



Appendix L

Stormwater Modelling Results



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Oteha Valley Catchment

Table A4 Peak discharge and water level impacts at key reporting locations – Oteha Valley Catchment (Existing Development scenario, CC 2121)

	Location (refer Figure 12)	ARI (yrs)	Peak Flow (m ³ /s)		Predicted Peak Water Level (mRL)*		Comment
			Pre-Dev.	Post-Dev.	Pre-Dev.	Post-Dev.	
A	Catchment outlet to Lucas Creek (upstream of model boundary)	2	43.6	43.3 (-0.3)	2.64	2.63 (-0.01)	Negligible impacts on peak discharges and flood levels in all events. Note location is upstream of boundary condition effects.
		10	101	101 (0)	3.56	3.56 (0.00)	
		100	163	163 (0)	4.21	4.21 (0.00)	
B	Downstream of confluence of Alexandra Stream and Oteha Stream	2	34.6	34.2 (-0.4)	10.47	10.45 (-0.02)	No increases to peak flood levels in all events.
		10	74.1	73.8 (-0.3)	11.69	11.68 (-0.01)	
		100	117	117 (0)	12.57	12.56 (-0.01)	
C	Downstream of confluence of Oteha Stream and tributary at Tawa Drive	2	22.9	22.3 (-0.6)	16.83	16.80 (-0.03)	No increases to peak discharges/flood levels in all events.
		10	50.1	49.9 (-0.2)	17.92	17.91 (-0.01)	
		100	78.2	77.6 (-0.6)	18.63	18.62 (-0.01)	
D	Outlet of 1200mm diameter pipe into modified watercourse (OF12)	2	4.6	4.9 (+0.3)	21.32	21.33 (+0.01)	There is approximately a 10% increase in peak discharge in the 2, 10 and 100-year ARI events, resulting in a 10-40mm increase in peak flood level.
		10	5.1	5.7 (+0.5)	21.36	21.40 (+0.04)	
		100	5.4	5.9 (+0.5)	21.40	21.44 (+0.04)	
E	Meadowood Reserve - Caribbean Road/UHH intersection (ponding area in park)	2	N/A - ponding location.		48.27	47.97 (-0.30)	Increased capacity of culvert under motorway results in a decrease in peak flood level in the 2, 10 and 100-year ARI events between 300mm to 460mm.
		10			49.24	48.82 (-0.42)	
		100			49.63	49.17 (-0.46)	
F	Upstream of ARC Refuse Pond	2	N/A - ponding location.		48.17	48.16 (-0.01)	Removal of ARC Refuse Pond does not adversely impact on flood levels upstream in the 2 and 10 year ARI events. The 100 year ARI peak flood level is increased by 150mm. This increase does not result in an increase to surcharging manholes.
		10			50.30	48.77 (-1.53)	
		100			52.45	52.60 (+0.15)	
G	Downstream of UHH/ Alexandra Stream crossing	2	9.7	9.7 (0.0)	28.96	28.96 (0.00)	
		10	20.0	20.2 (+0.2)	30.63	30.64 (+0.01)	

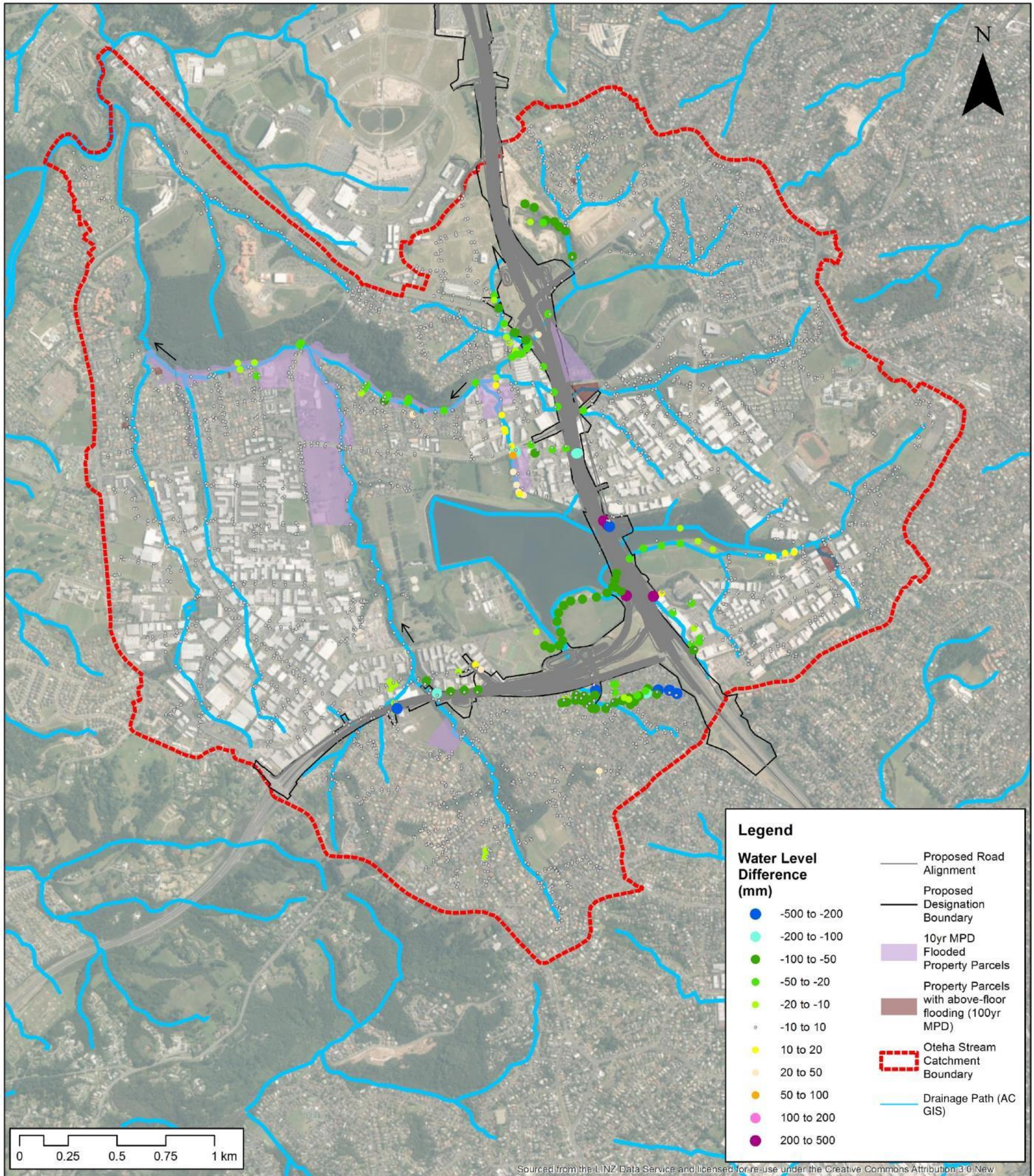


Location (refer Figure 12)		ARI (yrs)	Peak Flow (m ³ /s)		Predicted Peak Water Level (mRL)*		Comment
			Pre-Dev.	Post-Dev.	Pre-Dev.	Post-Dev.	
		100	32.3	32.4 (+0.1)	33.04	33.12 (+0.08)	There is no change to peak discharge & water level in the 2 year ARI event. There is a 10mm and 80mm increase in peak flood level in the 10 and 100 year ARI events respectively.
H	Greville Road pond at inlet of 3000mm diameter culvert	2	5.0	4.8 (-0.2)	28.06	27.96 (-0.10)	Wetlands discharging into the culvert do not adversely impact upstream peak discharges and flood levels for 2, 10 and 100 year ARI events.
		10	11.7	11.6 (-0.1)	29.89	29.66 (-0.23)	
		100	26.5	24.7 (-1.7)	31.60	31.54 (-0.06)	
I	Rosedale Road/State Highway 1 (flood prone area)	2	N/A - ponding location.		22.35	22.31 (-0.04)	No increases to peak flood level in any event. Reduction in ponding storage volume is offset by decreases in catchment runoff to the ponding location.
		10			25.63	25.48 (-0.15)	
		100			27.83	27.83 (0.00)	
J	Upstream of UHH/Alexandra Stream crossing	2	8.2	8.2 (+0.0)	29.79	29.79 (0.00)	There is a 50mm to 70mm increase in peak water level in the 10 and 100 year ARI events.
		10	19.7	19.5 (-0.2)	31.75	31.80 (+0.05)	
		100	35.1	35.4 (+0.3)	33.70	33.77 (+0.07)	

*Note: Reported levels are computed water levels and do not include an allowance for freeboard.



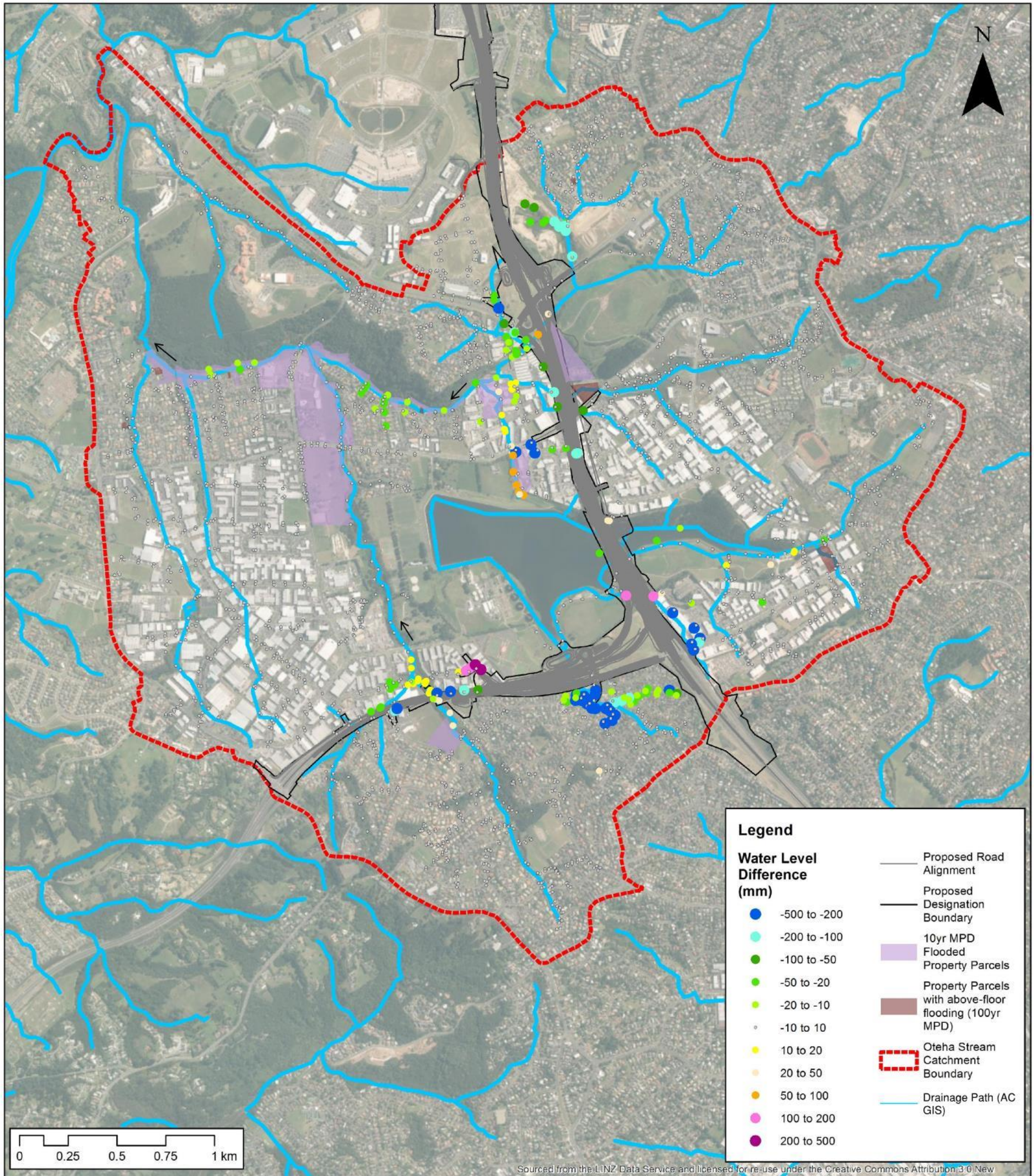
Figure A1 Peak water level differences (Mike Urban model component only) – Oteha Valley Catchment, 2 year ARI event



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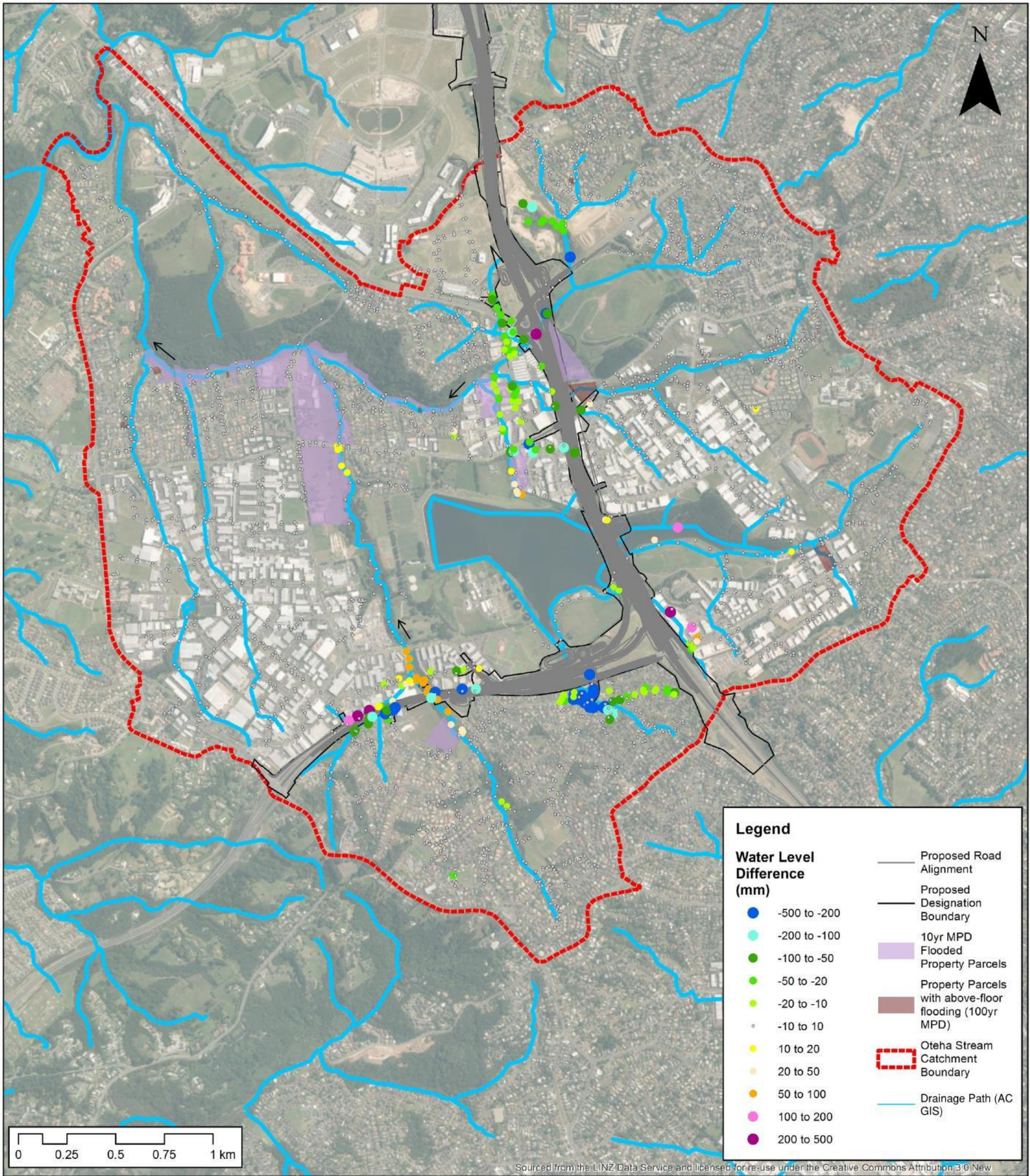


Figure A2 Peak water level differences (Mike Urban model component only) – Oteha Valley Catchment, 10 year ARI event



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Figure A3 Peak water level differences (Mike Urban model component only) – Oteha Valley Catchment, 100 year ARI event



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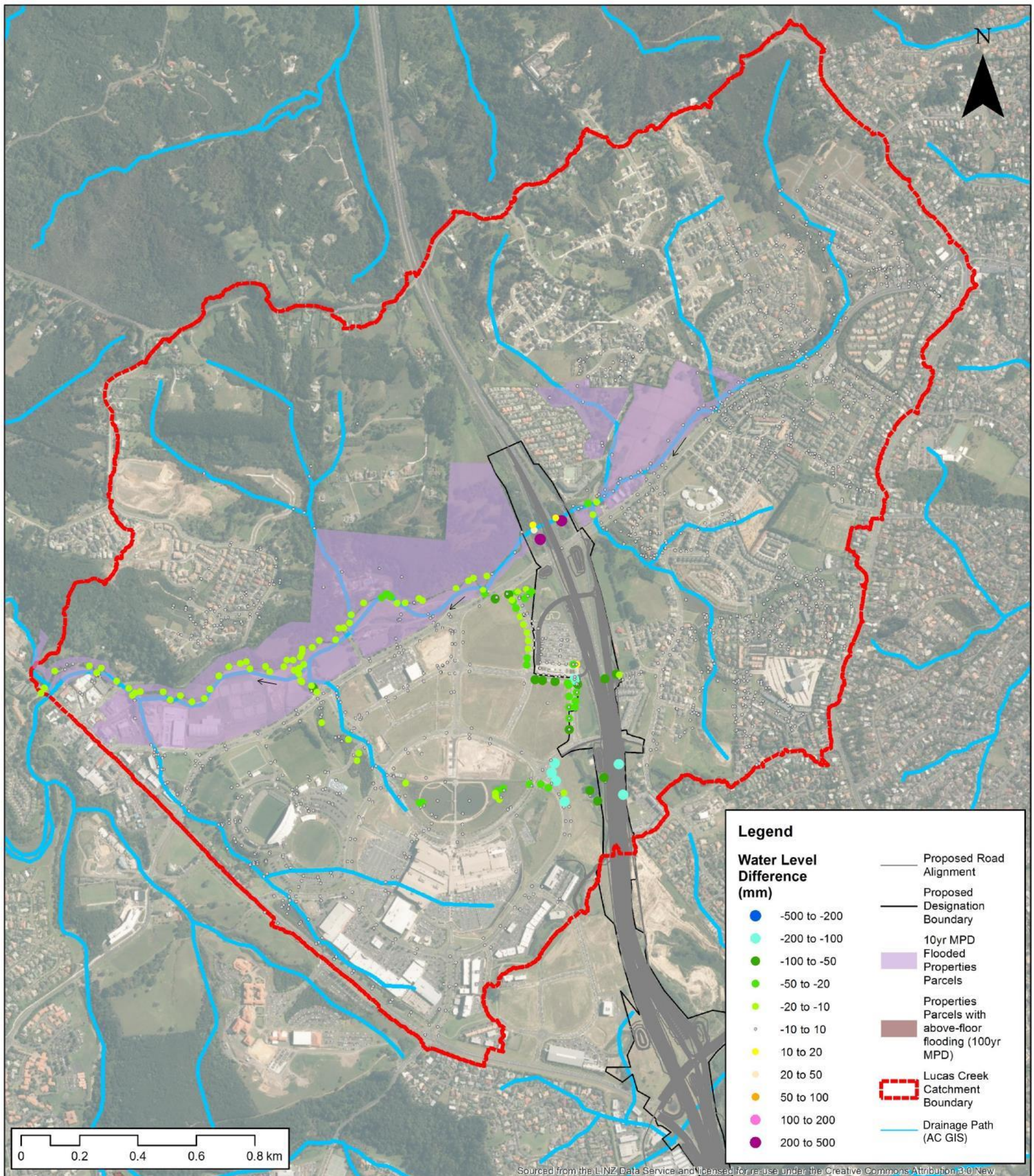
Lucas Creek Catchment

Table A5 Existing resource consents Changes at key downstream locations – Lucas Creek Catchment (Existing Development (2008) scenario, CC2121)

Location (refer Figure 13)		Peak Flow (m ³ /s)		Peak Water Level (mRL)		Comment
		Pre-Development	Post-Development	Pre-Development	Post-Development	
A	Lucas Creek at Dairy Flat Highway	Q ₂ = 30.7 Q ₁₀ = 73.1 Q ₁₀₀ = 138	Q ₂ = 30.2 (-0.5) Q ₁₀ = 73.0 (-0.1) Q ₁₀₀ = 138 (0)	Q ₂ = 7.01 Q ₁₀ = 7.68 Q ₁₀₀ = 8.41	Q ₂ = 7.00 (-0.01) Q ₁₀ = 7.67 (-0.01) Q ₁₀₀ = 8.41 (0.00)	No increase in peak discharges or water levels in the 2, 10 and 100 year ARI events.
B	Downstream of confluence of Lucas Creek and tributary at Appian Way	Q ₂ = 28.2 Q ₁₀ = 72.3 Q ₁₀₀ = 130	Q ₂ = 27.8 (-0.4) Q ₁₀ = 72.2 (-0.1) Q ₁₀₀ = 130 (0)	Q ₂ = 12.31 Q ₁₀ = 13.31 Q ₁₀₀ = 13.66	Q ₂ = 12.30 (-0.01) Q ₁₀ = 13.31 (0.00) Q ₁₀₀ = 13.66 (0.00)	No increase in peak discharges or water levels in the 2, 10 and 100 year ARI events.
C	Lucas Creek downstream of State Highway 1 (upstream of bus depot inflows)	Q ₂ = 19.2 Q ₁₀ = 45.3 Q ₁₀₀ = 77.6	Q ₂ = 19.1 (-0.1) Q ₁₀ = 45.6 (+0.3) Q ₁₀₀ = 78.5 (+0.9)	Q ₂ = 17.44 Q ₁₀ = 18.18 Q ₁₀₀ = 18.69	Q ₂ = 17.43 (-0.01) Q ₁₀ = 18.18 (0.00) Q ₁₀₀ = 18.70 (+0.01)	No increase in peak discharge/ water level in the 2 year ARI event. Small (<2%) increase in peak discharge in the 100 year ARI events, resulting in a 10mm increase in peak flood level.
D	Upstream of Albany Lake Reserve	Q ₂ = 1.5 Q ₁₀ = 2.9 Q ₁₀₀ = 3.1	Q ₂ = 1.2 (-0.3) Q ₁₀ = 2.8 (-0.1) Q ₁₀₀ = 3.1 (0.0)	Q ₂ = 48.34 Q ₁₀ = 49.16 Q ₁₀₀ = 50.06	Q ₂ = 48.32 (-0.02) Q ₁₀ = 48.89 (-0.27) Q ₁₀₀ = 49.94 (-0.12)	No increase in peak discharges or water levels in the 2, 10 and 100 year ARI events.

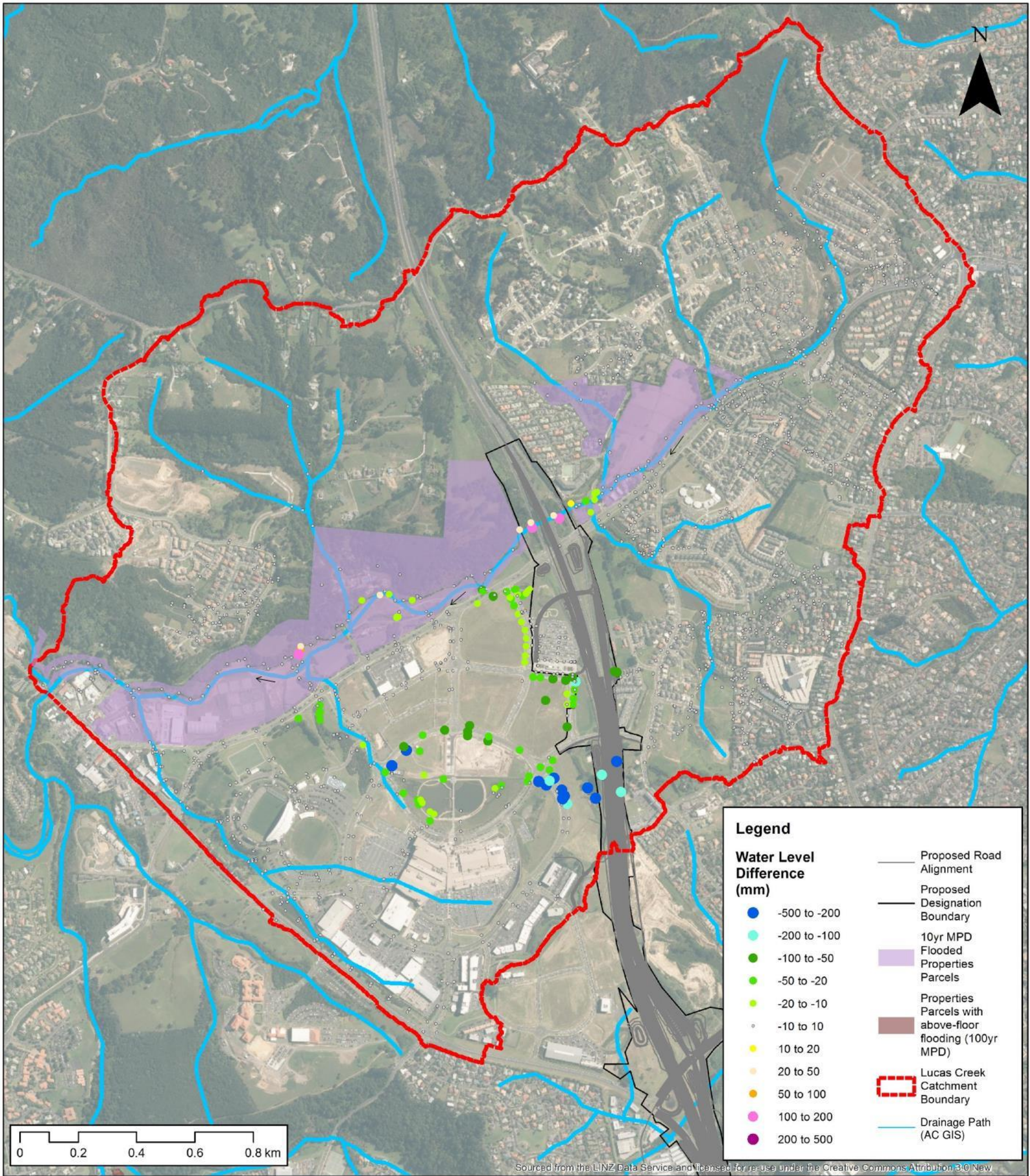
Note: Reported levels are computed water levels and do not include an allowance for freeboard.

Figure A4 Maximum water level differences – Lucas Creek Catchment, 2 year ARI event



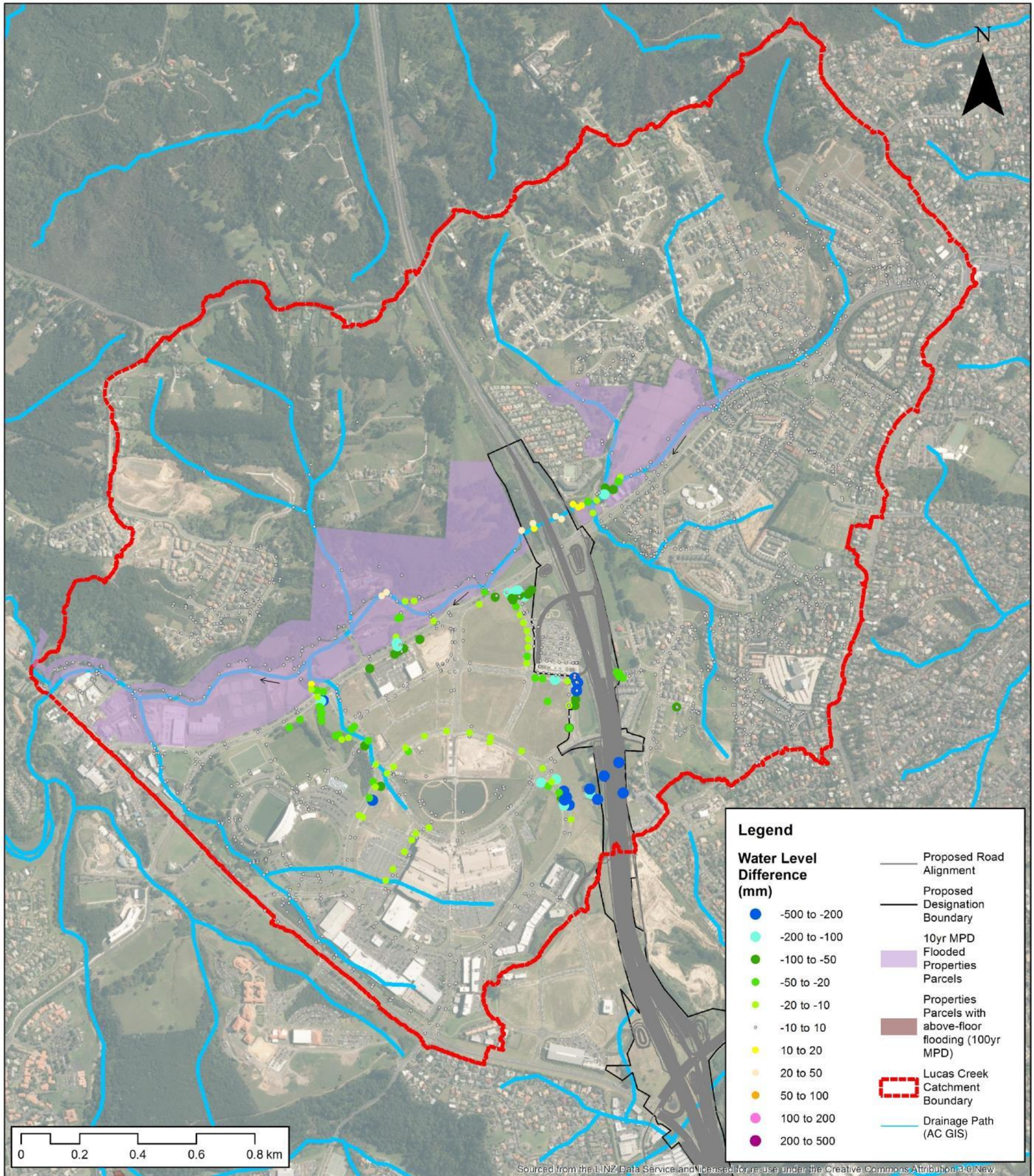
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Figure A5 Maximum water level differences – Lucas Creek Catchment, 10 year ARI event



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Figure A6 Maximum water level differences, Lucas Creek catchment, 100 year ARI event



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