
East Creek Detention Basins - Garnet Lehmann & Ballin Drive Parks

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A City Susceptible to Flash Flooding
Gowrie Ck Flood Mitigation Program

The 2011 Flood
  • Approx 1 in 500 year ARI runoff event

Hydrology and Planning
  • Hydrological & hydraulic model by AECOM
  • Gowrie Creek Catchment Management Strategy 1998
  • East Creek Masterplan 2014
Gowrie Ck Flood Mitigation Program

Program Funding

- $27.2m program
- $20m under NDRRA Cat D with $5m from Council
- $2.2m mostly RforR funding and minor other

Other Related Projects under R for R

- $1.7m OCR creek confluence works
- $5m Dent Street rail bridge
- $4.4m Ruthven Street culvert upgrade
Gowrie Creek Flood Mitigation

- Recent detention basins to reduce CBD flows
- Recent culvert and channel works to mitigate flood impacts and improve safety
- Ruthven Street culvert works
- Still to be done
Program Benefits

• 30% reduction in flood peak for nominal $Q_{100}$
• Approximately 0.5 metre lower for nominal $Q_{100}$
• Improved pedestrian and road safety
• Improved emergency services access
• Reduced impacts of major floods on businesses
• Reduced damage to buildings, contents, and infrastructure
Benefits – Nom Q100 Through the CBD

Before

After

Safety
Economic Benefit
Less Damage
Less Disruption
East Creek Detention Basins

Garnet Lehmann Park Detention Basin
  67 Ml storage

Ballin Drive Park Detention Basin
  40 Ml storage

Spring & Ramsay Street Detention Basin
Garnet Lehmann Park

- Degraded creek channel
- Isolated planted trees
- Mowed understory
- Little biodiversity
- Dog off leash
- Good location for a detention basin on East Creek
- 289 trees removed
Detention Basin Community Issues
The Evolution of a Detention Basin

1. A hydrology and flood modelling project

2. A flood mitigation program of works

3. An engineering flood mitigation works project
The Evolution of a Detention Basin

4. An engineering project with a landscape overlay & tree retention

5. A landscape and tree protection project with an engineering function

6. A truly integrated engineering works, public open space, environmental and social values project
## The Evolved Detention Basin

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<tr>
<th><strong>DRAINAGE</strong></th>
<th><strong>PARK</strong></th>
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<td>- Public Open Space</td>
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<td>- Detention Basin</td>
<td>- Dog Off Leash</td>
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<td>- Downstream Flood Mitigation</td>
<td>- Place for Play</td>
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<tr>
<th><strong>ENVIRONMENT</strong></th>
<th><strong>RECONNECTING COMMUNITY</strong></th>
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<td>- More Complex Habitat</td>
<td>- Connect People to Place</td>
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<td>- Underpin Future Biodiversity</td>
<td>- Recognise History of Park</td>
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<td>- Wildlife Corridor</td>
<td>- Visual Amenity</td>
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<td>- Heritage value of Exotic Vegetation</td>
<td>- “My backyard”</td>
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Garnet Lehmann Detention Basin

Project Management
- Council Project Services and AECOM

Design:
- AECOM & Redleaf

Construction:
- Council Construction and Maintenance Central
Garnet Lehmann - Waterway

- Reinstate pool & riffle sequence
- Construct fish lunkers
- Use large woody debris from trees removed
- Stabilise banks with vegetation
- Opportunity to plant rare and threatened species from Waterbird Habitat
Garnet Lehmann – Riparian Zone

1,100 new trees
7,300 new shrubs
21,000 new ground covers
Garnet Lehmann Memorial

Artwork by Toowoomba State High Students
Garnet Lehmann – Open Space

A different “place” for people to enjoy

Bird nesting boxes in existing trees

New dog off leash areas
Garnet Lehmann - Environmental

Cutting edge environmental science
Rehabilitated waterway habitat

Woody debris anchored in place with footings and rods
Garnet Lehmann - Environmental

Long term biodiversity

New sedge land with rare and threatened Hairy Joint Grass

Insect and lizard stacks
Connecting People – Lehmann’s
Garnet Lehmann – Success

- Budget $5.0 million
- Final Cost $4.5 million
- $0.5 million under budget
- Project delivered on time
- Well received by the community
- Positive media
Garnet Lehmann - Construction

- TRC Construction & Maintenance Branch “Principal Contractor” Day Labour
- Removal of 289 trees - subcontractor Brisbane Tree Services
- Earthworks
  - 6,000 m$^3$ cut to spoil (unsuitable material)
  - 18,000 m$^3$ imported fill (from Ballin Dr)
Garnet Lehmann – Outlet Culvert

Long 2/1500x1500 RCBC – subcontractor Sedl
Garnet Lehmann - Geotechnical

Geotechnical challenges
Garnet Lehmann - Landscape

- Soft landscaping - subcontractor Landscape Solutions
  - 17,000m² turf
  - 6,000m² gardens
  - 182 new mature trees
  - 926 small trees
  - 7,300 shrubs
  - 21,000 groundcover plantings
Garnet Lehmann – Foot Bridge

Boardwalk - subcontractor Designer Decks
Garnet Lehmann – Landscape
Ballin Drive - Construction

• Early works by TRC Construction & Maintenance Branch
  - New playground
  - Removal of 92 mature trees – subcontractor Brisbane Tree Service
  - Preliminary earthworks

• Allroads - Principal Contractor
  - LocalBuy Modified AS2124
  - 9,000m³ cut to fill
  - 48,000m³ cut to spoil
Ballin Drive - Construction

- Long 1/1200x1200 RCBC
- Landscaping - subcontractor Penfold Projects
  - 26,000m$^2$ turf
  - 19,000m$^2$ gardens
  - 310 new mature trees
  - 2,800 small trees
  - 18,000 shrubs
  - 53,000 groundcover plantings
Ballin Drive - Construction

Position: 452.79209° / +751.96579°
Altitude: 631m
Azimuth/Roaring: 049° N48E 08600miles (True)
Elevation Angle: -0.4°
Horiion Angle: -0.4°
Zoom: 1X
placement of trees and landscaping ready for planting
Failure Impact Assessment

- Detention basins considered as dams under the Water Supply (Safety & Reliability) Act as they temporarily hold large volumes of water.
- A dam failure impact assessment determines whether there are any people at risk downstream of the dam should it fail.
Failure Impact Assessment

- “PAR” determined by incremental increases in flood level between a no fail & dam fail scenario
- Referable dams are regulated by DEWS
- Status determined by either size and volume criteria or PAR
Failure Impact Assessment

- FIA undertaken by AECOM as part of design process
- Maximum Probable Flood
- Council purchased one property and undertook minor protection works for another to remove PAR
Failure Impact Assessment

• Under final design, Ballin Drive failing on its own had no PAR
• GL failing on its own had PAR of 0.06 at South St pump station
• Cascading failure of basins was critical scenario (ie assume that both basins fail concurrently)
Community has a right to information
Consultation is more than telling people what you have already decided to do
Council must have statutory approvals
Statutory Approvals

- Species Management Plan DEHP
- Nature Conservation Act Tree Clearing Permit DEHP
- Water Act Special Works Permit
- Fish Barrier Operational Works permits
- Planning Scheme Operational works
- ERA16 Extraction
- Cultural Heritage & Native Title
Lessons Learnt & Benefits

• The value of effective stakeholder engagement
• The difficulty in explaining engineering terms
• Anyone can be a Google expert
• It’s a connected world and social media can make or break a project
• Not just an engineering project – much more
• Small focus groups are better than public meetings
• Council can build it as well as a contractor
• Council day labour can deliver Value for Money
Lessons Learnt & Benefits

• Greater maturity in Council and in our engineering/project teams
• Diversify or fail
• Integrate or fail
• Innovate or fail
• People judge success by what they see and feel and engage, and not by the complexity of what is hidden
• Learn from the past; but
• No two projects are exactly the same
Garnet Lehmann Detention Basin

Highly Commended $1m-$5m IPWEAQ 2015
Thank you