Bobs Farm Sand Quarry

Ammos Resource Management Pty Ltd

Traffic Impact Assessment

January 2021

SECA solution

Bobs Farm Sand Extraction development

Traffic Impact Assessment

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Client: Ammos Resource Management Pty Ltd

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Quality Review and Document History

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1 Introduction

1.1 Background

Seca Solution was commissioned by Tattersall Lander Pty Ltd on behalf of Ammos Resource Management Pty Ltd to prepare a Traffic Impact Assessment for the proposed sand extraction quarry located off Nelson Bay Road, Bobs Farm. An assessment for the project was previously completed by Seca Solution, with this revised report completed for the updated access arrangement and taking into consideration requests for information received from the Department of Planning and Environment (DPIE).

Correspondence with DPIE and Roads and Maritime Services (RMS) has determined that all access for the development is to be provided off Nelson Bay Road, with the layout of this intersection to be provided in accordance with the requirements of RMS and Austroads Guidelines.

This traffic impact assessment has been prepared in accordance with Austroads Guidelines and the "RTA Guide to Traffic Generating Developments" published by RMS.

1.2 Scope of Report

The scope of this report is to review the traffic and access impacts associated with the proposed development and to assess the access arrangements for the development. The report provides advice on road network capacity, access issues and safety review. It further outlines the traffic management plan regarding designated haulage routes for trucks accessing the site.

1.3 Issues and Objectives of the study

The issues relative to the proposal are:

- Determine the future traffic generation for the development;
- Assess impact on the local road network due to the additional flows;
- Review the access arrangements for the development;
- Assess any other transport impacts associated with the development including a safety review.

The objective of the report is to document the impacts of the proposed development and provide advice on any infrastructure work required on the external road network as part of the development.

1.4 Planning Context

In preparing this document, the following guides and publications were used:

- RTA Guide to Traffic Generating Developments, Version 2.2 Dated October 2002;
- RMS TDT 2013/04 "Update Traffic surveys August 2013"
- Department of Planning EIS Guidelines, Roads and Related Facilities

1.5 Authority Requirements

The following issues were included in the DGRs previously issued for the development (including comments raised by the RMS) and are addressed in the following sections of this traffic impact assessment.

Table 1-1 DGRs Response

Comment	Report Inclusion
Accurate predictions of project-related traffic and a detailed assessment of the potential impacts of project-related traffic on the capacity, safety and efficiency of the road network	4.1, 4.1.2, 4.3.1, 4.3.2
A detailed description of the measures that would be implemented to upgrade and / or maintain the capacity, efficiency and safety of effected roads and intersections over the life of project	4.3.2
Identify all relevant vehicular traffic routes and intersections for access to / from the subject site	4.2, 4.2.1
Current traffic counts for all of the above traffic routes and intersections	2.3.1-7
The distribution on the road network of the trips generated by the proposed development. It is requested that the predicted traffic flows are shown diagrammatically to a level of detail sufficient for easy interpretation	4.2.1
Consideration of the traffic impacts on existing and proposed intersections and the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the proposed development during the construction and operational stages. The study should also give consideration to the cumulative traffic impacts of other proposed and approved developments in the area	4.3
Traffic analysis of any major / relevant intersection, using SIDRA or similar traffic model	4.3.2
Any other impacts on the regional and state road network including consideration of pedestrians, cyclists and public transport facilities and provision of service vehicles	3.2.3, 3.5, 4.1.5

The report has been updated to address recent comments provided by RMS in email correspondence dated 23rd June 2019, as below.

Comment	Report Inclusion
U-turn bay – a site TMP should be provided to control heavy vehicle access to and from the site, to ensure that the roundabouts are used.	Section 5
A safety assessment should be undertaken on the u-turn bay, which receives little usage at this time. If it is to be restricted to vehicles under 8 metres length, staff of the mine from the north direction will be able to use this bay to access the site. Is the sight and other aspects of the u-turn bay adequate for the increased usage?	Section 4.4

Revision 05 - Additional information request from Department of Planning and Environment:

The TIA is dated 1 July 2016 (now 10.12.2019) *and includes SIDRA intersection analysis based on 2014 data. Within the TIA at section 2.7 – other proposed developments it is state that "there are no other major developments occurring in the immediate vicinity of the subject site".*

To allow for other developments and potential background traffic growth, traffic data has been increased by an annual growth rate of 2% per annum to provide current 2020 base traffic. Normal growth rates provided by TfNSW in the Hunter Region is in the order of 1.5-2% per annum. 2% per annum in this location is considered a worst-case scenario, as Nelson Bay Road does not allow for through traffic movements, only access to the Nelson Bay peninsula.

Updated Sidra modelling has been completed and the results updated in the report.

As indicated in Item 4, below there is an approved development for eco-cabins on land adjoining the proposed sand mine. According, the TIA needs to consider the traffic impacts likely to be generated by the approved eco-cabin development on predicted traffic movements on Marsh Road.

The updated plans for the project allow for access to Nelson Bay Road only and no access to Marsh Road. An eco-cabin development is a very low traffic generator, similar to a motel type development and the RTA Guide to Traffic Generating Developments provides no rates in the AM peak for this land use and 0.4 trips per unit / cabin in the PM peak period only. It is considered that the volume of traffic associated with the eco-cabins will therefore not impact upon the overall road network in this location. The provision of the 2% annual growth for traffic on Nelson Bay Road will cover the traffic movements associated with the eco-cabin development.

For assessment of truck movements, the TIA must consider the impact of additional truck movements on public road network until the project-based trucks reach a major highway. For the proposed sand mine , DPE requires that traffic impacts are considered for single carriageway sections of the proposed haulage routes, the roundabout at Paul's Corner (Richardson and Nelson Bay Roads) and the roundabout at Cabbage Tree and Nelson Bay Roads.

Standard requirements from TfNSW require the impact of a proposal from the site access to the arterial road network only and they do not require any intersections further along the route to be assessed. TfNSW have previously reviewed this project and have not raised these two roundabouts as requiring any assessment.

Observations of traffic operations at both of these roundabouts indicates that both of these roundabouts operate very well with minor delays and congestion during both the morning and afternoon peak periods.

In terms of cumulative traffic impacts, DPE considers that sand haulage traffic due to other sand extraction operations must also be considered including:

- *Cabbage Tree Road Sand Quarry at Williamtown*
- *Mackas Sand operations at Salt Ash and William Town*
- *ATB Morton Salt Ash sand quarry*
- *Boral Resources Stockton Bight quarry at Fullerton Cove.*

The traffic flows associated with the above developments are relatively low and with the background growth value of 2% per annum discussed above the traffic flows associated with these developments have been allowed for. It is noted that all of these sites are to the south of the site and as such the traffic movements north past the subject site will be very minor. Traffic from these sites will be predominantly towards greater Newcastle or the Pacific Highway and would have been assessed as part of the relevant approvals including their cumulative impactsAM

It is DPE's experience that the AM peak traffic on Nelson Bay Road occurs earlier than the 7:45 to 8:45 am period provided in the TIA. Please provide details of how this peak period was determined or else amend to a more appropriate period.

Traffic data collected from the tube counts by Seca Solution show that the peak eastbound is higher between hours ending 9 AM and 10 AM than the hours before this.

For the westbound the highest peak is the hour between 7.00 and 8.00 AM with the hourly flows ending 7.00 AM and 9.00 AM being nearly identical.

This would indicate that the traffic flows presented for the hour between 7.45 and 8.45 are therefore acceptable.

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Traffic Count Summary Report

Count Number	1036	Ref : SECA	GOOGLE
Street	NELSON BAY ROAD, BOBS FARM : From LEMON TREE PASSAGE ROAD to PORT STEPHENS ROAD : WEST BOUND		
Location	Combined Counts 1034 and 1035 Westbound, west of Marsh Road U-Turn Facility, Wire Stranded Fence		*Carriageway*

TOTAL COUNT MATRIX

Start Date	12-SEP-14
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	82
Weekly 85th Percentile Speed	90
Five Day AADT	7984
Seven Day AADT	7699

	MON 15TH	TUE 16TH	WED 17TH	THU 18TH	FRI 12TH	SAT 13TH	SUN 14TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	10	15	8	17	16	30	38	66	13	134	19
1am - 2am	11	16	7	12	11	16	18	57	11	91	13
2am - 3am	20	10	12	6	6	22	12	54	11	88	13
3am - 4am	42	20	32	32	24	19	19	150	30	188	27
4am - 5am	112	104	89	93	93	44	33	491	98	568	81
5am - 6am	341	360	365	367	325	100	51	1758	352	1909	273
6am - 7am	763	739	733	723	687	176	88	3645	729	3909	558
7am - 8am	937	916	948	867	810	290	175	4478	896	4943	706
8am - 9am	733	709	689	702	687	385	329	3520	704	4234	605
9am - 10am	608	560	578	563	597	551	605	2906	581	4062	580
10am - 11am	537	469	462	544	609	570	705	2621	524	3896	557
11am - Midday	513	436	442	479	550	485	704	2420	484	3609	516
Midday - 1pm	505	431	461	445	486	541	682	2328	466	3551	507
1pm - 2pm	473	490	498	470	517	562	751	2448	490	3761	537
2pm - 3pm	509	528	548	601	518	520	849	2704	541	4073	582
3pm - 4pm	551	535	559	618	568	565	840	2831	566	4236	605
4pm - 5pm	432	476	495	524	539	483	687	2466	493	3636	519
5pm - 6pm	425	478	482	432	467	358	411	2284	457	3053	436
6pm - 7pm	208	212	221	205	212	182	255	1058	212	1495	214
7pm - 8pm	80	102	103	123	96	116	111	504	101	731	104
8pm - 9pm	78	68	75	98	97	119	102	416	83	637	91
9pm - 10pm	59	90	89	74	90	135	70	402	80	607	87
10pm - 11pm	43	33	40	26	59	84	25	201	40	310	44
11pm - Midnight	17	15	19	20	41	43	16	112	22	171	24
Total	8007	7812	7955	8041	8105	6396	7576	39920	7984	53892	7698

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Traffic Count Summary Report

Count Number	1033	Ref : SECA	Lat/Long : S32.76767 / E152.01245	GOOGLE
Street	NELSON BAY ROAD, BOBS FARM : From LEMON TREE PASSAGE ROAD to PORT STEPHENS ROAD : EAST BOUND			
Location	Combined Counts 1031 and 1032 Eastbound, west of Marsh Road U-Turn Facility, Wire Stranded Fence			*Carriageway*

TOTAL COUNT MATRIX

Start Date	12-SEP-14
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	84
Weekly 85th Percentile Speed	91
Five Day AADT	8070
Seven Day AADT	7612

	MON 15TH	TUE 16TH	WED 17TH	THU 18TH	FRI 12TH	SAT 13TH	SUN 14TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	22	35	35	39	35	52	40	166	33	258	37
1am - 2am	9	22	17	31	26	31	32	105	21	168	24
2am - 3am	12	16	20	23	17	20	20	88	18	128	18
3am - 4am	10	11	15	12	15	13	23	63	13	99	14
4am - 5am	28	31	33	25	29	37	28	146	29	211	30
5am - 6am	89	72	74	73	86	62	72	394	79	528	75
6am - 7am	281	260	274	291	252	122	112	1358	272	1592	227
7am - 8am	464	457	416	463	424	226	133	2224	445	2583	369
8am - 9am	496	501	503	498	467	335	190	2465	493	2990	427
9am - 10am	386	415	543	443	495	460	430	2282	456	3172	453
10am - 11am	433	436	439	453	492	621	530	2253	451	3404	486
11am - Midday	462	443	468	433	533	732	727	2339	468	3798	543
Midday - 1pm	444	427	445	483	618	673	649	2417	483	3739	534
1pm - 2pm	500	434	461	504	657	625	528	2556	511	3709	530
2pm - 3pm	512	522	556	531	808	592	500	2929	586	4021	574
3pm - 4pm	703	700	735	708	909	549	472	3755	751	4776	682
4pm - 5pm	944	978	969	989	960	534	470	4840	968	5844	835
5pm - 6pm	855	891	858	882	831	421	406	4317	863	5144	735
6pm - 7pm	397	461	459	463	590	272	246	2370	474	2888	413
7pm - 8pm	139	174	173	227	320	162	137	1033	207	1332	190
8pm - 9pm	131	148	140	178	243	118	99	840	168	1057	151
9pm - 10pm	92	117	101	141	192	81	71	643	129	795	114
10pm - 11pm	64	81	76	109	164	104	62	494	99	660	94
11pm - Midnight	28	40	61	62	82	74	41	273	55	388	55
Total	7501	7672	7871	8061	9245	6916	6018	40350	8070	53284	7612

2 Existing Situation

2.1 Site Description and Proposed Activity

2.1.1 Site Location and Access

The site is located within the general locality of Bobs Farm with road frontage to both Nelson Bay Road and Marsh Road (Figure 2-1 below). Nelson Bay Road runs along the southern boundary of the site and shall accommodate all vehicle access.

The site is currently vacant, with the location shown below in Figure 2-1.

Source: Google maps

■ *Figure 2-1 - Site Location*

Existing land use adjacent to the site is a mixture of rural residential and a local primary school.

2.2 Existing Traffic Conditions

2.2.1 Road Hierarchy

The major road through the locality is **Nelson Bay Road** which provides an important road link between the Nelson Bay area to the east of the site and Newcastle / Newcastle airport and the Pacific Highway to the west of the site. In the locality of the subject site, it provides two lanes of travel in both directions with a sealed shoulder. There are verges to both sides and there is a central median to restrict right turn movements to intersections with a number of U turn bays provided along its length to cater for local traffic demands.

The speed limit varies along its length and in the vicinity of the subject site is 80 km/h.

2.2.2 Roadworks

There are currently no road works occurring within the immediate vicinity of the of the subject site, with the exception of road resurfacing to the east of the site. Further to the east of the site, the Roads and Maritime Services (RMS) upgraded Nelson Bay Road, to provide two lanes of travel in both directions. These works included a central median to restrict right turn movements with a number of U turn facilities provided at side roads to allow for the right turn demand movements.

2.2.3 Traffic Management Works

No further traffic management works are proposed along Nelson Bay Road in this locality.

2.2.4 Pedestrian and Cycling Facilities

There are minimal pedestrian and cycling facilities in the general locality of the site, reflective of the very low demands in this area. Pedestrians and cyclists are able to utilise the sealed shoulder provided in both directions along Nelson Bay Road. During the site work a number of cyclists were observed on Nelson Bay Road but no pedestrians. This is reflective of the relatively remote location of the area from the major centres.

2.3 Traffic Flows

2.3.1 Peak Hour Flows

As part of the study work, Seca Solution completed traffic surveys at the 3-way give way controlled intersection of Marsh Road and Nelson Bay Road. These surveys were completed during both the morning and afternoon peak periods on Thursday 21st August 2014 during term time. The two-way traffic flows adjacent to the site on Nelson Bay Road (south of Marsh Road) were:

- 1,273, split 769 westbound towards Newcastle (60%) in the morning peak between 7.45 and 8.45 AM and
- 1,321, split 826 eastbound towards Nelson Bay (62%) in the afternoon peak between 3.30 and 4.30 PM

During the same periods, the two-way traffic movements on Marsh Road were much lower, at 42 in the AM peak and 110 in the PM period.

The surveyed morning and afternoon traffic flows are shown below:

Figure 2-2 - AM peak surveyed numbers

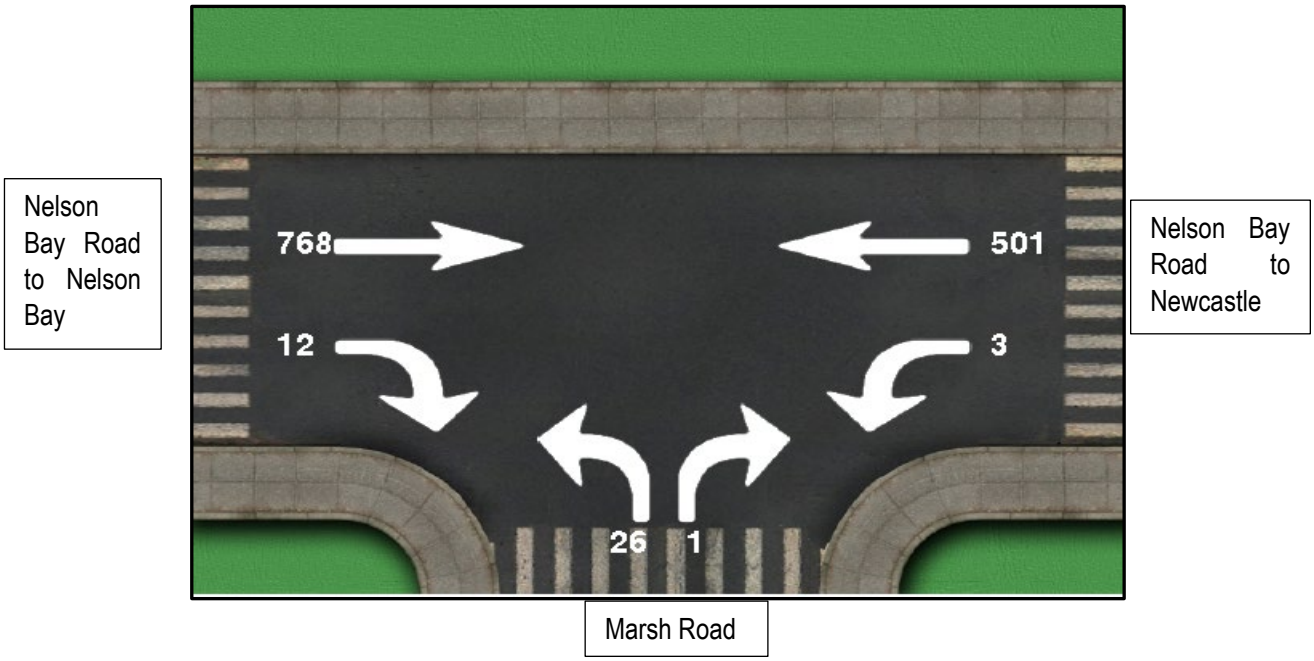
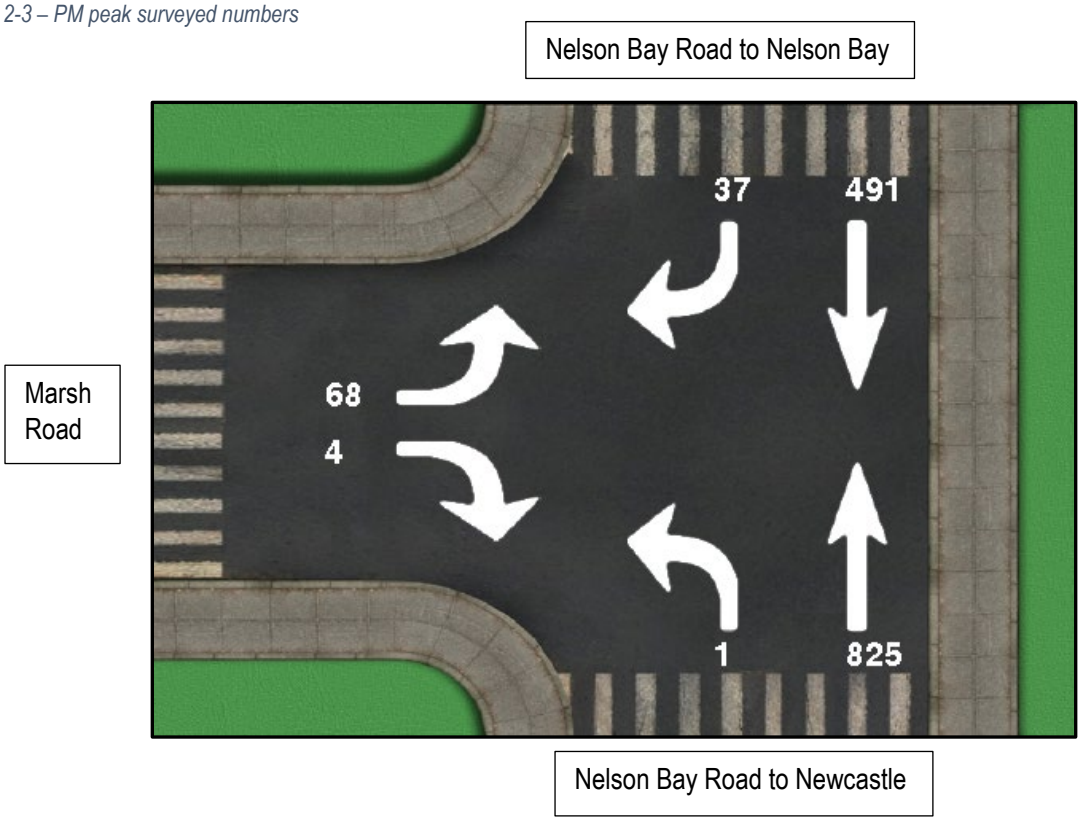


Figure 2-3 – PM peak surveyed numbers



2.3.2 Daily Traffic Flows

As part of the project, Seca Solution commissioned automatic tube counts to obtain current traffic volumes along both Nelson Bay Road and Marsh Road. A summary of the tube count data is provided below:

- The Marsh Road Annual Average Daily Traffic flow (AADT) was 713 vehicles per day. This was split between 412 eastbound and 301 westbound. This value is considerably lower than the value identified above (based on peak hour flows) and indicates that peak hour flows are influenced by the activities associated with student drop off and pick at the nearby school.
- The eastbound AADT on Nelson Bay Road was recorded at 7,612 vehicles per day.
- The westbound AADT on Nelson Bay Road was recorded at 7,699 vehicles per day.
- The combined two-way AADT for this section of Nelson Bay Road was 15,311 vehicles per day.

These tube counts were competed between 12th and 18th September 2014 outside of school holidays.

2.3.3 Daily Traffic Flow Distribution

The daily traffic volumes are reasonably balanced in both directions, with the above data indicating a bias in traffic movements eastbound in the morning and westbound in the afternoon. This would be reflective of the commuter demands, with commuters travelling from the Nelson Bay area towards greater Newcastle, Maitland and the Lower Hunter Valley and the reverse occurring in the afternoon period.

2.3.4 Vehicle Speeds

No speed surveys were completed as part of the study work. It is considered that drivers on Nelson Bay Road could travel at speeds over the posted speed limit, due to the speed limit being 100 km/h to the west of this location and there being no noticeable change in the road environment. For eastbound traffic, the road upgrades that have occurred in this area encourage drivers to speed up and as such could travel over the posted speed limit of 80 km/h. The posted speed limit increases to 100 km/h to the west of the site and it is considered that drivers speed up in anticipation of this change in speed.

The automatic tube counts provide the following data:

- 85th percentile speed on Nelson Bay Road eastbound was 91 km/h
- 85th percentile speed on Nelson Bay Road westbound was 90 km/h.

Vehicle speeds are low on Marsh Road, reflective of the road width and alignment as well as the presence of the school zone in this area. The tube count was located close to the intersection with Nelson Bay Road but west of the U-turn facility and indicates the following speeds:

- 85th percentile on Marsh Road eastbound was 65 km/h
- 85th percentile on Marsh Road westbound was 59 km/h.

2.3.5 Existing Site Flows

The site currently generates minimal traffic flows.

2.3.6 Heavy Vehicle Flows

Heavy vehicle movements in the vicinity of the subject site are relatively low, reflective of the limited through traffic movements along Nelson Bay Road. As a road that serves the Nelson Bay peninsular, there are no through traffic movements, with the only heavy vehicle movements being those associated with deliveries to the various urban centres. Heavy vehicle movements are restricted to delivery vehicles to the major shopping centres as well as some light industrial users.

During the traffic surveys, the vast majority of the traffic were light vehicles with the heavy vehicle content representing some 5% of the overall traffic movements.

2.3.7 Current Road Network Operation

Observations on site during the peak periods showed that the road network currently operates very well with minimal delays and congestion. The traffic movements along Nelson Bay Road flows well with no delays or congestion, and the two lanes of travel allow faster moving traffic to pass slow vehicles as appropriate. For traffic movements in and out of Marsh Road, the delays were minimal and drivers were able to determine suitable gaps for the right turn movements with very minimal delays.

Further to the west, it can be seen that the single lane of travel causes some delays, due to the volume of traffic. However, the road upgrade will allow for 2 lanes of travel and eliminate these delays.

Traffic flows along Nelson Bay Road are also influenced by seasonal demands, with summer demands increasing due to the tourists facilities in the Nelson Bay area. Similarly, the weekend traffic demands can be relatively high, reflective of weekend and day trips to the Nelson Bay area.

2.4 Traffic Safety and Accident History

Accident data provided by the RMS (**Appendix C**) for the locality shows that there have been a low number of recorded accidents in the vicinity of the intersection of Nelson Bay Road and Marsh Road, reflective of the low side road traffic flows and the good alignment of this intersection, providing good visibility in both directions for drivers entering and exiting the side road. The accidents that have occurred have been located away from the intersection and do not relate to the layout of the intersection nor its controls.

2.5 Parking Supply and Demand

2.5.1 On-street Parking Provision

Parking is permitted along both sides of the roads in the locality, on the verges as required with normal restricts in the immediate vicinity of the intersection and driveways.

2.5.2 Off-Street Parking Provision

There is parking provided within the various lots in the immediate vicinity of the subject site.

2.5.3 Parking Demand and Utilisation

During the site work, there were no vehicles parked on Nelson Bay Road. It is considered that any vehicles parking on this road would be associated with emergency or breakdowns only, as there is no demand to park on the road side in this location.

2.5.4 Set down or pick up areas

None along Nelson Bay Road in the vicinity of the site.

2.6 Public Transport

2.6.1 Rail Station Locations

The subject site is not served by trains. The nearest train station is in Hexham, approximately 25kms from the subject site.

2.6.2 Bus Stops and Associated Facilities

There are bus stops located on both sides of Nelson Bay Road in the vicinity of the site. These stops provide a sign only with no seats or shelter.

2.7 Other Proposed Developments

There are no other major developments proposed along Nelson Bay Road that would be impacted upon by the development in relation to traffic.

3 Proposed Development

3.1 The Development

The development proposal allows for a sand mining operation, with access off Nelson Bay Road. The initial stage of the proposal allows for establishing the site, clearing the site of vegetation and providing the two access points. The following stages are nominated:

a. Operational Stage 1 – Clearing and stockpiling of topsoil and production of initial sand material that is likely to be processed into landscaping soil base and sports field top-dress material.

b. Operational Stage 2- Processing of blonde sand material for all products range.

c. Operational Stage 3 – Setting up of dredging operations and winning of sand material for the processing of all products range.

Within the operational stages the main activities will be the bulk handling of sand material, utilising front end loaders and trucks and the general truck and dogs for transport of the material to the required markets.

The peak use on the site would allow for 200 trucks to enter and exit the site per day. A site plan is included in **Appendix A**.

3.1.1 Phasing and Timing

The development will be established in the first phase then proceed to operations. No staging of the project has been allowed for in this assessment.

3.1.2 Access and Circulation Requirements

A vehicle access point is proposed to allow for direct access off Nelson Bay Road. This access will be used by both light and heavy vehicles and allow for entry and exit movements. This access will be designed and constructed in accordance with Council and RMS design requirements, allowing for left in and left out movements only.

Circulation within the site will be determined by the operational requirements of the development. All vehicles will be able to enter the site and manoeuvre as required within the site and exit in a forward direction.

3.2 Access

The new access off Nelson Bay Road will be designed and constructed in accordance with Council and / or RMS requirements including a left turn deceleration lane, as well as an acceleration lane for left out exit movements. The central median on Nelson Bay Road restricts right turn movements in/out of the site access. The concept plan for the site access is provided in **Appendix B**.

3.2.1 Driveway Location

The driveway access on Nelson Bay Road is located on a straight section of road with a gentle bend east of the site, allowing excellent visibility to the right (west) for drivers exiting the site. In this location Nelson Bay Road provides two lanes of travel in both directions separated by a central median.

3.2.2 Service Vehicle Access.

All service vehicle access will be able to utilise the site access on Nelson Bay Road which has been designed to accommodate heavy vehicles up to B Doubles. There will be a requirement for a fuel truck to access the site as well as occasional maintenance vehicles for the quarry vehicles which will be located permanently on site. For the material handling trucks, servicing requirements will be completed off site.

3.2.3 Access to Public Transport

The site has limited access to public transport, with limited bus services provided along Nelson Bay Road. While future workers could use these bus services, it is considered that the proposed development will generate no demand for public transport use.

3.3 Circulation

3.3.1 Pattern of circulation

All vehicles will be able to enter and exit the site in a forward direction from Nelson Bay Road.

3.3.2 Road width

The internal roads and access driveway will take into account the swept path requirement of a truck and trailer combination including B-Doubles. There will not be any formal roads within the site, due to the nature of the development.

3.3.3 Internal Bus Movements

No internal bus movement required for this development.

3.3.4 Service Area Layout

No dedicated service area is provided. Trucks will be serviced off site and there will be no requirement for a dedicated service bay on the site.

3.4 Parking

The parking for the development will be provided for the staff located on site in an informal area close to the offices on the site.

There will be no requirement for the trucks to park on the site overnight. Equipment associated with the quarry operations will however stand on site.

3.5 Pedestrian and Bicycle Facilities

The site is relatively remote and as such it is considered that there will be no demand for pedestrian or cyclists' access. There will be no demand or provision for internal movement of pedestrians or cyclists within the site.

4 Transportation Analysis

4.1 Traffic Generation

Traffic associated with the development will vary based upon the market demands. Advice from the study team indicates that a peak daily demand could be 200 trucks entering and exiting the site. This is an absolute peak and at other times, there would be much lower flows and during particularly quiet periods, there would be no demand for trucks to enter and exit the site.

As a worst case scenario, this assessment has worked on the assumption that the peak daily demand could be 200 trucks entering and exiting the site per day. The site is proposed to operate between 7.00 AM and 7.00 PM Monday to Saturday.

Based on a typical working day of 10 hours for the delivery of material off site, the development will generate some 20 inbound and 20 outbound trucks per hour on average when the site is working at maximum capacity.

4.1.1 Daily and Seasonal Factors

The nature of the development will lead to significant variation is daily traffic flows, dependent upon market demands. During quiet periods, it is expected that there would be no demand for trucks to enter or exit the site. Flows could be much lower on a Saturday and the site will not operate on Sundays or public holidays.

4.1.2 Sight Distances

The site access point on Nelson Bay Road is located within an 80 km/h speed zone. For drivers entering the site, the alignment of Nelson Bay Road ensures that the required forward visibility distance is available along the road, to allow a driver to observe the left turn slip road into the site. For the posted speed limit of 80km/h, the stopping sight distance requirements is 100 metres and this distance is available based upon the on-site assessment. This distance will allow a driver approaching the site access to observe the start of the left turn deceleration lane and allow for safe manoeuvring into this lane for the trucks. This will also allow drivers following the trucks to adjust their vehicle speeds or move into the right hand lane on Nelson Bay Road and ensure that the trucks can safely enter the left turn slip lane.

Drivers exiting the site will be able to utilise the acceleration lane which extends for 320 metres with an additional 90 metre taper, allowing drivers of both light and heavy vehicles to merge into the traffic stream once up to speed. As such, sight distance is not critical for this driveway layout however it is noted that there is in excess of 500 metres visibility to the right out of the site access which would easily satisfy the safe intersection sight distance of 181 metres nominated by Austroads (allowing for assessment as an intersection).

For the existing U-turn facility on Nelson Bay Road opposite the site, catering for any westbound light vehicles turning off Nelson Bay Road, there is a deceleration lane provided allowing drivers to enter this U-turn facility in a safe manner. There is good visibility available on this approach, which is greater than 100 metres satisfying the minimum stopping sight distance. The use of this U-turn facility is discussed further in Section 4.4.

Overall, it is considered that the sight distances available for vehicles entering and exiting the site via Nelson Bay Road are acceptable, given the road alignment and access layout.

4.1.3 Queuing at entrance to site

There are no vehicle queues expected at site entry / exit points. Given the low overall traffic demands associated with the future development and the left in traffic arrangement on Nelson Bay Road all vehicles will be able to enter the site without delay. Any queues associated with exit movements from the site are expected to be minimal and will be contained within the site.

4.1.4 Comparison with existing site access

The site is currently used as a home business and has an access onto Marsh Road. The current use on site involves the occasional use of truck and dog combinations and these trucks operate in a safe manner with no reported issues or concerns. This access will not be utilised for the development, with all access off Nelson Bay Road.

4.1.5 Pedestrian Movements

The development is not expected to be a generator of pedestrian movements either to the site or within the site.

4.2 Traffic Distribution and Assignments

Given the location of Bobs Farm on the Nelson Bay peninsula, through traffic is limited. The markets for the quarry products are expected to be primarily to the north via Raymond Terrace or south through the greater Hunter area.

4.2.1 Origin / destinations assignment

90% of traffic is expected to have an origin/destination west of the site along Nelson Bay Road. The location of the access and the raised central median on Nelson Bay Road restricts heavy vehicle access to the site to be from the west only, including any traffic initially from the east. This will be reinforced by WHS Guidelines for the site operations.

The destination for deliveries will depend on market forces. Haulage routes are expected to be dispersed along existing local roads with:

- north bound deliveries travelling along Richardson Road to the Pacific Highway and Raymond Terrace
- west bound deliveries travelling along Cabbage Tree Road to Tomago and west along the New England Highway
- southbound deliveries travelling to Tomago to then travel south along the M1 Motorway
- Newcastle based deliveries travelling along Nelson Bay Road to Kooragang and connecting with the local road network as appropriate

Both Nelson Bay Road and Cabbage Tree Road are restricted access vehicle routes suitable for B-doubles and similar heavy haulage.

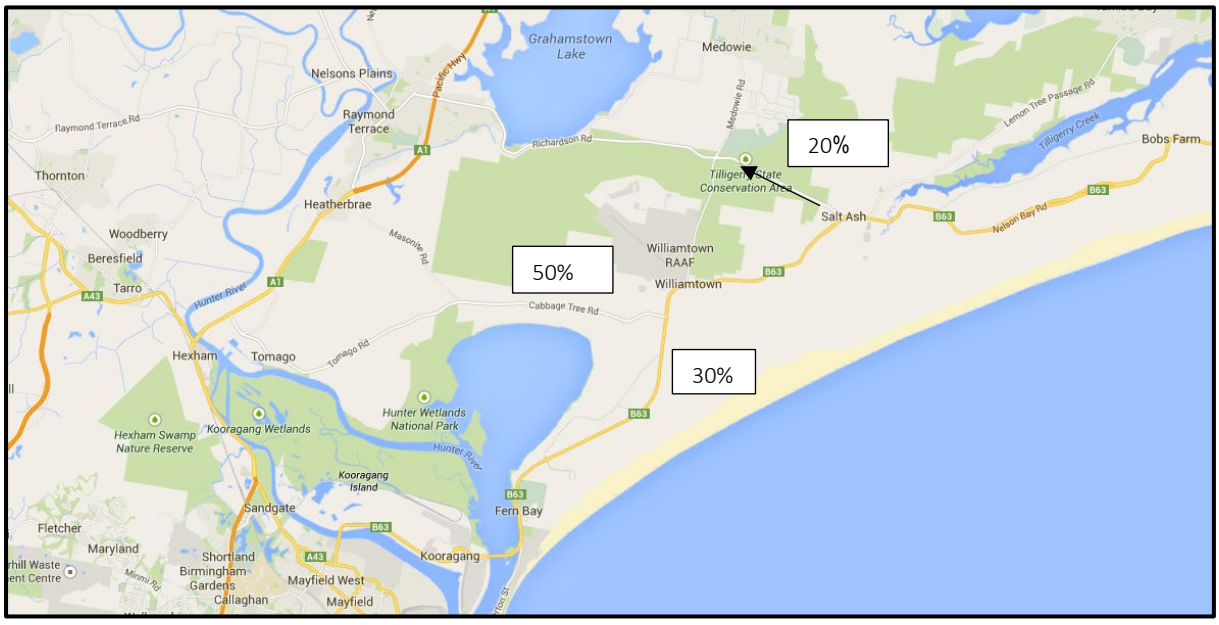


Figure 4-1 Traffic movements associated with outbound material movements

4.3 Impact of Generated Traffic

4.3.1 Impact on daily Traffic Flows

It can be seen that the development will have a low impact upon the overall daily traffic movements in the general locality of the subject site. At peak operations, there will be 200 truck movements in and out of the site with 90% of these movements heading west along Nelson Bay Road. This will potentially increase flows in Nelson Bay Road to the west of the site by 360 vehicles. The current AADT for this length of Nelson Bay Road is 15,311 and this could increase to 15,671 vehicles per day, an increase of 2.3% over the existing flows.

Overall it is concluded that the additional traffic movements associated with the proposed development will have an acceptable impact upon daily traffic flows along Nelson Bay Road.

4.3.2 Peak Hour Impacts on Intersections

The peak hour traffic volumes associated with the development have been determined based upon first principals. The development, at peak operations, will generate 200 inbound and 200 outbound truck movements per day, and based on the truck movements occurring over a 10 hour day the average hourly traffic movement would be 20 inbound and 20 outbound movements per hour, which could include peak hour periods.

All trucks exiting the proposed development will turn left out of the site. To ensure road safety is maintained, trucks will proceed along Nelson Bay Road to the roundabout at Nelson Bay Road / Port Stephens Drive and complete a U-turn at this location. This will be enforced through WH&S Guidelines for the site as well as driver instructions for any contractors visiting the site. This is discussed further in Section 5.

Seca Solution has previously collected traffic data at the intersection of Nelson Bay Road and Port Stephens Drive during the critical afternoon peak period on 2nd April 2014 (outside of school holidays) and the results of the survey are shown in Figure 4-2 below.

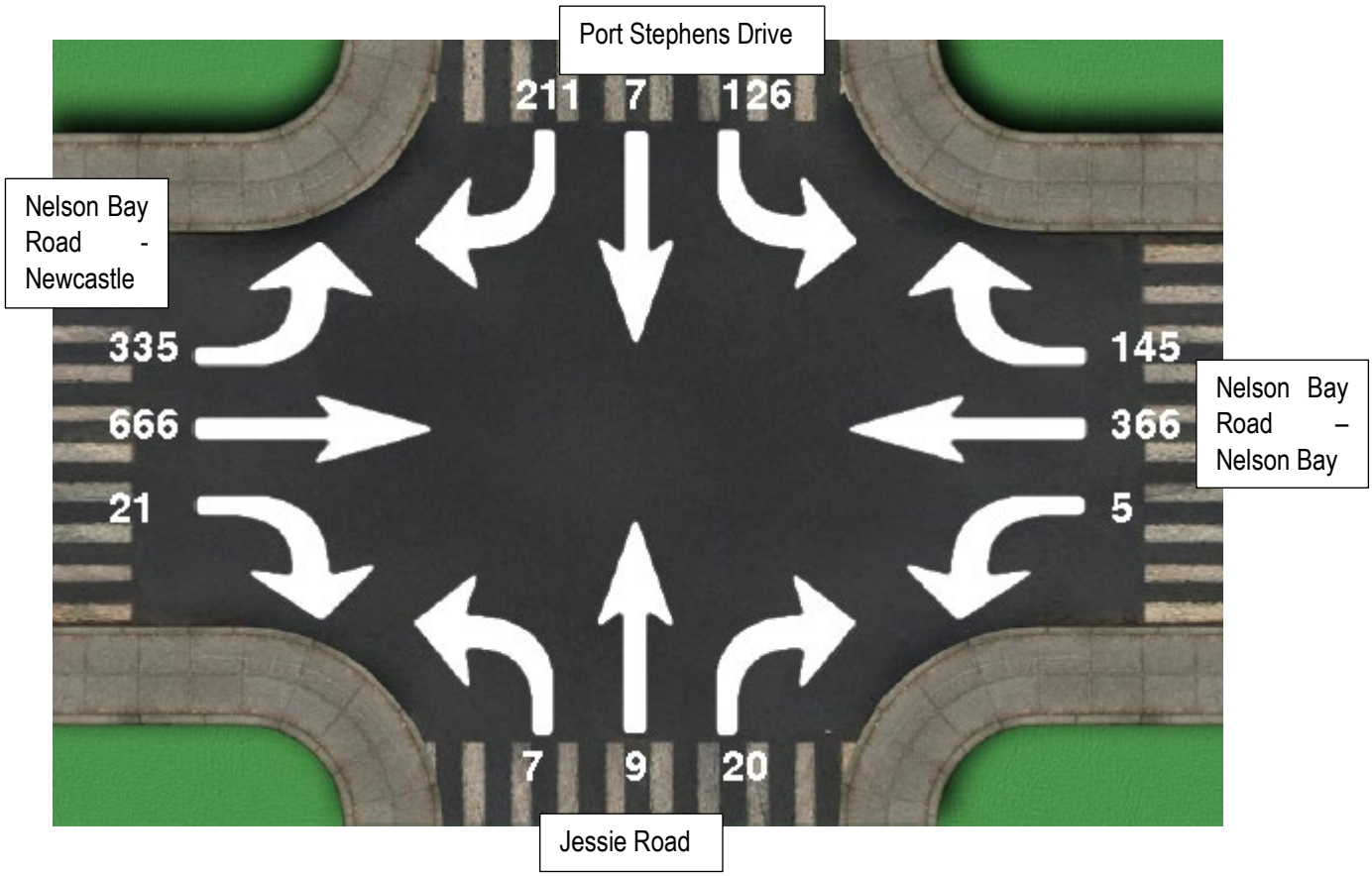


Figure 4-2 – Traffic survey results, roundabout at Nelson Bay Road and Port Stephens Drive (2014 PM peak)

The operation of this roundabout has been assessed with Sidra and the results of the analysis are presented below in Table 4-4. The results below have allowed for a background traffic growth rate of 2% per annum to bring them to current 2020 design flows.

Table 4-1 - Sidra modelling, roundabout of Nelson Bay Road and Port Stephens Road

Approach	Level of service	Delay (seconds)	Queue (metres)
Jessie Road	A / A	9.9 / 10.8	1.7 / 2.4
Nelson Bay Road east	A / A	9.0 / 9.4	14.8 / 20.0
Port Stephens Road	A / A	11.9 / 12.5	9.1 / 13.0
Nelson Bay Road west	A / A	7.0 / 7.4	21.5 / 29.9

Note – results for 2020 PM existing flows / 2030 PM flows allowing for 20% growth on all movements.

The above analysis shows that the roundabout is operating well with minimal delays and congestion for all road users. This roundabout will be impacted upon by the trucks from the quarry that have turned left out of the site and then use this roundabout to complete a U-turn.

The traffic flows through this roundabout are in the order of 1900 vehicles per hour in the PM peak, with a similar value in the AM peak. The additional traffic movements associated with the development could increase these values by some 20 vehicles per hour, representing an increase of 1% over the existing flows. It is considered that this will have a negligible impact upon the operation of the roundabout, based upon site observations and the Sidra analysis above for the peak period. Outside of the peaks, the traffic movements are much lower (20% or more) and the roundabout will operate with less delays, allowing for the movement of the trucks to occur.

The observations on site indicate that in the morning peak this roundabout operates well with similar or lower delays than during the afternoon peak period. Therefore, there will be minimal impact created by the additional truck movements associated with the proposal.

For the access route through to Newcastle / Raymond Terrace and Maitland, all of the major intersections are controlled by traffic signals or roundabouts and operate well with minimal delays and congestion. It is considered that the additional 20 trucks movements per hour maximum would have an acceptable impact upon these intersections.

4.3.3 Background traffic and other developments

In accordance with normal TfNSW requirements, the impact of the additional traffic has been reviewed allowing for 10 years background growth along Nelson Bay Road. A review of the historic traffic data along Nelson Bay Road shows that the rate of background growth is very low, at less than 1.5% per annum. Allowing for 20% background growth over a 10 year timeframe it is considered that the roundabout and the road network in the locality of the subject site will continue to operate to a high level. Table 4-4 above demonstrates that this roundabout will continue to operate well for the future design year of 2030.

As part of the planning for the upgrade of Nelson Bay Road, TfNSW have assessed the background growth along the road which would allow for development such as the development site and has designed the road and the connections accordingly. Therefore, it is concluded that the background growth together with the traffic associated with the development will have an acceptable impact.

The Sidra results in Table 4-4 show that the roundabout at the intersection of Nelson Bay Road and Port Stephens Drive will continue to operate with minimal delays and congestion. With all traffic movements increase by 2% per annum the roundabout continues to operate with low overall delays and minimal queues.

4.3.4 Impact of Construction Traffic

There will be minimal construction activity on site associated with the proposed development, as the site set up and establishment allows for clearing of vegetation only. The major impact during the establishment of the site will be during the construction of the left turn slip into the site off Nelson Bay Road and the acceleration lane. This will require work on the site as well as work adjacent to the existing road carriageway.

As part of the construction work, a Traffic Management Plan will need to be developed and implemented. This will be submitted to the RMS and Council for approval prior to any works commencing on site. A Works Authorisation Deed (WAD) will also be signed with the RMS to ensure the site access is designed and constructed in accordance with the road authority requirements.

4.4 Impact on Road Safety

The additional traffic flows associated with the development of the subject site will have a relatively low impact upon traffic safety. The site entry point for the trucks is located on Nelson Bay Road and a left turn deceleration lane will be provided in accordance with Austroads and RMS design requirements to ensure trucks can safely enter the site. The access is located on a relatively straight section of road offering good visibility for drivers entering and exiting the site at this location.

All vehicles will exit the site onto Nelson Bay Road with an acceleration lane to be provided, with design to cater for vehicles including trucks to get to speed prior to merging with through traffic onto Nelson Bay Road.

There is an existing U-turn facility located on Nelson Bay Road along the site frontage which caters for U-turns for traffic travelling from either direction.

A site visit was conducted on Friday 6th December 2019 by a Level 3 road safety auditor in order to review the layout of the U-turn facility and identify any impacts on road safety associated with the operation of this U-turn facility from the proposed development.

- The proposed access design has been located to ensure the layout of the U-turn facility will not be impacted.
- Light vehicles approaching the site from the east will be able to utilise this facility to undertake a U-turn and then turn left into the site. The demand for this movement would be associated primarily with staff which will be very low, with day to day operations expected to see 7-10 employees on site with these split to/from the east and the west. As such, it is considered there will be low impact upon the existing operation of the U-turn bay.
- A dedicated lane is provided for the U-turn with vehicle storage in the order of 65 metres. This gives a capacity of up to 10 vehicles, however given the low demands for this movement, it is unlikely more than 1 vehicle would be required to queue in this location at any time.
- There is good visibility on Nelson Bay Road (westbound) approaching the U-turn bay, with 200 metres forward visibility to sight a vehicle turning into the dedicated lane. This allows a driver behind to have sufficient time to react should the driver in front commence deceleration in the through lane before entering the U-turn bay.
- The forward visibility for a westbound driver making a U-turn exceeds 300m enabling the driver to anticipate a suitable gap to undertake a turn.
- Whilst this facility does not have the depth within the central median that others in the area do it is noted that there is also no Right Turn sign or One Way sign to indicate the direction of travel to drivers.

Overall it is considered that the proposed development will have an acceptable impact upon road safety in the general locality of the subject site.

4.5 Parking Analysis

The parking for the proposed development can all be accommodated on site. There will be an area set aside beside the office which will accommodate the staff located on site. The site will only require 7-10 people to operate the facility. Note that the trucks will not be parked on site and as such do not need to be provided for nor parking for the truck drivers private vehicles.

4.6 Public Transport

4.6.1 Options for improving services

It can be seen that the site is not well serviced by public transport and the nature of the development does not support public transport use. No improvements to public transport are considered necessary for the project.

5 Traffic Management Plan – Heavy Vehicles

The access routes for heavy vehicles will be controlled by a Driver's Code of Conduct for the site. This will be enforced through WH&S for the site as well as driver instructions for any contractors visiting the site. As part of the site induction all drivers will be advised of the restriction of the use of the U-turn bay adjacent to the site on Nelson Bay Road.

All trucks exiting the proposed development will turn left out of the site. To ensure road safety is maintained, trucks will proceed along Nelson Bay Road to the roundabout at Nelson Bay Road / Port Stephens Drive and for those with a destination to the west/south complete a U-turn at this location.

For heavy vehicles requiring access from the east to the site, the intersection of Nelson Bay Road/Lemon Tree Passage Road will be utilised to complete a U-turn to then approach the site from the west and turn left into the site.

The above routes are identified on Figure 5-1.

Figure 5-1 - Vehicle Movement Plan

6 Improvement Analysis

6.1 Improvements to Accommodate Existing Traffic

The existing road network in the immediate vicinity of the subject site is well developed and there are no road network upgrades currently occurring within the immediate vicinity of the subject site. The RMS has upgraded Nelson Bay Road to the east of the site to provide two lanes of travel between the subject site and Port Stephens Drive. This will benefit the trucks movements associated with the development. No further road upgrades are required to accommodate the existing traffic movements.

6.2 Improvements to Accommodate Background Traffic

The upgrade of Nelson Bay Road by RMS was completed to improve road safety and ensure there is adequate capacity for future increases in traffic movements. It is considered that no further road upgrades are required.

6.3 Additional Improvements to Accommodate Development Traffic

The site access for the development will include a left turn deceleration lane and an acceleration lane in order to allow for the safe movement of all vehicles entering and exiting the site.

No further road upgrades are required to accommodate the traffic movements associated with the development.

6.4 Alternative Improvements

No alternative improvements are put forward for the project.

7 Summary and Recommendations

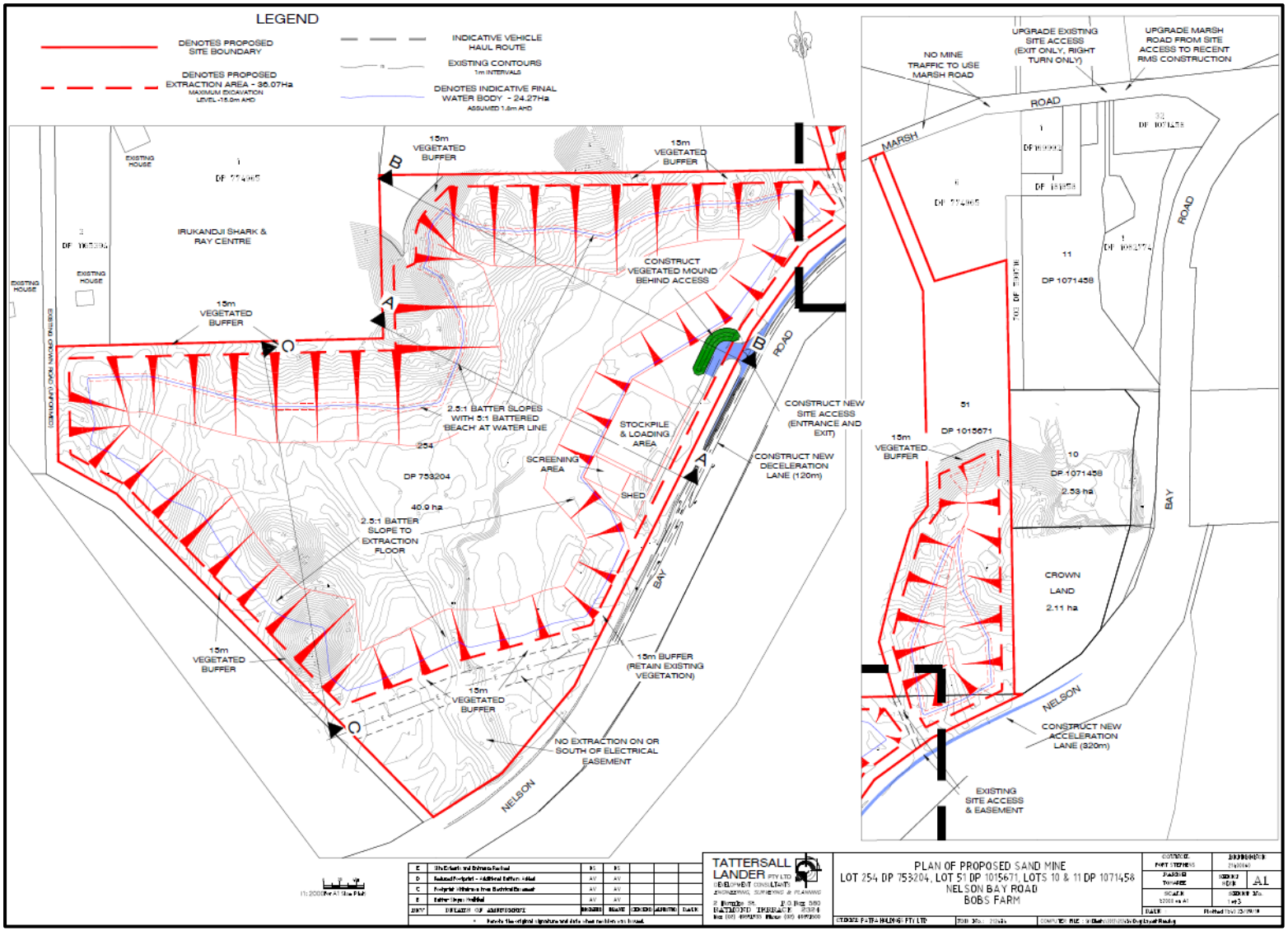
7.1 Summary

The following conclusions are drawn from the investigations into the proposed sand quarry at Bobs Farm off Nelson Bay Road:

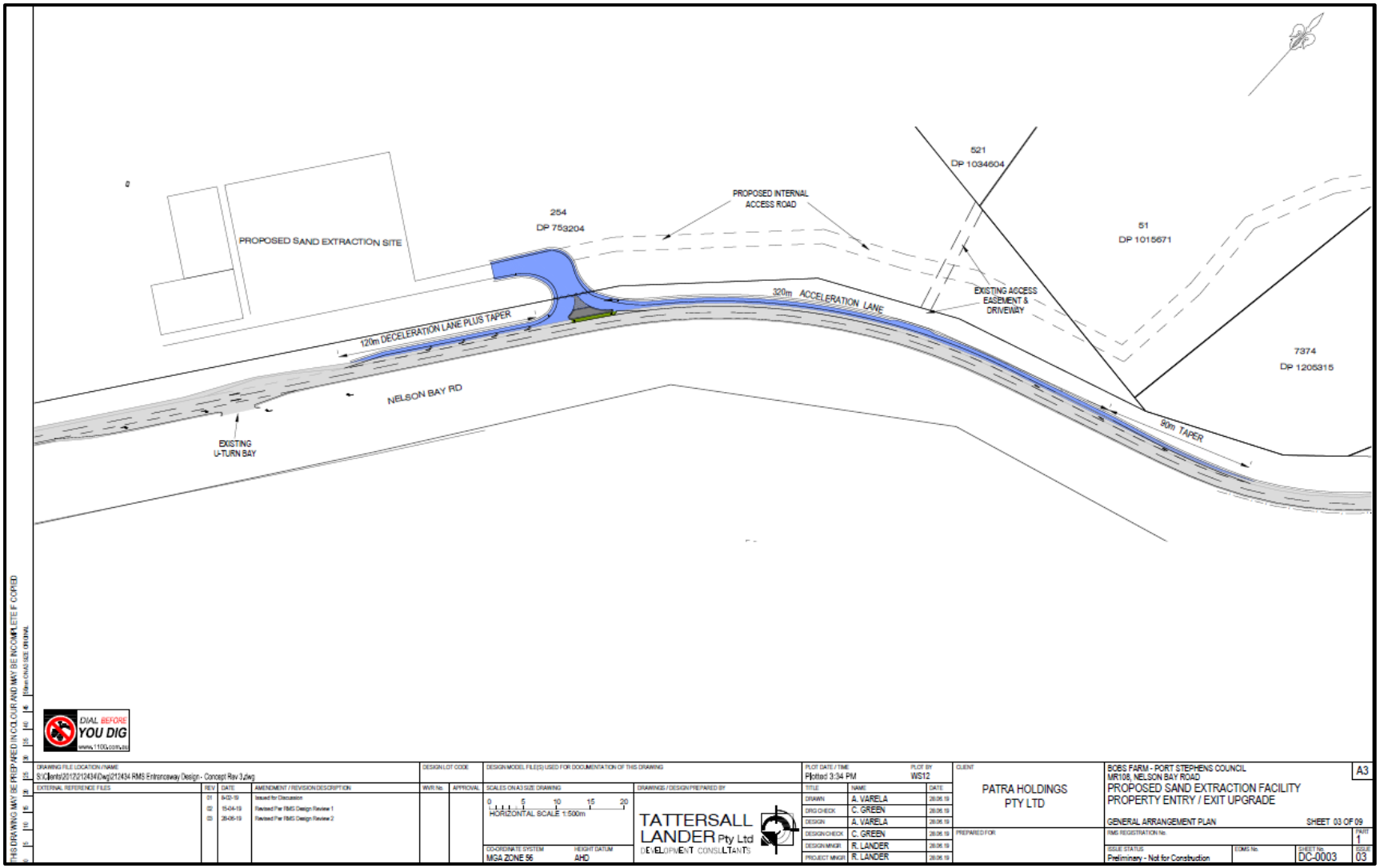
1. The site is located within the locality of Bobs Farm with frontage to both Nelson Bay Road and Marsh Road. The major access route for outbound material will be to the west of the site along Nelson Bay Road to centres such as Newcastle, Raymond Terrace and the Lower Hunter Valley.
2. The proposal allows for a sand quarry with all vehicle access via an upgraded site access off Nelson Bay Road.
3. The upgraded access will include a left turn deceleration lane to be built on Nelson Bay Road, designed and constructed in accordance with RMS and Council requirements. An acceleration lane will also be included on Nelson Bay Road to accommodate all vehicles exiting the site.
4. To accommodate trucks with destinations to the west, a U-turn is required at the roundabout controlled intersection of Nelson Bay Road and Port Stephens Drive. The trucks will then continue along Nelson Bay Road and then use Richardson Road to head towards Raymond Terrace and the Pacific Highway, or Cabbage Tree Road to head towards the New England Highway and Maitland or continue along Nelson Bay Road towards Newcastle. Both Nelson Bay Road and Cabbage Tree Road are RAV approved routes suitable for heavy haulage. There will be minimal demand for trucks approaching the site from the east, however the roundabout intersection of Nelson Bay Road / Lemon Tree Passage Road can be utilised to complete a U-turn for these vehicles to enable them to approach the site from the west
5. The access routes for trucks shall be controlled by a Traffic Management Plan, informing drivers of their requirements.
6. Light vehicles will be able to utilise the U-turn facilities provided along the Nelson Bay Road corridor. The U-turn facility along the site frontage has been reviewed and can continue to operate in a safe manner taking into account the development flows.
7. The site access points have been reviewed on site and allow for safe vehicle movements, with adequate sight lines and stopping sight distance available based upon vehicle speeds and the posted speed limit.
8. All parking can be accommodated on site. The trucks will not be parked on site over-night and there shall be minimal on-site staffing levels requiring minimal on-site parking.

The overall conclusion from the investigations is that traffic and access arrangements for the development proposal are satisfactory and that there is no traffic or access impediments to the development. The trucks access routes have been reviewed based upon impacts for other road users and road safety and the proposed access routes can operate in a safe and efficient manner with minimal delays for other road users. The access point on Nelson Bay Road will be designed and constructed in accordance with RMS and Council requirements to ensure the trucks, including B-Doubles can safely enter the site.

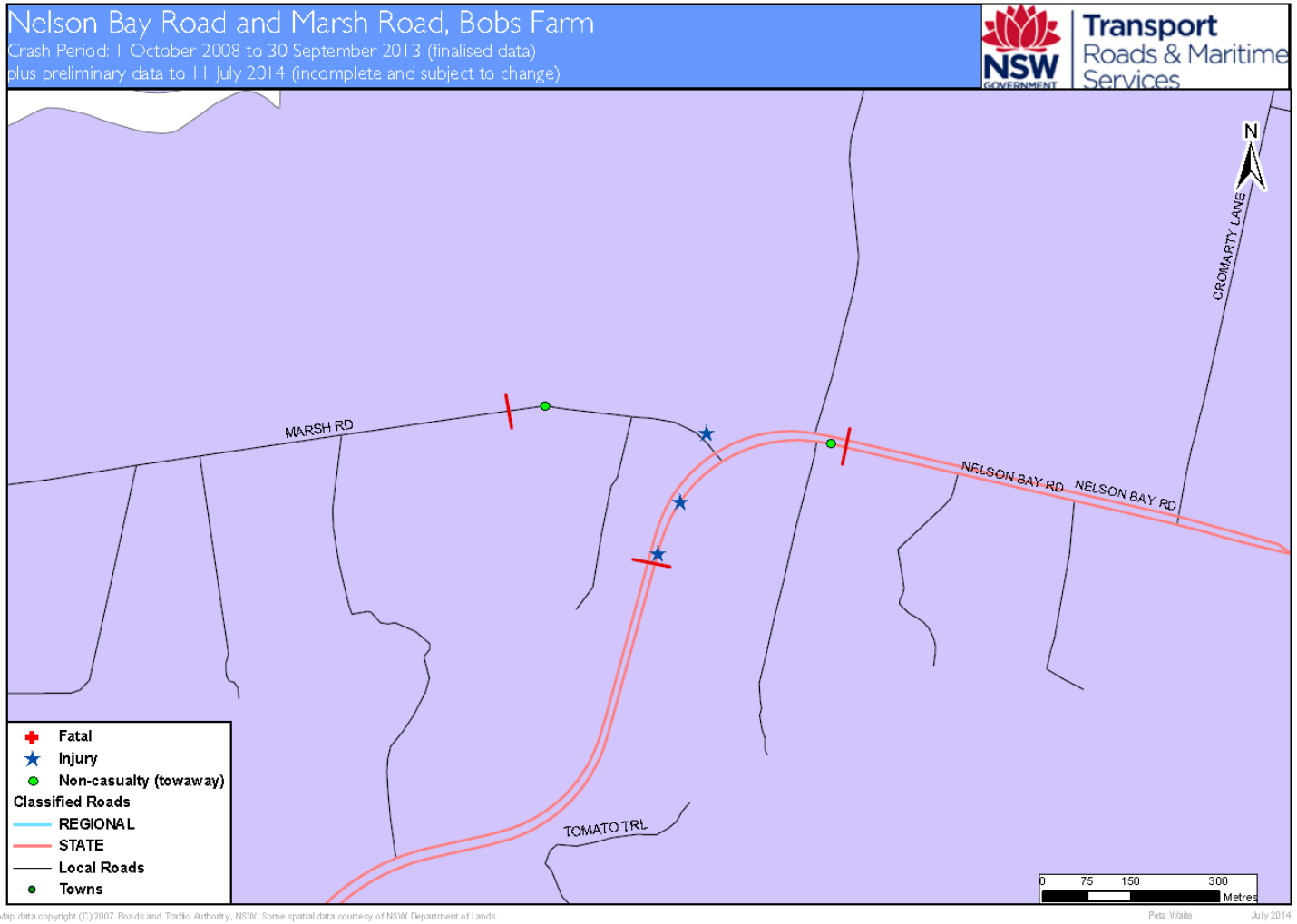
Appendix A Site Plan



Appendix B Concept Access Design



Appendix C Accident Data



Summary Crash Report

Transport for NSW — Centre for Road Safety

# Crash Type		
Car Crash	5	100.0%
Light Truck Crash	0	0.0%
Rigid Truck Crash	0	0.0%
Articulated Truck Crash	0	0.0%
'Heavy Truck Crash	(0)	(0.0%)
Bus Crash	0	0.0%
"Heavy Vehicle Crash	(0)	(0.0%)
Emergency Vehicle Crash	0	0.0%
Motorcycle Crash	1	20.0%
Pedal Cycle Crash	0	0.0%
Pedestrian Crash	0	0.0%

' Rigid or Artic. Truck " Heavy Truck or Heavy Bus
These categories are NOT mutually exclusive

Location Type		
*Intersection	0	0.0%
Non intersection	5	100.0%

* Up to 10 metres from an intersection
~ 07:30-09:30 or 14:30-17:00 on school days

Collision Type		
Single Vehicle	4	80.0%
Multi Vehicle	1	20.0%

Road Classification		
Freeway/Motorway	0	0.0%
State Highway	0	0.0%
Other Classified Road	3	60.0%
Unclassified Road	2	40.0%

Contributing Factors		
Speeding	3	60.0%
Fatigue	1	20.0%

Weather		
Fine	5	100.0%
Rain	0	0.0%
Overcast	0	0.0%
Fog or mist	0	0.0%
Other	0	0.0%

Road Surface Condition		
Wet	1	20.0%
Dry	4	80.0%
Snow or ice	0	0.0%

Natural Lighting		
Dawn	1	20.0%
Daylight	2	40.0%
Dusk	0	0.0%
Darkness	2	40.0%

Crash Movement		
Intersection, adjacent approaches	0	0.0%
Head-on (not overtaking)	0	0.0%
Opposing vehicles; turning	0	0.0%
U-turn	0	0.0%
Rear-end	1	20.0%
Lane change	0	0.0%
Parallel lanes; turning	0	0.0%
Vehicle leaving driveway	0	0.0%
Overtaking; same direction	0	0.0%
Hit parked vehicle	0	0.0%
Hit railway train	0	0.0%
Hit pedestrian	0	0.0%
Permanent obstruction on road	0	0.0%
Hit animal	0	0.0%
Off road, on straight	0	0.0%
Off road on straight, hit object	1	20.0%
Out of control on straight	0	0.0%
Off road, on curve	0	0.0%
Off road on curve, hit object	3	60.0%
Out of control on curve	0	0.0%
Other crash type	0	0.0%

Speed Limit				
			~ 40km/h or less	0 0.0%
40 km/h or less	0	0.0%	80 km/h zone	4 80.0%
50 km/h zone	0	0.0%	90 km/h zone	0 0.0%
60 km/h zone	1	20.0%	100 km/h zone	0 0.0%
70 km/h zone	0	0.0%	110 km/h zone	0 0.0%

CRASHES	5	
Fatal crash	0	0.0%
Injury crash	3	60.0%
Non-casualty crash	2	40.0%

^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn

Time Group		% of Day	
00:01 - 02:59	1	20.0%	12.5%
03:00 - 04:59	0	0.0%	8.3%
05:00 - 05:59	0	0.0%	4.2%
06:00 - 06:59	1	20.0%	4.2%
07:00 - 07:59	0	0.0%	4.2%
08:00 - 08:59	0	0.0%	4.2%
09:00 - 09:59	0	0.0%	4.2%
10:00 - 10:59	0	0.0%	4.2%
11:00 - 11:59	0	0.0%	4.2%
12:00 - 12:59	0	0.0%	4.2%
13:00 - 13:59	1	20.0%	4.2%
14:00 - 14:59	0	0.0%	4.2%
15:00 - 15:59	1	20.0%	4.2%
16:00 - 16:59	0	0.0%	4.2%
17:00 - 17:59	0	0.0%	4.2%
18:00 - 18:59	0	0.0%	4.2%
19:00 - 19:59	0	0.0%	4.2%
20:00 - 21:59	0	0.0%	8.3%
22:00 - 24:00	1	20.0%	8.3%

Street Lighting Off/Nil	% of Dark
1 of 2 in Dark	50.0%

CASUALTIES	3	
Killed	0	0.0%
Injured	3	100.0%
^ Unrestrained	0	0.0%

Crashes		Casualties
1	2014	1
1	2010	0
3	2009	2

~ School Travel Time		
Involvement	0	0.0%

McLean Periods			% Week
A	1	20.0%	17.9%
B	0	0.0%	7.1%
C	1	20.0%	17.9%
D	0	0.0%	3.5%
E	0	0.0%	3.6%
F	0	0.0%	10.7%
G	0	0.0%	7.1%
H	1	20.0%	7.1%
I	1	20.0%	12.5%
J	1	20.0%	10.7%

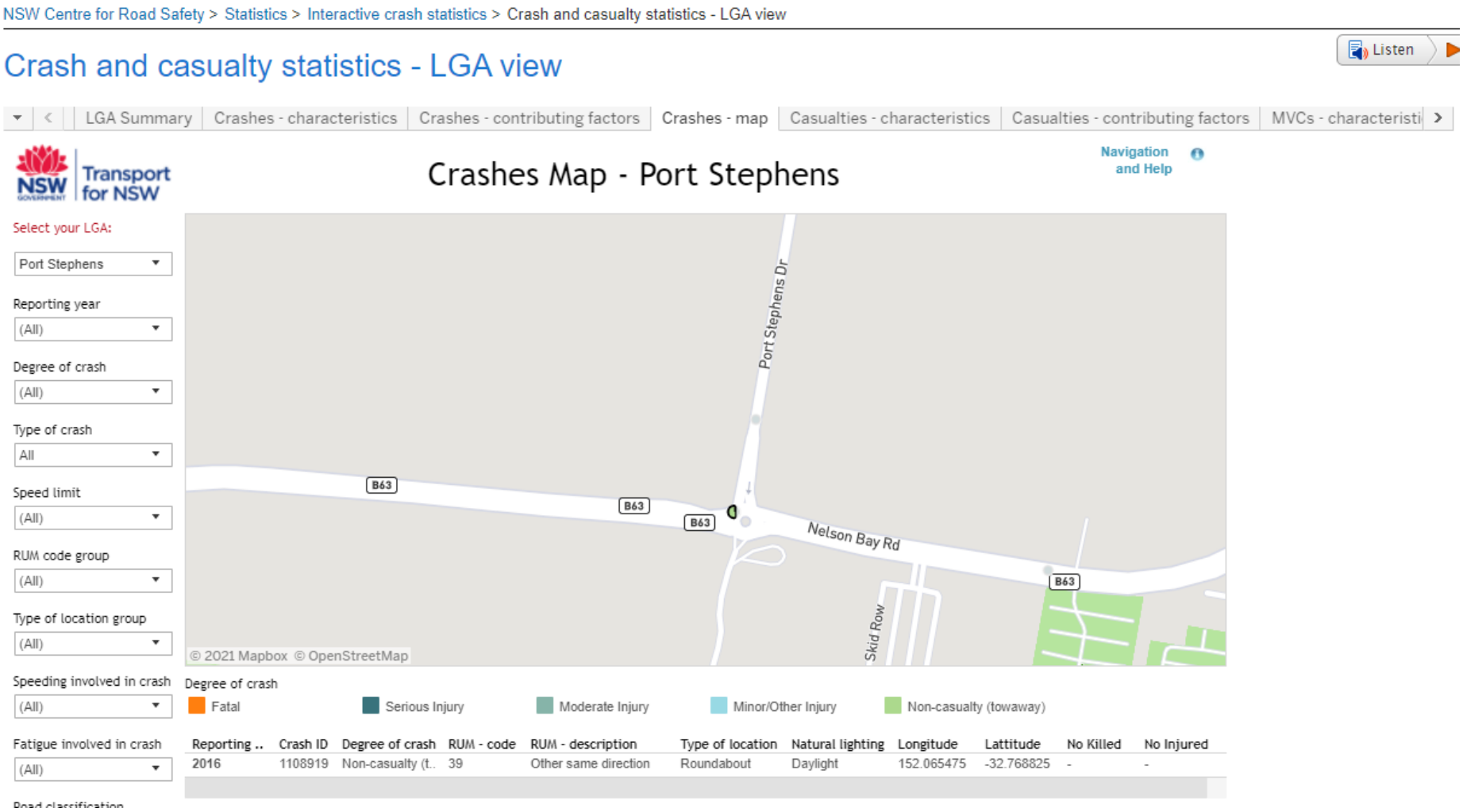
Day of the Week						# Holiday Periods					
Monday	0	0.0%	Thursday	0	0.0%	Sunday	2	40.0%	New Year	0 0.0%	Queen's BD	0 0.0%	Easter SH	0 0.0%
Tuesday	0	0.0%	Friday	0	0.0%	WEEKDAY	2	40.0%	Aust. Day	0 0.0%	Labour Day	0 0.0%	June/July SH	0 0.0%
Wednesday	2	40.0%	Saturday	1	20.0%	WEEKEND	3	60.0%	Easter	0 0.0%	Christmas	0 0.0%	Sept./Oct. SH	0 0.0%
									Anzac Day	0 0.0%	January SH	1 20.0%	December SH	0 0.0%

Crashid dataset 01/10/08-30/09/13 plus preliminary data to 11/07/14 Nelson Bay Road and Marsh Road, Bobs Farm
Note: Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Rep ID: REG01 **Office:** Hunter **User ID:** waitep

Generated: 11/07/2014 08:20



Crash data – 2014 to 2020 for roundabout at Nelson Bay Road and Port Stephens Drive