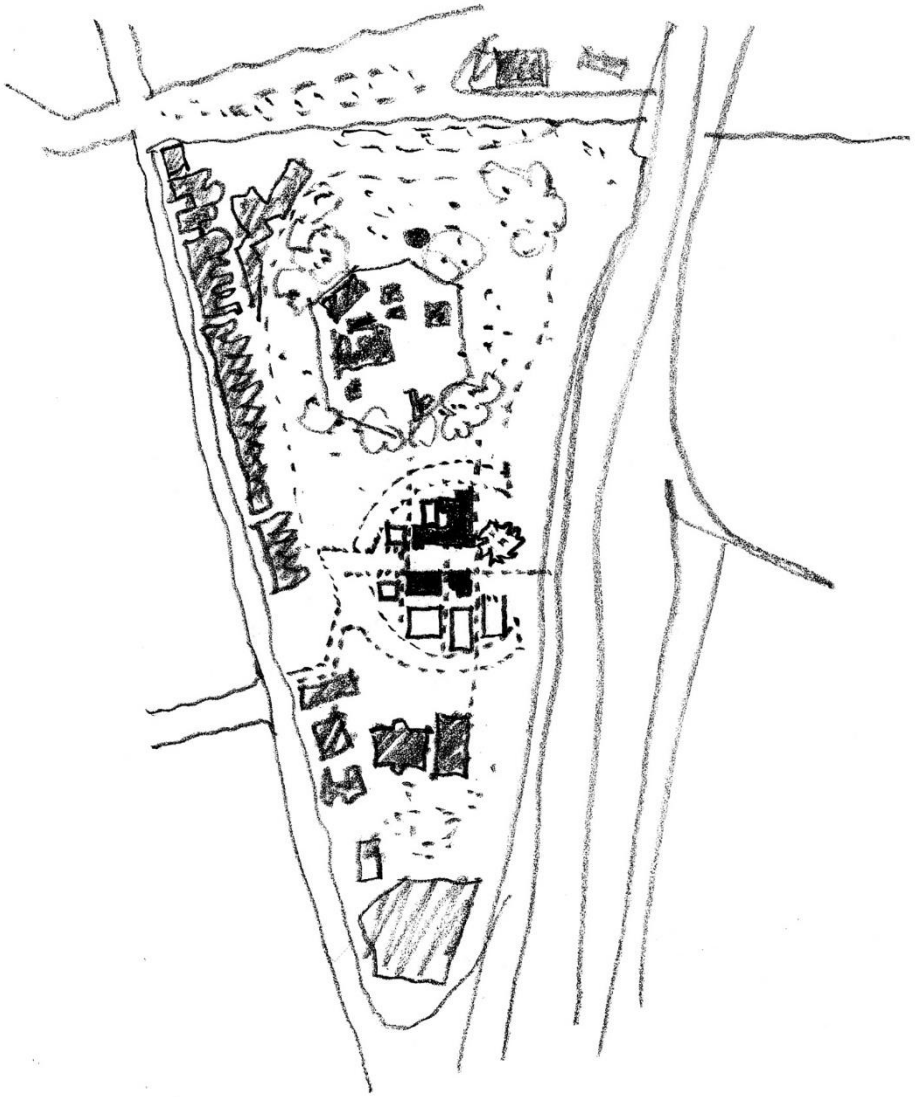
Fort Street Public School
Integrated Water Management Plan

SSD 10340
Prepared by Warren Smith & Partners
For Schools Infrastructure NSW
16 January 2020



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— SINCE 1981 —

16th January 2020

HYDRAULIC SERVICES
WATER MANAGEMENT PLAN
Fort Street Public School

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02	16th January 2020	Water Management Plan Updated with Comments
01	25th September 2019	Water Management Plan 100% Draft
Rev #	**Date**	**Description**

APPROVALS

02	**J. Skubevski**	**Current**	**T. Wise**	**D. Bolt**
01	**J. Skubevski**	**Superseded**	**T. Wise**	**D. Bolt**
Rev #	**Author**	**Status**	**Reviewer**	**Approver**

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INTRODUCTION

1. GENERAL

Warren Smith & Partners (WS+P) has been engaged by Schools Infrastructure NSW to prepare an Integrated Water Management Plan for the proposed development works at the Fort Street Public School.

The Fort Street Public School Campus ("the site") is located at Observatory Hill, Upper Fort Street, Millers Point NSW 2000 and is shown in ***Figure 1*** (approximate site location identified in red).

Figure 1: *Aerial View of Property Boundary (Source: Google Maps)*

This report will aim to address the following general SEARS condition; "Prepare an Integrated Water Management Plan detailing any proposed alternative water supplies, proposed end uses of potable and non-potable water".

This report will address the main objectives on the condition through mention of water efficient fittings and fixtures, rainwater harvesting and reuse. The hydraulic scope does not extend to water sensitive urban design and hence this aspect of the SEARS condition will not be addressed in this report.

2. DEMAND CALCULATIONS

The School currently has 200 students and 10 staff. It is proposed to increase the number of students and staff to 600 and 40 respectively as part of the project aspirational scope. However, it was recently advised that Option 3a will be pursued for this development stage with the intent to fulfil the aspirational scope as the project progresses and as project funds allow. The total proposed student and staff population as a result of the Option 3a scope amendment is 550 and 37* respectively. Ultimately, WS+P will document the demand calculations based on the population numbers of the aspirational scope as it is with the intent that it should be fulfilled in the future.

*37 based on a 1:15 staff to student ratio (previously advised by Johnstaff).

3.1 WATER SUPPLY DEMAND CALCULATIONS

The assumption used in determining the average daily potable water demands for the proposed additional student population of 400 was sourced from the Sydney Water table, "Average Daily Water Use by Property Type" and is presented in ***Table 1*** below. Please refer to *Schedule 1* for the Sydney Water table.

Where possible, potable water usage will be reduced by using low flow taps and sanitary fixtures, which typically provide the following flow rates:

- Shower 9.0L/min,
- Basin 4.5L/min,
- Sink 4.5L/min.

We expect Sydney Water to have historical data of the existing site (200 students and 10 staff) of which they can use to assess the effect of the additional 400 student load on existing infrastructure and ultimately provide advice on the proposed connection location and if any required amplifications or upgrades are required. Additionally, we have assumed that the average daily potable water demand for staff will be the same as students as per the Sydney Water table (*Schedule 1*).

Table 1: Average Daily Water Demand

Classification	Metric Unit	Average Demand (L/Metric Unit/Day)
Special Use - School	Student	20
Special Use – School	Staff (Student)	20

Please refer to ***Table 2*** below for the average daily water demand calculation.

Table 2: Average Daily Water Demand Increase Calculation

Total	Average Demand (L/Metric Unit/Day)	Total Average Daily Water Demand (kL)
400 (Students)	20	8
30 (Staff)	20	0.6

The following flows for the entire site have also been calculated:

- Probable simultaneous demand – 1.78 L/sec (subject to architectural development)
- Fire flow for hydrants – 20 L/sec
- Fire flow for sprinklers and drenchers – TBC – BCA Certifier & Fire Safety Engineer required to address heritage scope and building proximity on site

3. CONNECTIONS

4.1 WATER

It is proposed that connection is made to the Sydney Water DN150 CICL water main in Upper Fort Street as shown in **Figure 2** .

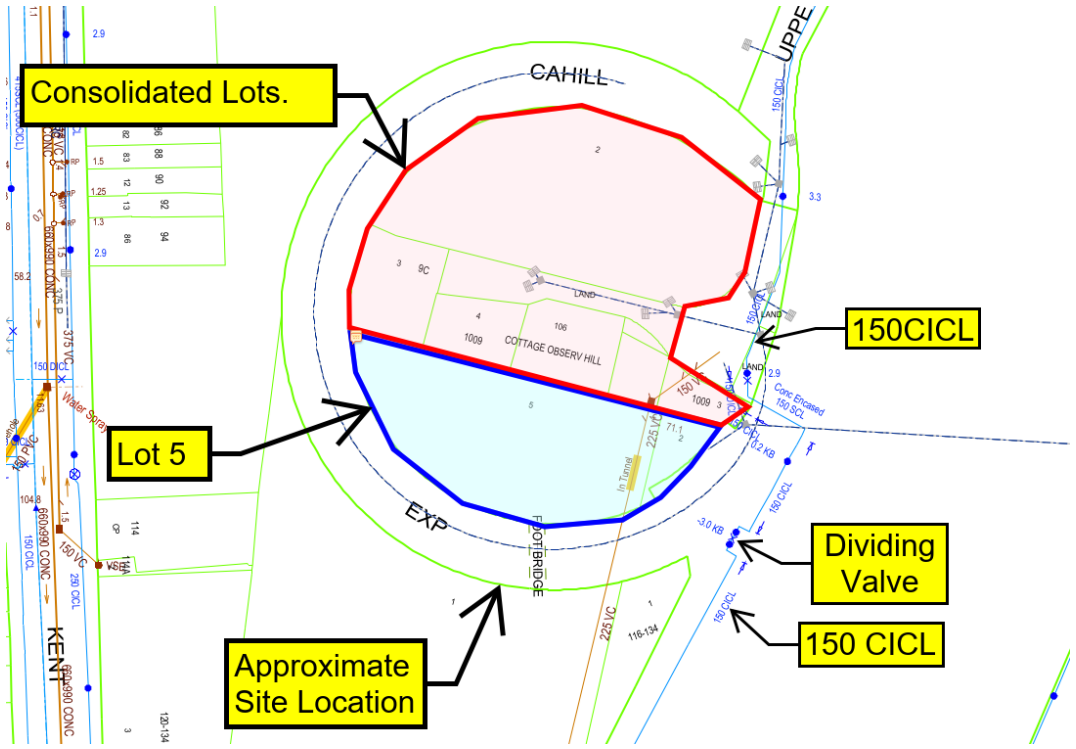

Figure 2: *Location of the Sydney Water Utility (Water) Main(s)*

The consolidation of all the land lots except for Lot 5 will require two (2) separate connections to the DN150 CICL water main to comply with the Sydney Water Network Utility Operator Guidelines. Each connection will require a separate Sydney Water authority meter and backflow prevention (RPZD) device to protect the potable water main.

It is proposed that both connections to the main are made in Upper Fort Street.

4. PRIVATE SYSTEM

4.1 POTABLE WATER

It is proposed that the potable water services extend from the infrastructure as described in the WS+P Schematic Design, Utility Services and Infrastructure Management Plan reports to all wet area fixtures and fittings as required, including basins, WC's, showers and the like.

Potable water services will also extend to any mechanical services as required.

4.2 NON-POTABLE COLD WATER

It is proposed that non-potable cold water services are not utilised for supply to any internal sanitary fixtures or fittings such as WC flushing. This is to minimise the risk of public health.

The non-potable cold water service extending from the rainwater reuse system will be used for irrigation purposes only. A potable cold water service with a reduced pressure zone device preceding the first take off where zone protection is required in accordance with AS 3500.1 will be utilised as a rainwater top-up supply. The top up supply is to be provided with an air gap (above) the rainwater tank overflow outlet.

5 WATER USAGE REDUCTION

5.1 LOW FLOW TAPS

Where possible, potable water usage will be reduced through the use of low flow taps and sanitary fixtures, typically using the following flow rates:

- Shower 9.0L/min,
- Basin 4.5L/min,
- Sink 4.5L/min.

Low flow taps are only to be used if the selected fixtures comply with the EFSG.

5.2 WATER METERING

The development will be metered with utility (Sydney Water) owned water meters at each land lot boundary. These water meters will have the capability for connection to BMCS via pulse read-out and therefore can be water demand and leak monitored.

Privately owned (and read) sub meters shall be provided to meter the usage of the following:

- Domestic hot water heaters cold water supply,
- OHSH Kitchen,
- Rainwater tank make-up water.

5.3 RAINWATER REUSE

Rainwater harvesting is designed to provide an alternative source for non-potable water uses for the school. Implementing a rainwater re-use system will result in the conservation of potable cold water sources and a reduction in the daily water demand. It will also reduce the stormwater discharged to the local authority (Sydney Water) drainage system.

Rain from sloped roof (metal deck) areas will be collected using gutters and downpipes where they will reticulate to the rainwater tank for re-use (irrigation purposes only).

5.4 HYDRANT AND SPRINKLER PUMP TESTING

It is proposed that the hydrant and sprinkler pump test water is reticulated directly to the rainwater tank during occasional testing (frequency to be determined in future design phases). This proposal is a great way of conserving water during testing where high flows (approximately 20 L/sec) for extended durations are expected.

Test water normally discharged to the civil stormwater system and so this option allows for the filling of the rainwater tank prior to overflow into the civil stormwater system.

7 SCHEDULE 1 SYDNEY WATER TABLE

"AVERAGE DAILY WATER USE BY PROPERTY TYPE"

Development Type	Development Sub-Type	Key Metric	Metric Unit	Average Demand (L/Metric Unit / Day)
Residential	Single Lot Torrens	Dwelling	Each dwelling	623.00
	Flats Torrens	Net Floor Area	Square Meter	2.36
	High Rise Units	Net Floor Area	Square Meter	3.34
	Single Lot Community	Dwelling	Each dwelling	623.00
Mixed	Residential / Commercial	Combined Floor Area	Each dwelling / Square Meter	Use separate rates for each component
	Commercial / Industrial	Combined Floor Area	Square Meter	Use separate rates for each component
Commercial	Aged Accom - Self Care	Net Floor Area	Square Meter	2.50
	Aged Accom - Hostel	Bed	Each bed	271.00
	Aged Accom - Full Care	Bed	Each bed	271.00
	Childcare	Net Floor Area	Square Meter	3.60
	Hotel / motel / serviced apartments	Room	Each room	359.94
	Office	Net Floor Area	Square Meter	2.27
	Shopping Centre	Net Floor Area	Square Meter	3.00
	Laundry / Dry Cleaner	Net Floor Area	Square Meter	10.50
	Café / Fast Food / Butcher / Deli	Net Floor Area	Square Meter	2.48
	Retail Units	Net Floor Area	Square Meter	2.48
	Medical / Veterinary	Net Floor Area	Square Meter	2.48
	Mechanical Repair	Net Floor Areas	Square Meter	2.48
	Car / Boat Sales	Net Floor Area	Square Meter	2.48
	Car Wash	Net Floor Area	Square Meter	9.40
	Club	Net Floor Area	Square Meter	3.77
Industrial	Heavy Process		As required	
	Chemical Manufacturing		As required	
	Printing Manufacturing		As required	
	Beverage Manufacturing		As required	
	Light Factory Unit	Developed floor area	Square Meter	2.82
	Warehousing	Developed floor area	Square Meter	2.82
	Transport / Bus Depot	Site area	Square Meter	0.91
Special Uses	University	Student	Each student	20.00
	School	Student	Each student	20.00
	Hospital	Bed	Each bed	271.00
	Religious assembles	Developed floor area	Square Meter	1.30
	Government Depot	Site area	Square Meter	0.91
	Community Centre / Library	Floor area	Square Meter	1.84
	Sport Fields with Amenities		As required	
	Park & Reserves		As required	
	Services - Police / Ambulance etc.	Floor area	Square Meter	1.40