



TRAFFIC IMPACT ASSESSMENT

**Manufacturing, Assembly, Aftermarket Service, Regional
Distribution Centre and Training Facility
Lot 32 DP 1014864
431 Masonite Road, Heatherbrae**

PREPARED FOR: SANDVIK MINING & CONSTRUCTION AUSTRALIA PTY LTD

JUNE 2010

**TRAFFIC IMPACT ASSESSMENT
SANDVIK MINING & CONSTRUCTION AUSTRALIA PTY LTD****LOT 32 DP 1014864
431 MASONITE ROAD, HEATHERBRAE**

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EXECUTIVE SUMMARY

Insite Engineering Services Pty Ltd has been engaged by Sandvik Mining & Construction Australia Pty Ltd to prepare a Traffic Impact Assessment to support a development application for a Manufacturing, Assembly, Aftermarket Service, Regional Distribution Centre and Training Facility at Lot 32, DP 1014864, 431 Masonite Road, Heatherbrae.

This report is required to support a development application to the NSW Department of Planning seeking changes to previously approved development on the site. Currently Sandvik occupy several sites across the Lower Hunter Region and seek to consolidate all operations on one site while increasing their production and maintenance capabilities. Initially the project will employ approximately 500 to 600 staff however it is expected staff numbers will grow to 750 within five years of operation. The development concept plan is shown in **Attachment A**.

This report presents the findings of the traffic assessment and includes the following;

1. An outline of the existing situation in the vicinity of the site.
2. An assessment of the traffic impacts of the proposed development including the predicted traffic generation and its impact on existing road and intersection capacities. This assessment will also consider construction traffic.
3. Reviews parking, public transport, pedestrian and cycle way requirements for the proposed development, including assessment against Council and the Roads and Traffic Authority standards and requirements.
4. Presentation of conclusions and recommendations.

The report has concluded the following;

- The proposed amendments to the approved development do not significantly alter the ultimate traffic generation or parking demand generated by the development nor the distribution of this traffic through the local road network. As such the findings of the previous Insite traffic study for the site are still relevant. However this report has been updated for the purposes of this development application.
- The main access route to the site will be via the Pacific Highway and Masonite Road.
- The Pacific Highway in the vicinity of the site has a current peak hour traffic volume of approximately 3,005 vph in the PM (3.15 pm to 4.15 pm) and 2,306 vph in the AM (7.30 am to 8.30 am).
- The Pacific Highway as a four lane two way dual carriageway road in the vicinity of the site has a likely mid block capacity of 3,800 vph. Therefore it currently has spare capacity to cater for development in the area.
- Masonite Road in the vicinity of the site has a current peak hour traffic volume of approximately 327 vph in the PM (3.15 pm to 4.15 pm) and 242 vph in the AM (7.45 am to 8.45 am).
- Masonite Road as a two lane two way road in the vicinity of the site has a likely mid block capacity of 1,200 vph. Therefore it currently has spare capacity to cater for development in the area.
- It has been determined that a condition of the sale of the land from Port Stephens Council to Sandvik will be that the section of Masonite Road along

the frontage of the site is reconstructed and upgraded to a suitable standard for industrial development and in accordance with Council's requirements.

- ☞ That the proposed development with a 2015 staffing level predicted to be 750 persons is likely to result in an AM peak traffic generation of approximately 317 vehicles per hour between 5 am and 6 am made up entirely of employee arrivals for commencement of the day shift.
- ☞ That the proposed development with a 2015 staffing level predicted to be 750 persons is likely to result in a PM peak traffic generation of approximately 322 vehicles per hour between 3 pm and 4 pm made up of employee departures with the completion of the day shift and approximately 10 heavy vehicle movements.
- ☞ The PM peak traffic period on the road network (3.15 pm to 4.15 pm) and the PM peak traffic generation period for the development (3.00 pm to 4.00 pm) almost coincide and should be considered to coincide for development impact assessment.
- ☞ The AM peak traffic generation period for the development (5 am to 6 am) occurs before the AM peak traffic period on the road network (7.30 am to 8.30 am) and therefore should be separately considered for development impact assessment.
- ☞ During the AM peak traffic period (7.30 am to 8.30 am) traffic generation from the site will be in the order of 201 vehicles per day made up of staff arrivals and 40 heavy vehicle movements.
- ☞ During the AM peak development traffic period (5 am to 6 am) the road network hourly volumes are approximately 1,512 vph on the Pacific Highway and 164 vph on Masonite Road.
- ☞ Traffic associated with construction activities on the site are significantly less than the traffic volumes generated by the development itself and it is expected the existing road network would be able to easily cater for these volumes. The peak period would occur during the pouring of slabs when concrete trucks will be delivering to the site. These will occur however in short

sharp peaks prior to the AM road network peak when traffic volumes on the road network are much lighter.

- ☞ All service vehicle trips generated by the development will utilise the Pacific Highway to access the site with 90 % having trip origins / destinations to the south and west of the site and 10 % having origin / destinations to the north of the site.
- ☞ Service vehicle trips during the peak hours are 50 % to the site and 50 % from the site.
- ☞ Employee trip distributions have been estimated as 60 % from or to the Pacific Highway to the south west (Newcastle, Lake Macquarie), 20 % from Adelaide Street (Raymond Terrace, Maitland), 15 % from or to the Pacific Highway to the north-east (Port Stephens and further north) and 5 % from or to Masonite Road to the south-east (Williamstown, Fern Bay, Tomago, Stockton).
- ☞ The main intersections to be impacted by the development are the Pacific Highway / Masonite Road roundabout (2 lane) and the Masonite Road / Camfield Drive roundabout (1 lane). SIDRA modelling of these intersections post development has shown that both roundabouts will continue to operate satisfactorily post development and with predicted ten year traffic growth for all likely peak traffic periods. The overall LOS experienced on these roundabouts will remain high at LOS A or LOS B for all scenarios modelled and the queue lengths expected are not considered unreasonable nor will they exceed the physical storage capacity provided at the roundabouts. Therefore the proposed development will not adversely impact on the operation of these intersections as they have sufficient spare capacity to cater for the traffic generated by the development.



- ☞ The proposal provides three separate accesses to the site. The use of three access points not only allows heavy and light vehicle movements to be separated it also allows the large traffic volumes entering and exiting the site at shift changes to be more easily and quickly distributed onto or off Masonite Road. For these reasons the use of three separate access points to the site should be supported.
- ☞ The accesses as shown on the current development plan are suitably staggered from the three accesses to the Weathertex complex opposite the site.
- ☞ Due to the high number of turning movements and the use by heavy vehicles each access point to the development should be constructed with a channelised right turn bay (CHR intersection type). SIDRA modelling of these accesses has determined that these right turn bays should provide storage for at least three (3) vehicles or one (1) heavy vehicle.
- ☞ As the heavy vehicle access is within the 100 km/h speed zone on Masonite Road the RTA should be requested to review the speed zoning in the vicinity of this access to consider the extension of the 70 km/h speed zone to the full frontage of the site.
- ☞ The internal car park and heavy vehicle areas proposed for the development comply with the requirements of the RTA's *Guide to Traffic Generating Developments*, PSDCP 2007 Part B3 – Parking, Traffic & Transport as well as AS2890.1-2004 and AS 2890.2-2002 and are considered appropriate.
- ☞ The site is currently serviced by public transport (buses) provided by Hunter

Valley Buses. Whilst the service is limited it will be available for use by staff of the proposed development. It is not thought however that the proposal will generate enough public transport ridership to impact on the public transport system to the extent that further services are required. Existing bus stop facilities are also considered adequate and no new or upgraded facilities are required.

- ☞ The development is likely to generate some pedestrian traffic accessing the nearby food outlets and public transport facilities on the Pacific Highway. To provide suitable facilities for this traffic a concrete pedestrian footpath should be provided from the main office to the start of the existing pedestrian facilities at the Masonite Road / Camfield Drive roundabout.
- ☞ With a large staff base it is expected the development will generate some bicycle and motor cycle traffic. The proposal provides suitable motorcycle and bicycle parking within a covered area on site accommodating 50 motor cycles and 38 bicycles.

Based on these conclusions it is recommended that the proposed Manufacturing, Assembly, Aftermarket Service, Regional Distribution Centre and Training Facility for Sandvik at 431 Masonite Road, Heatherbrae can be supported as the proposal will not adversely impact on the local and state road network in the vicinity of the site both during construction and post development and complies with all relevant Port Stephens Council and RTA requirements.

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1.0 INTRODUCTION

Insite Engineering Services Pty Ltd has been engaged by Sandvik Mining & Construction Australia Pty Ltd to prepare a Traffic Impact Assessment to support a development application for a Manufacturing, Assembly, Aftermarket Service, Regional Distribution Centre and Training Facility on Masonite Road, Heatherbrae. The land the development is sited on is formally described as containing the following land parcel:

 Lot 32 DP 1014864 – 431 Masonite Road, Heatherbrae.

The property is currently well vegetated vacant land.

This report is required to support a development application to NSW Department of Planning and allow the Department to assess the proposal in respect of its impact on the local and state road network. The application seeks to make changes to an approved development on the site but does not significantly alter the ultimate traffic generation or parking demand generated by

the development. As such the Insite traffic report that accompanied the original development application DA 16-2009-418-1 approved by Port Stephens Council on 27 November 2009 is still valid but has been reproduced and updated within this report.

This report presents the findings of the traffic assessment and includes the following;

1. An outline of the existing situation in the vicinity of the site.
2. An assessment of the traffic impacts of the proposed development including the predicted traffic generation and its impact on existing road and intersection capacities.
3. Reviews parking, public transport, pedestrian and cycle way requirements for the proposed development, including assessment against Council and the Roads and Traffic Authority standards and requirements.
4. Presentation of conclusions and recommendations.

2.0 SITE LOCATION

The subject site is shown in **Figure 1** below. It is located on Masonite Road, Heatherbrae approximately 300 metres south east of the Pacific Highway and adjacent to an existing industrial subdivision.

The site is described as 431 Masonite Road, Heatherbrae. It is currently vacant well vegetated land and is zoned 4 (a) Industrial pursuant to the Port Stephens LEP (2000). The total site area is 16 hectares. **Photograph 1** shows existing conditions at the site.

The site has single frontage to Masonite Road. Transport connections to the site will be via Masonite Road north west to the Pacific Highway which represents the main and most direct transport connection for origins and destinations generated by the development or to the south east to Tomago Road.

All heavy vehicle movements will be via the Pacific Highway with only a small percentage of employee traffic expected to utilise the Tomago Road connection to the site.

Therefore it is expected that in terms of traffic impact the proposal has the potential to impact on:

- Pacific Highway (SH 1),
- Masonite Road,
- Tomago Road, (east of Masonite Road),
- Pacific Highway / Masonite Road roundabout.
- Masonite Road / Camfield Drive roundabout,
- Masonite Road / Tomago Road give way controlled T-intersection (Type CHR) to a minor extent.



Photograph 1 –Development site – 431 Masonite Road, Heatherbrae.

The Pacific Highway is part of the State Highway network (SH 10). However as the site is more than 90 metres from the Pacific Highway the concurrence of the RTA under the Infrastructure SEPP is not triggered by the location of the site. However due to the overall scale of the development and the fact that more than 200 car parks are to be provided on the site the proposal does fall within column 1 of Schedule 3 of the Infrastructure SEPP and therefore requires referral to the Hunter Regional Development Committee (HRDC). The original application was considered by the Committee and recent advice from the RTA is that this minor modification need only be considered by the RTA and does not need to be referred back to the HRDC.

The Pacific Highway is a classified state highway under the care and control of the RTA. It provides the main transportation route along the east coast of NSW and in this location provides connection between the lower Hunter Region and the mid and far north coast areas. However in respect of this development it provides the transportation link to the New England Highway at Hexham

some 7 km's south west of the site. The New England Highway then provides the transportation route to the mining areas within the Hunter Valley and New England area which form the main origin / destinations for heavy vehicle traffic generated by the development. It is noted however that the proposed development is a consolidation of other Sandvik sites around Tomago and Hexham therefore this traffic, aside from minor expected growth as a result of the proposal, is already distributed on the road network west of Hexham. Therefore assessment of the impact of the development on the New England Highway west of Hexham is not considered necessary.

Masonite Road is a local road under the care and control of Port Stephens Council. Under a functional road hierarchy it performs a local access role providing access to properties along its length but also connects the town of Raymond Terrace with the villages of Williamtown, Tomago and Fern Bay / Stockton. It would therefore be considered a collector road under a functional road hierarchy.



Photograph 2 – Pacific Highway south of Masonite Road.



Photograph 3 – Masonite Road along the site frontage (looking north).



Photograph 4 – Tomago Road in the vicinity of Masonite Road (looking west).

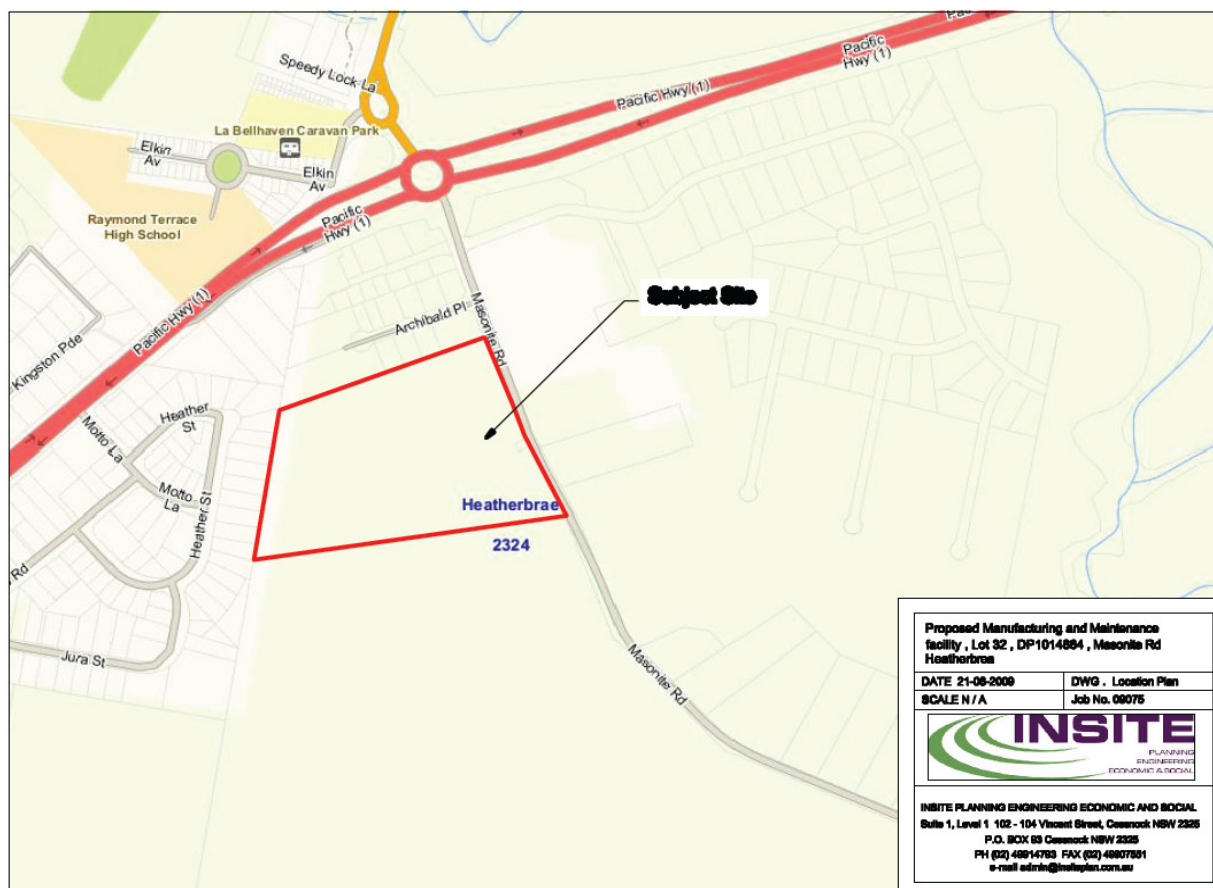


Figure 1 – Site Location



Figure 2 – Locality Plan

3.0 EXISTING ROAD NETWORK

The Pacific Highway as part of the state highway network (SH 10) is a major arterial road in the region. It connects the Raymond Terrace area to Newcastle, Sydney and the Hunter Valley to the south and west, as well as the major north coast regional areas and Brisbane to the north. It is therefore the main transportation route for the Raymond Terrace / Heatherbrae area as well as being a significant transport route for Sydney and

Newcastle traffic. In the vicinity of the site it is a dual carriageway four lane two way sealed road. Lane widths are between 3.5 and 3.6 metres and kerb and gutter and longitudinal drainage are located along its edges. A 70 km/h speed limit applies to this section of road and at the time of inspection it was observed to be in good condition. This section of the road also has wide sealed shoulders on both sides of the road.



Photograph 5 – Pacific Highway north of the site looking north

Masonite Road functionally provides access to individual properties in the area but also distributes traffic from Raymond Terrace to the village areas of Williamtown, Tomago and Fern Bay. It is therefore considered to be a collector road within a functional road hierarchy. In the vicinity of the site it is a two lane two way sealed road approximately 7 metres wide with unsealed shoulders of

varying width. Masonite Road is kerb and guttered immediately north of the site on the development side of the road only and a no stopping zone exists across this section of kerb and gutter to Archibald Place. A 70 km/h speed limit applies to this section of road and at the time of inspection it was observed to be in poor condition.



Photograph 6 – Masonite Road in the vicinity of the site looking north towards Pacific Highway



4.0 ROAD NETWORK IMPROVEMENTS

It has been determined that a condition of the sale of the land from Port Stephens Council to Sandvik will be that the section of Masonite Road along the frontage of the site is reconstructed and upgraded to a suitable standard for industrial development and in accordance with Council's requirements. Therefore though this section of Masonite Road is currently in poor condition and is probably unsuitable for the development this assessment can assume that the road will be upgraded to a suitable standard for the development by Port Stephens Council.

The RTA are also proposing a freeway link between the F3 freeway at Minmi to north of Raymond Terrace. The proposed route crosses Masonite Road south-east of the site. It would have the potential to significantly change traffic distributions to and from the site. However this project is yet to receive funding and is still at a preliminary planning stage. It is unlikely to be constructed within ten years and advice from the RTA is that its potential impact can be ignored in this assessment.

5.0 TRAFFIC VOLUMES

The RTA has a number of traffic counter stations near the site. The nearest traffic counter site for this assessment would be;

- Station 05.075 – Raymond Terrace – N of Windeyer's Ck Bridge, The latest data from the site available off the RTA web site is shown in Table 1 below;

Table 1 – AADT (vehicles per day) Station 05.075 – Raymond Terrace – N of Windeyer's Ck Bridge

2001	2004
19,280 vpd	23,168 vpd

This shows a traffic growth of approximately 6.3 % per annum between 2001 and 2004. If extrapolated to 2010 using a similar growth rate this would result in a predicted 2010 AADT traffic volume of 31,445. However a 6.3 % growth rate is considered significantly high and unsustainable as a normal background traffic growth rate and usually indicates that a major development or significant change to the road network has occurred. A review of RTA traffic count stations both south and north of the site indicates background traffic growth rates of between 2.6 % p.a.(station 05.083) and 3.3 % p.a. (05.001) between 1995 and 2004. On this basis it is considered more reasonable to extrapolate the 2004 count from Station 05.075 using a background traffic growth rate of 3 %. This background traffic growth rate will also be adopted for any future intersection modelling carried out as part of this assessment.

On this basis the predicted 2010 AADT traffic volume for the Pacific Highway near the site is around 27,700 vpd. Peak hour traffic volumes are usually in the order of 8% and 15% of AADT values. Therefore it is expected that peak hour traffic volumes on the Pacific Highway at this location will be between 2,210 vph and 4,150 vph.

Port Stephens Council was also sourced for traffic count data and a February 1997 count on Masonite Road produced an AADT of 1,330 vpd. Using a 3% traffic growth the Council count can be extrapolated to predict a 2010 count of 1,950 vpd with a peak hour range between 156 vph and 293 vph (8 % to 15 % of AADT).

A manual intersection count was carried out on the Pacific Highway / Masonite Road roundabout on Tuesday 25th May 2010 during peak AM and PM traffic hours mainly to determine traffic distribution through the intersection. However this count also allows determination of the peak traffic flows and the peak traffic hours on that day. It is considered an excellent guide to calibrate against the Council and RTA data to determine suitable existing traffic volumes to assess the impact of the development on the local road network.

The results of the manual traffic count indicated that the peak traffic flow on the Pacific Highway is approximately 3,005 vph in the PM (3.15 pm to 4.15 pm) and 2,306 vph in the AM (7.30 am to 8.30 am). These results fit within the expected range based on the RTA counts therefore it is considered they compare favourably with the RTA counts.

A manual intersection count was also carried out on the Masonite Road / Camfield Drive roundabout on Tuesday 18th May 2010 during peak AM and PM traffic hours. This count determined that the peak traffic flow on Masonite Road is approximately 327 vph in the PM (3.15 pm to 4.15 pm) and 242 vph in the AM (7.45 am to 8.45 am). These results indicate that the observed traffic counts could reflect an AADT higher than predicted from the Council count indicating a slightly higher traffic growth rate than the 3 % used. However the count is close to the top of the range predicted therefore again the manual counts are considered relevant enough to use for assessment purposes.

The tally sheets for the manual traffic counts are provided within **Attachment B**.

Given the good correlation of the Insite traffic counts and RTA and Council data it is considered that the Insite counts are representative of annual average traffic and have been adopted for traffic impact assessment purposes.

6.0 ROAD CAPACITY

The capacity of urban roads is generally determined by the capacity of intersections. However, Table 4.3 of the RTA's *Guide to Traffic Generating Developments* provides some guidance on mid block capacities for urban roads. This table is reproduced below.

Table 4.3
Typical mid-block capacities for urban roads with interrupted flow

Type of Road	One-Way Mid-block Lane Capacity (pcu/hr)	
Median or inner lane:	Divided Road	1,000
	Undivided Road	900
Outer or kerb lane:	With Adjacent Parking Lane	900
	Clearway Conditions	900
	Occasional Parked Cars	600
4 lane undivided:	Occasional Parked Cars	1,500
	Clearway Conditions	1,800
4 lane divided:	Clearway Conditions	1,900

Based on this table it is considered that the road network around the site has the following two way road capacities.

Table 2 – Road network capacities

Road	Estimated two way capacity
Pacific Highway	3,800 vph
Masonite Road	1,200 vph

Based on the traffic surveys carried out by Insite and noting the capacities in Table 2 it is considered that the adjacent road network is operating well within its technical capacity and has scope to cater for additional traffic provided suitable intersection controls are in place.

Therefore it is likely that the practical capacity of the intersections on the access routes from the development site to the arterial road network will be the limiting factor in terms of the local road network's capacity to cater for the additional traffic generated by the development. In this respect it is considered that the crucial intersections requiring assessment within this report are;

1. Pacific Highway / Masonite Road roundabout – large two lane roundabout at the start of the Raymond Terrace by-pass; and
2. Masonite Road / Camfield Drive roundabout – smaller single lane roundabout within the Heatherbrae industrial area.



7.0 ALTERNATE TRANSPORT MODES

Both Hunter Valley Buses and Port Stephens Coaches run services that set down and pick up passengers in the vicinity of the site. Hunter Valley Buses Newcastle service Route 140 runs along the Pacific Highway with the nearest bus stops being located near the Masonite Road roundabout approximately 450 metres from the site. It connects the central and west parts of Raymond Terrace with the Newcastle CBD providing seven am and five pm services on weekdays as well as three am and four pm services on Saturdays and three am and two pm services on Sundays.

Port Stephens Coaches Route 136 links Nelson Bay and Raymond Terrace and runs along Masonite Road. The nearest bus stops to the site are at the Masonite gates immediately north of the site. However this is a very limited service which provides only one am and one pm service on weekdays only. **Attachment C** shows the timetables and route maps for bus services in the area

that would be available for use by employees of the proposed development.

The area to the north and north-west of the site is well serviced by a network of concrete pedestrian footpaths providing access to nearby bus stops, take away food outlets and an off road cycleway linking the area to the Raymond Terrace CBD area along Adelaide Street. The only pedestrian crossing facilities in the area are provided by the way of refuges within the approach islands to the roundabouts on the Pacific Highway and at Camfield Drive.

Apart from the Adelaide Street off road cycleway, cyclists in the area would be required to share the roadway (Masonite Road) or utilise the wide sealed shoulders of the Pacific Highway.

The following photographs show the public transport, pedestrian and cycleway facilities around the site.



Photograph 7 – Footpath and refuges – Pacific Highway / Masonite Road roundabout.



Photograph 8 –Footpath and refuges – Masonite Road / Camfield Way roundabout.



Photograph 9 – Bus Stop – Pacific Highway near site.



Photograph 10 – Off – road cycleway – Adelaide Street



8.0 DEVELOPMENT PROPOSAL

The proposal is to construct a mine machinery manufacturing and maintenance plant on the site to be used by Sandvik. Sandvik are looking to consolidate all their current operations within the lower Hunter region into this one site with some capacity to grow. It is expected that within the first five years of operation the site will accommodate approximately 750 employees working varying shifts. Sandvik has provided a detailed breakdown of projected employee numbers for the site which is included as **Attachment F**. The proposed development concept plan is provided within **Attachment A**.

It is proposed to construct five (5) separate industrial buildings, a two storey main office building, three (3) separate amenities buildings, a number of store's buildings (3), guardhouse, motor cycle & bicycle storage shed (50 motor cycles & 38 bicycles) and approximately 600 car parks on the site. The gross floor area of buildings on the site will be 27,724 m². A detailed breakdown of the facilities provided on site is provided within

the car parking and traffic generation calculation tables provided in **Attachment G**. The site is expected to employ 750 people by 2015.

The main access to the site will be provided by the Pacific Highway and Masonite Road with only a small amount of employee traffic expected to utilise Tomago Road and Masonite Road to access the site. All heavy vehicle traffic generated by the site will utilise the Pacific Highway and Masonite Road to access the site.

Development approval for the original proposal was granted by Port Stephens Council on 27 November 2009 (DA 16-2009-418-1).

This development application to modify this approved development seeks to amend the layout and slightly reduce the building sizes but does not impact on the traffic generation, parking demand or access arrangements for the proposal;



9.0 TRAFFIC GENERATION

The RTA's *Guide to Traffic Generating Development's* provides specific advice on the traffic generation potential of various land uses. In this case specific components of the development will fall within the categories of factories, warehouses and offices as defined in the Guide. A traffic generation calculation for the proposal has been carried out using these rates and is included in **Attachment G**. In carrying out this calculation the following assumptions were made;

- ☞ The factory rate within the Guide was used for the workshop areas and amenities buildings.
- ☞ The warehouse rate within the Guide was used for all store areas; and
- ☞ The commercial office rate within the Guide was used for all office areas and the guardhouse.

The resultant peak hourly traffic generation determined for the development using the Guide's rates is 305 vph.

However Sandvik have provided a detailed list of employee numbers and shift start and finish times which allows for calculation of likely vehicular traffic generated at shift change times. It is considered that the peak traffic generation from the site will occur at change of shift times. A calculation of employee traffic generated by the development has therefore been carried out on the following basis;

- ☞ Employee arrival or departure will occur within 30 minutes of start of or end of shift.
- ☞ The number of employees will be as advised by Sandvik as being on site in 2015 and shifts will remain the same as those currently employed at the various Sandvik sites around the lower Hunter.

- ☞ A car occupancy rate of 1 has been used which is likely to be conservative for assessment purposes as some car pooling and alternate transport modes are likely to be utilised by employees.

This calculation is also provided within **Attachment G** and determined the following;

1. The AM peak for employee traffic will be 317 vph between 5 am and 6 am with the majority of this traffic occurring between 5.30 am and 6.00 am being associated with the commencement of the day shift.
2. The PM peak for employee traffic will be 312 vph between 3 pm and 4 pm with the majority of this traffic occurring between 3.30 am and 4.00 pm being associated with the completion of the day shift.

It is considered that these figures correlate reasonably well with the RTA rates and as they are more site specific have been adopted for use for further traffic impact assessment within this report.

Logistics data again provided by Sandvik identifies that the following service and heavy vehicle movements will occur.

- ☞ Utilities and small vans – 22 vehicles per day i.e. 44 vehicle movements per day peaking between 6 am and 7 am at 12 vehicle movements per hour.
- ☞ Medium trucks (2T – 4T) – 54 vehicles per day i.e. 108 vehicle movements per day peaking between 8 am and 9 am at 24 vehicle movements per hour.
- ☞ Large semi-trailers (4T-14T) – 8 vehicles per day i.e. 16 vehicle movements per day peaking between 7

am and 8 am at 6 vehicle movements per day.

- Larger oversize and/or wide load movements are also likely to occur on an average of 1 vehicle per week but will occur well outside peak road network periods.

In terms of the peak traffic periods for the development and the road network however the Sandvik provided information indicates the following;

- Little or no service vehicle traffic occurs during the AM development peak (5 am to 6 am)
- The road network AM peak 7.30 am to 8.30 am coincides with the peak service vehicle period for the Sandvik site. It is estimated service vehicle movements will be in the order of 40 vehicle movements per hour during this time.
- During the afternoon road network peak (3.15 pm to 4.15 pm) service vehicle movements are estimated to be 10 vehicle movements per hour.

It is noted that the afternoon peak for the development occurs close to the PM road network peak (3.15 pm to 4.15 pm) determined from the manual traffic counts and that during this afternoon period the road network traffic volumes remain relatively constant. Therefore for assessment purposes it has been assumed the PM development traffic peak and the PM road network peak coincide.

The AM development traffic peak however occurs before the AM road network peak during a period when road network traffic is considerably lighter. Therefore for assessment purposes two AM traffic periods need to be considered these being;

- a) The development traffic peak (5 am to 6 am).
- b) The road network peak (7.30 am to 8.30 am).

During the AM road network peak (7.30 am to 8.30 am) it has been determined that the likely employee traffic volume will be in the

order of 159 vph mainly associated with office staff commencing work.

Manual traffic counts were not carried out between the hours of 5 am and 6 am however for assessment purposes the existing traffic volumes determined from a manual count between 6 am and 7 am have been adopted for the period 5 am to 6 am. It is likely that traffic volumes during the 5 am to 6 am period would be even lower so it is considered in terms of intersection performance this is a conservative assumption.

In carrying out intersection capacity analysis it will also need to be considered that the arrival and departure of employee traffic is likely to occur within a 30 minute period so any modelling of the development traffic movements will need to take account of peaking effects.

Drayton Building and Construction have advised in regard to site construction activities that construction traffic generation will not exceed the likely peak hour traffic generation of the development.

The majority of this traffic will access the site via the Pacific Highway and Masonite Road. As the construction traffic volumes are likely to be significantly less than the traffic volumes generated by the development itself, it is expected the existing road network would be able to easily cater for these volumes. The peak period would occur during the pouring of slabs when concrete trucks will be delivering to the site. These will occur however in short sharp peaks prior to the AM road network peak when traffic volumes on the road network are much lighter.

The RTA in pre lodgement discussion raised the issue of the ability of the heavy vehicles to use the Masonite Road / Camfield Drive roundabout. Autotrack swept turning paths for a 19 metre semi-trailer and a 25 m B-Double are provided in **Attachment H**. These show that heavy vehicles can satisfactorily negotiate the roundabout when travelling along Masonite Road to/from the site.



10.0 TRIP DISTRIBUTION

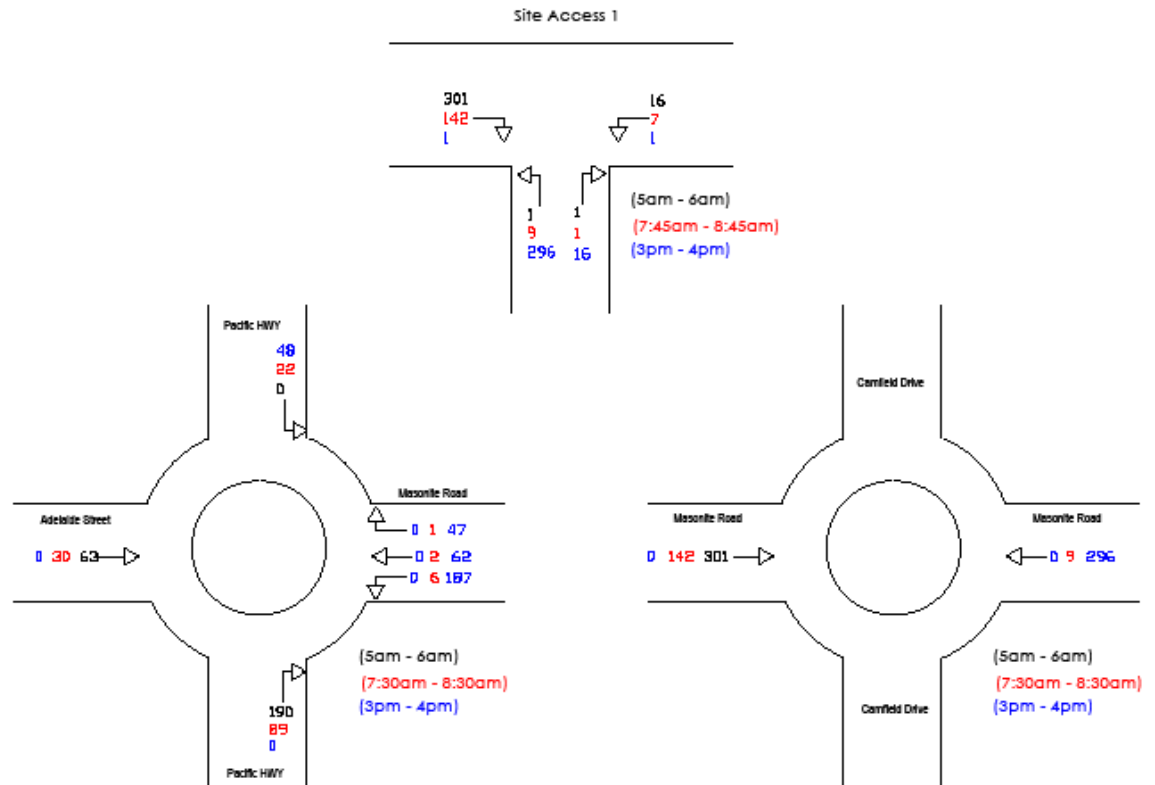
Before carrying out any traffic modelling the additional traffic generated by the development needs to be distributed through the adjoining road network. This involves making a number of assumptions as to trip making decisions by drivers. In distributing the traffic through the adjacent road network the following assumptions have been made for this site.

☞ All service vehicle trips generated by the development will utilise the Pacific Highway to access the site with 90 % having trip origins / destinations to the south and west of the site and 10 % having origin destinations to the north of the site.

☞ Service vehicle trips during the peak hours are 50 % to the site and 50 % from the site.

☞ Employee trip distributions have been estimated as 60 % from or to the Pacific Highway to the south west (Newcastle, Lake Macquarie), 20 % from Adelaide Street (Raymond Terrace, Maitland), 15 % from or to the Pacific Highway to the north-east (Port Stephens and further north) and 5 % from or to Masonite Road to the south-east (Williamtown, Fern Bay, Tomago, Stockton).

The resulting predicted trip distributions for traffic generated by the proposed development are shown in the figures below.



11.0 TRAFFIC IMPACTS OF DEVELOPMENT

The main traffic impacts that the development will have on the local road network relate to the impact of the additional traffic generated by the development on the capacity of the road network, in particular intersection capacity as well as the safety issues associated with the proposed access to the development.

The capacity of the local road network will be very dependent on any spare capacity in the Pacific Highway / Masonite Road roundabout and the Masonite Road / Camfield Drive roundabout. It is considered that the additional traffic flows on the Masonite Road / Tomago Road give way controlled intersection are light. From observation of the operation of this intersection during peak periods it is considered that the intersection operates with little or no delays during peak periods and it is unlikely that the level of additional traffic generated by the development will adversely impact on this intersection.

The impact of the development on the operation of the two subject roundabouts can be assessed by modelling traffic flows on these intersections pre and post development. This modelling has been carried out using the SIDRA 4 micro-simulation model. The summary sheets from the SIDRA modelling are included as **Attachment D**.

In carrying out this modelling a heavy vehicle percentage of 7.5 % was assumed. This is consistent with traffic data previously collected by both Insite and Better Transport Futures on the Pacific Highway south of the site at Hexham. A peak flow period of 30 minutes was adopted for modelling to reflect the fact that staff movements to and from the site are likely to occur within a half hour period.

The results of this modelling are shown in Tables 3.1, 3.2, 3.3, 3.4, 3.5 & 3.6 below with the movement level of service shown in brackets.

Table 3.1 –SIDRA 4 predictions – Pacific Highway / Masonite Road roundabout. AM Peak (5 am to 6 am)

Traffic Movement / performance measure	Existing	Post Development	2020
Masonite Rd left – average delay (LOS)	7.6 seconds (A)	7.7 seconds (A)	8.1 seconds (A)
Masonite Rd through – average delay (LOS)	8.2 seconds (A)	8.2 seconds (A)	8.9 seconds (A)
Masonite Rd right – average delay (LOS)	17.3 seconds (B)	17.4 seconds (B)	18.1 seconds (B)
Pacific Hwy NE left – average delay (LOS)	6.9 seconds (A)	7.9 seconds (A)	9.6 seconds (A)
Pacific Hwy NE through – average delay (LOS)	6.9 seconds (A)	8.2 seconds (A)	10.1 seconds (A)
Pacific Hwy NE right – average delay (LOS)	16.0 seconds (B)	17.5 seconds (B)	19.8 seconds (B)
Adelaide St left – average delay (LOS)	6.3 seconds (A)	6.8 seconds (A)	7.1 seconds (A)
Adelaide St through – average delay (LOS)	6.1 seconds (A)	6.6 seconds (A)	6.9 seconds (A)
Adelaide St right – average delay (LOS)	15.0 seconds (B)	15.6 seconds (B)	16.0 seconds (B)
Pacific Hwy SW left – average delay (LOS)	5.6 seconds (A)	5.6 seconds (A)	5.7 seconds (A)
Pacific Hwy SW through – average delay (LOS)	5.4 seconds (A)	5.4 seconds (A)	5.4 seconds (A)
Pacific Hwy SW right – average delay (LOS)	14.2 seconds (A)	14.2 seconds (A)	14.2 seconds (A)
Masonite Rd left – 95 % back of queue	2.1 metres	2.2 metres	3.2 metres
Masonite Rd through – 95 % back of queue	2.1 metres	2.2 metres	3.2 metres
Masonite Rd right – 95 % back of queue	1.9 metres	2.0 metres	2.8 metres
Pacific Hwy NE left – 95 % back of queue	16 metres	21.8 metres	36 metres
Pacific Hwy NE through – 95 % back of queue	16 metres	21.8 metres	36 metres
Pacific Hwy NE right – 95 % back of queue	15.2 metres	20.5 metres	32.7 metres
Adelaide St left – 95 % back of queue	8.8 metres	10.9 metres	14.3 metres
Adelaide St through – 95 % back of queue	8.8 metres	10.9 metres	14.3 metres
Adelaide St right – 95 % back of queue	8.8 metres	10.9 metres	14.3 metres
Pacific Hwy SW left – 95 % back of queue	7.2 metres	11.2 metres	14.2 metres
Pacific Hwy SW through – 95 % back of queue	7.2 metres	11.2 metres	14.2 metres
Pacific Hwy SW right – 95 % back of queue	7.0 metres	10.8 metres	13.8 metres

Table 3.2 –SIDRA 4 predictions – Pacific Highway / Masonite Road roundabout. AM Peak (7.30 am to 8.30 am).

Traffic Movement / performance measure	Existing	Post Development	2020
Masonite Rd left – average delay (LOS)	9.6 seconds (A)	9.6 seconds (A)	11.3 seconds (A)
Masonite Rd through – average delay (LOS)	10.9 seconds (A)	11.2 seconds (A)	13.4 seconds (A)
Masonite Rd right – average delay (LOS)	20.3 seconds (B)	20.4 seconds (B)	22.9 seconds (B)
Pacific Hwy NE left – average delay (LOS)	8.9 seconds (A)	10.5 seconds (A)	17.5 seconds (B)
Pacific Hwy NE through – average delay (LOS)	9.4 seconds (A)	11.2 seconds (A)	19.0 seconds (B)
Pacific Hwy NE right – average delay (LOS)	19.0 seconds (B)	21.1 seconds (B)	30.1 seconds (C)
Adelaide St left – average delay (LOS)	6.6 seconds (A)	6.9 seconds (A)	7.3 seconds (A)
Adelaide St through – average delay (LOS)	6.3 seconds (A)	6.7 seconds (A)	7.0 seconds (A)
Adelaide St right – average delay (LOS)	15.3 seconds (B)	15.7 seconds (B)	16.2 seconds (B)
Pacific Hwy SW left – average delay (LOS)	5.8 seconds (A)	5.8 seconds (A)	5.9 seconds (A)
Pacific Hwy SW through – average delay (LOS)	5.6 seconds (A)	5.6 seconds (A)	5.7 seconds (A)
Pacific Hwy SW right – average delay (LOS)	14.4 seconds (A)	14.4 seconds (A)	14.6 seconds (A)
Masonite Rd left – 95 % back of queue	8.3 metres	10 metres	15.8 metres
Masonite Rd through – 95 % back of queue	8.3 metres	10 metres	15.8 metres
Masonite Rd right – 95 % back of queue	7.0 metres	8.4 metres	12.9 metres
Pacific Hwy NE left – 95 % back of queue	38.1 metres	49 metres	97.6 metres
Pacific Hwy NE through – 95 % back of queue	38.1 metres	49 metres	97.6 metres
Pacific Hwy NE right – 95 % back of queue	35.3 metres	44 metres	83.2 metres
Adelaide St left – 95 % back of queue	17.2 metres	18.9 metres	24.8 metres
Adelaide St through – 95 % back of queue	17.2 metres	18.9 metres	24.8 metres
Adelaide St right – 95 % back of queue	17.2 metres	18.9 metres	24.8 metres
Pacific Hwy SW left – 95 % back of queue	10 metres	12.6 metres	15.9 metres
Pacific Hwy SW through – 95 % back of queue	10 metres	12.6 metres	15.9 metres
Pacific Hwy SW right – 95 % back of queue	9.6 metres	12.1 metres	15.2 metres

Table 3.3 –SIDRA 4 predictions – Pacific Highway / Masonite Road roundabout. PM Peak (3.15 pm to 4.15 pm).

Traffic Movement / performance measure	Existing	Post Development	2020
Masonite Rd left – average delay (LOS)	8.1 seconds (A)	9.2 seconds (A)	9.7 seconds (A)
Masonite Rd through – average delay (LOS)	8.3 seconds (A)	10.0 seconds (A)	10.5 seconds (A)
Masonite Rd right – average delay (LOS)	18.0 seconds (B)	19.7 seconds (B)	20.5 seconds (B)
Pacific Hwy NE left – average delay (LOS)	7.1 seconds (A)	7.1 seconds (A)	7.2 seconds (A)
Pacific Hwy NE through – average delay (LOS)	7.1 seconds (A)	7.1 seconds (A)	7.2 seconds (A)
Pacific Hwy NE right – average delay (LOS)	16.3 seconds (B)	16.3 seconds (B)	16.4 seconds (B)
Adelaide St left – average delay (LOS)	11.7 seconds (A)	13.0 seconds (A)	16.6 seconds (B)
Adelaide St through – average delay (LOS)	11.4 seconds (A)	12.7 seconds (A)	16.4 seconds (B)
Adelaide St right – average delay (LOS)	21.4 seconds (B)	22.9 seconds (B)	27.0 seconds (B)
Pacific Hwy SW left – average delay (LOS)	10.6 seconds (A)	14.6 seconds (A)	26.5 seconds (B)
Pacific Hwy SW through – average delay (LOS)	12.0 seconds (A)	16.9 seconds (A)	30.5 seconds (C)
Pacific Hwy SW right – average delay (LOS)	21.0 seconds (B)	26.1 seconds (B)	40.5 seconds (C)
Masonite Rd left – 95 % back of queue	16.3 metres	31 metres	32.8 metres
Masonite Rd through – 95 % back of queue	16.3 metres	31 metres	32.8 metres
Masonite Rd right – 95 % back of queue	14.7 metres	28.1 metres	29.3 metres
Pacific Hwy NE left – 95 % back of queue	18.6 metres	19 metres	22.9 metres
Pacific Hwy NE through – 95 % back of queue	18.6 metres	19 metres	22.9 metres
Pacific Hwy NE right – 95 % back of queue	17.2 metres	17.4 metres	21.0 metres
Adelaide St left – 95 % back of queue	39.2 metres	44.8 metres	56.3 metres
Adelaide St through – 95 % back of queue	39.2 metres	44.8 metres	56.3 metres
Adelaide St right – 95 % back of queue	39.2 metres	44.8 metres	56.3 metres
Pacific Hwy SW left – 95 % back of queue	94.4 metres	129.8 metres	237 metres
Pacific Hwy SW through – 95 % back of queue	94.4 metres	129.8 metres	237 metres
Pacific Hwy SW right – 95 % back of queue	91.7 metres	122.5 metres	217.3 metres

Table 3.4 –SIDRA 4 predictions – Masonite Road / Camfield Drive roundabout. AM Peak (5 am to 6 am)

Traffic Movement / performance measure	Existing	Post Development	2020
Masonite Rd S left – average delay (LOS)	8.6 seconds (A)	8.6 seconds (A)	8.6 seconds (A)
Masonite Rd S through – average delay (LOS)	7.7seconds (A)	7.7 seconds (A)	7.7 seconds (A)
Masonite Rd S right – average delay (LOS)	13.2 seconds (A)	13.2 seconds (A)	13.3 seconds (A)
Camfield Dr E left – average delay (LOS)	8.7 seconds (A)	10.0 seconds (A)	10.9 seconds (A)
Camfield Dr E through – average delay (LOS)	8.1 seconds (A)	9.1 seconds (A)	10.0 seconds (A)
Camfield Dr E right – average delay (LOS)	14.0 seconds (A)	15.3 seconds (B)	16.2 seconds (B)
Masonite Rd N left – average delay (LOS)	8.5 seconds (A)	8.5 seconds (A)	8.5 seconds (A)
Masonite Rd N through – average delay (LOS)	7.5 seconds (A)	7.5 seconds (A)	7.6 seconds (A)
Masonite Rd N right – average delay (LOS)	13.4 seconds (A)	13.4 seconds (A)	13.4 seconds (A)
Camfield Dr W left – average delay (LOS)	8.5 seconds (A)	8.5 seconds (A)	8.6 seconds (A)
Camfield Dr W through – average delay (LOS)	7.3 seconds (A)	7.3 seconds (A)	7.3 seconds (A)
Camfield Dr W right – average delay (LOS)	13.5 seconds (A)	13.5 seconds (A)	13.5 seconds (A)
Masonite Rd S left – 95 % back of queue	0.9 metres	0.9 metres	1.2 metres
Masonite Rd S through – 95 % back of queue	0.9 metres	0.9 metres	1.2 metres
Masonite Rd S right – 95 % back of queue	0.9 metres	0.9 metres	1.2 metres
Camfield Dr E left – 95 % back of queue	0.4 metres	0.4 metres	0.5 metres
Camfield Dr E through – 95 % back of queue	0.4 metres	0.4 metres	0.5 metres
Camfield Dr E right – 95 % back of queue	0.4 metres	0.4 metres	0.5 metres
Masonite Rd N left – 95 % back of queue	5.1 metres	15.5 metres	22.8 metres
Masonite Rd N through – 95 % back of queue	5.1 metres	15.5 metres	22.8 metres
Masonite Rd N right – 95 % back of queue	5.1 metres	15.5 metres	22.8 metres
Camfield Dr W left – 95 % back of queue	1 metre	1 metre	1.3 metres
Camfield Dr W through – 95 % back of queue	1 metre	1 metre	1.3 metres
Camfield Dr W right – 95 % back of queue	1 metre	1 metre	1.3 metres

Table 3.5 –SIDRA 4 predictions – Masonite Road / Camfield Drive roundabout. AM Peak (7.45 am to 8.45 am).

Traffic Movement / performance measure	Existing	Post Development	2020
Masonite Rd S left – average delay (LOS)	8.8 seconds (A)	8.8 seconds (A)	9.0 seconds (A)
Masonite Rd S through – average delay (LOS)	7.9 seconds (A)	7.9 seconds (A)	8.1 seconds (A)
Masonite Rd S right – average delay (LOS)	13.5 seconds (A)	13.5 seconds (A)	13.7 seconds (A)
Camfield Dr E left – average delay (LOS)	9.2 seconds (A)	9.8 seconds (A)	10.3 seconds (A)
Camfield Dr E through – average delay (LOS)	8.2 seconds (A)	8.8 seconds (A)	9.4 seconds (A)
Camfield Dr E right – average delay (LOS)	14.1 seconds (A)	14.7 seconds (B)	15.2 seconds (B)
Masonite Rd N left – average delay (LOS)	8.4 seconds (A)	8.4 seconds (A)	8.4 seconds (A)
Masonite Rd N through – average delay (LOS)	7.5 seconds (A)	7.5 seconds (A)	7.5 seconds (A)
Masonite Rd N right – average delay (LOS)	13.4 seconds (A)	13.4 seconds (A)	13.4 seconds (A)
Camfield Dr W left – average delay (LOS)	8.9 seconds (A)	8.9 seconds (A)	9.1 seconds (A)
Camfield Dr W through – average delay (LOS)	7.7 seconds (A)	7.7 seconds (A)	7.9 seconds (A)
Camfield Dr W right – average delay (LOS)	13.8 seconds (A)	13.9 seconds (A)	14.0 seconds (A)
Masonite Rd S left – 95 % back of queue	4 metres	4.4 metres	6.1 metres
Masonite Rd S through – 95 % back of queue	4 metres	4.4 metres	6.1 metres
Masonite Rd S right – 95 % back of queue	4 metres	4.4 metres	6.1 metres
Camfield Dr E left – 95 % back of queue	0.7 metres	0.8 metres	1.2 metres
Camfield Dr E through – 95 % back of queue	0.7 metres	0.8 metres	1.2 metres
Camfield Dr E right – 95 % back of queue	0.7 metres	0.8 metres	1.2 metres
Masonite Rd N left – 95 % back of queue	6.2 metres	10.8 metres	15.3 metres
Masonite Rd N through – 95 % back of queue	6.2 metres	10.8 metres	15.3 metres
Masonite Rd N right – 95 % back of queue	6.2 metres	10.8 metres	15.3 metres
Camfield Dr W left – 95 % back of queue	1.4 metres	1.4 metres	1.9 metres
Camfield Dr W through – 95 % back of queue	1.4 metres	1.4 metres	1.9 metres
Camfield Dr W right – 95 % back of queue	1.4 metres	1.4 metres	1.9 metres

Table 3.6 –SIDRA 4 predictions – Masonite Road / Camfield Drive roundabout. PM Peak (4.00 pm to 5.00 pm).

Traffic Movement / performance measure	Existing	Post Development	2020
Masonite Rd S left – average delay (LOS)	8.9 seconds (A)	9.1 seconds (A)	9.4 seconds (A)
Masonite Rd S through – average delay (LOS)	8.0 seconds (A)	8.1 seconds (A)	8.5 seconds (A)
Masonite Rd S right – average delay (LOS)	13.6 seconds (A)	13.7 seconds (A)	14.1 seconds (A)
Camfield Dr E left – average delay (LOS)	9.1 seconds (A)	9.1 seconds (A)	9.4 seconds (A)
Camfield Dr E through – average delay (LOS)	8.2 seconds (A)	8.2 seconds (A)	8.5 seconds (A)
Camfield Dr E right – average delay (LOS)	14.1 seconds (A)	14.1 seconds (A)	14.3 seconds (A)
Masonite Rd N left – average delay (LOS)	8.5 seconds (A)	8.5 seconds (A)	8.5 seconds (A)
Masonite Rd N through – average delay (LOS)	7.5 seconds (A)	7.5 seconds (A)	7.5 seconds (A)
Masonite Rd N right – average delay (LOS)	13.4 seconds (A)	13.4 seconds (A)	13.4 seconds (A)
Camfield Dr W left – average delay (LOS)	9.3 seconds (A)	10.8 seconds (A)	12.0 seconds (A)
Camfield Dr W through – average delay (LOS)	8.1 seconds (A)	9.6 seconds (A)	10.8 seconds (A)
Camfield Dr W right – average delay (LOS)	14.2 seconds (A)	15.8 seconds (B)	17.0 seconds (B)
Masonite Rd S left – 95 % back of queue	6.8 metres	20.3 metres	31.3 metres
Masonite Rd S through – 95 % back of queue	6.8 metres	20.3 metres	31.3 metres
Masonite Rd S right – 95 % back of queue	6.8 metres	20.3 metres	31.3 metres
Camfield Dr E left – 95 % back of queue	0.9 metres	0.9 metres	1.3 metres
Camfield Dr E through – 95 % back of queue	0.9 metres	0.9 metres	1.3 metres
Camfield Dr E right – 95 % back of queue	0.9 metres	0.9 metres	1.3 metres
Masonite Rd N left – 95 % back of queue	5.6 metres	6 metres	8.4 metres
Masonite Rd N through – 95 % back of queue	5.6 metres	6 metres	8.4 metres
Masonite Rd N right – 95 % back of queue	5.6 metres	6 metres	8.4 metres
Camfield Dr W left – 95 % back of queue	3.5 metres	4.4 metres	8.3 metres
Camfield Dr W through – 95 % back of queue	3.5 metres	4.4 metres	8.3 metres
Camfield Dr W right – 95 % back of queue	3.5 metres	4.4 metres	8.3 metres

In analysing these results reference needs to be made to Table 4.2 of the RTA's *Guide to Traffic Generating Developments* reproduced below which identifies the level of service criteria for intersection operation. This table identifies that for roundabouts a LOS C or higher indicates satisfactory operation while a LOS D is still satisfactory but nearing capacity.

The SIDRA modelling of these intersections post development has shown that both the Pacific Highway / Masonite Road roundabout and the Masonite Road / Camfield Drive roundabout will continue to operate satisfactorily post development and with predicted ten year traffic growth for all likely peak traffic periods. The overall LOS experienced on these roundabouts will remain high at LOS A or LOS B for all scenarios modelled and the queue lengths expected are not considered unreasonable nor will they exceed the physical storage capacity provided at the roundabouts.

It is therefore concluded that the proposed development will not adversely impact on the operation of these intersections as the intersections have sufficient spare capacity to cater for the traffic generated by the development.

Table 4.2
Level of service criteria for intersections

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



12.0 ACCESS LOCATION AND DESIGN

The proposal is to provide three (3) separate accesses to the site. A dedicated employee car park will be accessed at the northern end of the site while another employee and visitor car park will be accessed centrally along the site frontage near the main office building. Finally a heavy vehicle access to a heavy vehicle car park and entry guard house at the southern end of the site will be provided to ensure heavy and light vehicle movements on the site are separated as much as possible. The proposed access arrangements along with the size of the site itself ensure good manoeuvrability through the site such that forward entry and exit from the site is easily achieved for all vehicles.

The individual access requirements have been assessed against the requirements of Australian Standard AS2890.1-2004 Parking facilities – off street car parking and the Port Stephens Development Control Plan 2007 (PSDCP 2007) Part B3 – Parking, Traffic & Transport. Both documents are very similar in their requirements for access. It is considered however that the PSDCP 2007 will be the more relevant document to assess against. In accordance with Figure B3.2 of PSDCP 2007 the proposed parking areas are considered to be classified as a class A facility as they provide employee parking (all day parking). Then in accordance with Figure B3.3 of PSDCP 2007 for a class A off street parking facility servicing between 101 and 300 car spaces (each car park has approximately 300 spaces) and fronting a local road the access category required is a class 2 access. Figure B3.4 of PSDCP 2007 then specifies that a class 2 access should be at least a combined entry exit with a width of between 6 and 9 metres. The proposed accesses off Masonite Road will need to be designed to at least this standard but will need to also accommodate the swept turning

paths for the required design vehicles likely to use the accesses. This particularly applies to the proposed heavy vehicle access to the south of the site which will need to comply with AS2890.1-2002 Part 2 Parking facilities – Commercial vehicle facilities. Compliance with PSDCP 2007 can be appropriately conditioned on any consent issued for the proposal.

During the original development approval process the locations of these accesses were scrutinised and modified to ensure they were suitably staggered from the three accesses to the Weathertex complex opposite the site.

Sight distance requirements for accesses are specified within Figure B3.6 of AS2890.1-2004. For a road frontage speed of 70 km/h which applies on Masonite Road at this site a desirable sight distance of 97 metres is specified although a minimum sight distance of 89 metres is also specified. The proposed southern access (heavy vehicle) is located just within the 100 km/h zone on Masonite Road. Figure B3.6 of PSDCP 2007 requires a desirable and minimum sight distance of 160 and 139 metres respectively.

From site inspection it has been determined that at all access locations available sight distance is in excess of 200 metres therefore it is considered that the sight distance requirements are satisfied and the access locations are considered suitable. Available sight distance at the three proposed access locations is shown in **Photographs 11 to 16** below. Whilst the heavy vehicle access can meet the sight distance criteria for a 100 km/h speed environment the RTA may wish to review the speed zoning around this access because of its use by heavy vehicles and the impact that may have in terms of general road safety and awareness.



Photograph 11 – Site distance north from northern access



Photograph 12 – Site distance south from northern access



Photograph 13 – Site distance north from central access



Photograph 14 – Site distance south from central access



Photograph 15 – Site distance north from southern access



Photograph 16 – Site distance south from southern access

The pedestrian sight line requirements of AS2890.1-2004 can also be achieved through suitable access design ensuring all landscaping and other structures at the access exit points are kept lower than 1.2 metres high. This can be appropriately conditioned on any consent issued for the proposal.

Grades around the site are reasonably flat therefore it is expected that the gradient requirements for the accesses contained within section 3.3 of AS2890.1-2004 can also be easily achieved.

Overall it is concluded that the proposed access arrangements for the development can easily comply with the requirements of PSDCP 2007 and Australian Standard AS2890 Parking Facilities – Part 1 and Part 2 in terms of access location and design.

As Masonite Road in this area is essentially a rural type road the warrants for turning lanes at the access points have been checked against Austroads requirements contained within Austroads Guide to Traffic Engineering Practice – Part 5 Intersections at Grade Figure 6.41. Due to the likely high number of

turning movements and the use by heavy vehicles it is recommended that each access point to the development be constructed with a channelised right turn bay (CHR intersection type). To determine the required storage length a typical car park access was modelled using Sidra 4 based on the peak arrival rate of employees. The results of this modelling show that the 95 % back of queue length for the right turn bay on Masonite Road is likely to peak at 11 metres (16 metres in 2020) during the arrival of the day shift employees between 5 am and 6 am and the 95 % back of queue length on the internal driveway is likely to peak at 16 metres (35 metres in 2020) during the departure of the day shift employees between 3 pm and 4 pm. The Sidra summary sheets for this modelling are provided within **Attachment E**. Therefore it is recommended that the right turn bays provided at the access points to the site provide storage for at least three vehicles (21 metres).

As heavy vehicle arrival is expected to occur at reasonable intervals it is considered the storage bay for the right lane at the heavy vehicle access need only be one AV vehicle in length i.e. 19 metres.





13.0 ON-SITE PARKING AND MANOEUVRABILITY

In terms of on-site parking and manoeuvrability the proposal should comply with both Australian Standard AS2890.1-2004 Parking facilities – Part 1 – Off street car parking and the Port Stephens Development Control Plan 2007 (PSDCP 2007) Part B3 – Parking, Traffic & Transport.

A car parking calculation for the proposal has been carried out and included in **Attachment G**. The calculation has used rates from both the PSDCP 2007 and the RTA's Guide to Traffic Generating Developments. This calculation has determined that under PSDCP 2007 requirements a total of 327 car spaces are required with 16 disabled car spaces. Under RTA requirements a total of 380 car spaces are required. These figures have been determined assuming industrial rates for the workshop and amenities areas, warehouse rates for all store areas and commercial rates for the office and guardhouse areas of the site. The development concept provides 569 car parking spaces as required by Sandvik of which 16 could easily be nominated as disabled parking. As this is well in excess of the PSDCP and RTA rates it is considered that the proposal provides sufficient on-site parking.

A review of the plans indicate that the parking layout proposed is compliant with the requirements of PSDCP 2007 Part B3 –

Parking, Traffic & Transport, Australian Standard AS2890.1-2004 Parking Facilities – Part 1 Off-street car parking facilities and AS 2890.2-2002 Parking Facilities – Part 2 Commercial vehicle facilities. Parking modules are 2.5 metres wide by 5.5 metres long and the two way aisle widths within the car park are 6.7 metres wide. The disabled parking bays provided will be 3.2 metres wide. This should ensure convenient manoeuvrability through the site and ensure forward entry and exit from the site.

The use of three separate access points to the site not only allows heavy and light vehicle movements to be separated it will also allow the large traffic volumes entering and exiting the site at shift changes to be more easily and quickly distributed onto or off Masonite Road. For these reasons the use of three separate access points to the site should be supported.

It is concluded therefore that the internal car park and heavy vehicle areas proposed for the development comply with the requirements of the RTA's *Guide to Traffic Generating Developments*, PSDCP 2007 Part B3 – Parking, Traffic & Transport as well as AS2890.1-2004 and AS 2890.2-2002 and are considered appropriate.

14.0 PEDESTRIAN FACILITIES

It is likely that the proposed development will generate some pedestrian traffic. This would be from staff utilising the public transport available from the Pacific Highway or seeking refreshments from the nearby take-away and dine-in food outlets that also front the Pacific Highway. Therefore pedestrian linkages to these areas should be provided as part of the development. The existing pedestrian linkages are well developed from the Camfield Drive / Masonite Road roundabout however a pedestrian footpath from the main office building of the proposed development to this roundabout should be constructed to Port Stephens Council requirements as part of the development works.

Pedestrian linkages within the site will need to be provided and are to be designed to comply with the requirements of Australian Standards AS2890.1-2004 Parking facilities Part 1 – off street car parking and Port Stephens Council.





15.0 ALTERNATE TRANSPORT MODE FACILITIES

The proposed development is not expected to generate enough public transport usage to require any changes to the existing service. The existing service is limited and unlikely to be flexible enough for most staff. However there is some possibility that some staff could utilise the Newcastle – Raymond Terrace bus service from the Pacific Highway. Existing facilities at the nearby bus stops are considered good with excellent pedestrian facilities and a shelter provided at the main stop. No additional facilities are considered to be required apart from the pedestrian footpath from the site to the Masonite Road / Camfield Drive roundabout discussed in the previous section.

With a large staff base it is also expected that the proposed development will generate significant bicycle and motorcycle traffic and as such suitable end of trip facilities will need to be provided. The PSDCP 2007 does not provide guidance on requirements for these facilities therefore it is difficult to determine a likely demand. However Newcastle Council has recently adopted rates of 1 space per 20 staff for such facilities. As this is considered the most relevant guideline to utilise, it has

been used to recommend that the site provide at least 38 bicycle and 38 motorcycle spaces on the site. A suitable storage shed is to be provided with capacity for 50 motor cycles and 38 bicycles.

The proposal already provides suitable amenities for its staff including showers, which could be utilised by the staff using bicycles to travel to and from work.

Therefore it is concluded that subject site could if required by Council provide suitable alternate transport mode facilities through the provision of;

- A concrete footpath from the main office building to the Masonite Road / Camfield Drive roundabout; and
- The provision of bicycle and motorcycle parking facilities on site providing for catering for 38 bicycles and 50 motor cycles as proposed.

16.0 CONCLUSIONS

This traffic impact assessment of a proposed Manufacturing, Assembly, Aftermarket Service, Regional Distribution Centre and Training Facility for Sandvik Mining and Construction Australia Pty Ltd at 431 Masonite Road, Heatherbrae has concluded the following;

- ☞ The proposed amendments to the approved development does not alter the ultimate traffic generation or parking demand generated by the development nor the distribution of this traffic through the local road network. As such the findings of the previous Insite traffic study for the site are still relevant. However this report has been updated for the purposes of the development application.
- ☞ The main access route to the site will still be via the Pacific Highway and Masonite Road.
- ☞ The Pacific Highway in the vicinity of the site has a current peak hour traffic volume of approximately 3,005 vph in the PM (3.15 pm to 4.15 pm) and 2,306 vph in the AM (7.30 am to 8.30 am).
- ☞ The Pacific Highway as a four lane two way dual carriageway road in the vicinity of the site has a likely mid block capacity of 3,800 vph. Therefore it currently has spare capacity to cater for development in the area.
- ☞ Masonite Road in the vicinity of the site has a current peak hour traffic volume of approximately 327 vph in the PM (3.15 pm to 4.15 pm) and 242 vph in the AM (7.45 am to 8.45 am).
- ☞ Masonite Road as a two lane two way road in the vicinity of the site has a likely mid block capacity of 1,200 vph. Therefore it currently has spare capacity to cater for development in the area.
- ☞ It has been determined that a condition of the sale of the land from Port Stephens Council to Sandvik will be that the section of Masonite Road along the frontage of the site is reconstructed and upgrade to a suitable standard for industrial development and in accordance with Council's requirements.
- ☞ That the proposed development with a 2015 staffing level predicted to be 750 persons is likely to result in an AM peak traffic generation of approximately 317 vehicles per hour between 5 am and 6 am made up entirely of employee arrivals for commencement of the day shift.
- ☞ That the proposed development with a 2015 staffing level predicted to be 750 persons is likely to result in a PM peak traffic generation of approximately 322 vehicles per hour between 3 pm and 4 pm made up of employee departures with the completion of the day shift and approximately 10 heavy vehicle movements.
- ☞ The PM peak traffic period on the road network (3.15 pm to 4.15 pm) and the PM peak traffic generation period for the development (3.00 pm to 4.00 pm) almost coincide and should be considered to coincide for development impact assessment.
- ☞ The AM peak traffic generation period for the development (5 am to 6 am) occurs before the AM peak traffic period on the road network (7.30 am to 8.30 am) and therefore should be separately considered for development impact assessment.
- ☞ During the AM peak traffic period (7.30 am to 8.30 am) traffic generation from the site will be in the order of 201 vehicles per day made up of staff arrivals and 40 heavy vehicle movements.
- ☞ During the AM peak development traffic period (5 am to 6 am) the road network hourly volumes are approximately 1,512 vph on the Pacific Highway and 164 vph on Masonite Road.
- ☞ Traffic associated with construction activities on the site are significantly less than the traffic volumes generated by the development itself and it is expected the existing road network would be able to easily cater for these volumes. The peak period would occur during the pouring of slabs when concrete trucks will be delivering to the site. These will occur however in short sharp peaks prior to the AM road network peak when traffic volumes on the road network are much lighter.
- ☞ All service vehicle trips generated by the development will utilise the Pacific Highway to access the site with 90 %

having trip origins / destinations to the south and west of the site and 10 % having origin / destinations to the north of the site.

- Service vehicle trips during the peak hours are 50 % to the site and 50 % from the site.

- Employee trip distributions have been estimated as 60 % from or to the Pacific Highway to the south west (Newcastle, Lake Macquarie), 20 % from Adelaide Street (Raymond Terrace, Maitland), 15 % from or to the Pacific Highway to the north-east (Port Stephens and further north) and 5 % from or to Masonite Road to the south-east (Williamtown, Fern Bay, Tomago, Stockton).

- The main intersections to be impacted by the development are the Pacific Highway / Masonite Road roundabout (2 lane) and the Masonite Road / Camfield Drive roundabout (1 lane). SIDRA modelling of these intersections post development has shown that both roundabouts will continue to operate satisfactorily post development and with predicted ten year traffic growth for all likely peak traffic periods. The overall LOS experienced on these roundabouts will remain high at LOS A or B for all scenarios modelled and the queue lengths expected are not considered unreasonable nor will they exceed the physical storage capacity provided at the roundabouts. Therefore the proposed development will not adversely impact on the operation of these intersections as the intersections have sufficient spare capacity to cater for the traffic generated by the development.

- The proposal provides three separate accesses to the site. This not only allows heavy and light vehicle movements to be separated it also allows the large traffic volumes entering and exiting the site at shift changes to be more easily and quickly distributed onto or off Masonite Road. Therefore the use of three separate access points to the site should be supported.

- The accesses as shown on the current development plan are suitably staggered from the three accesses to the Weathertex complex opposite the site.

- Due to the high number of turning movements and the use by heavy vehicles each access point to the development should be constructed with a channelised right turn bay (CHR intersection type). SIDRA modelling of these accesses has determined that these right turn bays should provide storage for at least three (3) vehicles or one (1) heavy vehicle.

- As the heavy vehicle access is just within the 100 km/h speed zone on Masonite Road the RTA should be requested to review the speed zoning in the vicinity of this access to consider the extension of the 70 km/h speed zone to the full frontage of the site.

- The internal car park and heavy vehicle areas proposed for the development comply with the requirements of the RTA's *Guide to Traffic Generating Developments*, PSDCP 2007 Part B3 – Parking, Traffic & Transport as well as AS2890.1-2004 and AS 2890.2-2002 and are considered appropriate.

- The site is currently serviced by public transport (buses) provided by Hunter Valley Buses. Whilst the service is limited it will be available for use by staff of the proposed development. It is not thought however that the proposal will generate enough public transport ridership to impact on the public transport system to the extent that further services are required. Existing bus stop facilities are also considered adequate and no new or upgraded facilities are required.

- The development is likely to generate some pedestrian traffic accessing the nearby food outlets and public transport facilities on the Pacific Highway. To provide suitable facilities for this traffic a concrete pedestrian footpath should be provided from the main office to the start of the existing pedestrian facilities at the Masonite Road / Camfield Drive roundabout.

- With a large staff base it is expected the development will generate some bicycle and motor cycle traffic. The development provides suitable parking facilities for these transport modes through the provision of a covered parking area accommodating 50 motor cycles and 38 bicycles.

17.0 RECOMMENDATION

On the basis of this traffic impact assessment of the Sandvik Manufacturing, Assembly, Aftermarket Service, Regional Distribution Centre and Training Facility at 431 Masonite Road, Heatherbrae it is recommended that the proposed changes to the approved development can be supported as the changes will not alter the traffic impacts of the development. Overall the development will not adversely impact on the local and state road network and, subject to all the recommended works identified in this assessment and included on the original conditions of consent being completed, complies with all relevant Port Stephens Council and RTA requirements.

J.R. Garry BE(Civil), Masters of Traffic
Director, Insite Engineering Services Pty Ltd



ATTACHMENT A

Development Plans



ATTACHMENT B

Manual Traffic Counts



ATTACHMENT C

Bus Timetables and Route Map



ATTACHMENT D

SIDRA Tables – External Intersections



ATTACHMENT E

SIDRA Tables – Development Accesses



ATTACHMENT F

Forecast Employment – Sandvik Site



ATTACHMENT G

Traffic Generation & Car Parking Calculation Tables



ATTACHMENT H

Heavy Vehicle Swept Turning Paths – Masonite Rd / Camfield Dr Roundabout

