

Intermodal Logistics Centre at Enfield Environmental Assessment

CHAPTER 7

ROAD TRAFFIC AND TRANSPORT

■ October 2005

Contents

7.	Road Traffic and Transport	7-1
7.1	Existing Road Network Conditions	7-1
7.1.1	Regional and Local Road Networks	7-1
7.1.2	Existing Traffic Conditions	7-3
7.1.3	Road Safety	7-6
7.1.4	Road Pavement Condition	7-6
7.2	Existing Public Transport and Cyclist Network	7-6
7.2.1	Bus Network	7-6
7.2.2	Rail Network	7-6
7.2.3	Cycling and Pedestrian Network	7-7
7.3	Assessment of Impacts during Construction	7-7
7.3.1	Construction Timetable	7-7
7.3.2	Construction Traffic	7-7
7.4	Assessment of Impacts during Operation	7-8
7.4.1	Traffic Distribution	7-8
7.4.2	Traffic Generation	7-8
7.4.3	Traffic Impact	7-12
7.4.4	Intersection Performance	7-13
7.4.5	Access Arrangements	7-19
7.4.6	Parking	7-21
7.4.7	Queuing	7-21
7.4.8	Night Time Heavy Vehicle Movements	7-21
7.4.9	Heavy Vehicle Management	7-21
7.4.10	Local Area Traffic Management	7-22
7.4.11	Regional Impacts	7-22
7.4.12	Sensitivity Analysis	7-23
7.5	Mitigation Measures	7-23
7.5.1	Construction Traffic	7-23
7.5.2	Operational Traffic	7-23
7.6	Conclusions	7-24

7. Road Traffic and Transport

This chapter provides a description of road traffic and transport impacts relating to the proposed Intermodal Logistics Centre (ILC) at Enfield. It addresses the requirements of the Director-General, relating to traffic and transport, in particular the requirement for the provision of a traffic impact study which considers local and regional impact, especially due to 24 hour / 7 day operation. The information is derived from the Traffic and Transport Working Paper in Appendix B. In preparing the study consideration was given to the findings of previous studies undertaken, in addition to the on-going concerns of the local community and Councils and the requirements of the Director-General. The chapter includes:

- *A review of the existing road network conditions, including characteristics of the network in terms of key local roads, public transport, road safety assessment, asset conditions and intersection analysis;*
- *An overview of the expected on-site transport movements including container activity and non-container activities, proposed access arrangements and parking facilities;*
- *An assessment of the construction traffic impacts associated with the anticipated construction program;*
- *An assessment of the traffic impacts related to the development during the operation of the facility, including local and regional impacts; and*
- *The formulation of environmental management recommendations to ensure that any potential impacts resulting from the development are minimised.*

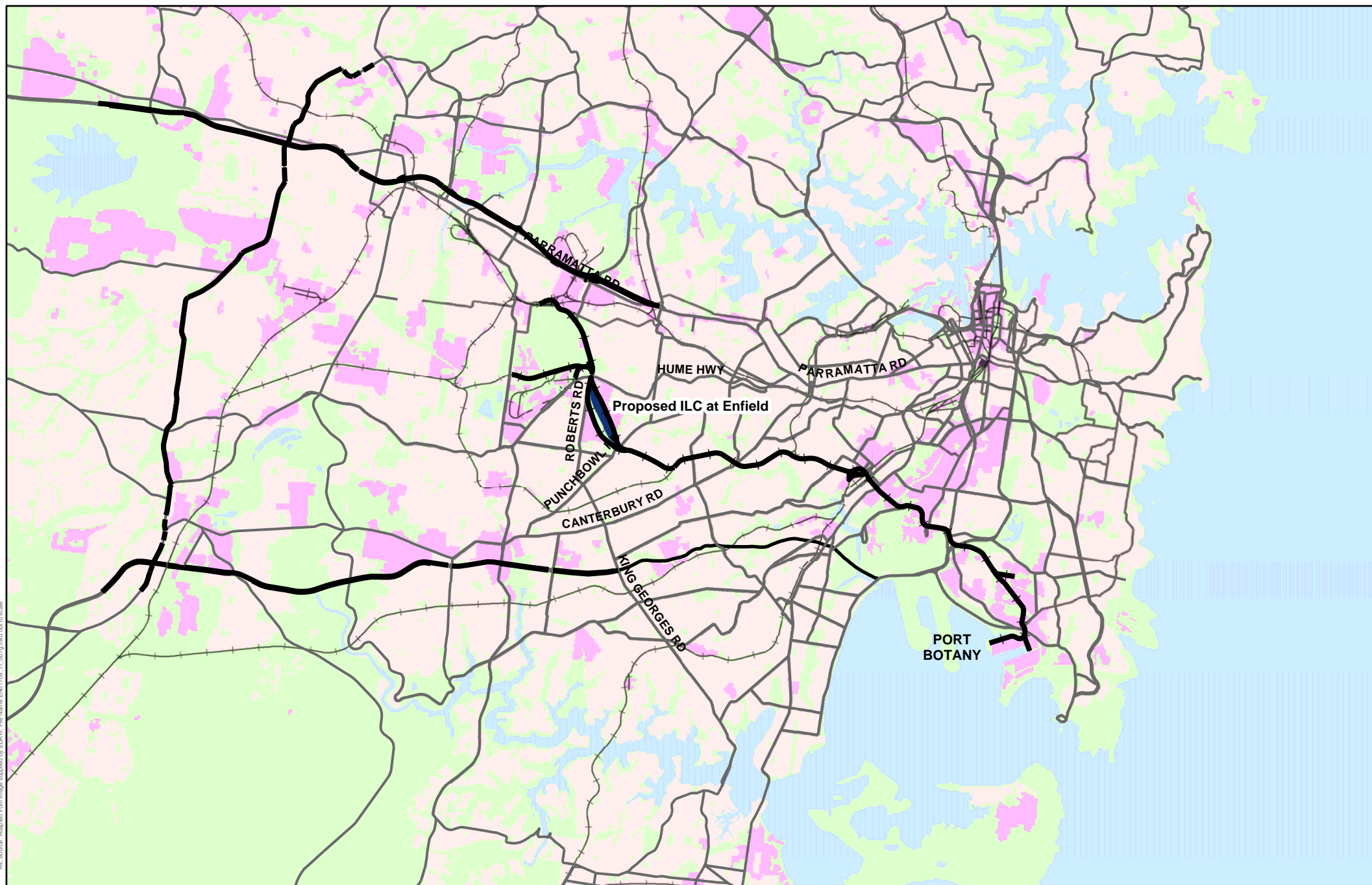
7.1 Existing Road Network Conditions

7.1.1 Regional and Local Road Networks

The proposed ILC site has major road links to all Sydney regions (refer to **Figure 7-1**). The Hume Highway within 1km of the key access / egress points to the proposed ILC site, provides direct links to the central western and south western regions, including Bankstown and Liverpool. Roberts Road connects the site with the southern and north western areas of Sydney, as well as with the M4 Motorway to Sydney's west and the M5 Motorway to Sydney's south west. These road connections are considered to be well suited to the proposed future use of the site, as it is anticipated that the majority of freight movements would be contained within these boundaries.

For the purpose of assessing local impacts, a study area has been defined as being bounded by the following roads:

- Hume Highway (north and west);
- Punchbowl Road and Coronation Parade (east); and
- Boronia Road / Juno Parade (south).



The intersections of Centenary Drive with Weeroona Road and Arthur Street have also been included. The selected study area includes all major roads used by heavy vehicles to gain access to the site. The study area is illustrated in **Figure 7-2**.

Key roads in the study area are described below:

- **Hume Highway** – The Hume Highway (also known as Liverpool Road) is a major arterial road running from the south west to the north east, between Liverpool and Ashfield. It is a 4 to 6 lane divided highway, and carries about 44,000 vehicles per day near Cosgrove Road, including 8 to 9% heavy vehicles in the morning peak;
- **Centenary Drive / Roberts Road** – Centenary Drive / Roberts Road is a major north south arterial, with generally 3 lanes in each direction and a median. Its daily traffic is around 60,000 vehicles, including up to 12% heavy vehicles in the morning peak period;
- **Punchbowl Road** – Punchbowl Road runs parallel to the Hume Highway through the study area. It is a 4-lane arterial road, carrying around 35,000 vehicles per day, with 5 to 7% heavy vehicles in the morning peak;
- **Boronia Road / Juno Parade** – This road runs east west between Roberts Road and the Hume Highway. It carries around 15,000 vehicles per day in four lanes of traffic. During morning peak periods, heavy vehicles make up around 9% of traffic;
- **Cosgrove Road** – Cosgrove Road is a collector road running north south between the Hume Highway and Punchbowl Road. It carries around 14,000 vehicles per day through a predominantly industrial area. Heavy vehicles make up around 18% of morning peak hour;
- **Wentworth Street** – Wentworth Street is a local industrial road between Norfolk Road and the proposed ILC site. Peak hour volumes are around 200 vehicles per hour, with about 60% heavy vehicles, originating from the existing industrial developments served by Wentworth Street;
- **Norfolk Road** – Norfolk Road is a local road that connects Wentworth Street with Roberts Road, and extends into the residential area west of Roberts Road. It intersects with Roberts Road at a signalised junction. Peak hour volumes west of Roberts Road are around 500 vehicles per hour, with 4 to 5% heavy vehicles. This road has a 3 tonne load limit and heavy vehicles consist of buses and service vehicles.

The morning peak period on the network is generally between 7am to 9am, and the afternoon peak period is between 4pm to 6pm. The peak hour occurs within the network peak period and varies from location to location.

7.1.2 Existing Traffic Conditions

Traffic surveys were undertaken to collate classification counts and intersection counts at key locations within the study area. These sites were chosen on the basis of being on key routes for heavy vehicles. The data were used to develop the road network model, which aims to predict future traffic interactions.

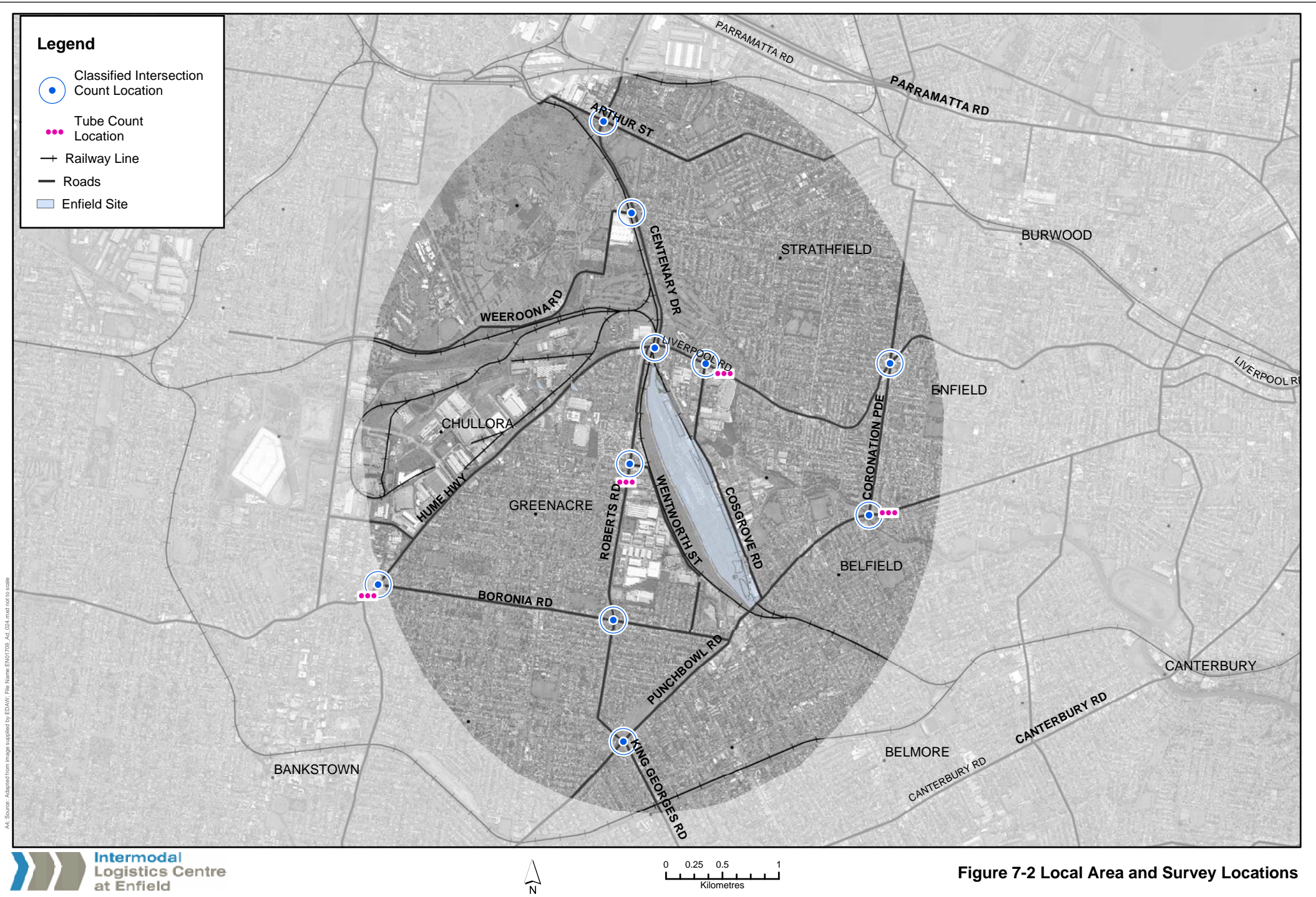


Figure 7-2 Local Area and Survey Locations

A regional network model was developed to assess the impact of the proposed development on the surrounding road network. The 2005 base for the network model was calibrated based on the traffic count data (at sites shown in **Figure 7-2**) collected for this study. This network model was used to assess the future impacts (in 2016) of the ILC on the surrounding road network.

Intersections for which count data were collected (shown in **Figure 7-2**) were analysed using the criteria outlined in **Table 7-1**. Generally, intersections should be designed for Level of Service (LoS) C or better. In the longer term, where future conditions have been taken into account, the Roads and Traffic Authority (RTA) considers LoS D or better to be acceptable. LoS is a factor of the average delay in seconds experienced by all vehicles passing through an intersection.

■ **Table 7-1: Level of Service Criteria* for Intersections**

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays	At capacity, requires other control mode
F		Roundabouts require other control mode	

* Sourced from the Guide to Traffic Generating Developments (RTA, 2002)

The existing operation of key intersections within the study area is detailed in **Table 7-2**.

Table 7-2: Existing Intersection Operation

Intersection	Control	AM Peak		PM Peak	
		LoS	Average Delay (secs/veh)	LoS	Average Delay (secs/veh)
Centenary Drive / Arthur Street	Signals	C	37	C	39
Centenary Drive / Weeroona Street	Signals	A	12	A	8
Roberts Rd / Juno Parade	Signals	E	57	D	48
King Georges Rd / Punchbowl Road	Signals	F	>200	F	119
Georges River Rd / Coronation Parade	Signals	B	17	A	13
Roberts Rd / Norfolk Road	Signals	B	20	B	20
Hume Highway / Boronia Road	Signals	B	18	B	27
Hume Highway / Roberts Road / Centenary Drive	Signals	F	>200	D	44
Hume Highway / Cosgrove Road	Signals	C	29	D	52
Hume Highway / Coronation Parade	Signals	C	31	B	24

Most of these intersections within the study area are operating satisfactorily, but Roberts Road / Juno Parade and Hume Highway / Roberts Road / Centenary Drive are over capacity in the morning peak period, operating at LoS E and F respectively. The intersection at King Georges Road / Punchbowl Road, at existing LoS F, is over saturated in both peak periods.

7.1.3 Road Safety

Crash data covering the period 1999 to 2004 were obtained from the RTA for the five key Councils surrounding the study area. The percentages of crashes were highest on Roberts Road, Punchbowl Road and the Hume Highway. As this is an industrial development the key vehicle types of interest are heavy and light trucks. The vast majority of accidents (over 75%) involved passenger vehicles, 17% involved light trucks and 6% involved heavy trucks. Analysis of key intersections identified the intersection of Hume Highway / Roberts Road / Centenary Drive to have the highest percentage of accidents involving heavy trucks (7%). A total of 32 accidents (2.6%) were recorded in the immediate vicinity of local schools, but none involved heavy trucks.

7.1.4 Road Pavement Condition

Road pavement inspections were undertaken at key roads within the study area. The inspected road sections generally appear well maintained. However, the survey identified sections of the Hume Highway adjacent to Cosgrove Road, the northern end of Cosgrove Road and the southern end of Wentworth Street (south of Mayvic Street) as potentially requiring rehabilitation and structural improvements.

7.2 Existing Public Transport and Cyclist Network

7.2.1 Bus Network

The existing bus network does not adequately service the site. There are only a few bus routes operating in the Enfield area. The closest routes to the site are the 447 (operated by Pleasure Tours), which serves Roberts Road northbound, en route between Belmore and Greenacre, and 484 (operated by Transit First), which runs the length of Roberts Road, providing links to Strathfield and Greenacre.

All bus routes in the Enfield area operate between approximately 6am and 9pm on weekdays, except for route 484, which runs from 7am to 7pm. Weekend services, with reduced hours of operation, are provided on most of these routes, except for route 447 (no Sunday runs) and route 484 (no weekend runs).

7.2.2 Rail Network

Enfield is located between two metropolitan railway lines, the Inner West Line and the Bankstown Line. The closest stations are Belmore and Lakemba on the Bankstown Line, which are both approximately 2.3km from the proposed site entrances on Cosgrove Road and Wentworth Street respectively. Without direct bus services linking the railway stations to the development site, the railway services do not adequately serve the site.

7.2.3 Cycling and Pedestrian Network

There are several cycle routes established within the vicinity of Enfield. The Ryde – Botany Bay walking and cycling route is located on the other side of the Cooks River and connections to this route from the ILC site are not easily made. A new on-highway cycle route is proposed on Centenary Drive as part of the draft NSW Bicycle Network Strategy. It would run between the Hume Highway, at the northern end of the site to Homebush west, using the M4 Motorway shoulder route.

Local on-road paths on Maiden Street and Noble Avenue, in Greenacre, are easily accessible from the Norfolk Road entrance. These routes link to a path shared with pedestrians, which runs on the north side of Hume Highway linking to Bankstown to the west and the Ryde - Botany Bay path to the east.

7.3 Assessment of Impacts during Construction

7.3.1 Construction Timetable

It is anticipated that construction activity would occur over a period of approximately 27 months. Traffic volumes generated by the construction personnel on the site would vary, depending on the construction timetable.

The indicative timetable is as follows:

- Stage 1 – Site Preparation – months 1- 4;
- Stage 2 – Earthworks and Drainage – months 2 -12;
- Stage 3 – Road and Rail Infrastructure – months 8 -15; and
- Stage 4 – Warehousing and Final Works – months 15 -27.

There is a fifth stage allowing for the construction of the Light Industrial and Commercial Area on Cosgrove Road. This may occur during Stage 4 and/or as market demand requires.

7.3.2 Construction Traffic

The main road transport task during construction of the new terminal would be the delivery of materials and concrete to the site and removal of stockpile and contaminated material from the site. Based on the indicative construction program, the construction impact is not considered to be substantial.

The average vehicle activity during the construction period is about 29 construction vehicles per day. The peak vehicle activity is likely to be in month 15 when Stages 3 and 4 overlap, with an average of 75 vehicles per day during this period.

The main routes used for the movement of key materials from the site would be via the Hume Highway or via Roberts Road. Heavy construction traffic would be restricted to arterial routes, with trucks prohibited from using local streets in residential areas.

The construction staff traffic impact is not considered to be significant. It is anticipated that construction would employ 150 to 170 workers for 12 months continuous construction, with a peak of

240 workers for 2 months. If it were assumed that all staff would be on site at any one time and that each occupied one car (a worst case assessment), the construction staff traffic peak of 240 vehicles in the peak hour, representing less than an additional 1% of total traffic, would have a negligible impact on road network and intersection performance.

7.4 Assessment of Impacts during Operation

7.4.1 Traffic Distribution

The traffic generated by the proposed ILC was distributed onto the surrounding road network, based on the forecast market area for the ILC, as described in Chapter 3 – project Need and Alternatives. In order to model this distribution of truck activity from the ILC, representative industrial zones in each Local Government Area were identified, and the model adjusted to reflect these origins and destinations.

The bulk of container movements to and from Enfield are expected to be in the area west of Enfield. The local government areas of Bankstown and Parramatta account for the largest proportions of activity. The nature of this market area is reflected in the distribution of trucks to and from the ILC. Key access routes include the M5 Motorway, Roberts Road, the Hume Highway and M4 Motorway.

7.4.2 Traffic Generation

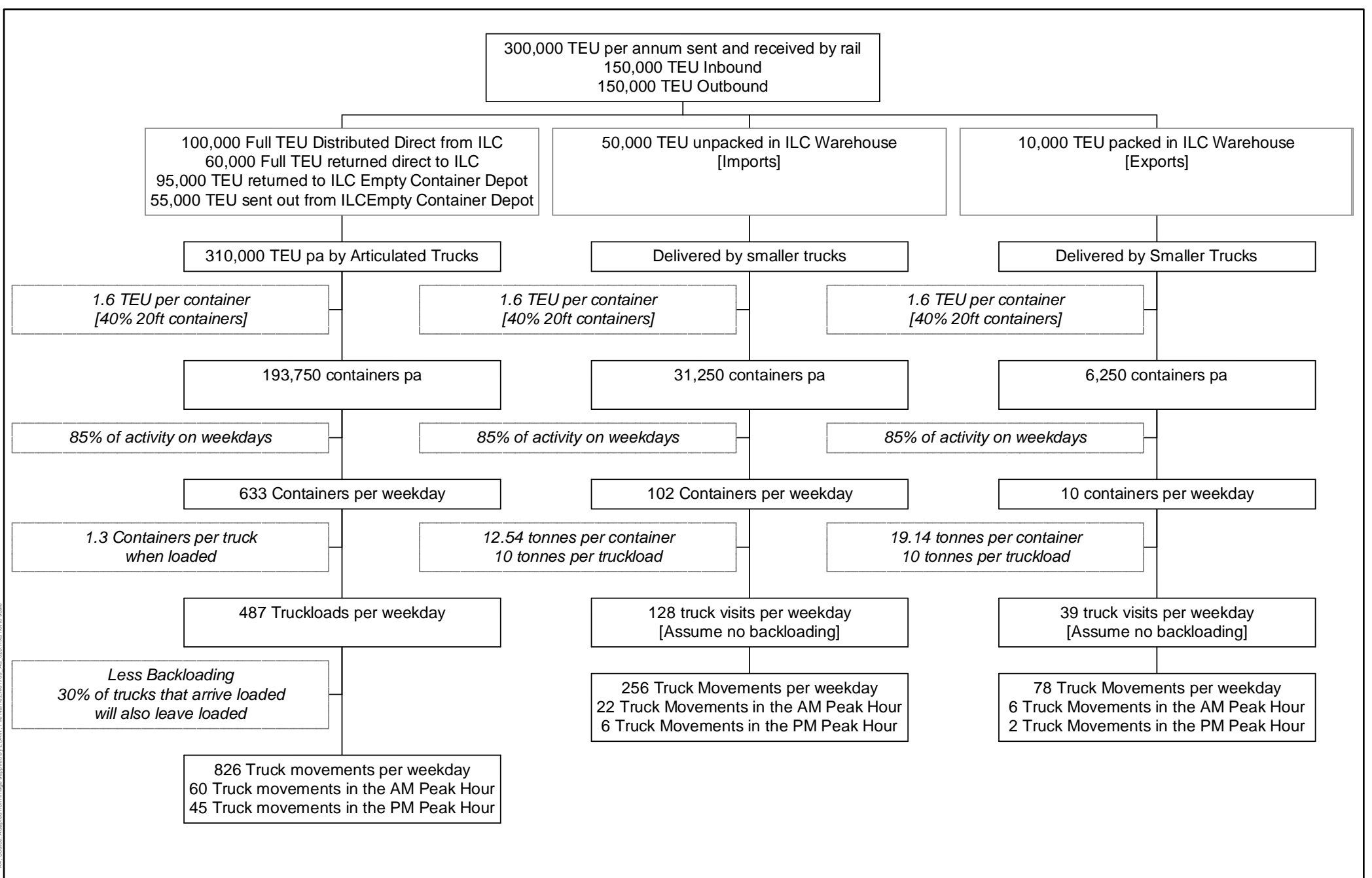
Generation of vehicular activity by trucks from the proposed ILC was estimated from the assumed rail container throughput of 300,000 TEUs per year. The full list of assumptions is shown in **Table 7-3** and the process and volumes shown in **Figure 7-3**. Note that between 3am and 5am, it has been assumed for traffic modelling purposes that there would be no truck arrivals or departures. The primary activity on site during this time would be maintenance.

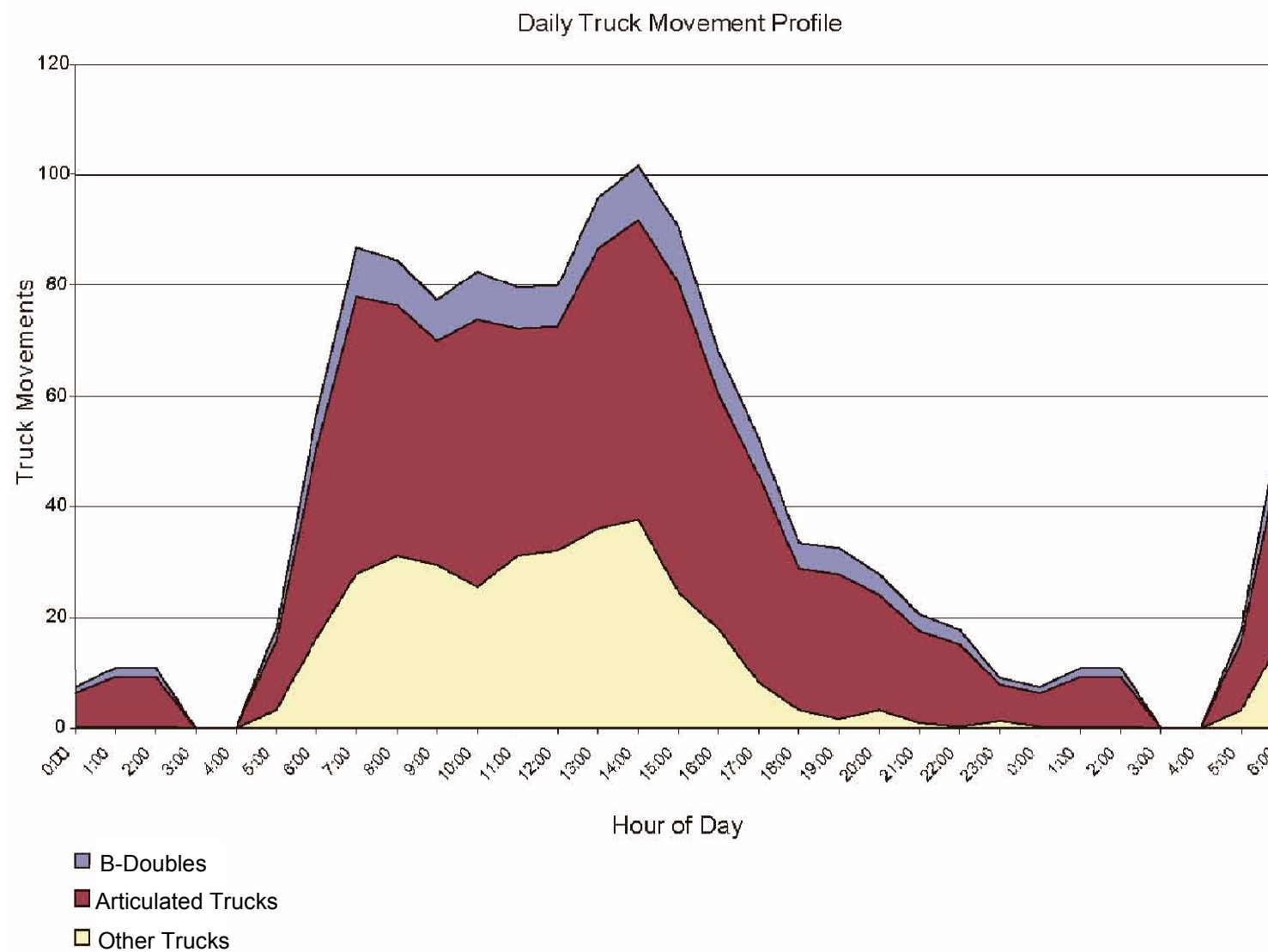
Based on the assumptions and processes, **Figure 7-4** and **Table 7-4** show the profile of on-site truck activity anticipated during the full operation of the development. There is expected to be approximately 1,160 truck movements per day, of which 30% would be light trucks. The peak activity of movements for the ILC would occur between 2pm and 3pm, with 103 truck movements anticipated.

The data suggest the AM peak period would be between 7am and 8am with 88 truck movements anticipated. During the AM and PM peak hour periods, office traffic generated by the development would be a maximum of 142 additional cars for each peak hour period. The Light Industrial and Commercial Area proposed for Cosgrove Road would generate an estimated 169 cars and trucks for each peak hour period.

■ **Table 7-3 Traffic Generation Assumptions**

Assumption	Source
<p><u>Truck Utilisation</u> 1.3 Containers per truck when loaded</p> <p><u>Hours of Activity</u> 365 days per year 24 hours per day on-site activity 22 hours per day movement to site 2 11-hour shifts for packing and unpacking (less meal breaks)</p> <p><u>Profile of Vehicular Activity</u> 85% of activity on weekdays 10% of activity on Saturdays 5% of activity on Sundays 74% of activity 7am-5pm 15% of activity 5pm-8pm 11% of activity 8pm-7am</p> <p><u>Container Types</u> 60% of Containers are 40ft (1.6 TEU / container)</p> <p><u>Truck Types</u> 25% of trucks entering site (exports) are B-Doubles 10% of trucks leaving the site (imports) are B-Doubles</p> <p><u>Backloading</u> 30% ie of all trucks that arrive loaded, 30% will also leave loaded.</p> <p><u>Container Weights</u> Imported 20ft container = 13.5 tonnes Imported 40ft container = 11.9 tonnes Exported 20ft container = 18.3 tonnes Exported 40ft container = 19.7 tonnes Average Import = 12.5 tonnes Average Export = 19.1 tonnes</p> <p><u>Bulking Factor - Weight for smaller trucks carrying non-containerised goods</u> 10 tonnes</p> <p><u>Workload Profile</u> 2 people in a gang, 1 gang per container 4 person-hours to pack or unpack 1 20ft container 8 person-hours to pack or unpack 1 40ft container 25% contingency for general warehouse staffing</p>	<p>2004 survey of Swanson and Webb Docks, Melbourne.</p> <p>East and West Swanson terminals, Dynon and Kewdale rail freight terminals, CRT and SCT Altona terminals, Yennora and Qenos NSW operations.</p> <p>Dynon and Kewdale rail freight terminals, Port Botany, CRT and SCT Altona terminals, Yennora and importer exporter service level demands.</p> <p>Sydney Ports, Yennora, CRT Altona, AusTrak Somerton business planning and modelling from Dandenong intermodal terminal feasibility assessment.</p> <p>Based on Port Botany Expansion EIS</p> <p>SPC 2004/2005 Data</p> <p>CRT Altona, Yennora, AusTrack Somerton, Chalmers Yarraville and Fishermans Island, modelling from Dandenong intermodal terminal assessment, and data from Melbourne and Fremantle container movement studies.</p>





■ **Table 7-4: Weekday Volume of Truck Activity**

Hour Commencing (24 hour clock)	Total Movements				
	B-Doubles	Articulated Trucks	Total Container Trucks	Small Trucks	Total
0:00	1	6	7	0	7
1:00	2	9	11	0	11
2:00	2	9	11	0	11
3:00	0	0	0	0	0
4:00	0	0	0	0	0
5:00	2	13	15	3	18
6:00	6	34	41	16	57
7:00	9	51	60	28	88
8:00	8	46	54	31	86
9:00	8	41	49	30	78
10:00	9	49	58	26	84
11:00	8	42	49	31	81
12:00	8	41	49	32	81
13:00	9	51	61	36	97
14:00	10	55	65	38	103
15:00	10	57	67	25	92
16:00	8	43	51	18	69
17:00	7	38	45	8	53
18:00	5	26	31	3	34
19:00	5	27	31	2	33
20:00	4	21	25	3	28
21:00	3	17	20	1	21
22:00	3	15	18	0	18
23:00	1	7	8	1	9
Daily Total	128	698	826	334	1,160

Note: Totals may appear not to add due to rounding

7.4.3 Traffic Impact

The impact of the development was derived from the model (calibrated by local traffic surveys), modelling natural growth projections for the area (base 2005 and future 2016), and assigning the traffic generated by the site onto the future road network based on projected commercial activity. Measures of link capacity (between intersections) and intersection operation were used to identify the impact of the proposed development on the road network. The road network was analysed both with and without the future development of Enfield to compare the effect of background traffic growth with the impact of the development.

Table 7-5a and **Table 7-5b** provide a summary of the results of the future traffic modelling conducted for the local road network, with and without the ILC development, for the AM peak and the PM peak periods. The AM peak period was between 7am and 9am, with the peak hour between 8am and 9am. The PM peak period is between 4pm and 6pm, with the peak hour between 5pm and 6pm. These results indicate that on most key roads, the impact on peak hour traffic resulting from the development of the ILC is minimal, representing less than 1% of the total traffic, on average, beyond the local access roads (Cosgrove Road and Wentworth Street).

The additional truck activity generated by the development would be concentrated on key arterial roads such as Roberts Road, M4 Motorway, M5 Motorway and the Hume Highway. This is shown in **Figure 7-5a** and **Figure 7-5b**. In some instances, a reduction in traffic volumes occurs as vehicles switch to alternative routes. Changes in traffic volume at some locations, particularly intersections, can change travel times, making alternative routes more attractive.

There would also be reduced growth in heavy vehicle traffic on the M5 Motorway between Sydney Airport and King Georges Road, due to the increase in rail transport of freight containers from Port Botany to Enfield. This is discussed further in Section 7.4.11.

7.4.4 Intersection Performance

The modelled intersection performance results are shown in **Table 7-6**. The analysis indicated that several key intersections would operate at an unsatisfactory level of service in the future scenarios. Most intersections become saturated in 2016 without the ILC development. This poor performance of intersections was attributed primarily to background traffic growth, as it was shown there is little difference in intersection operation in 2016 when comparing with and without the ILC. Two intersections, Roberts Road / Norfolk Road and Roberts Road / Juno Parade, show minor increases in the average delay time of vehicles with the ILC development. Of particular note is the continued satisfactory performance of the Roberts Road / Norfolk Street intersection and the poor performance of the Hume Highway / Cosgrove Road intersection, even without the operation of the proposed ILC development. This latter intersection is important to the successful operation of the ILC and to general traffic. Enhancements may be necessary for this intersection and these are discussed in Section 7.5.

Overall, the impact on the surrounding local road network is not significant, as the total truck volume does not adversely affect the level of service at the intersections in 2016.

Table 7-5a: Modelled Future Traffic Volume AM Peak Hour

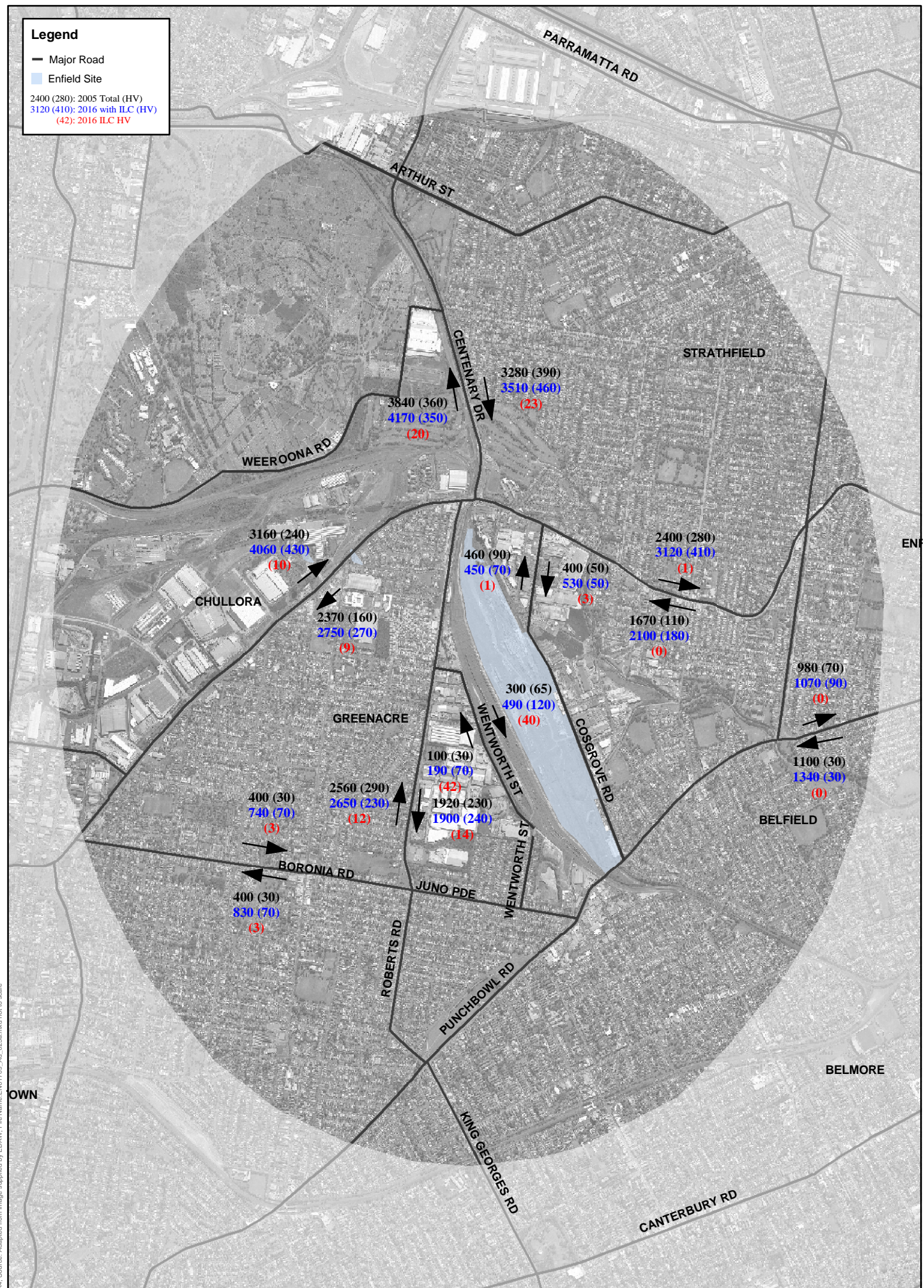
Location		2005 Existing Volumes	2016 without ILC	2016 Traffic Volumes with ILC			
Road	Location			Total Traffic Volumes	ILC Trucks	ILC Cars	% change from 2016 base
Boronia Road EB	E of Hume Highway	457	725	736	3	6	2
Boronia Road WB	E of Hume Highway	403	821	827	3	0	1
Centenary Drive NB	S of Weeroona Road	3,836	4,192	4,172	20	0	0
Centenary Drive SB	S of Weeroona Road	3,283	3,459	3,513	23	19	2
Cosgrove Road NB	S of Hume Highway	464	429	450	1	0	5
Cosgrove Road SB	S of Hume Highway	395	384	525	3	52	37
Georges River Road EB	E of Coronation Parade	981	1,044	1,067	0	0	2
Georges River Road WB	E of Coronation Parade	1,103	1,356	1,340	0	18	-1
Hume Highway NB	W of Centenary Drive	3,160	4,038	4,059	10	3	1
Hume Highway SB	W of Centenary Drive	2,367	2,747	2,745	9	0	0
Hume Highway EB	E of Cosgrove Road	2,407	3,124	3,124	1	0	0
Hume Highway WB	E of Cosgrove Road	1,665	2,027	2,100	0	50	4
Hume Highway NB	N of Stacey Street	2,461	2,507	2,507	3	6	0
Hume Highway SB	N of Stacey Street	1,622	1,754	1,752	3	0	0
Roberts Road NB	S of Norfolk Road	2,564	2,648	2,649	12	37	0
Roberts Road SB	S of Norfolk Road	1,924	1,905	1,905	14	0	0
Wentworth Street NB	South of Norfolk Road	96	147	189	42	0	29
Wentworth Street SB	South of Norfolk Road	304	395	489	40	57	24

NB – northbound SB – southbound EB – eastbound WB – westbound.

Table 7-5b: Modelled Future Traffic Volume PM Peak Hour

Location		2005 Existing Volumes	2016 without ILC	2016 Traffic Volumes with ILC			
Road	Location			Total Traffic Volumes	ILC Trucks	ILC Cars	% change from 2016 base
Boronia Road EB	E of Hume Highway	335	390	387	2	0	-1
Boronia Road WB	E of Hume Highway	469	816	865	3	2	6
Centenary Drive NB	S of Weeroona Road	3,172	3,835	3,864	10	13	1
Centenary Drive SB	S of Weeroona Road	3,826	3,916	3,897	13	0	0
Cosgrove Road NB	S of Hume Highway	517	551	769	1	83	40
Cosgrove Road SB	S of Hume Highway	594	645	623	3	0	-3
Georges River Road EB	E of Coronation Parade	782	755	751	0	12	-1
Georges River Road WB	E of Coronation Parade	1,167	1,129	1,181	0	0	5
Hume Highway NB	W of Centenary Drive	2,292	2,912	2,903	6	0	0
Hume Highway SB	W of Centenary Drive	2,791	3,669	3,574	8	2	-3
Hume Highway EB	E of Cosgrove Road	1,910	2,787	2,940	1	83	5
Hume Highway WB	E of Cosgrove Road	2,119	2,879	2,778	1	0	-4
Hume Highway NB	N of Stacey Street	1,617	1,612	1,578	2	0	-2
Hume Highway SB	N of Stacey Street	2,675	2,640	2,531	3	2	-4
Roberts Road NB	S of Norfolk Road	2,146	2,809	2,802	8	0	0
Roberts Road SB	S of Norfolk Road	2,470	2,178	2,243	9	19	3
Wentworth Street NB	South of Norfolk Road	150	223	286	25	34	28
Wentworth Street SB	South of Norfolk Road	114	167	192	23	0	15

NB – northbound SB – southbound EB – eastbound WB – westbound.



A4: Sources: Adapted from image supplied by EDAR. File Name: EN01709_Ad_025a.mxd not to scale



Legend

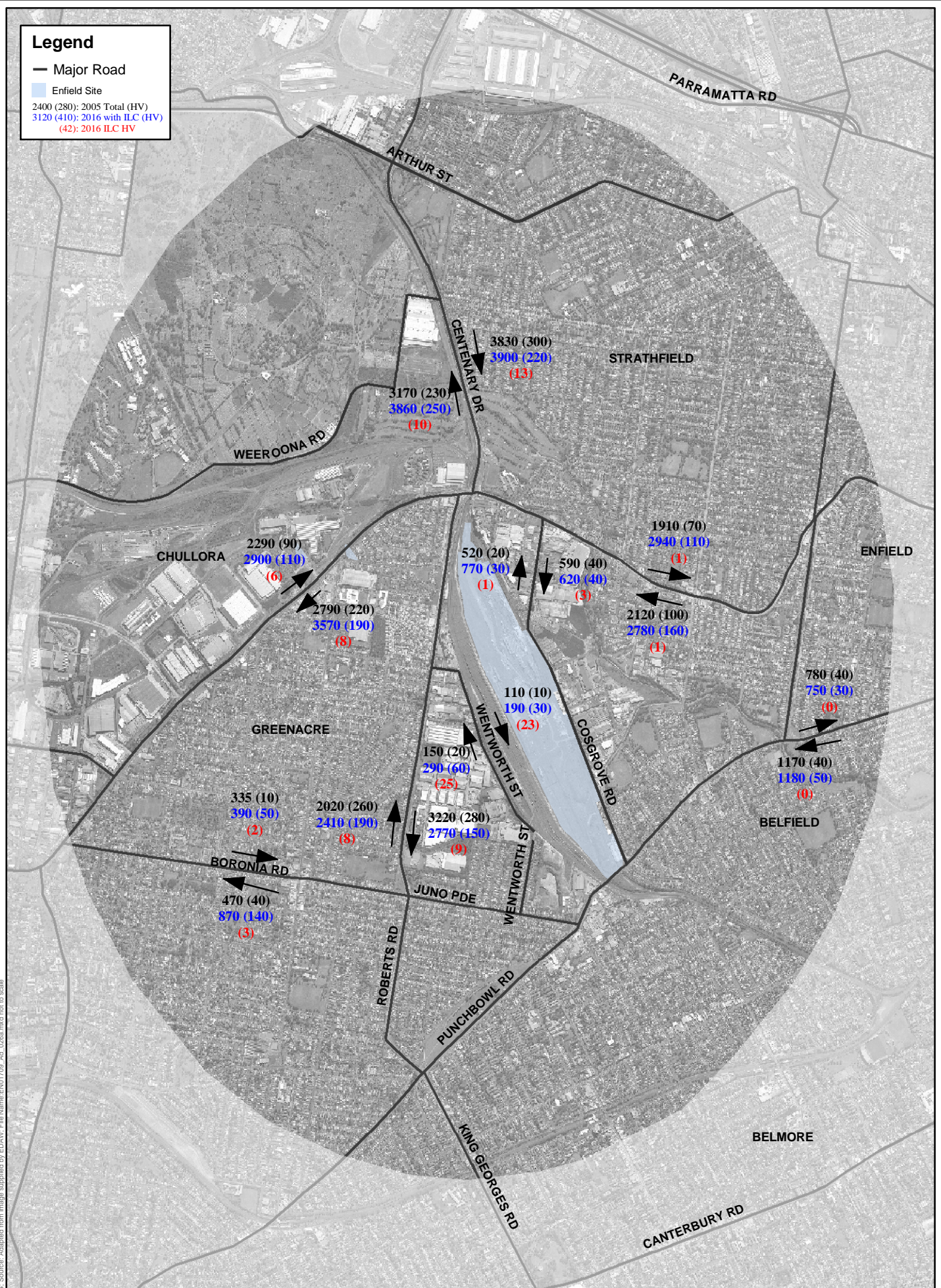
— Major Road

■ Enfield Site

2400 (280): 2005 Total (HV)

3120 (410): 2016 with ILC (HV)

(42): 2016 ILC HV



Ad: Source: Adapted from image supplied by EDAA; File Name: EN01709_Art_026a.mxd not to scale

■ **Table 7- 6: Future Intersection Operation**

	AM Peak					PM Peak				
	2005	2016 Base		2016 With Enfield ILC		2005	2016 Base		2016 With Enfield ILC	
Intersection	LoS	Av Del	LoS	Av Del	LoS	LoS	Av Del	LoS	Av Del	LoS
Roberts Road / Juno Parade	E	97	F	102	F	D	191	F	182	F
King Georges Road / Punchbowl Road	F	>200	F	>200	F	F	>200	F	>200	F
Georges River Road / Coronation Parade	B	19	B	19	B	A	13	A	13	A
Roberts Road / Norfolk Road	B	24	B	31	C	B	35	C	41	C
Hume Highway / Boronia Road	B	51	D	55	D	B	44	D	44	D
Hume Highway / Roberts Road / Centenary Drive	F	>200	F	>200	F	D	178	F	168	F
Hume Highway / Cosgrove Road	C	>200	F	>200	F	D	>200	F	>200	F
Hume Highway / Coronation Parade	C	>200	F	159	F	B	57	E	51	E
Centenary Drive / Arthur Street	C	57	E	65	E	C	45	D	46	D
Centenary Drive / Weeroona Road	A	14	B	14	B	A	9	A	9	A

7.4.5 Access Arrangements

Traffic access options at different locations around the ILC site were investigated. In determining the preferred access points, the primary routes for heavy vehicles and the potential impact on residential and community areas were considered. The majority of truck movements are expected to be in areas west of the ILC. Key access routes include the M5 Motorway, Roberts Road, Hume Highway and the M4 Motorway.

The access options are shown in **Figure 7-6**. Options to link the north of the site to Roberts Road or the Hume Highway / Roberts Road intersection were not considered feasible due to physical constraints, the inability to meet full entry/exit requirements for trucks, and the imposition of an additional layer of complexity to a major intersection. Access to Roberts Road to the west of the site via direct access options from Amarina Avenue and Norfolk Road were not considered practicable, due to the need for resumption of land and/or existing premises and due to direct impacts on existing business and the design of the intermodal terminal.

Indirect access to Roberts Road via Wentworth Street and Norfolk Road is feasible and provides no operational constraints.



Options to link directly with Punchbowl Road, or indirectly via an extension of Wentworth Street, to the south of the site were not considered feasible due to physical constraints, the inability to provide a signalised intersection, the need for resumption of private land and the cost of the additional works required.

Several options were considered for access to the Hume Highway via Cosgrove Road or Gould Street from the east of the site. Most were not considered feasible due to the intersection and signalling constraints, in part due to the proximity of the Hume Highway / Centenary Drive / Roberts Road intersection / flyover, and also due to the need to acquire land. The design of the terminal was also affected in some cases. The existing Cosgrove Road configuration is considered the best option, with minimal road modifications required and to complement the ILC design.

Based on the studies conducted and the design of the proposed 300,000 TEU Intermodal Logistics Centre, Sydney Ports Corporation concluded that Cosgrove Road and Norfolk Road via Wentworth Street are the least constrained access locations for heavy vehicles utilising the fully developed site and were consequently chosen as the preferred access points. These locations provide direct access through industrial corridors. Roberts Road and the Hume Highway are the key distribution roads linking Enfield with the target markets for the ILC, predominantly located west of the site.

7.4.6 Parking

The likely number of parking spaces should be based on the anticipated number of employees on the site. This number is recommended as a maximum rather than a minimum number of parking spaces. Parking arrangements for trucks and cars on site would be addressed as part of the detailed design of the project.

7.4.7 Queuing

During the peak of activity, there would be about 52 truck arrivals in a one-hour period entering the site. Each truck, upon arrival at one of the access points, would travel to the relevant facility in the site. All traffic would be accommodated on-site and managed by traffic management plans.

7.4.8 Night Time Heavy Vehicle Movements

Although the ILC site would operate over 24 hours, truck activity would not be spaced evenly throughout the day. Less truck activity would occur at night. It is anticipated that about 6% of truck movements are likely to occur between 10pm and 6am, with 5% of these movements taking place between 5am and 6am. These numbers are generally consistent with the surrounding network, such as Roberts Road, which has an average of 12 to 13% existing heavy vehicle movement from 10pm to 6am.

7.4.9 Heavy Vehicle Management

The operation of the site is likely to involve a number of different lessees, operating independently but with similar objectives. The development of a site traffic management plan is one mechanism that

could bind all lessees and transport operators to a central objective of developing the ILC site as a model of good practice and would consider the following issues:

- Consideration of a vehicle booking system (VBS) or similar system that provides for even and structured arrival of trucks to the site for loading and unloading, and accommodates the optimum number of trucks on-site awaiting service. This may also create arrival schedules that minimise impacts on local demand peaks;
- Development of local area traffic management initiatives to guide trucks using the arterial road network; and
- Compliance with safe load practices and addressing vehicle weight-of-load thresholds on the road network in accordance with the *Road Transport (General) Act, 2005*.

The requirements for heavy vehicle management under a site traffic management plan would be developed in consultation with the RTA.

7.4.10 Local Area Traffic Management

Local Area Traffic Management (LATM) measures can be utilised to reinforce the characteristics of roads in the local network and to manage any potential impacts resulting from truck movements to and from the ILC. The objective for introducing measures would be to ensure that heavy vehicles travelling to and from the ILC use appropriate routes and do not travel through residential areas. LATM measures such as light traffic thoroughfares are already in place in Norfolk Road and Rawson Road, west of Roberts Road, as well as in other east west roads in the area. As well as maintaining the existing limits on these east west roads, specific improvements will be considered for the intersection of Norfolk Road and Roberts Road, to ensure trucks are unable to cross Roberts Road from Norfolk Road, either east or west bound. The intersection performance for vehicles turning from Roberts Road into Norfolk Road east will be improved, and measures will be introduced to ensure that trucks leaving the ILC via Norfolk Road must turn left or right at Roberts Road. Truck movements will be monitored using 24 hour cameras. Sydney Ports will work with Bankstown and Strathfield Councils, the RTA and the community to develop these and other appropriate strategies for the local area.

7.4.11 Regional Impacts

An assessment was undertaken to ascertain the regional impact of the Intermodal Logistics Centre on the road network. The most significant points to be drawn from the assessment are:

- Where the heavy vehicle volume increases, it is generally only by a small margin (the increase in heavy vehicles on Roberts Road, which has the highest increase in the number of heavy vehicles associated with the ILC is about 28 in the AM peak, which is less than 1% of the total traffic stream);
- The additional heavy vehicle activity generated by the development would be concentrated on key arterial roads such as Roberts Road / Centenary Drive, M4 Motorway and Hume Highway; and

- There would be a reduced growth in heavy vehicle traffic on the M5 Motorway, due to some heavy vehicle activity from Port Botany being replaced by the rail movements to the intermodal facility at Enfield.

On roads beyond the local access roads, the volumes of truck movements generated by the development of the ILC are low, representing less than 1% of the total traffic volumes on these key roads. These low volumes of heavy vehicles generated by the Enfield ILC indicate that no dedicated infrastructure is required to support a stand alone road freight corridor for the movement of heavy vehicles to and from the ILC.

7.4.12 Sensitivity Analysis

A sensitivity assessment was undertaken to ascertain a worst-case with the number of trucks generated from the site. Sensitivities that affect heavy (container) truck numbers include the container/truck ratio, backloading rates and the weekday activity profile. Light truck numbers are affected by truck size and load size. Realistic potential variations on the baseline would result in changes ranging from a container truck reduction of 6 movements per hour to an increase of 12 movements per hour, or to an increase of 28 light truck movements per hour. This number of movements would have a minimal impact on the surrounding road network (representing less than 1% of total traffic) and would not significantly change the findings of the assessment. The forecasts presented are also likely to be conservative in the long term, as the operators of the site will strive to achieve operational efficiencies in order to reduce their transport costs.

7.5 Mitigation Measures

The following traffic management and mitigation measures would be considered during the detailed design of the development.

7.5.1 Construction Traffic

The traffic modelling has indicated that the proposed ILC will have a minimal impact during the construction phase. Appropriate traffic management plans will be developed to manage construction traffic during the site construction period.

7.5.2 Operational Traffic

The traffic modelling has shown that:

- The proposed ILC will have a minimal impact on traffic volumes and the performance of intersections in the immediate area;
- The number of additional movements on the regional road network from the ILC development is very low (less than 1% of total traffic, on average) and does not detrimentally affect network performance; and
- It is the impact of natural traffic growth in the study area that will result in the poor performance of some intersections during peak periods.

It is suggested that the RTA investigate options for the operation of the following intersections to improve performance for all road users. These include:

- King Georges Road / Punchbowl Road;
- Hume Highway / Roberts Road / Centenary Drive;
- Hume Highway / Coronation Parade;
- Centenary Drive / Arthur Street;
- Roberts Road / Juno Parade; and
- Cosgrove Road / Hume Highway.

The operation of the Hume Highway / Cosgrove Road intersection is of direct relevance to the proposed ILC. The traffic modelling forecasts that the Hume Highway / Cosgrove Road intersection operates poorly (Level of Service F), with just the predicted growth in background traffic to 2016. Satisfactory operation of this intersection in 2016 could be achieved through the provision of three through lanes in each direction on the Hume Highway between Centenary Drive and Cosgrove Road. This would improve the forecast Level of Service F to achieve a Level of Service D in the PM peak, even with most ILC truck traffic using the Roberts Road / Norfolk Road intersection. If all ILC truck movements used the Hume Highway / Cosgrove Road intersection, the performance would be Level of Service E. The Roberts Road / Norfolk Road intersection is operating with spare capacity and no intersection enhancement, other than that proposed to restrict truck movements across Roberts Road, is required.

7.6 Conclusions

The road traffic and transport assessment found that the development of the ILC at Enfield would have a minimal impact on the road network during construction and operation. Beyond the local roads used to gain access to the site (Cosgrove Road and Wentworth Street), the number of trucks generated by site activities represents less than 1% of the average total traffic on the road network around the site.

During construction, the average vehicle activity is about 29 trucks per day and between 150 and 170 cars (construction staff) per day. Based on the forecast traffic volumes, appropriate traffic management plans would be developed to manage construction traffic during the site construction period. For the operation of the ILC site, the assessment found that there would be about 1,160 truck movements into and out of the site per day. The majority of these would be between 6am and 5pm, with a daily peak of 103 movements between 2pm and 3pm. Although some intersections in the study area are forecast to be at capacity in 2016, this is due to general traffic growth rather than due to the development of the ILC. Any additional truck activity generated by the development would be concentrated on key arterial roads such as Roberts Road / Centenary Drive, the M4 Motorway and the Hume Highway. Based on the forecast traffic impact, the proposed mitigation strategies include:

- The investigation of intersection upgrades by the RTA to improve performance for all road users. The upgrade of the Hume Highway / Cosgrove Road intersection is an important intersection for the efficient operation of the ILC and for general traffic;
- The development of local area traffic management measures to ensure that trucks travelling to and from the ILC use appropriate routes and do not travel through residential areas; and
- The preparation of appropriate traffic management plans for operational activities generated by the ILC, with consideration of site traffic generation, vehicle access arrangements, vehicle parking requirements and truck management.