PORT KEMBLA GRINDING MILL
TRAFFIC IMPACT ASSESSMENT

FOR

CEMENT AUSTRALIA

Gold Coast
Suite 26, 58 Riverwalk Avenue
Robina QLD 4226
P: 07 5562 5377

Brisbane
Level 2, 428 Upper Edward Street
Spring Hill QLD 4000
P: 07 3831 4442

Sydney
Studio 203, 3 Gladstone Street
Newtown NSW 2042
P: 02 9557 6202

W: www.bitziosconsulting.com.au E: admin@bitziosconsulting.com.au

Project No: P0697 Version No: 003 Issue date: 21 January 2011

DOCUMENT CONTROL SHEET

Issue History

Report File Name	Prepared by	Reviewed by	Issued by	Date	Issued to
P0697.001R Port Kembla Grinding Mill Traffic Impact Assessment	S.Vetevood	A.Bitzios	A.Bitzios	25 August 2010	A.Trezise (Siteplus)
P0697.002R Port Kembla Grinding Mill Traffic Impact Assessment	S.Vetevood	A.Bitzios	A.Bitzios	21 September 2010	A.Trezise (Siteplus)
P0697.003R Port Kembla Grinding Mill Traffic Impact Assessment	A.Bitzios	A.Bitzios	A.Bitzios	21 January 2011	A.Trezise (Siteplus)

Certified System
Quality
ISO 9001
SAI GLOBAL

CONTENTS

Tables

Figures

Appendices

1. INTRODUCTION

1.1 PURPOSE

Bitzios Consulting has been commissioned by Cement Australia to prepare a Traffic Impact Assessment (TIA) for a proposed Grinding Mill in Port Kembla, NSW. The land on which the project will be located is land subject to reclamation by the Port Kembla Port Corporation (PKPC) as part of the Outer Harbour Development.

The Port Kembla Outer Harbour TIA was completed by AECOM and has been submitted for Part 3A approval. A large component of the information used for the compilation of this TIA has been sourced from the AECOM report.

1.2 BACKGROUND

Port Kembla is located on the east coast of NSW, being one of three major ports in the state. The Port Kembla Outer Harbour lies approximately 6km south of Wollongong CBD and 80km south of Sydney.

Historically the port has serviced the needs of regional industries, predominantly coal (export) and steel (import of raw materials and steel products). As part of the Outer Harbour development, PKPC proposes to introduce additional landside facilities to attract new trades and increase the volume of existing cargoes.

Having recently undergone a major expansion of the inner harbour area, the port has seen a diversification of its trade base to include general and break bulk cargoes, containers and motor vehicle imports. That development, which included the construction of three new berths and the development of 53 hectares of land, has allowed the port to become the largest vehicle importing hub in Australia. It should be noted that it is also the principal grain export port for producers in Southern and South-Western NSW.

Cement Australia is planning to construct a Grinding Mill within the Outer Harbour area to produce cement and ground granulated blast furnace slag (GGBFS). The proposed Port Kembla Grinding Mill has been designed to enable further expansion to cater for future growth and is planned to deliver the largest single grinding mill in Australia. The current proposed project will produce approximately 800,000 tonnes of cement and 300,000 tonnes of GGBFS per annum.

Cement and GGBFS are products that are used in the majority of structures built and there will be a growing need and benefit to have such a product available locally to the Illawarra and other growth sectors in the region. This project has the capacity to provide a substantial portion of the cement and GGBFS required for the NSW market and thus is a major component in guaranteeing the required supply for the building industry into the future.

The site is ideally located having good access to imported products, whilst also being located in close proximity to one of the main sources of material for the creation of GGBFS, being Granulated Blast Furnace Slag (GBFS). GBFS is available from Bluescope and can be sourced from a stockpile located at 21 Area. It should be noted that this material is currently transported to Sydney, therefore this project provides an added benefit by relocating and internalising heavy vehicle trips from Sydney to within Port Kembla.

It is expected that this project will generate up to 150 new jobs during construction and will directly employ ten people when completed. Whilst not quantified, indirectly, this project is likely to result in a substantial increase in employment for Illawarra and southern Sydney local residents.

1.3 SITE LOCATION

The site is located within the Wollongong Local Government Area and is located on land to be reclaimed by the PKPC in the first stage of that development project. It is located in the vicinity of Blue Scope Steel and other associated heavy industrial activities, which form the industrial area of Port Kembla.

The site location and key surrounding roads are shown in Figure 1.1.

Figure 1.1: Site Location

The site is ideally situated to access truck freight routes and to receive raw product by sea. The area is serviced by road, rail and sea transport, which supports the existing and proposed industrial activities located in Port Kembla.

1.4 SCOPE

The scope of this report is based on the Director-General requirements dated 14 July 2010. These requirements include:

- details of the traffic volumes likely to be generated during construction and operation;
- an assessment of the predicted impacts of this traffic on the safety and the capacity of the surrounding road network;
- quantities to be moved to and from the site and by what means; and
- options to minimise road based haulage.

The Director-General requirements also stated that the following guidelines should be used in assessing the traffic impacts:

- RTA Guide to Traffic Generating Developments; and
- RTA Road Design Guide.

Consultation with Council and the RTA assisted with further refining the scope of works as follows:

- intersection capacity assessment of the Five Islands Road/Flinders Street intersection and the Five Islands Road/Springhill Road intersection in accordance with the RTA Guide to Traffic Generating Developments for base year 2013 and future year 2023 peak traffic demand periods;
- employee/visitor parking, site access and site safety assessment in accordance with AS2890.1; and
- heavy vehicle turn path assessment in accordance with AS2890.2.

The RTA Road Design Guide was not required to be referred to in this traffic impact assessment as there were no road design related impacts required to be assessed.

Key recommendations made in the AECOM report (February 2010), prepared as part of the submission for the Part 3A application for the Outer Harbour reclamation area, are summarised as follows:

- all Port related traffic will use Flinders Street and Five Islands Road as the main haulage route;
- there is unlikely to be any traffic impacts as a result of the increased levels of employee traffic and truck movements; and
- construction traffic movements are unlikely to pose a greater impact than operational vehicles, however Traffic Management Plans (TMP's) should be developed during the construction phases to address work practices such as definition of haulage routes, driver protocols and hours of construction.

Subsequently, the scope of this traffic impact assessment also includes the preparation of a Driver Code of Conduct, which addresses haulage routes and driver protocols.

The scope of this traffic impact assessment addresses the Director-General requirements and any condition of consent that may be issued for the Outer Harbour Part 3A development application that is in general alignment with the AECOM report findings.

2. EXISTING ROAD NETWORK

2.1 OVERVIEW

Road transport will play a significant role in linking the Outer Harbour to the rest of the supply chain. The focus of this report is to consider the capability of the road network, in the vicinity of the proposed Grinding Mill site, to cater for additional development related traffic.

The main access and haulage route to the Outer Harbour from the Southern Freeway is via Five Islands Road. From Five Islands Road, the most direct access to the Outer Harbour is via Flinders Street and Old Port Road.

A description of the nature of the key roads that are to be utilised in the area is discussed below.

2.2 FIVE ISLANDS ROAD

Five Islands Road is a state-controlled road operated and maintained by the RTA. Five Islands Road provides a major link to Port Kembla from the Southern Freeway and Princess Highway. The road intersects both Springhill Road and Flinders Street and is therefore a critical connection between the Inner and Outer Harbour.

Five Islands Road consists of divided carriageway with three lanes in each direction and widening at major intersections to accommodate turning lanes as shown in Figure 2.1. The speed limit of Five Islands Road along the impacted section is 80 km/h.

Figure 2.1: Five Islands Road

2.3 SPRINGHILL ROAD

Springhill Road is a state-controlled road operated and maintained by the RTA. Springhill Road forms the western boundary of the Inner Harbour. The majority of the freight accessing the area is using, or at least crossing Springhill Road. Through its connections to Five Islands Road, which is the main access to the Outer Harbour, Springhill Road provides a major north-south arterial link within the port area.

Springhill Road has a speed limit of 80 km/h and comprises a divided carriageway with three lanes in each direction. There are turn lanes provided at the majority of the intersections for right and left turning vehicles, as shown in Figure 2.2.

Figure 2.2: Springhill Road

2.4 FLINDERS STREET

Flinders Street is a state-controlled road operated and maintained by the RTA. Flinders Street and Old Port Road contains a loop off Five Islands Road which provides access to the Outer Harbour area. This road is an undivided carriageway with two lanes in each direction as can be seen in Figure 2.3. Flinders Street has a speed limit of 60km/h.

Figure 2.3: Flinders Street Westbound

2.5 CHRISTY DRIVE

Christy Drive is a wide two lane undivided carriageway and will provide access to the proposed new North-South Link Road which will provide direct access to the site. The first 150m of Christy Drive is operated and maintained by Wollongong City Council. The remainder of Christy Drive is operated and maintained by PKPC.

3. PROPOSED DEVELOPMENT

3.1 KEY COMPONENTS OF THE DEVELOPMENT

The development is proposed to be delivered in stages, with this development application representing Stage 1. The proposed stages are as follows:

- Stage 1 - installation of the Grinding Mill, materials storage, clinker storage, site infrastructure and cell silos for the dispatch of finished product;
- Stage 2 – the addition of a second Grinding Mill and associated raw material and finished product storage; and
- Stage 3 – the addition of a third mill and associated infrastructure.

It is envisaged Stage 1 will be completed in 2013 and, subject to market conditions, whilst Stage 2 and Stage 3 would proceed approximately seven (7) and fifteen (15) years later respectively.

Stage 1 of the proposed development will produce:

- 800,000 tonnes of cement per annum; and
- 300,000 tonnes ground granulated blast furnace slag (GGBFS) per annum.

The completion of all three stages would raise the plant capacity to:

- approximately 2.5 million tonnes of cement per annum; and
- approximately 0.5 million tonnes of GGBFS per annum.

The key components of the Stage 1 project include:

- a processing plant including transfer hoppers, storage bins, Grinding Mill and storage silos for dispatch;
- a materials transfer system which incorporates extensive enclosed conveyor systems, transfer chutes and dust suppression system and bag house for air quality control;
- Clinker storage shed;
- truck and ship loading and unloading facilities;
- associated office, workshop, substation, transformer yard and car parking; and
- temporary external stockpile for ground blast furnace slag (material obtained from 21 Area used to manufacture GGBFS).

Appendix A of this report includes site plans showing the extents of the proposed development.

The Grinding Mill development proposed by Cement Australia is developed on land as part of the Outer Harbour development project. This project does not incorporate any infrastructure that was recommended as part of that development application.

The infrastructure recommended for Outer Harbour development will be provided by PKPC. The road infrastructure offering access to the Outer Harbour development will be established before the site is taken over by Cement Australia.

3.2 PKPC INFRASTRUCTURE

The development of the Outer Harbour is intended to maximise available land area and to provide the maximum number of berths suitable for container handling, bulk trades and general cargo. Figure 3.1 summarises the infrastructure that will be provided by PKPC as part of their land reclamation project.

Source: AECOM, December 2009

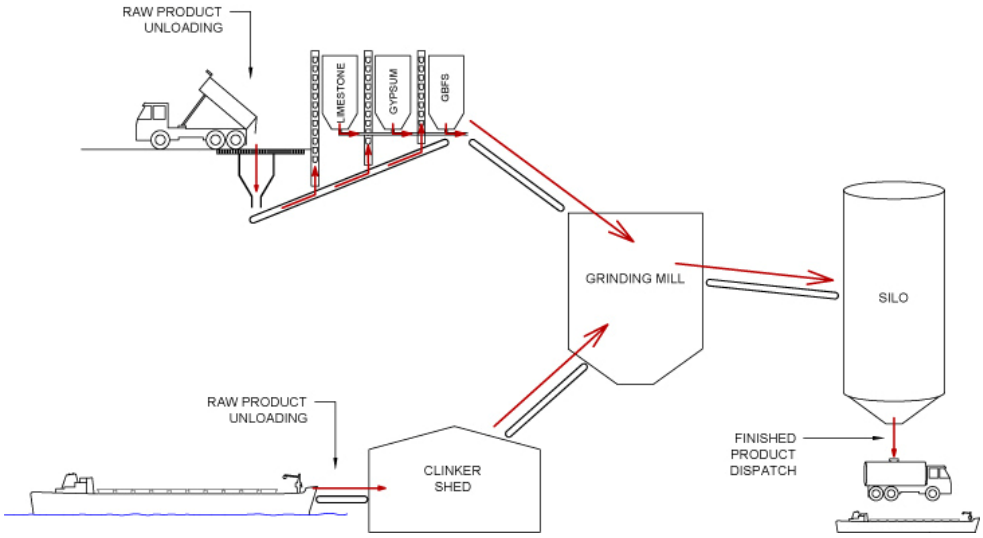
Figure 3.1: Infrastructure Development

The new road links to be provided (as seen in Figure 3.1) will be operated and maintained by PKPC.

It should be noted that the existing rail siding on the western side of the proposed North-South Link Road is severed from the site by the new road link.

3.3 PRODUCTION PROCESS

The cement production process is best summarised in Figure 3.2 below. Essentially raw material is sourced into the site predominantly via ship and truck, where it is then refined and blended to create cement. The final product is then mostly distributed via truck with some material exported via ship.



Source: Siteplus 2010

Figure 3.2: Production Process

3.4 TRANSPORT MODE SHARE

As part of the Stage 1 development, it is not intended to use rail as a mode of transport. The main reason for this is that the majority of the raw material is being provided locally or is being transported in by ship. The quantum of material being manufactured and a combination of the location of the destinations and existing rail infrastructure does not make it feasible to have rail as a mode choice option. Cement Australia will strongly consider the use of rail in subsequent development stages, particular if the Maldon-Dombarton Rail Link was completed and if a critical mass in product generation was achieved to increase its viability.

The proposed mode share (by tonnage) for the Stage 1 development is estimated in Table 3.1 below.

Table 3.1: Transport Mode Share

Raw Materials	Kilo-Tonne/Year
Clinker – Ship	740
Slag (dry) – Truck	310
Gypsum – Truck	60
Limestone - Truck	400
Flyash – Truck	4
Lime – Truck	4
Finished Products	**Tonnes/Year**
GGBFS – 150kT by Ship, 180kT by Truck	330
Cement – Truck	830

It should be noted that flyash and lime are to be delivered as a back-loaded product and therefore will not generate specific truck movements in addition to what has been assumed in this assessment.

The information from Table 3.1 can be summarised as follows:

- Raw Material
  - 64% ship (mostly Clinker)
  - 36% road
- Finished Product
  - 87% road
  - 13% ship

3.5 TRUCK DRIVER CODE OF CONDUCT

To assist with the management of truck movements to and from the site, a 'Truck Driver Code of Conduct' has been developed and is included in Appendix B.

The "Truck Driver Code of Conduct" will be made available to truck drivers as part of their induction process.

The "Truck Driver Code of Conduct" document will be reviewed periodically to ensure its relevance and currency.

4. TRAFFIC VOLUMES

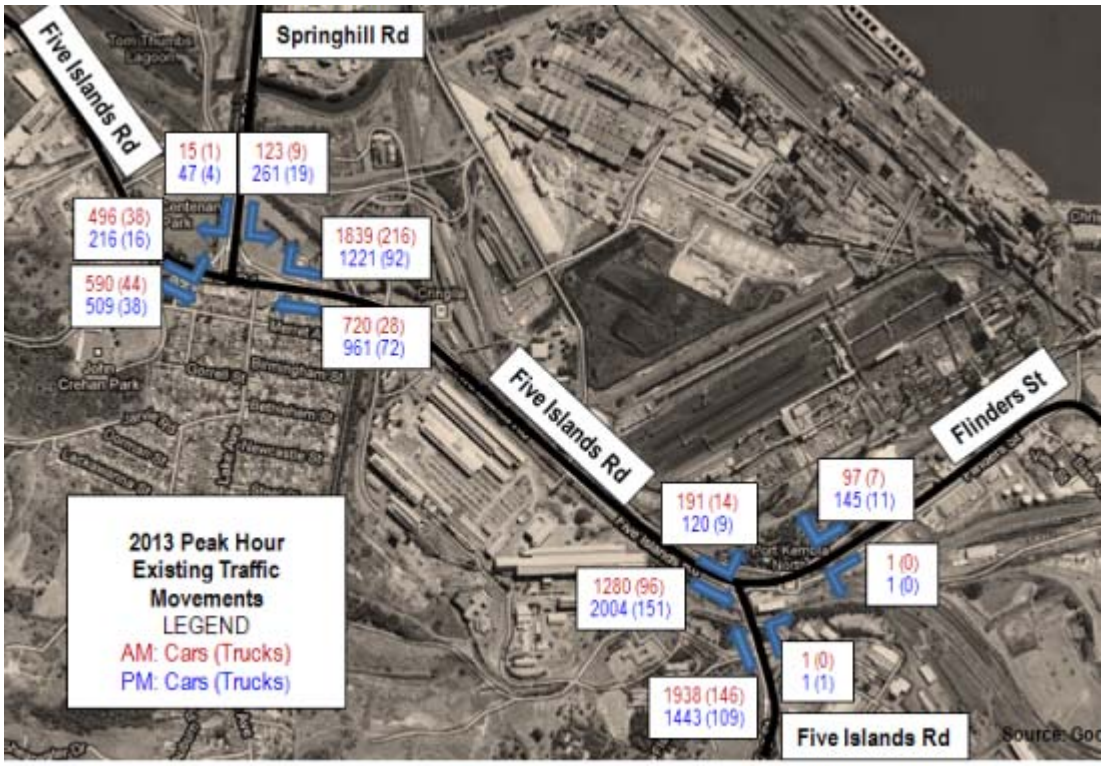
4.1 BACKGROUND TRAFFIC

As agreed in consultation with the RTA, the assessment is to be undertaken for the base year 2013 and future year 2023 traffic demands.

The assessment focuses on the morning and evening peak hours as these are the periods when traffic volumes of the surrounding network are the highest and there is the greatest demand placed on road infrastructure.

Data concerning relevant intersection movements for future years 2016 and 2036 were made available by AECOM, obtained from the Port Kembla Outer Harbour Development TIA. Using the provided data, the 2013 and 2023 background traffic volumes were developed through interpolation.

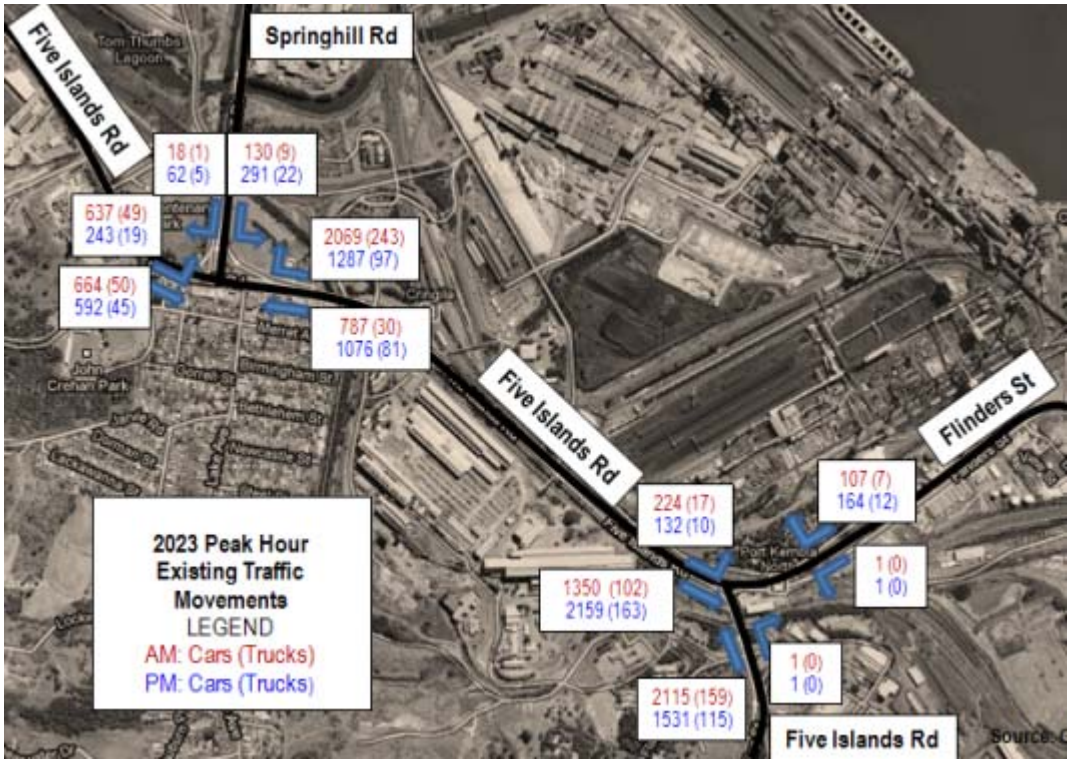
Figure 4.1 shows the background traffic volumes (ie without development) for the two key intersections (Five Islands Road/Springhill Road and Five Islands Road/Flinders Street) for the year 2013. Heavy vehicle movements have been shown separately to better detail the predicted increase in truck movements associated with the proposed development.



Map Source: Google 2010

Figure 4.1: 2013 Traffic Volumes without Development

Figure 4.2 shows the predicted future year 2023 traffic volumes across the same two intersections. The increase in background traffic over the ten year period is noticeable.



Map Source: Google 2010

Figure 4.2: 2023 Traffic Volumes without Development

4.2 DEVELOPMENT TRAFFIC

4.2.1 Site Operating Hours

The mill will operate 24 hours a day. Truck deliveries of raw materials to the site will generally be delivered from 5am to 6pm, hence over a 13 hour period. Occasionally deliveries may be required outside the formerly stated hours. The product will be dispatched 24 hours a day, 7 days a week.

4.2.2 Site Traffic Generation

The development traffic will be generated by the trucks delivering raw material and dispatching finished product.

Raw material will be delivered to the site by 32 tonne heavy vehicles (truck and trailer). There will be approximately 140 raw material truck deliveries per day during peak periods.

Dispatch of product will be via 26 tonne heavy vehicles (B-Doubles) which deliver finished product to customers. The estimated number of delivery trucks during peak periods is 232.

The above stated truck movements relate to peak product delivery periods. This will occur for approximately 30% of the operation time of the plant across the year. Subsequently, averaging these daily truck volumes across the expected delivery period within a typical peak day, would be considered an appropriate representation of the 85$^{th\%ile}$ equivalent peak hour truck movements.

It should be further re-iterated that the site receival capacity and material production capacity does not allow for trucks to load or unload at rates higher than this in any case. It takes approximately 4-5 minutes for a truck to unload raw material and 12-15 minutes for a truck to load finished product.

Table 4.1 is a summary of the estimated traffic volumes generated by the Grinding Mill development. Daily raw material delivery and finished product dispatch numbers comprise both GGBFS and General Blend Cement production related truck movements.

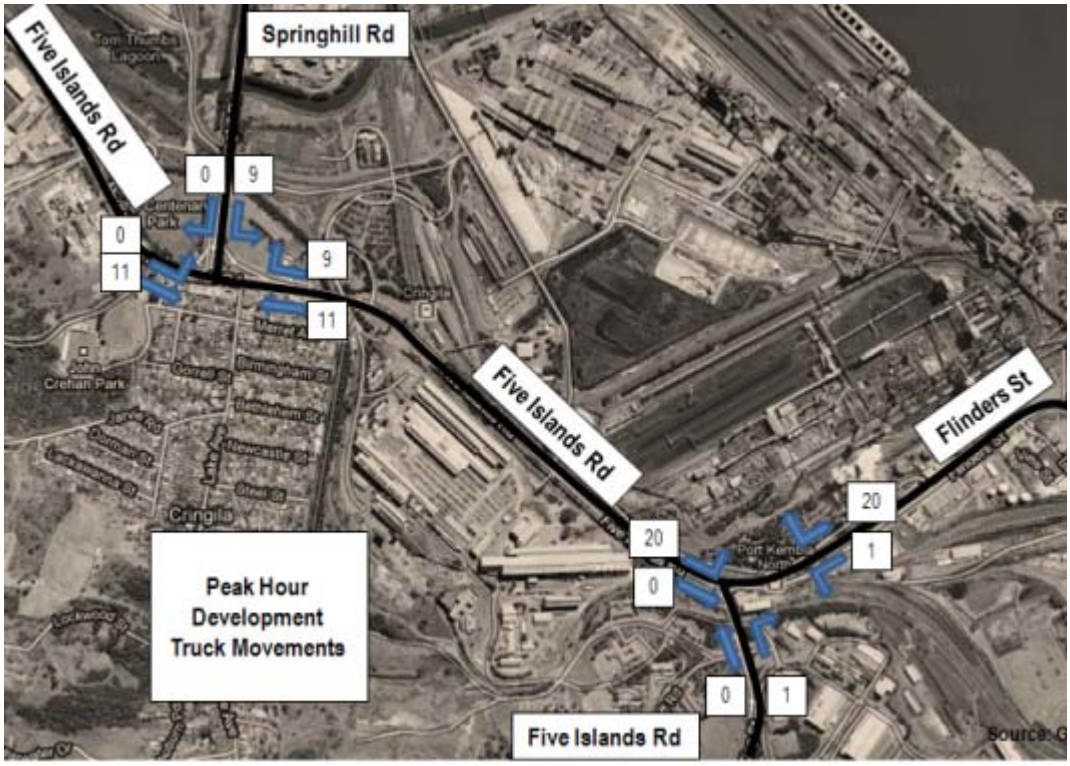
Table 4.1: Traffic Generation – Proposed Development

Trip Direction	Raw Material (Truck Trips per day)	Raw Material (Truck Trips per hour)[1]	Finished Product (Truck Trips per day)	Finished Product (Truck Trips per hour)[2]
21 Area to Site	116	9	0	0
Site to 21 Area (note: raw material returning empty)	116	9	0	0
Site to F6 (note: raw material returning empty)	8	1	230	10
F6 to Site (note: finished product returning empty)	8	1	230	10
Site to Five Islands South (note: raw material returning empty)	16	1	2	0
Five Islands South to Site (note: finished product returning empty)	16	1	2	0
TOTAL	280	22	464	20

1. *Daily movement divided by 13hrs per day*
2. *Daily movement divided by 24hrs per day*

The proposed development will generate an estimated 42 trips per peak hour (22 raw material delivery and 20 finished product trips) while the site is working at maximum capacity.

Figure 4.3 shows the resultant expected additional truck movements on the two key intersections.

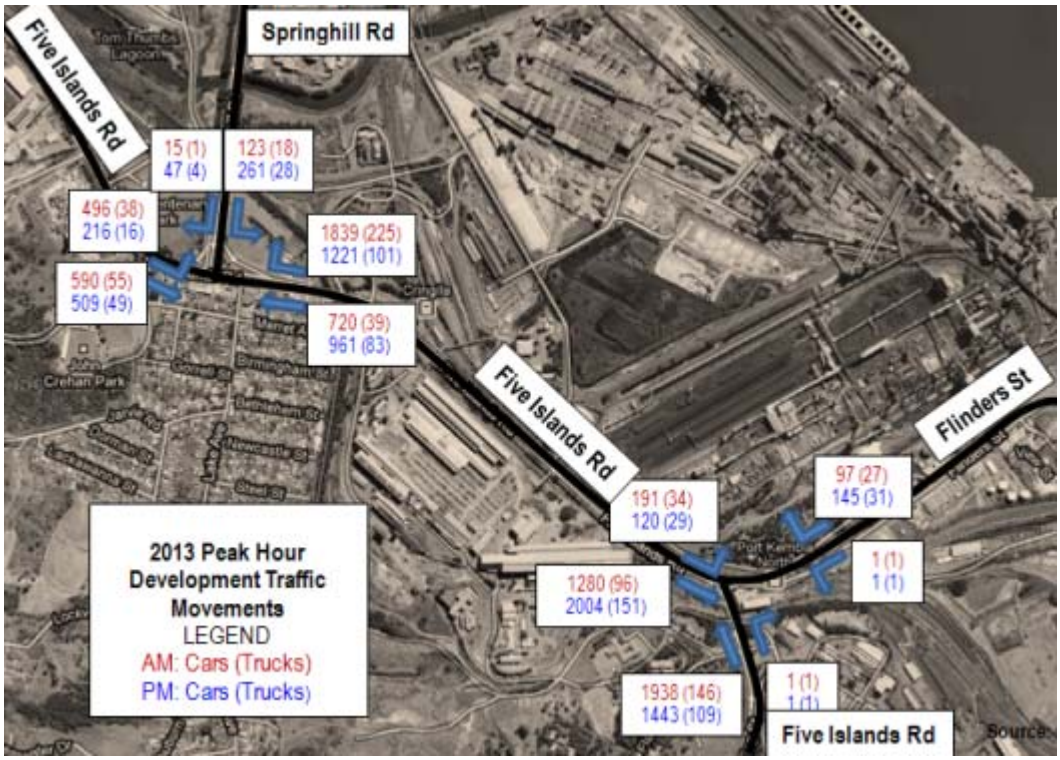


Map Source: Google 2010

Figure 4.3: Development Traffic

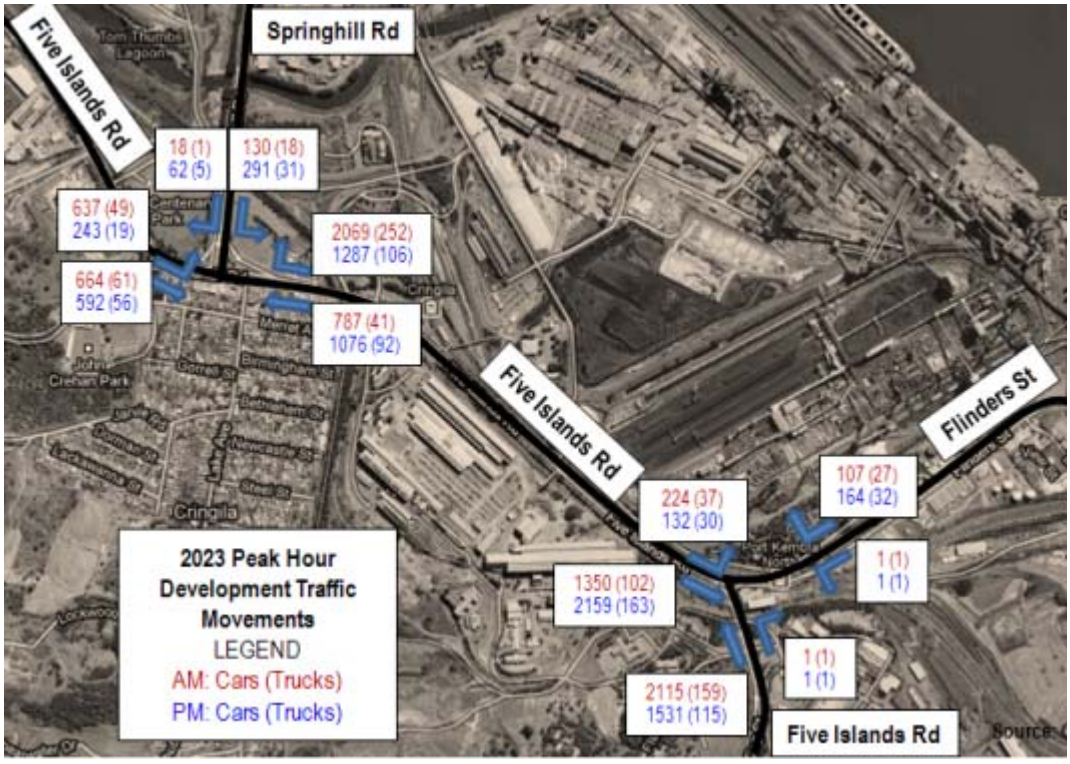
4.3 TRAFFIC VOLUMES – WITH DEVELOPMENT

Traffic volumes generated by the development (refer Figure 4.3) have been added to the background traffic to create 'with development' traffic volumes scenarios for years 2013 and 2023 traffic demands. These traffic volumes are shown in Figure 4.4 and Figure 4.5 respectively.



Map Source: Google 2010

Figure 4.4: 2013 Traffic Volumes with Development



Map Source: Google 2010

Figure 4.5: 2023 Traffic Volumes with Development

5. TRAFFIC ASSESSMENT

5.1 SIDRA MODELLING

For this project, intersection modelling was undertaken using SIDRA Intersection 5.0. SIDRA Intersection is a widely accepted analytical tool for evaluation of alternative intersection designs in terms of capacity, level of service and a wide range of performance measures.

SIDRA Intersection output data used in this assessment includes:

- Degree of Saturation – a measure of the ratio between traffic volumes and the capacity of the intersection;
- Average Delay – the average time in seconds that vehicles wait at the intersection;
- Level of Service – a measure of the overall performance of the intersection and its approaches; and
- Queue Distance – queue distance in metres.

5.2 CUMULATIVE IMPACTS

This report has been updated to include an assessment of the cumulative impacts associated with both the Outer Harbour and the Grinding Mill developments. In this assessment, there has been no reduction in Outer Harbour development trips for the Grinding Mill site, nor has there been any reduction in Grinding Mill truck movements from the internalisation of trips from Area 21 away from Mount Ousley, thus making this a conservative assessment.

Table 5.1 and Table 5.2 provides a summary of the intersection performance under 2013 and 2023 traffic demands, “with” and “without” the proposed developments for morning and evening peak hour periods. The assessment also includes a comparison between the Outer Harbour ‘project’ and ‘concept’ stage cases. The detailed outputs for each SIDRA Intersection analysis undertaken are attached in Appendix C.

As the models were already shown to be saturated in the ‘without development’ scenarios, the ‘with development’ scenarios were run using fixed cycle and phase times that mimicked the ‘without development’ scenarios. This ensured a ‘like for like’ comparison and accurate determination of the true impacts associated with the ‘development only’ traffic.

Table 5.1: SIDRA Intersection Analysis Summary – Cumulative Assessment – Five Islands Rd / Flinders St (AM/PM peak)

Scenarios	Five Islands Road (SE)								Flinders Street								Five Islands Road (NW)							
	Through				Right				Left				Right				Left				Through			
	DOS	Delay (Sec)	Queue (Veh)	LOS	DOS	Delay (Sec)	Queue (Veh)	LOS	DOS	Delay (Sec)	Queue (Veh)	LOS	DOS	Delay (Sec)	Queue (Veh)	LOS	DOS	Delay (Sec)	Queue (Veh)	LOS	DOS	Delay (Sec)	Queue (Veh)	LOS
Five Islands Road/Flinders Street 2013 AM																								
Without Development	0.46	0.80	4.50	A	0.01	64.50	0.10	E	0.37	67.60	3.90	E	0.41	66.50	4.00	E	0.40	13.30	6.40	A	0.40	1.90	6.40	A
With Outer Harbour + Without Development	0.46	0.80	4.50	A	0.01	64.50	0.10	E	0.40	68.90	4.40	E	0.48	67.80	4.40	E	0.40	13.50	6.50	A	0.40	1.90	6.50	A
With Outer Harbour + With Development	0.46	0.80	4.50	A	0.03	68.20	0.20	E	0.59	71.30	5.20	F	0.61	69.20	5.20	E	0.41	13.90	6.80	A	0.41	1.90	6.80	A
Five Islands Road/Flinders Street 2013 PM																								
Without Development	0.34	0.70	2.90	A	0.01	64.50	0.10	E	0.47	73.70	5.80	F	0.61	70.30	5.80	E	0.57	13.30	8.50	A	0.58	2.20	8.50	A
With Outer Harbour + Without Development	0.34	0.70	2.90	A	0.01	64.50	0.10	E	0.57	76.00	6.50	F	0.70	72.40	6.50	F	0.58	13.70	8.80	A	0.58	2.20	8.80	A
With Outer Harbour + With Development	0.34	0.70	2.90	A	0.03	68.20	0.20	E	0.75	81.20	7.50	F	0.83	76.10	7.50	F	0.59	14.20	9.30	A	0.59	2.30	9.30	A
Five Islands Road/Flinders Street 2023 AM (Project)																								
Without Development	0.49	0.80	5.10	A	0.01	64.50	0.10	E	0.44	70.00	4.40	E	0.51	68.50	4.40	E	0.42	13.20	6.90	A	0.42	1.70	6.90	A
With Outer Harbour + Without Development	0.49	0.80	5.10	A	0.01	64.50	0.10	E	0.48	71.50	4.90	F	0.59	70.10	4.90	E	0.43	13.40	7.10	A	0.43	1.70	7.10	A
With Outer Harbour + With Development	0.49	0.80	5.10	A	0.03	68.20	0.20	E	0.68	75.20	5.80	F	0.73	72.50	5.80	F	0.43	13.50	7.10	A	0.43	1.70	7.10	A
Five Islands Road/Flinders Street 2023 PM (Project)																								
Without Development	0.36	0.80	3.40	A	0.01	70.00	0.10	E	0.47	77.80	6.80	F	0.60	74.00	6.80	F	0.61	13.70	10.30	A	0.62	2.30	10.30	A
With Outer Harbour + Without Development	0.36	0.80	3.40	A	0.01	70.00	0.10	E	0.51	79.90	7.50	F	0.68	75.80	7.50	F	0.62	14.00	10.60	A	0.62	2.40	10.60	A
With Outer Harbour + With Development	0.37	0.80	3.40	A	0.03	73.80	0.20	F	0.70	83.70	8.40	F	0.79	78.50	8.40	F	0.63	14.60	11.10	B	0.63	2.40	11.10	A
Five Islands Road/Flinders Street 2023 AM (Concept)																								
Without Development	0.49	0.80	5.10	A	0.01	64.50	0.10	E	0.44	70.00	4.40	E	0.51	68.50	4.40	E	0.42	13.20	6.90	A	0.42	1.70	6.90	A
With Outer Harbour Concept + Without Developm	0.49	0.80	5.10	A	0.01	64.50	0.10	E	0.58	75.70	5.90	F	0.76	74.10	5.90	F	0.44	13.50	7.20	A	0.44	1.70	7.20	A
With Outer Harbour + With Development	0.49	0.80	5.10	A	0.03	68.20	0.20	E	0.83	87.50	7.20	F	0.91	83.10	7.20	F	0.44	13.80	7.40	A	0.44	1.70	7.40	A
Five Islands Road/Flinders Street 2023 PM (Concept)																								
Without Development	0.36	0.80	3.40	A	0.01	70.00	0.10	E	0.47	77.80	6.80	F	0.60	74.00	6.80	F	0.61	13.70	10.30	A	0.62	2.30	10.30	A
With Outer Harbour Concept + Without Developm	0.36	0.80	3.40	A	0.01	70.00	0.10	E	0.57	85.70	9.10	F	0.82	81.20	9.10	F	0.63	14.60	11.20	B	0.63	2.40	11.20	A
With Outer Harbour + With Development	0.36	0.80	3.40	A	0.03	73.80	0.20	F	0.80	101.60	10.70	F	0.94	94.60	10.70	F	0.64	15.10	11.70	B	0.64	2.50	11.70	A

Table 5.2: SIDRA Intersection Analysis Summary – Cumulative Assessment – Five Islands Rd / Springhill Rd (AM/PM Peak)

Scenarios	Five Islands Road (E)								Springhill Road								Five Islands Road (W)							
	Through				Right				Left				Right				Left				Through			
	DOS	Delay (Sec)	Queue (Veh)	LOS	DOS	Delay (Sec)	Queue (Veh)	LOS	DOS	Delay (Sec)	Queue (Veh)	LOS	DOS	Delay (Sec)	Queue (Veh)	LOS	DOS	Delay (Sec)	Queue (Veh)	LOS	DOS	Delay (Sec)	Queue (Veh)	LOS
Five Islands Road/Springhill Road 2013 AM																								
Without Development	0.20	0.00	NA	NA	0.91	20.00	31.80	B	0.10	12.60	0.80	A	0.11	90.20	0.90	F	0.30	11.40	NA	NA	0.91	77.70	26.20	F
With Outer Harbour + Without Development	0.20	0.00	NA	NA	0.91	20.00	31.80	B	0.10	12.60	0.80	A	0.11	90.20	0.90	F	0.30	11.40	NA	NA	0.94	86.90	28.70	F
With Outer Harbour + With Development	0.21	0.00	NA	NA	0.92	21.20	34.10	B	0.11	13.00	0.90	A	0.11	90.20	0.90	F	0.30	11.40	NA	NA	0.97	99.00	31.40	F
Five Islands Road/Springhill Road 2013 PM																								
Without Development	0.28	0.00	NA	NA	0.71	16.10	11.40	B	0.25	14.20	2.80	A	0.22	57.30	1.70	E	0.13	11.40	NA	NA	0.69	36.90	12.70	C
With Outer Harbour + Without Development	0.28	0.10	NA	NA	0.71	17.50	11.40	B	0.25	14.20	2.80	A	0.22	57.30	1.70	E	0.13	11.40	NA	NA	0.72	37.50	13.10	C
With Outer Harbour + With Development	0.29	0.00	NA	NA	0.72	16.20	11.70	B	0.26	14.40	3.00	A	0.22	57.30	1.70	E	0.13	11.40	NA	NA	0.74	38.10	13.50	C
Five Islands Road/Springhill Road 2023 AM (Project)																								
Without Development	0.26	0.00	NA	NA	1.00	15.00	67.30	B	0.11	12.50	0.70	A	0.12	78.90	0.90	F	0.39	11.40	NA	NA	1.00	109.80	33.70	F
With Outer Harbour + Without Development	0.27	0.00	NA	NA	1.00	15.00	67.30	B	0.11	12.50	0.70	A	0.12	78.90	0.90	F	0.39	11.40	NA	NA	1.09	147.50	40.10	F
With Outer Harbour + With Development	0.28	0.00	NA	NA	1.00	15.00	67.30	B	0.12	12.90	0.80	A	0.12	78.90	0.90	F	0.39	11.40	NA	NA	1.11	182.50	45.80	F
Five Islands Road/Springhill Road 2023 PM (Project)																								
Without Development	0.31	0.10	NA	NA	0.77	17.50	14.60	B	0.29	14.70	3.60	B	0.29	57.70	2.20	E	0.15	11.40	NA	NA	0.77	38.20	15.00	C
With Outer Harbour + Without Development	0.32	0.10	NA	NA	0.77	17.50	14.60	B	0.29	14.70	3.60	B	0.29	57.70	2.20	E	0.15	11.40	NA	NA	0.79	39.10	15.50	C
With Outer Harbour + With Development	0.32	0.10	NA	NA	0.77	17.80	15.00	B	0.30	14.90	3.70	B	0.29	57.70	2.20	E	0.15	11.40	NA	NA	0.81	40.10	16.00	C
Five Islands Road/Springhill Road 2023 AM (Concept)																								
Without Development	0.26	0.00	NA	NA	1.00	15.00	67.30	B	0.11	12.50	0.70	A	0.12	78.90	0.90	F	0.39	11.40	NA	NA	1.00	109.80	33.70	F
With Outer Harbour Concept + Without Developm	0.28	0.00	NA	NA	1.00	15.00	67.30	B	0.11	12.50	0.70	A	0.12	78.90	0.90	F	0.39	11.40	NA	NA	1.09	236.90	54.60	F
With Outer Harbour Concept + With Development	0.28	0.00	NA	NA	1.00	15.00	67.30	B	0.12	12.90	0.80	A	0.12	78.90	0.90	F	0.39	11.40	NA	NA	1.11	277.60	61.00	F
Five Islands Road/Springhill Road 2023 PM (Concept)																								
Without Development	0.31	0.10	NA	NA	0.77	17.50	14.60	B	0.29	14.70	3.60	B	0.29	57.70	2.20	E	0.15	11.40	NA	NA	0.77	38.20	15.00	C
With Outer Harbour Concept + Without Developm	0.33	0.10	NA	NA	0.77	17.50	14.60	B	0.29	14.70	3.60	B	0.29	57.70	2.20	E	0.15	11.40	NA	NA	0.84	41.60	16.70	C
With Outer Harbour Concept + With Development	0.33	0.10	NA	NA	0.77	17.80	15.00	B	0.30	14.90	3.70	B	0.29	57.70	2.20	E	0.15	11.40	NA	NA	0.85	43.20	17.30	D

Whilst the above assessment shows many of the scenarios to result in operations with LOS F, this should be interpreted with caution. The RTA LOS value uses delay as the measure of effectiveness, which does not take into account the true capacity or operations of the intersections. For instance, in Table 5.1, in the 2013AM peak (without development) the left turn movement out of Flinders Street is shown to have a LOS F with a 71.3s delay. However, the DOS is 0.59 and the 95%^{ile} queue is 5.2 vehicles. The latter attributes would deem that an upgrade is not required. In most cases, it is the DOS that dictates the need to upgrade an intersection and the delays and queue information is used to determine the intersection configuration required to meet the competing needs (ie length of turn pockets and need for slip or continuous lanes, etc).

On this basis, the above cumulative intersection analysis results show that the Flinders Street intersection only just fails for the right turn movement out of Flinders Street in the 2023 PM peak period for the Concept Stage of the Outer Harbour development (with Grinding Mill development).

The Springhill Road intersection appears to fail much earlier predominantly relating to the AM peak eastbound movement. This approach fails in the AM peak period regardless of any development occurring. As the intersection becomes over-congested any marginal increase in traffic shows a disproportional increase in queuing and delay. Subsequently, it would be inappropriate to consider that the delays shown in year 2023 for the eastbound movement is as a direct result of the development traffic, but rather a function of the intersection being oversaturated during the AM peak period.

In general, the extent of queuing appears to have generally increased by one vehicle on the Flinders Street approach and by three to four vehicles on the Five Islands Road approaches, as a result of the proposed Grinding Mill development. The Outer Harbour development appears to increase the level of queuing on the Flinders Street approach by less than one vehicle and five to seven vehicles on the Five Islands Road approach.

5.3 IMPACT CONSIDERATIONS

These impacts are considered to be minimal in light of the following:

- the positive benefit the Grinding Mill development is likely to have by internalising trips between 21 Area and the Outer Harbour instead of truck travelling towards Mount Ousley (as currently occurs);
- the cumulative assessment did not reduce trips from the Outer Harbour Development component, to cater for the Grinding Mill facility which occupies 4.5ha of the total 9ha able to be used as developable land;
- the truck arrival patterns for a cement plant is typically in the early hours of the morning, not coinciding with the impacted eastbound commuter peak movement along Five Islands Road;
- the context of 11 development truck movements in the peak hour, on the eastbound approach along Five Islands Road at Springhill Road, is less than 1% of the total traffic on this approach. Even when including the cumulative impact of the Outer Harbour development (Concept Stage) this proportion increases to less than 4% of the total traffic on this approach; and
- should this cumulative assessment be undertaken such that the Grinding Mill occurred prior to the Outer Harbour development, then the net impacts associated with the Grinding Mill would be substantially less due to the disproportional increase in congestion as the intersection performance increases beyond DOS 0.9.

Based on the information provided within this assessment, it is unreasonable for this development to contribute funding towards any upgrade to the Five Islands Road / Flinders Street intersection or the Five Islands Road / Springhill Road intersection.

6. SITE ASSESSMENT

6.1 SITE ACCESS

6.1.1 Overview

A site plan detailing the proposed access configurations are attached in Appendix A.

The site currently proposes to contain two points of entry and three points of egress for truck movements and a separate entry/exit for employees and visitors.

'Raw Material' delivery trucks will enter via the side laneway and exit via the North-South Link Road. 'Final Product' receival trucks will enter via the northern end of the site from the North-South Link Road and exit via the laneway towards the eastern end of the site.

Visitors and employees will enter and exit from a separate driveway fronting the North-South Link Road.

6.1.2 Access Width and Location

Autoturn has been used to check the access width arrangements. Currently, all the points of access have been designed with sufficient width for the corresponding heavy vehicle size.

The sight distances from each of the points of egress appear to be isolated from any other surrounding visual clutter. Subsequently, the sight distance from the egress points are considered to be acceptable.

It should be noted, that whilst it is not ideal to have multiple points of access in close proximity, the two points of egress towards the south-eastern end of the site is not considered to be of concern. The traffic volume on the lane way is expected to be low and the conflict in 'Product Delivery' movements would be exacerbated if it were forced to be merged together internally within the site, prior to entering onto the laneway.

The employee and visitor access has appropriate sight distances and is located at a suitable distance (50m) away from the laneway intersection with the North-South Link Road.

6.2 SITE PARKING

6.2.1 Provisions

Whilst the development has stated that it will ultimately employ ten staff members, they will be working across three shifts. Subsequently, there will be a requirement to provide only a maximum of four spaces for employee parking.

It is expected that an additional two to three spaces would be sufficient to cater for any visitors to the site.

The site plan contained within Appendix A shows that a provision of eight car spaces has been made, including one disabled car space.

Given the nature of the proposed land use, it is not considered necessary to allocate a disabled parking space, as it is unlikely that it would ever be used. The site is large enough to cater for any special circumstance where a person with a disability is required to park in the vicinity of the administration building.

6.2.2 Dimensions

Whilst not considered necessary, the disabled parking bay (as shown on the site plan) is not designed in accordance with AS2890.6. If the disabled parking space is to be retained, then the bay is required to be 5.4m long and 2.4m wide, with a shared space made available immediately adjacent of the same dimension.

The dimensions of all other parking spaces are 2.6m wide by 5.4m long and are in accordance with AS2890.1.

6.3 HEAVY VEHICLE TURN PATHS

Autoturn software was used to determine if additional localised road widening was required to cater for turn paths of heavy vehicles within the site. The turn path assessment for the 'final product' and 'raw material' heavy vehicles are shown in Figure 6.1 and Figure 6.2 respectively.

The turn path assessment shows that heavy vehicles can suitably navigate their way through the site under the current proposed internal road configuration.

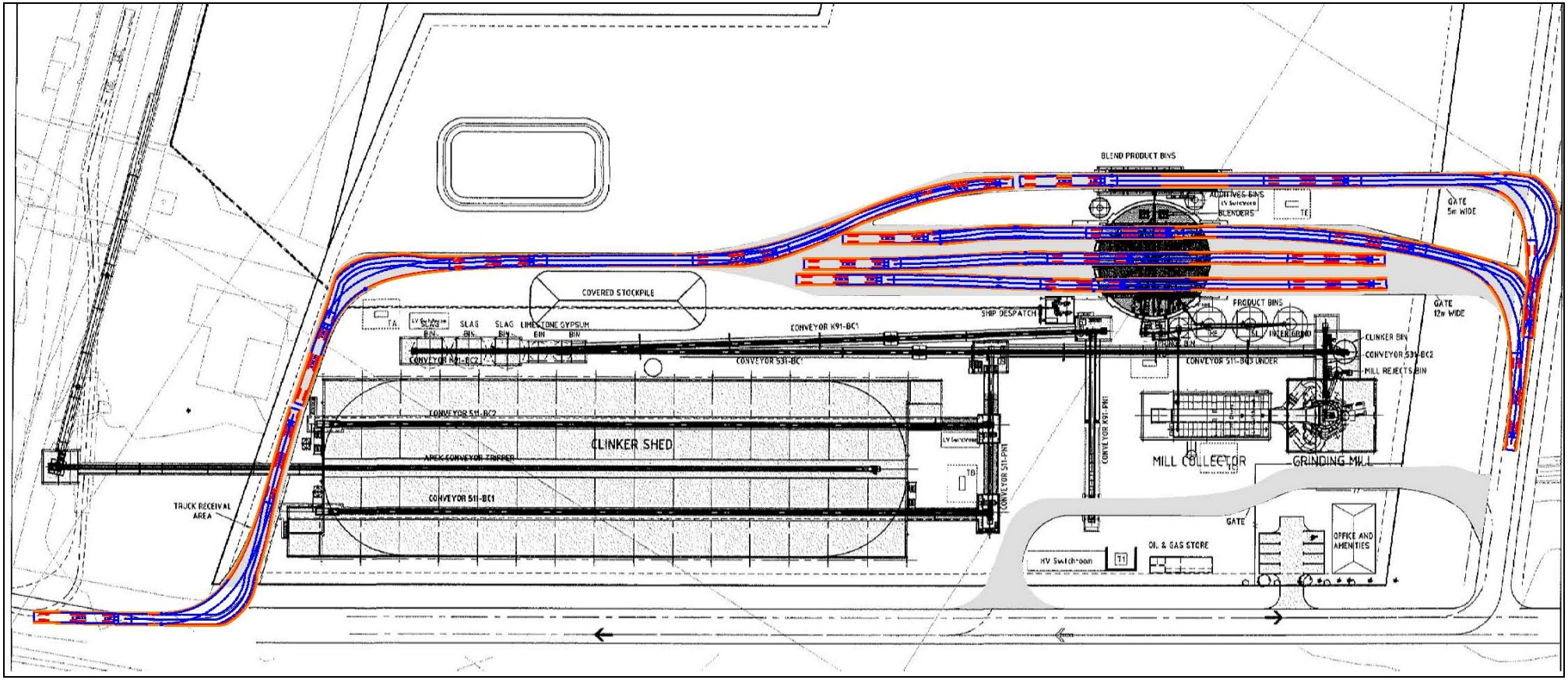


Figure 6.1: Finished Product Dispatch Vehicles Turn Paths

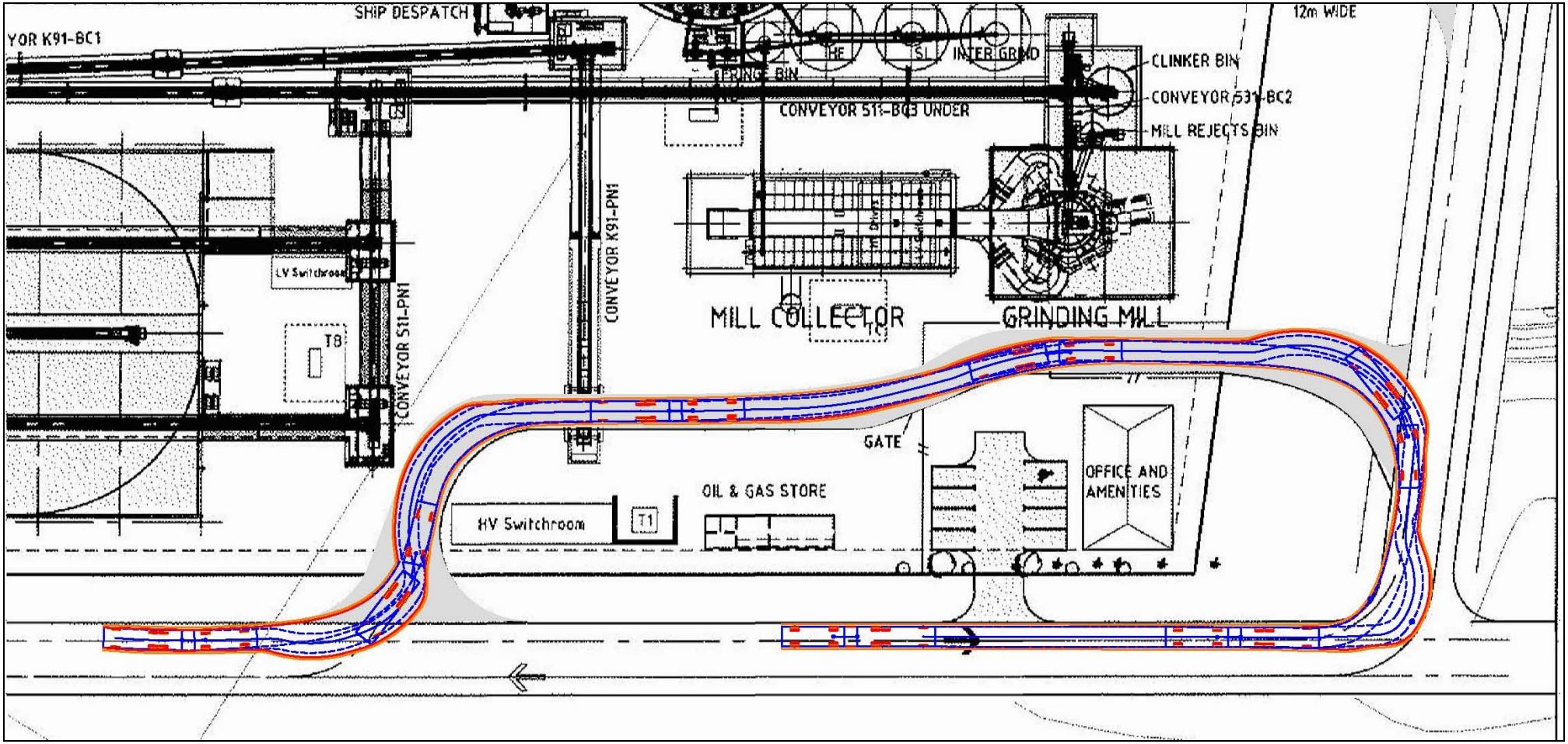


Figure 6.2: Raw Product Heavy Vehicles Turn Paths

6.4 SITE SAFETY

Upon reviewing the site plan provided, a number of safety concerns require to be addressed and are listed in the following sections.

6.4.1 Entrapment

There is the potential for a visitor to enter in the 'final product' truck entry area. If a visitor accidently enters this area, there is no mechanism to allow them to safely exit. Consideration should be given to ensuring a system is implemented to manage this issue or that appropriate facilities are provided to enable a visitor to safely turn around and exit.

Implementation of appropriate signage to deter visitors from entering the first point of access ('final product' truck entry) shall be installed and shall be subject to a signage design, subsequent Design Audit, and ongoing monitoring.

6.4.2 Lighting

As the site is expected to be operational 24 hours per day, it is considered necessary that all potential truck/pedestrian conflict areas are well lit.

6.4.3 Signage

Given the wide range of issues that is associated with access configurations, pedestrian movements and site safety, a Signage Plan shall be developed, detailing all the proposed signage that is to be attributed to the site.

A Design Audit and a Pre-Opening Audit shall also be undertaken to reduce the risk relating to any crash/incident that may occur in the future.

7. CONSTRUCTION MANAGEMENT

7.1 TRAFFIC IMPACTS

The expected truck movements during the construction stage are not expected to exceed the anticipated hourly truck volumes predicted during the site's operations. Subsequently there is unlikely to be any construction management related truck impacts associated with the development.

There is expected to be up to 150 employees expected to be working on-site. The arrival and departure of these employees are expected to be outside of the typical commuter peak periods. The employee arrival and departure times are also expected to be fairly well spread as a result of the wide range of contractors likely to be involved during the construction phase of the project. It should be noted that the contractors used are likely to be already working in the Port Kembla area, and will be simply moving on to their next project. Subsequently, the net increase in employment related trips is not expected to introduce noticeable impacts to the road network.

The main construction impact is moreso likely to relate to the land reclamation component of the construction activities which is subject to a separate Part 3A application.

7.2 CONSTRUCTION EMPLOYEE PARKING

A construction parking plan has been developed and is included in Appendix D. There is provision for approximately 180 vehicles in the proposed car park.

The parking area is to be located on the western side of the proposed North-South Link Road. As part of the staff site induction, it will be imperative to reinforce to staff the need to look out for moving traffic when attempting to cross the North-South Link Road.

7.3 SITE SAFETY

It is recommended that regular road safety audits are conducted on the traffic management plans during the construction phase of the project to ensure that the site remains safe.

8. CONCLUSION

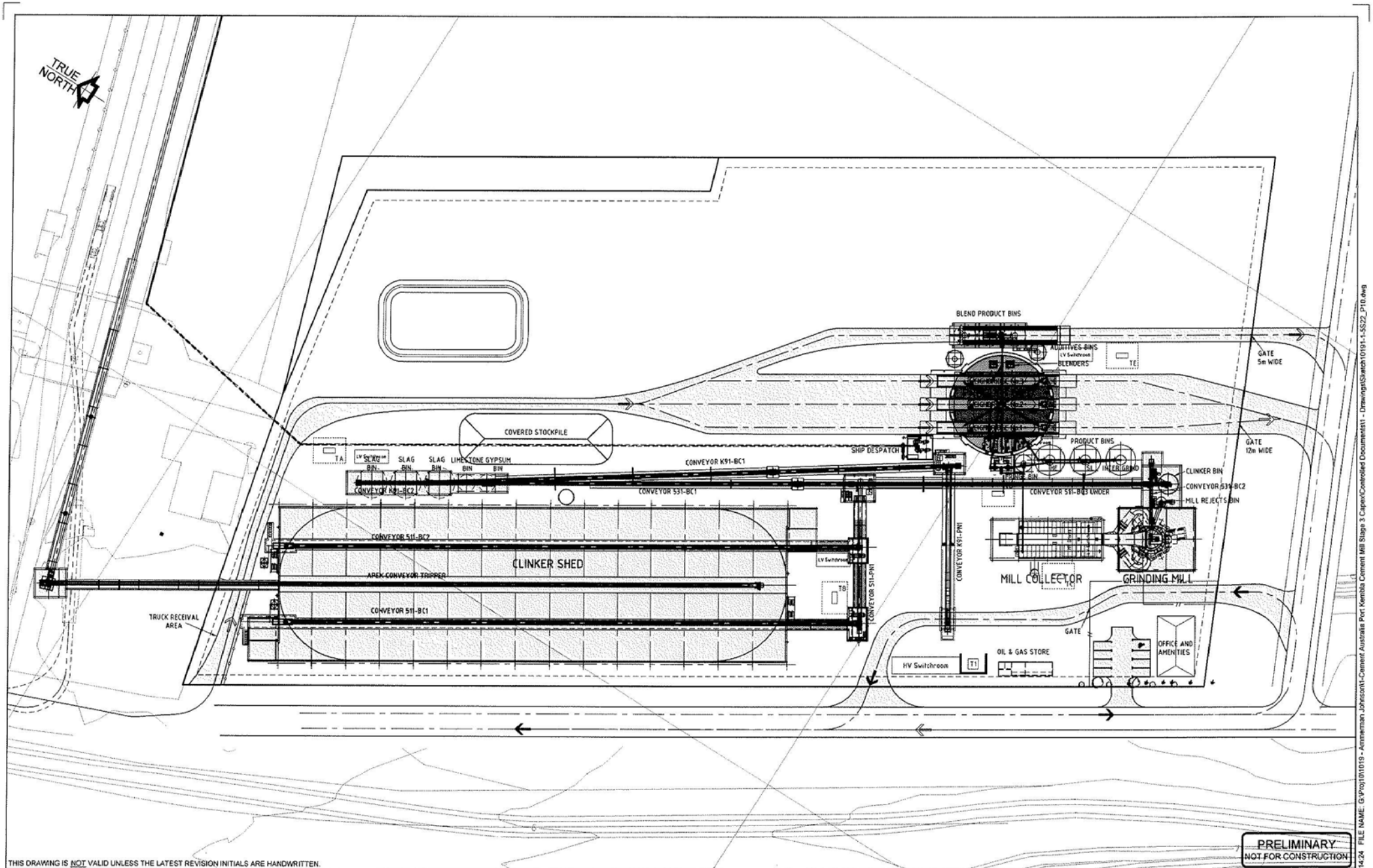
Bitzios Consulting has prepared impact assessment report for Cement Australia for the Grinding Mill development in the Outer Harbour, Port Kembla in NSW.

The key findings from the assessment were as follows:

- the development is estimated to generate 42 trips per peak hour (22 raw material delivery and 20 finished product dispatch trips) while the site is working at maximum capacity;
- the number of newly created heavy vehicle trips is low compared to the forecast increase in background traffic;
- analysis undertaken using SIDRA Intersection 5.0 for two key intersections surrounding the proposed development indicated only minimal changes in the intersection performance due to the proposed development;
- the number of parking spaces provided meets the site's parking generation;
- there is unlikely to be any construction management traffic impacts as the truck volumes are not expected to exceed levels to what is predicted during its operations. Approximately, 180 car parking spaces are proposed to be provided to cater for construction related employees;
- a number of safety related recommendations have been made in relation to the internal road configuration and access arrangements. It is recommended that a detailed signage plan be prepared accompanied with a Design Audit, followed up by a Pre-Opening Road Safety Audit, to reduce the risk of any incidents occurring during project opening; and
- it is recommended that proposed site traffic management plans are also audited throughout the construction period to ensure site safety.

APPENDIX A

PORT KEMBLA GRINDING MILL SITE PLAN



PRELIMINARY
NOT FOR CONSTRUCTION

THIS DRAWING IS NOT VALID UNLESS THE LATEST REVISION INITIALS ARE HANDWRITTEN.

SITE COORDINATES TO MGA

REVISION RECORD

REV No	DESCRIPTION	BY	CHK'D	DSG'D	APPR'D	DATE
P7	PRELIMINARY - NOT FOR CONSTRUCTION	MPAA				23-06-10
P6	PRELIMINARY - NOT FOR CONSTRUCTION	MPAA				04-06-10
P5	PRELIMINARY - NOT FOR CONSTRUCTION	MPAA				01-06-10
P4	PRELIMINARY - NOT FOR CONSTRUCTION	MPAA				21-05-10
P10	PRELIMINARY - NOT FOR CONSTRUCTION	MPAA				14-09-10
P9	PRELIMINARY - NOT FOR CONSTRUCTION	MPAA				12-08-10
P8	PRELIMINARY - NOT FOR CONSTRUCTION	MPAA				15-07-10

mpa CONSULTING ENGINEERS AUSTRALIA
A.B.N. 34 113 919 565
60 Lekkhardt St. Spring Hill Queensland 4004 Australia
Ph +61 7 3120 3500 Fax +61 7 3120 3505
mpabris@mpaaustralia.com www.mpaaustralia.com

ammerman johnson group pty ltd

SCALE: 1:500 SHEET SIZE: A1

	NAME	SIGNATURE	DATE
DRAWN	MPAA		MAY 10
DRG CHECK			
DESIGNED			
CLIENT REVIEW			
MPA PROJ. MAN			

PORT KEMBLA CEMENT MILL STAGE 3 CAPEX
SITE ARRANGEMENT
STAGE 1

DRG. No. 10191-1-5S22 Rev P10

DATE/TIME: 14.09.2010@16:14:24 FILE NAME: G:\Proj\10\10191 - Ammerman Johnson\1-Cement Australia Port Kembla Cement Mill Stage 3 Capex\Controlled Documents\1 - Drawings\Sketch\10191-1-5S22_P10.dwg

APPENDIX B

TRUCK DRIVER CODE OF CONDUCT

TRUCK DRIVER CODE OF CONDUCT

FOR

CEMENT AUSTRALIA

Gold Coast
Suite 26, 58 Riverwalk Avenue
Robina QLD 4226
P: 5562 5377

Brisbane
Level 2, 428 Upper Edward Street
Spring Hill QLD 4000
P: 3831 4442

W: www.bitziosconsulting.com.au E: admin@bitziosconsulting.com.au

Project No: P0697 Version No: 001 Issue date: 20 August 2010

DOCUMENT CONTROL SHEET

Issue History

Report File Name	Prepared by	Reviewed by	Issued by	Date	Issued to
P0697 Port Kembla Grinding Mill Truck Drivers Code of Conduct	S.Vetevood	A.Bitzios	A.Bitzios	20/08/2010	A.Trezise (Siteplus)

Certified System
Quality
ISO 9001
SAI GLOBAL

CONTENTS

1. GENERAL RESPONSIBILITIES

As a professional driver working in the transport industry, I agree to and adopt this code of conduct. I accept that as a professional driver I have responsibilities under both chain of responsibility and OH&S Legislation to maintain my fitness for duty and not accept unsafe practices or breaches of the law. I share the road with other road users to improve community safety.

1. I recognise and accept my obligations as a professional driver by:
   - setting a good example to others;
   - supporting safety within the workplace; and
   - actively supporting this code and promoting it to other drivers; and encouraging safety on the road.
2. I undertake to comply with all road laws, and be considerate of others by:
   - being professional at all times;
   - being considerate of other road users;
   - being fit for duty - alert, healthy and prepared for the driving task;
   - observing speed limits & seat belt laws;
   - observing fatigue regulations;
   - observing drug & alcohol laws;
   - leaving a safe distance between other vehicles;
   - travelling in left lanes unless overtaking;
   - avoiding using noisy engine brakes at inappropriate times;
   - not being under the influence of drugs or alcohol; and
   - not tailgating other vehicles.
3. I agree to and adopt all the company's working policies and regulations;
4. I agree to obey all the other related laws.
5. I support the introduction in companies of "Safe Systems" of work that include practices & procedures to reduce the risk of injuries or death.
6. I take pride in my vehicle and conduct regular checks to ensure my truck and the load is in a safe condition.
7. I understand that driver distraction is a risk and will reduce this risk through:
   - avoiding the use of mobile phones, two way radios or other forms of communication whilst the vehicle is moving; and
   - fully preparing for any journey to avoid being distracted when driving.
8. I actively support this Code of Conduct for the purpose of promoting compliance with laws and promoting safe behaviour, within the workplace and on the road.
9. I undertake to actively participate through my OH&S representatives/delegates to commit to industry.

2. LEGAL DRIVING HOURS AND REST PERIOD

Definition of rest the *"rest time"* – The rest time is any continuous period of at least 15 minutes that is not driving time or work time. Breaks of less than 15 minutes are classed as work time.

Definition of rest the *"work time"* - The work time of a driver includes driving time, and other time spent by the driver doing the following tasks:

a. loading or unloading;

b. inspecting, servicing or repairing;

c. cleaning or refuelling;

d. performing marketing tasks;

e. helping with or supervising an activity mentioned in paragraphs a to c; and

f. recording information, or completing a document in accordance with the regulations, or in relation to the operation of a truck.

The maximum a driver can drive without a break is five hours and a driver must have a minimum of 30 minutes rest in every 5.5 hours. The rest can be taken in one period of 30 minutes or two separate periods of at least 15 minutes each. Breaks less than 15 minutes are counted as work time.

A driver can take a rest period in the driver's seat with the engine turned off, in an approved sleeper berth, or away from the vehicle. However, rest periods of 24 consecutive hours must be taken away from the vehicle. Also, a driver must have a minimum of ten hours rest, including one rest period of at least six consecutive hours.

A driver cannot work more than 14 hours in any 24 hour period. The 14 hours includes a maximum of 12 hours driving time. It is any 24 hour period, e.g. 6.00am to 6.00am or 5.30pm to 5.30pm.

The maximum number of hours a regulated truck driver can work (Including drive) in any 168 hour (7 day) period is 72 hours.

Table 2.1 summarises the truck driver allowable work hours.

Table 2.1: Standard hours, drive/ working hours and rest periods for a solo and two up truck drivers

In a period of...	..... a driver must not drive/work more than	..... and must have a rest period of no less than.....	The rest period may be taken
5 hours and 30 minutes	5 hours	30 minutes , either as one period or two separate periods of 15 minutes each	In the driver's seat with the engine turned off. In an approved sleeper birth away from the vehicle.
24 hours	14 hours (maximum 12 hours driving)	10 hours, with a minimum of 6 hours	In the driver's seat with the engine turned off. In an approved sleeper birth away from the vehicle.
168 hours (1 week)	72 hours	96 hours	In the driver's seat with the engine turned off. In an approved sleeper birth away from the vehicle. 24 consecutive hours of rest to be taken away from the vehicle.
Minimum rest time away from truck	24 hours continuous Heavy truck drivers only		

3. SAFETY

3.1 GENERAL

The driver must follow the following general company rules:

- comply with the instructions given for health and safety;
- comply with all safety instructions, including safe working practices and procedures set in place and use any equipment that is issued for personal protection and ensure that is maintained in proper order;
- never wilfully, recklessly or intentionally interfere with, remove, misuse or damage anything that is provided in the interests of safety, health or welfare nor wilfully place at risk the safety and health of any other person at their workplace;
- work with due care and consideration to safeguard your own safety and health and the safety and health of others;
- smoking is forbidden in all Cement Australia vehicles, mobile plant, buildings and enclosed structures; and
- protect the environment.

3.2 USE OF MOBILE PHONES

The driver must follow the following company rules relating to use of mobile phones:

- it is strictly forbidden to drive a vehicle while using (includes talking, sending or receiving text messages, playing games or taking photos when using a hand-held phone). It is also forbidden to perform these activities when the vehicle is stopped but not parked, for example when you are waiting at traffic lights;
- a hands-free device can reduce the physical effort to make and receive calls but it doesn't necessarily make it safe to use a phone while driving. It is forbidden to use a hands-free phone while driving if it causes you to lose proper control of your vehicle. The penalty is a significant fine and demerit points;
- if using a hands-free phone while driving is required:
  - make sure it is a hands-free phone that is set up and working before you start driving;
  - keep the conversation short. Don't engage in complex or emotional conversations;
  - tell the person on the other end that you are driving and may have to end the call;
  - never text message (SMS) while driving; and
  - end the call if it is distracting you from driving.

3.3 SITE SAFETY

The driver must follow the following company rules relating to site safety:

- speed limit at the site is10 km/h;
- maintain a clean and orderly site;
- comply with safety directions;
- assess hazards in a task before commencing;
- immediately report all potential hazards seen on site;

- immediately report all injuries;
- immediately report any environmental damage – oil spills, noise, soil contamination etc.; and
- drivers are not allowed to enter contained spaces. Entry to confined spaces is subject to a permit, which is issued to appropriately trained authorised persons only.

4. WORK ETHICS

4.1 ALCOHOL AND DRUGS

It is Cement Australia's policy to maintain a drug and alcohol free work environment. The use, sale, transfer or possession of illegal drugs or other illegal substances, is strictly prohibited at the work site. This also includes illegal or improper use of controlled substances.

Reporting to work under the influence of any such substance is also strictly prohibited. Doing so will result in the application of the relevant disciplinary procedures.

In addition, compliance with any laws, policies or regulations regarding the use or possession of alcohol, illegal drugs, or controlled substances by persons who operate motor vehicles is mandatory.

The following Blood Alcohol Content (BAC) levels apply for entry to the Cement Australia site:

- BAC level of 0.0% applies to heavy vehicle drivers;
- the consumption of alcohol and other drugs, except prescribed and over the counter medicines during work hours is prohibited;
- bringing alcohol and other drugs on site is prohibited; and
- if planning to consume alcohol locally after work ensure your vehicle is parked outside Cement Australia premises.

4.2 FRAUD AND THEFT

The driver must note the following company rules relating to fraud and theft:

- if fraud or theft is found to be undertaken by an employee, then the termination of their employment will occur; and
- fraud includes theft, criminal deception, making false representations to gain an unjust advantage and abuse of Cement Australia's property or time.

4.3 STANDARDS OF BEHAVIOUR

The following behaviour is unacceptable in the workplace:

- instigating a fight and/or workplace bullying;
- assaulting or threatening other employees or persons;
- theft;
- harassment and discrimination of any kind;
- initiation or participation in unauthorised activities that may cause personal injury, property damage or physical stress or anxiety to other employees or members of the public;
- abuse, damage or destruction of property;
- interfering with or removing without permission, the property of the company or any other person;
- failing to adhere to safe operating procedures;
- horseplay, practical jokes and skylarking; and
- the taking unauthorised photographs and removal of company assets is strictly forbidden.

Employees under the influence of alcohol and/or drugs will not be permitted on any worksite. Employees affected by alcohol and/or drugs must not drive a company vehicle or operate any plant, equipment or machinery.

5. PRE-DEPARTURE CHECK

Pre-departure check is a procedure to be completed daily. Each daily worksheet contains a section for recording the daily pre-trip check. Each driver is to complete this section by carrying out a visual inspection of the items listed. This is to be done by the driver prior to the commencement of each shift/or when changing into another vehicle mid shift.

A pre-trip check involves the inspection of critical equipment. Each driver has to visually inspect as a minimum the items listed below:

- Wheels and Tyres:
  - tyres are adequately inflated;
  - tyre tread and depth and integrity; and
  - wheels are secure.
- Wheels and reflectors:
  - all lights, including clearance lights, are working;
  - reversing alarm (where applicable); and
  - all reflectors and lenses are intact and clean.
- Windscreens, mirrors and wipers:
  - windows, mirrors for security, damage and grime; and
  - wipers and windscreen washers ensuring clear forward vision.
- Structure, Bodywork and Fluid Systems:
  - all panels and readily visible structural members are secure; and
  - leaks of any fluid (oil, water, refrigerant/coolant, hydraulic fluid, brake fluid or other).
- Brakes:
  - brake failure indicators;
  - pressure/vacuum gauges; and
  - drain air tanks daily.
- all roadworthiness faults found during the daily vehicle inspection shall be documented in the driver maintenance report book (DMR), and reported immediately to the appropriate personnel to ascertain the urgency of the fault, in accordance with all the procedures.
- responsibility for communicating faults:
  - any major faults are to be reported by the driver directly to their regional transport manager or their delegate as well as being recorded/ reported in the Vehicle DMR book.

6. HOURS OF OPERATION

The proposed Grinding Mill is expected to be operational 24 hours per day. Drivers are likely to be driving across different periods of the day and are to be aware of the requirement to drive to the prevailing conditions.

As a driver you need to be aware that your driving behaviour and level of attention will need to vary across different times of the day, for instance:

Day-Time Periods

- you will need to pay additional attention to congestion and possible queuing;
- you will need to be patient and drive according to the road conditions at the time;
- you will need to reduce the number of times you change lanes to minimise the potential of a crash; and
- you will need to be more cognisant of cyclists and pedestrians along the roadside and crossing the road.

Night-Time Periods

- you will need to pay additional attention to adhering to speed limits;
- you will need to be mindful that you are driving past residential communities where people are sleeping;
- you will need to take greater caution of other speeding or non-complying motorists;
- you will need to take greater caution of animals possibly crossing the road or feeding on the road's edge; and
- you will need to be mindful of coming across early morning or late evening pedestrians/cyclists that may or may not be alcohol affected.

7. TRUCK ROUTES

You are to remain on designated truck routes. The designated truck routes are as follows:

Site to 21 Dump

The approved route is via:

- Christy Drive;
- Old Port Road;
- Flinders Street;
- Five Islands Road; and
- Springhill Road.

Site to North of Masters Road and South of Warilla

The approved route is via:

- Christy Drive;
- Old Port Road;
- Flinders Street;
- Five Islands Road; and
- the F6

Site to Warrilla

The approved route is via:

- Christy Drive;
- Old Port Road;
- Flinders Street;
- Five Islands Road; and
- King Street.

8. INFORMATION SOURCES

- Documentation and Information provided by Cement Australia
- The Transport Workers Union (Victorian/Tasmanian Branch) – Driver Code of Conduct http://www.twu.asn.au/info/general/Document/get/448/documentId/
- Union (Victorian/Tasmanian Branch) – Transport Industry Code of Conduct

  http://www.twu.asn.au/info/general/Document/get/449/documentId/
- Truck Drivers manual

  http://www.infrastructure.gov.au/roads/safety/publications/1990/pdf/Edu_book_Truck.pdf
- Driving Hours and Rest Periods

  http://www.truckmoves.com.au/tools/DrivingHours.pdf
- NSW Government, RTA, Heavy Vehicle Driver Handbook

  http://www.rta.nsw.gov.au/licensing/downloads/heavy_vehicle_driver_handbook.pdf

APPENDIX C

SIDRA INTERSECTION OUTPUTS

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2013 AM Without Development

Five Islands Road / Flinders Street
2013 AM Peak Without Development
Signals - Fixed Time Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	2084	7.0	0.455	0.8	LOS A	4.5	33.3	0.10	0.09	76.6
23	R	1	0.0	0.010	64.5	LOS E	0.1	0.6	0.96	0.59	23.6
Approach		2085	7.0	0.455	0.9	LOS A	4.5	33.3	0.10	0.09	76.5
North East: Flinders Street											
24	L	1	0.0	0.372	67.6	LOS E	3.9	29.1	0.97	0.76	22.9
26	R	104	6.7	0.405	66.5	LOS E	4.0	29.4	0.97	0.75	23.3
Approach		105	6.7	0.405	66.5	LOS E	4.0	29.4	0.97	0.75	23.3
North West: Five Islands Rd (NW)											
27	L	205	6.8	0.397	13.3	LOS A	6.4	47.1	0.21	1.01	54.2
28	T	1376	7.0	0.397	1.9	LOS A	6.4	47.1	0.12	0.11	73.9
Approach		1581	7.0	0.397	3.3	LOS A	6.4	47.1	0.13	0.23	70.9
All Vehicles		3771	7.0	0.455	3.7	LOS A	6.4	47.1	0.14	0.17	69.8

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2013 AM With Development

Five Islands Road / Flinders Street
2013 AM Peak With Development
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	2084	7.0	0.455	0.8	LOS A	4.5	33.3	0.10	0.09	76.6
23	R	2	50.0	0.027	68.2	LOS E	0.2	1.7	0.97	0.62	23.2
Approach		2086	7.0	0.455	0.9	LOS A	4.5	33.3	0.10	0.09	76.4
North East: Flinders Street											
24	L	2	50.0	0.529	69.8	LOS E	4.7	39.3	0.98	0.78	22.9
26	R	124	21.8	0.536	67.8	LOS E	4.8	39.5	0.99	0.77	23.1
Approach		126	22.2	0.536	67.9	LOS E	4.8	39.5	0.99	0.77	23.1
North West: Five Islands Rd (NW)											
27	L	225	15.1	0.405	13.7	LOS A	6.6	50.2	0.22	0.99	54.0
28	T	1376	7.0	0.405	1.9	LOS A	6.6	50.2	0.12	0.12	73.8
Approach		1601	8.1	0.405	3.5	LOS A	6.6	50.2	0.14	0.24	70.6
All Vehicles		3813	8.0	0.536	4.2	LOS A	6.6	50.2	0.14	0.17	68.9

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2023 AM Without Development

Five Islands Road / Flinders Street
2023 AM Peak Without Development
Signals - Fixed Time Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	2274	7.0	0.491	0.8	LOS A	5.1	38.0	0.10	0.09	76.4
23	R	1	0.0	0.010	64.5	LOS E	0.1	0.6	0.96	0.59	23.6
Approach		2275	7.0	0.491	0.9	LOS A	5.1	38.0	0.10	0.09	76.3
North East: Flinders Street											
24	L	1	0.0	0.444	70.0	LOS E	4.4	32.2	0.99	0.76	22.4
26	R	114	6.1	0.505	68.5	LOS E	4.4	32.5	0.99	0.76	22.8
Approach		115	6.1	0.505	68.6	LOS E	4.4	32.5	0.99	0.76	22.8
North West: Five Islands Rd (NW)											
27	L	241	7.1	0.419	13.2	LOS A	6.9	51.4	0.22	0.98	54.3
28	T	1452	7.0	0.419	1.7	LOS A	6.9	51.4	0.12	0.11	74.2
Approach		1693	7.0	0.419	3.3	LOS A	6.9	51.4	0.13	0.24	70.8
All Vehicles		4083	7.0	0.505	3.8	LOS A	6.9	51.4	0.14	0.17	69.6

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2023 AM With Development

Five Islands Road / Flinders Street
2023 AM Peak With Development
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	2274	7.0	0.491	0.8	LOS A	5.1	38.0	0.10	0.09	76.4
23	R	2	50.0	0.027	68.2	LOS E	0.2	1.7	0.97	0.62	23.2
Approach		2276	7.0	0.491	0.9	LOS A	5.1	38.0	0.10	0.09	76.2
North East: Flinders Street											
24	L	2	50.0	0.641	72.9	LOS F	5.2	43.2	1.00	0.82	22.3
26	R	134	20.1	0.654	70.5	LOS F	5.2	43.2	1.00	0.81	22.5
Approach		136	20.6	0.654	70.5	LOS F	5.2	43.2	1.00	0.81	22.5
North West: Five Islands Rd (NW)											
27	L	261	14.2	0.427	13.5	LOS A	7.1	54.5	0.23	0.97	54.1
28	T	1452	7.0	0.427	1.7	LOS A	7.1	54.5	0.12	0.11	74.1
Approach		1713	8.1	0.427	3.5	LOS A	7.1	54.5	0.14	0.24	70.6
All Vehicles		4125	7.9	0.654	4.3	LOS A	7.1	54.5	0.15	0.18	68.6

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2013 PM Without Development

Five Islands Road / Flinders Street
2013 PM Peak Without Development
Signals - Fixed Time Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	1552	7.0	0.339	0.7	LOS A	2.9	21.8	0.08	0.07	77.1
23	R	1	0.0	0.010	64.5	LOS E	0.1	0.6	0.96	0.59	23.6
Approach		1553	7.0	0.339	0.8	LOS A	2.9	21.8	0.08	0.07	77.0
North East: Flinders Street											
24	L	1	0.0	0.472	73.7	LOS F	5.8	43.0	0.99	0.80	21.7
26	R	156	7.1	0.608	70.3	LOS E	5.8	43.1	1.00	0.79	22.5
Approach		157	7.0	0.608	70.3	LOS E	5.8	43.1	1.00	0.79	22.5
North West: Five Islands Rd (NW)											
27	L	129	7.0	0.574	13.3	LOS A	8.5	63.4	0.19	1.20	54.4
28	T	2155	7.0	0.575	2.2	LOS A	8.5	63.4	0.15	0.14	73.1
Approach		2284	7.0	0.576	2.8	LOS A	8.5	63.4	0.15	0.20	71.8
All Vehicles		3994	7.0	0.608	4.7	LOS A	8.5	63.4	0.16	0.17	67.9

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2013 PM With Development

Five Islands Road / Flinders Street
2013 PM Peak With Development
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	1552	7.0	0.339	0.7	LOS A	2.9	21.8	0.08	0.07	77.1
23	R	2	50.0	0.027	68.2	LOS E	0.2	1.7	0.97	0.62	23.2
Approach		1554	7.1	0.339	0.8	LOS A	2.9	21.8	0.08	0.07	76.9
North East: Flinders Street											
24	L	2	50.0	0.703	78.1	LOS F	6.7	54.1	1.00	0.87	21.3
26	R	176	17.6	0.739	73.0	LOS F	6.7	54.1	1.00	0.86	22.0
Approach		178	18.0	0.739	73.1	LOS F	6.7	54.1	1.00	0.86	22.0
North West: Five Islands Rd (NW)											
27	L	149	19.5	0.584	14.0	LOS A	9.0	68.0	0.20	1.19	54.3
28	T	2155	7.0	0.584	2.2	LOS A	9.0	68.0	0.15	0.14	72.9
Approach		2304	7.8	0.584	3.0	LOS A	9.0	68.0	0.16	0.21	71.5
All Vehicles		4036	8.0	0.739	5.2	LOS A	9.0	68.0	0.16	0.19	66.8

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Isalands Rd/Flinders St
2023 PM Without Development

Five Islands Road / Flinders Street
2023 PM Peak Without Development
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	1646	7.0	0.360	0.8	LOS A	3.4	25.5	0.08	0.07	77.0
23	R	1	0.0	0.011	70.0	LOS E	0.1	0.6	0.97	0.59	22.2
Approach		1647	7.0	0.360	0.9	LOS A	3.4	25.5	0.08	0.07	76.9
North East: Flinders Street											
24	L	1	0.0	0.469	77.8	LOS F	6.8	50.2	0.99	0.80	20.9
26	R	176	6.8	0.598	74.0	LOS F	6.8	50.4	0.99	0.79	21.7
Approach		177	6.8	0.598	74.0	LOS F	6.8	50.4	0.99	0.79	21.7
North West: Five Islands Rd (NW)											
27	L	142	7.0	0.614	13.7	LOS A	10.3	76.6	0.20	1.19	54.0
28	T	2322	7.0	0.615	2.3	LOS A	10.3	76.6	0.15	0.14	72.7
Approach		2464	7.0	0.615	3.0	LOS A	10.3	76.6	0.15	0.21	71.4
All Vehicles		4288	7.0	0.615	5.1	LOS A	10.3	76.6	0.16	0.18	67.1

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2023 PM With Development

Five Islands Road / Flinders Street
2023 PM Peak With Development
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	1646	7.0	0.360	0.8	LOS A	3.4	25.5	0.08	0.07	77.0
23	R	2	50.0	0.029	73.8	LOS F	0.2	1.9	0.97	0.62	21.8
Approach		1648	7.0	0.360	0.9	LOS A	3.4	25.5	0.08	0.08	76.8
North East: Flinders Street											
24	L	2	50.0	0.656	81.6	LOS F	7.7	61.4	1.00	0.85	20.6
26	R	196	16.3	0.713	76.2	LOS F	7.7	61.4	1.00	0.84	21.4
Approach		198	16.7	0.713	76.3	LOS F	7.7	61.4	1.00	0.84	21.4
North West: Five Islands Rd (NW)											
27	L	162	18.5	0.623	14.3	LOS A	10.8	81.7	0.21	1.18	53.8
28	T	2322	7.0	0.623	2.4	LOS A	10.8	81.7	0.16	0.15	72.5
Approach		2484	7.8	0.623	3.2	LOS A	10.8	81.7	0.16	0.22	71.1
All Vehicles		4330	7.9	0.713	5.6	LOS A	10.8	81.7	0.17	0.19	66.1

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2013 AM With Outer Harbour
Project -Without Development

Five Islands Road / Flinders Street
2013 AM Peak With Outer Harbour Project Without Development
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	2084	7.0	0.455	0.8	LOS A	4.5	33.3	0.10	0.09	76.6
23	R	1	0.0	0.010	64.5	LOS E	0.1	0.6	0.96	0.59	23.6
Approach		2085	7.0	0.455	0.9	LOS A	4.5	33.3	0.10	0.09	76.5
North East: Flinders Street											
24	L	1	0.0	0.399	68.9	LOS E	4.4	34.5	0.98	0.77	22.7
26	R	116	14.7	0.476	67.8	LOS E	4.4	34.8	0.98	0.76	23.1
Approach		117	14.5	0.476	67.8	LOS E	4.4	34.8	0.98	0.76	23.1
North West: Five Islands Rd (NW)											
27	L	222	11.3	0.403	13.5	LOS A	6.5	49.3	0.22	0.99	54.1
28	T	1376	7.0	0.403	1.9	LOS A	6.5	49.3	0.12	0.12	73.8
Approach		1598	7.6	0.402	3.5	LOS A	6.5	49.3	0.14	0.24	70.6
All Vehicles		3800	7.5	0.476	4.0	LOS A	6.5	49.3	0.14	0.17	69.2

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2013 AM With Outer Harbour
Project - With Development

Five Islands Road / Flinders Street
2013 AM Peak With Outer Harbour Project With Development
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	2084	7.0	0.455	0.8	LOS A	4.5	33.3	0.10	0.09	76.6
23	R	2	50.0	0.027	68.2	LOS E	0.2	1.7	0.97	0.62	23.2
Approach		2086	7.0	0.455	0.9	LOS A	4.5	33.3	0.10	0.09	76.4
North East: Flinders Street											
24	L	2	50.0	0.585	71.3	LOS F	5.2	45.0	0.99	0.81	22.6
26	R	136	27.2	0.606	69.2	LOS E	5.2	45.1	1.00	0.80	22.9
Approach		138	27.5	0.606	69.3	LOS E	5.2	45.1	1.00	0.80	22.9
North West: Five Islands Rd (NW)											
27	L	242	18.6	0.410	13.9	LOS A	6.8	52.3	0.23	0.97	53.9
28	T	1376	7.0	0.410	1.9	LOS A	6.8	52.3	0.12	0.12	73.8
Approach		1618	8.7	0.410	3.7	LOS A	6.8	52.3	0.14	0.24	70.3
All Vehicles		3842	8.5	0.606	4.5	LOS A	6.8	52.3	0.15	0.18	68.3

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2023 AM With Outer Harbour
Project - Without Development

Five Islands Road / Flinders Street
2023 AM Peak With Outer Harbour Project Without Development
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	2274	7.0	0.491	0.8	LOS A	5.1	38.0	0.10	0.09	76.4
23	R	1	0.0	0.010	64.5	LOS E	0.1	0.6	0.96	0.59	23.6
Approach		2275	7.0	0.491	0.9	LOS A	5.1	38.0	0.10	0.09	76.3
North East: Flinders Street											
24	L	1	0.0	0.480	71.5	LOS F	4.9	37.9	1.00	0.79	22.1
26	R	126	13.5	0.586	70.1	LOS E	4.9	38.1	1.00	0.78	22.6
Approach		127	13.4	0.586	70.1	LOS E	4.9	38.1	1.00	0.78	22.6
North West: Five Islands Rd (NW)											
27	L	258	10.9	0.425	13.4	LOS A	7.1	53.5	0.23	0.97	54.2
28	T	1452	7.0	0.425	1.7	LOS A	7.1	53.5	0.12	0.11	74.1
Approach		1710	7.6	0.425	3.5	LOS A	7.1	53.5	0.14	0.24	70.6
All Vehicles		4112	7.4	0.586	4.1	LOS A	7.1	53.5	0.14	0.18	69.0

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2023 AM With Outer Harbour
Project - With Development

Five Islands Road / Flinders Street
2023 AM Peak With Outer Harbour Project With Development
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	2274	7.0	0.491	0.8	LOS A	5.1	38.0	0.10	0.09	76.4
23	R	2	50.0	0.027	68.2	LOS E	0.2	1.7	0.97	0.62	23.2
Approach		2276	7.0	0.491	0.9	LOS A	5.1	38.0	0.10	0.09	76.2
North East: Flinders Street											
24	L	2	50.0	0.679	75.2	LOS F	5.8	49.3	1.00	0.86	21.8
26	R	146	25.3	0.734	72.5	LOS F	5.8	49.3	1.00	0.85	22.2
Approach		148	25.7	0.734	72.6	LOS F	5.8	49.3	1.00	0.85	22.2
North West: Five Islands Rd (NW)											
27	L	278	17.3	0.433	13.5	LOS A	7.1	55.0	0.23	0.95	54.3
28	T	1452	7.0	0.432	1.7	LOS A	7.1	55.0	0.12	0.11	74.2
Approach		1730	8.7	0.432	3.6	LOS A	7.1	55.0	0.14	0.25	70.5
All Vehicles		4154	8.4	0.734	4.6	LOS A	7.1	55.0	0.15	0.18	68.1

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2013 PM With Outer Harbour
Project - Without Development

Five Islands Road / Flinders Street
2013 PM Peak With Outer Harbour Project - Without Development
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	1552	7.0	0.339	0.7	LOS A	2.9	21.8	0.08	0.07	77.1
23	R	1	0.0	0.010	64.5	LOS E	0.1	0.6	0.96	0.59	23.6
Approach		1553	7.0	0.339	0.8	LOS A	2.9	21.8	0.08	0.07	77.0
North East: Flinders Street											
24	L	1	0.0	0.570	76.0	LOS F	6.5	50.2	1.00	0.84	21.3
26	R	173	12.7	0.700	72.4	LOS F	6.5	50.2	1.00	0.83	22.1
Approach		174	12.6	0.700	72.4	LOS F	6.5	50.2	1.00	0.83	22.1
North West: Five Islands Rd (NW)											
27	L	141	13.5	0.581	13.7	LOS A	8.8	66.0	0.20	1.19	54.3
28	T	2155	7.0	0.580	2.2	LOS A	8.8	66.0	0.15	0.14	73.0
Approach		2296	7.4	0.580	2.9	LOS A	8.8	66.0	0.15	0.21	71.6
All Vehicles		4023	7.5	0.700	5.1	LOS A	8.8	66.0	0.16	0.18	67.1

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2013 PM With Outer Harbour Project - With Development

Five Islands Road / Flinders Street
2013 PM Peak With Outer Harbour Project - With Development
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	1552	7.0	0.339	0.7	LOS A	2.9	21.8	0.08	0.07	77.1
23	R	2	50.0	0.027	68.2	LOS E	0.2	1.7	0.97	0.62	23.2
Approach		1554	7.1	0.339	0.8	LOS A	2.9	21.8	0.08	0.07	76.9
North East: Flinders Street											
24	L	2	50.0	0.751	81.2	LOS F	7.5	62.4	1.00	0.94	20.7
26	R	193	21.8	0.831	76.1	LOS F	7.5	62.4	1.00	0.93	21.4
Approach		195	22.1	0.831	76.2	LOS F	7.5	62.4	1.00	0.93	21.4
North West: Five Islands Rd (NW)											
27	L	161	24.2	0.588	14.2	LOS A	9.3	70.7	0.21	1.18	54.2
28	T	2155	7.0	0.588	2.3	LOS A	9.3	70.7	0.15	0.15	72.8
Approach		2316	8.2	0.588	3.1	LOS A	9.3	70.7	0.16	0.22	71.3
All Vehicles		4065	8.4	0.831	5.7	LOS A	9.3	70.7	0.17	0.20	65.9

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Isalands Rd/Flinders St
2023 PM With Outer Harbour
Project - Without Development

Five Islands Road / Flinders Street
2023 PM Peak With Outer Harbour Project - Without Development
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	1646	7.0	0.360	0.8	LOS A	3.4	25.5	0.08	0.07	77.0
23	R	1	0.0	0.011	70.0	LOS E	0.1	0.6	0.97	0.59	22.2
Approach		1647	7.0	0.360	0.9	LOS A	3.4	25.5	0.08	0.07	76.9
North East: Flinders Street											
24	L	1	0.0	0.513	79.9	LOS F	7.5	57.5	1.00	0.83	20.6
26	R	193	11.9	0.678	75.8	LOS F	7.5	57.6	1.00	0.82	21.4
Approach		194	11.9	0.678	75.9	LOS F	7.5	57.6	1.00	0.82	21.4
North West: Five Islands Rd (NW)											
27	L	154	13.0	0.619	14.0	LOS A	10.6	79.5	0.21	1.19	53.9
28	T	2322	7.0	0.619	2.4	LOS A	10.6	79.5	0.15	0.15	72.6
Approach		2476	7.4	0.619	3.1	LOS A	10.6	79.5	0.16	0.21	71.3
All Vehicles		4317	7.4	0.678	5.5	LOS A	10.6	79.5	0.17	0.19	66.3

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St
2023 PM With Outer Harbour Project - With Development

Five Islands Road / Flinders Street
2023 PM Peak With Outer Harbour Project - With Development
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	1646	7.0	0.360	0.8	LOS A	3.4	25.5	0.08	0.07	77.0
23	R	2	50.0	0.029	73.8	LOS F	0.2	1.9	0.97	0.62	21.8
Approach		1648	7.0	0.360	0.9	LOS A	3.4	25.5	0.08	0.08	76.8
North East: Flinders Street											
24	L	2	50.0	0.698	83.7	LOS F	8.4	69.6	1.00	0.90	20.3
26	R	213	20.2	0.793	78.5	LOS F	8.4	69.6	1.00	0.89	21.0
Approach		215	20.5	0.793	78.6	LOS F	8.4	69.6	1.00	0.89	21.0
North West: Five Islands Rd (NW)											
27	L	174	23.0	0.626	14.6	LOS B	11.1	84.7	0.22	1.17	53.7
28	T	2322	7.0	0.627	2.4	LOS A	11.1	84.7	0.16	0.15	72.5
Approach		2496	8.1	0.627	3.3	LOS A	11.1	84.7	0.16	0.22	70.9
All Vehicles		4359	8.3	0.793	6.1	LOS A	11.1	84.7	0.17	0.20	65.3

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St 2023 AM With Outer Harbour Concept - Without Development

Five Islands Road / Flinders Street
2023 AM Peak With Outer Harbour Concept Without Development
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	2274	7.0	0.491	0.8	LOS A	5.1	38.0	0.10	0.09	76.4
23	R	1	0.0	0.010	64.5	LOS E	0.1	0.6	0.96	0.59	23.6
Approach		2275	7.0	0.491	0.9	LOS A	5.1	38.0	0.10	0.09	76.3
North East: Flinders Street											
24	L	1	0.0	0.576	75.7	LOS F	5.9	50.7	1.00	0.87	21.3
26	R	151	25.8	0.758	74.1	LOS F	5.9	50.7	1.00	0.86	21.9
Approach		152	25.7	0.758	74.1	LOS F	5.9	50.7	1.00	0.86	21.9
North West: Five Islands Rd (NW)											
27	L	288	17.0	0.435	13.5	LOS A	7.2	55.6	0.24	0.94	54.3
28	T	1452	7.0	0.435	1.7	LOS A	7.2	55.6	0.12	0.11	74.2
Approach		1740	8.7	0.435	3.6	LOS A	7.2	55.6	0.14	0.25	70.4
All Vehicles		4167	8.4	0.758	4.7	LOS A	7.2	55.6	0.15	0.19	67.9

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St 2023 AM With Outer Harbour Concept - With Development

Five Islands Road / Flinders Street
2023 AM Peak With Outer Harbour Concept With Development
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	2274	7.0	0.491	0.8	LOS A	5.1	38.0	0.10	0.09	76.4
23	R	2	50.0	0.027	68.2	LOS E	0.2	1.7	0.97	0.62	23.2
Approach		2276	7.0	0.491	0.9	LOS A	5.1	38.0	0.10	0.09	76.2
North East: Flinders Street											
24	L	2	50.0	0.827	87.5	LOS F	7.2	65.9	1.00	1.04	19.7
26	R	171	34.5	0.906	83.1	LOS F	7.2	65.9	1.00	1.03	20.3
Approach		173	34.7	0.906	83.2	LOS F	7.2	65.9	1.00	1.03	20.3
North West: Five Islands Rd (NW)											
27	L	308	22.4	0.442	13.8	LOS A	7.4	58.7	0.25	0.93	54.1
28	T	1452	7.0	0.442	1.7	LOS A	7.4	58.7	0.12	0.11	74.1
Approach		1760	9.7	0.442	3.8	LOS A	7.4	58.7	0.14	0.26	70.0
All Vehicles		4209	9.3	0.906	5.5	LOS A	7.4	65.9	0.16	0.20	66.4

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Isalands Rd/Flinders St 2023 PM With Outer Harbour Concept - Without Development

Five Islands Road / Flinders Street
2023 PM Peak With Outer Harbour Concept - Without Development
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	1646	7.0	0.360	0.8	LOS A	3.4	25.5	0.08	0.07	77.0
23	R	1	0.0	0.011	70.0	LOS E	0.1	0.6	0.97	0.59	22.2
Approach		1647	7.0	0.360	0.9	LOS A	3.4	25.5	0.08	0.07	76.9
North East: Flinders Street											
24	L	1	0.0	0.566	85.7	LOS F	9.1	74.1	1.00	0.91	19.6
26	R	223	19.7	0.824	81.2	LOS F	9.1	74.1	1.00	0.91	20.5
Approach		224	19.6	0.824	81.2	LOS F	9.1	74.1	1.00	0.91	20.5
North West: Five Islands Rd (NW)											
27	L	179	23.5	0.629	14.6	LOS B	11.2	85.8	0.23	1.17	53.7
28	T	2322	7.0	0.629	2.4	LOS A	11.2	85.8	0.16	0.15	72.4
Approach		2501	8.2	0.629	3.3	LOS A	11.2	85.8	0.16	0.23	70.8
All Vehicles		4372	8.3	0.824	6.4	LOS A	11.2	85.8	0.18	0.20	64.8

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Flinders St 2023 PM With Outer Harbour Concept - With Development

Five Islands Road / Flinders Street
2023 PM Peak With Outer Harbour Concept - With Development
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Five Islands Rd (SE)											
22	T	1646	7.0	0.360	0.8	LOS A	3.4	25.5	0.08	0.07	77.0
23	R	2	50.0	0.029	73.8	LOS F	0.2	1.9	0.97	0.62	21.8
Approach		1648	7.0	0.360	0.9	LOS A	3.4	25.5	0.08	0.08	76.8
North East: Flinders Street											
24	L	2	50.0	0.800	101.6	LOS F	10.7	91.7	1.00	1.09	17.7
26	R	243	26.3	0.938	94.6	LOS F	10.7	91.7	1.00	1.08	18.5
Approach		245	26.5	0.938	94.6	LOS F	10.7	91.7	1.00	1.08	18.5
North West: Five Islands Rd (NW)											
27	L	199	31.2	0.638	15.1	LOS B	11.7	91.2	0.24	1.15	53.5
28	T	2322	7.0	0.637	2.5	LOS A	11.7	91.2	0.16	0.16	72.3
Approach		2521	8.9	0.637	3.5	LOS A	11.7	91.2	0.17	0.24	70.5
All Vehicles		4414	9.2	0.938	7.6	LOS A	11.7	91.7	0.18	0.22	62.8

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2013 AM Without Development

Five Islands Road / Springhill Road
2013 AM Peak Without Development
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	748	3.7	0.196	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	2055	10.5	0.910	20.0	LOS B	31.8	242.8	0.44	0.83	48.9
Approach		2803	8.7	0.910	14.7	LOS B	31.8	242.8	0.32	0.61	54.7
North: Springhill Road											
7	L	132	6.8	0.102	12.6	LOS A	0.8	6.0	0.06	0.74	57.1
9	R	16	6.3	0.112	90.2	LOS F	0.9	6.8	0.98	0.67	20.3
Approach		148	6.8	0.113	21.0	LOS B	0.9	6.8	0.16	0.73	47.7
West: Five Islands Rd (W)											
10	L	534	7.1	0.302	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.8
11	T	634	6.9	0.910	77.7	LOS F	26.2	194.4	1.00	1.00	22.0
Approach		1168	7.0	0.910	47.4	LOS D	26.2	194.4	0.54	0.86	30.7
All Vehicles		4119	8.2	0.910	24.2	LOS B	31.8	242.8	0.38	0.68	44.5

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2013 AM With Development

Five Islands Road / Springhill Road
2013 AM Peak With Development
Signals - Fixed Time Cycle Time = 150 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	759	5.1	0.201	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	2064	10.9	0.917	21.2	LOS B	34.1	260.9	0.46	0.84	47.8
Approach		2823	9.4	0.917	15.5	LOS B	34.1	260.9	0.34	0.61	53.7
North: Springhill Road											
7	L	141	12.8	0.113	13.0	LOS A	0.9	6.8	0.06	0.74	57.1
9	R	16	6.3	0.112	90.2	LOS F	0.9	6.8	0.98	0.67	20.3
Approach		157	12.1	0.113	20.9	LOS B	0.9	6.8	0.15	0.73	48.2
West: Five Islands Rd (W)											
10	L	534	7.1	0.302	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.8
11	T	645	8.5	0.935	84.1	LOS F	28.0	210.0	1.00	1.04	20.8
Approach		1179	7.9	0.935	51.2	LOS D	28.0	210.0	0.55	0.88	29.3
All Vehicles		4159	9.0	0.935	25.8	LOS B	34.1	260.9	0.39	0.69	43.2

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhll Rd
2023 AM Without Development

Five Islands Road / Springhill Road
2023 AM Peak With Development
Signals - Fixed Time Cycle Time = 130 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	976	3.7	0.261	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	2153	10.5	1.000[3]	15.0	LOS B	67.3	513.7	1.00	0.94	53.3
Approach		3129	8.7	1.000	10.4	LOS A	67.3	513.7	0.69	0.65	59.6
North: Springhill Road											
7	L	139	6.5	0.109	12.5	LOS A	0.7	5.5	0.06	0.74	57.2
9	R	19	5.3	0.115	78.9	LOS F	0.9	6.9	0.97	0.67	22.4
Approach		158	6.3	0.115	20.5	LOS B	0.9	6.9	0.17	0.73	48.2
West: Five Islands Rd (W)											
10	L	686	7.1	0.388	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.8
11	T	714	7.0	0.995	109.8	LOS F	33.7	250.1	1.00	1.24	17.1
Approach		1400	7.1	0.995	61.6	LOS E	33.7	250.1	0.51	0.97	26.1
All Vehicles		4687	8.2	1.000	26.0	LOS B	67.3	513.7	0.62	0.75	42.8

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.
9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2023 AM With Development

Five Islands Road / Springhill Road
2023 AM Peak With Development
Signals - Fixed Time Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1001	5.0	0.269	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	2148	10.9	1.000[3]	15.0	LOS B	67.2	513.9	1.00	0.94	53.3
Approach		3149	9.3	1.000	10.3	LOS A	67.2	513.9	0.68	0.64	59.7
North: Springhill Road											
7	L	148	12.2	0.121	12.9	LOS A	0.8	6.2	0.06	0.74	57.2
9	R	19	5.3	0.115	78.9	LOS F	0.9	6.9	0.97	0.67	22.4
Approach		167	11.4	0.121	20.4	LOS B	0.9	6.9	0.16	0.73	48.6
West: Five Islands Rd (W)											
10	L	686	7.1	0.388	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.8
11	T	725	8.4	1.019	137.0	LOS F	38.3	287.6	1.00	1.35	14.4
Approach		1411	7.8	1.020	76.0	LOS F	38.3	287.6	0.51	1.03	22.7
All Vehicles		4727	8.9	1.020	30.2	LOS C	67.2	513.9	0.61	0.76	39.9

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.
9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2013 PM Without Development

Five Islands Road / Springhill Road
2013 PM Peak Without Development
Signals - Fixed Time Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1033	7.0	0.277	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	1313	7.0	0.711	16.1	LOS B	11.4	84.9	0.37	0.79	52.8
Approach		2346	7.0	0.711	9.1	LOS A	11.4	84.9	0.20	0.44	62.2
North: Springhill Road											
7	L	280	6.8	0.245	14.2	LOS A	2.8	21.1	0.17	0.75	55.1
9	R	51	7.8	0.218	57.3	LOS E	1.7	12.7	0.96	0.71	27.9
Approach		331	6.9	0.245	20.8	LOS B	2.8	21.1	0.29	0.75	47.9
West: Five Islands Rd (W)											
10	L	232	6.9	0.131	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.9
11	T	547	6.9	0.694	36.9	LOS C	12.7	94.5	0.95	0.81	34.4
Approach		779	6.9	0.694	29.3	LOS C	12.7	94.5	0.66	0.78	39.2
All Vehicles		3456	7.0	0.711	14.7	LOS B	12.7	94.5	0.32	0.55	53.5

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2013 PM With Development

Five Islands Road / Springhill Road
2013 PM Peak With Development
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1044	8.0	0.282	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	1322	7.6	0.719	16.2	LOS B	11.7	87.1	0.37	0.79	52.7
Approach		2366	7.8	0.719	9.1	LOS A	11.7	87.1	0.21	0.44	62.2
North: Springhill Road											
7	L	289	9.7	0.259	14.4	LOS A	3.0	22.5	0.17	0.75	55.1
9	R	51	7.8	0.218	57.3	LOS E	1.7	12.7	0.96	0.71	27.9
Approach		340	9.4	0.259	20.8	LOS B	3.0	22.5	0.29	0.75	48.1
West: Five Islands Rd (W)											
10	L	232	6.9	0.131	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.9
11	T	558	8.8	0.716	37.5	LOS C	13.1	98.8	0.95	0.83	34.1
Approach		790	8.2	0.716	29.8	LOS C	13.1	98.8	0.67	0.79	38.8
All Vehicles		3496	8.0	0.719	14.9	LOS B	13.1	98.8	0.32	0.55	53.4

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2023 PM Without Development

Five Islands Road / Springhill Road
2023 PM Peak Without Development
Signals - Fixed Time Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1157	7.0	0.310	0.1	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	1384	7.0	0.766	17.5	LOS B	14.6	108.4	0.46	0.81	51.3
Approach		2541	7.0	0.766	9.6	LOS A	14.6	108.4	0.25	0.44	61.4
North: Springhill Road											
7	L	313	7.0	0.287	14.7	LOS B	3.6	26.7	0.20	0.76	54.5
9	R	67	7.5	0.285	57.7	LOS E	2.2	16.5	0.97	0.72	27.8
Approach		380	7.1	0.287	22.3	LOS B	3.6	26.7	0.33	0.75	46.6
West: Five Islands Rd (W)											
10	L	262	7.3	0.148	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.9
11	T	637	7.1	0.769	38.2	LOS C	15.0	111.4	0.97	0.87	33.7
Approach		899	7.1	0.769	30.4	LOS C	15.0	111.4	0.69	0.81	38.4
All Vehicles		3820	7.0	0.769	15.7	LOS B	15.0	111.4	0.36	0.56	52.3

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2023 PM With Development

Five Islands Road / Springhill Road
2023 PM Peak With Development
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1168	7.9	0.315	0.1	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	1393	7.6	0.774	17.8	LOS B	15.0	112.2	0.47	0.81	51.0
Approach		2561	7.7	0.774	9.7	LOS A	15.0	112.2	0.25	0.44	61.2
North: Springhill Road											
7	L	322	9.6	0.302	14.9	LOS B	3.7	28.4	0.20	0.76	54.4
9	R	67	7.5	0.285	57.7	LOS E	2.2	16.5	0.97	0.72	27.8
Approach		389	9.3	0.302	22.2	LOS B	3.7	28.4	0.33	0.75	46.7
West: Five Islands Rd (W)											
10	L	262	7.3	0.148	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.9
11	T	648	8.6	0.790	39.1	LOS C	15.5	116.3	0.98	0.89	33.3
Approach		910	8.2	0.790	31.1	LOS C	15.5	116.3	0.69	0.83	38.0
All Vehicles		3860	8.0	0.790	16.0	LOS B	15.5	116.3	0.37	0.56	52.1

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2013 AM With Outer Harbour
Project - Without Development

Five Islands Road / Springhill Road
2013 AM Peak With Outer Harbour Project - Without Development
Signals - Fixed Time Cycle Time = 150 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	760	5.0	0.201	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	2055	10.5	0.910	20.0	LOS B	31.8	242.8	0.44	0.83	48.9
Approach		2815	9.0	0.910	14.6	LOS B	31.8	242.8	0.32	0.61	54.7
North: Springhill Road											
7	L	132	6.8	0.102	12.6	LOS A	0.8	6.0	0.06	0.74	57.1
9	R	16	6.3	0.112	90.2	LOS F	0.9	6.8	0.98	0.67	20.3
Approach		148	6.8	0.113	21.0	LOS B	0.9	6.8	0.16	0.73	47.7
West: Five Islands Rd (W)											
10	L	534	7.1	0.302	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.8
11	T	651	8.4	0.943	86.9	LOS F	28.7	215.8	1.00	1.06	20.3
Approach		1185	7.8	0.943	52.9	LOS D	28.7	215.8	0.55	0.89	28.7
All Vehicles		4148	8.6	0.943	25.8	LOS B	31.8	242.8	0.38	0.69	43.2

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2013 AM With Outer Harbour
Project - With Development

Five Islands Road / Springhill Road
2013 AM Peak With Outer Harbour Project - With Development
Signals - Fixed Time Cycle Time = 150 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	771	6.4	0.206	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	2064	10.9	0.917	21.2	LOS B	34.1	260.9	0.46	0.84	47.8
Approach		2835	9.7	0.917	15.4	LOS B	34.1	260.9	0.34	0.61	53.8
North: Springhill Road											
7	L	141	12.8	0.113	13.0	LOS A	0.9	6.8	0.06	0.74	57.1
9	R	16	6.3	0.112	90.2	LOS F	0.9	6.8	0.98	0.67	20.3
Approach		157	12.1	0.113	20.9	LOS B	0.9	6.8	0.15	0.73	48.2
West: Five Islands Rd (W)											
10	L	534	7.1	0.302	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.8
11	T	662	10.0	0.968	99.0	LOS F	31.4	238.6	1.00	1.13	18.5
Approach		1196	8.7	0.968	59.9	LOS E	31.4	238.6	0.55	0.93	26.6
All Vehicles		4188	9.5	0.968	28.3	LOS B	34.1	260.9	0.39	0.71	41.4

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhll Rd
2023 AM With Outer Harbour
Project - Without Development

Five Islands Road / Springhill Road
2023 AM Peak With Outer Harbour Project - With Development
Signals - Fixed Time Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	988	4.8	0.265	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	2153	10.5	1.000[3]	15.0	LOS B	67.3	513.7	1.00	0.94	53.3
Approach		3141	9.0	1.000	10.3	LOS A	67.3	513.7	0.69	0.65	59.7
North: Springhill Road											
7	L	139	6.5	0.109	12.5	LOS A	0.7	5.5	0.06	0.74	57.2
9	R	19	5.3	0.115	78.9	LOS F	0.9	6.9	0.97	0.67	22.4
Approach		158	6.3	0.115	20.5	LOS B	0.9	6.9	0.17	0.73	48.2
West: Five Islands Rd (W)											
10	L	686	7.1	0.388	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.8
11	T	731	8.3	1.028	147.5	LOS F	40.1	301.1	1.00	1.39	13.6
Approach		1417	7.8	1.028	81.6	LOS F	40.1	301.1	0.52	1.05	21.6
All Vehicles		4716	8.5	1.028	32.1	LOS C	67.3	513.7	0.62	0.77	38.7

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.
9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2023 AM With Outer Harbour
Project -With Development

Five Islands Road / Springhill Road
2023 AM Peak With Outer Harbour Project - With Development
Signals - Fixed Time Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1013	6.1	0.274	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	2148	10.9	1.000[3]	15.0	LOS B	67.2	513.9	1.00	0.94	53.3
Approach		3161	9.6	1.000	10.2	LOS A	67.2	513.9	0.68	0.64	59.8
North: Springhill Road											
7	L	148	12.2	0.121	12.9	LOS A	0.8	6.2	0.06	0.74	57.2
9	R	19	5.3	0.115	78.9	LOS F	0.9	6.9	0.97	0.67	22.4
Approach		167	11.4	0.121	20.4	LOS B	0.9	6.9	0.16	0.73	48.6
West: Five Islands Rd (W)											
10	L	686	7.1	0.388	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.8
11	T	742	9.7	1.052	182.5	LOS F	45.8	347.1	1.00	1.51	11.4
Approach		1428	8.5	1.052	100.3	LOS F	45.8	347.1	0.52	1.11	18.5
All Vehicles		4756	9.3	1.052	37.6	LOS C	67.2	513.9	0.61	0.79	35.6

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.
9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2013 PM With Outer Harbour
Project - Without Development

Five Islands Road / Springhill Road
2013 PM Peak With Outer Harbour Project - Without Development
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1050	7.9	0.283	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	1313	7.0	0.711	16.1	LOS B	11.4	84.9	0.37	0.79	52.8
Approach		2363	7.4	0.711	9.0	LOS A	11.4	84.9	0.20	0.44	62.3
North: Springhill Road											
7	L	280	6.8	0.245	14.2	LOS A	2.8	21.1	0.17	0.75	55.1
9	R	51	7.8	0.218	57.3	LOS E	1.7	12.7	0.96	0.71	27.9
Approach		331	6.9	0.245	20.8	LOS B	2.8	21.1	0.29	0.75	47.9
West: Five Islands Rd (W)											
10	L	232	6.9	0.131	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.9
11	T	559	8.6	0.717	37.5	LOS C	13.1	98.8	0.95	0.83	34.1
Approach		791	8.1	0.717	29.8	LOS C	13.1	98.8	0.67	0.79	38.8
All Vehicles		3485	7.5	0.717	14.8	LOS B	13.1	98.8	0.32	0.55	53.4

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2013 PM With Outer Harbour
Project - With Development

Five Islands Road / Springhill Road
2013 PM Peak With Outer Harbour Project -With Development
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1061	8.9	0.288	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	1322	7.6	0.719	16.2	LOS B	11.7	87.1	0.37	0.79	52.7
Approach		2383	8.2	0.719	9.0	LOS A	11.7	87.1	0.21	0.44	62.3
North: Springhill Road											
7	L	289	9.7	0.259	14.4	LOS A	3.0	22.5	0.17	0.75	55.1
9	R	51	7.8	0.218	57.3	LOS E	1.7	12.7	0.96	0.71	27.9
Approach		340	9.4	0.259	20.8	LOS B	3.0	22.5	0.29	0.75	48.1
West: Five Islands Rd (W)											
10	L	232	6.9	0.131	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.9
11	T	570	10.4	0.739	38.1	LOS C	13.5	103.1	0.96	0.85	33.8
Approach		802	9.4	0.739	30.4	LOS C	13.5	103.1	0.68	0.80	38.5
All Vehicles		3525	8.6	0.739	15.0	LOS B	13.5	103.1	0.32	0.55	53.2

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2023 PM With Outer Harbour
Project - Without Development

Five Islands Road / Springhill Road
2023 PM Peak With Outer Harbour Project - Without Development
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1174	7.8	0.316	0.1	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	1384	7.0	0.766	17.5	LOS B	14.6	108.4	0.46	0.81	51.3
Approach		2558	7.4	0.766	9.5	LOS A	14.6	108.4	0.25	0.44	61.5
North: Springhill Road											
7	L	313	7.0	0.287	14.7	LOS B	3.6	26.7	0.20	0.76	54.5
9	R	67	7.5	0.285	57.7	LOS E	2.2	16.5	0.97	0.72	27.8
Approach		380	7.1	0.287	22.3	LOS B	3.6	26.7	0.33	0.75	46.6
West: Five Islands Rd (W)											
10	L	262	7.3	0.148	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.9
11	T	649	8.5	0.790	39.1	LOS C	15.5	116.3	0.98	0.89	33.3
Approach		911	8.1	0.790	31.1	LOS C	15.5	116.3	0.70	0.83	38.0
All Vehicles		3849	7.5	0.790	15.9	LOS B	15.5	116.3	0.36	0.56	52.2

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd
2023 PM With Outer Harbour
Project - With Development

Five Islands Road / Springhill Road
2023 PM Peak With Outer Harbour Project - With Development
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1185	8.7	0.321	0.1	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	1393	7.6	0.774	17.8	LOS B	15.0	112.2	0.47	0.81	51.0
Approach		2578	8.1	0.774	9.6	LOS A	15.0	112.2	0.25	0.44	61.3
North: Springhill Road											
7	L	322	9.6	0.302	14.9	LOS B	3.7	28.4	0.20	0.76	54.4
9	R	67	7.5	0.285	57.7	LOS E	2.2	16.5	0.97	0.72	27.8
Approach		389	9.3	0.302	22.2	LOS B	3.7	28.4	0.33	0.75	46.7
West: Five Islands Rd (W)											
10	L	262	7.3	0.148	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.9
11	T	660	10.0	0.811	40.1	LOS C	16.0	121.5	0.98	0.91	32.8
Approach		922	9.2	0.811	32.0	LOS C	16.0	121.5	0.70	0.85	37.5
All Vehicles		3889	8.5	0.811	16.2	LOS B	16.0	121.5	0.37	0.57	51.8

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhll Rd 2023 AM With Outer Harbour Concept- Without Development

Five Islands Road / Springhill Road
2023 AM Peak With Outer Harbour Concept - With Development
Signals - Fixed Time Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1013	7.3	0.275	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	2153	10.5	1.000[3]	15.0	LOS B	67.3	513.7	1.00	0.94	53.3
Approach		3166	9.6	1.000	10.2	LOS A	67.3	513.7	0.68	0.64	59.8
North: Springhill Road											
7	L	139	6.5	0.109	12.5	LOS A	0.7	5.5	0.06	0.74	57.2
9	R	19	5.3	0.115	78.9	LOS F	0.9	6.9	0.97	0.67	22.4
Approach		158	6.3	0.115	20.5	LOS B	0.9	6.9	0.17	0.73	48.2
West: Five Islands Rd (W)											
10	L	686	7.1	0.388	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.8
11	T	761	10.8	1.086	236.9	LOS F	54.6	417.8	1.00	1.69	9.1
Approach		1447	9.1	1.086	130.0	LOS F	54.6	417.8	0.53	1.21	15.2
All Vehicles		4771	9.3	1.086	46.9	LOS D	67.3	513.7	0.62	0.82	31.4

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.
9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd 2023 AM With Outer Harbour Concept -With Development

Five Islands Road / Springhill Road
2023 AM Peak With Outer Harbour Concept - With Development
Signals - Fixed Time Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1038	8.4	0.284	0.0	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	2148	10.9	1.000[3]	15.0	LOS B	67.2	513.9	1.00	0.94	53.3
Approach		3186	10.2	1.000	10.2	LOS A	67.2	513.9	0.67	0.63	59.9
North: Springhill Road											
7	L	148	12.2	0.121	12.9	LOS A	0.8	6.2	0.06	0.74	57.2
9	R	19	5.3	0.115	78.9	LOS F	0.9	6.9	0.97	0.67	22.4
Approach		167	11.4	0.121	20.4	LOS B	0.9	6.9	0.16	0.73	48.6
West: Five Islands Rd (W)											
10	L	686	7.1	0.388	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.8
11	T	772	12.0	1.110	277.6	LOS F	61.0	471.5	1.00	1.82	8.0
Approach		1458	9.7	1.110	152.4	LOS F	61.0	471.5	0.53	1.29	13.3
All Vehicles		4811	10.1	1.110	53.6	LOS D	67.2	513.9	0.61	0.84	28.9

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.
9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd 2023 PM With Outer Harbour Concept - Without Development

Five Islands Road / Springhill Road
2023 PM Peak With Outer Harbour Concept - Without Development
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1204	9.4	0.328	0.1	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.9
6	R	1384	7.0	0.766	17.5	LOS B	14.6	108.4	0.46	0.81	51.3
Approach		2588	8.1	0.766	9.4	LOS A	14.6	108.4	0.25	0.43	61.6
North: Springhill Road											
7	L	313	7.0	0.287	14.7	LOS B	3.6	26.7	0.20	0.76	54.5
9	R	67	7.5	0.285	57.7	LOS E	2.2	16.5	0.97	0.72	27.8
Approach		380	7.1	0.287	22.3	LOS B	3.6	26.7	0.33	0.75	46.6
West: Five Islands Rd (W)											
10	L	262	7.3	0.148	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.9
11	T	674	11.4	0.836	41.6	LOS C	16.7	128.1	0.99	0.94	32.2
Approach		936	10.3	0.835	33.2	LOS C	16.7	128.1	0.72	0.87	36.8
All Vehicles		3904	8.5	0.835	16.3	LOS B	16.7	128.1	0.37	0.57	51.6

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

MOVEMENT SUMMARY

Site: Five Islands Rd/Springhill Rd 2023 PM With Outer Harbour Concept - With Development

Five Islands Road / Springhill Road
2023 PM Peak With Outer Harbour Concept - With Development
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Phase Times)

Movement Performance - Vehicles

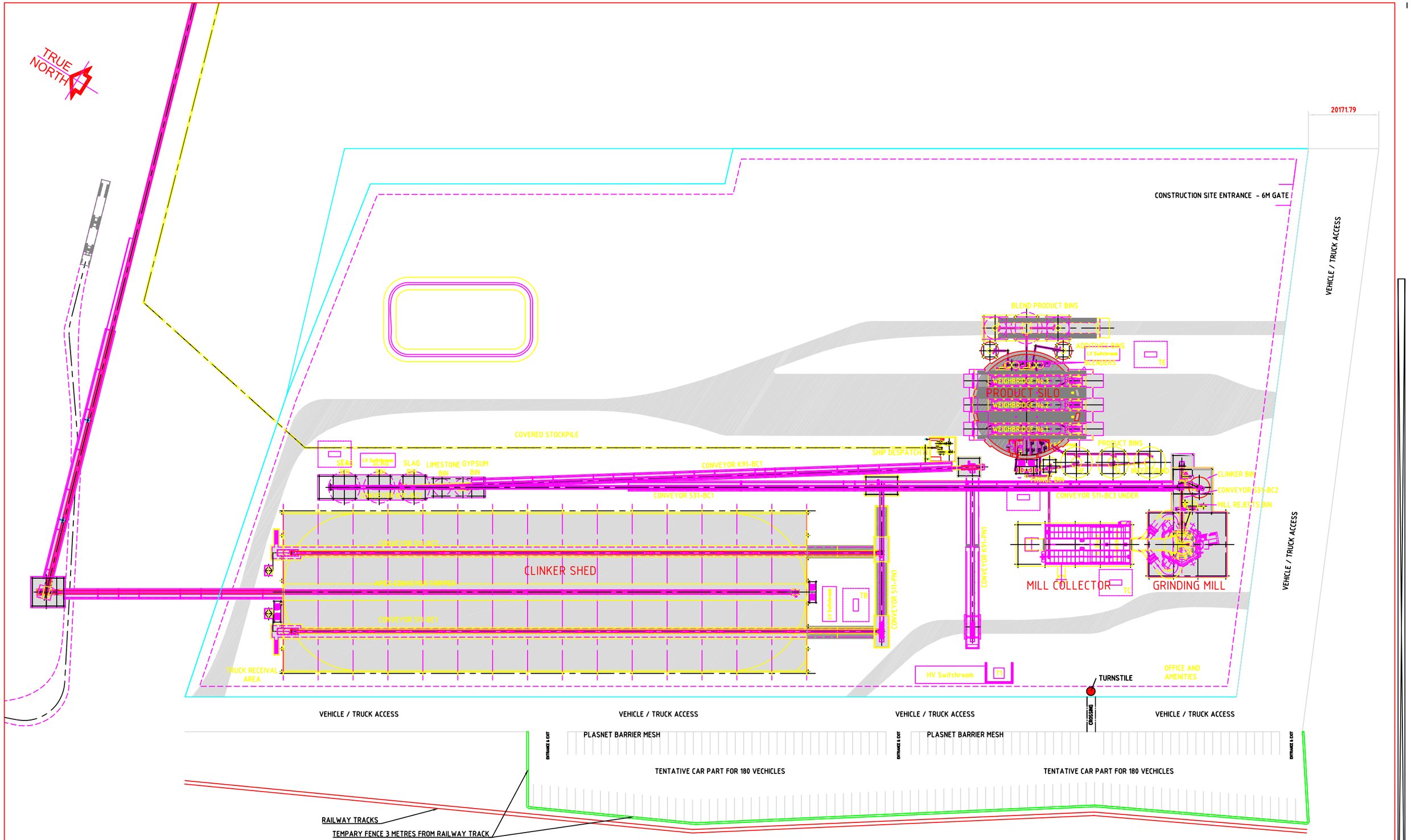
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Five Islands Rd (E)											
5	T	1215	10.2	0.332	0.1	NA[9]	NA[9]	NA[9]	NA[9]	0.00	79.8
6	R	1393	7.6	0.774	17.8	LOS B	15.0	112.2	0.47	0.81	51.0
Approach		2608	8.8	0.774	9.5	LOS A	15.0	112.2	0.25	0.43	61.5
North: Springhill Road											
7	L	322	9.6	0.302	14.9	LOS B	3.7	28.4	0.20	0.76	54.4
9	R	67	7.5	0.285	57.7	LOS E	2.2	16.5	0.97	0.72	27.8
Approach		389	9.3	0.302	22.2	LOS B	3.7	28.4	0.33	0.75	46.7
West: Five Islands Rd (W)											
10	L	262	7.3	0.148	11.4	NA[9]	NA[9]	NA[9]	NA[9]	0.69	58.9
11	T	685	12.8	0.856	43.2	LOS D	17.3	134.5	1.00	0.96	31.5
Approach		947	11.3	0.856	34.4	LOS C	17.3	134.5	0.72	0.89	36.1
All Vehicles		3944	9.5	0.856	16.8	LOS B	17.3	134.5	0.37	0.57	51.2

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS E. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

9 Continuous movement

APPENDIX D

CONSTRUCTION PARKING PLAN



PRELIMINARY
NOT FOR CONSTRUCTION

THIS DRAWING IS NOT VALID UNLESS THE LATEST REVISION INITIALS ARE HANDWRITTEN.

SITE COORDINATES TO MGA

REVISION RECORD

REV No	DESCRIPTION	BY	CHKD	DSG'D	APPR'D	DATE
P7	PRELIMINARY - NOT FOR CONSTRUCTION					23-06-10
P6	PRELIMINARY - NOT FOR CONSTRUCTION					04-06-10
P5	PRELIMINARY - NOT FOR CONSTRUCTION					01-06-10
P4	PRELIMINARY - NOT FOR CONSTRUCTION					21-05-10
P3	PRELIMINARY - NOT FOR CONSTRUCTION					19-05-10
P2	PRELIMINARY - NOT FOR CONSTRUCTION					06-05-10
P1	PRELIMINARY - NOT FOR CONSTRUCTION					05-05-10

[redacted]

ammjohn pty ltd

SCALE: 1:500 SHEET SIZE: A1

	NAME	SIGNATURE	DATE
DRAWN			MAY 10
DRG. CHECK			
DESIGNED			
CLIENT REVIEW			
MPA PROJ. MAN.			

PORT KEMBLA CEMENT MILL STAGE 3 CAPEX
SITE ARRANGEMENT
STAGE 1

DRG. No. 10191-1-5S22

Rev P7