

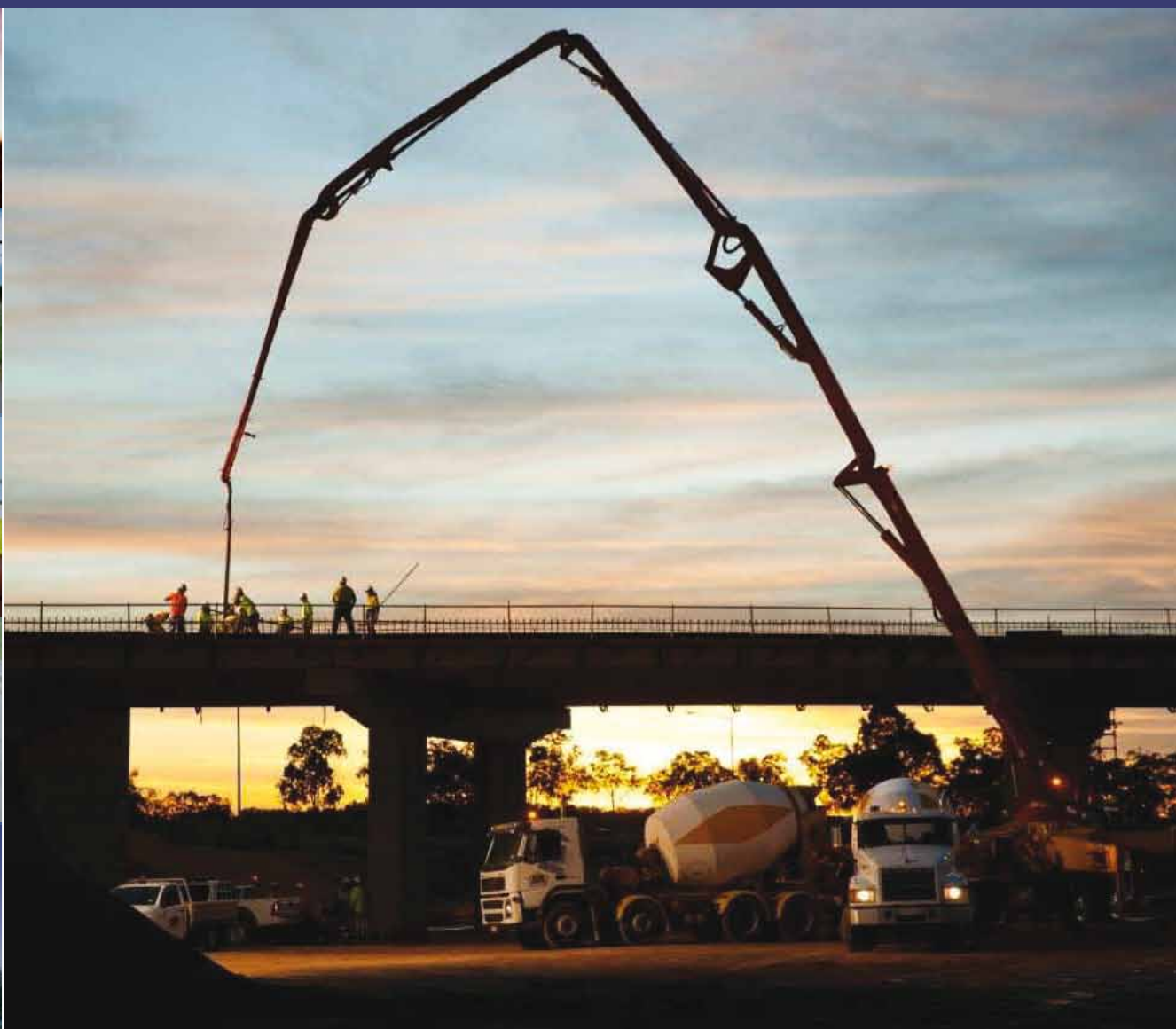


Australian Government

Department of Infrastructure and Transport

Infrastructure Planning and Delivery: **Best Practice Case Studies**

DECEMBER 2010



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Port of Melbourne Corporation – Channel Deepening Project, Victoria

Roads and Traffic Authority, New South Wales – M7 motorway, NSW

Department of Transport, Energy and Infrastructure, South Australia – Northern Expressway, SA

Southbank Institute of Technology, Queensland – Southbank Education and Training Precinct, QLD

Department of Construction and Infrastructure, Northern Territory – Tiger Brennan Drive, NT

WA Water Corporation – Southern Seawater Desalination Plant

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Infrastructure Planning and Delivery: Best Practice Case Studies

DECEMBER 2010





Minister's Foreword



The Australian Government has begun an era of nation building in Australia, working with state and territory governments to build world class infrastructure that boosts Australia's productive capacity and improves living standards.

Infrastructure investment is a key driver of a stronger, more productive economy. The International Monetary Fund estimates that every dollar invested in infrastructure boosts economic activity by up to \$1.80.

Transport directly represents some 5% cent of Australia's GDP and directly employs some 500,000 people.

The Australian Government has made significant progress in improving Australia's infrastructure in recent years, establishing Infrastructure Australia and setting up a record \$37 billion Nation Building program to develop the nation's roads, rail and ports.

Equally important is the Government's ongoing reform efforts to overhaul the way we plan, regulate and govern infrastructure, to effectively deliver infrastructure projects, and to tackle bottlenecks and capacity constraints that exist in the economy.

It is this commitment that has resulted in the publication of the first *Infrastructure Planning and Delivery: Best Practice Case Studies* booklet.

The Council of Australian Governments' Infrastructure Working Group has selected six major case studies to highlight those facets of major infrastructure projects that demonstrate best practice.

The report encourages governments and industry to learn from each other and adopt best practice strategies for future procurement of major infrastructure to drive best value for money for the Australian taxpayer or investor.

I would like to acknowledge the contributions of Infrastructure Working Group members, my Department and PriceWaterhouseCoopers in producing this booklet.

I hope governments, industry and academia will find it a useful and practical guide for future infrastructure projects.

A handwritten signature in black ink, appearing to read 'A Albanese', written in a cursive style.

Anthony Albanese

MINISTER FOR INFRASTRUCTURE AND TRANSPORT

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1

Introduction and scope



1.1 Introduction

Modern, efficient infrastructure underpins the economic health of all nations, supporting the economy, improving productivity, and providing access to opportunities to build stronger communities. As economies grow and populations expand, so too does the scale of demand on the infrastructure that supports daily life.

Improving infrastructure networks can be a hugely expensive task. New railways, roads, desalination plants, power stations and broadband connections can cost hundreds of millions, and often, billions of dollars. At the same time, their impact is equally huge: transforming neighbourhoods and cities; underpinning water security; and powering our homes, factories and offices.

Getting the delivery of such infrastructure right is therefore an issue of real importance. Cost overruns can run into hundreds of millions of dollars; a poorly specified project can fail to meet the objectives set out for the investment. As a result, improving infrastructure delivery is now a key priority for governments and government agencies across Australia.

Whilst there have been many highly successful deliveries of infrastructure in Australia's recent history, there are still lessons to be learned. With stakeholders demanding greater transparency and placing additional scrutiny on infrastructure decisions, Governments are rightly very keen to ensure that investment outcomes do not fall short of expectations.

1.2 Scope

The Council Of Australian Governments' (COAG) Infrastructure Working Group (IWG), following discussions with Infrastructure Partnerships Australia, are seeking support to conduct analysis to highlight:

- Key best practice behaviours
- Strategies in the planning, approval, assessment, delivery or operation stages which require specific attention or new methods.

On behalf of the IWG, the Department of Infrastructure and Transport contracted PricewaterhouseCoopers (PwC) to provide that support. PwC was requested to provide a short report, based on six case studies selected by the IWG, which in the view of the IWG highlight key examples of best practice in infrastructure planning and delivery. PwC was not asked to conduct an audit of these case studies: instead, PwC was requested to review existing documentation and, where necessary, speak to individuals involved in the project's delivery to identify examples of best practice at a high level.

The IWG requested that the processes and behaviours for analysis in the review should include, but not be limited to:

- Infrastructure assessment and planning, including business case development
- Overarching project governance
- Project management and delivery
- Project planning
- Choice of delivery and funding methods, including the allocation of risk between parties
- Management of ongoing operations.

The six case studies selected by the IWG are:

1. The M7 Motorway in New South Wales, which opened in December 2005
2. The Southbank Institute of Technology in Queensland, which opened in October 2008
3. The Port of Melbourne Channel Deepening project, which opened in November 2009
4. The Northern Expressway in South Australia, which opened in September 2010 (note that Tiger Brennan Drive was not operational at the time of preparing this book.)
5. Tiger Brennan Drive, in the Northern Territory, which is due to open late in 2010
6. The Southern Seawater Desalination Plant in Western Australia, due to open in late 2011.

1.3 Report structure

Chapter 2 of this report:

- Gives a brief tabular description of each project and notes the limitations and difficulties encountered in conducting the analysis
- Highlights the key best practice processes and behaviours that flow from the case studies, to provide a summary of the lessons learnt and a snapshot of best practice behaviours
- Briefly describes 'best practice' for each of these processes and behaviours
- Outlines PwC's approach to the task, and defines a set of eight processes and behaviours that underpin successful project planning and delivery.

Chapters 3-8 of the report then cover each case study in turn, incorporating:

1. A description of the project
2. A comparison of the forecast costs and benefits of the project with the actual costs and benefits, where data is available
3. A detailed examination of the governance, delivery and procurement behaviours and processes that were followed
4. A comparison of those processes against widely accepted best practice norms
5. A conclusion section which shows how positive project outcomes were supported by best practice processes and behaviours.

2

Key best practice lessons

2.1 Key lessons emerging from the case studies

The IWG identified six projects which highlight key examples of best practice in infrastructure planning and delivery. A high level summary of the projects is provided in Table 1.

Table 1: High level summary of five key project characteristics

| Project | State | Operational | Opening date | Procurement method | Procurement details |
|--------------------------------------|-------|--|--------------|---|--|
| M7 Motorway | NSW | Yes | Dec 2005 | Public Private Partnership (PPP) | Build Own Operate Transfer (BOOT) – including patronage risk |
| Southbank Institute of Technology | QLD | Yes | Oct 2008 | PPP | Design Build Finance Operate Maintain (DBFOM) availability payment |
| Channel Deepening | VIC | Yes | Nov 2009 | Alliance | Traditional alliance |
| Southern Seawater Desalination Plant | WA | No | Late 2011 | Alliance | Traditional alliance |
| Tiger Brennan Drive | NT | No (Not operational at the time of publication) | End 2010 | Alliance and Design Construct Operate (DCO) | Alliance Early Contractor Involvement (ECI) for design phase; DCO for construction |
| Northern Expressway | SA | Yes | Sept 2010 | Design and Construct (D&C) | Traditional D&C. Govt will impose toll |

A number of points should be noted before the key lessons are outlined:

1. Two of the six projects which PwC was asked to consider are not completed yet. As a result, the detailed conclusions of those case studies, and the lessons contained here should be assessed in that light.
2. Whilst three projects are alliance-type arrangements, two projects were PPP and one was a traditional D&C. This should not be read as endorsement of a particular procurement method. A key lesson from this work is that the procurement method should be tailored to the project and in particular to the unique risks of each individual project.
3. PwC relied upon publicly available documentation and communications with individuals involved in the respective projects for the information contained in these case studies. PwC has not audited the information or the outcomes of the project, and the lessons contained here should be assessed in that light.

Key lessons

For each case study, this report highlights a number of key best practice planning and procurement lessons from the relevant project. In this section, a series of overarching lessons from the six case studies are drawn out, even if two of the projects are yet to be completed:

1. Projects that develop from long-term plans and which have robust business cases are likely to be most successful

The case studies suggest that projects which are underpinned by a body of strong, sound policy and receive the long-term commitment of governments are more likely to result in a positive outcome. For example, the M7 motorway and the Channel Deepening Project were both planned over a long period. In addition, the case studies illustrate that robust business cases, developed and tested over a number of years, help to ensure that the final project design and specification meet the needs of users and the wider community and are therefore successful.

2. Strong project governance arrangements mean strong project delivery

The case studies show the importance and value of strong governance and project management arrangements. Most of the projects created sophisticated governance arrangements, incorporating clear key lines of responsibility for key project owners and managers, such as the Joint Leadership Team arrangements for the Northern Expressway and the Executive Steering Group for the Southern Seawater Desalination Plant. These arrangements are seen to be particularly important in partnership and alliancing procurement models, where considerable risks are retained in the public sector. Independent expert advisors and joint governance arrangements are practical steps to ensure value for money is achieved in these circumstances.

3. The procurement model should be chosen on the basis of project specifics and should rigorously follow established published guidelines

The case studies demonstrate that an objective procurement options analysis should be undertaken to ensure that a procurement method is selected that 'best' fits the characteristics of the project. In this context, the existence of government guidelines provides a clear framework for efficient risk allocation and competitive bidding to drive innovation and value, and gives the private sector a good degree of transparency and certainty about the overall process. For example, the case of the Victorian Channel Deepening Project, the environmental risks and market specialism required, justified an alliancing approach.

4. Transfer risk appropriately in order to maintain value for money

The case studies demonstrate that different risk transfer arrangements can be appropriate for different projects. The M7 motorway successfully transferred most risk to the private sector, since technical and other uncertainties were limited, allowing the private sector to introduce design innovations; similarly the Southbank Institute of Technology PPP transferred only some of the risk, keeping 'demand' risk where it is best managed for such projects, in the public sector. The case studies demonstrate that risk transfer, which is of course closely connected to the procurement model, should be considered on a case by case basis on its first principles, not by prior decision.

5. Careful management of local and environmental impacts assists project delivery

Reducing and mitigating local and environmental impacts are very important goals in their own right; they also help smooth project delivery. The case studies show that close and meaningful community engagement can lead to major design and delivery changes that are welcomed by local communities and improve the asset (for example, the shared bicycle and pedestrian path on the Northern Expressway). Impartial Environmental Impact Statements are a prerequisite for major projects, and independent verification (for example, by the Office of the Environmental Monitor in Victoria) can be very helpful in building trust for controversial projects and might be considered more frequently by proponents than at present.

6. Be open to learning the lessons from previous projects

Lessons learned from previous projects can be very helpful in improving new processes. The Southern Seawater Desalination Plant demonstrates the value of an honest review of previous similar projects (in this case the Perth desalination plant) being used to inform new processes; similarly, the Northern Territory Government used its experience from the first stages of Tiger Brennan Drive to inform the approaches to the later stages of the project. This openness and honesty can be difficult, but it is clearly invaluable in ensuring continuous improvement in planning and delivery processes.

2.2 Best practice planning and delivery

There is a very considerable body of guidance in Australia which sets out ‘best practice’ processes and behaviours in relation to project planning and delivery. In particular, in addition to guidance issued by the Australian Government, for the most part each State and Territory also has its own guidance material. The key lessons identified from the case studies are consistent with these guidelines and emphasise that a project-specific approach is always required.

Reviewing the content of each guidance document is not required in this report and would not be practical. Instead, a brief summary of the key guidance material available and the key issues addressed have been provided.

Project assessment, planning and selection

The most recent cross sector infrastructure decision-making guidance has been provided by Infrastructure Australia (IA) in their *Better Infrastructure Decision Making* guidelines.¹ Infrastructure Australia advocates the use of reform and investment framework to guide decision makers as outlined in the table below:

Table 2: Infrastructure Australia’s reform and investment framework

| Stage | Description | Components required | Rationale |
|---------------------------|--|---|--|
| 1. Goal definition | <p>Definition of the fundamental economic, environmental and social goals that Australia seeks to achieve as outlined in existing planning documents and strategies. For example:</p> <ul style="list-style-type: none"> • Sustainable economic growth and increased productivity • Lower carbon emissions and pollution • Greater social amenity and improved quality-of-life. | <ul style="list-style-type: none"> • Specific and quantified goals, objectives and targets. • Outline how the initiative aligns with existing infrastructure plans. • Outline how the goals and objectives align with those of other parties (eg National – Including Infrastructure Australia’s Strategic Priorities, State/ Territory, Regional, and Local level) and across sectors. | Goals are needed against which problems and solutions can be assessed. |
| 2. Problem identification | Objective, specific, evidence-based and data rich identification of problems of infrastructure systems and networks that may hinder the achievement of those economic, environmental and social goals. | <ul style="list-style-type: none"> • Situation Assessment – a review and analysis of the current status. • Scenario Assessment – a review and analysis of the future status that identifies: <ul style="list-style-type: none"> – Drivers and trends of the current and future situation – Base-case using the current trends (certainties) – Alternative futures using future trends (uncertainties). • A list of Problem Statements that can be accurately defined and quantified. | Specificity regarding inadequacies is essential in order to take targeted and therefore more effective action. |

¹ See Infrastructure Australia, *Better Infrastructure Decision-Making: Guidelines for making submissions to Infrastructure Australia’s infrastructure planning process*, through Infrastructure Australia’s Reform and Investment Framework, October 2009

| Stage | Description | Components required | Rationale |
|----------------------------|--|---|--|
| 3. Problem assessment | Objective and quantified appraisal of the economic, environmental and social costs of those deficiencies, so that the most damaging deficiencies can be identified and prioritised. | <ul style="list-style-type: none"> Accurate and objective assessment of the economic/ environmental/social impacts of those problems. Priorities identified which reflect the scale of impacts. | Understanding the impact of deficiencies allows the worst problems to be identified and prioritised. |
| 4. Problem analysis | Objective policy and economic analysis of why these deficiencies exist – ie what is the underlying cause (depending on the sector, reasons could include market failure, government failure, capital restrictions, etc). This should include an assessment of noninfrastructure reasons for the problem – eg. land use patterns, peak demand or education/ business hours. | <ul style="list-style-type: none"> For each deficiency, analysis of why those problems have developed. Covers both immediate and underlying causes (eg. not just lack of investment', but causes of underinvestment, eg. regulatory environment). | Understanding the causes allows effective and targeted solutions to be created. Infrastructure (which tends to be capital intensive) is often not the only cause of problems. |
| 5. Option generation | Development of a full range of interventions that address the problems in the domains of: <ul style="list-style-type: none"> Reform (regulation, legislation and governance) Investment. | Identify the full range of options for each problem from the domains of: <ul style="list-style-type: none"> Reform – eg independent pricing, regulation, approvals, coordination Investment – eg better use through demand management, capacity increases. | Identification of a broad range of options – across reform and investment areas – rather than relying on early judgements or pre-conceived ideas – is more likely to identify the best solution or package of solutions. It also discourages a focus on capital intensive investments alone. |
| 6. Option assessment | Strategic analysis and cost-benefit analysis to assess those options. The appraisal should incorporate the full range of economic, environmental and social impacts (including agglomeration and trade impacts, carbon impacts, noise, and social amenity) so that the impact on all goals is measured and understood. | Qualitative and quantitative analysis including: <ul style="list-style-type: none"> Strategic analysis – using high-level profiling assessment – to assist in the analysis of a large number of options. Rapid analysis – using a high-level appraisal assessment – such as a Rapid Cost-Benefit Analysis (CBA) – to assist in the analysis of a smaller number of options. | An understanding of the strategic and economic value along with the risks and uncertainties in delivery is essential to understand how the options or package of options will achieve the fundamental goals outlined in Stage 1. |
| 7. Solution prioritisation | Identification of policy and investment priorities from the list of solutions, on an objective basis that gives primacy to the Benefit-Cost Ratio (BCR) of initiatives, but is balanced by considerations such as strategic fit and deliverability (including risk, affordability). | <ul style="list-style-type: none"> A structured and objective evaluation framework – that reflects the primacy of Cost-Benefit Analysis along side the strategic value and deliverability risk is used to make decisions on the long term infrastructure pipeline. A review of the solution is made against the fundamental goals/ problem identification. | BCRs provide the best available objective evidence as to whether an initiative is likely to deliver a net benefit to the community. They also encourage economic efficiency in the allocation of scarce funds. |

This framework advocates a series of best practice approaches that are also common to the majority of other guidance documents (eg at the State/Territory level). The key elements of this framework are:

1. The development of long term infrastructure plans incorporating land use projections
2. A careful definition of the problems and challenges facing a region/area/network/corridor
3. A genuine exploration of all available options to address the issues identified, including pricing and regulatory measures as well as new capital investment
4. An evidenced based assessment of the merits of the different options, primarily through the use of cost-benefit analysis methodologies
5. The prioritisation of the best performing options according to the evidence.

A very similar approach is advocated by the Australian Transport Council in its *National Guidelines for Transport System Management in Australia*.² Similarly rigorous requirements are set out by the Australian Energy Regulator in its *Regulatory investment test for transmission*.³ State and Territory guidance, typically labelled 'Business Case Guidelines' and issued by State/Territory Treasuries or Departments of Premier and Cabinet, contain many of the same key elements, notably a commitment to options evaluation and the use of cost-benefit analysis to drive decisions.⁴

Project governance and management

The dominant best practice architecture for project governance in Australia is the Gateway Review Process. The Australian Government adopted the United Kingdom's Office of Government Commerce Gateway Review Process in 2005. This process was developed to improve the delivery of major projects and introduced it in the UK in 2000. The Gateway Review Process is now used by the Australian Government, and by many State and Territory governments including New South Wales, Queensland, South Australia, Victoria, Western Australia.⁵

The Gateway Review Process is a structured process whereby reviews are carried out at key decision points in a program or project's life cycle, known as 'gateways', by a team of experienced people, independent of the project team. This process is intended to improve project delivery by:

- Identifying the skills and experience required to deliver successful projects
- Increasing stakeholder understanding of their role in successful project management and the factors which contribute to the achievement of project objectives
- Identifying early on in projects where corrective action may be required
- Improving project management and delivery skills.⁶

2 Australian Transport Council, *National Guidelines for Transport System Management in Australia*, December 2006, available at: <http://www.atcouncil.gov.au/documents/NGTSM.aspx>

3 See, for example, Australian Energy Regulator, *Regulatory investment test for transmission*, available at: <http://www.aer.gov.au/content/index.phtml?itemId=730920>

4 Examples include the NSW Premier Department's *Business Case Guidelines*; the South Australian Department of Treasury and Finance *Guidelines for the Evaluation of Public Sector Initiatives*; the Victorian Department of Treasury and Finance's *Lifecycle Guidance Material*; and the Western Australian Department of Treasury and Finance's *Business Case Guidelines*.

5 See, for example: Australian Government Department of Finance and Deregulation, *Gateway Review Process*, available at: <http://www.finance.gov.au/gateway/index.html>

6 Australian Government Department of Finance and Administration, *Guidance on the Gateway Review Process – A Project Assurance Methodology for the Australian Government*, August 2006, p 2, available at: <http://www.finance.gov.au/publications/gateway-publications/docs/FMG20.pdf>

The six stages of the Gateway Review Process are described in Table 3 below:

Table 3: Stages of the Gateway Review Process, Commonwealth Government Department of Finance and Deregulation

| Critical state or gate | Type of review |
|------------------------|-----------------------|
| Gate 0 | Business need |
| Gate 1 | Business case |
| Gate 2 | Procurement strategy |
| Gate 3 | Investment decision |
| Gate 4 | Readiness for service |
| Gate 5 | Benefits realisation |

Project procurement and funding methods

A crucial component of all infrastructure projects is the procurement and funding decision. The key overriding principles are that:

- The choice of delivery mechanism should be appropriate to a project's unique circumstances and risks
- An objective 'value for money' assessment should be made in selecting the procurement option.

Again, this is an area with considerable best practice guidance. Indeed, many elements are covered in the Business Case Guidelines and Gateway Review Process discussed above. For example, supplementary guidance on procurement is provided within the framework of the Investment Lifecycle Guidelines issued by the Victorian Department of Treasury and Finance.⁷ Detailed best practice guidelines also exist for individual procurement methods. For example:

- Infrastructure Australia and the Council of Australian Governments agreed wide ranging National Public Private Partnership Policy and Guidelines on 29 November 2008.⁸ The document outlines a series of key principles in the application of PPP, including value for money, public interest, risk allocation, output orientation, transparency; accountability and engaging the market.
- Currently guidelines in relation to 'good practice' alliance contracting are typified by the Policy for Alliance Contracting released by the Victorian Department Treasury and Finance in July 2010. To effectively address the emerging opportunities and issues in alliance contracting, a collaborative inter-jurisdictional approach is being undertaken. The Inter-Jurisdictional Alliancing Steering Committee has been established to pursue a number of joint initiatives, including the development of new policies, guidelines and training programs.⁹

⁷ Victorian Department of Treasury and Finance, Investment Lifecycle Guidelines – Supplementary Guidance, July 2007, available at: <http://www.lifecycleguidance.dtf.vic.gov.au/admin/library/attachments/ILG%20-%20Supplementary%20Guidance%20%231%20-%20Procurement%20Strategy%20Guideline%20v1-1%20Feb%2009.pdf>

⁸ http://www.infrastructureaustralia.gov.au/public_private_partnership_policy_guidelines_pdf.aspx

⁹ The Steering Committee was initially comprised of representatives from the treasury departments of NSW, QLD, VIC (chair) and WA. The Commonwealth joined in August 2010.

3

Channel Deepening Project, Victoria



3.1 Project overview

The Port of Melbourne (PoM) is one of Australia's largest container ports and its operation is critical to the economic well-being of Victoria. It handles more shipping containers than any other Australian port and is the key entry and departure point for South Eastern Australia imports and exports. The PoM is linked to the open sea by shipping channels running through Port Phillip Bay.¹⁰

The Channel Deepening Project (The Project) was one of the largest and most critical maritime projects undertaken in Victoria. The Project primarily involved dredging specific shipping channels in Port Phillip Bay to deepen them and thus accommodate larger vessels with heavier cargo loads. Prior to the Channel Deepening Project, shipping channels provided an unrestricted passage from the PoM to Bass Strait for vessels with a draught of up to 11.6 metres. Following completion of the Channel Deepening Project, vessels with a draught of up to 14 metres are able to access the port at all tides.¹¹

The Channel Deepening Project was managed by the Port of Melbourne Corporation (PoMC) and the dredging component was delivered by dredging company Royal Boskalis Westminster (Boskalis) under an alliance agreement. The estimated project cost in the final business case was \$969 million.¹²

Dredging commenced in February 2008 and more than 22 million cubic metres of sand and silt were removed from existing channels – an area equal to approximately 1% of Port Phillip Bay. The dredging took approximately 21 months and was completed in November 2009.

While the dredging process was ultimately successful, the Channel Deepening Project and its proponents the PoMC, were required to undertake a considerable amount of project development and planning work over six years (from 2001 to 2007) in order to convince the Victorian Government and the community that the Channel Deepening Project was economically viable and safe for the Port Phillip Bay environment.

¹⁰ Victorian Auditor-General's Office, The Channel Deepening Project, May 2009.

¹¹ The Channel Deepening Project also included works that related to the management of dredged material, berth upgrades, installation of new navigational aides and the protection of utility services in the channel. The focus of this case study will be the delivery of the dredging component of the Channel Deepening Project.

¹² Note that in addition to the dredging component delivered by Boskalis, the \$969 million budget also included significant Design and Construct packages which were delivered by separate contractors.

Figure 1: Channel Deepening Project Sites in Port Phillip Bay



3.2 Objectives, costs and benefits

Objectives

In the final business case for the Channel Deepening Project, its objectives were as follows:

1. Provide competitive and efficient access to the port through innovative high-quality facilities and services
2. Increase trade
3. Deliver the project on time, within budget and in compliance with environmental and other regulatory standards.

Project objectives 1 and 2 relate to maintaining the Port of Melbourne's competitive position as Australia's busiest container port, increasing trade and growing employment.

Prior to the Channel Deepening Project, the depth of the PoM's shipping channels constrained the operation of larger vessels. This constraint led to inefficient use of the port as shipping companies were limited to using smaller vessels or timing the tides when larger vessels were in use. The PoMC argued that these inefficiencies would lead to additional costs to the shipping companies that would be passed on to importers and exporters relying on the Port of Melbourne.¹³ By deepening the shipping channels to accommodate vessels with a draught of up to 14 metres, the constraints on larger vessels would be alleviated.

In relation to project objective 3 the dredging component of the Channel Deepening Project was required to be completed by 31 December 2009 and the project budget was \$969 million.¹⁴ As part of the Supplementary Environmental Effects Statement, a comprehensive Environmental Management Plan (EMP) was developed before the dredging commenced. The EMP detailed a range of environmental safeguards and requirements that were required during the dredging process. The EMP also set out the environmental monitoring programme following completion of the project. At the time the environmental requirements were the most stringent ever applied to a dredging project in Australia with over 150 environmental controls and nearly 60 project delivery standards.¹⁵

The final benefit to cost ratio of the project was reported as 2.6.¹⁶

Outcomes

The dredging component of the Channel Deepening Project was officially completed in November 2009 – one month ahead of the project deadline and at least \$200 million below its project budget of \$969 million.¹⁷ The risk contingency in the project budget was \$137 million,¹⁸ which indicates that the overall cost savings were attributable to strong risk management and mitigation by the PoMC.

Stephen Bradford, CEO of the PoMC said 'the fact that the project was finished well before its 31 December 2009 deadline and below budget was testament to the integrity of the project's planning and level of environmental research'.¹⁹

¹³ Victorian Auditor-General's Office, The Channel Deepening Project, May 2009.

¹⁴ Port of Melbourne Corporation, Media Release, Channel Deepening Approved, December 2007. Note that in addition to the dredging component delivered by Boskalis, the \$969 million budget also included significant Design and Construct packages which were delivered by separate contractors.

¹⁵ Port of Melbourne Corporation, Media Release, Channel Deepening Project Completed, November 2009.

¹⁶ Parliamentary Inquiry into the Port Phillip Bay channel deepening, Final Report, September 2008. Note that the benefit to cost ratio of the project was based on the project budget of \$969 million, not the actual eventual cost of the project, which was significantly less than this.

¹⁷ Port of Melbourne Corporation, Media Release, Channel Deepening Project Completed, November 2009.

¹⁸ Victorian Auditor-General's Office, The Channel Deepening Project, May 2009.

¹⁹ *ibid.*



Following finalisation of the dredging, a number of close-out audits were completed to measure compliance with the controls and monitoring requirements of the EMP.

In February 2010, the PoMC reported that a high level of compliance with the EMP requirements was achieved during construction. A range of post-construction activities are required by the Channel Deepening Project EMP, including environmental monitoring, surveys and inspections – these activities are ongoing.

3.3 Governance, delivery and procurement

Policy and planning

Key reasons for the successful delivery of the Channel Deepening Project were its strong alignment with policy, ongoing Government support and its compelling service need, established early in the planning process.

The priority of deepening the shipping channels to the Port of Melbourne in order to provide access for deeper draught vessels emerged from a series of studies undertaken and policies made between 1999 and 2001.

The *Victorian Ports Strategic Study* prepared for the Victorian Department of Infrastructure in 2000 concluded that the depth of the shipping channels leading to the PoM would become a limiting factor. The body responsible for shipping channels to the Port of Melbourne, the Victorian Channels Authority (predecessor to the PoMC), undertook preliminary studies in 1999–2001 on the likely costs and benefits of the deepening the channel access to the Port of Melbourne to accommodate 14 metre draught vessels, as well as a preliminary assessment of environmental, technical and operational issues.²⁰

In parallel to the Victorian Channel Authority's preliminary studies, the Victorian State Government released the *Growing Victoria Together* policy in 2001, which outlined a plan for meeting a broad range of economic, social and environmental goals. This policy recognised the importance of upgrading economic infrastructure in order to improve the competitiveness of Victoria's industry.

In response to the shipping industry moving towards the use of larger (5th and 6th generation) vessels, the *Victorian Ports Strategic Framework (2004)* identified the Channel Deepening Project as a key project in meeting future industry needs and promoting efficient use of the Port of Melbourne.

In 2004, the Victorian State Government's economic statement, *Victoria: Leading the Way*, earmarked channel deepening as a priority State project, announcing in-principle support for deepening the shipping channels in Port Phillip Bay, subject to environmental and other requirements being satisfied.²¹

²⁰ Minister for Planning, Assessment under the Environment Effects Act 1978 – Port Phillip Bay Channel Deepening Project, November 2007

²¹ Department of Infrastructure, Victorian Ports Strategic Framework, November 2004.

Key project insights – Policy and planning

- The Government and Port of Melbourne recognised the need for the Channel Deepening Project to respond to industry change, technological innovation and competitive pressures. This underlying need was recognised well before detailed, robust cost-benefit analysis was undertaken for the final business case (which ultimately validated the need).
- The Government's mandate to upgrade economic infrastructure in order to strengthen trade meant that the Channel Deepening Project was strongly supported within Government over an extended period of time. This support was particularly important throughout the planning phase given the wider community's concern over the Channel Deepening Project's environmental impact.
- Nick Easy, Executive General Manager of the Channel Deepening Project, acknowledged that the Channel Deepening Project benefitted from 'a long term commitment from the government and strong government policy that stated a clear economic rationale for the project.'

Business case development and environmental approvals

Throughout the planning phase of the Project, the PoMC developed revised versions of the business case to accommodate changes in costs, environmental requirements and project scope. While the business case development process was iterative, time consuming and required a significant commitment of resources it ultimately led to a robust, comprehensive business case. This comprehensive business case provided enough information to enable the Victorian Government to approve the project and ensured that the project was well designed and scoped – contributing to its successful delivery.

The business case for the Project was developed in parallel with the environmental impact analysis and regulatory approvals process which were embodied in an Environment Effects Statement and Supplementary Environment Effects Statement. In May 2002, the Minister for Planning required the Victorian Channel Authority to prepare an Environmental Effects Statement under the *Environment Effects Act 1978* to investigate the potential environmental effects of the Channel Deepening Project.

Following completion of the Environmental Effects Statement in July 2004, it was released for public comment. An Inquiry Panel was appointed at this time to consider the Environmental Effects Statement and review public submissions. The business case at this time estimated the project cost to be around \$400 million.²²

In March 2005, the Minister for Planning released the Inquiry Panel's Report together with a Ministerial Statement providing a provisional response to the Inquiry's recommendations. The Panel found that the risk analysis, project design, the plan for managing the environmental impacts and communication with the community required substantial revision. The Panel also found that the Channel Deepening Project needed better cross-departmental support and stakeholder communication. In July 2005 the Minister for Planning required the PoMC to prepare a Supplementary Environmental Effects Statement to further investigate aspects of the Channel Deepening Project previously examined in the Environmental Effects Statement.

The Supplementary Environmental Effects Statement was undertaken over two years and was released in March 2007 and effectively replaced the Environmental Effects Statement documentation for the purpose of informing assessment of the project.²³ The project cost included in the Supplementary Environmental Effects Statement at this time had increased to \$763 million.²⁴

²² Port of Melbourne Corporation, Media Release, Channel Deepening Project Completed, November 2009.

²³ <http://www.dse.vic.gov.au/DSE/nrenpl.nsf/LinkView/BDDCAA497E7DA6ADCA256D480003CF2892FBC7C133A6F520CA2572DA007FAB8B>

²⁴ Victorian Auditor-General's Office, The Channel Deepening Project, May 2009.

Following public exhibition and an Independent Panel review of the Supplementary Environmental Effects Statement, the Minister for Planning assessed the Channel Deepening Project as environmentally acceptable in October 2007. In late 2007 the final business case was approved by the PoMC Board of Directors and was subsequently approved by the Project Review Committee and the Expenditure Review Committee. In addition, the State and Commonwealth environmental approvals were granted.

Following completion of the final business case in December 2007, the project's cost had increased to \$969 million, due primarily to additional costs related to environmental monitoring, stakeholder communications and risk contingencies.

The Victorian Auditor General's Office audit of the Channel Deepening Project, undertaken in early 2009, found that the final business case complied with the requirements of the Victorian Business Case Guidelines by:

- Describing the service need and project objectives, and stating a clear rationale for the project
- Demonstrating a strong link between the project, government policy and the corporation's objectives
- Providing evidence of wide-ranging stakeholder consultation
- Following a sound approach in deciding on a preferred option
- Justifying the project in terms of the quantifiable costs and benefits
- Describing the reasons for the recommended approach to procurement
- Explaining the approach to managing the risks
- Demonstrating that the PoMC could afford the project without calling on additional funding from the Government.

Key project insights – Business case development and environmental approvals

- While development of the business case and environmental approvals process was time consuming and required a significant commitment of resources, this process ultimately led to a robust, defensible business case which proved the project's feasibility and satisfied key stakeholders (public and private) that the project would not likely have any significant adverse environmental effects on Port Phillip Bay.
- Nick Easy, Executive General Manager of the Channel Deepening Project, noted that 'putting in the work to understand project scope and its risks (in a dynamic environment) was critical to the PoMC developing robust project costs and effective risk mitigation strategies – which ultimately led to a well managed, successful outcome.'
- Despite the significant increase in estimated project costs over the planning phase, the economic and environmental case of the Channel Deepening Project remained strong. This was ultimately validated by the Victorian Auditor General's Office in its audit of the final business case and by the PoMC in complying (at a high level) with the Environmental Management Procedures.
- Projects that are complex, uncertain and particularly risky must be adequately funded and resourced with experienced proponents to ensure that the necessary amount and quality of work is completed to develop a business case that captures robust cost-benefit analysis, risk and socio-environmental analysis.

Project governance and management

Given the cost, complexity and stakeholder interest in the Channel Deepening Project, the PoMC was required to implement a strong project governance structure with clear lines of accountability, senior internal support and wider cross-departmental support.

Board of Directors

The PoMC is a government-owned corporation which is governed by a Board of Directors (the Board). The Board members hold office pursuant to the *Transport Integration Act 2010* on terms and conditions determined by the Minister for Roads and Ports and the Treasurer.

Executive

The Board was supported by the Executive led by the Chief Executive Officer (CEO), Stephen Bradford and the Executive General Manager of the Channel Deepening Project, Nick Easy. The Executive consisted of key executives across different departments of PoMC and met regularly to oversee the development of the Channel Deepening Project and provide regular advice and information to the Board.

Project team

The Executive General Manager of the project was responsible for a team which worked on various aspects of the Channel Deepening Project including the dredging, environmental, engineering, risk and finance aspects. The dedicated project team was staffed with experienced individuals who provided an appropriate level of continuity as the Channel Deepening Project moved from the planning phase into the implementation phase.

Alliance teams (executive and management)

Given the 'relationship' based contracting nature of the alliance between PoMC and Boskalis, an Alliance Executive Team made up of senior representatives from PoMC and Boskalis was created to oversee the execution of the alliance. This team was supported by an alliance management team that met regularly to address operational matters, cost and scope issues and to ensure the work was carried out in accordance with the detailed designs and Environmental Management Procedures.

Project Taskforce

A key recommendation flowing from the Environmental Effects Statement process was the creation of a high-level project management group with representation from interested state government departments, agencies and the PoMC. In response to this recommendation, a Project Taskforce was created which met monthly and kept wider government up to date on the Channel Deepening Project with progress and issues. The Project Taskforce was important for maintaining coordination across agencies and information flows on the Project. The Project Taskforce consisted of members from the following Victorian Departments: Department of Transport (chair); Department of Sustainability and Environment; Department of Premier and Cabinet; Department of Treasury and Finance; Department of Industry, Innovation and Regional Development; Department of Primary Industries and the PoMC.

The Victorian Auditor General's Office audit report found that the Project Taskforce enabled government departments to provide better support and guidance to the Port of Melbourne. The work of the Project Taskforce showed the importance of cross-departmental support for large, complex projects with far-reaching impacts.²⁵

²⁵ Victorian Auditor-General's Office, The Channel Deepening Project, May 2009.

The Office of the Environmental Monitor

The Minister for Planning's assessment of the Supplementary Environmental Effects Statement recommended the appointment of an independent monitor. The Office of the Environmental Monitor was created in December 2007 and will operate until 31 December 2011. Its purpose is to provide an independent view of the environmental performance of the Channel Deepening Project to regulators and the Victorian community.

It is responsible for:

- Monitoring and evaluating the environmental performance of the Channel Deepening Project, including the investigation of issues raised by stakeholders and the community
- Reviewing the reports the PoMC produces on the environmental management of the Channel Deepening Project
- Advising the PoMC and Ministers, or their delegates, on these and any other matters referred to the Environmental Monitor by the relevant Minister.²⁶

Project Stakeholder Advisory Committee²⁷

The PoMC established the Project Stakeholder Advisory Committee during the preparation of the Supplementary Environmental Effects Statement to represent community and environmental groups, tourism, local government, unions, business and port-related interests in relation to the Channel Deepening Project. The Committee was created in response to stakeholder communication shortcomings identified in the Environmental Effects Statement. The 18 person committee provided advisory services to the PoMC on community and environmental concerns throughout the planning and implementation phase. A Dive Industry Liaison Group was also created during the construction phase of the project.

Key project insights – Project governance and management

- The Port of Melbourne created a strong, responsive project governance and management structure for the Channel Deepening Project which was staffed by a senior, experienced project team. To provide accountability, an experienced project director was installed as the Executive General Manager of the Channel Deepening Project and provided a strong link from the Board through to the project and alliance teams. The Board and CEO were intimately involved and applied high levels of governance throughout the planning, approvals and construction process. The Channel Deepening Project also benefitted from continuity of key senior staff who shared a vision for the realisation of the project.
- The Alliance Teams were able to identify issues and make decisions on a timely basis. The relationship was described by Nick Easy as a 'true partnership, where shared culture, values, work ethic and commitment were fundamental to the success of the alliance'.
- The findings from the Supplementary Environmental Effects Statement identified the need to provide stakeholders (other government departments and the community) with greater engagement and information related to the Channel Deepening Project. The creation of the Project Taskforce and Project Stakeholder Advisory Committee addressed the pre-Supplementary Environmental Effects Statement shortcomings of the project governance structure, demonstrating a more collaborative approach by recognising and valuing the input of wider project stakeholders.
- In cases where a project is environmentally sensitive, the use of an independent body to oversee environmental monitoring can improve the wider community's confidence in the project.

²⁶ ibid

²⁷ Port of Melbourne Corporation, Media Release, Channel Deepening Committee Members Announced, July 2005.

Procurement model and risk allocation

The dredging works of the Channel Deepening Project were procured under a project alliance agreement between PoMC and Boskalis.

In July 2010, the Victorian Department of Treasury and Finance issued new policy for alliance contracting stating, amongst other things, that ‘the use of alliance contracting is appropriate where it can be demonstrated that an alliance approach will deliver incremental value for money over other (procurement delivery) alternatives’.²⁸

The procurement process was audited by the Victorian Auditor General’s Office in 2009 based on the Port of Melbourne’s adherence to general procurement policy and best practice alliance guidelines, and the robustness of procurement options analysis. Key observations from the audit were:

- The PoMC’s procurement policy and processes were sound and consistent with the required standards – this included a commitment to obtaining ‘value for money’, an authorisation/decision-making structure and minimum documentation requirements.
- The PoMC had correctly applied its own procurement policy to the alliance agreement with Boskalis – this included setting and applying clear selection criteria, creating a selection panel, appointing a probity adviser, seeking technical and commercial advice, conducting workshops and due diligence.
- There was sufficient evidence to demonstrate the appropriateness of project alliancing, particularly given the complex technical challenges of dredging without explosives and formulating a plan for containing contaminated material.
- The PoMC’s documentation of the procurement options analysis, elements of the evaluation process and contractual structuring required strengthening in the process undertaken to secure an alliance partner.

Key project insights – Procurement model and risk allocation

- The complexity of the Channel Deepening Project, the degree of research and innovation required and the nature of the global dredging market were key qualitative factors that led to the PoMC selecting a project alliance as the preferred procurement method. Within the alliance framework these conditions also required alignment of the culture, values and commitment of the parties in the alliance. The PoMC’s procurement decision was validated by the Victorian Auditor General’s Office and by the successful completion of the project ahead of time and within budget.
- Nick Easy noted that ‘while the focus of the alliance is on developing a strong relationship, it is critical that the alliance partner be incentivised in the agreement to perform in an efficient and effective manner in order to optimise costs and project outcomes such as schedule and compliance’.
- Although the Victorian Government’s Project Alliancing Practitioners’ Guide was released after the project alliance agreement had been developed, the Victorian Auditor General’s Office audit shows that the PoMC used principles and processes that ultimately reflected best practice guidelines.

²⁸ Department of Treasury and Finance, Policy for Alliance Contracting, July 2010, P5.

Project monitoring and managing environmental risk

The key risk of the Channel Deepening Project was its potential impact on the bay environment. The environmental risks were assessed as part of the Supplementary Environmental Effects Statement and managed via the development of Project Delivery Standards that required compliance during dredging and ongoing environmental and bay-wide monitoring.

The environmental monitoring programs for the Channel Deepening Project focused on turbidity, underwater noise and airborne noise. Data from these programs informed operations and management actions were implemented if data exceeded limits predicted in the Supplementary Environmental Effects Statement. All Environmental Management Plan based requirements for these monitoring programs were met and closed out via internal audits undertaken by the Office of the Environmental Monitor.²⁹

A suite of nine bay-wide monitoring programs provided broader information on the status of key species, habitats and ecological processes in Port Phillip Bay. During the construction phase of the Channel Deepening Project, two bay-wide monitoring programs, (1) contaminants in fish and (2) plume intensity, were completed and closed out via internal audits. The remaining seven bay-wide monitoring programs are ongoing and results from these programs will be reported in post-construction quarterly project reports for the next two years.

The Project Delivery Standards within the Channel Deepening Project Environmental Management Plan (EMP) identified a series of controls, inspections, surveys and monitoring requirements that were applicable for pre-construction, construction and post-construction phases of the project. A series of close-out audits were undertaken and found that the activities were mostly undertaken in accordance with the EMP. There were three partial non-conformances identified. These were investigated and resolved with preventative measures put in place. They resulted in no material impacts to the environment.³⁰

Key project insights – Project monitoring and managing environmental risk

- The key risk of the Channel Deepening Project was the potential for an adverse impact on the environment. Environmental risks were investigated by the PoMC and tested over a period of four years during the Environmental Effects Statement and Supplementary Environmental Effects Statement processes. These investigations led to the development of a comprehensive EMP that included a range of project delivery standards (PDS) and monitoring requirements that the PoMC was required to comply with during construction and post-construction.
- Nick Easy identified the trial dredge program undertaken in 2005 as 'significant' in relation to testing the capability to dredge without explosives, capturing real time hydrodynamic data that formed a basis for validating predictive models and measuring the potential environmental impact of the dredge plume, and building credibility.
- To validate compliance and assure other project stakeholders an independent auditor was appointed to monitor environmental compliance.
- Risk is inherent in all projects and therefore resources and time must be allocated to identify risk, estimate its impact and investigate mitigation processes. Regardless of the difficulty to identify, measure and mitigate risk, project proponents must be willing to deploy the time and resources to convince all stakeholders that risk is managed effectively.

²⁹ Port of Melbourne Corporation, EMP Close-out Report, Channel Deepening Project – Construction, February 2010.

³⁰ See Office of Environmental Monitor reports at <http://www.oem.vic.gov.au/Officeinvestigationsreportsadvice>

3.4 Summary of key conclusions

Following review of the Channel Deepening Project, the following key conclusions regarding best practice planning and procurement can be identified:

1. **Policy and planning** – Projects that are underpinned by a body of strong, sound policy and receive the long term commitment of Government are more likely to result in a positive outcome.
2. **Business case development** – Projects that are complex, uncertain and particularly risky must be adequately funded and resourced with experienced professionals to ensure that the necessary amount and quality of work is completed to develop a business case that includes a robust cost-benefit analysis, sound risk assessments and full socio-environmental impact analysis.
3. **Project governance** – Projects should be governed and managed in a manner that promotes accountability and responsibility throughout the decision making structure. Wider project stakeholders should be engaged early in the project planning process.
4. **Procurement options** – An objective procurement options analysis should be undertaken to ensure that a procurement method is selected that ‘best’ fits the characteristics of the project. Where an alliance is used, the culture, values and commitment of the parties is critical and must be aligned.
5. **Risk analysis** – Risk is inherent in all projects and therefore resources and time must be allocated to identify risk, estimate its impact and investigate mitigation processes. Regardless of the difficulty of identifying, measuring and mitigating risk, project proponents must be willing to deploy the time and resources to convince all stakeholders that risk is managed effectively.
6. **Environmental management** – Managing environmental impacts is commonly a major substantive and presentational task for large infrastructure projects. In this case, the creation of a rigorous environmental reporting and monitoring regime, enforced through the independent Office of the Environmental Monitor, played an important role in delivering strong environmental outcomes and providing the community with assurances in this regard.



4

M7 motorway, New South Wales



4.1 Project overview

The opening of the M7 in December 2005 closed a significant 'missing link' in the Sydney orbital road network.

Previously named the Western Sydney Orbital, the motorway met an identified need to link the M2, M4 and M5 motorways and this has been reflected in the strong patronage since its opening.

The M7 is four lanes and 40 kilometres long (Sydney's longest motorway), with dual carriageways in both directions. A wide central median exists to cater for future transport needs. At the time of construction it was Australia's largest urban road project.

The M7 was procured by the NSW Roads and Traffic Authority (RTA) under a PPP. This approach was similar to the method undertaken for other Sydney motorways, and allowed the NSW Government to transfer the majority of the risks of construction and ownership to the private sector. The winning consortium was Westlink Motorway, which included road constructors Abigroup and Leighton Contractors, tolling and customer management operator Transurban and motorway investor Macquarie Infrastructure Group. This consortium structure was unique at the time, being the first to include a tolling and customer management operator as an equity investor.

Key features include:

- A fully electronic, distance-based, toll, the only distance based toll road in Sydney
- Avoidance of 48 sets of traffic lights along the length of the motorway (resulting in reduced travel times)
- Provision of a 40 kilometre separated cycleway and walking track.

Infrastructure Partnerships Australia (IPA) has credited M7 as 'a highly successful example of a true public/private partnership. It was strongly supported by all levels of Government – Local, State and Federal'. For example, the Steering Committee included representatives of both the State and Commonwealth governments, and there was a close working relationship between the Commonwealth and State throughout the project.

A Review Panel made up of representatives from State and Commonwealth governments was established to oversee the M7 project. This allowed the State and Commonwealth governments to be informed on the progress and activities, which generated a sense of 'ownership'. This integration was demonstrated in the announcement by the NSW Minister for Roads and the then Federal Minister for Transport and Regional Services relating to the preferred proponent.

Figure 2: The Westlink M7 motorway and the Sydney major road network



4.2 Objectives, costs and benefits

Objectives

The benefits of the project focus on the contribution to mobility, freight transit and new employment in Western Sydney. As the project's sponsor, the RTA identified a number of benefits to the community including:³¹

- Safer and more efficient road transport for both passenger vehicles and freight in Western Sydney
- Better access to employment opportunities for the people of Western Sydney, through the provision of links between existing and future industrial and residential areas
- Stronger economic growth within Western Sydney, with further investment in the area being encouraged by potential savings in transport costs
- Reductions in the number of heavy vehicles using local roads
- Better air quality and less noise in key residential areas
- Faster travel times between key Western Sydney suburbs.

³¹ Westlink M7 motorway: summary of contracts, RTA, 2003

The RTA performed a detailed cost-benefit analysis before proceeding to procurement of the project. The analysis captured the initial and recurring capital costs, operation and maintenance costs, road user benefits (savings in vehicle operating costs, travel time, and accident costs), pedestrian benefits and environmental externalities.

The analysis confirmed a net present benefit for the project of \$4.6 billion, and a benefit cost ratio of 3.4.³²

Outcomes

The motorway was launched eight months ahead of schedule; and the electronic tolling system 10 months ahead of schedule. It has proven to be a catalyst for development in Western Sydney, meeting the objectives of employment and economic growth. The M7 has contributed to, and benefitted from land use changes along the motorway corridor, and from the prioritised North-West and South-West Growth Areas.

No post-completion outcomes study has been performed specifically on the M7. However, in 2008 an Ernst and Young report commissioned by Transurban found that the net present value of the Sydney toll road network was approximately 15% higher than estimated in the cost benefit analyses of the original motorways. This was attributed to a number of factors including higher than forecast environmental benefits and higher than forecast traffic flows.

Six months after tolling commenced on the motorway, Westlink Motorways commissioned the market research firm UMR to undertake a telephone survey of 600 western Sydney residents. Approximately 75% of respondents were of the opinion that the M7 was either 'very positive' or 'somewhat positive', with only 6% expressing a negative view.

Whilst actual traffic flows on the M7 have fallen below initial forecasts, the increased average journey length, and an extended ramp-up period than forecast (with traffic still growing at 6–7% per annum, five years after opening) have ensured that the motorway achieves its financial objectives.

4.3 Governance, delivery and procurement

Policy and planning

Conceptual planning over several decades

The evolution of the M7 can be traced through a policy and planning process that stretched over four decades.

The concept of a north-south freeway-standard link in Western Sydney was first proposed by the NSW Department of Main Roads in the 1960s.³³ The *Sydney Area Transportation Study* in 1974 proposed the need for an outer metropolitan highway and confirmed a corridor for its route. The route was further refined in the *Liverpool to Hornsby Highway Strategy Study Final Route* of 1993.

The preferred route was announced by the Commonwealth in April 1994, some nine years before the commencement of construction, and seven years before registrations of interest were sought from the private sector.

A feature of the planning and inception stage was the degree of community consultation that was undertaken. In 1998, consultation was undertaken regarding preliminary designs and features. Changes to the route aimed at minimising environmental impact were made as a result of these consultations.

³² *ibid*

³³ Westlink M7 motorway: summary of contracts, RTA, August 2003



Policy prioritisation

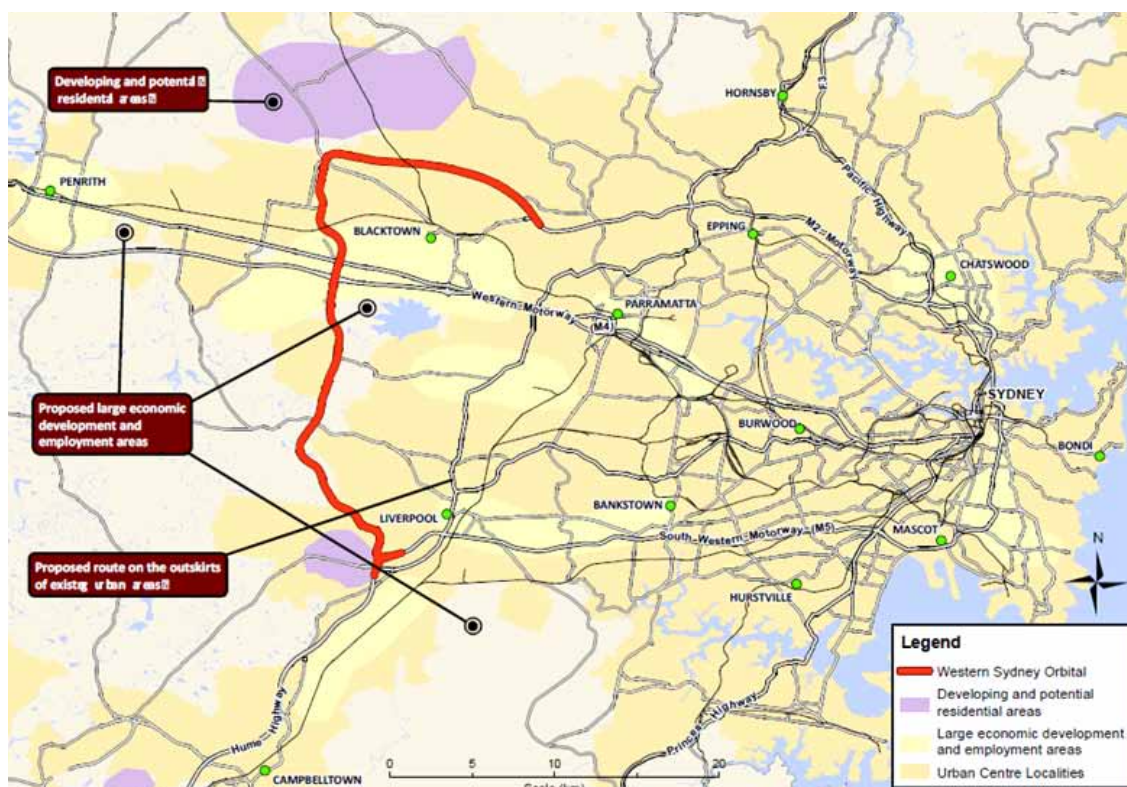
Released in 1998, *Action for Transport 2010 – An Integrated Transport Plan for Sydney (Action for Transport 2010)* set an objective to deliver 21 projects on a 10 point action plan for the Sydney transport network.

At the time, western Sydney was expanding rapidly through Greenfield development. The existing train lines heading West and Southwest provided transport to Parramatta and the city, but did not provide connections for residents to workplaces also in the western suburbs.

Recognising this need, *Action for Transport 2010* identified the M7 as a priority project with target delivery by 2007. The alignment for the road was predominantly Greenfield land at the time of its development, but it ran alongside regions earmarked by the NSW Government as residential and industrial growth priorities.

The plan highlighted the potential for the M7 to improve the competitiveness of freight and play a role in meeting the transport needs of Sydney's growing western suburbs. The following figure shows the M7 in the context of the prioritised growth areas.

Figure 3: Extract from Action for Transport 2010. The prioritised growth areas surrounding the proposed M7 are identified



Key project insights – Policy and planning

- Conceptual planning occurred over several decades (can be traced back to the 1960s). The project was foreshadowed in several preliminary planning documents, allowing some expectation in the community and industry that a motorway would be developed in the future.
- Inclusion of the M7 in the *Action for Transport 2010* plan gave priority to the project. Although briefly, the plan set out the motivation behind the project and committed the Government to a target delivery date. The plan gave preliminary indications of the how the project would be funded.
- The project was delivered ahead of time. The procurement process for the motorway commenced three years after the release of the *Action for Transport 2010* plan and the project was opened in December 2005, a full year ahead of the 2007 target.
- The M7 became a catalyst for the development of an industrial corridor through Western Sydney. As a vital link with other motorways the M7 delivered significant time savings for freight transport which could now avoid using the Cumberland Highway, a congested main road. Western Sydney communities with limited mass transport options now had numerous route options available to shorten travel time between homes and new places of work.

Business case development

The *Action for Transport 2010* plan recognised that delivering these projects would require investment through ‘productive partnership between all levels of government and the private sector’. It also speculated that the M7 was a project of national significance, and thus financial responsibility for its delivery should rest with the Commonwealth Government.

Development of the business case commenced in 1994 when the then Federal Minister for Transport announced plans to undertake an Environmental Impact Study. Funding for pre-construction activities was later announced in 1996.

It was not initially envisaged that the M7 would be a toll road. This possibility was raised by the Commonwealth Department of Transport and Regional Services in 1999. While the M7 was to form part of the National Highway system, and therefore be funded by the Commonwealth, funding was not available in the short- to medium-term. Consequently the RTA commenced exploration of tolling options and the impact a toll would have on traffic flows.

The project was released to the market in 2001 as a Build Own Operate Transfer (BOOT) PPP. It received \$360 million in funding from the Federal Government in acknowledgement of its status as an important connection in the National Highway network. The funding was provided on the basis that there was no incremental toll for freight vehicles.

Key project insights – Business case development

- Analysis demonstrated that the motorway could be commercially viable as a toll road. By procuring the toll road PPP the infrastructure delivery could be accelerated as opposed to under full Government funding.
- Delivered as a PPP, the M7 involved the investment of \$2.23 billion of private funds into public infrastructure. Of the 21 projects identified in the *Action for Transport 2010* plan, this received the largest investment of private funds.
- Although not fully funded by the Federal Government, funding support of \$360 million was provided to the project as a replacement for the Cumberland Highway in the National Highway network.

Procurement model and risk allocation

As part of the BOOT PPP, the private sector parties took responsibility for financing, planning, designing, constructing, commissioning, operating, maintaining and repairing the M7 over a 34 year concession period.

This procurement model has been applied, with some evolution, to nearly all of the projects in Sydney's toll road network.

Procurement process

The use of privately financed projects (also known as PPPs) has existed since the Sydney Harbour Tunnel project in the mid 1980s. While the model has evolved through a number of toll road procurements, the first extensive guidelines were published in 2001 – *Working With Government: Guidelines for Privately Financed Projects*. These guidelines set out best practice for the procurement process and allocation of project risks for both economic and social infrastructure.

In accordance with the *Working With Government* guidelines, procurement of the M7 followed a rigorous staged process. Registrations of interest were invited from private sector parties in July 2001. Responses were received from three consortia, and after evaluation, all three were issued formal requests for proposals in November 2001.

Fully developed proposals were received from all three consortia in March 2002 and a detailed evaluation process commenced. Following best practice, the comparative value of each response was evaluated against a public sector comparator, developed before the bids were received, and presenting a hypothetical, risk-adjusted estimate of the cost if it was financed by the public sector. The evaluation also included a non-price assessment which followed a predetermined set of weighted criteria.

The evaluation was governed by an experienced evaluation panel supported by legal and financial advisors, a review panel and a probity auditor.

This detailed process is considered to be best practice for PPP procurement. From the state's point of view, the process gives comfort that the winning bidder is providing a competitive price that represents value for money. From the private sector view, the process has sufficient clarity, certainty, probity and review to justify their full commitment to the tendering process.

The successful proponent was selected in October 2002, 11 months after the issue of the request for proposal. At the time, completing the procurement process in 11 months represented best practice.

The summary of contracts released by the RTA in August 2003 advised that 'the delivery of the project by the private sector, in accordance with the [agreed] rights, obligations and risk allocations...is expected to result in a significant net financial benefit to the RTA, with the financial costs of the project to the RTA being outweighed by a substantive transfer of risks to the private sector and by an upfront payment to the RTA that had to be (and was) made by the private sector participants on 14 February 2003'.



Features of the procurement model

Inherent in the model for economic infrastructure was a policy of ‘no cost to Government’, where the risks of construction cost and financial performance were transferred to the private sector.

The BOOT procurement model provided the following benefits to Government:

- Neither state nor federal funding existed at the time to deliver the project. Procurement under the BOOT model brought private investment which could deliver the project ahead of the target set in the *Action for Transport 2010* plan.
- Under a BOOT arrangement, most of the material risks could be transferred to the private sector in exchange for them having the right to collect tolls. The competitive tendering process drove innovation in design that may not have been achieved under a typical design and construction contract.
- Provision for the RTA to share in toll revenue that exceeded 105% of forecast revenue, allowing the RTA to benefit from any revenue upside in excess of the traffic forecasts.

The BOOT arrangement also included benefits the private sector could realise through the efficient delivery of the project. These included:

- Constructors were entitled to an early completion incentive payment. In total, \$69 million of incentive payments were made.³⁴
- Early completion resulted in less capitalised interest on the project debt than was forecast. The owners were then able to refinance the project with a more attractive financing package, improving their return on investment.

Key project insights – Procurement model and risk allocation

- The project was viable as a standalone commercial operation. The fundamentals underlying the growth of Western Sydney could sustain the project as a commercial venture, capable of being financed at a toll level which was affordable to motorists.
- Private investment can be used to bring forward infrastructure: the use of the BOOT PPP model allowed the motorway to be delivered when full government funding was not available.
- The BOOT model has inherent benefits to Government in the allocation of risk to the private sector. Under this model, Government could transfer the significant toll road risks of construction, tolling operations and traffic forecasts to the private sector.
- The precedents established in delivery of the M2, M4 and M5, along with the release of the *Working With Government* guidelines provided a framework for efficient risk allocation and competitive bidding to drive innovation and value.
- The BOOT PPP model provides incentives for private sector innovation.
- With the financial performance of the project dependent on patronage, several innovations in distance-based tolling and community engagement were delivered that may not have existed under other procurement methods where a similar incentive over the life of the project does not exist.

³⁴ Early completion performance bonuses were paid to Transurban (\$8.3 million) and the Abigroup Leighton Joint Venture (\$61 million) for delivery of the tolling and customer service system, and design and construction services, respectively. Source: Transurban Annual Report 2006.

Project governance

In the BOOT model, project governance is formalised in the Project Deed and associated project documents. Together these documents cover all contractual obligations on the private sector and Government. The documents also govern the requirements for ongoing service delivery, including service levels and the calculation of tolls.

The core contract for the M7 is the *Western Sydney Orbital Project Deed* which was entered into with the RTA on 13 February 2003.

The private sector participants formed two companies to enter into the Project Deed with the RTA – *Westlink Motorway Limited* and *WSO Co Pty Limited* ('the Project Company').

Separate subcontracts were entered into by the Project Company to allocate its obligations to separate special purpose companies. The obligations to operate, maintain and repair the motorway were allocated to WestLink (Services) Pty Ltd. The obligations for tolling and customer management were allocated to Transurban Infrastructure Developments (WSO) Pty Limited.

Key project insights – Project governance

- The governance of the project is established contractually by the Project Deed between the RTA and the Project Company. This clarifies the role and obligations of the private sector consortium and the RTA.
- The Project Deed sets out the governance and obligations over the whole life of the project, including the operating term. This structure is often absent from other procurement models that focus only on the construction phase.

Post-construction monitoring

Ownership and operation of the project until February 2037 is governed by specific service level and reporting obligations detailed in the Project Deed, including:

- All lanes are kept open at all times, regardless of whether tolling systems are operational (with certain exclusions such as repairs or emergency response).
- Responsibility for the ongoing maintenance and repair of the motorway, control centre, plant and equipment, and the project's local road connections.
- Compliance with the conditions of the Minister for Planning's approval of 28 February 2002. In particular, the project is required to prepare periodic independent Environmental Impact Audit Reports to assess the extent to which actual impacts reflect the predictions made as part of the planning approval. These have been prepared after 12 months and two years of operation, and a third report is scheduled after seven years of operation.

Key project insights – Post-construction monitoring

- The obligation to repair and maintain the motorway incentivises the construction to a degree of design and quality that minimises the ongoing costs. This incentive is less apparent under traditional design and construction or alliancing contracts where the obligation to repair often ends after a pre-defined defect rectification period.
- The Project Deed clearly defines the obligation of availability, safety and service that must be maintained over the life of the concession.
- The requirement to periodically review the environment impacts demonstrates a commitment to transparency and monitoring that is not required of other public roads.

Attention paid to wider risk management issues

One of the most successful aspects of the M7 is how it has developed goodwill and engagement with the local community, with the project demonstrating a genuine attempt to engage with the community in a meaningful way. The M7 was launched amid public controversy around the use of private investment in infrastructure, the progressive tolling of road corridors in Sydney, and the traffic channelling that was performed through the closure of public roads that were an alternative to toll roads. With such concerns in the community, the NSW Premier at the time commissioned a review of the provision of motorways in NSW.

Although the M7 was launched the same month the Premier's report was released, many of the recommendations were already apparent in the successful manner and model being adopted by M7's private consortium.

Addressing community risk during construction

Prior to construction commencing, five Community Liaison Groups were established to ensure that the members of the community closest to the construction were properly informed of the planned construction in their neighbourhood and to assist in mitigating any impacts. In total, there were well over 120 Community Liaison Group meetings conducted that contributed to a better project and the feedback from the residents involved was very positive.³⁵

Responding to traffic risk – Communicating the benefits of distance-based tolling

Fixed-price tolling encourages motorists to make assessment on whether the fixed toll they will pay is representative of the journey they wish to make. A motorist who wishes to make a short journey only may feel the full toll is disproportionate. In these situations the decongestion benefits of the motorway are not realised.

The M7 was Sydney's first distance-based electronic toll road. Market research identified a lack of understanding as to how the new system would work, and the benefits it would provide.

Unlike other motorways, the toll for the M7 was publicly announced by the RTA several months before the opening of the motorway. This strategy allowed an extensive community information campaign that could communicate the value of short journeys to users and the community, rather than focusing on the price.

A key initiative of the communications team was the creation of an interactive toll calculator on the M7 website. This allowed online visitors to enter their entry and exit points along the motorway's 17 interchanges and see the toll they would pay.³⁶ With approximately 50 different tolls being applied across a variety of potential trips,³⁷ the complexity had the potential to confuse motorists. The website calculator helped communicate the message of per kilometre tolling (initially at 25 cents per kilometre), capped at a maximum of 20 kilometres.

Local press were also encouraged to test the interactive calculator, allowing them to report factually on the toll for different journeys. This strategy proved very successful in communicating the message on distance based-tolling.

³⁵ Infrastructure Partnerships Australia. Infrastructure Partnerships Australia Case Studies Westlink M7, Sydney.

³⁶ RTA, Westlink M7 motorway: Summary of contracts, August 2003.

³⁷ Infrastructure Partnerships Australia. Infrastructure Partnerships Australia Case Studies Westlink M7, Sydney.

Addressing the community risk of cash-less tolling

The M7 was the first Sydney toll road without the option to pay cash. Whilst essential to the operation of distance-based tolling, this required motorists to obtain an electronic tolling transponder or face a higher toll.

As the tolling and customer management operator, Transurban undertook a comprehensive research and community consultation process to develop a business plan for the electronic tolling system that met the different needs of regular and casual road users.

Marketed under the Roam brand, the products and pricing were released to the market two months prior to the opening of the motorway. Demonstrating further engagement with its customers, Transurban sought and received the endorsement of the motoring advisory group NRMA for its Roam tolling products.

Included in an Infrastructure Partnerships Australia case study of the M7 was the following commentary from NRMA President Alan Evans:

'Westlink M7 have thought about Sydney motorists when structuring their tolling products and have shown good faith as suggested by NRMA Motoring and Services by offering a month long toll free period.... Let's hope that future motorway projects follow the example set by Westlink M7.'

Engagement with the community

In November 2006 the Blacktown City Council awarded Transurban and the Westlink Motorway Limited its Joint Corporate Citizens of the Year for 2007. The Mayoral Minute announced the award to 'two organisations, which individually and collectively have made an enormous contribution to [Blacktown City], the Council and the Citizens of Blacktown over the past several years and to its future economic development'. Of particular mention is the inaugural General Manager of Westlink, Flan Cleary, who quickly sought to become part of the Blacktown community, undertaking key sponsorships that enabled the Council to bring the Sydney Symphony Orchestra to the City, sponsorship of the Council's annual Art Exhibition, and becoming a key partner in the reintroduction of the Cities Marathon (with the inaugural Westlink M7 Cities Marathon held in 2006).

Key project insights – Wider risk management issues

- The establishment of community liaison groups during the construction phase assisted in addressing and managing unnecessary impacts on the local residents.
- Focused market research identified a need for more information in the community on the benefits of distance based tolling. Letterbox-drops, public information meetings, community information booths and the website were all used to communicate the route and explain the benefits. The success of the messaging was tested by the results of ongoing research.
- Bringing forward the release of the tolling structure, aided by an interactive toll calculator, allowed the community to appreciate the benefits of distance-based tolling in their own situations. This was found to be more useful than communicating time-savings, which will vary depending on the length of each motorist's journey. Local media helped to inform the public of the interactive toll calculator.
- The M7 management demonstrated a genuine willingness to engage with the community and contribute as a good corporate citizen.



4.4 Summary of key conclusions

The factors contributing to the success of the M7 fit in to four overarching themes:

1. The project demonstrated superior engagement with its community:

- Demonstrated genuine and meaningful engagement with the community during construction, implementation, and ongoing operations.
- The establishment of community liaison groups during the construction phase assisted in addressing and managing unnecessary impacts on the local residents.
- Focused market research identified the information gaps in the communications strategy around distance-based tolling. Ongoing market research proved the benefits had been communicated successfully.
- Bringing forward the release of the tolling structure, aided by an interactive toll calculator, allowed the community to appreciate the benefits of distance-based tolling in their own situations. This was found to be more useful than communicating time-savings, which will vary depending on the length of each motorist's journey.

2. The project was in the public's interest:³⁸

- The motorway was located in an area of Sydney that was growing rapidly through land use changes, and which was surrounded by NSW Government prioritised growth areas. The area had limited access to public transport or major arterial roads.
- The Western Sydney section of the Sydney orbital network was in the development pipeline for four decades, with preliminary route plans existing from the 1960s. The level of growth (especially from new industrial parks) was now sufficiently underway to sustain the development of the 'missing link' of the orbital network.
- There was no route-channelling or closure of alternative roads to generate traffic on the motorway. This demonstrates the motorway was a viable project on a standalone basis and public confidence was not harmed by maintaining existing roads.
- The implementation of distance-based tolling provided value to local motorists who could use the motorway for short journeys and pay a toll that was commensurate to their journey.

³⁸ The revised Working With Government Guidelines issued in 2006 includes the requirement to manage the public interest. This is now referred to as the Public Interest Test (PIT) and it must be issued with the expression of interest, and updated and submitted to NSW Cabinet throughout the tender process.

3. The procurement process following a structured approach to demonstrate governance and deliver value for money:

- The procurement process followed the *Working With Government* guidelines which provided the framework for a complete evaluation process, ensured rigorous and defensible evaluation of proposals, and ensured the value for money was tested against a public sector comparator.
- Inherent in the PPP BOOT model was the transfer of the majority of the project risks to the private sector.
- The Project Deed formalised the obligations of the Government and Westlink Motorways and set out the governance of the project over 34 years of construction and operations.

4. Utilisation of private financing:

- The project mobilised \$2.2 billion of private finance which allowed the delivery of the project to be accelerated when no public finance was available.
- The private finance was supplemented by a contribution of \$360 million by the Commonwealth Government, in recognition of the vital role of the motorway in the National Highway network and the delivery of freight.

Following review of the M7 project, the following key conclusions regarding best practice planning and procurement can be identified:

1. **Long term planning** – Conceptual and detailed planning for the missing link of the Sydney Orbital network can be traced back to the 1960s. Although this may be construed as evidence of unnecessary delay, the long gestation period did ensure that the community and industry were fully aware of the plans for the link and its need was well established. In addition, the project's inclusion in the NSW Government's *Action for Transport 2010* plan gave priority and momentum to the project which helped to deliver the commercial deal.
2. **Commercially viable** – Analysis demonstrated that the motorway could be commercially viable as a toll road. By procuring as a toll road PPP the infrastructure delivery could be accelerated, with appropriate risk transfer, as opposed to a potentially long delay whilst waiting for budget headroom for Government funding.
3. **Risk allocation to the private sector** – The BOOT model has inherent benefits to Government in the allocation of risk to the private sector. Under this model, Government could transfer the significant toll road risks of construction, tolling operations and traffic forecasts to the private sector. Whilst there have been issues with the transfer of patronage risk with other toll roads, this project demonstrates that the transfer of patronage risk can be successfully achieved where the need for the road is clear, as demonstrated not by gaps on maps or congestion, but by robust demand forecasting.
4. **The value of government procurement guidelines** – The precedents established in delivery of the M2, M4 and M5, along with the release of the *Working With Government* guidelines provided a clear framework for efficient risk allocation and competitive bidding to drive innovation and value, and gave the private sector a good degree of transparency and certainty about the overall process.

5

Northern Expressway, South Australia



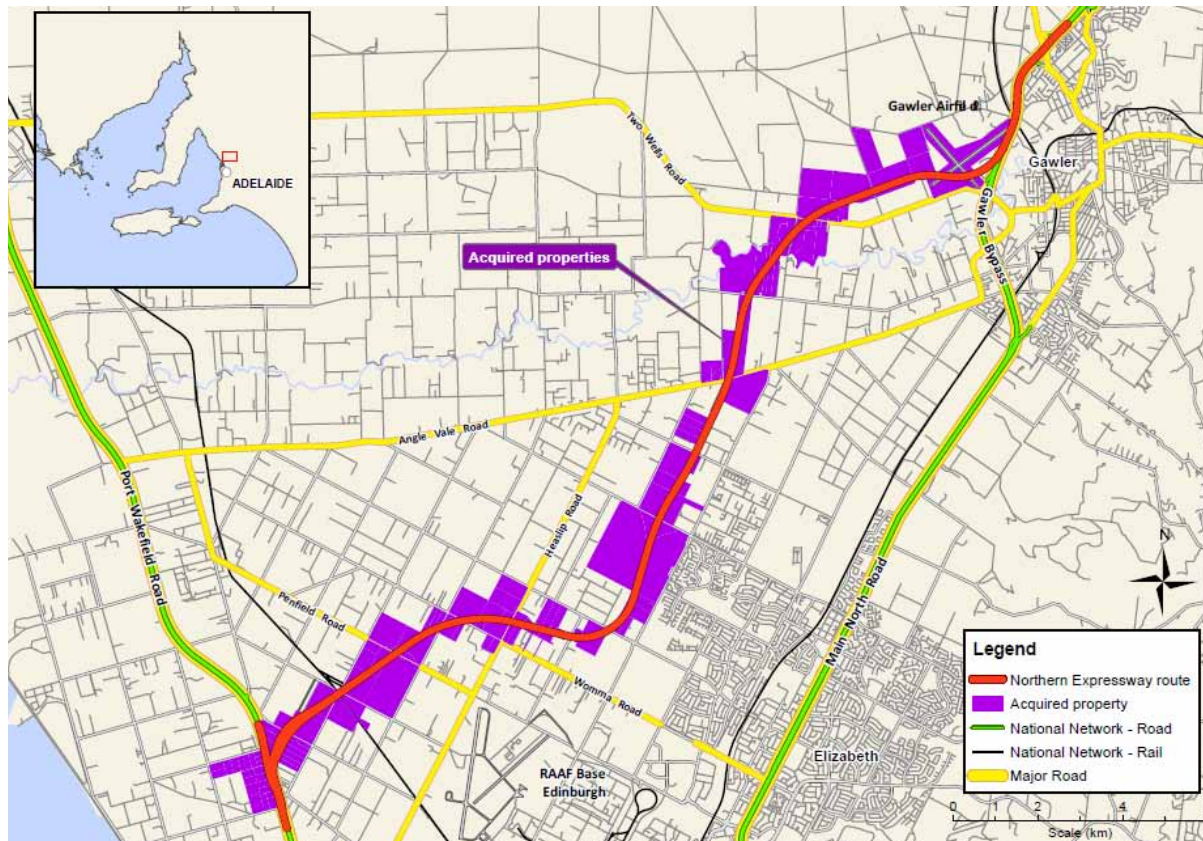
5.1 Project overview

The northern area of metropolitan Adelaide is a growth area with future development expected to come from the key existing industries such as manufacturing, defence, information technology, horticulture and viticulture. The Edinburgh Parks development, together with established major industries such as GM Holden, form part of a major arc of industry extending from Salisbury/Elizabeth to Outer Harbour (through Cavan, Wingfield and Port Adelaide).

The Northern Expressway Project was the largest road construction project undertaken in South Australia since the 1960s, involving the construction of a 23 kilometres, four lane road with an associated cycle and pedestrian path linking the Gawler Bypass with Port Wakefield Road. It is a joint initiative between the South Australian and Australian Governments and is led by the South Australian Department for Transport, Energy and Infrastructure (DTEI).

The Northern Expressway was delivered under a Design and Construct contract by a consortium including a design joint venture (Maunsell (AECOM), SMEC and Dare Sutton Clark) and a construction joint venture (Fulton Hogan and York Civil). It cost \$564 million, of which the Australian Government contributed \$451 million under the Nation Building Program and the South Australian Government contributed \$113 million. The Northern Expressway opened in September 2010, within budget and three months ahead of schedule.

Figure 4: The Northern Expressway including acquisition of properties



5.2 Objectives, costs and benefits

Objectives

The objectives for the Northern Expressway included:

- Increasing transport efficiency, particularly for freight transport between the Sturt Highway and the Port of Adelaide
- Improving road safety with a higher standard facility for National Network traffic and reducing heavy vehicle traffic that had been using alternative routes through residential areas to avoid congestion on Main North Road
- Creating a more effective connection with port and rail facilities by linking directly to the Port of Adelaide, facilitating a future road/rail intermodal terminal at Waterloo Corner, and providing improved access to rail terminals
- Reducing the environmental and social impacts of existing heavy vehicle traffic movements by transferring traffic to a new route of an appropriate standard
- Enhancing economic outcomes for the State and reducing the cost of moving freight from the Riverland and Barossa regions to the Port of Adelaide.

5.3 Outcomes

The Northern Expressway was opened in September 2010, within budget and three months ahead of schedule. Given that the completion date for the project had already been brought forward by a year relative to the timeframe originally envisaged this is a significant achievement.

The project's contractors have also exceeded the minimum target of 10% employment for young and Indigenous people, with an average of 14% of the total hours worked over the life of the project coming from these target groups.

Local employment and local industry participation have also been a feature of the project:

- More than 3,300 people worked on site (accounting for more than 1.5 million construction hours)
- Around 95% of employees lived in South Australia and around 50% of employees came from either Adelaide's northern suburbs or regional areas further north
- Over 80% of suppliers engaged by DTEI and the project contractors listed their principal place of business as South Australia
- Over 84% of plant suppliers listed South Australia as their principal place of business.³⁹

Mutually advantageous outcomes for the project and the environment have also been achieved, with additional wetlands that will help with flood mitigation created using the pits from which fill required for the project was sourced. A seed orchard established to produce native seeds and tubestock for landscaping purposes has reduced the demand on wild seed stocks.

Strategic infrastructure planning in South Australia

The South Australian Government guides the provision of the State's infrastructure through *South Australia's Strategic Plan* ('the Strategic Plan'), the *South Australian Planning Strategy* ⁴⁰ and the *Strategic Infrastructure Plan for South Australia* ('the Infrastructure Plan').⁴¹ These plans establish clear, long-term strategic goals and directions. Key priorities for transport infrastructure include improving land transport links to the Port of Adelaide and improving the north-south transport corridor.

Road infrastructure planning in South Australia focuses on three indicators measuring the effectiveness of road system investment and management: road pavement surface condition; all day congestion (urban); and road fatalities and serious injuries. These metrics inform not only the prioritisation of maintenance expenditure but also new investment. The key drivers for investment in roads are safety and accommodating anticipated growth in freight movements as a result of economic growth.

The Infrastructure Plan sets out the following strategic priorities for road transport:

- Improving the state's competitiveness through efficient freight transport networks and improved international links
- Minimising the impact of freight vehicle movement on the community and environment by appropriately locating and protecting freight routes
- Concentrating resources on maintaining and improving existing assets rather than extending the network.

³⁹ Source: DTEI (2010) Northern Expressway presentation June 2010

⁴⁰ Government of South Australia (2010) The 30-Year Plan for Greater Adelaide.

⁴¹ Government of South Australia (2005) Strategic Infrastructure Plan for South Australia: 2005/06 – 2014/15.

The South Australian Government has also assisted the six regional Local Government Associations to prepare regional transport plans for local road networks by providing a framework for individual councils to integrate their local road networks with State Government transport planning strategies for the arterial road system.

Environmental approvals, community engagement and business case development

Planning for the Northern Expressway commenced in 2003, with Australian and State government approval for the proposed route obtained in June 2007 following the completion of a preliminary concept design and environmental, social and economic investigations.

Initial planning activity was focused on the investigation of possible routes, which included consideration of:

- Impacts on the community, including noise effects, visual impacts and property effects
- Impacts on business, through the value of horticultural production and capital assets lost and changes in the potential for the economic development of businesses
- Accommodating a buffer for RAAF Edinburgh and a proposed future extension of the runway
- Facilitating the future development of an intermodal facility.

The investigation of possible routes, incorporated a number of route selection workshops with key stakeholders, industry representatives and government agencies.

At the same time as route planning was taking place, preliminary environmental, social and economic investigations were undertaken.

Environmental approvals

In South Australia, land acquired under the relevant provisions of the Highways Act 1926 is automatically excluded from the environmental assessment processes contained in the Development Act 1993. However, the DTEI voluntarily adopted a process that considered and assessed issues as they would have been covered had the Development Act been applicable.

To inform submissions from the public and government agencies, environmental, social and economic impact assessments undertaken by technical specialists were published in an environmental report released in March 2007.

The region's biodiversity and local community interests were protected by:

- Plantings on the overpass embankments at the intersections situated near populated areas, softening and screening the expressway from adjacent residential properties
- Planting a range of trees, including river red gums, river boxes and wattles, as well as shrubs, grasses, reeds and sedges to improve biodiversity in important riparian zones
- The expressway crossing the Gawler River via two bridge structures, one of which allows for 'one-in-100 years' flood mitigation
- Exploiting large areas of land associated with the interchange ramps for the management of stormwater and the reintroduction of native vegetation.

Community engagement

A Community Involvement Plan, developed in September 2006, outlined guiding principles and provided a broad framework for community involvement for the Northern Expressway and Port Wakefield Road upgrade. Key stakeholders were engaged through specific forums to assist with the planning study. These groups included:

- A Government Steering Committee comprising Federal and State government representatives for the purposes of providing high-level oversight of the project and keeping the Australian Government informed of progress
- A Government Reference Group to provide South Australian government agencies with the opportunity to make a whole-of-government contribution to the project
- A Stakeholder Reference Group involving local government, community, business and industry representatives.

Wider community engagement processes began in mid-November 2006, with a range of information, engagement and feedback tools used to reach the community. These included:

- Printed materials, such as a brochure outlining the route, explaining the project objectives and providing visual impressions of what the expressway may look like and fact sheets. The fact sheets were also translated into Vietnamese and Khmer recognising the importance of ensuring everyone was fully informed including the area's significant immigrant population
- Electronic and traditional media, including animations and voiceover descriptions
- Information displays in local shopping precincts staffed by project representatives during busy shopping hours
- Presentations and tours for community groups
- A freecall number for community members to provide feedback.

Members of the community were also invited to send a letter directly to the Project Director. More than 6,000 people used these forums to provide feedback. Specific queries and comments were documented and mapped on a community map server. The environmental approvals process and community and stakeholder engagement resulted in a number of important design changes being made to the project during the planning phase, including:

- Adjustments to route alignment to mitigate some property impacts
- Additional entry points for emergency services
- Partial interchanges being converted to full interchanges and additional interchanges being provided
- The inclusion of a shared use pedestrian and cycle path
- Greater community involvement in landscaping projects and local school participation in construction and engineering programs.⁴²

Of these additional scope requirements, only the conversion of partial interchanges to full interchanges received additional funding (of \$14 million). All other items had to be accommodated within the original budget requiring the project team to explore innovative processes/solutions to drive savings opportunities.

⁴² Source: DTEI (2010) Northern expressway presentation June 2010.

Around 160 properties were wholly or partially acquired for the expressway and associated upgrade of Port Wakefield Road. Given the sensitive nature of property acquisitions and a project schedule that did not provide sufficient slack to accommodate a delay in taking possession of the required land, the establishment of an effective process to engage and negotiate terms with landowners was an important part of the overall project. A key to success was having a team of experienced valuers and community engagement staff who were focused and dedicated to the task. The DTEI engaged with property owners by:

- Providing landowners with an information pack and contact details for further visits and follow ups
- Contacting landowners to arrange appointment times for home visits
- Ensuring that visits to landowners involved experienced communications and valuation team members.⁴³

Business case development

An economic analysis of the proposed project using the prescribed Australian Transport Council (ATC) and Austroads Project Evaluation Framework and Method was completed in 2007. The methodology used was also consistent with the South Australian Department of Treasury and Finance's *Guidelines for the Evaluation of Public Sector Initiatives* (December 1997) and the Australian Transport Council's method for transport infrastructure evaluation.

The economic analysis considered road user benefits including travel time savings, accident costs, vehicle operating cost reductions and off-road benefits, including the impact of improving links between industrial zones and growth areas. The analysis found that the project had a net present value of approximately \$461 million and a Benefit Cost Ratio of 2.4.

Financial management presented a key challenge for the project. Based on trends at the time, allowances for cost escalation over the life of the project may not have covered growth in key input prices, including those for steel, oil and construction industry resources.

To meet the financial challenge the DTEI's primary strategy was to bring forward project completion by a year, limiting the scope for cost escalation. Apart from accelerating the project timetable a number of strategies for realising cost savings were identified by the project team. These strategies included:

- Procuring 3 million cubic metres of fill required for construction from the project site to reduce material costs by \$30 million and converting the resulting borrow pits into wetlands that will play an important role in flood mitigation within the Gawler flood plain
- Optimising interchange design to reduce land acquisition and construction costs
- Targeting the expression of interest and tender processes to a time when there was a lull in construction activity in Victoria and New South Wales as a way of increasing competitive tension in the bid process
- Obtaining all relevant mining and environmental approvals to enable a DTEI quarry to be made available to supply aggregate for the 450,000 tonnes of asphalt required.

43 DTEI (2007) Northern Expressway Environmental Report, Vol. 1, p.3-4

Key projects insights – Environmental approvals, community engagement and business case development

- Although the land acquired for this project was excluded from the environmental assessment process, the DTEI voluntarily adopted and considered an equivalent process. As part of this process, synergies in the use of the corridor were considered, including exploiting land associated with interchange ramps for the management of stormwater and the reintroduction of native vegetation.
- Community engagement was extensive, including a Stakeholder Reference Group, electronic media (including animations and voice over descriptions, information displays in local shopping centres and the opportunity to send a letter directly to the Project Director. In response to the 6,000 letters received, a number of important design changes were made.
- The process to engage and negotiate terms with landowners was important to ensure that delays were avoided. Of particular importance was the fact that all visits to landowners involved experienced communications and valuation team members.
- The business case involved problem identification and goal definition based on planning documents such as the State's strategic plan and State Infrastructure Plan. This is consistent with Infrastructure Australia's economic appraisal guidelines.
- The possibility of cost overruns was addressed by identifying a number of strategies for realising cost savings, including procuring materials from the project site and targeting the expression of interest and tender processes to a time when there was a lull in construction activity in Victoria and New South Wales. In addition, completion of the project was accelerated by a year to limit the impact of cost escalation of key inputs such as steel and oil.

Delivery mechanism and risk assignment

The project did not involve significant technical uncertainty and a key challenge faced by the DTEI was its limited capacity to absorb risk with respect to project costs. However, the importance of controlling costs in this project, as identified above, meant that a close relationship between the DTEI and contractors was critical, as was the early involvement of the contractors in the project planning process. As such, the Northern Expressway was procured under a single D&C contract with a high level focus on collaboration.

Relationship contracting, a process to establish and manage relationships that aims to remove barriers, encourage maximum contributions, and allow all parties to achieve success, was considered to offer the greatest scope for innovation and supply chain efficiency in the project's delivery.⁴⁴ It was also important for providing certainty over price and outcomes through the assignment of key risks such as price escalation, latent conditions and the integration of design with construction.

Expressions of Interest for the design and construction of the Northern Expressway were sought in September 2007, with shortlisted registrants invited to submit tenders for the Design and Construct Contract by the end of March 2008.

Registrants for the expression of interest process were asked to provide information in relation to both price and non-price criteria, with the latter focused on collaboration between the D&C contractors and at the project level more generally, risk management and mitigation strategies, the approach to environmental issues and community engagement.

Following the development of an initial shortlist, registrants attended a positive guidance workshop run by DTEI, providing them with an opportunity to expand upon innovative concepts and ideas and allowing the Department to clarify and validate their written submissions. Requests for tender were provided to a final shortlist of applicants. Three consortia were invited to bid.

⁴⁴ The definition of relationship contracting used here is taken from Australian Constructors Association (1999) Relationship Contracting: optimising project outcomes.



Reflecting the period of the contract and nature of the site, the contract did not provide for extensions of time or additional payments for wet weather, industrial conditions or latent condition (which could only be effectively transferred if the DTEI project team had undertaken a comprehensive geotechnical investigation).

To encourage the full participation of designers in this process the DTEI undertook to compensate participants for intellectual property developed during the tender preparation phase.

The expression of interest and tender process was also used by the project team to clarify important non-price outcomes including:

- A requirement for the contractors to proactively develop a positive relationship with the community
- Achieving value for money on the basis of service and whole-of-life costs
- Delivering training, development and employment opportunities for local youth and Indigenous people, including apprentices and on-the-job training
- The contractor utilising DTEI graduate engineers on a full-time work experience basis for the duration of the construction works as a way of facilitating knowledge transfer.

Key project insights – Delivery mechanism and risk assignment

- The DTEI ensured that the procurement approach used best supported the completion of construction within the required timeframe. Early constructor involvement and a focus on addressing both price and non-price criteria in the tendering process were both important elements. While procurement has been undertaken using a Design and Construct contract, there has also been a focus on achieving the 'best for project' outlook and the integration of customer and contractor teams that is a characteristic of alliance contracting.
- Having the right cultural fit is important. Identifying the contractors with whom the DTEI could establish an effective collaborative relationship was an important part of the proponent selection phase. Respondents were asked to address specific non-price criteria addressing collaboration. A series of Positive Feedback Workshops gave the Department the opportunity to observe the contractors' teams at work in an environment of competitive tension.

Risk management

An initial risk assessment identified a number of key risks associated with the project. These are summarised below, along with the mitigation strategies that were adopted.⁴⁵

| | |
|---|---|
| Delays in State and Commonwealth approvals | <p>Delays in approvals can cause an extension of the project timeline with a resultant impact on overall project costs.</p> <p>A mitigation strategy of setting realistic timeframes in the project plan, effective communication with key decision makers and having approval contingencies in place. The Government Steering Committee, comprising both State and Commonwealth officers ensured an effective approvals process.</p> <p>A proactive DTEI Executive ensured responsive and effective approvals and decision making.</p> |
| Shortage of experienced engineering consultants and skilled construction resources | A procurement plan was developed and the project delivery timeline accelerated to maximise opportunities. A variety of contract sizes were used to attract both local and national contractors. |
| Shortage of material resources for construction | This risk involves insufficient fill and pavement materials being available. Ultimately, a source of fill was found on site. |
| Price escalation | Acceleration of construction program and transfer of price escalation for labour and materials to the design and construction contractors (excluding bitumen and diesel). |
| Land acquisition process delays construction activities | Acquisition process commenced as soon as possible with construction activity contingencies in place. The design and construct contract was let with only 60% of the required land acquired. Collaboration ensured that if any delay in property access arose then the team would work around the issue. |
| Communities demand more stringent noise criteria | Development of an Environment Protection Authority-endorsed Noise Management Plan and an allowance in the cost estimates for additional noise treatments. |
| Discovery of Aboriginal heritage site | <p>Engage Indigenous heritage stakeholders and develop a Cultural Heritage Management Plan.</p> <p>The Indigenous community was engaged up front in the route selection process and undertook a detailed site investigation of the preferred route. Onsite, Indigenous monitors were engaged from day one to ensure transparency of process.</p> |

Key project insights – Risk management

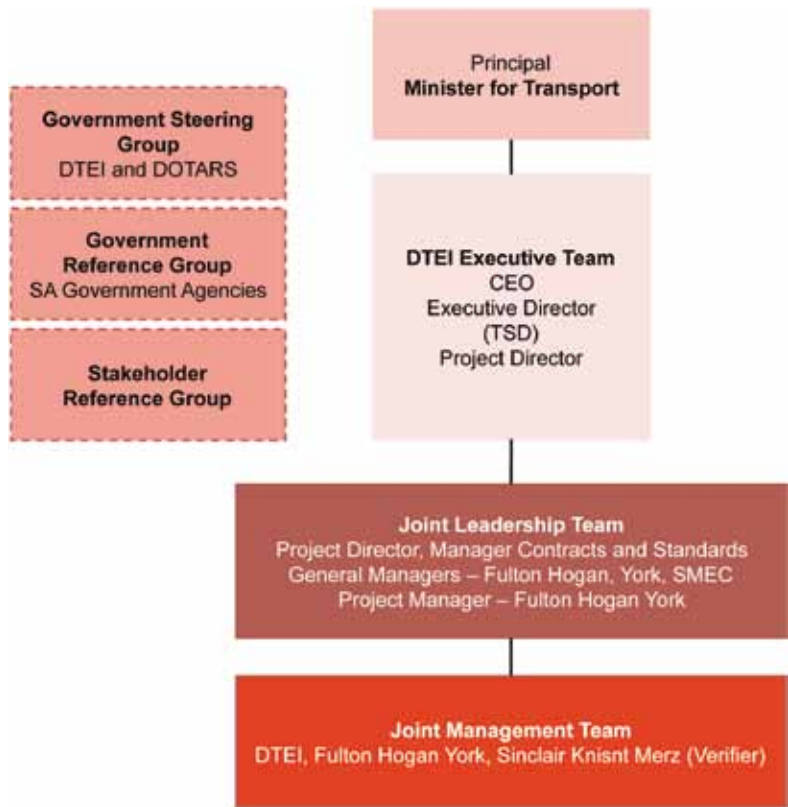
- Attention to the risks associated with the Northern Expressway project, and the most cost effective strategies for dealing with individual risks was an important part of the scoping, planning and procurement phases of the project. The strong understanding of risks contributed to the decision to use a relationship based contracting approach and the assignment of specific risks based on whether the Department or the contractors could absorb a risk at lowest cost.

⁴⁵ DTEI (2007) Northern Expressway Project: Gawler to Port Wakefield Road, Port Wakefield Road Upgrade, Submission to the Parliamentary Public Works Committee, August 2007

Project governance and management

The overarching governance structure for the project is summarised in Figure 5.

Figure 5: Project governance



Ultimately, responsibility for the project rested with the South Australian Minister for Transport. However, given the Australian Government’s financial contribution, the Government Steering Group also had an important role in the project’s governance structure. The Government and Stakeholder reference groups provided forums for other key stakeholders to represent their interests and concerns.

An Executive Team from the Department for Transport, Energy and Infrastructure, comprising the Chief Executive Officer, the Executive Director of the Transport Services Division and the Project Director were responsible for delivering the project to budget and within timeframes.

The DTEI’s interests in the project were represented by a Superintendent (supported by SKM acting as a verifier) and DTEI staff. The role of SKM is important in the overall governance of the project as it provides an independent source of advice on the contractors’ performance.

A Joint Leadership Team comprising the DTEI’s Project Director and Manager, Contracts and Standards, the General Managers of the construction contractors, the General Managers of the design contractors and Fulton Hogan York’s Project Manager was the primary governance body at the project management and contract management level. Its main role was to establish and maintain a culture of one team with a ‘best for project’ mindset within the joint management team.

The Joint Management Team responsible for project management included members of the DTEI, the design and construction joint venture and the independent verifier. At an early stage a decision was made that specific support resources (eg document controller and programmers to support the project management software solution) should be available to the integrated project management team for the purposes of facilitating the effective flow of information and resource across the project.

Including representatives of the design joint venture in both the Joint Leadership Team and Joint Management Team was a deliberate strategy to help ensure that decisions made during both the design and construction phases were consistent with minimising whole-of-life costs for the project.

Project performance is assessed by way of monthly reporting of Key Performance Indicators (KPIs) related to safety, quality and environment, community and stakeholder engagement, schedule, budget and culture.

Culture was measured using a wellbeing survey of the project workforce capturing skills development of the workforce, staff movements not having an adverse impact on the project and the extent to which issues were appropriately resolved with escalation to the Joint Leadership Team.

Community and stakeholder engagement was assessed through KPIs measuring compliance with the communications plan, the commitment of the communications team, the operation of the project's issue management register and community and management team involvement.

Key project insights – Project governance and management

- A team culture supporting collaboration and co-ownership of issues had to be created by the project leadership team. The Project Director's focus on the value of teams and the importance of team development played a key role in the development of this culture as did ensuring that the integrated project management team was the right size (despite the pressure to reduce overheads inherent in a tight budget). Establishing an on-site office facility to accommodate the integrated project team was also important for ensuring integration.

5.4 Summary of key conclusions

Following review of the Northern Expressway project, which opened to traffic on 13 September 2010,⁴⁶ the following key conclusions regarding best practice planning and procurement can be identified:

1. **Big projects impact local communities** – The project leadership team seems to have understood that they were providing an urban design solution and acknowledged that the project is more than 'just building a road'. This understanding informed the project's community consultation and ensured that this function was adequately resourced from an early stage.
2. **Strong governance must underpin partnership arrangements** – The quality of integration and working relationships in projects involving some form of partnering are a critical factor in successful project delivery. To help achieve the requisite level of integration and working together, DTEI's project delivery team established appropriate governance and project management structures. For example, SKM's role as an independent verifier for the DTEI staff and the Joint Leadership Team represent strong steps to manage the risks inherent in a partnership approach.
3. **Contractor due diligence** – An important focus for the DTEI during the EoI and tender stages of the project was to identify the contractors whose teams were most likely to be able to achieve the level of integration that was required. Specific non-price criteria to which potential contractors had to respond in their EoI and tender were used, as were a series of positive feedback workshops that gave the DTEI project team the opportunity to observe teams in an environment of competitive tension.

⁴⁶ Note that landscaping works are still to be completed.

6

Southbank Education and Training Precinct, Qld



6.1 Project overview

The Southbank Institute of Technology (the Institute) is an education institution with 28,660 students enrolled in 123 programs in 2009-10, including 4,172 international students from 95 countries.

Southbank Education and Training Precinct was Queensland's first PPP and was delivered under the Queensland Government's PPP Policy and Value for Money Framework for \$542 million (net present value, June 2005 dollars). The project required the construction of 11 new buildings, and refurbishment of four buildings and resulted in 2,990 square metres of student accommodation and serviced apartments. Under the PPP contract, Axiom Education Queensland (ABN AMRO, John Holland and Spotless Facilities Management) designed, constructed and financed the project and will maintain the precinct facilities over a 34 year period. The contract was fixed price, with payment contingent on the buildings being operational.

Design works commenced July 2005 and construction was completed in October 2008 (seven weeks ahead of schedule) at a construction cost of \$233 million.

The Southbank Education and Training Precinct Project was judged as the 'Best Global Project' at the prestigious Public Private Finance Awards in London on 22 May 2007. These awards are a celebration of industry best practice and attract entries from around the world.

6.2 Objectives, costs and benefits

Objectives

The project supports the objectives of the Queensland Government's *Towards Q2* (three quarters of people holding trade, training or tertiary qualifications – currently around 55%)⁴⁷ and responds to the *Education and Training Reforms for the Future* in supporting diverse and flexible learning opportunities for young Queenslanders and providing a vehicle for pathways articulation.

Southbank Education and Training Precinct outcomes

With world class facilities delivered under the PPP, the Institute now has the built environment to provide a broad range of programs with particular emphasis on paraprofessional courses. These new programs cover a wide range of vocations including civil engineering, biotechnology, arts, fine arts, media, building design, project management and entrepreneurship.

The table below shows a significant improvement over time in competencies and qualifications completed. While student numbers appear to have decreased overall, this is due to an increased focus on encouraging students to complete Certificate IV or higher qualifications, as opposed to short courses, resulting in a higher qualified student cohort.

Table 4: Selected Academic Statistics from Southbank Institute of Technology

| | 2006-07 | 2007-08 | 2008-09 | 2009-10 |
|--|---------|---------|---------|---------|
| Total students | 28,290 | 28,112 | 29,654 | 28,660 |
| Total qualifications completed | 7,326 | 7,186 | 8,132 | 8,662 |
| Total competencies successfully completed | 143,462 | 148,280 | 153,315 | 170,059 |
| Higher level training (Cert IV and above) successfully completed | 60,426 | 63,573 | 71,935 | 82,886 |

From the outset the Southbank Education and Training Precinct Project aimed to provide the highest level of ecologically sustainable design. It was awarded the 2009 Southbank Business Sustainability Award for environmental design, water conservation, waste management and energy management.

Construction was completed seven weeks ahead of schedule. More than 75% of buildings were delivered early (some up to six months ahead of schedule).



⁴⁷ Queensland Government, *Toward Q2 – Tomorrow's Queensland*.

6.3 Governance, delivery and procurement

Policy and planning

Service identification (Southbank Institute Redevelopment Rationale)

The Southbank Education and Training Precinct Project addressed evolving education and training needs of students and other clients, the expected growth in demand for key course offerings and the strategic direction of the (then) Department of Employment and Training and the Institute, which had highlighted inadequacies, inflexibilities, and operational inefficiencies with the original facilities.

The original Southbank site had evolved over time, with buildings constructed on an 'as needed' basis. As a result, the campus had no uniform identity, and was a mix of aging 'purpose built' facilities, converted warehouses and temporary infrastructure solutions.

Preliminary assessment development

The Southbank Education and Training Precinct Project was the first project delivered in accordance with the Queensland Government PPP Policy and Value for Money Framework, with the Preliminary Assessment endorsed by the Queensland Government in August 2002 for progression as a priority project for PPP Business Case investigation.

Key project insights – Policy and planning

- The Southbank Education and Training Precinct Project was underpinned by a strong service need to meet the growing demand for education and training in modern teaching facilities. The rationale for the project and its preferred procurement method were re-examined and tested during the preliminary assessment phase. By undertaking a preliminary assessment the Queensland Government was able to satisfy itself that the service need was robust, the value for money benefits were tangible and the procurement method was suitable.

Business case development

The Steering Committee, in line with PPP policy, required an assessment of the attractiveness of this project as a PPP. To gain an understanding of the viewpoint of the private sector, a market sounding exercise sought input from potential participants. The market sounding exercise showed that the market was keen to participate in the project under a PPP model. It also indicated that the greater the level of private sector participation in providing the non-core services, with the opportunity to conduct appropriate commercial activities, the greater the value for money outcome for government.

The Public Sector Comparator and the Partnership Model was developed for all three options and for generating information critical to the financial assessment and value for money assessment. The Public Sector Comparator is representative of the most cost effective delivery method that would traditionally (publicly financed) be used to satisfy the output specification. The Partnership Model is the alternative form of project delivery (privately financed) and was represented by a Design, Build, Finance and Operate procurement model (PPP availability model). The Partnership Model is primarily used to provide an initial hypothetical analysis of whether a value for money outcome is likely to be delivered and to give an indication of the likely affordability of the project. A combination of the Partnership Model (quantitative analysis) and qualitative analysis is used to determine the potential value for money of the PPP model. The qualitative measures considered in the Southbank Education and Training Precinct Project were: ability to deliver the project on-time; long-term delivery of reliable non-core public services; risk transfer; innovation; asset utilisation; and economies of scale.

In December 2002, the Queensland Government considered the business case and endorsed that the PPP procurement proceed with the project defined as the full redevelopment of the Southbank Institute and partial redevelopment of Brisbane State High School.

Key project insights – Business case development

- The Southbank Education and Training Precinct Project underwent a rigorous business case analysis before approval by the Queensland Government. The business case considered a range of project options and was supported by a robust quantitative financial assessment.
- Importantly, the Queensland Government undertook a comprehensive market sounding process as part of developing the business case. Given the critical role the private sector plays in PPP project delivery, understanding the private sector's key issues and concerns was essential in assessing the attractiveness and viability of the project.

Project governance and management

The (then) Department of Employment and Training retained lead agency status within the Queensland Government for Southbank Education and Training Precinct procurement, with the Director-General filling the role of accountable officer for the project.

The procurement process was facilitated by documentation of the evaluation principles and evaluation structure. The documentation included nominations and roles for a Steering Committee, Project Director, Evaluation Committee and three Evaluation Subcommittees. The Steering Committee was comprised of senior officers from Queensland Treasury, the (then) Department of Employment and Training, the (then) Department of Education and the Arts, the Department of Public Works, the Department of Premier and Cabinet, the (then) Department of State Development and Innovation, and the Institute.

The Project Evaluation Committee was assisted by Freehills (legal advice), PricewaterhouseCoopers (financial advice) and Department of Public Works (technical advice) and was under the oversight of the Project Steering Committee.

All processes were overseen by the project's Probity Auditor (Deloitte Touche Tohmatsu) and conducted in accordance with the State's evaluation methodology prepared for the Southbank Education and Training Precinct Project. The binding bid stage was governed by the following policy and procedure documents:

- Probity Guidelines Binding Bid Stage (September 2003)
- Probity Guidelines Binding Bid Stage Contractor Management (September 2003)
- Probity Plan Request for Final Offer (December 2004)

Strict probity controls operated throughout the Binding Bid phase. There were a number of controlled presentations during this phase.

Three mandatory presentations were required to be made by the proponents: conceptual framework through master planning; schematic design and decant plans; and commercial and legal framework. After submission of bids, the proponents were required to give a presentation of their submission. Disclosure of the Public Sector Comparator or any indication of cost parameters did not occur and, as a result, both bidders submitted initial bids that well exceeded the Public Sector Comparator. This led to a further 'revise and confirm' process in which information of the 'gap' between their bids and the Public Sector Comparator was provided. Revised bids from both bidders did not adequately address the 'gap' between their bids and the Public Sector Comparator.

Proponents advised that the information provided by the State was limited, did not contain affordability constraints and led to the submission of bids which did not meet the evaluation criteria. It was apparent that for projects of this size, nature and complexity, more sophisticated interaction and engagement was required. As a result, the Request For Final Offer (RFFO) stage of procurement adopted a more interactive tender process and the benefits were illuminated by the Final Offer lodged by Axiom.

The Probity Auditor issued a RFFO Stage Probity Report covering the period 1 December 2004 to 30 March 2005. The December 2004 RFFO Plan outlined certain procedural controls that the State's nominated representatives were required to adhere to in meeting with Axiom representatives. These controls related to issues such as maintaining confidentiality of sensitive information and avoiding conflicts of interest. The RFFO process had been carried out in accordance with the Probity Plan and nothing came to the attention of the Probity Auditor that led them to believe that the RFFO process had not been conducted in a fair and equitable manner with regard to probity.

Project governance during construction and operations

The Project Deed established a governance framework including a Project Control Group and the appointment of State and Project Company representatives. The Project Control Group met monthly and discussed issues in relation to: transition and works plans; design, construction and commissioning issues; communication matters directly impacting the delivery of core services; community and media relations; safety matters; and other emerging issues. The State and Project Company representatives were the authorised officers to issue directions and bind their entities under the contract. These representatives were able to appoint delegates to assist in exercising their powers.

The Government provided additional financial resources to the lead agency, the Department of Employment and Training, to ensure a well equipped Project Team was established to manage the design and construction phase of the Project. Technical advisers from the Department of Public Works were appointed along with legal and financial advisers from the private sector. The Project Team was led by a senior officer of the Institute who had the authority to respond to project issues swiftly and decisively.

During the construction phase a good working relationship was established between the State and the consortium partners and this led to many issues being resolved quickly and within contractual boundaries. A partnership charter with eleven joint key objectives agreed by all parties was developed, outlining the guiding principles to achieve understanding and alignment of the project partners' objectives. Regular partnering workshops throughout the construction phase ensured timely resolution of issues through discussion and negotiation.

Key project insights – Project governance and management

- The Southbank Education and Training Precinct Project was governed and managed in a manner that promoted accountability and responsibility throughout the decision making structure. Importantly, the decision making structure included representation from a wide variety of stakeholders and input from specialist advisers.
- During the tender process, the Southbank Education and Training Precinct Project would have benefitted from a more 'interactive' process with the private sector. This type of approach would have reduced the risk of the private sector misinterpreting project scope or output specifications.
- During the construction phase the Queensland Government maintained strong relations and communication with Axiom to ensure that issues were resolved in a timely manner.

Procurement model and risk allocation

Public Private Partnership Policy

Queensland's *Public Private Partnership Policy* (PPP Policy) – *Achieving Value for Money in Public Infrastructure and Service Delivery* was launched in September 2001. This is supported by the Value for Money Framework, which was released in August 2002. A fundamental review of the Value for Money Framework commenced in 2004 and involved consultation with key stakeholders within government and private sector organisations. This process confirmed the Value for Money Framework was a robust assessment tool for potential PPP and non-PPP projects, however, improvements were required to enhance its effectiveness and efficiency. Key improvements to processes were a direct result of the lessons learned from the Southbank Education and Training Precinct Project, and culminated in the Value for Money Framework being updated in 2006 and 2008. Key enhancements included:

- Strengthening the Preliminary Assessment stage to ensure clear articulation of the depth and breadth of analysis required (compared to the more detailed analysis of a business case).
- Greater standardisation of project documentation to reduce costs incurred by government and bidders in agreeing general terms and conditions. This included release of the raw (that is non-risk adjusted) Public Sector Comparator, except in circumstances where the release will compromise the commercial interests of the State. Overall, the private sector believed that the release of the raw Public Sector Comparator would provide a level of comfort that a project would have a reasonable chance of proceeding as a PPP before they commit (often significant) resources to the bid. Most jurisdictions support the release of the raw Public Sector Comparator (PSC) but on the condition that its release does not compromise the competitive tension in the provider market.⁴⁸
- Refocusing the approach to probity issues to improve engagement with proponents during the bidding stage. Building on the experience gained from this project, an interactive tender process would expedite the expression of interest to Binding Bid stage by ensuring fullest understanding of the government's requirements prior to bid lodgement.
- Thresholds for projects to be assessed for PPP potential increased from \$50 million to \$100 million whole-of-life net present value, reflecting the substantial bid costs involved for government and private sector in PPP procurement.

Procurement

The evaluation and contract finalisation processes were conducted in accordance with the Queensland Government's *PPP Policy – Achieving Value for Money in Public Infrastructure and Service Delivery*.

In February 2003, the Department of Employment and Training issued an Invitation for expression of interest for the Southbank Education and Training Precinct Project. For the purposes of evaluating expression of interest responses an Evaluation Committee was established and supported by three subcommittees (education and technical evaluation; financial evaluation; and legal evaluation). Five consortia responded and in August 2003 the Queensland Government endorsed a shortlist of three consortia to be invited to submit Binding Bids.

As part of finalising the Binding Bid documentation in late 2003, the Public Sector Comparator was reviewed to ensure it accurately reflected the cost of delivering the output specification via traditional government procurement. This review process is regularly undertaken during the procurement phase as new information on cost and assumptions comes to hand, in order to better reflect the benchmark against which the State can compare bidder's proposals. An invitation for Binding Bids was released in December 2003. One consortium withdrew prior to submitting a Binding Bid in May 2004. The two Binding Bids received were subjected to extensive evaluation against four broad categories – education, technical, legal and financial, and value for money against the State's Public Sector Comparator.

⁴⁸ Also see, for example, Council of Australian Governments (2008) National Public Private Partnership Guidelines, Volume 4: Public Sector Comparator Guidance.

Following evaluation of Binding Bids, in September 2004, the two consortia were invited to participate in a 'revise and confirm' process, with bids resubmitted in October 2004.

On 24 November 2004, the Queensland Government announced that only Axiom had met all the objectives of the project brief and endorsed a direct engagement process with Axiom to develop a final detailed binding bid proposal for progressing the procurement of the Southbank Education and Training Precinct Project.

Axiom was not granted preferred provider status, but was given the opportunity to more interactively engage with the Institute to get a better understanding of their needs. The resulting dialogue assisted Axiom to refine its design within the affordability envelope. Axiom submitted a final offer in March 2005 which was assessed against key evaluation that demonstrated it met the State's pricing, performance and risk allocation benchmarks.

On 19 April 2005, the Premier announced the selection of the Axiom consortium as the successful proponent. Financial close was reached on 30 June 2005.

The significant time taken in the PPP procurement phase of Southbank Education and Training Precinct Project was a result of several factors. These included the complexity of the project, the relative lack of experience within the Queensland Government (given that this was the first project to proceed as a PPP under the Value for Money Framework) and the constrained nature of engagement with the private sector.

Contractual Structure – Project deed

The primary contract is the Project Deed, dated 19 April 2005, between the State of Queensland and the Axiom.

The agreement set out the terms under which the Axiom designed, constructed and commissioned the facilities. This was achieved through contractual arrangements the Axiom had put in place with John Holland Pty Ltd (the Contractor). The performance of the Contractor under its design and construct contract with the Axiom was guaranteed to the Axiom by John Holland's parent company Leighton Holdings Limited, under a parent company guarantee.

The independent certifier, appointed under the Independent Certifier Deed between the State of Queensland and the Axiom carried out specified certification, inspection and dispute resolution functions with respect to the design and construction component of the project.

The general obligations of the Axiom are that it must undertake the financing, planning, design, construction, commissioning, operation, maintenance, repair and hand back of the facilities at Southbank campus and perform the transition works and services in accordance with the Project Deed and other specified project agreements.

Eighty one detailed key performance indicators were established to enable assessment of the Axiom's performance in delivering the services.

Construction

Design works commenced in July 2005 and construction was completed in October 2008 (seven weeks ahead of schedule) at a construction cost of \$233 million. The phased opening of new buildings was delivered between January 2007 and October 2008 whilst the Institute continued its operations. More than 75% of buildings were delivered early, some up to six months ahead of schedule.

The Southbank Education and Training Precinct Project was a complex construction in a high density inner city precinct and the PPP project achieved what could not have been achieved by any other procurement method. The Queensland Government accepted that the Southbank Education and Training Precinct Project could not be delivered as a single package using traditional delivery methods and achieve the same level of outcomes as the PPP delivery. The PPP consortium achieved a very innovative, integrated solution with the 70,000 square metres of built space being

delivered on a smaller footprint than the original complex allowing greater opportunity for open space, pedestrian pathways and future growth. More importantly, the PPP project was delivered in a 'live' environment with no major divergence from the agreed transition and construction plans established between the Institute and the consortium over the 3 year and 4 month construction period. The uninterrupted delivery of core services throughout the transition and construction phase was a key marker of success.

Risk allocation

The risk transferred to the private sector was quite significant. Careful risk assessment achieved an overall risk allocation in line with the Queensland Government's PPP policy. The project effectively transferred the design, construction, financial, operating, performance and maintenance risks to Axiom. Of the total risk adjustment of around 14%, 13% was transferable under the PPP. This included:

- The private sector warranting defects over the contractual life of the project (30 years).
- Transfer of malicious damage risk up to certain annual thresholds regardless of where, how and when the damage occurred, ensuring an upfront and integrated focus on design, materials used and the manner of undertaking security services.
- All risks associated with the construction, operation and management of the student accommodation and serviced apartment of the project were transferred. The State was not required to guarantee any minimum levels of the occupation of the accommodation.
- Transfer of risk delays in satisfying the conditions precedent. Previously, the standard procedure was to have separate contractual and financial close dates, to allow time to satisfy the Conditions Precedent. Axiom was required to bid an assumed financial close date as a period of time from contractual close. Any delay between the actual financial close and the assumed financial close resulted in a reduction to Axiom's concession period; and Axiom accepted all price risk during the period from the bid date to actual financial close.

The State retained those risks it was best placed to manage, including overall demand levels for the buildings, legislative changes and the cost and time impact of state-initiated modifications.

Whole-of-life outcomes

Whole-of-life costing is perhaps the most important aspect of the value for money consideration of a project, given some research suggests the operating footprint of a commercial building could be five times that of its capital footprint.⁴⁹ Spotless is responsible for maintaining the facilities with service standards dictated through a detailed suite of key performance indicators.

Eighty-one key performance indicators incentivise Axiom and Spotless to provide services in accordance with contract obligations. With the exception of an ongoing significant defect the overall compliance measured by the key performance indicator regime has been excellent. The most recent customer satisfaction survey indicated that 79% of institute staff were satisfied with Spotless' response time; 74% indicated that their quality expectations were met and more than 75% commented positively on the friendly service delivered.

49 Royal Academy of Engineering (1998) The Long Term Costs of Owning and Using Buildings.

Innovation

Anticipating potential future user needs, a ‘loose fit’ design philosophy has been adopted with buildings being developed as interchangeable ‘education boxes’ rather than faculty-specific cellular facilities. The design also allows for the easy conversion of the facilities to alternative commercial, high-tech production or research use, if required. Non-conventional, education estate planning, with shared rather than ‘owned’ facilities, has resulted in major space utilisation efficiencies and a greater range of teaching space options including student-centric collaborative learning modes such as learning commons, breakout spaces, resource pods, e-learn centres, clusters, studios, refreshment hubs, cafés and outdoor courtyards as well as traditional cellular theory rooms, laboratories, lecture theatres and auditoria.

Key project initiatives – Procurement modelling and risk allocation

- The Queensland Government followed best practice PPP guidelines from the UK and Australia in developing its own approach to PPP projects. Importantly, the Queensland Government undertook a review of the Value For Money framework following its first PPP project and made improvements to the policy.
- The evaluation and contract finalisation processes were conducted in accordance with the Queensland Government's PPP Policy *Achieving Value for Money in Public Infrastructure and Service Delivery*. The Queensland Government was able to reach a project outcome that not only provided superior results to the Public Sector Comparator (project costs were 3.9% lower), but also delivered the other benefits of PPPs which include innovation, leading edge design, optimal risk allocation and whole-of-life considerations.

Project monitoring

Project governance during operations

In the operations phase, an Operations Committee was established comprising senior representatives from Axiom, Spotless, the State (represented by the Department of Education and Training) and the Institute. The Institute continues in its role of contract management and has dedicated resources performing this role. Several sub-committees of the Operations Committee have been formed which address the day-to-day interactions between the Axiom and the Institute. In the majority of cases, issues are addressed at the sub-committee level and only a small number are escalated to the Operations Committee.

The Operations Committee is currently reviewing its terms of reference to focus on strategic priorities and alignment of project partners’ objectives that address operational and minor defect matters.

6.4 Summary of key conclusions

Following the review of the Southbank Education and Training Precinct Project, the following key conclusions regarding best practice planning and procurement have been identified:

1. **Interactive tender process** – Would have reduced the risk of the private sector misinterpreting the project scope or output specifications. However, the project did undertake a market sounding process as part of developing the business case to understand the private sector’s key issues and concerns.
2. **Learning lessons** – The Southbank Education and Training Precinct was the first PPP by the Queensland Government, who subsequently provided input in to the Value for Money framework based on the lessons learned in this project.
3. **Problem identification** – The project was underpinned by a strong service need, which was re-examined and tested during the Preliminary Assessment Phase to determine that the service need remained robust.

7

Tiger Brennan Drive, Northern Territory



7.1 Project overview

The East Arm Port Access Route is a three stage project estimated to cost \$110 million (a contribution of \$74 million by the Australian Government and \$36 million by the Northern Territory (NT) Government). The aim of the project is to ease traffic congestion, improve safety and reduce travel times between Darwin and Palmerston. The project is one of the single largest projects in the Northern Territory and is the Territory's largest ever road and bridge project.

Stage One of the project included the enhancement of Berrimah Road (between Tiger Brennan Drive (TBD) and Wishart Road) and the creation of dual turning lanes to ease congestion. Stage One is valued at \$10 million. Stage One was completed in February 2009.

Stage Two of the project involves the extension of Tiger Brennan Drive from Berrimah Road to the Stuart Highway. Stage Two is valued at \$89 million. It includes 7.5 kilometres of four lane freeway and a grade separated interchange at the junction of the Stuart Highway, Roystonea Avenue and Tiger Brennan Drive extension (Figure 6).

Stage Three of the project will be the construction of the Berrimah Road Railway Overpass. Stage Three is valued at \$11 million.

Figure 6: Map of Tiger Brennan Drive extension



This case study will focus on the procurement of Stage Two – the TBD Extension. The NT Government chose the Early Contractor Involvement (ECI) procurement method to deliver the project. The decision to adopt this method was due to the benefits provided including:

- The ability for the contractor to bring their own experience to the project during the detailed design stage of the contract
- Synergies arising from participation of a high performance design and construction team working in cooperation with the Principal
- Better integration of specific construction methodologies into the design
- Provide greater flexibility and allocation of time for planning in the project
- Likelihood of earlier acquisition of critical construction materials
- Earlier dedication of construction resources to the project
- Negotiated apportionment of risk.⁵⁰

On 17 November 2008, Macmahon Contractors were awarded the first phase of the ECI contract which allowed SKM, the head consultant, to begin planning and preliminary design activities. Macmahon were able to procure any long lead items, clear the site and carry out service relocation as part of phase 1 of the contract. The Risk Adjusted Maximum Price (RAMP) and all contract plans were developed for the phase 2 tender submission. Macmahon was awarded the main construction contract on 1 July 2009. The project is due to be opened by Minister Albanese at the end of 2010.⁵¹

⁵⁰ Department of Construction and Infrastructure (2010), Stage 2 – Tiger Brennan Drive Extension, site: <http://www.nt.gov.au/infrastructure/projects/tbd/stage2/index.shtml>

⁵¹ Department of Construction and Infrastructure (2010), Stage 2 – Tiger Brennan Drive Extension, site: <http://www.nt.gov.au/infrastructure/projects/tbd/stage2/index.shtml>

Construction works for this stage are still in progress and therefore, no post construction evaluation has been prepared. As such, the case study has been prepared through publicly available information, consultation with the NT Department of Construction and Infrastructure's representative and information provided by the NT Department of Lands and Planning.

7.2 Objectives, costs and benefits

Objectives

The extension of TBD is the largest and most significant section of the East Arm Port Access Route. The project aims to improve traffic flow to East Arm Port (the Port) from rural areas and Palmerston. There are currently 34,000 vehicles travelling between these destinations each day. This project is set to improve road safety, reduce travel time and ease traffic congestion for these vehicles. The extension has also been designed for the future. It will ensure that the 92,500 vehicles predicted to be travelling the same route in 2031 can do so efficiently. As such the project objectives are to:

- Enhance freight capacity
- Improve corridor capacity between Darwin and Palmerston and rural areas.

TBD represents the last link between the Stuart Highway and the current TBD. The Port is the only significant port on Australia's north coast.⁵² It has recently benefited from a \$200 million investment to expand its capability and capacity. The Port is significant for the export of live cattle and for offshore and onshore oil and gas projects. Recent growth in exploration, mining, oil and iron ore as well as gas projects have increased demand for the Port. As demand grows, bottlenecks to and from the Port should be addressed, inclusive of the issues surrounding safety of road trains mixed with commuter traffic. The extension of TBD has been designed to allow for road train access to the Port.

Outcomes

The first stage of the TBD project has been completed on time and on budget. Stage Two of the project was intended to be awarded in September 2008.⁵³ However, as the NT Government election was on 9 August 2008 and the Government was in caretaker mode, Stage Two of TBD project was not awarded to Macmahon Contractors until 17 November 2008. Stage Two commenced in early 2009 and is due to be completed by the end of 2010. Stage Two involves Macmahon directly employing up to 200 people, including subcontractors, at the peak of construction. Ninety-nine per cent of the workforce are local employees.⁵⁴

Stage Two utilises an ECI procurement method and has been separated into two parts. Part One is the planning and design of the project, which cost \$10.3 million and included design and planning activities, service relocations and ordering of long lead items. The design stage is now complete. Part Two is the construction stage and it has been estimated to cost \$84.3 million.⁵⁵

As set out in the information booklet provided to tenderers bidding for the design component of the project, the community are expecting the following benefits of the project.

52 The Territory (2010), East Arm Port, site: <http://www.theterritory.com.au/index.php?menuID=161>, accessed 21 June 2010.

53 Northern Territory Government (2008), Construction Division Year in Profile 2007/08, site: http://www.nt.gov.au/infrastructure/construction/documents/ConDiv_YearInProfile_08.pdf; accessed 18 June 2010.

54 Ralph Wragg Australian Business News (2008), Macmahon award Stage Two Darwin road contract, 20 November 2008.

55 Department of Construction and Infrastructure (2010), Personal Communication, 22 June 2010.

Table 5: Outcomes expected from Stage Two – TBD extension⁵⁶

| Function | Required outcome or benefit |
|--|--|
| Capacity | Provide a freight efficient two lane, dual carriageway road extending Tiger Brennan Drive to the Stuart Highway including a grade separated interchange. |
| Safety | High level of operational safety as well as safety for construction workers and vehicular and pedestrian traffic during construction, operation and maintenance. |
| Cultural heritage and environmental impact | Safeguard cultural heritage and environmental values by minimising community and environmental impacts and building safeguards into design. |
| Targeted community consultation | Engage the community to ensure relevant local issues are understood and addressed in design and construction, particularly relating to Traffic Management. |

7.3 Governance, delivery and procurement

Policy and planning

The East Arm Port Access Route has been in the pipeline for over 20 years. Strategic planning for the Darwin to Palmerston corridor identified the need for continual development of the arterial network linking the Stuart Highway and TBD to the northern suburbs and to provide direct access to the new East Arm Port for freight entering and exiting Darwin in the 1970s. In 1984, the 'Darwin Regional Structure Plan' identified the centres of Darwin (CBD), Casuarina, Palmerston and Weddell as the major transport nodes and the focus of retail/commercial employment activity.⁵⁷

The Department of Transport and Works Road division released the 'Darwin Arterial Roads – Tiger Brennan Drive Planning Statement' in September 1987. The East Arm Port Access project responds to the need outlined in this Statement for 'an arterial network to effectively connect Palmerston and the Darwin Central Business District as well as providing satisfactory levels of access along the corridor for freight and commuter traffic'.⁵⁸ The TBD extension is the last link of a fully planned road, and therefore land reservations for the road were already in place.⁵⁹

The bilateral agreement between the NT and the Australian Government relating to the 2004 to 2009 National Land Transport Plan (AusLink Investment Program) outlined upgrade works to Tiger Brennan Drive/Berrimah Road – East Arm access. This project forms part of that agreement.

In 2007, the AusLink Adelaide – Darwin Corridor Strategy set out a number of short term priorities, including those relevant to this project such as:

- Improving safety through targeted infrastructure improvements
- Risk reduction at targeted rail level crossings
- Appropriate infrastructure upgrades to facilitate industry development.⁶⁰

⁵⁶ Northern Territory Government (2008), Request for Tender – Information Booklet: Tiger Brennan Drive Extension, Tender Number T08 – 1345, Project Numbers FGD05400 and FRD05151, May 2008, p3.

⁵⁷ Department of Planning and Infrastructure (2007), *Project Proposal Report (Stages 1 & 2) Scoping and Development – East Arm Port Access*, September, p3.

⁵⁸ Department of Planning and Infrastructure (2007), *Project Proposal Report (Stages 1 & 2) Scoping and Development – East Arm Port Access*, September, p3.

⁵⁹ Department of Construction and Infrastructure (2010), *Personal Communication*, 22 June 2010.

⁶⁰ Department of Transport and Regional Services (2007), *Adelaide – Darwin Corridor Strategy*, June 2007, p ii.

In December 2009, the Northern Territory Government released 'Territory 2030', the 20-year strategic plan for the Northern Territory. The plan includes 128 targets linked to one of six key priorities – education, economic sustainability, society, health and wellbeing, the environment and knowledge, creativity and innovation. Key targets and actions related to the provision of this project include:

Society

Objective 3: The Territory maintains an enviable lifestyle

Target: Territorians and our suburbs, cities, towns and regions are connected by appropriate infrastructure

Objective 4: Ensuring public safety

Target: Improve driver, passenger, rider and pedestrian safety on the Territory's roads.⁶¹

Economic sustainability

Objective 2: Investment and infrastructure

Target: Undertake long-term infrastructure planning for roads, power, water, sewerage and telecommunications.⁶²

Business case development

As noted in the previous section the development of an alternative access route to the Port has been in the pipeline for many years. Increased traffic on the corridor into the city and the Port made the case to set out detailed plans for a new route. The investment in the Port, and the growing demand from the mining sector for the Port, supported the business case to commence construction of the TBD extension. A number of alternatives were considered in the business case.

A Project Proposal Report (PPR) for scoping and development of Stages One and Two of the Project was prepared in September 2007. The PPR outlined the status of planning for the project and detailed the proposed expenditure for preconstruction, planning, investigations, preliminary design and contract documentation.⁶³ The PPR also outlines the strategic fit, risks, governance and contractual arrangements, scoping, environmental, cultural and social issues, timing, design and construction features, demand forecasts, safety and refers to a benefit cost analysis. The summary of the benefit cost analysis in the PPR suggests that the project would result in significant net economic benefits with a 'likely benefit-cost ratio (BCR) of between 2.75 and 4.20.' The BCR is suggested to be conservative because it does not include 'any benefits arising from improved trade outcomes consequential to the project'.⁶⁴

There were a number of different designs developed during the planning phases of the TBD extension – each with a different focus. In particular there were a number of combinations of designs which focused on bridges and interchanges in comparison to traffic lights. The aim of the TBD extension was to reduce bottlenecks and ensuring value for money. The final design of the TBD extension included both bridges and interchanges to allow for traffic to continue to flow and traffic lights where appropriate.

The initial costing for the TBD extension project was \$89 million; this included Part One (the design) and Part Two (construction). Parts One and Two have been awarded to Macmahon Contractors for \$10.3 million and \$84.3 million respectively.

61 Northern Territory Government (2009), Territory 2030: Strategic Plan 2009, website: www.territory2030.com.au; accessed 25 June 2010.

62 Northern Territory Government (2009), Territory 2030: Strategic Plan 2009, website: www.territory2030.com.au; accessed 25 June 2010.

63 Department of Planning and Infrastructure (2007), *Letter to General Manager AusLink Planning*, 13 September 2007.

64 Department of Planning and Infrastructure (2007), *Project Proposal Report (Stages 1 & 2) Scoping and Development – East Arm Port Access*, September, p15.

Originally, the delivery of this project was through the Department of Planning and Infrastructure (DPI). In late 2009, DPI was split to create two new departments – Department of Lands and Planning (DLP) and Department of Construction and Infrastructure (DCI). DLP is the client agency for the project and DCI delivers the project on behalf of DLP.

The design component of the project involved:

- The planned the performance of the work under the contract
- Undertaking the detailed planning and preliminary design
- Identification, mitigation, negotiation and apportion of the risk to the construction of the TBD extension
- Identification of early works and implementing construction as part of the design component of the TBD extension
- Pricing of the works for the construction of the project (excluding early works).⁶⁵

MacDonald International and Financial Auditor – Merit Partners provided an independent estimate of all project costs.

Environmental approvals

The DPI submitted the project to the Department of Natural Resources, Environment, the Arts and Sports (NREATS). NREATS made a decision that under the *Environmental Assessment Act*, there was no requirement for a formal environmental assessment of the project. However, a number of matters needed to be managed, which have been incorporated into a *Project Environmental Management Plan*.⁶⁶ Usually, two separate Environmental Management Plans (EMP) are developed for projects – one by the government proponents and the other by the contractor. The ECI delivery method meant that a joint EMP could be developed to set out the responsibilities of all parties.

A *Project Environmental Management Plan* was completed in September 2009. The *Project Environmental Management Plan* includes the contractors environmental management systems and procedures and a number of environmental management sub-plans. It includes all the environmental aspects of the project from all parties point of view, that is – Macmahon, the Department of Lands and Planning and the Department of Construction and Infrastructure.

The aims of this EMP was to:

- Capture all relevant environmental issues associated with the TBD extension project
- Develop environmental mitigation measures to minimise the potential impacts associated with the construction phase of the project
- Incorporate the environmental mitigation measures identified into a comprehensive framework to facilitate and ensure their appropriate management through the construction stage of the project.⁶⁷

The Environment Management Plan is audited regularly by Macmahon and DCI and its implementation has verified by NREATS.

⁶⁵ Northern Territory Government (2008), *Request for Tender – Information Booklet: Tiger Brennan Drive Extension, Tender Number T08 – 1345, Project Numbers FGD05400 and FRD05151*, May 2008.

⁶⁶ Macmahon Contractors (2009), *Tiger Brennan Drive Extension Stage 2: Project Environmental Management Plan: Macmahon Ref No: N016*, September 2009.

⁶⁷ Macmahon Contractors (2009), *Tiger Brennan Drive Extension Stage 2: Project Environmental Management Plan: Macmahon Ref No: N016*, September 2009, p8.

Key project insights – Planning business case development and environmental approvals.

- The planning for the East Arm Port Access Route has been in train for over 30 years. Planning documents dating back to 1984 note the importance of Palmerston as a major transport node, and the need for appropriate transport to link it with the Darwin CBD. The Northern Territory Government had planned for the East Arm Port Access route well in advance of it being required.
- In recent years, the Northern Territory and Australian Governments recognised the growing demand for the East Arm Port and the increasing congestion and travel times from Palmerston and the rural areas. It was identified as a priority in the Auslink planning documents between the two governments. The growing demand from commercial and passenger vehicles supported the need for the project to go ahead. The project supports the vision set out in the Northern Territory Government's strategic plan Territory 2030 by providing long term infrastructure that is safe, linking the rural areas to the city.

Project governance and management

The Northern Territory's enthusiasm to ensure a collaborative approach to the delivery of Stage Two partly explains the choice of an ECI delivery method. The project governance and management reflects this collaborative approach.

At the design stage of the project there was a collaborative approach between the client (the Department of Planning and Infrastructure), the project manager (the Department of Construction and Infrastructure)⁶⁸, the contractor (Macmahon) and the contractor's designers (SKM). In setting out the detailed planning and preliminary design, risks and pricing of the works, each party worked together to deliver the outcome. The collaborative approach was facilitated by a number of workshops including workshops on:

- Foundation
- Risks and opportunities
- The Risk Adjusted Maximum Price⁶⁹
- Relationship and team building
- Design scope
- Value management for interchange layout
- Commercial aspects.

There are two main groups responsible for the delivery of the construction of the TBD extension was the Project Management Group and Project Leadership Group.

The Project Management Group

The day-to-day management of the project delivery is completed by the Project Management Group which includes representatives from the Department of Land and Planning, the Department of Construction and Infrastructure, the Larrakia Development Corporation, Macmahon and SKM.

⁶⁸ Note: The Department of Land and Planning and the Department of Construction and Infrastructure were the Department of Planning and Infrastructure at the design stage.

⁶⁹ Note that one of the RAMP workshops included an Australian Government representative.

The Project Leadership Group

The Project Management Group reports to the Project Leadership Group which has senior representatives from the Department of Land and Planning, the Department of Construction and Infrastructure, Macmahon and SKM.

Key project insights – Project charter and management

- The Northern Territory Government aimed to achieve better outcomes in the delivery of the TBD extension through early engagement with the contractor and ongoing collaboration between the Departments and the contractors

Other contract plans

The Department of Construction and Infrastructure, the Department of Land and Planning, Macmahon and SKM have set out a number of other plans to ensure the processes and delivery of TBD occurs to appropriate standards. Other contract plans include:

- Stakeholder management
- Employee relations management plan
- Quality assurance
- Safety
- Relationship management
- Traffic management
- Local industry participation policy.

Procurement model and risk allocation

The design and construction of the TBD extension was procured under the ECI delivery method. The Department of Construction and Infrastructure has noted that the use of ECI was to gain the benefits of a design and construct (D&C) delivery method whilst minimising the intensive resources required in the tender process of a normal D&C delivery method. ECI was developed using the Queensland Department of Main Roads' procurement guidelines. The Department of Main Roads' procurement guidelines were adjusted to suit the Northern Territory Government processes.



The contract was split into two parts. The first component, the design, was conducted via the ECI or delivery method. The second component, the construction, involved typical arrangements of a design and construct contract. However, there is a focus on relationship management throughout the two stages.

Procurement method

In the design component of the contract the Department of Construction and Infrastructure, the Department of Land and Planning, Macmahon and SKM:

- Planned the performance of the work under the contract
- Completed detailed planning and preliminary design
- Identified, mitigated, negotiated and apportioned the risk for the construction component
- Identified early works and implemented construction as part of the design component
- Priced the works for construction (excluding early works).⁷⁰

At the end of the design component of the project Macmahon submitted a construction offer with the Risk Adjusted Maximum Price (RAMP) to complete the construction work. The RAMP took into account the risk apportionment negotiated with the Departments during the design stage.

The development of the RAMP was conducted on an open book basis. The intention was that Macmahon would 'share on a transparent and full disclosure basis, all information and documentation of the financial costs of performing the work under the contract so that only the true and bona fide costs of performing the work under the contract are sought to be, and are in fact, recovered under the contract'.⁷¹

At the completion of the design stage, the Departments were satisfied that Macmahon had provided an appropriate RAMP and accepted their construction offer. The construction stage included the:

- Completion of detailed design
- Preparation of construction documentation
- Construction of the works.⁷²

Construction of Stage Two is currently taking place and is scheduled to be completed by the end of 2010.

Selection process

The Department of Construction and Infrastructure used a two envelope process for the selection of tenders. This means that tenders were evaluated by non-price elements initially. Once a preferred tenderer is chosen by the tender assessment panel, the second envelope containing the contractor's financial information is opened and checked for conformance. Commercial negotiations commenced and once the tender assessment panel is satisfied, Part One of the contract was awarded.

Tenderers were first evaluated on the non-price criteria set out in the table on the following pages.

⁷⁰ Northern Territory Government (2008), Request for Tender – Information Booklet: Tiger Brennan Drive Extension, Tender Number T08 – 1345, Project Numbers FGD05400 and FRD05151, May 2008, p5.

⁷¹ *ibid.*

⁷² *ibid.*

Table 6: Non-price evaluation criteria for the design component

| Criteria | Weighting | Sub-criteria |
|------------------------------------|-----------|---|
| Past performance | 12% | <p>Previous experience</p> <p>Provide an overview of tenderer's experience in projects of similar nature, scope and size including:</p> <ul style="list-style-type: none"> a. Details of the project experience and track record of the tenderer b. A list of three relevant projects that the tenderer has completed detailing the contractual context, key outcomes, disputes, traffic management requirements, lessons learnt, standard of work, project delivery and degree of necessary supervision of the contractor. <hr/> <p>Performance history</p> <p>Provide an overview of the tenderer's performance history including details of:</p> <ul style="list-style-type: none"> c. Previous disputes and claims d. Evidence of achievement of key performance indicators including the tenderer's safe and fair workplace record and outcomes on projects of similar nature, scope and size. <hr/> <p>Referees</p> <p>Provide details and referees for at least 3 completed contracts of similar nature, scope and size. Note that the Principal may contact these referees at its absolute discretion.</p> |
| Whole-of-life cost | 5% | <p>Whole-of-life cost</p> <p>Tenderer to provide:</p> <ul style="list-style-type: none"> e. Approach to whole-of-life considerations for this project including any special factors that may impact on the costs to the Principal of this project f. Evidence demonstrating how this was achieved on projects of a similar nature scope and size. |
| Local development and value adding | 20% | <p>Local industry participation</p> <p>Demonstrate an understanding of the Building Northern Territory Industry Participation framework and how it will be applied to this project. (Refer Conditions of Tender Clause 1.5)</p> <hr/> <p>Accredited training programs</p> <p>Provide details on the level of accredited training programs or other training initiatives the tenderer currently undertakes.</p> |

Table 6: Non-price evaluation criteria for the design component (continued)

| Criteria | Weighting | Sub-criteria |
|------------|-----------|---|
| Timeliness | 10% | <p>Timely completion of project</p> <p>Provide details of how the tenderer will complete the requirements in accordance with the Tender Documents (this is to include evidence of completion of past projects on time).</p> <p>Provide a project program detailing how timeframes as stated in the Brief can be achieved. Program to include:</p> <ul style="list-style-type: none"> g. Methodology of design/construction including all key activities h. Delivery timeline, clearly indicating critical path <p>Tender to provide details of key construction processes which will be used to achieve timeline efficiencies including critical elements of supply.</p> |
| Capacity | 30% | <p>Skills and experience</p> <p>Provide overview of relevant experience of key personnel that will be involved in delivery of the project as set out in the Tender Response Schedule section titled 'Tenderer's Key Personnel and Project Management Team'. Tenderer to include:</p> <ul style="list-style-type: none"> i. Project organisation chart for each of Stage 1 and Stage 2 j. Overview of specialised skills/qualifications and knowledge of nominated personnel (curriculum vitae's). <hr/> <p>Current commitments</p> <p>Provide details of current project commitments of nominated key personnel including details of project, contract award date, total value, percentage not completed and due date for completion.</p> <p>Provide details of current bids in process that are not yet finalised including details of project, contract award date, total value, percentage not completed and anticipated date for completion.</p> <hr/> <p>Financial</p> <p>Provide details of the tenderer's financial capacity and financial resources including current credit rating</p> <p>Provide details of tenderer's processes and procedures to ensure payment of employees, sub-contractors and creditors.</p> <hr/> <p>Risk management</p> <p>Details of quality accreditation such as iso 9001: 2000 or AS4360 or equivalent and how the tenderer will implement such systems on this project.</p> <p>Tenderer to outline significant stage one and stage two risks, the strategies it will use to manage/mitigate these risks and detail opportunities/alternatives to add value.</p> <p>Detail any legal action pending which the tenderer is a party to.</p> |

Table 6: Non-price evaluation criteria for the design component (continued)

| Criteria | Weighting | Sub-criteria |
|---|-----------|---|
| Innovation | 8% | Innovation Tenderer to demonstrate how it will approach innovation on this project. Describe innovative delivery methods proposed that will provide increased efficiency and effectiveness in delivery/completion of this project. |
| Understanding of and affinity for relationship management | 15% | Understanding and affinity for relationship management Tenderer to demonstrate understanding and affinity for relationship management. |

The Department of Construction and Infrastructure received five responses to the request for tender. These five responses were shortlisted on the non-price criteria to three. Each of the three tenderers that were short listed were put through an in-depth interview process which included a workshop to test the tenderers' response to potential situations. The preferred tenderer was selected and then the second 'price' envelope is opened.

Risk

A risk and opportunity register has been developed to set out the details of each risk including its:

- Category eg approvals, client, commercial and legal, commissioning etc
- Potential consequence
- Potential likelihood
- Proposed treatment
- Status
- Responsibility

In relation to the financial risk of the project a commercial negotiation has resulted in a gain/share arrangement. The RAMP was agreed to at the completion of the design stage. It has been agreed that Macmahon will take all of the risk for any fluctuation above the RAMP. ie. if the construction costs more than the RAMP, then Macmahon's will have to bare the cost. If the construction costs less than the RAMP, then there is an agreed 50/50 gain share arrangement.

As the contract is still in progress it is not yet known the accuracy of the gain share. It is also unknown what will happen to any government share in the benefits.



Post-construction monitoring and managing environmental risk

Under the General Conditions of Contract between the Department of Planning and Infrastructure and Macmahon, Clause 26 refers to defects liability. The defects liability period is for 12 months from the date of practical completion. During this period the contractor must respond to any construction faults. Any general wear and tear maintenance will be covered by the Department of Construction and Infrastructure.

The Government has already undertaken a 'lessons learnt' session regarding the application of the ECI procurement method to date. They have noted that, in general, the ECI process is beneficial. They believe that there has been time savings through the collaborative approach to decision-making. The ability to have the contractor, designer and client all in one room shortens decision times.

However, they have noted that there are possible misgivings in the use of ECI per two project. For example:

- All of the risk has been put onto the contractor, Macmahon, who have priced this through the RAMP. If Government had taken on some of this risk, then the price may have been lower
- The scope of the project was quite wide, and this could have been adjusted to increase manageability.

7.4 Summary of key conclusions

Following review of the Tiger Brennan Drive project, and notwithstanding that the project is not yet complete, the following key conclusions regarding best practice planning and procurement at the present stage can be identified:

1. **Well considered strategic planning works** – The planning for this project appears to be well considered. Darwin city strategic plans considered the need for a link between the two major transport nodes and the focus of retail/commercial employment activity of Palmerston and Darwin for more than 30 years. Increasing traffic flows between these two areas and to the East Arm Port meant that capacity issues and peak hour congestion and delays were starting to appear. This in turn supported the business case for the project that would help to relieve these capacity constraints and improve the efficiency and connectivity to the East Arm Port.
2. **Governance arrangements are important in ECI** – The interaction between the Department of Construction and Infrastructure, as the delivery agency, and the Department of Lands and Planning, as the client for the project, appears to work well. The two agencies worked with the contractor (Macmahon), the contractor's designers (SKM) and the Laarrakia Development Corporation to ensure well supported decision making and day to day management. Having all relevant parties involved in regular project meetings can shorten time required to make decisions.
3. **Further monitoring is required** – As the project is still in construction, it can be difficult to conclude on the processes and decisions made in project set up and delivery. It is therefore suggested that a full project evaluation of the choice of delivery method for the construction of the project is completed. This may also make an assessment of demand forecasts against actual traffic and therefore help to inform any future projects or traffic management required.

8

Southern Seawater Desalination Plant, WA

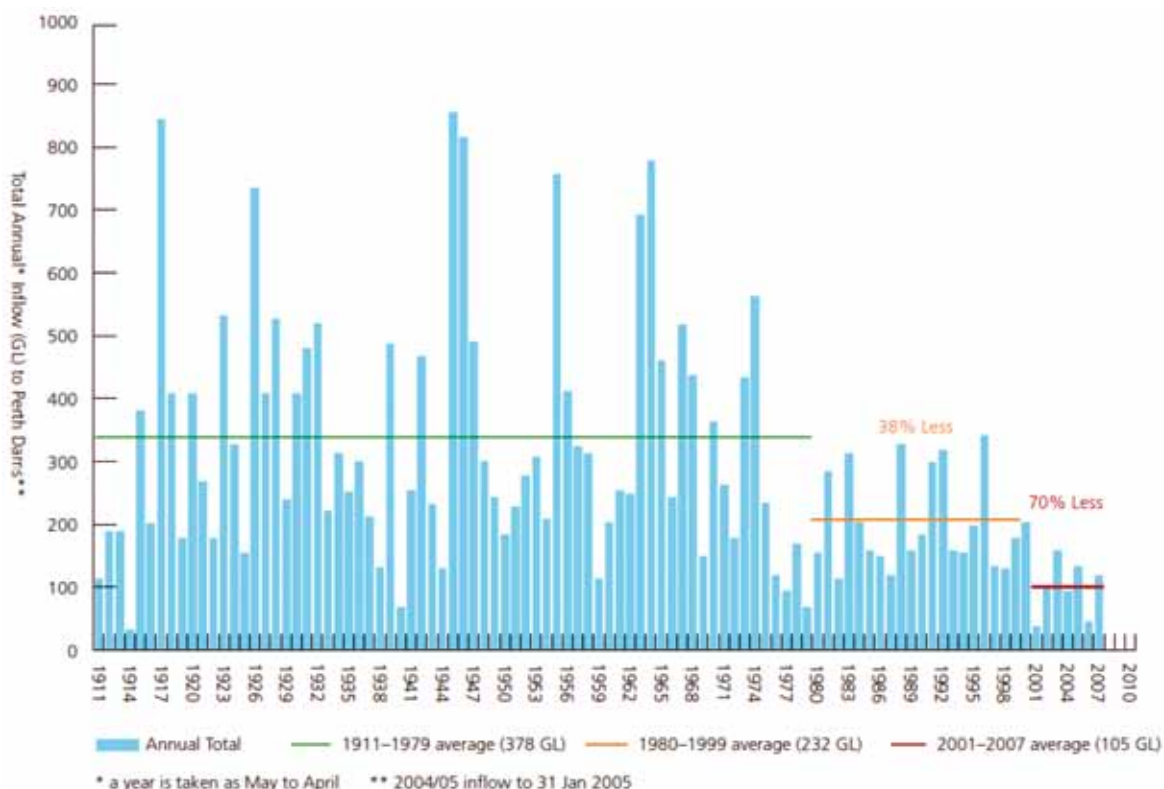


8.1 Project overview

The Southern Seawater Desalination Plant (SSDP), located approximately 150 kilometres south of Perth, will be the next major water source for Western Australia. The plant is scheduled for commissioning in late 2011 and will produce 50 gigalitres of drinking water annually with the capacity to expand output to 100 gigalitres per year.

A key feature of the SSDP is that it will provide a water source that is independent of rainfall. As the average annual inflow into Perth's dams has been around 70% lower than the average between 1911 and 1974, identifying climate independent water sources has become increasingly important for the Water Corporation. Following the completion of the SSDP, more than 30% of Perth's drinking water supply will come from climate independent sources, providing a buffer against this drying trend.

The SSDP will help to meet Perth's projected need for an additional 150 gigalitres of water per annum and help to reduce reliance on the Gnangara Mound, an important groundwater source north of Perth, to more sustainable levels.

Figure 7: Yearly inflow to Perth dams including Southern Sources

Source: Water Forever: Options for our water future (April 2008)

Design, construction and operation of the plant (for 25 years from commissioning) was awarded to the Southern SeaWater Alliance (SSWA); a consortium between Spanish firms Tecnicas Reunidas and Valoriza Agna, local companies; AJ Lucas and WorleyParsons, and the Water Corporation. The integrating pipeline and infrastructure is being delivered by local contractors under traditional competitive contracting.

8.2 Objectives, costs and benefits

Objectives

The objectives of the SSDP are:⁷³

- Achieving the optimum whole-of-life costs for the Water Corporation
- First production of water by late 2011
- Demonstrate value for money and seek and exploit efficiencies to the maximum extent possible
- The delivery and operation of the project safely, ensuring no harm comes to those associated with, or coming into contact with, the project
- Delivery and operation of the project in a manner that complies with the Water Corporation's operating requirements, statutory requirements, conditions imposed by the Minister for the Environment, supports State Government policy in relation to local content and complies with the Corporation's policies, standards, guidelines and protocols

⁷³ Water Corporation (2007) Request for Proposals to Form Alliances to Construct and to Operate and Maintain the Southern Seawater Desalination Plant.

- Protect the well-being of all people involved with or impacted by the project and enhance communities by engaging with members of the public affected by the project
- The project must win internal and external stakeholder endorsement and specifically include the Corporation's personnel in design, pre-commissioning, testing and commissioning.

With a total cost of \$955 million, the SSDP includes a seawater desalination plant located at Binningup, associated infrastructure to connect the plant to the main trunk line, and a pump station and 14 kilometre pipeline which will allow water from the plant to be pumped to several reservoirs during the winter period when supply to households and businesses will not need to draw on the desalination plant's output.

Outcomes

Construction of the SSDP commenced on 1 July 2009 and commissioning of the plant is expected in late 2011. At the time of writing it is expected that the project will be delivered on time and within budget.

The success of the SSDP to date has been the delivery of an alliance to design, construct, operate and maintain the desalination plant, with construction commencing in time to ensure that the plant's output will be available for the 2011/12 summer. To achieve this, planning, approvals and procurement processes had to be completed within around two years, a much shorter timeframe than the five years that would normally be available.

There are a number of factors that have contributed to the success of the project:

- A robust water source planning approach that ensured that contingency options were identified and developed to the point that the demise of the Water Corporation's preferred source did not lead to significant slippage in the target date for a new water source.
- Effective management of stakeholder concerns and the building of a community mandate for the project when the desalination plant option emerged quickly. The effectiveness of this process of building trust and understanding with the local communities of Binningup and Myalup has been demonstrated by the low number of complaints received since construction commenced.
- Successful management of the risks inherent in running the environmental and planning approval and procurement phases of the project in parallel.
- The ability to leverage lessons from the planning, procurement, design, construction and subsequent operation of the Perth Seawater Desalination Plant to help make project delivery feasible within the required timeframe and to deliver enhanced outcomes across a number of aspects of the project.

Strategic water source planning in Western Australia

Initial planning and assessment of water source requirements was undertaken as part of the development of the Integrated Water Supply Scheme (IWSS) Source Development Plan 2005.⁷⁴ This plan identifies future water source requirements for the period 2005–2050 based on long term projections of demand growth, the reliability of supply desired by the community, and expected supply from existing and future water sources. Water source planning has been reviewed and expanded under the *Water Forever 2009* planning study.

⁷⁴ Water Corporation (2005) Integrated Water Supply Scheme Source Development Plan: Planning Horizon 2005–2050.

The Water Corporation uses an integrated resource planning approach to identify any need for new water sources, which includes a comparison of options to reduce demand, such as water efficiency initiatives, with options that increase supply through capital expenditures. This approach is consistent with Infrastructure Australia's view that making better use of existing infrastructure can deliver significant benefits without the need for new investment.⁷⁵ Decisions on a new water source take into account conditions at the time and are informed by a risk assessment. This assessment takes into account dam storage levels, groundwater access and the probability that severe water use restrictions would be required in the absence of a new water source. All aspects of the total scope of works for the SSDP were assessed within the context of a capital constrained economy, and wherever possible works for the 100 gigalitre/year capacity has been deferred until a future decision on the viability of expansion is made within the framework of the *Water Forever* planning study.

Following a decision on water source augmentation the selection, sequence and timing of source developments is undertaken based on considerations that include:

- Technical viability
- Social and environmental acceptability
- Public health
- Financial viability.⁷⁶

A key requirement identified by the Source Development Plan was for a new water source to augment existing supplies to meet demand growth and address regulatory pressure to reduce extraction from the Gngangara Mound groundwater source. In the absence of a new source the risk of tighter water use restrictions following one or two years of poor dam inflows would have moved above acceptable levels.

Initially, the South West Yarragadee aquifer had been identified as the preferred source option, with the desalination option developed as a contingency. The Source Development Plan established the planning and approval timeframes for what was then known as Desalination Plant No.2. Environmental studies were to commence in March 2005, with environmental approval targeted for March 2007. A feasibility study was scheduled for April 2005 to April 2006. The delivery of water, if required, was scheduled to commence in the summer of 2009-10. The revised timeline saw further environmental studies carried out to address critical path baseline marine data studies in March 2007 and all approvals being obtained from September 2007 until June 2009. The final delivery for the project will allow water to be delivered from mid to late 2011.

Ultimately, the South West community's opposition to the groundwater option and concerns about the impact of on-going climate change on the recharging of the aquifer resulted in the preferred source augmentation option being shelved in May 2007.⁷⁷ This presented particular challenges for the Water Corporation as the lead agency due to the loss of lead time on the desalination project relative to the timeframes envisaged in the Source Development Plan.

⁷⁵ See for example Infrastructure Australia (2008) A report to the Council of Australian Governments, December 2008, pp.28-31.

⁷⁶ Water Corporation (2005) Integrated Water Supply Scheme Source Development Plan: Planning Horizon 2005-2050.

⁷⁷ Premier Alan Carpenter, Media Release 15 May 2007.

Key project insights – Objectives costs and benefits

- The planning exercise of which the SSDP was an outcome recognised the need to update water source planning to reflect new information about the trend in inflows to the State's dams. Based on this information and updated demand projections, there was a clearly defined problem that potential source augmentation had to address. This was to reduce the risk that harsher water use restrictions would be necessary by 2010 to an acceptable level.
- Overall, the planning process that has resulted in the SSDP provided for a robust top-down decision-making process, which was based on a clear case for action, and considered a range of options (including demand reduction measures). In addition, planning for water source augmentation included the development of contingency options. Ultimately, the existence of a well developed contingency was crucial to the Water Corporation's ability to achieve the required outcomes within the timeframe for augmentation despite the unanticipated demise of its initially preferred option.
- However, the publicly available documentation provides information on the capital costs and cents per kilolitre of water but not on the results of a formal cost-benefit analysis of options for demand reduction and source augmentation. The robustness of decision-making processes could also have been enhanced by a better understanding of the cost to the community from imposing severe water restrictions, a cost that the IWSS Source Development Plan acknowledged was not well understood. A key component of the benefits of both demand reduction and source augmentation options is the avoided cost associated with restrictions.

Business case development and environmental approvals

The development of the supporting business case for the SSDP was partly determined by the compressed timeframes available given the shelving of the groundwater source option. While certain elements of the planning for the South West Yarragadee water source could be transferred across to the SSDP, particularly the planning for assets required for integration with the main trunk line, a robust business case was needed to be developed for the desalination option.

The Water Corporation's previous experience with delivering a desalination plant was an important factor in the timely development of the business case. Also important was the ability of the Water Corporation's project team to fast-track the development of the business case to meet a deadline that both internal and wider government processes were not designed to accommodate.

The business case development process is outlined in Table 7 on the following page.

Table 7: SSDP business case development process

| | |
|-----------------------------|--|
| March 2005 | Initial feasibility studies undertaken |
| May 2006 – November 2006 | Finalisation of shortlisted sites |
| May 2006 – January 2007 | Focused investigation into integration asset scope and marine water quality |
| February 2007 | Permanent baseline monitoring established and critical environmental consultancy commenced |
| February 2007 – May 2007 | Scope for Desalination Plant and potential expansion determined, and detailed cost estimates developed |
| May 2007- July 2007 | Business case developed for the Procurement and Approvals phase |
| August 2008 – November 2008 | Business case developed for the Project Implementation phase |
| December 2008 | Business case finalised after selection of preferred alliance partner |

Robust cost estimates to underpin the business case were developed using the Perth Seawater Desalination Plant (PSDP) as a starting point and then scaled up to reflect the larger size of the SSDP. The other critical factor in the development of the cost estimates was the escalation applied to the PSDP costs, the project team invested significant time and effort in this activity. Drawing on past experience allowed the project team to focus on escalating cost factors rather than having to develop an understanding of the individual cost factors from scratch, resulting in robust cost estimates being generated within a 4-5 month window.

Determination of the scope for a 50 giganlitre/year plant with the ability to expand to 100 giganlitre/year was informed by a careful assessment of the trade-offs between the cost of immediately undertaking works to support the expansion and the costs associated with delaying those works to a future date. The scope for the second stage of the SSDP was that any component required to expand capacity to 100 giganlitre/year was only to be constructed as part of the first stage implementation if construction later would:

- Put at risk existing assets (constructed as part of the first stage) or affect the operating capability of the 50 giganlitres plant during construction
- Substantially extend the implementation timeframe of the second stage upgrade
- Substantially disturb areas rehabilitated as part of the environmental conditions
- Be constructed for at least a 50% lower cost compared to later installation (based on the present value of the savings required over the 10 years).

The other critical factor in the development of the cost estimates was the escalation applied to the PSDP costs and the project team invested significant time and effort in this activity. Drawing on past experience allowed the project team to focus on the escalated cost factors rather than having to develop an understanding of individual cost factors from scratch. This approach allowed robust cost estimates to be generated over a 4–5 month period prior to the May 2007 announcement.

Investigations of the coastal strip from Jurien Bay to Bunbury to identify potential desalination plant sites had been undertaken since early 2004. Desktop studies were undertaken to identify possible locations, and further engineering and environmental assessments were carried out on some of the potentially feasible options.

Initial studies included environmental constraints assessments, as well as consideration of social and technical factors. The requirement of the investigations was to identify potential locations that could sustain the intake and brine discharge from a 45 gigalitre/year desalination plant with potential to increase to 100 gigalitre/year in the future.

In November 2006, the then Premier stated that the Government would not approve a desalination plant in the Port Kennedy or East Rockingham areas due to the overwhelming environmental and social impacts.

The choice of Binningup as the location of the plant reflected the consideration of a number of dimensions including social, environmental, technical and economic sustainability; and ease of access to the power network, Integrated Water Supply Scheme and the open ocean coastline which reduces energy and infrastructure requirements and provides the right conditions for water mixing.

The alternative of locating the plant at the Kemerton Industrial Park around 10 kilometres from Binningup was also considered. While this site would have minimised the impact on Binningup Beach and the towns of Binningup and Myalup, it was estimated to increase construction costs by between 22% and 36% and annual operating costs by between 4% and 13% relative to the Binningup option.⁷⁸

In May 2006, several studies were undertaken to determine the water quality and appropriate risk assessment of the environmental issues that would be encountered at the Binningup site. With the timelines for the South West Yarragadee groundwater source extending into 2007, the critical path activities were addressed in February 2007 to obtain baseline marine environment data, effectively shortening the approvals timeframe by four months.

During the development of the procurement strategy component of the business case the Water Corporation examined alternative procurement methods for the desalination plant, including the use of a PPP. The preferred option of procurement under a competitive alliance was chosen because:

- It offered the greatest scope for integrating technological innovations into the plant design and capturing the expertise of contractors
- As the owner-participant the Water Corporation would have a greater ability to monitor progress during the design and construction stage and influence plant efficiency during the operation and maintenance stage relative to alternative procurement processes such as a PPP
- Risk control, including around community attitudes and planning and environmental approvals, would be more effective
- The ability to determine KPIs in relation to design and construction and subsequently, operations and maintenance.

In addition, having used a competitive alliance for the Perth Seawater Desalination Plant, a project that was delivered on time and on budget despite construction taking place during a period of strong growth in materials and labour prices, the Water Corporation had an in-depth understanding of the procurement method.

Key project insights – Business case development and environmental approvals

- The Water Corporation was required to deliver a business case for the SSDP within a tight timeframe and if it had been unable to achieve this, key outcomes in relation to water source augmentation would not have been delivered. The ability to leverage off the experience gained with the Perth Seawater Desalination Plant and the agility with which the project team was able to operate within established process was critical to success.
- The choice of a competitive alliance reflected the need to integrate technological innovations into plant design, maintain close oversight given the project timelines and the Corporation's ultimate responsibility for water supply, and the ability to involve contractors in the management of critical risks to the project delivery.

⁷⁸ Water Corporation (2007) Second Seawater Desalination Plant: Site Alternatives and Considerations.

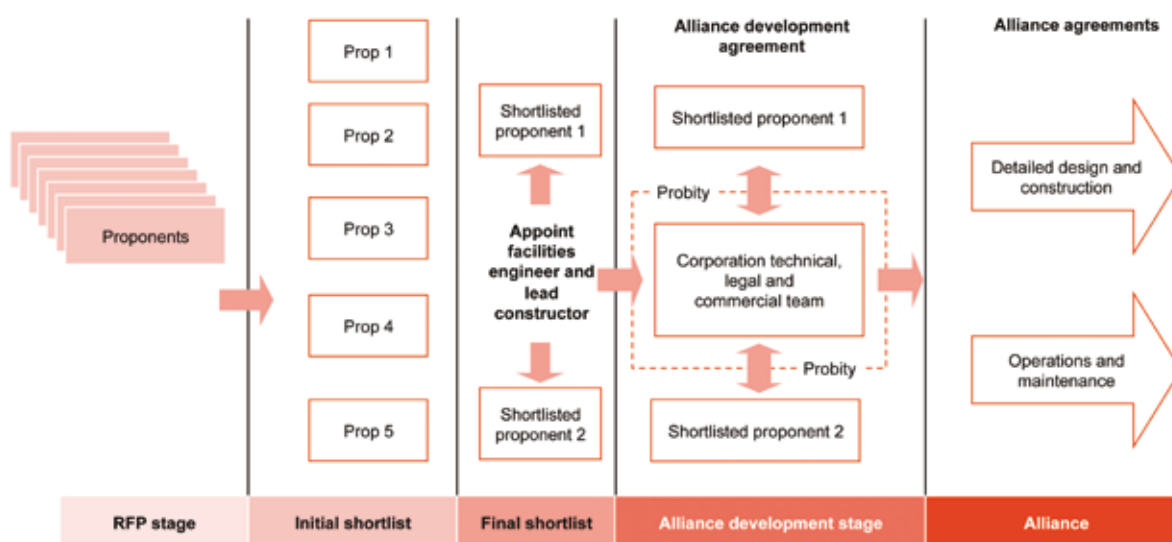
Delivery mechanism⁷⁹

The alliance framework delivers the design and construction and then operation and maintenance of the plant for 25 years (with assets handed over in a condition to operate for a further 10 years). These activities are captured in two agreements between the alliance participants, one dealing with design and construction, the other with operations and maintenance.

The lessons learned from the first desalination plant had a significant influence on the design of the contracting strategy and the selection phase. These key lessons were:

- Ongoing knowledge transfer from the alliance non-owner participants was crucial to the Water Corporation
- Primary selection should be focused on a process provider/operator to ensure the strength of this component in the alliance
- The lead constructor should be a non-owner participant not only during the design and construction phase but also for some period of the life of the operation and maintenance alliance.

Figure 8: Southern seawater desalination project competitive alliance process



Source: Water Corporation (2007) Request for proposals to form alliances to design and construct, and to operate and maintain the Southern Seawater Desalination Plant, p.8.

The process used to identify the alliance participants and form the alliance is shown in Figure 8. To inform the preparation by potential non-owner partners of proposals an initial project scope was prepared that placed clear boundaries around the project, limiting scope to the plant ocean intake and outfall and supporting infrastructure within the site boundary. Based on lessons from the PSDP the focus of the initial and final shortlisting of proponents was on the experience as a process provider and operator of a major reverse osmosis desalination plant.

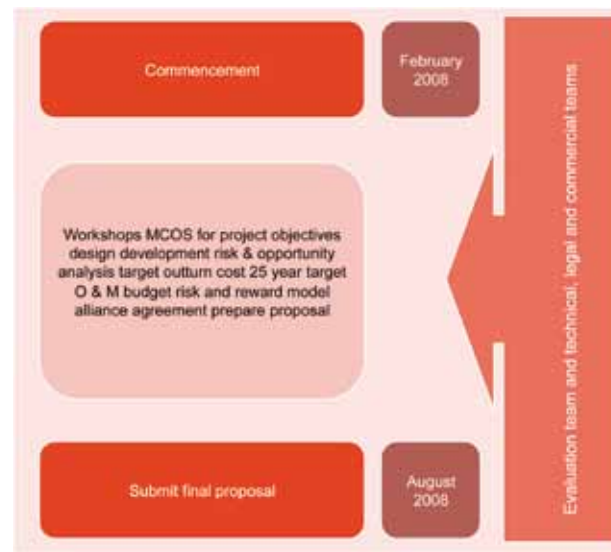
Respondents were asked to address the issues of how key objectives in terms of safety, compliance, fit for purpose, whole-of-life cost outcomes, operational date, community and stakeholder satisfaction were to be achieved. They were also required to demonstrate that they possessed core competencies in process design, operational experience, reverse osmosis membrane technology expertise, pre-treatment technology expertise and energy optimisation expertise.

⁷⁹ The focus of this section is on the alliance approach adopted for delivering the desalination plant. The project also involves the procurement of assets required to integrate the plant into the IWSS. As this component of the project involves assets whose technical and operational requirements are well understood, and for which there is a sufficiently deep pool of local contractors, competitive tenders are being used for delivery.

Proposals were subject to an initial desktop evaluation to develop a shortlist of four proponents. Interviews and further evaluation were used to reach the final shortlist of two proponents, with much of the evaluation effort directed toward confirming that proponents possessed the competencies identified in their proposals.

Development of the Alliance commenced in February 2008: Figure 9 outlines a number of activities involving the Water Corporation and the shortlisted proponents that were used to develop the Alliance Agreement and prepare a final proposal.

Figure 9: Alliance development stage



Source: Water Corporation, Southern Seawater Desalination Plant: Industry Briefing 18 September 2007

One benefit of the alliance delivery method for the project has been the capacity to leverage the relationship between the Water Corporation as the project owner and the non-owner partners to address issues such as community attitudes to the desalination plant.

Key project insights – Delivery mechanism

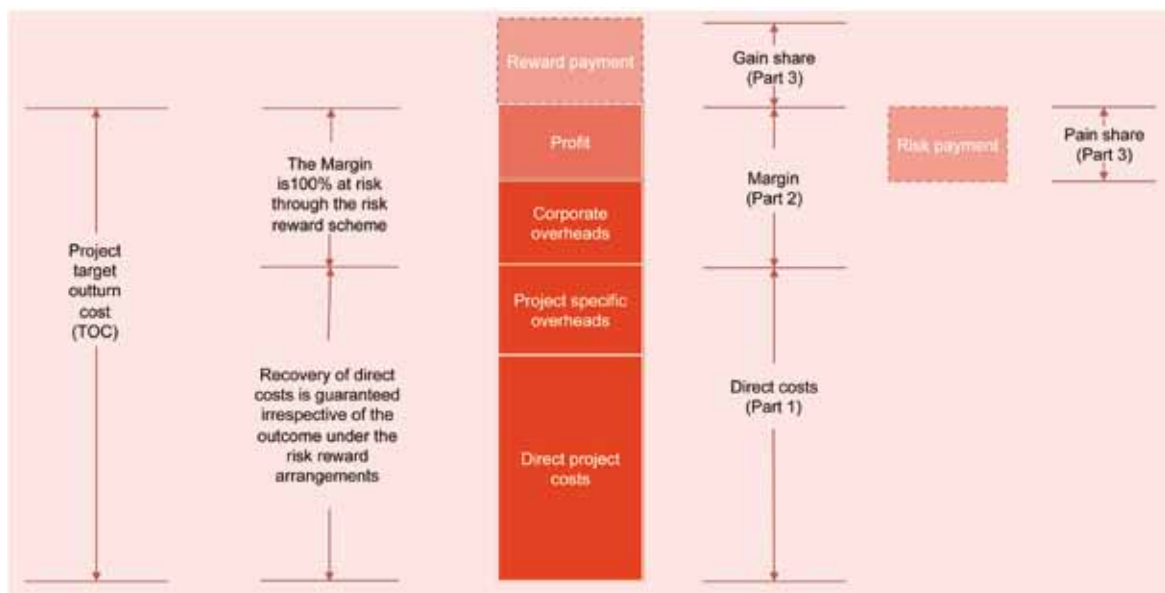
- Lessons learned during the course of the alliance used to deliver the Perth desalination plant, informed the development of the alliance for the SSDP.
- The Water Corporation could have chosen to procure the SSDP using a PPP, but the WA Government did not approve this when tabled. Victoria is using a PPP to procure the Wonthaggi Desalination Plant and the Water Corporation is currently considering the use of a PPP for procuring a desalination plant in the Pilbara region. Relative to a competitive alliance, a PPP would have allowed for greater risk transfer and would have spread procurement costs over the life of the desalination plant.
- However, PPPs require a high degree of certainty as to the infrastructure needs, timing and scale of work, and service delivery specifications. Furthermore, PPPs can take considerable time to develop.
- Faced with uncertainty in relation to technical specifications for the plant and environmental and planning conditions a competitive alliance appears to have been an appropriate choice for the Water Corporation, particularly given the tight timeframes required. It also needs to be recognised that even if these conditions had not existed there may have been greater certainty around value-for-money under a competitive alliance given the Corporation's experience with the Perth Seawater Desalination Plant.

The use of an alliance approach to deliver the SSDP limited the choice of funding to debt financing by the Water Corporation. There is also little scope within an alliance framework to reallocate specific sources of financial risks to the contractor, other than to the extent that they erode the margin component of total outturn costs or are factored into a future risk payment.

Figure 10 summarises the payment structure for the SSDP design and construction phase. Financial risk with respect to direct project specific costs and project specific overheads is borne by the Water Corporation as the owner-participant. Risk in relation to erosion of the margin component due to cost overruns and poor performance on non-cost key result areas is shared equally amongst the alliance participants with the non-owner participant's exposure capped at 100% of their margin.

Risk and reward payments are designed to focus the efforts of participants on the achievement of outstanding outcomes and reward participants for outstanding performance. Cost savings or overruns against the target outturn cost are shared equally between the Water Corporation and the non-owner participants.

Figure 10: Southern seawater desalination design and construction alliance payment structure



Source: Water Corporation (2007) Request for proposals to form alliances to design and construct, and to operate and maintain the Southern Seawater Desalination Plant, p.8.

Risk assessment

The evaluation process also provided the Water Corporation with the opportunity to assess the specific cost and risk profiles of initial proposals. Following the shortlisting process, the Water Corporation was confronted with a choice between two proposals with different characteristics. One of these proposals represented a low capital, higher risk but lower cost delivery option while the other involved more capital, lower risk relative to its competitor and higher construction costs.

Assessing the relative merits of these two quite different proposals was a particular challenge faced by the evaluation team. Significant effort was invested in ensuring that technical differences between the two proposals were effectively controlled for, and an exhaustive modelling of the financial risk characteristics of each proposal was undertaken. Ultimately, this evaluation led to the selection of the lower risk alternative on the basis that it had the lowest risk adjusted whole-of-life costs.

The Water Corporation also took specific actions based on its experience with the Perth Desalination Plant Alliance to reduce the risk of design and construction decisions being made without fully taking into account their potential impact on costs and performance during the operation and maintenance stage. A provision in the alliance framework locks in the equity of non-owner participants in the design and construction stage for a period of at least five years after commissioning, helping to sharpen the incentive to inform decision-making with consideration of whole-of-life cost impacts.

Key project insights – Risk assessment

- A decision between competing proposals for an infrastructure project often requires an assessment of risk adjusted cost outcomes to help ensure that value-for-money drives decision-making, rather than the minimisation of financial costs.
- In assessing competing proposals, the Water Corporation undertook a rigorous assessment of alternatives controlling for differences in technical specifications and informed by a well-developed understanding of the risks associate with the different options.
- Lessons from past projects were used to tighten the provisions of the Alliance to control whole-of-life costs. In particular, design and construction alliance partners are required to retain equity for the first five years of the plants operating life.

Risk management

A key success of the project to date has been that planning and approvals were secured quickly enough to allow construction to commence in time for commissioning ahead of the summer of 2011/12. Effective identification of risks, followed by their active management, has played an important role in this success. Key non-financial risks included:

- The need to have integration assets and other works away from the plant finished in time for the commissioning of the plant in late 2011
- The need to obtain environmental and planning approvals before final Ministerial approval to proceed could be given
- Running the procurement and approvals processes in parallel created a litigation risk that would have crystallised had the necessary approvals not been obtained within the timelines envisaged in the alliance frameworks
- Strong community opposition to the plant, which if not addressed, could have impinged on Ministerial, environmental and local government approvals being obtained within required timeframes.

Ultimately, the Water Corporation had to accept the first and second of these risks and manage them within its existing project management framework.

The risk with respect to environmental approvals was mitigated by drawing on the lessons from the Perth Desalination Plant when developing environmental impact monitoring and management rules for the plant and by choosing to seek Federal environmental approvals through a separate process rather than through the state system. This strategy allowed the Water Corporation to remain more closely involved with the Federal approvals process than it would have been under the state system approach.

Environmental risk management commenced with a scoping document (October 2007) followed by an Environmental Impact Assessment in March 2008 with an Environmental Protection Authority Bulletin released in June 2008. Under Western Australian legislation approvals the level of assessment was set by the EPA. State and Federal environmental approvals were required before approval for works could be given.

The environmental approvals process resulted in the following outcomes:

- Preliminary designs and location
- Layout and environmental envelope
- Management plans
- Ministerial Conditions on construction, operation and monitoring

The risk that planning approvals could be delayed or rejected reflected the current legislation and the need to obtain a rezoning of the Binningup land to allow the desalination plant to be built. The Water Corporation sought to work constructively with the relevant local government to achieve a win-win outcome for both parties. This included identifying where common use infrastructure needed to be upgraded and the mutually advantageous use of soil removed from the desalination plant site as fill at the local government's waste disposal facility.

The rapid emergence of the desalination plant as the preferred option for source augmentation meant that there had been little opportunity for stakeholder consultation prior to the announcement of the plant. Binningup and Myalup are small beachside communities of around 600 households and 400 households respectively. Many of the local residents place a very high value on the natural amenities of the area. Understandably then, around 70% of the Binningup community were opposed to the plant at the time of its announcement.

The Water Corporation approached consultation with the local communities with an open and transparent attitude. From the start there was a commitment to genuine engagement and working constructively with people to ensure a thorough understanding of the key issues on both sides. A Social Impact Assessment recommended the establishment of a Community Reference Group (CRA) to work on community related issues associated with the construction and ongoing operations of the SSDP. This group includes representatives from various Binningup and Myalup community groups, members of the general community and representatives from the Shire of Harvey. In addition to the 13 community members, there is an independent chair and a representative from the Water Corporation on the committee. Neither the chair nor the Water Corporation representative has voting rights. The Water Corporation also provides the CRG with administrative support in the form of an executive officer. A \$1 million local benefit package was also established to help the communities of Binningup and Myalup cope with the impacts of the desalination plant.

Consultation with the affected communities also informed the ultimate design of the plant. In particular, following completion of the SIA several modifications were made to the proposed project in an effort to remove or reduce potential negative impacts. Most notable from a social impact assessment and management perspective were the following:

- Originally, the worst case scenario impact assessment anticipated that the beach would need to be closed for up to 18 months for construction of the ocean discharge pipeline, including a temporary jetty. Instead, the ocean pipeline will be buried and constructed via a tunnelling process. As a result, 200 metres of the beach, either side of the pipeline, will be closed for only 2-3 weeks rather than 500 metres, either side of the pipeline, being closed for up to 18 months.
- The worst case scenario impact assessment originally incorporated a camp housing the construction workforce. A camp was not part of the preferred bidder's design for the construction phase. Instead, workers either commute to work from existing residences or find their own temporary accommodation within the surrounding area.

Key project insights – Risk management

- The tight timeframe for planning, approvals and procurement meant that running these processes in parallel was unavoidable. However, this approach inevitably created a more complex and interrelated set of risks around not only the delivery timeframe but also in terms of financial risks associated with having to delay finalising the alliance if environmental approvals were delayed.
- Having accepted these risks, the Water Corporation; put in place mitigation strategies that drew on its experience with the Perth Seawater Desalination Plant (environmental risks); actively engaged with local government to find win-win outcomes for both parties; and undertook a genuine, constructive and transparent consultation process with local communities.
- The importance of effective consultation on the part of government and its private sector partners has been highlighted by other case studies of infrastructure projects.¹ Within the constraints of project cost and achieving the required outcomes the engagement of the community should be reflected in the delivery of the project, and where dissatisfaction arises it needs to be managed appropriately.
- More generally, the Water Corporation's experience in delivering water source augmentation projects and using alliances for capital works has been an important in its willingness and ability to retain project risks.

Project governance and management

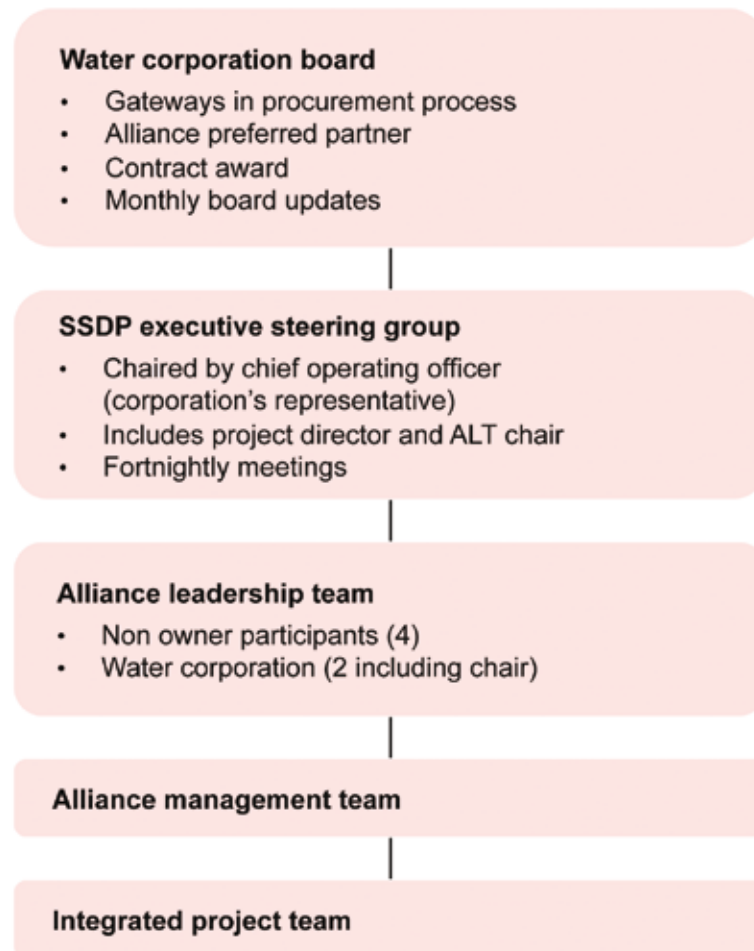
Project governance for the SSDP is reflective of the specific requirements of an alliance. In particular, a governance regime is required not only to oversee the SSDP as a stand-alone project within the Water Corporation but also to ensure that the alliance operates as intended.

As a public corporation, the Water Corporation is governed by a Board of Directors appointed under the Water Corporation Act 1995. The Board is responsible for overall corporate governance and approves the Water Corporations goals, strategic directions and budgets. The Board is also responsible for ensuring that legal compliance; ethical behaviour and proper risk management processes are in place and operate effectively. The Board is accountable to the WA Minister for Water acting as the shareholder for the performance of its duties.

In the case of the SSDP the Board was responsible for signing off at each gateway in the procurement process, selecting the preferred alliance partner and awarding contracts. The Board also received monthly updates on progress.

An Executive Steering Group, comprising the Water Corporation's Chief Operating Officer, the Project Director and the Alliance Leadership Team Chair, oversaw the work of the project team within the Water Corporation, meeting fortnightly for this purpose.

Project governance at the alliance level, which is based on the Water Corporation's standard alliance governance framework, is shown in Figure 11. The key governance role is played by an Alliance Leadership Team (ALT) comprised of two Water Corporation representatives and one representative from each of the non-owner participants. Each representative is authorised to represent and bind their respective Alliance Participant on any matter relating to the Project Alliance.

Figure 11: Southern seawater desalination plant governance structure

Source: Water Corporation (2007) Request for proposals to form alliances to design and construct, and to operate and maintain the Southern Seawater Desalination Plant, p.14.

The critical role played by the ALT is in the settling of disputes at the management level. The structure of the ALT needs to support the openness, trust and alignment of interests that should characterise the settlement of disputes and the operation of the alliance in general.

The core functions of the ALT are to:

- Lead the Project Alliances
- Ensure that the project objectives are met
- Resolve issues elevated to it on a 'best for project' basis.

The structure, responsibilities and accountabilities of the ALT and the Alliance Management Team (AMT) are set out in the Project Alliance Agreements and were developed in collaboration with the two shortlisted proponents during the Alliance Development Agreement Stage.

Overarching responsibility for project management rests with the AMT, which is comprised of representatives from both the owner and non-owner participants.

Key project insights – Project governance and management

- Alliances potentially place greater demands in terms of ongoing project management on public sector agencies than some other procurement models.
- Reflecting the importance of Alliancing for the Water Corporation's capital works program more generally, the Corporation has invested in the development of standardised governance arrangements for projects being delivered by an alliance. These standardised arrangements provide guidance in relation to the appropriate relationships between the Water Corporation, non-owner participants, members of the ALT and AMT, and parties within the Water Corporation with ownership of specific protocols.
- The Corporation has also developed a bespoke project management framework that is aligned with its sustainability business principles and applied to capital works projects

8.3 Summary of key conclusions

Following review of the Southern Seawater Desalination project, notwithstanding that the project is not yet complete, the following key conclusions regarding best practice planning and procurement at this stage can be identified:

1. **Strong arrangements for alliancing contracts** – Alliancing arrangements, since they involve shared responsibility for cost overruns, need careful management to protect public funds. Recognising the importance of alliancing for the Water Corporation's capital works program, the Water Corporation invested in the development of standardised governance arrangements for projects being delivered through an alliance.
2. **The value of contingency planning** – Planning for water source augmentation included the development of contingency options. When the lead supply option was rejected, the existence of contingency options allowed the required outcomes to be achieved within the timeframe for augmentation despite the unanticipated demise of the preferred option.
3. **Learning the lessons of previous projects** – Lessons learned during the course of the alliance used to deliver the Perth Desalination plant informed the development of the alliance for the SSDP. In particular, the lessons informed the process used to develop the alliance, which used a rigorous assessment of alternatives controlling for differences in technical specifications and informed by a well-developed understanding of the financial risks associated with the different options. Lessons from past projects were used to tighten the provisions of the Alliance to control whole-of-life costs. In particular, design and construction alliance partners are required to retain equity for the first five years of the plants operating life.

