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RETAIL PRECINCT

77-87 Tench Avenue, Jamisontown

WSUD Strategy Report
Issue 01

Prepared for C&S Sentas Pty Ltd
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Table of Contents

1	Introduction	4
2	Water Sensitive Urban Design	5
2.1	Principles, Objectives and Targets	5
2.2	Site Analysis	5
2.3	Treatment Train	5
3	Draft Operations & Maintenance Schedule	7
3.1	General	7
3.2	Bio-retention Pond	7
4	Conclusions	9
	Appendix 1	10
	Stormwater Layout Plan.....	10

List of Figures

Figure 1.1	Site Plan	4
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List of Tables

Table 2.1	Catchment Area – 1.68ha	6
Table 2.2	Stormwater Quality Improvement Devices.....	6
Table 2.3	MUSIC Summary Table	6
Table 3.1	Bio-retention Pond Maintenance Frequency	7

This document outlines the Water Sensitive Urban Design (WSUD) Strategy for the proposed retail precinct located at 78-88 Tench Avenue, Jamisontown. This strategy looks at the principles, objectives and targets for WSUD, the opportunities and constraints to the implementation of WSUD, as well as the proposed WSUD measures to be implemented as part of the proposed works.

The Construction Plans prepared by Morson Group Architects show 3 buildings with associated driveway. The proposed development is illustrated in Figure 1.1 below.

NEPEAN RIVER

TENCH RESERVE

M4 MOTORWAY

EXISTING WALKED PATH

BOAT RAMP & EFTY

EXISTING PEDESTRIAN FOOTPATH

PROPOSED PEDESTRIAN BRIDGE

BOAT TRAILER PARKING

TENCH AVE

PUBLIC CARPARK

EXISTING BUS STOP

EXISTING OVERHEAD POWER LINES

EXISTING PLAY AREA

OPEN LAMINATED AREA

T1 T2 T3 T4 T5 T6 T7 T8 T9 EXISTING (T10) T11

PARKING

FUTURE RESTAURANT & CAFE CONNECTION AS BUILT PHASE 2

WATERLINE PROPOSED PLAN 2020

CONTINGENCY IMPROVED PATHWAY FOR BICYCLISTS & PEDESTRIANS

LIVELY ALFRESCO RESTAURANTS

BICYCLE PARKING & SERVING FACILITIES

VIBRANT LEISURE PLAZA & CAFES

IMAGE COURTESY OF GOOGLE EARTH

2 Water Sensitive Urban Design

2.1 Principles, Objectives and Targets

Penrith City Council has implemented a Water Sensitive Urban Design Policy in 2013. The aim of this policy is to respond to the growth of developable land within the Penrith Local Government Area (LGA) and improve the water conservation, and the quality and quantity of stormwater runoff from both new land development, and redevelopment of existing properties as they are developed.

The Policy is used to provide guidance for engineers and architects to ensure that developments mitigate their stormwater impacts on the natural environment.

Water Conservation aims to reduce the demand for potable water. This initiative was developed by the NSW State Government. The main tool for reducing demand for potable water is the BASIX scheme. The proposed development of this site will require the use of BASIX on a per lot basis as each of the proposed lots is developed.

Urban development increases the pollutant load of stormwater to the receiving water bodies. Stormwater Quality controls have been derived to reduce the impact of this increased loading on the environment. Penrith City Council has set targets for stormwater treatment trains to meet on a per site basis.

The targets that Council has set as part of the Water Sensitive Urban Design policy 2013 are as follows:

- 90% reduction of mean annual load of total gross pollutants
- 85% reduction of mean annual load of Total Suspended Solids (TSS)
- 60% reduction of mean annual load of Total Phosphorus (TP)
- 45% reduction of mean annual load of Total Nitrogen (TN)

Stormwater runoff modelling is carried out using the software called MUSIC (Model for Urban Stormwater Improvement Conceptualisation) using data from Council's WSUD Technical Guidelines.

2.2 Site Analysis

The site is comprised of one lot with an area of 31,884sqm with a gentle sloping topography towards the rear. The site has one street frontage to Tench Ave to its Northern Boundary.

As a result, the proposed stormwater treatment train will treat the runoff from most of the site area with the exception of the undevelopment area which is downstream of the treatment device.

2.3 Treatment Train

The site consists of one catchment only, which has various sub-catchments that collect detrimental pollutants at various rates. The MUSIC model adopts the pollutant parameters

from Council WSUD Technical Guidelines. The catchments are allocated as outlined in the following table.

Table 2.1 Catchment Area – 1.68ha

Type	Area (m ²)	Fraction Impervious
Roof	3148	100%
Driveway	10201	100%
Landscape	3473	0%
Total	16822	

It is proposed to meet Council's stormwater quality improvement targets outlined in part 2 of this strategy with a combination of proprietary devices. The proposed stormwater quality improvement devices are outlined in the following table.

Table 2.2 Stormwater Quality Improvement Devices

Rainwater Tank	It is proposed to have only one (1) each lot with a 1.5kL rainwater tank associated with unit 5 only.
Bioretention Basin	A bioretention basin is a vertical filtration media consisting of a sandy loam material. It is planted with nutrient removing plants. The bioretention basins proposed have a maximum hydraulic conductivity of 100mm/hr. the filter media area is 250m ² with 0.2m deep.

MUSIC was used to model the proposed site drainage stormwater treatment train. The proposed treatment train on the development application documentation meets the objectives and targets of Penrith City Council's WSUD Policy 2013.

The following table summarises the results from the MUSIC model.

Table 2.3 MUSIC Summary Table

Nutrient	Post-Development without Treatment (kg/yr)	Post-Development with Treatment (kg/yr)	Reduction (%)
Total Suspended Solids	2230	273	87.8
Total Phosphorus	3.95	1.1	72.1
Total Nitrogen	19.3	10.3	46.5
Gross Pollutants	221	0	100

The results indicate that the proposed stormwater treatment train meets the requirements of the Penrith City Council Water Sensitive Urban Design Policy 2013.

3 Draft Operations & Maintenance Schedule

3.1 General

The maintenance schedule covers all the stormwater quality measures adopted for the proposed development. The maintenance of some of these measures (proprietary products) is controlled by manufacturers' requirements for mechanical devices and industry standards for environmental measures.

3.2 Bio-retention Pond

Following its construction, the bio-retention pond should be inspected every 1 to 3 months (or after each major rainfall event) for the initial vegetation establishment period to determine whether or not the bio-retention zone requires maintenance or the media requires replacement. The following critical items should be monitored:

- Ponding, clogging and blockage of the filter media;
- Establishment of desired vegetation/plants and density; and
- Blockage of the outlet from the bio-retention system.

After the initial establishment period (typically 1 to 2 years), inspections may be extended to the frequencies shown in the maintenance frequency table below..

If the bio-retention system is not maintained frequently, the entire filter media may need to be replaced due to clogging of the media material with fine particles. This can result in frequent maintenance being more cost effective in the long-term.

The following maintenance activities will be required with inspection frequencies shown in Table 3.1 below.

- Maintenance of flow to and through the system;
- Maintaining the surface vegetation;
- Preventing undesired overgrowth vegetation/weeds from taking over the area;
- Removal of accumulated sediments; and
- Debris removal.

The recommended maintenance frequency for the bio-retention pond is included in Table 3.1 below.

Table 3.1 Bio-retention Pond Maintenance Frequency

ITEM	PERIOD	RESPONSIBILITY	MAINTENANCE PROCEDURE
Inspection – Minor Maintenance	6 mths and after major storms	Maintenance Contractor	Debris clean out including surface of bio-retention, inlet, outlet and overflow

ITEM	PERIOD	RESPONSIBILITY	MAINTENANCE PROCEDURE
Inspection – Minor Maintenance	6 mths and after major storms	Maintenance Contractor	Trench surface vegetation. Trimming, weed infestation, erosion.
Inspection – Minor Maintenance	6 mths and after major storms	Maintenance Contractor	Dewatering between storms, top soil layer replacement or possibly entire media layer replacement
Inspection – Major Maintenance	1 year and after major storms	Maintenance Contractor	Pit and grate condition. Evidence of cracking or spalling of concrete structures. Evidence of erosion in downstream channel

Reference should be made to manufacturer's specifications for operation and maintenance.

4 Conclusions

An investigation of the proposed site and stormwater treatment train has been undertaken for 78-88 Tench Avenue, Jamisontown.

A detailed MUSIC model was established for the site. The model was based on the parameters provided within the Penrith City Council WSUD Technical Guidelines. Using a combination of proprietary devices and bio-retention basins, the proposed stormwater treatment train will meet the WSUD Targets adopted by Penrith City Council.

It is recommended that Council approves the proposed treatment train for the retail precinct development.

Appendix 1

Stormwater Layout Plan



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