

Our Reference: SY193308

12th February 2021

Sirius Development Pty Ltd

c/- John Green
52 Victoria Street
Paddington NSW 2021

Dear John,

Re: 2-60 Cumberland Street, The Rocks (SSD 10384)

Northrop Consulting Engineers Pty Ltd, as the stormwater engineering consultant for this project, has reviewed the “Request for Advice” provided by City of Sydney dated 17th December 2020 and provide the following response in relation to item 6- Public Domain-MUSIC link.

The City has adopted MUSIC-link for assessing Water Sensitive Urban Design (WSUD) compliance for developments. A stormwater quality assessment for the proposed development must comply with the City’s specific modelling parameters as adopted in MUSIC-link. A certificate or report from MUSIC-link and the electronic copy of the MUSIC Model must be submitted for review and approval with the stormwater quality assessment report.

Northrop has assessment the Water Sensitive Urban Design (WSUD) for this project and has proposed the following treatment measures to achieve City of Sydney’s water quality targets. Provided below is a screenshot of the MUSIC model and results.

Stormwater Pollutants	% Reduction in average annual load	Pollution Reduction Target (%)
Total Suspended Solids	85.3	85
Total Phosphorus	78.4	65
Total Nitrogen	51	45
Gross Pollutants	100	90

Stormwater treatment

The stormwater treatment train consists of

- 2 x Water Quality Chambers
- Ocean Protect 16x 690 PSorb filter cartridges

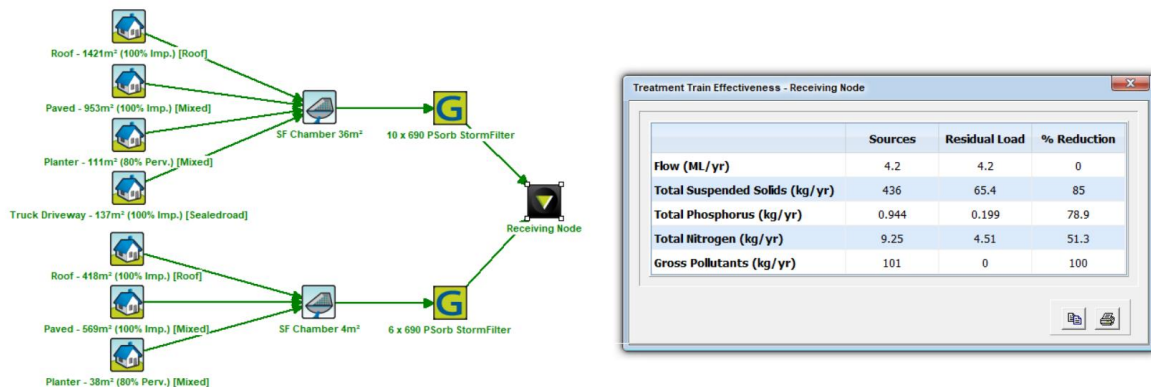


Figure 1: MUSIC model layout

As shown above, the stormwater treatment targets appropriate for the site will be met by the treatment measures provided. The pollutant removal performance as predicted by MUSIC modelling exceeded City of Sydney Water quality targets of 90%/85%/65%/45% for GP, TSS, TP and TN respectively.

This letter is based on our professional opinion and design assumptions that have been made in accordance with normal engineering practice.

Please feel free to discuss any aspect with the undersigned.

Neville Naicker
Civil Engineer
Northrop Consulting Engineers

Stephen Fryer
BE (Civil) MIEAust CPEng NER
Principal | Civil Engineer
Northrop Consulting Engineers

Attachments:

1. Appendix A – City of Sydney MUSIC link

MUSIC-link Report

Project Details		Company Details	
Project:	2-60 Cumberland St, The Rocks	Company:	Northrop Consulting Engineers Pty Ltd
Report Export Date:	31/08/2020	Contact:	Neville Naicker
Catchment Name:	14332 - 2-60 Cumberland St The Rocks (Prelim - Option3)	Address:	Level 2, 3 Horwood Place Parramatta NSW 2150
Catchment Area:	0.365ha	Phone:	02 9241 4188
Impervious Area*:	96.71%	Email:	NNaicker@northrop.com.au
Rainfall Station:	66062 SYDNEY		
Modelling Time-step:	6 Mminutes		
Modelling Period:	1/01/1982 - 31/12/1986 11:54:00 PM		
Mean Annual Rainfall:	1278mm		
Evapotranspiration:	1265mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.33		
Study Area:	City of Sydney Sandy Loam Soil		
Scenario:	City of Sydney Development		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Receiving Node	Reduction	Node Type	Number	Node Type	Number
Flow	-	Sedimentation Basin Node	2	Urban Source Node	7
TSS	0.00183%	Generic Node	2		
TP	85.3%				
TN	78.4%				
GP	51%				
	100%				

Comments

- The 'SF Chamber' node has been modified to represent the below ground filtration chamber. Default 'K' values have been manually adjusted to 1 in order to eliminate any performance from the actual tank, which would already be accounted for in the Filter Generic Node Target Elements/Transfer Functions. This must be adjusted for any proprietary filter using this method of modelling. Not doing this would represent a duplication of the chamber attenuation effect. (For any questions, please Contact Ocean Protect on 1300 354 722).

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Receiving	Receiving Node	% Load Reduction	None	None	-0.00
Receiving	Receiving Node	GP % Load Reduction	90	None	100
Receiving	Receiving Node	TN % Load Reduction	45	None	51
Receiving	Receiving Node	TP % Load Reduction	65	None	78.4
Receiving	Receiving Node	TSS % Load Reduction	85	None	85.3
Sedimentation	SF Chamber 36m	% Reuse Demand Met	None	None	0
Sedimentation	SF Chamber 36m	Exfiltration Rate (mm/hr)	0	0	0
Sedimentation	SF Chamber 36m	Extended detention depth (m)	0.25	1	0.77
Sedimentation	SF Chamber 36m	High Flow Bypass Out (ML/yr)	None	None	0
Sedimentation	SF Chamber 4m	% Reuse Demand Met	None	None	0
Sedimentation	SF Chamber 4m	Exfiltration Rate (mm/hr)	0	0	0
Sedimentation	SF Chamber 4m	Extended detention depth (m)	0.25	1	0.77
Sedimentation	SF Chamber 4m	High Flow Bypass Out (ML/yr)	None	None	0
Urban	Paved - 569m (100% Imp.)	Area Impervious (ha)	None	None	0.057
Urban	Paved - 569m (100% Imp.)	Area Pervious (ha)	None	None	0
Urban	Paved - 569m (100% Imp.)	Total Area (ha)	None	None	0.057
Urban	Paved - 953m (100% Imp.)	Area Impervious (ha)	None	None	0.095
Urban	Paved - 953m (100% Imp.)	Area Pervious (ha)	None	None	0
Urban	Paved - 953m (100% Imp.)	Total Area (ha)	None	None	0.095
Urban	Planter - 111m (80% Perv.)	Area Impervious (ha)	None	None	0.0022
Urban	Planter - 111m (80% Perv.)	Area Pervious (ha)	None	None	0.0088
Urban	Planter - 111m (80% Perv.)	Total Area (ha)	None	None	0.011
Urban	Planter - 38m (80% Perv.)	Area Impervious (ha)	None	None	0.0008
Urban	Planter - 38m (80% Perv.)	Area Pervious (ha)	None	None	0.0032
Urban	Planter - 38m (80% Perv.)	Total Area (ha)	None	None	0.004
Urban	Roof - 1421m (100% Imp.)	Area Impervious (ha)	None	None	0.142
Urban	Roof - 1421m (100% Imp.)	Area Pervious (ha)	None	None	0
Urban	Roof - 1421m (100% Imp.)	Total Area (ha)	None	None	0.142
Urban	Roof - 418m (100% Imp.)	Area Impervious (ha)	None	None	0.042
Urban	Roof - 418m (100% Imp.)	Area Pervious (ha)	None	None	0
Urban	Roof - 418m (100% Imp.)	Total Area (ha)	None	None	0.042
Urban	Truck Driveway - 137m (100% Imp.)	Area Impervious (ha)	None	None	0.014
Urban	Truck Driveway - 137m (100% Imp.)	Area Pervious (ha)	None	None	0
Urban	Truck Driveway - 137m (100% Imp.)	Total Area (ha)	None	None	0.014

Only certain parameters are reported when they pass validation

Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Sedimentation	SF Chamber 36m	Notional Detention Time (hrs)	8	12	0.636
Sedimentation	SF Chamber 36m	Total Nitrogen - k (m/yr)	500	500	1
Sedimentation	SF Chamber 36m	Total Phosphorus - k (m/yr)	6000	6000	1
Sedimentation	SF Chamber 36m	Total Suspended Solids - k (m/yr)	8000	8000	1
Sedimentation	SF Chamber 4m	Notional Detention Time (hrs)	8	12	0.0902
Sedimentation	SF Chamber 4m	Total Nitrogen - k (m/yr)	500	500	1
Sedimentation	SF Chamber 4m	Total Phosphorus - k (m/yr)	6000	6000	1
Sedimentation	SF Chamber 4m	Total Suspended Solids - k (m/yr)	8000	8000	1

Only certain parameters are reported when they pass validation