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for a better world
AECOM
A Decade of Flood Recovery & Resilience
The Queensland Experience
Ben McMaster, Julian Brangwynne-Smith & Martin Boshoff
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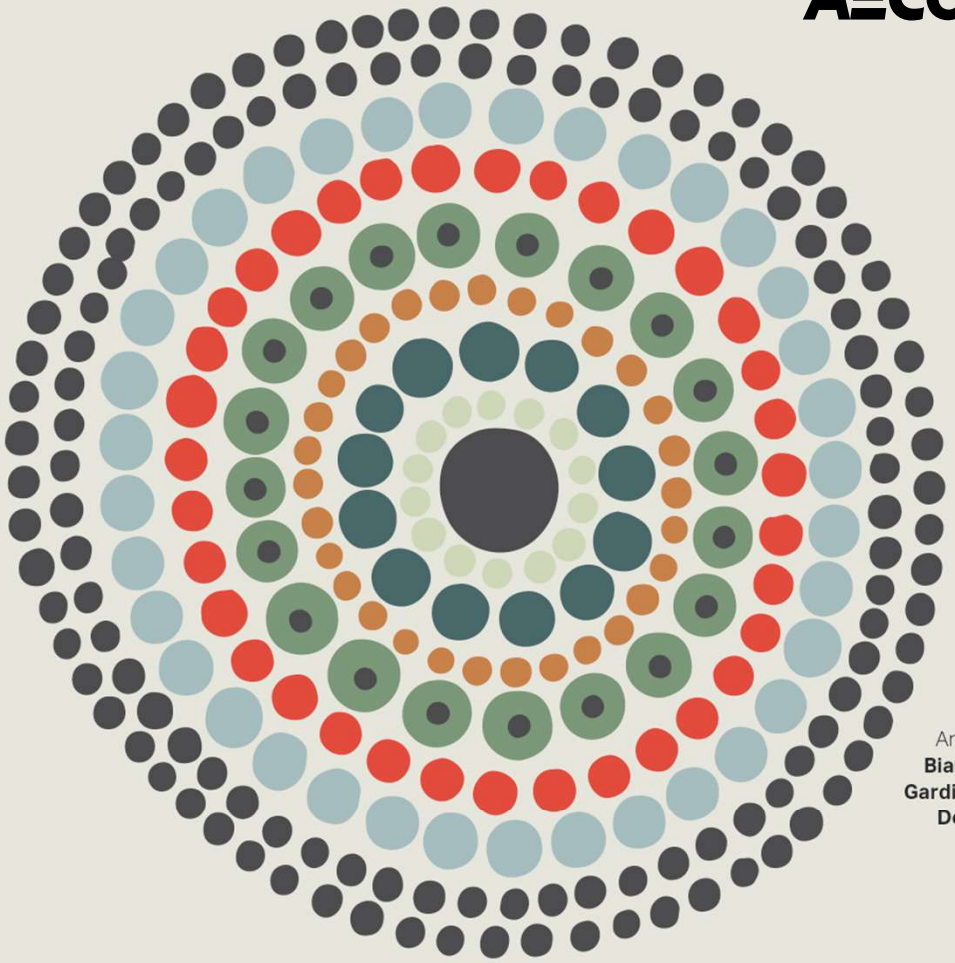
As we open today,
I would like to acknowledge
the First Peoples
across our countries —
the Aboriginal and Torres Strait
Islander Peoples across Australia
and their continuing connection
to country, and Māori as tangata
whenua of Aotearoa (New Zealand).

I would also like to extend
my acknowledgment
to our Aboriginal, Torres Strait
Islander, Māori and Pasifika
colleagues who are joining us
today.



Art by
Bianca
Gardiner
Dodd

Speakers

Martin Boshoff
Water Resources Sector Lead – Australia & New Zealand

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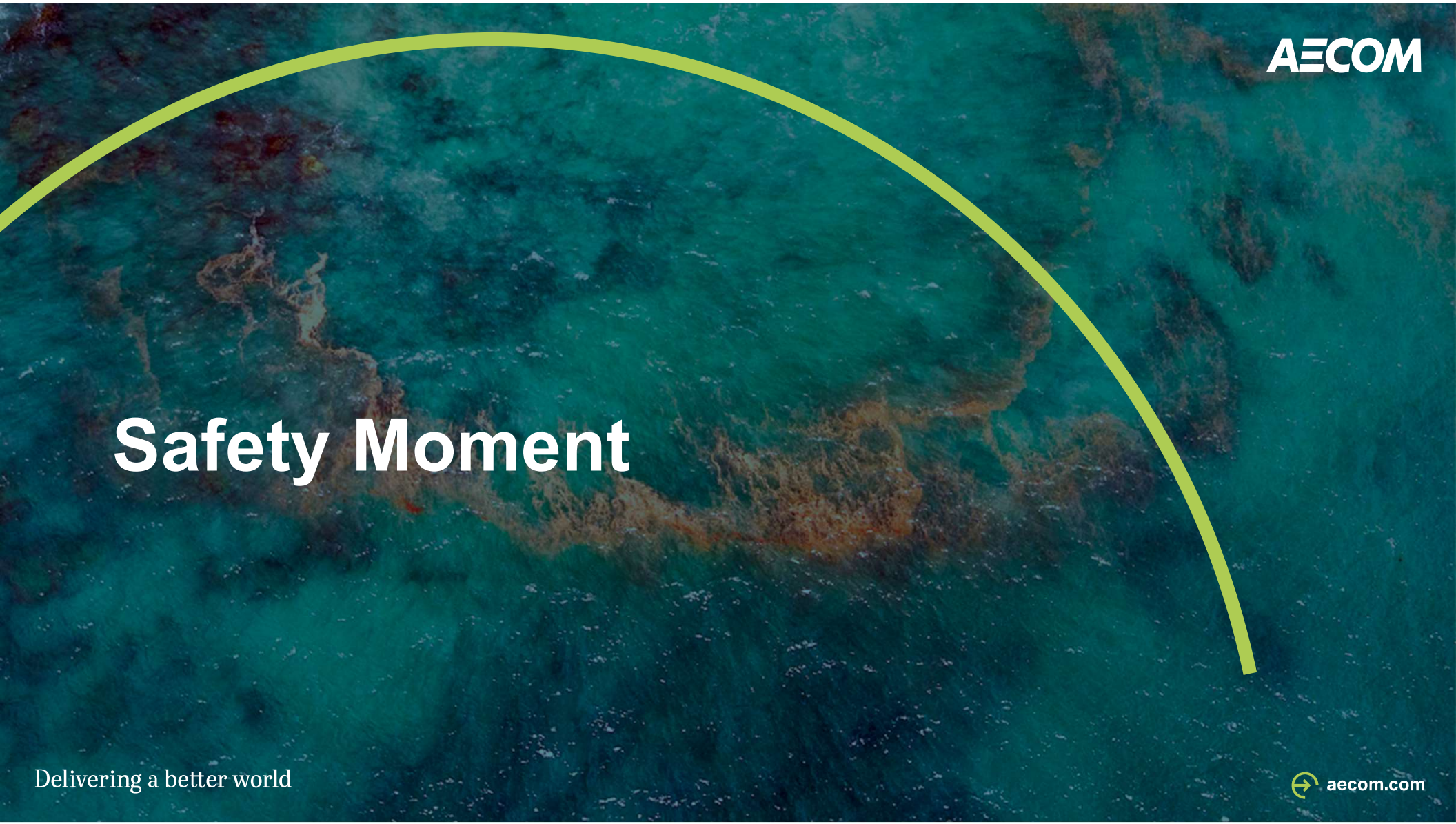
Julian Brangwynne-Smith
Technical Director – Integrated Program Delivery

Agenda

- Safety moment
- Setting the scene: 2010/11 flood event
- QRA establishment & funding arrangement
- Immediate response and damage assessments
- Reconstruction efforts
- Understanding flood risk and building resilience
- Q&A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Safety Moment
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Mental Health and Extreme Weather Events - Considerations for Flood Victims and First Responders

Research has shown that **mental health risk** is elevated for flood victims who:

- had their homes/businesses/farms inundated by flood water
- reported multiple and frequent exposures
- were still displaced after 6 months
- experienced insurance disputes and rejections

*If needing immediate assistance, reach out to services provided by your employer (i.e. **EAP**) or the two NZ helplines:*
***Depression NZ** -0800 111 757*
***Lifeline** -0800 543 354*

"Repeated trauma exposure is linked to the severity of adverse mental health impacts in emergency service workers. 39% of emergency responders are diagnosed with a mental health condition at some point in their life"
Black Dog Institute – Mental Health Impacts of Floods (2021)

2010/11 Queensland Flood Event

Setting the Scene

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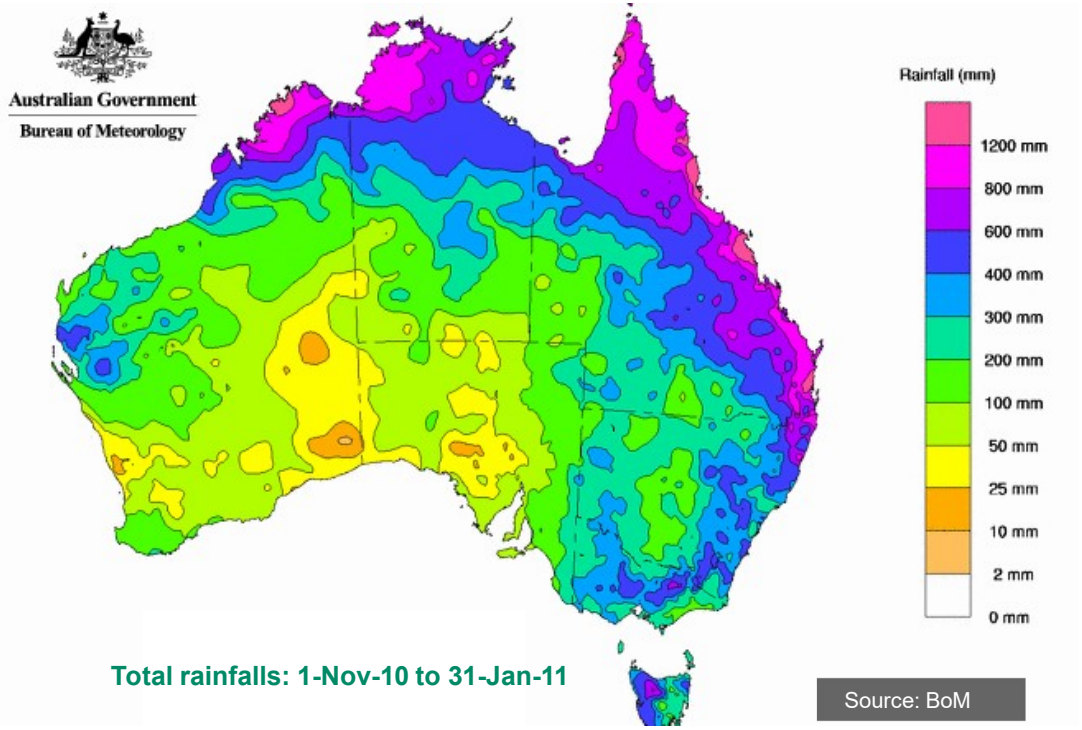
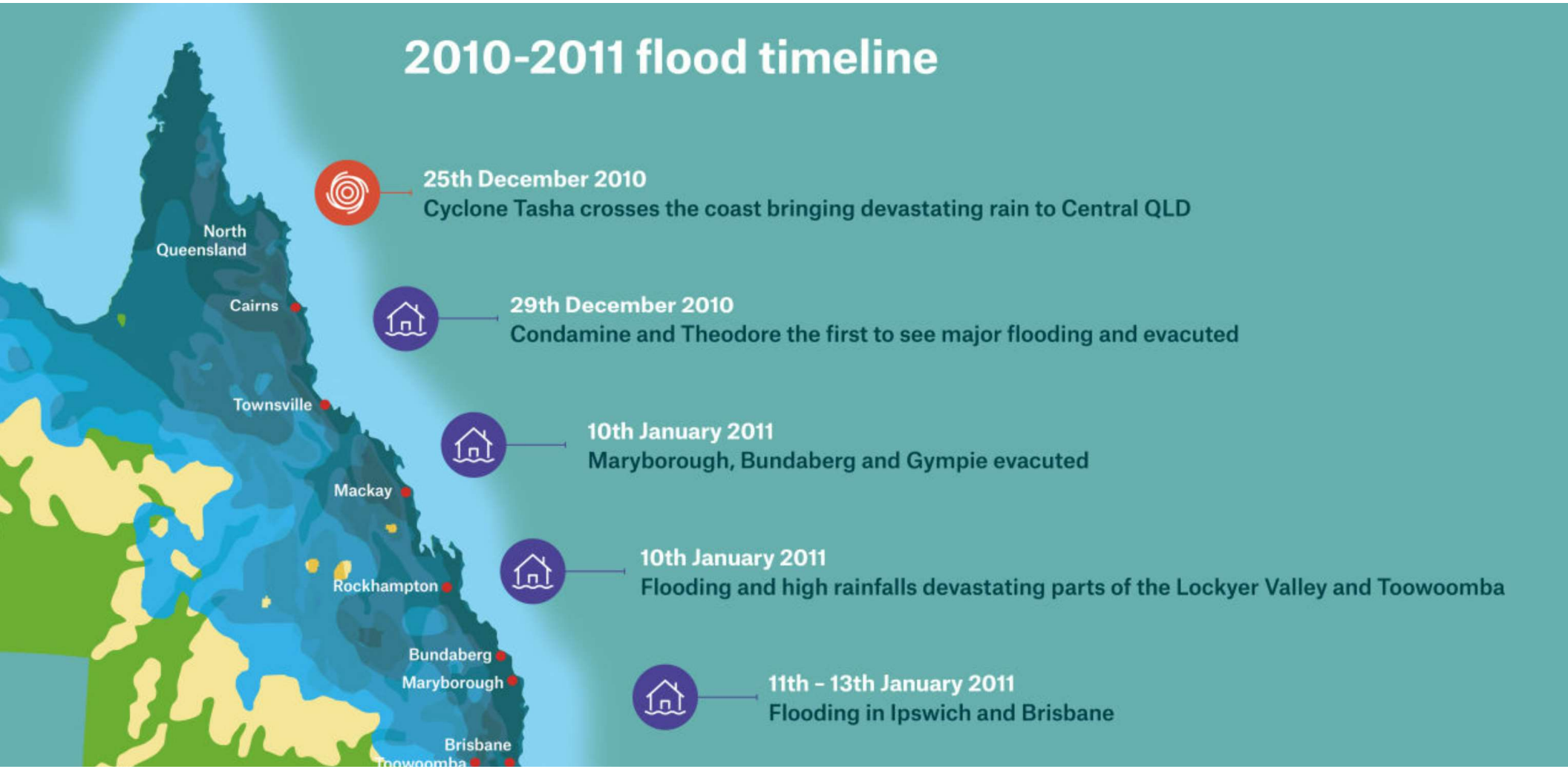
Setting the Scene: Extreme Rainfall Across the State

- Australian Bureau of Meteorology warned that a La Niña event was likely to occur in 2010.
- A strong La Niña event took place in the Pacific Ocean in late 2010 – the second strongest on record since 1917-1918.
- Monsoonal rainfall brought by Tropical Cyclone Tasha when it crossed the North Queensland coast on the 25th of December 2010, exacerbated floods already impacting communities in Central Queensland.
- Rockhampton, Gympie, Emerald, Bundaberg, Dalby and Roma, were all deeply impacted by the extreme rainfall, which later devastated communities in Toowoomba, the Lockyer Valley, Ipswich and Brisbane.



Setting the Scene: A Timeline of the Disaster



Setting the Scene: Record Breaking Flooding and Extensive Impacts

The cost...

1,000

Families displaced

12,000

People placed in evacuation centres across QLD

200,000

People affected (approx)

$30B

Loss in Australia's GDP

37,000

Homes and businesses inundated

$1B

Suncorp insurance claims in SEQ

16,000

Homes and businesses partially flooded

$6B

In damages total

78%

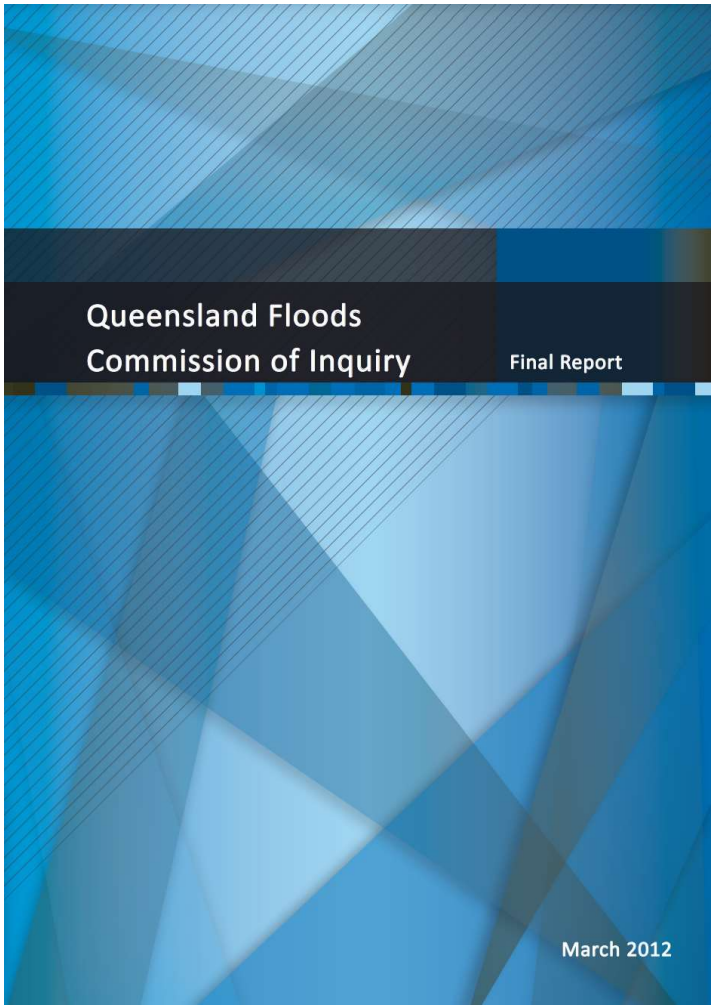
Of QLD declared a disaster zone

Setting the Scene: Flood Commission of Inquiry

The 650-page document contained **177 recommendations** relating to:

- Flood emergency management
- Flood planning
- Management of dams

…and, if implemented, will improve the preparation and planning of future floods and natural disaster emergency response in Queensland.

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Establishment of the *Queensland Reconstruction Authority (QRA)*

- The *Queensland Reconstruction Authority (QRA)* was **established under the Queensland Reconstruction Authority Act 2011 following unprecedented natural disasters that struck Queensland over the summer months of 2010-11**.
- A legislative amendment that came into effect on 11 June 2015 made QRA a permanent part of the Queensland Government.
- The QRA is the state's lead agency responsible for disaster recovery and resilience policy.
- The QRA reports to the Deputy Premier and Minister for State Development, Infrastructure, Local Government and Planning, the Honourable Dr Steven Miles MP, and also to the Queensland Reconstruction Board.
- Under the Queensland Reconstruction Authority Act 2011, the key purpose of the Queensland Reconstruction Board is to oversee the operations of the Queensland Reconstruction Authority (QRA).
- Jimmy Scott is the A/Chief Executive Officer (CEO) of the Queensland Reconstruction Authority.

Source: About us | Queensland Reconstruction Authority (qra.qld.gov.au)

Funding History (2011 to 2018)

Natural Disaster Relief and Recovery Arrangements (2011-2018)

Where does NDRRA funding come from?

- 75% of works reimbursed by Australian government
- 25% of works funded by State government
- Emergency Management Australia (EMA) administers NDRRA funding on behalf of the Australian government
- Emergency Management Queensland (EMQ) coordinated NDRRA funding in Queensland to 2011

Funding History (2018 – present)

Disaster Recovery Funding Arrangements (2018-present)

- The Australian Government *Disaster Recovery Funding Arrangements (DRFA)* came into place on 1 November 2018.
- The DRFA replaced the previous *Natural Disaster Relief and Recovery Arrangements (NDRRA)*.
- In broad terms.. Funding under DRFA is now split 50:50 between Australian Government and State Governments.

Source: Disaster Recovery Funding Arrangements 2018 (disasterassist.gov.au)


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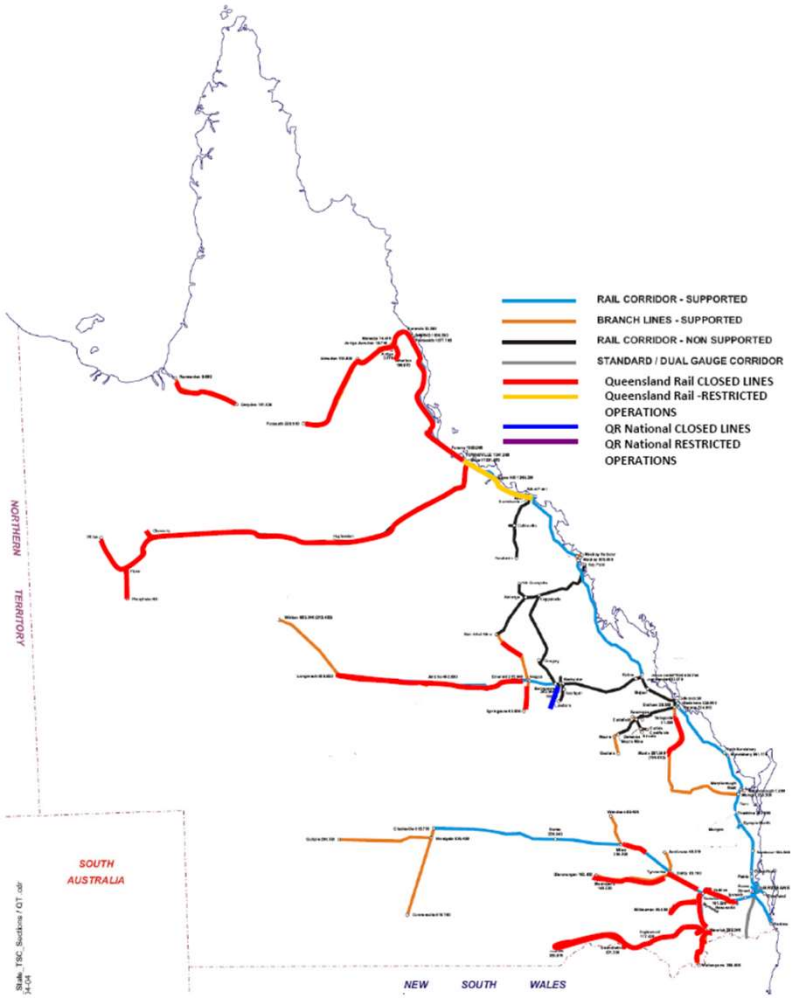
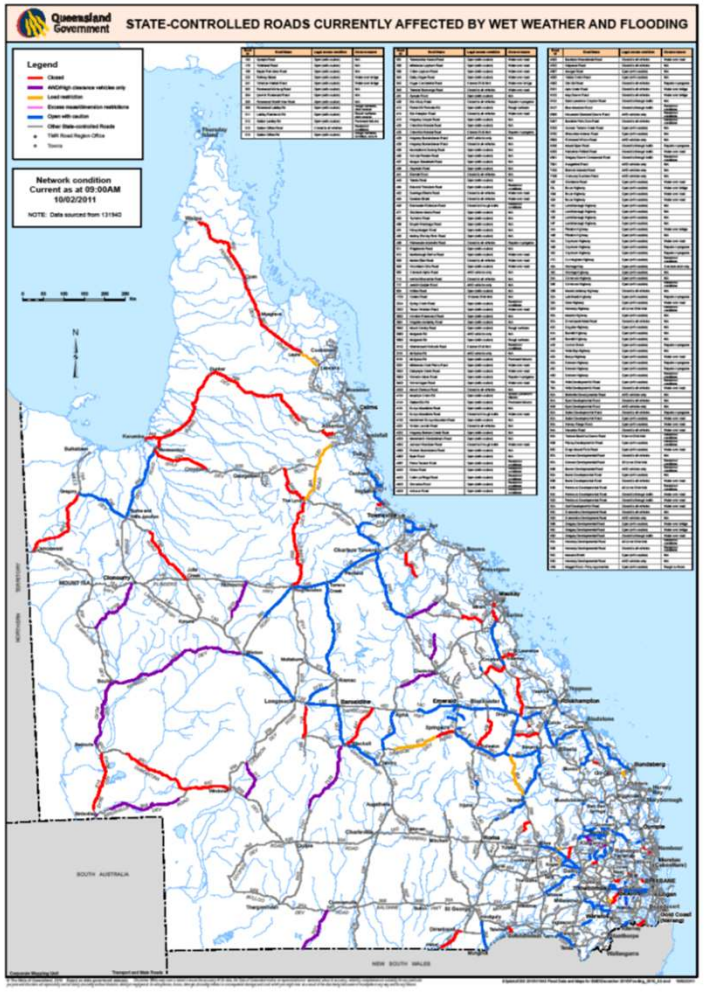
Impacts to State Controlled Roads & National Rail Network





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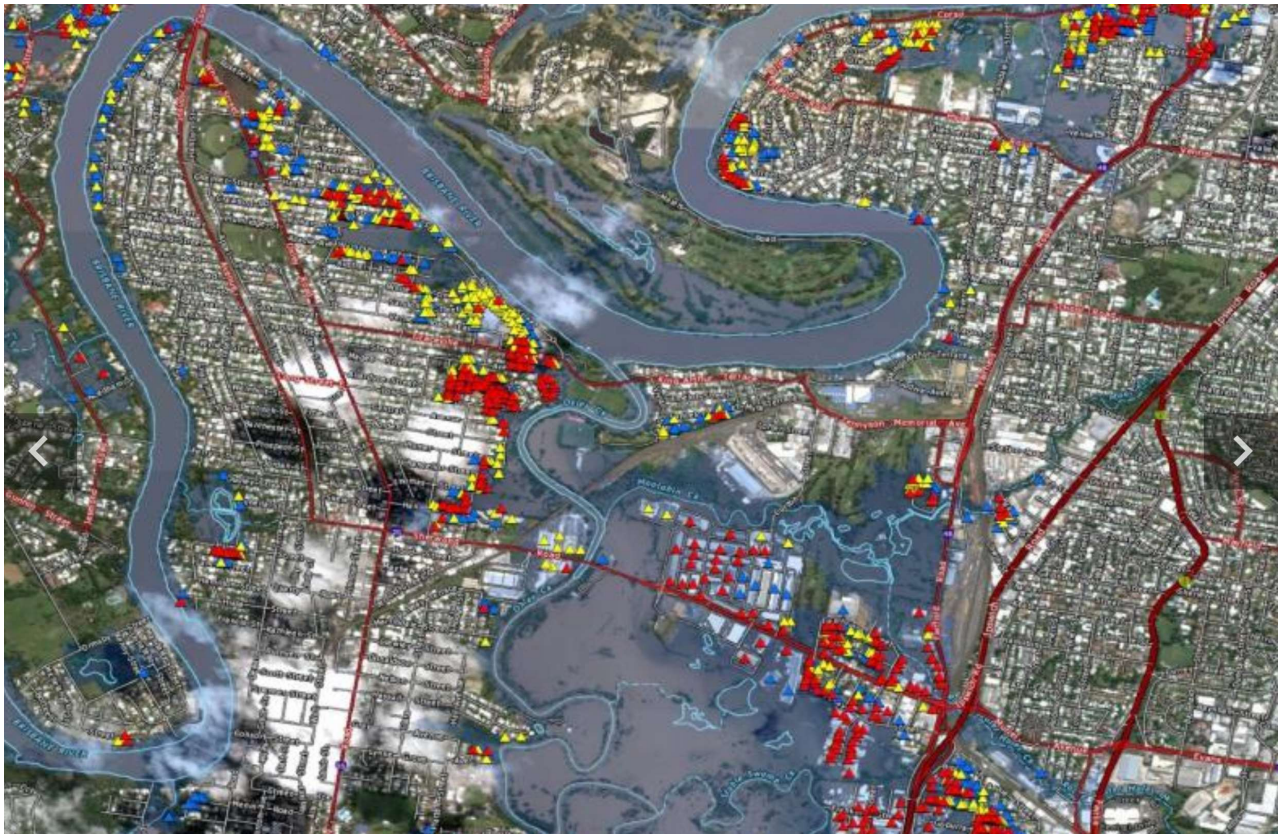
Building Damage Assessments

- QRA introduced Damage Assessment and Reconstruction Monitoring (DARM) in 2011.
- DARM is one of the main ways QRA monitors and supports reconstruction and recovery after a severe natural disaster or significant weather event.
- After every significant event, QRA visits impacted communities to monitor and record the progress of reconstruction and recovery.
- Visits usually occur every three months after an event, for up to a year.
- **Over 16,000 buildings inundated in the 2010/11 event.**



Scale of Transportation Infrastructure Damage Across the State (at 30 April 2011)

- 28% (approx. 9,170 km) of road network damaged by 2010 and 2011 weather events – road network suffered more damage than any other asset
- 55% (approx. 4,750km) of rail network affected
- 89 bridges and culverts damaged
- 5% of TMR's Brisbane cycle network and 5% of Cairns cycle network affected

Types of Damage

Pavement Damage

Approx. 85% of all essential public asset infrastructure damage

Types of Damage

Damage to bridges, culverts and floodways

Approx. 5% of all essential public asset infrastructure damage


Bedourie – Boulia Diamantina Developmental Road


Bloomfield River Crossing


Murphy's Creek Road

Types of Damage

Damage due to slope instability

Approx. 10% of all essential public asset infrastructure damage

Cunningham’s Gap

Damage to Rail and Maritime Infrastructure

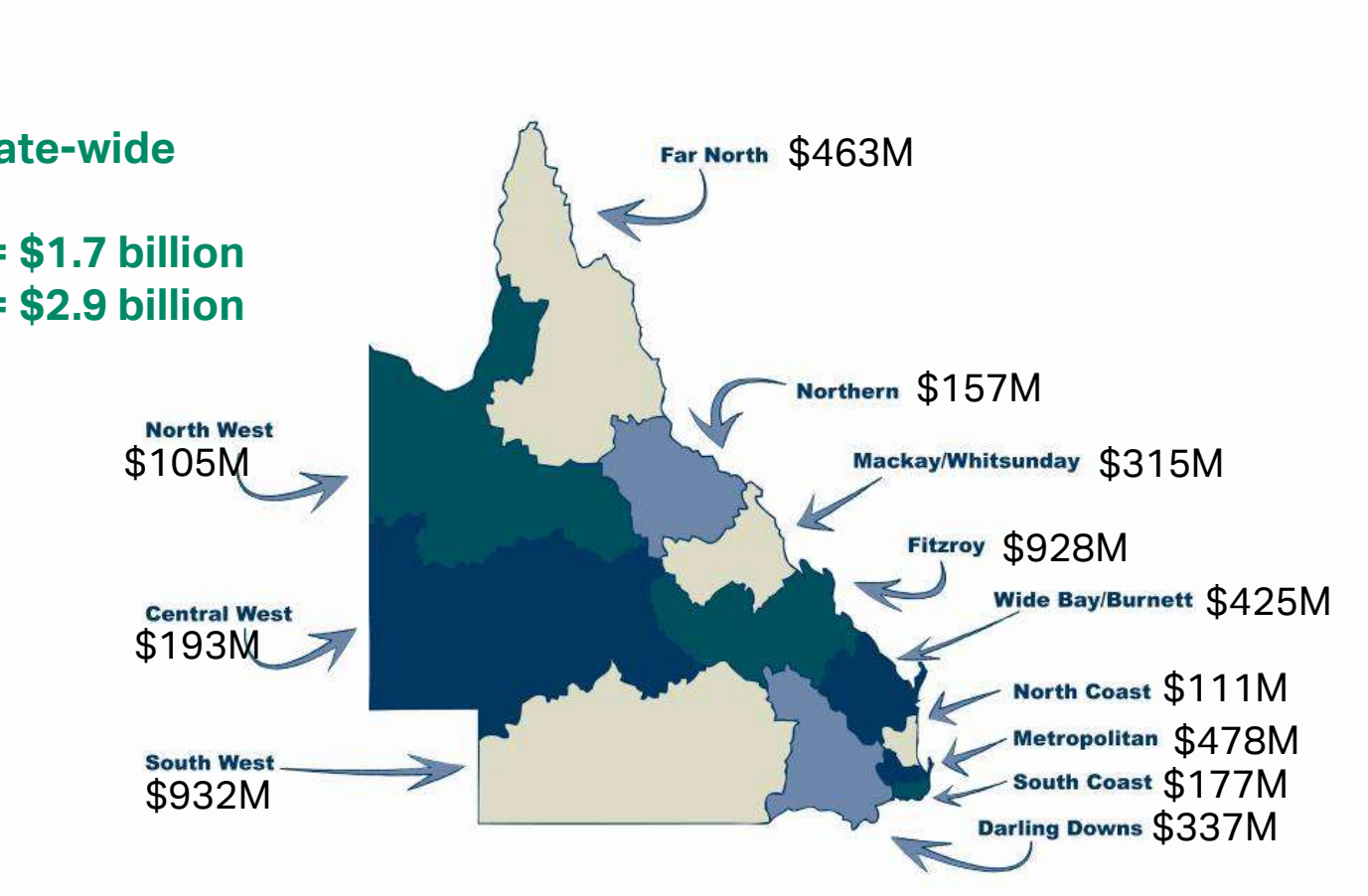
Western Rail Line - Toowoomba

Townsville Sea Reach Leads

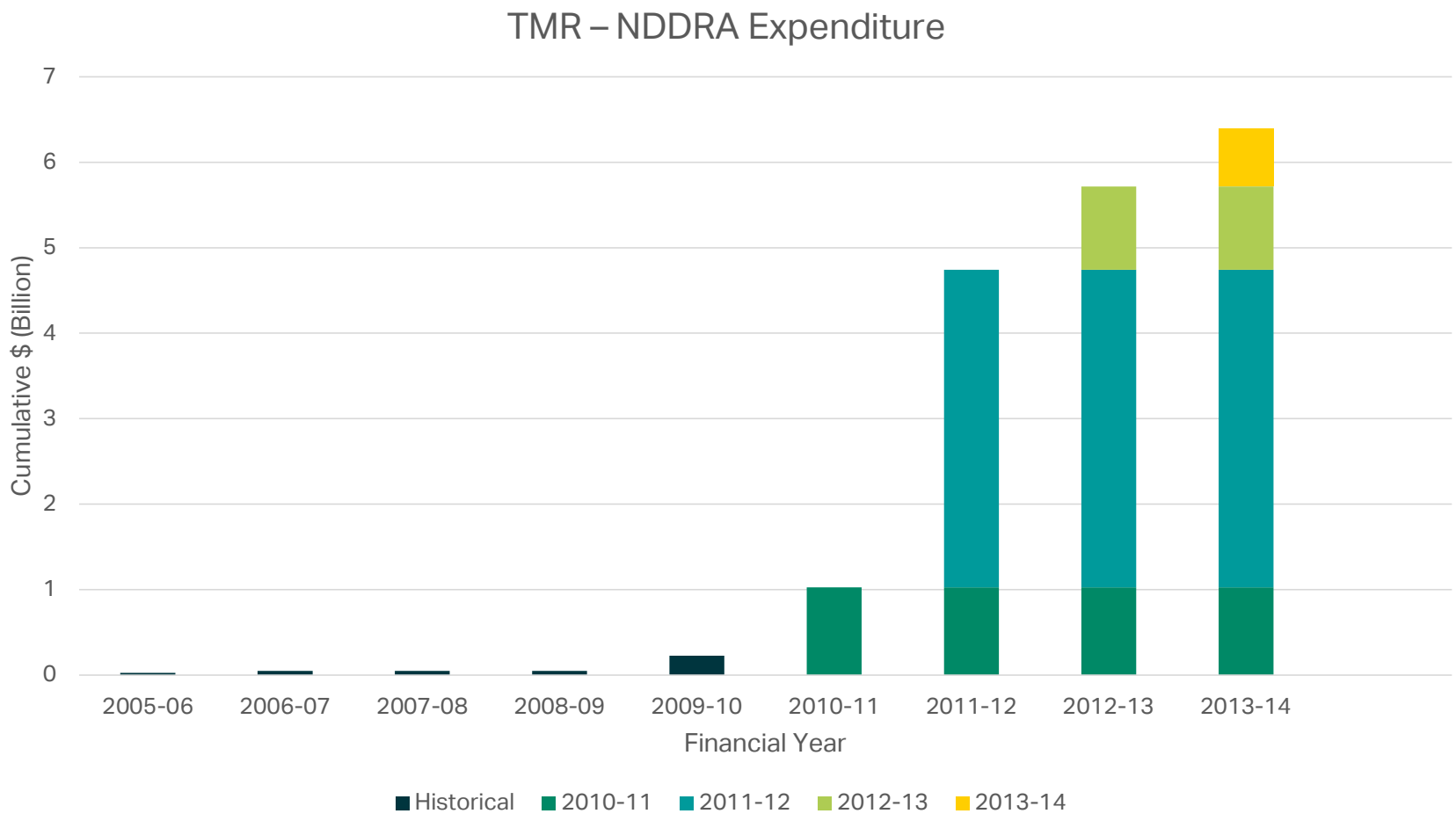
Estimated damage (2011 dollars) as at end March 2011

$4.6 billion state-wide

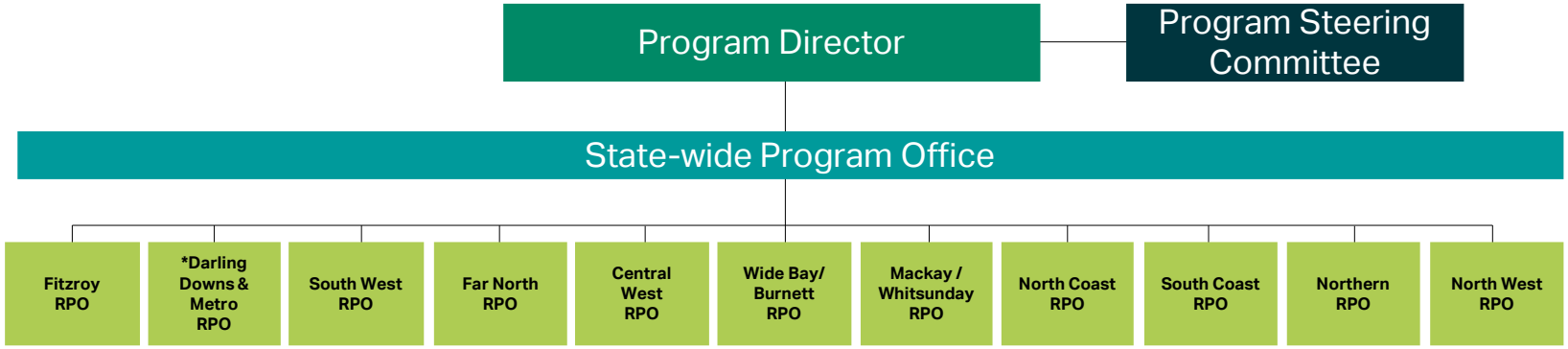
2010 events = $1.7 billion
2011 events = $2.9 billion

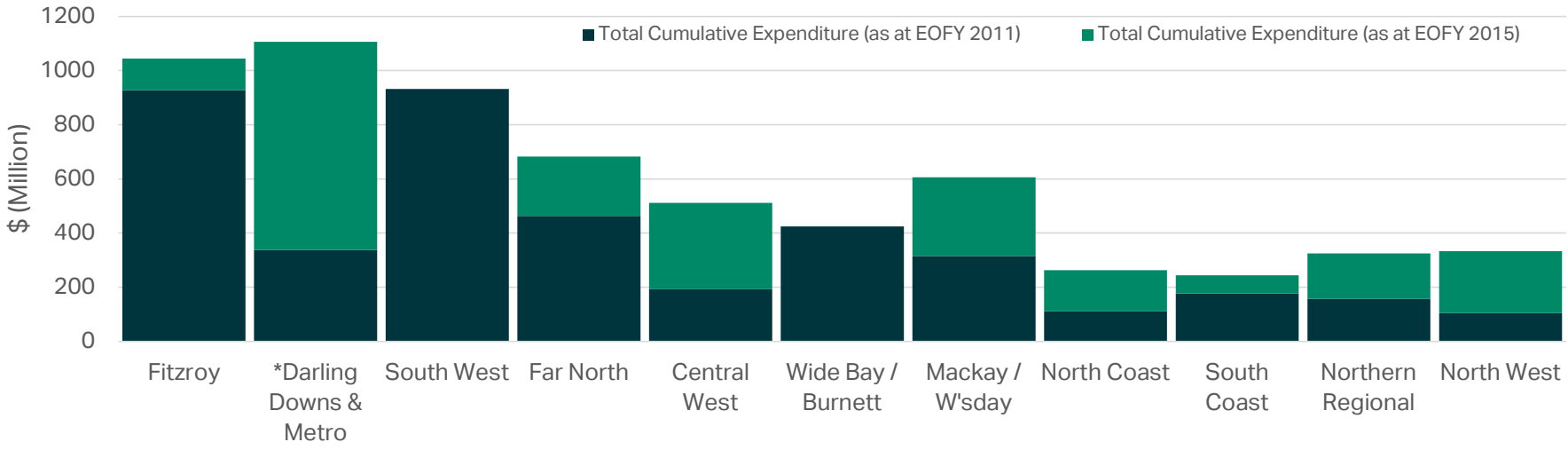


Historical Expenditure - Department of Transport & Main Roads (TMR)



Program Delivery Structure and Additional Event Damage Expenditure





* Represents 2 regions under 1 RPO

What have we learnt?

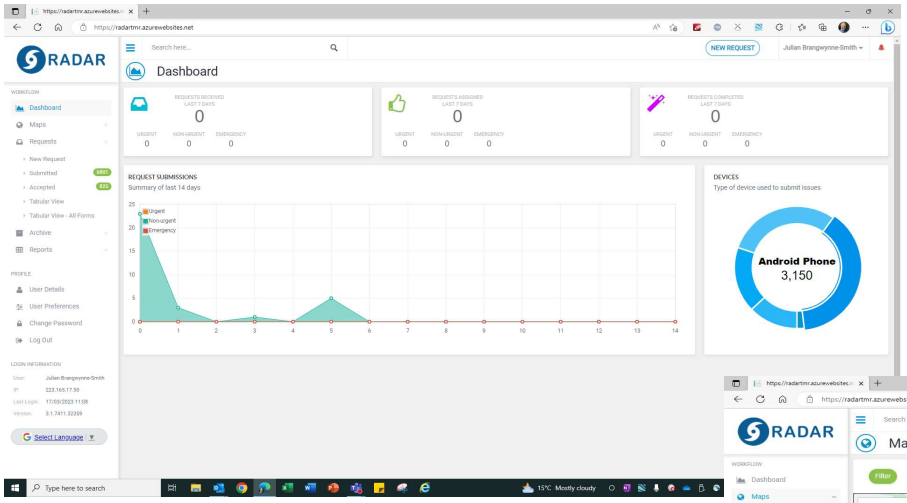
Gathering data

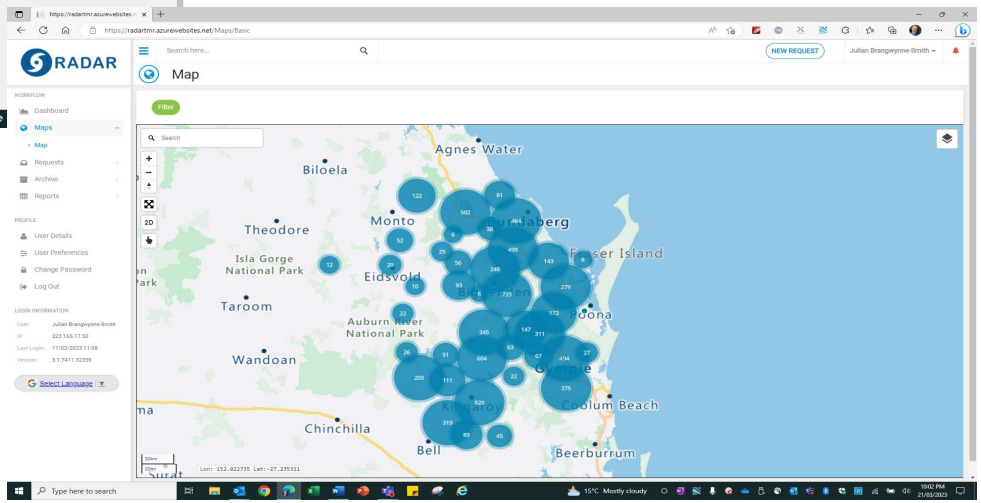
Evidence is 'KING'!

Phase 1 Estimate –

Damage assessment for funding application

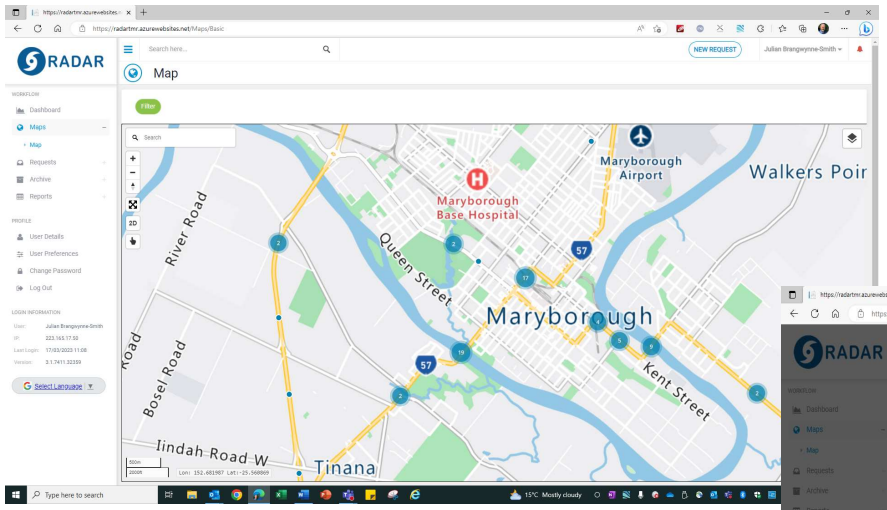
What have we learnt?
Gathering data (TMR RADAR system)

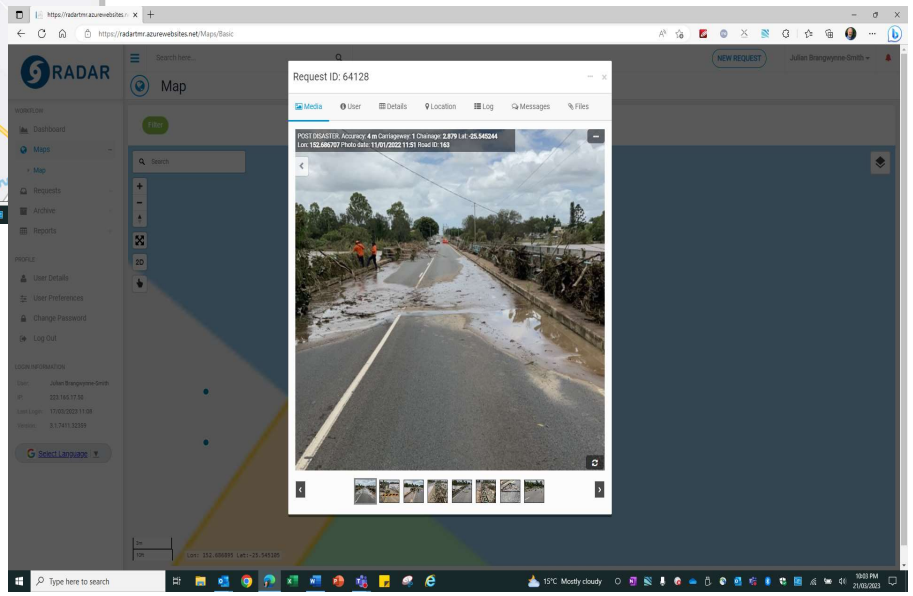




Lessons Learnt in TNRP Delivery – Gathering the Evidence

What have we learnt?
Gathering data (TMR RADAR system)

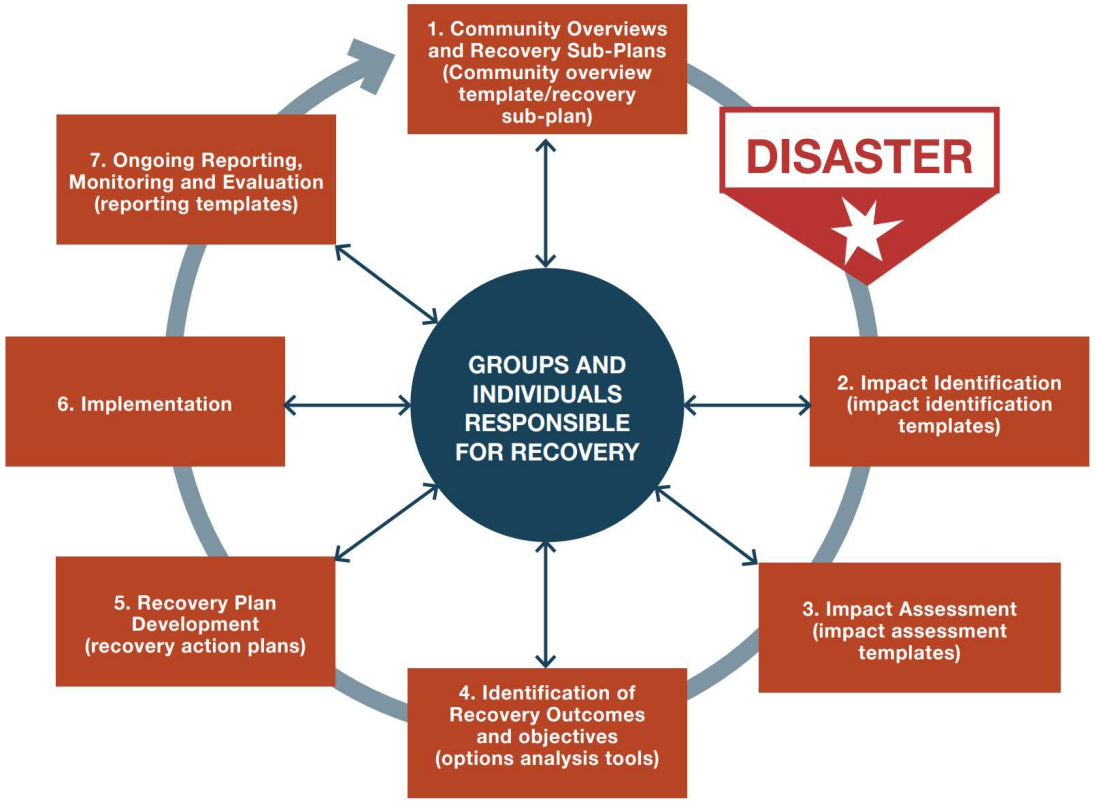




Lessons Learnt in TNRP Delivery – Using a centralised, common and accessible repository for data

What have we learnt?

Flood Recovery Process & Methodology (Qld Recovery Plan, 2021)



Source: QRA

What have we learnt?

Characteristics of a Successful Recovery

Community-led	Respects the role of all communities in recovery and seeks to engage, enable and include those more at risk in disasters throughout the recovery process.
Dynamic and tailored	Reflects the specific context of the event and unique history, values and dynamics of affected communities whilst reflecting and anticipating community needs, priorities and aspirations in a complex environment.
Evidence-based	Recovery programs are designed, managed, monitored and evaluated on the basis of needs and impacts of potentially compounding consequences as well as evidence from diverse sources.
Collaborative, scalable and capability focused	Recovery programs are implemented in a scalable, collaborative and flexible manner drawing on the compatibility of functions and resources. They recognise, utilise and grow existing recovery capabilities.
Resilient	Enables the sustainable enhancement of lives, livelihoods and community resilience.

Source: QRA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Reconstruction Efforts – Transport and Main Roads Case Study
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Department of Transport & Main Roads Response

- **Established the Transport Network Reconstruction Program (TNRP)**
- **Part of TMR Queensland Transport and Roads investment Program (QTRIP)**
- **All modes**
  - Road
  - Rail
  - Ports
  - Maritime
- **Established the State-wide Program Office (SPO) and 12 Regional Project Offices**
- **TNRP reports to the Queensland Reconstruction Authority**

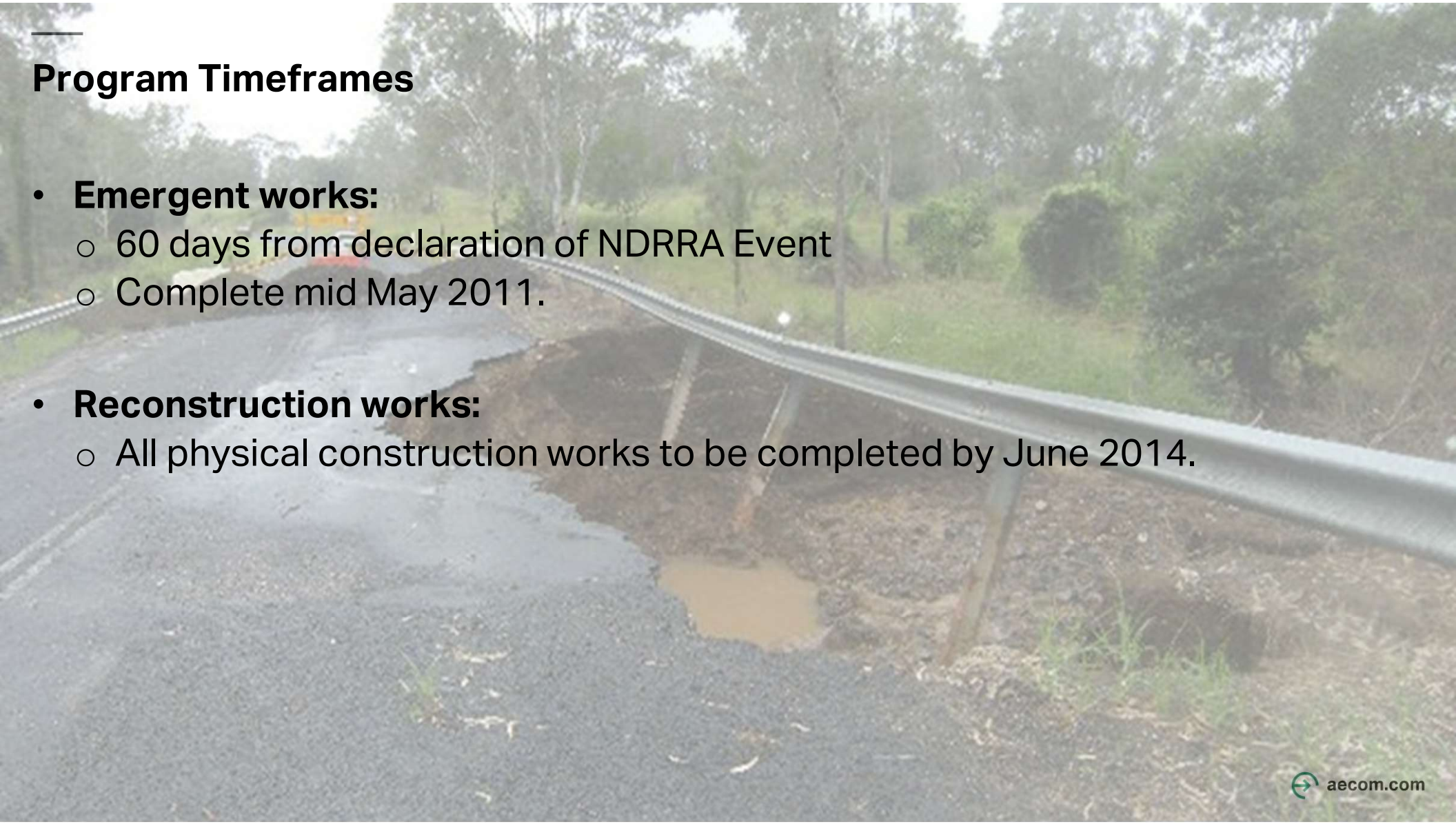
Governance


QRA
Infrastructure Investment Committee
TNRP Steering Committee
State-wide Program Office (SPO)
Regional Program Offices (RPOs)
Roadtek
Contracting Community
Tier 1 / Other / Local Contractors
Local Government
The Community

Program Timeframes

- **Emergent works:**
  - 60 days from declaration of NDRRA Event
  - Complete mid May 2011.

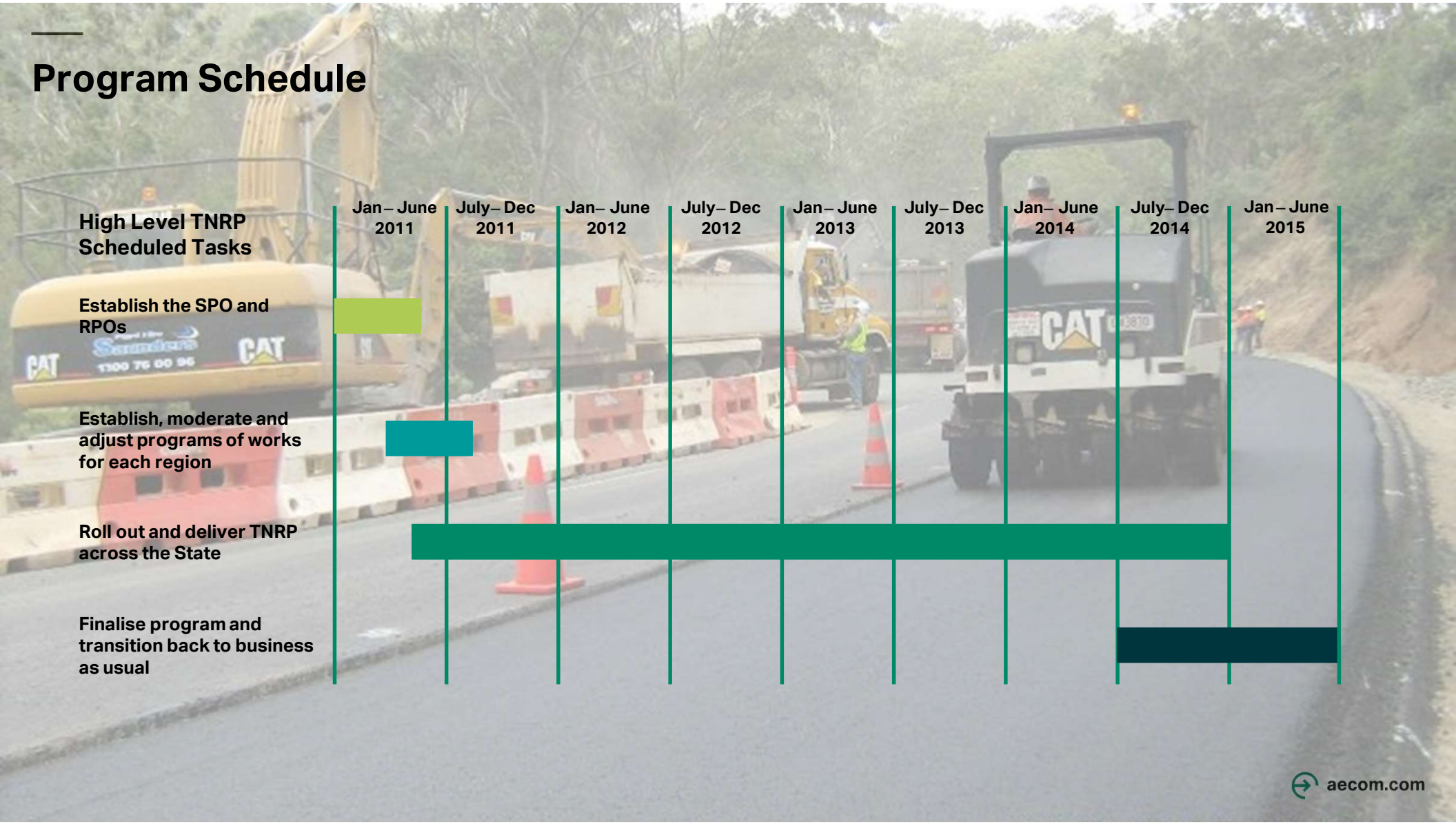
- **Reconstruction works:**
  - All physical construction works to be completed by June 2014.



Emergent Works Phase

- 6,900 km (76%) of damaged road network recovered
- $407m to recover road network
- 4,420 km (93%) of damaged rail network recovered
- $55m to recover rail network
- 123 (76%) navigation aids recovered
- 100% cycleways recovered

Program Schedule



What have we learnt?
Contracting Strategy

- Use local capability, ensuring long term sustainability of local industry and business.
- Collaborate with and assist local industry to become pre-qualified with TMR.
- Use major contractors to supplement local industry.
- Major pre-qualified contractors bring in staff, facilities and equipment (self sustainable).
- Build KRA/KPIs into contracts that encourage and reward engagement of local industry, suppliers, employment etc. and provide a stimulus back into the local economy.

What have we learnt?

Contracting Strategy (continued…)

Three-pronged approach:

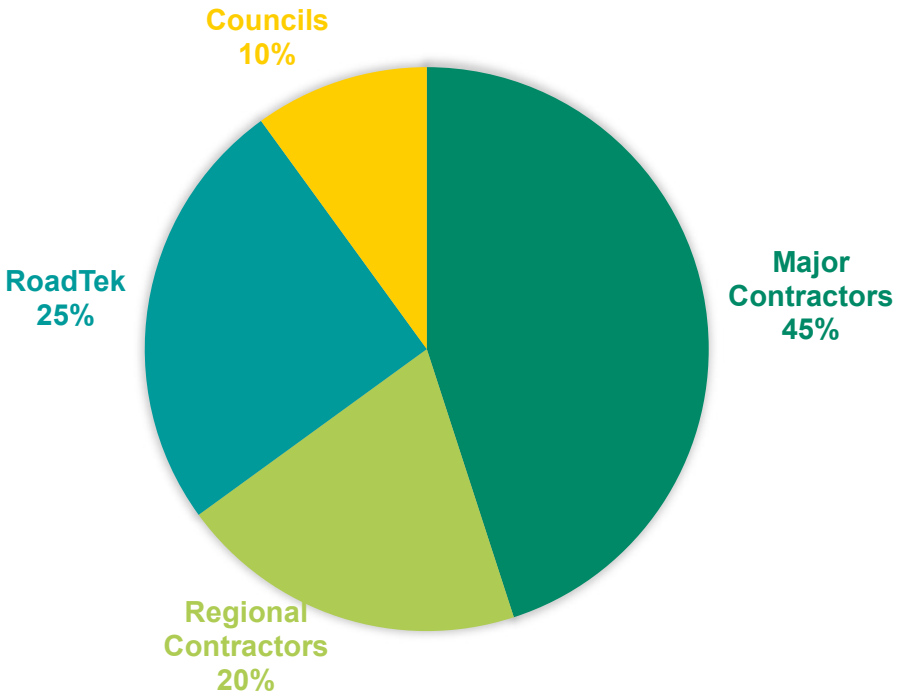
- RoadTek and Local Government Authorities / Councils (average $20M and $5M respectively)
  - sole invitation
  - benchmarked performance

- Competitively tendered packages of values $5M to $50M to small-to-medium regionally based prequalified contractors
  - rolling program 2nd and 3rd tranche
  - benchmarked performance

- Competitively tendered large works packages of values $100M to $250M to larger (Tier 1) prequalified contractors
  - rolling program 2nd tranche
  - benchmarked performance

What have we learnt?
Packaging Strategy

- Packaging on a road-by-road basis.
- Conjoined delivery of 2010 and 2011 Events.
- Pursue opportunities to deliver other complementary QTRIP projects combined with reconstruction work.
- Look to combine Betterment opportunities within reconstruction projects.



Leads to reduced impacts on community, travelling public and freight stakeholders

One Package – One Procurement – One Contract

What have we learnt?

Major Contract form of engagement

Performance Incentivised Cost Reimbursable Contract (PICR)

- We needed flexibility around inevitable scope change and to have COLLABORATION as a valued and measurable behaviour from the outset.
- The PICR was set up to enable tenders to be called based on a preliminary schedule of works.
    - This enables a target cost to be set based on this schedule of works
    - It is a highly collaborative form of contract with actual costs being reimbursed under an incentive framework
    - Significant changes of scope can be managed as designs are phased through the lifecycle, finalised and the target cost is adjusted
- There are strict probity rules in place and an independent financial auditor confirms costs incurred.

What have we learnt?

Engaging Industry and the Supply Chain

- Ongoing contractor briefings held in the Regions – start discussions early!
- Briefings with peak industry bodies
- Engagement with key suppliers e.g. quarries, plant hire companies etc.
- Leveraging existing TMR state-wide supply agreements for bitumen and cement.
- Undertaking regional and state-wide supply and demand analyses.
- Materials shortages potentially delivered under principal-supplied arrangements.
- Logistics solutions required.
- Immediately pre-invest in and stockpile non-perishable materials.

Product	Amount
Bitumen	> 200,000 T
Granular Material	> 10,500,000 T
Asphalt	> 500,000 T
Cement	> 225,000 T
Stabilisers	> 70 (TBC)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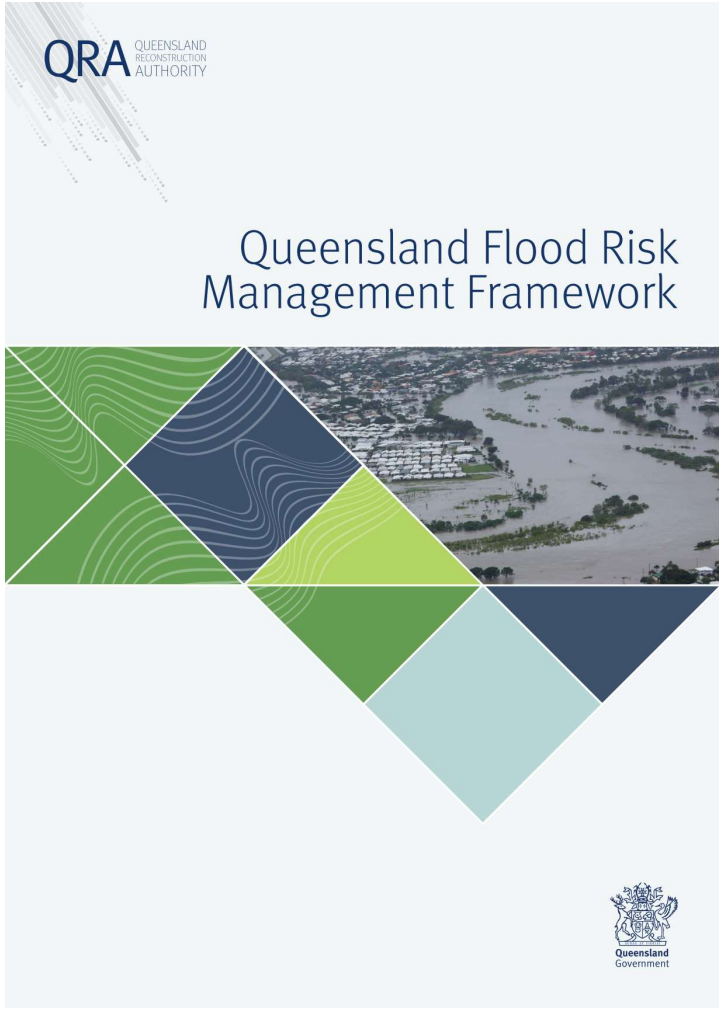
Queensland Flood Risk Management Framework



Metric 1 - Annual investment in flood risk management

Metric 2 - Risk-based land use planning

Metric aspiration

Land use planning decisions consider natural hazards and mitigate risks as far as practicable to ensure long-term sustainability of our communities

Metrics

- **M2a**: Number of councils with SPP2017 compliant local planning scheme
- **M2b**: Area of residential zoned land within the QFAO 1% AEP extent

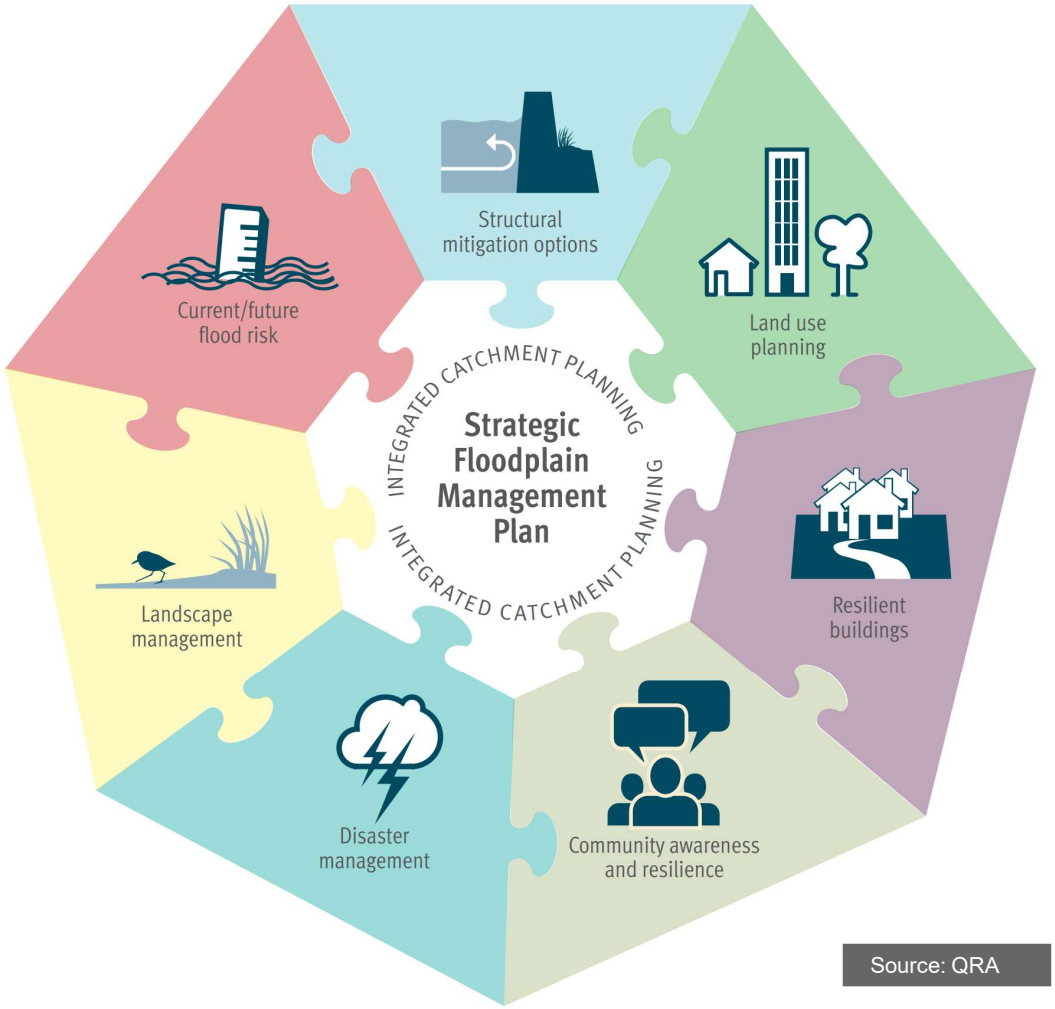
Metric 3 - Flood study coverage

Metric 4 - Accessible flood information

Metric 5 – Flood warning Infrastructure

Source: QRA

Floodplain Management Plans

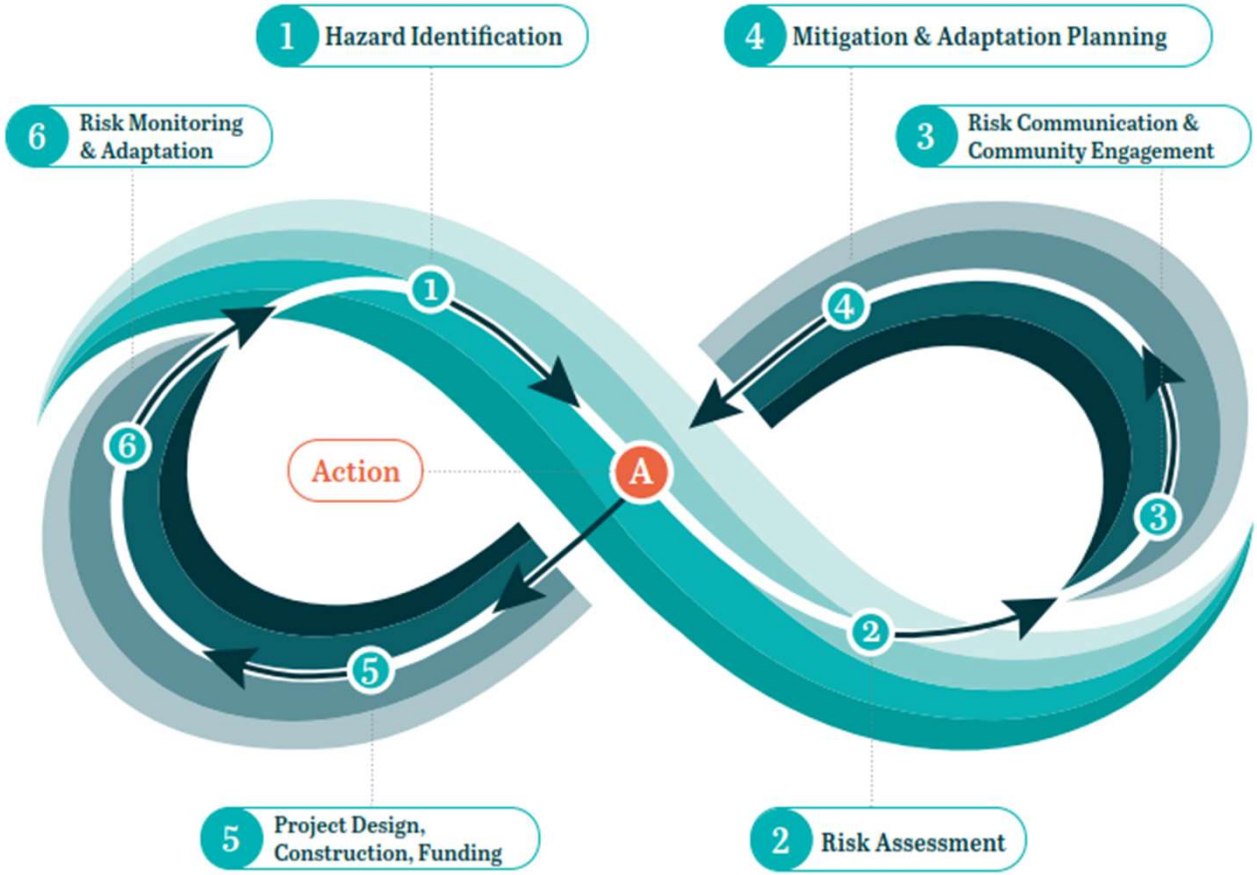


Source: QRA

What have we learnt?

It has taken QLD >10 years to get to this stage.

Flood Risk Management Life-Cycle



Source: AECOM

Applying the Flood Risk Management Life-Cycle – Toowoomba Case Study

Source: ABC News


Source: The Australian

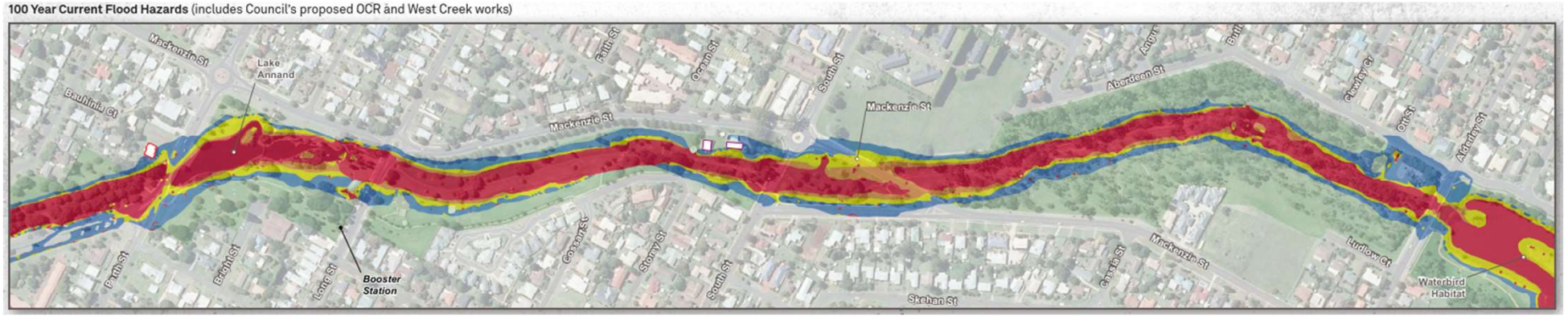
Source: Triple M

Gowrie Creek Flood & Risk Management Study (Steps 1 & 2)

Hazard Identification and Risk Assessment

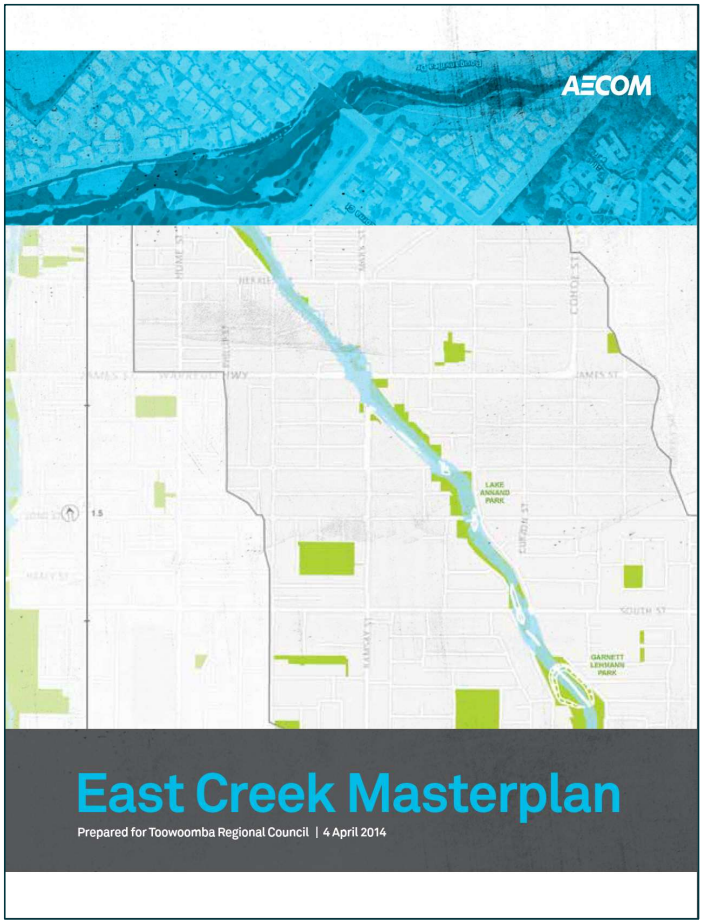
100 Year Current Flood Hazards (includes Council's proposed OCR and West Creek works)

100 Year Current Flood Hazards (includes Council's proposed OCR and West Creek works)



East Creek Masterplan (Steps 3 & 4)

Risk Communication, Community Engagement and Mitigation Planning



Proposed Capital Works Implementation Plan (listed from higher to lower priority)

Priority	Location	Culvert	Channel	Detention	Est. Cost	Key Benefit(s)
HIGH	Ballin Drive Park		✓	✓	$5.9M	- Critical to achieving 100 year road immunities - Reduces hazards - Mitigates buildings - 100 year immunity at Stenner St, key local route in upper catchment
HIGH	Garnet Lehman Park			✓	$5.6M	- Critical to achieving 100 year road immunities - Reduces hazards - Mitigates buildings
MEDIUM	Herries to James	✓ ✓	✓		$5.55M	- 100 year immunity at Herries St and James St, key local and regional routes - 7 buildings mitigated, including 3 multi-family residences
MEDIUM	Ruthven to Neil	✓ ✓	✓		$5.49M	- Reduced flooding and hazard along Chalk Dr, Neil St, Ruthven St and in CBD - 6 buildings mitigated
MEDIUM	James to Perth	✓	✓		$4.94M	- 100 year immunity along Kitchner St (due mainly to Perth St and basins) - 100 year immunity at Perth St
MEDIUM	Hume	✓			$4.91M	- 100 year immunity at Humes St, a key regional transport route
MEDIUM	South	✓			$2.82M	- 100 year immunity at South St and roundabout, providing local access route South of James St - 2 Council buildings mitigated
MEDIUM	Mackenzie near South	✓			$0.76M	- Removes maintenance obligations and vehicular flood risk
LOW	Margaret	✓			$2.61M	- 10 year immunity and reduced hazard nearby
LOW	Alderley	✓			$2.48M	- 100 year immunity at Alderley St and along Aberdeen St
LOW	Mackenzie near Ballin Drive	✓			$1.56M	- 100 year immunity at Mackenzie St
LOW	Long	✓			$2.57M	- 100 year immunity at Long St and roundabout

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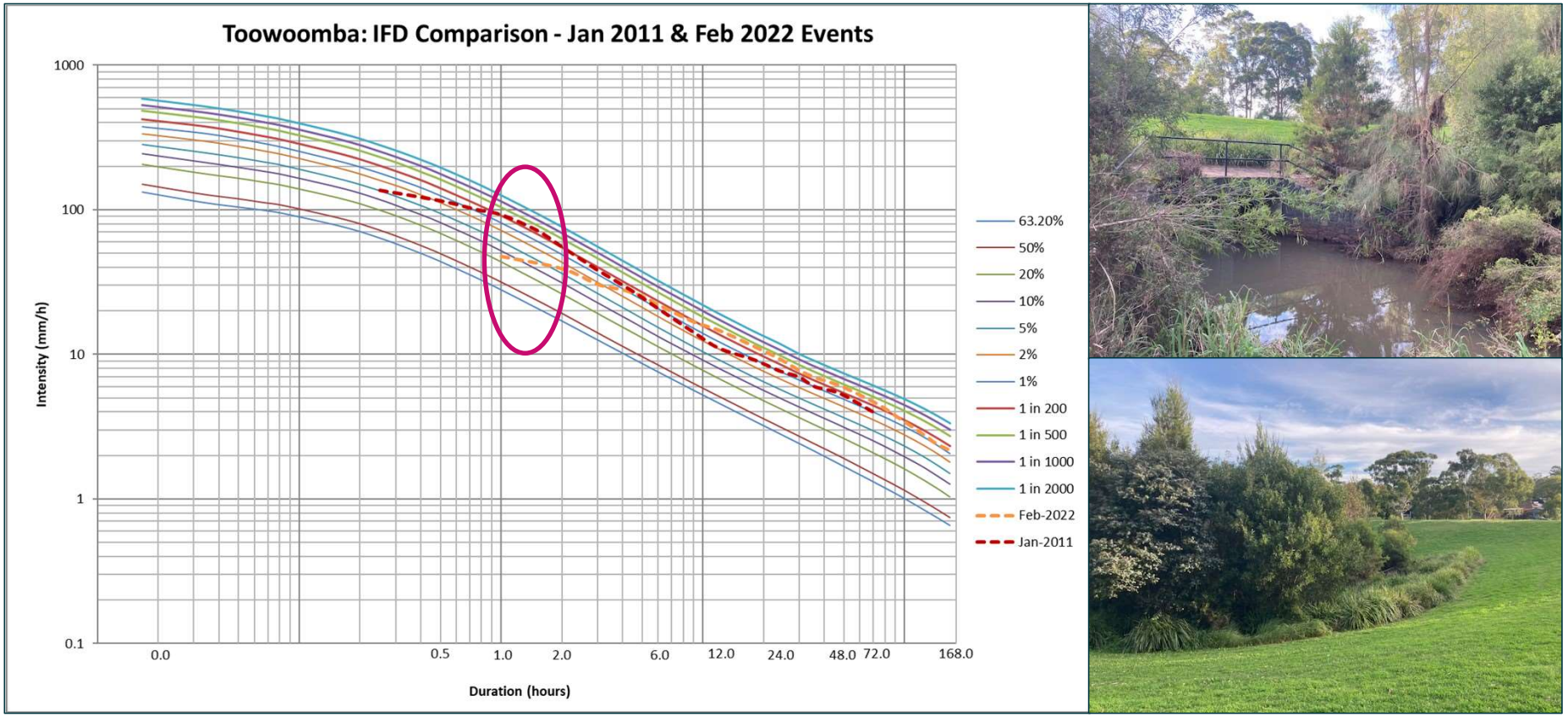
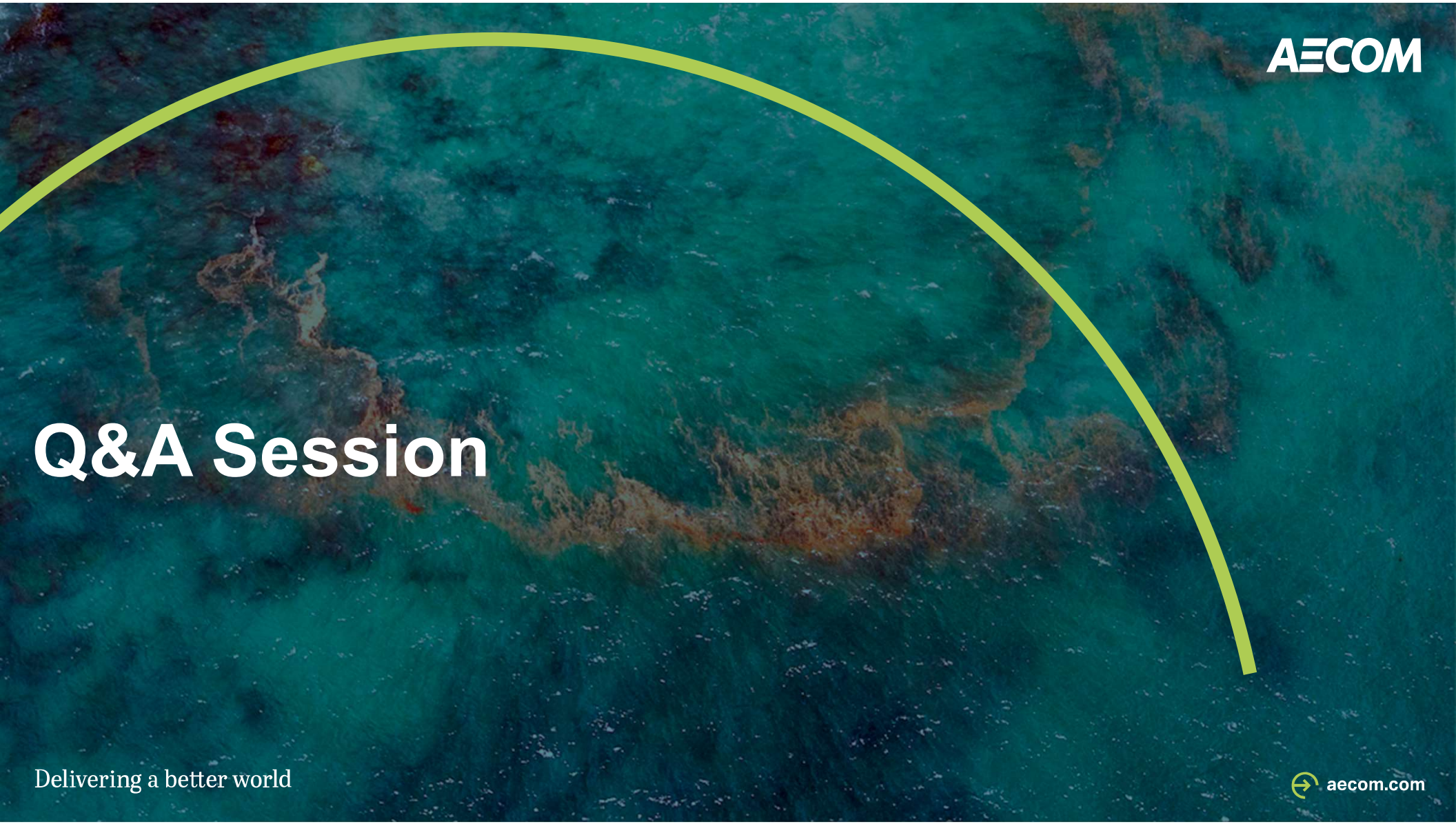
Garnett Lehmann Park Detention Basin (Step 5)

Project Design & Construction Funding

Monitoring Ongoing Risk and Adapting (Step 6)

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