COMMUNITY DRIVEN FLOOD RISK MANAGEMENT PLANNING FOR RURAL TOOWOOMBA TOWNSHIPS

IPWEAQ Annual Conference 2018

Rodney Betts | Toowoomba Regional Council
Mark Page | Engeny Water Management

11 October 2018
Toowoomba Region faces severe flooding

New Planning Scheme commenced

40 flood studies commenced

FRAPESA project commenced

Flood studies released

Public Engagement and Planning Scheme Amendment process

Flood Risk Information Portal

Urban Stormwater Master Plans


Previous floods

Future floods
TRC’S FLOOD MANAGEMENT JOURNEY - FRAPESA

Flood + us - our journey
Steps on the path to achieving our goal

OUR GOAL
A safer, stronger, more resilient region
Financially, socially and environmentally sustainable

OUR JOURNEY
Flood Studies

LAND USE PLANNING
Land-use planning
Waterway & wetland maintenance
Erosion control

EDUCATION
Community education

INSURANCE
Policies

ENVIRONMENT
Erosion

STRUCTURAL
Detention basins
Channel floodplain improvements

DEVELOPMENT
Minimise flood risk
Reduce development

EMERGENCY
Evacuation
Possession plan

INFRASTRUCTURE
Roads
Bridges
Railways
Dams

BUILDING
Residential materials
Structural elements
FRAPESA PROJECT
Flood Risk Assessment, Planning Evaluation and Scheme Amendment

Timeline

- Flood Studies Launch - Round 1 Consultation
- Flood Data Review - Flood Study Updates
- Flood Risk Assessment - Planning Evaluation
- Review of Outcomes - Develop Policy & Risk Overlay
- Flood Risk Launch - Round 2 Consultation
- Submission Review - Policy & Overlay Finalisation
- Planning Scheme Amendment

Timeline:
- Feb-April 2015
- Mid 2015
- Late 2015
- Early 2016
- Oct-Dec 2016
- Early 2017
- Mid 2017 - Mid 2018
FLOOD STUDIES

- **42 flood studies** across 35 locations
- Range of Flood Study types:
  - Historical
  - Comprehensive
  - Overland Flow Path
- Consultation and community engagement plan
THE COMMUNITIES

Limited Financial Resources ~$600/week below the Queensland and Australian averages for income

Vulnerable Population ~40% of the population above 65 years of age or under 5 years of age

~75% home ownership

Invested and Involved

Specific Flood Risks Isolation Short warning times Additional impacts from overland flow

Lack of Formal Planning No current flood emergency management plans in place

Preference to “live with” rather than resist flooding

Community Resilience School, chid care, hospital, aged care and evacuation centres in some communities at risk from flooding

Vulnerable Land uses

~30% of population is above 65 yrs (Qld and Aus average 15%)
ROUND 1 CONSULTATION

Promotion at Community Events

- 4 Agricultural Shows
  - Millmerran
  - Pittsworth
  - Oakey
  - Toowoomba
- Goombungee Community Conversation Event
ROUND 1 CONSULTATION

Consultation Events

- 12 Open House Events
- Over 2000 in person and online interactions
- Overall positive engagement and feedback
Follow-up meetings and property visits held across the region:

- Oakey
- Hodgson Vale
- Ellangowan
- Toowoomba
- Pampas
- Crows Nest
- Millmerran
- Goombungee
COMMUNITY FLOOD INFORMATION

• More than 150 submissions and 1850 sets of flood information received.

• Oakey Flood Information:
  • Independent flood data review undertaken
  • Community flood data was found to be consistent with model

• Data otherwise used to calibrate and validate flood studies at other locations

• 3 Flood Studies as well as overland flow path mapping separation and rationalisation updated as a result

• All updated studies were peer reviewed
FLOOD STUDIES

• **42 flood studies** across 35 locations

• Range of Flood Study types:
  - Historical
  - Comprehensive
  - Overland Flow Path

• Consultation and community engagement (2014/15)

• Endorsed and released in February 2015

• First step towards Council’s goal of a **Safer, Stronger, More Resilient Region**
FLOOD RISK MANAGEMENT APPROACH

FRAPESA

FRMPs

AIDR HANDBOOK 7
Flood Risk Assessment – consistent with Qld SPP, QFCOI and QRA guidelines and national best practice

Planning Evaluation

- **Exposure** considers flood likelihood and hazard for different land uses
- **Exposure, Vulnerability** and **Tolerability** was scored for each town
- **Higher Risk Scores** indicated **more stringent land use policies** and the need for development controls
- Approach allows towns to be **prioritised based on risk** using planning approaches
FLOODPLAIN RISK MANAGEMENT PLANS – HIGH RISK TOWNS

FLOODPLAIN RISKS ACROSS RURAL TOOWOOMBA TOWNSHIPS

**Example – Oakey Township**

<table>
<thead>
<tr>
<th>Town</th>
<th>Key Planning Risks</th>
<th>Expected Growth</th>
<th>Exposure Score</th>
<th>Vulnerability Score</th>
<th>Tolerability Score</th>
<th>Evaluation Result</th>
</tr>
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<tr>
<td>Oakey</td>
<td>R4/R3/R2 risk building impacts; impacts on future growth; isolation (longer term); impact on vulnerable uses</td>
<td>Consistent with LGA average</td>
<td>Highly Exposed</td>
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[Table showing key planning risks, expected growth, exposure score, vulnerability score, and tolerability score for different towns in rural Toowoomba townships.]
FLOODPLAIN RISK MANAGEMENT PLANS

• FRAPESA project identified seven High Risk Towns that required Floodplain Risk Management Plans (FRMPs)

• TRC commenced study for Oakey in 2016/17

• DILGP 2016-17 Grants and Subsidies – funding assistance for six towns
TRC’S FLOOD MANAGEMENT JOURNEY - FRMPs

Flood + us - our journey
Steps on the path to achieving our goal

A safer, stronger, more resilient region
Financially, socially and environmentally sustainable

OUR GOAL

- Flood Studies
- Environment
- Infrastructure
- Emergency
- Structural
- Development
- Education
- Finance
- Building
Stage 1
Feb to Aug 2017
• Complete data collection
• Update flood modelling
• Conduct initial community consultation
• Delivery of Stage 1 Report

Stage 2
Aug to Sept 2017
• Complete flood damages assessment
• Identify and assess potential flood mitigation options and local emergency planning
• Undertake option evaluation workshop with Council
• Conduct second community consultation
• Delivery of Stage 2 Report

Stage 3
Sept to Nov 2017
• Prepare draft Floodplain Risk Management Options Analysis documents and draft FRMPs
• Present Floodplain Risk Management Options Analysis and draft FRMPs to Council

Stage 4
Nov 2017 to Mar 2019
• Present draft FRMPs to Community
• Prepare final FRMPs (based on Community feedback)

Stage 5
Apr to Jun 2019
• Present Final FRMPs to Council for endorsement
• Release final FRMPs to public exhibition and update based on consultation feedback
• Present final FRMPs to Council

FRMP PROJECT STAGES
FLOODPLAIN RISK MANAGEMENT

• FRAPESA outcomes incl. current community flood response behaviour and vulnerability

• Flood risks (hazard, warning time, isolation, critical infrastructure, etc.)

• Practicality (effectiveness, implementation)

Consideration of Measures

Assessment and Evaluation of Measures

• Project Assessment Sheets

• Cost Benefit Analysis (Flood Damages Assessment)

Peer Review

• Process

• Outcomes
FLOODPLAIN RISK MANAGEMENT MEASURES

**Property Modification**
- Re-classification of high risk development areas
- Property resumption
- House raising

**Response Modification**
- Community flood education and awareness
- Extend the gauge network and install flood warning systems
- Flood depth indicators and flood warning signs
- Local emergency plans (incl. Flood Intel. Cards)

**Flood Behaviour Modification**
- Construct levees
- Vegetation clearing
- Creek widening
- Creek bypass
- Bridge upgrade
- Road upgrade for egress
### Option 3 - Improve Flood Conveyance Option

<table>
<thead>
<tr>
<th>Description of Mitigation Option</th>
<th>5 year</th>
<th>20 year</th>
<th>50 year</th>
<th>200 year</th>
<th>500 year</th>
<th>PMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood Mitigation Benefit (Buildings with flood above floor level)</td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
<td> </td>
</tr>
<tr>
<td>Base Case</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>29</td>
<td>43</td>
</tr>
<tr>
<td>Bridge Removal</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>13</td>
<td>45</td>
</tr>
</tbody>
</table>

| Estimated Financial Cost | High |

| Environmental & Cultural Heritage Issues | The areas downstream of the MacDougall Street bridge are protected vegetation and may be affected by potential bridge works. |

| Social Impacts | No anticipated social impacts |

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**Legend**

- **Buildings at Risk above Flood Risk:** High Risk Flood Damage Risk Zone B
- **Buildings at Risk below Flood Risk:** Low Risk Flood Damage Risk Zone A
- **High Risk Flood Damage Risk Zone:** &nbsp; 30%
- **Low Risk Flood Damage Risk Zone:** &nbsp; 10%
- **High Risk Flood Damage Risk Zone A:** &nbsp; 90% Bonell Creek
- **Low Risk Flood Damage Risk Zone A:** &nbsp; 90% Bonell Creek
- **Cathedral Memorial:** &nbsp; 10% Bonell Creek

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**Cooyar Floodplain Risk Management Plan**

**Option Assessment Sheet**

**Option 3 - Improve Flood Conveyance of Bridge**
Mitigation Option 01: Levee

Constructing levees around the township on the southern side of the rail line. Total levee length is approximately 2.5km with an average height of 1.1m.

Impact on Properties

- Total number of properties flooded above floor for 1% AEP flood event:
  - without mitigation: 63
  - with mitigation: 22
- Total number of additional properties flooded above floor for mitigation: 2

Financial Cost
High

Environmental & Cultural Heritage Issues
Levee intersects a biodiversity corridor at the southern end of Lagoon St.

Social Impact
Levee embankment will have an impact on the visual amenity of the surrounding properties and protection of a select number of properties within the entire township may create multiple social issues.
### Mitigation Option 01: Levee

<table>
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<tr>
<th>Impact on Properties</th>
<th>Without Mitigation</th>
<th>With Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of properties flooded above floor for 1% AEP flood event</td>
<td>49</td>
<td>1</td>
</tr>
<tr>
<td>Total number of additional properties flooded above floor for mitigation</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

#### Financial Cost
- Medium

#### Environmental & Cultural Heritage Issues
- No known environmental or cultural heritage issues.

#### Social Impact
- Levee may have an impact on the visual amenity of the surrounding properties.
FRMP COMMUNITY CONSULTATION - REFLECTION

Understand the community

- current emergency response, level of resilience, demographics, risks and expectations
- Some communities are difficult to engage due to demographic, high level of resilience and self reliance, awareness of FRMP process

Find effective ways to communicate

- open house events, surveys, letters, fact sheets, social media, community notice boards, hobby meetings

Maintain ownership and relevance

- promote ownership through communication and education
- review and update FRMPs
WHAT’S NEXT

Final community engagement to be undertaken in 2019.

Outcomes to be reported to Council for endorsement of the FRMPs as the basis for emergency management and future infrastructure planning.
FLOOD MANAGEMENT OUTCOMES

• FRAPESA:
  o 42 Flood Studies
  o Policy/Overlays and Planning Scheme Amendment
  o Flood Risk Information Portal

• FRMP:
  o Flood Studies Updated (ARR 2016)
  o Flood Risk Analysis
  o Flood Risk Management Plans for 7 high risk townships
Projects shortlisted for the “Flood Risk Management Project of the Year” included:

- Brisbane River Catchment Flood Study
- Brisbane City-Wide Overland Flow Path Modelling and Flood Risk Mapping Study
- Installing First Flood Warning System in the Mirrool Creek Catchment
- North Rockhampton Flood Mitigation Area
- *Toowoomba Regional Floodplain Management – Safer Stronger More Resilient Region*
FLOODPLAIN MANAGEMENT AUSTRALIA

... And the 2018 WINNER was ... !!!
ABOUT FLOODPLAIN MANAGEMENT AUSTRALIA

FLOODPLAIN MANAGEMENT AUSTRALIA (FMA) is the nation’s leading network for flood risk management with a Membership of over 140 organisations and professionals.

FMA Membership is available to Councils, agencies, businesses and individuals involved in flood risk management across the country.
ABOUT FLOODPLAIN MANAGEMENT AUSTRALIA

OVER 140 MEMBERS NATIONWIDE
Local Government Councils, CMAs, Government agencies, businesses and professionals involved in all aspects of flood risk management

PROFESSIONAL DEVELOPMENT
National Conferences held annually, Flood Risk Management Short Course and FMA Meetings + Workshops

NATIONAL VOICE + MEMBER ADVOCACY
A unified voice for flood risk management representing Members’ interests at State and Commonwealth government levels

CONFERENCE DISCOUNTS + MEMBER BENEFITS
Discounted registration to National FMA Conferences and varied promotional opportunities throughout the year

TRUSTED NETWORK OF FLOOD PROFESSIONALS
Engineers, land use planners, technicians, elected council representatives, and decision makers from all around Australia

WISE PLANNING + DEVELOPMENT
Promoting strategic planning which proactively guides appropriate development in floodplain areas

Find out more at FLOODS.ORG.AU
FMA is holding its 59th Annual Conference at the nation’s capital, Canberra, in May 2019.

+ Focus - A National Call to Action: Making Australia Flood Safe.
+ Over 400 representatives from Commonwealth, State and Local Government and the FRM industry.
+ Call for Abstracts open now until Monday 29 October.

Find out more at FLOODPLAINCONFERENCE.COM