

Integrated Stormwater Management Plan

Campbell's Stores

Prepared for Tallawoladah Pty Ltd

13th October 2016

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Contents

1.0	EXECUTIVE SUMMARY	3
2.0	INTRODUCTION	3
3.0	EXISTING DEVELOPMENT	4
4.0	PROPOSED REDEVELOPMENT	6
4.1	STORMWATER DESIGN	8
4.2	HYDROLOGY	8
4.2.1	EXISTING STORMWATER PIPE NETWORK	8
4.2.2	CACHMENT & CROSS FLOWS	9
4.2.3	HYDROLOGICAL ANALYSIS RESULTS	9
4.3	EROSION AND SEDIMENT CONTROL	9
4.4	WATER QUALITY	10
4.4.1	STORMWATER TREATMENT	10
4.5	MAINTENANCE AND MONITORING	11
	Appendix A	13
	Appendix B	20

1.0 EXECUTIVE SUMMARY

This integrated stormwater management plan is prepared to facilitate water sensitive urban design measures, minimisation of pollutant discharges into Sydney harbour and protection of Campbell's Stores building.

The plan includes:

- The identification of existing hydrological conditions.
- Objectives and performance standards for water cycle outcomes that are to be achieved during construction and operation of the project, including the identification and consideration of relevant design guidelines, standards and catchment management plans.
- Water management measures to be applied to meet the objectives and performance standards, including:
 - i) Stormwater treatment devices to remove gross pollutants.
 - ii) Stormwater treatment devices to capture sediments, oils and greases from stormwater run-off.
- Ongoing operation maintenance, management and monitoring measures.
- An overall stormwater design which complies with SHFA guidelines, city of Sydney Council stormwater drainage code and the relevant Australian standards.
- Maintain existing flooding characteristics of adjoining properties.
- Minimise risks to personal safety of occupants and the risk of property damage to address the flood impacts on the site of the 100 year ARI and Probable Maximum Flood (PMF) storm, including consideration of climate change, storm wave action and tidal inundation.

2.0 INTRODUCTION

This report has been submitted by Taylor Thomson Whitting (TTW) who has been engaged by Tallawoladah Pty Ltd to design the civil works for Campbell's Stores project. This report has been prepared by Stephen Brain of TTW who is a qualified practicing Civil Engineer with relevant experience in stormwater and environmental engineering.

3.0 EXISTING DEVELOPMENT

The site is located between Hickson Road and Campbell's Cove. The existing building consists of four restaurants with outside dining areas (See Figure 1 and Figure 2 below).

The existing building on the site currently discharges stormwater to the harbour and Hickson Road.

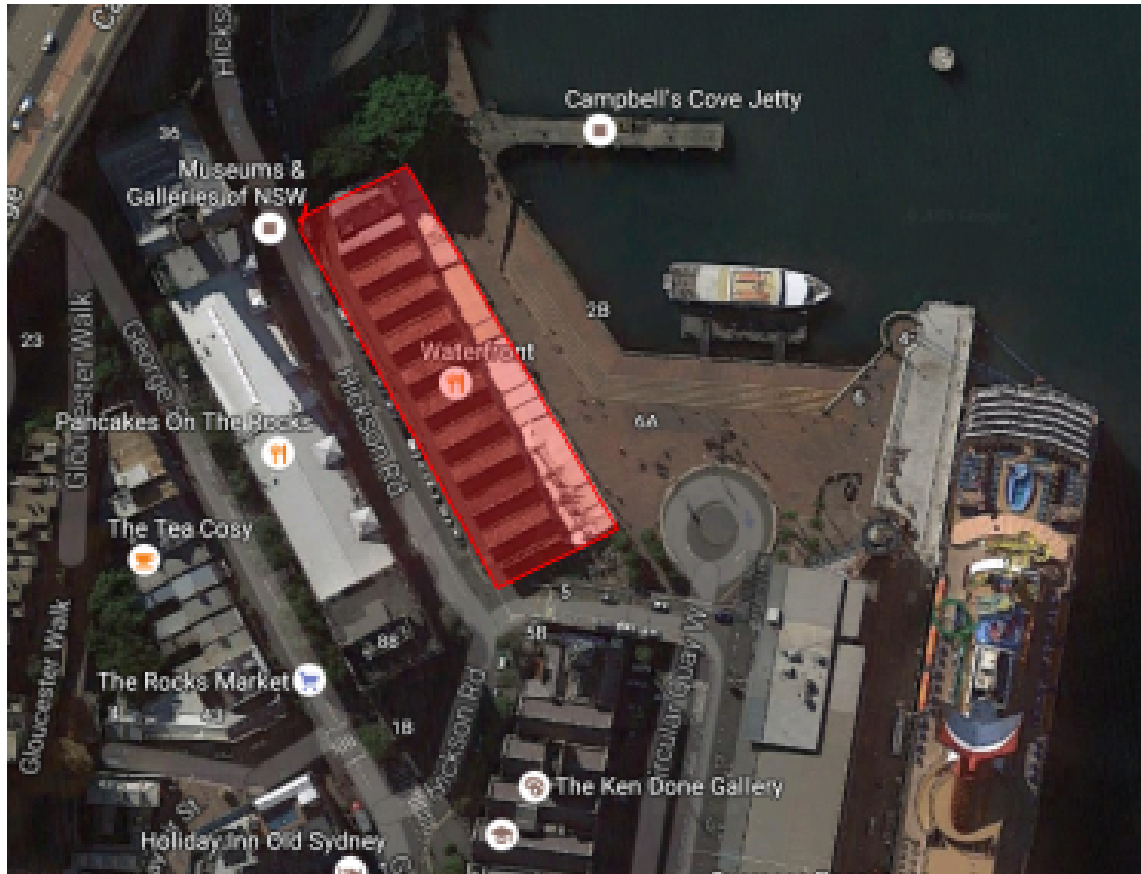


Figure 1: Existing Campbell's site



Figure 2: Existing Campbell's Cove Promenade looking toward Campbell's Stores from waterfront

4.0 PROPOSED REDEVELOPMENT

The proposed works involve redevelopment of the Campbell's Stores buildings and surrounds into a world class dining precinct with boutique waterfront restaurants and flexibility to cater for convention cocktail parties and gala dinners.

To the east of Campbell's Stores buildings (Figure 3 below), Campbell's Cove Promenade paved levels are proposed to be adjusted, create a public precinct suitable for the location and its usage. The benefits will include better protection to the Campbell's Stores buildings against water damage, creation of a uniform public space and creation of a cohesive dining precinct adjacent the water in Campbell's Cove.



Figure 3: Proposed Campbell's stores Waterfront Dining Concept image by Jahnson Pilton Walker

Hickson Road footpath to the west of Campbell's Stores building is to be widened and a raised pedestrian crossing will be provided to improve amenity along the street frontage and allow an expanded area for dining (See Figure 4). Also a new terrace and sun shading awning is proposed to the north of the Campbell's Stores buildings with retained pedestrian connection and sight lines between Hickson Road and the waterfront.

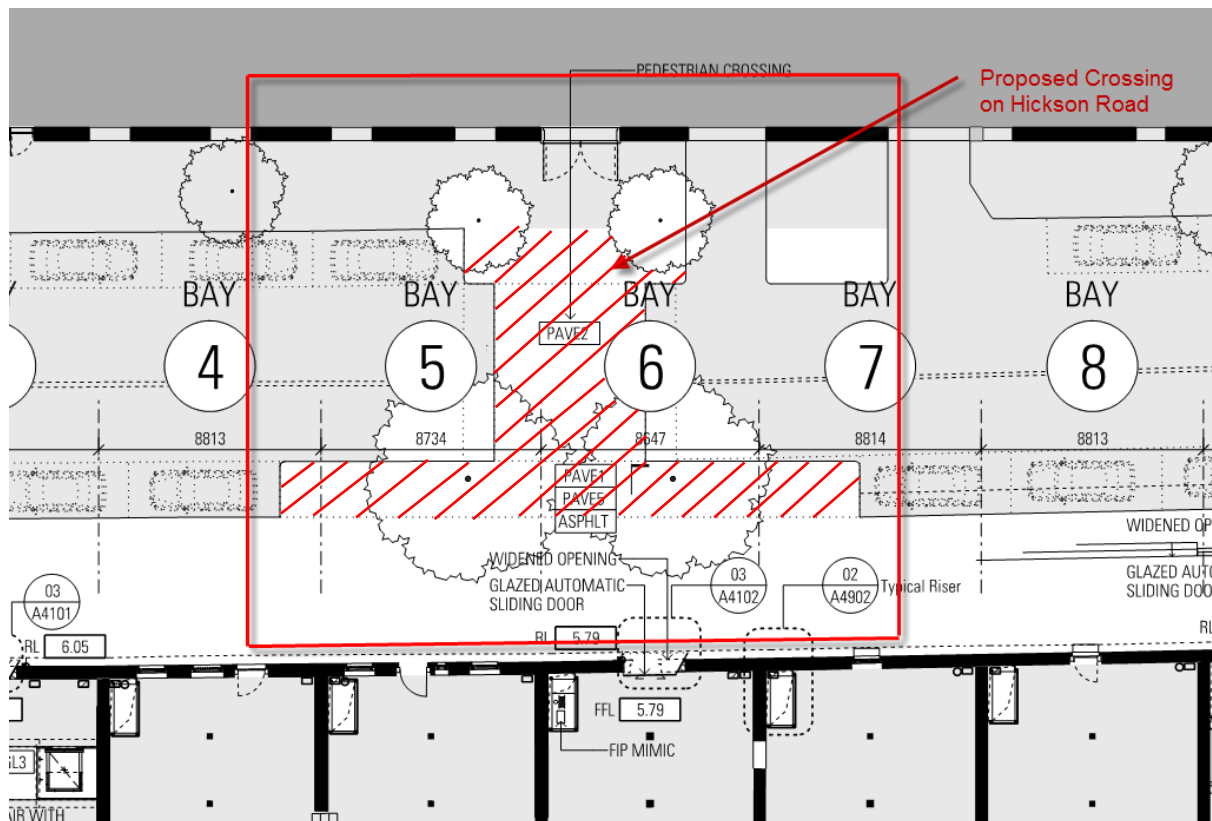


Figure 4: Proposed Crossing on Hickson Road

4.1 STORMWATER DESIGN

Stormwater drainage works for the proposed development of Campbell's store is shown on civil drawings appendix A: Civil Plans - SKC10, SKC 12 for Campbell's stores building and Hickson Road.

Stormwater quality treatment will be required for the proposed redevelopment of the building. NSW maritime guidance for stormwater disposal into Sydney Harbour requires the treatment in the form of a Gross Pollutant Trap (GPT) and secondary filter for stormwater treatment prior to discharge into the water

4.2 HYDROLOGY

4.2.1 EXISTING STORMWATER PIPE NETWORK

The existing stormwater drainage system (Figure 5 below) and other services were obtained based on limited services survey and Dial Before You Dig information.



Figure 5: Service locations from (DBYD)

4.2.2 CATCHMENT & CROSS FLOWS

A system of pits and pipes on Hickson Road and Campbell's store building captures majority of the runoff from the catchment. Our site inspection shows there are adequate overland flow paths for the adjacent catchments.

4.2.3 HYDROLOGICAL ANALYSIS RESULTS

Based on our calculations, it is our opinion that:

- The hydraulic effect of the proposed development on adjacent, downstream and immediate upstream for storms up to and including 100-year ARI storm event are minimised.
- The overland flow paths documented for the proposed development are adequate to provide adequate freeboard via overland flow paths for the Hickson road and waterfront promenade as demonstrated within the current Taylor Thomson Whitting Civil Stormwater Plans attached in Appendix A to convey stormwater runoff from the upstream catchment into the harbour.

4.3 EROSION AND SEDIMENT CONTROL

Construction works are to be carried out in accordance with the Sydney council, EPA and "Blue Book" erosion and sediment control, requirements. To maintain the water quality during the construction stage, soil and erosion control measures will be installed as below:

- Siltation fence
- Sedimentation traps
- Geotextile filter pit surround
- Sandbag kerb inlet sediment trap
- Hay bale barriers

Measures apply in accordance with the erosion and sediment control drawing as demonstrated within plan SKC03.

4.4 WATER QUALITY

4.4.1 STORMWATER TREATMENT

This report documents the water quality treatment for the building catchment only as that area discharges to the harbor directly.

The building catchment was modeled in MUSIC to demonstrate the proposed treatment train below will lead to a reduction in the following pollutant prior to discharge into the harbor.

- removal of total suspended solids;
- removal of total phosphorus;
- removal of total nitrogen;
- Gross Pollutants;

The stormwater treatment train for the proposed development includes:

- 1 x SPEL Filter (or equivalent)
- 1x HumeGard GPT (or equivalent)
-

Refer to **Table 1** below for the stormwater treatment analysis summary and results.

Pollutant	Load (kg/yr)	Residual Load	Load reduction (%)
Gross Pollutants (kg/yr)	134	0	100
Total Suspended Solids (kg/yr)	1260	250	80.1
Total Phosphorus (kg/yr)	2.3	0.966	58.1
Total Nitrogen (kg/yr)	15.4	8.77	43.1

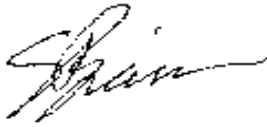
Table 1: MUSIC results

TTW believes based on results above, proposed stormwater treatment is in compliance with Australian Runoff quality and Green Building of Australia recommendations.

4.5 MAINTENANCE AND MONITORING

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
<u>Stormwater Drainage culverts</u>			
Inspect for Sediments deposited in the GPT units, riparian channel and water ponding.	Six monthly	Owner/Maintenance Contractor	-- Remove sediments causing water ponding beyond the design channel levels.
<u>Sub-Soil Drainage within structures</u>			
Inspect any blocked Outlet pipes and Flush out subsoil drains	Annually	Owner/Maintenance Contractor	-cctv inspect and clear out any blocked outlets. Flush out subsoil drains. Ensure edge is not pitted or damaged.
Check Faulty joints or separated joints and reseal or tape the joints	Five yearly	Owner/Maintenance Contractor	-cctv inspect and identify poor joints or damaged pipe. Ensure faulty or separated joints are securely sealed where required. Seal gaps as required Repair as required..
Inspect and check for Root invasion and remove the roots around the subsoil pipes	Annually	Owner/Maintenance Contractor	-Remove roots invading or encroaching pipes using hand held tools and check for any damaged pipes. Repair as required.

Authorised By
TAYLOR THOMSON WHITTING (NSW) PTY LTD

A handwritten signature in black ink, appearing to read 'S. Brain', written in a cursive style.

STEPHEN BRAIN
Technical Director