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Civil Engineering Design & Project Management

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ABN 99 753 214 183

STORMWATER & FLOOD MANAGEMENT REVIEW

Huntlee New Town Residential Development – Modification 20

Lot 34 DP 755211

26 SCOTT STREET, NORTH ROTHBURY. NSW. 2335.

Project:	Huntlee New Town Residential Development
Client:	Disage Pty Limited - Dennis Beddall (ABN 46 067 791 388).
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April 19, 2022

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Revision 1

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Revision 1	-	Prepared by: Paul Meredith MEIAust | CPEng | NER | RPEQ | IPWEAQ	Date: 19 April 2022

Introduction

TriCAD Design (TcD) has been commissioned by Disage Pty Limited (Dennis Beddall) to undertake a stormwater & flood management review of the proposed stormwater and flood management strategy as prepared by Northrop Engineers Dated July 2021 and December 2021. It is understood that the review will be submitted to the NSW Minister for Planning for his consideration in approving Modification 20 of the Huntlee Subdivision in North Rothbury.

The location of the subject allotment is shown in **FIGURE 1** below.

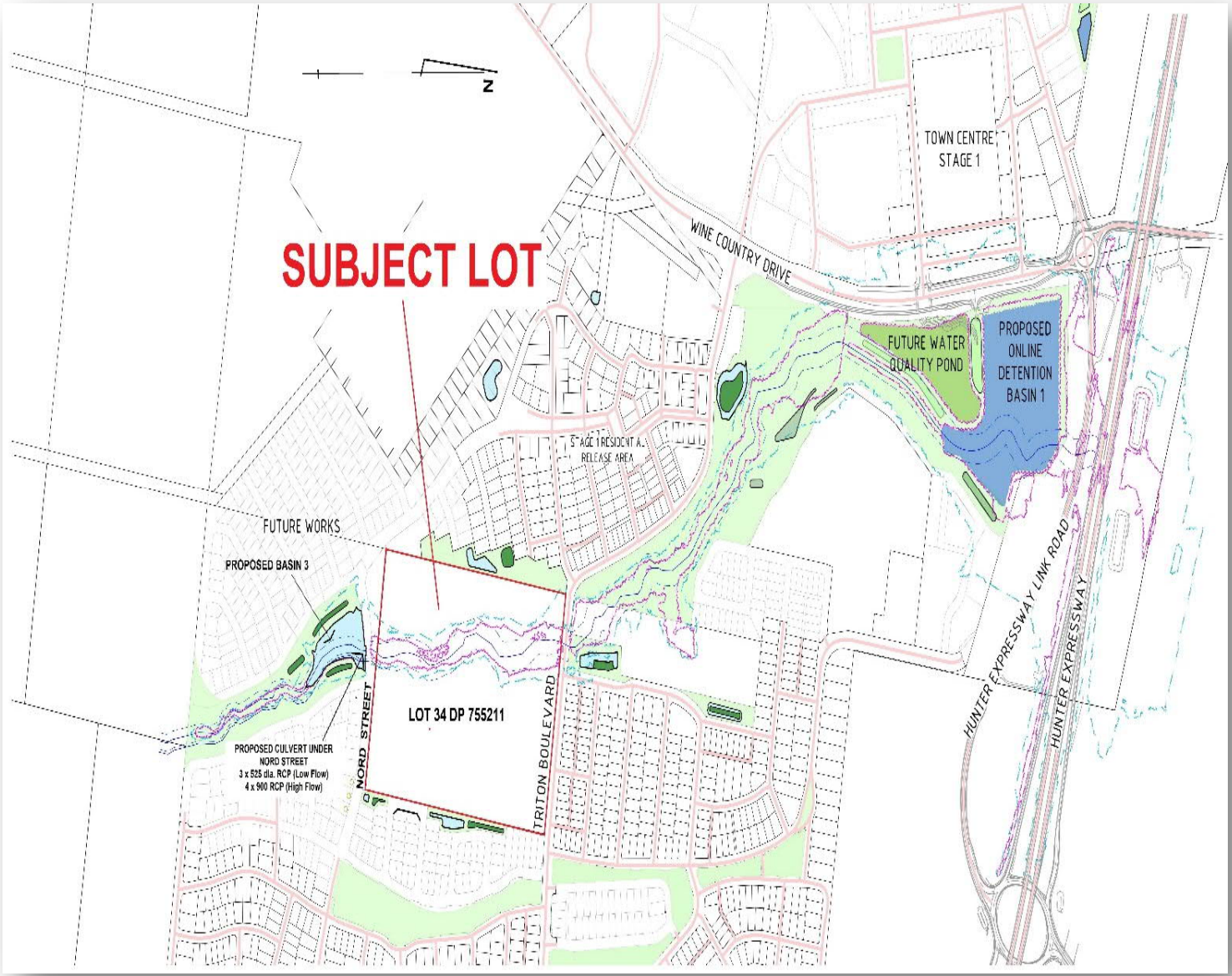


FIGURE 1 – Locality Plan

This stormwater and flood management review has been undertaken to specifically identify any stormwater drainage and flood management issues that may be imposed on the subject site. The Review will make recommendations that may assist in mitigating any identified impacts as a consequence of the adjoining land development. It will appraise the pre and post development stormwater flows that have been reported in the Northrop Engineers report. This review will also note any adverse impacts that these flows may have on the subject property as a consequence of the proposed upstream development.

Available Data

The following data & reports have been used in this report:

- ✓ Online Stormwater Detention Basin 3 – Huntlee Urban Release Area Tributary Two. Dated 7 July 2021 Revision C.
- ✓ Huntlee New Town Residential Development – Modification 20. Stormwater & Flood Management Strategy Dated 17 December 2021 Revision A.
- ✓ Aerial Imagery of the subject site – dated 13 June 2021.
- ✓ Data extracted from the Australian Rainfall & Runoff Datahub – Dated 19 April, 2022.
- ✓ Rainfall depth data extracted from the Australian Bureau of Meteorology - Dated 19 April, 2022.

It should be noted that the following documents have not been sited as part of this review:

- Detailed design drawings of Basin 3 or Nord Street – have not been provided.
- Worley Parsons 2012 report – "Trunk Stormwater and Flooding Assessment" – has not been provided.
- Pre and Post stormwater hydrographs for Basin 3 – have not been provided.

Existing Site

The subject lot is bounded on the north by Triton Boulevarde and Nord Street to the south. The existing Town Centre residences are located along the west extremity of the site. The site currently has improvements of a residential dwelling and outhouses and gains legal vehicular access off Scott Street via an existing Right-of-Way corridor – see **FIGURE 2** below. The balance of the lot is primarily open grazing pasture and sparse bushland.

An existing waterway is located within the subject lot that conveys runoff from northern perimeter of the site (Nord Street) to the southern boundary of the site (Triton Boulevarde).

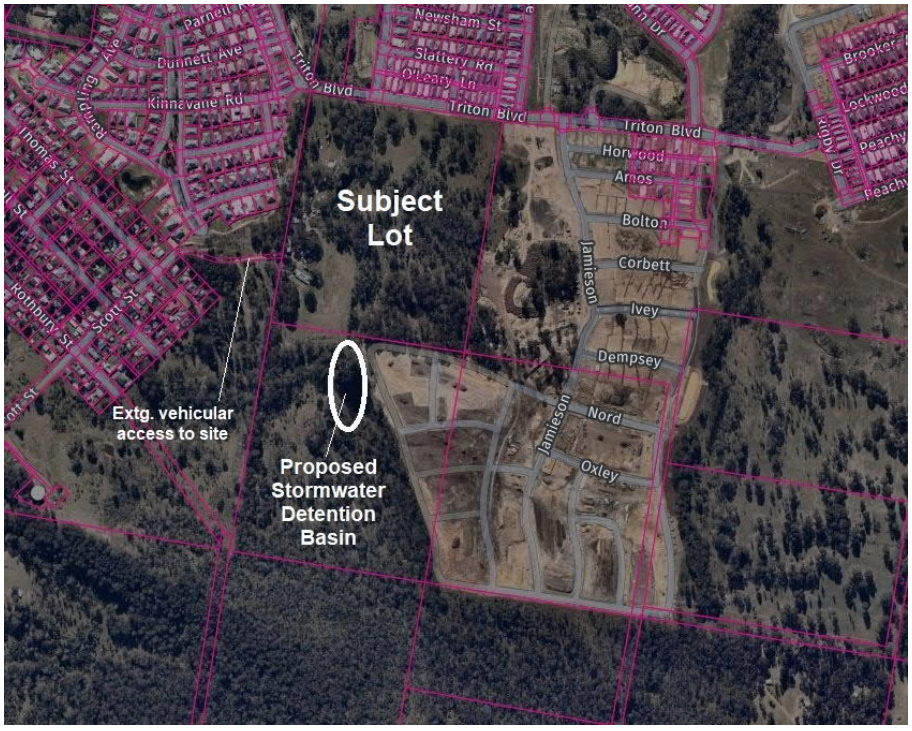
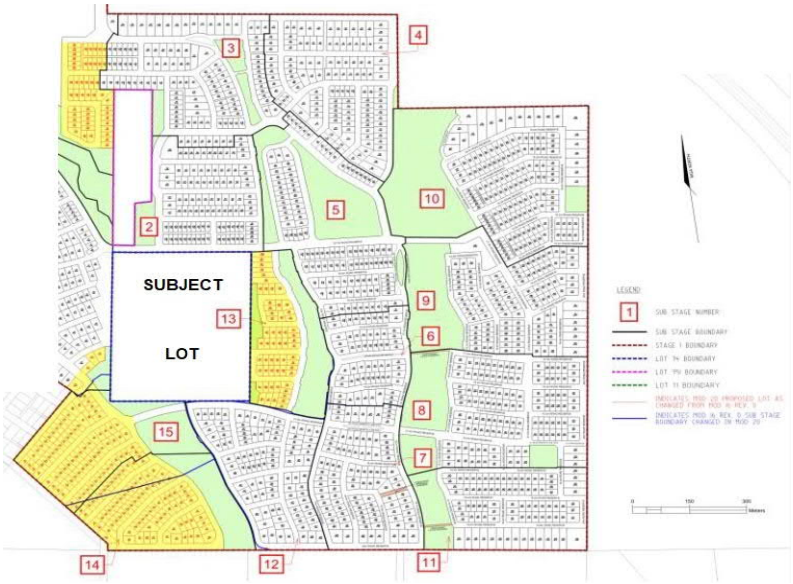


FIGURE 2 – Existing Site Details

Huntlee Pty Limited has been progressing the development of a major residential land development on the properties surrounding the subject site with Stage 1 receiving initial approval on 14 September 2011.

Currently, there is a submission before the Minister to approve a variation for the inclusion of Stages 13 – 16.

It is understood that construction of the culverts and road way within Nord Street is well underway – see image opposite.



NOTE:

Yellow areas represent additional stages of the development currently submitted for approval under Modification 20.

FIGURE 3 – Proposed Development Areas

Stormwater & Flood Management Strategy

OBSERVATIONS AND COMMENTS

The following comments and suggestions are offered as part of the review:

- Rainfall Depths – access to the BOM web site has yielded the rainfall depths shown in the adjacent table. Although the depths for 20%, 10% and 1% AEP events appear consistent – the 50% AEP storm events do not. Can this please be clarified?
- The Designers have suggested that applying a 0% blockage factor to the drainage structures is the "worse-case" scenario. Respectfully, this maybe the case in ascertaining the flow rates down stream – but it certainly would not be the worse-case scenario in regards to the sizing of Basin 3. ARR 2019 recommends that a blockage factor of at least 50% should be applied to all cross-drainage structures.
- If a 50% blockage factor is applied – then more water would need to be detained in Basin 3, increasing the volume required to detain the flow.
- The Designers have not reported on the issue of storm water over topping Nord Street in the event of major storm events or indeed during the PMF. This may have implications of safety on the design and level of Nord Street as well as the sizing of the outlet structures from Basin 3.

Table | Chart Unit: mm

Duration	Annual Exceedance Probability (AEP)						
	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	1.85	2.10	2.93	3.55	4.19	5.09	5.84
2 min	3.08	3.49	4.82	5.77	6.75	8.03	9.05
3 min	4.29	4.85	6.72	8.07	9.45	11.3	12.8
4 min	5.39	6.10	8.47	10.2	12.0	14.4	16.4
5 min	6.38	7.23	10.1	12.1	14.3	17.3	19.7
10 min	10.2	11.5	16.1	19.5	23.1	28.2	32.5
15 min	12.7	14.4	20.2	24.5	29.0	35.4	40.8
20 min	14.6	16.6	23.2	28.1	33.2	40.6	46.7
25 min	16.1	18.3	25.6	30.9	36.5	44.5	51.1
30 min	17.4	19.7	27.5	33.2	39.2	47.7	54.7
45 min	20.2	22.9	31.8	38.4	45.2	54.7	62.4
1 hour	22.3	25.3	35.0	42.1	49.4	59.7	68.0
1.5 hour	25.4	28.8	39.7	47.7	55.9	67.2	76.3
2 hour	27.9	31.5	43.5	52.1	61.0	73.2	83.1
3 hour	31.7	35.9	49.5	59.3	69.4	83.3	94.6
4.5 hour	36.3	41.1	56.8	68.1	79.8	96.2	109
6 hour	40.1	45.4	63.0	75.8	88.9	107	123
9 hour	46.5	52.7	73.6	88.8	105	127	146
12 hour	51.7	58.8	82.5	99.9	118	144	166
18 hour	60.2	68.7	97.2	118	141	173	199
24 hour	67.0	76.6	109	133	159	195	226
30 hour	72.6	83.1	119	146	174	214	248
36 hour	77.3	88.7	127	156	187	230	266
48 hour	84.8	97.5	141	173	207	255	294
72 hour	95.1	110	158	195	233	285	328
96 hour	102	117	169	208	248	301	345
120 hour	106	122	176	215	255	310	354
144 hour	109	125	180	219	259	313	358
168 hour	111	128	182	220	259	314	359

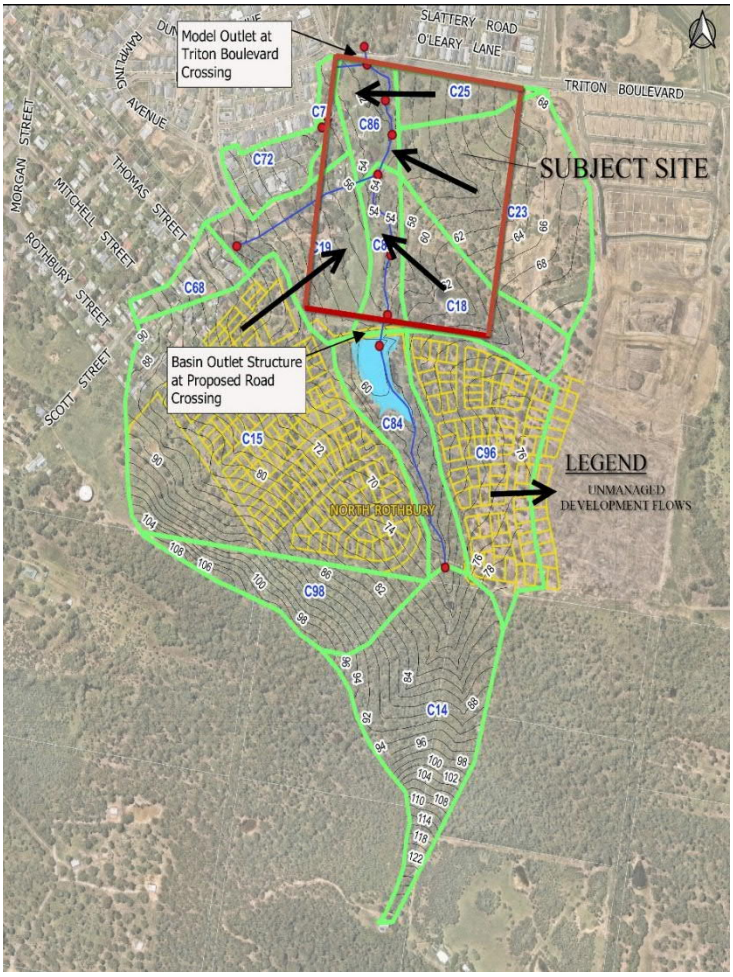


FIGURE 4 – Rainfall Data &Catchment Areas

- The Designers have suggested a 65% fraction impervious for the developed catchment areas. Can this value be justified please?
- The Designers have not elaborated on the need for detailed erosion and scour protection at the outlet of Basin 3. Given that outlet velocities greater than 4m/sec are expected it is considered necessary that some form of energy dissipation would be required at the outlet. It is suggested that an 11m long rock apron will not mitigate the erosion issues that may occur as a consequence of these velocities.
- It is noted that the Designers have opted to use a 0% fraction impervious for some of the impervious catchments. It is suggested that no catchment is 0% impervious and that a minimum value for rural type catchments should be 10%.
- No details have been provided to show where the proposed water quality measures are to be used.
- Pluviograph data has been adopted by the Designers using the Millfield site which is 32.5Km (by road) from the subject site. Adoption of Site 061014 Branxton is only 9.2Km away and would be a closer approximation of the subject site rainfall.
- Although it is acknowledged that Catchments C14, C15, C98, C84 and C96 all contribute to the volume of the proposed Basin 3 - it also evident from Figure 7B within the Northrop Report that there are areas of catchment C15 plus all of catchments C18, C23 and C25 are wholly unmanaged before they enter Lot 34. How do the Designers propose to manage these areas for water quantity and quality?
- The Designers have not provided any details on the extents of the post-development flooding (1% AEP and PMF) within Lot 34. The coloured images extracted from the 2-D modelling do not give any clarity to the differences between the pre and post development impacts on Lot 34. Can this please be clarified?

Summary

TriCAD Design has undertaken a review of the Stormwater & Flood Management Strategy prepared by Northrop Engineers. Although extensive modelling and analysis of Tributary Two has been undertaken – it is apparent from the reports that all the potential post-development impacts on Lot 34 have not been fully detailed.

Accordingly, it is suggested that the Designers provide the additional information requested above so that a fully informed assessment of the development's impacts can be assessed.