

**THIESS**

2014 AUSTRALIAN CONSTRUCTION  
ACHIEVEMENT AWARD

# HUNTER EXPRESSWAY STAGE 2

.....  
EASTERN SECTION



Stage 2 of the Hunter Expressway involved the construction of 13km of the new 40km expressway between the M1 Pacific Motorway near Seahampton and the New England Highway west of Branxton, including the rugged Sugarloaf Range section.

## Introduction

The \$1.7bn Hunter Expressway involved the construction of a new four-lane freeway link between the M1 Pacific Motorway near Seahampton and the New England Highway, west of Branxton.

The Hunter Expressway Alliance including Roads and Maritime Services (RMS), Thiess, Parsons Brinckerhoff and Hyder Consulting (the Alliance) delivered the eastern section (Stage 2). Traversing the Sugarloaf Range, the Alliance team navigated steep environmentally-sensitive terrain to provide new connections and ease traffic congestion across the Upper Hunter Region.

### KEY PROJECT FEATURES INCLUDED:

- » Two grade-separated interchanges at the Newcastle interchange on the Pacific Motorway and at Buchanan on John Renshaw Drive
- » A sophisticated mine fill project involving 196,000 cubic metres of grout to fill the voids under major structures
- » More than 2 million cubic metres of earthworks
- » Three twin viaduct bridge sites (800m combined length and up to 42m high)
- » 23 bridges (including two overpasses)
- » Working in a 'live' traffic environment with up to 31,000 vehicle movements a day on the M1 Pacific Motorway.

## Outcomes achieved against planned targets for key project parameters



The Alliance including RMS developed 12 Key Result Areas (KRAs) to measure the team's performance.

### KEY ACHIEVEMENTS INCLUDED:

- » A Lost Time Injury Frequency Rate of 0.4 (only two lost time injuries occurred during 4.6 million project hours)
- » Completing the project \$40 million below the 'Overall Target Outturn Cost' of \$885 million
- » Reaching 'opening completion' on 13 August 2013, more than five weeks ahead of schedule
- » Handing RMS a 'defect free' project, including all documentation, nine weeks after opening completion and more than seven weeks ahead of schedule
- » Preserving and protecting important heritage items, including the Richmond Vale Railway and sensitive Aboriginal areas
- » Receiving and resolving a very low number of complaints (138 over three years)
- » Substantially reducing planned traffic interruptions on the Pacific Motorway
- » Recording above industry standard assessments for several areas of construction.

### Delivering sustainability

A focus on minimising vegetation clearance and maintaining fauna connections under the viaduct bridges and at strategic locations along the alignment helped to deliver sustainable outcomes.

### OTHER ENVIRONMENTAL-SUSTAINABILITY INITIATIVES INCLUDED:

- » Use of recycled glass in drainage bedding material
- » Introducing a water recycling system throughout the project to minimise the use of potable water
- » Trialling two hybrid excavators
- » Recycling more than 174,000 tonnes of fly ash for mine fill grouting.

The project's overall design will deliver long term economic and safety benefits to the transport industry and broader community, and accommodate the potential for future upgrades.

*Extensive proactive consultation ensured stakeholder satisfaction, with input and feedback sought on the final design and construction staging impacts.*

### Community

The Alliance raised and donated more than \$300,000 for the local community. The Hunter region benefited from Thiess' social responsibility program Care, which funded seven local charities to the tune of some \$42,000 on top of the incredible fund-raising activities on site, which the whole team supported.

## Complexity, difficulty and optimisation of the construction task



The Hunter Expressway Stage 2 was one of the largest and most complex projects in New South Wales' history, presenting environmental, geographical, Aboriginal and European heritage, technical and time-frame challenges.

The Sugarloaf Range section traverses undulating forests, watercourses and areas of historical mine workings. The risk posed by the presence of mine voids left large tracts of the route potentially unstable and liable to severe subsidence. Other risks included constructing two major interchanges under roadways with significant traffic volumes.

### OPTIMISATION STRATEGIES INCLUDED:

- » Focusing concept design and approvals on minimising disturbance to vegetation, erosion management and sediment control
- » Reducing clearing below agreed targets
- » Managing cross drainage sites and temporary controls to above industry standards

- » Undertaking a sophisticated mine fill project to stabilise the old mine workings beneath structures at the Newcastle Interchange and in the Sugarloaf Range (viaducts), reducing the effects of mine subsidence to manageable levels
- » Using precast balanced cantilever viaduct bridges and pier columns to reduce on site activity in the Sugarloaf Range and shorten construction time on critical path activities
- » Building 11km of engineered access roads in the Sugarloaf Range to facilitate and support construction
- » Constructing an incremental launch bridge over live traffic on the M1 Pacific Motorway
- » Undertaking complex traffic staging at interchanges
- » Upgrading from a 60km/hr to 80km/hr design on the Newcastle Interchange to reduce the project's footprint and mine fill requirements
- » Lengthening the crossing of Minmi Creek to protect sensitive Aboriginal heritage sites by using a steel trough girder design to increase the span to eliminate piers and keep abutments out of the sensitive area.

### Filling mine voids

The logistics of drilling and filling the old mine workings, and simultaneously constructing the sub-structure for the viaduct bridges in the Sugarloaf Range's steep terrain, required meticulous planning, 'out-of-the-box' thinking and precise coordination.

The depth and scale of mine voids beneath the Hunter Expressway necessitated one of the most sophisticated mine fill projects to date and provided significant improvements over standard industry practice.

The multi-purpose design of mine fill drill and grout platforms enabled them to be adapted for later use as piling and crane platforms, as well as storage and crib shed locations.

The supply of grouting materials was a major operation involving trucking of 174,000 tonnes of fly ash and 13,500 tonnes of cement via access tracks to the site's specially-adapted grout batch plants.

### Reducing on-site activity

The use of precast segmented balanced cantilever bridges overcame site constraints. In total, 566 viaduct deck segments were transported to site using oversized vehicles under 'escort'. Each segment ranged from 55 tonnes to 110 tonnes in weight, and measured 12m long, up to 4.2m high and 2.84m wide. There were 177 column segments, each weighing 35 tonnes, and measuring 6m long, 2m high and 3m wide. Each segment was produced in a controlled environment with millimetre accuracy.

### Staging construction

There were more than 48,500 traffic movements per day on the local and regional road network adjacent to and through the site. Interchanges were constructed in 12 discrete stages to minimise impact on and from road users.

## Leadership and management of the project delivery



Final inspection and ribbon cutting

### An emphasis on collaboration

The Alliance's vision was to "open a new frontier that benefits the Hunter Region and nation by daring to be different in achieving outstanding results".

Team collaboration and a culture of openness and communication was fostered during design and reinforced throughout construction, creating a high performance team committed to the project.

The alliance agreement and client's ongoing involvement facilitated flexibility in design solutions with a 'best-for-project' approach unencumbered by normal contractual constraints. A client peer review team participated throughout the project. Senior RMS staff were also embedded in the Alliance team from the start, providing insight, guidance and a client perspective.

Alliance partners put forward experienced professionals and construction personnel to form a team capable of managing the project's significant risk areas. Sub-alliances with specialist and expert sub-contractors were also formed, providing access to skills, expertise and capabilities to help mitigate and manage risks associated with mine fill operations and the viaducts.

The Alliance valued the interface between design and construction teams. The construction team had early involvement in the design process, emphasising constructability and collaboration, and reducing requests for information.

At peak production, there were more than 400 pieces of plant and a workforce of more than 900 on site. Weekly coordination meetings involved various teams and overall interface coordination meetings ensured the project continued smoothly. Issues blocking progress were identified early and appropriate solutions developed.

### Embedding a safety culture

The Alliance was committed to embedding a safety culture with initiatives designed to empower workers to address safety issues. Cross-disciplinary safety inspections, a working group to assess severe weather conditions, a dedicated height rescue team, monthly safety culture assessments and regular safety events promoted awareness and safe work practices.

A 'safety alliance' involving Thiess, RMS and Workcover was formed in 2011, ensuring a collaborative approach to safety leadership and delivering improved health and safety results.

The project experienced zero lost time due to Industrial Relations issues.

### A focus on training

Ongoing team training and development delivered a number of initiatives including literacy training, frontline supervisor development, and formal programs in construction, administration and safety.

**THE ALLIANCE TEAM'S SKILL, EXPERIENCE AND APPROACH TO THIS DIFFICULT AND CHALLENGING PROJECT PRODUCED AN OUTSTANDING OUTCOME FOR THE CLIENT, THE PARTNERS, AND THE COMMUNITY OF THE HUNTER REGION AND NSW.**

## Project partners (the Alliance)

<b>RMS</b>	Client and design review
<b>Thiess</b>	Construction partner
<b>Parsons Brinckerhoff and Hyder Consulting</b>	Design partners

## Sub-alliance partners

<b>VSL</b>	Viaducts superstructure
<b>Keller Minefill</b>	Drilling and minefill

## Alliance leadership team

<b>Peter Wellings</b>	RMS
<b>Colin Nunn</b>	RMS
<b>Brendan Donohue</b>	Thiess Pty Ltd
<b>Geoff Murrant</b>	Thiess Pty Ltd
<b>Graham Richardson</b>	Hyder Consulting
<b>David Stuart-Watt</b>	Parsons Brinckerhoff

## Project team members

<b>RMS Interface Manager</b>	Tony Gant
<b>Alliance Manager</b>	Peter Chatburn
<b>Design Manager</b>	Belinda Virant / Bruce Sweet
<b>Construction Manager</b>	Boyd Knights / Martin Hitchcock
<b>Project Development Manager</b>	Greg Fell
<b>Engineering Manager</b>	Aidan McCann
<b>Constructability Manager</b>	Todd Myers
<b>Construction Phase Services Manager</b>	Vince Urbano



## Contractor and client logos

### Contractors





### Client





### Assets supplied

Thiess\_NewLogo\_CMYK\_Gradient.eps

Parsons Brinckerhoff Logo.eps

Hyder Consulting Logo.eps

Hunter Expressway Alliance Logo.eps

AustGovt\_stacked.eps

Roads and Maritime Services Logo.eps

## Entry form

We submit the following entry for consideration for the 2014 Australian Construction Achievement Award.

Project Details		
Project title: Hunter Expressway Stage 2 – Eastern Section, Pacific Motorway to Kurri Kurri		Location: Hunter Valley NSW
Summary of scope of work (maximum of 50 words please): Design and construction of 13km of new expressway, including substantial minefilling, 29 bridges (6 high-level viaduct bridges over three deep gullies), 2.5 million cubic metres of earthworks and concrete & asphalt pavements. Also included are a new interchange at Buchanan and reconstruction of the Newcastle Interchange on the Pacific Motorway.		
Contract value: \$825M	Contract type: Alliance - Design & Construct	
Contract period: 200 weeks	Date of Substantial Completion: 13 August 2013	
Purpose of project: New National Highway expressway connection		Name of client / principal: Roads and Maritime Services
Address: Level 9, 101 Miller Street, North Sydney NSW		
Postcode: 2060	Contact name: Tony Gant	Title: Principal Project Delivery Manager, Hunter
Telephone: 02 4924 0393, 0411 112 683		Facsimile: 02 4924 0291
Description	Data required	Response
Contract	Contract tendered value or equivalent (e.g. TOC)	\$825M plus Scope Changes \$61m. Final (est) TOC \$886M
	Contract final value or actual outturn cost (AOC)	\$849M (est)
	Principal reasons for variances	Savings on contingency items and construction costs
	Any unresolved disputes? Status of those disputes?	NO
Contract period	Commencement date	2 December 2009
	Original completion date	20 September 2013
	Actual completion date	13 August 2013
	Principal reasons for variances	Acceleration of viaduct construction
Safety	Total hours worked	4.63M to 31 August 2013
	Total Recordable Incident Rate	6.7
	Details of any fatalities on the project	NIL

Continued >

## Entry form continued

The Hunter Expressway Alliance comprises 4 partners. Details of each partner are included.

Details of Entrant		
Name and position (Managing Director or equivalent): Martin Hitchcock (Alliance Manager) Thiess Pty Ltd		
Address: Level 5, 26 College Street, Sydney		Postcode: 2000
Contact name: Tel (02) 4014 5001 Fax (02) 9353 6040	Title: Alliance Manager	
Telephone: (02) 4014 5001 (02) 9332 9400-alternative M: 0418 715 954	Facsimile: (02) 9353 6040	Email: mhitchcock@thiess.com.au
Contact for logo approval: Martin Hitchcock	Name of organisation: Thiess Pty Ltd	
Address: Level 5, 26 College Street, Sydney, NSW		Postcode: 2000
Contact name: Martin Hitchcock	Title: Alliance Manager	
Telephone:	Facsimile:	Email: mhitchcock@thiess.com.au
Contact for PR information: Martin Hitchcock	Name of organisation: Thiess Pty Ltd	
Address: As above		Postcode:
Contact name:	Title:	
Telephone:	Facsimile:	Email:
Contact for video content: Martin Hitchcock	Name of organisation: Thiess Pty Ltd	
Address:		Postcode:
Contact name:	Title:	
Telephone:	Facsimile:	Email:

## ENTRY DECLARATION

We are duly authorised to submit this entry on behalf of the Entrant named on this form and:

- ✓ Agree to abide by the rules and conditions governing the Australian Construction Achievement Award as set out in this document, including payment of final entry fees if selected as a finalist.
- ✓ Declare that substantial completion of the project has been achieved in the 12 months prior to 30 September 2013.

Signature: 

Company:  
Thiess Pty Ltd

Name and position (Managing Director or equivalent):  
Martin Hitchcock (Alliance Manager)

Date:  
21/10/13

Details of Entrant		
Name and position (Managing Director or equivalent): Parsons Brinckerhoff Australia Pty Limited David Stuart-Watt		
Address: Level 27, 680 George Street, Sydney, NSW		Postcode: 2000
Contact name: David Stuart-Watt	Title: Director	
Telephone: (02) 9272 5100	Facsimile: (02) 9272 5101	Email: dstuartwatt@pb.com.au
Contact for logo approval: AS ABOVE	Name of organisation:	
Address:		Postcode:
Contact name:	Title:	
Telephone:	Facsimile:	Email:
Contact for PR information: AS ABOVE	Name of organisation:	
Address:		Postcode:
Contact name:	Title:	
Telephone:	Facsimile:	Email:
Contact for video content: AS ABOVE	Name of organisation:	
Address:		Postcode:
Contact name:	Title:	
Telephone:	Facsimile:	Email:

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Signature: 

Company:  
Parsons Brinckerhoff Australia Pty Limited

Name and position (Managing Director or equivalent):  
David Stuart-Watt

Date:  
21/10/13

## Entry form continued

Details of Entrant		
Name and position (Managing Director or equivalent): Hyder Consulting Pty Ltd Graham Richardson		
Address: Level 5, 141 Walker Street, North Sydney, NSW		Postcode: 2060
Contact name: Graham Richardson	Title: Associate Director of Transport	
Telephone: (02) 8907 9000	Facsimile: (02) 8907 9001	Email: Graham.richardson@hyderconsulting.com
Contact for logo approval: AS ABOVE		Name of organisation:
Address: AS ABOVE		Postcode: 2060
Contact name:	Title:	
Telephone:	Facsimile:	Email:
Contact for PR information: AS ABOVE		Name of organisation:
Address: AS ABOVE		Postcode:
Contact name:	Title:	
Telephone:	Facsimile:	Email:
Contact for video content: AS ABOVE		Name of organisation:
Address: AS ABOVE		Postcode:
Contact name:	Title:	
Telephone:	Facsimile:	Email:

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Signature: 

Company:  
Hyder Consulting Pty Ltd

Name and position (Managing Director or equivalent):  
Graham Richardson *Director Transport Projects*

Date:  
21 / 10 / 2013

Name and position (Managing Director or equivalent): Roads and Maritime Services <del>Tony Gant</del> CHRISTIAN McCALLUM		
Address: Level 9, 101 Miller Street, North Sydney, NSW		Postcode: 2060
Contact name: Tony Gant	Title: Principal Project Delivery Manager, Hunter	
Telephone: 4924 0393 M: 0411 112 683	Facsimile: (02) 4924 0291	Email: tgant@rms.nsw.gov.au
Contact for logo approval: AS ABOVE		Name of organisation:
Address: AS ABOVE		Postcode: 2060
Contact name:	Title:	
Telephone:	Facsimile:	Email:
Contact for PR information: AS ABOVE		Name of organisation:
Address: AS ABOVE		Postcode:
Contact name:	Title:	
Telephone:	Facsimile:	Email:
Contact for video content: AS ABOVE		Name of organisation:
Address: AS ABOVE		Postcode:
Contact name:	Title:	
Telephone:	Facsimile:	Email:

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- Declare that substantial completion of the project has been achieved in the 12 months prior to 30 September 2013.

Signature: 

Company:  
ROADS AND MARITIME SERVICES

Name and position (Managing Director or equivalent):  
CHRISTIAN McCALLUM (ALLIANCE INTERFACE MANAGER)

Date:  
28.10.13

## Declaration

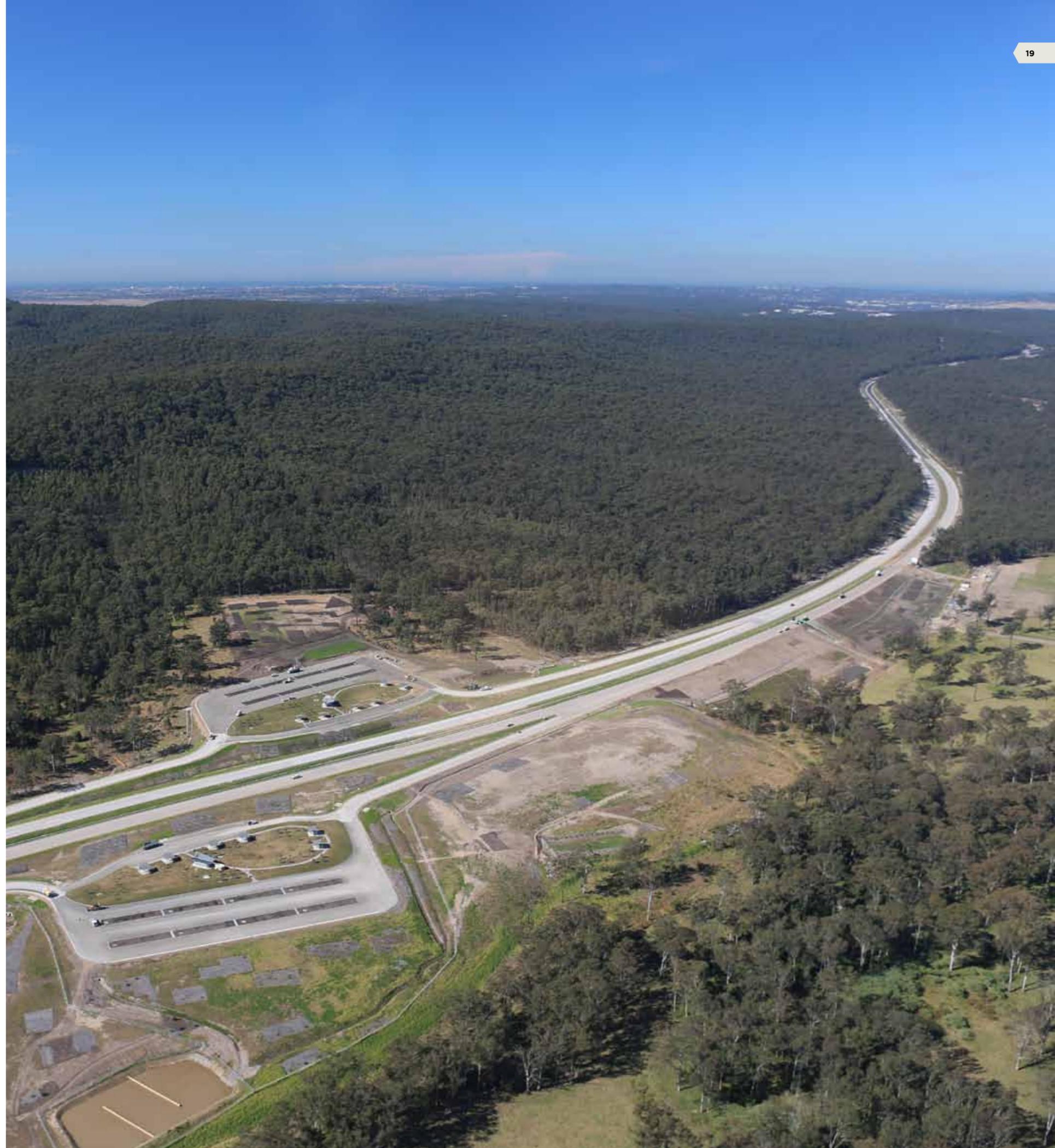
### WE ARE DULY AUTHORISED TO SUBMIT THIS ENTRY ON BEHALF OF THE ENTRANT NAMED ON THIS FORM AND:

- » Agree to abide by the rules and conditions governing the Australian Construction Achievement Award as set out in this document, including payment of final entry fees if selected as a finalist.
- » Declare that substantial completion of the project has been achieved in the 12 months prior to 30 September 2013.



**BRUCE MUNRO**  
MANAGING DIRECTOR, THIESS

7 November 2013



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