SH1 Atiamuri Bridge Replacement

- Project Overview
- Contract Procurement
- Design and Consenting
- Construction
- Project Outcomes
- Key Learning's
Collaboration

“The action of working with someone to produce something” – Oxford Dictionary

For the Project team:

• Working together towards a common goal
• Project focused
• Early discussions on actual and potential risks
Project Overview

• Purpose of the project
• Where it is located
• Main elements of scope
• The people in the Delivery Teams
• Time-line
Purpose

• Replacement of existing steel arch bridge
  – Fatigue Failures
  – Excessive Repair Costs
• Realignment of SH1 to improve safety and efficiency
  – Substandard Approach Alignments
Location
Location
Scope
Bridge Replacement and Road Realignment
Relocate SH1/30 Intersection
New Rest Area
Stormwater Pond
Waikato River Trail
Delivery Team

• Project Management Board (PMB),
• Site Management Team (SMT) and
• Design and Construction Team
• Support Team
Contract Procurement

• Separable Portion 1 - Investigation and Scheme Assessment
  • Scheme Assessment Report
  • Topographical survey
  • Geotechnical Testing
  • Draft Designation and Resource Consents

• Procurement Strategy
  • Early Contractor Involvement (ECI)
  • Best outcome for NZTA based on complexity and scale
  • Separable Portion 2 tendered and evaluated under Price Quality Method
Contract Procurement

- Separable Portion 2 – Early Contractor Involvement
  - Refinement of Preferred Design into the Specimen Design
  - Preparation of Principal’s Requirements
  - Completion of Designation and Resource Consents
  - Assistance with Land Acquisition
  - Preparation of funding application
Contract Procurement

- Continue from SP2 to SP3
  - No Guarantees
  - Dependant on reconciliation and negotiation of Lump Sum price

- SP3 – Design and Construct
  - Detailed Design and Construction Documentation
  - Physical Construction
  - Quality Assurance
Contract Procurement

- Lump Sums
- NZS 3910 Contract
  - No LD’s
  - Reduced Retentions
  - Allocated Risks
- NZTA Principal Arranged Insurance
Design and Consenting

• Programme
• Consents
• Affected Parties
• Land Owner Negotiations
• Detailed Design
• Service Relocations
• Water Take
## Programme

- **Original SP2 Programme**
  - **SP2 Award**: Jul 2010
  - **Specimen Design**: Oct 2010
  - **Consents**: Oct 2010
  - **SP3 Price & Reconciliation**: Nov 2010
  - **SP3 Award**: Dec 2010
  - **Commence Construction**: Jan 2011
Consents

- Alteration to Designation Consents – 2 no.
  SWDC & TDC
- Resource Consents – 6 no.
  Bridge, Earthworks, Stormwater, Spoil Disposal, Bridge Removal, Water Take
- Non-notified
- Sign-off by Affected Parties
Affected Party Sign Off

• Iwi Groups
  Mokai Marae
  Ngati Tahu Ngati Whaoa Runanga Trust
  Raukawa Charitable Trust

• Landowners
  NZ Forest Products
  Mighty River Power

• Waikato River Trails Trust
Affected Party Sign Off

- Iwi Groups
  - Mokai Marae ✓
  - Ngati Tahu Ngati Whaoa Runanga Trust ✓
  - Raukawa Charitable Trust

- Landowners
  - NZ Forest Products ✓
  - Mighty River Power ✓

- Waikato River Trails Trust ✓
Affected Party Sign Off

- Iwi Groups
  - Mokai Marae ✓
  - Ngati Tahu Ngati Whaoa Runanga Trust ✓
  - Raukawa Charitable Trust  Feb 2011

- Landowners
  - NZ Forest Products ✓
  - Mighty River Power ✓

- Waikato River Trails Trust ✓
Affected Party Sign Off

- Iwi Groups
  - Mokai Marae
  - Ngati Tahu Ngati Whaoa Runanga Trust
  - Raukawa Charitable Trust
    - Feb 2011

- Landowners
  - NZ Forest Products
    - Sept 2011
  - Mighty River Power

- Waikato River Trails Trust
SP2 Close Out

- Resource Consents Sep 2011
- MRP Land Agreement Oct 2011
- Possession of Site Nov 2011
- Detailed Design Advanced
- Service Relocations
- Project Documentation
- Water Take Consent
Construction

- Earthworks
- Drainage
- Pavement & Surfacing
- Bridge Structure
- Traffic Management
- Climate
- Ground Conditions
- Atiamuri Slip
- Existing Bridge Removal
- Additional Scope
Main Cut

- Original design bench cut
- 4.0m H x 4.2m V benches
- Loose soils - drop outs
- Design change
Main Cut
Southern Fill Embankment

• Simple fill embankment (8m high)
• Minor cut to waste
• 37,000m³ structural fill
• CBR>20% (scala penetrometer > 4 blows/50mm)
• Air voids < 7%
Southern Fill Embankment
Southern Fill Embankment
Southern Fill Embankment
Sidling Fill

- Liquefaction investigations (CPT’s, boreholes)
- Stability report – remedial options
- Stone columns
- EQ drains
- Do nothing
Sidling Fill
Sidling Fill
Sidling Fill
Sidling Fill
Pavement & Surfacing

- SMA to bridge & SH30 intersection
- 2 coat chipseal SH1
- 330,000 l of bitumen used
- FBS AP40 basecourse
- AP65 subbase
- CBR20+ subgrade
Bridge Foundations

- Bored insitu piles
- Up to 1.8m diameter
- Sleeved annulus 7m deep
Waikato River Levels

- Flooding of work platforms
- Damage to erosion and sediment controls
- Coordination with MRP
- River level control v’s $
Bridge Piers and Headstocks
Bridge Stringers
Bridge Stringers

- Assembled on ground
- Lifted in pairs
- 40 tonne lifts
Bridge Stringers

- 4 x 2.5m deep stringers
- 5 sections / 3 spans
- Bolted splice connections
- 380t structural steel
- ZMS coating
- Temp supports to end spans
- Hanging scaffold splice access
Bridge Stringers
Bridge Stringers
Bridge Deck
Bridge Barriers

- Precast TL5 barriers
- Insitu stitch
- Dedicated walk/cycleway
Traffic

- Divided site
- Traffic management
- Haul road crossings
- Speed
- Trucks
- NZ Police
- Radar drones
- Accidents
Traffic
Climate

- Fog
- Sub zero temperatures
- Rainfall
- Drought
Ground Conditions

- Soil types
- Erosion
- Tomo’s
Atiamuri Slip

• Large scope increase
• Timing and time
• Resourcing
• Investigation, design, design check, approval & construction
• Insurance claim
  – NZTA PAI (Principal Arranged Insurance)
  – Loss adjusters
  – Underwriters
Atiamuri Slip
Atiamuri Slip
Existing Bridge Removal
Existing Bridge Removal

- Ultra-thermic cutting
- 5,000°C at the cutting tip
- Concrete & steel recycled
Additional Scope

- Southern undercut
- Major culvert crossing
- Existing pavement rehabilitation
- Atiamuri slip
- Swale lining
- Weigh station
- Safe systems guardrail

All accommodated within programme, resourcing & budget
Project Outcomes

- Excellent planning and execution
- Excellent public perception (tidy site)
- Opened early
- Under project funding
  - Accurate forecasting
  - Timely pricing of variations
- Environmental performance (including awards)
- Stakeholders
- Public (road, Waikato river trail, car park)
- Recycling of old bridge
- Team relationship (NZTA, Resolve, HEB, Goodman)
Key Learning's

• Partnering and Collaborative behaviour – a pathway to success

• Benefits of relationship and value based contracting
  - openness
  - transparency
  - attitude that no problem is too large
  - always a win win outcome
  - inclusiveness
  - best for project focus