

SBEnc Boardroom Briefing

Aurecon Offices – Perth – 21 March 2018

SBEnc Project 2.51

Developing a Cross-Sector Digital Asset Information Model Framework for Asset Management (DAIM)

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Curtin University



Sustainable
Built Environment
National Research Centre

Project Team

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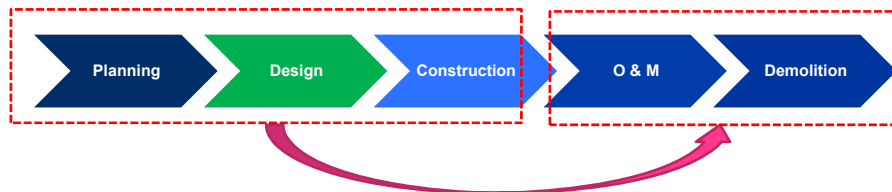
Why P2.51? Industry Drivers



- Construction industry embracing benefits of digitalisation
- Client demands
- Best value from asset - operational efficiency
- Pressure on O&M budgets
- Streamline the supply chain

What is P2.51?

From D&C to Asset Management



1. Development of a data structure – scalability & data integration.
2. Identification of asset information requirements (AIR)
3. A workflow to integrate data from existing assets.
4. Challenging cultural and established practice methodologies.
5. Identification of commonalities across the three sectors.

SBEnc Projects – Organic Evolvement



2.24 Integrated Project Environments – Leveraging Innovation for Productivity Gain through Industry Transformation

This research will contribute to realising productivity benefits of digital modelling and integrated project

Processes Completed

2.34 Driving Whole-of-life Efficiencies through BIM and Procurement

In 2013, the Australian Department of Industry identified lifting productivity and economic growth as

Processes Completed

2.51 Developing a Cross Sector Digital Asset Information Model Framework for Asset Management

Project 2.51 Fact Sheet Asset management in the built environment has been the

Processes Current

3.27 Using Building Information Modelling (BIM) for Smarter and Safer Scaffolding Construction

Information Sheet (544Kb, Sept 2014) Temporary structures like scaffolding have a significant impact

Productivity Completed

3.28 National BIM Guidelines and Case Studies for Infrastructure

Information Sheet (472Kb, March 2015) Mechanisms that improve collaboration and communication in the

Productivity Current

3.48 Sustainable Asset Management: Selecting Optimal Maintenance Strategies Based on Multi-criteria Decision Making

Project Fact Sheet In an economic downturn, it is of critical importance to

Productivity Current

Case Studies

- ✓ Case 1: Armadale Road
- ✓ Case 2: Forrestfield Airport Link
- ✓ Case 3: New Grafton Bridge



Overall view of the cases

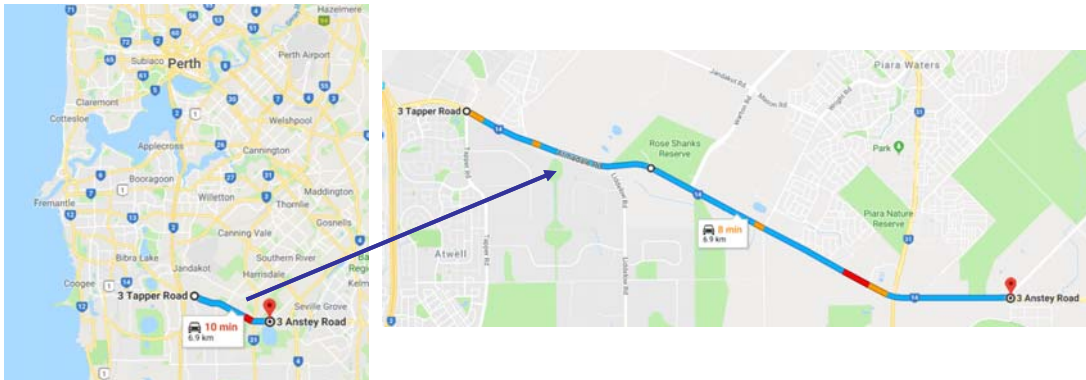
Case 1
Case 2

Case 3

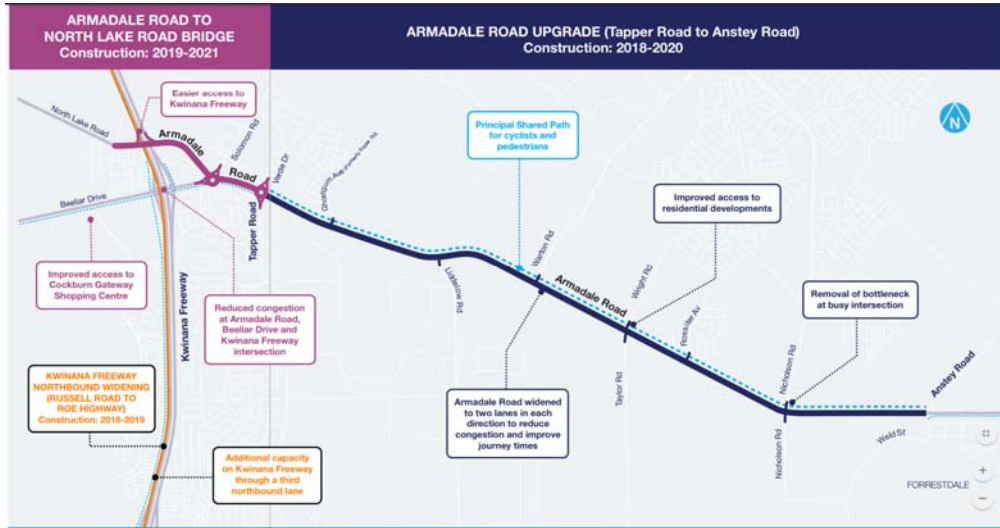


Case 1: Armadale Road

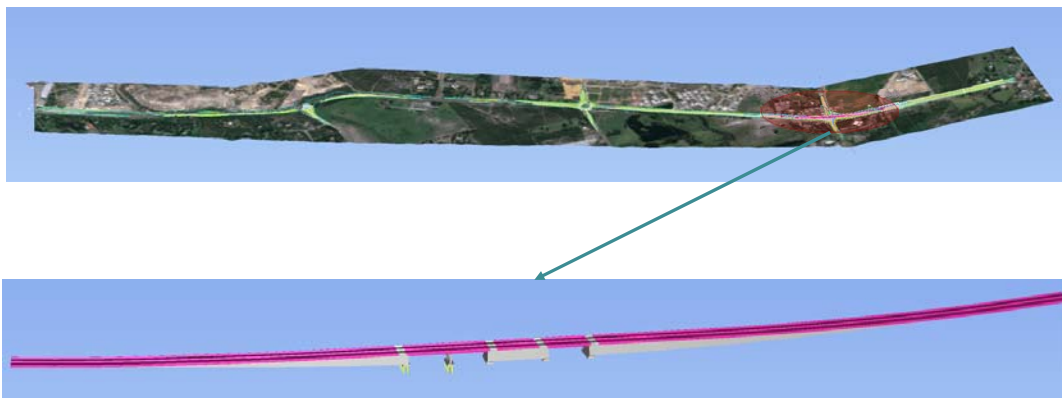
7km section of Armadale Road from Tapper Road to Anstey Road



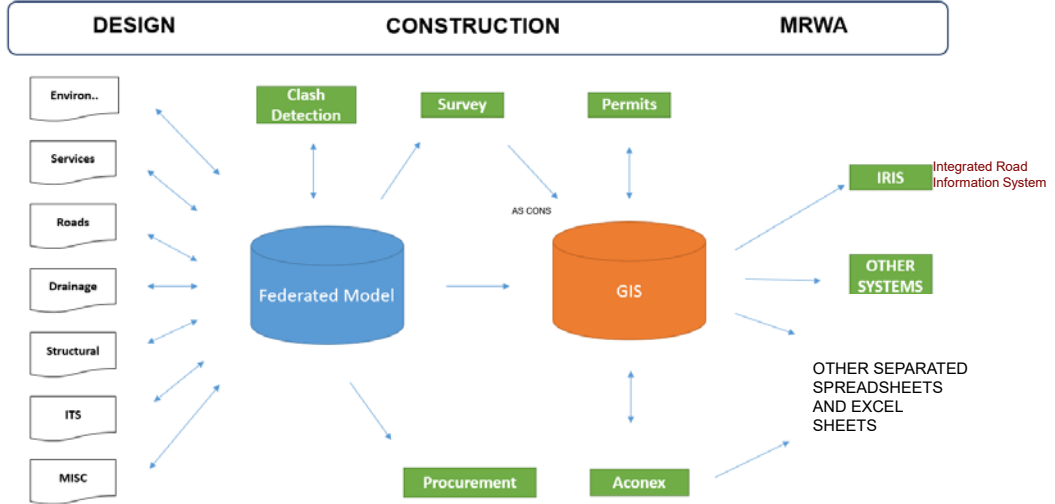
Case 1: Armadale Road



Case 1: Armadale Road



Case 1: Armadale Road



Case 1: Armadale Road

General Deliverables	Document	Comment
Digital Delivery Strategy Document	Yes	Prepared in consultation with MRWA staff
Project Implementation Plan	Yes	
Digital Execution Plan	Yes	
Employer Information Requirements Document	Yes	Produced as model for future projects

Design Deliverables Schedule	Model Element		15% Submission		85% Submission		IFC Design Submission		Deliverable			Design Software		Software Requirements
	(D1) Yes/No	(D2) Yes/No	LOD	LOD	LOD	LOD	2D drawings	3D model	GIS layer					
Utility Design	Yes	Yes	100	300	300	300	Yes	Yes	Yes	MX	12D			
Road alignment	Yes	Yes	100	200	200	200	Yes	Yes	Yes	MX	12D			
Side road alignment	Yes	Yes	100	200	200	200	Yes	Yes	Yes	MX	12D			
Earthworks	Yes	Yes	100	200	200	200	Yes	Yes	Yes	MX	12D			
Pavements	Yes	Yes	100	200	200	200	Yes	Yes	Yes	MX	12D			
Drainage elements - pits/pipes/headwalls	Yes	Yes	-	200	200	200	Yes	Yes	Yes	MX	12D			
Drainage basins/swales	Yes	Yes	100	200	200	200	Yes	Yes	Yes	MX	12D			
Kerbs	Yes	Yes	100	200	200	200	Yes	Yes	Yes	MX	12D			
Road Safety Barriers	Yes	Yes	-	200	200	200	Yes	Yes	Yes	MX	12D			
Major Signs/Gantries	Yes	Yes	-	200	200	200	Yes	Yes	Yes	ACAD	12D			
Landscaping	Yes	No	-	-	-	-	Yes	No	Yes	ACAD	ACAD			
Fencing	Yes	No	-	-	-	-	Yes	No	Yes	ACAD	ACAD			
Lane marking	Yes	No	-	200	200	200	Yes	Yes	Yes	ACAD	12D			
Services														
Existing in-ground services	Yes	Yes	-	100	200	200	Yes	Yes	Yes	12D	12D			
Existing above ground services - poles and wires	Yes	No	-	-	-	-	Yes	No	Yes	ACAD	ACAD			
New Services	Yes	Yes	-	200	300	300	Yes	Yes	Yes	12D	12D			
Electrical/ITS														
Light Poles	Yes	Yes	-	200	200	200	Yes	Yes	Yes	ACAD	12D			
CCTV poles	Yes	Yes	-	200	200	200	Yes	Yes	Yes	ACAD	12D			
Emergency Phones	Yes	Yes	-	200	200	200	Yes	Yes	Yes	ACAD	12D			
VMS Gantries	Yes	Yes	-	200	200	200	Yes	Yes	Yes	ACAD	12D			
Electrical pits/conduits	Yes	Yes	-	100	200	200	Yes	Yes	Yes	ACAD	12D			
Electrical transformers/substations	Yes	Yes	-	200	200	200	Yes	Yes	Yes	ACAD	12D			
ITS pits/conduits	Yes	Yes	-	100	200	200	Yes	Yes	Yes	ACAD	12D			
ITS field cabinets	Yes	Yes	-	200	200	200	Yes	Yes	Yes	ACAD	12D			
Bridges 1820 and 1821 (Nicholson Road Bridge)														
Piles	Yes	Yes	-	200	300	300	Yes	Yes	Yes	Tekla	Tekla			
Pilecaps	Yes	Yes	-	200	300	300	Yes	Yes	Yes	Tekla	Tekla			
Piers	Yes	Yes	-	200	300	300	Yes	Yes	Yes	Tekla	Tekla			
Abutment Footings	Yes	Yes	-	200	300	300	Yes	Yes	Yes	Tekla	Tekla			
Abutment Column forms	Yes	Yes	-	200	300	300	Yes	Yes	Yes	Tekla	Tekla			
Sill Beams	Yes	Yes	-	200	300	300	Yes	Yes	Yes	Tekla	Tekla			
Skirt Beams	Yes	Yes	-	200	300	300	Yes	Yes	Yes	Tekla	Tekla			
Upper Wing Walls	Yes	Yes	-	200	300	300	Yes	Yes	Yes	Tekla	Tekla			

- Asset Classification System (Transport for NSW)
- Austroads Data Standard



Case 1: Armadale Road

Our work plan

- Develop AIR for road and bridge (Girder Bridge)
- Develop DAIM for road and bridge
- Validate our proposed DAIM framework

Focal points

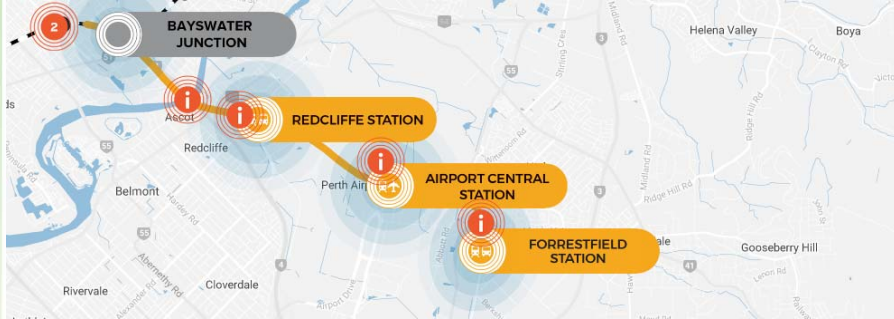
- Main Roads WA
- Dale Harrison and Liam Donnelly (Metropolitan Road Improvement Alliance)



Case 2: Forrestfield Airport Link

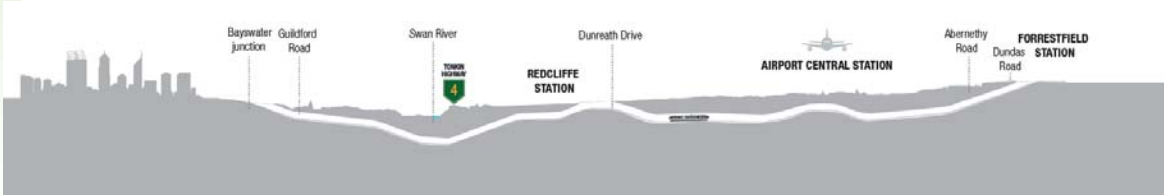


Case 2: Forrestfield Airport Link



Three new stations at Redcliffe, Airport Central and Forrestfield.

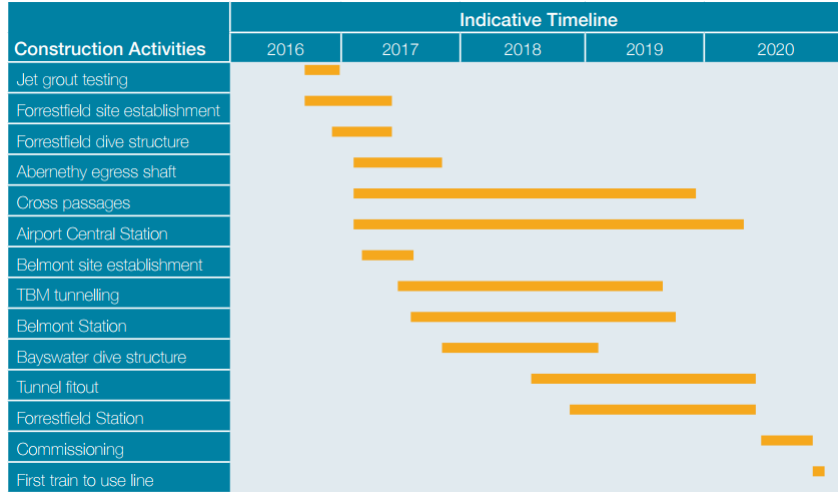
8.5 kilometres of new tracks, 8km of it in tunnels



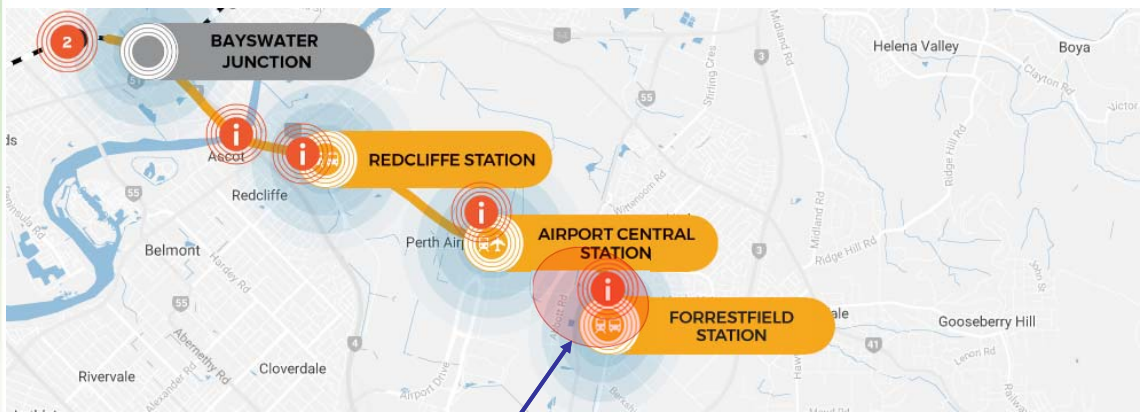
Case 2: Forrestfield Airport Link



Case 2: Forrestfield Airport Link



Case 2: Forrestfield Airport Link



Pilot Study



Case 2: Forrestfield Airport Link



Case 2: Forrestfield Airport Link

Our work plan

- Develop AIR for Railway and Tunnel
- Develop DAIM for Railway and Tunnel
- Validate our proposed DAIM framework

Focal points

- Troy Morse and Ian McAteer (Western Australia Public Transport Authority)

Case 3: New Grafton Bridge



Project scope

Building an additional **525 metre** bridge 70 metres downstream from the existing road and rail bridge.

Project snapshot

- Contractors: Fulton Hogan
- Form of contract: Design and construct contract
- Start date of major construction: **November 2016**
- Expected completion date: **2019** (weather permitting)
- Project value: \$240 million.

<https://v2.communityanalytics.com.au/rms/grafon#>



Case 3: New Grafton Bridge

Our work plan

- Develop AIR for Bridge (Segmental Bridge)
- Develop DAIM for Bridge
- Validate our proposed DAIM framework

Focal points

- Stan Robb(NSW Roads and Maritime Services) and Will Hackney (Aurecon)



Summary

1. Transportation Infrastructure

- Road
- Bridge (Girder and Segmental Bridge)
- Railway
- Tunnel

2. BIM Implementation in Design and Construction Stage

3. Across Australia (East and West Coast)



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