Keeping the roads moving…

June 5, 2007
Transurban Group vision & business

Vision:
- The pre-eminent global toll road developer, owner and manager, producing superior shareholder returns by delivering innovative transport solutions that work better for the people and businesses using them.

Current Business:
- The application of capital to the development and acquisition of toll roads in Australia, North America and Western Europe and/or the application of intellectual property globally to maximise growth in shareholder value.
Who is Transurban

- Top ten road investor globally
- Owner & manager of Australia’s best toll road assets
- Pioneer of Full Electronic Tolling
- Innovator in sophisticated electronic toll roads

**ASSET MIX %**

CityLink 100% Ownership and Operations
Hills M2 100% Ownership and Operations
WM7 40% Ownership and 100% Tolling Operations
Pocahontas Parkway 100% Ownership and Operations

Market capitalisation A$6.3 billion*

*Includes Cars
Transurban skill base

- Traffic
- Finance
- Electronic Tolling systems
- Customer first focus
- Active Partnering
- Road Performance
- Project Delivery
- Protecting Environment & Community
CityLink Facts and Figures
Melbourne CityLink

- 22 kilometre motorway
- Concession until 2034
- Toll increases 4.5% or inflation
- 100% electronically tolled
- Over 200 million transactions per year
CityLink

For the record…..

• CityLink 1 million + e-TAGs
• 700,000 daily transactions
• 700,000 + customers
• 720,000 + accounts
• 1.4 million vehicles registered
• 40,000 + casual motorists per week
• Violations < 1%
• WL volumes: > 120,000 vehicles per day
• SL volumes: > 110,000 vehicles per day
• Tunnels: > 80,000 vehicles per day
CityLink Tunnels

Burnley Tunnel (Outbound\Eastbound)

- Total Length - 3.6km
- Maximum Depth below surface 65 metres
- Traffic Envelope - (3 lanes + 0.5m shoulders; 4.9 m vertical clearance)
- Emergency Egress
  - Cross Passages
  - Refuge Rooms
  - Pedestrian Egress Tunnel
  - Escape Stairs
CityLink Tunnels

Domain Tunnel
(Inbound\Westbound)

- Total Length – 1.6km
- Maximum Depth below surface 25 metres
- Traffic Envelope (3 lanes + 0.5m shoulders; 4.9 m vertical clearance)
- Emergency Egress
  - Cross Passages
  - Escape Stairs
CityLink Concession

- Contract with State managed through Concession Deed
- Melbourne CityLink Act
- CityLink Concession length is 34 Years
- Concession is managed by VicRoads
  - Strong Relationship Management
- Deed undergoes regular change
Traffic Management, Incident Response & Emergency Management
Incident Response & Emergency Management

This involves:
- Monitoring of the City Link systems (traffic, incident alarms, environmental systems)
- Manage traffic flow on-off CityLink (with VicRoads)
- Response & clearance of known incidents on the City Link
- Towing Services, including heavy salvage
- Breakdown Services

This is achieved via:
- Traffic Control Room (24/7)
- Surveillance & Incident Response Group (24/7)
24 x 7 Traffic Control Room

- 2 or 3 operators per shift (12 hr shifts)
- Extensive initial and on-going training and assessment
  - Emergency Management Principles
  - Traffic Management
  - First Aid
  - Fire Fighting
  - Tunnel specific equipment
- Business Continuity
  - Alternate control room (remote site) available within 24 hours
Surveillance & Incident Response Group

- 3 Patrols on shift during peak periods and 2 at other times
- Fully equipped vehicles for:
  - Towing/pushing
  - Traffic management
  - Clean up
  - Breakdown
- Detection & Response times as required by MCL Act
  - 5 minutes detection
  - 10 minutes response - hazardous (actual = 5 mins)
  - 40 minutes - non-hazardous (actual = 10 mins)
- Contracted towing and other services
  - Accident Towing (heavy haulage)
  - Animal Control Services (stray dogs, cattle, sheep, etc)
Plans & Procedures

- Emergency Management Plans
  - Tunnel Evacuation Plans
  - Developed with Police and Emergency Services
- Operational Procedures
  - Fire
  - Spills
  - Accidents/incidents
  - Prohibited Users
  - Equipment Failure
- Pre-programmed Traffic Management Plans
- Annual desktop exercises
- Live emergency exercise every 3 years
Tunnel Systems
Tunnel Systems
Tunnel Traffic Management

- Lane Use Signals
- Tunnel Incident Management Signs
- Variable Speed Limit Signs
- Automatic Incident Detection (video based)
Radio Rebroadcast/PA

- In tunnel only
- Over-ride the commercial radio network with incident information using traffic plans or manual intervention
- Provides for Emergency Services communication
- Public address system
  - Operates via traffic plans or manual intervention
  - Used to broadcast instructions during Incidents
Tunnel Fire Systems

- Fire cabinets located every 60 metres
  - Doors alarmed
  - Emergency Services communication
- Linear Thermal Detection
  - 30 metre sections
  - Not primary system due to slow response
- Deluge System
  - 30 metre sections at 2500 litres/min
- Ventilation System
- Overhead Smoke Extraction System
Tunnel Evacuation

- Stairs to Surface
- Cross Passages to other tunnel
- Evacuation Lighting
- Pre-determined plans
On Road Systems
Motorists Emergency Telephones

- Connected to the Traffic Control Room
- Hands Free Operation
- Linked to closest CCTV camera
- Spacing
  - Every 60 metres in tunnel
  - Approx 1km open road
CCTV, AID and Advisory Display Signs

- Over 230 cameras across CityLink
- CCTV complete Link Coverage
- Automatic Incident Detection
  - Complete Tunnel Coverage
  - Selected areas open road
  - Stopped vehicles, pedestrians, debris
- Advisory Display Signs
  - Located on all ramp entrances
  - Advise motorists of conditions on the Tollway. (Delays, Closed, etc.)

120 CCTV + 114 AID
Variable Message Signs

- 9 Located on the Link
- Advise motorists of conditions ahead. (Incidents, Delays etc.)
Interface with Other Agencies
VicRoads

- VicRoads manages the MCL Concession Deed for the State
- Strategic Matters
  - Executive Liaison Committee (MD/CEO)
- Operational Matters
  - Operational Committee
  - Supply of Drive Time Information (real time)
  - Supply of Traffic Data (monthly)
  - Access to camera network
  - Supplementing on-road resources
  - Participation on event management & Freeway planning committees
Other Agencies

- EPA
- Municipal Councils within CityLink corridor
- Victorian Transport Association
- Melbourne Ports Corporation
- Water & Energy Companies
- Emergency Services (VicPol, MFESB, MAS, SES)
- DoI / DSE / DoJ
- VicTrack
- Bicycle Victoria
- Event organizers
- RTA - NSW
Tunnel Safety
Tunnel Safety Review (2005-2006)

The review consisted of:-

• Analysis of serious tunnel fires (1949 – 2006)
• Review of PIARC Standards
• Review of European Directives
• Development of a Semi-Quantitative Safety Model
• HAZOP
• Risk Analysis
Casualties v Fire Duration

- Casualties are relatively insensitive to fire duration
Serious Tunnel Fires 1949 - 2006

- Casualties increase as tunnel length increases

![Fire Casualties vs Tunnel Length](chart.png)

transurban
Serious Tunnel Fires 1949 - 2006

- Length of tunnel damaged increases with the square root (approx) of fire duration

\[ y = 7.5526x^{0.5517} \]

\[ R^2 = 0.6346 \]
Quantitative Risk Model

- Unacceptable Risk Level (Red Line) determined by risk of death on Victoria Road Network
- ALARP region (Green Line) is 10 times safer
- Model allows comparison of Risk Treatments
Level of Safety
Baseline

FN Curves - CML Tunnels - Baseline

Cumulative frequency 1/year

Fatalities

Unacceptable threshold
Acceptable threshold
Baseline
Level of Safety
Stop New Vehicles Entering

FN Curves - CML Tunnels - stop new vehicles entering tunnel

Fatalities
Cumulative frequency 1/year

Unacceptable threshold
Acceptable threshold
Baseline
Stop entry
Level of Safety
Secure power for Jet Fan(s)

FN Curves - CML Tunnels - secure power jet fan

Cumulative frequency 1/year

Fatalities

- Unacceptable threshold
- Acceptable threshold
- Baseline
- Secure jet fan
Level of Safety
Reduce congestion in Tunnel

FN Curves - CML Tunnels - 1 lane restriction on congested traffic

Cumulative frequency 1/year

Fatalities

- Unacceptable threshold
- Acceptable threshold
- Baseline
- 1 Lane
Burnley Tunnel Accident – 23 March 2007

- Collision involving 3 Trucks & 4 Cars
- Three fatalities
- Initial explosion and fire ball
- Serious fire (10MW)
- Smoke contained by Overhead Smoke Extraction System
- Tunnel evacuated (247 people)
- Fire contained by deluge system, extinguished by MFESB
- Tunnel repaired and re-commissioned within 4 days
Tunnels Ventilation Scheme During Fire