

## DRAINAGE REPORT



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**Client:** Nadine Street Pty Ltd  
**Project:** Residential Subdivision  
**Project No:** 26522  
**SCC Ref:** SF9367  
**Date:** 30/11/2016

# RESIDENTIAL SUBDIVISION ON SITE DETENTION DESIGN REPORT at NADINE STREET, SANCTUARY POINT

This report has been prepared at the request of Shoalhaven City Council for at source on site detention calculations in regards to a Section 75W modification DA 485-12-2002 MOD 1 lodged with the Department of Planning & Environment.

Calculations have been prepared by a qualified practicing engineer using DRAINS version 2016.07.

#### **Pre-Development Site**

The following is the data used to determine the peak flows for the post - development site

|                                                                   |           |
|-------------------------------------------------------------------|-----------|
| Existing area of site discharging to the existing detention basin | 3.7316 ha |
| Percentage of impervious area                                     | 0%        |

This gives a Peak discharge of

|                  |                        |
|------------------|------------------------|
| Q <sub>5</sub>   | 1.47 m <sup>3</sup> /s |
| Q <sub>100</sub> | 2.52 m <sup>3</sup> /s |

#### **Post-Development Site**

The following is the data used to determine the existing peak flows from the pre - development site

|                                                                    |        |
|--------------------------------------------------------------------|--------|
| Proposed area of site to discharge to the existing detention basin | 3.5215 |
| Percentage of impervious area                                      | 67%    |

This gives a Peak discharge with out at source OSD

|                  |                        |
|------------------|------------------------|
| Q <sub>5</sub>   | 1.83 m <sup>3</sup> /s |
| Q <sub>100</sub> | 2.90 m <sup>3</sup> /s |

This gives a Peak discharge with at source OSD

|                  |                        |
|------------------|------------------------|
| Q <sub>5</sub>   | 1.76 m <sup>3</sup> /s |
| Q <sub>100</sub> | 2.78 m <sup>3</sup> /s |

The total proposed area to discharge into the existing detention basin is calculated by using the existing area discharging into the detention basin and adding the impervious areas from proposed lots 29-34

The percentage of impervious area is calculated by

Typical lot size – the area of all lots and public reserves divided by the number of lots

$$3.2204 / 51 = 0.063 \text{ ha}$$

The previous area associated with each typical lot

$$0.063 \times 0.6 = 0.0378 \text{ ha}$$

Typical road reserve associated with each typical lot – total area of road reserve divided by the number of lots

$$0.7991 / 51 = 0.0157 \text{ ha}$$

The pervious area associated with road reserve

$$0.0157 \times 0.95 = 0.015 \text{ ha}$$

Total area each future at source OSD will cater for – Typical lot size + Typical road reserve

$$0.063 + 0.0157 = 0.0787 \text{ ha}$$

Total impervious area each at source OSD will cater for – Impervious area of typical lot plus impervious area of road reserve

$$0.0378 + 0.015 = 0.0528 \text{ ha}$$

Percentage impervious – Total impervious area divided by total area

$$0.0528/0.0787 = 0.67 = 67\%$$

#### **At Source On-site Detention Calculations**

Difference in peak flow between pre-development and post-development for the minor storm

$$1.83 - 1.47 = 0.36 \text{ m}^3/\text{s}$$

Difference in peak flow between pre-development and post-development for the major storm

$$2.90 - 2.52 = 0.38 \text{ m}^3/\text{s}$$

Peak flow required to be detained by each future at source OSD tank for the minor storm

$$0.36/51 = 0.007 \text{ m}^3/\text{s}$$

Peak flow required to be detained by each at source OSD tank for the major storm

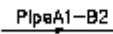
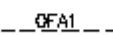
$$0.38/51 = 0.007 \text{ m}^3/\text{s}$$

#### **Conclusion**

Providing tanks to be installed at dwelling construction stage on each lot with 7000L dedicated OSD and a 83mm low level orifice (refer to typical tank detail) the pre and post development discharge from the site into the existing detention basin will be matched for all storm events up to and including the 100 ARI.

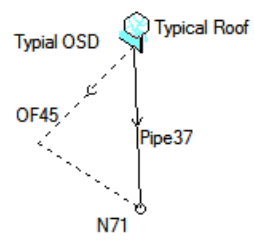
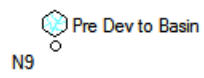
## APPENDIX A DRAINS LEGEND –

### LEGEND OF TYPICAL DRAINS SYMBOLS:

|                                                                             |                                                                                                |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| CATCHMENTS SHOWN THUS:                                                      |  CatA1      |
| PITS SHOWN THUS:                                                            |  PitA1      |
| NODES SHOWN THUS:                                                           |  N-EXISTING |
| DETENTION BASINS SHOWN THUS:                                                |  Basin1     |
| PIPES SHOWN THUS:                                                           |  PipeA1-B2  |
| OVERLAND FLOW PATHS SHOWN THUS:                                             |  OFA1       |
| OPEN CHANNELS SHOWN THUS:                                                   |  Chnl1      |
| FLOW (m <sup>3</sup> /s) IN PIPES AND OPEN CHANNELS SHOWN THUS:             | 0.057                                                                                          |
| FLOW (m <sup>3</sup> /s) IN OVERLAND FLOW PATH SHOWN THUS:                  | 0.006                                                                                          |
| FLOW (m <sup>3</sup> /s) FROM CATCHMENTS SHOWN THUS:                        | 0.057                                                                                          |
| TOP WATER LEVEL IN PITS AND OPEN CHANNELS SHOWN THUS:                       | 3.65                                                                                           |
| UPSTREAM AND DOWNSTREAM HYDRAULIC GRADE LEVEL IN PITS AND PIPES SHOWN THUS: | 3.95<br>3.95                                                                                   |

LEGEND FOR THE OUTPUT FROM  
THE DRAINS PROGRAM

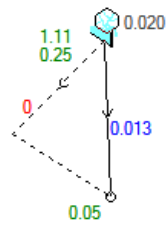
APPENDIX B DRAINS DATA –



APPENDIX C: DRAINS 1:5YR (20% AEP) EVENT - Diagram showing Peak Flows

1.47

1.83



1 in 5 year (20% AEP) Summary:

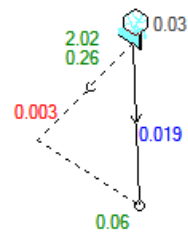
Pre development flows for 20% AEP = 1.47m<sup>3</sup>/s

Peak flow detained by each OSD tank for 20% AEP = 0.020 – 0.013 = 0.007m<sup>3</sup>/s

APPENDIX D: DRAINS 1:100YR (1% AEP) EVENT - Diagram showing Peak Flows

2.52

2.9

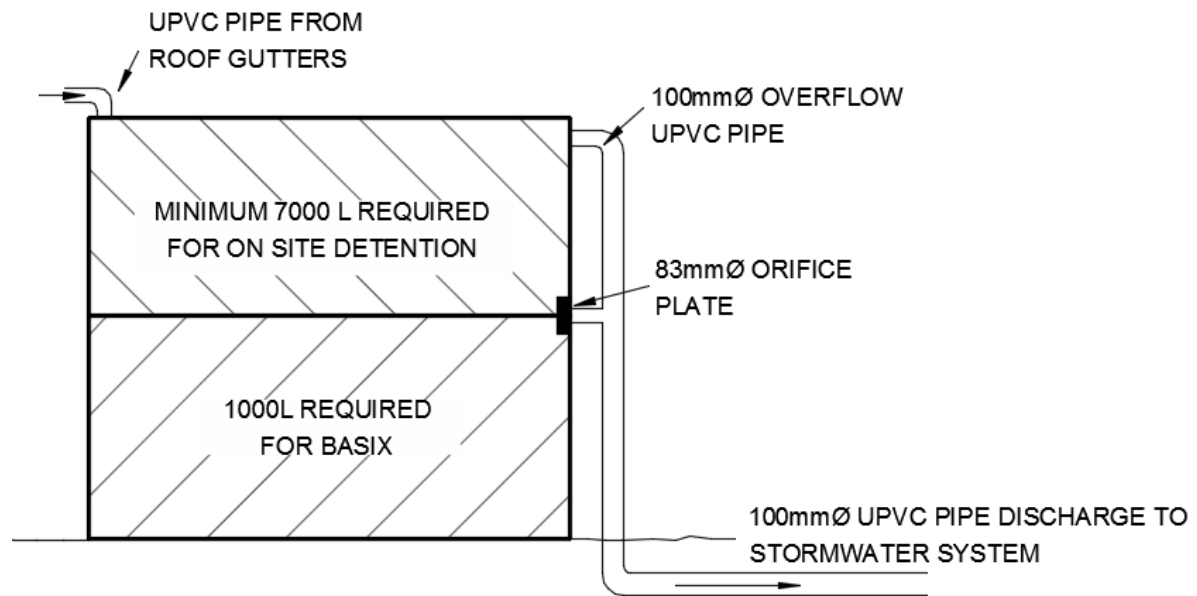


1 in 100 year (1% AEP) Summary:

Pre development flows for 1% AEP = 2.52m<sup>3</sup>/s

Peak flow detained by each OSD tank for 1% AEP =  $0.030 - 0.019 - 0.003 = 8\text{m}^3/\text{s}$

APPENDIX E: TYPICAL DETENTION TANK DETAIL



TYPICAL DETENTION TANK

SCALE NTS

