



WARRNAMBOOL
CITY COUNCIL

Simpson Street Tunnel Rehabilitation and Lining Stage 1

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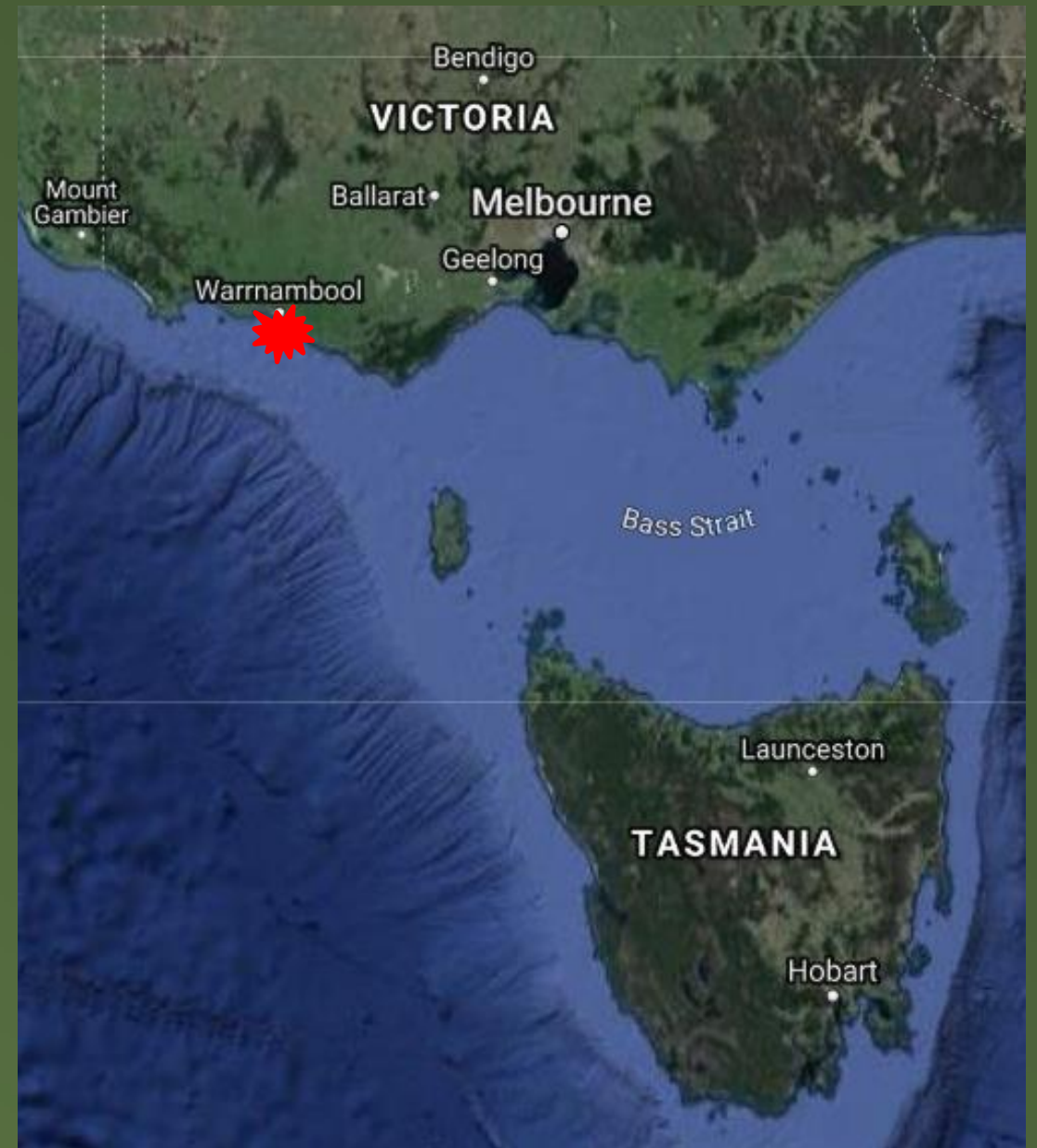
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Warrnambool

- On the Great South Coast
- 270km south-west of Melbourne
- Population 35,957
- municipal area 120sqkm.



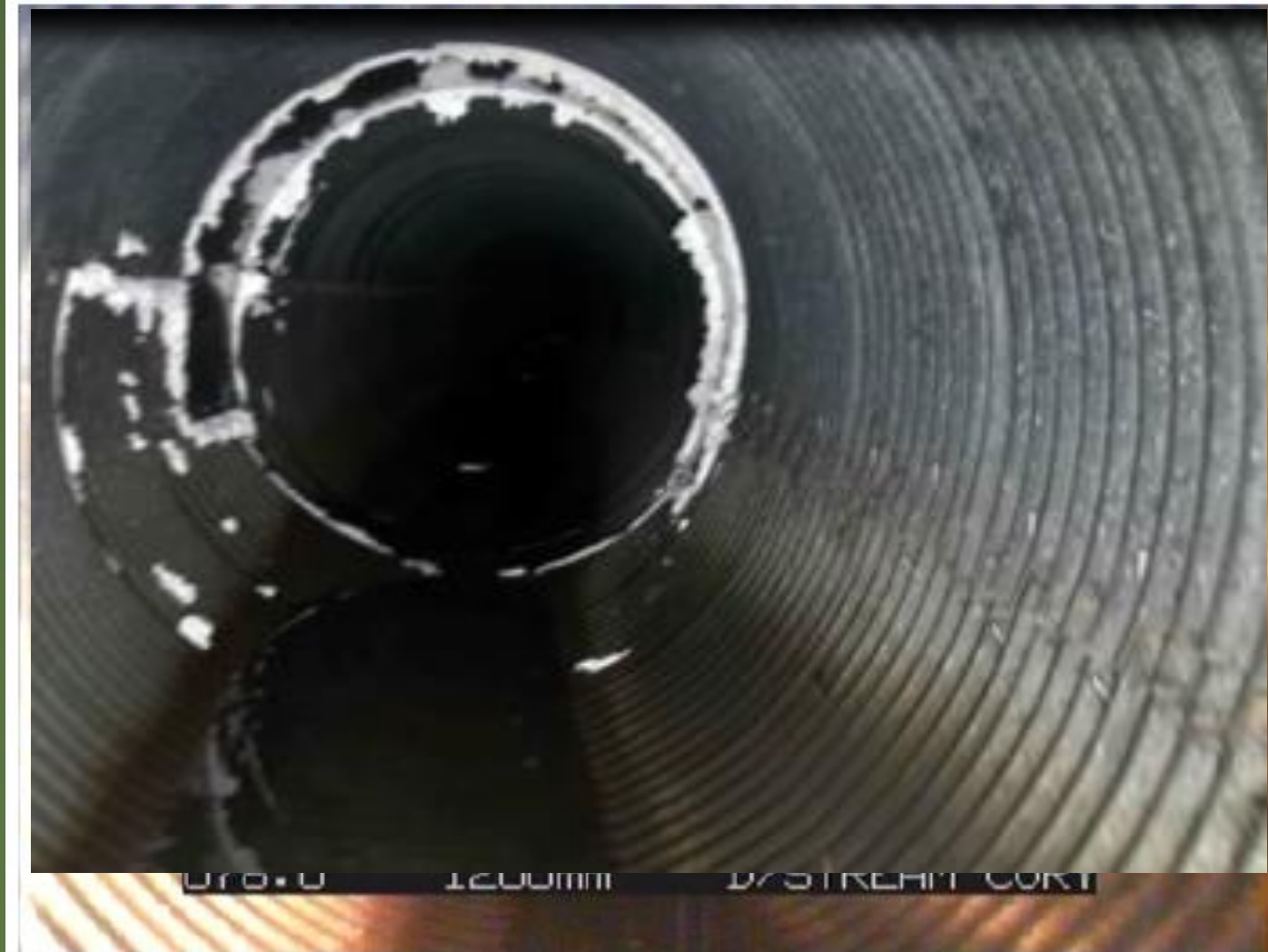
Simpson Street Tunnel

- Constructed 1968 to 1972
- Runs from Princes Highway to outfall at Hopkins River.
- 725m long
- Cut through Bridgewater formation of limestone/sandstone
- Redirects water from Merri River catchment to the Hopkins river catchment



Simpson Street Tunnel

Upper Section



Multi-plate Steel
Culvert
1200 mm dia

Princes Highway
Thompson street

Some plates
dislodged

Invert
Corrosion

Simpson Street Tunnel

Middle Section



Simpson Street Tunnel

Pit 5 Change of direction

Storm water to the left
Sewer on the right
Sewer inspection plate

Sewer continues
down Simpson
Street



Simpson Street Tunnel

Lower Section



Unlined sections

Timber sets

Multi plate culvert

Simpson Street Tunnel

Strategy

Option 1 Do Nothing

Option 2 Partial re-sleeve of tunnel and
upstream catchment diversion

Option 3 Re-sleeve existing tunnel and
duplicate tunnel along side -1500 mm dia

Option 4 Larger diameter tunnel same alignment 2400mm

Option 5 New tunnel alignment and back filling existing tunnel

Simpson Street Tunnel



Preferred

Option 2 Partial re-sleeve of tunnel and
upstream catchment diversion

- Critical section from Thompson street to Pit 5 to be re-sleeved
- Treatment of Pit 5 and Void (sewer tunnel)
- Consequential works replacement of Pit Cover at Thompson Street

Simpson Street Tunnel



Tunneline treatment 2015

Preparation

Custom Steel form work

Cast in 10 m sections

Removing air

Fibre reinforce Concrete liner

80 meter completed Pit 5 towards


Rail overpass

Cost \$680,000

\$8600 per lineal metre

Simpson Street Tunnel






Geotechnical Investigation

Simpson Street, Warrnambool

REPORT NUMBER: AGT17473



Chainage	Location	Schmidt Hammer (MPa)	Pick Difficulty to Rip	Knife Difficulty to Rip	Point Load Test (MPa)	Estimated Strength
0	E/W/R	25/26/28	X	X	1.77	H
3	E/W/R	5/18/28	Very Difficult	Very Difficult		M
6	E/W/R	X	Easy	Easy		VL
8.3	W/R	18/20	Very	Very Difficult		M
10.7	R	17	Very Difficult	Very Difficult		M
14.5	R	21	X	X		H

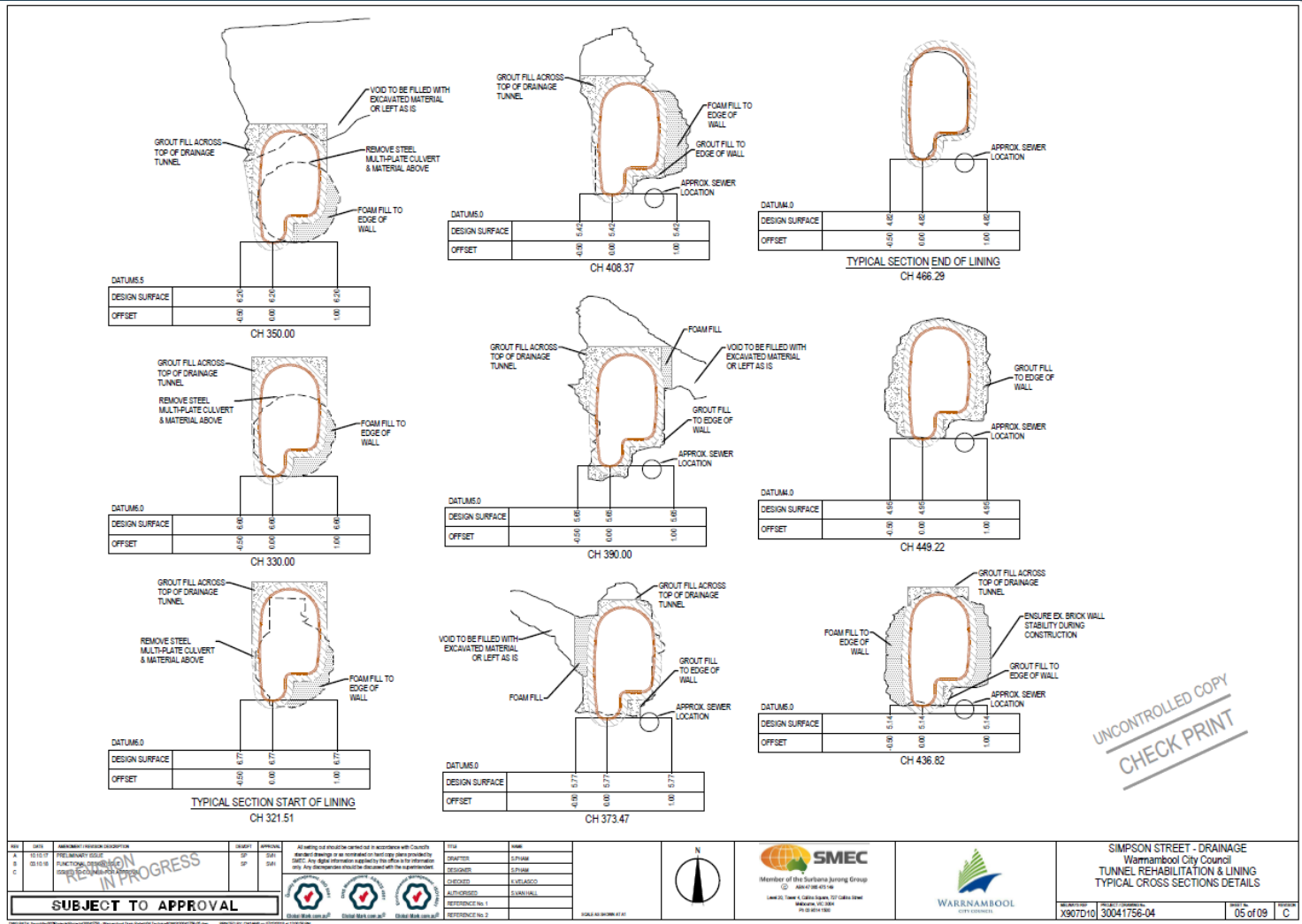
Further Investigation

Geotechnical Investigation

- Visual inspection
- Pick and Knife test
- Schmidt hammer
- Lab point load test

Simpson Street Tunnel

Further Investigation



Survey
Laser Scanned point
Cloud
Accurate 3d Model
for design
Better understanding of
damage and voiding
Better quality plans

Simpson Street Tunnel

GFRP Liner Grouted in place 2018



Pit 4 Cover removed
for access
2.4 m dia depth 20 m
Tunnel Preparation
GFRP Section
lowered into tunnel
Assembly of liner
Grouting liner in place
Inside the liner
Cost \$1.3m
\$8700 per lineal
metre



Questions





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