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St Aloysius' College, Kirribilli (Main Campus)

Civil

Stormwater Management Report

Prepared for:

Bloompark Consulting Pty Ltd

Prepared by:

Timothy Fitzhardinge
Project No. 33964
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Date:
16th March 2018

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Revision

Site Address:	47 Upper Pitt St, Kirribilli
Real Property Description:	Lot 10 in DP880841
Proposed Development:	Educational Development
Client:	Bloompark Consulting Pty Ltd
Local Authority	North Sydney Council
Authority Reference #:	N/A
Wood & Grieve Reference:	33964(A)-SYD-C-R-SMP

Tim Fitzhardinge
For and on behalf of
Wood & Grieve Engineers

REVISION	DATE	COMMENT	APPROVED BY
A	06.02.18	SSDA Issue	**TIF**
B	16.03.18	SSDA Issue	**TIF**

Contents

1. Introduction

Wood & Grieve Engineers have been commissioned by Bloompark Consulting Pty Ltd to prepare this Stormwater Management Plan (SMP) in support of the Site Significant Development Application for the proposed development at 47 Upper Pitt St, Kirribilli. The sites real address is Lot 10 in DP880841.

This SMP outlines the conceptual DA level stormwater design for the proposed development of the future development lots on the site.

This SMP illustrates that the proposed development complies with the North Sydney Council's Engineering Guide for Development, Australian Rainfall and Runoff, Australian Standards and best engineering practise.

The purpose of this SMP is to evaluate the quantity and quality of stormwater associated with the proposed development plan so as to demonstrate to Council that an appropriate stormwater management strategy has been adopted.

The SMP specifically addresses the following items for both the construction and operational phases of the development:

- Stormwater runoff volumes and detention (Stormwater Quantity);
- Stormwater quality treatment measures (Stormwater Quality),
- Erosion and Sedimentation Control.

The following will be achieved with the correct application of this SMP report:

- Appropriate standards to be maintained on all aspects of stormwater within the site,
- Establishment of a unified, clear and concise stormwater management strategy.

2. Existing Site Characteristics

2.1 Property Detail

Address: 47 Upper Pitt St, Kirribilli

Real Property Description: Lot 10 in DP880841

Total Site Area: 3835m² (0.3835Ha)

The proposed development can be seen on the concept design drawings in Appendix A of this report.

The proposed development is situated within North Sydney Council. The proposed redevelopment will consist of refurbishment of the existing educational facility.

The site is bounded by:

- Upper Pitt Street to the north
- Residential properties to the east
- Kirribilli Avenue to the south
- Jeffrey's Street to the west

Refer to locality plan in figure 1.

Figure 1: Site Location Plan (Source: Nearmaps 2016)

2.2 Topography

The existing site is a 100% impervious educational facility.

The site falls North-east to South-west away from Upper Pitt street. The high point of the site is located in the North east corner of the site at a level of RL34.03m AHD with the low point located along the South east corner boundary of RL16.97m AHD.

2.3 Stormwater Catchments

The surrounding area has been investigated to determine the likely impact of existing external stormwater catchments on the proposed site.

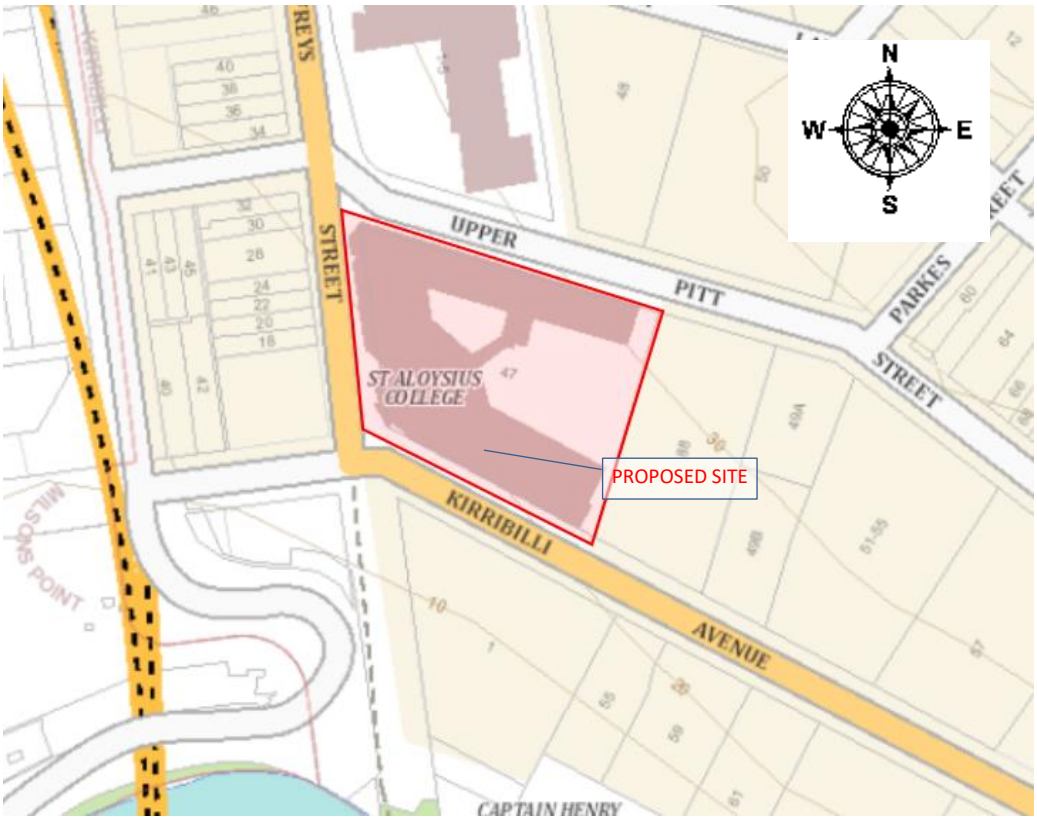


Figure 2: Upstream Catchment Plan
(Source: SIX VIEWER 2017 – Department of Land and Property Information NSW)

The site is situated around the middle of the catchment. Overland flows from the upstream catchment will be conveyed through the existing road networks.

2.4 Existing Stormwater Discharge

The site contains existing stormwater pit and pipe networks. The existing drainage network discharges via council's drainage infrastructure; through an existing kerb inlet pit with a concrete lintel along Kirribilli Avenue.

3. Local Authority Requirements

North Sydney Council set the design requirements for any new stormwater management system associated with new development in their Engineering Guide for Development. A summary of the key requirements for the development of the Stormwater management system for this development are summarized below.

3.1 Stormwater Conveyance Requirements

Council's Engineering Guide for Development states that the following design storm Average Recurrence Intervals ARI's should be allowed for when designing the Stormwater runoff conveyance systems for the development.

Table 1: Stormwater Drainage Serviceability

Design Parameter	Design Storm ARI (Years)	Conveyance Method
Minor Drainage System	20	In Ground (Piped)
Major Drainage System	100	Overland

3.2 On Site Detention Requirements

Section 18.1.1 of North Sydney Council's DCP states "To mimic pre-development or natural drainage system as much as possible". This condition implies that On-site detention requirements are to limit post development runoff to the pre-development runoff. Both pre-development and post development consist of 100% impervious area, thus no on-site detention required.

3.3 Stormwater Quality Treatment

Council's DCP States that " All developments with a gross floor area greater than 2000m² are to undertake a stormwater quality assessment to demonstrate that the development will achieve the post-development pollutant load standards indicated below: "

a) Litter and vegetation larger than 5mm: 90% reduction on the Baseline Annual Pollutant Load;
b) Total Suspended Solids: 85% reduction on the Baseline Annual Pollutant Load;
c) Total Phosphorous: 65% reduction on the Baseline Annual Pollutant Load;
d) Total Nitrogen: 45% reduction on the Baseline Annual Pollutant Load.

4. Flood Impact Assessment

When considering a new development, it is necessary to assess the impact of existing flooding on the proposed development and the potential flooding impact of the proposed development upon existing developments located upstream and downstream of the site.

4.1 Existing Flooding

4.1.1 Flood Related Development Controls

Wood and Grieve have reviewed Council's LEP documentation and Council's Flood Studies North Sydney LGA Flood Study (February 2017) and the site is located within Council's 1% AEP Flood extent. From Figure 3 below, the northern and western boundary of the proposed development are impacted by minor flooding during the 1% AEP. The flood depth inundation for the 1% AEP storm event generally ranges from 0.00m to 0.15m along both Upper Pit Street and Jeffreys Street.

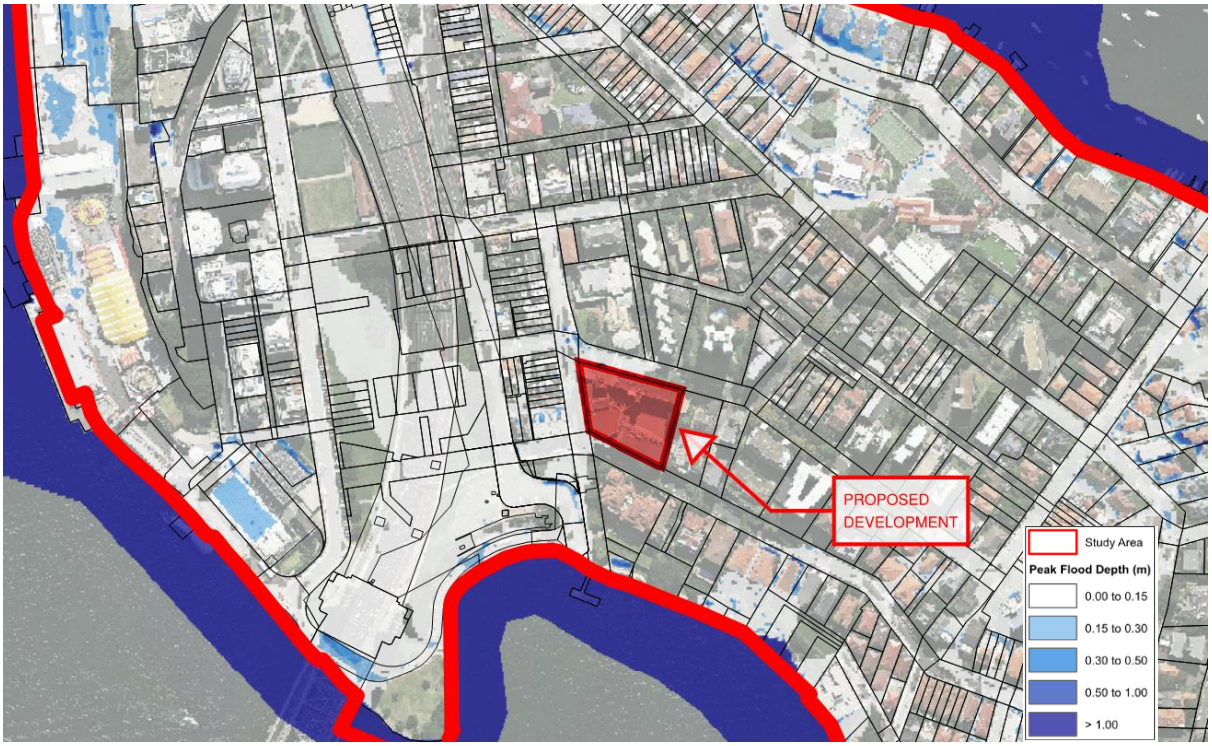


Figure 3: Peak Flood Depth and Flood Level Contours 1% AEP (Source: North Sydney LGA Flood Study WMA water – February 2017)

Reference to North Sydney Flood mapping indicates that the site has a low risk classification for flooding. If flood barriers are required, they will be designed to meet council's 500mm freeboard, flood flooding solutions or approved equivalent.

4.1.2 Local Flooding

Local or Nuisance flooding describes flooding occurring due to site specific constraints. Local flooding is often caused by local topographical constraints and stormwater drainage system capacity restrictions.

Wood & Grieve have assessed the local constraints surrounding and through the site to ascertain any areas where local flooding may be an issue.

All proposed site drainage has been documented to fall towards to the proposed and existing stormwater pit and pipe system which ultimately drains to Kirribilli Avenue.

5. Stormwater Conveyance

This section of the report discusses the systems proposed to allow for stormwater to be conveyed across the site to the legal point of discharge.

As discussed in Section 3.1 of this report Council have set minimum design parameters for the flows they require to be conveyed through the in ground drainage system and what they will allow to be conveyed in a controlled manner overland across the site.

5.1 Surface Drainage

The surface areas will be drained through a variety of methods, discussed below, in accordance with AS3500.3:2015 and Council's stormwater drainage guidelines.

5.1.1 In-Ground Drainage

The in-ground drainage has been designed to meet the following criteria:

- In the minor design storm event (20 year) there will be no surcharging of the in ground drainage system and;
- In the major design storm event (100 year) there will be no uncontrolled discharge from the site onto the residential properties to the east of the site.

Surface runoff from the development sites will be directed to stormwater inlet structures using the design topography of these elements. The inlet structures have been designed to adequately convey the surface runoff into the in ground drainage network.

The runoff will then be conveyed underground across the site through a pit and pipe system and then to the legal point of discharge using gravity and the geometric falls of the pipe system.

5.2 Legal Point of Discharge

The legal point of discharge will be into Council's kerb inlet pit and street drainage network in Kirribilli Avenue.

6. Stormwater Quality

This section of the report demonstrates the Stormwater Quality Improvement Devices (SQID's) to be implemented and the Pollutant Export Modelling undertaken to demonstrate the effectiveness of the treatment system in achieving the reduction targets set by Council.

6.1 Potential Pollutants

There are a wide range of potential stormwater pollutant sources which occur from urbanised catchments, many which can be managed through appropriate stormwater quality treatment. Typical urban pollutants may include:

- Atmospheric deposition
- Erosion (including that from subdivision and building activities)
- Litter and debris
- Traffic emissions and vehicle wear
- Animal droppings
- Pesticides and fertilisers
- Application, storage and wash-off of car oil, detergents and other household and commercial solvents and chemicals
- Solids accumulation and growth in stormwater systems
- Weathering of buildings

These pollutants in urban stormwater can be placed into various categories as follows. The pollutants underlined below are able to be readily modelled:

- Suspended Solids
- Litter
- Nutrients such as Nitrogen and Phosphorous
- Biological oxygen demand (BOD) and chemical oxygen demand (COD) materials
- Micro-organisms
- Toxic organics
- Trace metals
- Oils and surfactants

While only the key pollutants underlined above will be examined within the modelling, the stormwater Quality Improvement Devices implemented are expected to assist in reducing a wide range of pollutants. For example, heavy metals are commonly associated with, and bound to fine sediments. Thus reducing the discharge of fine sediment during the construction and operational phases will reduce the discharge of heavy metals to existing stormwater systems.

6.2 Pollutant Reduction System

In order to achieve the pollutant reduction targets specified in section 3.3 of this report a series of treatment devices are proposed, which together, form a treatment train. The diagram below shows the proposed treatment train for this development.

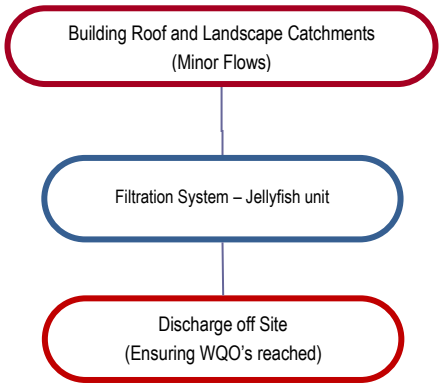


Figure 4: Proposed Water Quality Treatment Train

Further discussion on each element of this treatment train is provided below.

6.2.1 Stormwater360 Jellyfish

The Stormwater360 Jellyfish filter unit used filtration cartridges to remove high levels of stormwater pollutants including:

- Total Suspended Solids (TSS), median removal efficiency of 89%, including particles down to two microns
- Total Nitrogen (TN), median removal efficiency of 55%
- Total Phosphorous (TP), median removal efficiency of 65%
- Total Copper (Cu), median removal efficiency of 61%
- Total Zinc (Zn), median removal efficiency of 91%.
- Total Oil and Grease, median removal efficiency of 62%

One Jellyfish JF-1200-3-1 has been proposed for the development.
The MUSIC modelling parameters for this device are set by the manufacturer, Stormwater360.

Figure 5: Jellyfish infiltration Unit (Source: Stormwater360)

6.3 Pollutant Reduction Modelling

In order to demonstrate that the proposed treatment train meets the required reduction targets, pollutant reduction modelling is proposed using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Software program Version 6.1 by eWater CRC. Pollutant export rates are currently only available for Total Suspended Solids (TSS), Total Nitrogen (TN), Total Phosphorous (TP) and Gross Pollutants (GP). Therefore only quantitative modelling for TSS, TN, TP & GP has been undertaken using MUSIC.

Modelling has only been undertaken on the post-development proposal with SQID's installed so as to demonstrate the percentage reduction for each pollutant type.

6.3.1 MUSIC Program Setup

This section explains the setup of the MUSIC model with the detailed pollutant reduction calculations being included in the MUSIC results in Appendix C.

For MUSIC Modelling (using MUSIC 6.2.0) the following parameters have been used in accordance with North Sydney Council WSUD Reference Guideline:

Table 2: MUSIC modelling parameters

Model Parameters	
Meteorological Data:	Sydney 1959
Evaporation Data:	Sydney 1959
Time Step:	6 minute

Table 3: Recommended MUSIC Runoff Generation Parameters

Parameter	Urban Residential
Rainfall Threshold (mm)	1.4
Soil Capacity (mm)	120
Initial Storage (%)	25
Field Capacity	80
Infiltration Capacity Coefficient a	200
Infiltration Capacity Coefficient b	1.00
Initial Depth (mm)	10
Daily Recharge Rate (%)	25
Daily Drainage Rate (%)	5
Daily Deep Seepage Rate (%)	0

MUSIC Concentration Parameters

Table 4: MUSIC Concentration Parameters for Sydney Catchment Authority

Land-use Type	Parameters	TSS Log10 mg/L		TP Log10 mg/L		TN Log10 mg/L	
		Base Flow	Storm Flow	Base Flow	Storm Flow	Base Flow	Storm Flow
Roof Area	Mean	N/A	1.3	N/A	-0.89	N/A	0.3
	STD Dev	N/A	0.32	N/A	0.25	N/A	0.19
Residential	Mean	1.2	2.15	-0.85	-0.6	0.11	0.3
	STD Dev	0.17	0.32	0.19	0.25	0.12	0.19

Table 5: Catchment modelling parameters

Node Description	Area (Ha)	Percentage Impervious (%) / Area Impervious (Ha)		Land Use Rainfall and Pollutant Parameters
Site - Roof	0.3835	100	0.3835	Urban Roof
	Total: 0.3835Ha			

6.3.2 MUSIC Results & Parameters

MUSIC Model

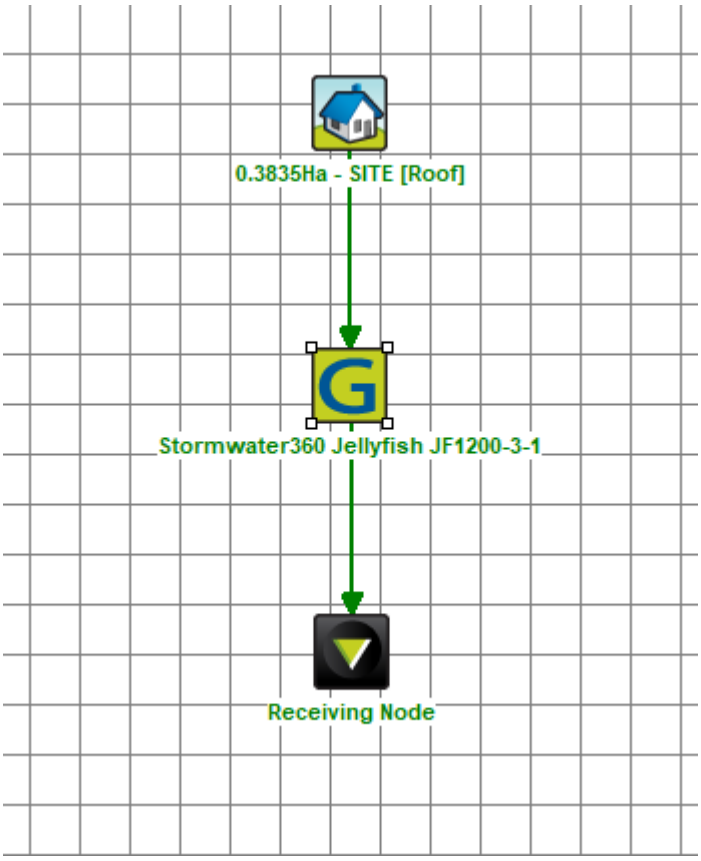
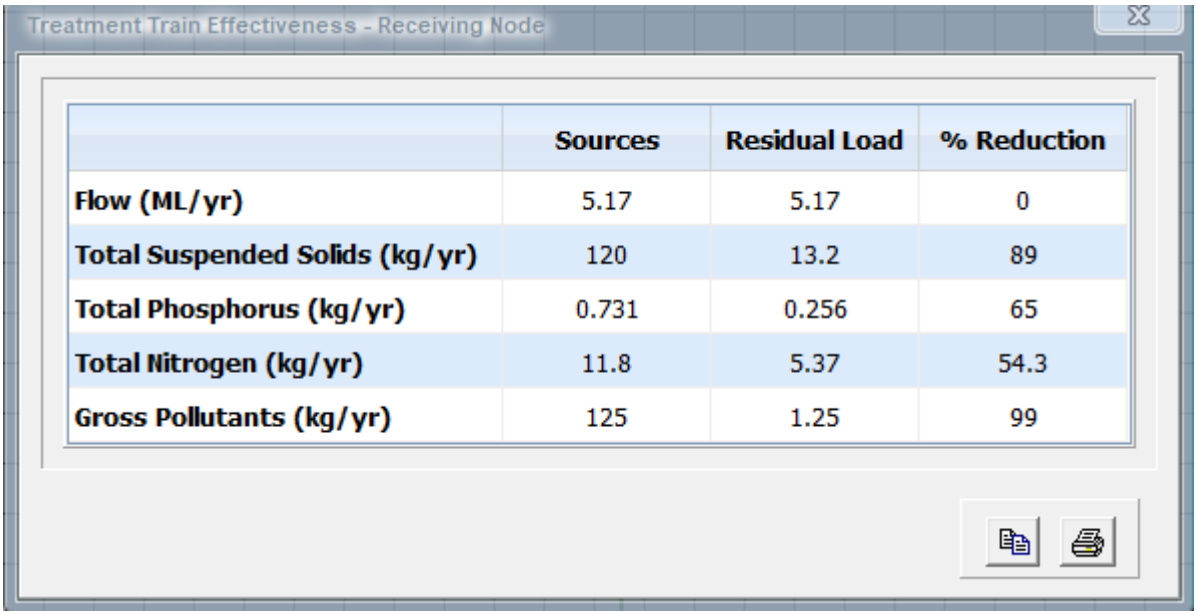


Figure 6 MUSIC Model

MUSIC Output



	Sources	Residual Load	% Reduction
Flow (ML/yr)	5.17	5.17	0
Total Suspended Solids (kg/yr)	120	13.2	89
Total Phosphorus (kg/yr)	0.731	0.256	65
Total Nitrogen (kg/yr)	11.8	5.37	54.3
Gross Pollutants (kg/yr)	125	1.25	99

Figure 7 MUSIC Results

6.3.3 Pollutant Reduction Results

A number of management measures have been considered with a focus on reducing polluted runoff volumes from the site. The WSUD principals proposed for stormwater treatment includes the following SQID's:

- Jellyfish Unit JF-1200-3-1

The effectiveness of the treatment devices proposed in the above section has been modelled using MUSIC with the overall treatment train efficiency results shown in Table 10 below.

Table 6: Treatment Train Efficiencies

Indicator	Total Site Reduction	Site Targets	Target Achieved
Gross Pollutants	99.0%	90%	Yes
Total Suspended Solids (TSS)	89.0%	85%	Yes
Total Phosphorus (TP)	65.0%	65%	Yes
Total Nitrogen (TN)	54.3%	45%	Yes

From the results presented above it can be seen that the proposed SQID's mean that the stormwater quality treatment meets with the reduction targets set for the development.

7. Erosion & Sedimentation Control

Landcom have published a design guide entitled "Managing Urban Stormwater - Soils and Construction" which is regarded as the standard to which erosion and sedimentation control should be designed to within NSW. North Sydney Council specifies compliance with the Landcom design guide in there Stormwater and Floodplain Management Technical Manual.

The control of erosion and sedimentation describes the measures incorporated during and following construction of a new development to prevent the pollution and degradation of the downstream watercourse.

A Soil and Water Management Plan has prepared as part of the development application documentation and is included in Appendix A of this report.

Common control measures adopted are:

- Sedimentation fences;
- Sedimentation basins;
- Stormwater drainage inlet protection;
- Overland flow diversion swales;
- Shaker Grids and wash downs for vehicles leaving the construction site;
- Dust control measures.

The maintenance of these control measures throughout their intended lifespan will ensure that the risk of erosion and sedimentation pollution of the downstream watercourse will be minimized.

8. Conclusion

The civil design in this report complies with North Sydney Council's DCP, Australian Standards and best practice principals. The proposed development addresses (and incorporates as required) stormwater quantity, stormwater conveyance and stormwater quality treatment in accordance with Council's Stormwater Management DCP.

APPENDIX A Civil Drawings

APPENDIX B Music Model Results

Source nodes
Location,0.3835Ha - SITE
ID,1
Node Type,UrbanSourceNode
Zoning Surface Type,Roof
Total Area (ha),0.383
Area Impervious (ha),0.383
Area Pervious (ha),0
Field Capacity (mm),80
Pervious Area Infiltration Capacity coefficient - a,200
Pervious Area Infiltration Capacity exponent - b,1
Impervious Area Rainfall Threshold (mm/day),1
Pervious Area Soil Storage Capacity (mm),120
Pervious Area Soil Initial Storage (% of Capacity),25
Groundwater Initial Depth (mm),10
Groundwater Daily Recharge Rate (%),25
Groundwater Daily Baseflow Rate (%),5
Groundwater Daily Deep Seepage Rate (%),0
Stormflow Total Suspended Solids Mean (log mg/L),1.3
Stormflow Total Suspended Solids Standard Deviation (log mg/L),0.32
Stormflow Total Suspended Solids Estimation Method,Stochastic
Stormflow Total Suspended Solids Serial Correlation,0
Stormflow Total Phosphorus Mean (log mg/L),-0.89
Stormflow Total Phosphorus Standard Deviation (log mg/L),0.25
Stormflow Total Phosphorus Estimation Method,Stochastic
Stormflow Total Phosphorus Serial Correlation,0
Stormflow Total Nitrogen Mean (log mg/L),0.3
Stormflow Total Nitrogen Standard Deviation (log mg/L),0.19
Stormflow Total Nitrogen Estimation Method,Stochastic
Stormflow Total Nitrogen Serial Correlation,0
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Baseflow Total Suspended Solids Standard Deviation (log mg/L),0.17
Baseflow Total Suspended Solids Estimation Method,Mean
Baseflow Total Suspended Solids Serial Correlation,0
Baseflow Total Phosphorus Mean (log mg/L),-0.82
Baseflow Total Phosphorus Standard Deviation (log mg/L),0.19
Baseflow Total Phosphorus Estimation Method,Stochastic
Baseflow Total Phosphorus Serial Correlation,0
Baseflow Total Nitrogen Mean (log mg/L),0.32
Baseflow Total Nitrogen Standard Deviation (log mg/L),0.12
Baseflow Total Nitrogen Estimation Method,Stochastic
Baseflow Total Nitrogen Serial Correlation,0
Flow based constituent generation - enabled,Off
Flow based constituent generation - flow file,
Flow based constituent generation - base flow column,
Flow based constituent generation - pervious flow column,

Flow based constituent generation - impervious flow column,
Flow based constituent generation - unit,
OUT - Mean Annual Flow (ML/yr),5.17
OUT - TSS Mean Annual Load (kg/yr),120
OUT - TP Mean Annual Load (kg/yr),0.731
OUT - TN Mean Annual Load (kg/yr),11.8
OUT - Gross Pollutant Mean Annual Load (kg/yr),125
Rain In (ML/yr),5.70644
ET Loss (ML/yr),0.540941
Deep Seepage Loss (ML/yr),0
Baseflow Out (ML/yr),0
Imp. Stormflow Out (ML/yr),5.1655
Perv. Stormflow Out (ML/yr),0
Total Stormflow Out (ML/yr),5.1655
Total Outflow (ML/yr),5.1655
Change in Soil Storage (ML/yr),0
TSS Baseflow Out (kg/yr),0
TSS Total Stormflow Out (kg/yr),120.451
TSS Total Outflow (kg/yr),120.451
TP Baseflow Out (kg/yr),0
TP Total Stormflow Out (kg/yr),0.731026
TP Total Outflow (kg/yr),0.731026
TN Baseflow Out (kg/yr),0
TN Total Stormflow Out (kg/yr),11.7549
TN Total Outflow (kg/yr),11.7549
GP Total Outflow (kg/yr),124.991

No Imported Data Source nodes

No USTM treatment nodes

Generic treatment nodes
Location,Stormwater360 Jellyfish JF2250-3-1
ID,3
Node Type,GenericNode
Lo-flow bypass rate (cum/sec),0
Hi-flow bypass rate (cum/sec),0.0175
Flow Transfer Function
Input (cum/sec),0
Output (cum/sec),0
Input (cum/sec),10
Output (cum/sec),10
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Output (cum/sec),
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Output (cum/sec),
Input (cum/sec),
Output (cum/sec),
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Output (cum/sec),
Input (cum/sec),
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Output (cum/sec),
Gross Pollutant Transfer Function
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Output (kg/ML),
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Output (kg/ML),
Input (kg/ML),
Output (kg/ML),
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Total Nitrogen Transfer Function
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Output (mg/L),
Input (mg/L),
Output (mg/L),
Total Phosphorus Transfer Function
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Output (mg/L),
Input (mg/L),
Output (mg/L),
TSS Flow based Efficiency Enabled,Off

TSS Flow based Efficiency,
TP Flow based Efficiency Enabled,Off
TP Flow based Efficiency,
TN Flow based Efficiency Enabled,Off
TN Flow based Efficiency,
GP Flow based Efficiency Enabled,Off
GP Flow based Efficiency,
IN - Mean Annual Flow (ML/yr),5.17
IN - TSS Mean Annual Load (kg/yr),120
IN - TP Mean Annual Load (kg/yr),0.731
IN - TN Mean Annual Load (kg/yr),11.8
IN - Gross Pollutant Mean Annual Load (kg/yr),125
OUT - Mean Annual Flow (ML/yr),5.17
OUT - TSS Mean Annual Load (kg/yr),13.2
OUT - TP Mean Annual Load (kg/yr),0.256
OUT - TN Mean Annual Load (kg/yr),5.37
OUT - Gross Pollutant Mean Annual Load (kg/yr),1.25
Flow In (ML/yr),5.1655
ET Loss (ML/yr),0
Infiltration Loss (ML/yr),0
Low Flow Bypass Out (ML/yr),0
High Flow Bypass Out (ML/yr),0
Orifice / Filter Out (ML/yr),0
Weir Out (ML/yr),0
Transfer Function Out (ML/yr),5.1655
Reuse Supplied (ML/yr),0
Reuse Requested (ML/yr),0
% Reuse Demand Met,0
% Load Reduction,0
TSS Flow In (kg/yr),120.451
TSS ET Loss (kg/yr),0
TSS Infiltration Loss (kg/yr),0
TSS Low Flow Bypass Out (kg/yr),0
TSS High Flow Bypass Out (kg/yr),0
TSS Orifice / Filter Out (kg/yr),0
TSS Weir Out (kg/yr),0
TSS Transfer Function Out (kg/yr),13.2496
TSS Reuse Supplied (kg/yr),0
TSS Reuse Requested (kg/yr),0
TSS % Reuse Demand Met,0
TSS % Load Reduction,89
TP Flow In (kg/yr),0.731026
TP ET Loss (kg/yr),0
TP Infiltration Loss (kg/yr),0
TP Low Flow Bypass Out (kg/yr),0
TP High Flow Bypass Out (kg/yr),0
TP Orifice / Filter Out (kg/yr),0
TP Weir Out (kg/yr),0
TP Transfer Function Out (kg/yr),0.255859

TP Reuse Supplied (kg/yr),0
TP Reuse Requested (kg/yr),0
TP % Reuse Demand Met,0
TP % Load Reduction,65
TN Flow In (kg/yr),11.7549
TN ET Loss (kg/yr),0
TN Infiltration Loss (kg/yr),0
TN Low Flow Bypass Out (kg/yr),0
TN High Flow Bypass Out (kg/yr),0
TN Orifice / Filter Out (kg/yr),0
TN Weir Out (kg/yr),0
TN Transfer Function Out (kg/yr),5.37367
TN Reuse Supplied (kg/yr),0
TN Reuse Requested (kg/yr),0
TN % Reuse Demand Met,0
TN % Load Reduction,54.2857
GP Flow In (kg/yr),124.991
GP ET Loss (kg/yr),0
GP Infiltration Loss (kg/yr),0
GP Low Flow Bypass Out (kg/yr),0
GP High Flow Bypass Out (kg/yr),0
GP Orifice / Filter Out (kg/yr),0
GP Weir Out (kg/yr),0
GP Transfer Function Out (kg/yr),1.24991
GP Reuse Supplied (kg/yr),0
GP Reuse Requested (kg/yr),0
GP % Reuse Demand Met,0
GP % Load Reduction,100

Other nodes
Location,Receiving Node
ID,2
Node Type,ReceivingNode
IN - Mean Annual Flow (ML/yr),5.17
IN - TSS Mean Annual Load (kg/yr),13.2
IN - TP Mean Annual Load (kg/yr),0.256
IN - TN Mean Annual Load (kg/yr),5.37
IN - Gross Pollutant Mean Annual Load (kg/yr),1.25
OUT - Mean Annual Flow (ML/yr),5.17
OUT - TSS Mean Annual Load (kg/yr),13.2
OUT - TP Mean Annual Load (kg/yr),0.256
OUT - TN Mean Annual Load (kg/yr),5.37
OUT - Gross Pollutant Mean Annual Load (kg/yr),1.25
% Load Reduction,461E-9
TSS % Load Reduction,89.0
TN % Load Reduction,54.3
TP % Load Reduction,65.0
GP % Load Reduction,99.0

Links
Location,Drainage Link,Drainage Link
Source node ID,1,3
Target node ID,3,2
Muskingum-Cunge Routing,Not Routed,Not Routed
Muskingum K, ,
Muskingum theta, ,
IN - Mean Annual Flow (ML/yr),5.17,5.17
IN - TSS Mean Annual Load (kg/yr),120,13.2
IN - TP Mean Annual Load (kg/yr),0.731,0.256
IN - TN Mean Annual Load (kg/yr),11.8,5.37
IN - Gross Pollutant Mean Annual Load (kg/yr),125,1.25
OUT - Mean Annual Flow (ML/yr),5.17,5.17
OUT - TSS Mean Annual Load (kg/yr),120,13.2
OUT - TP Mean Annual Load (kg/yr),0.731,0.256
OUT - TN Mean Annual Load (kg/yr),11.8,5.37
OUT - Gross Pollutant Mean Annual Load (kg/yr),125,1.25

Catchment Details
Catchment Name,33964 - 47 UPPER PITT STREET
Timestep,6 Hours
Start Date,1/01/1959
End Date,31/12/1959 6:00:00 PM
Rainfall Station, 66062 SYDNEY
ET Station,Monthly User Defined
Mean Annual Rainfall (mm), 1490
Mean Annual ET (mm), 1260