

STONEQUARRY CREEK (PICTON) FLOOD STUDY UPDATE FINAL VOLUME II

FIGURES

Figure 1: Locality Map
Figure 2: Study Area Topography
Figure 3: Picton LEP 2011 – Land Use Zones
Figure 4: Recorded and Anecdotal Historic Flood Marks
Figure 5: Historic Flood Event Reports
Figure 6: 2016 Flood Event Photographs
Figure 7: Rating Curve
Figure 8: Flood Frequency Analysis
Figure 9: Pluviometer Rain Gauges
Figure 10: Daily Rain Gauges
Figure 11: WBNM Hydrologic Model – Subcatchment Delineation
Figure 12: Hydraulic Roughness (Manning's 'n' values)
Figure 13: Hydraulic Model Extent and Hydraulic Structures
Figure 14: Boundary Conditions
Figure 15: June 2016 Calibration Event – Rainfall Data
Figure 16: June 2016 Calibration Event – Comparison Hydrograph
Figure 17: Peak Flood Depth June 2016 Event with comparison to High Water Marks
Figure 18: Spatially Varying IFD – 1% AEP, 12 hour duration
Figure 19: Critical Duration Map – 1% AEP Event
Figure 20: Peak Flood Depths and Level Contours – 5% AEP Event
Figure 21: Peak Flood Depths and Level Contours – 1% AEP Event
Figure 22: Peak Flood Depths and Level Contours – 0.5% AEP Event
Figure 23: Peak Flood Depths and Level Contours – 0.2% AEP Event
Figure 24: Peak Flood Depths and Level Contours – PMF Event
Figure 25: Peak Flood Velocities – 5% AEP Event
Figure 26: Peak Flood Velocities – 1% AEP Event
Figure 27: Peak Flood Velocities – PMF Event
Figure 28: Peak Water Level Profile – Stonequarry Creek
Figure 29: Peak Water Level Profile – Racecourse Creek
Figure 30: Peak Water Level Profile – Crawfords Creek

Figure 31: Peak Water Level Profile – Locality Map with Key Locations
Figure 32: Climate Change Sensitivity – 0.5% versus 1% AEP Event
Figure 13: Climate Change Sensitivity – 0.2% versus 1% AEP Event
Figure 34: Provisional Hydraulic Categorisation – 5% AEP Event
Figure 35: Provisional Hydraulic Categorisation - 1% AEP Event
Figure 36: Provisional Hydraulic Categorisation – PMF
Figure 37: Provisional Hydraulic Hazard – 5% AEP Event
Figure 38: Provisional Hydraulic Hazard – 1% AEP Event
Figure 39: Provisional Hydraulic Hazard – PMF

FIGURE 1
LOCALITY MAP

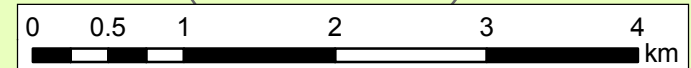
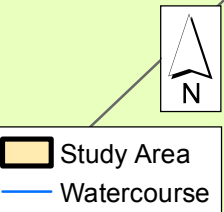
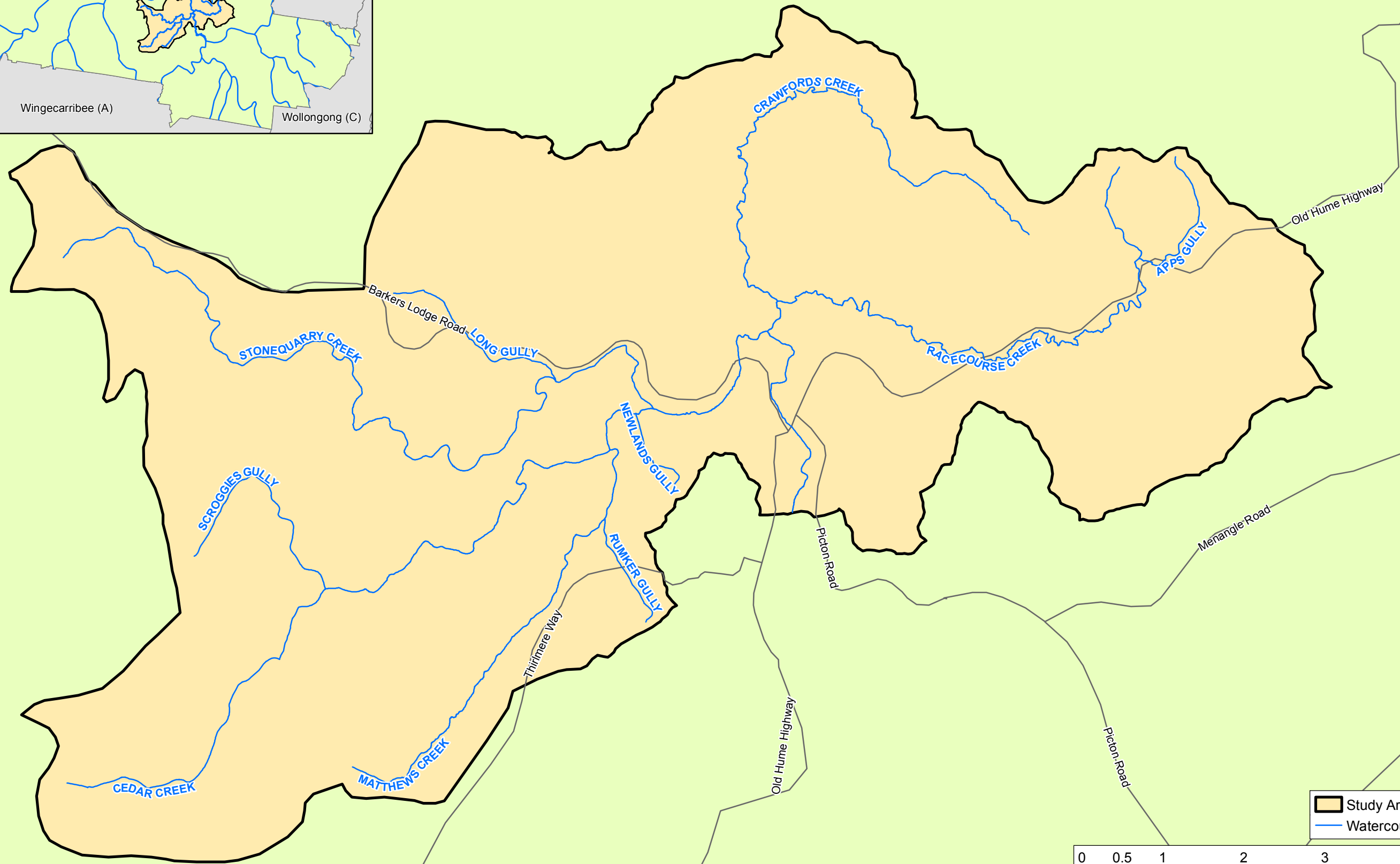
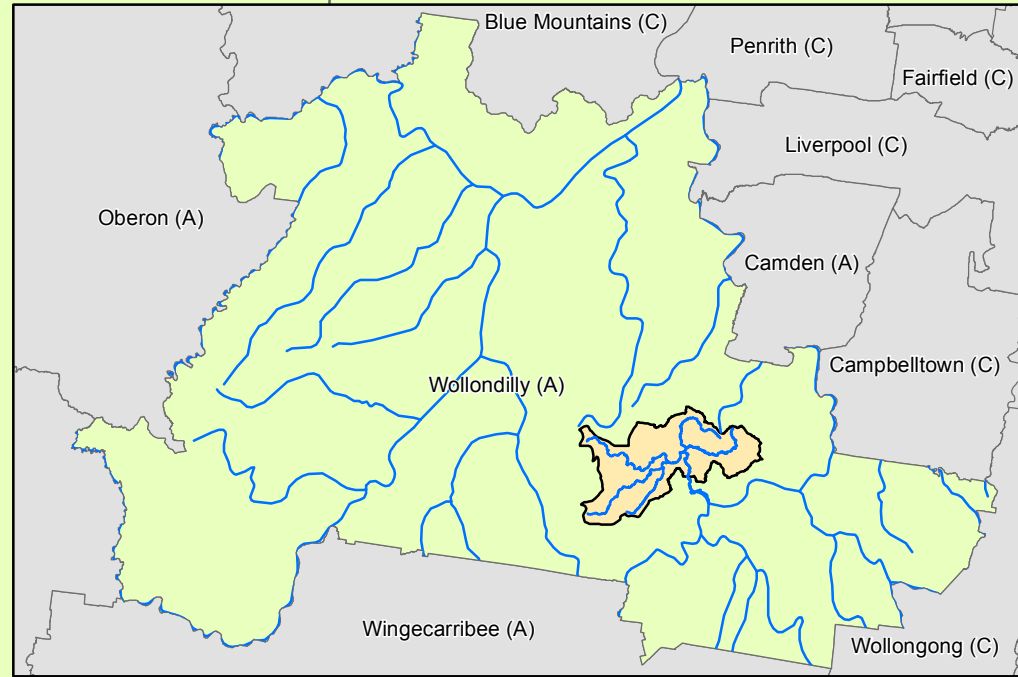


FIGURE 2
STUDY AREA TOPOGRAPHY

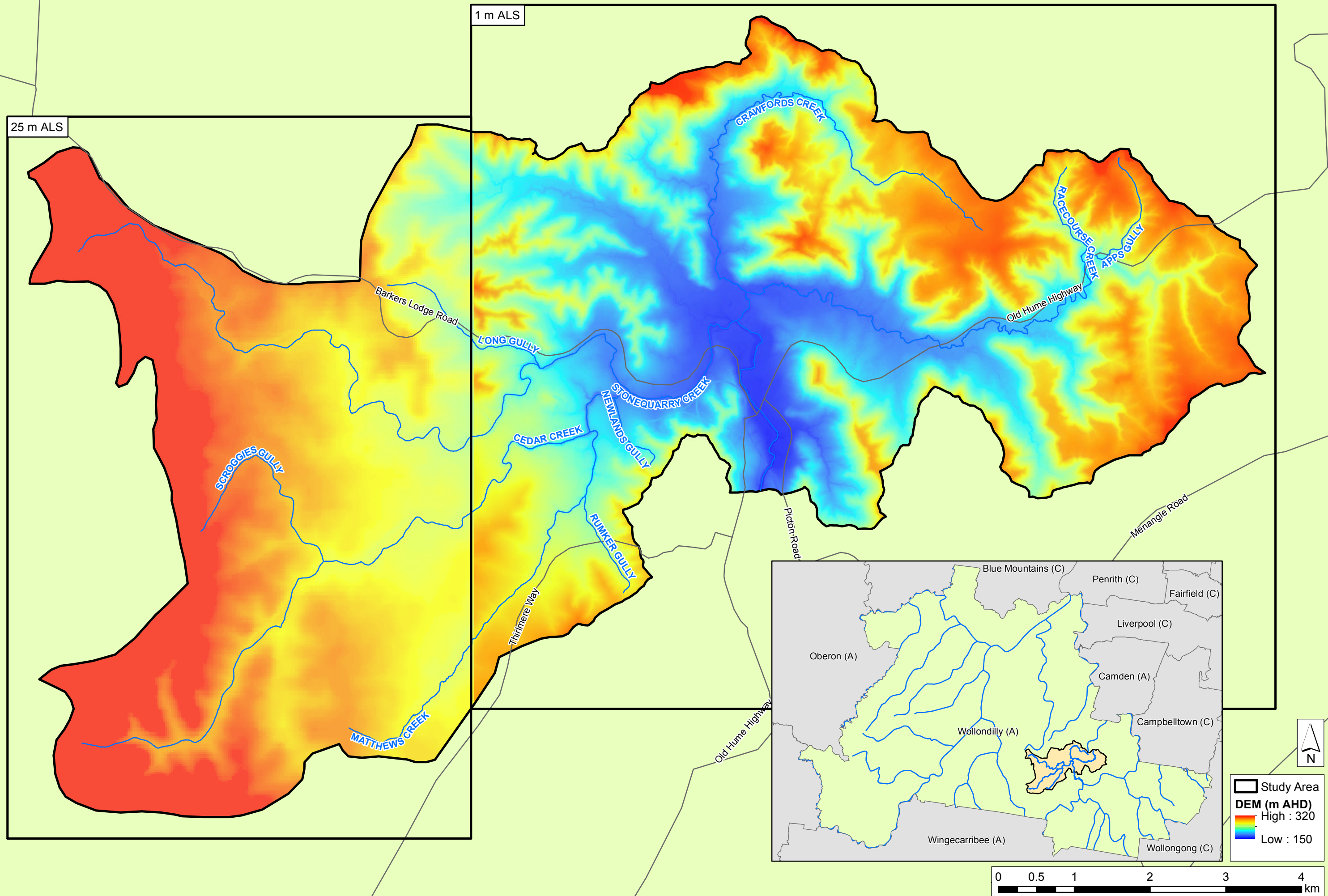
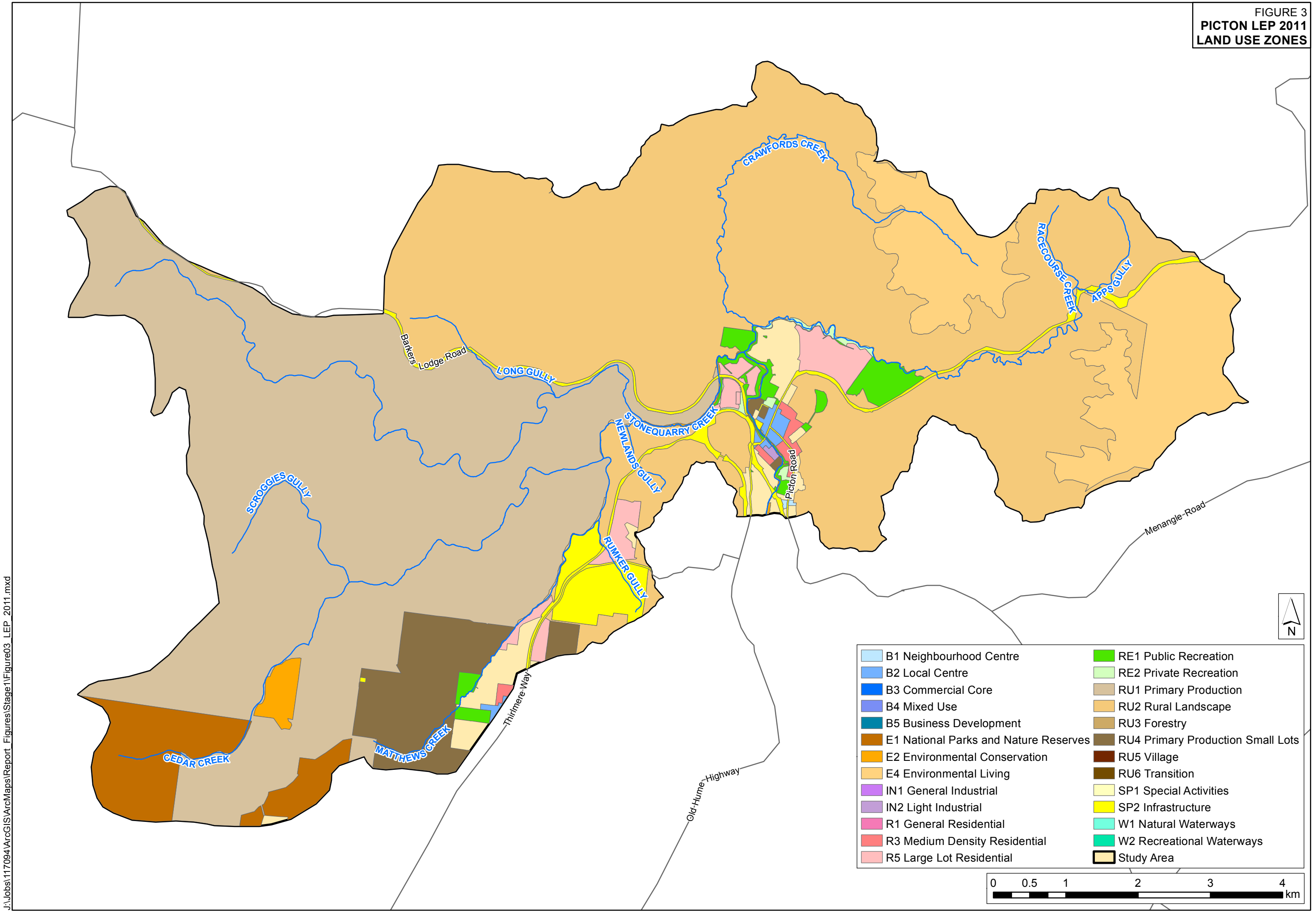


FIGURE 3
PICTON LEP 2011
LAND USE ZONES



1910
Flood smaller than that of 1930.

1963
3 Ft. deep, high velocity watercourses into the creek on the Picton Post trail

1969
157.04 mAHD recorded at Middleton's Store.

**FIGURE 4
RECORDED AND ANECDOTAL
HISTORIC FLOOD MARKS**

1969
157.12 mAHD measured at Residence on Menangle St West.

1969
158.03 mAHD measured at Cottage on Elizabeth St.

1956
0.76 m in St Mark's Church.

1930
2 days of rainfall
Water entered St Mark's Church.

1930
2 days of rainfall
Flood levels reached over the handrails of Stonequarry Creek Bridge.

1911
3 days of rainfall
Creek rose over the town bridge. Several residents evacuated to seek higher ground.

1930
2 days of rainfall
Water was within 3 feet (~0.9 m) of the verandah of the Royal George Hotel.

1969
157.52 mAHD measured at Picton Hotel.

1930
2 days of rainfall
Argyle Street was inundated up to the bridge and experienced high velocity flows.

1969
157.56 mAHD measured at Westpac Bank.

1952
7 days of rainfall
6 Inches (~150 mm) of rainfall over 7 days recorded at Picton Post Office.

1969
157.14 mAHD measured at Picton Plaza.

1911
3 days of rainfall
871 Points (~310 mm) of rainfall recorded at Picton Post Office.

1930
2 days of rainfall
770 Points (~270 mm) of rainfall recorded at Picton Post Office.

1943
6 days of rainfall
929 Points (~330 mm) of rainfall over 6 days recorded at Picton Post Office.

1943
6 days of rainfall
Water rose above the stone supports of the bridge, but did not cover the decking.

1969
156.58 mAHD measured at residence opposite Showgrounds.

1943
6 days of rainfall
Argyle Street was inundated for hundreds of yards. Low situated houses were badly affected.

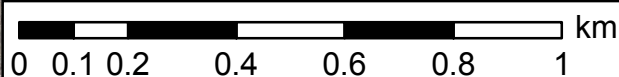
1930
2 days of rainfall
P. Brookes' House was inundated up to the gate.

1930
2 days of rainfall
G. Bells' House on Menangle Street was waist-high in water.

1930
2 days of rainfall
Many houses and farms flooded near Stonequarry Creek.

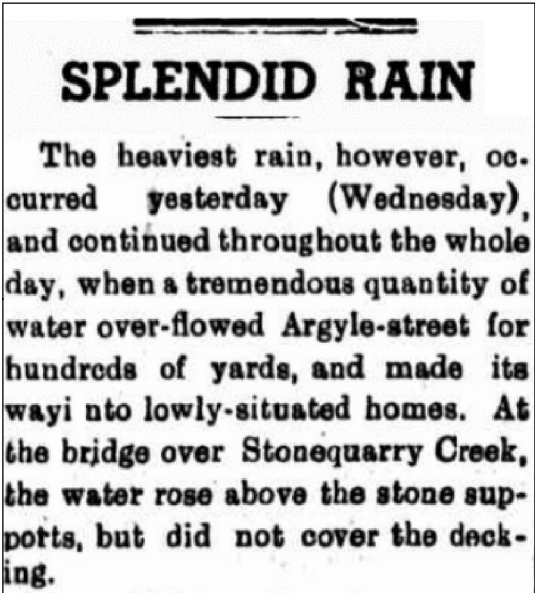


- Flood Marks
- Location of a Surveyed High Water Mark (HWM), June 2016
- TUFLOW Hydraulic Model Extent
- 1% AEP Flood Extent

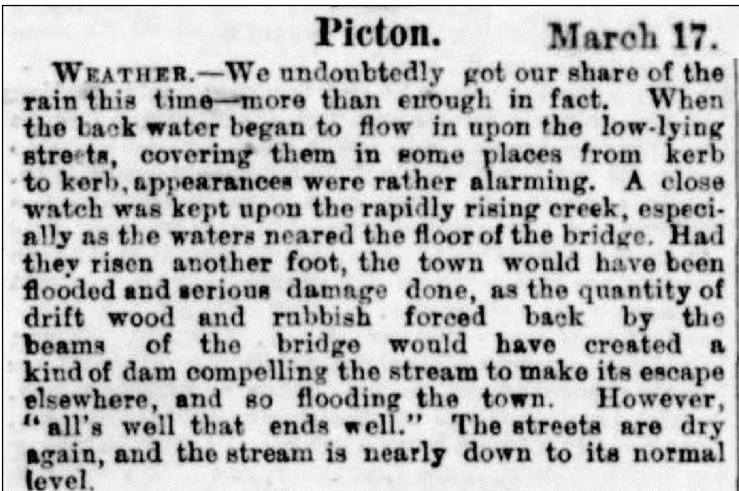




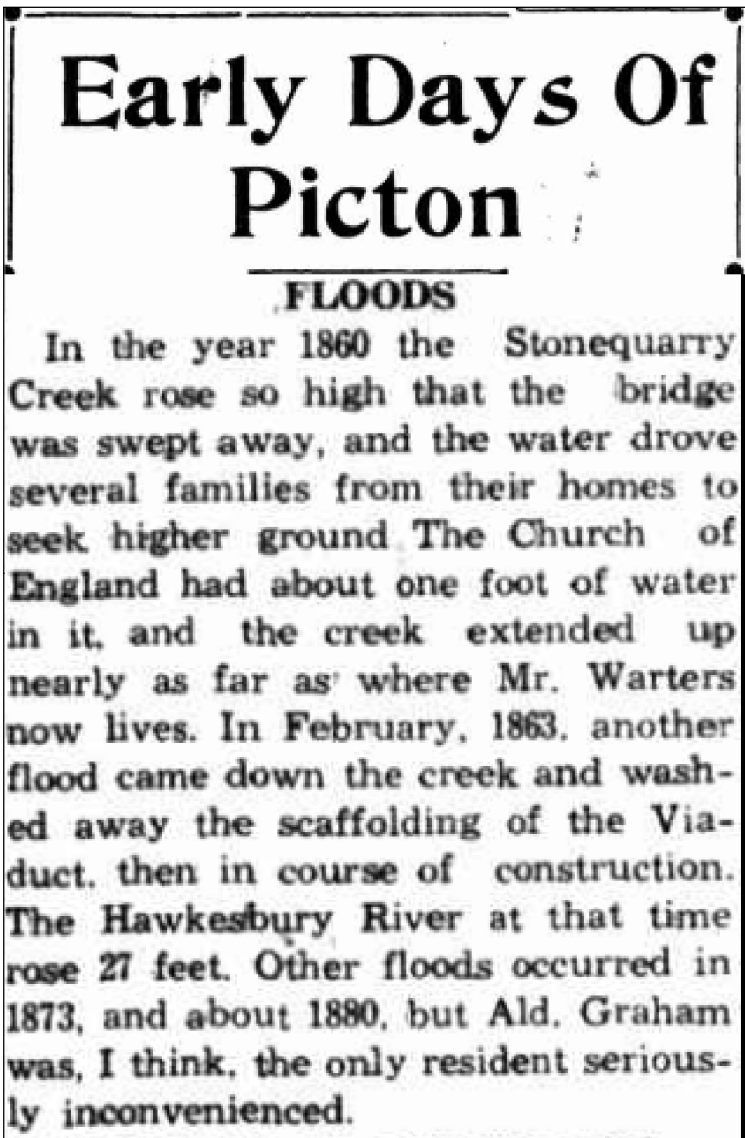
The Sun – 'Floods at Picton', Friday, 13th January 1911.



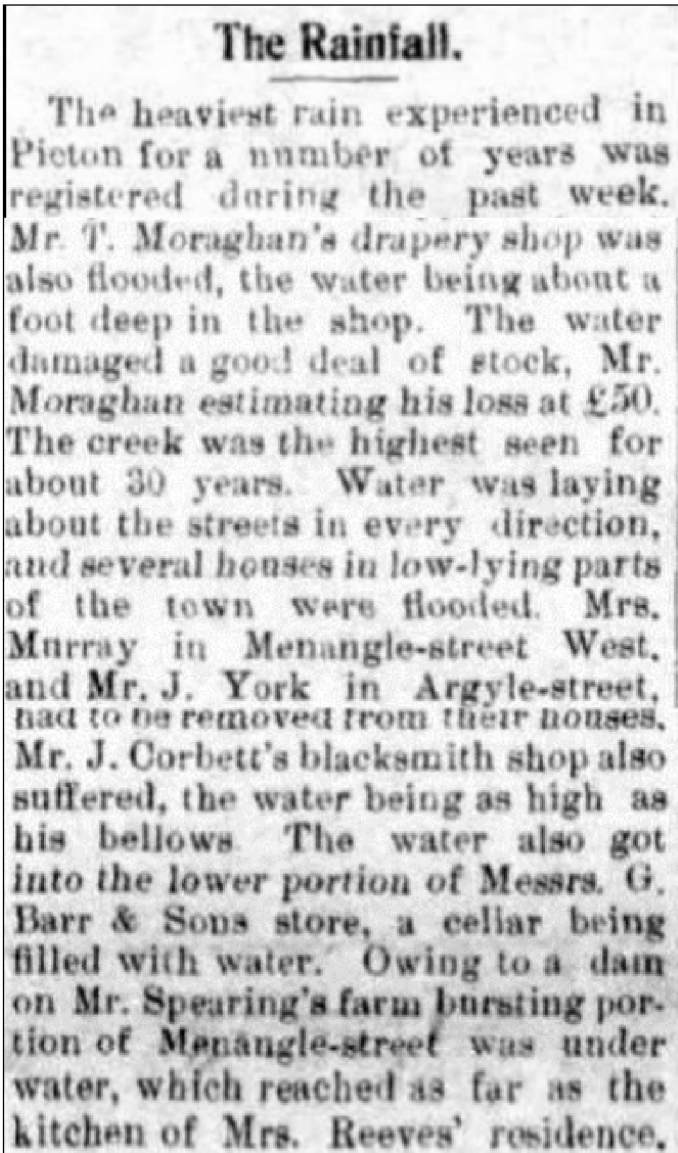
The Picton Post – 'Splendid Rain', Thursday, 20th May 1943.



Australian Town and Country Journal – 'Picton', Saturday, 22nd March 1890.



The Picton Post – 'Early Days of Picton: Floods', Thursday, 19th December 1946.



The Picton Post – 'The Rainfall', Wednesday 18th January 1911.



The Picton Post – 'Severe Storm and Floods', Wednesday, 4th June 1930.



Roads during flood, Wollodilly Leisure Centre 2016



Stonequarry Creek at Argyle St Bridge, ABC 2016



Argyle St - Flood height, Daily Mail 2016



Argyle St (Country Bumpkin gift shop), Daily Mail 2016



Argyle St (George IV Inn), South West Voice 2016



Damaged homes after the event, Perth Now 2016



Argyle St (Khan's SUPA IGA), Perth Now 2016



Streets of Picton - Flood height, Daily Mail 2016



Stonequarry Creek in flood, Picton Fire and Rescue 2016

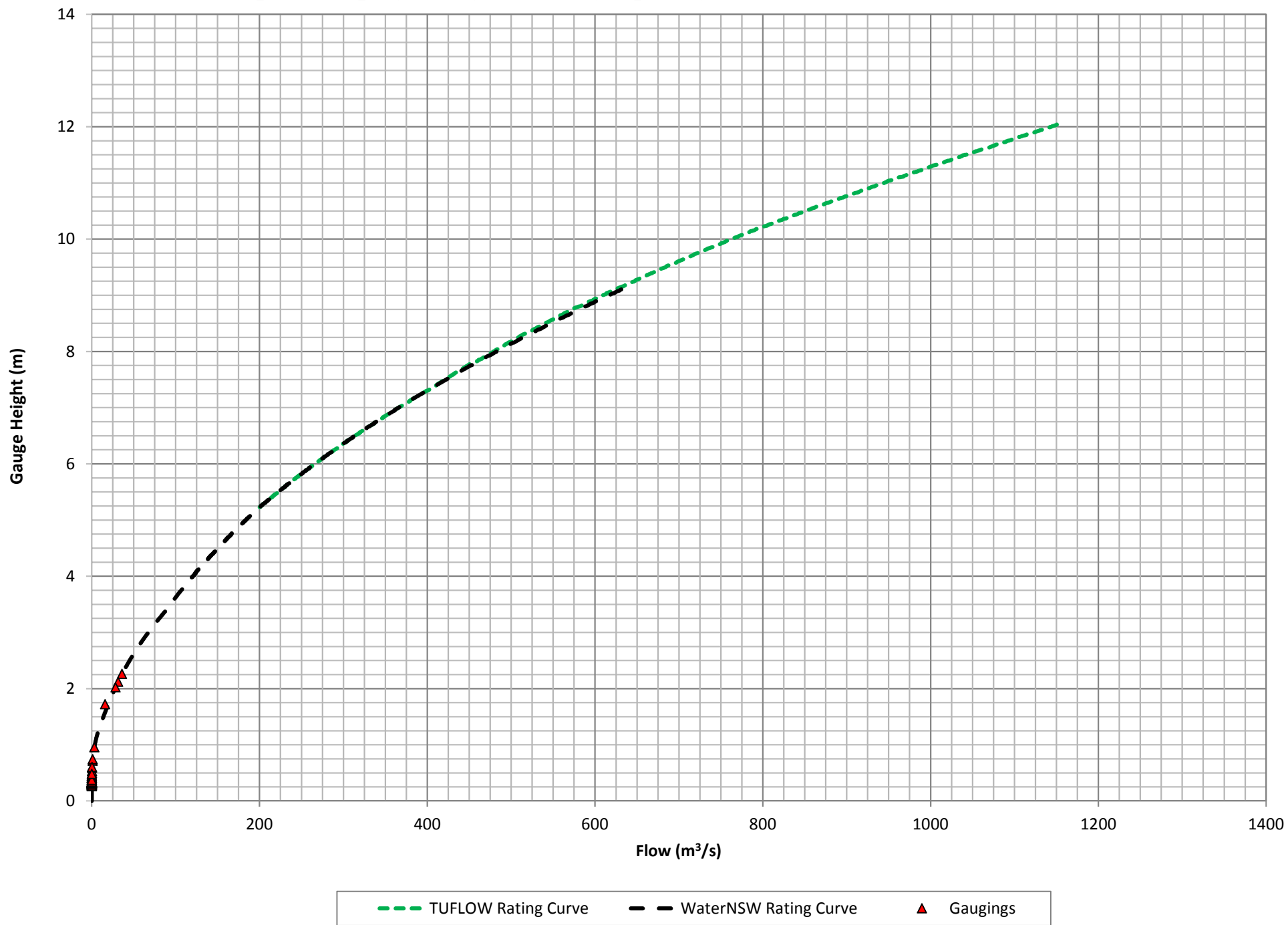


FIGURE 7
PICTON - 212053
RATING CURVE AND GAUGINGS
STONEQUARRY CREEK GAUGE

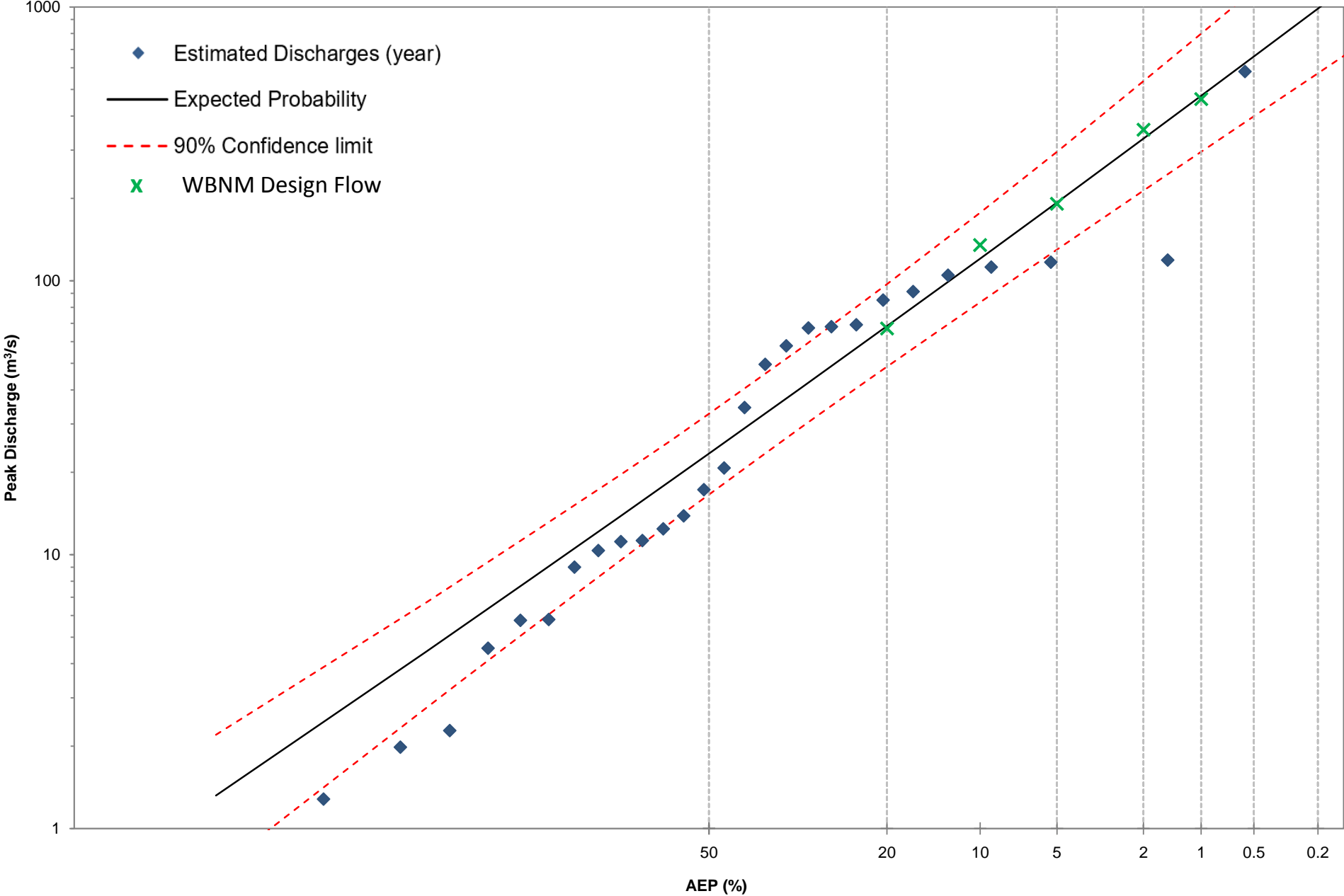
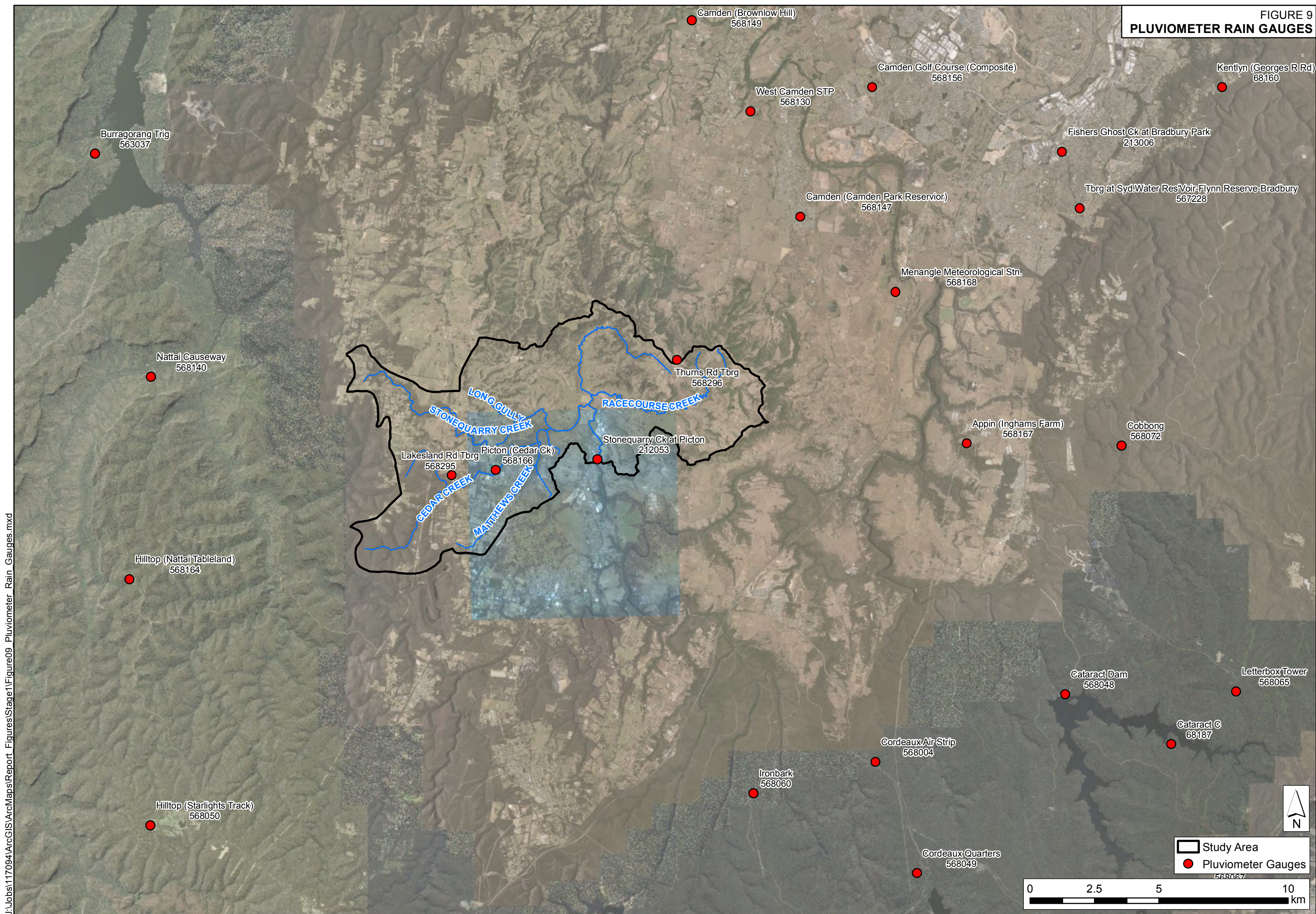


FIGURE 8
FLOOD FREQUENCY ANALYSIS
T30 - PICTON

FIGURE 9
PLUVIOMETER RAIN GAUGES



J:\Jobs\117094\ArcGIS\ArcMaps\Report_Figures\Stage1\Figure10_Daily_Rain_Gauges.mxd

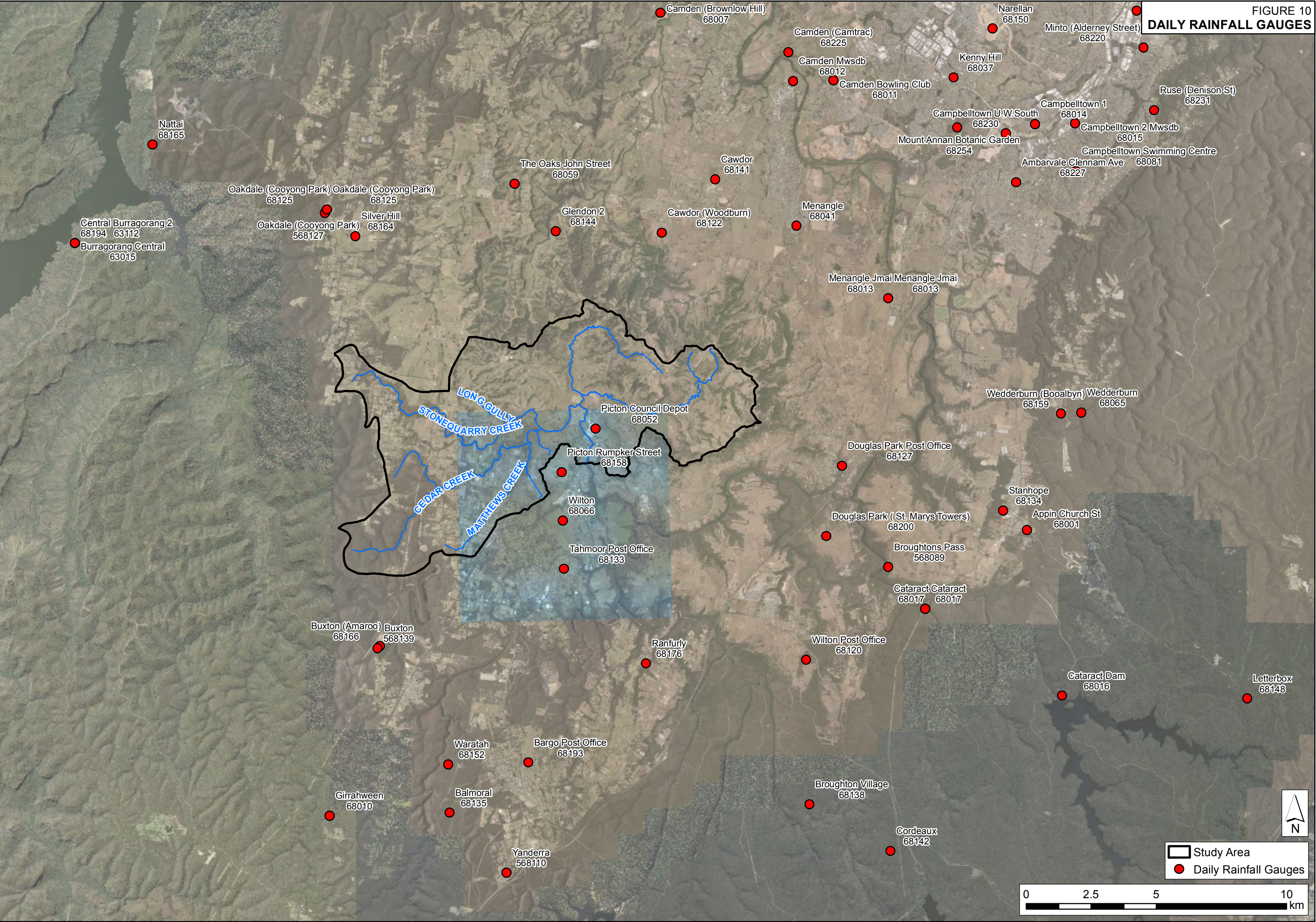
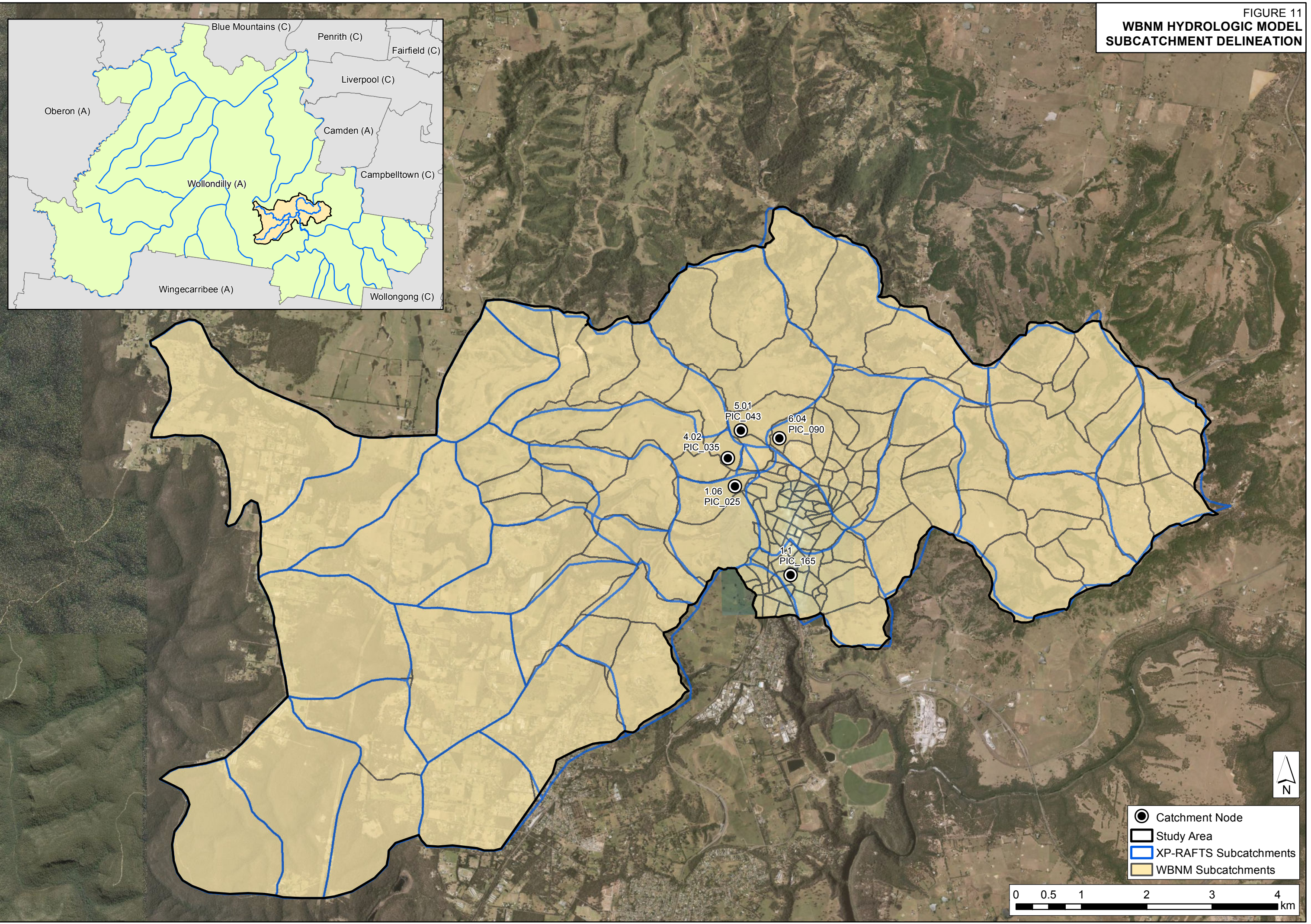
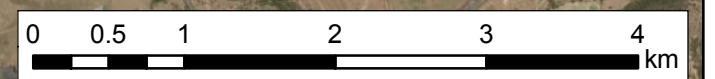
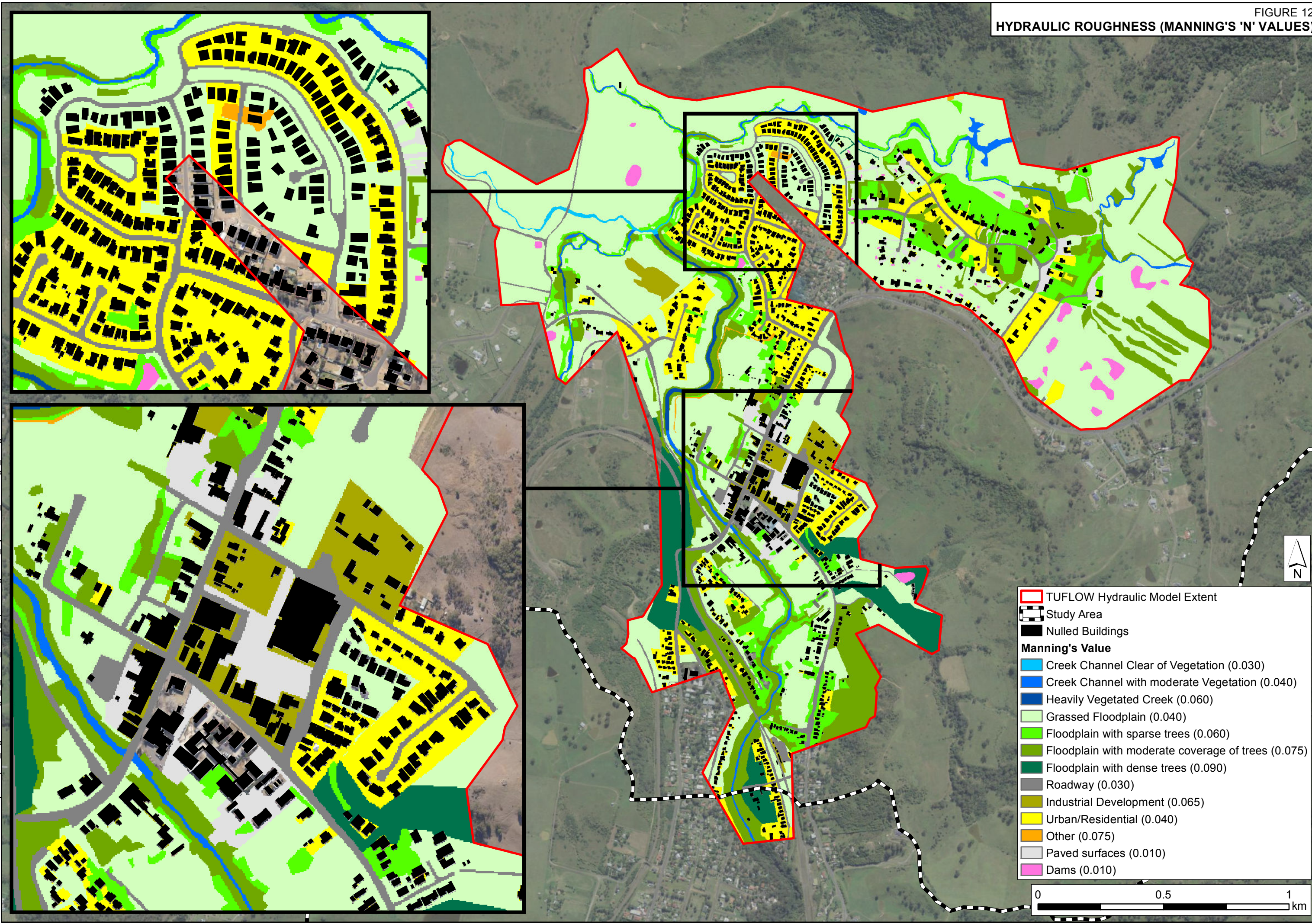


FIGURE 11
WBNM HYDROLOGIC MODEL
SUBCATCHMENT DELINEATION



- Catchment Node
- ▭ Study Area
- ▬ XP-RAFTS Subcatchments
- ▭ WBNM Subcatchments





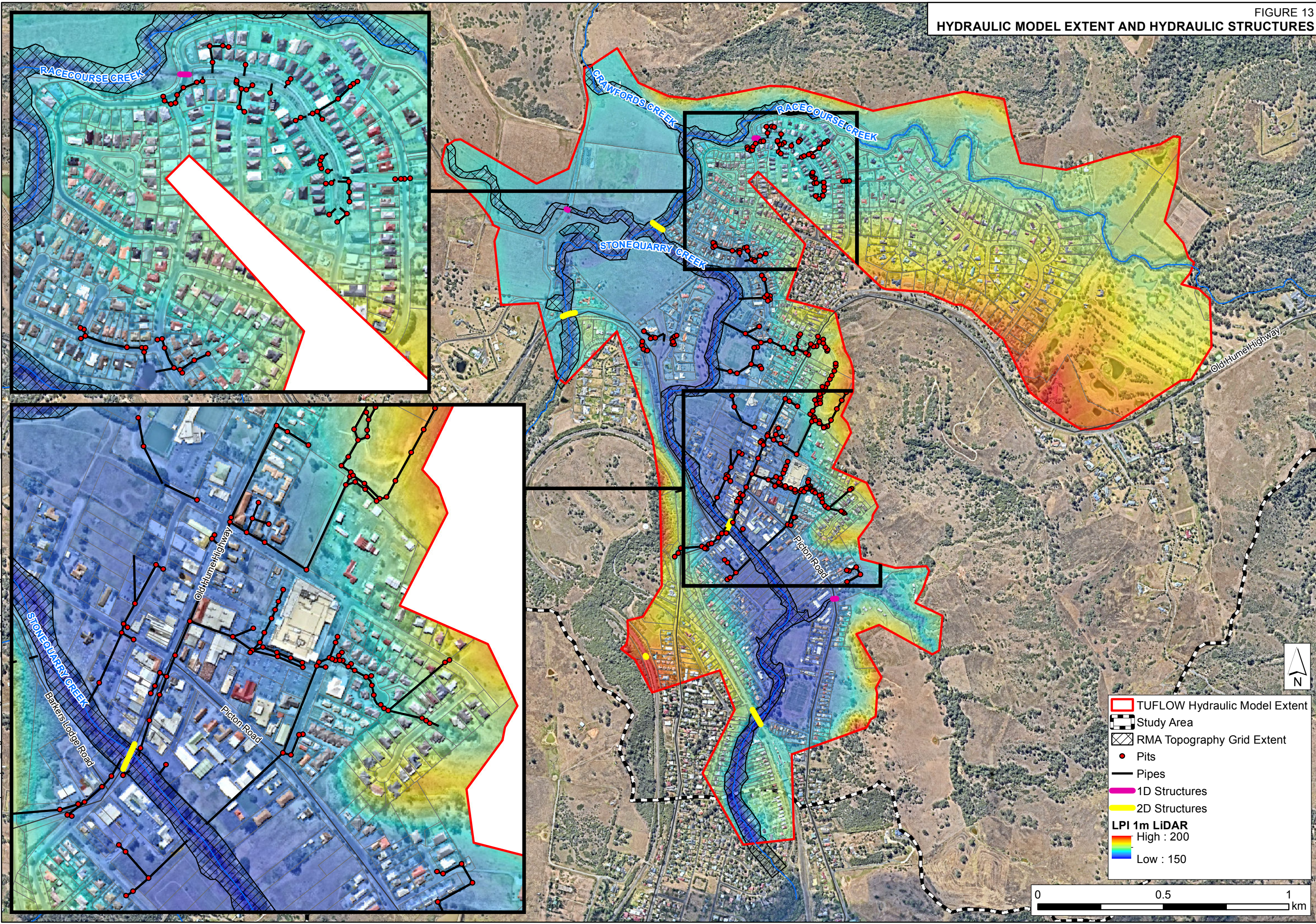


FIGURE 14
BOUNDARY CONDITIONS

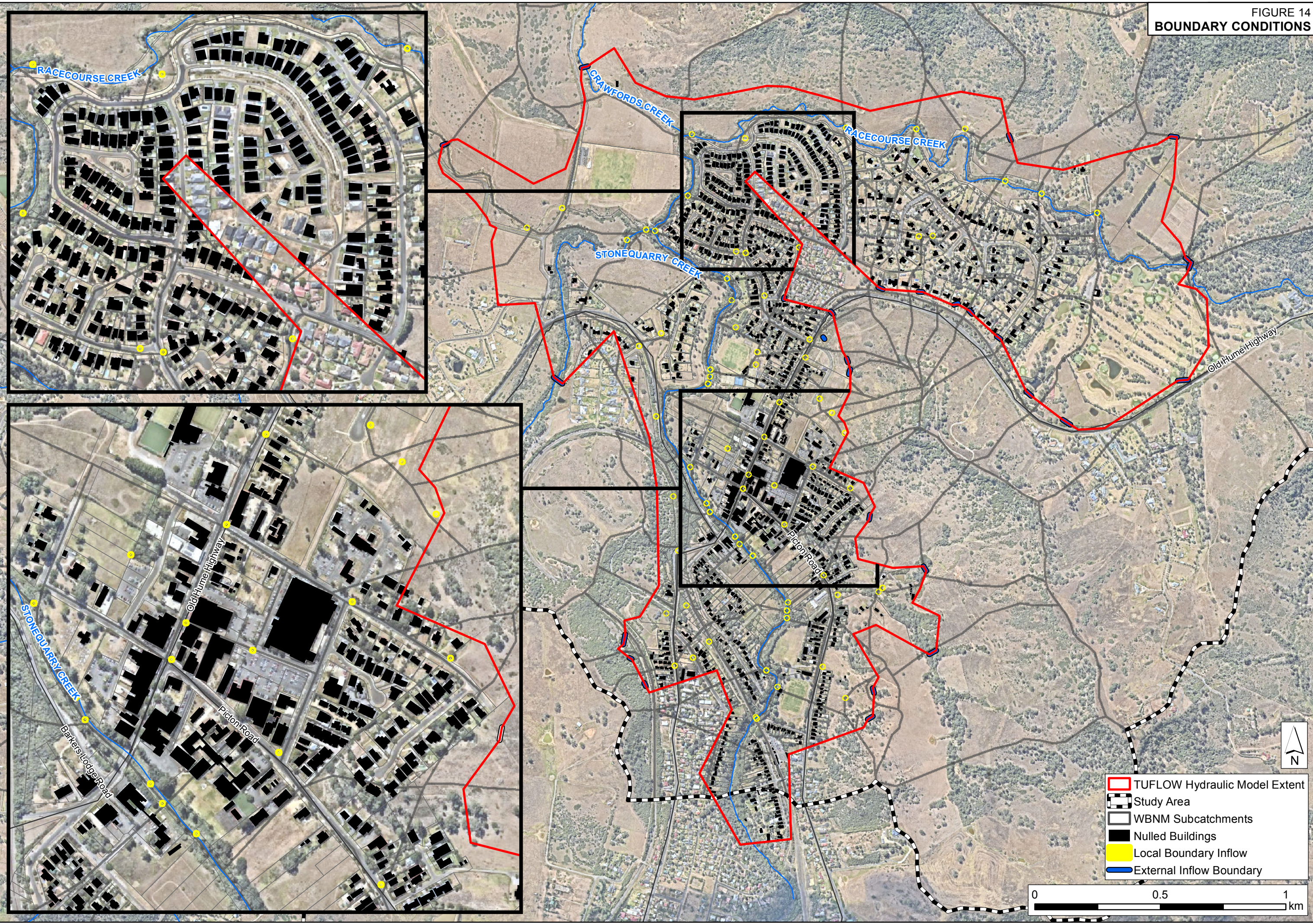
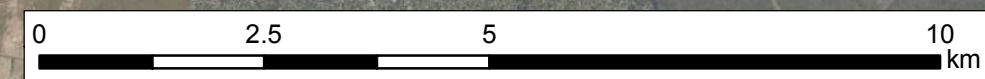
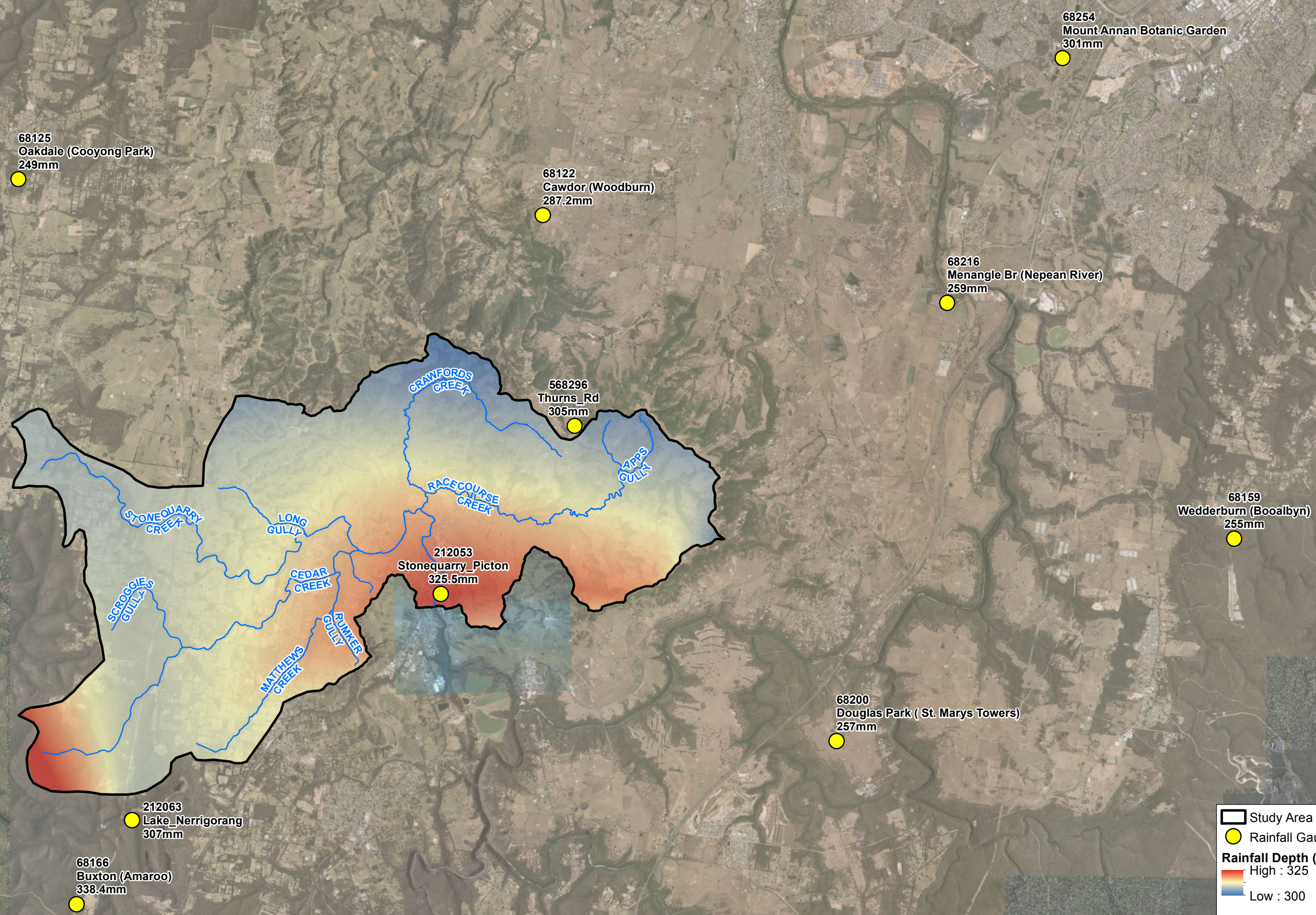


FIGURE 15
JUNE 2016 CALIBRATION EVENT
RAINFALL DATA



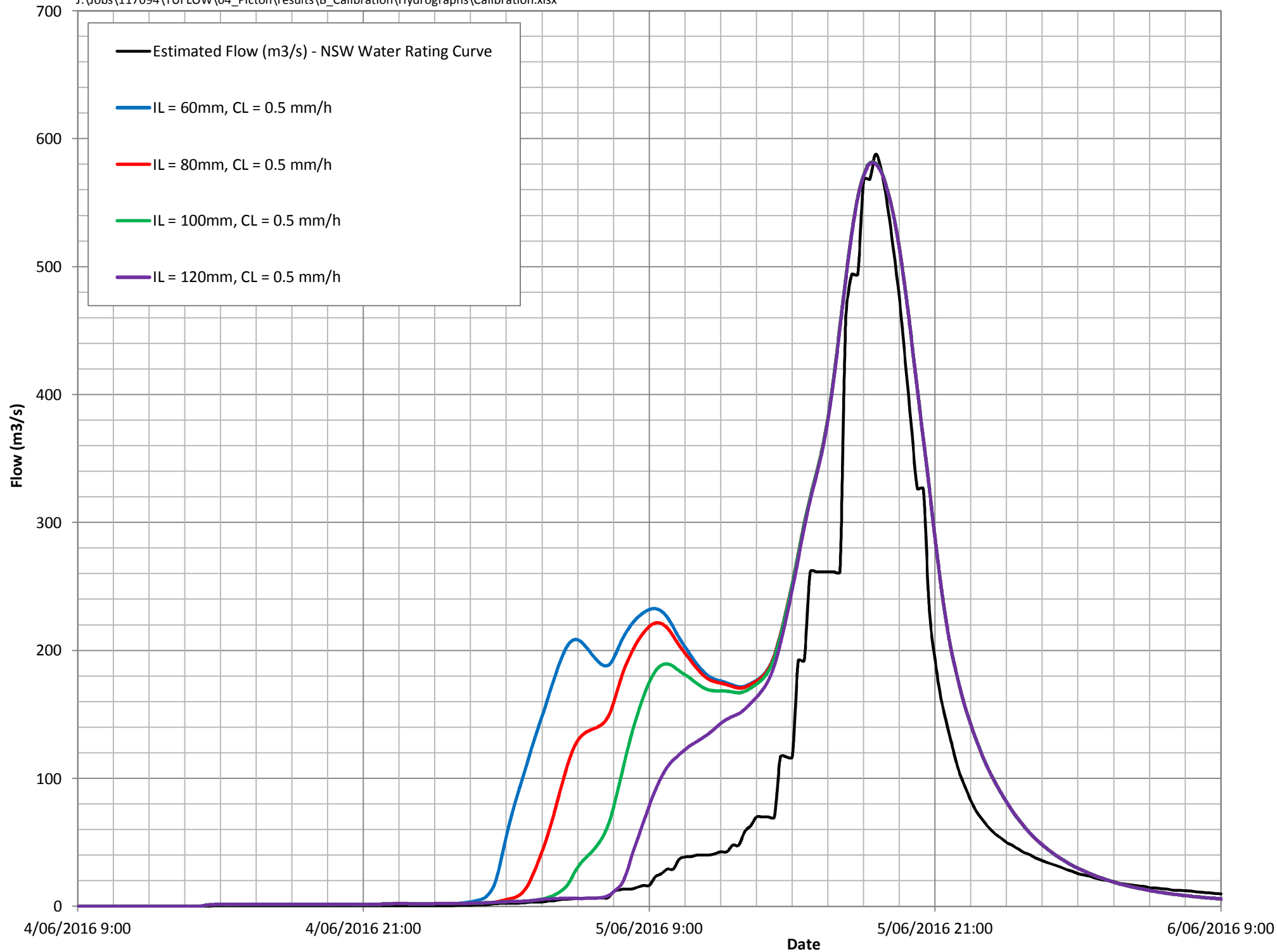
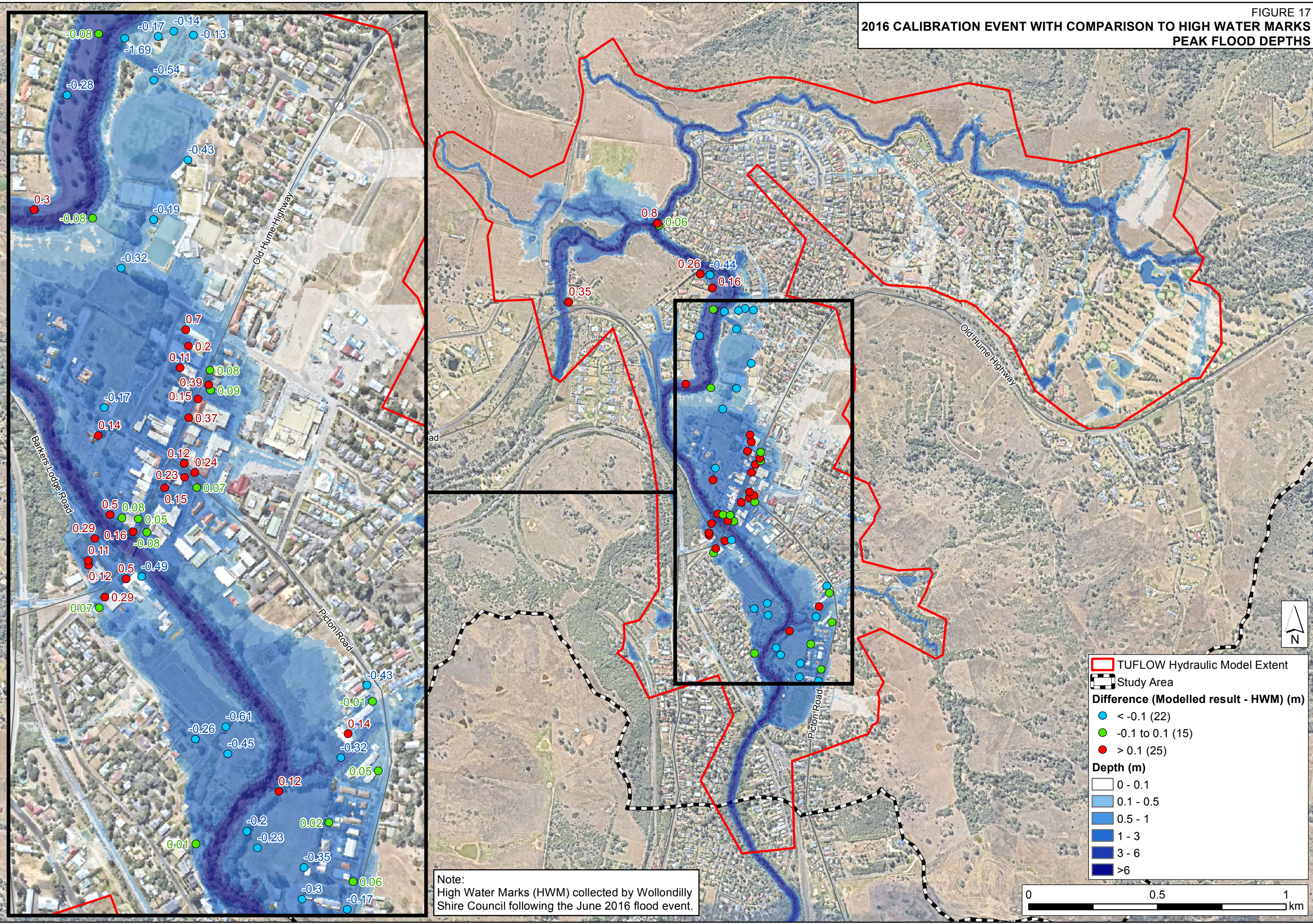


FIGURE 16
JUNE 2016 CALIBRATION EVENT
COMPARISON HYDROGRAPH

J:\Jobs\117094\ArcGIS\ArcMaps\Report_Figures\Stage 1 Flood Study Update\Figure17 PeakFloodDepth_June2016 HWM Difference WMA IL120 CL05.mxd

FIGURE 17
2016 CALIBRATION EVENT WITH COMPARISON TO HIGH WATER MARKS
PEAK FLOOD DEPTHS



J:\Jobs\117094\ArcGIS\ArcMaps\Report_Figures\Stage_1_Flood_Study_Update\Figure18_Spatially_Varying_IFD_100y720min.mxd

FIGURE 18
SPATIALLY VARYING IFD
1% AEP EVENT - 12 HOUR DURATION

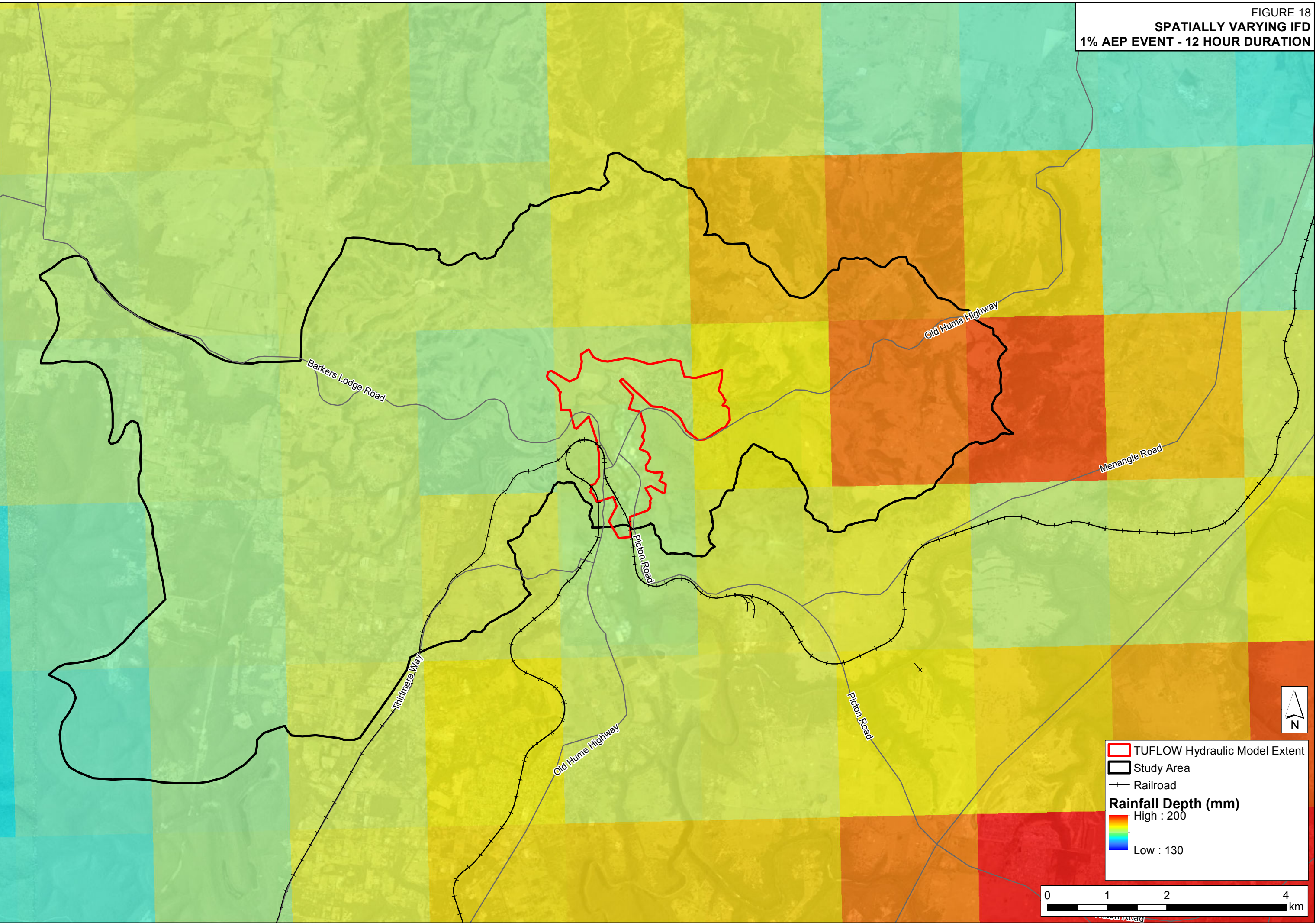


FIGURE 19
CRITICAL DURATION MAP
1% AEP EVENT

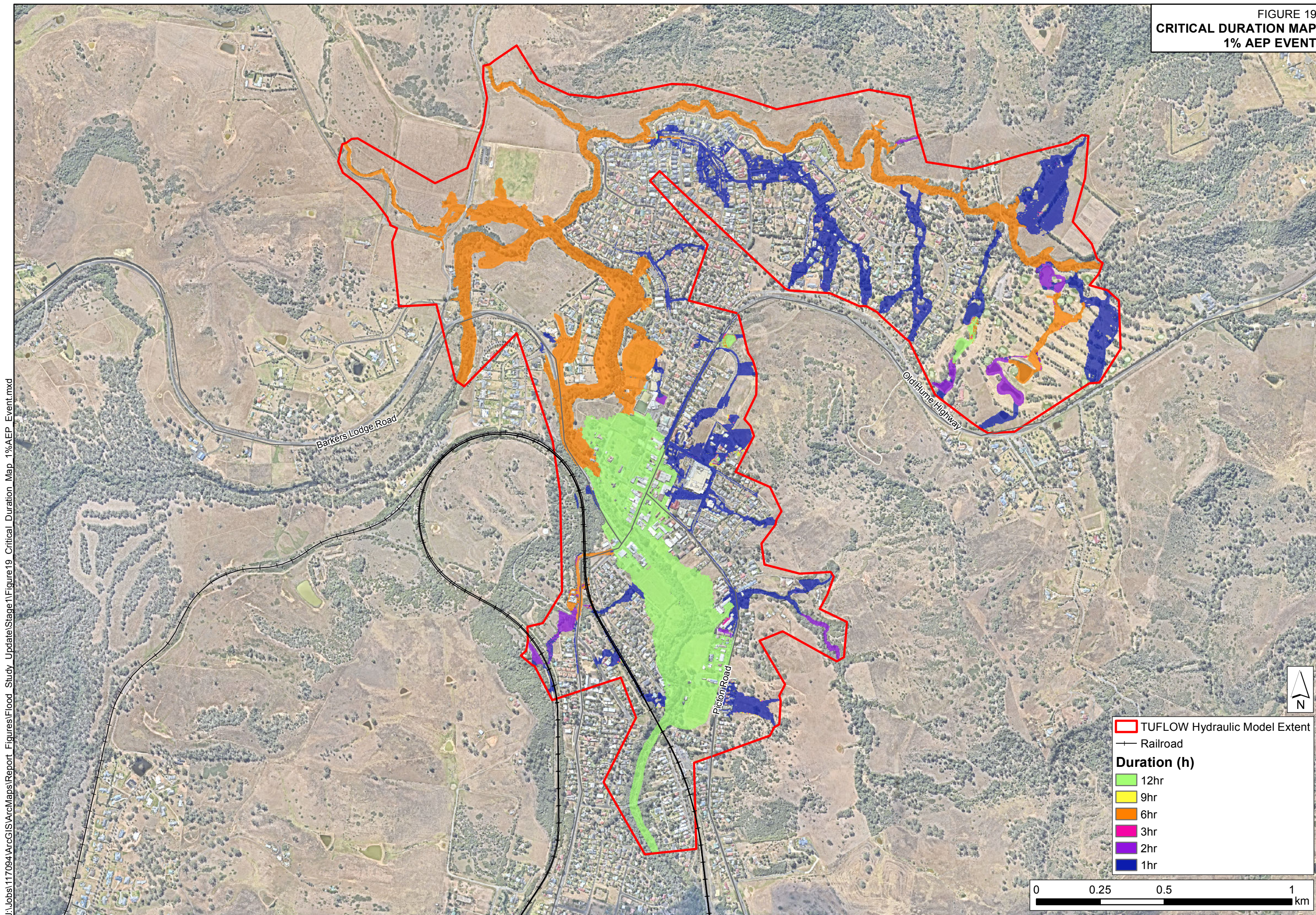


FIGURE 20
PICTON DESIGN FLOOD DEPTHS AND EXTENT
5% AEP EVENT

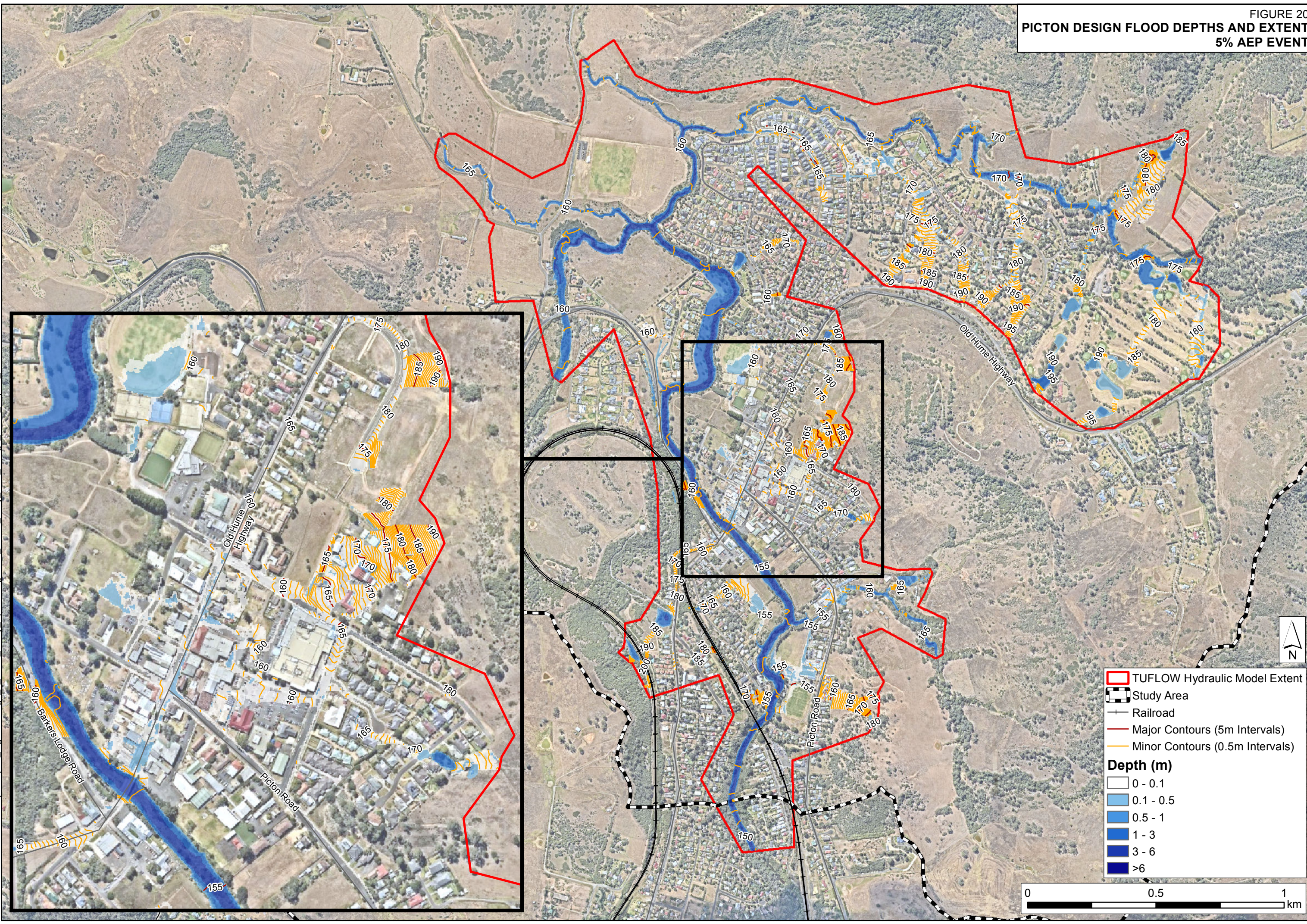


FIGURE 21
PICTON DESIGN FLOOD DEPTHS AND EXTENT
1% AEP EVENT

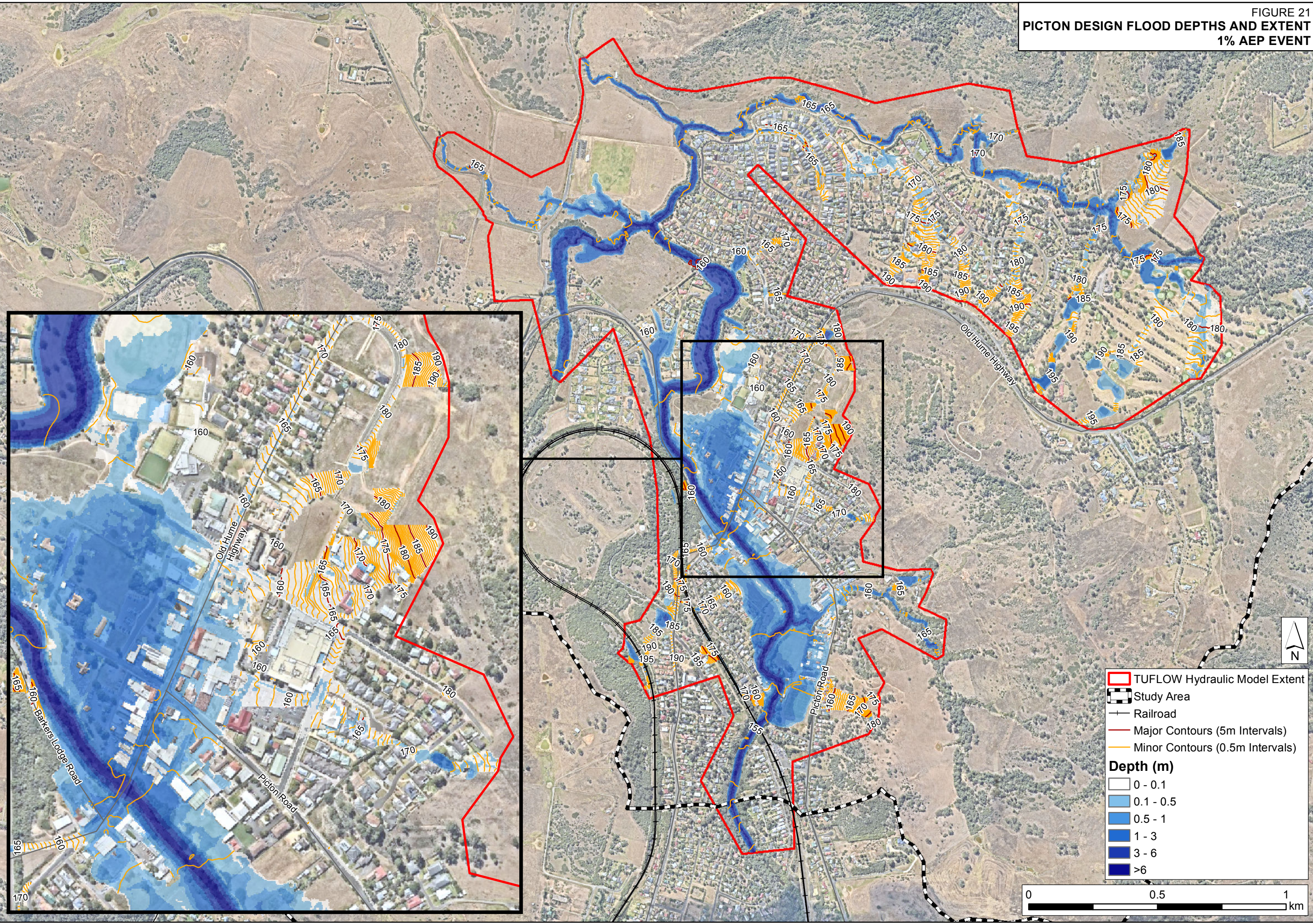


FIGURE 22
PICTON DESIGN FLOOD DEPTHS AND EXTENT
0.5% AEP EVENT

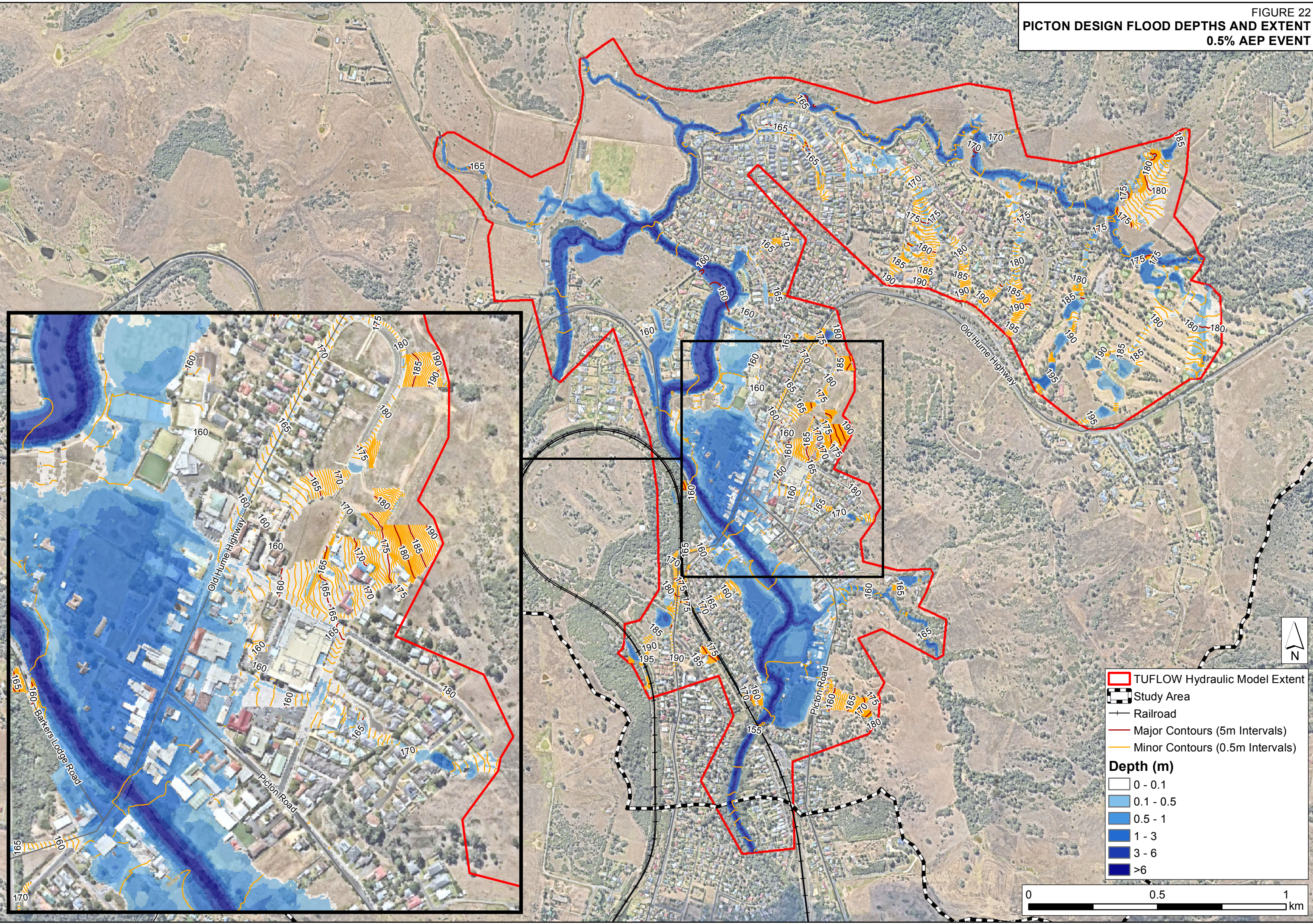


FIGURE 23
PICTON DESIGN FLOOD DEPTHS AND EXTENT
0.2% AEP EVENT

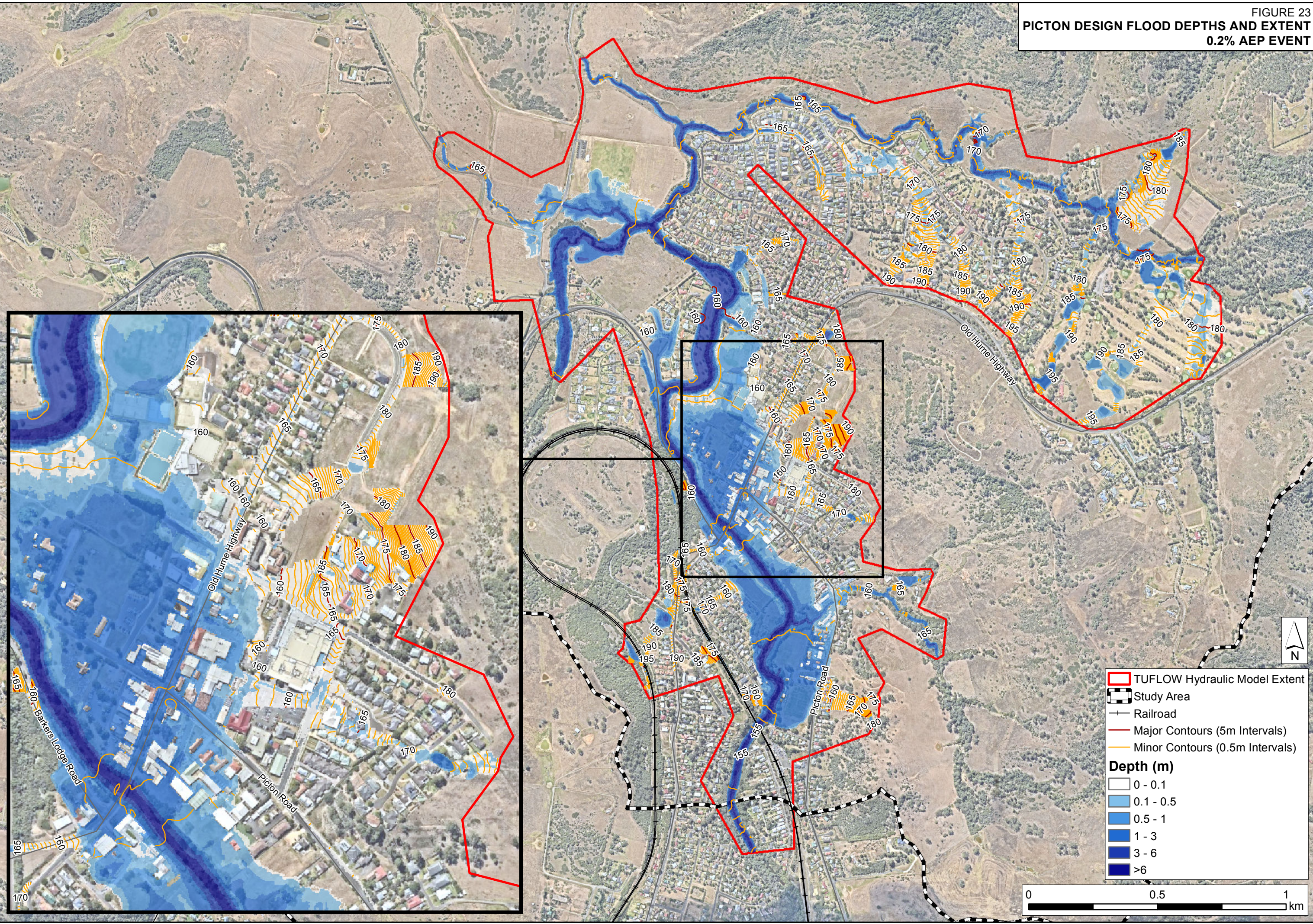


FIGURE 24
PICTON DESIGN FLOOD DEPTHS AND EXTENT
PMF EVENT

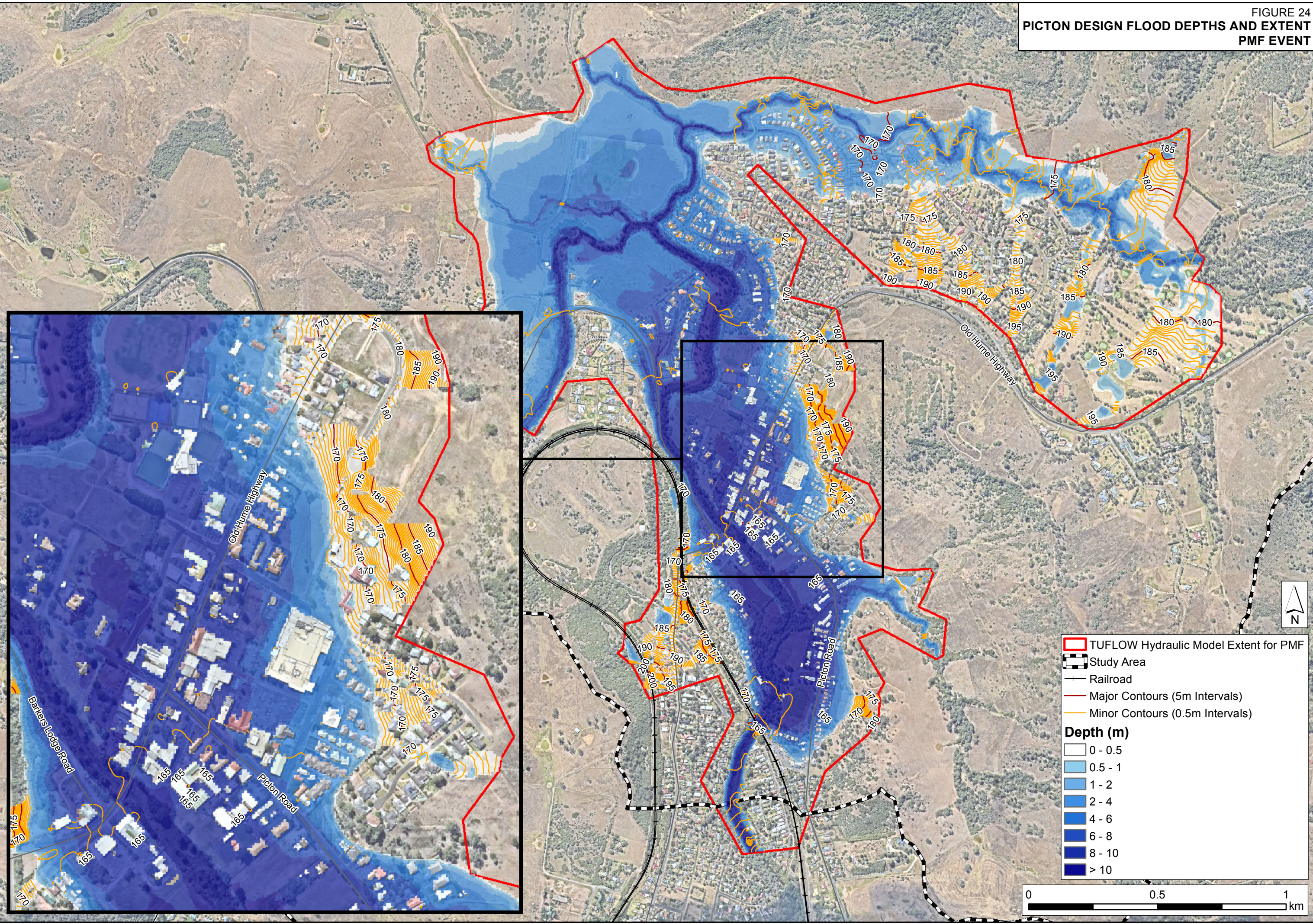


FIGURE 25
PICTON DESIGN FLOOD VELOCITY
5% AEP EVENT

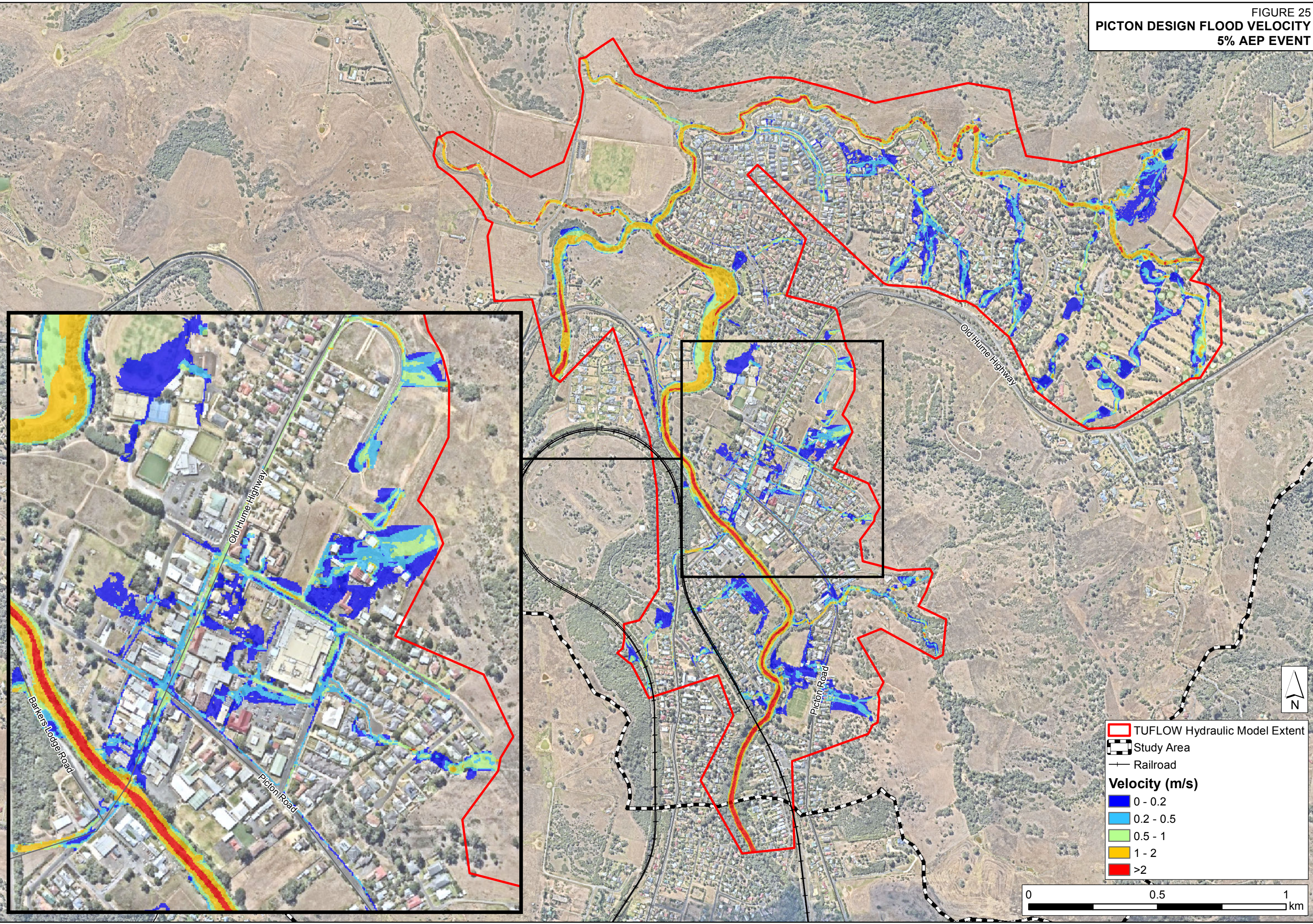


FIGURE 26
PICTON DESIGN FLOOD VELOCITY
1% AEP EVENT

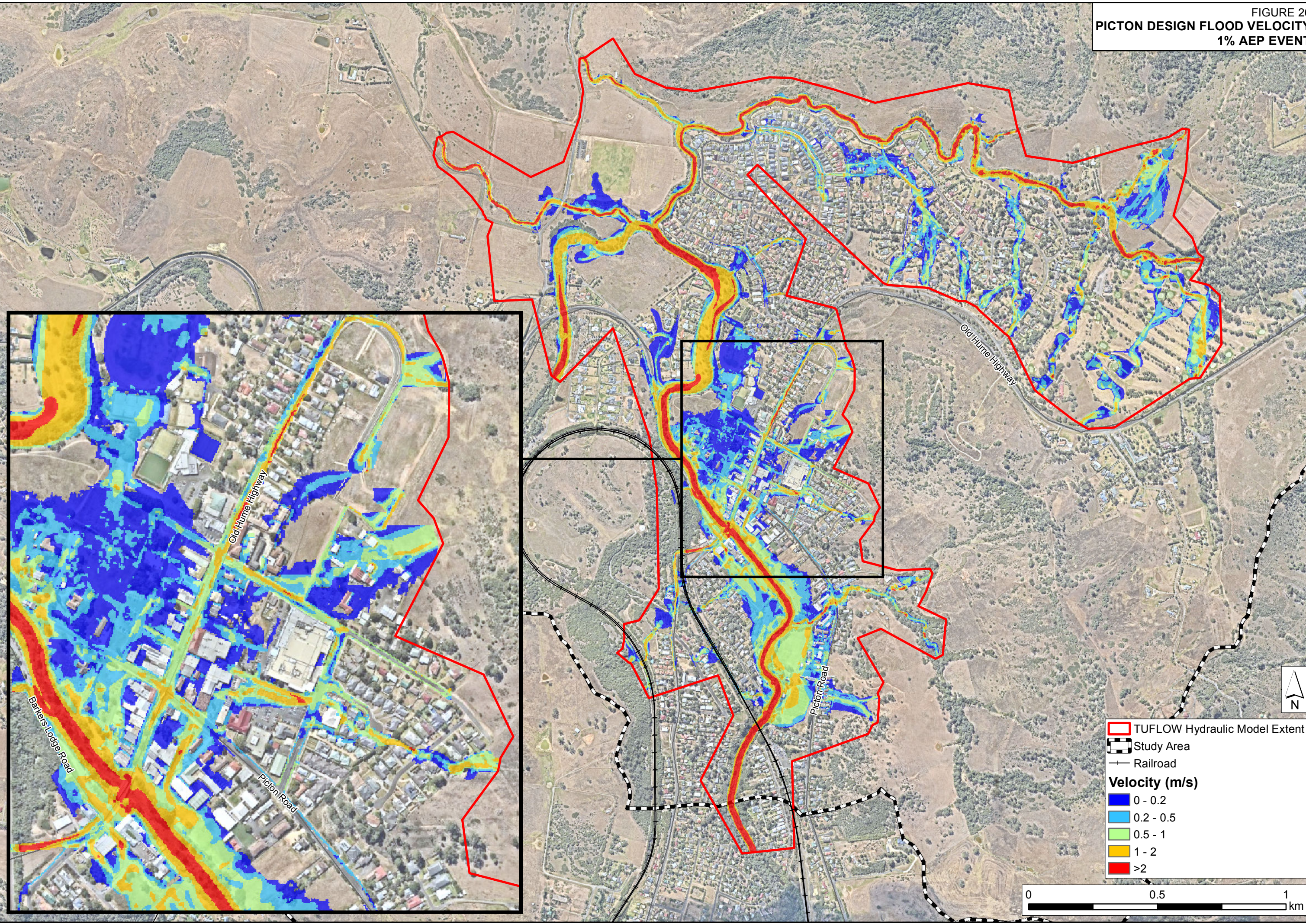
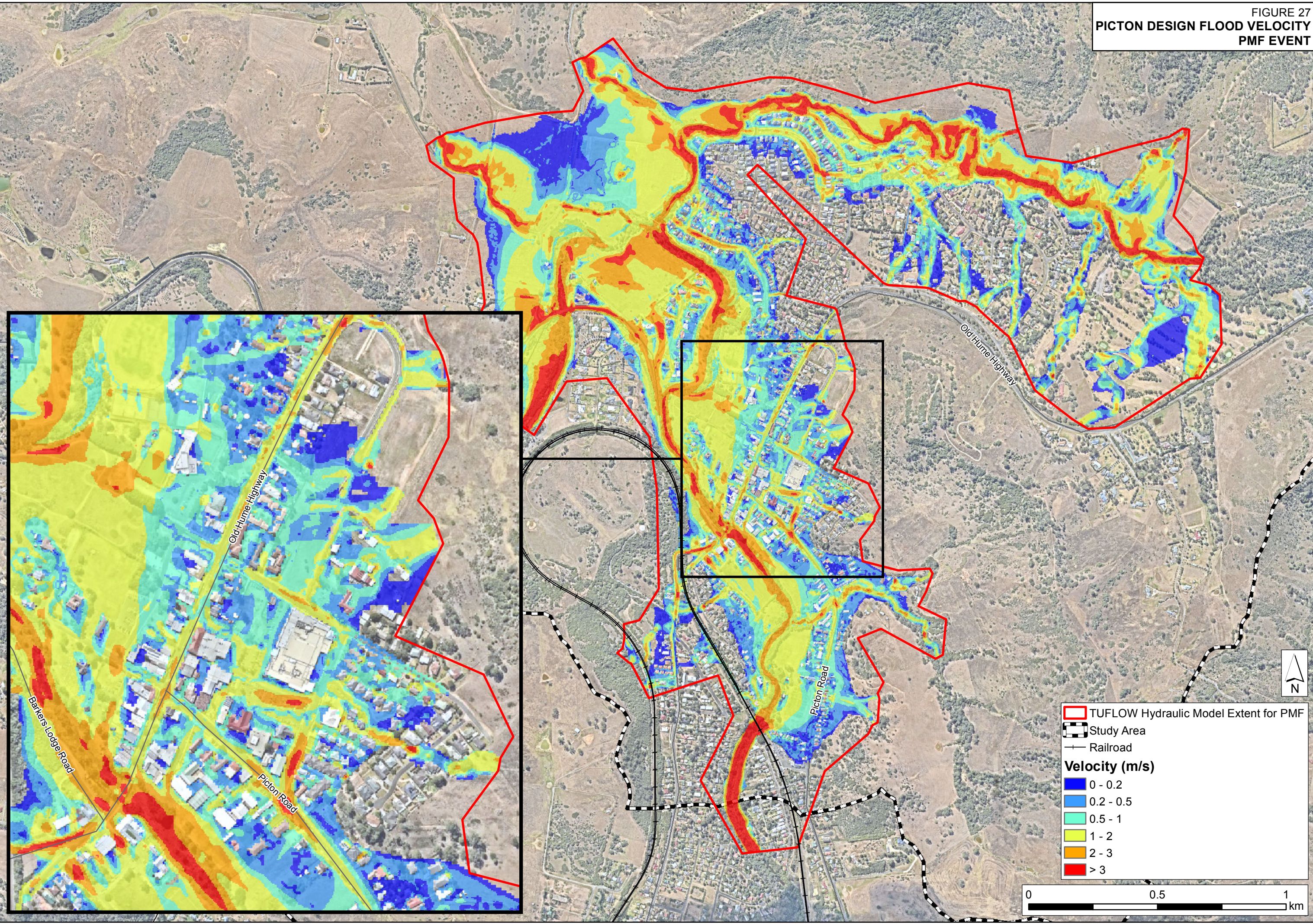


FIGURE 27
PICTON DESIGN FLOOD VELOCITY
PMF EVENT



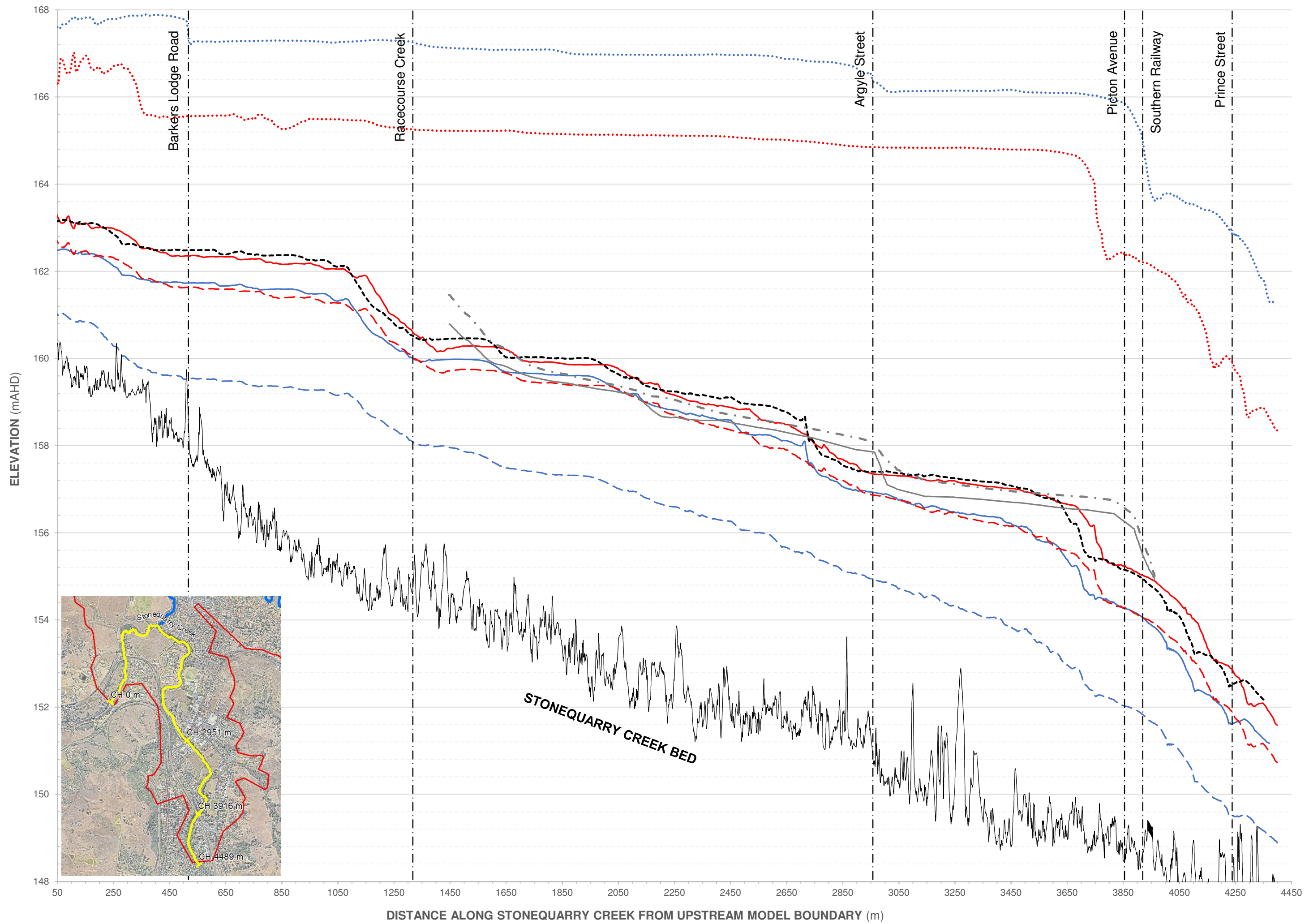


FIGURE 28
STONEQUARRY CREEK
PEAK WATER LEVEL PROFILE

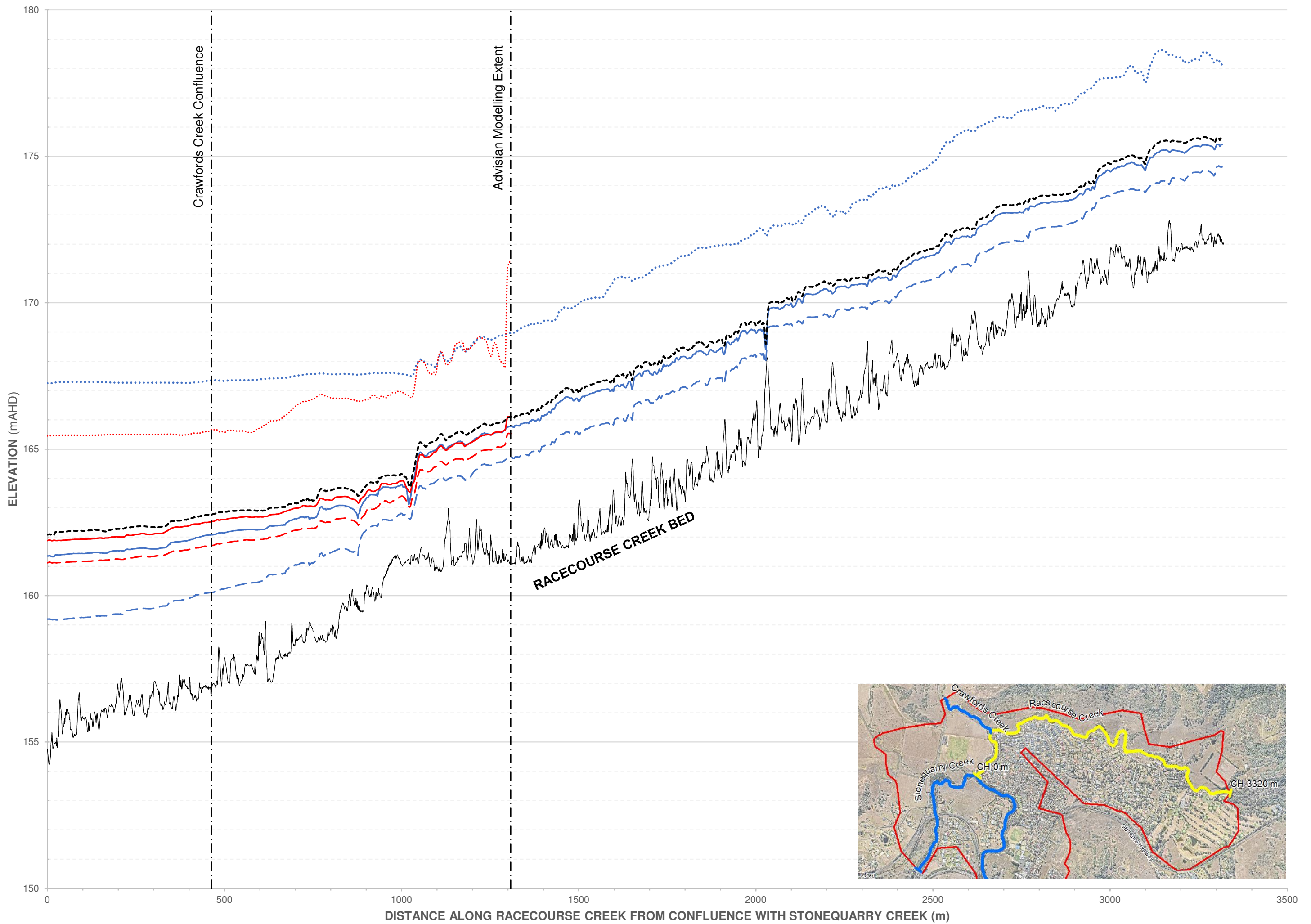


FIGURE 29
RACECOURSE CREEK
PEAK WATER LEVEL PROFILE

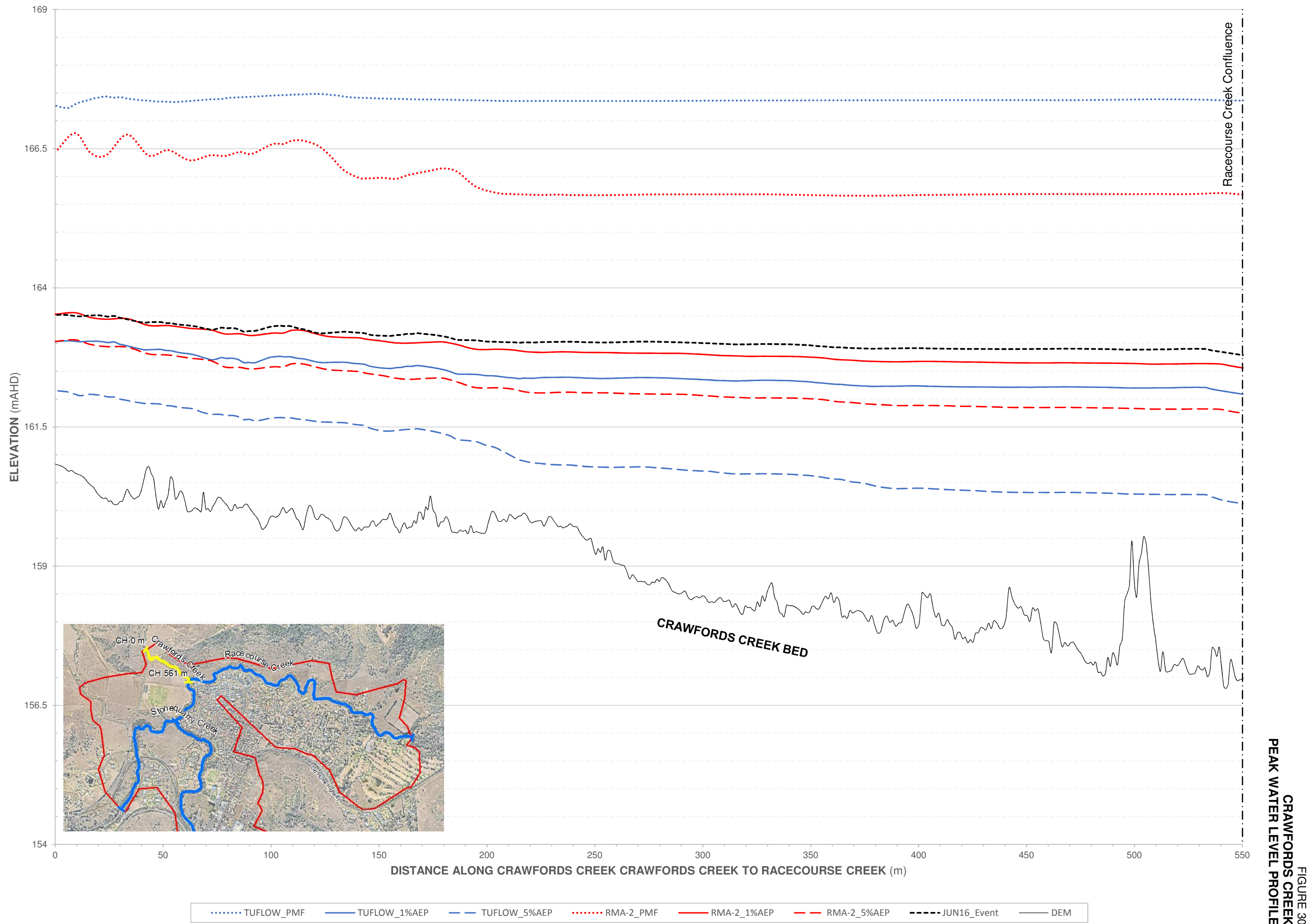


FIGURE 31
PICKTON CREEKS AND CHAINAGE
KEY LOCATIONS

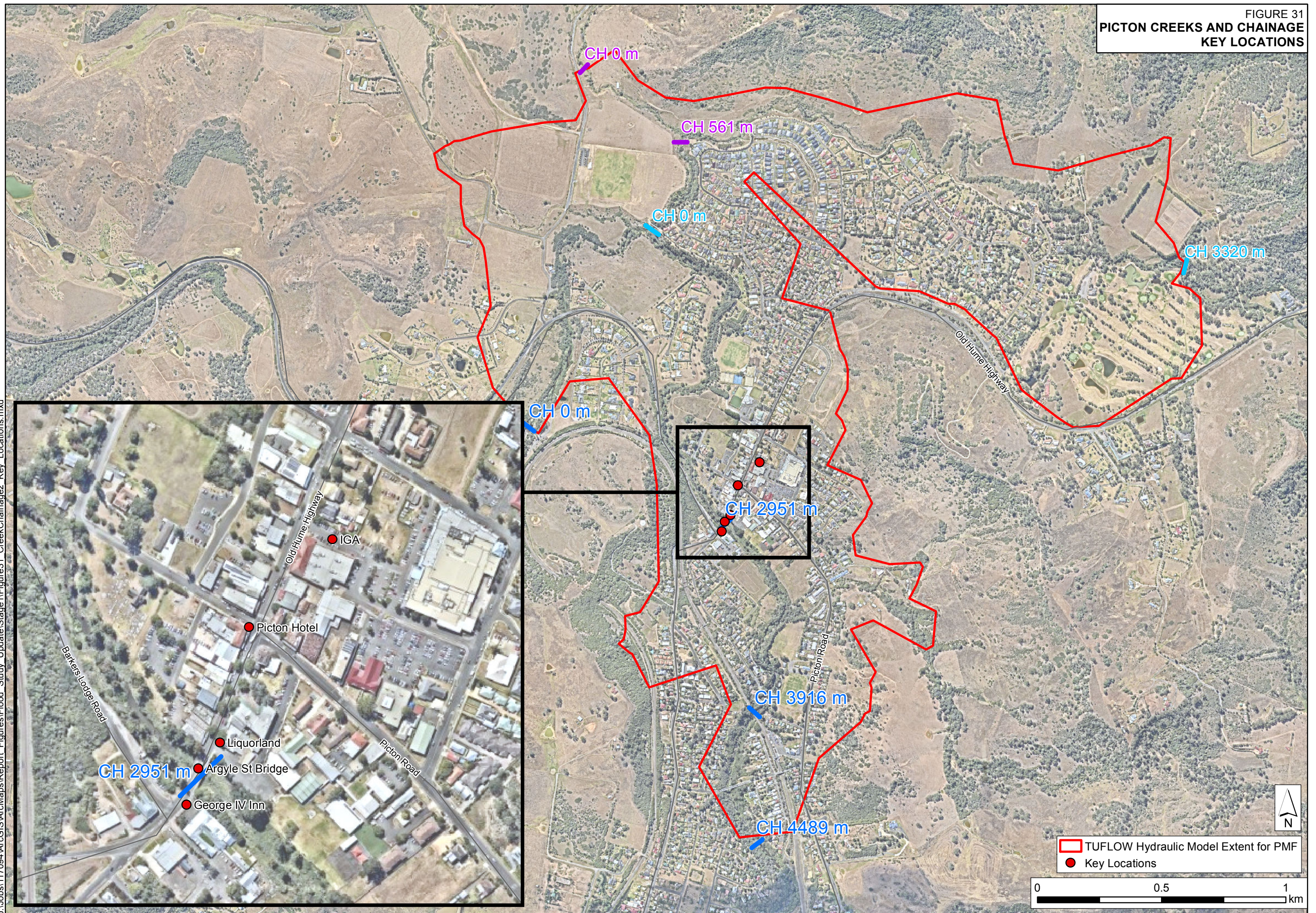


FIGURE 32
IMPACT MAP
ENVELOPED 1% AEP vs ENVELOPED 0.5% AEP

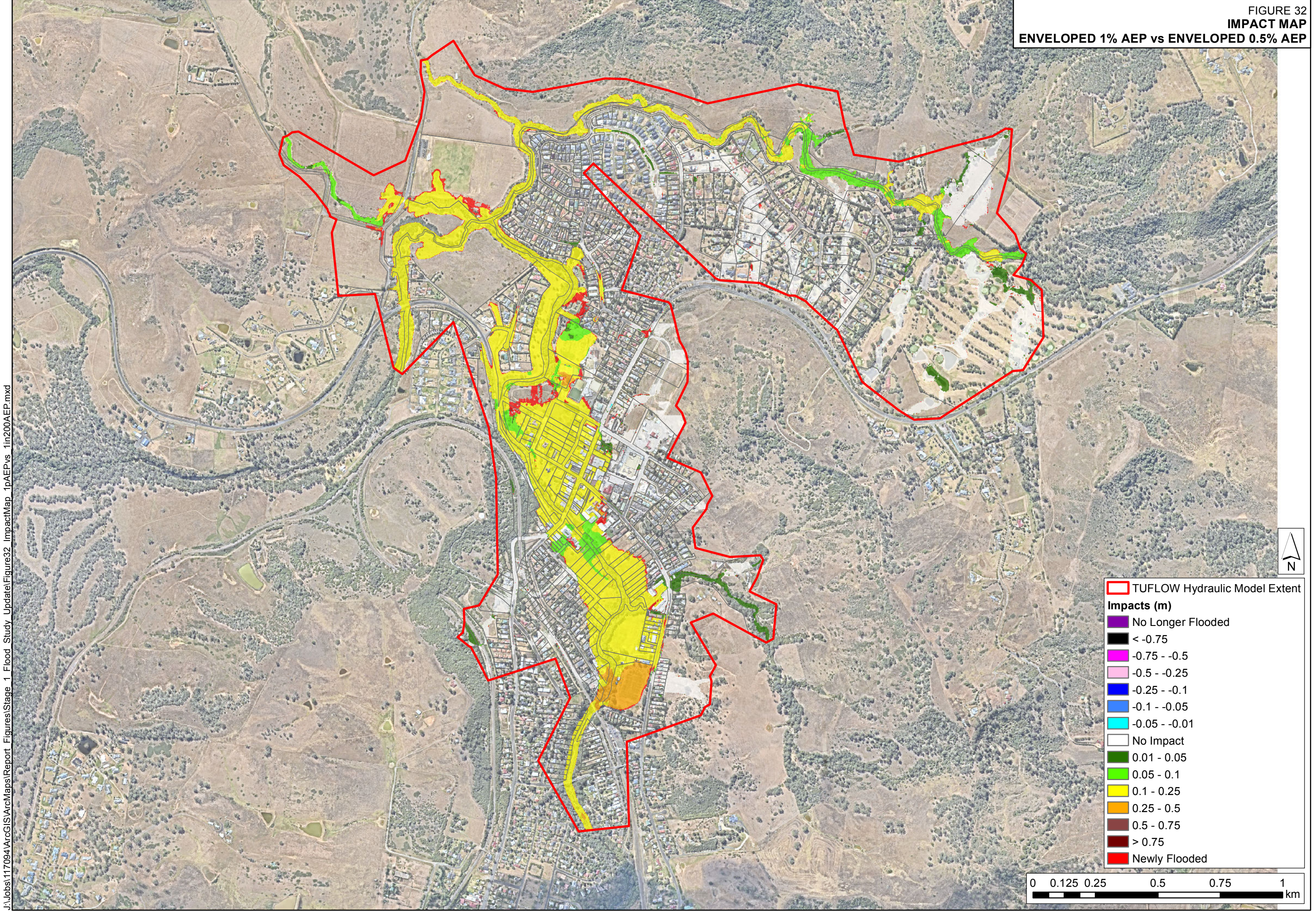


FIGURE 33
IMPACT MAP
ENVELOPED 1% AEP vs ENVELOPED 0.2% AEP

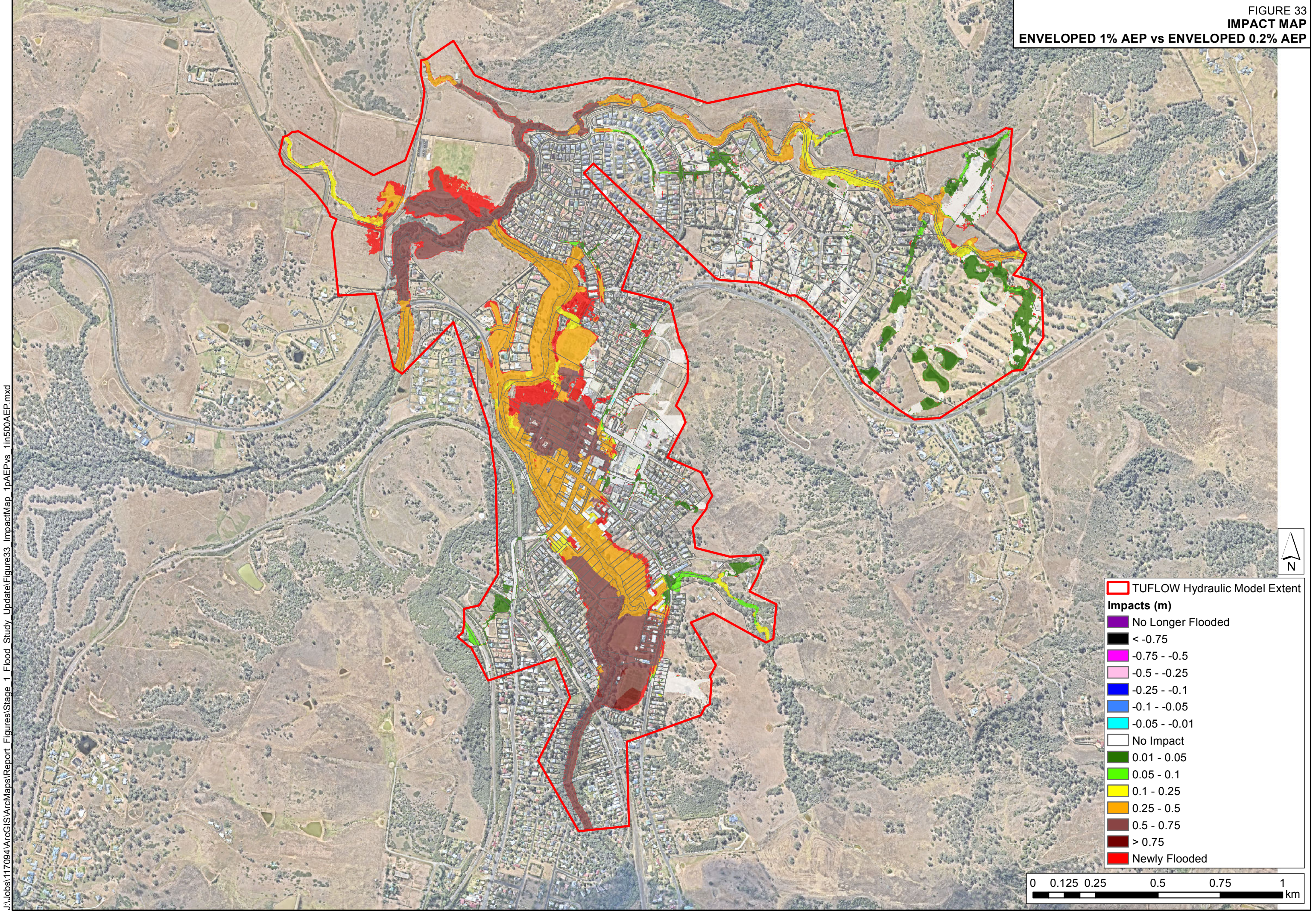


FIGURE 34
HYDRAULIC CATEGORISATION
5% AEP EVENT

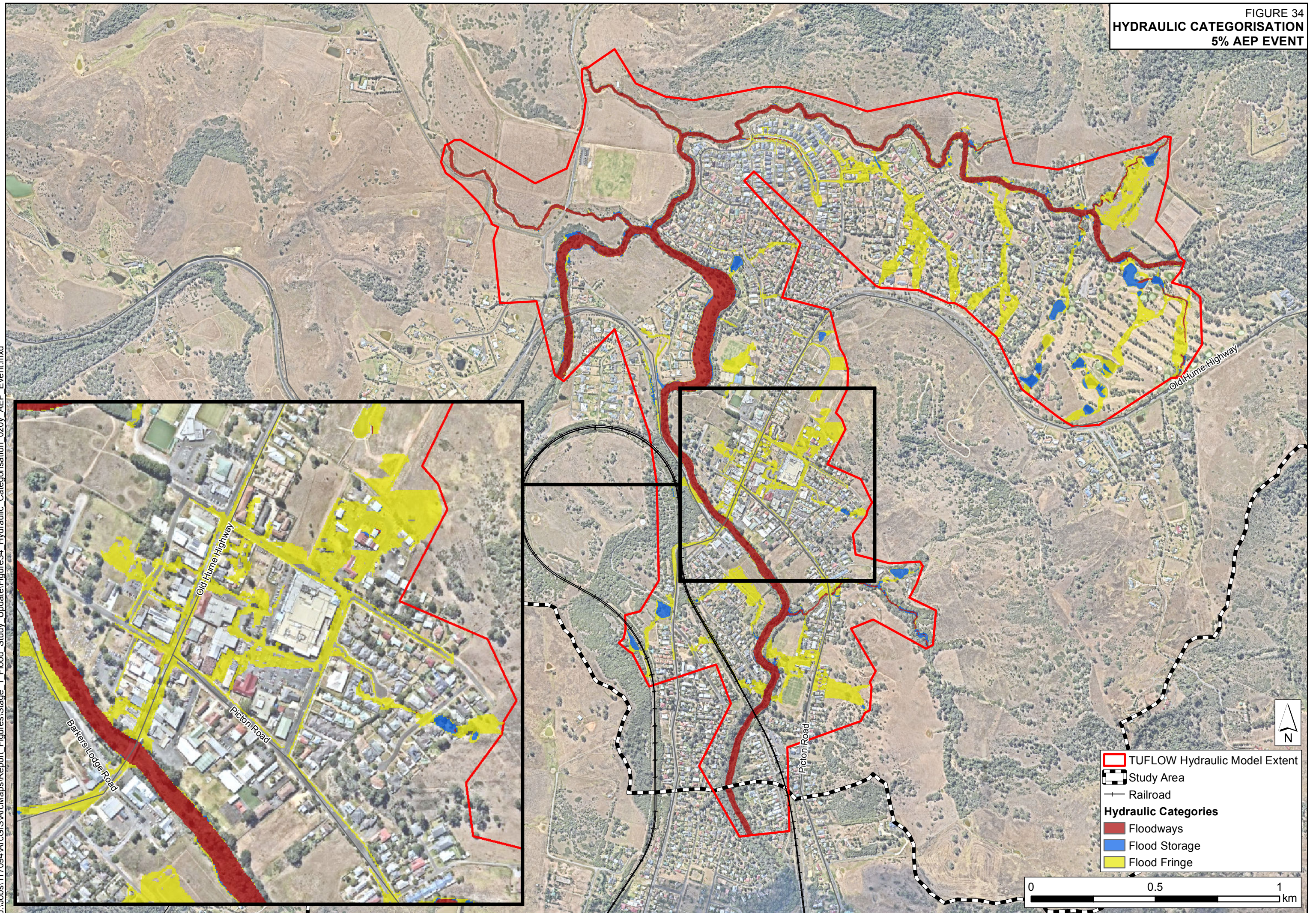


FIGURE 35
HYDRAULIC CATEGORISATION
1% AEP EVENT

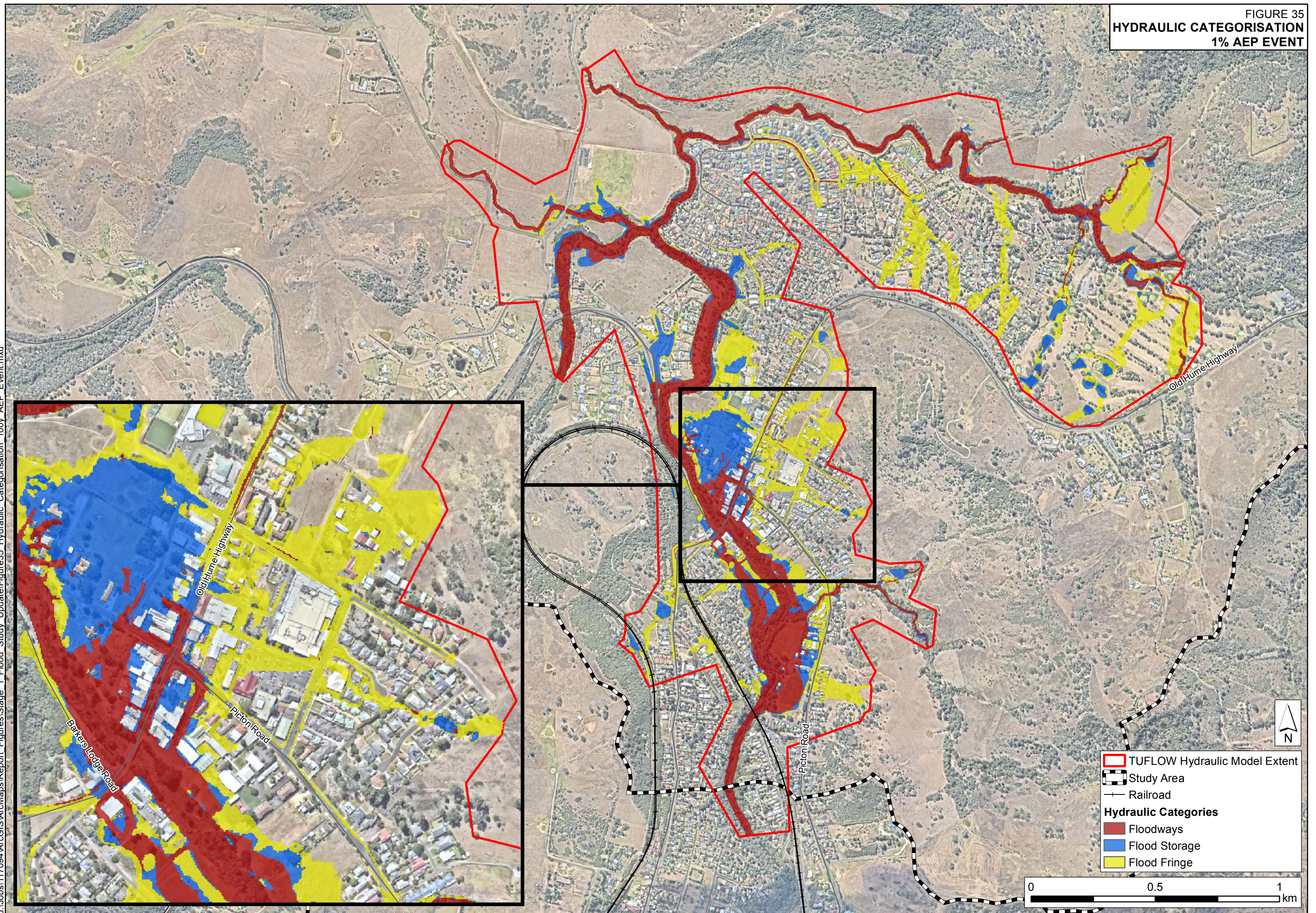


FIGURE 36
HYDRAULIC CATEGORISATION
PMF EVENT

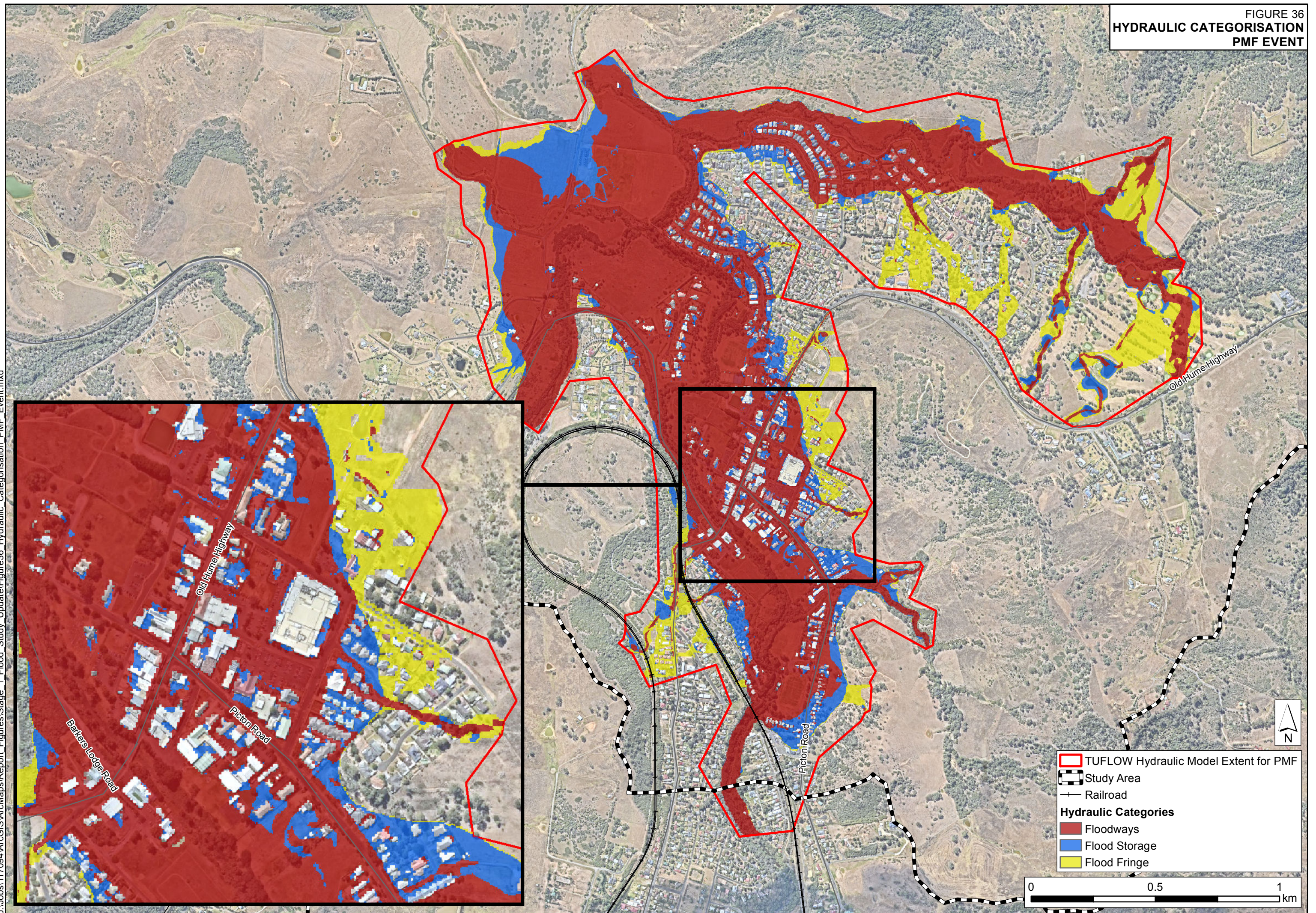


FIGURE 37
HYDRAULIC HAZARD
5% AEP EVENT

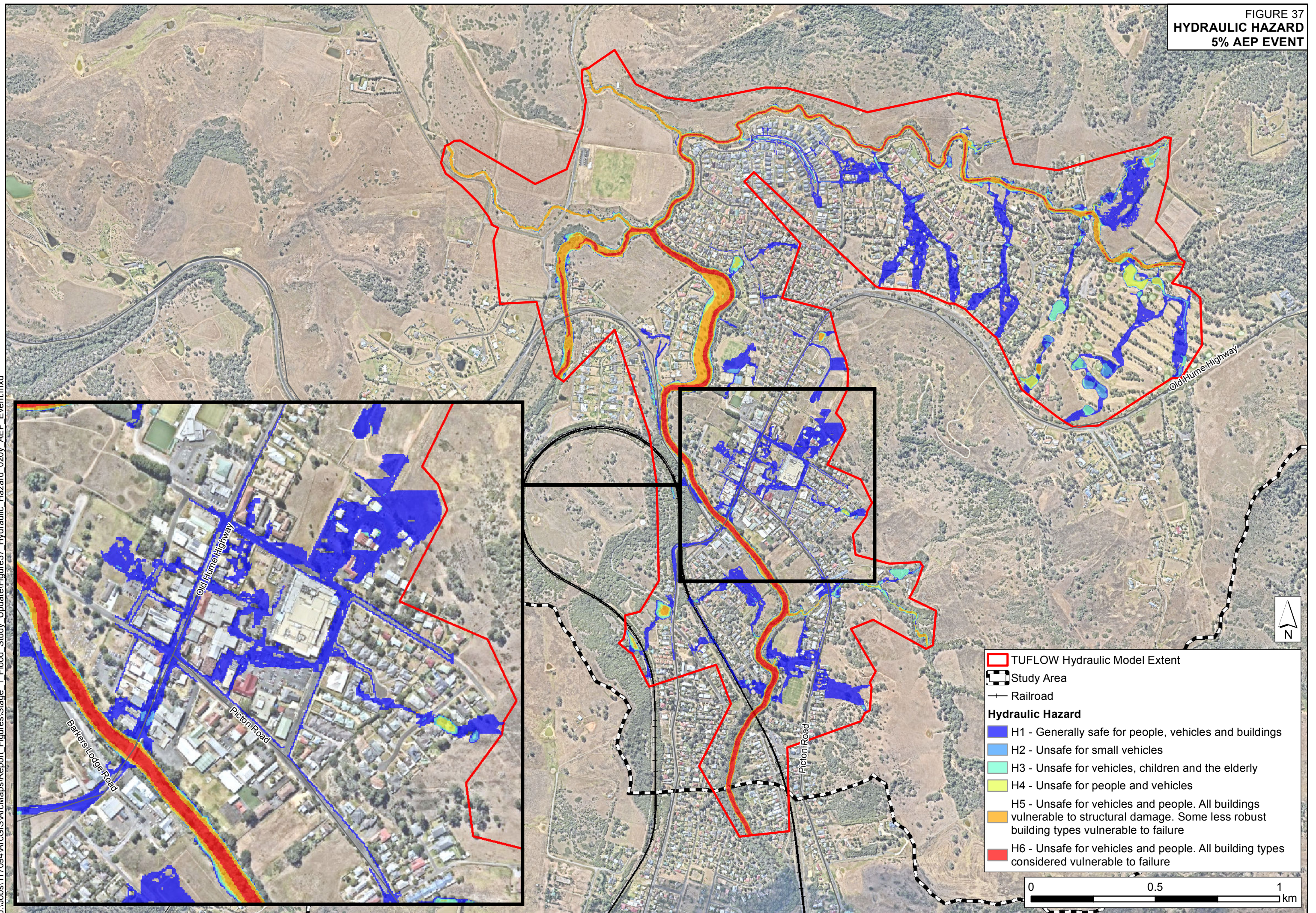


FIGURE 38
HYDRAULIC HAZARD
1% AEP EVENT

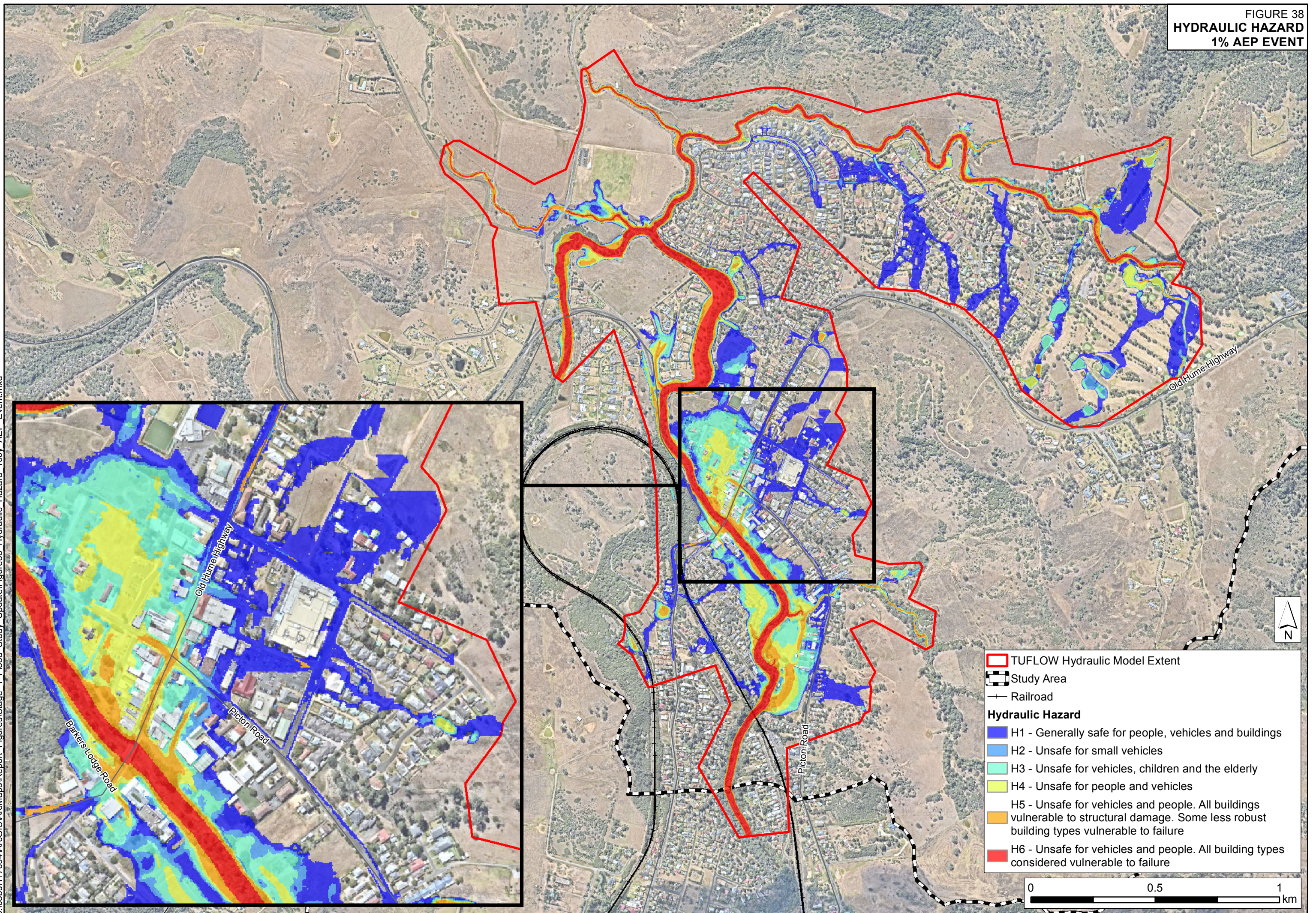


FIGURE 39
HYDRAULIC HAZARD
PMF EVENT

