



Checklist for submitting a WSUD response

Subdivision style example

The development site is 15,400 m². 48 three bedroom townhouses are proposed for the site. The table below shows a breakdown of surface types within the development site. Permeable paving will be used for non-trafficable paving within the development. The site's legal point of discharge is a side entry pit in Railway Parade. The side entry pit is one meter deep.

Surface type	Area (m ²)	Considered impervious for purpose of stormwater quality assessment
Type A roof to tanks	2,160	Impervious
Type B roof to tanks	1,080	Impervious
Driveways	900	Impervious
Footpaths and roads to raingarden	4,740	Impervious
Footpaths and roads not to raingarden	240	Impervious
Permeable paving	540	Pervious
Garden	5,760	Pervious
TOTAL	15,420	

Stormwater runoff from the site will be treated using rainwater tanks, a sediment sump, a raingarden and permeable paving (refer to the plan on page 2 below):

a) Rainwater tanks

Runoff from each townhouse roof will be diverted to a 2,000 L above ground rainwater tank. Rainwater will be used for toilet flushing, cold laundry taps and garden irrigation. To be conservative, when modelling rainwater tank pollutant removal, only toilet flushing and cold laundry demands were included. The toilet flushing demand was assumed to be 20 litres per person per day and the cold laundry demand was assumed to be 21 litres per person per day. It was assumed that there is an average occupancy of one person per bedroom.

Rainwater tank overflows from Type A dwellings will discharge via the sediment sump and raingarden. Rainwater tank overflows from Type B dwellings will discharge directly to the legal point of discharge in Railway Parade.

b) Sediment capture pit

Runoff from Type A allotments and the 4,740 of roads and footpaths will discharge into an underground sediment capture pit. The sediment capture pit will be 2 m wide by 2 m long. The base of the pit will be one meter lower than the inlet and outlet pipes to provide a sump for sediment accumulation. The accumulated sediment will be periodically removed.

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c) Raingarden

Runoff will be piped from the sediment sump to a 40 m² raingarden within the pocket park adjacent to the entrance to the subdivision. Stormwater will infiltrate through the vegetated filter media where physical and biological processes will remove pollutants. Stormwater will pass through the 500 mm deep filter media into an underdrain pipe and be conveyed to the legal point of discharge in Railway Parade.

The raingarden will be unlined as it is more than 5 m away from any building foundations. The extended detention above the filter media surface (200 mm) will allow temporary ponding of the stormwater during rainfall events. When the extended detention is full, additional inflows into the raingarden will be discharged into an overflow pipe and be conveyed to the legal point of discharge in Railway Parade.

The raingarden will be planted with a suite of native plant species in accordance with Council's [Raingarden Planting Palette](#).

d) Permeable paving

Stormwater runoff from the non-trafficable pathways will be infiltrated to the underlying soils using permeable paving. During large rainfall events, stormwater that cannot be infiltrated via the pavers will flow overland to road network drainage.

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MUSIC assessment

The stormwater treatment strategy was modelled using Version 6.2 of the Model for Urban Stormwater Improvement Conceptualisation (MUSIC). The model was created in accordance with Melbourne Water’s MUSIC Guidelines (2016).

The model layout is shown below in figure 1. The results for the treatment train effectiveness are shown in **Error! Reference source not found.** It can be seen that the strategy meets the required stormwater quality standards.

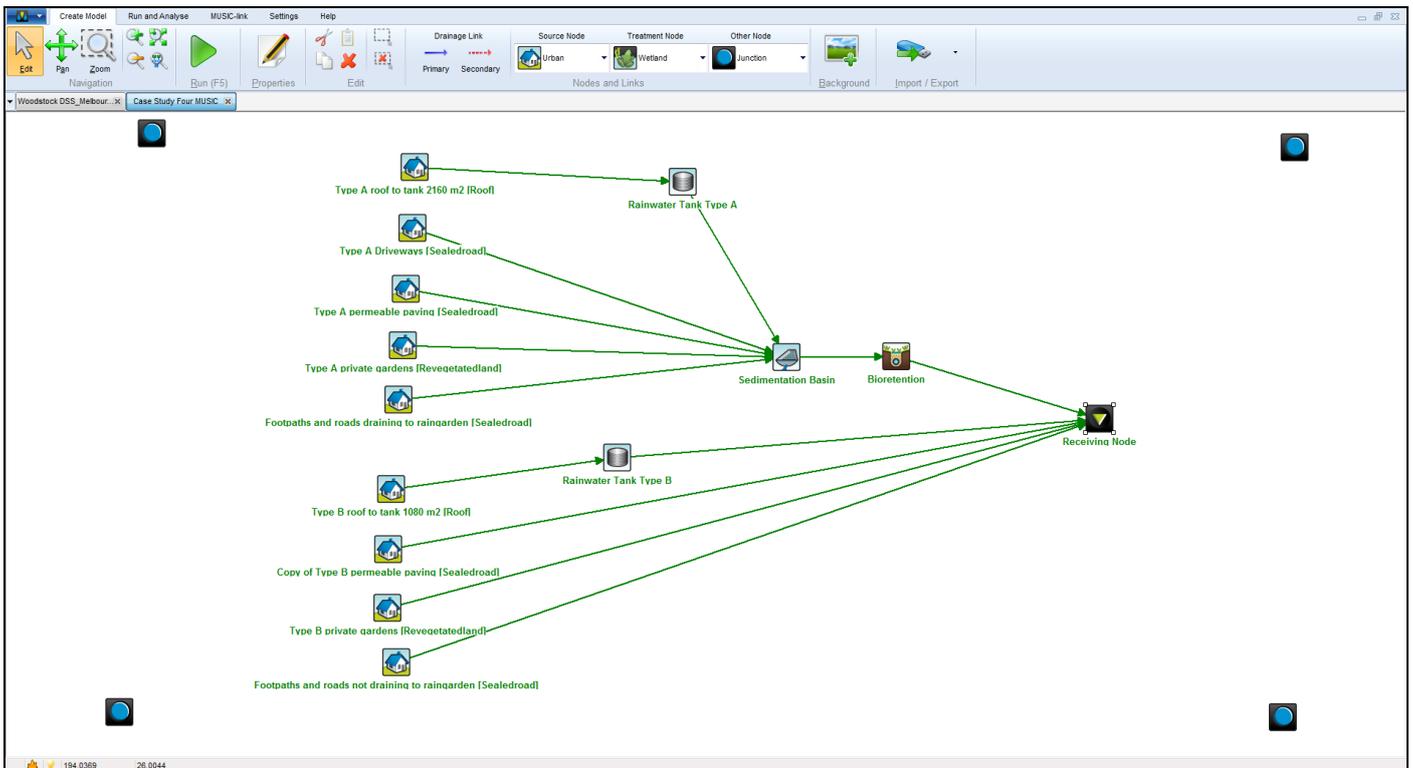


Figure 1: Screen shot of the electronic MUSIC model.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	5.41	4.13	23.7
Total Suspended Solids (kg/yr)	1270	252	80.2
Total Phosphorus (kg/yr)	2.33	0.864	63
Total Nitrogen (kg/yr)	12.7	6.06	52.2
Gross Pollutants (kg/yr)	193	5.07	97.4

Figure 2: The MUSIC model results (treatment train effectiveness)

Parameter	Reduction achieved with proposed stormwater treatment strategy	Reduction required to comply with Clause 22.08 (based on Best Practice standards)
Mean annual load of total suspended solids	50%	80%
Mean annual load of total phosphorous	63%	45%
Mean annual load of total nitrogen	52%	45%
Mean annual load of litter	97%	70%
Mean annual stormwater runoff volume	24%	NA

Figure 3: Comparison of MUSIC results with stormwater quality standards

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