MUSIC Modelling

The MUSIC software package has been used to provide a preliminary quantitative assessment of the proposed stormwater treatment train in managing the volume of pollutant discharge generated from the proposed site. The MUSIC model will be developed using the parameters outlined in the DRAFT NSW MUSIC Modelling Guidelines (August 2010). The sizing of the proposed stormwater quality treatment devices will be based on the following:

- size and proposed use of each sub-catchment under proposed conditions
- the propsosed stormwater treatment train as discussed in Section X, and
- the need to achieve the Director General's Requirements regarding stormwater quality pollutant reduction targets as discussed below.

Stormwater Treatment Objectives

The design objective of the stormwater treatment train is to achieve the stormwater quality treatment targets as specified in the DGRs. The treatment reduction target are as follows:

- Total Suspended Solids 80%
- Total Phosphorus 65%
- Total Nitrogen 45%
- Gross Pollutants 100%

Input Parameters

The following modelling input parameters have been adopted in

- Pluvio rainfall data from the Bureau of Meteorology Penrith Lakes AWS (Station # 067113)
- Average Areal Potential Evapo-Transpiration Data from Sydney (as provided by eWater)
- Pollutant EMC values from the DRAFT NSW MUSIC Modelling Guidelines (August 2010)
- Default Impervious Area Properties
- Default Pervious Area Properties
- Default Groundwater Properties.
- External Irrigation reuse based on 5 ML/year/ha

A single model has been developed to reflect the proposed development and has been modelled based on the following catchment areas.

Sub-Catchment	Nodes	Adopted EMC's Values	Catchment Area (m^2)	Impervious Percentage
Lot 1	Building Roof	Roof	5,700	100%
	Car Park/Hardstand Areas	Commercial	7,879	95%
Lot 2	Building Roof	Roof	4,500	100%
	Car Park/Hardstand Areas	Commercial	6,050	95%
Lot 3	Building Roof	Roof	21,500	100%
	Car Park/Hardstand Areas	Commercial	29,431	95%
Lot 4	Building Roof	Roof	23,000	100%
	Car Park/Hardstand Areas	Commercial	31,349	95%
Lot 5	Building Roof	Roof	2,600	100%
	Car Park/Hardstand Areas	Commercial	3,717	95%

Sub-Catchment	Nodes	Adopted EMC's Values	Catchment Area (m^2)	Impervious Percentage
Lot 6	Building Roof	Roof	9,500	100%
	Car Park/Hardstand Areas	Commercial	13,129	95%
Lot 7	Building Roof	Roof	1,600	100%
	Car Park/Hardstand Areas	Commercial	2,210	95%
Lot 8	Building Roof	Roof	11,200	100%
	Car Park/Hardstand Areas	Commercial	15,453	95%
Access Road	Roof to Rainwater Tank	Road	19,885	85%

It should be noted that the total building footprint area is based on the objective of providing up to 80,000 m2 of large format industrial real estate with roof area distributed to each lot on a pro-rated basis.

A screen shot of the MUSIC model is shown in **Figure 1**.

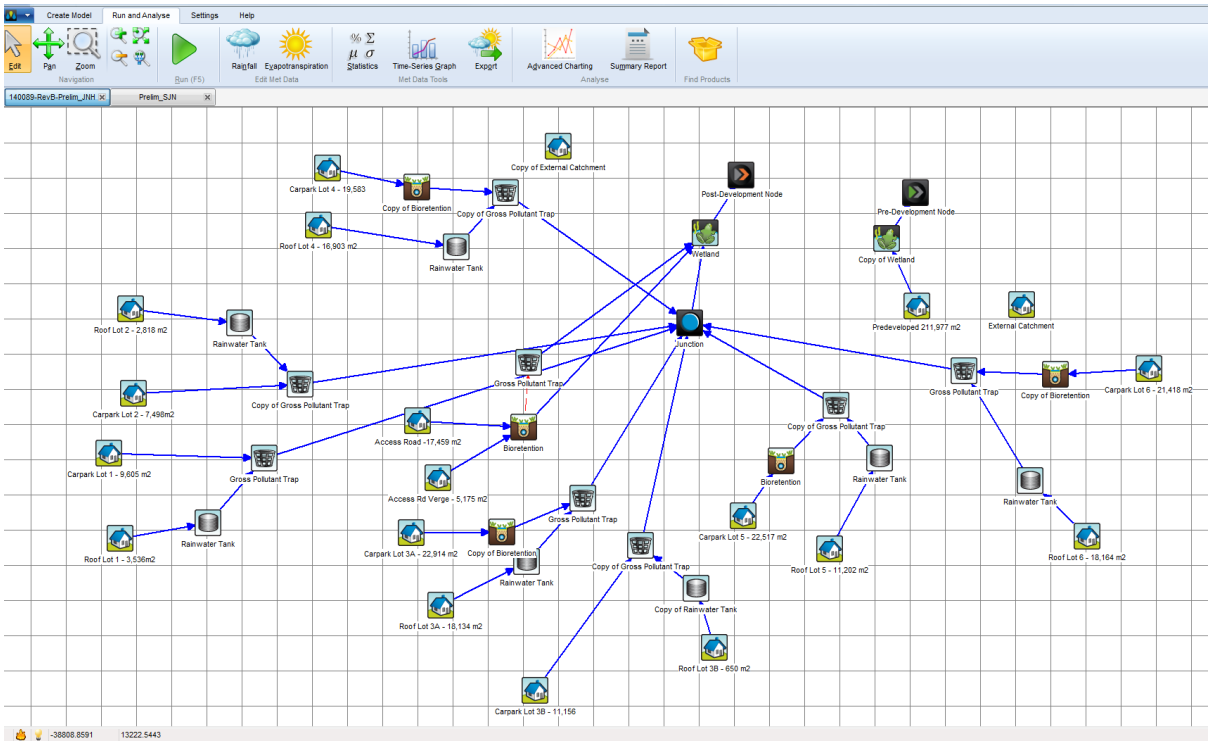

Figure 1 – Screen Shot of MUSIC Model

MUSIC results

The modelling results for each of the models are presented below.

	Site Under Proposed Conditions without stormwater quality treatment devices	**Site Under Proposed Conditions with stormwater quality treatment devices**	***Percentage Reduction***	***Required Reduction Targets***	***Satisfied DGRs***
Total Suspended Solids (kg/yr)	33000	2230	93.2%	80%	Yes
Total Phosphorus (kg/yr)	62.4	20.9	66.5%	65%	Yes
Total Nitrogen (kg/yr)	359	165	54%	45%	Yes
Gross Pollutants (kg/yr)	4220	0	100%	100%	Yes

Size of Stormwater Quality Treatment Devices

The results presented above have been achieved with the following stormwater quality treatment devices implemented on each proposed lot.

Lot Number	**Rainwater Tanks for Reuse**	**Litter Baskets**	**Gross Pollutant Traps**	**Bio-retention Swales/Basins**
Lot 1	Yes	In all surface stormwater inlet pits	Yes	Yes (min filtration media area of 200 m^2)
Lot 2	Yes	In all surface stormwater inlet pits	Yes	Yes (min filtration media area of 300 m^2)
Lot 3	Yes	In all surface stormwater inlet pits	Yes	Yes (min filtration media area of 1,400 m^2)
Lot 4	Yes	In all surface stormwater inlet pits	Yes	Yes (min filtration media area of 1,500 m^2)
Lot 5	Yes	In all surface stormwater inlet pits	Yes	Yes (min filtration media area of 200 m^2)
Lot 6	Yes	In all surface stormwater inlet pits	Yes	Yes

Lot Number	Rainwater Tanks for Reuse	Litter Baskets	Gross Pollutant Traps	Bio-retention Swales/Basins
				(min filtration media area of 650 m^2)
Lot 7	Yes	In all surface stormwater inlet pits	Yes	Yes (min filtration media area of 110 m^2)
Lot 8	Yes	In all surface stormwater inlet pits	Yes	Yes (min filtration media area of 770 m^2)
Access Road	No	In all surface stormwater inlet pits	No	No

Conclusion

The MUSIC modelling results presented above demonstrates that the stormwater management strategy and treatment devices proposed for the development can effectively manage pollutant runoff generated from the site. The results demonstrate that with onsite treatment devices incorporated into the stormwater management strategy, total pollutant volumes generated across the site can be effectively reduced to achieved the DGR's and significant reduce the impact on downstream receiving waterways.