Food Processing and Packaging Facility at Part Lot 2304 Templar Road, Erskine Park

Integrated Water Management Plan

Report No S.CIP-0103-R002
Date 30 July 2013

engineering sustainable environments

REPORT AUTHORISATION

PROJECT: **FOOD PROCESSING AND PACKAGING FACILITY AT PART LOT 2304 TEMPLAR ROAD, ERSKINE PARK**
INTEGRATED WATER MANAGEMENT PLAN

REPORT NO: **S.CIP-0103-R002**

Date	Rev	Comment	Prepared by	Checked by	Authorised by
24-07-13	A	Preliminary	PJ	MR	AM
26-07-13	B	Revised Preliminary	PJ	MR	AM
30-07-13	C	Issue for EIS Submission	PJ	MR	AM

Melbourne Office
10 Yarra Street
South Yarra VIC 3141
Australia
Tel: +61 3 9249 0288
Fax: + 61 3 9249 0299
Email: ulmelb@umowlai.com.au
Web: www.umowlai.com.au
ABN: 29 143 564 738

Sydney Office
L7, 657 Pacific Highway
St Leonards NSW 2065
Australia
Tel: +61 2 9431 9431
Fax: +61 2 9437 3120
Email: ulsyd@umowlai.com.au
Web: www.umowlai.com.au
ABN: 99 150 174 782

Brisbane Office
123 Charlotte Street
Brisbane QLD 4000
Australia
Tel: +61 7 3210 1800
Fax: +61 7 3210 1799
Email: ulbris@umowlai.com.au
Web: www.umowlai.com.au
ABN: 91 142 668 773

EXECUTIVE SUMMARY

Umow Lai have been engaged to prepare a Water Cycle Management Plan on behalf of CIP as part of the Environmental Impact Statement for the Proposed Food Processing and Packaging Facility at Part Lot 2304 Templar Road, Erskine Park, NSW.

The use of water sensitive urban design principles including the collection and reuse of rainwater, and the use of water efficient fixtures will result in a reduction in the potable water demand of the development relative to a comparable benchmark.

Due to the nature of the facility, careful consideration has been given to the use of appropriately sourced potable and non potable water supply streams supplying the various end uses. Further consideration has been given to the on-site treatment of waste water to ensure the quality of discharge is in line with Sydney Water requirements.

We would recommend that the proposed water management measures are in accordance with the current regulatory requirements and that the scheme should be adopted as an acceptable method of addressing the water management issues relevant to the site.

CONTENTS

1.0 REPORT OBJECTIVE

The aim of this report is to outline the strategy for water management for the Proposed Food Processing and Packaging Facility at Part Lot 2304 Templar Road, Erskine Park, NSW.

This water management strategy has been prepared to identify;

- Site conditions and available infrastructure
- Site water demands
- Water efficiency measures
- Available sources of potable and non potable water to meet site demands
- A practical water management strategy for the site
- Waste water discharge treatment considerations
- Spill containment and bunding

The water management strategy has been prepared in consideration of relevant Sydney Water and local authority requirements.

This report should be read in conjunction with the following;

- Architectural site and building plans
- Stormwater Management Report and layouts
- Site Infrastructure Services Report
- Waste, Storage and Handling Report

2.0 SITE WATER AND SEWER INFRASTRUCTURE

2.1 WATER INFRASTRUCTURE

A 150mm authority water main is located adjacent to the west of the site in Templar Road. The proposed connections to the main include

- 1 x 150mm potable water
- 1 x 150 combined hydrant & sprinkler fire water supply

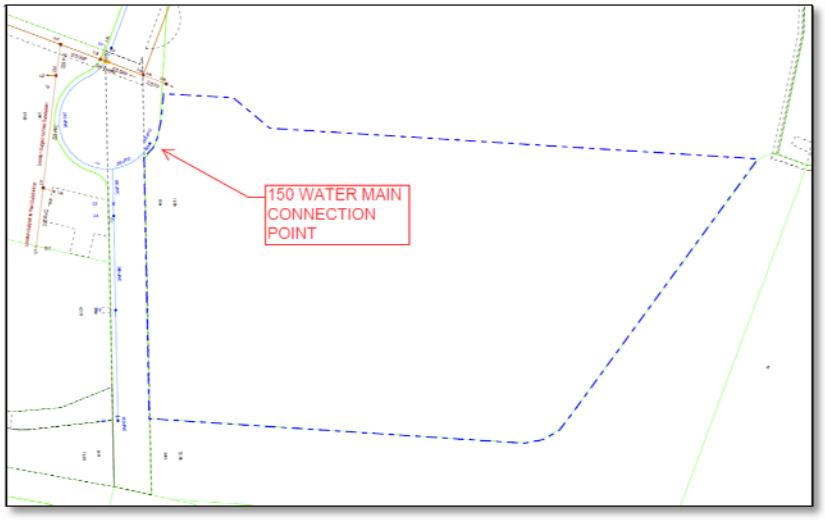

Figure 1 *DBYD Authority Water Main*

A flow and pressure enquiry has been received from Sydney Water, refer to Appendix A

In summary the available flow and pressure to the site is;

Available flow and pressure	Flow l/s	Pressure m/h
Static Minimum	-	43
Static Maximum	-	88
Fire Installations based on Peak Demand	5	43
	20	41
	40	37
	60	31
Maximum permissible flow	111	4

2.2 SEWER INFRASTRUCTURE

A 225mm sewer main serves the site, and is located approximately 10m north of the property boundary adjacent to Templar Road. An extension to the sewer connection point will be required to bring the sewer main to 1m within the property boundary.

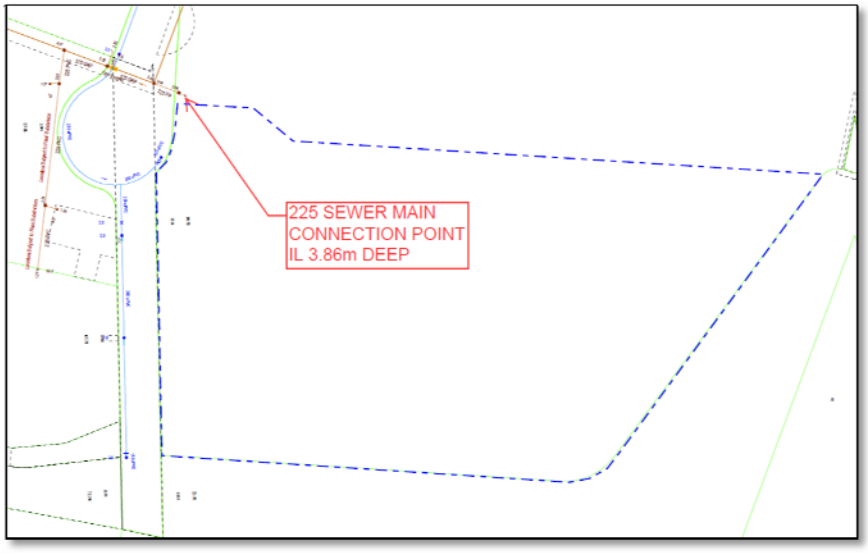

Figure 2 *DBYD Authority Sewer Main*

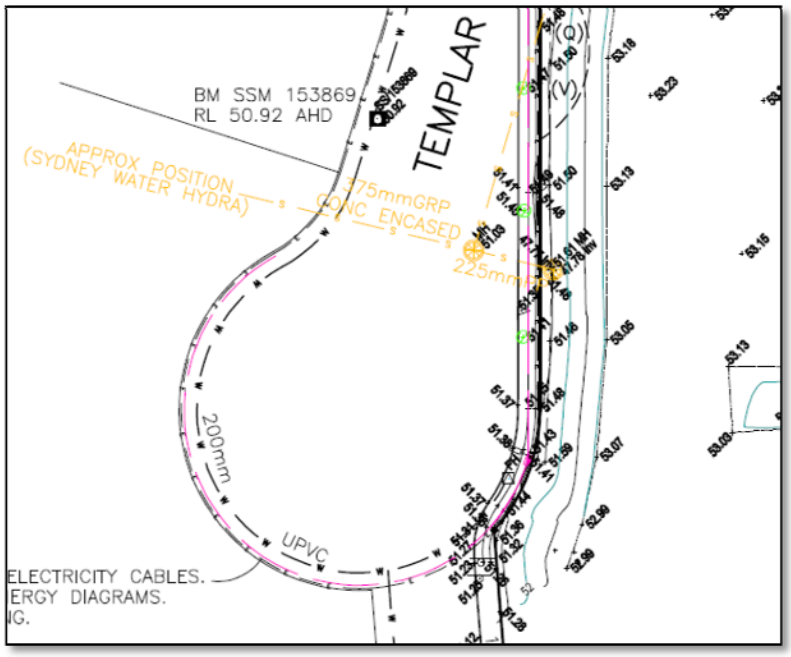

Figure 3 *Survey plan detail of sewer main*

3.0 WATER MANAGEMENT STRATEGY

3.1 WATER SUPPLY SOURCES

The two available water supply sources to meet site demands are;

- Authority supplied mains water
- Rainwater harvested from roof areas

3.1.1 Rainwater Harvesting

Rainwater harvesting involves the collection, storage and re-use of rainwater from the roof areas of a development for internal and external uses. In relation to the proposed development site, harvested rainwater could potentially be used for toilet and urinal flushing and irrigation of landscaped areas.

Rainwater harvesting contributes to the conservation of drinking quality water, improves the reliability of our water supplies, frees up water for the environment and reduces the potential export of pollutants into the natural environment downstream.

The following measures will need to be adhered to with respect to the rainwater tank installation:

- Tanks to be installed and maintained to prevent cross connection with the potable mains water supply, including provision of a backflow prevention device at water meters;
- Provision of a low-level potable water top-up switch or tank bypass facility to ensure continual supply during drier periods;
- All rainwater services to be clearly labelled “Non-Potable Water” with appropriate hazard identification;
- Pipe work used for rainwater services to be coloured lilac in accordance with AS1345. All valves and apertures to be clearly and permanently labelled with safety signs to comply with AS1319.

3.2 WATER EFFICIENCY MEASURES

Water efficient fixtures, fittings and equipment will be installed throughout the site to minimise water consumption. Water efficiency strategies include;

- Installation of minimum 4 star WELS rated efficient tap ware and fixtures to non process areas
- Knee operated hand and knife wash facilities throughout the process areas
- Landscaping with plant species that require minimal water and irrigating with appropriate systems to minimize water loss and evaporation. This includes using native plant species, using mulch deeply around garden beds, avoiding watering when it’s windy, watering during the coolest parts of the day and using a drip irrigation system with rain sensors.

3.3 SITE WATER DEMAND ASSESSMENT

The proposed facility will feature food related process activities. These activities require regular cleaning and disinfection wash down which will account for the majority of water use for the building. Due to the process nature of the building, water consumption is expected to be relatively consistent throughout the year.

The main categories for various water demands for the facility include;

- Process hot and cold water
- Staff and administration; kitchen, staff change room toilets and ablutions
- Landscape Irrigation
- Evaporative cooling makeup water

The following demand volumes have been projected for the water balance assessment, based on typical process and non process activities:

Category	Minimum (kL/day)	Maximum (kL/day)	Average (kL/day)	Total annual demand (kL/year)
Process water	426	426	426	155,490
Staff & Administration	9.6	12.0	11.8	4,307
Irrigation	0	8.6	4.5	1,660
Evaporative cooling Make up	79.9	79.9	79.9	29,163
Total demand	**515.5**	**526.5**	**522.2**	**190,620**

Table 1 *Site Water Demand Assessment*

3.4 WATER BALANCE ASSESSMENT

The water demands best suited to rainwater supply include toilet and urinal flushing, and landscape irrigation. A further breakdown of the site water demand assessment follows, noting the resulting potable and non potable demands;

Category	Minimum (kL/day)	Maximum (kL/day)	Average (kL/day)	Total annual demand (kL/year)
Potable Demands				
Process water	426	426	426	155,490
Staff & Administration – Kitchen & Ablutions	6.9	8.6	8.4	3,101
Potable Sub Total	**432.9**	**434.6**	**434.4**	**158,591**
Non Potable Demands				
Staff & Administration – Kitchen & Ablutions	2.7	3.4	3.4	1,206
Irrigation	0	8.6	4.5	1,660
Evaporative cooling Make up	79.9	79.9	79.9	29,163
Non Potable Sub Total	**82.6**	**91.9**	**87.8**	**32,029**

Table 2 *Site Water Demand Assessment – Potable vs. Non Potable*

A water balance model has been undertaken to assess a suitable volume of rainwater storage to adequately meet the projected non potable water demand.

The water balance assumed the roof rainwater catchment area to be 2,500 m^2 and the total rainwater tank volume of 100 kL.

The water balance modelled daily rainfall vs. consumption utilising over ten years of daily rainfall data supplied from the Bureau of Meteorology (BOM). Data sourced from the BOM station;

Orchard Hills Treatment Works (6.3 km from Erskine Park)
Number: *67084*
Lat: *33.80° S*
Lon: *150.71° E*
Elevation: *93 m*

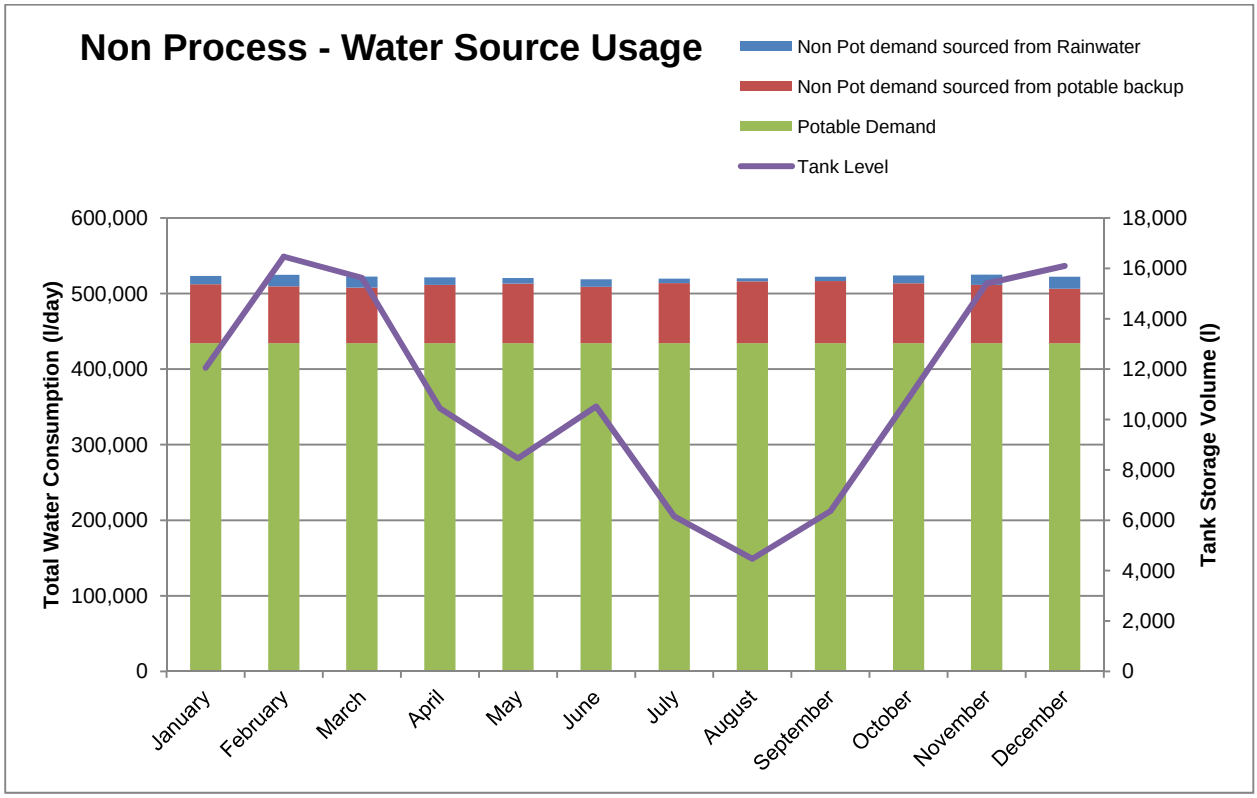

Figure 4 *Typical monthly Potable vs. Non potable Water Consumption*

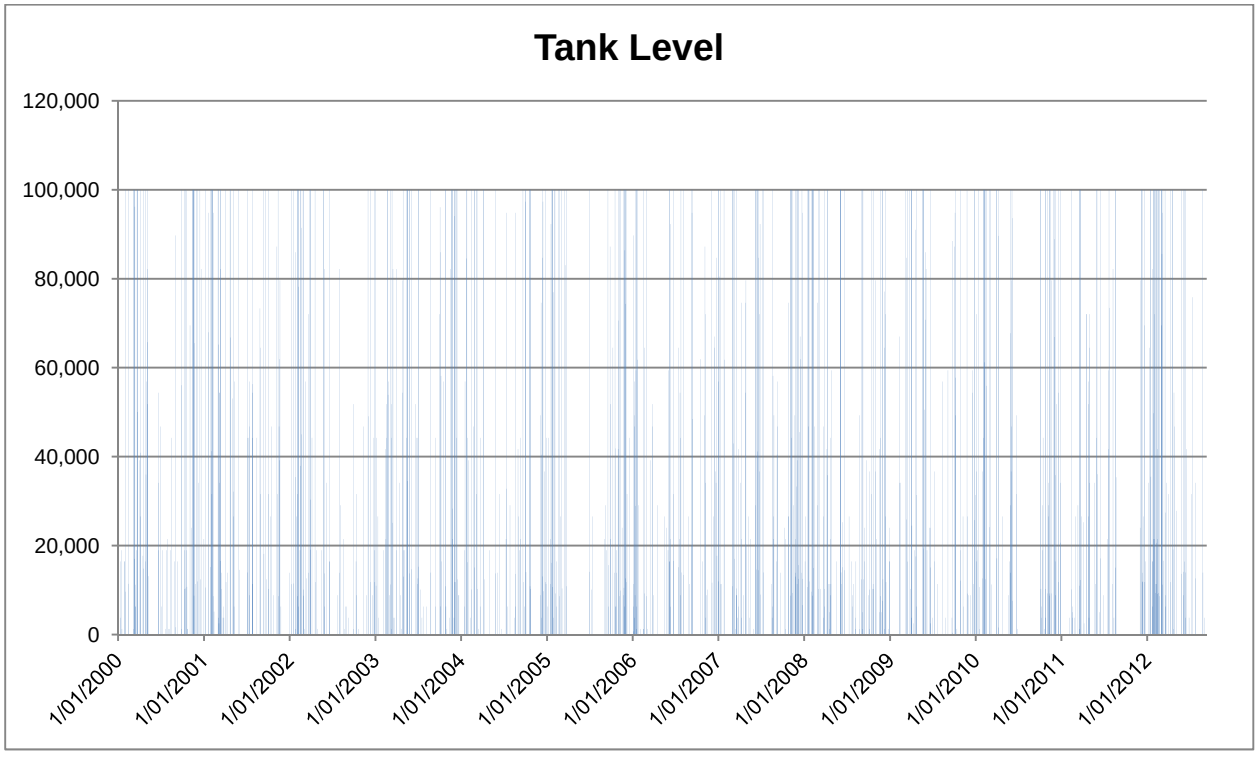

Figure 5 *Tank volume projected overt 10 years*

4.0 WASTE WATER DISCHARGE

4.1 PURPOSE

Waste water collected from process areas will be treated via an onsite Waste Water Treatment Plant (WWTP) prior to discharging to the Sydney Water sewer main on Templar Road.

The purpose of the treatment plant is to treat trade waste on site to a standard that can be discharged to the sewer system. Solids removed from the wastewater will be sent to landfill.

A trade waste agreement for the waste stream will be negotiated as the detailed design of the plant is progressed.

4.2 WASTE WATER

Processing activities within the facility will include meat products (beef, lamb, pork and, chicken) in highly automated production lines.

Wastewater generated is mainly from cleaning cycles that occur at regular occurrences throughout the day.

4.2.1 Raw Water Characteristics

The following WWTP inflow raw water characteristics are expected;

Daily Effluent Volume	
Category	**Volume (kL/day)**
Process	264
Cleaning	162
Contingency 30%	128
Treatment Plant Design Volume	**554**

Flow Rate	
Category	**Flow (kL/hour)**
Peak	76
Average	30
Design	**30**

Raw Water Quality Characteristics	
Category	**Concentration**
Biochemical Oxygen Demand (BOD_5)	<3,000 mg/l
Chemical Oxygen Demand (COD)	<5,000 mg/l
Total Oil and Grease	<1,000 mg/l
Suspended Solids	<2,000 mg/l
pH	6 - 10

4.2.2 Proposed Treated Effluent Characteristics

Treated effluent will be treated to the following criteria and be suitable for discharge to the sewer system:

Treated Effluent Quality Characteristics	
Category	**Concentration**
Biochemical Oxygen Demand (BOD_5)	900 mg/l
Chemical Oxygen Demand (COD)	1,500 mg/l
Total Oil and Grease	50 mg/l
Suspended Solids	200 mg/l
pH	7 - 9

4.2.3 WWTP Metering and Sampling

The wastewater treatment plant will include the following process components:

- Flow metering prior to the treatment systems
- Sampling points prior to the treatment systems
- Conductivity metering in the balance tank
- pH metering in the balance tank
- Dissolved metering oxygen in the balance tank
- Flow metering downstream of the treatment systems
- Conductivity metering downstream of the treatment systems
- pH metering downstream of the treatment systems
- Sampling points downstream of the treatment systems

These monitoring points will be logged in the WWTP control system

Flow metering will provide instantaneous and daily totals. Others shall monitor and log continuous readings.

4.2.4 WWTP Components

The WWTP will feature some or all of the following components to achieve the effluent discharge quality requirements noted above;

- Balance tank sized to provide flow buffering of 24 hours, complete with a mixer and/or aeration system to prevent the tank becoming anaerobic and odourous. A DO probe will used to control aerator or mixer to set dissolved oxygen levels in the tank. The mixer will prevent grit deposition in the balance tank.

- Screening removal system for removal of coarse pollutants in the trade waste. The screen and bin will be enclosed to reduce potential odour escape.

- Primary treatment system suitable for removal of solids, oil and grease, within an enclosed process unit for odour control.

- Secondary treatment system/s will be biological treatment processes to reduce the biological oxygen demand (BOD_5) of the waste stream.

- Solids Handling system to collect solids from the process units and the sludge handling unit. The dewatering system will be provided for sludge volume reduction to10%w/v after dewatering. The sludge storage area will be covered and feature an odour control unit for odour control. Sludge will be trucked off site to landfill via trucks.

- Odour Control will be provided to achieve less than 1 odour unit at the site boundary.

- Chemical storage areas will be bunded for all chemicals required on site.

- Control system. The WWTP will feature all instrumentation and controls in place for remote monitoring and operation of the plant. A local control panel will be provided at the WWTP site, with alarms and control I/Os being sent to the facility central control system.

5.0 SPILL CONTAINMENT AND BUNDING

Chemicals will be stored throughout the facility for use in process and cleaning activities. A summary of bulk storage chemicals and indicative volume follows;

- Quatfoam – 10,000 L
- Chlorinated Foam – 20,000 L
- Sanitiser – 3,000 L

Containment will be provided to chemical storage areas to prevent spillage from entering stormwater or waste water systems. The proposed containment to these areas includes;

- A bunded floor area sufficient for the classification and volume of the product being stored.
- Dry sump within the bunded area for pump out in the event of spillage
- Canopy over the bunded area to comply with regulations for storage of the classification of chemicals being stored.
- All necessary fire services and equipment that may be required for the classification of the chemicals being stored.
- Containment Risk Assessments will be undertaken throughout all stages of the design process

Further containment will be provided where oil storage is requires within plantrooms and workshops. Bunded areas with drainage to coalescing plate oil separator pre treatment devices will be provided to all areas featuring the storage of oils.

6.0 SUMMARY AND RECOMMENDATIONS

The report addresses the water management requirements of the proposed development.

The major water management results and recommendations for the proposed development are as follows:

- Efficient fixtures and fitting will be installed throughout the facility to minimise site water consumption
- A 100 kL rainwater harvesting system will be provided for the site. Due to the large catchment area, the rainwater harvesting system will provide a significant contribution to the non potable water demands for the site
- Water demand for the site is generally consistent throughout the year, due to the process nature of the site
- A Waste Water treatment plant will treat all process related trade waste water to an acceptable standard prior to discharge from the site
- Adequate bunding and containment measures will be adopted to prevent potential chemical spills from entering the waste water or stormwater systems

We recommend that the design philosophy detailed in this report be accepted as an appropriate approach to addressing the water management issues relevant to the proposed development.

APPENDIX A SYDNEY WATER FLOW & PRESSURE STATEMENT

Statement of Available Pressure and Flow

Sydney WATER

WMS No: **283591**
Contact No: 8849-3531
Fax No: 8849-3071

Date: 26/06/2013

Pressure & Flow Application Number: 8466438
Your Pressure Inquiry Dated: Tue June 25 2013
Property Address: 16-70 Templar Rd, Erskine Park 2759

The expected maximum and minimum pressures available in the water main given below relate to modelled existing demand conditions, either with or without extra flows for emergency fire fighting, and are not to be construed as availability for normal domestic supply for any proposed development.

ASSUMED CONNECTION DETAILS

Street Name: Templar Rd	Side of Street: West
Distance & Direction from Nearest Cross Street	50 metres South from Lockwood
Approximate Ground Level (AHD):	58 metres
Nominal Size of Water Main (DN):	200 mm

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	88 metre head
Minimum Pressure	43 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	43
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5 10 15 20 30 40 50 60	43 42 42 41 40 38 35 31
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	5 10 15 20 30 40 50 60	43 42 42 41 40 37 35 31
Maximum Permissible Flow	111	4

(Please refer to reverse side for Notes)

Robert Wickham
Principal Planner
Urban Growth – Asset Services

General Notes

This report is provided on the understanding that (i) the applicant has fully and correctly supplied the information necessary to produce and deliver the report and (ii) the following information is to be read and understood in conjunction with the results provided.

1. Under its Act and Operating Licence, Sydney Water is not required to design the water supply specifically for fire fighting. The applicant is therefore required to ensure that the actual performance of a fire fighting system, drawing water from the supply, satisfies the fire fighting requirements.

2. Due to short-term unavoidable operational incidents, such as main breaks, the regular supply and pressure may not be available all of the time.

3. To improve supply and/or water quality in the water supply system, limited areas are occasionally removed from the primary water supply zone and put onto another zone for short periods or even indefinitely. This could affect the supply pressures and flows given in this letter. This ongoing possibility of supply zone changes etc, means that the validity of this report is limited to one (1) year from the date of issue. It is the property owner's responsibility to periodically reassess the capability of the hydraulic systems of the building to determine whether they continue to meet their original design requirements.

4. Sydney Water will provide a pressure report to applicants regardless of whether there is or will be an approved connection. Apparent suitable pressures are not in any way an indication that a connection would be approved without developer funded improvements to the water supply system. These improvements are implemented under the Sydney Water 'Urban Development Process'.

5. Pumps that are to be directly connected to the water supply require approval of both the pump and the connection. Applications are lodged through Quick Check Agents (List available on Sydney Water Website - www.sydneywater.com.au). Where possible, on-site recycling tanks are recommended for pump testing to reduce water waste and allow higher pump test rates.

6. Periodic testing of boosted fire fighting installations is a requirement of the Australian Standards. To avoid the risk of a possible 'breach' of the Operating Licence, flows generated during testing of fire fighting installations are to be limited so that the pressure in Sydney Water's System is not reduced below 15 metres. Pumps that can cause a breach of the Operating Licence anywhere in the supply zone during testing will not be approved. This requirement should be carefully considered for installed pumps that can be tested to 150% of rated flow.

Notes on Models

1. Calibrated computer models are used to simulate maximum demand conditions experienced in each supply zone. Results have not been determined by customised field measurement and testing at the particular location of the application.

2. Regular updates of the models are conducted to account for issues such a urban consolidation, demand management or zone change.

3. Demand factors are selected to suit the type of fire-fighting installation. Factor 1 indicates pressures due to system demands as required under Australian Standards for fire hydrant installations. Factor 2 indicates pressures due to peak system demands.

4. When fire-fighting flows are included in the report, they are added to the applicable demand factor at the nominated location during a customised model run for a single fire. If adjacent properties become involved with a coincident fire, the pressures quoted may be substantially reduced.

5. Modelling of the requested fire fighting flows may indicate that local system capacity is exceeded and that negative pressures may occur in the supply system. Due to the risk of water contamination and the endangering of public health, Sydney Water reserves the right to refuse or limit the amount of flow requested in the report and, as a consequence, limit the size of connection and/or pump.

6. The pressures indicated by the modelling, at the specified location, are provided without consideration of pressure losses due to the connection method to Sydney Water's mains.