



# **Bow Bowing Bunbury Curran Creek Strategic Floodplain Risk Management Study and Plan**

**Final Draft**

**Volume 2 - Maps**

## **Bow Bowing Bunbury Curran Strategic Floodplain Risk Management and Plan**

FINAL DRAFT - VOLUME 2 (MAPS)

for

Client Name

by

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## 1.1 REVISION HISTORY

Date	Version	Name	Comments
13/06/2018	1	Filippo Dall'Osso	First draft for internal review
18/06/2018	2	Steven Molino	Preliminary Draft for Council Review
13/08/2018	3	Steven Molino	Revised Draft for Council Review
14/11/2018	4	Steven Molino	Revised Draft for Council Review
4/12/2018	5	Steven Molino	Final Draft Version

## 1.2 DOCUMENT APPROVAL

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Position	Principal
For Campbelltown City Council	
Name	Cathy Kinsey
Position	Coordinator Stormwater and Structural Design

The Bow Bowing Bunbury Curran Strategic Floodplain Risk Management Study and Plan includes the Campbelltown Locality, Ingleburn Locality and Remainder Bow Bowing Bunbury Curran Creek projects. Campbelltown City Council has prepared this document with financial assistance from the NSW and Australian Governments through the Natural Disaster Resilience Program and with financial assistance from the NSW Government through its Floodplain Management Program. This document does not necessarily represent the opinions of the NSW Government or the Office of Environment and Heritage or the Australian Government.

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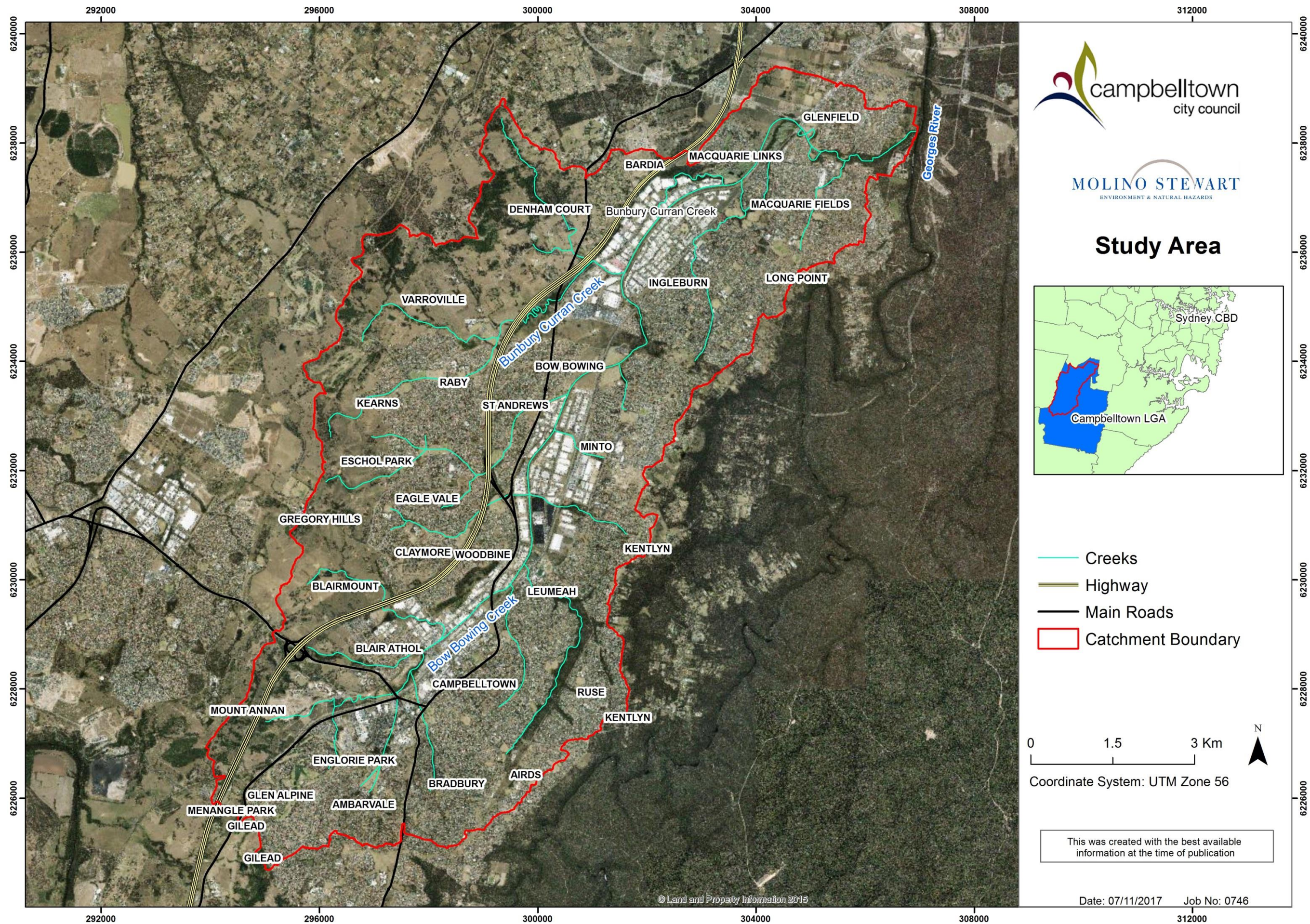
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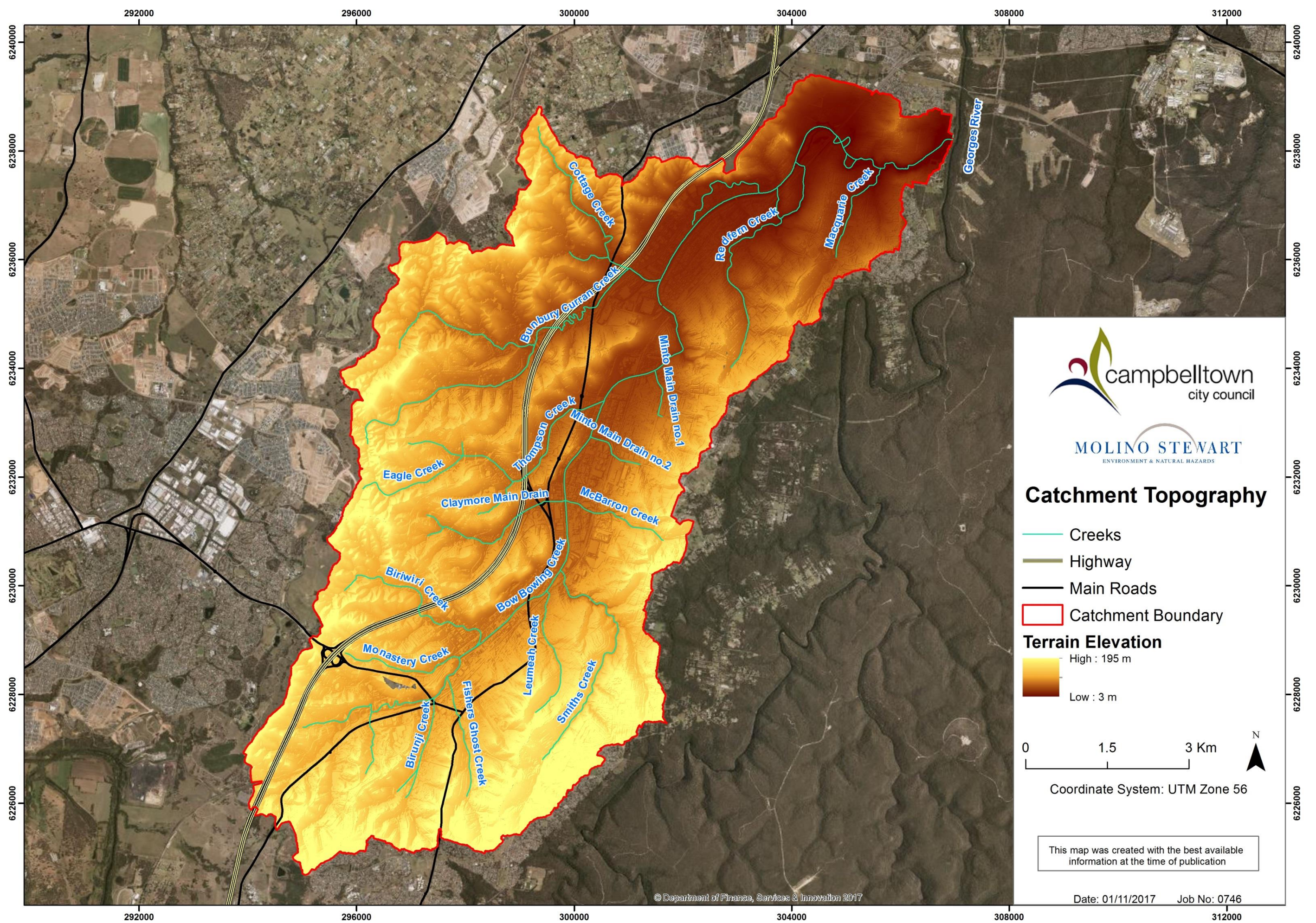






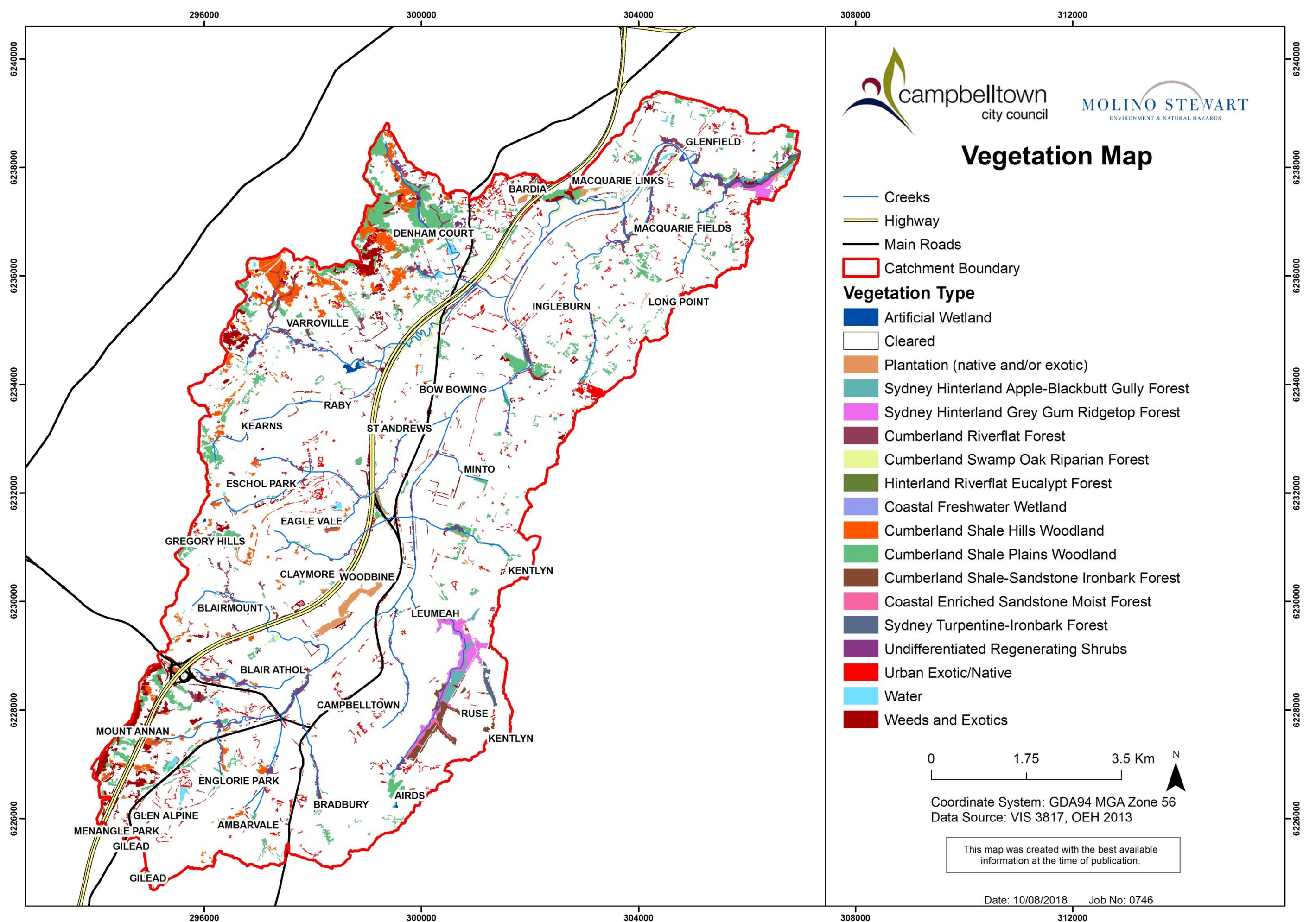
Map 1 Locality of the study area





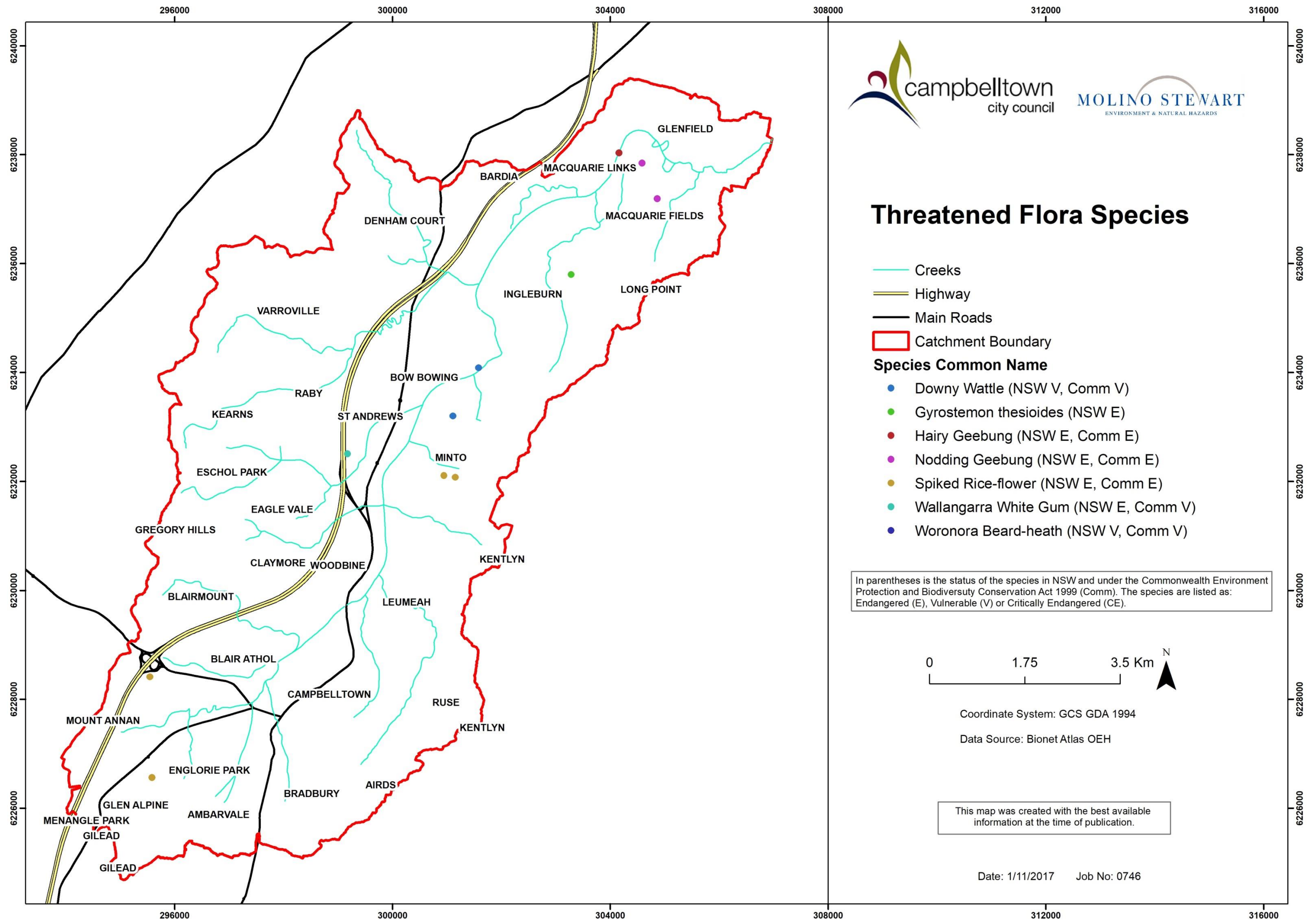
Map 2 Catchment Topography





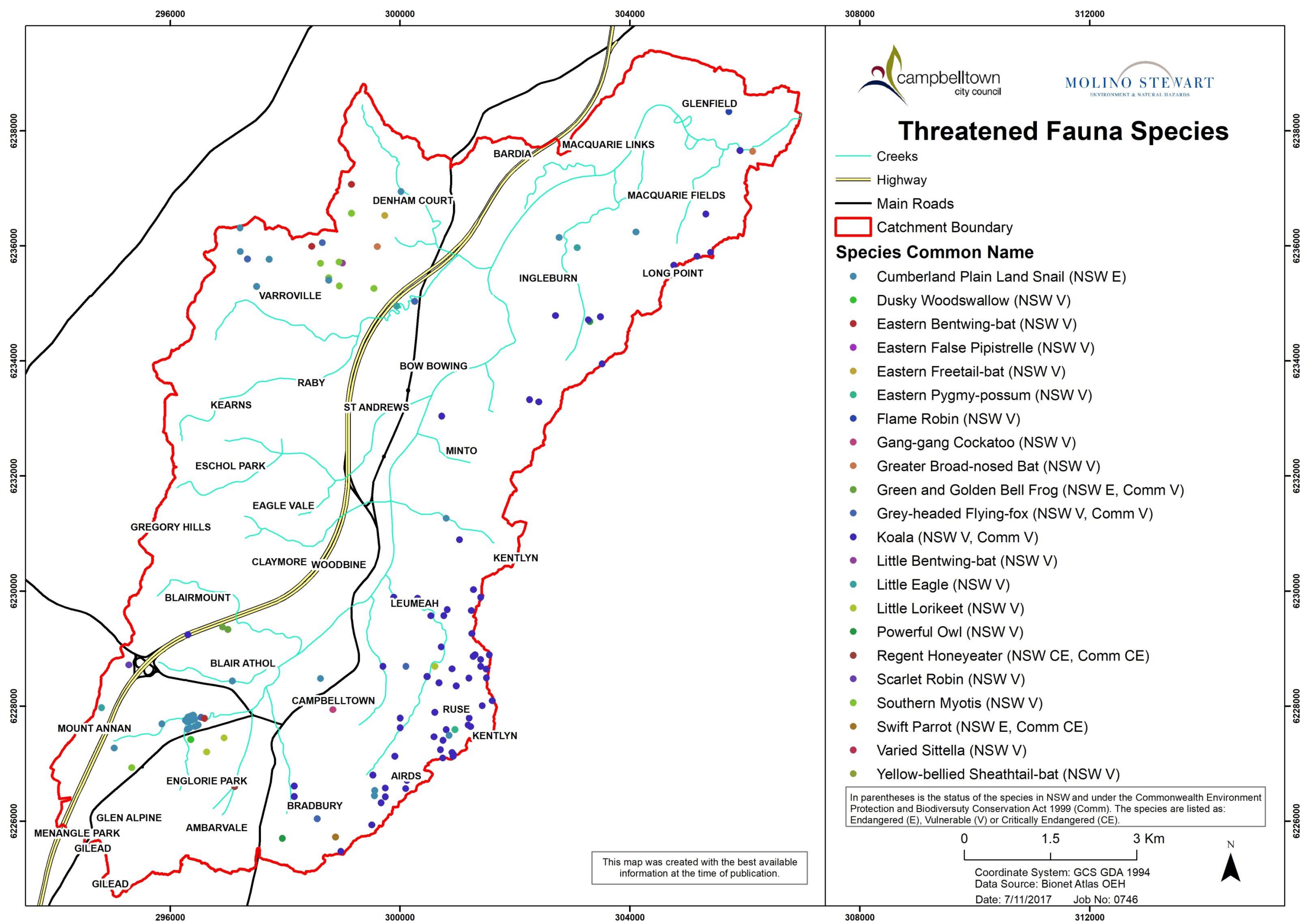
Map 3 Map of the natural areas





Map 4 Threatened flora species





Map 5 Threatened fauna species



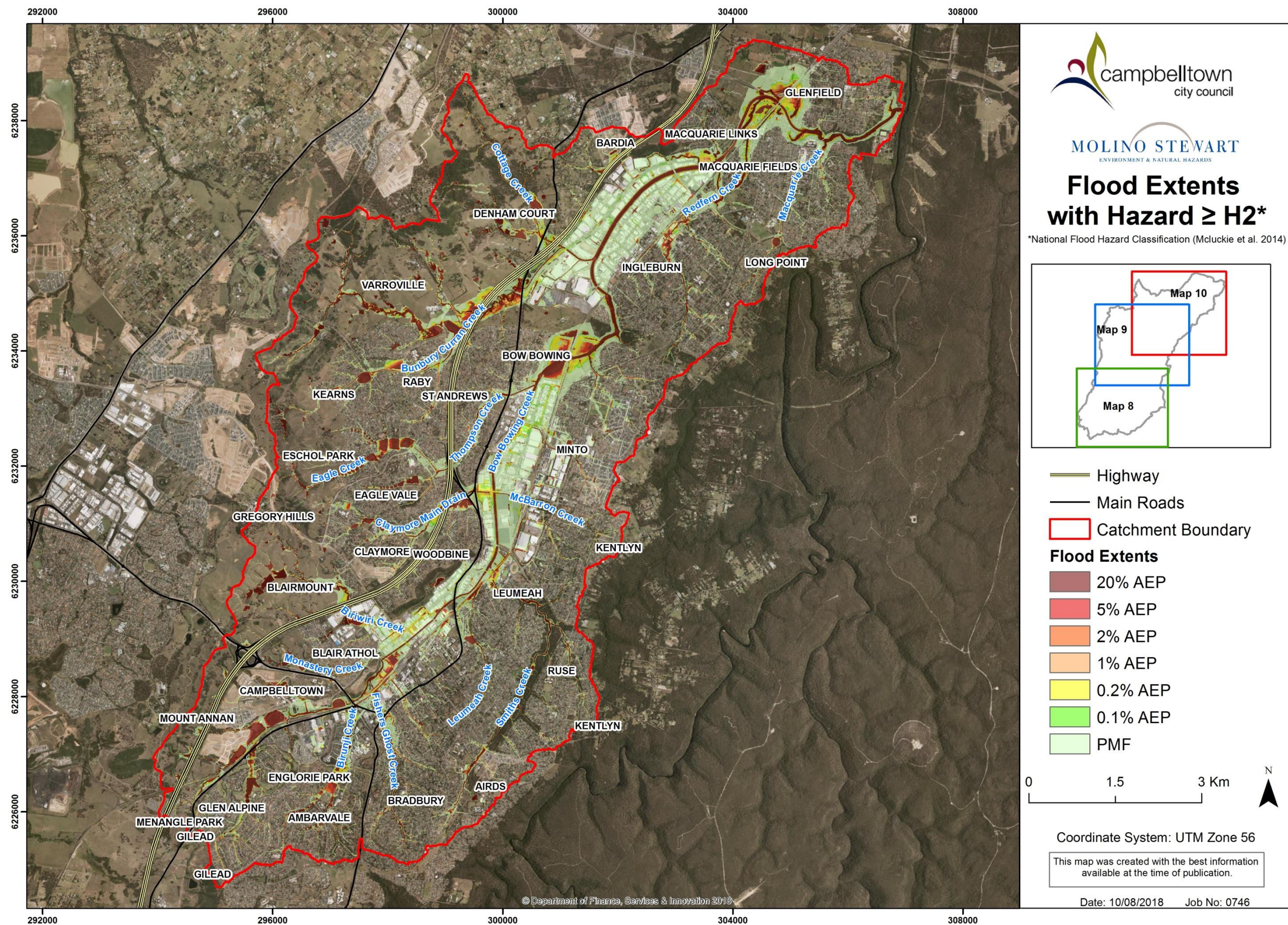




Table 1. Heritage Items displayed in Map 6

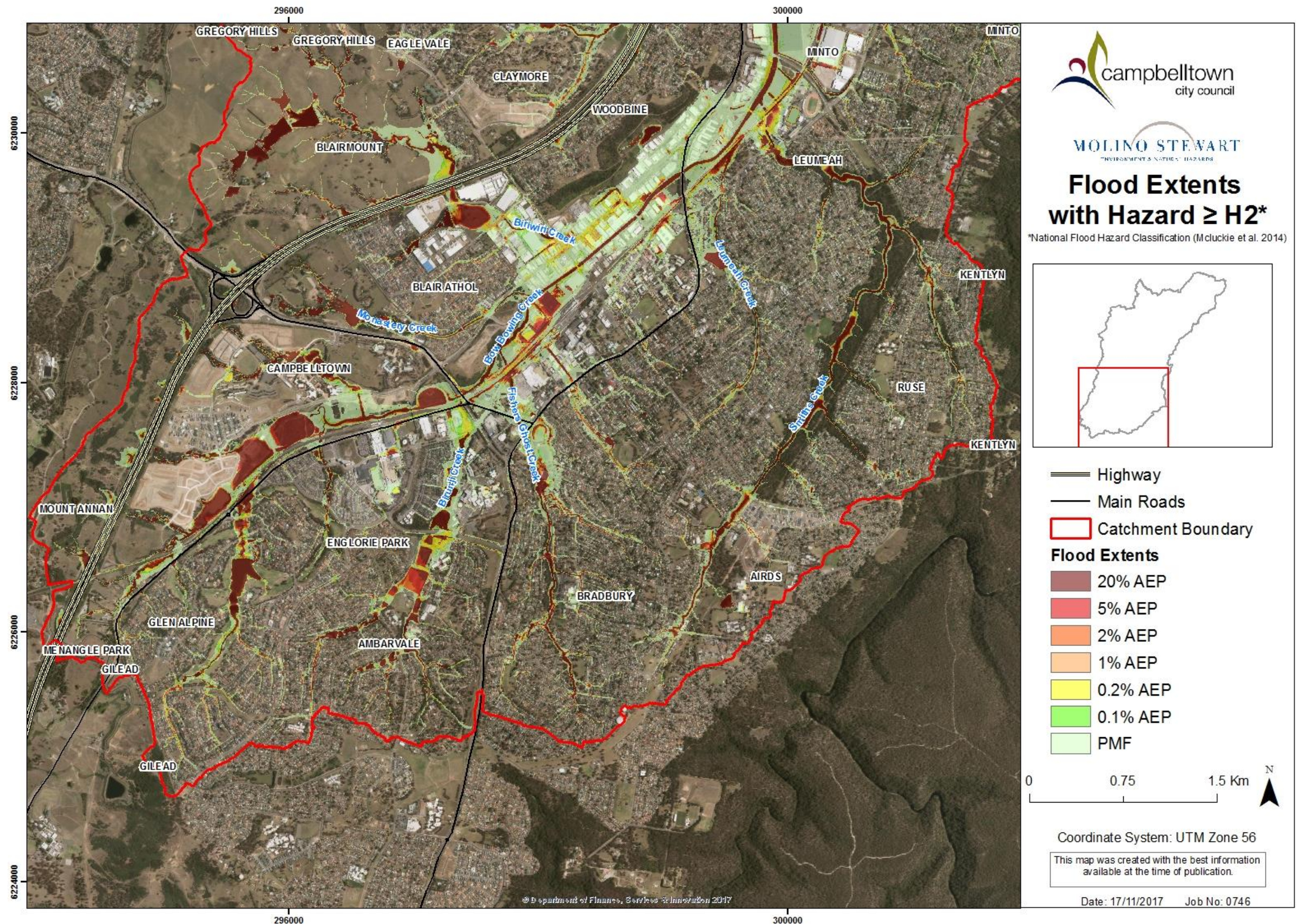
Label	Heritage Item	Label	Heritage Item	Label	Heritage Item
C1	Queen Street Heritage Conservation Area	I17	House	I5	Silos
I00004	Glenalvon (including house, stables, grounds and water trough)	I18	Richmond Villa	I50	Englorie Park House
I00007	Queen Street Buildings Group - Bursill's Shop	I19	St David's Presbyterian Church and former Manse	I51	Eschol Park House (including six street trees)
I00007	Queen Street Buildings Group - Former Coach House	I2	Blair Athol Group - Blair Athol	I6	Raith
I00007	Queen Street Buildings Group - Former Railway Hotel	I2	Blair Athol Group - The Kraal	I61	Glen Alpine - site of original house
I00007	Queen Street Buildings Group - McGuanne House	I2	Blair Athol Group - The Kia	I62	Glen Alpine - second house of that name
I00007	Queen Street Buildings Group	I21	Emily Cottage	I65	Hurlstone Agricultural High School - original school building
I00193	St Johns Church Group	I22	Quondong	I67	Boronia
I00212	Denham Court group	I23	Caversham	I68	The Pines
I00265	Former Campbelltown Post Office	I24	Braefield	I7	Water supply reservoir, cattle tank and silt traps
I00343	Hollylea and former Plough Inn	I25	Wesleyan Chapel	I70	Ingleburn Community Hall
I00424	Macquarie Field House, homestead group, ruins and rural landscape setting	I26	Former Farrier's Arms Inn and Water Trough	I71	Ingleburn Horse Trough
I00497	Warby's Stables and Barn	I27	Former Fieldhouse's Produce Store	I72	Ingleburn Public School
I00499	Former Commercial Bank of Sydney	I28	Campbelltown Court House	I73	Woodcrest
I00640	Dredges Cottage	I31	Former Kendall's Mill House	I78	Milestone XXXII
I00737	Varro Ville homestead group	I32	Former Congregational Manse	I79	Warby's Dams 1 and 2 on Leumeah Creek
I01298	Epping Forest homestead complex	I34	Water trough	I8	Presbyterian Cemetery
I01373	Upper Canal System (Pheasants Nest Weir to Prospect Reservoir)	I36	Former Town Hall	I80	Warby's Dams 3 and 4 on Leumeah Creek
I01373	Upper Canal System (Pheasants Nest Weir to Prospect Reservoir)	I38	Methodist/Congregational Cemetery	I88	Milestone XXX
I01387	Robin Hood Farm homestead group and surviving undeveloped setting	I39	House	I89	Milestone XXXI
I01389	Sugarloaf Farm, homestead group and rural landscape setting	I4	Campbelltown Reservoir	I9	St Elmo
I1	Briar Cottage	I40	House	I91	Campbellfield or Redfern's Cottage
I10	Milestone XXXIII	I41	House	I96	St Andrews Farmhouse
I100	Ingleburn Dam	I42	Cransley	OLEP1*	Sydney Water Supply Upper Canal
I105	Varro Ville"" - estate	I43	House	OLEP2*	Blairmount
I11	House	I44	Glenroy Cottage	OLEP3*	Blairmount
I12	St John the Evangelist Church (new)	I45	Hillcrest	*Not listed in Local Environmental Plan	
I13	St Peter's Anglican Church Group - Church, Rectory, Former Stables and Anglican Cemetery	I48	Milestone XXVII		
I15	Campbelltown Railway Station	I49	Mount St Joseph		





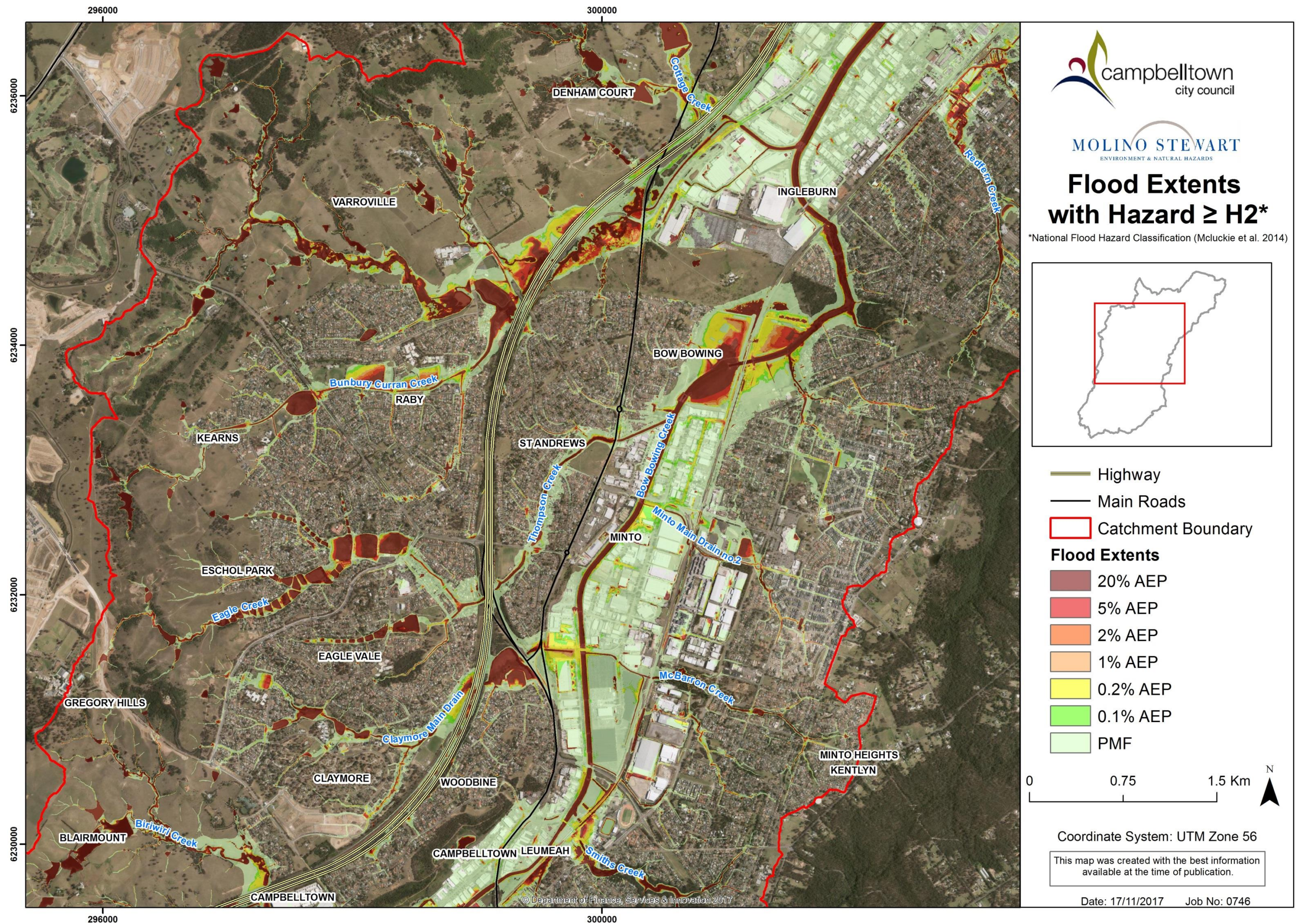
Map 7 Flood extents with hazard  $\geq$  H2





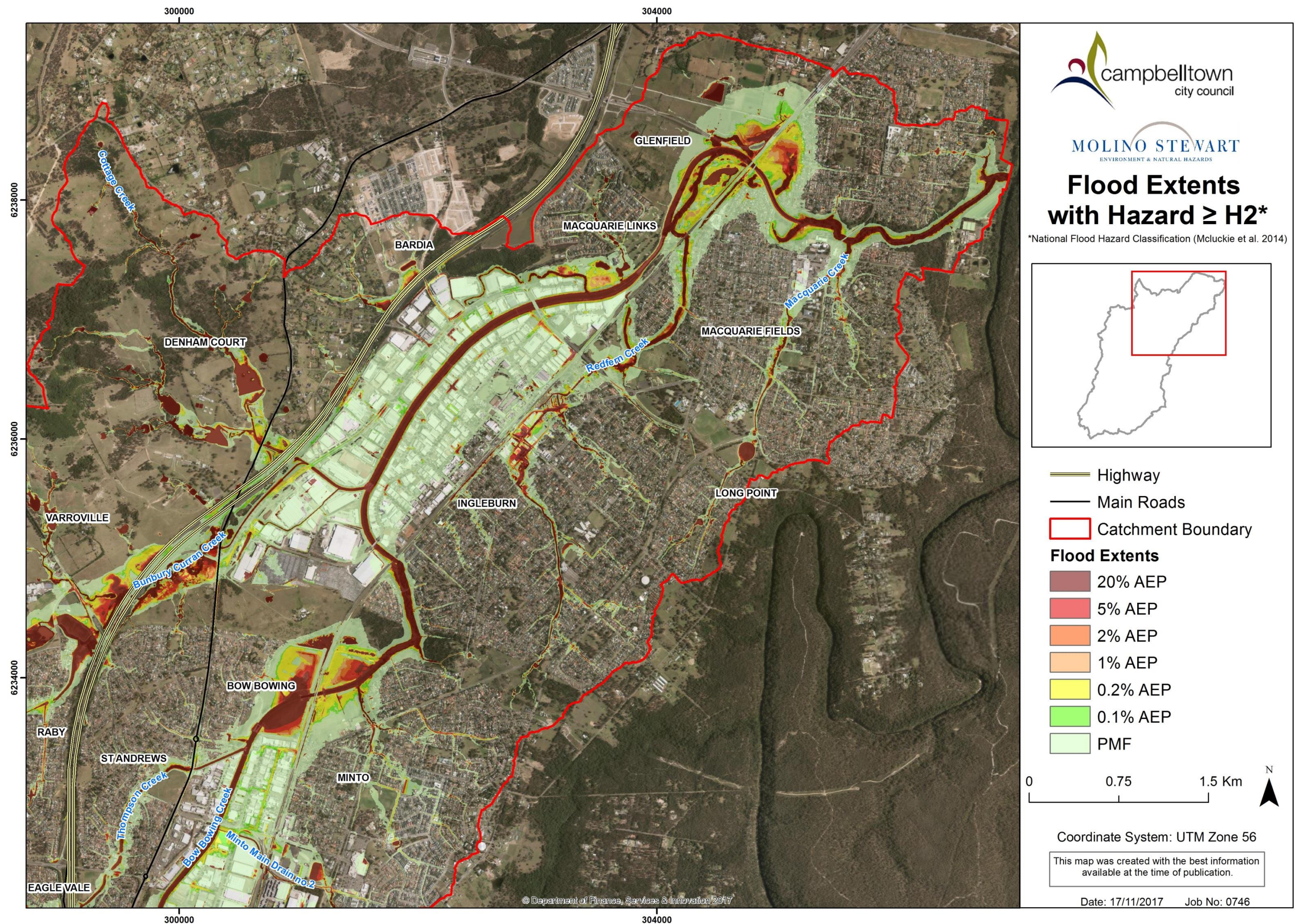
Map 8 Flood extents with hazard  $\geq H2$  in the southern section of the study area





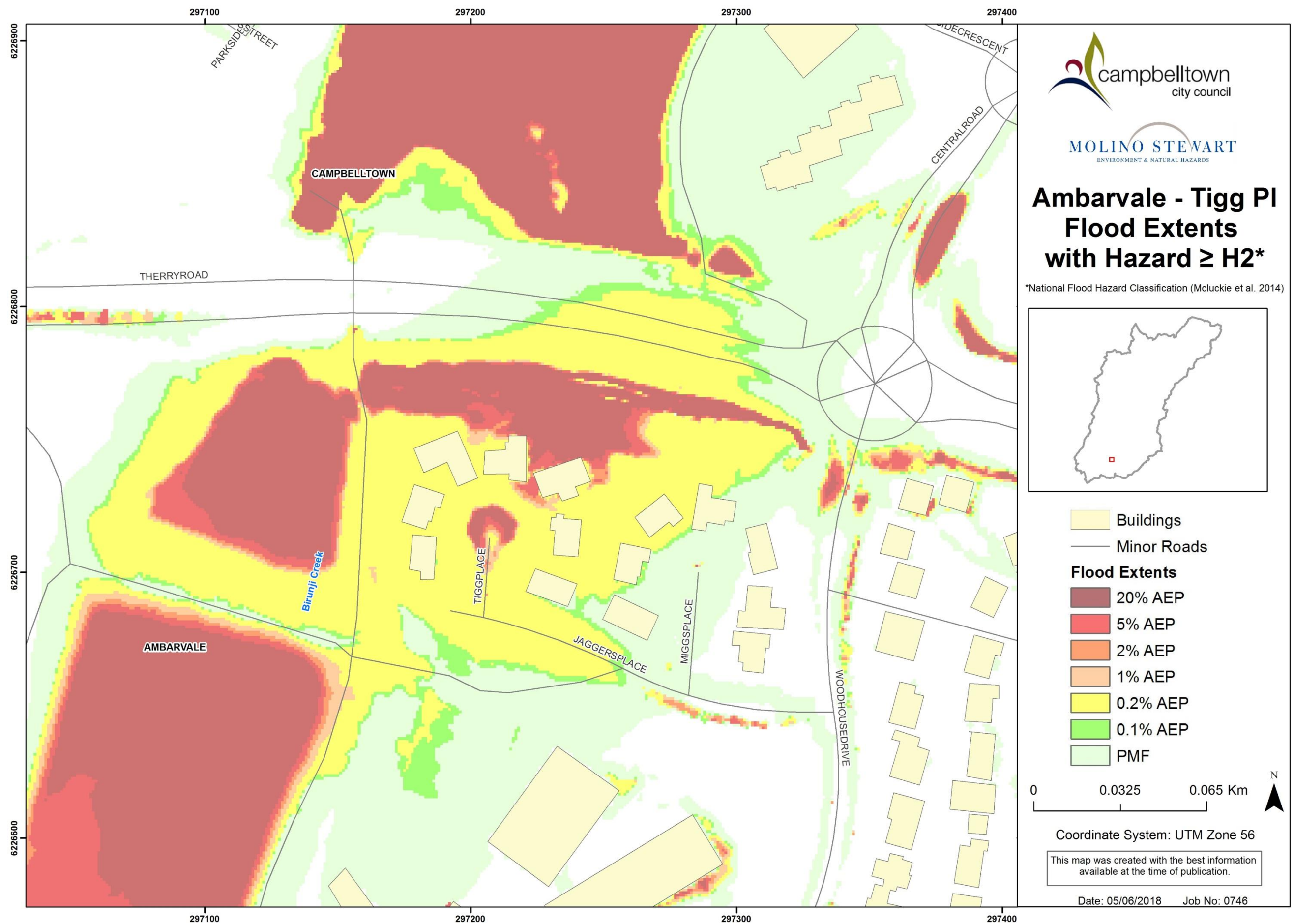
Map 9 Flood extents with hazard  $\geq H2$  in the centre of the study area





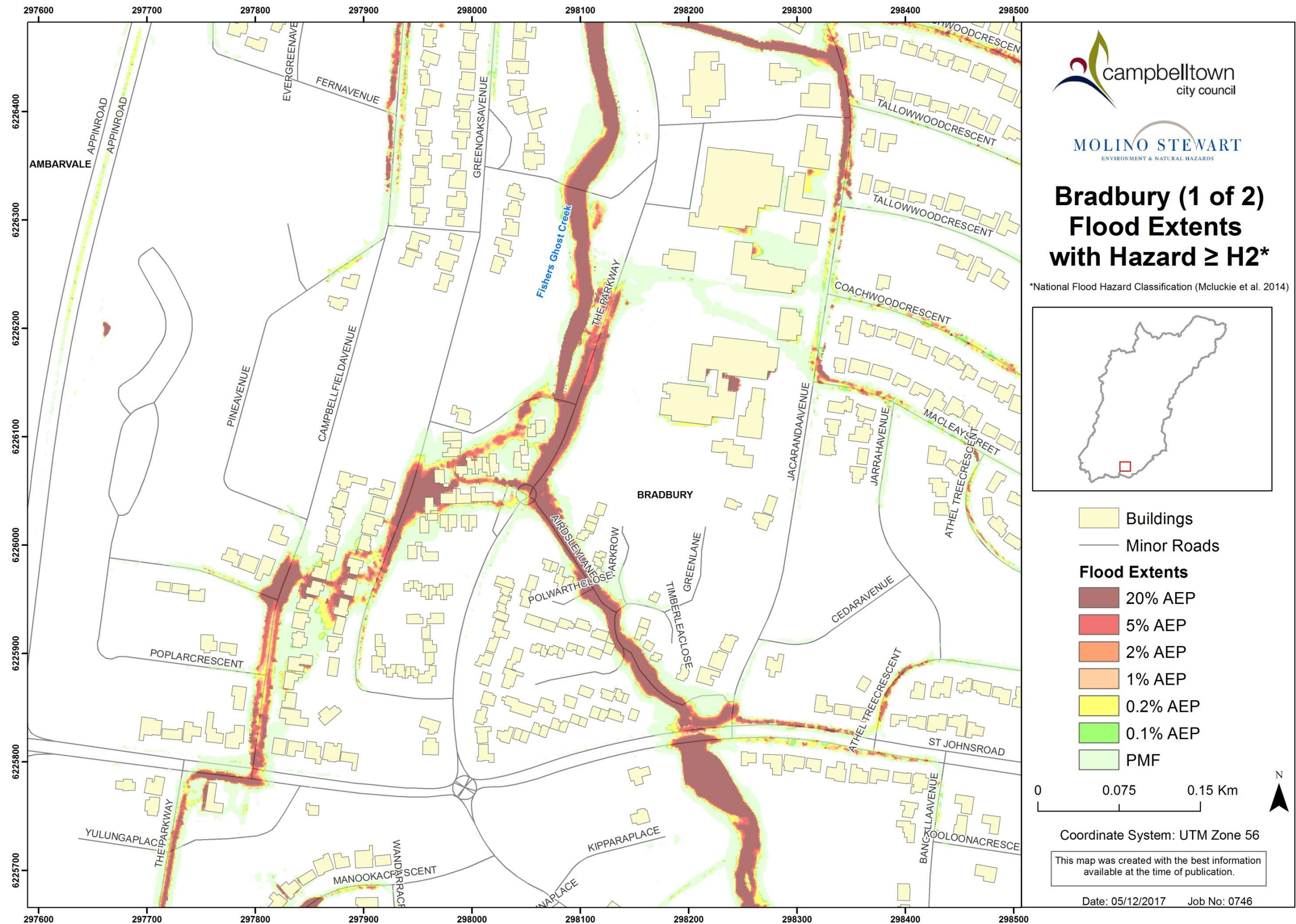
Map 10 Flood extents with hazard  $\geq$  H2 in the northern section of the study area





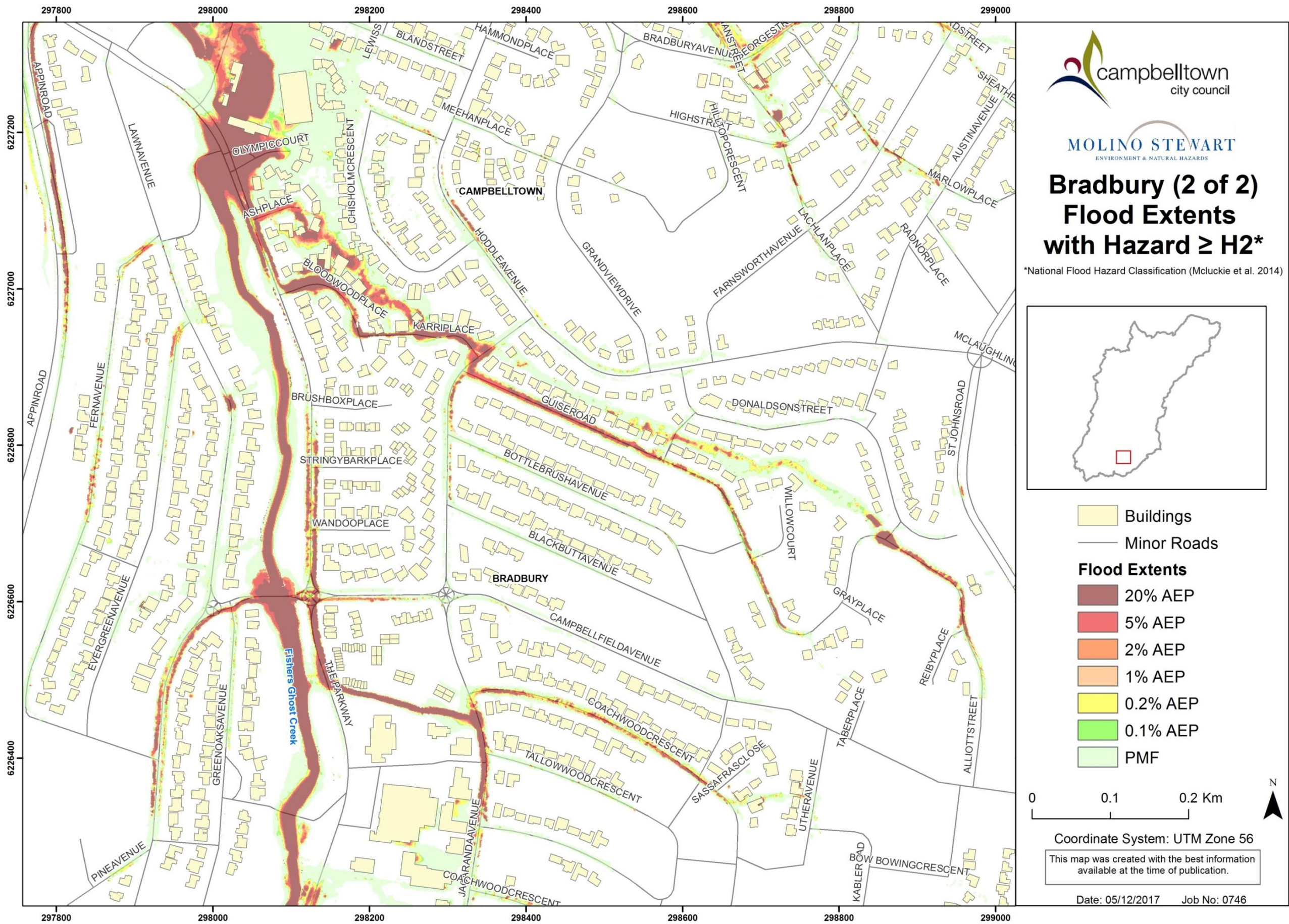
Map 11. Overland flooding in Ambarvale – Tigg PI.





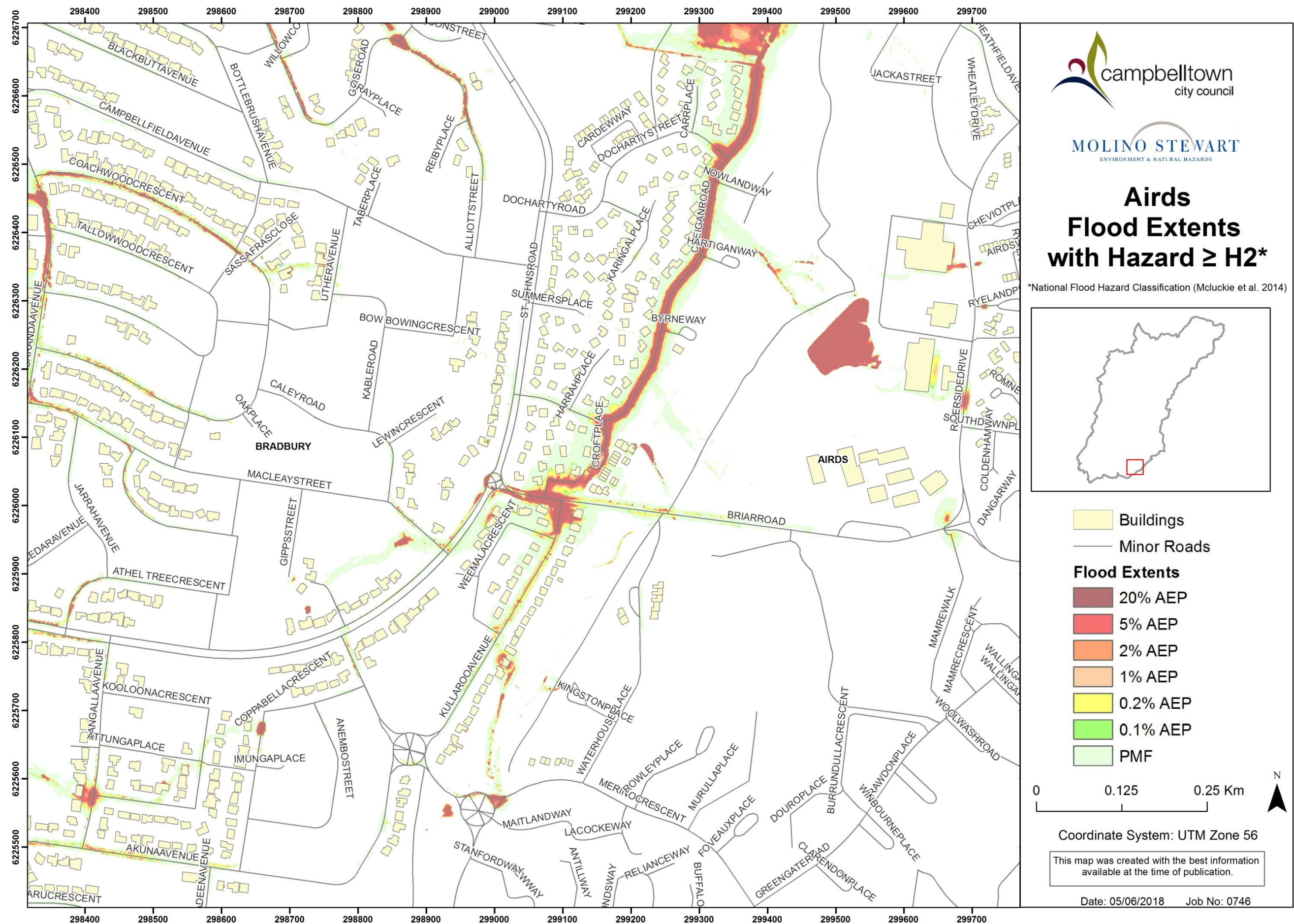
Map 12 Overland flooding in Bradbury (1 of 2)





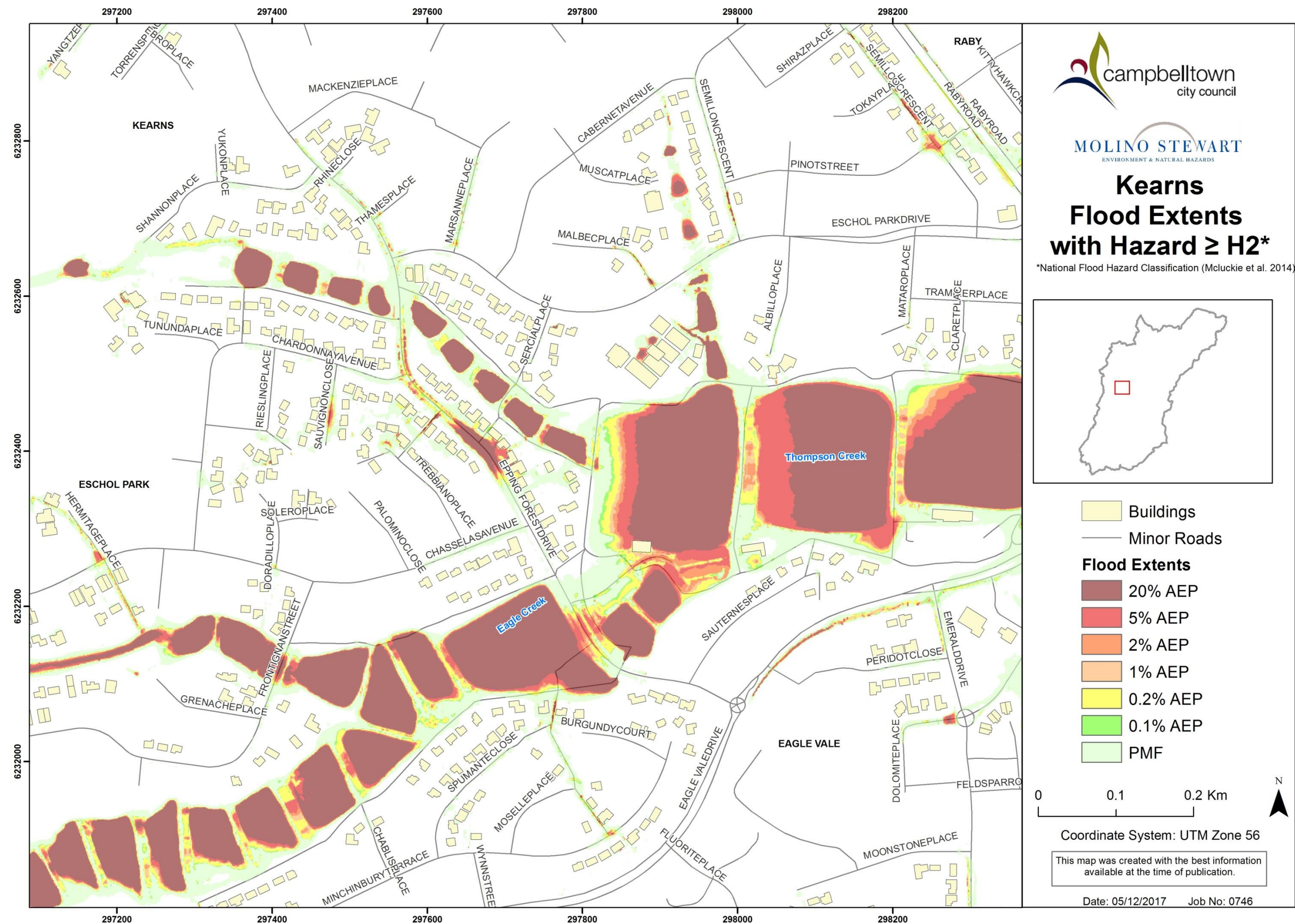
Map 13 Overland flooding in Bradbury (2 of 2)





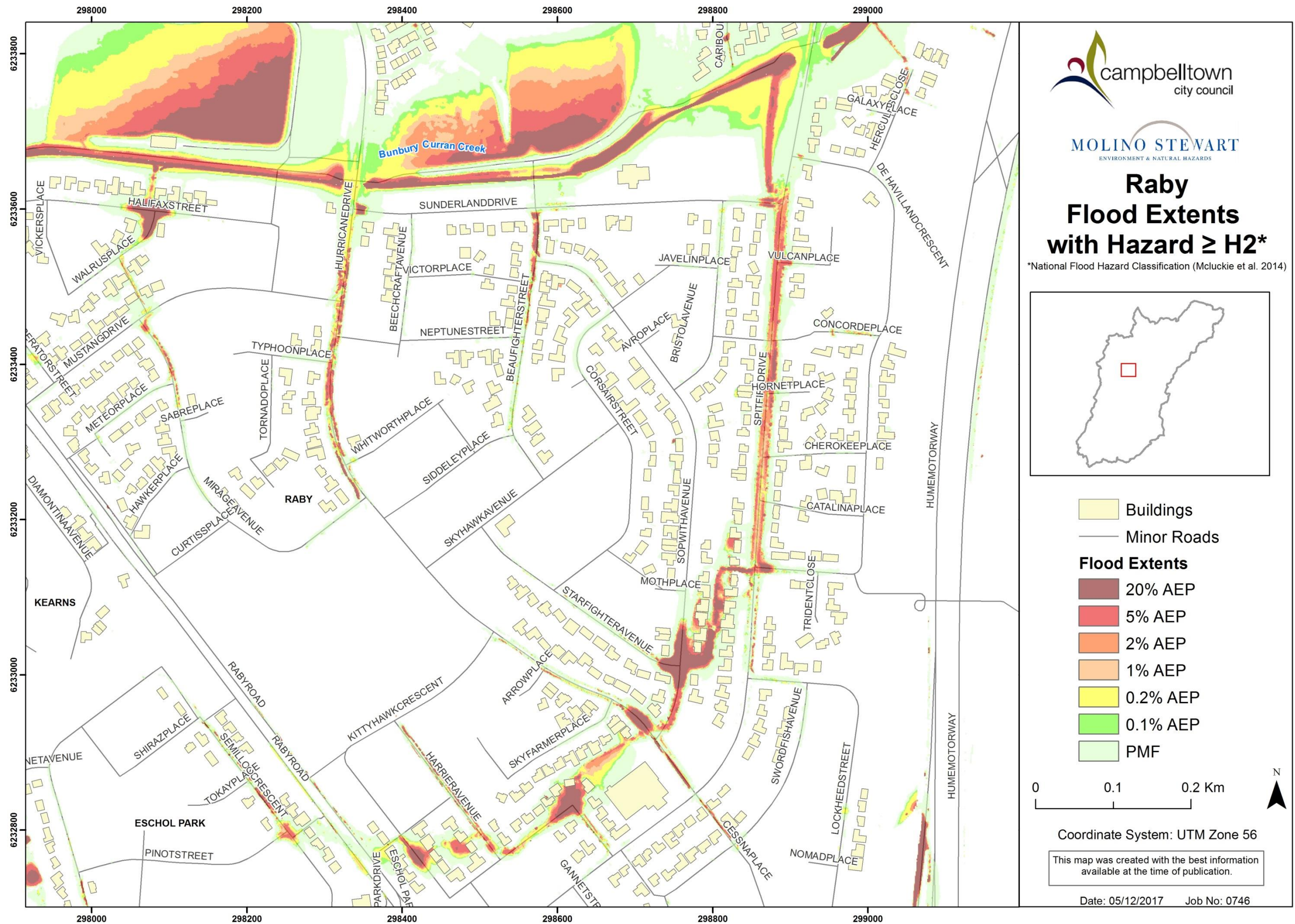
Map 14. Overland flooding in Airds





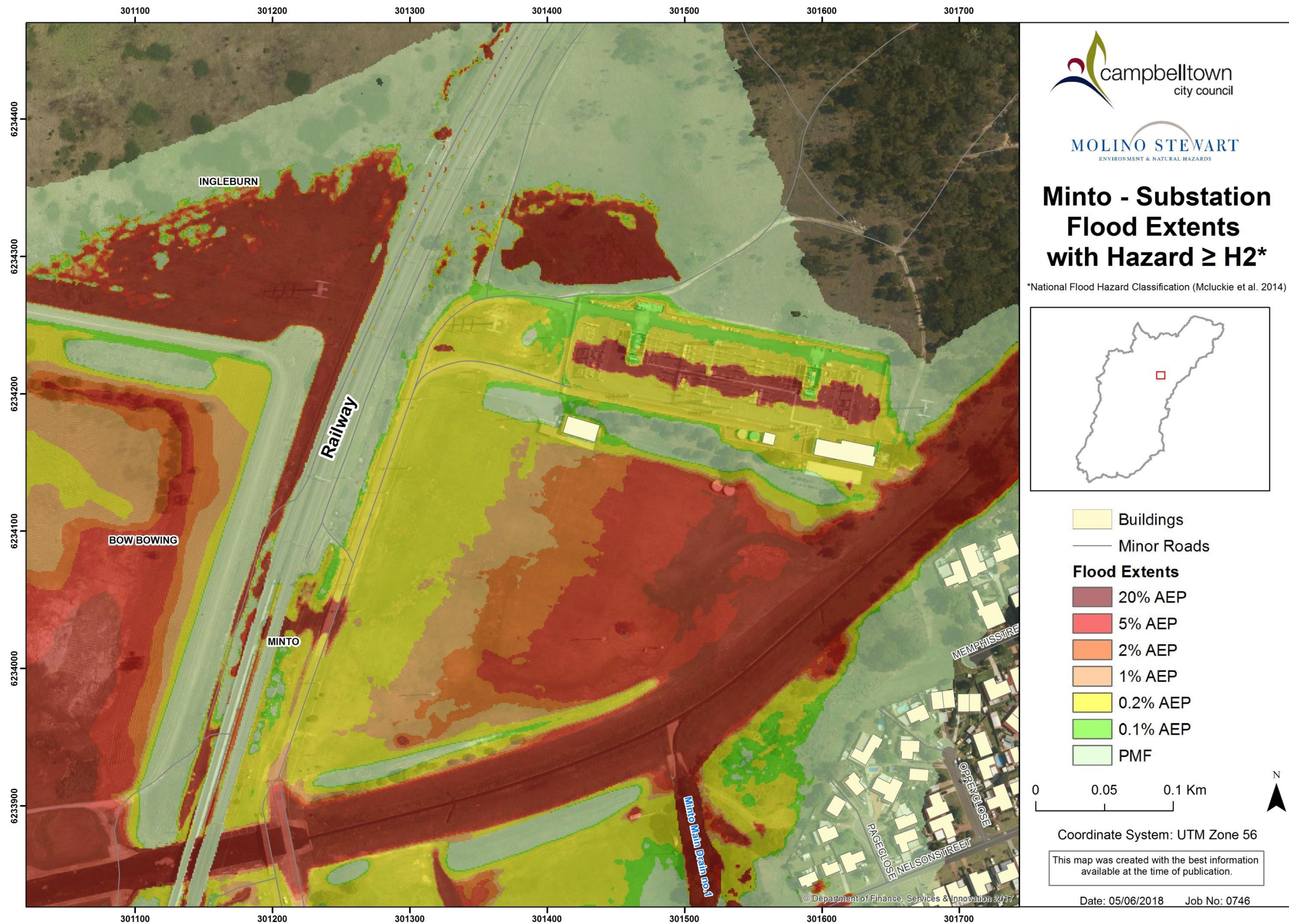
Map 15 Overland flooding in Kearns





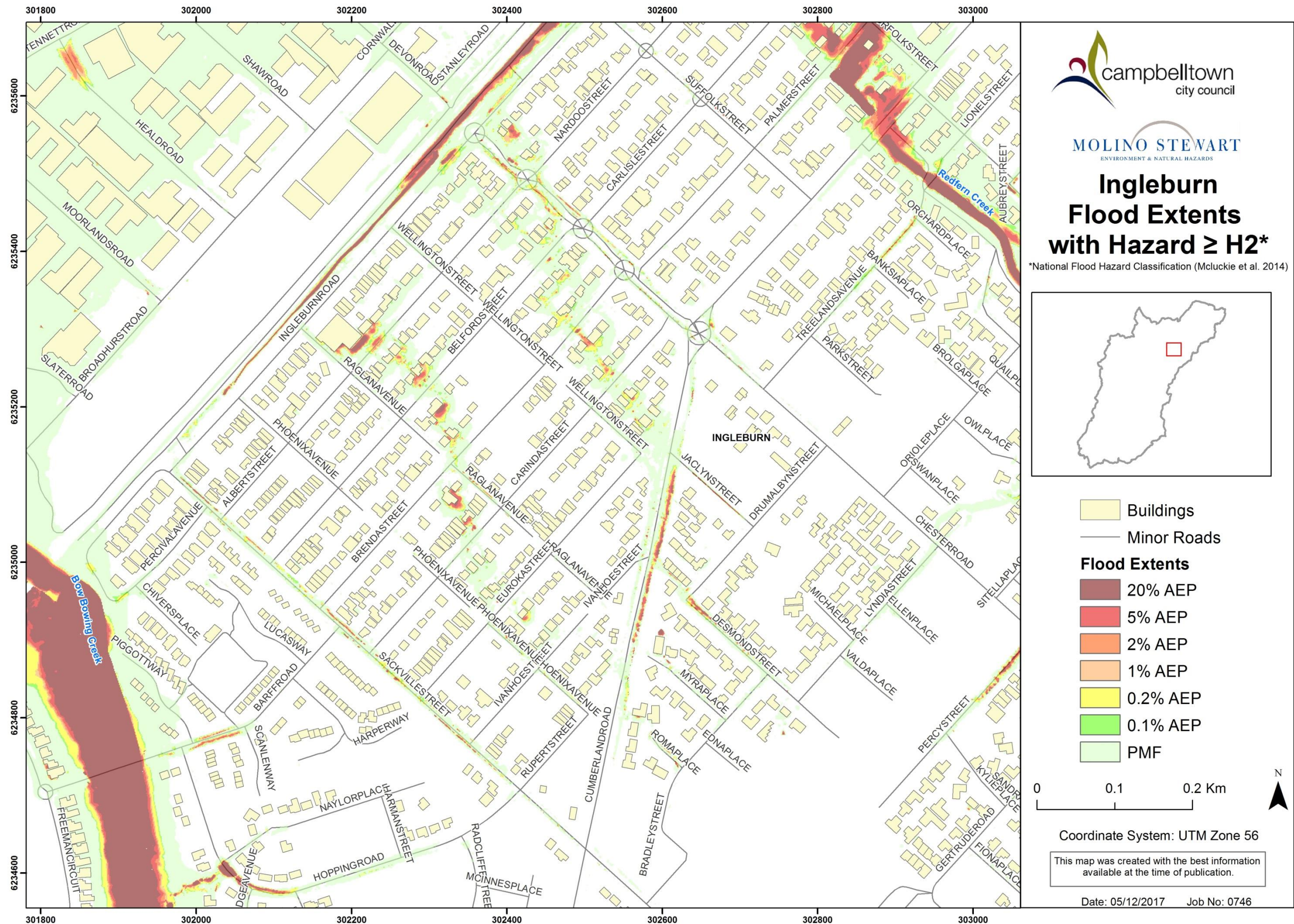
Map 16 Overland flooding in Raby





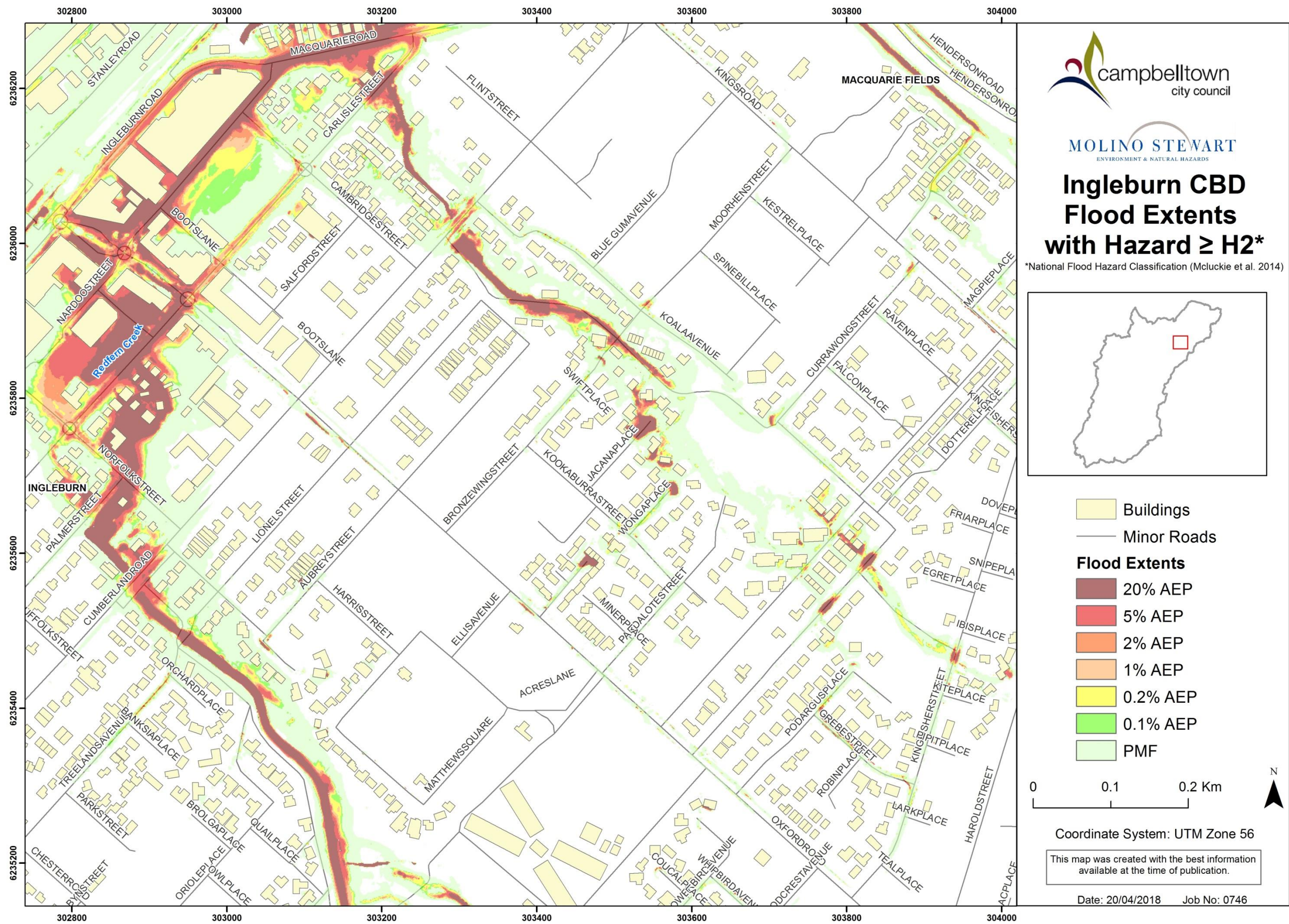
Map 17. Overland flooding in Minto affecting the electric power substation





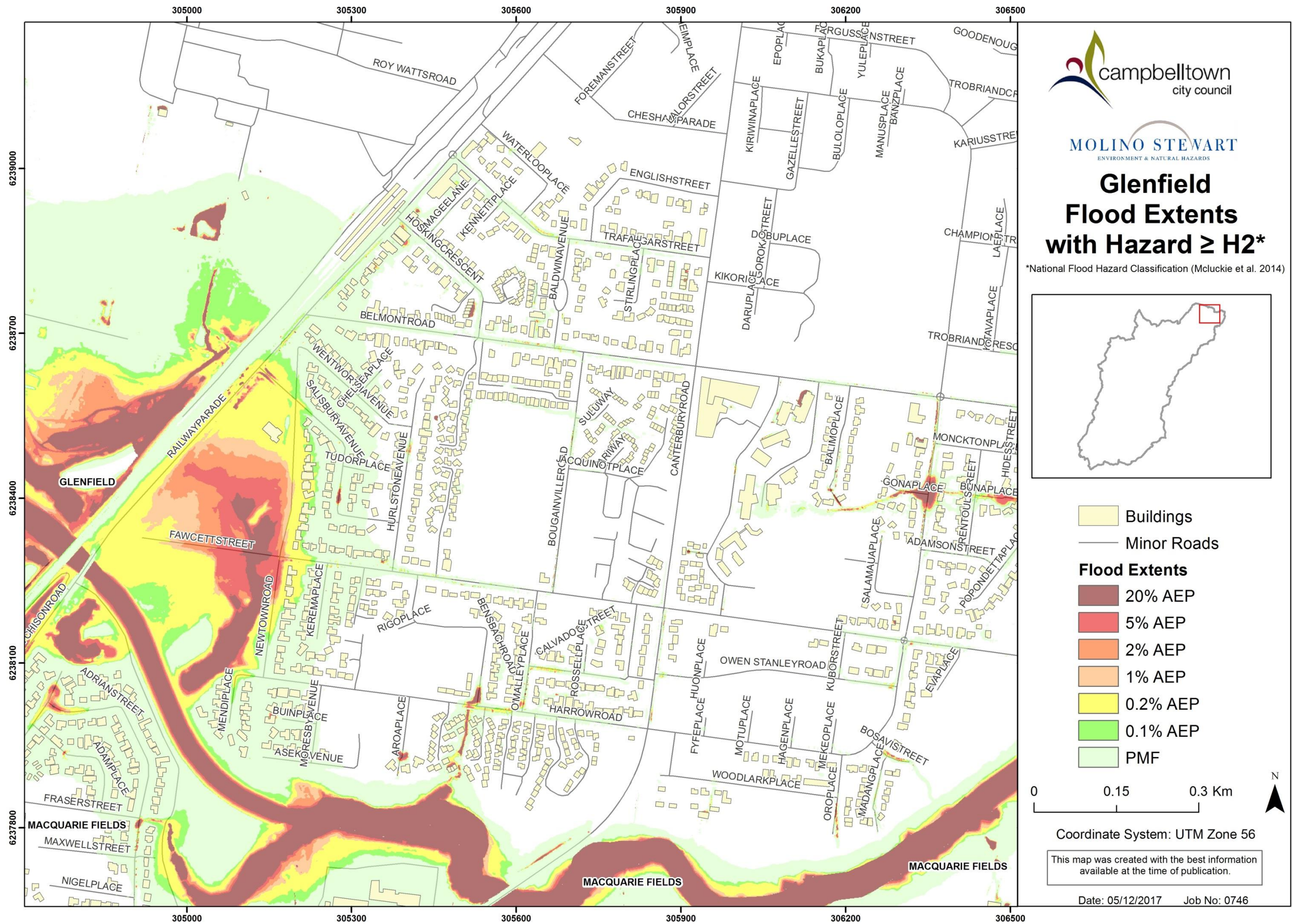
Map 18 Overland flooding in Ingleburn





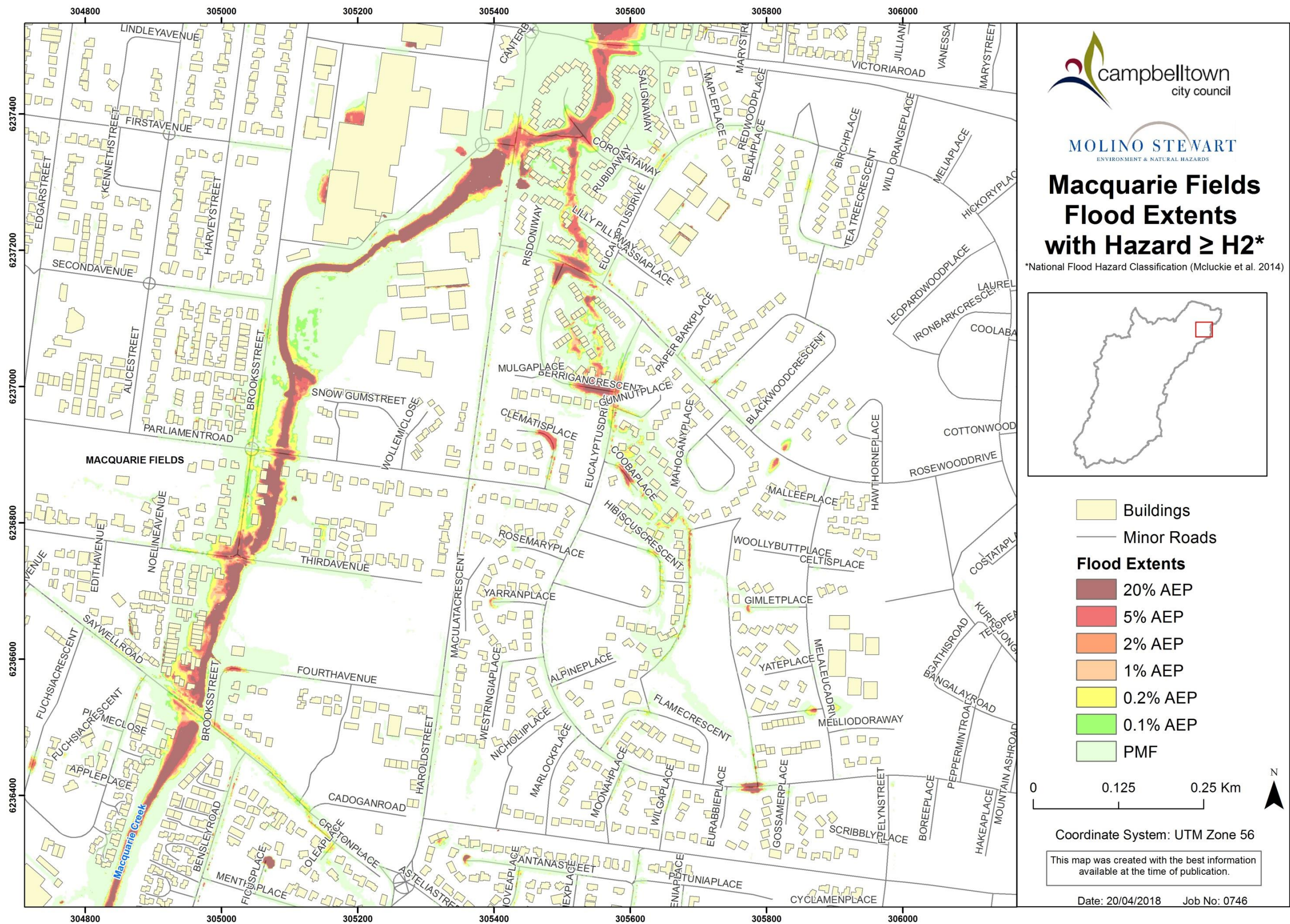
Map 19 Overland flooding in Ingleburn CBD





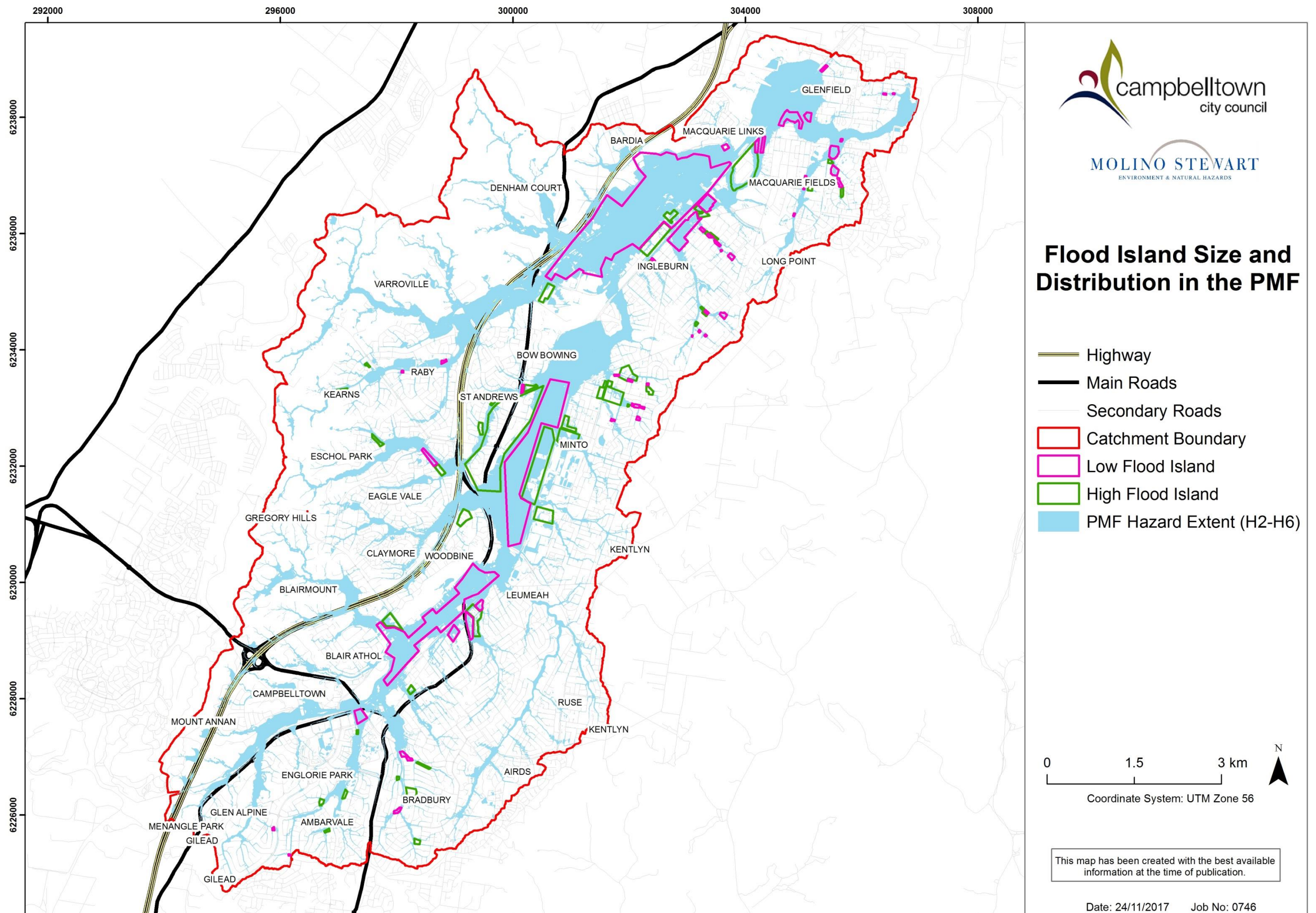
Map 20 Overland flooding in Glenfield





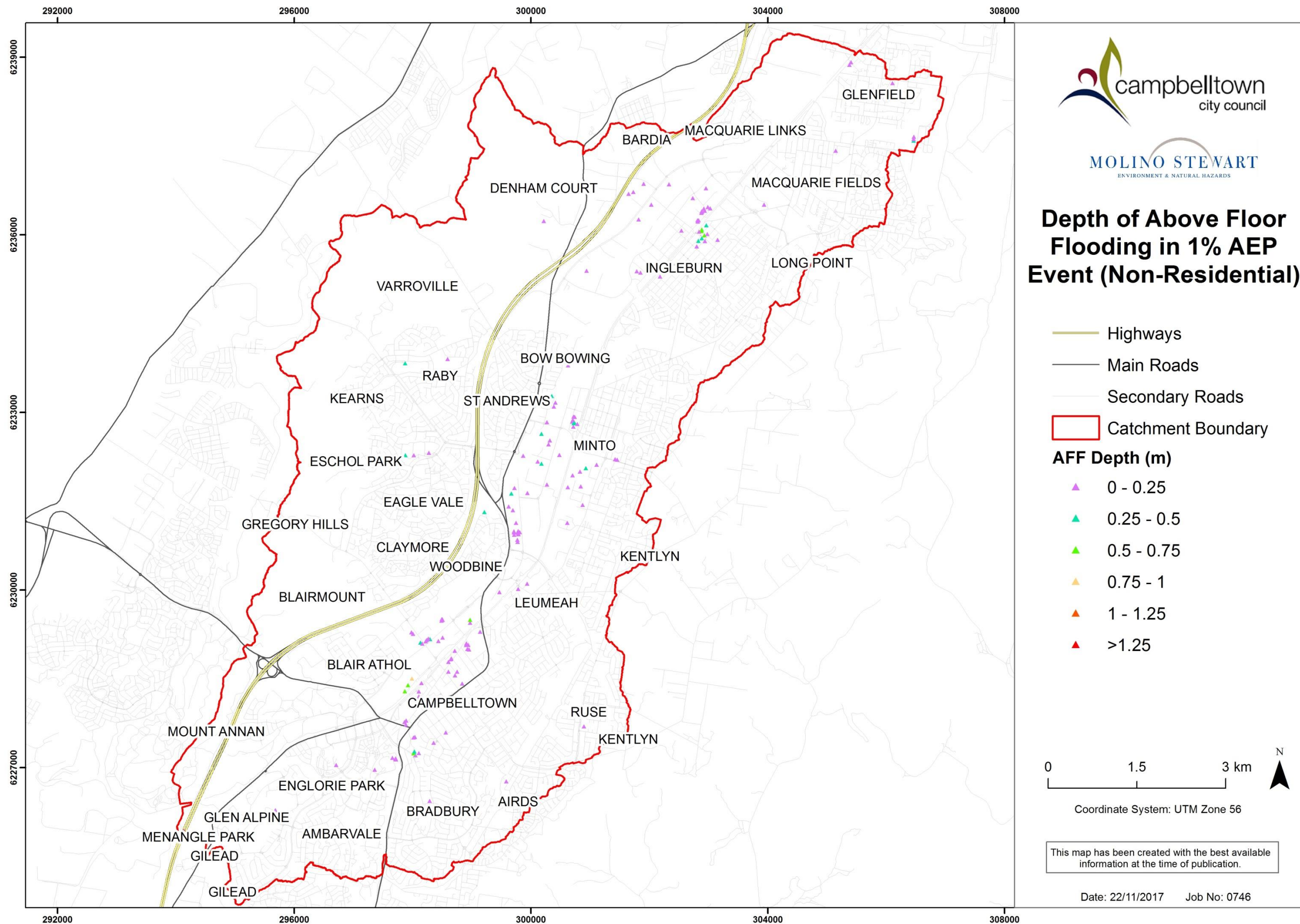
Map 21 Overland flooding in Macquarie Fields





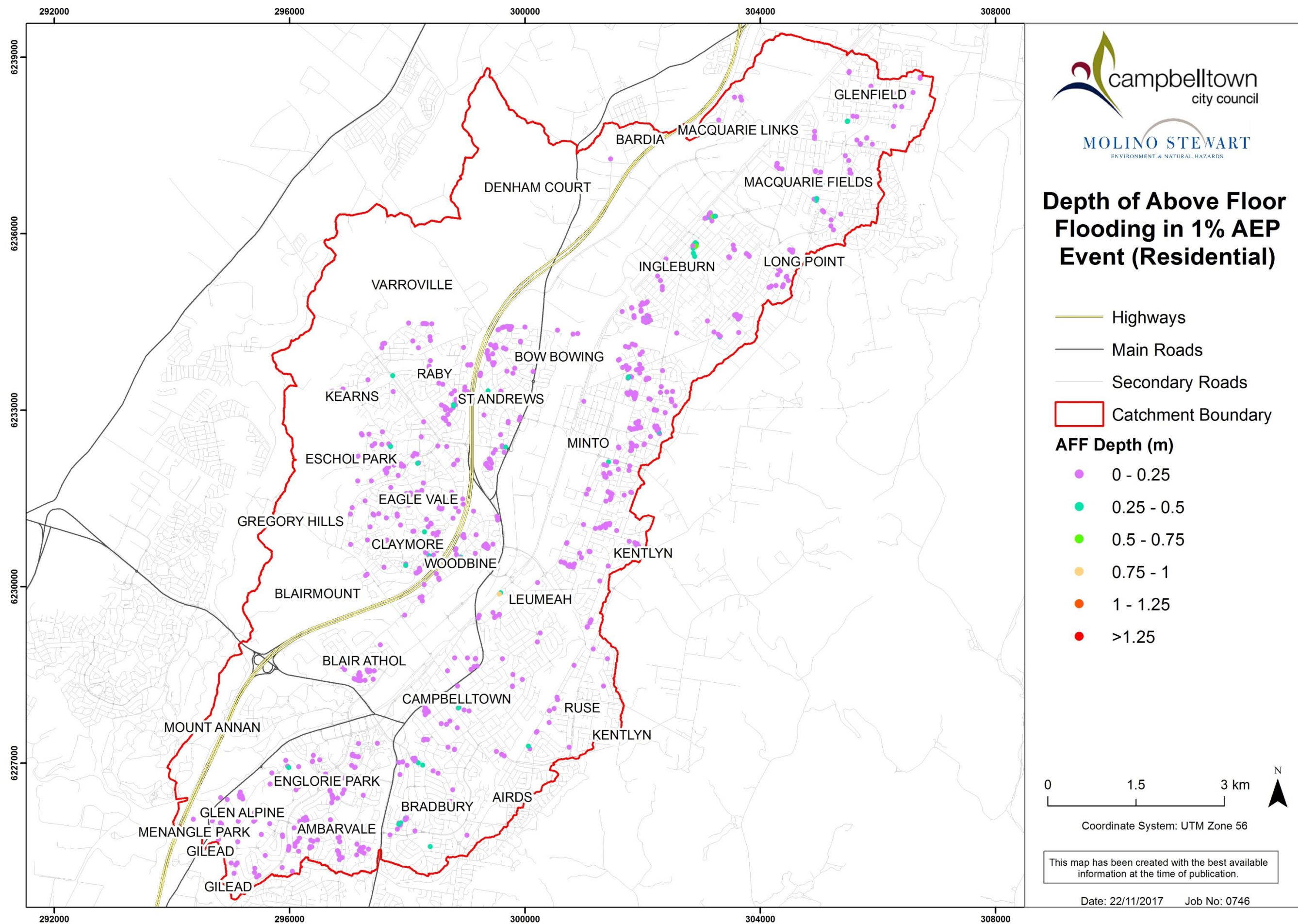
Map 22 Flood Island Size and Distribution in the PMF





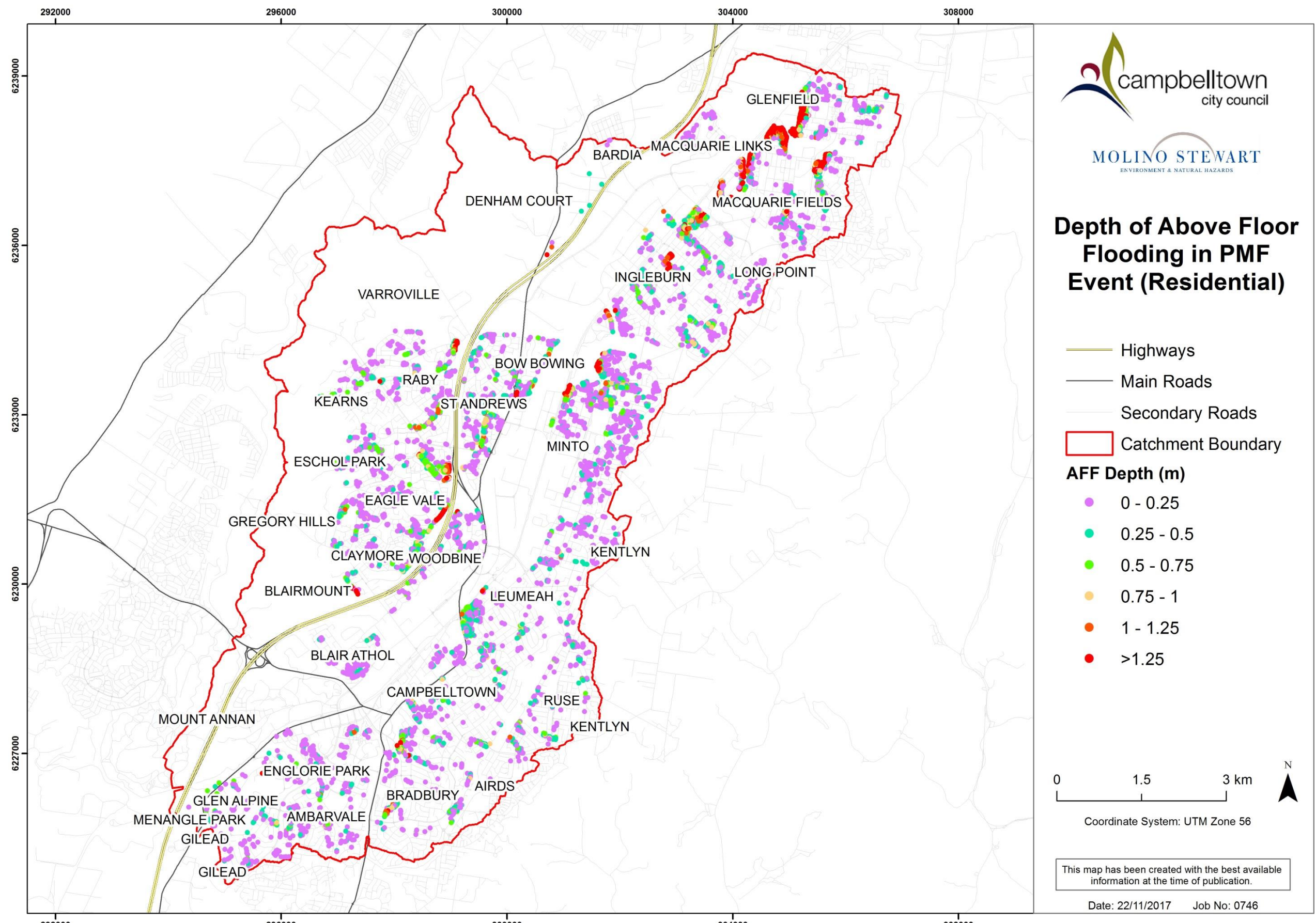
Map 23 Depth of Above Floor Flooding (AFF) for Residential Buildings in the 1% AEP Event





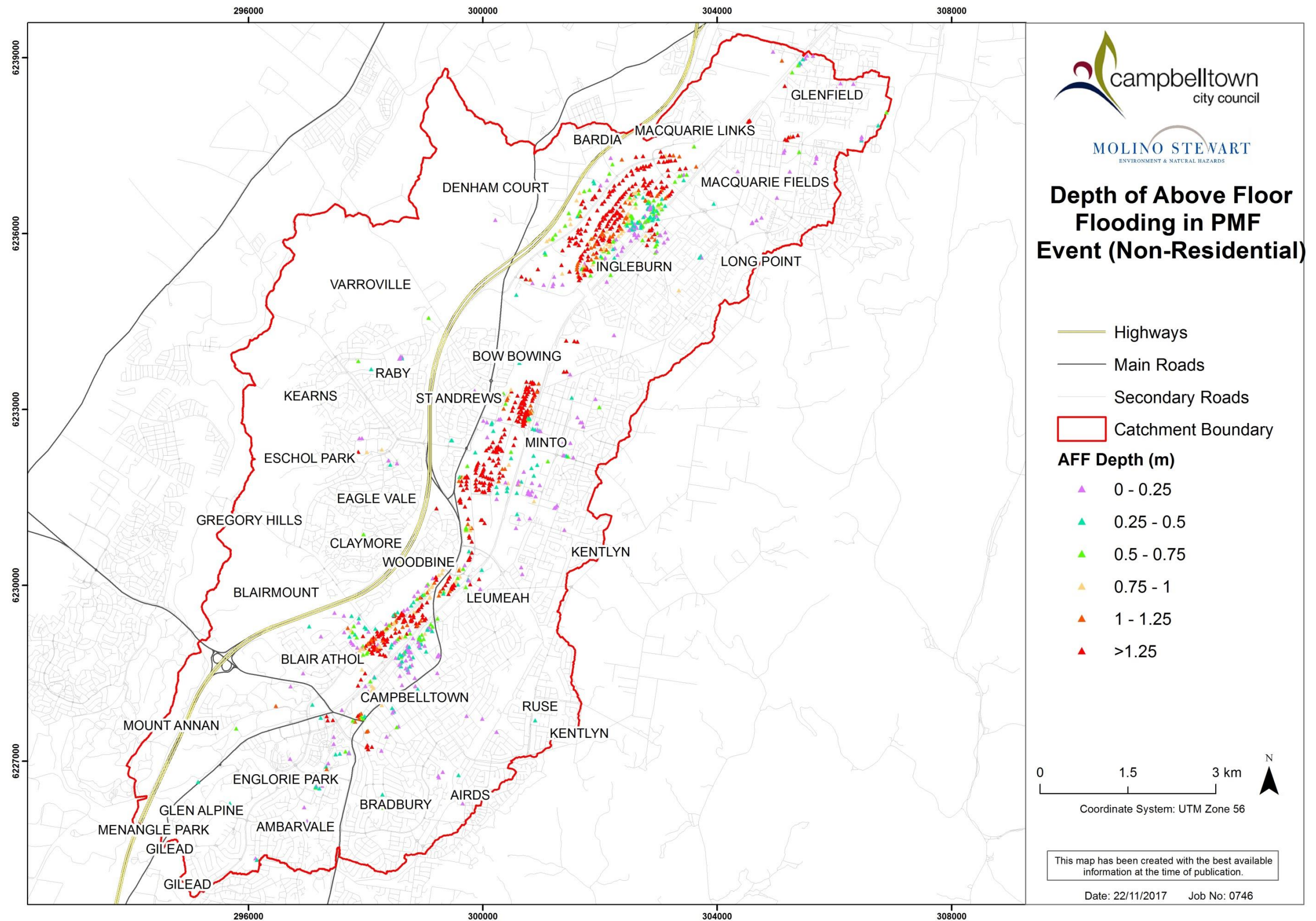
Map 24 Depth of Above Floor Flooding (AFF) for Non-Residential Buildings in the 1% AEP Event





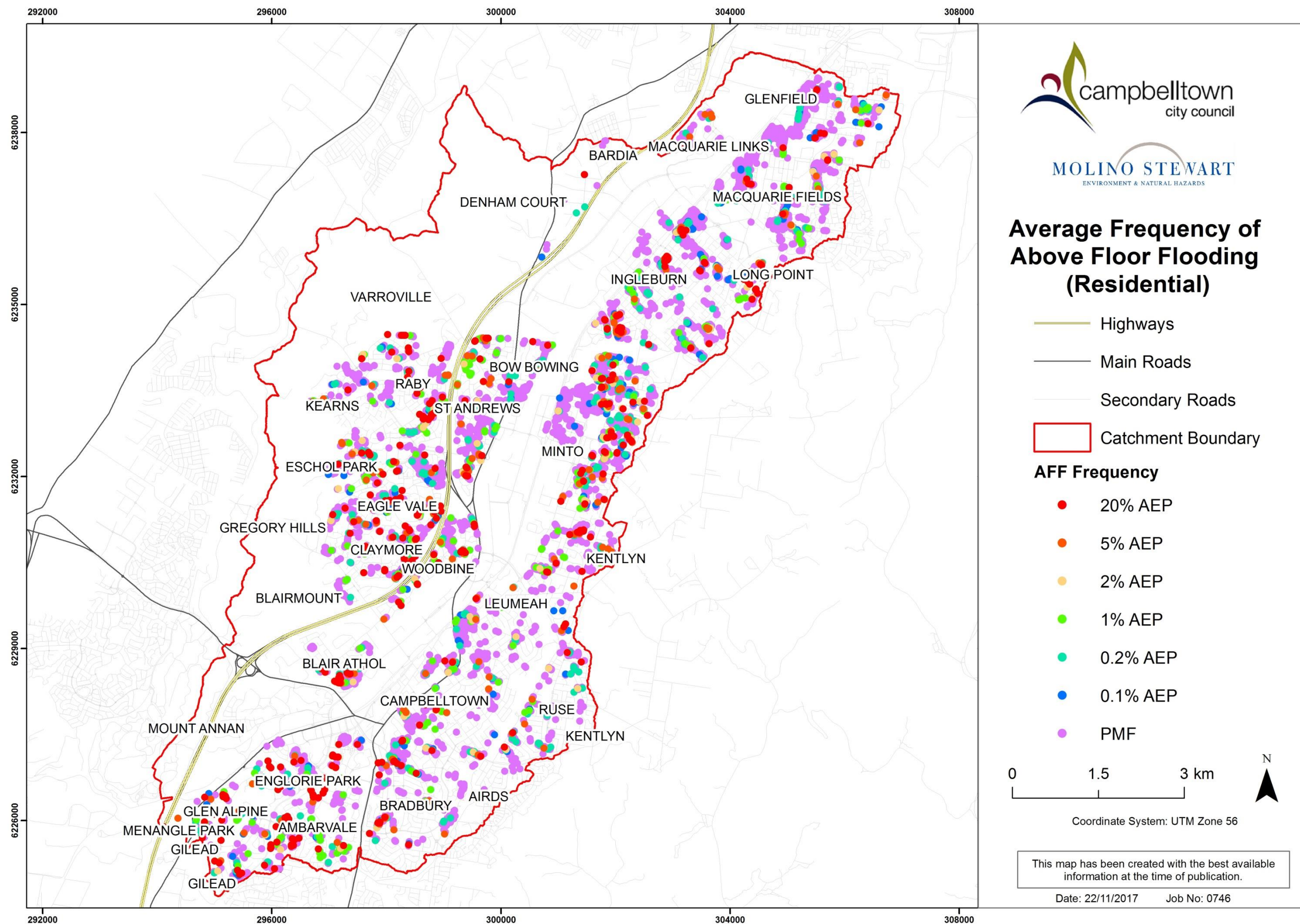
Map 25 Depth of Above Floor Flooding (AFF) for Residential Buildings in the PMF





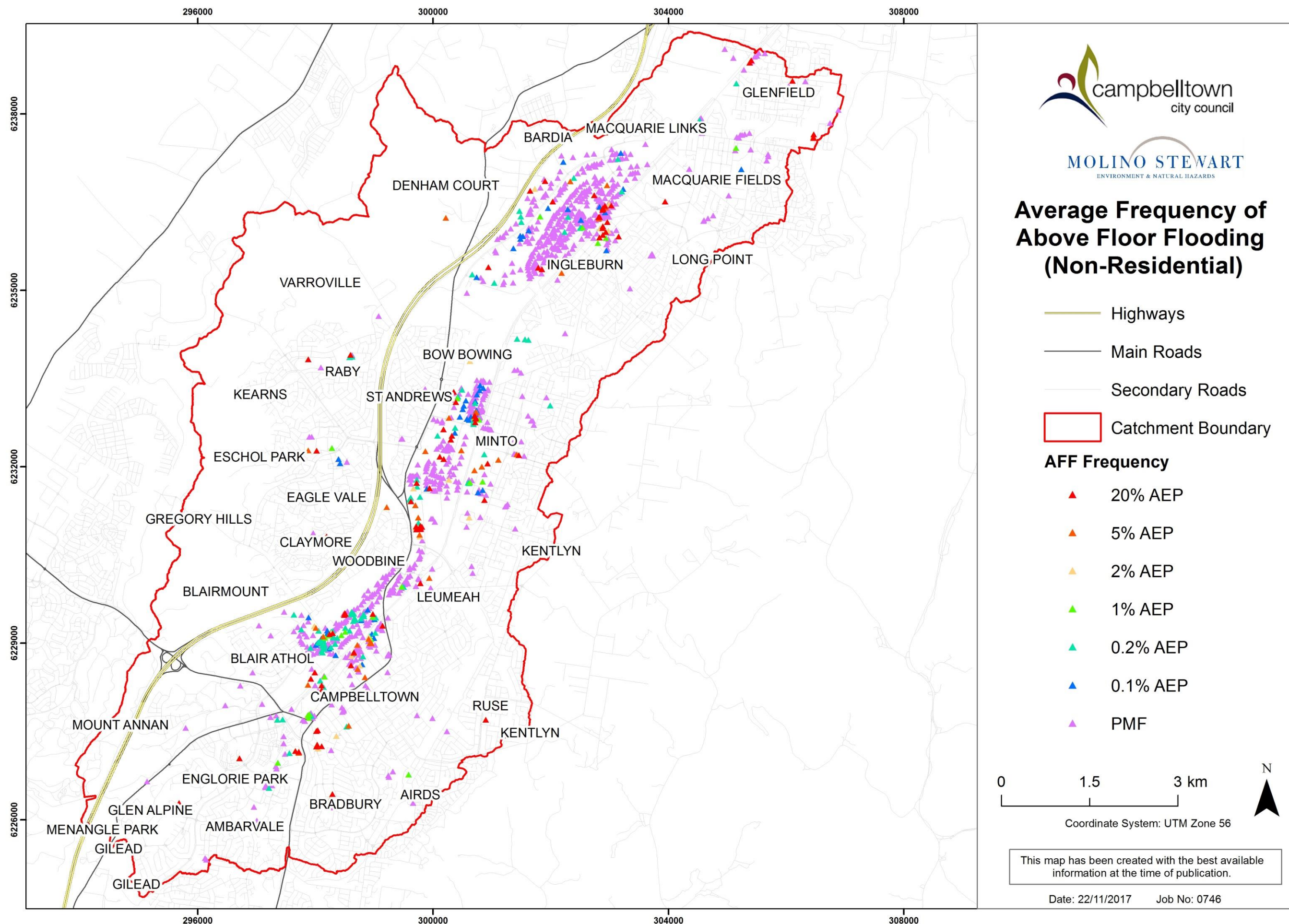
Map 26 Depth of Above Floor Flooding (AFF) for Non-Residential Buildings in the PMF





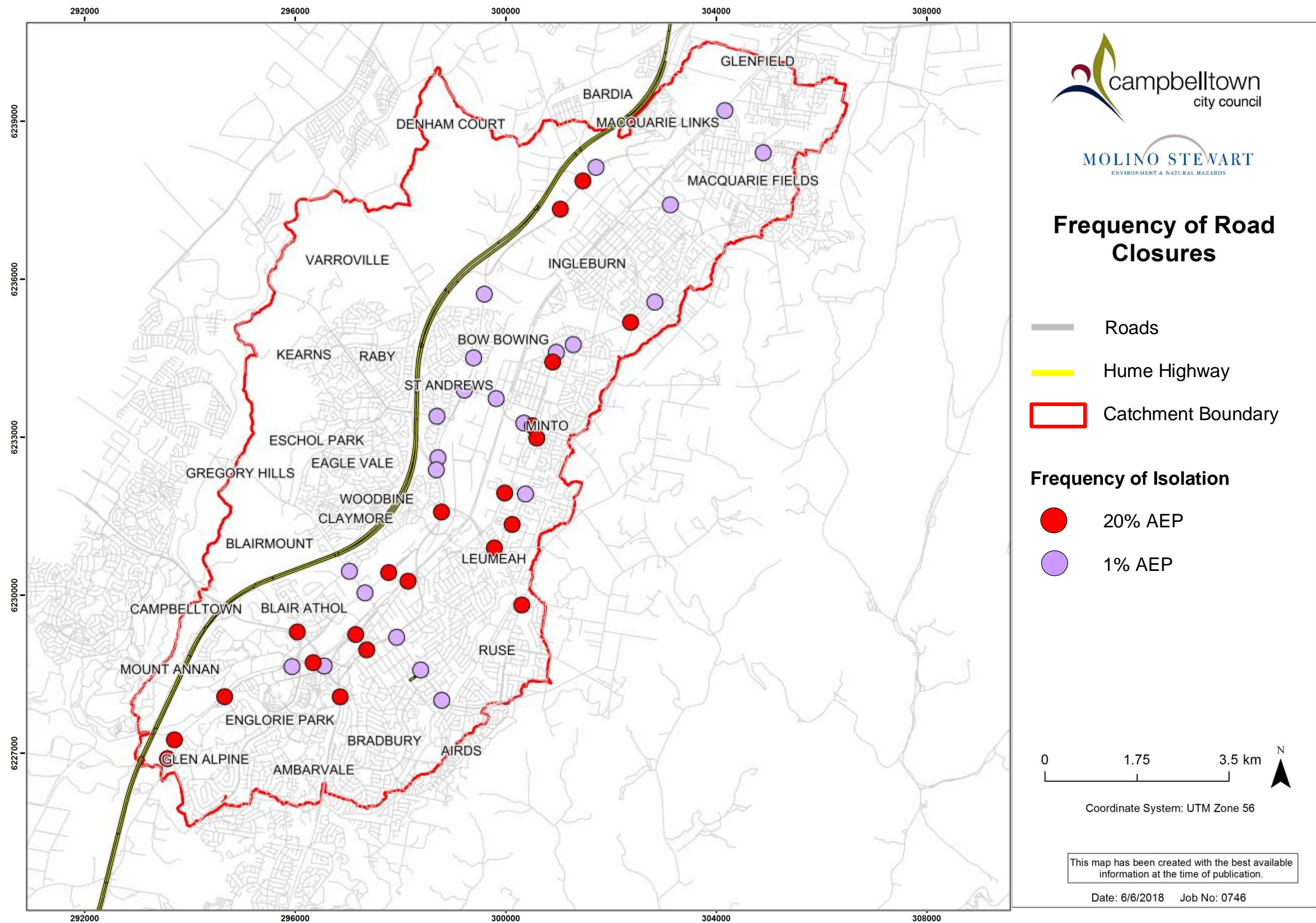
Map 27 Average Frequency of Above Floor Flooding (AFF) for Residential Buildings





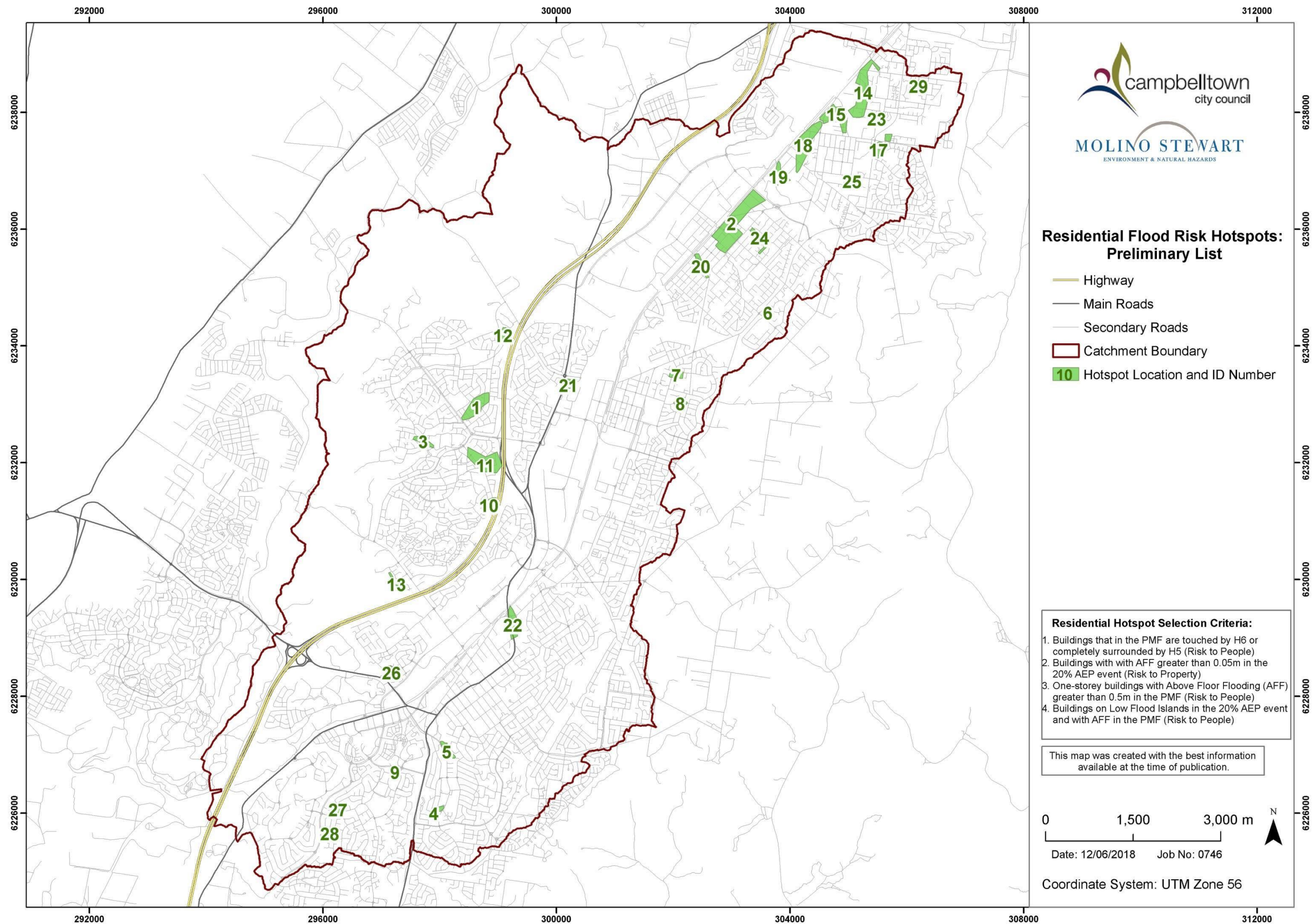
Map 28 Average Frequency of Above Floor Flooding (AFF) for Non-Residential Buildings





Map 29 Frequency of Road Closures due to Flooding





Map 30 Preliminary List of Residential Hotspots (refer to Table 2)



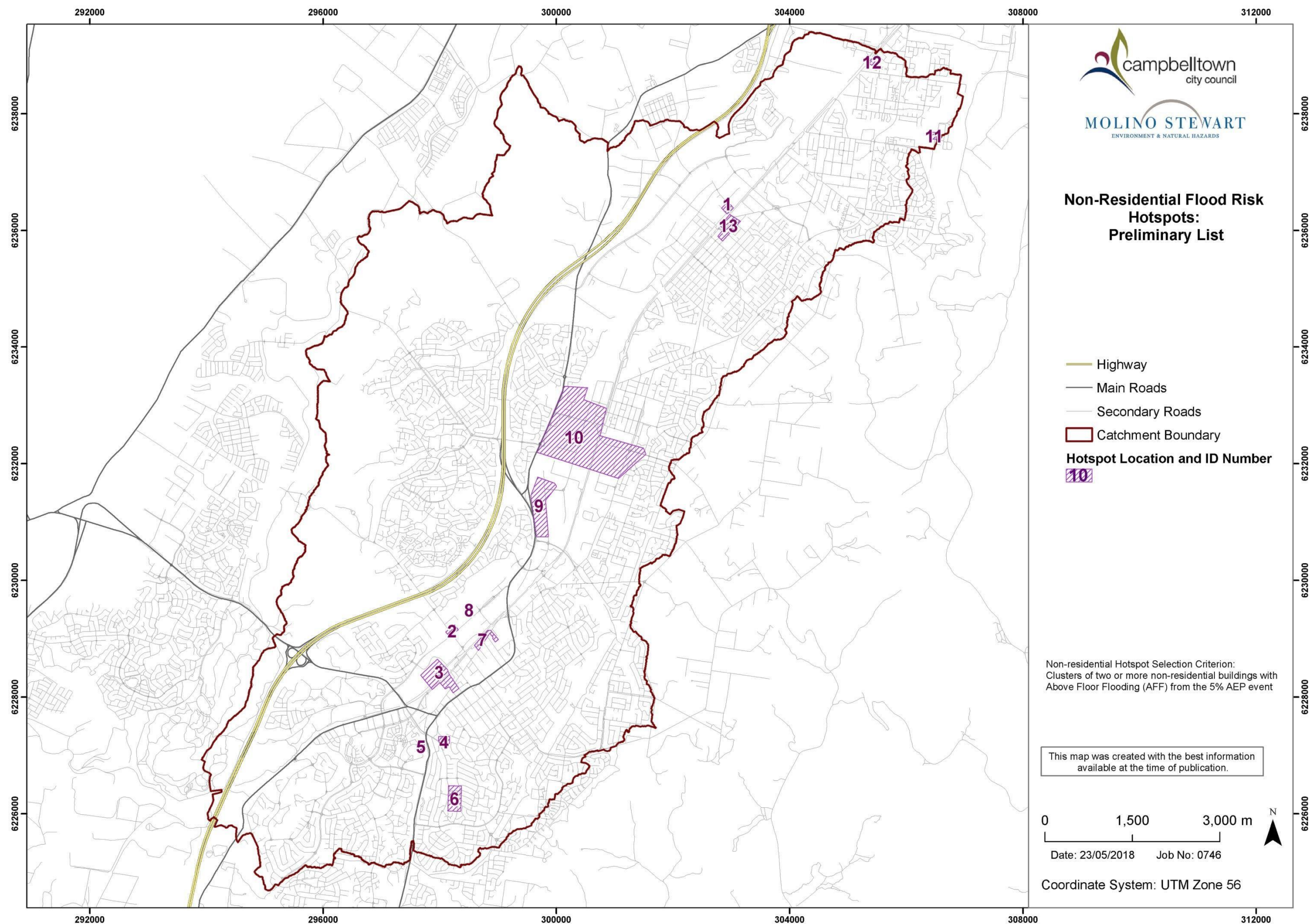
Table 2. Preliminary and final lists of residential flood risk hotspots

<b>ID Number</b>	<b>Hot Spot Location</b>	<b>Rationale for Inclusion in Preliminary List</b>	<b>Further Analysis Required? (inclusion in Final List)</b>
1	Sopwith and Spitfire Dr - Raby	Criteria 2 (risk to property) and 3 (risk to life) are satisfied by multiple buildings	Yes
2	Ingleburn CBD	Risk to property and life criteria are satisfied by multiple buildings.	Yes
3	Epping Forest Dr, Kearns	Criteria 2 (risk to property) satisfied by 3 buildings. Criterion 3 (risk to life) satisfied by all buildings.	Yes
4	Green Oaks Ave, Bradbury	Criteria 2 (risk to property) and risk to life criteria are satisfied by multiple buildings.	Yes
5	Bloodwood Pl, Bradbury	Criteria 2 (risk to property) and risk to life criteria are satisfied by multiple buildings.	Yes
6	Packard Cl, Ingleburn	Risk to life criteria 3 and 4 satisfied by multiple buildings	No. Under criterion 4, low flood islands are confined by floodwaters with hazard level not greater than H1 in the 5% AEP and 20% AEP events.
7	Ohlfsen Rd, Minto	Criterion 3 (risk to life) is satisfied by multiple buildings.	No. Only one criterion is satisfied.
8	Gilbert Street, Minto	Risk to life criteria 3 and 4 satisfied by multiple buildings	No. Under criterion 4, low flood islands are confined by floodwaters with hazard level not greater than H1 in the 5% AEP and 20% AEP events.
9	Tigg Pl, Ambarvale	Criteria 1 and 3 (risk to life) satisfied by multiple buildings	Yes
10	Gould Rd, Claymore	Criteria 1 and 3 (risk to life) satisfied by multiple buildings	Yes
11	Gould Rd, Eaglevale	Criterion 3 (risk to life) is satisfied by most buildings.	No. Only one criterion is satisfied.
12	Matra Pl, Raby	Criteria 1 and 3 (risk to life) satisfied by multiple buildings	Yes
13	Appaloosa Cct, Blairmont	Criteria 1 and 3 (risk to life) satisfied by multiple buildings	Yes
14	Macquarie Fields/Glenfield #1	Buildings satisfy criteria 1, 3 and 4 (risk to life). Under criterion 4, low flood islands are confined by floodwaters with hazard level not greater than H1. Hot Spot driven by PMF.	Yes
15	Macquarie Fields/Glenfield #2	Buildings satisfy criteria 1, 3 and 4 (risk to life). Under criterion 4, low flood islands are confined by floodwaters with hazard level not greater than H1. Hot Spot driven by PMF.	Yes
16	Victoria Rd, Macquarie Fields	Criterion 3 (risk to life) satisfied by most buildings. Some buildings also satisfy criteria 1, 2 and 4. Under criterion 4, low flood islands are confined by floodwaters with hazard level not greater than H1.	Yes
17	Coronata Wy, Macquarie Fields	Criteria 1 and 3 (risk to life) satisfied by multiple buildings	Yes
18	Macquarie Fields/Glenfield #3	Criteria 1 and 3 (risk to life) satisfied by multiple buildings	Yes
19	Waratah Cres/Mayee Rd, Macquarie Fields	Criteria 1 and 3 (risk to life) satisfied by multiple buildings	Yes
20	Chester Rd, Ingleburn	Buildings satisfy criteria 1, 3 and 4 (risk to life). Under criterion 4, low flood islands are confined by floodwaters with hazard level not greater than H1.	Yes
21	Wyperfeld Pl, Bow Bowing	Buildings satisfy criteria 3 and 4 (risk to life).	No. Under criterion 4, low flood islands are confined by floodwaters with hazard level not greater than H1.
22	Rudd Rd, Leumeah	Buildings satisfy criteria 3 and 4 (risk to life).	No. Under criterion 4, low flood islands are confined by floodwaters with hazard level not greater than H1.



<i>ID Number</i>	<i>Hot Spot Location</i>	<i>Rationale for Inclusion in Preliminary List</i>	<i>Further Analysis Required? (inclusion in Final List)</i>
23	Harrow Rd, Glenfield	Criterion 2 (risk to property) is satisfied.	Yes
24	Oxford Rd, Ingleburn	Criterion 2 (risk to property) is satisfied.	Yes
25	Brooks St, Macquarie Fields	Criterion 2 (risk to property ) and 3 (risk to life) are satisfied	Yes
26	Mossberry St, Blair Athol	Criterion 2 (risk to property) satisfied by 4 buildings	No. AFF caused by local “puddles”.
27	Clennam Ave/Brownlow Pl	Criterion 2 (risk to property) satisfied by 4 buildings	No. AFF caused by local “puddles”.
28	Lightwood St, Ambarvale	One building only satisfies criterion 3 (risk to life)	No. One building only is affected
29	Balimo Pl, Glenfield	One building only satisfies criterion 1 (risk to life)	No. One building only is affected





Map 31 Preliminary List of Commercial and Industrial Flood Risk Hotspots (Refer to Table 3)



Table 3. Preliminary and final lists of commercial and industrial flood risk hotspots

ID Number	Hotspot Location	Rationale for Inclusion in Preliminary List	Further Analysis Required? (inclusion in Final List)
1	Louise Av – Ingleburn	There are 5 industrial buildings between Louise Av and Aero Rd with AFF from the %5 or 20% AEP	Yes
2	Blaxland and Badgally Rd – Campbelltown	Two commercial buildings in Blaxland Rd show AFF from the 20% AEP. There is also a building in Badgally Rd with AFF from the 5% AEP.	Yes
3	Farrow Rd and Dumaresq St, Campbelltown	There are two large commercial buildings on Farrow Rd with AFF from the 5% AEP.	Yes
4	Olympic Court - Bradbury	The sports centre here is affected by Fishers Ghost Ck, with three buildings showing AFF from the 20% AEP. Two of these seem to be used for storage only or hosting filtration tanks. The third one hosts an indoor pool.	No. The flood is only impacting buildings owned by Council.
5	Campbelltown Hospital	Two of the hospital buildings show AFF from the 5% AEP, and another two from the 20% AEP.	No. The Flood Model contains a small amount of the hospital's storm water drainage network, which is unlikely to represent full system performance. Flooding at this location is likely to be managed by the hospital storm water system.
6	Jacaranda Av and Tallowood Cres - Bradbury	The commercial area west of Jacaranda Av shows 3 buildings with AFF from the 20% AEP.	No. Two of the affected buildings in Jacaranda Av experience shallow flows, which would be managed by the pipes in the car park. The third building is Broadway Shopping Centre, whose central building's floor levels are set significantly higher than the ground level, and there is drainage throughout the car park.
7	Queen Street – Campbelltown	There are two commercial buildings showing minor AFF from the 20% AEP between Queen St and Langdon Av, one more building at the end of Langdon Av and two more larger buildings further north along Queen St, past Chamberlain St.	No. The affected buildings were inspected and most of these have floor level above ground floor and would not experience AFF in the 20% or 5% AEP events.
8	Rose St – Campbelltown	There is a cluster of 4 buildings classified as Industrial in the model.	No. Upon inspection it was observed that the affected buildings are part of the Animal Care Centre and they are probably Kennels. Given the nature of these buildings no further action is required.
9	Airds Rd and Swaffham Rd – Minto	This area shows a cluster of non-residential buildings along Airds Rd, between Rose Payten Dr and Swaffham Rd, with AFF from the 20% AEP or from the 5% AEP.	No. Although part of the flooding is caused by Claymore Main Drain and McBarron Creek joining Bow Bowing Creek and overcharging to some extent, the buildings of interest appear to be mainly affected by local flooding which originates on site and is likely to be managed by private stormwater systems.
10	Minto Industrial Area - Minto	This area presents three main clusters of non-residential buildings with apparent AFF from the 5% AEP or 20% AEP. One cluster is located along Airds Rd, east of Bow Bowing Creek and south of Minto Main Drain no.2. A second cluster of smaller buildings is located further north in proximity of Lincoln St. The third cluster of buildings is south of Thompson Creek, along Saggart Field Rd.	No. Each cluster of buildings was inspected and flooding in frequent event is either likely to be managed by the private stormwater system, or the buildings actual floor level is high enough to avoid AFF in the 20% and 5% AEP events.
11	Glenfield Water Recycling Plant - Glenfield	The model shows AFF of three buildings within the Plant in the 5%AEP.	No. Upon closer inspection the flooding shown by the model was deemed artefactual.
12	Hosking Crescent and Railway Parade - Glenfield	Two commercial buildings at the crossroad between Hosking Cres and Railway Parade in Glenfield show AFF from the 5% AEP.	No. Upon inspection the floor level of these buildings was found to be elevated above the ground floor by a sufficient extent to avoid AFF in frequent events.
13	Ingleburn CBD		Yes





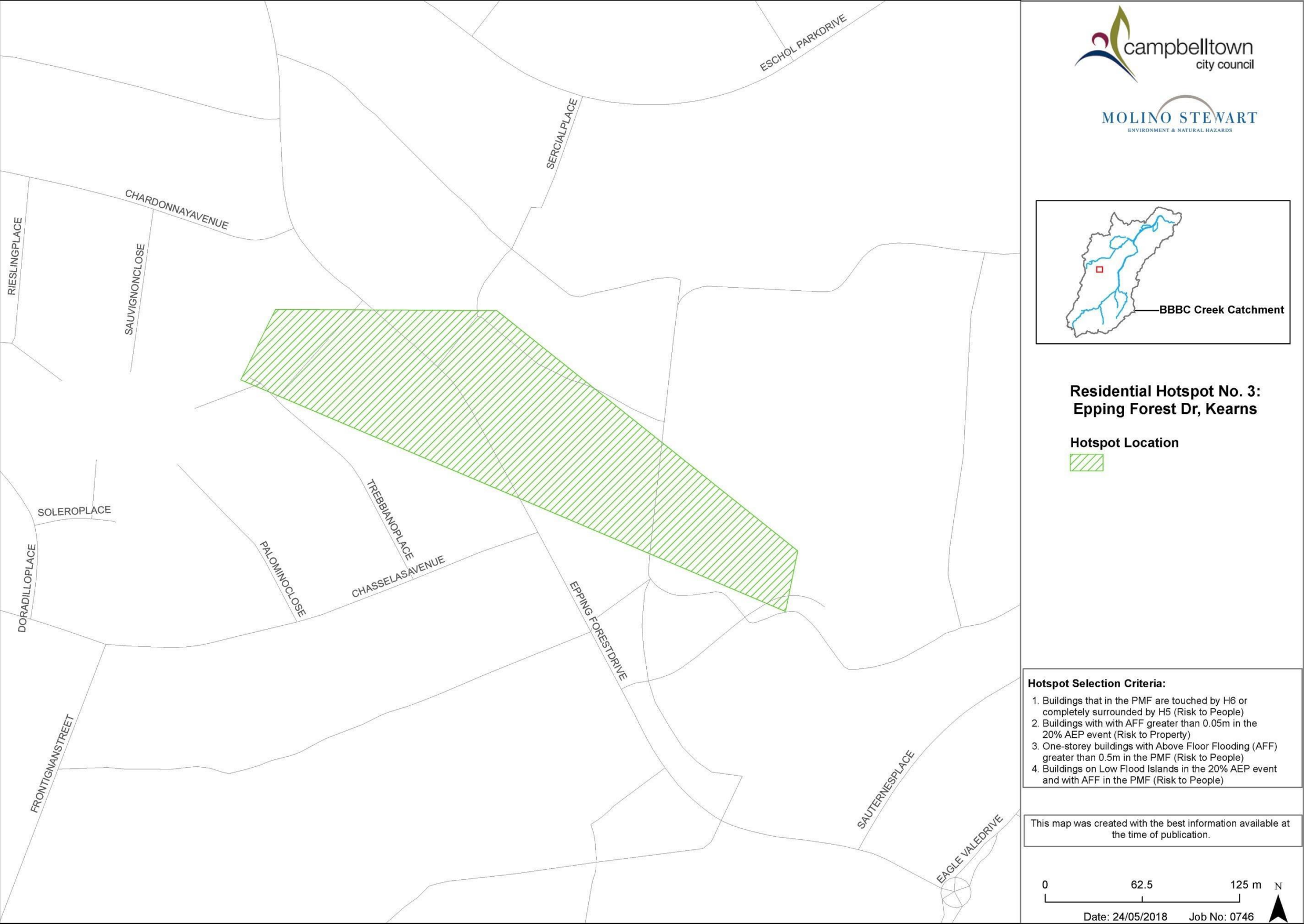
Map 32 Residential Hotspot 1: Sopwith Ave and Spitfire Drive- Raby





Map 33 Residential Hotspot 2: Ingleburn CBD





Map 34 Residential Hotspot 3: Epping Forest Drive, Kearns





Map 35 Residential Hotspot 4: Green Oaks Avenue, Bradbury





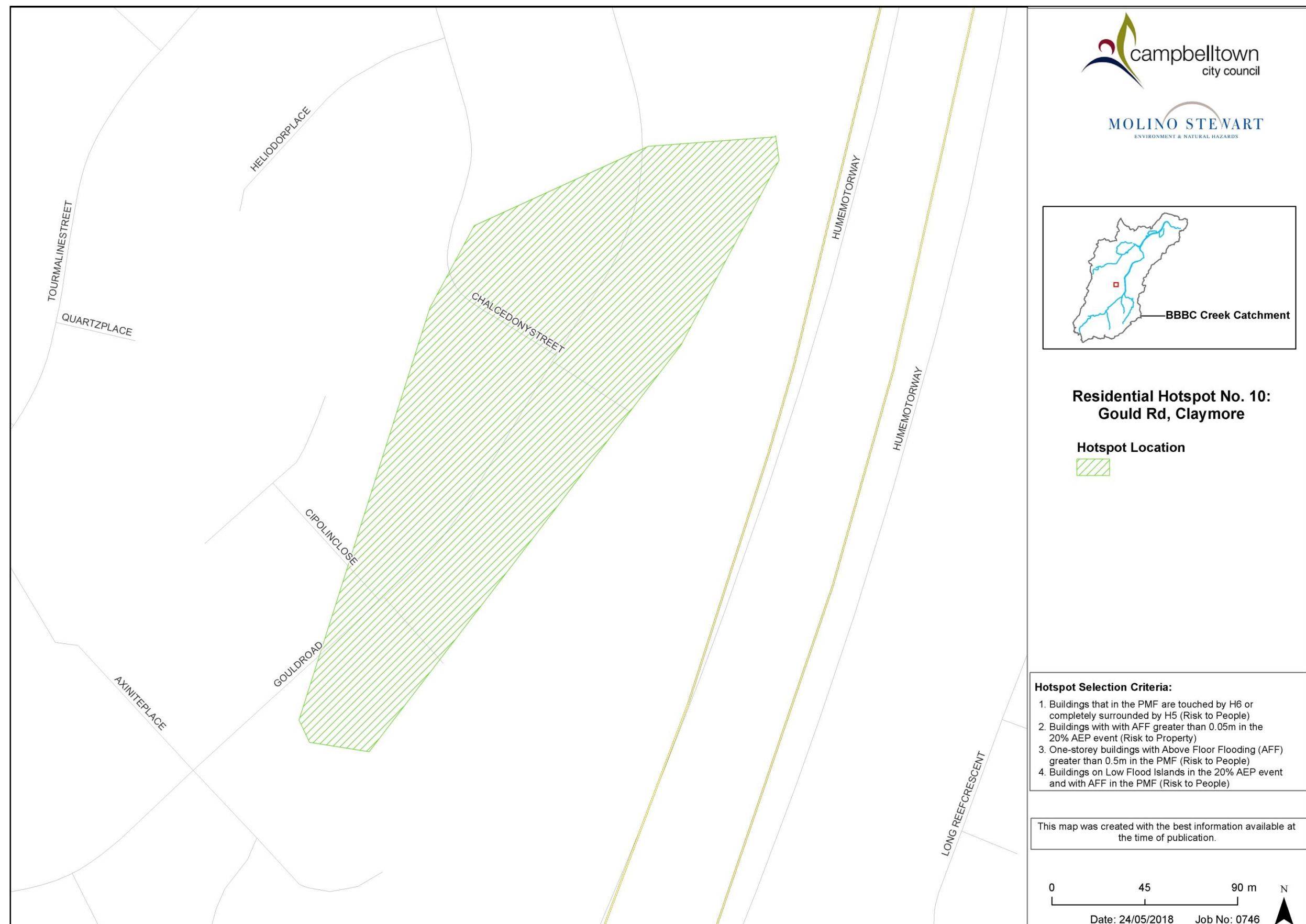
Map 36 Residential Hotspot 5: Bloodwood Place, Bradbury





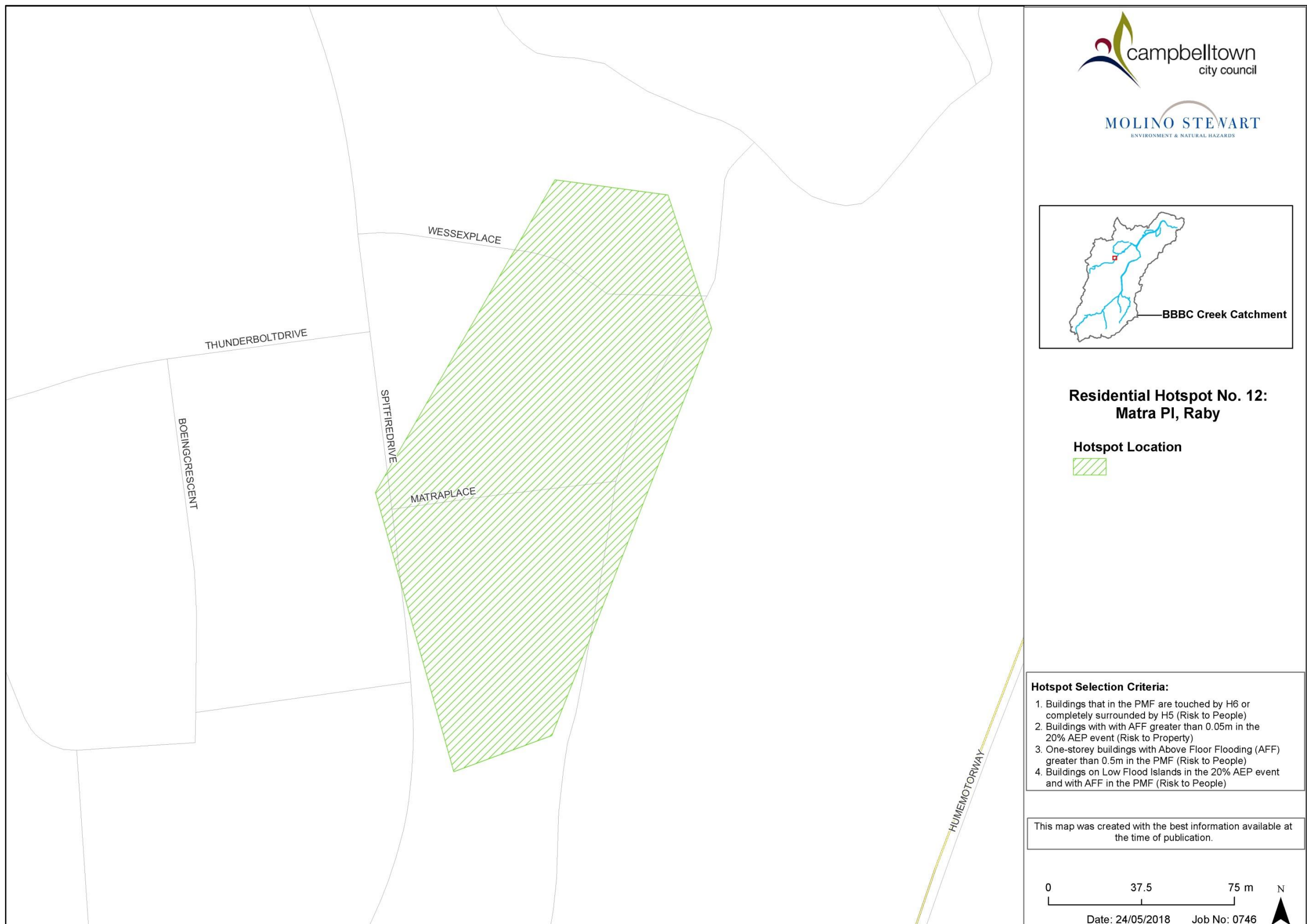
Map 37 Residential Hotspot 9: Tigg Place, Ambarvale





Map 38 Residential Hotspot 10: Gould Road, Claymore





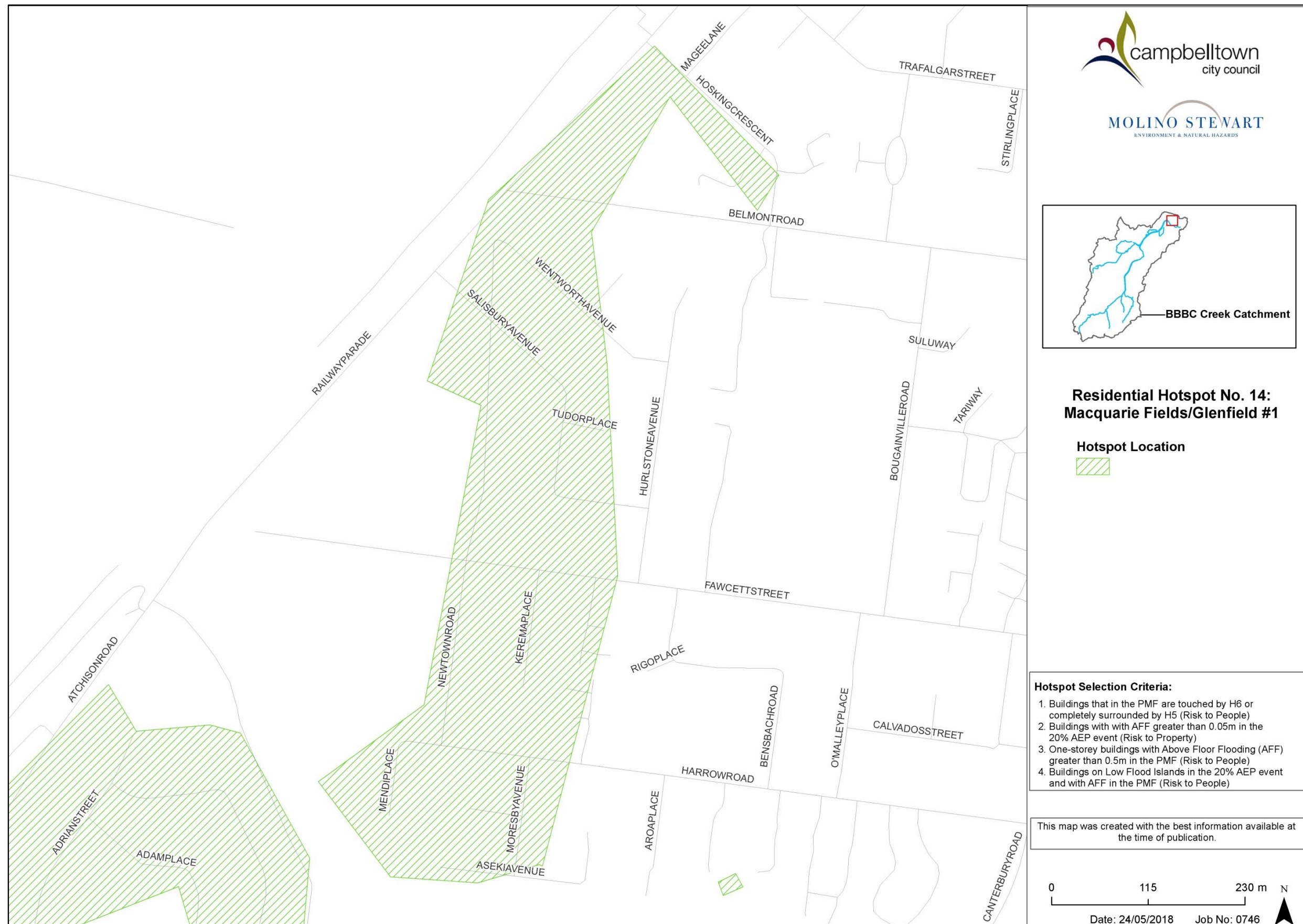
Map 39 Residential Hotspot 12: Matra Place, Raby





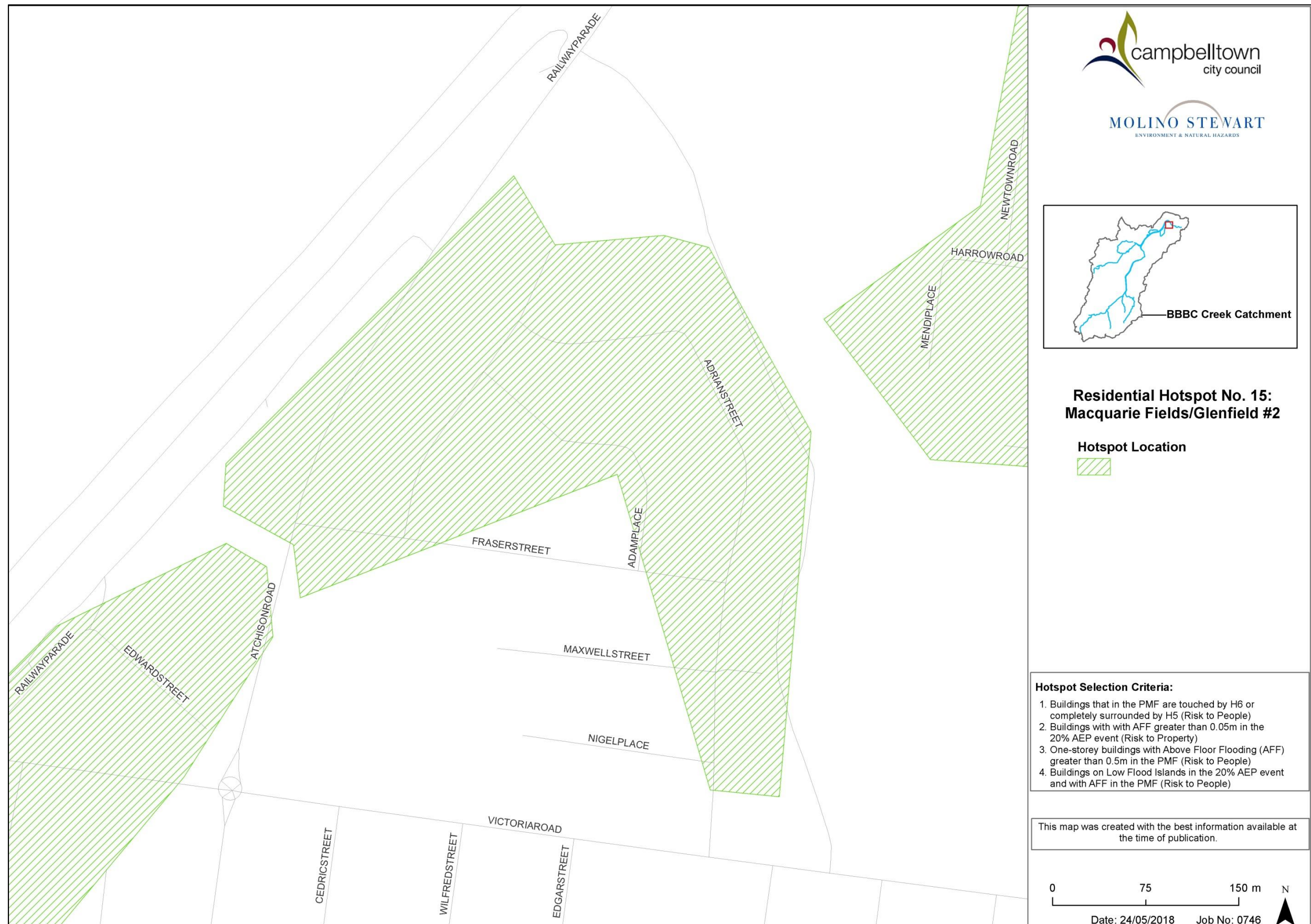
Map 40 Residential Hotspot 13: Appaloosa Circuit, Blairmont





Map 41 Residential Hotspot 14: Macquarie Fields/Glenfield #1





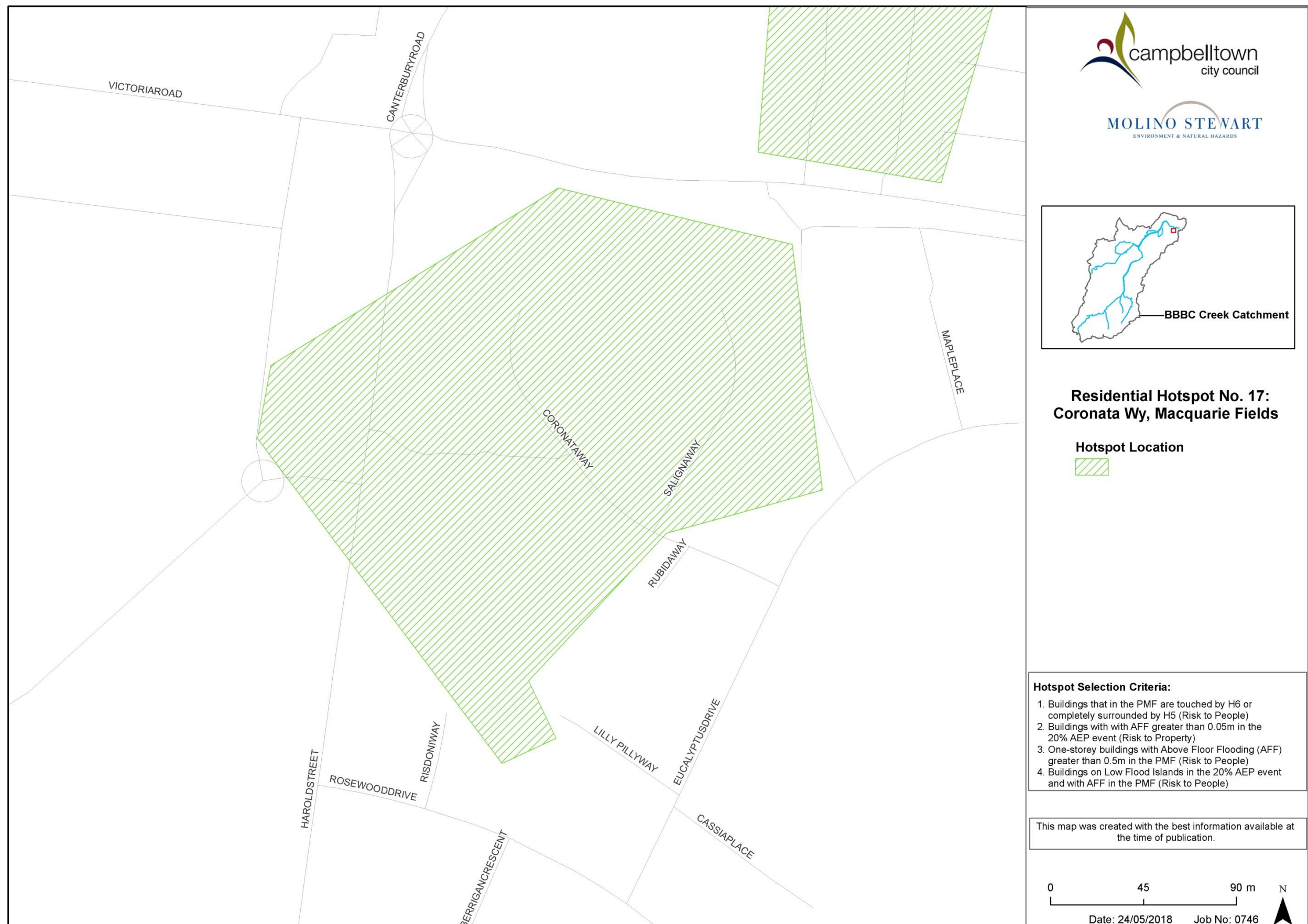
Map 42 Residential Hotspot 15: Macquarie Fields/Glenfield #2





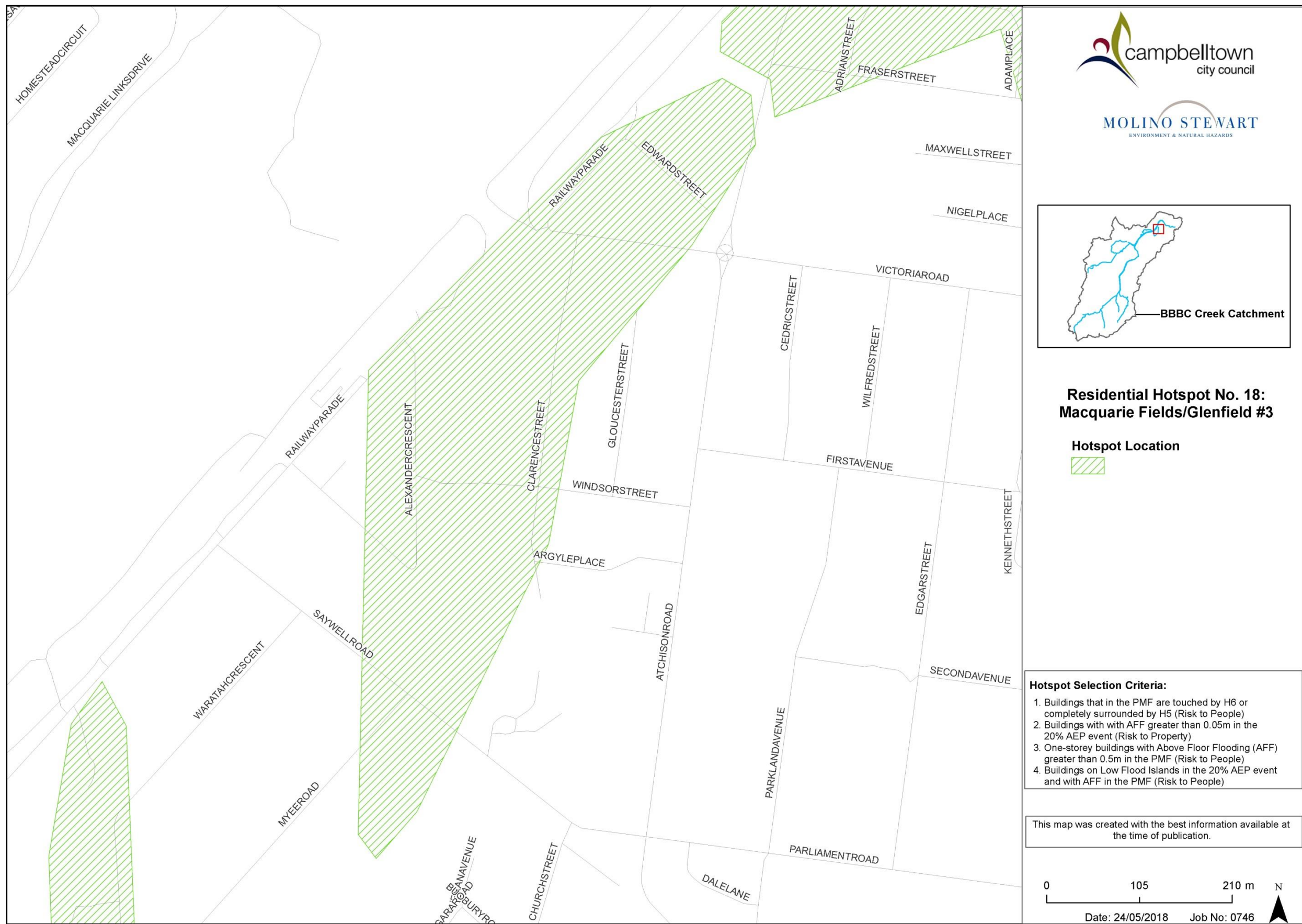
Map 43 Residential Hotspot 16: Victoria Road, Macquarie Fields





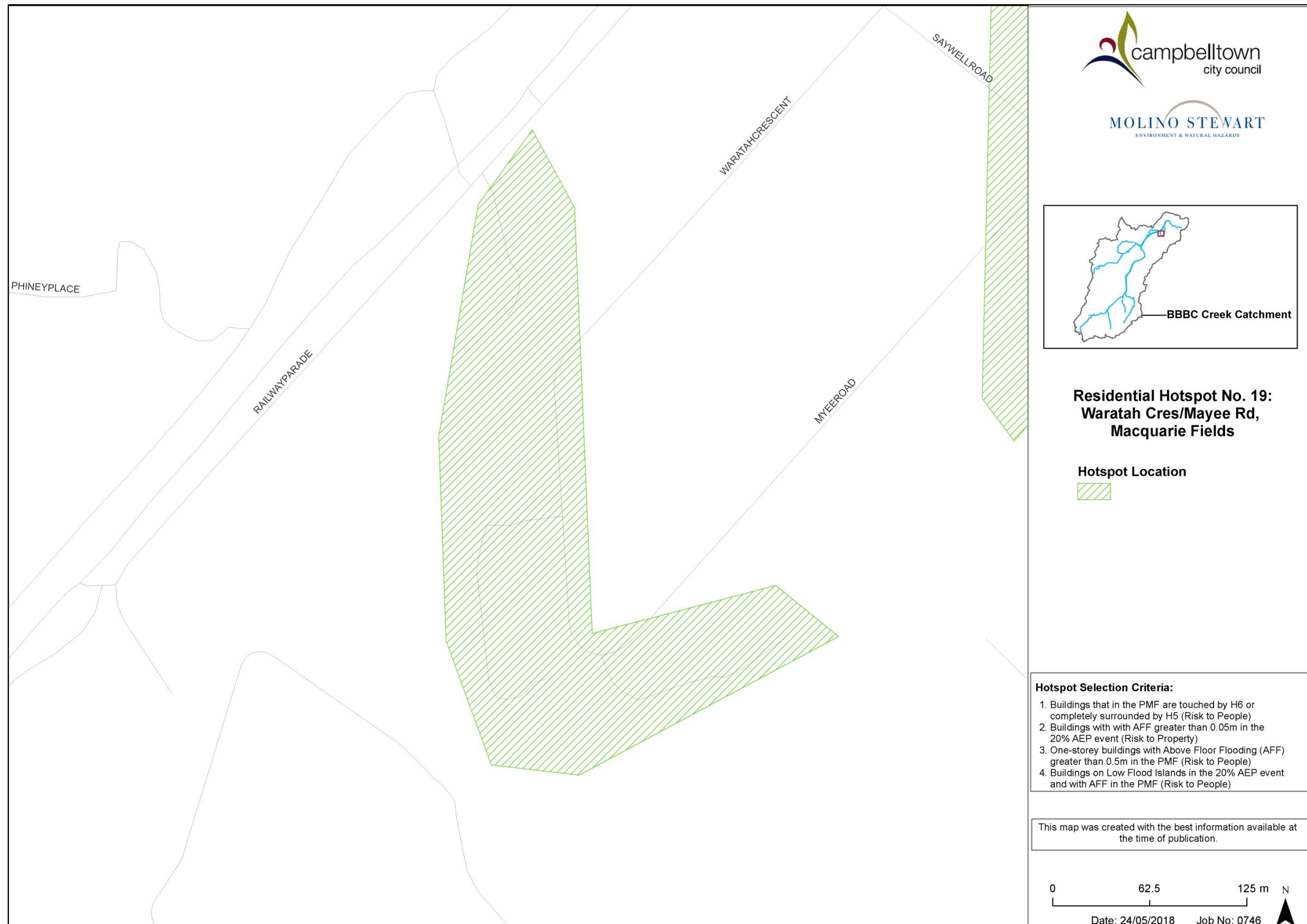
Map 44 Residential Hotspot 17: Coronata Way, Macquarie Fields





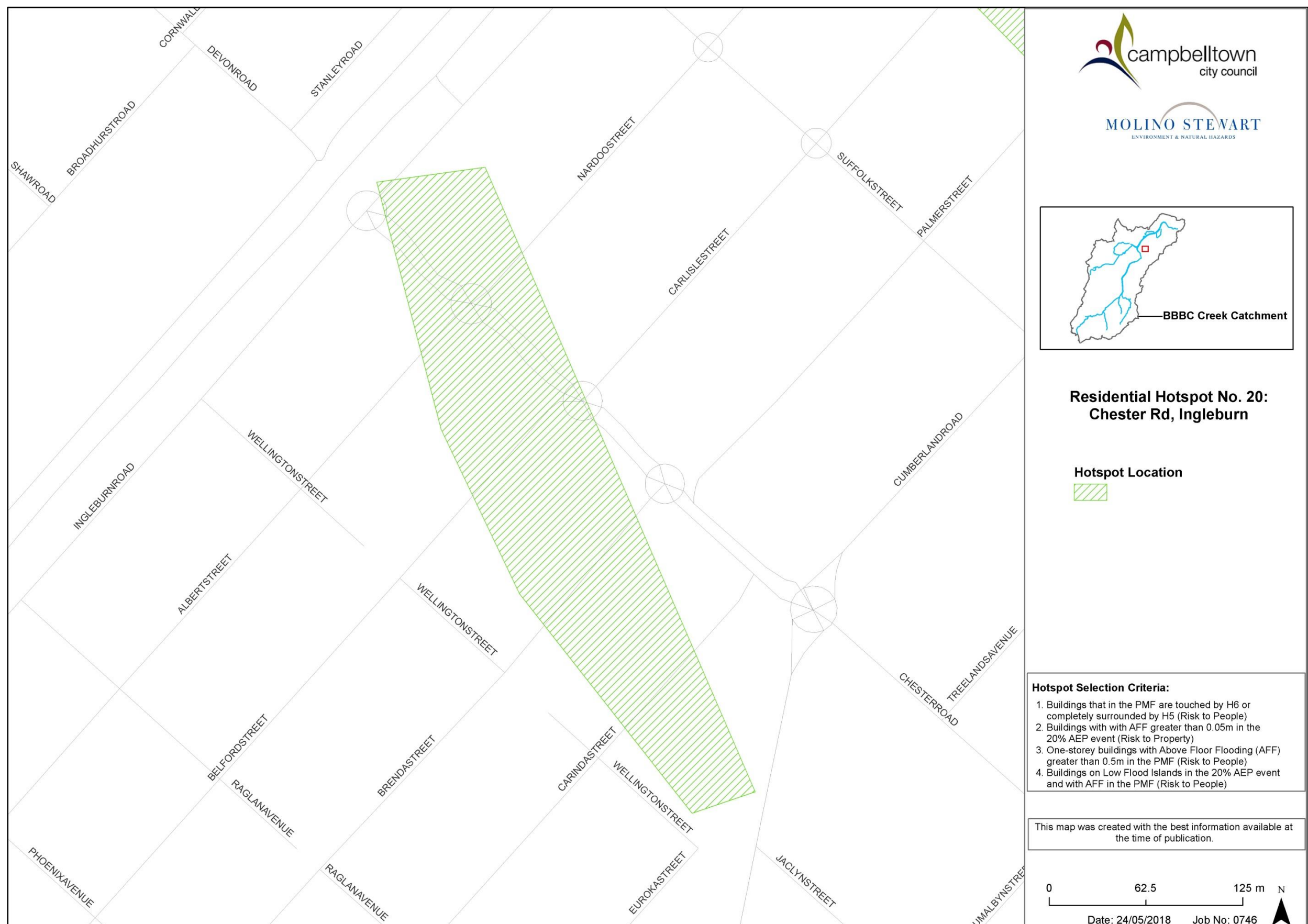
Map 45 Residential Hotspot 18: Macquarie Fields/Glenfield #3





Map 46 Residential Hotspot 19: Waratah Crescent / Mayee Road, Macquarie Fields





Map 47 Residential Hotspot 20: Chester Road, Ingleburn





Map 48 Residential Hotspot 23: Harrow Road, Glenfield





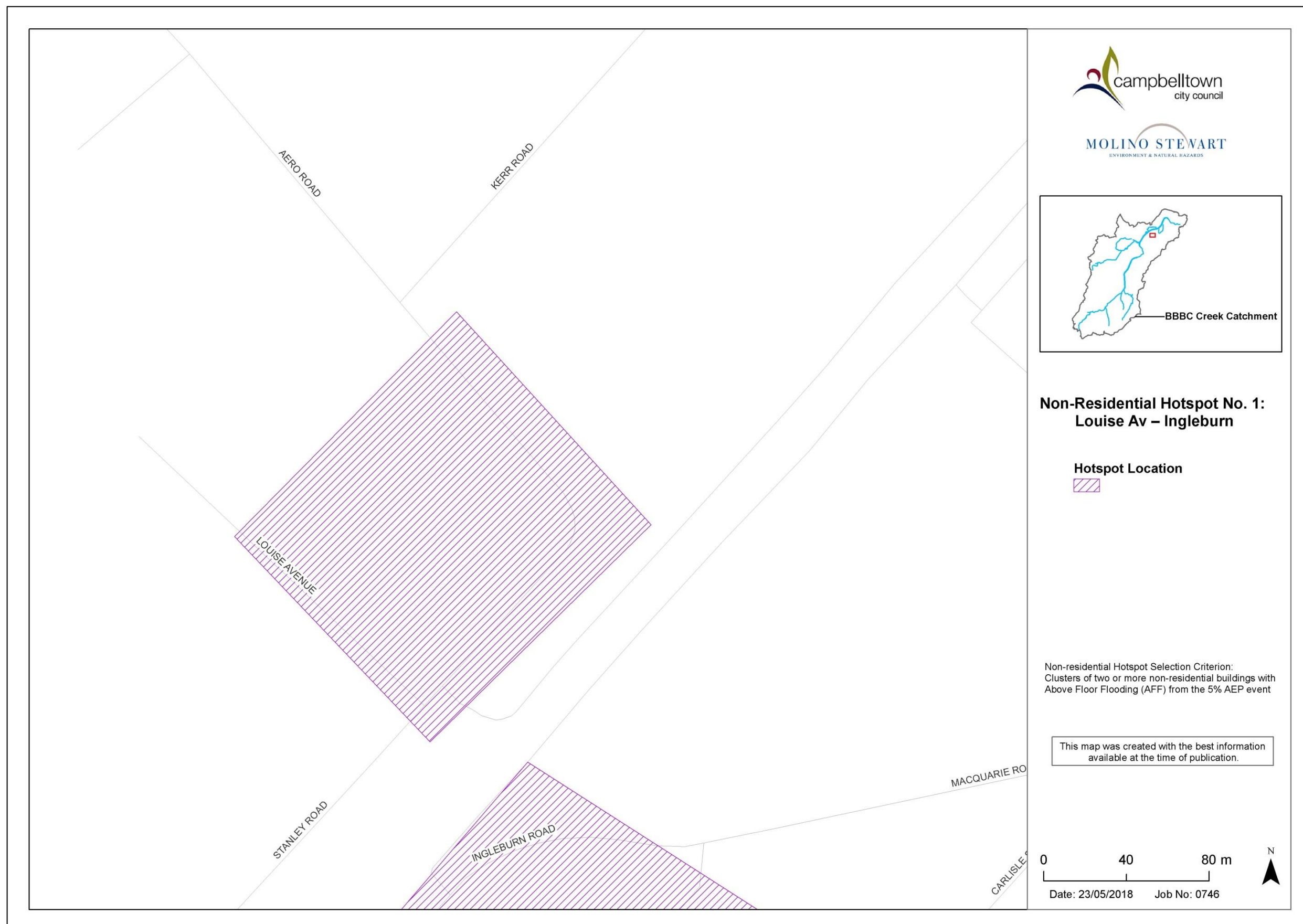
Map 49 Residential Hotspot 24: Oxford Road, Ingleburn





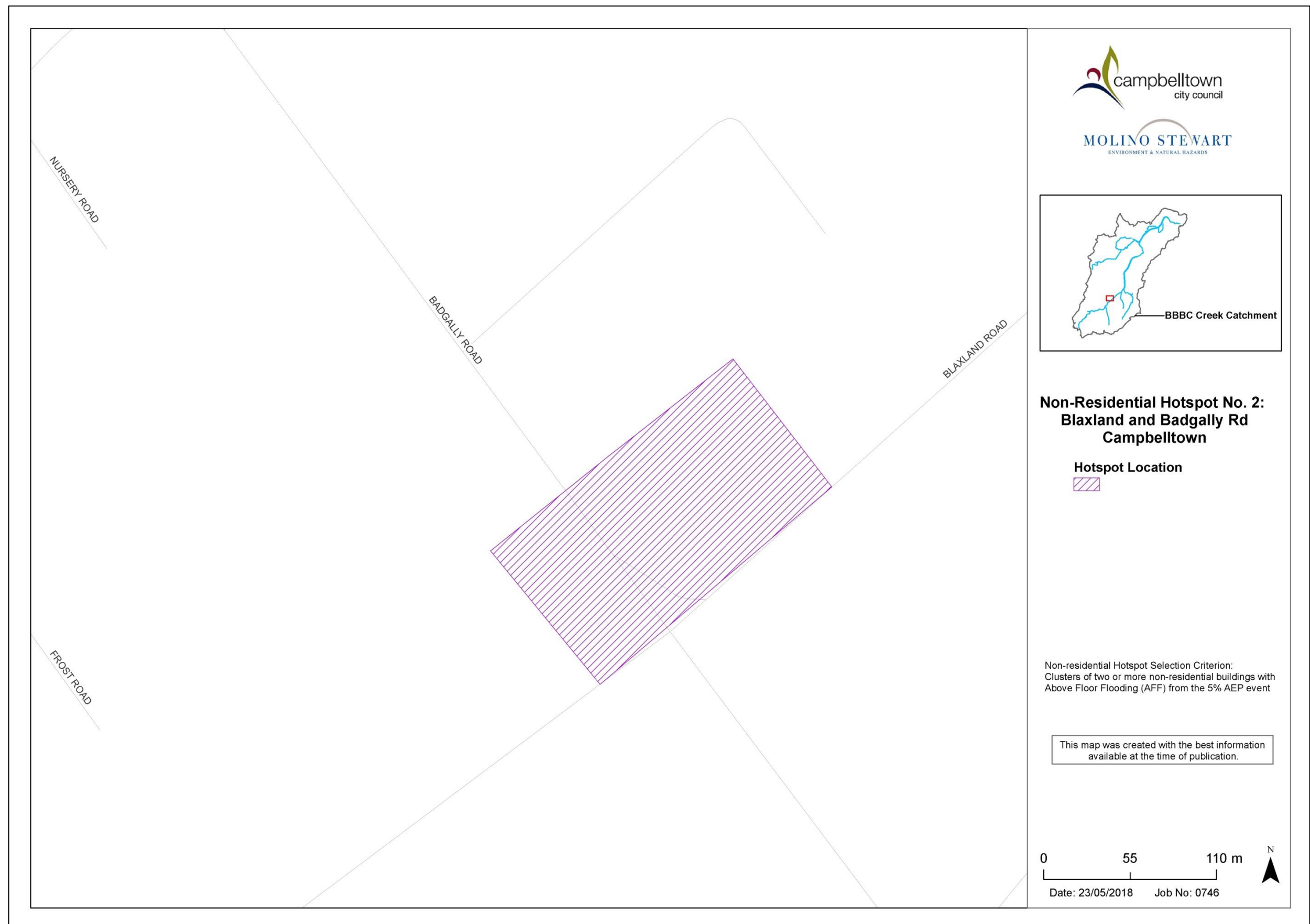
Map 50 Residential Hotspot 25: Brooks Street, Macquarie Fields





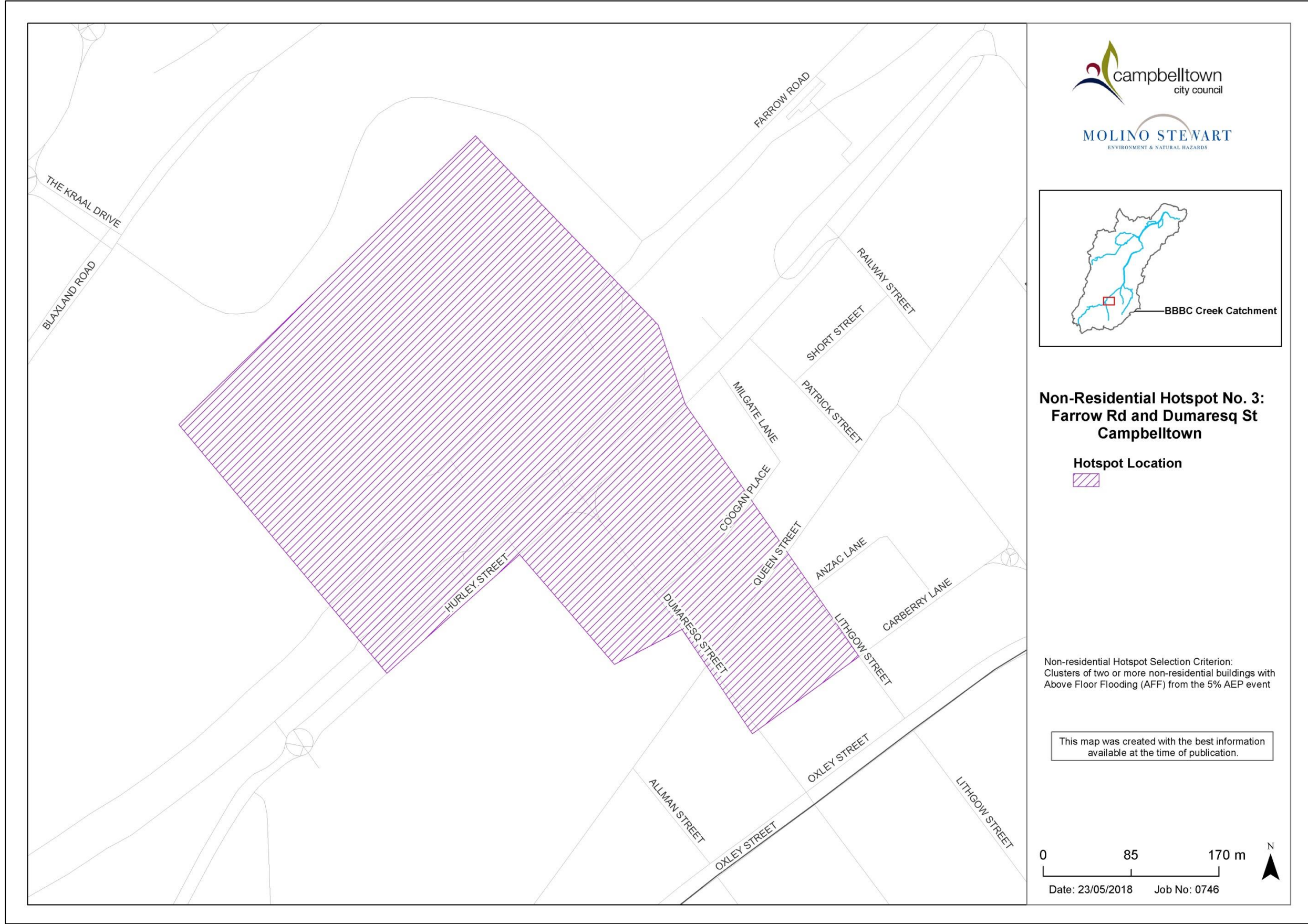
Map 51 Non-Residential Hotspot 1: Louise Avenue - Campbelltown





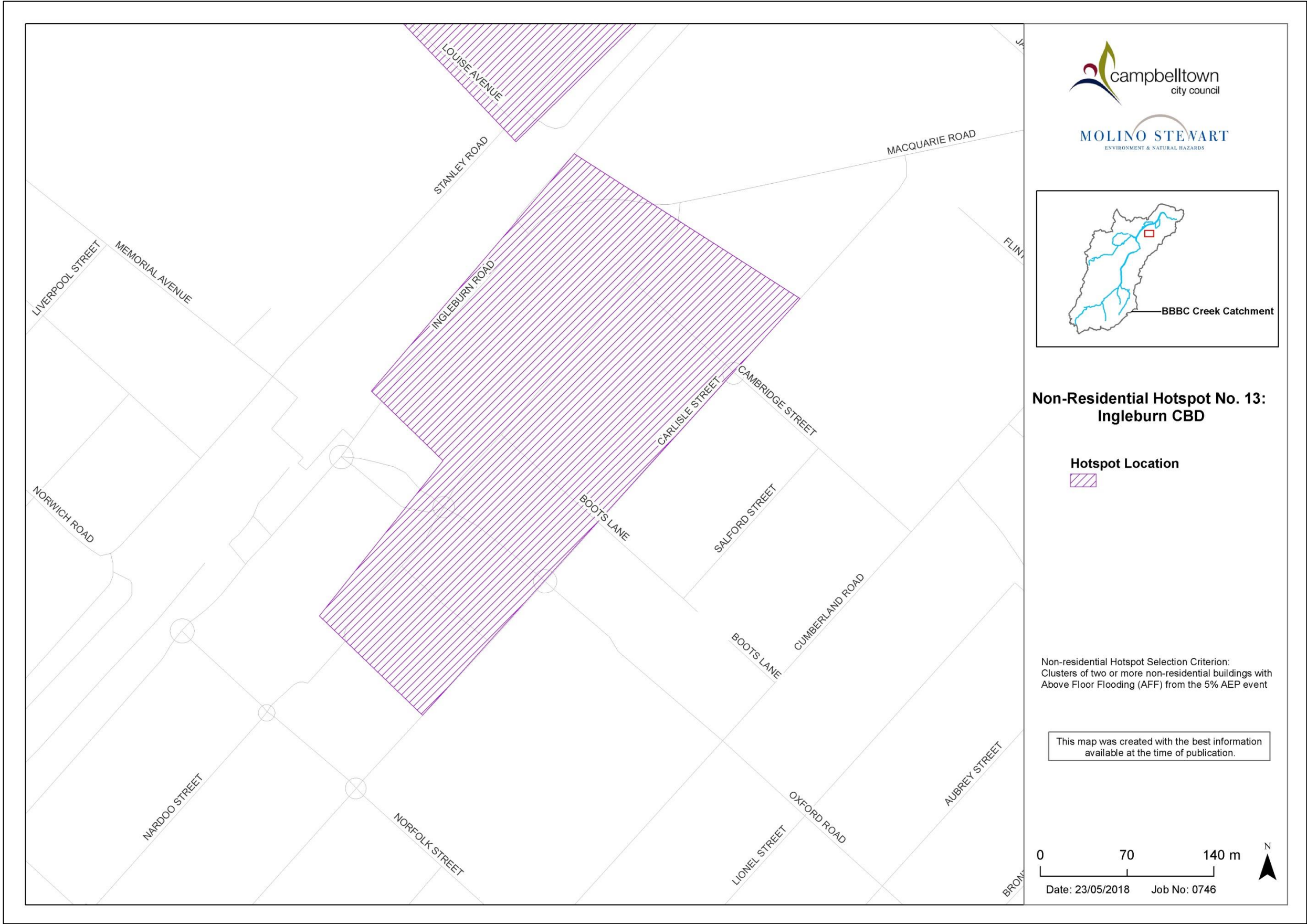
Map 52 Non-Residential Hotspot 2: Blaxland and Badgally Road - Campbelltown





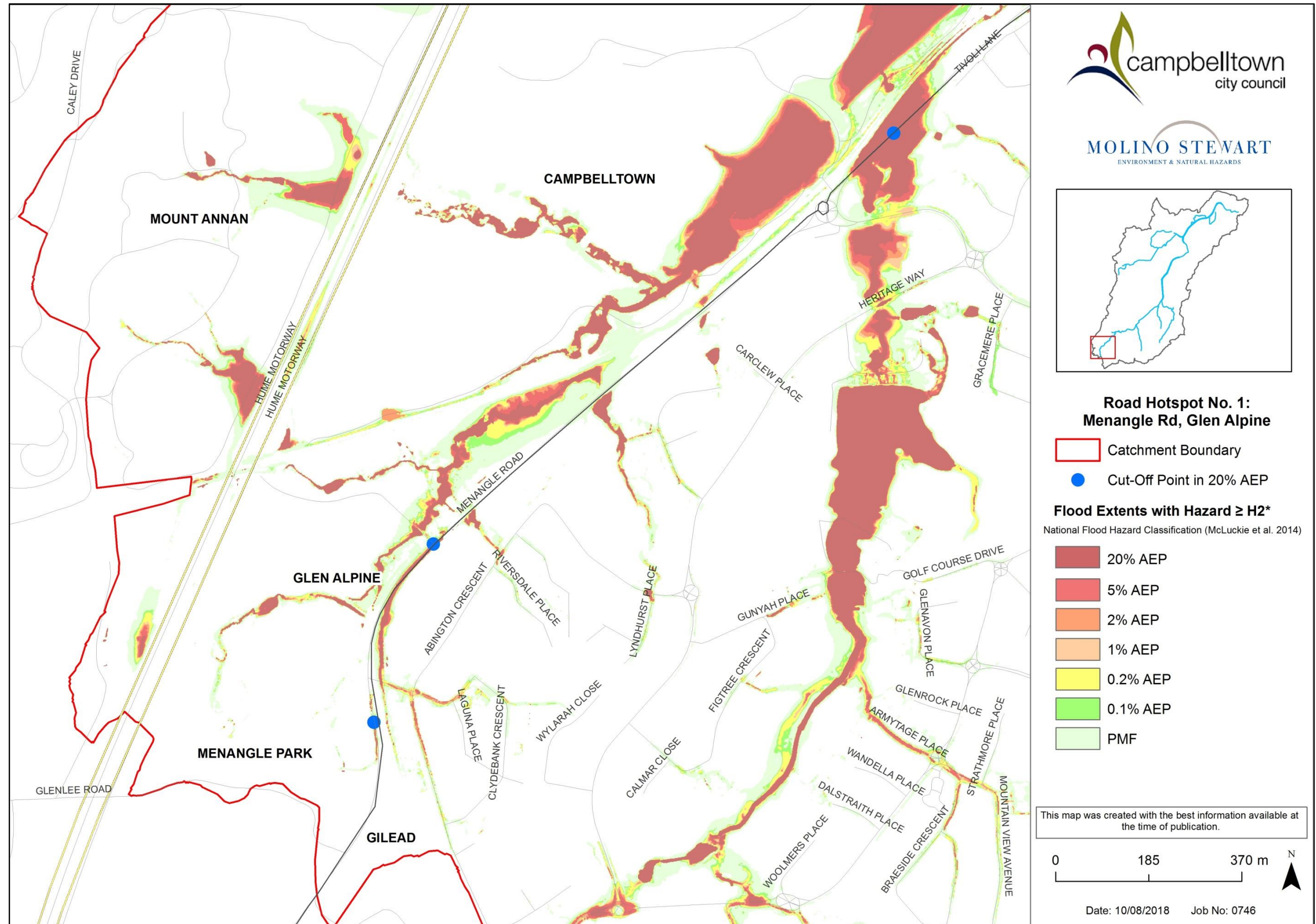
Map 53 Non-Residential Hotspot 3: Farrow Road - Campbelltown





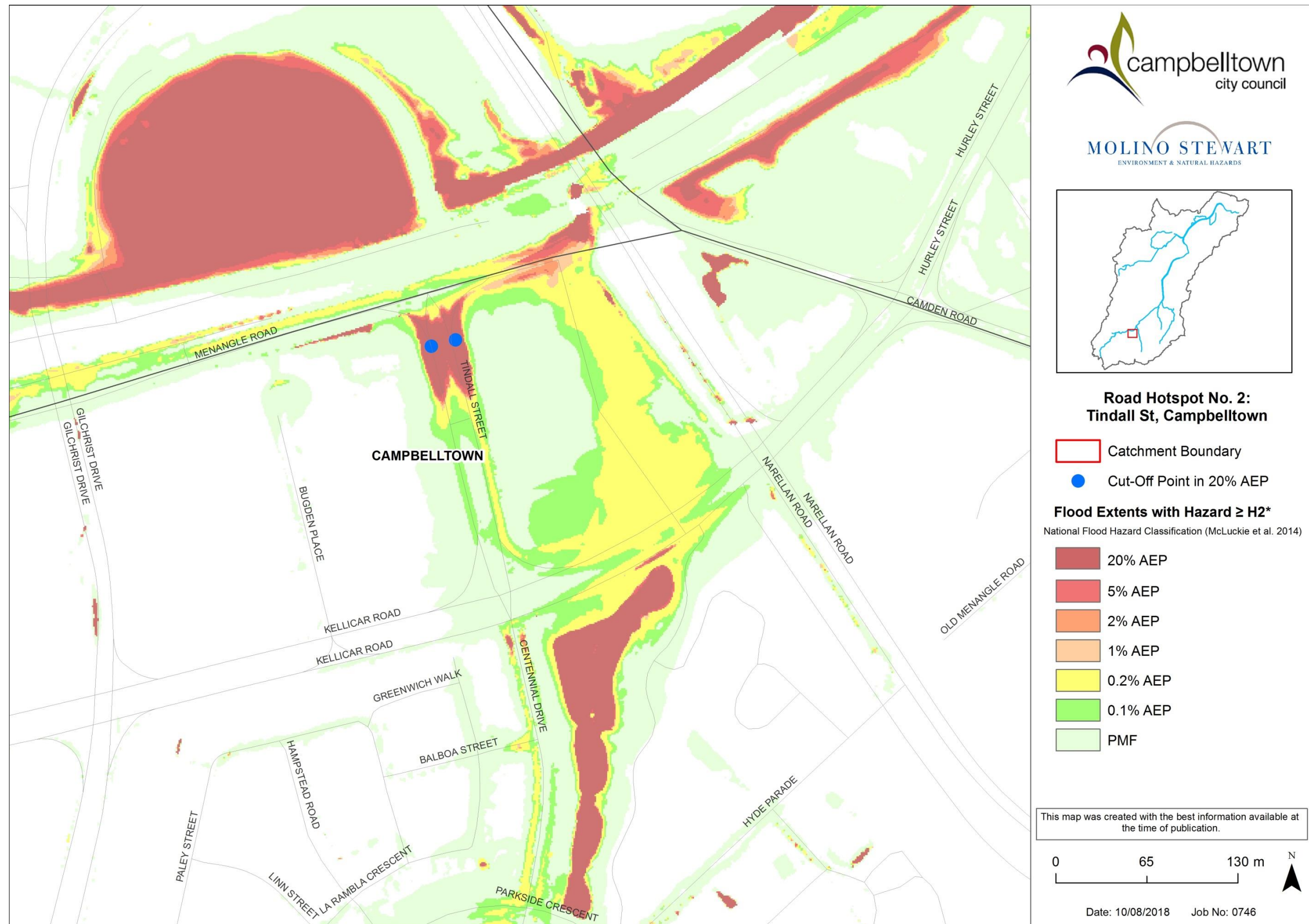
Map 54 Non-Residential Hotspot 13: Ingleburn CBD





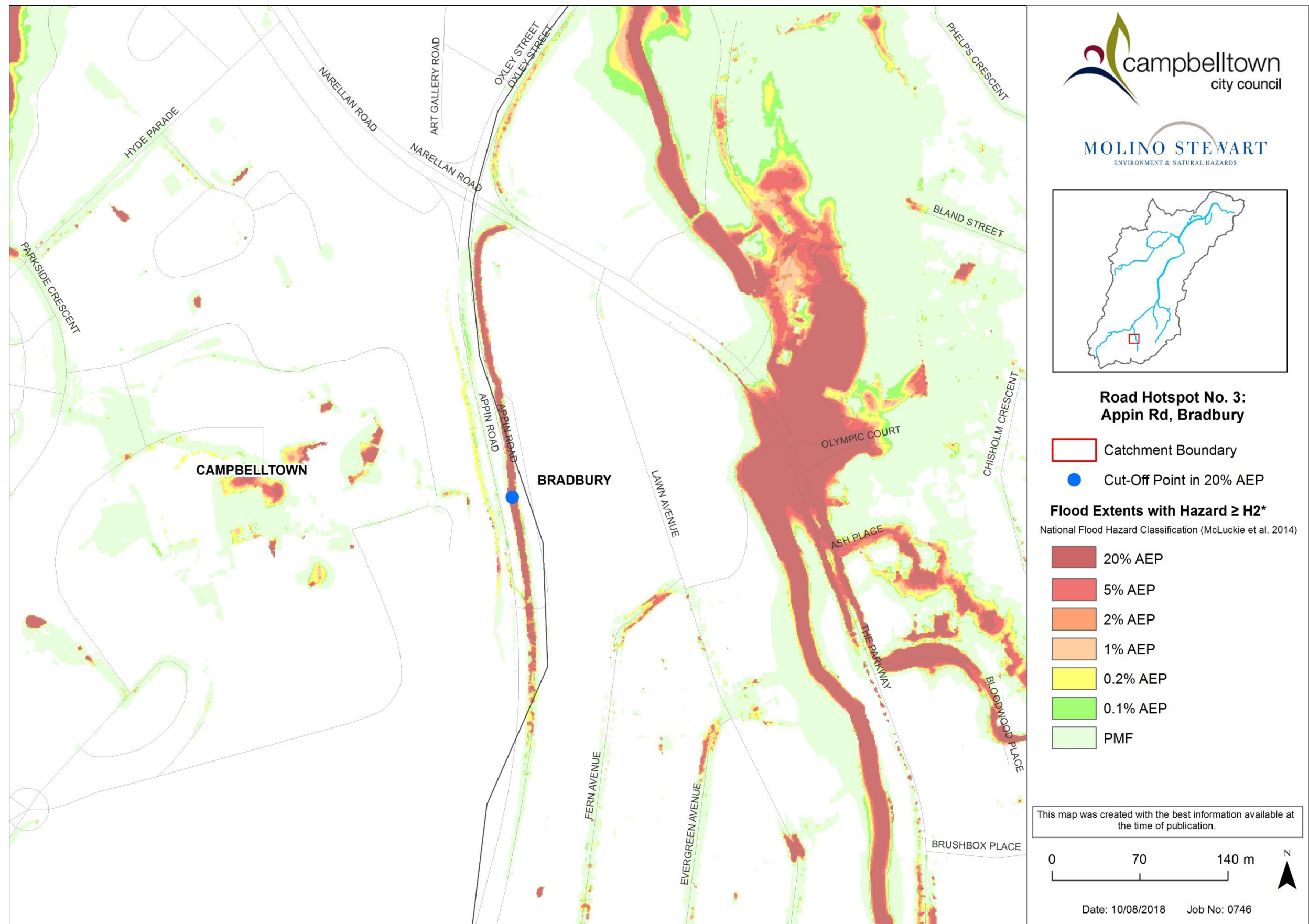
Map 55 Road Hotspot 1: Menangle Road, Glen Alpine





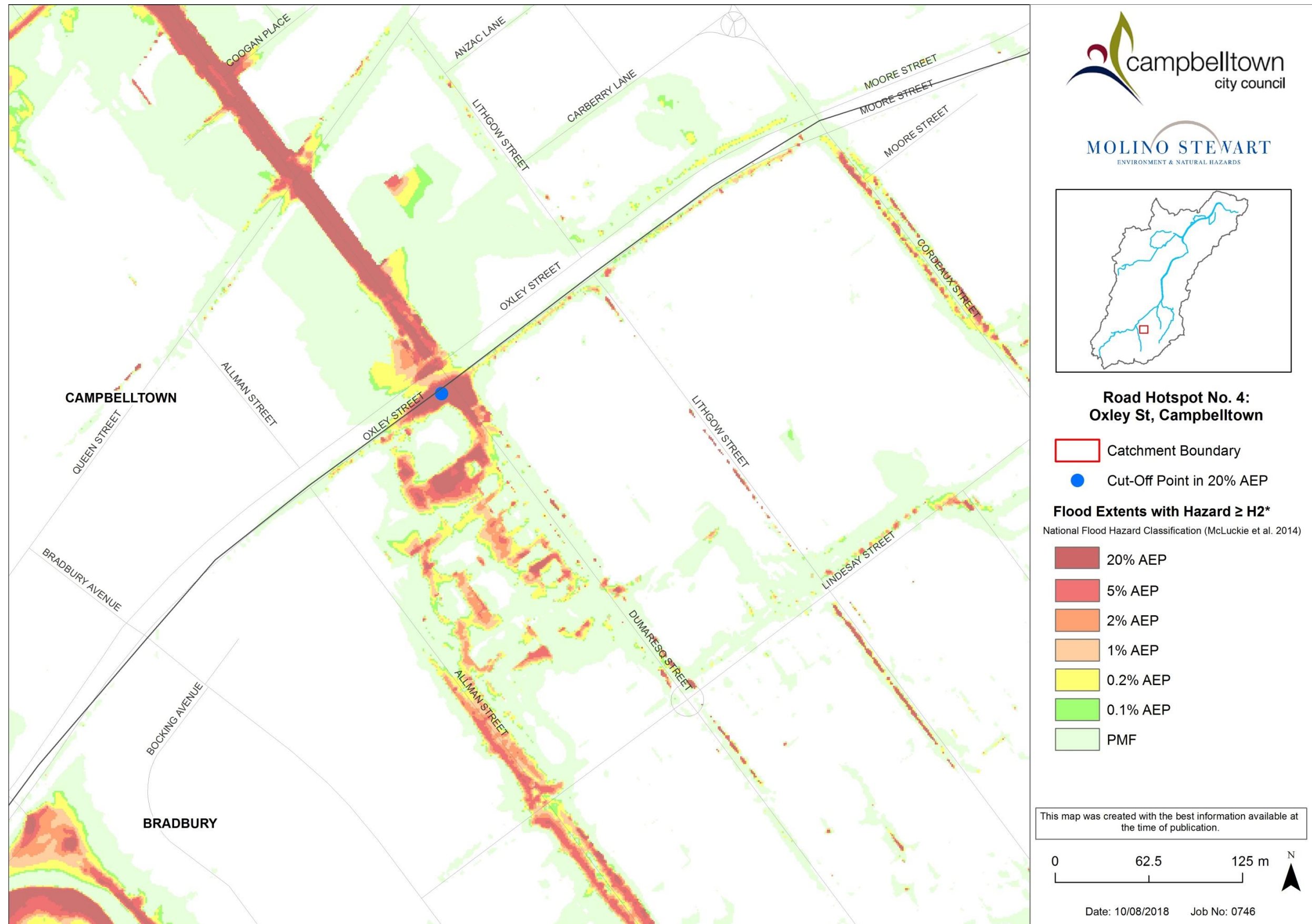
Map 56 Road Hotspot 2: Tindall Street, Campbelltown





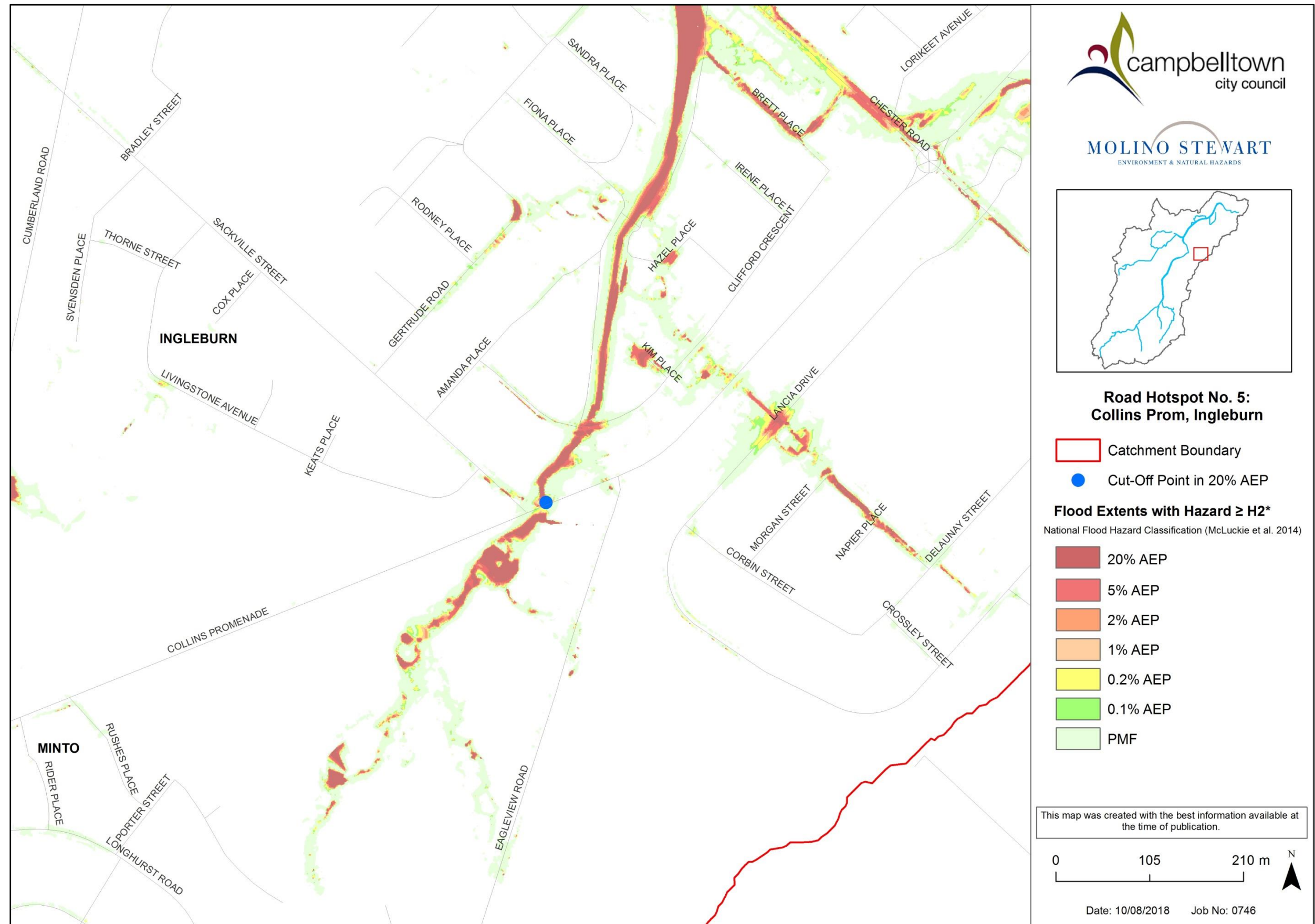
Map 57 Road Hotspot 3: Appin Road, Bradbury





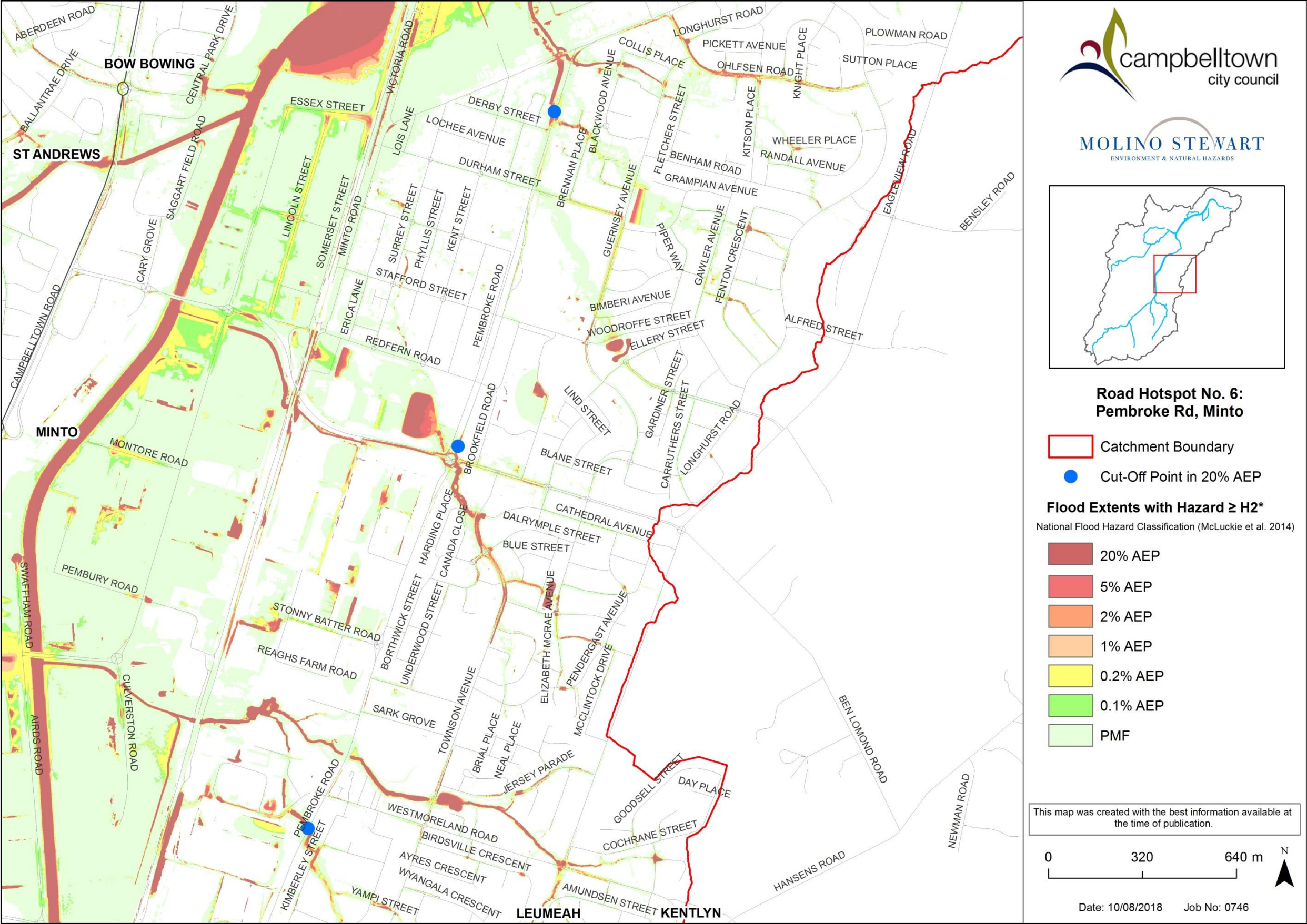
Map 58 Road Hotspot 4: Oxley Street, Campbelltown





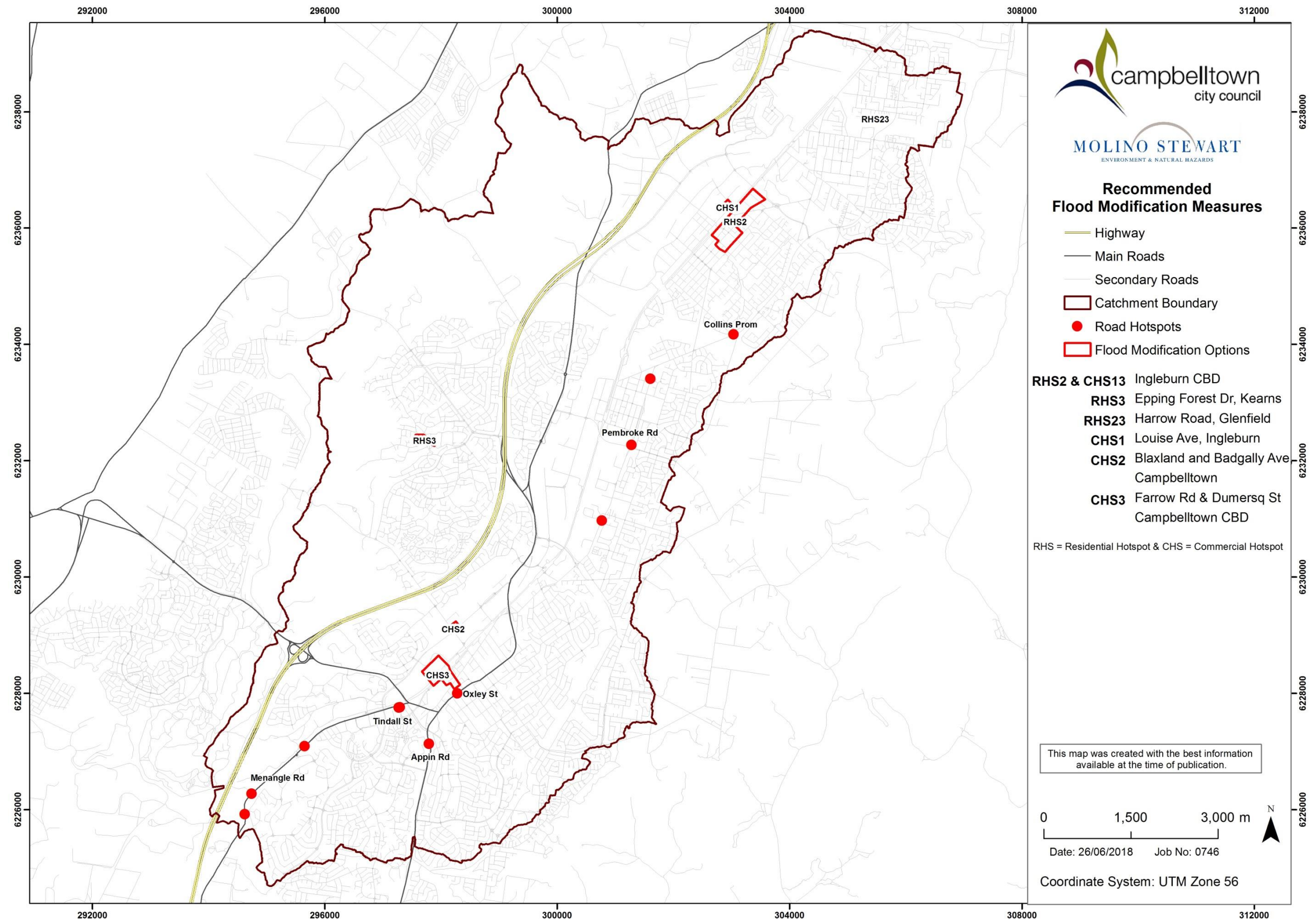
Map 59 Road Hotspot 5: Collins Promenade, Ingleburn





Map 60 Road Hotspot 5: Pembroke Road, Minto





Map 61 Recommended flood modification measures