

2302017

WATER CYCLE MANAGEMENT PLAN

CENTRAL COAST COUNCIL DCP CHAPTER 3.1.10 – WATER CYCLE
MANAGEMENT
ON SITE DETENTION AND NUTRIENT CONTROL

PLAN PREPARED FOR:
KASS KHANAFER
16 WARRAH STREET
ETTALONG BEACH

PLAN PREPARED BY:

Angela Halcrow BSc MEEM MIEAust CPENG

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HALCROW & ASSOCIATES PTY LTD

CONSULTING CIVIL AND STRUCTURAL ENGINEERS

P.O BOX 6349 KINCUMBER

PHONE 43690977

This plan has been prepared to address the requirements of GCC DCP Chapter 3.1.10 Water Cycle Management for the development project at 16 Warrah St Ettalong Beach.

PURPOSE

GCC DCP Chapter 3.1.10, Water Cycle Management aims to facilitate the application of water sensitive urban design to manage and restore the water balance, reduce risk to life and damage due to flooding, reduce potable water use and protect and enhance natural water systems.

The development at 16 Warrah St Ettalong Beach is a proposed Multi Unit development and is required to address the following components of the DCP.

- Water conservation
- Retention
- Stormwater Quality
- On site detention
- Local Overland drainage
- Flooding

The development area of the site is less than 2000 square metres and therefore the deemed to comply solutions may be used.

The following information is provided to support compliance with the above requirements.

WATER CONSERVATION

The water conservation aspects of this development is covered by Basix requirements.

WATER RETENTION

The intent of the water retention target is to mimic the natural catchment hydrology from development sites in terms of Quantity (Volume), Rate (Peak flow) and Response (time it takes for rain to run off the site).

Using the deemed to comply requirements of DCP Chapter 6.7 the required retention volume is estimated as follows:

$$V = 0.01A(0.02F)^2 = 0.01 \times 730.45(0.02 \times 75)^2$$

Retention required using this method is 16.4 cubic metres.

Rainwater Reuse.

The proposed development is a residential development therefore the guidelines in the DCP can be used to estimate rainwater reuse.

Rainwater reuse based on the deemed to comply formula is as follows:

Reuse for toilet, laundry and landscape watering yields 50% of the 35l/sq metre weekly use rate.

Reuse volume weekly is $35 \times 0.5 \times 380 = 6650$ litres

Rainwater tanks totaling a minimum of 9000 litres are proposed for the site.

The rainwater reuse is not sufficient to meet the total retention required on the site and an infiltration trench is required. The required retention in an infiltration trench and alternative storage is $(16.4 - 6.6) = 9.83$ cubic meters using the deemed to comply method

An infiltration trench is proposed in the front landscaping to provide the required on site detention. This trench has a storage capacity of 4.43 cubic metres with a 30 minute infiltration volume estimated to be 4.7 cubic metres. Additional storage is available as surface storage in the driveway and via the stormwater junction pit. This contains a total of 10.7 cubic metres and drains via the infiltration system. This exceeds the total site retention required under DCP 3.11 deemed to comply calculations.

STORMWATER QUALITY TARGET

All stormwater from the proposed development area will pass through either the rainwater tank or the infiltration trench. The site discharge index is therefore 0.008 which complies with Councils maximum allowable SDI= 0.1

Flows from the rainwater tank system will overflow to infiltration trenches.

ON SITE DETENTION

In accordance with Section 3.10.1 of the CCC DCP On site detention (OSD) is required to be provided in conjunction with this development.

The usual requirements for OSD relate to storms of 5 year to 100 year average recurrence interval.

The site located within the Woy Woy rainfall area. Although the site previously contained a residence, outbuildings and pavements under the requirements of DCP

3.1 runoff post development is required not to exceed the undeveloped (grassed) runoff.

In accordance with the DCP requirement it is proposed to provide on-site detention of stormwater to limit post development peak flows from the site to the pre development peak flows for storm events up to and including the 1% AEP storm event.

The proposed detention system has been modelled using a runoff routing model, "Drains". Woy Woy rainfall data (1987 ARR) with a soil type of 1 and antecedent moisture content of 3 was used for modelling purposes.

The onsite detention system has been modelled as a tank system including the credit from the rainwater tanks and the infiltration storage and surface storage within driveway pavements. Infiltration rates through the trench are modelled using a small diameter orifice. These flows are not included in the reported flow rates because the water is retained on site and does not flow to Councils stormwater system. Dual orifice controls are required to control the infiltration storage system and the surface storage system to ensure that small storms have adequate detention and larger storms are not overly detained.

This model predicts that stormwater flow to the drainage system will be less than or equal to the predeveloped flows for peak storms of recurrence intervals from 5 to 100 years.

ON-SITE DETENTION STORAGE CALCULATIONS

Site Area 730.45 sq metres

Pre-Development Parameters

The site falls towards a local depression within the site, tc of the order of 8 minutes

Post-Development

Total 730.45 square metres (75% impervious)

Detention Storage

Rainwater Tank - Minimum 7.05 cubic metres, 9 cubic metres provided
4.5 cum credit claimed

Infiltration trench Storage (18 double cells) 4.43 cubic metres

Surface storage inclusive of pits 11.0 cubic metres

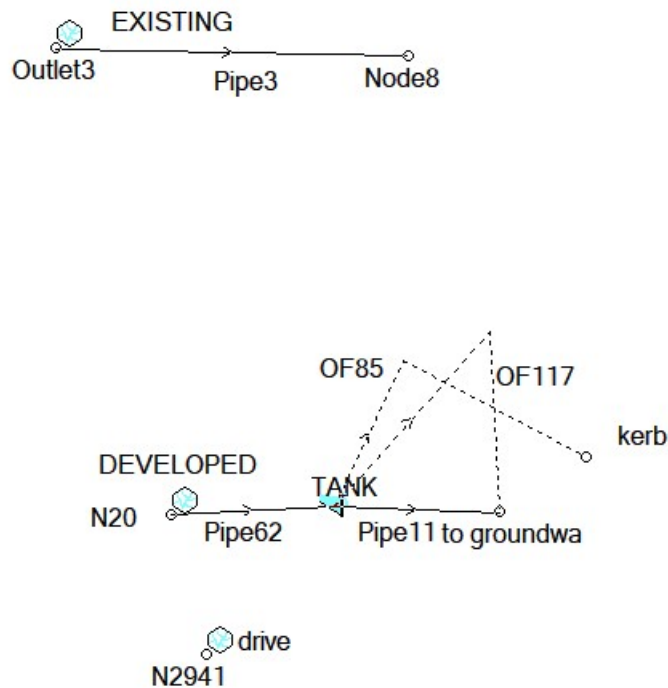
Total Detention Storage - 19.93 cubic metres inclusive of pits

Total storage on site 24.5 cubic metres

Model Results

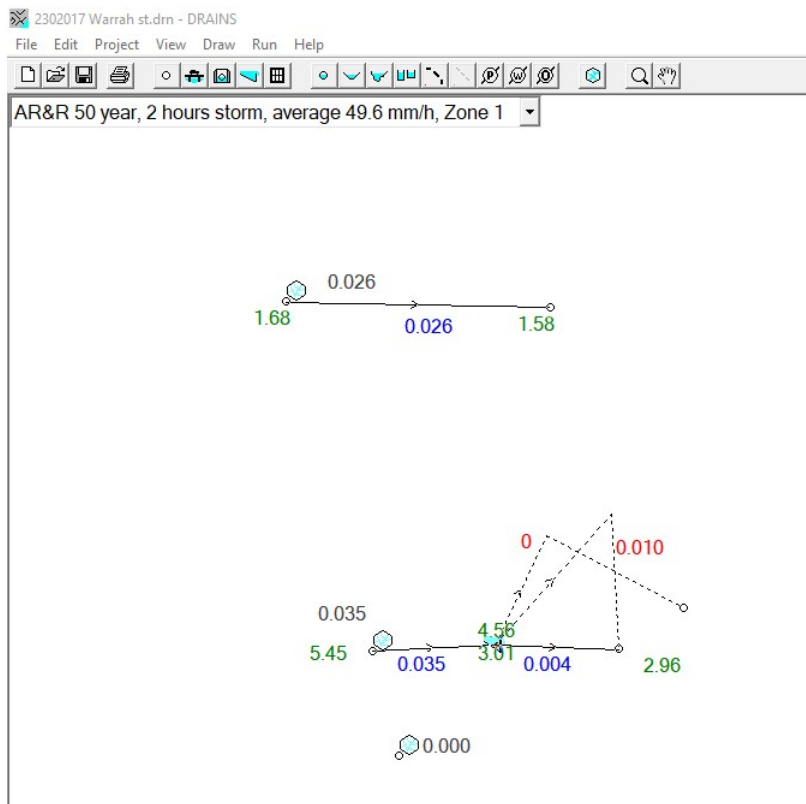
The existing and proposed system has been modelled using run off routing software (Drains) based on an IIsax model (ARR1987 method and rainfall used). Storms for each recurrence interval of durations ranging from 5 minutes to 2 hours were modelled.

Drains outputs are appended to this document. The model used is represented below:



The modeled system achieves peak flows for each recurrence interval which do not exceed the natural site peak flows.

Drains outputs for the system as modeled are shown below.



SUMMARY OF DRAINS FLOWS

Storm	Predevelopment flow l/s	Post development flow with retention l/s
5 yr 5 min	1	0
10 minute	3	0
25 minute	8	9
30 minute	6	9
1 hour	6	9
1.5 hour	9	9
2 hour	9	9
10 yr 5 min	4	0
10 minute	7	6
25 minute	12	9
30 minute	10	9
1 hour	12	9
1.5 hours	15	9
2 hours	15	9
20 yr 5 min	7	0
10 minute	11	9
25 minute	18	10
30 minute	17	9
1 hour	17	10
1.5 hour	20	10
2 hour	21	10
50 yr 5 min	11	0
10 minute	18	9
25 minute	24	10
30 minute	22	10
1 hour	21	10
1.5 hours	24	10
2 hours	26	10
100 yr 5 min	14	8
10 minute	22	9
25 minute	33	17
30 minute	27	10
1 hour	24	14
1.5 hours	27	16
2 hours	30	17

OVERLAND FLOW REQUIREMENTS

The site is not in a designated flow path. Adjoining property to the rear is developed and property to the west is subject to a current DA as shown on plan. Following development piped and overland flows, in excess of infiltrated volumes, from this development will be directed to the street.

FLOODING REQUIREMENT

The site is not shown on Councils on line Flooding Maps as flood affected in the 1% AEP event or within the flood planning area. No further flooding considerations have been taken into account.