



Hollylea Road Precinct

Hollylea Road, Leumeah NSW

Stormwater Management Plan



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1. Introduction

Northrop Consulting Engineers (Northrop) have been engaged by Michael Brown Planning Strategies to prepare a Civil Engineering Report to support a Planning Proposal submission to Campbelltown City Council for a proposed mixed-use development for the precinct located at Hollylea Road, Leumeah 2560. The report outlines the stormwater quantity and quality management and the potential impacts of flooding on the proposed mix-used development.

The proposed development will seek to respond to the proposals for Leumeah as described in the Campbelltown Residential Development Strategy (RDS) which supports the Draft Campbelltown Local Environmental Plan 2014 (CLEP 2014). The site is located within the Glenfield to Macarthur Urban Renewal Corridor and aligns with the proposed project Leumeah 2035, Campbelltown City Council's high-level design and renewal strategy for the integrated growth and development for Leumeah and the greater Campbelltown region.

The proposed works will involve the construction of a complete mixed-use retail & residential development within the nominated 'growth node' nearby to the Leumeah Railway Station.

This report has been prepared in accordance and alignment with:

- The Campbelltown (Sustainable City) Development Control Plan Volume 1 Amendment 5 (April 2015)
- The Campbelltown (Sustainable City) Development Control Plan Volume 2 Engineering Design for Development (June 2009)
- Bow Bowing Bunbury Curran Creek Strategic Floodplain Risk Management Study and Plan – Draft Report for Campbelltown City Council by Molino Stewart Pty Ltd (Aug 2018)
- Bow Bowing Bunbury Curran Creek Strategic Floodplain Risk Management Study and Plan (draft) Volume 2 – Maps - for Campbelltown City Council by Molino Stewart Pty Ltd (Aug 2018)

2.1 Existing Site Description

The site comprises of primarily industrial and commercial related developments and is adjacent to the T5/T2 Sydney Rail Line which provides a rail service from Macarthur to Sydney. Broader surroundings include food outlets, tourist facilities, recreation areas and major rail and road infrastructure. The site location is shown in figure 2-1 below.

An aerial photograph of the Leumeah area in Sydney, Australia. A large, irregularly shaped area in the center is highlighted in yellow and outlined with a red dashed line. This area contains several large industrial or commercial buildings. To the left of this highlighted area, there are more industrial buildings and parking lots. To the right, there is a railway line and a residential area. A red arrow points from the text 'SITE LOCATION' to the highlighted area. Another red arrow points from the text 'LEUMEAH TRAIN STATION' to a building near the railway line. The map includes labels for several roads: 'CAMPELLTOWN ROAD' on the left, 'PLUGH INN ROAD' at the top, 'OSBURN ROAD' on the right, and 'Pembroke Road' at the bottom right. The text 'LEUMEAH' is also visible near the train station.

Figure 2.1: Site Locality Plan (SIXmaps 2019)

Figure 2.2: Approximate Location of existing Services (DBYD 2019)

2.2 Proposed Development

The proposed development will involve the demolition of residential building and associated infrastructure of the subject site. The site will be developed to accommodate a mix of residential, commercial, recreation and entertainment uses that will complement the growth and renewal strategy for the Leumeah Precinct and the greater Campbelltown-Macarthur area. Buildings will have ground floor retail that will provide local services for residents and commuters, with apartments above ranging from seven storeys and greater in height. Refer Figure 2.3 for the proposed urban design plan



Figure 2.3: Proposed Urban Design Plan

3. Stormwater and Flooding

The Campbelltown City Council specifies a minor and major storm flow approach to stormwater drainage design and will be adopted for the proposed development as per *The Campbelltown (Sustainable City) Development Control Plan Volume 1 Amendment 5 (April 2015)*.

The proposed drainage system will convey all runoff from the 20 year ARI (minor) and 100 year ARI (major) storm events prior to discharge to Council's stormwater network which is assumed to discharge into Bow Bowling Creek.

A below ground system of pits and pipes within the development site will convey flows up to and including the minor storm with overland flows routes through proposed road, hardstand and landscaped areas designed for storm events exceeding the minor event. The maximum discharge rate from the post development site is not to exceed the predevelopment flows for all storms up to the 100 year ARI event. The stormwater network will be designed in detail upon receipt of existing survey and stormwater information.

3.1. Flooding

Following review of the stormwater/catchment advice request response from Campbelltown City Council, the site is affected as follows:

- The furthest upstream lot within the proposed site (Lot 1 DP 565611 – 14 Hollylea Road, Leumeah) is marginally affected by flooding from a 100 year ARI flood in the adjacent Bow Bowing Creek system.
- The furthest downstream lot within the proposed site (Lot 3 DP 258315 – 5 Plough Inn Road, Leumeah) should not be affected by flooding from a 100 year ARI flood in the adjacent Bow Bowing Creek system.

These lots represent the highest and lowest points across the proposed development site. It has been inferred that the lots between may be either be marginally affected or unaffected by flooding and is to be confirmed upon receipt of additional flooding information requested from Council.

3.2. Onsite Stormwater Detention

Following review of Campbelltown City Council Engineering Design for Development Guide and the Bow Bowing Curran Creek Flood study as well as discussions with council engineers, we anticipate that an OSD will not be required for this development.

Campbelltown City Council specify that the maximum discharge from the post-development site is not to exceed the predeveloped flows for all storms up to the 100-year ARI storm. We assume that the impervious fraction of the development will decrease due to the introduction of significant landscaped areas, when compared to the existing flood prone development area. Therefore, it is anticipated that the post development discharge will be equivalent to or below pre-development discharge, negating the need for any additional stormwater detention facility or council infrastructure upgrades.

4. Stormwater Quality Management

In accordance with Council's Development Control Plan, the site is required to achieve stormwater pollutant load reductions. Stormwater quality devices are required to provide stormwater quality management for the proposed works. Rainwater Tanks are to be implemented comply with Campbelltown Council's BASIX benchmarks.

7.1. Stormwater Quality Modelling

To appropriately manage the volume of pollutants discharged from the site, a stormwater ‘treatment train’ has been developed. MUSIC software has been used to create a model of the development to calculate the percentage of pollutants captured and removed from the site prior to discharging from the site. Catchment and treatment parameters were included in accordance with the Campbelltown Council WSUD Guidelines and the NSW MUSIC modelling guidelines.

The following input parameters have been adopted into these models:

- Pluvio Rainfall data from the NSW Bureau of Meteorology Lucas Heights 6-minute rainfall data (1962-68)
- Pollutant Event Mean Concentrations (EMC) from the Campbelltown Council WSUD Guidelines
- Rainfall-Runoff Parameters from the NSW MUSIC Modelling Guidelines

Table 1 provides a summary of the land use characteristics of the site during this stage. The land-use types and areas were approximated from the schematic in Figure 2-2 and are subject to change.

Table 1: Stage 1 Land Use Characteristics

Surface Type	Area (ha)	Proportion of Total Site (%)
Roof Area	1.529	48.9
Promenade Area	0.222	7.11
Landscape Area	0.443	14.18
Paved Area	0.930	29.78
TOTAL SITE	3.124	100

The water quality objectives for the development as defined by Council's WSUD Guideline can be achieved by the combined benefits of the following:

- All catchment areas draining through base lined Bioretention prior to discharge
The bioretention properties are as follows:
 - Filter Area = 350m²
 - Extended Detention Depth = 0.3m
 - Filter Depth = 0.4m
 - Saturated Hydraulic Conductivity = 100 mm/hr
- Rainwater Tanks connected to irrigation to be used as additional stormwater quality treatment.
- End of the line Rocla CDS0708M Gross pollutant trap

Figure 4.1 provides a depiction of the proposed treatment train design as adopted in MUSIC stormwater quality modelling software.

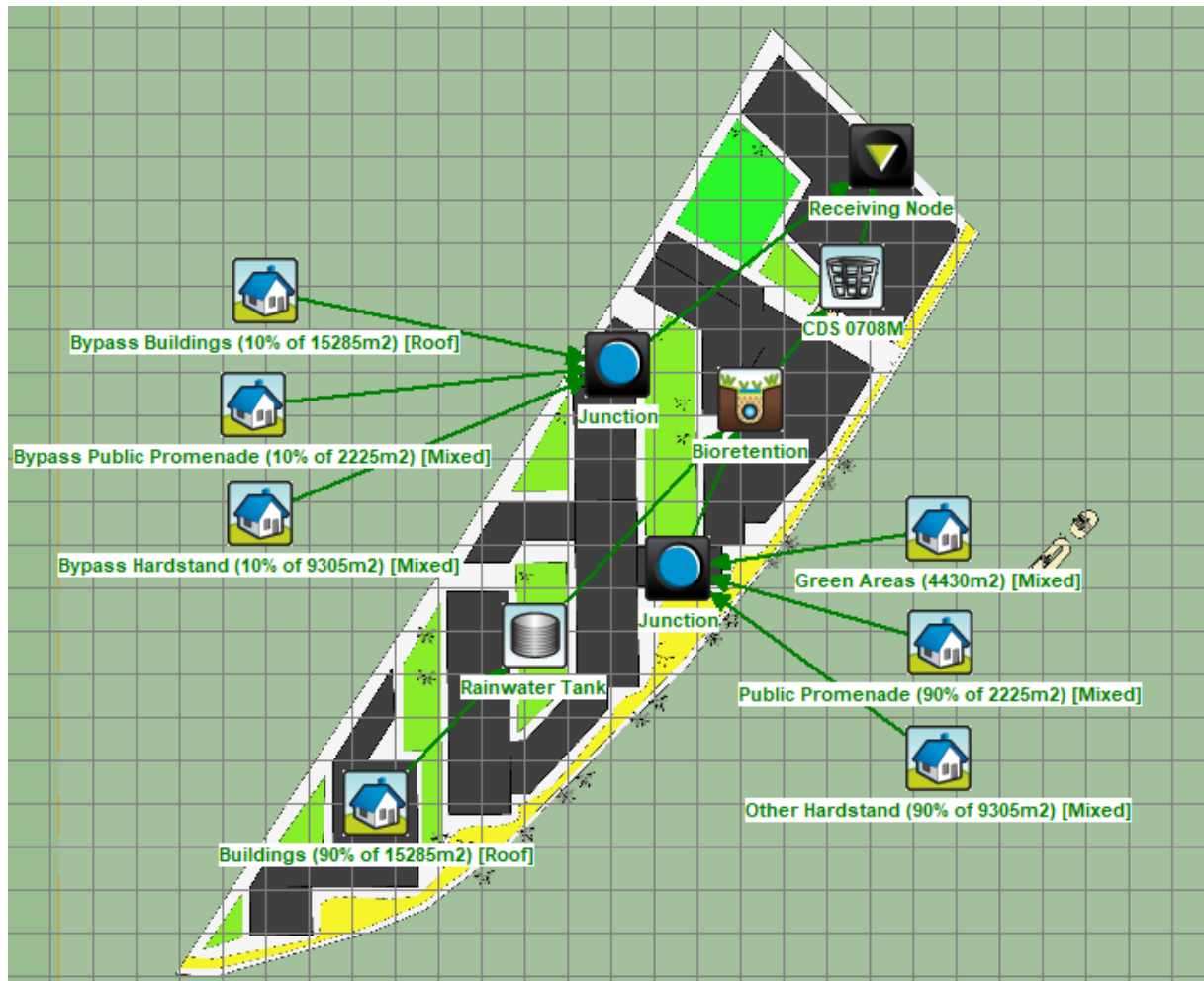


Figure 4.1: Stage 1 MUSIC Treatment Train

Table 2 below shows the results from MUSIC modelling indicating that the prescribed water quality objectives are achieved.

Table 2 - Stormwater Quality Management Performance Results- Stage 1 (Entire Site)

Surface	Source Loads	Residual Loads	Reduction (%)	Target Reduction (%)	Comment
Total Suspended Solids (kg/yr)	2190	342	84.4	80	Complies
Total Phosphorus (kg/yr)	4.81	2.09	56.5	45	Complies
Total Nitrogen (kg/yr)	45.2	21.3	52.9	45	Complies
Gross Pollutants (kg/yr)	533	50	90.6	90	Complies

Based on the above modelling results, the proposed stormwater (water quality) drainage strategy will achieve the prescribed reduction targets as set by Campbelltown City Council for Gross Pollutants, Total Suspended Solids, Total Phosphorous and Total Nitrogen. The introduction of proprietary water quality treatment devices within OSD tanks may be utilised to aid in nutrient/pollution removal subject to detailed design development of the site.

8. Conclusion

We understand on-site detention is unlikely to be required for the subject site following review of the relevant council guidelines and phone discussions. We also anticipate that the proposed site will be marginally flood affected. These assumptions have been made based on the information provided to us at the time of this proposal and the inference that the percentage of impervious area will remain approximately the same from the existing development.

Stormwater quality modelling and indicative proposed treatment trains have been developed in MUSIC. The results indicate that the stormwater pollutant load reduction targets as set out by Campbelltown City Council's WSUD Guidelines are achieved.

The stormwater assessment report has been prepared to conform to the requirements of the Campbelltown (Sustainable City) Development Control Plan Volume 1 (2015) and Volume 2 (2009).

We trust this report satisfies your requirements at this time. Should you have any questions or queries with any item discussed in this letter, feel free to contact the undersigned on (02) 9241 4188.

Yours faithfully,


Angelica Kamperos

Civil & Environmental Engineer
BE Civil (Hons) & BE Environmental

Northrop Consulting Engineers Pty Ltd