

# Intermodal Logistics Centre at Enfield Environmental Impact Statement

## SITE SEWER AND WATER INVESTIGATIONS

June 2005



# Intermodal Logistics Centre at Enfield Environmental Impact Statement

## SITE SEWER AND WATER INVESTIGATIONS

■ June 2005

Sinclair Knight Merz ABN 37 001 024 095 100 Christie Street PO Box 164 St Leonards NSW Australia 1590 Tel: +61 2 9928 2100 Fax: +61 2 9928 2500 Web: www.skmconsulting.com



## Contents

1.	Executive Summary						
2.	Intro	duction	2				
3.	Wate	er	3				
	3.1	Expected Maximum Demands for Development	3				
	3.2	Fire Flow Demand Estimates	5				
	3.3	Possible Water Main Amplifications	5				
	3.4	Existing Trunk Water Mains	6				
4.	Sew	er	9				
	4.1	Existing Sewer Mains Within The Site	9				
	4.2	Connection Requirements	9				
5.	Acce	eptable Connection Practices- Sydney Water Infrastructure	12				
6.	Dete	rmination of Existing Loads Within Authority Infrastructure	13				
7.	Cond	clusions	14				
Арр	pendix	A SWC Infrastructure	15				



## 1. Executive Summary

## Water

- Water is available from the authority mains in Cosgrove Rd between Pilcher and Madeline Streets. A connection can be made to this water main at any point and represents the most cost effective solution in supply to the site.
- The main can supply 40 l/s at 110 kpa (11 m/h). This flow will be sufficient for the domestic demands and fire hydrant supply provided pressure boosting via a pump is included in any scheme design.
- Water storage will be required for sprinkler protection. The estimated storage amount is 350,000 litres.
- Estimated water demands are as follows: Potable Water up to 5.91 l/s, Fire Hydrants up to 40 l/s, Sprinkler System up to 80 l/s.

### Sewer

- The site has several opportunities for connection and discharge to the authority sewer mains. Connection point options are at the intersection of Pilcher St and Cosgrove Rd, intersection of Blanche St and Cosgrove Rd, within the site at the far southern corner in the approximate location of Cox's Creek and within the adjoining vacant land parcel at the rear of Gould Street to the north. Maintaining the existing sewer connection at the intersection of Pilcher St and Cosgrove Rd represents the most cost effective solution for the site.
- Estimated total Average Flow from the development is 0.961/s with a total peak Peak Dry Weather flow of 3.62 l/s.
- The topography of the site and the depth of the existing authority sewer connection points will make draining the site entirely by gravity impractical. Sewer pumping stations may be necessary in some isolated areas to achieve full sewerage coverage at the site.
- All trade waste will require pre-treatment on site prior to discharge into the authority system.

### **Feasibility Study**

 A feasibility study enables the authority to model the load impacts on both the water and sewer services from the site onto existing infrastructure. In the feasibility study, SWC will identify the preferred connection points for both water and sewer and any developer service charges likely to be levied against the project. SKM lodged an application with SWC for the site on the 18.03.05.



## 2. Introduction

The former Enfield Marshalling Yards site (the proposed Intermodal Logistics Centre (ILC)) is bounded to north, south and east by Sydney Water Corporation (SWC) owned infrastructure and services. The site in its present configuration has connections to both water and sewer mains located along the Cosgrove Road boundary. For the purposes of this investigation we will discount any services external to the site, west of the new Enfield Marshalling Yards.

This report identifies the extent of:

- existing SWC site infrastructure,
- opportunities for both future water and sewer connections from or to the site,
- discusses potential loads for both water supply and sewer discharge
- relevant background information regarding methodology with respect to dealing with the Sydney Water Corporation.

Included within this report (Appendix A) is a drawing of all surrounding SWC owned infrastructure. The drawing details existing water and sewer drainage mains with additional notes added in text to show potential future or existing connections for both water and sewer drainage. The orange lines identify existing sewer main pipes whilst the blue lines represent water main pipes.

The report also includes information related to existing water main flow and pressure estimations in Cosgrove Road. This data has been obtained from SWC and is current for twelve months from the date of issue.



## 3. Water

The site is surrounded by a number of Sydney Water mains. Supply for the existing buildings within the site is taken from the 150mm water mains in Cosgrove Road. The Cosgrove main from the north interconnects into adjoining mains in Gould, Madeline, and Pilcher Streets. The Cosgrove main from the south interconnects into adjoining mains in Hope, Blanche and Punchbowl Roads to form a typical Sydney Water ring main system.

The manner in which these mains are supplied does have implications for the ILC site if any amplification or extension is required along Cosgrove Road. The ILC site falls between two reservoir supply zones, which explains why the north and south mains in Cosgrove road are not interconnected. Sydney Water will not allow interconnection between mains supplied from different reservoir systems.

The size of the mains along Cosgrove Road vary between 150mm and 100mm. Mains of 100mm can be expected to supply in the order of 12 l/s, whilst 150mm mains could be expected to supply up to 35 l/s. The minimum size mains fronting an industrial or commercial development is 150mm.

## 3.1 Expected Maximum Demands for Development

A development of the size and nature of the proposed ILC site will create two types of water demand - metered potable domestic water and fire water flows.

The ILC development will be utilising a number of strategies to reduce consumption through water recycling. In particular, strategies for the capture of rainwater from large roofed areas will help greatly to reduce overall potable water consumption on site. Recycled water will be used for container washing, irrigation and toilet flushing. The container washing system will also operate a separate water recycling system to ensure minimum water wastage. These factors mean that the site will in all likelihood have a very low consumption rate.

The estimated average potable water demand for the site is calculated at 8.45 l/s. The peak potable water demand for the site is calculated to be 12.68 l/s.

By factoring in the achievable reductions by use of harvested rainwater in irrigation and toilet flushing the 8.45 l/s demand figure can be reduced by 35% to 5.91 l/s. These calculations indicate peak water demands for the ILC development will be confined to the fire flows. The following table sets out guidelines for determining potable water flow demands in various developments.

## TYPICAL PEAK HOUR DEMAND RATES

Demand type <sup>A</sup>	Demand rate units	Adelaide	Ballarat/Bendigo	Brisbane	Canberra <sup>B</sup>	Darwin	Gold Coast	Melbourne/Geelong	Newcastle	Perth	Sydney	Gippsland
Residential												
High density	L/s/100 units	4:25	3	6	3 <sup>C</sup>	9.8 <sup>D</sup>	7.75	3	1.6	9,7	3	E
1000 m <sup>2</sup> lots	L/s/100 lots	9	9	15	15	15.6 <sup>D</sup>	7:75	10	2.9	18.7	12	F
$500 \text{ m}^2$ lots	L/s/100 lots	6.35	6	10	7.5	15.6 <sup>D</sup>	5.81	8	2.9	14	6.5	F
Commercial	L/s/ha	1.20	0.5	0.4	0,6 - 1.1	1.1	1.21	0.6	0.5	0.7	0.9	E
Industrial												
	≥200 ha L/s/ha			0.25			G	0.8	E	0.7	E	Ε
General heavy	≥40 ha L/s/ha	~		0.4			G	1.0	E	0.7	1.3	E
Light	L/s/ha	0.65	0.5	0.25	0.54	1.1	1.21	0:4	0.26	0.7	1.3	) E
Designated high usage	L/s/ha		2	E			G	2.5	Ε	E	E	E
Public utilities												
Schools	L/s/ha L/s/school	0.25	0.25	2	1.1	1.7	G	0.23	0.3		4 Hig h 2Primar y	E
General public purposes	L/s/ha	0.25	0.1	1,0	0.75		G	0.2			0.1	E
Hospitals	L/bed/day L/s/ha	0.25	4000	1000	1.7		1870	900	1675	938	1500	Ε
Reserves												
Parks	L/s/ha		0.1	0	1.5	3.5	G	0.2			0.1	E
Golf courses	L/s/ha		0.1	0	1.5		G	0.05	0.04		0.1	E
Market gardens	L/s/ha			0	5		G	0.2			0.25	E
Pastures	L/s/ha			0			G	0.01			E	E
Gardens	L/s/ha			0	1.5		G	0.32			0.25	E
Other									1			1
Fire demand	L/s/hydrant			Н	J							



## 3.2 Fire Flow Demand Estimates

The estimated fire hydrant demand for the ILC site is 40 l/s with a minimum dynamic pressure at the discharge nozzle of no less than 250 kPa. To provide this pressure the hydrant system will require a diesel booster pump. Storage will not be required provided demand is capped at 40 l/s.

For a industrial development mix such as what is proposed, the expected sprinkler fire flow demands will be in the order of 80 l/s. However, without completely understanding the nature or type of storage use within the proposed commercial buildings, the building designs and requirements of the light industrial areas on site a more accurately figure cannot be obtained.

Under the charter within which Sydney Water operates, the authority is only required to provide a minimum flow through their mains in city areas of 10 l/s. Sydney Water will supply flows exceeding this amount, anything up to 60 l/s dependant of course on existing infrastructure capacity. The attached pressure flow inquiry lodged by Sinclair Knight Merz identifies the maximum capacity of the water mains in Cosgrove Road as being 40 l/s at 110 kpa.

The current infrastructure configuration will not be able to supply the required estimated sprinkler fire flow and large scale costly amplification to the existing water mains would be required to increase mains flows to meet the required demand. Where high water flows are required, the common and cheaper option is to supplement requirements with on site fire storage tanks. It is the estimate of Sinclair Knight Merz that a potential total storage capacity on site of 350,000 litres will be required as part of any future sprinkler system. Storage will not be required for the hydrant system, the current water mains flow is adequate for supply.

### 3.3 **Possible Water Main Amplifications**

Sydney Water requires all industrial and commercial sites to be connected to 150mm mains. The current configuration along Cosgrove Road has the mains ending at Pilcher Street to the south and Blanche St to the north. Dependent on final connection locations for the new site, amplification of one of these mains in Cosgrove Road may be required. As discussed in an earlier sub section of this report interconnection between the two mains is not possible because both water mains are fed from separate reservoirs supplies.



## 3.4 Existing Trunk Water Mains

The site has three major trunk mains passing through it. Two of the mains are reservoir supply lines located deep below the surface (in tunnel) to the north and south of the site. The authority has verbally indicated building over these two mains will be allowed without the need for structural reinforcement of either the water mains or the building foundations.

The third water main runs directly through the centre of the site. Known as the Illawarra main, it is a 900 mm main feeder line and whilst located in the ground it is not in a tunnel. There may be issues with respect to building a structure over the Illawarra main and further inquiries will be required to establish if any limitations are to be set by the SWC. Our preliminary investigations have revealed that the main is not in use at the moment (due to repeated failures in various sectors) and is effectively isolated from the authority network. It is important to note, however, the line is yet to be decommissioned by Sydney Water and therefore must still be considered active.

	SINCLAIR KNIGHT MERZ							Sydney
	R	EC'D	3 0	MAR	2005	P.MGŖ		WAT&R
Postal Address: 51 Hermitage Road West Ryde NSW 2114		.WHO		— A(	D D Q M	P	ressure Cor	Inquiry No : 2771 tact Person : Robert Wickham Contact No : (02) 9800 6462 Fax No : (02) 9800 6479
	UC	)E-No			FILE			Date : 24 March, 2005

Sinclair Knight Merz P/L P O Box 164 St Leonards N.S.W. 2065 Attention : Michael Gunther

Your Pressure Inquiry Dated : 23/03/05 Property Address: 64 - 76 Cosgrove Road, Strathfield

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 firefighting, and are not to be construed as availability for normal domestic supply for any proposed development.

## ASSUMED CONNECTION DETAILS

Street Name	Cosgrove Road		Side of St	reet		East
Nearest Cross Street	Pilcher Street		Distance & Direction from Nearest Cross Street	40	m	North
Approximate Ground I Nominal Size of Water	.evel (AHD): Main (DN):	19 150	metres mm			

## WATER MAIN PRESSURES AT CONNECTION POINT

Maximum Pressure	88	metre head
Minimum Pressure	54	metre head
WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow	Minimum Pressure
	(L/s)	(m head)
Fire Hose Reel Installations	0.66	54
(Normally two hose reels simultaneously)		
& 3. Fire Hydrant / Sprinkler Installations	10	51
(Minimum pressures are based on the design pressure	15	47
expected to be maintained for 95% of the time)	20	42
	25	36
	30	29
	35	20
	40	11
	N/A	$N/\Lambda$
Maximum Permissible Flow	N/A	N/A
& 5. Fire Installations based on peak demand.	10	50
( Minimum pressures are based on the design pressure expected to	15	46
be maintained with flows combined with peak demand in the water	20	40
main.)	25	34
	30	27
	35	19
	40	9
	N/A	N/A
Maximum Permissible Flow	42	4
(Plage refer to reverse side for NOTES)		

Team Leader Asset Planning



## Fireflow Pressure Enquiry

Number 8409 For Fireflow Pressure Enquiries only Telephone: 9350 6661

Date:

22 March, 2005

Sinclair Knight Mercz PO Box 164 St Leonards NSW

Attention:

Michael

2065

 Application No
 1320396

 Property Address:
 112-114 Cosgrove Rd

Strathfield South

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 firefighting, and are not to be construed as availability for normal domestic supply for any proposed development.

## ASSUMED CONNECTION DETAILS

Street Name	Cosgrove Rd		Side of	street	East
Distance & direction from cross street	125 metres	south	from	Blanche St	
Approximate Ground Level (AHD):	12 metres				
Nominal Size of Water Main (DN):	150 mm				

## EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

	NORMAL SUPPLY CONDITION		
1	Maximum Pressure	43	m head
	Minimum Pressure	30	m head

WITH PROPERTY FIRE PREVENTIONS SYSTEM DEMANDS	Flow L/s	Pressure head m
Fire Hose Reel Installations( two hose reels simultaneously)	0.66	30
2 & 3 Fire Installations based on	10	15
95% availability.		
Pressure expected to be		
maintained with flows for 95%		
of the time		
Maximum Permissible Flow	12	9
4 & 5 Fire Installations based on	10	11
peak demand.		
Pressure expected to be		
maintained with flows		
combined with peak demand		
in the watermain		
Maximum Permissible Flow	12	4
(Please refer to reverse side for NOTES)	)	

J. Maclachlan Team Leader

Asset Planning Sydney Water Corporation ABN 49 776 225 038 115 133 Rothurst Street Sydney NSW 3000 Australia PO Box A53 Sydney South NSW 1232 Australia



## 4. Sewer

There are a number of connection possibilities for the ILC site. These are as follows

- A 225 mm sewer is available for connection and located on the intersection of Pilcher and Cosgrove Rd. This connection point has always been utilised by the marshalling yards;
- A 225mm sewer is available for connection and located on the intersection of Blanche and Cosgrove Rd. This connection point serves the existing light commercial development opposite Blanche Rd. A short extension to this line would be required if this connection point was to be utilised;
- A 600mm sewer is available for connection and located within the site at the far southern corner in the approximate location of Cox's Creek.

The possibility of a connection may also exist to the north of the site. A sewer runs within the adjoining vacant land parcel at the rear of Gould Street. This sewer is not servicing the site at the moment and further investigation would be required to determine ownership of the land parcel in which the sewer lies.

## 4.1 Existing Sewer Mains Within The Site

The site is encumbered in the south sector by a 600mm diameter authority sewer mains. The main is located in the Cox's Creek area of the site and is a large capacity trunk line. Building over this main would not be possible in its current configuration. The possibility may exist to divert the line around the site along a boundary. However, this would be an expensive exercise and should not be considered unless the area is earmarked for construction. The current plan nominates the land for community space.

### 4.2 Connection Requirements

Sydney Water requires a minimum 225mm connection to service industrial or large commercial properties. The ILC site complies with this requirement, through the various connection options described previously. Although the site has at least two relatively straightforward connections with another two other possible connection options, it does not appear to be possible to drain the entire site by means of a gravity sewer, regardless of which connection point was selected.

Rather than undertake expensive infrastructure alterations to the authority sewer to maximise the areas on site that can be serviced by a gravity drainage connection, a series of local pump stations is recommended. In large sites such as this the installation of individual pumps stations is a common solution to avoid expensive external site works to the authority owned infrastructure.



The estimated flow discharges from site have been calculated in accordance with WSA and Sydney Water standards. The calculations are shown in the following **Table 3.1** 

#### **Enfield ILC** Area m<sup>2</sup> Total Comments EP Comments Project Admin 500 500 8 Adopt 8 =160EP (@1.0 FSR) x 0.05Ha. "Advanced Planning of Sewerage Systems" by I Graudins EΡ 8 8 Adopt 70 = 40 EP (@1.0 FSR) 1.75Ha. Building A 17,500 17,500 70 "Advanced Planning of Sewerage Systems" by I Graudins ΕP 70 70 Adopt 70 = 40 EP (@1.0 FSR) 1.75Ha. 17,500 Building B 17,500 70 "Advanced Planning of Sewerage Systems" by I Graudins EΡ 70 70 Adopt 16= 40 EP (@1.0 FSR) x 0.4Ha. Building C 4,000 4,000 16 "Advanced Planning of Sewerage Systems" by I Graudins EΡ 16 16 Adopt 8 = 40 EP (@1.0 FSR) 0.2Ha. Building D 2,000 2,000 8 "Advanced Planning of Sewerage Systems" by I Graudins ΕP 8 8 Adopt 8 = 40 EP (@1.0 FSR) 0.2Ha. Building E 2,000 2,000 8 "Advanced Planning of Sewerage Systems" by I Graudins ΕP 8 8 Adopt 56 = 40 EP (@1.0 FSR) 1.4Ha. Building F 14.0 00 14,000 56 "Advanced Planning of Sewerage Systems" by I Graudins EΡ 56 56

### Table 3.1 Sewage Discharge Profiles



Enfield ILC Project	Area m <sup>2</sup>	Total	Comments	EP	Comments
Light Industrial Cosgrove Rd	30,000	30,000		120	Adopt 120 = 40 EP (@1.0 FSR) 3.0Ha. "Advanced Planning of Sewerage Systems" by I Graudins
EP	120	120			
Toll Site	10,000	10,000		40	Adopt 40 = 40 EP (@1.0 FSR) 1Ha. "Advanced Planning of Sewerage Systems" by I Graudins
EP	40	40			
Total EP				388.00	

Building L/s	
Admin sewer discharge 0.02	
Building A sewer discharge 0.17	
Building B Sewer discharge 0.17	
Building C Sewer discharge 0.04	
Building D Sewer discharge 0.02	
Building E Sewer discharge0.02	
Building F Sewer discharge 0.14	
Light Industrial Cosgroe Road 0.29	
Toll Lease site 0.10	
	0(1)

TOTAL Average Flow	0.961/s
TOTAL Peak Dry Weather Flow	3.62 l/s



## 5. Acceptable Connection Practices- Sydney Water Infrastructure

Of critical importance when assessing the limitations in connection to Sydney Water infrastructure is the type of land use (commercial, industrial, residential etc). The following offers a description of the requirements for various title options.

### **Consolidation of Existing Titles into One Single Title:**

In the case of the ILC site the consolidation of existing land titles will work in the client's favour. Sydney Water will allow a single water connection point for the site (multiple connections and water meters will not be permitted – maximum allowance is one meter per title) thus reducing the likelihood of having to extend the existing water mains north along Cosgrove Road.

With respect to sewer connections, multiple connections from one property is allowed by the authority. This will enable Sydney Ports to maximise the connection points to the south and north east of the site. The entire site can be covered with a single Section 73 Developer Application.

### Single Title with Strata Title Lots:

As above. Identical to the requirements of a single consolidated title.

#### Multiple Torrens Titles (Subdivision of existing lots):

Individual titles will require a separate sewer and water connections. Each block may have multiple sewer connections but only one single water connection. Any newly created blocks which do not have water or sewer mains connections within or immediately adjacent to the boundary will require authority mains extensions. The alternate and more cost effective option to this is to create an easement through the adjoining property to allow installation of the service connections. The easement could be incorporated at the time of tile sub division. Each title will require an individual Section 73 Developer Application with SWC



## 6. Determination of Existing Loads Within Authority Infrastructure

The determination of existing loads and capacities within the authority infrastructure cannot be undertaken independently of the authority. The controlling authority has the records, data and mapping archives, which are vital in order to carry out capacity assessment models.

When assessing loads or capacities of an existing water or sewer main a much bigger picture than just the site itself has to be taken into account.

For example a sewer available for connection to a particular property may, only a short distance down stream, join into a large carrier mains. The carrier mains could potentially receive up stream discharge from a number of suburbs or large industrial users. All these factors have to be incorporated into the model. The alternate example for water model can be even more complex, with Sydney Water's zones often feeding from multiple supplier sources or carrier mains.

It is for this reason that standard practice in these cases is to apply for a Feasibility Study with Sydney Water. The feasibility study enables the authority to model the load impacts on both the water and sewer services. The subsequent reply from the authority will notify a connection point for both water and sewer and any developer service charges likely to be levied against the project. The authority in their reply to the inquiry will not indicate maximum available water and pressure flows. However, this can be done separately by lodgement of a speculative pressure inquiry.

Sinclair Knight Merz has been asked by Sydney Ports to undertake a feasibility study for the site as an addendum to our original scope of works. The application was lodged on 18.03.2005. This reply will provide SPC complete picture for all water and sewer connection parameters at the site.



## 7. Conclusions

The following key points and conclusions can be drawn from this report.

Both authority water and sewer services are available to service the site. Limitations for both these systems will cause minor constraints, none of which we believe will affect the viability of the proposed development. It is envisaged that these problems could be overcome or nullified during the design stage of the project.

The flow rate of water through the existing mains will meet the potable peak demand flows and the predicated fire hydrant flows. Whilst the mains cannot supply sufficient water for a high hazard sprinkler system, on site storage can be provided to supplement the water main flows, which is quite a normal scenario for many commercial and industrial sites in the Sydney area.

The sewer system that borders the site to the east along Cosgrove Road and again in the south near the Cox's Creek offers a number of connection opportunities. Whilst there may be some areas within the site that cannot effectively be drained by traditional gravity drainage methods, a system of on site sewer pump stations can overcome this impediment.

Unfortunately we have not as yet received a formal reply from the SWC regarding the feasibility study application. As soon as the document becomes available we intend to forward a copy onto SPC with a brief summary and interpretation of the authorities findings.



# Appendix A SWC Infrastructure

