



ALDANMARK
CONSULTING ENGINEERS

STORMWATER REPORT

66 Channel Highway
KINGSTON TAS

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DOCUMENT CONTROL

VERSION	DATE	AUTHOR		APPROVED
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1. INTRODUCTION AND SCOPE OF ENGAGEMENT

Aldanmark have been engaged to design a stormwater system for the proposed unit development at 66 Channel Highway, Kingston. It has been indicated that the Department of State Growth will require that the sites post-development peak discharge does not exceed the pre-development peak discharge for stormwater in the case of a 2% AEP storm. The following report outlines the methodology and assumptions used to ensure the proposed development complies with this condition.

2. DETENTION MODEL

The following areas were determined from survey drawings by PDA Surveyors dated February 2022 and site plan concept by Shane Mann & Associates dated July 2022:

Detention model site area:	≈ 9438.24 m ²
Pre-development Impervious areas (driveway) :	≈ 715.79 m ²
Pre-development Pervious areas (lawns/gardens):	≈ 8722.45 m ²
Post-development Roofed areas:	≈ 350.64 m ²
Post-development Unroofed deck areas:	≈ 19.41 m ²
Post-development Driveway/Hardstand areas:	≈ 1275.97 m ²
Post-development Impervious Courtyard areas:	≈ 148.16 m ²
Post-development Pervious areas (lawns/gardens):	≈ 7644.07 m ²

Coefficients of run-off adopted for design are as follows:

Roofed areas:	C = 1.00
Impervious areas:	C = 0.90
Unroofed deck areas:	C = 0.25
Pervious areas:	C = 0.11

The runoff coefficient for pervious areas has been determined as per the equation stated in AS3500.3 clause 5.4.6:

$$C_p = m \times (0.0133 \times^{10} I_{60} \times 0.233)$$

Where: m = Multiplier for runoff coefficient (AS3500.3 Table 5.4.6(A))
¹⁰I₆₀ = Rainfall intensity for a 60-minute duration storm with an ARI of 10 years (if less than 25 adopt 25, if greater than 70 adopt 70).

As sandy soil is characteristic of the site location, C_p would be decreased by 0.1, if the final value of C_p would not be lesser than 0.1 as a result.

Pervious area runoff coefficient:

$$C_p = 1.05 \times (0.0133 \times 25 \times 0.233) = 0.11$$

Design Rainfall Intensities:

5-minute duration - 2% AEP Kingston:

I = 107 mm/hr (BOM IFD)

Calculations have been based on the Modified Rational Method for stormwater run-off:

$$Q = \frac{C \times I \times A}{3600}$$

Where: Q = Design Volumetric Flow Rate [L/s]
 C = Runoff Coefficient
 I = Rainfall Intensity [mm/hr] (5 minute - 2% AEP storm)
 A = Sum of all equivalent areas [m²]

Pre-Development Permissible Site Discharge (PSD):

$$Q_{PSD} = \frac{(0.11 \times 8722.45 + 0.9 \times 715.79) \times 107}{3600} = 47.67 \text{ L/s}$$

Post-Development:

$$Q_{Post} = \frac{(0.11 \times 7644.07 + 1 \times 350.64 + 0.90 \times 1275.97 + 0.90 \times 148.16 + 0.25 \times 19.41) \times 107}{3600} = 73.65 \text{ L/s}$$

As shown above the post development flow Q_{Post} is 25.98 L/s greater than the permissible site discharge Q_{PSD} and therefore on-site detention (OSD) is required. To determine the volume of storage required to reduce the post development peak discharge to the permissible site discharge Autodesk Software - Storm and Sanitary Analysis was utilised.

The model simulated the runoff from all new hardstand and roofed area being connected to an underground detention tank fitted with a 90mm orifice device. The results of the model showed that a minimum detention volume of 8,450L is required.

The stormwater arrangement for the site is shown on Aldanmark civil drawings C1.02 to C1.06 Job No. 22E82-1 Revision G and in Figure 2. The outflow hydrographs for the site, as shown in Figure 1, demonstrate the post-development peak discharge is below pre-development levels.

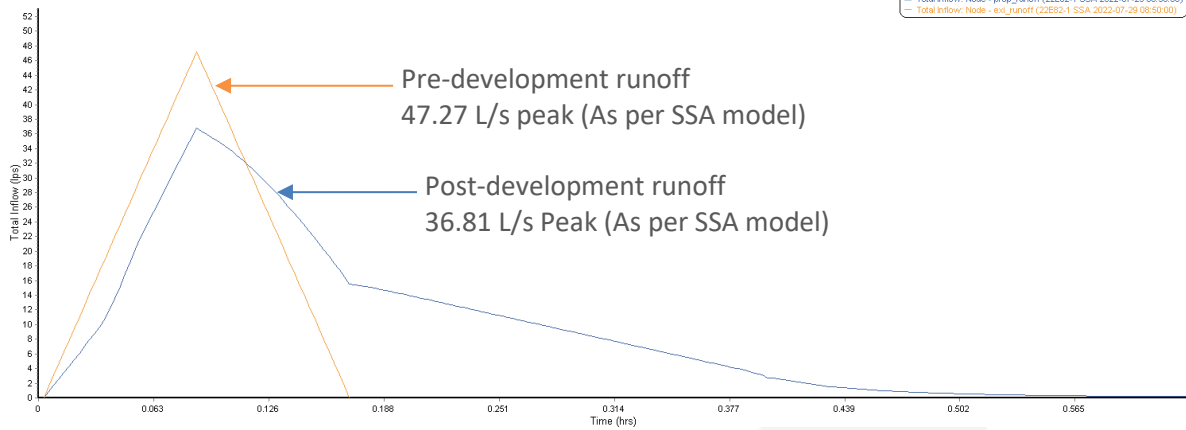


FIGURE 1: SITE OUTFLOW HYDROGRAPHS

3. STORMWATER SITE LAYOUT

The final layout of the stormwater system is shown on the civil engineering services plan in Figure 2.

Runoff from the driveway is collected by several 450mm and 600mm grated pits which connect to a proposed 13,440L below ground detention tank. Roof downpipes are also to be connected to the proposed detention tank. The detention tank is fitted with an 90mm outlet orifice and a 225mm overflow outlet. The outlet of the detention tank discharges via a proposed 225mm headwall to an existing side entry pit in the Southern Outlet road reserve.

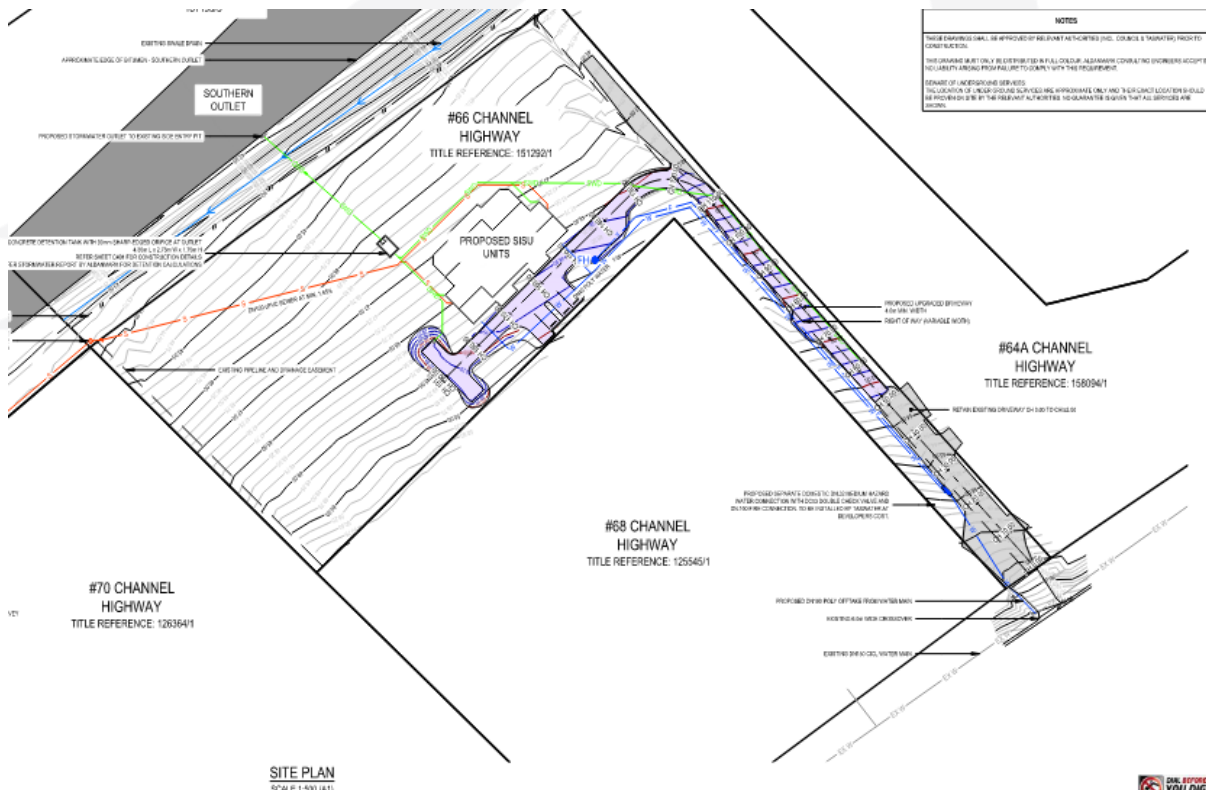


FIGURE 2: PROPOSED STORMWATER LAYOUT

4. CONCLUSION

This report has demonstrated that the proposed development at 66 Channel Highway Kingston complies with the requirement that post-development peak runoff is to be no greater than pre-development in the case of a 2% AEP storm.

Note:

- No assessment has been undertaken of the stormwater infrastructure within the State Road Reservation and its capacity.
- This report assumes the State Road Reservation stormwater infrastructure has capacity for the pre-development peak discharge.
- It is the responsibility of the Department of State Growth to assess their infrastructure and determine the impact (if any) of altered inflows into their stormwater network.

Please contact me at rmoon@aldanmark.com.au if you require any additional information.

Yours faithfully,

A handwritten signature in blue ink, appearing to read "R Moon", with a long horizontal line extending to the right.

Ruben Moon
Civil Engineering Technician