Costin Roe Consulting

Value in Engineering and Management

Stormwater Management Plan

Proposed Redevelopment for Coca-Cola Amatil
9 Roussell Road
Eastern Creek

Prepared For:
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1 INTRODUCTION

Goodman proposes to construct a new Preform Injection Moulding Plant facility for Coca-Cola Amatil consisting of a two level steel framed structure at their existing distribution centre in Roussell Road, Eastern Creek.

1.1 Background

The development is located in the south-east corner of the recently constructed distribution centre.

The proposed development comprises of one large single level steel framed building with provision for truck parking and unloading via a recess dock on the western end of the building. The building will be constructed over existing hardstand area with stormwater connections being made to existing infrastructure which allowed for future development in this portion of the site.

1.2 Scope

Costin Roe Consulting Pty Ltd has been commissioned by Goodman to prepare this report in support of a proposed Application for Development to be lodged over the site.

The report provides a summary of the design principles and planning objectives for stormwater management for the project. It should be noted that drawings developed for this report are conceptual only, and not a detailed design. Details provided are subject to adjustment as the design is developed to completion.

1.3 Authority Jurisdiction

The site falls within the boundaries of Blacktown City Council however this development will be assessed and approved at state level.

1.4 Discharge from Development Sites

Stormwater from the site will discharge to Reedy Creek through the existing stormwater system provided during the recently constructed distribution centre. The existing stormwater system allows for scour protection at outlet points and appropriate water quality controls which include gross pollutant tanks, siphon actuated filtration and a large bio-retention basin in the north of the site.

The existing drainage system incorporates the ability for connection to the future planned stormwater regional collection network. The design includes allowance for roof water storage tanks. It is noted that these tanks are not constructed at this time with construction planned for when the regional collection network is commissioned. The existing facility has incorporated a roof water re-use system in which half of the roof water is collected in above ground tanks on site for re-use in toilet flushing, truck wash and irrigation. This existing system will be connected to the new facility for toilet flushing and the relocated truck wash.

2 HYDROLOGY

2.1 General Design Principles

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, Blacktown City Council Engineering Guide for Development, Blacktown City Council Stormwater Quality Control Policy and accepted engineering practice.

Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage.

Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication "Australian Rainfall and Runoff" (1987 Edition), Volumes 1 and 2 (AR&R).

2.2 Major System Design

The piped stormwater drainage system has been designed to accommodate the 100-year ARI storm event. Overland flow paths have also been provided for the emergency case of a system blockage to convey all stormwater runoff up to and including the Q100 event have been provided which will limit major property damage and any risk to the public.

2.3 On-site Detention/ Existing Drainage

Blacktown City Council, in common with many other local authorities in the Sydney region, limit the runoff discharged from private property into the underground piped drainage system.

As part of the development of the existing distribution centre On-site detention (OSD) has been provided in a dual bio-retention/ OSD basin located in the north of the site. Accordingly, as the original design incorporated the proposed development, the detention basin result in no on-site detention systems being required for the proposed re-development.

2.4 Runoff Models

In accordance with the recommendations and standards of Blacktown City Council, the calculation of the runoff from storms of the design ARI has been calculated with the catchment modelling software DRAINS.

3 HYDRAULICS

3.1 General Requirements

Hydraulic calculations will be carried out during detail design stage utilising DRAINS modelling software to ensure that all surface and subsurface drainage systems perform to or exceed the required standard.

The design parameters for the DRAINS model are to be based on the recommendations as defined by Blacktown City Councils Engineering Guide for Development 2005 and are as follows:

Model	Model for Design and analysis run	Rational method	
	Rational Method Procedure	ARR87	
	Soil Type-Normal	3.0	
	Paved (Impervious) Area Depression Storage	1	mm
	Supplementary Area Depression Storage	1	mm
	Grassed (Pervious) Area Depression Storage	5	mm
AMC	Antecedent Moisture Condition (ARI=1-5 years)	2.5	
AMC	Antecedent Moisture Condition (ARI=10-20 years)	3.0	
AMC	Antecedent Moisture Condition (ARI=50-100 years)	3.5	
	Sag Pit Blocking Factor (Minor Systems)	0	
	On Grade Pit Blocking Factor (Minor Systems)	0	
	Sag Pit Blocking Factor (Major Systems)	0.5	
	On Grade Pit Blocking Factor (Major Systems)	0.2	
	Inlet Pit Capacity		

Table 1: DRAINS Parameters

3.2 Freeboard

The calculated water surface level in open junctions of the piped stormwater system will not exceed a freeboard level of 150mm below the finished ground level, for the peak runoff from the Major System runoff. Where the pipes and junctions are sealed, this freeboard would not be required.

3.3 Public Safety

For all areas subject to pedestrian traffic, the product (dV) of the depth of flow d (in metres) and the velocity of flow V (in metres per second) will be limited to 0.4, for all storms up to the 100-year ARI.

For other areas, the dV product will be limited to 0.6 for stability of vehicular traffic (whether parked or in motion) for all storms up to the 100-year ARI.

3.4 Roadway Drainage

The spacing of inlets along the roads will be such that the depth of flow, for the Major System design storm runoff, will not exceed the top of the roadway kerb (150mm above gutter invert).

A preliminary layout of piped stormwater drainage for the site has been prepared and is included in the Appendix A to this report (Drawing CO9170.05-CSK01).

3.5 Overland Flow

The piped system has been designed to convey all storms up to and including the 20-year ARI. Dedicated flow paths have been shown which will convey stormwater from the site to the estate road system and to the trunk detention basins.

4 WATER QUALITY CONTROLS

4.1 Regional Parameters

There is a need to target pollutants that are present in the stormwater so as to minimise the adverse impact these pollutants could have on receiving waters and to also meet the requirements specified by the Blacktown City Council Stormwater Quality Control Policy (BCCSQCP).

The development type can be classed as Industrial/Commercial, this results in the following treatment priority and retention criteria as per the BCCSQCP.

Priority	Pollutant	Description	Retention Criteria for Development Site
1	Fine Sediment	Contaminant particles 0.1mm or less	50% of the total annual load
2	Hydrocarbons, Motor oils & grease		Whichever is greater: 1. 90% of the total annual load; or 2. Total discharge from site of total Petroleum Hydrocarbons (TPH) <10mg/L at all times.
3	Gross Pollutants	Trash litter and vegetation larger than 5mm	90% of the total annual load
4	Coarse Sediment	Contaminant particles between 0.1mm and 5mm	80% of the total annual load
5	Nutrients	Total phosphorous and total nitrogen	45% of the total annual load for each nutrient

Table 4.1: Pollution Retention Criteria

As the development is more than 5 hectares, therefore all objectives are required to be treated to the standards as cited above as per the BCCSQCP.

4.2 Stormwater Treatment Measures

As discussed in this report, the recently constructed distribution centre incorporated the water quality measure which included the area to which the proposed development will be located. Furthermore the proposed development involves the replacement of hardstand areas with roofed areas which would result in a decrease in the expected pollutant loading on the existing infrastructure. As such no additional water quality measures are proposed for the development. The existing water quality system is described following.

The drainage system for the site (and the proposed development) is to be designed as a split system, that is a roof drainage system and a hardstand drainage system.

Roof water will be directed to the existing roof water system and the rainwater storage tanks. As per the recently approved and constructed distribution centre additional treatment of the roofwater is not proposed for the development.

Hardstand and car parking drainage systems are required to be treated by the Stormwater Treatment Measures (STM's). The STM's have been sized according to the catchment area of the hardstand only. The STM's for the site have been based on a treatment train approach to ensure that all of the objectives as defined above are met.

Components of the treatment train for hardstand and parking areas are as follows:

- Pits are to have grated pit covers which will not allow large litter objects from entering the stormwater system;
- 2 gross pollutant traps at end of line; and
- Two water quality devices utilising a syphon-actuated filtration system (Stormwater360 Stormfilter) will be located at the north of the site.
- Bio-retention/ On-site detention basin located at the northern end of the site.

The above noted STM's will provide treatment in the following manner:

- Grated Pit Covers - Gross pollutants and litter are trapped by the grated pit covers
- Gross Pollutant Trap - Gross pollutants or litter that pass through the pit covers would be trapped and contained here. A smaller percentage of course sediments and other pollutants will also be contained in the GPT.
- Bio-retention Basin - The bio retention basin will retain gross pollutants, coarse sediments, a percentage of Hydrocarbons motor oils & grease and some fine sediment, any dissolved nutrients..
- Siphon-actuated filtration system – The filtration system is to consist of a Stormwater 360 filtration device. This system is able to be customised through the

specification of its filter media to effectively target pollutants that are required to be retained. The filtration unit will mainly target fine sediments, nutrients and hydrocarbons (motor oils & grease), that is Items 1, 2 & 5 from Table 2.

Through the use of the STM's in the treatment train and the tertiary treatment action of the detention/bio-retention basin, the pollution retention criteria for the site as defined in *Table 4.1* is able to be achieved on an overall site basis.

4.3 Maintenance And Monitoring

The STM's are to be inspected at 3 month intervals for the first year of operation and at 4 month intervals for the second year of operation, details of the type and amount of pollutants are to be logged, with the details kept on site. Upon completion of the first two years of operation a maintenance schedule will be able to be established based on the recommendations of the manufacturer and the logged data, with cleaning and removal of trapped pollutants from the devices occurring at a maximum time of 6 month intervals.

Appendix A

DRAWINGS BY COSTIN ROE CONSULTING

Co9170.05-CSK01