Laser Scanning Pavement Auditing Survey
Northern Diversion Project
Melbourne

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FIG SYDNEY 2010

Project Background

Northern Diversion Sewer Project

- Northern suburbs of Melbourne
- 12.5 kilometres of tunnels
- Stage 1 – 8 km
- Stage 2 – 4.5 km

Project Stakeholders

- Melbourne Water – Tunnel asset owner and client
- Transurban – CityLink Freeway Tollway operator
- VicRoads – Responsible authority for surrounding roads
- John Holland – Tunnel constructor
- Aurecon – Project Management and Supervision
- SKM – Design and Geotechnical

Site location

- 5 metres from pavement surface to crown (top) of tunnel below
- Safety – Traffic Management required

Site location

The Project Brief

- Survey intelligent client and stakeholders

- Pre and post construction survey
- Survey to VicRoads Class AUD1 specification
  - Horizontal ± 0.030 m
  - Vertical ± 0.005 m
- Total Station and digital level

- Real time construction monitoring - John Holland
- Pavement Strength Evaluator (PaSE) - Vicroads
- Daily driving tests

So why use Laser Scanning?

Whoever has the most data

WINS!

Instrumentation

- Leica TCRA 1203 robotic total station
- Leica DNA10 Digital Level and invar staff
- Leica ScanStation 2

Field Survey

- Pre-construction survey August 2009
- Post-construction survey October 2009

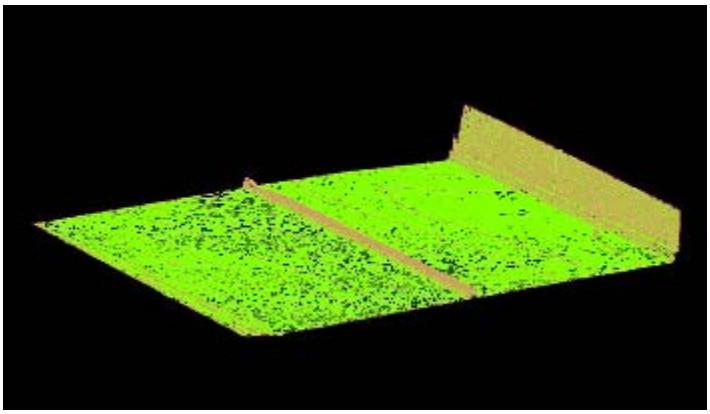
- Safety – Management and night operations

- Survey Control
  - Stable marks
  - Fixed targets for the duration of the project
  - Same marks for Laser Scan and Total Station

Processing

- Extraction of data to DTM grid mesh
- 50 mm x 50 mm interval
- Review of data to remove non pavement strikes

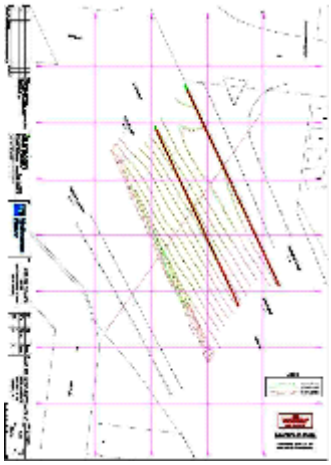
Processing



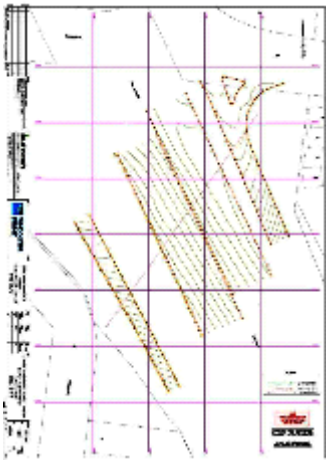
Results and comparisons

- Contour comparison
- DTM difference by contour
- DTM grid spot level comparison
- DTM difference by volume
- Long section comparison
- Driving

Laser Scan



Total Station



DTM contour difference

Outcomes and conclusions

An appreciation of Laser scanning

- Accuracy ✓
- Repeatability ✓
- Coverage ✓
- Data density ✓

Questions