (M-H)
Middle	High (H)
South	Low to Medium (L-M)

Table 18: Strategic Importance rating by sector

The overall ratings of the sectors applied to the road project sections are shown in Table 19.

Rating	Sector and Project Section									
	Outer North		North		Middle			South		
	NC1	NC2	R1	R2	R3	R4	R5	R6	R76	R8
Overall Rating	M-H	M-H	M-H	M-H	H	H	H	L-M	L-M	L-M

Table 19: Strategic Importance rating by road project section

8.3 Prioritisation of Road Project Sections

The objective of the prioritisation of project sections is to prioritise the importance of the road project sections by balancing the importance of problem severity and strategic importance.

The approach involved the following steps:

- Step 1:** Plot the strategic importance rating (high, medium and low) against problem severity rating (high, medium and low) for each road project;
- Step 2:** Develop “unconstrained” program based on strategic merits and problem severity for the road project sections.

8.3.1 Overall Prioritisation

The ratings of road project sections by problem severity (Section 8.1) and by strategic importance (Section 8.2) were correlated against each other to determine an overall priority for each road project section. The overall priority of road project sections are shown in Figure 30.

'Greater the problem and higher the strategic importance, higher the priority for delivery'

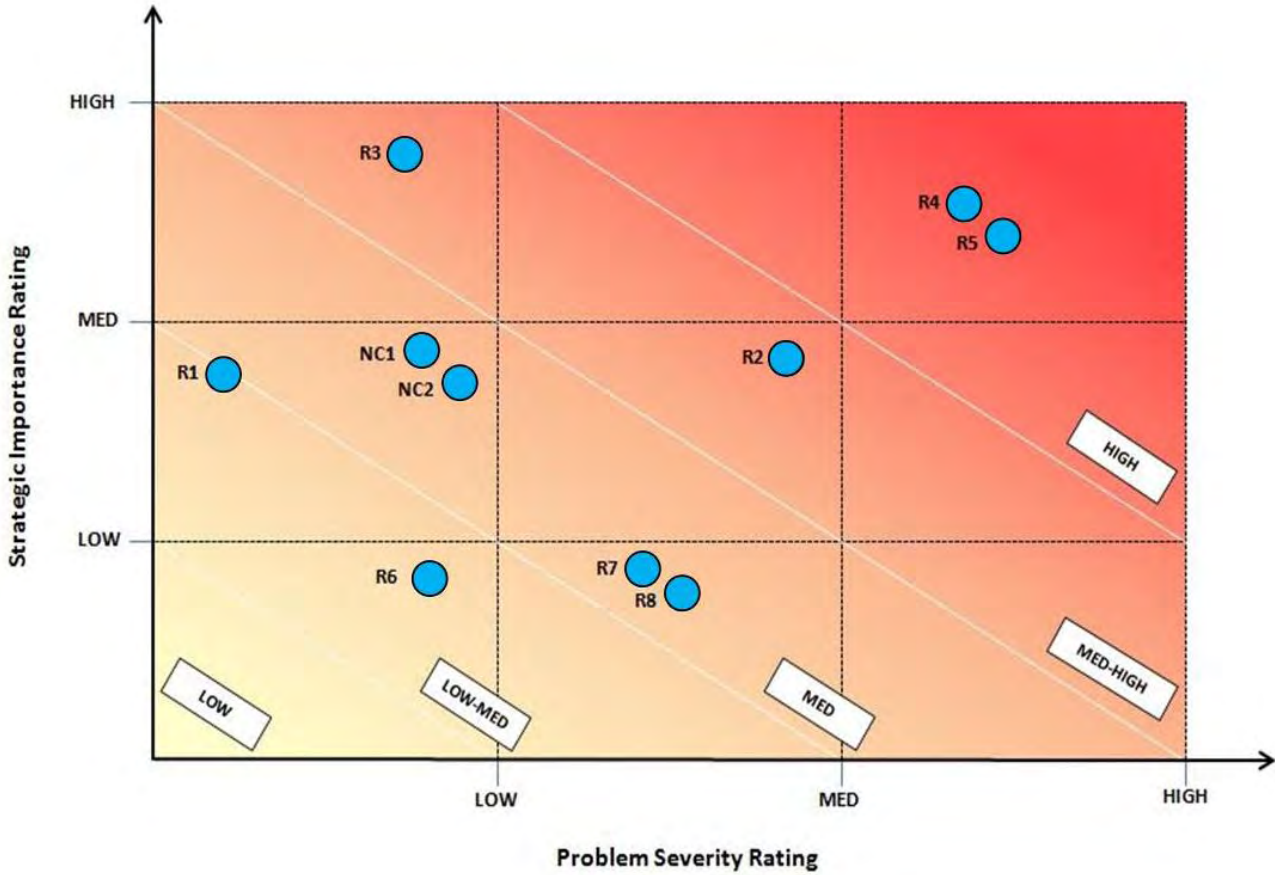


Figure 30: Prioritisation of Road Project sections

Figure 31 provides a geographical representation of the how the road project sections have been prioritised.

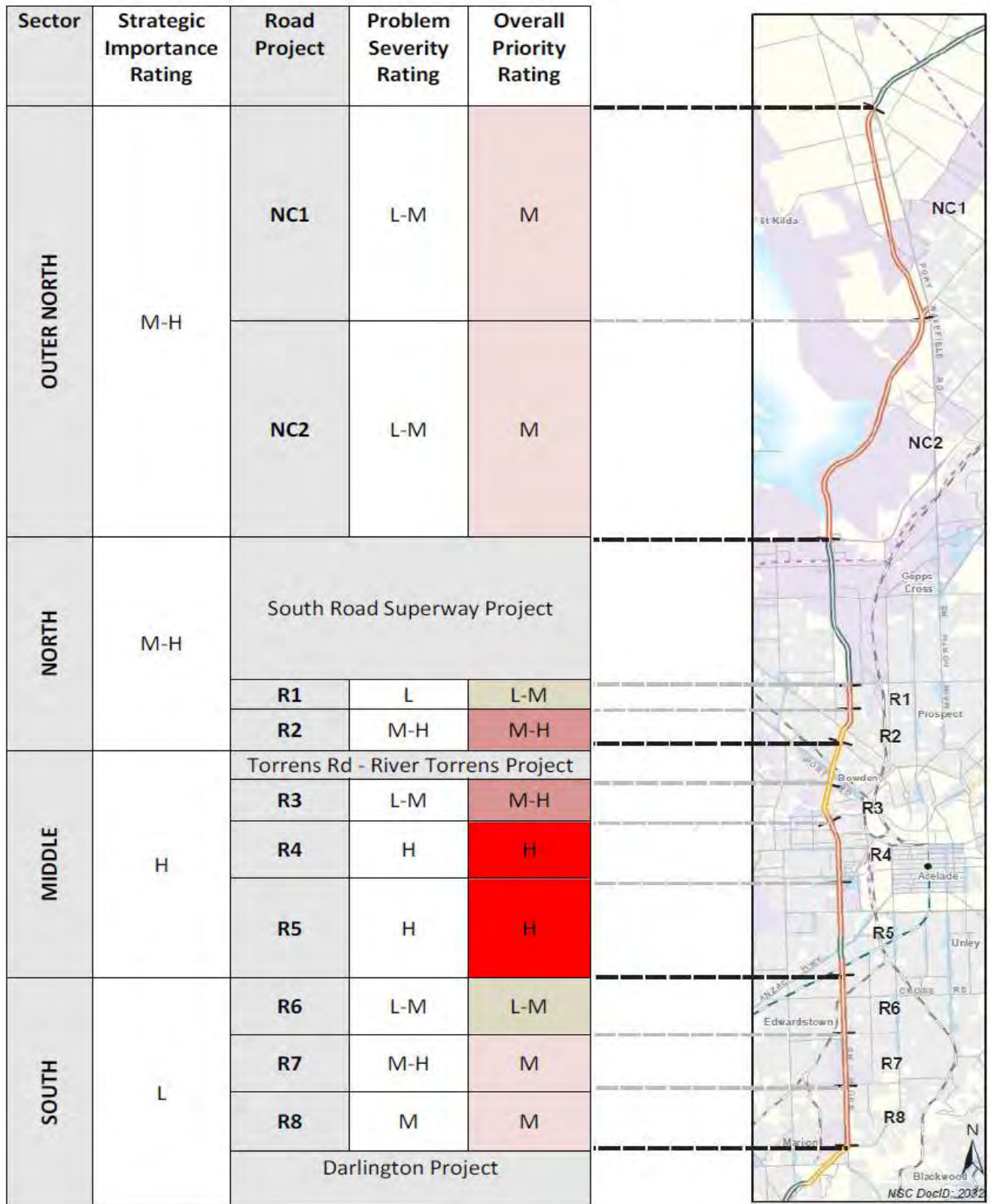


Figure 31: Prioritisation of Road Project Sections

8.4 Stakeholder Engagement

Throughout the process, the prioritisation approach was tested and refined by engaging with a number of stakeholders within the DPTI. This included conducting a workshop at which the process and preliminary outcomes were presented and discussed, and follow up meetings with staff at Metropolitan Road and Traffic Operations (MeTRO) and Policy and Planning.

8.4.1 Order of Works Workshop

The Order of Works workshop was held on the 1st October 2014 with the wider stakeholders within DPTI to review the project team's approach and initial ratings of the projects based on problem severity. The workshop aimed to gain consensus on the "problems" along the unfunded sections of the North-South Corridor. The project sections were initially ranked for each problem indicator and then ranked overall.

The workshop participants were divided into 6 groups and the group activities were undertaken in two stages. The workshop participants were provided with the project team recommended order of works (evidence based on traffic volume and composition, travel times, speed, casualty crashes and north-south/east-west data for all vehicles), and were asked to present their recommendation of delivery sequence for the unfunded North-South Corridor projects.

9 Land Acquisition and Preservation

Land Acquisition and Preservation has been investigated as part of this Strategy to determine an effective and efficient approach to the acquisition of property for the delivery of the North-South Corridor.

A different approach (e.g. early and consistent land preservation and acquisition) is also considered in the Strategy.

Securing access (right of entry) and ownership of property at the required time is critical to deliver the program. Failure to obtain access to the land prior to construction will delay the commencement of work, which would result in a failure to meet the government and the communities' expectations.

Obtaining access (right of entry) and ownership to land can be by negotiation between DPTI and the land owner/occupier or failing agreement through compulsory acquisition. Negotiation occurs by way of either owner approach, DPTI initiated purchases or DPTI purchasing land that is currently on the market for sale.

Compulsory acquisition is a highly emotive outcome and should be commenced with a sufficient lead time to secure properties within the legislative framework.

Effective community engagement and consultation are essential to manage successful outcomes.

9.1 Land Acquisition Process Timeframes

The acquisition process cannot occur without funding. Once funding has been obtained then the acquisition process can commence. The time to complete acquisition can vary dependant on the circumstance which can cause delays and risk to the successful delivery of projects.

Negotiated Acquisition

Where parties amicably agree on a price for their property a negotiated acquisition process can occur in a relatively short amount of time (i.e. couple of months). Based on previous experiences protracted negotiation can take significantly longer and may not even be successful. If the negotiation process fails, compulsory acquisition must commence.

Compulsory Acquisition

A non-contentious compulsory acquisition process could take 14 months and allowing for objections and protracted negotiations could take 2 years or more. A guide to DPTI's compulsory acquisition process under the *Land Acquisition Act 1969* is shown in Figure 32.

The Compulsory Acquisition Process: From First Letter to Right of Entry

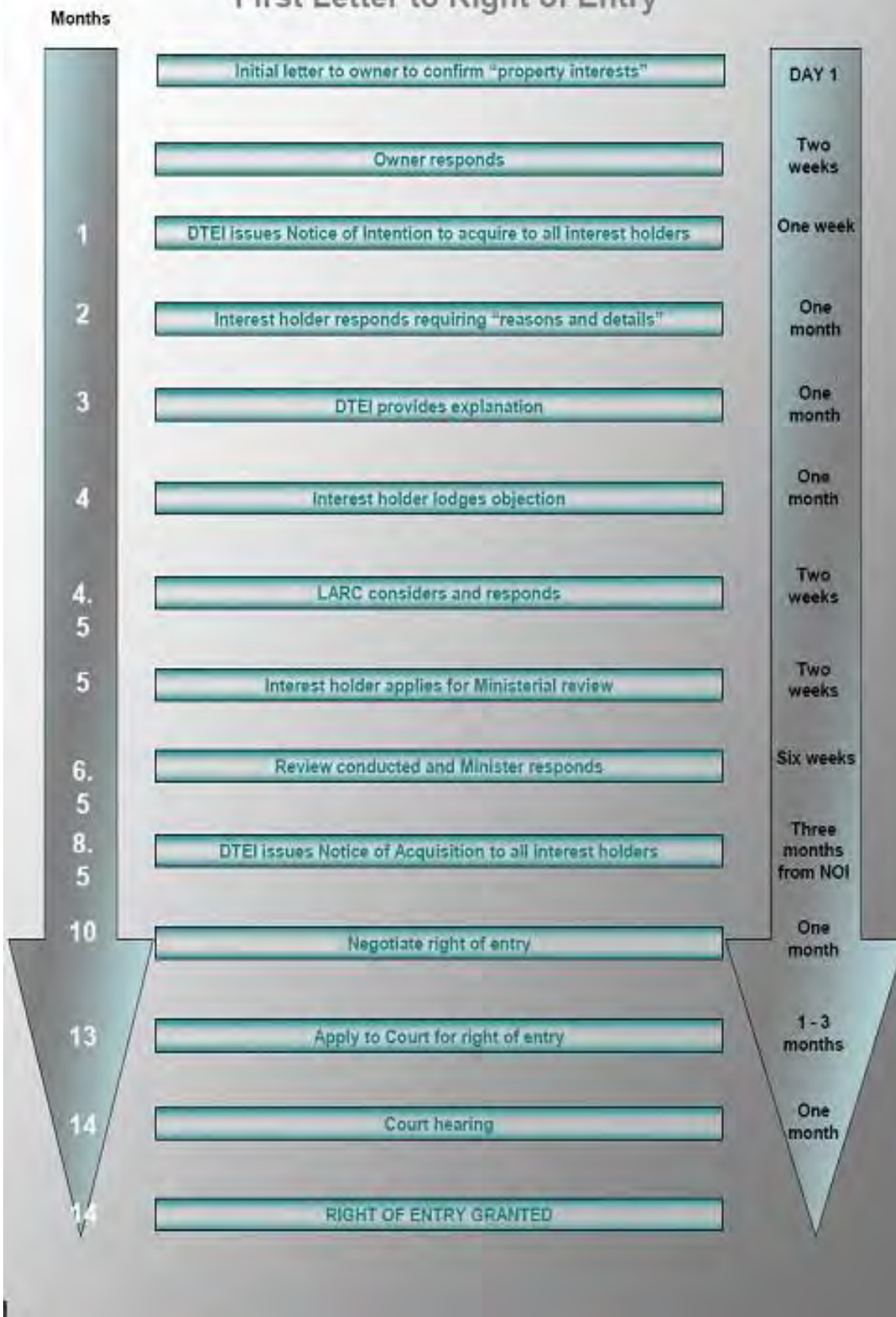


Figure 32: Compulsory Acquisition Process and Timeframes

9.2 Land Acquisition Costs

The following figures detail the land acquisition costs (in 2014 real dollars) associated with delivering the unfunded sections of the North-South Corridor. The land acquisition costs make up between 9 and 29 percent of these sections, highlighting the need for efficient and effective land acquisition to reduce program risk.

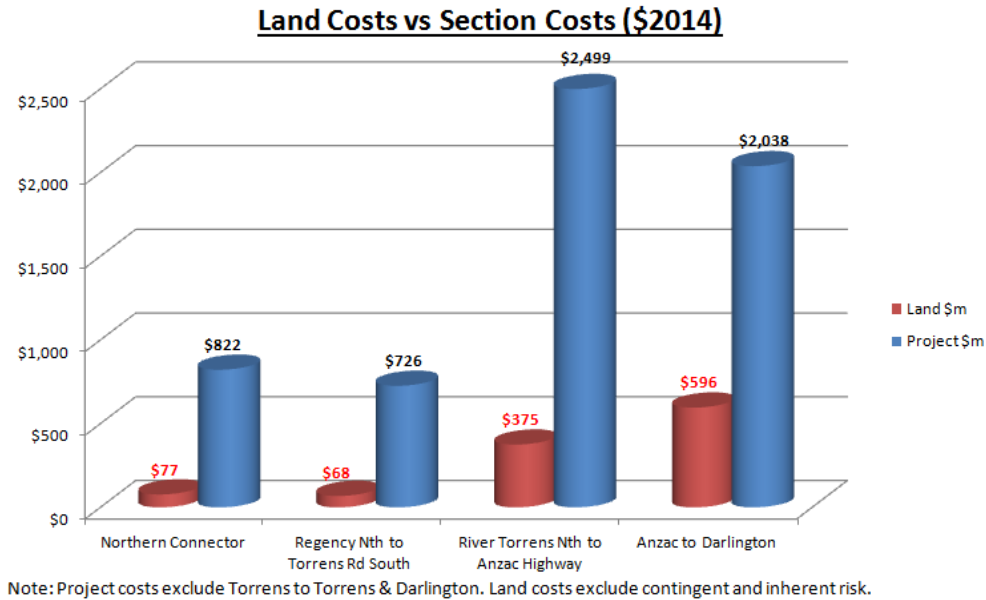


Figure 33: Land costs by unfunded sections of the North-South Corridor

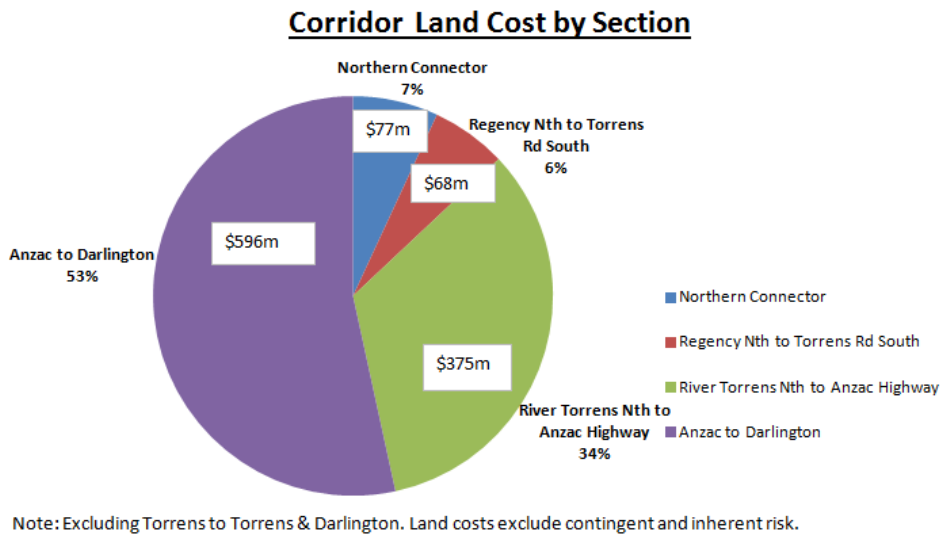


Figure 34: Proportion of corridor land costs by unfunded sections of the North-South Corridor

9.3 Methodology

To determine an efficient and effective approach to the acquisition of property, the following process was adopted:

- Step 1:** Review Concept Planning Reports to get a broad understanding of the land use considerations and “Constraint Mapping” which guided the preferred schemes;
- Step 2:** Review DPTI’s Guide to Property Acquisition guideline document, and relevant legislation including but not limited to the *Highways Act 1926* and *Land Acquisition Act 1969*;
- Step 3:** Review of approaches to land acquisition and preservation management, and associated risk;
- Step 4:** Undertake a Land Acquisition Strategy Workshop (8 September 2014) with internal stakeholders (DPTI) to identify strategies to:
 - reduce ‘business as usual’ acquisition timeframes;
 - change processes to enable acquisition to occur outside of funded road projects.
- Step 5:** Develop efficient and effective approach to managing the acquisition of land process.

9.3.1 Long Lead & High Risk Analysis

There are significant risks if the traditional approach to land acquisition is used to deliver the North-South Corridor over a 10 year period.

In the Torrens Road to Torrens River (T2T) and Darlington projects, the compulsory acquisition process has proven challenging for DPTI’s acquisition staff through dealing with upset and aggressive land owners. A reflection on the current process and discussion with key DPTI staff highlighted the need for a different approach for the North-South Corridor.

Communication to land owners that their land will be required and then delays in commencing the compulsory acquisition process or subsequently advising owners that they land will not be required are distressing for both the land owner and DPTI.

Not having funding to purchase land for the whole of the North-South Corridor upfront as it comes up for sale or as owners approach DPTI will result in increased purchasing and compensation costs, not only because the value of land will potentially increase over time, but the land will be developed and increase in value for which the department will have to compensate at the increased developed land value.

Not preserving the land early (i.e. stating the departments intentions publically and early) within the North South Corridor prevents DPTI from objecting to the development of land within the corridor which wastes land owners time, effort and money and in turn increases future acquisition costs. Additionally, the public knowledge that the North South Corridor will eventually be upgraded (as stated in ITLUP and the media) creates uncertainty for current and future land owners which results in ill informed decisions i.e. wasting time, effort and money in buying, renovating and developing properties that will eventually be acquired.

During a compulsory land acquisition process, land owners will actively communicate with each other to achieve similar or better compensation outcomes. This will be amplified in the North-South Corridor program due to the extent of land required which results in increased negotiation durations and compensation costs.

9.4 Alternative Land Acquisition Funding Model

An Opportunity exists to reduce the risk of property acquisition times (impacting the ability to commence road construction) by funding acquisition in advance of a funded road project.

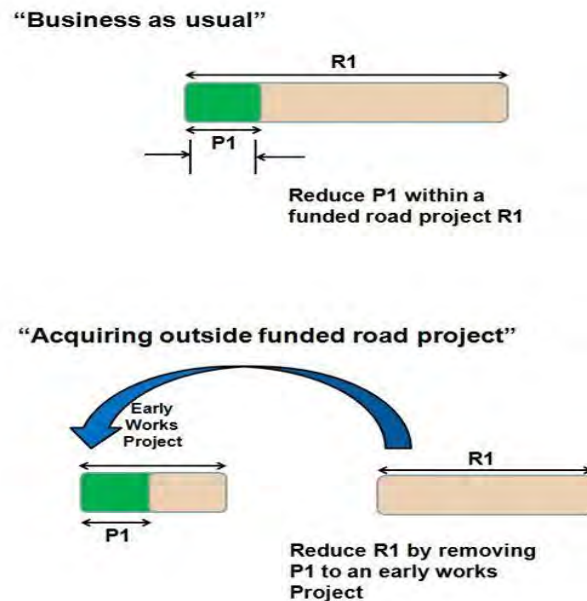


Figure 35: Land Acquisition Early Works

The ability to fund property acquisition way in advance will provide a greater period of time to negotiate land acquisition and reduce delays to commencement dates of the road construction projects. A longer negotiation period may result in an increase in negotiated purchases, which are considered a more amicable outcome and reduces the number of compulsory acquisitions.

9.5 Land Acquisition & Preservation Mechanisms

The Commissioner of Highways has the power to acquire land by negotiation or compulsorily acquire land under the *Highways Act 1926* subject to approval of the Minister for Transport and Infrastructure. The compulsory acquisition of land is heavily regulated through the *Land Acquisition Act 1969*.

DPTI should use existing legislative tools to effectively preserve the North-South Corridor land. The following are current known options available to preserve land:

1. *Land and Business (Sales and Conveyancing) Act 1994*

Section 7 of the *Land and Business (Sales and Conveyancing) Act 1994* provides for particulars that must be supplied by a vendor to a purchaser of land before settlement. The vendor through their agent will seek information from various stakeholders including government departments about the proposed future use of land and any possible restrictions that may affect an incoming purchaser of land. At a minimum DPTI, through its' Land Use Coordination section, should note in any Section 7 response that the land may be required for future road works and throughout the project. The standard response would require update to reflect the current status (e.g. if the 10 year timeframe is adopted).

It is worth noting at this point, that a section 7 search is undertaken by the vendor's agent upon listing of a property for sale and is valid for 3 months. A vendor must give up to date information in the

section 7 and if searches are over 3 months old when a contract is signed, a refresh should be undertaken. DPTI will need to ensure that it provides up to date accurate information.

2. Metropolitan Adelaide Road Widening Plan Act 1972

The *Metropolitan Adelaide Road Widening Plan Act 1972* ("MARWP") provides a mechanism for DPTI through the Commissioner of Highways to control development on land (e.g. building works) that may be required for road widening. Currently this plan includes reference to land on South Road and other land that may be required for the North-South Corridor. However the plan could be amended or varied to include additional land. This would give land owners some certainty over the short and long term as to the potential requirements for the North-South Corridor, it would also assist DPTI's Land Use Coordination section by enabling them to effectively and efficiently communicate with land owners to provide a consistency and certainty of DPTI's intentions, resulting in confidence for land owners/occupiers of the process over the 10 year period,

3. The Highways Act 1926

Section 39B of the *Highways Act 1926* enables the Governor to make a regulation declaring a particular project to be an authorised project. Section 39D of the *Highways Act 1926*, provides the power for the Minister to then acquire land by agreement or compulsorily for the purposes of the authorised project. Before work can commence on the project a description of the project and how it is to be funded must be referred to the Public Works Committee of the Parliament for inquiry and consideration.

Gaining authorised project status for the North-South Corridor would enable the early acquisition of land, for the program of works, whether by negotiation or compulsory acquisition prior to the traditional funded project.

The advantage of section 39B status would benefit the program of works through access to early funding and the ability to preserve the land which includes early notification to land owners and stakeholders.

The limitations under section 20(1)(a) of the *Highways Act 1926* on the Commissioner of Highways to only acquire land for present or future roadwork would not restrict the Minister from approving the early acquisition of authorised project land.

4. Development Act 1993

The Minister for Planning can initiate an amendment to a Local Government Development Plan to reflect changes as a result of an approved major development or project ie identifying the boundary of the North-South Corridor.

The State planning agency undertakes the investigations for the Minister initiated amendments, and consultation with the public is conducted by the Development Policy Advisory Committee (DPAC).

This Minister initiated DPA process would take time but would provide certainty, confidence and consistency in communication with stakeholders.

9.6 Land Acquisition Workshop

A land acquisition workshop was held on 8 September 2014. At the workshop, participants (DPTI) were asked to identify strategies to expedite and improve land acquisition activities to achieve a 10 year delivery program.

This included reducing the 'business as usual' acquisition timeframes and changing processes to make acquisition occur outside funded road projects.

The key findings of the workshop have influenced the strategy for efficient & effective management of land acquisition referenced in Section 9.7.

9.7 Strategy for the Efficient & Effective Management of Land Acquisition

The Strategy recommends a continuous program of works which enables a holistic approach to land acquisition based on securing funding early (separately and in advance of a road project) through early 'negotiated' purchasing (strategic purchasing) encompassing owner approach negotiated outcomes, DPTI initiated purchases and DPTI purchasing land for sale.

The Strategy recommends early preservation of land to provide certainty to land owners and stakeholders affected by the program of works.

The Strategy also recommends that if compulsory acquisition is required it is effectively delivered by a well planned, communicated and consistent process that is supported by the early preservation of land.

Legislative approval of a program of works to seek early funding and acquisition coupled with effective communication and community engagement throughout would enable flexibility and commitment within the parameters of planned land acquisition policies and procedures. Consistency and transparency in decision making are the key to ensuring that stakeholders feel engaged in the program whilst ensuring DPTI acquisition staff feel empowered in the knowledge that they are supported by the legislative approved program of works.

The Strategy recommends the following;

Governance – *undertaking taking business efficiently and effectively;*

- Gaining authorised project status (legislative approval) pursuant to section 39B of the *Highways Act 1926* to enable the early acquisition of land prior to a traditional funded road project;
- Adopting up to date policies and procedures to ensure consistent practices and to provide confidence in their administration.

Land preservation mechanisms – *early notification to stakeholders of Government's intention to acquire land for the program of works by:*

- notification under section 7 Land and Business (Sales and Conveyancing) Act 1994
- amendment of the Metropolitan Adelaide Road Widening Plan
- Ministerial initiated amendment to local government Development Plans

Strategic land acquisition - *securing funding early to enable:*

- owner approach negotiated outcomes;
- DPTI initiated purchases;
- DPTI purchasing land for sale;
- compulsory acquisition of land via the Land Acquisition Act 1969;

9.7.1 Strategy Outcomes

Securing funding early in the program will enable effective and efficient investment and implementation of strategic land acquisition practices which will result in:

- potential time savings;
- potential reduced costs;
- certainty;
- confidence;
- consistency of practice.

Clear, up to date, robust policies and procedures for all acquisition of land must be used to increase certainty and provide DPTI staff with clear objectives and guidelines in undertaking their duties.

Adequate lead times results in informed planning and effective engagement with stakeholders which can benefit individuals and the community in a number of ways:

- Acquisition by agreement is less adversarial than compulsory acquisition, land owners and occupiers should feel valued and engaged in the process. Significant acquisition of land in an area can significantly affect the market value of properties in the area and the demand for properties particularly if the final design of the road is unknown;
- Owners react in different ways. Some are proactive and may well decide very quickly how they will approach the affect on their life. They may approach DPTI to sell their property, put their property on the market or prefer to wait until the compulsory acquisition process commences. There will also be varying degrees of anxiety and anticipation. If DPTI is in a position to acquire property as early as possible in the North-South Corridor program of works, then DPTI will be in a position to more effectively manage the process, resulting in hopefully less likelihood of properties being neglected or not maintained and 'ghetto' type areas evolving.
- Successful engagement will reduce the feeling of helplessness that compulsory acquisition can create. Successful and effective strategies for acquiring land will assist DPTI along with land owners and occupiers to make informed, short and long term decisions about the land;
- Further, opportunities may be considered and realised by commercial investors who may consider investing in a business opportunity along the corridor for a definite period (e.g. a fast food outlet to service the construction period). With adequate planning these opportunities to develop strategic partnerships will also be available to DPTI throughout the 10 year period;
- Failing successful acquisition by negotiation, the compulsory acquisition requirements and process must be carefully identified and co-ordinated to ensure that the project delivery times and program timeframe is met.

10 Services

Utility services have been investigated as part of the Strategy to determine how to efficiently and effectively manage services during the delivery of the North-South Corridor program of works. This section also investigates what management activities can be undertaken in advance (early) of a funded road project by a 'whole of corridor' services team to create program efficiencies.

Utility services management (avoid, protect or relocate) is a critical component that sits on the critical path to the delivery of any project. It is a complex and detailed activity that requires significant resourcing to deliver a project. The primary objective of any project is to relocate services prior to the scheduled road construction commencement date. However, there are many challenges and risks in achieving this, such as gaining right of entry to land (through the land acquisition process), managing the sheer number and size of utilities affected, long lead times to supply and install services, negotiating terms and conditions with utility service providers and many more time consuming activities that pose significant risk to delivery timeframes.

Managing this work systemically and effectively will reduce cost and timing risks associated with services management.

10.1 Services Management Costs

As background, the following graphs detail the services management costs (in 2014 real dollars) associated with delivering the unfunded sections of the North-South corridor.

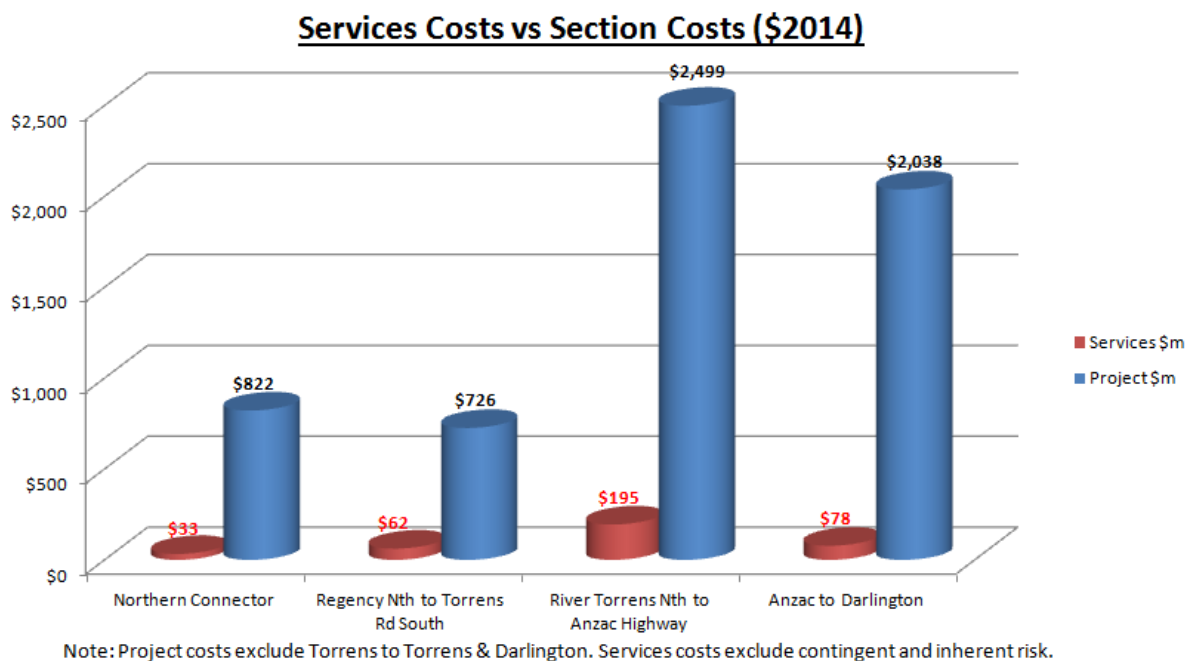
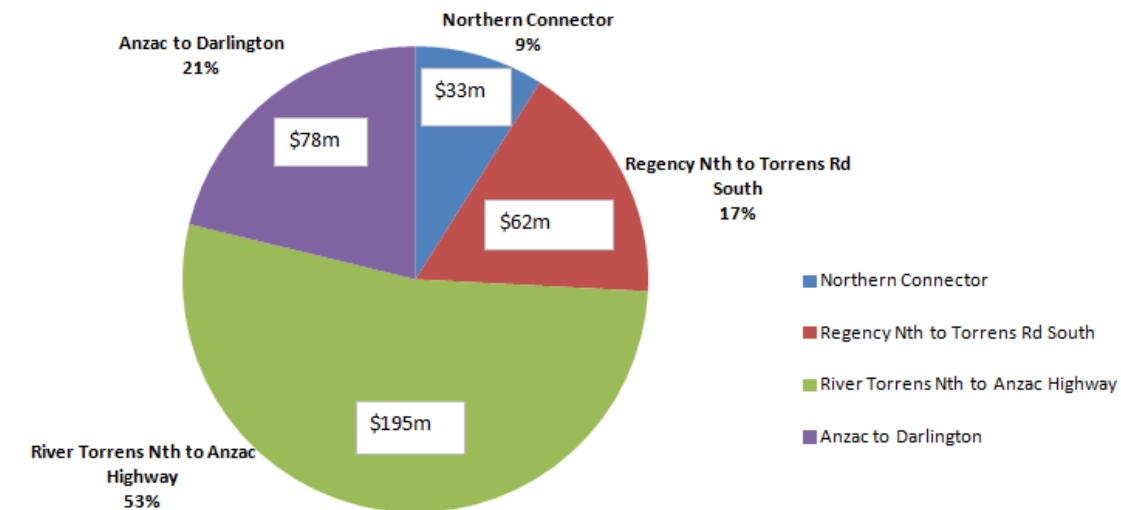


Figure 36 – Services costs by unfunded sections of the North-South Corridor

Corridor Services Cost by Section (\$2014)



Note: Excluding Torrens to Torrens & Darlington. Services costs exclude contingent and inherent risk.

Figure 37 – Proportion of corridor service costs by unfunded sections of the North-South Corridor

10.2 Methodology

To determine an efficient and effective approach to the management of services, the following process was adopted:

- Step 1:** Review previous services information from North-South Corridor planning studies to identify long lead / high risk services that would significantly impact the program delivery timeframe;
- Step 2:** Investigate services management activities that can be undertaken early;
- Step 3:** Undertake a workshop with across DPTI representation seeking input to consider ‘services management’ strategies and to identify risks and opportunities;
- Step 4:** Develop efficient and effective approaches to managing services.

10.2.1 Long Lead & High Risk Services

A review of the services work to date from the planning studies identified that there was only one major piece of services infrastructure that would significantly impact the program timeframe being the Telstra Exchange near Cross Road (approximately 5 years to relocate). The relocation of the exchange needs to be funded as an associated works project five years in advance of the funded road project. Alternatively further design work needs to be undertaken to determine options to avoid the need to relocate the exchange.

10.2.2 Early Services Management

A major road project can typically involve two years of services management (avoid, protect or relocate) and in some cases this can be longer for infrastructure associated with major power and telecommunication distributors (i.e. South Australian Power Networks (SAPN) and Telstra). The Strategy has investigated what management activities can be undertaken in advance (early) of a funded road project by a whole of corridor services team to create program efficiencies. Early coordination, cooperation and communication with services providers is vital in de-risking funded road projects. The following process (Figure 34) was investigated to manage services early without causing significant risk of re-work or unnecessary expense prior to the commencement of the road construction project. This is based on the ability to relocate 'critical path' services to a location that is outside of the final road footprint (e.g. offline outside of the North South Corridor or to a dedicated services corridor) and may require land acquisition prior to relocation. The boxes highlighted in red dashed lines (Figure 38) identify the services management activities that can occur in advance of funded road projects by a whole of corridor services team.

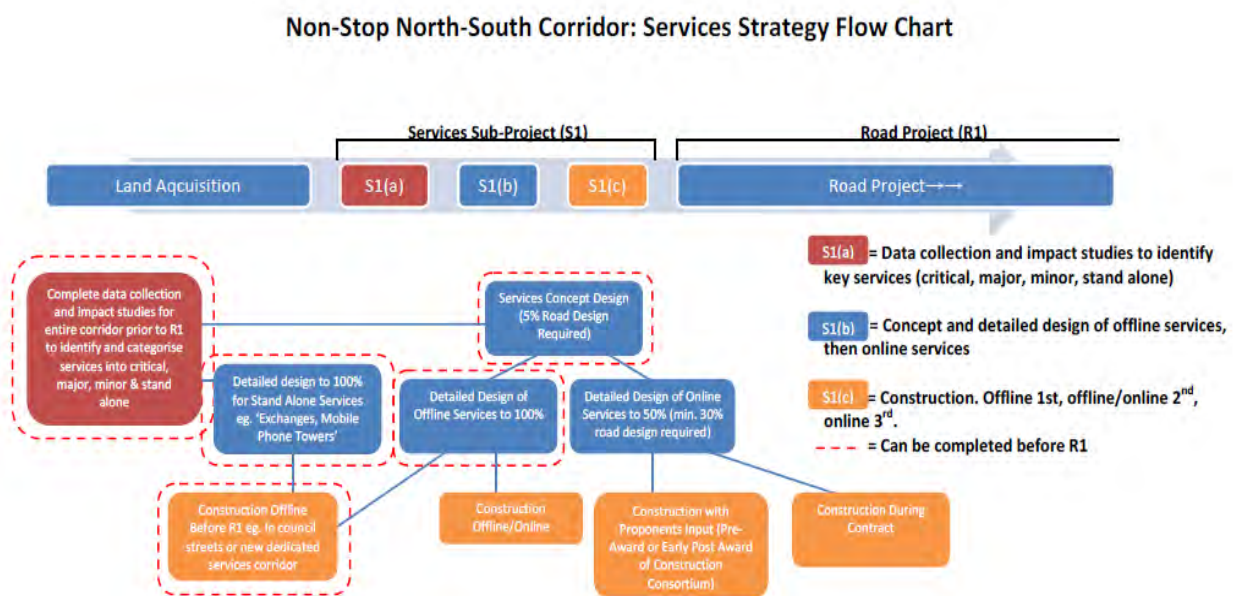


Figure 38: Services Strategy Flow Chart

The above approach will still present the following issues and risks:

- The community may oppose land acquisition and service relocations years in advance of the road construction project;
- Service relocations may be slowed down by the time taken to acquire land or gain right of entry to land;
- There is a risk that the road design could change and a service relocation was not needed;
- The approach may not be viable unless the North-South Corridor Program is endorsed to enable and fund a whole of corridor services management approach;
- Councils may not accept the relocation of services onto their land (e.g. offline locations).

10.2.3 Services Workshop

A services workshop was held on 1st September 2014. At the workshop, participants (DPTI) were asked to consider the early services management approach and to identify new ideas to be effective and efficient in managing services. Furthermore, participants were asked to identify risks and opportunities associated with those ideas.

The key findings of the workshop have influenced the strategy for efficient & effective management of services referenced in Section 10.3.

10.3 Strategy for the Efficient & Effective Management of Services

The following recommends an approach to being efficient & effective in the management of services:

10.3.1 Pro-Active Planning, Design and Delivery

- Develop a whole of corridor governance structure for the management of services with accountability to actively reduce risks and costs over the program of works;
- Create a whole of corridor services team that becomes the single point of contact for service providers and who strategically manage services in a consistent, pro-active and transparent manner;
- Seek opportunities to fund early services works by undertaking:
 - Early services investigations in consultation with third party service providers to:
 - Locate and map (in 3D) current services;
 - Understand impacts to services;
 - Determine how to manage services (avoid, protect or relocate);
 - Undertake services planning and design.
 - Early acquisition of additional land to relocate services;
 - Early relocation of services.
- Develop a services corridor plan that preserves the location of longitudinal and transverse services corridors to guide the future design of the road corridor and provides certainty to service providers;
- Make provision for additional land to accommodate a services corridor;
- Reduce costs and justify a services corridor by integrating with 'other' transport infrastructure:
 - locate a common service corridor underneath a footpath/cycle path;
 - provide a footbridge that serves as a services bridge and ITS gantry.
- Aspire to relocate all third party services (e.g. non-essential to the operation of the road) from the free flow non-stop motorway and surface arterial South Road;
- Develop a 3D services model to accurately identify and manage services;
- Prevent new and/or relocated services from being installed on the current South Road to prevent future re-work and relocation/protection costs;
- Design the road corridor (where possible) to avoid high cost / long lead services;
- Engage consultants who are approved by service providers to undertake services design to expedite the services management process;
- All above ground services infrastructure to be designed and located in accordance with safe systems 'road safety' principles;
- Fast track North-South Corridor concept plans to a 30% design level to provide greater certainty for early services relocation.

10.3.2 Collaborate with Third Party Service Providers

- Seek opportunities to engender collaboration with service providers (e.g. charters, memorandums of understanding and steering committees);
- Partner with service authorities and contractors under an alliance contract (e.g. an integrated team);
- Work with respective service providers to develop a North-South Corridor 'standard' contract to provide consistency and certainty between all parties over the duration of the program of works;
- Seek legislative change to provide the road authority with greater power to influence collaborative 'best for state' outcomes;
- Coordinate planning activities undertaken by service providers and the road authority to provide 'best for state' value for money outcomes.

11 Costs

11.1 Total Project Costs

Total costs for the unfunded sections of the North-South Corridor are presented in Table 20 which includes an additional 5% cost for generic project items made up of the following:

- DPTI resourcing requirements for delivering and operating the infrastructure;
 - Traffic Management Centre staff;
 - Additional departmental full time employees outside of project team:
 - Property acquisition personnel;
 - Planning and Design personnel.
- A new or upgraded Traffic Management Centre to support a fully managed motorway North South Corridor;
- Bus operational costs incurred due to bus operating contract penalties (i.e. rerouting buses along to detour routes);
- Public transport subsidies to provide incentives for motorists to travel on public transport instead of cars to reduce congestion on the road network through construction of the North-South Corridor;
- Funding to increase the number of bus and rail services to further promote the use of public transport by motorists to reduce congestion on the roads;
- Operation and maintenance cost for the corridor.

All costs should be treated as indicative only.

Table 20 provides the summary of total costs for the unfunded sections of the North-South Corridor.

Road Project Section	Indicative Costs (2014 Real Dollars)*
NC1	\$250m
NC2	\$610m
R1	\$310m
R2	\$450m
R3	\$270m
R4	\$1100m
R5	\$1250m
R6	\$710m
R7	\$800m
R8	\$640m
<i>Total</i>	<i>\$6390m</i>
<i>Associated Works</i>	
New Traffic Management Centre	TBA
VMS Operations	\$10m
Suggested Network Upgrades	\$60m
Public Transport Projects (including Emerson grade separation)	\$310m
<i>Total Associated Works</i>	<i>\$380m</i>
Total Unfunded (Including 5%)	\$6770m
Torrens to Torrens (Funded)	\$680m
Darlington (Funded)	\$450m
Total Funded	\$1130m
Total Corridor (Unfunded & Funded)	\$7900m

Table 20: Total costs for the unfunded and funded sections of the North-South Corridor

*Costs are rounded to the nearest \$10m.

12 Programming

12.1 Basis for the Programming

Australian and South Australian Governments both recognise the North-South Corridor is strategically important and acknowledge significant problems exist for its entire length (excluding the already upgraded sections) that inhibit the road from performing its role and function in a safe, efficient and reliable manner.

Section 8 identified an evidence based approach to prioritising the ten nominated road projects, where individual road project sections were prioritised based on their relative strategic importance and their relative magnitude of the transport problem:

‘Greater the problem and higher the strategic importance, higher the priority for delivery’

Figure 39 illustrates the priority order of road projects.

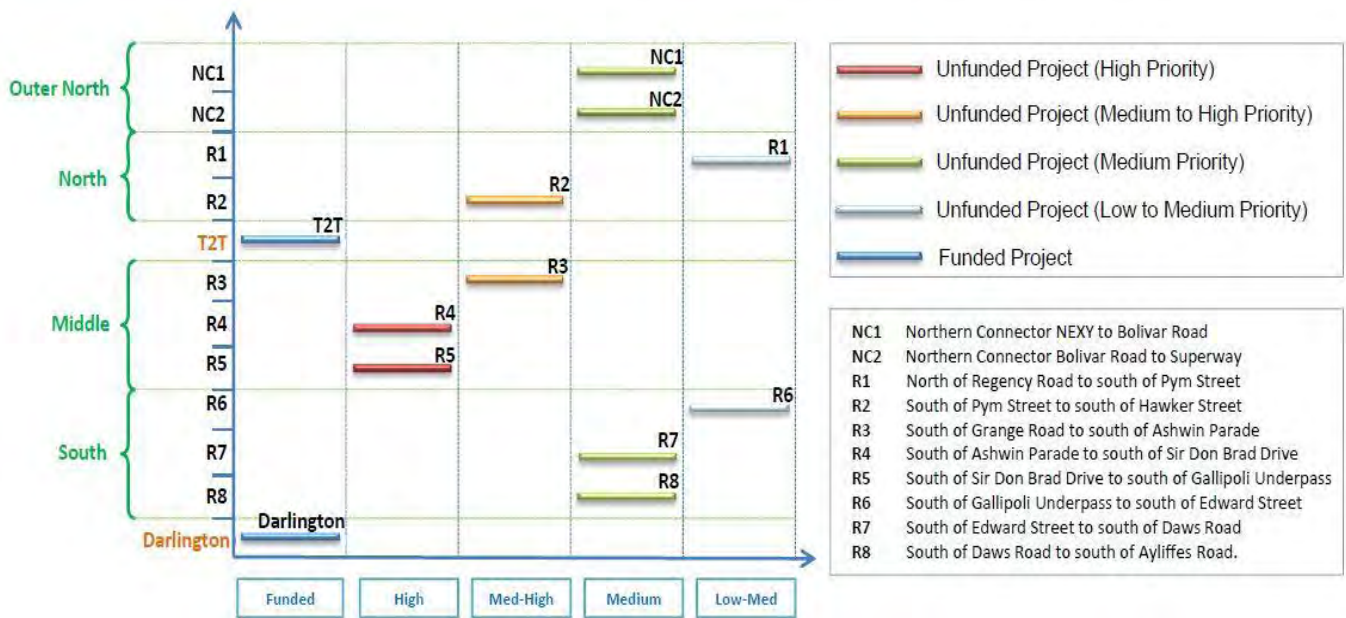


Figure 39: Priority Order of Projects

The above approach intends to realise the potential of the North-South Corridor by unlocking benefits of economically productive infrastructure in priority order.

Using the priority order of road projects as a foundation, the Strategy has investigated *possible* program scenario's that provide a high level *indication* of the yearly work effort and cash flows involved in fully upgrading the North-South Corridor. The programs will also be used to inform the economic analysis of fully upgrading North-South Corridor.

The programs will provide Australian and South Australian Governments an indication of the magnitude of work and yearly expenditure required to fully upgrade the North-South Corridor under two broad program scenarios delivering in priority order and delivering Northern Connector first and over two program durations of 10 years (The Strategy) and 15 years (ITLUP).

12.1.1 Deliver in Priority Order

Program 1a: ITLUP 'Business as Usual'

This program was developed using the DPTI business as usual approach to understand the yearly work and cash flows involved in delivering the North-South Corridor in accordance with the ITLUP delivery timeframe of 15 years.

Program 1b: ITLUP 'Alternative'

This program was developed to test the benefits of funding early work activities separately and in advance of road construction projects.

Program 1c: 10 Years Strategy 'Business as Usual'

This program was developed to compress the ITLUP program (1a) by overlapping the required number of road projects to meet the 10 year timeframe to understand the yearly work and cash flows involved.

12.1.2 Deliver Northern Connector First

Program 2a: ITLUP 'Business as Usual'

This program was developed using the DPTI business as usual approach to bring Northern Connector to the front of the program in accordance with the ITLUP delivery timeframe of 15 years to understand the yearly work and cash flows involved in delivering the North-South Corridor

Program 2b: 10 Year Strategy 'Business as Usual'

This program was developed to compress the ITLUP program (2a) by overlapping the required number of road projects to meet the 10 year timeframe to understand the yearly work and cash flows involved.

12.2 The Programming Process

A process was adopted to build the five programs:

- Step 1:** Develop broad program 1 – Deliver in priority order;
- Step 2:** Develop broad program 2 – Deliver Northern Connector first;
- Step 3:** Develop generic 'business as usual' and 'alternative' project delivery models;
- Step 4:** Develop project 'work break down structures' (durations and costs) for each road project section (NC1, NC2 and R1 to R8);
- Step 5:** Develop program 'givens' and 'guiding principles';
- Step 6:** Build detailed programs 1a, 1b, 1c, 2a and 2b;
- Step 7:** Cash flow the detailed programs.

Moving beyond the Strategy, the programs can be adopted as reference programs, so that when further work is undertaken they can be updated. Figure 40 illustrates a flow diagram of the process.

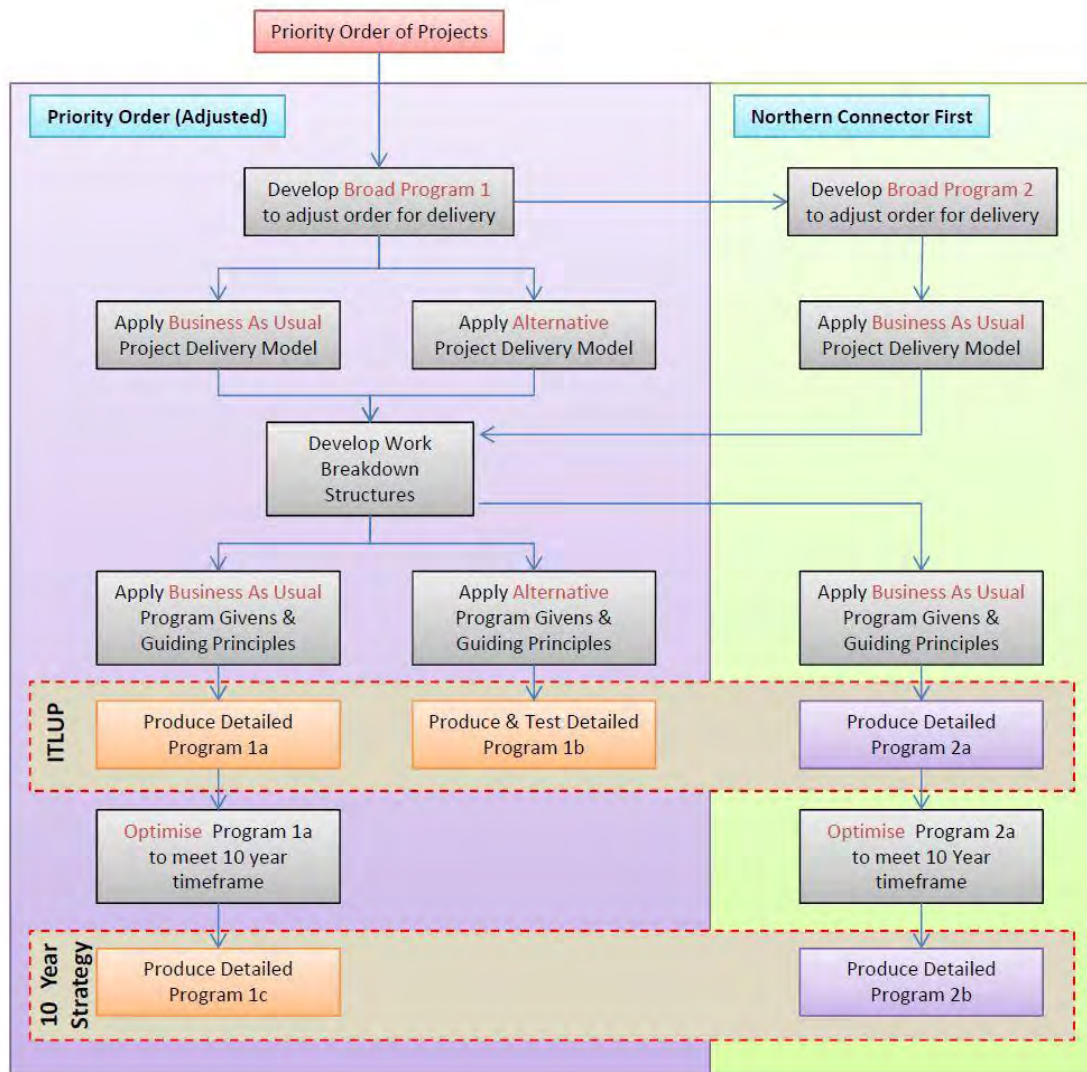


Figure 40: The Programming Process

12.3 The Broad Programs

Broad programs were developed as a high level method to evenly distribute the number of road projects and inturn cash flows over the program and to create continuous interfaces between projects to reduce redundancy.

As a high level starting point, the broad programs assume that all of the road projects will each take an average of four years to plan, design and construct similar to the currently funded Torrens to Torrens and Darlington projects. The broad programs include the ten unfunded and two funded road projects i.e. twelve road projects in total. The Strategy has used the ITLUP delivery duration of 15 years as the foundation of the broad programs (i.e. three concurrent projects at any one time over the duration of the program) and the detailed programming will be used to optimise the program to meet the 10 year delivery period.

No. of road projects delivered concurrently in a group	No. of delivery groupings	Calculation	Duration	Alignment
3 projects at any one time	4	4 groups x 4 years =	Approx. 15 years	ITLUP

Table 21: Calculation of concurrent projects to meet ITLUP delivery timeframe.

12.3.1 Broad Program 1 – Deliver in Priority Order

Broad Program 1 was developed using the priority order of projects as a starting point and applying the principles of three concurrent projects at any one time (ITLUP timeframe) and creating continuous project interfaces to reduce redundancy. Figure 41 graphically represents the process.

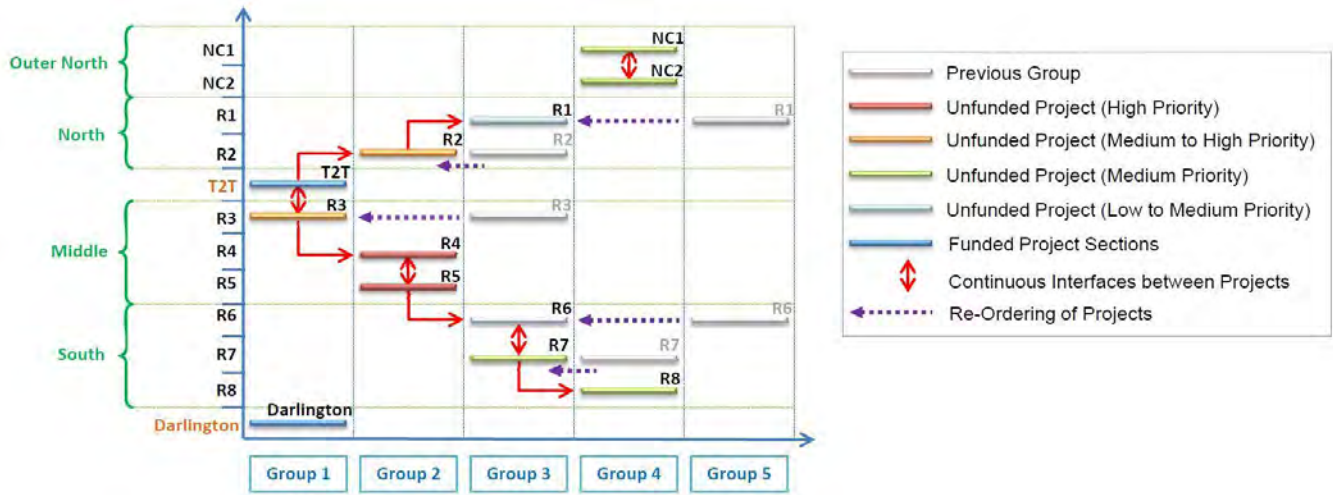


Figure 41: Development of Broad Program 1

The following steps were applied to derive Broad Program 1:

- Project R1 moved forward to Group 3 to allow a continuous interface with R2;
- Project R2 moved forward to Group 2 to allow a continuous interface with T2T;
- Project R3 moved forward to Group 1 to allow continuous interfaces between T2T and R4 projects;
- Project R6 and R7 moved forward to Group 3 to allow continuous interfaces between R5 and R8.

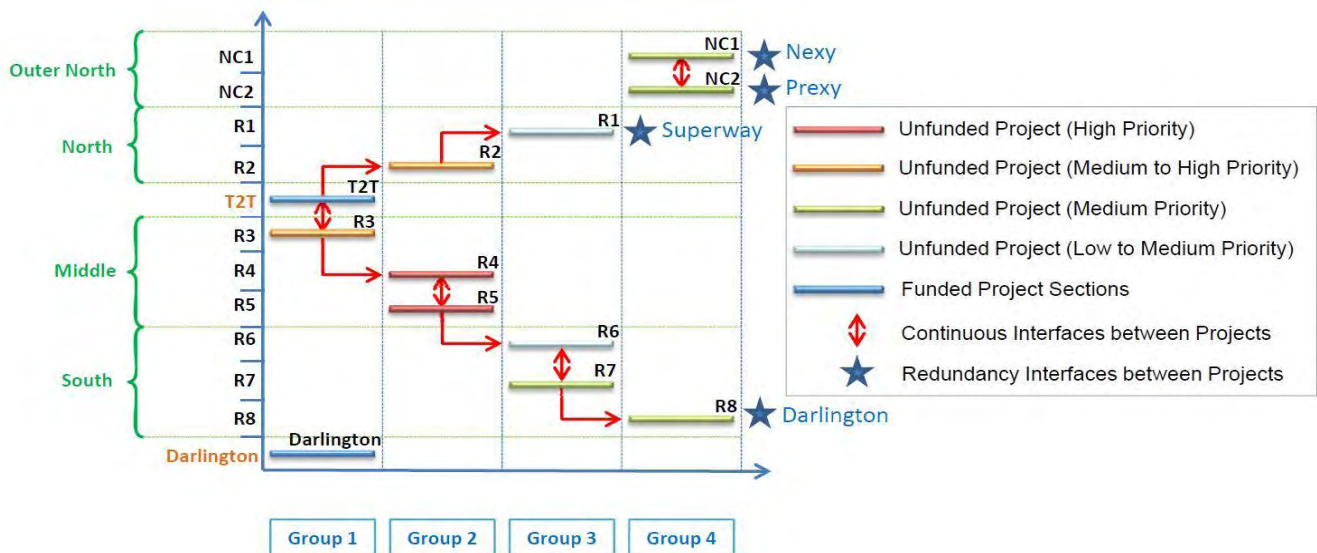


Figure 42: Broad Program 1 – Priority Order of Projects

Broad Program 1 has resulted in the 'high' and 'medium to high' priority projects occurring in the first half of the program and the 'medium' and 'low to medium' priority projects being delivered in the second half of the program. The program is considered to be broadly delivered in priority order.

Broad Program 1 has resulted in a delivery sequence that starts from the middle section of South Road first then progresses on northbound and southbound fronts simultaneously until the projects connect up to Northern Expressway in the north and Darlington to the south at the end of the program i.e. an inside-out delivery strategy.

12.3.2 Broad Program 2 – Deliver Northern Connector First

Broad Program 2 has been created to bring Northern Connector Projects (NC1 and NC2) to the front of the program, due to:

- Greater level of confidence in attaining early approvals and funding. Northern Connector is the only project that is currently lodged with Infrastructure Australia and has progressed to 'threshold level' i.e. one step away from 'ready to proceed';
- Bringing Northern Connector forward bides time to progress planning and approvals for the remaining road project sections.

Broad Program 2 was developed by using Broad Program 1 as a foundation and moving forward Northern Connector (NC1 & NC2) to the front of the program and re-ordering the remaining projects to adhere to the principles of priority order, three concurrent projects at any one time (ITLUP timeframe) and creating continuous project interfaces to reduce redundancy. Figure 43 graphically represents the process.

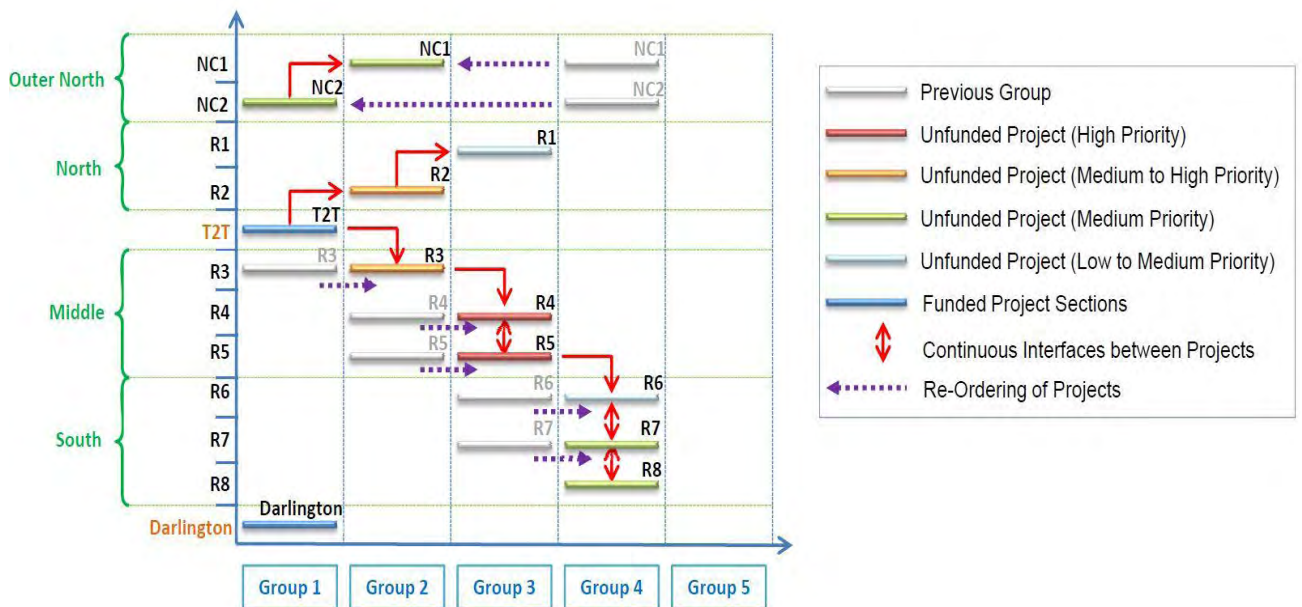


Figure 43: Development of Broad Program 2

The following steps were applied to derive Broad Program 2:

- Project NC2 moved forward to Group 1 (The Northern Connector planning study identified NC2 has greater priority than NC1)
- Project NC1 moved forward to Group 2 to allow a continuous interface with NC1.
- Project R3, R4, R5, R6 and R7 moved back one group to maintain three concurrent projects at any one time.

Broad Program 2 is illustrated in Figure 44 below.

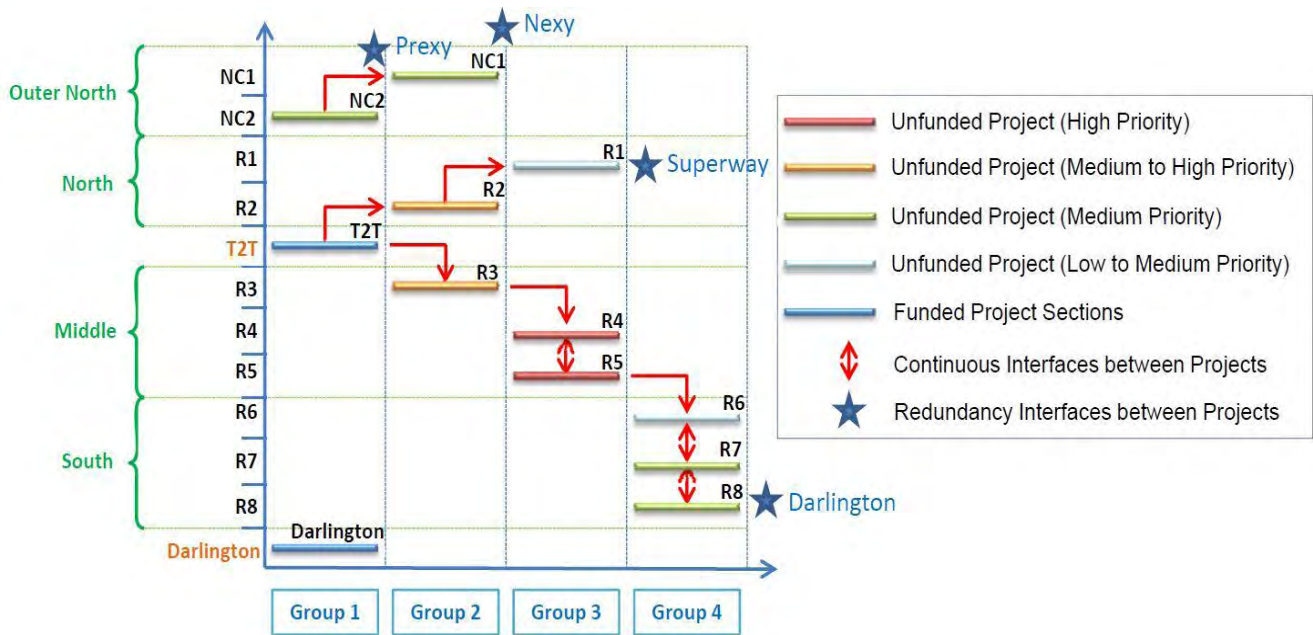


Figure 44: Broad Program 2 – Northern Connector First

Broad Program 2 has resulted in a delivery sequence that starts from the Northern Connector (northern section) and broadly progresses on a southbound front until the projects connect with the Darlington project at the end of the program (i.e. a north-south delivery strategy).

12.4 Project Delivery Models

A project delivery model was developed to identify all work activities and their associated delivery sequence within a project. Project delivery models assist with the creation of work break down structures and logic links between work activities to build the detailed programs. The project delivery models broadly follow a "Design and Construct (D&C)" type contract.

The business as usual delivery model has been used to build detailed programs 1a, 1c, 2a and 2b and the alternative delivery model has been used to build the detailed program 1b.

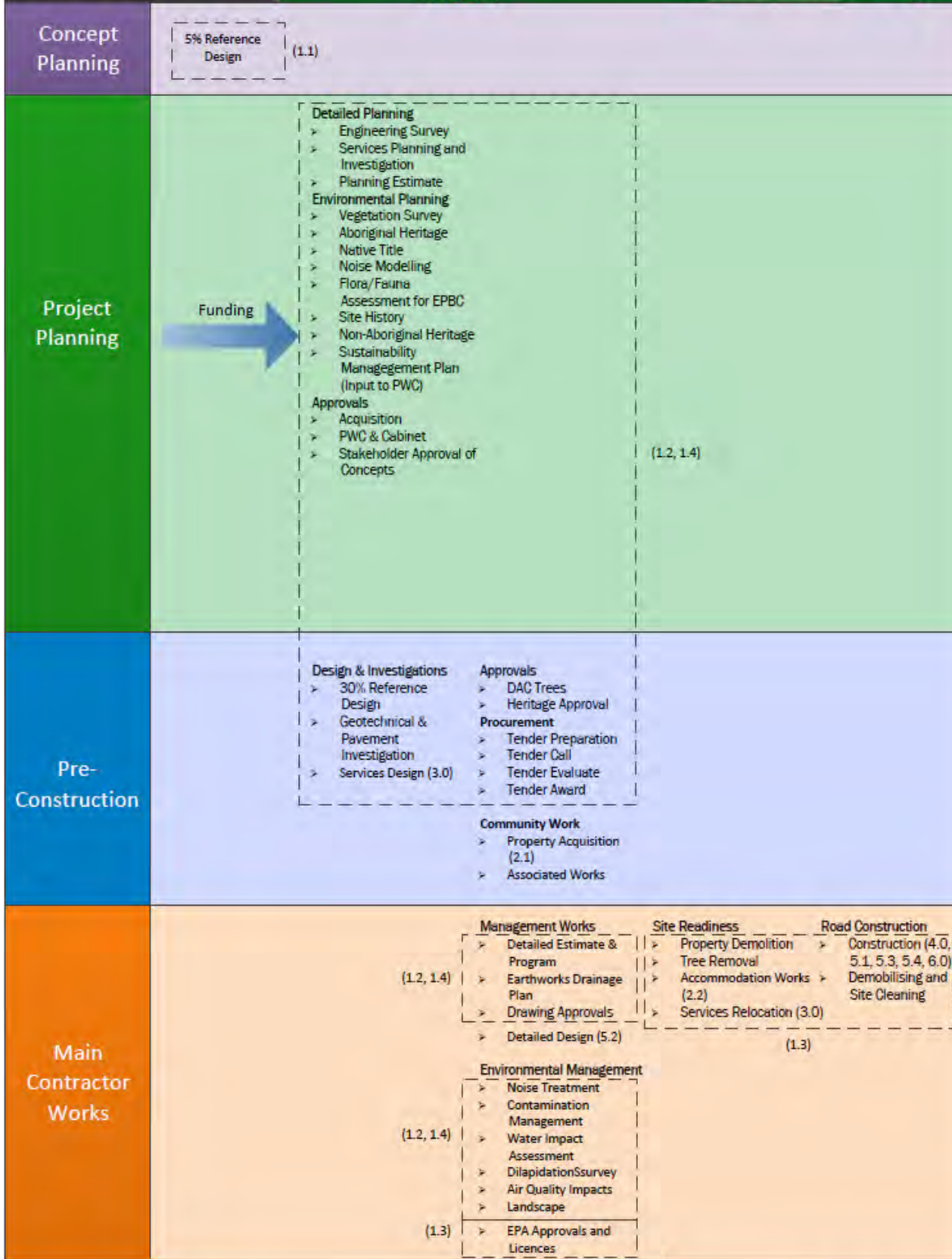
Business as Usual Model

This model adopts DPTI's 'business as usual' sequence of work activities in delivering road projects.

Alternative Project Delivery Model

This model identifies bringing work activities forward as early works resulting in an 'alternative' sequence of work activities.

The alternative model requires two separate lots of funding to deliver the road project. The early works funding (first funding injection) enables the commencement of early planning and early construction works (design, acquisition, services and associated works) prior to funded roadwork's components (second funding injection).



Note: Numbers align with estimate items

November 27, 2014

Figure 45: Business as Usual Model

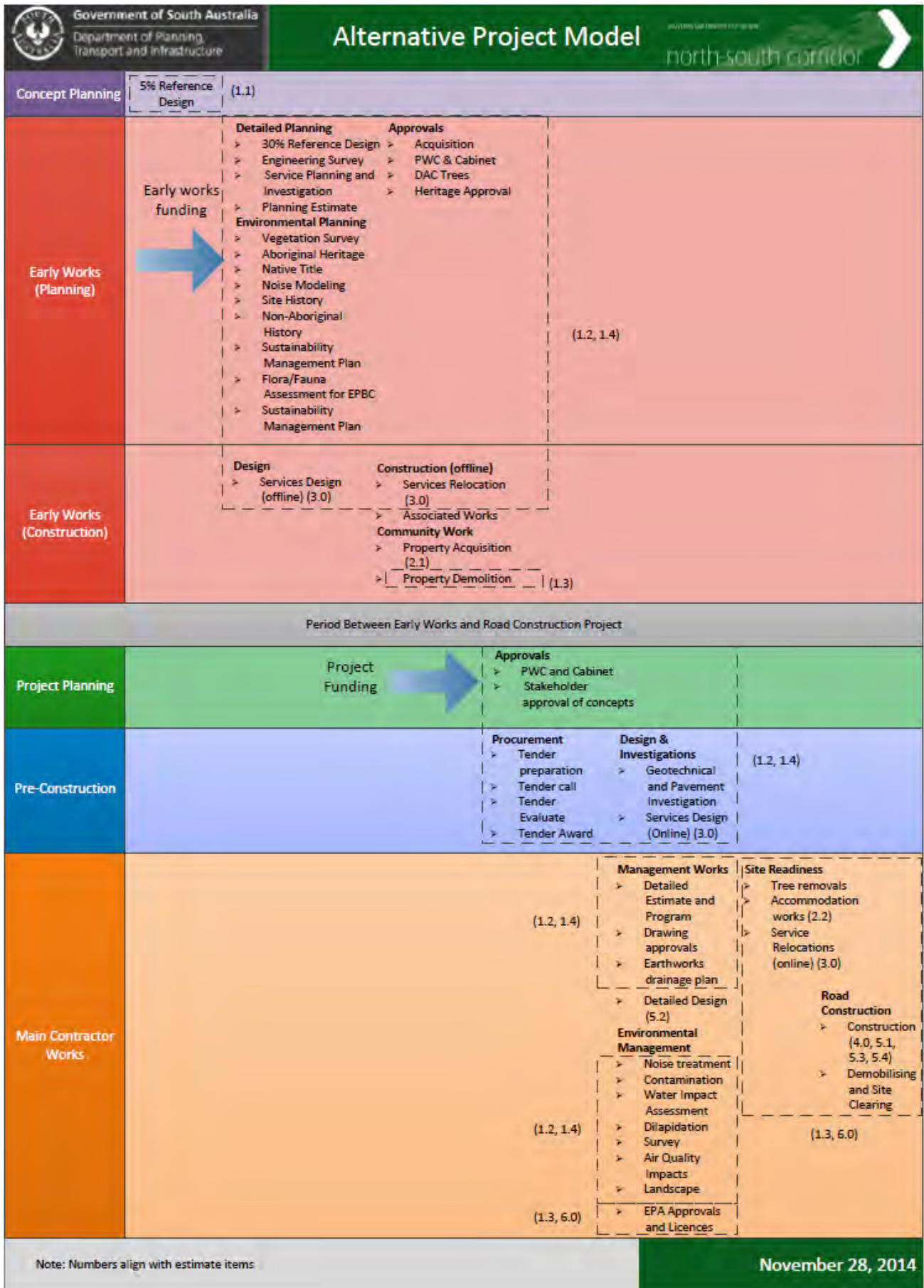


Figure 46: Alternative Project Model

12.5 Work Breakdown Structures (WBS's)

Work Breakdown Structures (WBS's) have been prepared for each of the ten 'road' project sections to express the work activity durations and costs to build the five detailed programs and to determine cash flows. An example WBS is shown in Figure 46 which identifies who determined the durations for each activity (boxes indicate the type and source of high level estimation of indicative durations).

PROJECT SECTION INFORMATION						
Project Name:	Project R3					
Section:	North of River Torrens to South of Ashwin Parade					
Length (KM):	1 km					
Cost Estimate:	\$271,521,138					
Work Breakdown Structure		Indicative Duration	Estimate Item	Costs	Source of Durations	
Scoping	1) Project Scoping	18 months	1.1	\$1,396,882	DPTI	
Development	1.2		1.2	\$4,190,647		
	1.4		1.4	\$386,691		
	Generic	1) Detailed Planning	6 months			
		1a) Services Planning and Investigation	4 weeks			
		1b) Engineering Survey	3 months			
		1c) 30% reference Design				
		2) Environment Planning				
		2a) Vegetation Survey	8 weeks			
		2b) Aboriginal Heritage	8 weeks			
		2c) Native Title	8 weeks			
		2d) Noise Modelling	8 weeks			
		2e) Flora/Fauna Assessment for EPBC	8 weeks			
		2f) Site History	8 weeks			
		2g) Non-Aboriginal Heritage	8 weeks			
2h) Sustainability Management Plan (Input to PWC)		5 weeks				
3) Investigations (Geotech, pavement & contamination)	6 months			DPTI		
4) Approvals						
4a) Acquisition	6 weeks					
4b) PWC & Cabinet	6 months					
4c) Stakeholder Approval of Concepts	4 weeks					
5) Planning Estimate	1 month					
6) Community Engagement	29 weeks					
7) Rail Agreements	0					
8) Procurement	9 months					
8a) Tender Preparation						
8b) Tender Call						
8c) Tender Evaluate						
8d) Tender Award						
Specific	1) Detailed Design	22 weeks	5.2	\$4,918,599	SEMPAC	
	2) Services Design	6 months	3.0	\$1,000,000		
	Generic	3) Environment Management				
		3a) Noise Treatment	8 weeks			
		3b) Contamination Management	8 weeks			
		3c) Water Impact Assessment	4 weeks			
		3d) Dilapidation Survey	4 weeks			
	3e) Air Quality impacts	8 weeks				
	3f) Landscape	4 weeks				
	4) Detailed Estimate & Program	6 weeks			DPTI	
	5) Approvals					
	5a) Drawing Approvals	90 days				
	5b) Environmental Approvals					
5(b)(1) DAC Trees	3 months					
5(b)(2) Heritage Approval	3 months					
5c) Earthworks Drainage Plan	2 month					
6) Community Engagement	40 weeks					
Implementation	Pre construction	1) Property Acquisition	2 years	2.1	\$28,408,150	DPTI
		2) Property Demolition	24 weeks			
		3) Accommodation Works	12 weeks	2.2	\$1,903,346	TBH
		4) Tree Removal	8 weeks			
		5) Services Relocation	25 weeks	3.0	\$19,724,195	SEMPAC
	Generic	6) EPA Approvals and Licences	2 months			DPTI
	Construction	1) Construction	104 weeks	4, 5.1, 5.3, 5.4, 6.0	\$179,617,571	TBH
		2) Demobilisation and site clearance	8 weeks			SEMPAC
	Total:				\$262,921,138	
	Associated Works Project					
Generic	Associated Works Design	6 months			DPTI	
	Network Modifications, Public Transport and Transport Op	2 year		\$18,600,000		
Subtotal:				\$18,600,000		
Total:				\$271,521,138		

Figure 47: Work Breakdown structure of Project R3.

12.5.1 Determination of Work Breakdown Structure Durations

To determine work breakdown structure durations appropriate for a strategy level investigation, two approaches were adopted:

1. Determine generic durations that apply to all road projects;
2. Determine project specific work activity durations for each project.

12.5.1.1 Generic Work Activity Durations

Consultation occurred throughout DPTI to determine the work activity durations that were considered generic across all road projects. All specified durations are based on previous project delivery experiences within DPTI. At a strategy level, it should be recognised that the generic work activity durations are considered an 'average' duration and are not affected by the size of the project and in some cases are governed by minimum statutory approval timeframes (i.e. Section 49 development approvals). Refer to Figure 43 which details which work activities are generic.

12.5.1.2 Project Specific Durations

Project specific durations have been applied to known work activities that are specific to the delivery of the individual road project and affect the duration of the program.

Project NC2:

- 12 months to preload the salt crystallisation fields prior to road construction.

Project R6:

- 5 years to relocate the Edwardstown Telstra Exchange.

Detailed design & service relocations:

- Each road project has individual durations based on the size and scope of the project. The durations have been derived by estimators based on the estimated cost of the activity (e.g. higher the cost the longer the duration).

Construction:

- Each road project has individual durations based on the size and scope of the project developed using a benchmarking process in combination with a high level construction staging methodology. The construction durations are as follows:

- NC1 – 30 months;
- NC2 – 30 months;
- R1 – 26 months;
- R2 – 34 months;
- R3 – 24 months;

- R4 – 46 months;
- R5 – 46 months;
- R6 – 27 months;
- R7 – 42 months;
- R8 – 30 months.

12.5.1.3 Costs

At a strategic level, project costs have been assigned to known work activities and work activity groupings that are specific to the delivery of the individual road projects. Two approaches were adopted:

- Assign costs that can apply to a specific work activities;
- Assign costs that cover a range of activities (i.e. Grouped Activity Costs).

The specific work activity and grouped activity costs have been assigned in accordance with DPTI's estimate item numbering framework. Refer to Project Delivery Models and Work Breakdown Structure to determine the assignment of cost against each activity.

12.5.1.3.1 Specific Work Activity Cost

The specific work activity costs were taken from the planning estimates and cost opinions of individual road project costs, detailed in Section 7.2 of this report. The specific work activities with assigned costs are:

- Detailed design (Estimate Item 5.2)
- Services design (Estimate Item 3.0)
- Property acquisition (Estimate Item 2.1)
- Accommodation works (Estimate Item 2.2)
- Services relocation (Estimate Item 3.0)
- Construction (Estimate Item 4.0)

Refer to Figure 43 for the details of work activities costs.

12.5.1.3.2 Grouped Activity Costs

The Grouped activity costs were adopted at the Concept Planning, Project Planning, Detailed Design, Pre-Construction and Construction stage.

Concept Planning

- Client Scoping Costs (Estimate Item 1.1)

Project Planning and Detailed Design

- Client Development Costs (Estimate Item 1.2)
- Principal Arranged Insurance (Estimate Item 1.4)

Pre-Construction and Construction

- Client Implementation Costs (Estimate Item 1.3)

- Contractors Onsite Overheads (Estimate Item 5.3)
- Contractors Margin (Estimate Item 5.4)
- Risk & Contingency (Estimate Item 6.0)

For example under the Project Planning and Detailed Design stage, these costs will cover a range of activities such as detailed planning, survey, environmental planning, drawing approvals, PWC & Cabinet approvals, community engagement etc.

12.5.1.4 Cash flows

To determine cash flows for the 5 programs (1a, 1b, 1c, 2a and 2b), the program sequencing and durations determined the distribution of costs in real dollars. The assignment of costs as per estimate items in Figures 41 and 42 had an additional 5% loading to cover for operational and maintenance costs (previously described in Section 11.1).

All the costs are distributed in a linear manner except for property acquisition and construction costs which have distribution curves applied to better reflect how the costs will be spread during these works.

- Construction – Typical Bell curve;
- Property acquisition – Flattened bell curve.

For reporting the cash flow two different approaches have been adopted.

- Real costs (present day dollars);
- Out turn costs (escalated as per departmental compound rates).

To finalise the program cash flows the inclusion of funded projects, Torrens Road to River Torrens and Darlington have been added. The cash flow outputs for the 5 programs are presented in Section 14.

12.5.1.4.1 Escalation and Outturn

Price escalation has been applied against real dollar estimates at the departmental approved (compound) rates to arrive at out-turn dollar costs for individual projects noted within the program. These rates are 3%p.a for 2014/15, 4% p.a for 2015/16 and 5% p.a beyond.

The above rates take into account 'micro' influences on key resource inputs such as labour, materials, plant, fuel, bitumen and property prices along with highly influential 'macro' price drivers such as construction market trends (volume of civil construction and related industry (e.g. mining) work across Australia), currency pricing and economic cycle impacts on Government and private sector funding availability amongst other influences. The escalation rates used are a most likely estimate based on information available at this point in time and are considered reasonable given both historical trends and predicted future influences recently noted within biannual reviews of DPTI's price escalation policy.

12.6 Program Givens and Guiding Principles

The following givens (G) and guiding principles (GP) were applied to building the detailed programs:

- The program commences from 1 January 2015 on endorsement of the Strategy (G);
- Funded projects within the program shall commence from 1st July 2016 (i.e. start of the 16/17 financial year) after 18 months of concept planning and funding submissions (G);
- Darlington and T2T projects shall be completed by December 2018 (G);
- The program shall provide continuous interfaces where indicated in the 'broad program scenarios' to eliminate redundancy. (GP);
- All early work road projects in the alternative project delivery model shall occur in parallel at the start of the program. (G);
- The compression of the program to meet the 10 year timeframe shall retain the delivery order of the broad programs. (G);
- The Telstra exchange relocation shall occur prior to funding road project R6 (G);
- Planning and pre-construction activities of one project can run in parallel to the construction activities of an adjacent project;
- Community engagement shall not be recorded in the programs but is considered to run the whole duration of the program of works. (G)

13 The Implementation (Programs)

13.1 Introduction

The process outlined in Section 12 has enabled the creation of 5 programs.

Program 1a: Priority order over 15 Years | ITLUP | Business as Usual

Program 1b: Priority order over 15 Years | ITLUP | ALTERNATIVE

Program 1c: Priority order over 10 Years | STRATEGY | Business as Usual

Program 2a: Northern Connector First over 15 Years | ITLUP | Business as Usual

Program 2b: Northern Connector First over 10 Years | STRATEGY | Business as Usual

The following figures present one page (rolled up) summaries of each program.

The summary programs highlight and provide guidance on key milestones and work effort:

- when concept planning needs to commence to meet project start date;
- when funding needs to be granted to commence projects;
- the number of planning and project teams required at any one time;
- the number of contracts being managed at any one time;
- the number of projects under construction at any one time;
- determination of how to bundle projects for funding submissions and delivery contracts.

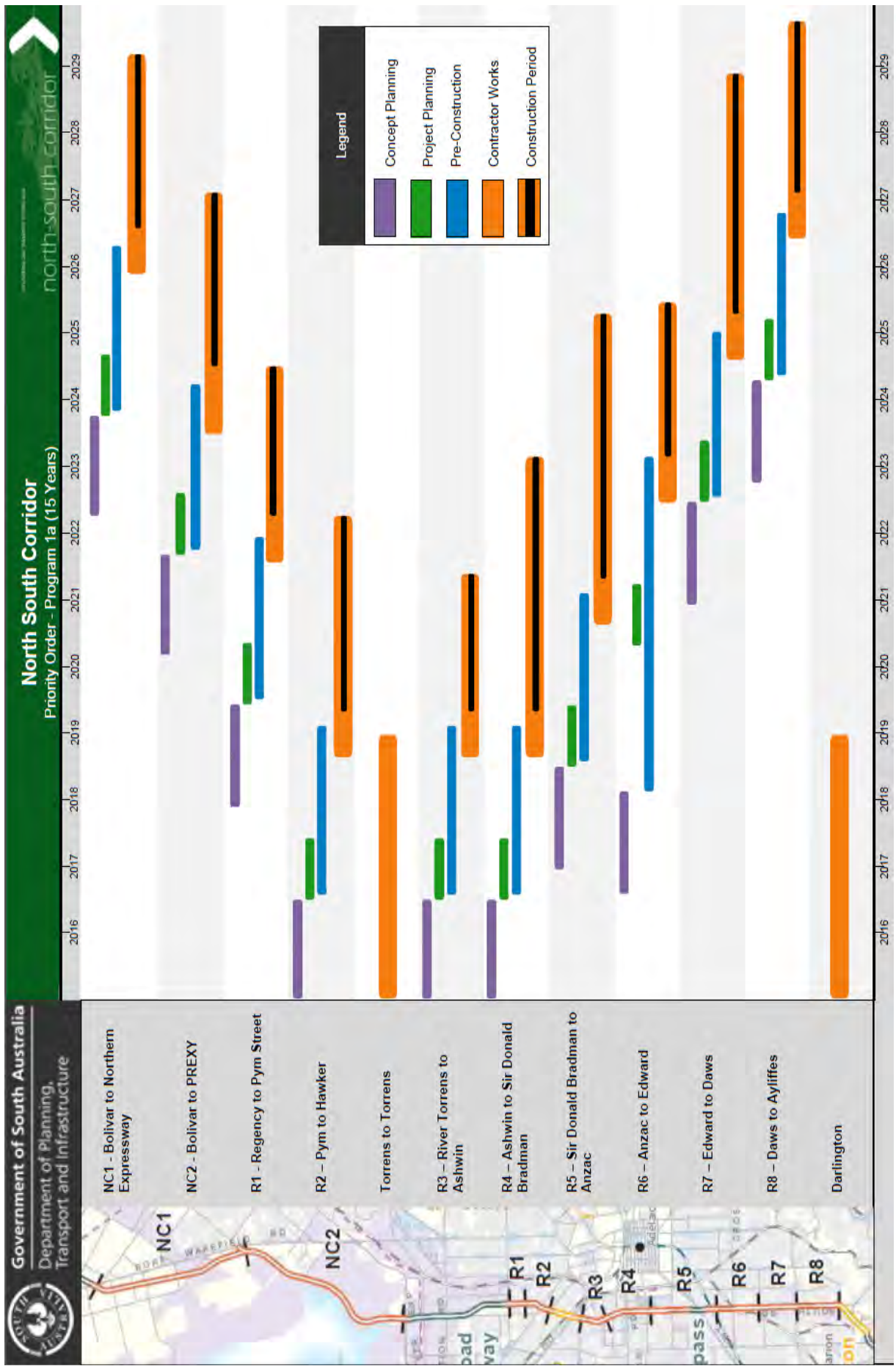


Figure 48: Priority Order - Program 1a (15 Years)

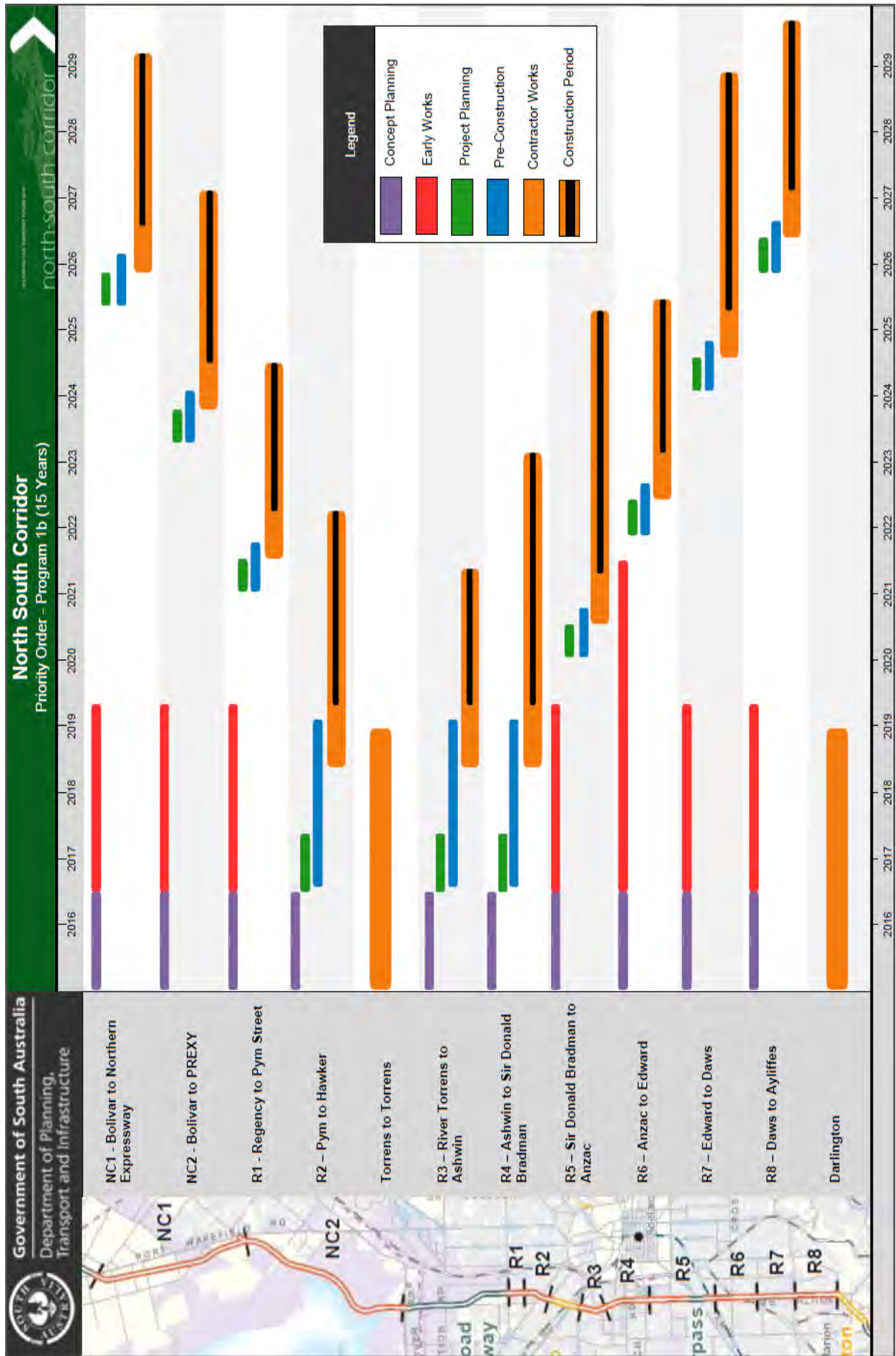


Figure 49: Priority Order - Program 1b (15 Years)

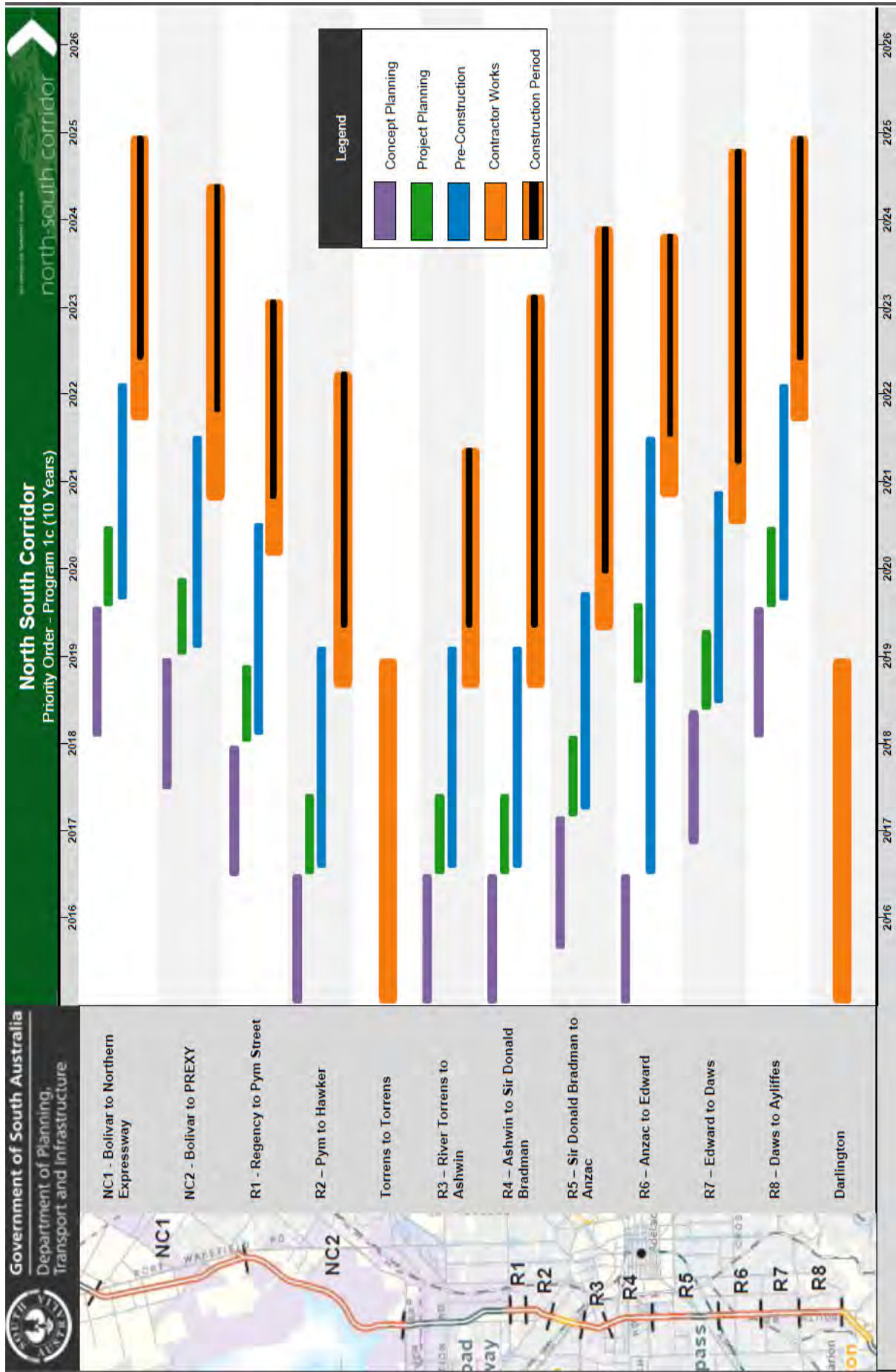


Figure 50: Priority Order - Program 1c (10 Years)

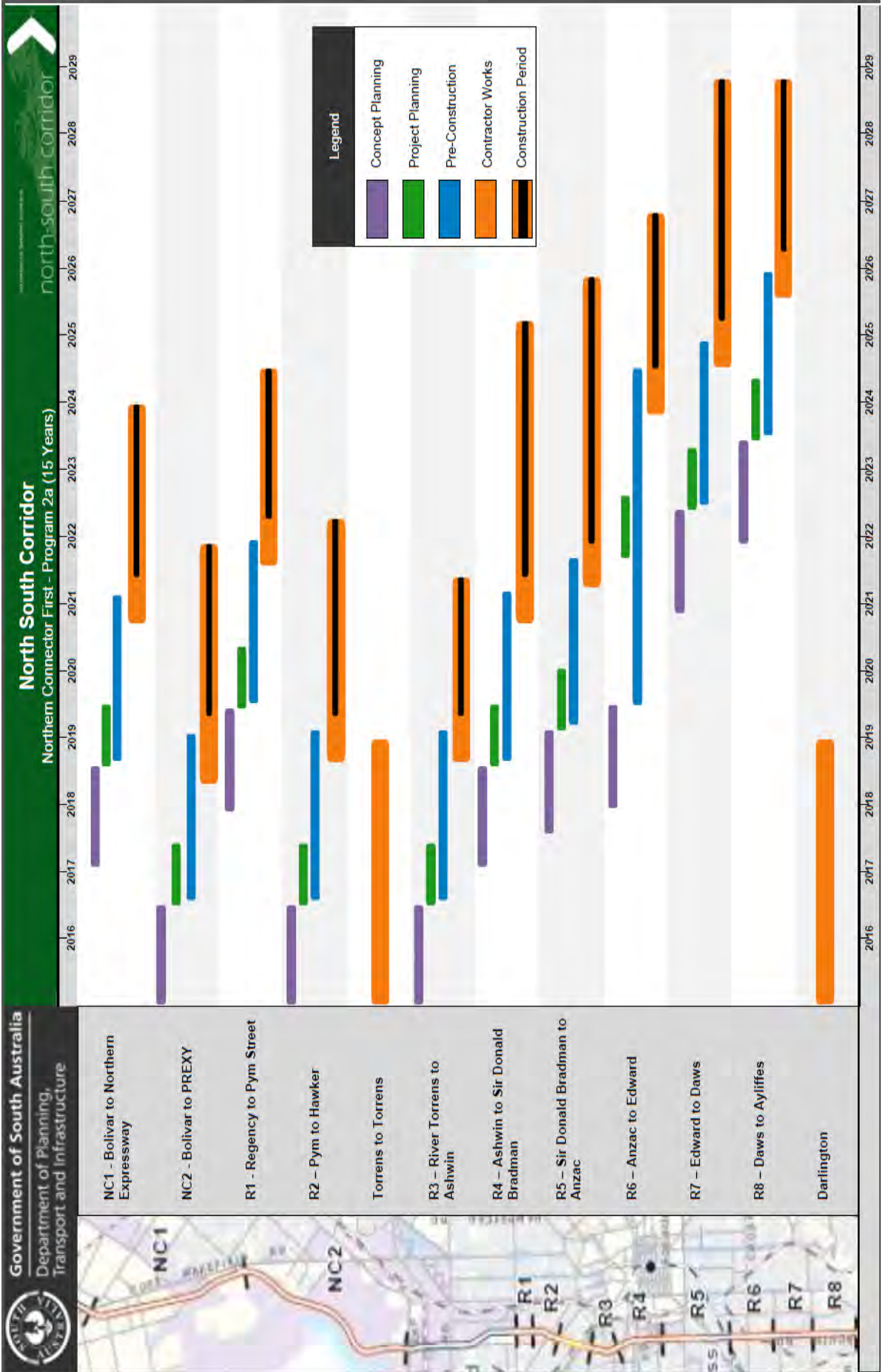


Figure 51: Priority Order - Program 2a (15 Years)

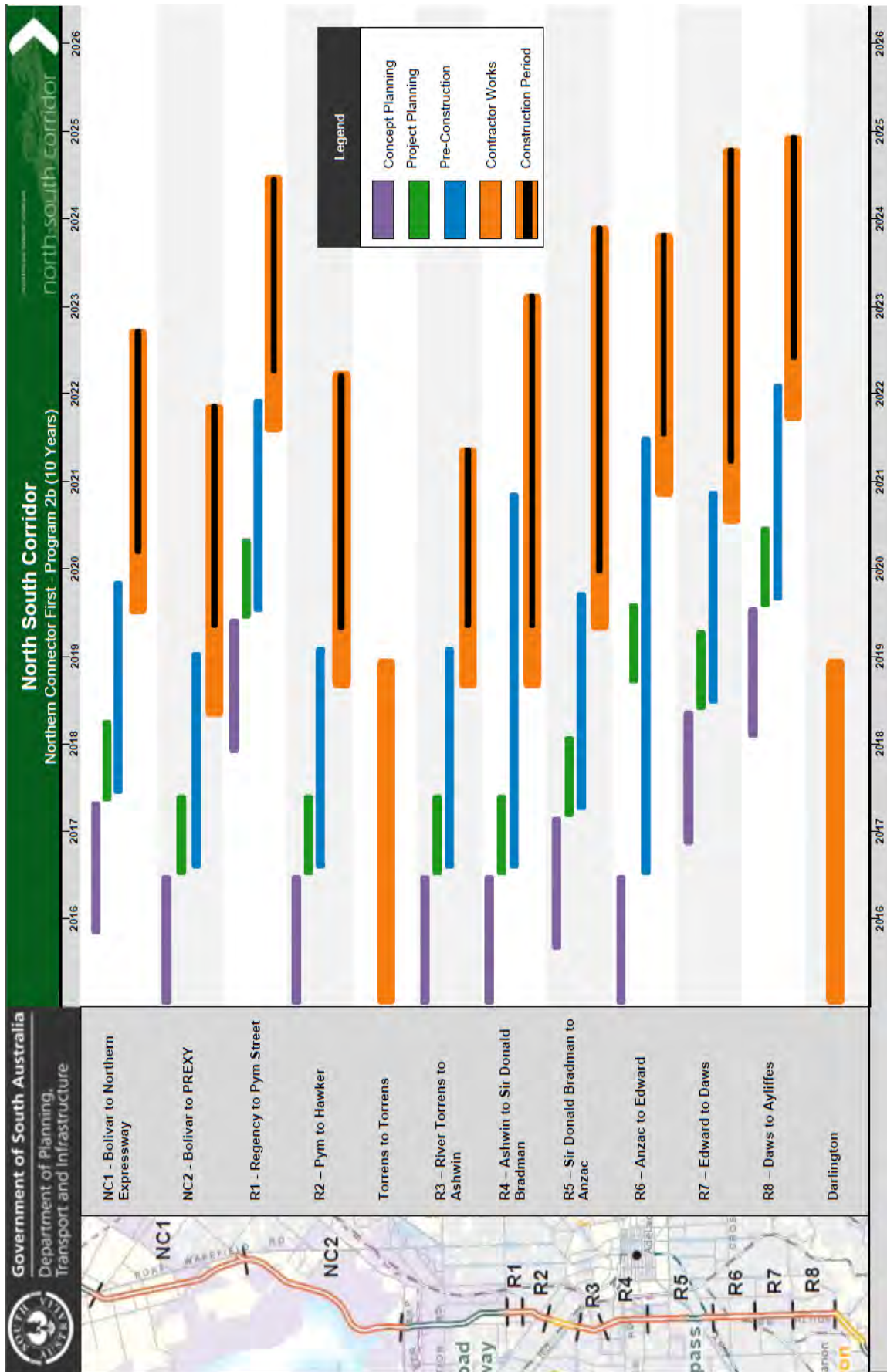


Figure 52: Priority Order - Program 2b (10 Years)

13.2 Consideration of Other External Projects

Once the program is chosen, further detailed programming will need to be undertaken to understand the impacts and timing of external projects which may influence the program.

13.2.1 Local Government Projects

North-South Corridor stretches across several local government regions. The following councils will need to be consulted to determine if there will be any council projects that will coincide and impact the delivery of the North-South Corridor.

- City of Adelaide;
- City of Marion;
- City of Mitcham;
- City of Unley;
- City of West Torrens;
- City of Charles Sturt;
- City of Port Adelaide Enfield;
- City of Salisbury;
- City of Playford;
- City of Holdfast Bay;
- City of Prospect.

13.2.2 Utilities Provider Projects

The following utilities providers will need to be consulted to determine if there will be any services projects that will coincide and impact the delivery of the North-South Corridor.

- SA Power Networks;
- SA Water;
- APA Group;
- Telstra;
- Optus;
- Sabre Net/AMCOM;
- NBNCO;
- Australian Satellite SYSTEM;
- Primus;
- AAPT;
- VISIONSTREAM/Nextgen;
- ELECTRANET;
- IFIBRE;

- AGILE;
- Pipe Networks;
- Vodafone/Hutchison;
- TPC.

13.2.3 Developer Projects

The following proposed major development was recently announced (24th October 2014) in the media which may impact on the delivery of the North-South Corridor.

Adelaide Airport Expansion

- The blueprint for 30-Year expansion of Adelaide Airport is announced on the 24th October 2014.
- Intersection/road section that would be impacted due to the expansion proposals: -
 - Richmond Road/Marion Road Intersection – Airport link
 - As included in the Draft Integrated Transport and Land Use Plan (2013), the transfer of taxis, buses and controlled commercial vehicles through a new route along Richmond Road and extending to the Export Park Policy Area of the airport will lower traffic demands using Sir Donald Bradman Drive and entering along Sir Richard Williams Avenue. This will entail improvements to the Marion Road / Richmond Road intersection (which was identified as being at capacity in the aforementioned Adelaide Airport Access Study 2007), possible enhancements along Richmond Road and the development of a new link roadway from Richmond Road abutting the Keswick Creek at West Richmond into the Export Park Policy Area;
 - No expected timing is available.
 - James Melrose Road (or Mooringe Avenue)
 - Proposed to upgrade and/or maintain collector road(s) and subsequent intersections (e.g. Marion Road/Mooringe Avenue) to accommodate B-Double vehicles;
 - No expected timing is available.
 - Morphett Road/Deeds Road to Richmond Road (Southern Collector Route)
 - The State 30-Year Plan for Greater Adelaide included the provision of a new collector route adjacent the south eastern corner of the airport (between the Morphett and Airport East Precincts). This new route could connect though the Netley Commercial Park to Marion Road or alternatively via Richmond Road and emanating from either Morphett Road or Deeds Road, with the primary aim to cater for commercial traffic to and from Camden Park/North Plympton. Airport developments and non-airport related feeder traffic using the new Southern Collector will contribute to increased traffic on Richmond Road. Reservation of land for this collector route within the airport continues to be maintained. The current study suggests greater functionality should the collector route have passage through the Netley Commercial Park, where a four way intersection at Desmond Avenue would require signalisation to safely and efficiently accommodate traffic movements;
 - Within 10 years prospect.

The North-South Corridor project team will need to consider the impacts of any developer funded upgrade to the surrounding road network that may impact the delivery of the North-South Corridor. The North-South Corridor Team will need to work closely with DPTI's Land Use Coordination Group.

14 The Investment (Cash Flows)

14.1 Introduction

Cash flows have been produced for each of the 5 programs using the process outlined in Section 12.

The following figures present one page graphical summaries of the cash flows for each program.

The graphical cash flow summaries provide guidance of the level of yearly expenditure required to deliver the North-South Corridor. It includes the funded projects (Darlington & T2T) and unfunded projects (NC1, NC2, R1 to R8). The cash flows have been presented as real 2014 costs and escalated out-turn costs.

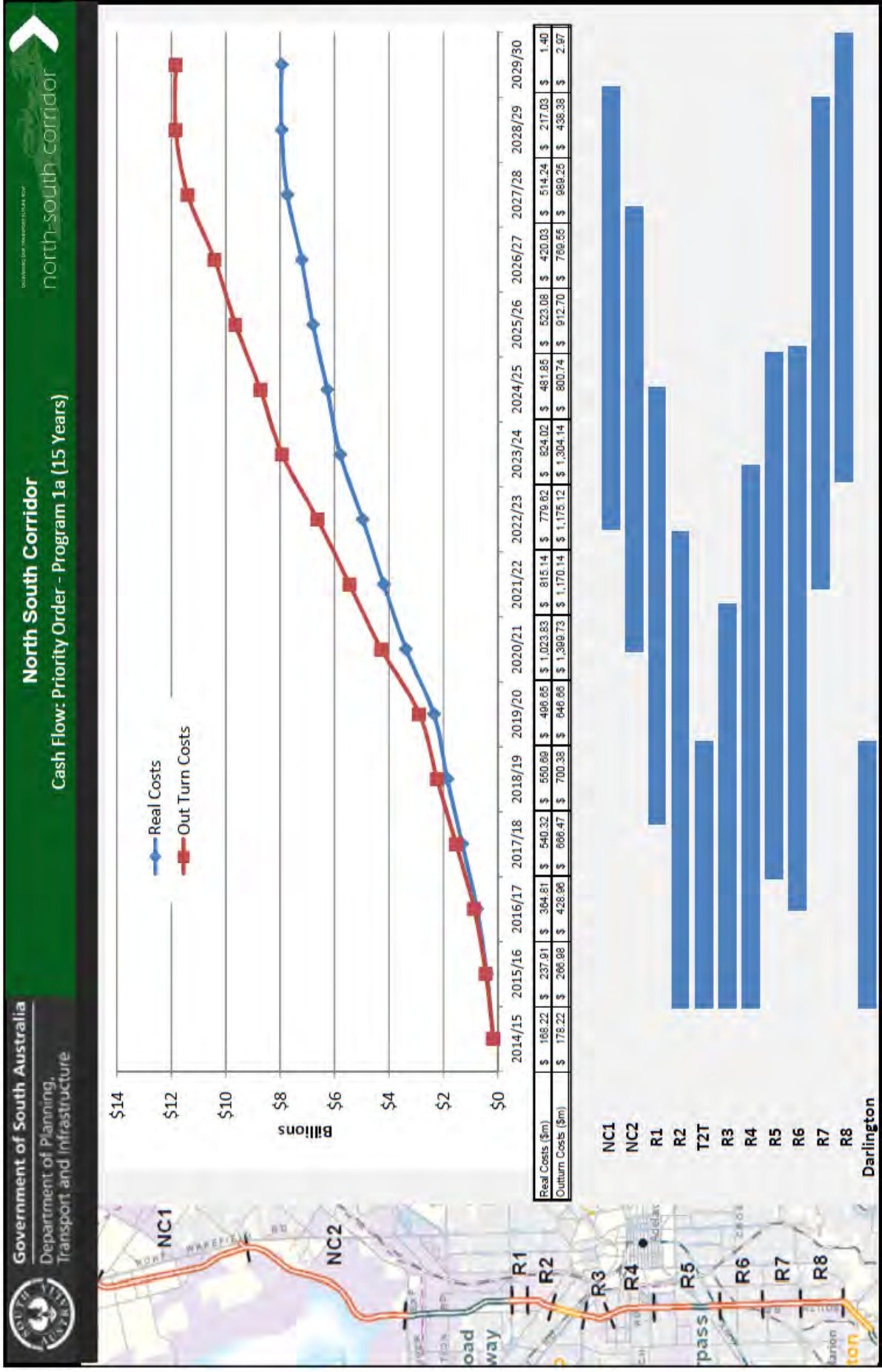


Figure 53: Cash Flow: Priority Order - Program 1a (15 Years)

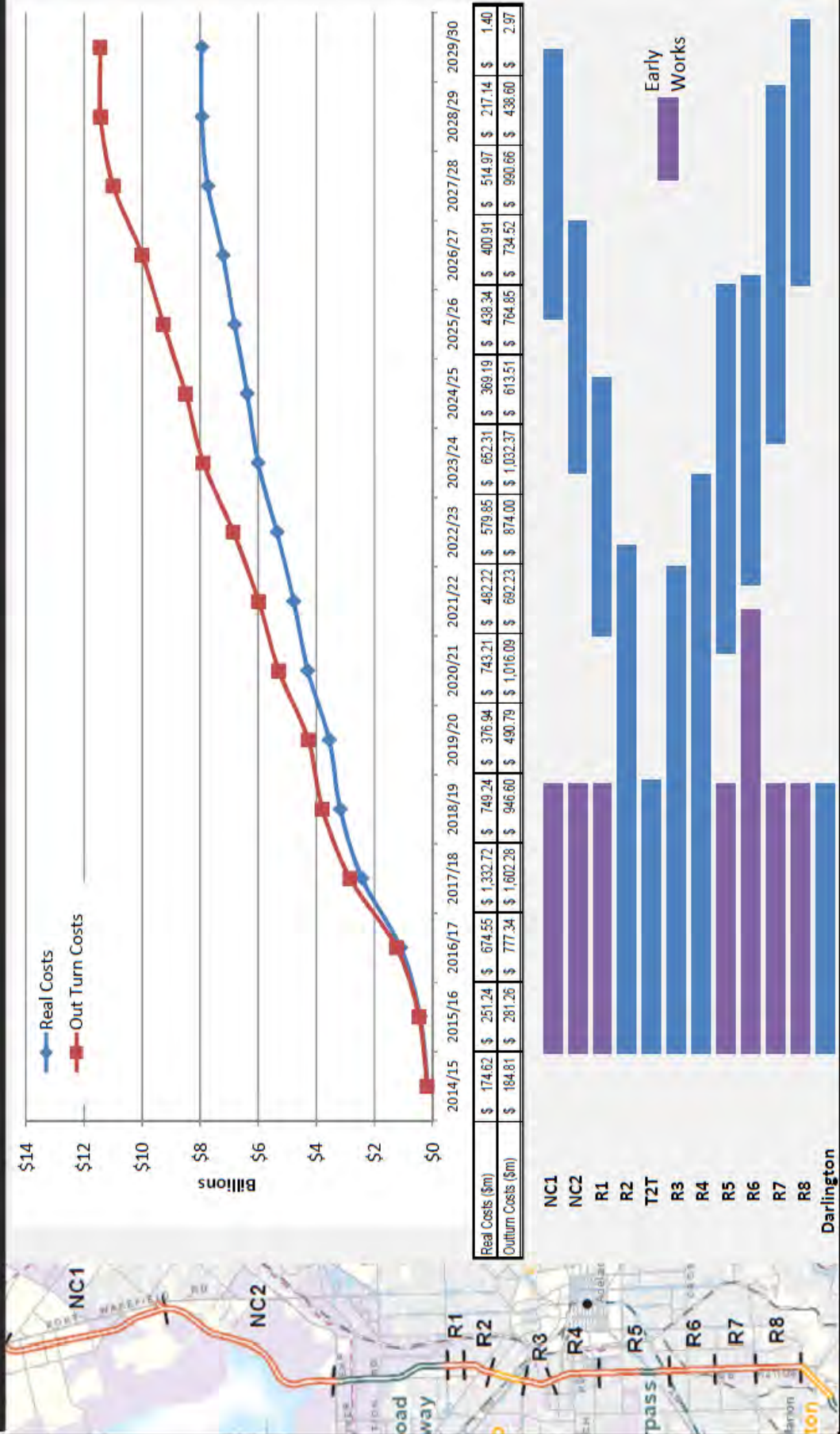


Figure 54: Cash Flow: Priority Order - Program 1b (15 Years)

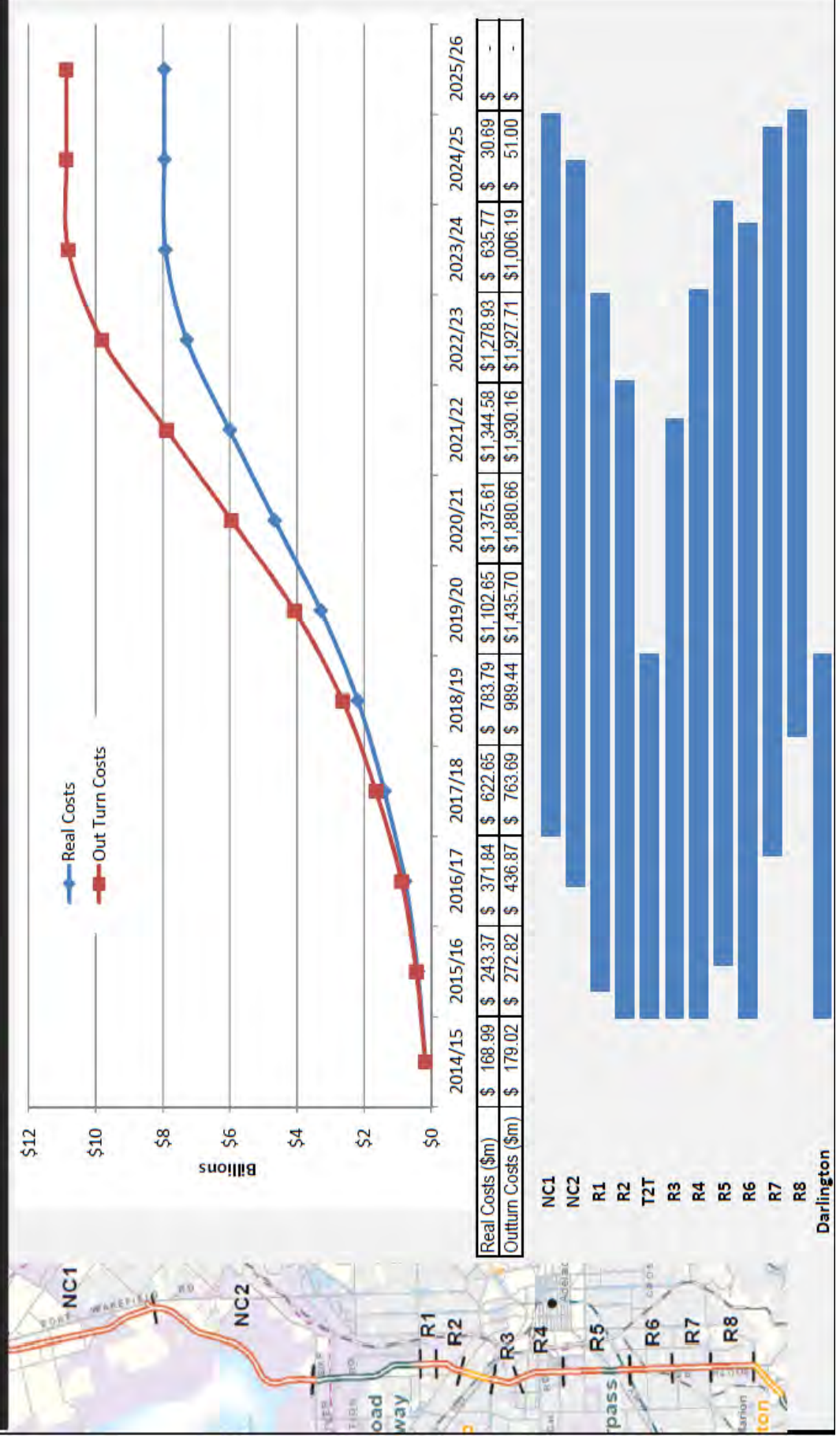


Figure 55: Cash Flow: Priority Order - Program 1c (10 Years)

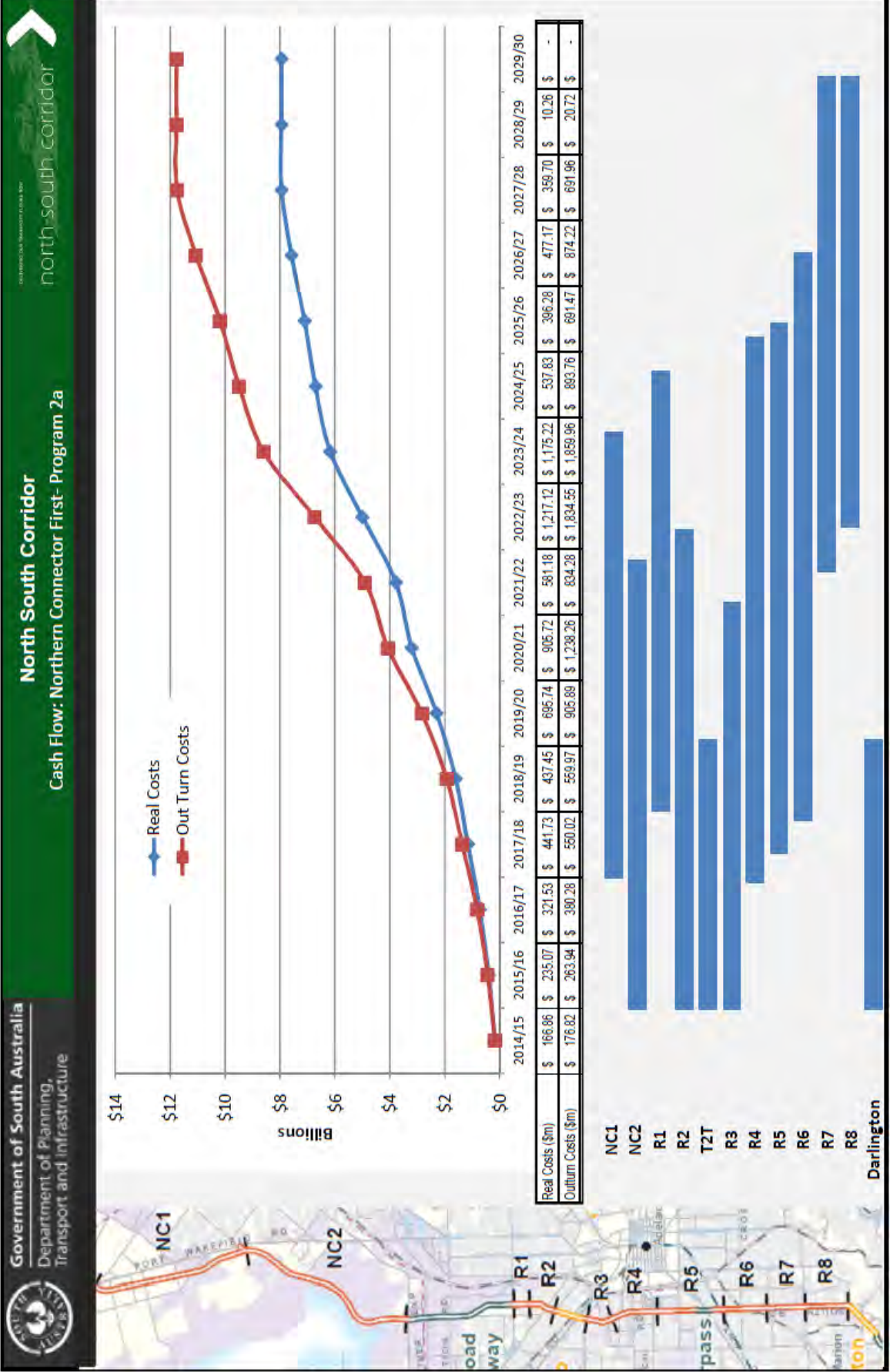


Figure 56: Cash Flow: Northern Connector First – Program 2a

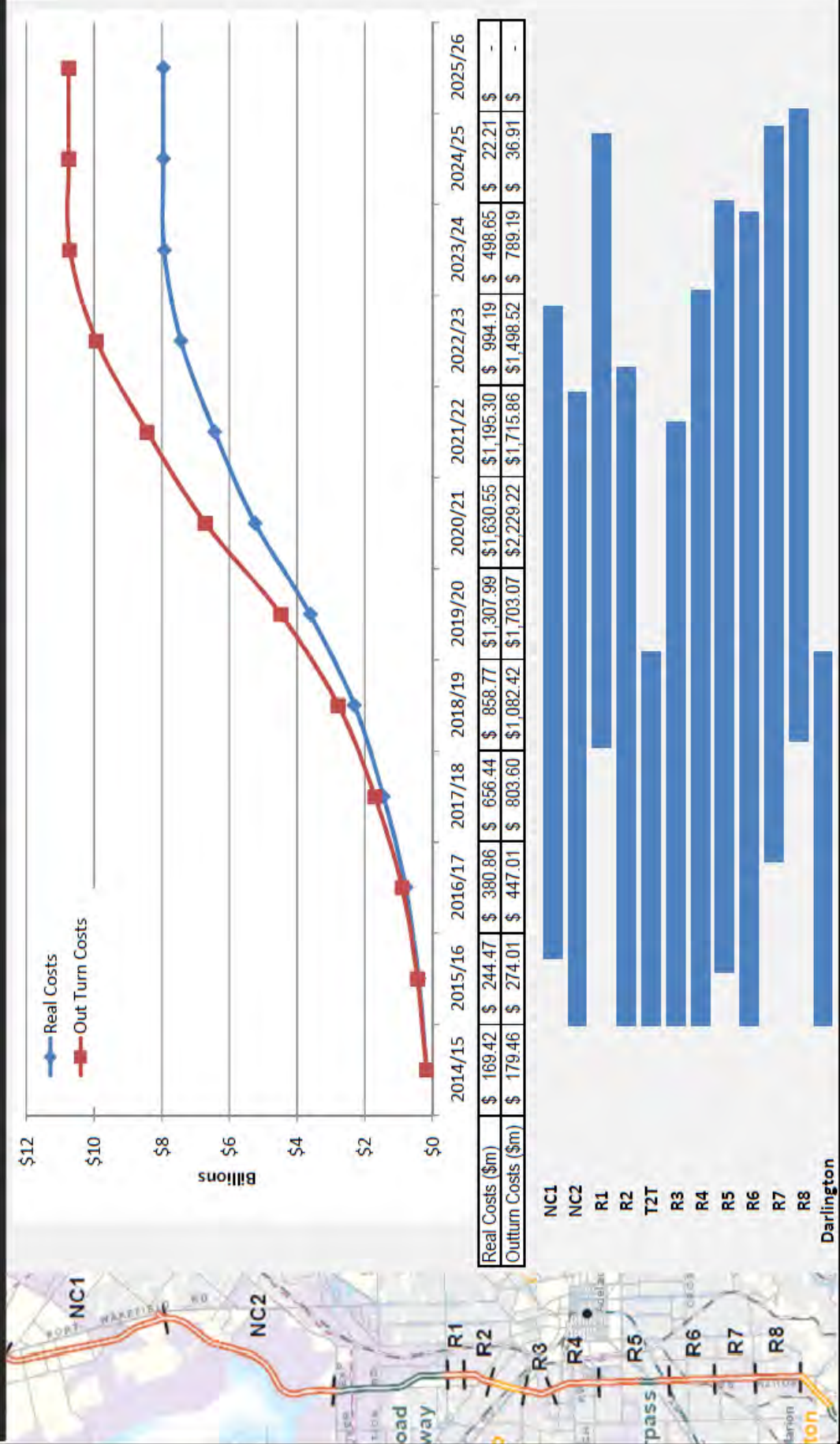


Figure 57: Cash Flow: Northern Connector First – Program 2b

14.2 Future Cash Flow Influences

The following discussion should be taken into account as broad overarching context when consider the reasonableness of the cash flows portrayed in Section 14.1.

14.2.1 Integrated Transport and Land Use Plan (ITLUP)

- ITLUP should be used (at a high level) as a primary source of info/context to highlight potential financial risks associated with 10 year delivery (and 15 year sensitivity);
- ITLUP short (1-5 years) and medium (6-15 years) term funding “demand” should be referenced in terms of the context of what DPTI ‘potentially’ has planned over the next 10-15 years (circa on average \$1b per annum). Recent changes in ITLUP’s short and medium term demand profiles highlighted the issues associated with the changing profile of demand over time. The medium term will have significant competing priorities which will highlight potential strains on funding capacity (in the absence of any private sector involvement). The final funding demand highlighted as part of the North-South Road Corridor 10 Year Delivery Strategy will be matched against the latest ITLUP viewpoint;
- Future predicted funding “supply” for DPTI should also be initially sourced from ITLUP work (which is drawn from DPTI’s 2013 Economic Development Board (EDB) work with Department of Treasury and Finance (DTF)/Department of Premier and Cabinet (DPC). The extension of the EDB work captured within ITLUP highlighted the potential funding shortfalls in ITLUP based on comparing the historical expenditure of DPTI vs Whole of Government funding from circa 2001 and applying this to EDB “funding supply” benchmarks to operate within specific financial management parameters (e.g. desired Net Debt to Income ratio for SA of < 50%, which has recently reduced to 35% past the 2014 State Budget);
- Any future analysis around funding supply as part of the North-South corridor work will need to note post State Election changes to the dynamics around SA’s financial management benchmarks and its potential to impact funding supply moving forward. Specific reference can be made from the State Budget as a result of the Motor Accident Commission (MCA) (part) sale, Australian Budget funding changes and SA Water gearing adjustments which indicate altered financial management dynamics for SA. The fiscal position of our State is still noted as tight in the short term;
- A review of actual cash flows (as above) highlighted some potential short term funding capacity hurdles (when compared against ITLUP/other benchmarks) in the latter part of the current four year forward estimate period.

14.2.2 National Partnership Agreement (NPA) with the Australian Government

- North South Corridor (NSC) 10 Year Delivery Strategy will need to be cognisant of changes noted within the current approved NPA (2014 - 2019) with the Australian Government;
- Specifically there are changes noted in the current NPA (refer below) that may impact the financial management of projects within the above timeframe. Similarly there may be other risks apparent with respect to the following NPA (beyond 2019) considering the NSC 10 Year Delivery Strategy is for a longer timeframe;
- In terms of potential financial management impacts of the current approved NPA, it should be noted that there may be influences around the following that 'could' impact cash flowing to an extent:
 - Issues associated with any additional expenditure beyond P50 approvals (historical approval has been based on an escalated P90 figure). These conditions present a risk that any cost over-runs during project delivery will be realised at the completion of the project;
 - Changes to the approval process around the re-application of savings between projects;
 - Other changes (the NPA proposes a range of revised processes, some of which could impact the timing of the SRC 10 Year Delivery Strategy, either negatively or also positively in some instances). Specific impacts will only be known once further consultation/development/application of the NPA has occurred and, at this point in time, the ability for the agreement to potentially impact this strategy is all that should be broadly noted.

14.2.3 Other

- The potential for this strategy to be influenced by potential impacts of associated maintenance funding should be noted. High level estimates can be obtained from ITLUP, if required;
- ITLUP highlighted the continued need for future investigations to be undertaken (on a project by project basis) relating to the potential for private sector involvement to assist in achieving deliverability objectives. This is consistent with clause 17(L) within the approved NPA which flags continued assessment of potential private sector involvement on a case by case basis (which has historically been undertaken by DPTI on all large project bids). Any future assessments will need to consider the current policy platform of the SA Government against any potential project options identified;
- In terms of limitations, an assessment is required for any abnormal 'expenditure spikes' within 10 year timeframe once initial cash flows have been prepared. However, the potential influence/context should also be cross referenced given its ability to significantly dilute annual cash flows required from traditional Government funding sources.

14.2.4 Public Private Partnerships

The extent of required works along the North-South Road Corridor is a significant task in the short to medium term in South Australia. These type of projects have historically been funded via traditional means (a mix of State and Australian funding) utilising various procurement options (Design & Construct, Design, Construct and Maintain and Alliance models). In addition to traditional project delivery, the current National Partnership Agreement (NPA) with the Australian Government flags continued assessment of potential private sector involvement on projects such as these on a case by case basis (which has historically been undertaken by DPTI on all large project funding bids). ITLUP has also highlighted the continued need for future investigations to be undertaken relating to the

potential for private sector involvement to assist in achieving deliverability objectives (subject to alignment to current South Australian policy directives).

The combined outcome of the above influences is that the full range of procurement/funding and financing options will once again need to be considered for application against the future requirements of the North-South Road Corridor. In terms of non-traditional procurement options the following should be noted:

- Procurement options that transfer full demand (traffic) risk to the private sector are currently not favoured in a South Australian context given:
 - required traffic volumes are insufficient (e.g. there is a large element of diversion along the South Road Corridor given free alternative routes within close proximity as well as the nature of traffic flows along the road);
 - demand risk transfer currently conflicts with South Australian Government Policy.
- Procurement options that transfer partial demand (traffic) risk ('hybrid models') are largely untested in the Australian market and are still in concept development in other states. Hybrid models should be considered in any future analysis of procured options.
- A possible future procurement option that could be relevant subject to appropriate analysis is the Availability Payment PPP mechanism (AP PPP):
 - Under this model, the private sector is responsible for building, owning, operating, maintaining and funding the infrastructure under a long term (e.g. Design & Construct plus 25-40 years) concession period;
 - The AP PPP mechanism is based on the availability of the road against pre-determined standards. If the road is not available to the prescribed standard the 'availability payment' from the State Government to the private sector is reduced via an abatement regime;
 - This mechanism would only be possible subject to demonstration of value for money and funding availability. With respect to value for money there must be sufficient (appropriate) risk transfer to enable efficiencies to be realised over public sector delivery. It should be noted that the periodical availability payments still have a sizeable impact on the State Budget.

It is considered that financial market 'capacity' to fund/finance such projects has increased substantially over the last 2 years (since the European Debt Crisis) meaning there are less 'financial constraints' on the ability for the private market to undertake sizeable projects. Limitations on project size will be more influenced by engineering / planning / timing constraints when compared against the funding capacity of the South Australian Government to approve these projects when considering other DPTI and Whole of Government initiatives on the table.

14.3 Procurement & Funding Submission Opportunities

Work packages provide flexibility to bundle projects to best suit funding submissions (investment) and procurement strategies (delivery). A funding submission or procurement strategy could include multiple work packages or a single work package.

Commonly the following delivery models are adopted for individual road projects and associated work projects:

- Managing Contractor;
- Construction Only;
- Design and Construction;
- Single Target Outturn Cost (TOC) Alliance;
- Competitive Alliance.

The program approach will allow government to explore a variety of other innovative delivery models for the work packages:

- Delivery Partner Model
 - Previously adopted by the Olympic Development Authority (London Olympics);
 - Previously adopted by RMS, NSW Roads and Maritime Services (Pacific Highway Upgrade).

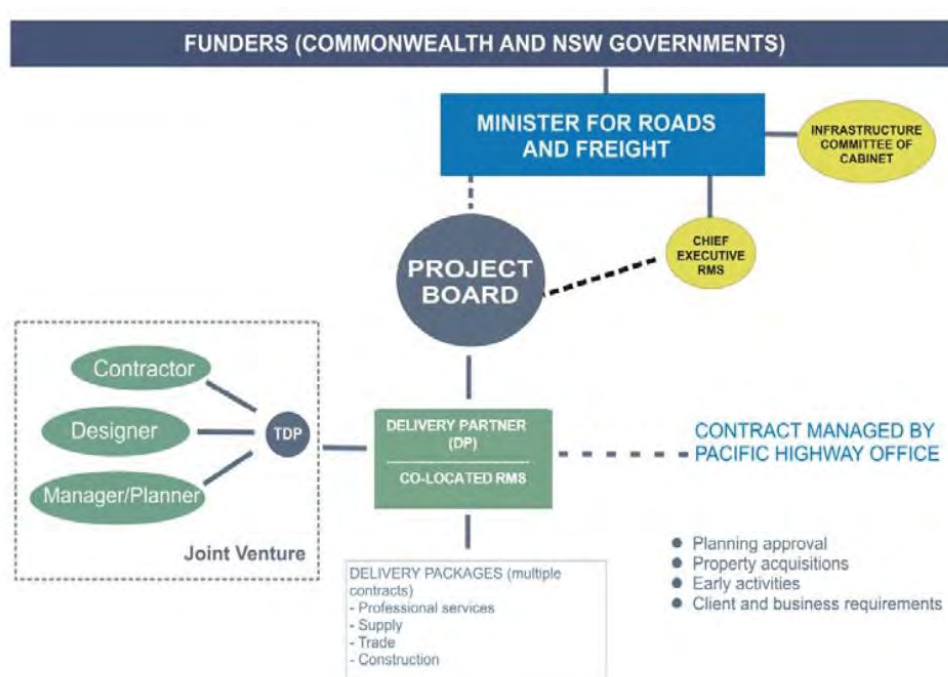


Figure 58: Delivery Partner Model

- Project Allocation Model
 - Previously adopted by CERA, Christchurch City Council & NZTA (Stronger Christchurch Infrastructure Rebuild (SCIRT)).

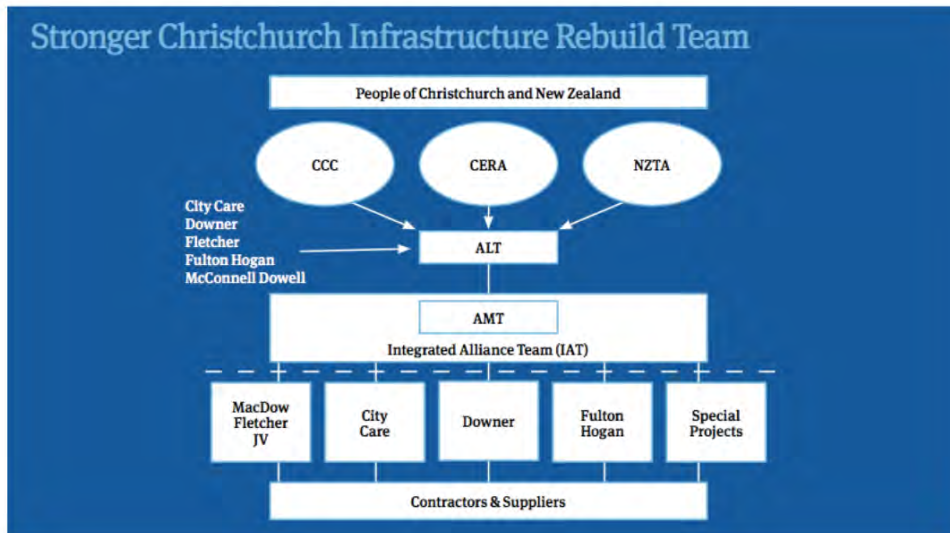


Figure 59: Project Allocation Model

- Project Bundling Model

- Previously adopted by VicRoads (Level Crossing Removal Projects (LCRP)).

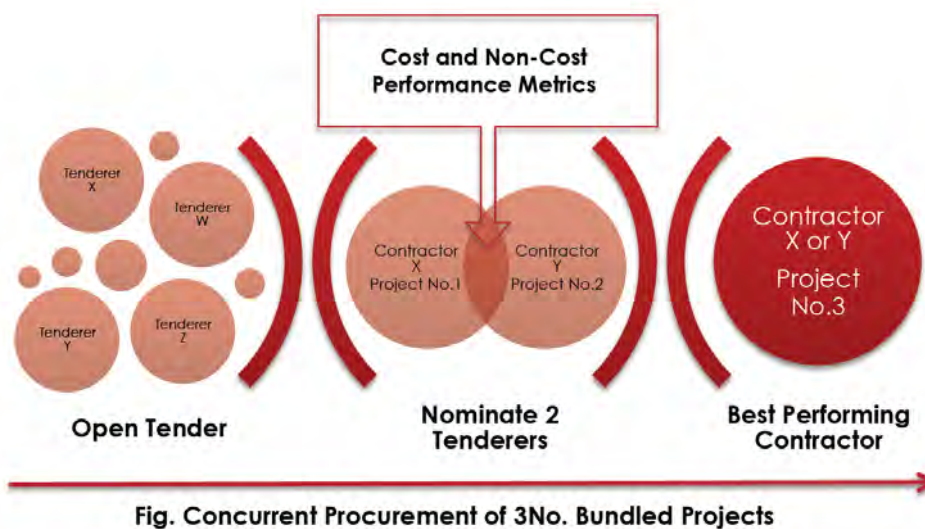


Figure 60: Project Bundling Model

The program approach will seek to drive competitiveness in the market to influence;

- cost certainty;
- cost savings;
- higher value for money;
- design and construction innovation;
- maximisation of local labour, resources and suppliers (i.e. local participation);
- optimise risk allocation and minimise exposure to Government.

The program approach will also provide flexibility to balance the size and cost of a work packages, to maximise the overall program benefits. Some of these benefits are outlined below, and identify flexibility in scale of projects will produce a wide range of benefits

Larger work packages may;

- reduce design and construction interfaces with adjacent road project;
- improve efficiency in reducing contract management;
- entice national, international and Tier 1 companies with a high degree of competency to attain competitiveness and higher value for money (time & cost savings, quality outcomes and international learning's);
- May attract new international contractors to enter the market.

Whereas smaller work packages:

- provide increased opportunities for Tier 2 and 3 companies;
- increase competitiveness due to a larger pool of companies capable of undertaking smaller work packages;
- improve local contractors skill and capability;
- allow early works to commence e.g. service relocation and hence reducing overall program risk and contracting work to those with the best capability to deliver.

15 Risk and Opportunities

The successful delivery of the North-South Corridor will be based on the ability to successfully manage risks and seek opportunities. The Strategy has documented the anticipated risks and opportunities associated with:

- Being effective and efficient in the delivery of the non-stop North-South Corridor;
- The timeframe of delivering within 10 years;
- The success and robustness of The Strategy;
- General business.

A process of generating the strategy risks and opportunities have been identified (only) to:

- Guide the investigations and findings of The Strategy;
- Highlight potential risks and opportunities that should be considered beyond The Strategy.

To achieve the above, the following process was adopted:

- Step 1:** Undertake a workshop with the project team to identify risks and opportunities associated with the success and robustness of delivering the Strategy;
- Step 2:** Capture risks and opportunities from workshops associated with various topics regarding the strategy;
- Step 3:** Undertake a workshop with across DPTI representation seeking input to identify risks and opportunities associated with:
- being effective and efficient in the delivery of the non-stop North-South Corridor;
 - the timeframe of delivering within 10 years.
- Step 4:** Undertake a workshop with across DPTI representation seeking input to identify risks and opportunities associated with communication and engagement in the event the Strategy is released publically;
- Step 5:** Compile a risk and opportunities register to log where risks and opportunities have been considered as part of The Strategy and to identify what needs to be considered beyond The Strategy.

15.1 Project Workshops

Numerous workshops were conducted through the development of The Strategy. Each workshop focused on a different topic associated with the Strategy and within each workshop the respective risks and opportunities were identified and were subsequently captured in the risk and opportunities register. Risks and opportunities were identified from the following workshops:

- Successfully delivering The Strategy Workshop;
- Services Workshop;
- Land Acquisition Workshop;
- Project Delivery Packages Workshop;
- Detour Routes Workshop;
- Order of Works Workshop.

15.2 Risk and Opportunities Workshop

A dedicated risk and opportunities workshop was held on 24th September 2014 with stakeholders across DPTI to identify risks and opportunities associated with the delivery of the unfunded sections of the North-South Corridor.

The following topics were discussed to assist with determining risks and opportunities;

- Governance / Political / Funding
- Early Works
- Network and Land Use Integration (e.g. ITLUP)
- Corridor Consistency
- Market Drivers (e.g. supply and demand)
- Project Interfaces

15.3 Communication And Engagement Risk and Opportunities Workshop

A dedicated communication and engagement risk and opportunities workshop was undertaken on 13 October 2014 to identify risks and opportunities in the event The Strategy is released publically.

The workshop proposed three scenarios and invited group discussion to identify risks and opportunities with regards to each scenario. The scenarios consisted of:

Scenario 1 – *'Tell and Sell'*

Scenario 2 – Industry Consultation and 'Tell and Sell'

Scenario 3 – Consultation key to the strategy development

The outputs of the workshop have been used to assist in the preparation of a communication and engagement strategy. This has been prepared in the eventuality The Strategy is publically released.

15.4 Risk and Opportunities Register

A risk and opportunities register has been compiled. Each risk or opportunity has been identified and registered as either:

- considered as part of The Strategy or;
- to be considered beyond The Strategy.

Beyond the Strategy, the risk and opportunities need to be scored and mitigated as part of a formal risk assessment process to assist with the implementation of the Strategy. Importantly, the risks and opportunities marked as considered as part of The Strategy still need to be a part of the risk assessment process.

DELIVERING THE STRATEGY

Purpose:

- To provide a recommended approach to delivering The Strategy

Outcome:

- A series of recommendations that are effective and efficient in the investment and implementation of the fully upgraded North-South Corridor in 10 years.

16 The Strategy (**Key Findings**)

The Strategy through evidence based investigation recommends an approach to effectively invest and implement the fully upgraded Non-Stop North-South Corridor in 10 Years.

The foundation of the Strategy is built on the effective and efficient **delivery** of **infrastructure solutions** as a **program** underpinned by eleven work pillars and supported by an open, transparent and inclusive **communication** and **engagement** of stakeholders, community and government.



The Strategy provides **robust** and **flexible** approaches to;

- funding submissions
- procurement approaches
- delivery order of projects
- changes to infrastructure solutions
- changes to the duration of the program of works (10, 15 and 20 yrs etc..)

16.1 Why (**The Focus**)

Focus 1 – Fully Upgraded Non-Stop North South Corridor

South Australian and Australian Governments recognise South Road is strategically important and acknowledge significant problems exist for its entire length that inhibit the road from performing its role and function in a safe, efficient and reliable manner.

The focus of the Strategy is implementing of the non-stop North-South Corridor to provide a reliable free flowing transport 'spine' that connects the expanding industrial areas in the north and south, supports higher freight transport productivity and improves access to freight gateways and accessibility to employment, leisure and service opportunities.

Focus 2 - Effective and efficient investment and implementation

The Strategy focuses on investment and implementation program management strategies that will be effective and efficient in upgrading the Non-Stop North-South Corridor. This focuses on a whole of corridor approach as opposed to funding and delivering individual projects.

Focus 3 - The 10 Year Timeframe

The Strategy seeks to investigate the implication of the Australian Governments aspiration to deliver the fully upgraded Non-Stop North-South Corridor within a decade. The foundation of the strategy is robust and flexible to accommodate future changes in direction.

16.2 What (Infrastructure Solutions)

16.2.1 Road Projects

The Strategy recommends the North-South Corridor be split up into a maximum of ten road projects. These represent logical sections that best reduce redundancy and maximise delivery flexibility so that if adjacent road projects are not delivered or funded concurrently or sequentially (due to time differences between delivering projects) there is limited rework in the future.

The ten road projects from north to south are:



NC1	7.1km	Northern Connector (Northern Expressway to Bolivar Road intersection)
NC2	8.4km	Northern Connector (Bolivar Road intersection to Superway)
R1	1.3km	Superway to South of Regency Road
R2	1.84km	South of Regency to South of Hawker Street
R3	1.0km	South of Grange Road to south of Ashwin Parade
R4	2.13km	South of Ashwin Parade to South of Sir Donald Bradman Drive
R5	2.58km	South of Sir Donald Bradman to South of Glenelg Tram
R6	1.6km	South of Glenelg Tram Overpass to south of Cross Road
R7	2.6km	South of Cross Road to south of Daws Road
R8	1.8km	South of Daws Road to south of Ayliffes Road

A total of 30.35km of corridor is to be upgraded to complete the Non-Stop North-South Corridor.

16.2.2 Associated Works Projects

The Strategy recommends the North-South Corridor be supplemented with associated works projects. These represent Network Modifications, Public Transport Projects and Traffic Operations Projects to support the construction of the North-South Corridor.

A traffic management centre with increased capacity will be required to support the management of the fully upgraded Non-Stop North-South Corridor.

Associated Works Project

Network Modifications (NM)

1A	Hanson Rd/Torrens Rd
1B	David Tee/Torrens Rd/Regency Rd
2	Midblock (Btw Torrens Rd & Henley Beach Rd)
3A	Kilkenny Rd/Port Rd
3B	East Ave/Port Rd
4A	East Ave/Grange Rd
4B	Holbrooks Rd/Grange Rd
5A	Holbrooks Rd/Henley Beach Rd
5B	Marion Rd/Henley Beach Rd
6	Marion Rd/Sir Donald Bradman Dve
7	Marion Rd/Richmond Rd
8	Marion Rd/Anzac Hwy
9	Midblock (Btw Anzac Hwy & Cross Rd)
10	Marion Rd/Cross Rd
11	Marion Rd/Raglan Rd
12	Marion Rd/Daws Rd
13	Churchill Rd/Regency Rd
14	Port Rd/Park Tee/Adam St
15	Port Rd/James Congdon Dve

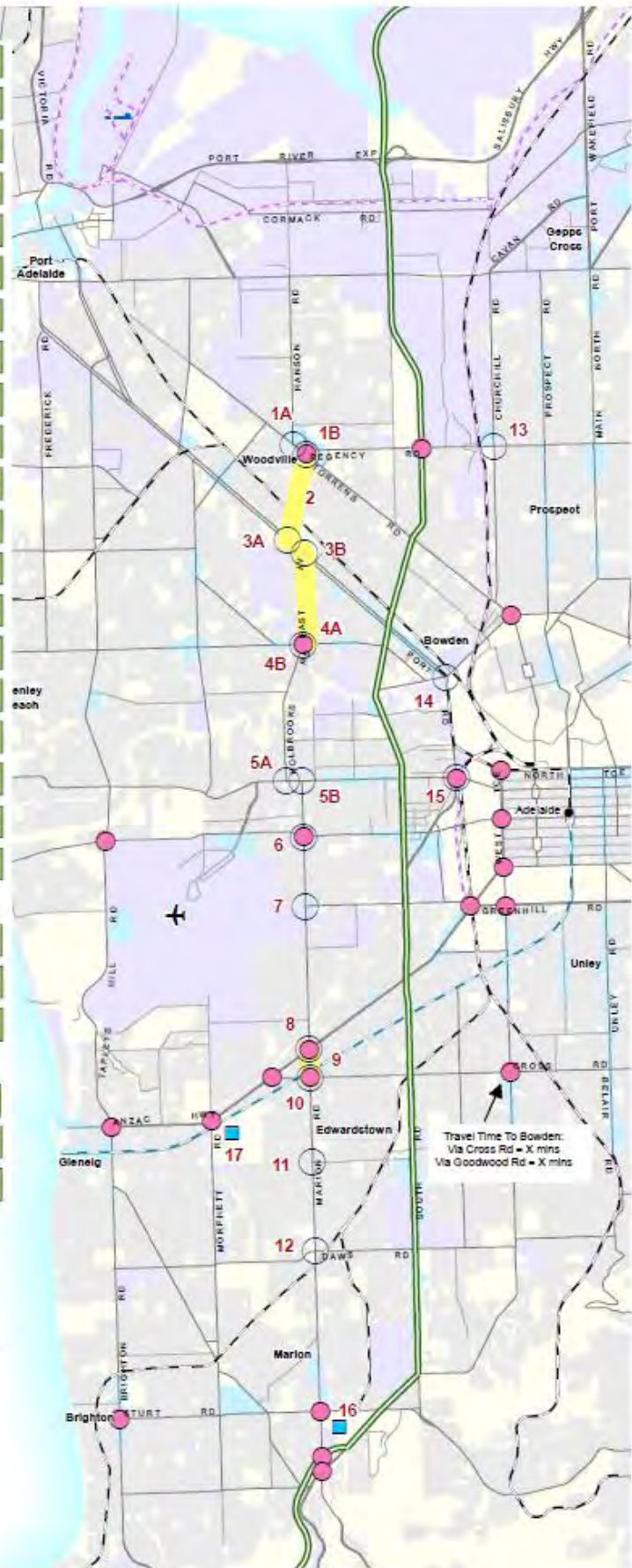
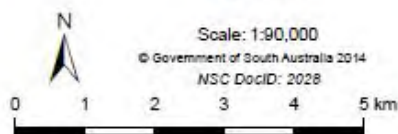
Public Transport Projects (PT)

16	Tonsley Park Interchange
17	Park n Ride at Morphettville Racecourse

Traffic Operations Projects (TOP)

Variable Message Signs (VMS)
Traffic Management Centre (TMC)

Intersection Upgrades	Tramway
Midblock Upgrades	O-Bahn
VMS Travel Choice Signal	Freight railway
North-South corridor (non-stop)	Significant retail areas
Promoted Public Transport	Existing key industry areas
Main road	Built-up area
Passenger railway	Sea port
	Airport

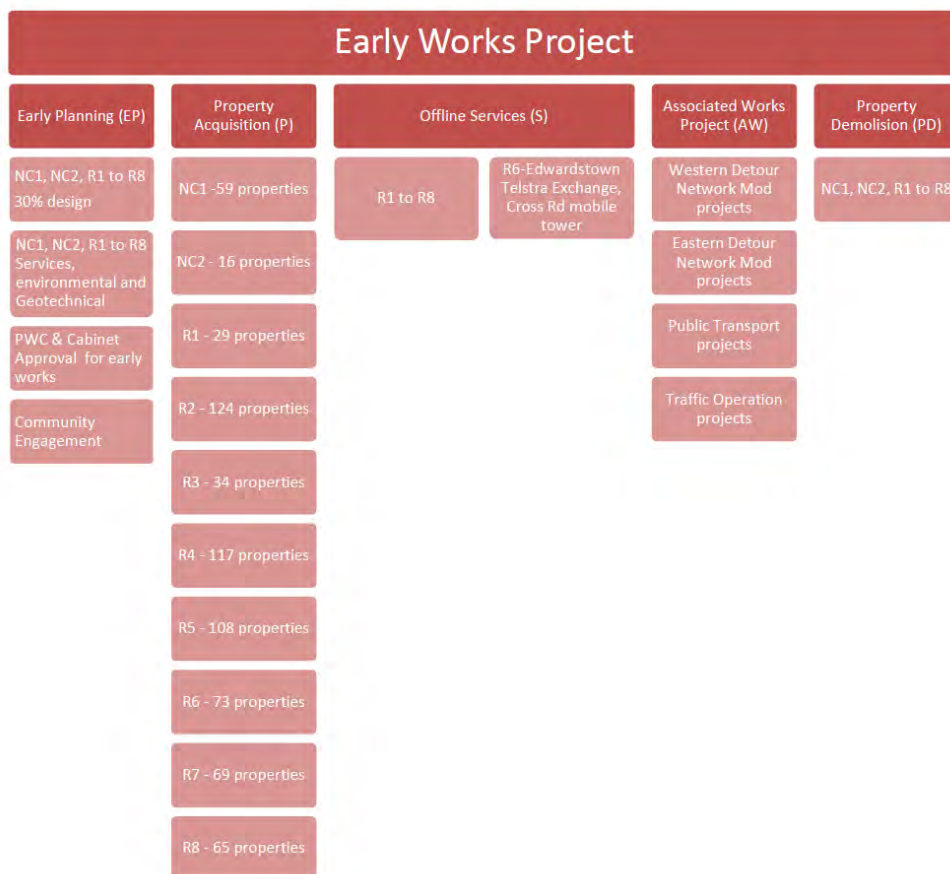


16.2.3 Early Works Projects

The Strategy recommends 10 Early Works (EW) Projects be funded separately and in advance and concurrently of road construction projects to support the efficient and effective delivery of the program of works. The Early Works Projects shall include:

- early planning of the road corridor to an advanced concept design stage (notionally 30%)
- undertake all utility services, environmental and geotechnical investigations
- commence community engagement in the areas of the early works projects
- undertake property acquisition and demolition to accommodate the future road project
- undertake service relocations for offline services (i.e. services that can be relocated to a local road or outside the ultimate road corridor)
- implement associated works projects (network modifications, public transport and traffic operations projects) to support the implementation of future road projects

The Strategy recommends the following early work components be funded and implemented separately in advance of the road construction projects:



16.2.4 North-South Corridor Costing

Road Project Section	Indicative Costs (2014 Real Dollars)*
NC1	\$250m
NC2	\$610m
R1	\$310m
R2	\$450m
R3	\$270m
R4	\$1100m
R5	\$1250m
R6	\$710m
R7	\$800m
R8	\$640m
<i>Total</i>	<i>\$6390m</i>
<i>Associated Works</i>	
New Traffic Management Centre	TBA
VMS Operations	\$10m
Suggested Network Upgrades	\$60m
Public Transport Projects (including Emerson grade separation)	\$310m
<i>Total Associated Works</i>	<i>\$380m</i>
Total Unfunded (Including 5%)	\$6770m
Torrens to Torrens (Funded)	\$680m
Darlington (Funded)	\$450m
Total Funded	\$1130m
Total Corridor (Unfunded & Funded)	\$7900m

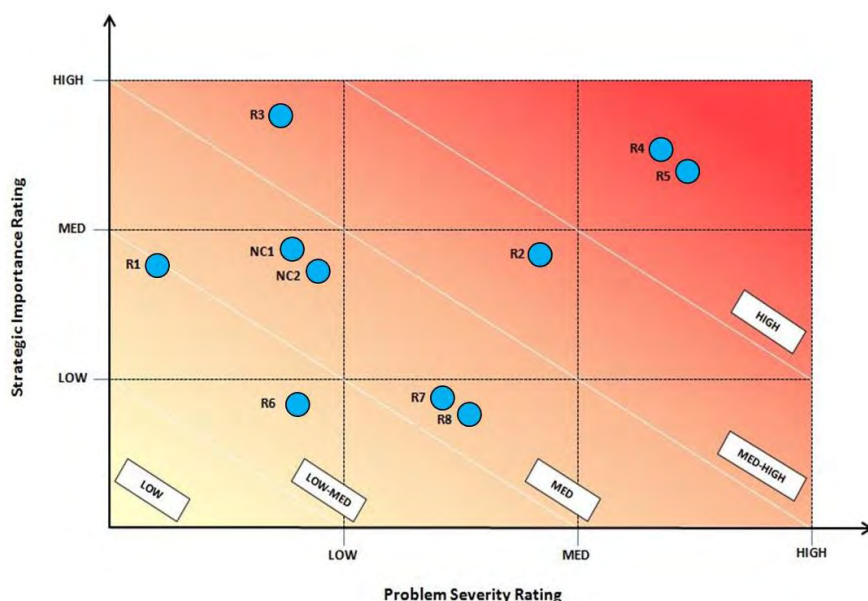
16.3 When (The Program)

16.3.1 Project Delivery Order

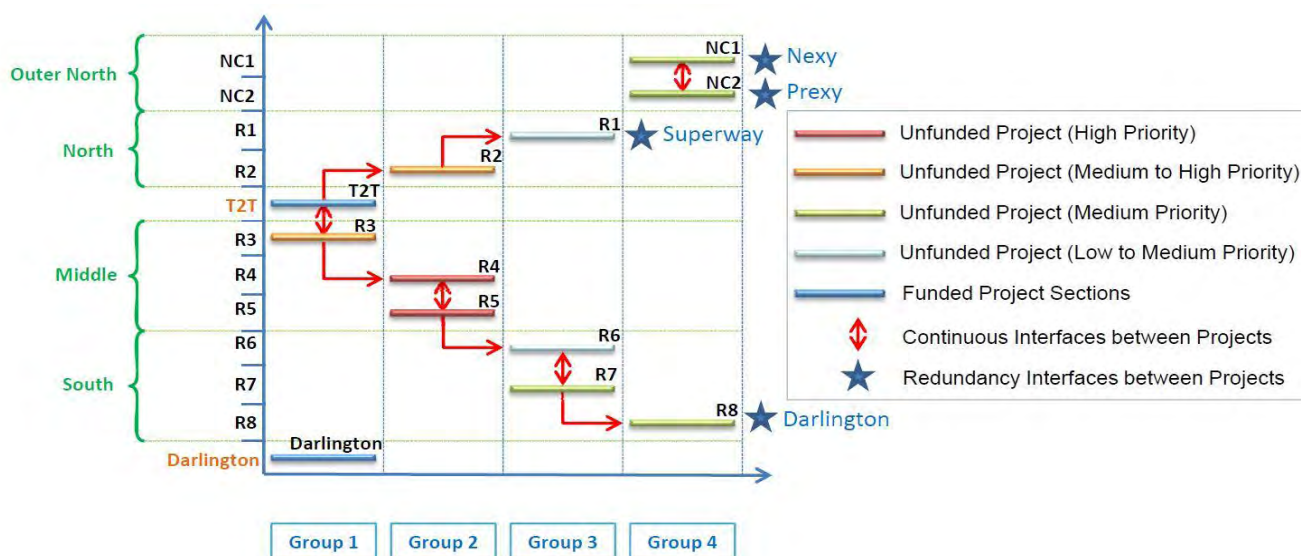
The delivery order of road projects is critical in realising the potential for the North-South corridor by unlocking benefits of economically productive infrastructure in priority order.

The Strategy recommends an evidence based approach to prioritising the importance of the ten nominated road projects based on their strategic significance and the magnitude of problems experienced that inhibit the road from performing its role and function to serve community and business in a safe, efficient and reliable manner.

'greater the problem and higher the strategic importance, the higher the priority'



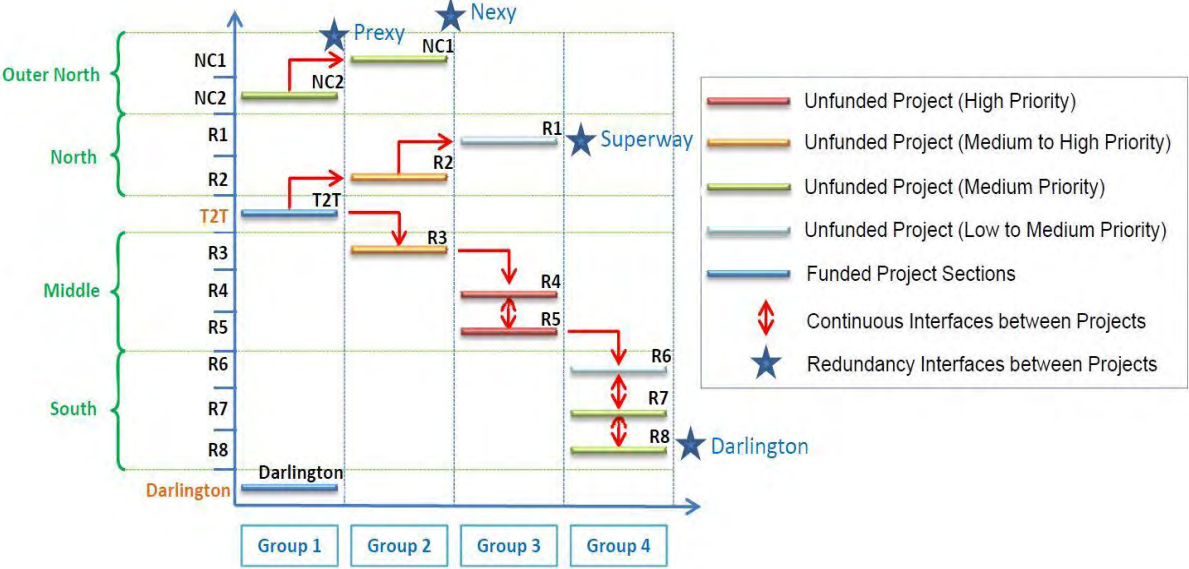
The Strategy recommends a delivery grouping that balances prioritisation against program timeframe against delivery efficiencies.



Sector	Road Project	Priority Rating	Delivery Group
OUTER NORTH	NC1	M	4
	NC2	M	4
NORTH	South Road Superway Project		
	R1	L-M	3
	R2	M-H	2
MIDDLE	Torrens Rd - River Torrens Project		
	R3	M-H	1
	R4	H	2
	R5	H	2
SOUTH	R6	L-M	3
	R7	M	3
	R8	M	4
	Darlington Project		



An alternative program has been created to bring Northern Connector Projects (NC1 and NC2) to the front of the program, due to a greater level of confidence in attaining early approvals and funding. Northern Connector is the only project that is currently lodged with Infrastructure Australia and has progressed to 'threshold level' i.e. one step away from 'ready to proceed'. Additionally, bringing Northern Connector forward bides time to progress planning and approvals for the remaining road project sections.



16.3.2 The Program of Works

To be determined.

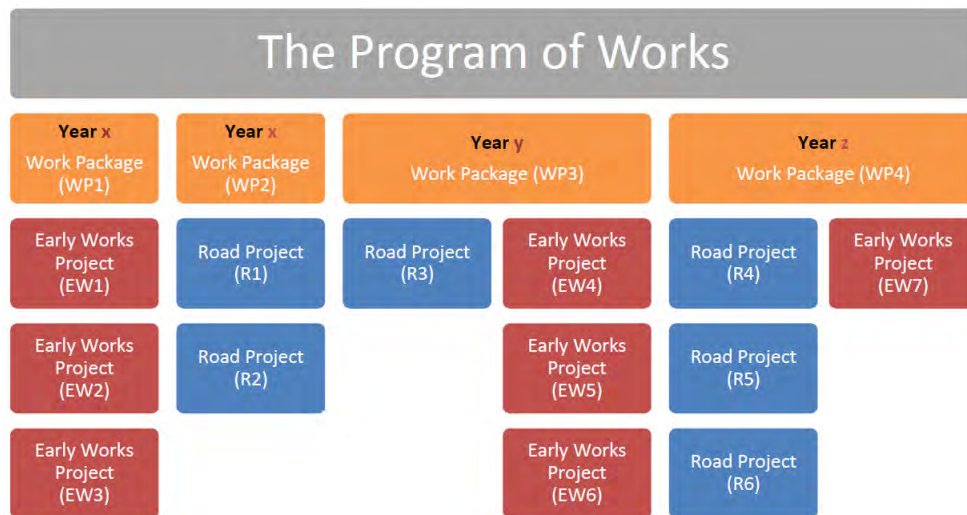
16.3.3 The Funding Interventions/Cash Flows

To be determined.

16.4 How (Effective Delivery of the Strategy)

16.4.1 Management of Procurement & Funding Submissions

The Strategy provides flexibility for innovative and effective ways to secure funds and procure the fully upgraded North-South corridor. The Strategy recommends the delivery of the North-South corridor be a continuous program of works made up of work packages. The Strategy has defined the components and durations of ten 'road' (blue) and 'early works' (red) projects that make up the program of works. The work packages (orange) have not been defined as they provide flexibility to bundle the projects to best suit funding submissions (investment) and procurement strategies (delivery). A funding submission or procurement strategy could include multiple work packages or a single work package.



The program of works approach of The Strategy allows government to explore a variety of innovative delivery models for the work packages, such as;

The program of works approach will seek to drive competitiveness in the market to influence;

- cost certainty
- cost savings
- higher value for money
- design and construction innovation
- maximisation of local labour, resources and suppliers (i.e. local participation)
- optimise risk allocation and minimise the risk exposure to Government

It will also provide flexibility to balance the size and cost of a work packages, where larger work packages;

- reduce design and construction interfaces with adjacent road projects
- efficiency in reducing contract management.
- entice national, international and Tier 1 companies to create competitiveness and achieve higher value for money (time & cost savings and quality outcomes).

Whereas smaller work packages;

- provide increased opportunities for smaller Tier 2 and 3 companies
- increase competitiveness due to a larger pool of companies capable of undertaking smaller work packages

16.4.2 Management of Land Acquisition and Preservation

The Strategy recommends a continuous program of works which enables a holistic approach to land acquisition based on securing funding early (separately and in advance of a road project) through early 'negotiated' purchasing (strategic purchasing) encompassing owner approach negotiated outcomes, DPTI initiated purchases and DPTI purchasing land for sale.

The Strategy recommends early preservation of land to provide certainty to land owners and stakeholders affected by the program of works.

The Strategy also recommends that if compulsory acquisition is required it is effectively delivered by a well planned, communicated and consistent process that is supported by the early preservation of land.

Legislative approval of a program of works to seek early funding and acquisition coupled with effective communication and community engagement throughout would enable flexibility and commitment within the parameters of planned land acquisition policies and procedures. Consistency and transparency in decision making are the key to ensuring that stakeholders feel engaged in the program whilst ensuring DPTI acquisition staff feel empowered in the knowledge that they are supported by the legislative approved program of works.

The Strategy recommends the following;

Governance – *undertaking business efficiently and effectively;*

- Gaining authorised project status (legislative approval) pursuant to section 39B of the *Highways Act 1926* to enable the early acquisition of land prior to a traditional funded road project;
- Adopting up to date policies and procedures to ensure consistent practices and to provide confidence in their administration.

Land preservation mechanisms – *early notification to stakeholders of Government's intention to acquire land for the program of works by:*

- notification under section 7 Land and Business (Sales and Conveyancing) Act 1994
- amendment of the Metropolitan Adelaide Road Widening Plan
- Ministerial initiated amendment to local government Development Plans

Strategic land acquisition - *securing funding early to enable:*

- owner approach negotiated outcomes;
- DPTI initiated purchases;
- DPTI purchasing land for sale;
- compulsory acquisition of land via the Land Acquisition Act 1969.

16.4.3 Management of Services

The following recommends an approach to being efficient & effective in the management of services:

16.4.3.1 Pro-Active Planning, Design and Delivery

- Develop a whole of corridor governance structure for the management of services with accountability to actively reduce risks and costs over the program of works;
- Create a whole of corridor services team that becomes the single point of contact for service providers and who strategically manage services in a consistent, pro-active and transparent manner;
- Seek opportunities to fund early services works by undertaking:
 - Early services investigations in consultation with third party service providers to:
 - Locate and map (in 3D) current services;
 - Understand impacts to services;
 - Determine how to manage services (avoid, protect or relocate);
 - Undertake services planning and design.
 - Early acquisition of additional land to relocate services;
 - Early relocation of services.
- Develop a services corridor plan that preserves the location of longitudinal and transverse services corridors to guide the future design of the road corridor and provides certainty to service providers;
- Make provision for additional land to accommodate a services corridor;
- Reduce costs and justify a services corridor by integrating with 'other' transport infrastructure:
 - locate a common service corridor underneath a footpath/cycle path;
 - provide a footbridge that serves as a services bridge and ITS gantry.
- Aspire to relocate all third party services (e.g. non-essential to the operation of the road) from the free flow non-stop motorway and surface arterial South Road;
- Develop a 3D services model to accurately identify and manage services;
- Prevent new and/or relocated services from being installed on the current South Road to prevent future re-work and relocation/protection costs;
- Design the road corridor (where possible) to avoid high cost / long lead services;
- Engage consultants who are approved by service providers to undertake services design to expedite the services management process;
- All above ground services infrastructure to be designed and located in accordance with safe systems 'road safety' principles;
- Fast track North-South Corridor concept plans to a 30% design level to provide greater certainty for early services relocation.

16.4.3.2 Collaborate with Third Party Service Providers

- Seek opportunities to engender collaboration with service providers (e.g. charters, memorandums of understanding and steering committees);
- Partner with service authorities and contractors under an alliance contract (e.g. an integrated team);
- Work with respective service providers to develop a North-South Corridor 'standard' contract to provide consistency and certainty between all parties over the duration of the program of works;

- Seek legislative change to provide the road authority with greater power to influence collaborative 'best for state' outcomes;
- Coordinate planning activities undertaken by service providers and the road authority to provide 'best for state' value for money outcomes.

16.4.4 Management of Traffic

The Strategy recommends promoting North-South Detour Routes to minimise community and business journey times during the construction of the North-South Corridor.

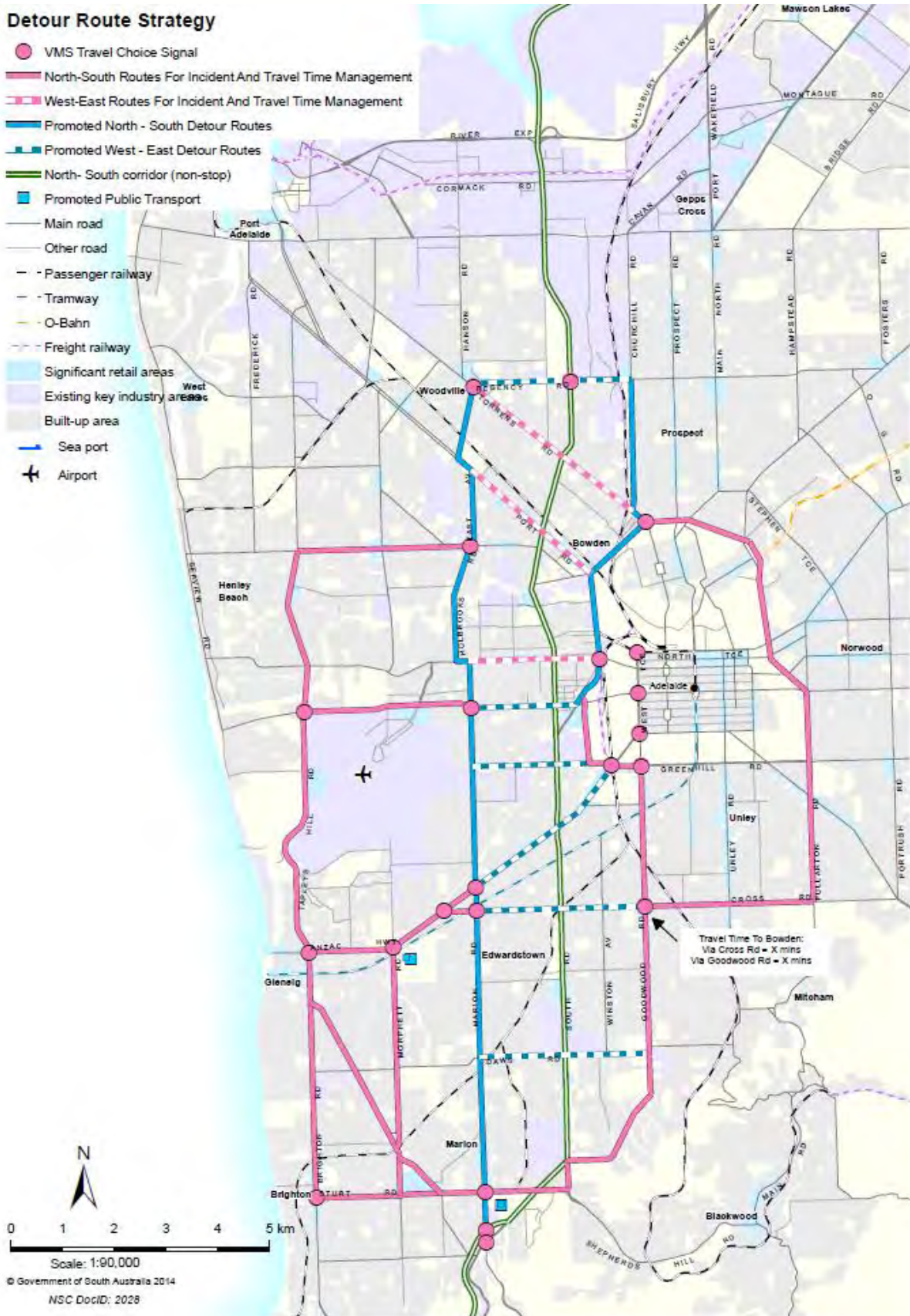
The strategy recommends a promoted north-south detour route 'spine' that runs in parallel to the west of South Road during the construction. Similarly, there will be promoted east-west detour routes to minimise journey times for community and business travelling from the western suburbs across to the eastern suburbs and vice versa.

The network modification upgrades required for the promoted detour routes can be delivered in a flexible manner, either early in the program of works or progressively to meet the staged construction of the North-South Corridor.

The promoted detour routes will be supported by VMS travel choice signs strategically located at key nodes across the wider network to proactively assist commuters during the construction of the North-South Corridor. The VMS signs will provide real time traveller information to allow community and businesses the flexibility to make informed route and mode choice decisions during construction. Providing options to use transport interchanges for bus and rail plays a key role in supporting the construction of the North-South Corridor.

Detour Route Strategy

- VMS Travel Choice Signal
- North-South Routes For Incident And Travel Time Management
- - - West-East Routes For Incident And Travel Time Management
- Promoted North - South Detour Routes
- - - Promoted West - East Detour Routes
- North- South corridor (non-stop)
- Promoted Public Transport
- Main road
- Other road
- - - Passenger railway
- - - Tramway
- - - O-Bahn
- - - Freight railway
- Significant retail areas
- Existing key industry areas
- Built-up area
- Sea port
- ✈ Airport



16.4.5 Management of Resources

In order to support the effective and efficient delivery of infrastructure solutions as a program of works the following resourcing structure be required.

To be determined.

16.4.6 Management of the Community and Stakeholders

The Strategy will be supported by an open, transparent and inclusive **communication and engagement** of stakeholders, community and government.

The Strategy recommends a communication & engagement strategy that encompasses all stages regardless of project delivery order or funding interventions.

It focuses on best practice, innovative communication and engagement processes in keeping with state, national and international trends in public participation and is cognisant of the state-wide strategic framework of policies and plans for South Australia, including the Better Together: principles of engagement.

Individual project specific communication and engagement plans will still be required to coincide with design development and delivery of projects within the program of works.

The guiding principles of effective communication & engagement include:

- build positive, trusting relationships through the provision of accurate and timely information and genuine engagement;
- scope of community and stakeholder influence to be identified and clearly articulated in all communication materials;
- the community and key stakeholders will be kept informed throughout all stages;
- DPTI will seek ways to actively involve stakeholders and the community in the implementation of The Strategy and build understanding of the rationale behind and support of this Strategy;
- respect the values of all stakeholder groups and demonstrate honesty in all dealings and open communication at all times;
- engagement of stakeholders who are likely to have an interest in or be affected by The Strategy will begin early in the program, to create a greater sense of ownership and provide opportunities to contribute towards the solution to community issues;
- ongoing consultation with directly affected stakeholders will take place during all states of the preservation and protection of the corridor and any land acquisition process to achieve the best possible outcome and provide greater certainty in planning for their future;

Stakeholders

- directly impacted property owners and occupiers;
- wider local community;
- local government – administration and elected member bodies;
- special interest stakeholders;
- state and Australian members.

Mechanisms to engage (in addition to above)

- media;
- stakeholder database.

The Aim of communication & engagement strategy is to address likely interests and concerns of stakeholders to minimise negative perceptions of the program and enhance positive support for The Strategy.

Key messages of The Strategy are detailed above and will be communicated during implementation.

17 Next Steps

The next step beyond the strategy is to create and implement an action plan. The successful delivery of this action plan relies on many organisations and individuals to achieve the goals of the strategy.

The action plan needs to elaborate the following components identified in the strategy.

17.1 Infrastructure Solutions

- Undertake a detailed concept design for the remaining section of the corridor.
- Network Modifications
 - Undertake detail investigations (e.g. SIDRA/AIMSUN modelling) for the identified detour route upgrades and formal cost estimates (P50 & P90);
 - Consult and amend (e.g. solutions and time frame delivery), if any, for the integration of Integrated Transport and Land Use Plan (ITLUP) solution plans with North-South Corridor Detour Routes Strategy;
 - Consult with external stakeholders (e.g. local governments, utilities providers and private developers) for potential projects that might act as significant constraint to the development of North-South Corridor Detour Routes Strategy.
- Revise and confirm cost estimates for the proposed public transport projects (e.g. Emerson Rail Crossing) as the project progress into final stage of design.

17.2 Program Management

- Undertake more detailed cost estimates (P50 & P90) for project sections being considered for funding. Update cash flows as estimates progress.
- Revisit and refine project durations to gain further confidence in the program of works.
- Investigate the construction durations from a first principles staging approach and refine construction programs.
- Undertake a more accurate assessment of project and program cash flows using the new program of works.

17.3 Effective Delivery

- Amending the Metropolitan Adelaide Road Widening Plan (MARWP) to include the current footprint of the North-South Corridor;
- Investigate resourcing requirements of acquisition officers and valuers and the costs for providing property services;
- Commence data collection from service authorities and engage in concept designs for services to be relocated offline;
- Create a dedicated team comprising of both department and third party utility authorities to manage services work for the corridor;

- Investigate the creation of a services corridor to enable services to be completely relocated as part of Early Works project;
- Undertake detailed investigations (including traffic management plan and implementation of Variable Message Signs) of traffic management across the wider network associated with any staged construction of the North-South Corridor;
- Conduct a formal Risk Assessment session with suitable participants to score all risks in the Risk & Opportunities register;
- Undertake a process of formalising stand out opportunities for possible further consideration in the delivery phase of the strategy;
- Complete a Communication and Engagement plan and begin engagement with key stakeholders.

