Legacy Way Project

Presentation to IoM³ – Hong Kong Branch - 27 March 2013
Outline

• Project overview
• Geology and geotechnical issues
• Tunnelling
• SFRC segments
• Cross passages
• Progress to date
• Concluding remarks
• Q & A
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Contract between TRANSCITY and the three designers to deliver the D&C design, Design Certification and As-Constructed Certification
Project Overview

- AUD $1.8bn D & C contract let in September 2010, to be complete by 2015
- two-lane TBM PCC segment lined rock tunnels length = 4.3km each
- 36No. XPs every 120m, 4No. substations and sump/pump station.
- grades at 3% except for the Eastern end where the grade rises to 5%.
Double shield rock TBMs

- TBM Annabell
- TBM Joyce
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Bunya Phyllite  
Neranleigh-Fernvale Beds
SAMPLE N1.3.18 36.08-36.83  *Ordinary Light*. A folded quartz+chlorite layer crosses the centre of the field; white is quartz, and the small greyish areas are chlorite. Opaque+sericite+quartz material occupies the remainder of the field. The black strips are opaque and the speckled grey-white areas are sericite+quartz+opaque. The anastomosing cleavage style of opaque is in the lower left. The spaced cleavage is in the upper right, expressed by the long opaque strips. Diameter of field 2.5 mm.
BPY phyllite-hornfels-quartzite (FR)

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<td>28 - 30</td>
<td>5</td>
</tr>
<tr>
<td>30 - 32</td>
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</tbody>
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**UCS ave (MPa)**

- FR: 5.35
- SW: 2.05
- DW: 1.83

**UCS k (MPa)**

- FR: 4.28
- SW: 1.64
- DW: 1.46
Weathering
Rock structure

Figure 5 - Mainline Tunnels, Domain D/E (48 degrees)
In situ stress
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LEGACY WAY

Trackless wagon transport
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SFRC Segments

- 12.0 m Outside diameter
- 11.3m internal diameter
- Ring internal dia. / thickness = 32
- Segment span / thickness = 12
- 8 + 1 universal ring
- 2.0 m wide
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Segment quality control
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Cross Passages
LEGACY WAY

Substation openings
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Tunnelling progress

- TBMs Annabell and Joyce are expected to breakthrough in the next 2 to 3 months
- Both TBMs at approximately ch.3km – Joyce approx. 100m in advance of Annabell
Spoil disposal
Mt Coot-tha Quarry
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Concluding remarks

Key points to high advance rates to date:

- Good geotechnical understanding and probabilistic assessment of ground risk
- Good stand-up time, low water inflows - double-shield can realise full potential
- Staggered grouting & innovative design including circumferential joint dowels
- High segment production rate (rebar fixing minimised)
- Minimising steel in segments – 350mm SFRC can be safely handled
- Effective high-volume spoil removal system
- Trackless materials transport in the tunnels
- Frame-less XP openings minimise obstruction