SUPPLEMENTARY

Table S1. Climate Parameters Pertinent to Fletchers Creek Subwatershed

Climate Parameters of Fletchers Creek subwatershed

	Precipitation/year (mm)	Evapotranspiration mm/year
2008	1026	599
2009	725	603
2010	876	637
2011	910	617
2012	667	689
2013	861	620
2014	755	625
2015	637	671
2016	609	770
2017	826	668
2018	673	663

Table S2 Soil Types in Fletchers Creek sub-watershed

Sub5 Soil Types		
Soil Type	**Area (ha)**	**Soils Type %**
Clay	576	12
Clay Loam	3903	81
Variable	314	7
Total	4793	100

S1

Atmospheric heat fluxes include net shortwave solar radiation (HS), net atmospheric longwave radiation (HA), longwave radiation from water (HBR), conductive heat transfer (HC), and evaporative heat transfer (HE) (Thomann and Mueller, 1987). The net heat flux between the stream and the sediment bed (HGW) is the sum of conduction and advection. Heat from runoff sources is also included. The model uses: Net solar radiation, Net atmospheric radiation, Water radiation, Latent heat flux, Sensible heat flux,

Groundwater heat flux, Overland and Overland Drainage heat flux. However, in the presence set up the overland and overland drainage and groundwater heat flux is not used.

Table S3 Time Steps Used for Calibration of MIKE SHE and MIKE HYDRO

Time Steps		
Process in Model	**Time Step**	**Unit**
MIKE HYDRO	1	Second
MIKE SHE-Overland	30	Minutes
MIKE SHE-Unsaturated zone	30	Minutes
MIKE SHE-Saturated zone	6	Hours

Table S4 Water Balance Analysis with for 2016 and 2017 with climate change RCP4.5 scenario

	2016- A relatively Dry Year		**2017- A relatively Wet Year**	
	No Climate Change	**Climate Change RCP4.5 Scenario**	**No Climate Change**	**Climate Change RCP4.5 Scenario**
	Cumulated in mm		Cumulated in mm	
Precipitation	609	643	792	821
Evapotranspiration	449	457	436	439
Overland Flow to River	58	94	195	210
SZ Drain to River	45	56	91	96
Base flow to river	58	59	73	75

Table S4 shows that evapotranspiration increased from 449 mm to 457 mm (by 1%) and overland flow increased from 58 mm to 94 mm (by 36mm) in a typical dry year and evapotranspiration increased from 436 mm to 439 mm and overland flow increased from 195 mm to 210 mm (by 15mm) in a typical wet year.

Table S5 Number of Hours the Fletchers Creek Temperature Increase with Climate Change RCP 4.5 Scenario in 2050 (Base a Dry Year-2016)

Distance From Start (m)	0	5000	11000	17000	21000	25607
Increase in Water Temperature	(m)	(m)	(m)	(m)	(m)	(m)
<0 and =0	673	803	570	559	456	439
>0 and <1	7960	6827	7086	7186	7403	7511
>=1 and <2	78	721	734	778	720	666
>=2 and <3	21	272	264	162	134	98
>=3 and <4	4	63	60	42	24	23
>=4 and <5	1	29	19	10	0	0
>=5 and <6	0	18	4	0	0	0
>=6 and <7	0	4	0	0	0	0
>=7	0	0	0	0	0	0

Table S6 No of Hours the Fletchers Creek Temperature Increase with Climate Change RCP 4.5 Scenario in 2050 (Base a Wet Year-2017)

Distance From Start (m)	0	5000	11000	17000	21000	25607
Increase in Water Temperature	(m)	(m)	(m)	(m)	(m)	(m)
<0 and =0	698	1295	941	730	574	535
>0 and <1	7695	5870	6277	6642	6935	7059
>=1 and <2	273	1026	1094	1021	969	908
>=2 and <3	50	317	238	227	202	184
>=3 and <4	17	150	131	95	40	36
>=4 and <5	4	43	29	12	12	13
>=5 and <6	0	16	18	7	5	2
>=6 and <7	0	5	3	3	0	0
>=7 and <8	0	5	6	0	0	0
>=8 and <9	0	9	0	0	0	0
>=9	0	1	0	0	0	0

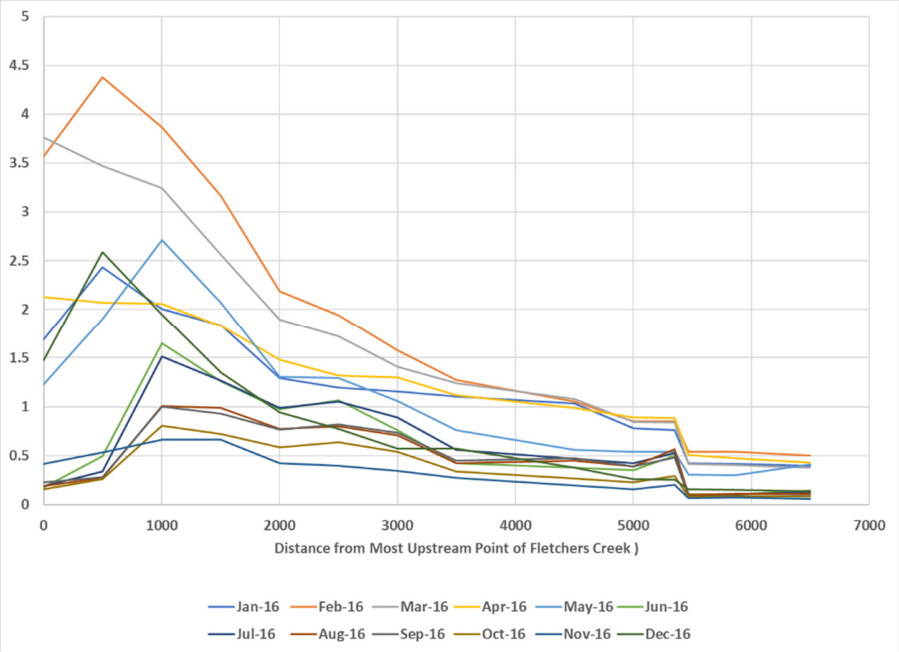

Figure S1 Maximum Monthly Hourly Temperature Change in Fletchers Creek with Land Use Change from Existing to Low Density Urban Land Use Change (Scenario-1) in 2016

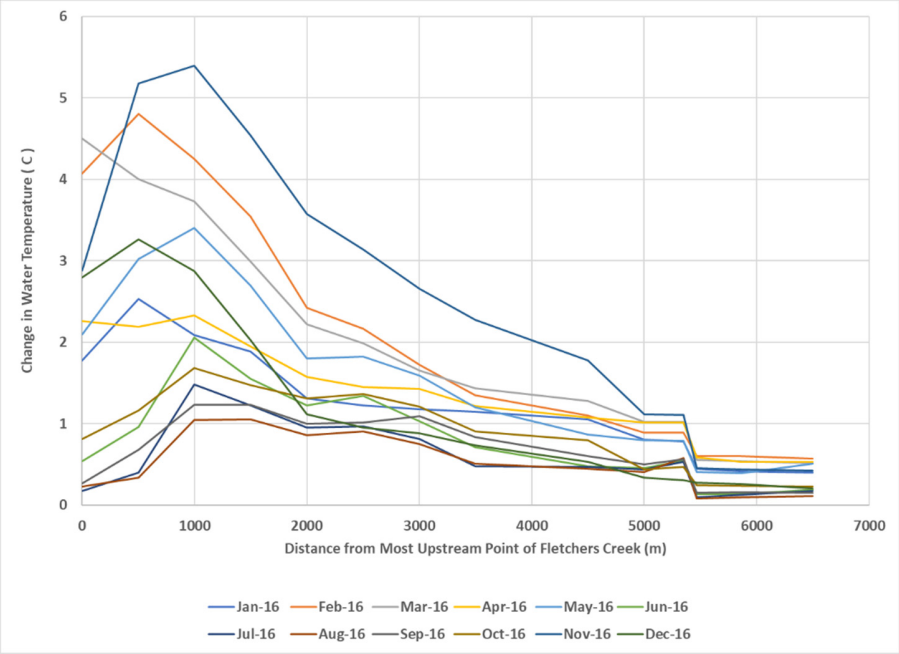

Figure S2 Maximum Monthly Hourly Temperature Change in Fletchers Creek with Land Use Change from Existing to High Density Urban Land Use Change (Scenario-2) in 2016

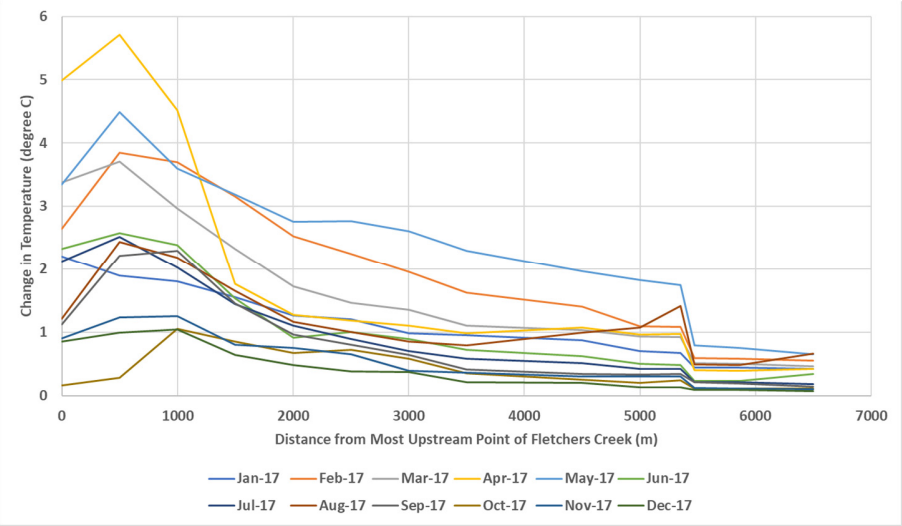

Figure S3 Maximum Monthly Hourly Temperature Change in Fletchers Creek with Land Use Change from Existing to Low Density Urban Land Use Change (Scenario-1) in 2017

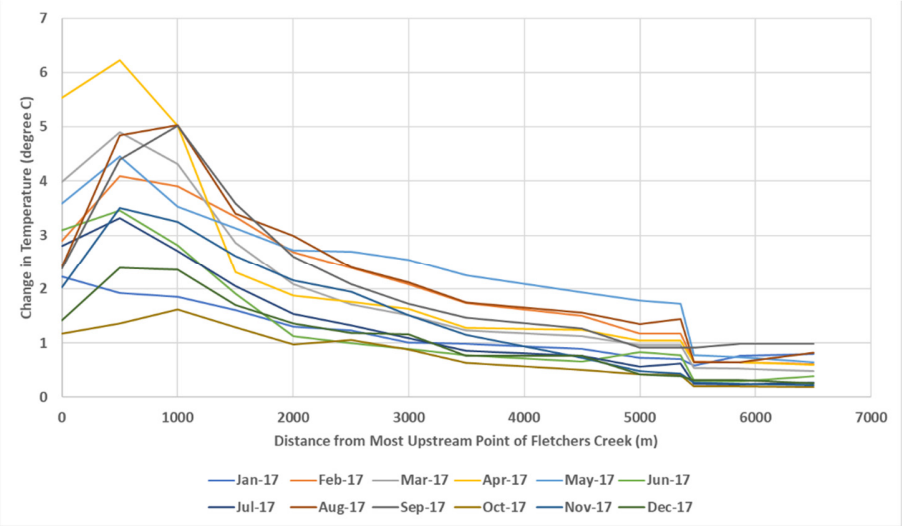

Figure S4 Maximum Monthly Hourly Temperature Change in Fletchers Creek with Land Use Change from Existing to High Density Urban Land Use Change (Scenario-2) in 2017