- Sites
- Constraints
- Design
- Construction
- Conclusions
Site locations

[Map showing locations in Fiji: Viti Levu, Yasawa Group, Viti Levu sites 1642 Lomawai, 2217 Vunivaivai, 2921 Vunidilo, and 620 Cogeloa FSC.]

Bringing ideas to life
Bridge 620 - Cogeloa
Bridge 1642 - Lomawai
Bridge 2217 - Vunivaivai
Bridge 2912 - Vunidilo
Design and construction constraints

Large flood loading
- Bridges are subjected to yearly flood events which over top the deck. Scour and debris also impose large design loading.

High seismic loading
- Bridges are subjected to high seismic loading. $Z$ values 0.23-0.28 (Auckland $Z = 0.1$). Sites are prone to liquefaction and lateral spreading.
Poor founding conditions

- Deep soft soil sites at 3 of 4 bridge sites. No suitable founding layer found at Bridge 2217 to the investigation depth of 65m.

- SPT ‘N’ values of near zero
Durability

- 100 year design life,
- Local concrete suppliers not accustomed to high specification concrete,
- Draft amendments to cover requirements NZS3101,
- Use of supplementary cementitious materials 30% fly ash type C and corrosion inhibitors to the mix designs

<table>
<thead>
<tr>
<th>Bridge</th>
<th>Vunidilo</th>
<th>Vunivaivai</th>
<th>Lomawai</th>
<th>Cogeloa</th>
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Construction constraints

- Construction logistics
- Construction access
  - Access roads to bridges are narrow and tight in places,
  - Shipping plant & materials to Labasa
- Concrete supply (outer islands) and quality
  - Good supply in Suva, able to achieve 50MPa,
  - Elsewhere 40MPa max without the use of admixtures.
- Precast capabilities
  - Limited precast facilities for bridge beam construction, all in Suva,
  - No moulds available.
- Construction equipment
  - Limited cranes and crane capacity, 50T cranes only.
- Construction programming
  - Construction is outside of cane season (6 months) / in wet season.
Design

- Design dimensions:
  - Lane width: 3500 mm
  - Pedestrian walkway width: 1700 mm
  - Handrail height: 1100 mm

- Materials:
  - TL3 steel barrier
  - Concrete topping

- Reinforcement:
  - In-situ reinforced concrete deck
  - Precast prestressed T3 beam

- Other features:
  - Soffit of abutment/pier headstock
  - Slight crossfall

- Notes:
  - Refer to note 1 for approximate crossfall.
Design

- GAP65 OR SIMILAR ANGULAR GRAVEL COMPACTED TO 95% OF MAXIMUM DRY DENSITY FROM NZS 4402:1986 TEST 4.1.3 IN 300mm LAYERS TO BOTTOM OF HEADSTOCK

- SECUGRID 80/80 Q6 (PET) GEOGRID OR SIMILAR APPROVED

- BIDM A29 GEOTEXTILE OR SIMILAR APPROVED

- 300 SED H5 TREATED PILE 15m LONG INSTALLED SMALL END DOWN
Construction

- Logistics
- Precast in Suva yard
Construction

- Pile load test
Construction

- Labasa
Questions ?