Scenic Highway, Statue Bay
Cyclone Marcia Reconstruction Works
Presentation Topics

- Cyclone Marcia damage
- Immediate Clean-up & Descaling
- The Restoration Solution
  - Options Investigation
  - Value for Money
  - Approved Funding Break-up
  - Scope of Work
    - Downslope Works
    - Upslope Works
    - Easements
Presentation Topics

❖ Construction Issues
  ➢ Separate Contracts
  ➢ Inconsistent Geology below Wall
  ➢ Revised Revetment Wall Foundation
  ➢ Termination of Contract for Convenience

❖ Completion of Construction by Council
  ➢ Revised Funding Estimate
  ➢ Benefits
  ➢ Cost Savings
  ➢ Progress to Date

❖ Questions?
Pre-Cyclone Marcia

Aerial view of Scenic Highway, Statue
Cyclone Marcia Damage

- Erosion and undermining of Scenic Highway
Cyclone Marcia Damage

- Slip failure of the cliff face
Clean-up & Descaling

Initial descaling of cliff face by Council
Restoration

- Consulting Engineers appointed to investigate restoration options and safety of ongoing use of road to road users
- Assessment made of safety to road users of potential cliff failure
  - Scenic Highway initially closed to all traffic
  - When re-opened - reduced to one lane & one direction of travel due to ongoing safety concerns
  - detour established via adjacent residential street
Statue Bay Aerial Footage Before Construction.mp4
Options Investigation

- Options report undertaken by Consultant
- Options costed to establish value for money
- Solution based on multi-criteria analysis
- Downslope Options
  - Rock armour revetment wall - too large a footprint
  - Gravity block revetment wall
  - Bridge / viaduct - very expensive
Options Investigation

➢ Upslope
  ➢ Regrade / rebench slope - insufficient space
  ➢ Rockfall netting / mesh - did not decrease risk of further slips which occurred as a result of Cyclone Marcia
  ➢ Soil nails and shotcrete
  ➢ Pile wall - very expensive

➢ Options costed to establish value for money
**Approved NDRRA Funding**

- NDRRA approved funding for restoration & betterment
- Original approved cost estimate was ~$16.5 million
- Funding approval break-up:

<table>
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<tr>
<th>Description</th>
<th>Amount</th>
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<tr>
<td>NDRRA Restoration (Cat B):</td>
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<td>NDRRA Betterment (Cat D) – capped:</td>
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<td>LSC contribution (Cat D + Complementary):</td>
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Revised NDRRA Funding

- After completion of design and award of contracts
- Revised cost estimates and category of funding
- Revised funding approval break-up:

<table>
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<th>Category</th>
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<td>LSC contribution (Cat D + Complementary):</td>
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<td><strong>$20.32 M</strong></td>
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NDRRA Funding

Cat B Scope:

Downslope
- Road reconstruction, including guardrail
- Reinforced earth embankment
- Ocean protection wall, including concrete capping slab

Upslope
- Soil nailing & shotcrete stabilisation to 3 areas of slippage (some of the area is Cat D funded)
- Drainage around stabilisation areas
NDRRA Funding

Cat D Scope:

Downslope
- Concrete lined table drains
- Concrete protection barriers

Upslope
- Some of the soil nailing & shotcrete stabilisation to the 3 areas of slippage (the bulk of the 3 areas is Cat B funded)
NDRRA Funding

Complementary Works Scope:

**Downslope**
- Concrete pathway
- Safety balustrade along pathway
- Some additional guardrail
- Connections of revetment wall to existing retaining walls
- Transitions to existing road at both ends
- Additional pavement depth

**Upslope**
- Nil
Scope of Work

- **Downslope Works**
  - Large gravity block ocean protection revetment wall
  - Reconstruction of road, including guardrail and footpath

- **Upslope Works**
  - 15 m long soil nails into cliff face @ 1-2m H&V spacings
  - 200 mm thick shotcrete surfacing
  - Chute and sub-horizontal drainage

- Negotiations to acquire Volumetric Easements for Upslope presented a unique challenge
Scope of Works

- Shotcrete surfacing
- Gravity block ocean protection wall
- New footpath
- Mechanically stabilised earth embankment
- New Pavement

Proposed Road Cross Section
Downslope & Upslope Works
Volumetric Easements
Volumetric Easements
Construction

ulously proposed as a single construction contract

Project separated into two construction contracts

- Downslope
  - mechanically stabilised earth (MSE) embankment with gravity block retaining wall
  - Road reconstruction

- Upslope
  - Length of soil nails necessitated volumetric easements
  - downslope to proceed while upslope design finalised & easements negotiated
Funding Deadlines

- Original funding deadline required completion of project by 30th June 2017
  - Poor sub-surface geology encountered after excavation for wall foundation
  - Required further complex geotechnical investigation
  - Revision to foundation design required
  - Protracted volumetric easement negotiations
- Extension of time to 31st December 2017 applied for by Council
  - EoT approved by QRA & EMA
Downslope Construction Issues

- Presence of rock not consistent when excavating for foundations
  - Required detailed revision of foundation design to suit inconsistent geology
- Council applied for extension of time to 30\textsuperscript{th} June 2018 to complete the works
  - Formal approval for EoT was forthcoming
Completion of Construction

In early March 2018, Council became aware that

- completion of construction by 30\textsuperscript{th} June 2018 was unlikely
- the contractor’s suppliers were withholding supply of materials because they had not been paid
- work on the downslope had ceased & the upslope was about to cease
Completion of Construction

On March 14\textsuperscript{th} 2018, Council terminated both upslope and downslope contracts ‘for convenience’

Council made the decision to become the Principal Contractor & complete the construction
Completion of Construction

Council appointed internal Project Manager and Construction Manager

Re-engaged Contractor’s Consultant Project Manager and two QA project staff

Work recommenced on site within five (5) business days, ie, by 21st March

All major suppliers & subcontractors were re-engaged directly by Council
Lessons Learned

- Alternative construction solutions
- Funding timing constraints
- Geotech investigations and interpretation
- Project management consistency
- Decisive action
- Reliance on records
Cost to Complete

- Revised cost following completion of construction and including BCIPA adjudication decisions
- Funding break-up

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<td>NDRRA Betterment (Cat D) – capped</td>
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Completed Project
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Thank You

Questions

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