Water sensitive infill development

- A case study for the Norman Creek catchment using water mass balance

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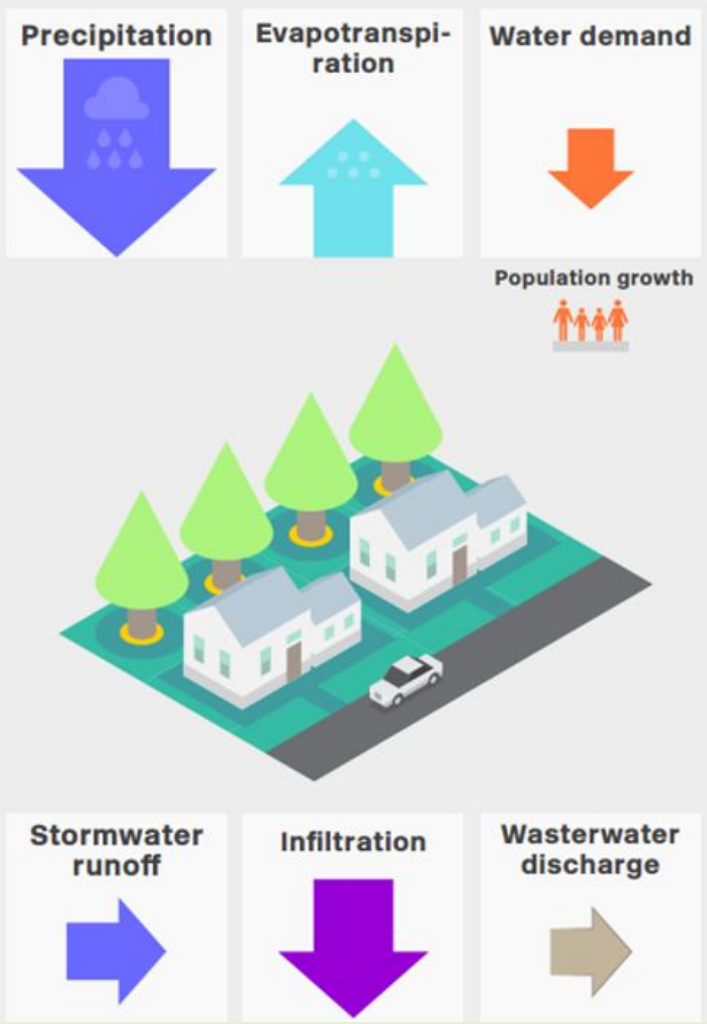
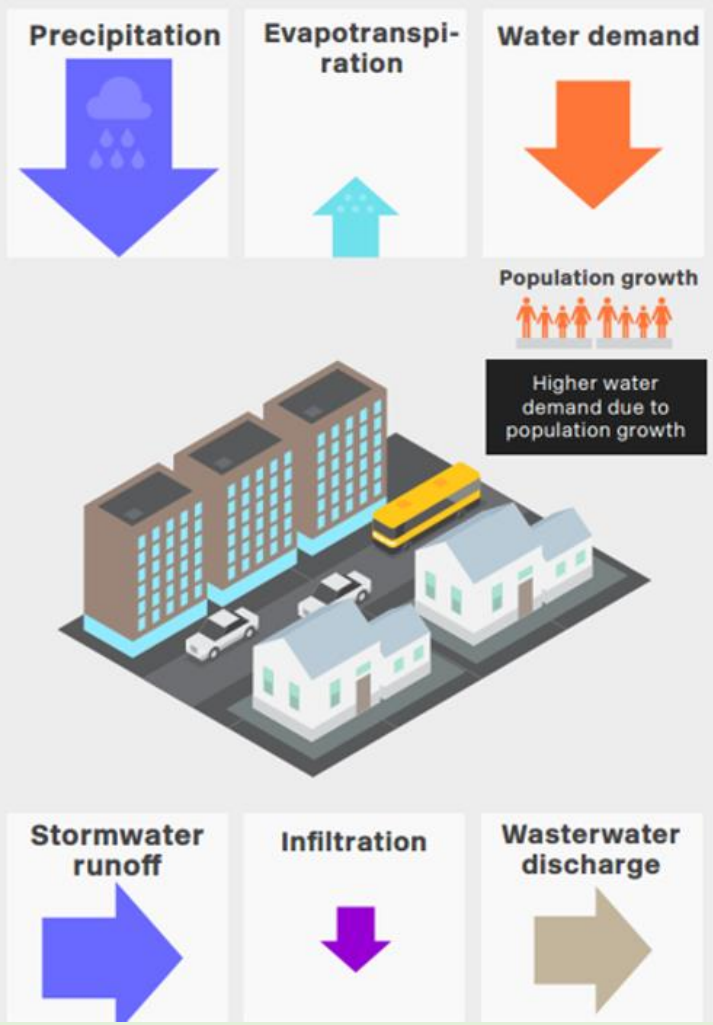
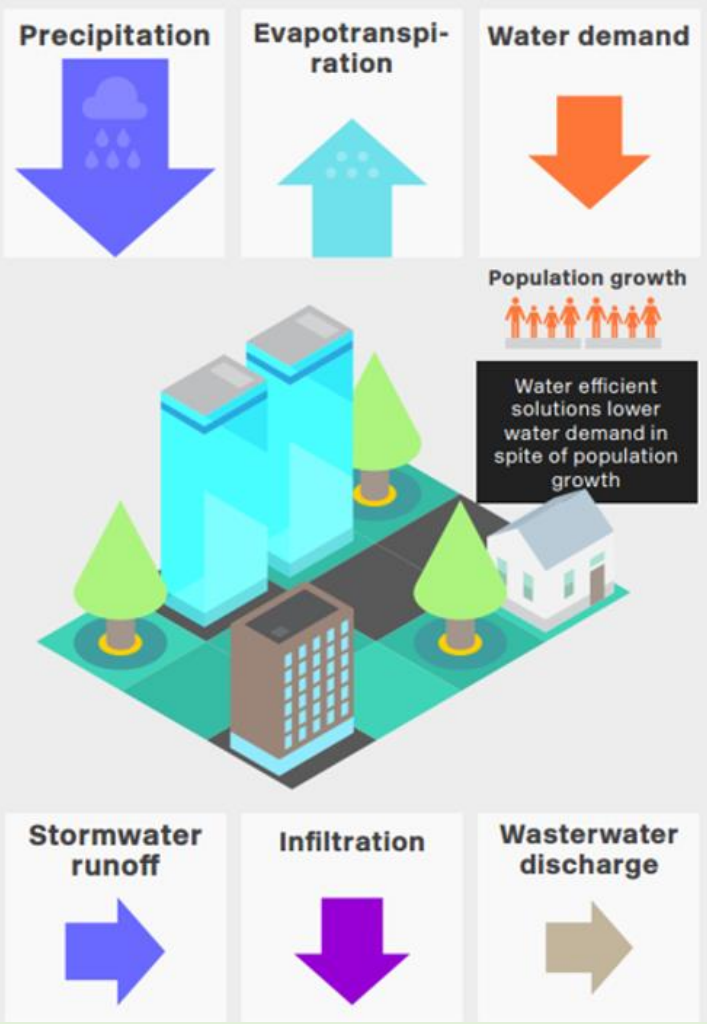
Low-density development 2016



Infill development (Business-as-usual) 2031

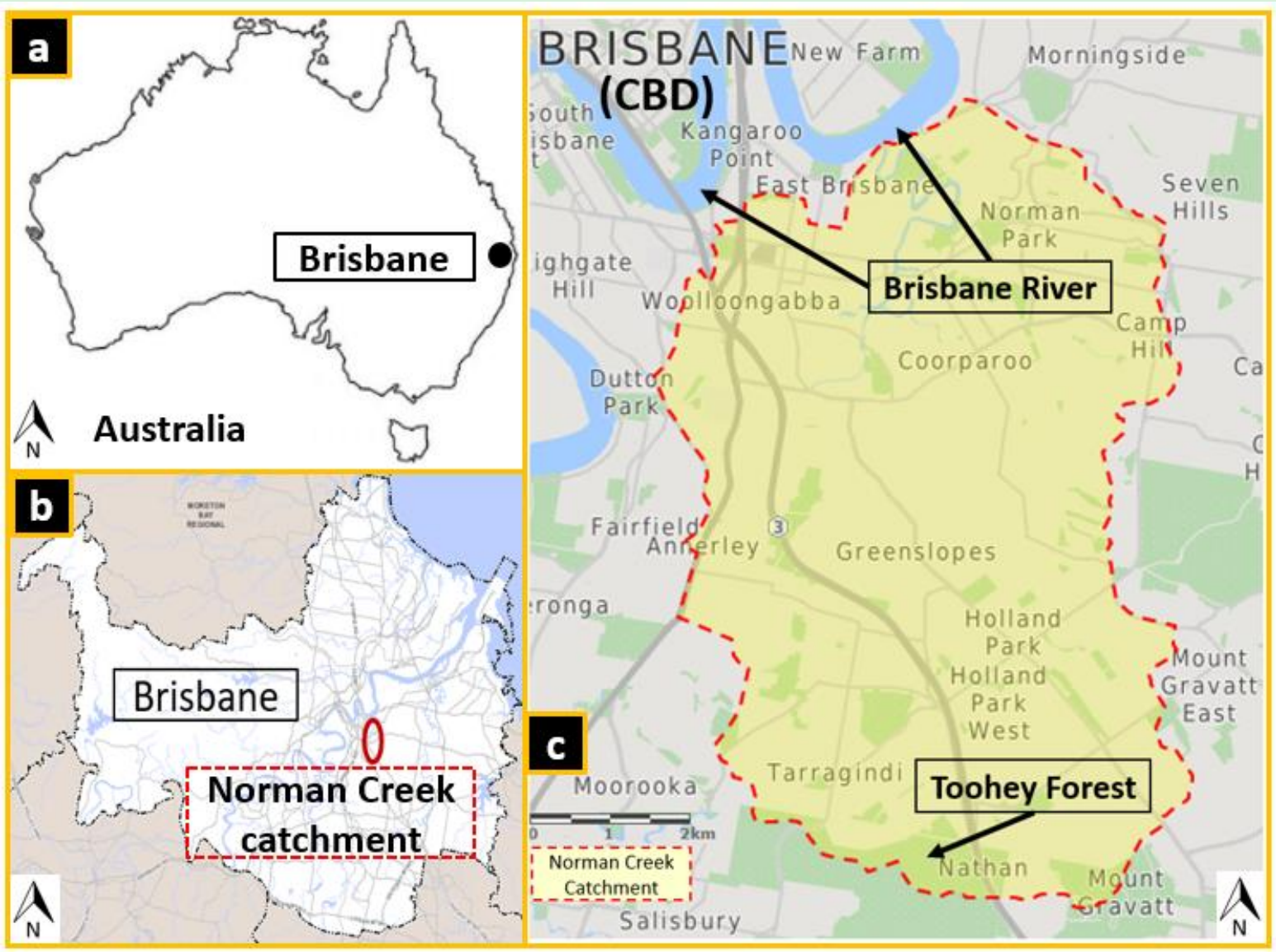


Water-sensitive infill development 2031



(CRC WSC, 2017)

Norman Creek case study area:



Background information:
Area: 3,038ha
Population: 90,000

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Legend:

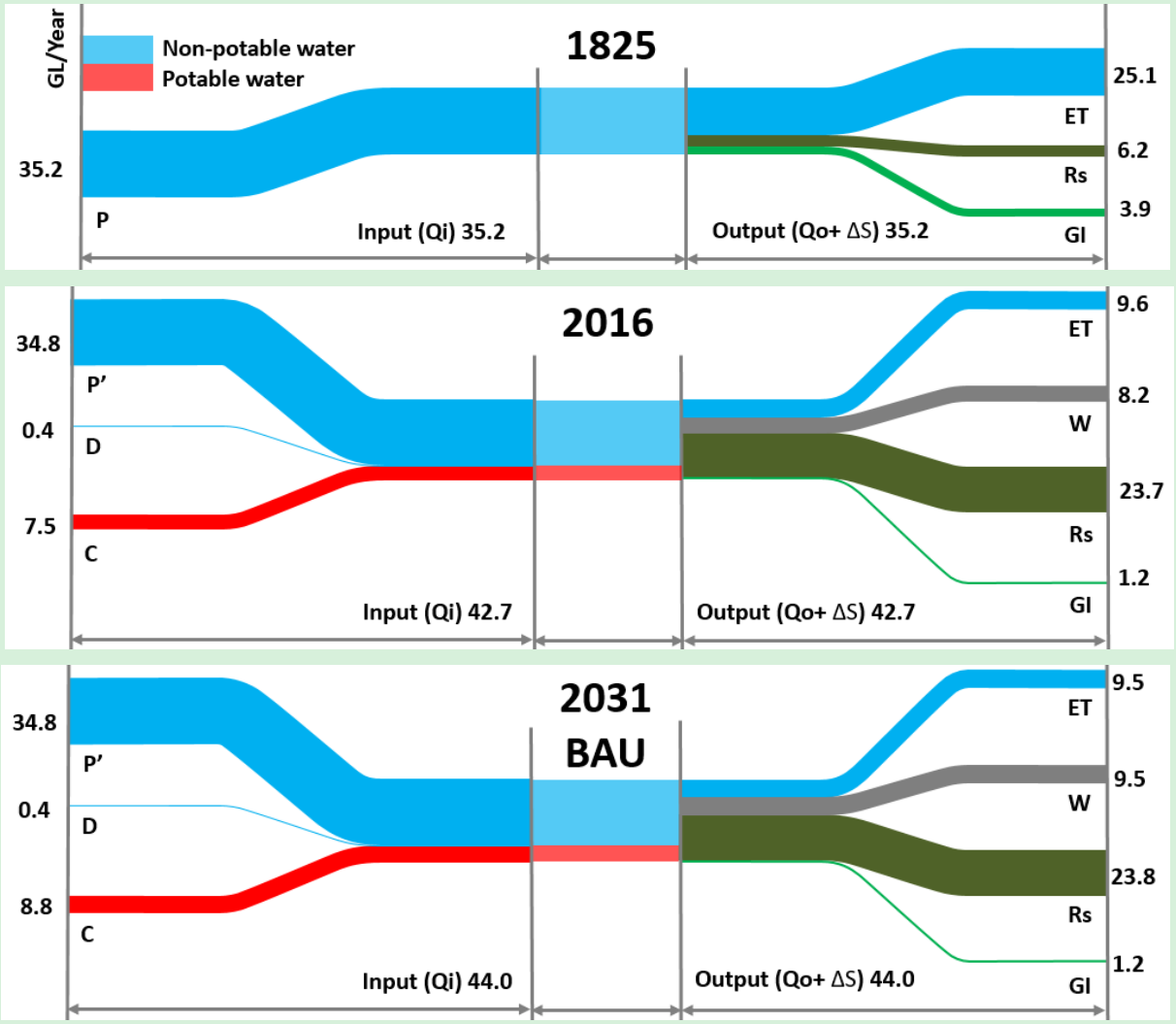
- BAU
- Runoff
- WSUD area
- Runoff in WSUD applied area

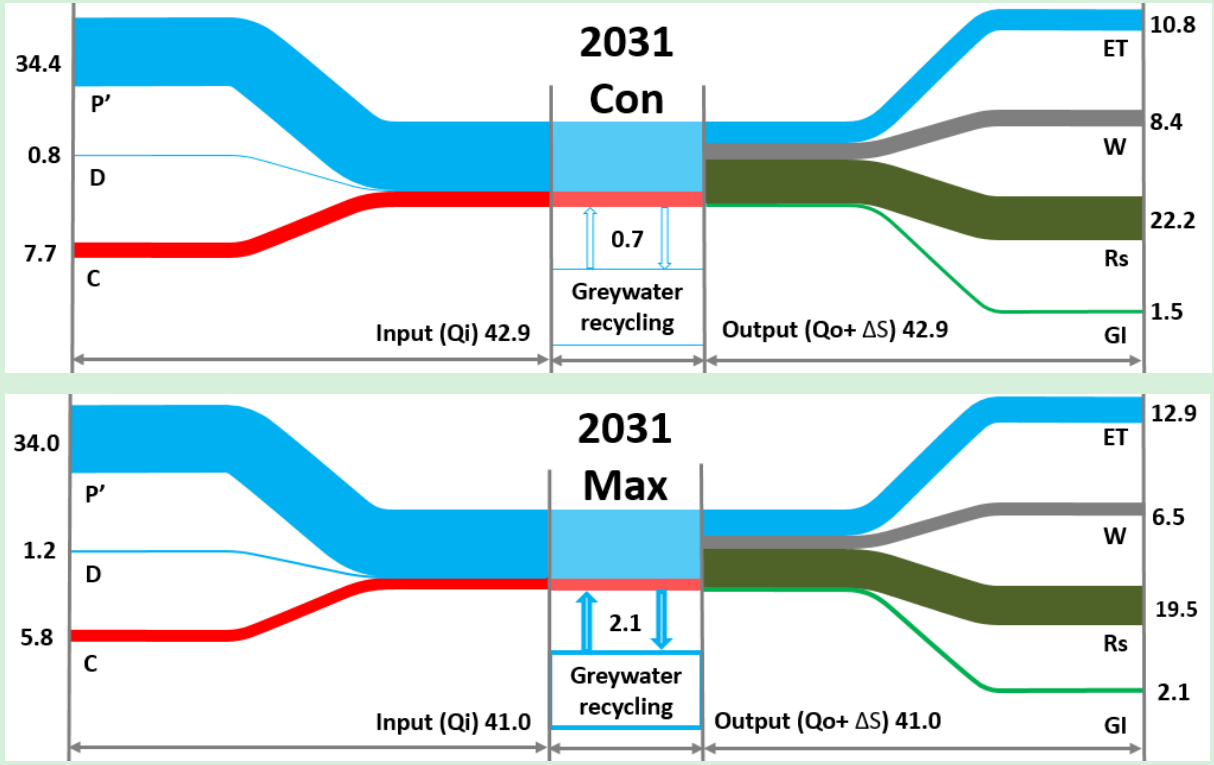
Water metabolism indicators	Description	Equation	Performance target
I. Indicators of resource efficiency			
Water extracted	$\frac{\text{Volume of water extracted from external sources}}{\text{Population of the urban area}}$	$\frac{C}{\text{Population}}$	Smaller is better
Internal harvesting ratio	$\frac{\text{Volume of freshwater harvested internally}}{\text{Total volume of water supplied to meet demand}}$	$\frac{D}{C+D+R}$	Higher is better
Internal recycling ratio	$\frac{\text{Volume of water recycled internally}}{\text{Total volume of water supplied to meet demand}}$	$\frac{R}{C+D+R}$	Higher is better
II. WSUD Indicators of hydrological performance[5]			
Stormwater runoff ratio	$\frac{\text{WSUD case stormwater runoff}}{\text{Base case stormwater runoff}}$	$\frac{Rsx}{Rs0}$	Depends on the base case, if the base case is pre-development, higher is better; if the base year is BAU, lower is better.
Total stream discharge ratio	$\frac{\text{WSUD case total stream discharge}}{\text{Base case total stream discharge}}$	$\frac{(Rs+W)x}{(RS+W)0}$	
Infiltration ratio	$\frac{\text{WSUD case groundwater infiltration}}{\text{Base case groundwater infiltration}}$	$\frac{GIx}{GI0}$	Higher is better
Evapotranspiration ratio	$\frac{\text{WSUD case evapotranspiration}}{\text{Base case evapotranspiration}}$	$\frac{ETx}{ET0}$	Higher is better
Open space ratio	$\frac{\text{WSUD case open space}}{\text{Base case open space}}$	$\frac{OSx}{OS0}$	Higher is better

C: centralised water supply, D: decentralised water supply, R: reuse of wastewater

Infill development indicators and equations developed by Kenway, et al. (2011), Renouf, et al. (2016), and Farooqui, et al. (2016)

Water mass balances:





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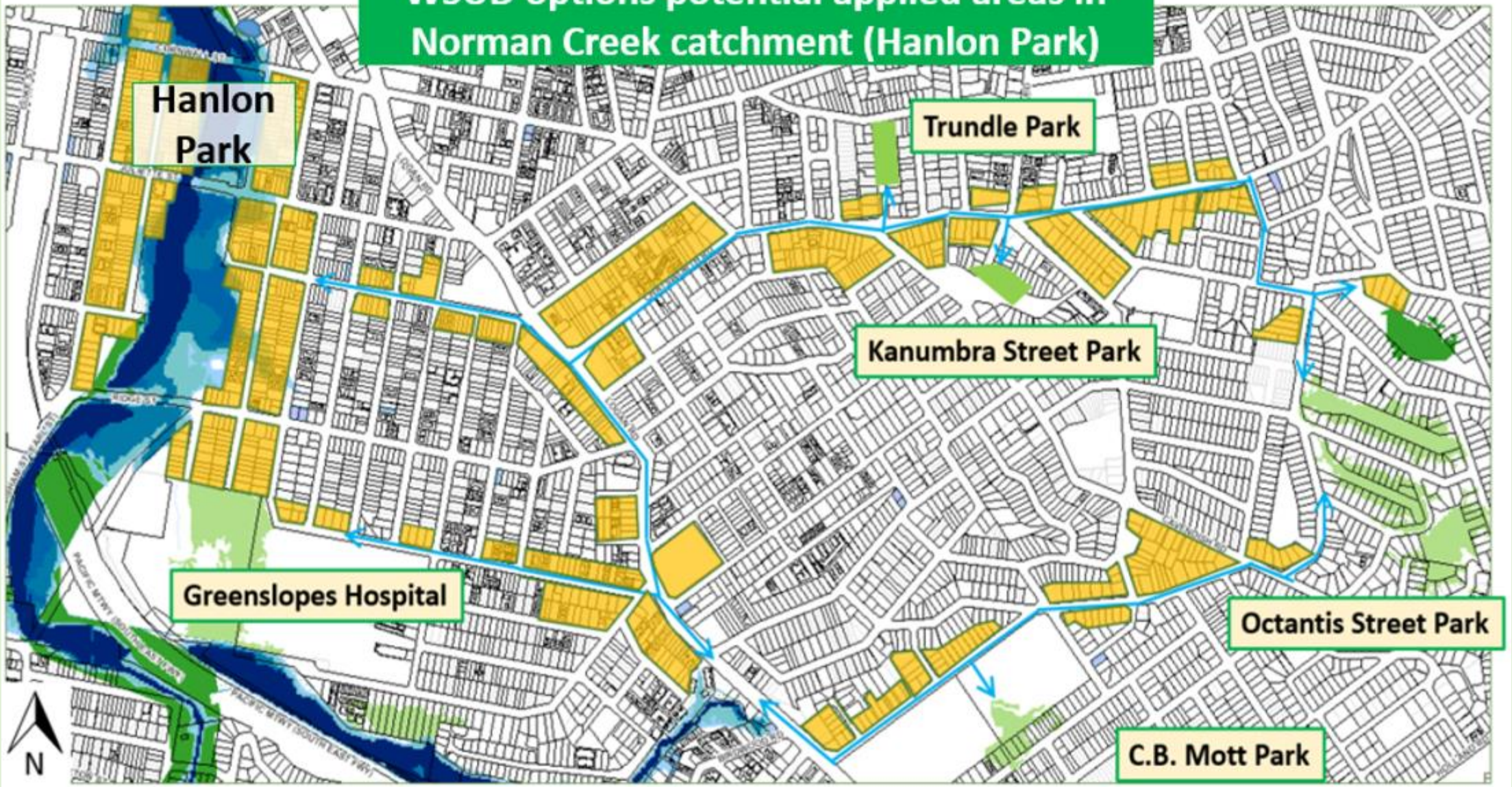
WSUD options potential applied areas in Norman Creek catchment (Hanlon Park)



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Thank you.

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