BETTER TRANSPORT FUTURES
MARK WAUGH

Anna Bay Sand Extraction Project

HAY ENTERPRISES (NSW) PTY LTD

Traffic Impact Statement
August 2018

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ABN 67 106 169 180

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Contents

1 Introduction

This Traffic Impact Statement (TIS) has been prepared to accompany an Environmental Impact Statement (EIS) for a proposed small scale sand extraction project at Anna Bay NSW.

1.1 The Project Proposal

Tattersall Lander Pty Ltd on behalf of Hay Enterprises (NSW) Pty Ltd is seeking to develop a small scale sand mine with associated machinery shed, access roads and a caretakers residence at No. 4226 Nelson Bay Road Anna Bay NSW.

The Project is a proposed mine to access and remove as required, sand material that is threatening a main 33kV AusGrid transmission line that serves the Nelson Bay area. The sand has accumulated and continues to accumulate under the transmission lines through wind action. The proposal is 'designated' development, being an 'extractive industry' with a planned extraction rate of up to a maximum of 50,000 cubic metres per year and is within 500 metres of another extractive industry site operating during the last 5 years.

The operating life of the site is anticipated to be 30 years.

1.2 Scope of Work

These investigations have assessed the range of traffic and transport features of the subject site and its surrounds with specific reference to the requirements of the Guide to Traffic Generating Developments (Version 2.2, RTA October 2002) (Herein after referred to as the Guide) The work is required to accompany the Environmental Impact Statement supporting the Development proposal for the subject site and development. Specific work tasks have included:

1. INCEPTION – Project briefing, review of Secretary's Environmental Assessment Requirements (SEAR's)
2. SITE INVESTIGATIONS – Consideration of the existing form and features of the surrounding road system.
3. TRAFFIC COUNTS – Turning counts for one weekday peak period at the intersection of Nelson Bay Road with Port Stephens Drive, conducted on Tuesday 6th December 2017 prior to school holidays affecting traffic flows, to represent regular weekday activity which is more relevant to this operation.
4. An automatic counter was also placed on Nelson Bay Road for 7 days in the vicinity of the subject site, from Tuesday 6th December 2017 to Tuesday 13th December 2017.
5. DESIGN REVIEW – Site access assessment and review of proposed production capacity issues and traffic movements – review road connections as suitable for site access requirements, from a technical capacity, movement and also road safety perspective.
6. ASSESSMENT - Traffic Impact Assessment in accordance with the Guide to Traffic Generating Development (RTA 2002)
7. TIS REPORT - Prepare a Traffic Impact Statement (TIS) incorporating the findings from the above assessments, suitable for lodging with the road authorities for approval and addressing the matters raised in the traffic and transport elements of EAR 1172:
    a. predictions of the road traffic generated by the construction and operation of the development, including a description of the types of vehicles likely to be used for transportation of quarry products;
    b. assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road networks, detailing the nature of the traffic generated, transport routes, traffic volumes and potential impacts on local and regional roads;
    c. description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road network (particularly the proposed transport routes) over the life of the development;
    d. evidence of any consultation with relevant roads authorities, regarding the establishment of agreed contributions towards road upgrades or maintenance; and
    e. description of access roads, specifically in relation to nearby Crown roads and fire trails;

The TIS report is set out as follows:

- Chapter 2 describes the existing situation
- Chapter 3 details the traffic and transport aspects of the subject site and development proposal
- Chapter 4 presents the traffic impact assessment of the proposal
- Chapter 5 summarises the conclusions and recommendations from the investigations.

2 Project Background

2.1 Site Description and Local Context

The project site is located within the Port Stephens Shire Council Local Government area at Lot 591 DP 1191380 4226 Nelson Bay Road Anna Bay NSW.

The local environment surrounding the project includes a range of different land uses and could be described as semi-rural in character. There is a mixture of land uses along Nelson Bay Road, which provides the only road access to the subject site. These include a number of residential properties, a church, other extractive industry and earth moving businesses, a petrol station and some smaller agricultural land holdings. The site is currently zoned RU2 under the Port Stephens Council LEP 2013.

The site is bounded by Nelson Bay Road to the north, and the sand dunes of Stockton Bight to the south.

There is an electricity easement located east-west across the property and it is the migration and encroachment of sand from the Stockton Bight to the south that is the subject of this project proposal. To the east of the site is the Baylife Church.

Photo 1 – Electricity lines within easement across subject site, looking east. Showing sand to the right

The site location and local road network are shown in **Figures 1 and 2** below and overleaf.

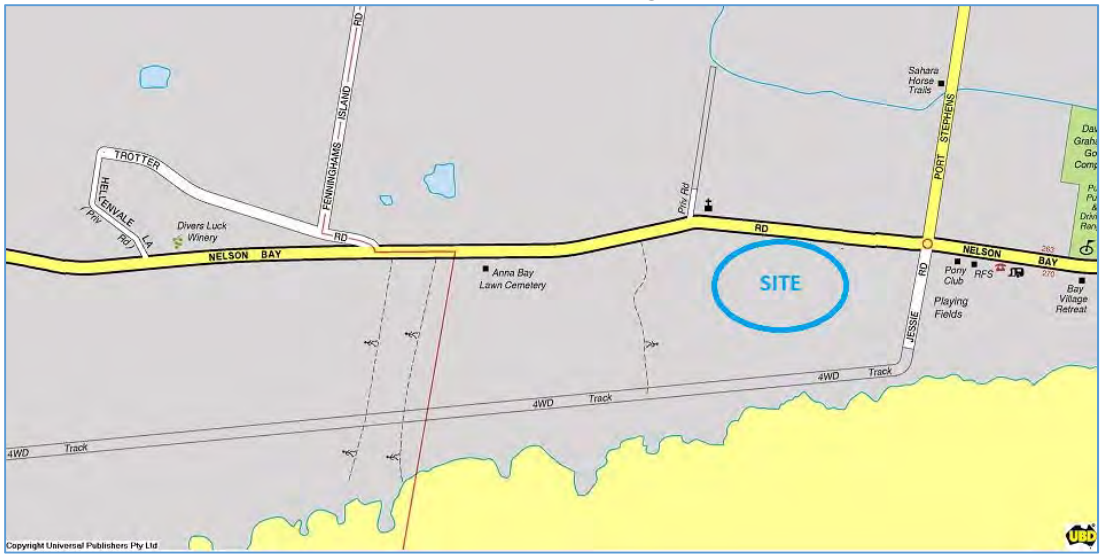


Figure 1 – Local Road Network
Source: UBD Australian City Streets Version 5.0
Note: The extent of sand dunes shown is for illustrative purposes only and is not accurate

Figure 2 – Site Concept Plan – Area designated SP2 is Nelson Bay Road
Source: Tattersall Lander Pty Ltd 2017

Figure 3 – Adjoining Sand Extraction Operations
Source: Tattersall Lander Pty Ltd 2017

2.2 Site Access Road Network

Nelson Bay Road

The most significant road in the network that serves the subject site is Nelson Bay Road. It is a classified main road, designated as the B63 route in the NSW main road network. It is an arterial road with the section in the immediate vicinity of the subject site upgraded to four lane dual carriageway standard in May 2015, applying a rural design standard. 100% of traffic that will access the site will use Nelson Bay Road.

Photo 2 –Nelson Bay Road looking east in the vicinity of the subject site.

Photo 3 – Nelson Bay Road looking east from Nelson Bay Road / Port Stephens Drive Roundabout

Photo 4 – Nelson Bay Road looking west from Nelson Bay Road / Port Stephens Drive Roundabout.

There is a central median in place preventing right turns along the section of the road from Bobs Farm to Anna Bay, except where specific turn facilities are provided. There are a number of right turn and U-turn bays for example at Trotter Road and Cromarty Lane, with every second bay suitable for large vehicles.

Photo 5 – Trotter Road Seagull intersection and U-turn facility on Nelson Bay Road (looking East)

Photo 6 – Seagull intersection allowing right turn movements at Nelson Bay Road / Trotter Road (looking east)

Photo 7 – U-turn bay at Nelson Bay Road / Trotter Road

Port Stephens Road / Nelson Bay Road Roundabout

With right runs prohibited by a central median, traffic approaching the subject site from the west has to perform a U-turn at the roundabout controlled intersection of Nelson Bay Road with Port Stephens Drive. This is a four leg intersection with the southern leg being Jessie Road. (See overleaf.)

Photo 8 – Western approach to Nelson Bay Road / Port Stephens Drive Roundabout, looking east

Photo 9 – Eastbound circulating lane through Nelson Bay Road / Port Stephens Drive Roundabout

Photo 10 –Port Stephens Drive looking north from Nelson Bay Road Roundabout

Jessie Road

Jessie Road is a local road connecting to the Nelson Bay Road / Port Stephens Drive roundabout as the southern of four legs. It is an unsealed road providing access to a number of properties, including the Nelson Bay Pony Club, a carpark on the south eastern corner of the roundabout and an earthmoving business. It also provides access to the easement which carries electricity lines across the subject site. It has unofficial signposts noting the road as a 'No Through Road', with no access to the beach or sand dunes.

Photo 11 – Jessie Road looking north toward the Nelson Bay Road / Port Stephens Drive Roundabout

Photo 12 – Jessie Road looking south from the Nelson Bay Road / Port Stephens Drive Roundabout

Photo 13 – Jessie Road looking south

Photo 14 – Easement looking west from Jessie Road toward subject site.

2.3 Traffic Surveys and Site Observations

1. Traffic Surveys

Monitoring of traffic movements was conducted for one week day peak period at the intersection of Nelson Bay Road with Port Stephens Drive. The count was conducted on Tuesday 6th December 2017, prior to school holidays affecting traffic flows, to represent regular weekday activity which is more relevant to this operation.

An automatic counter was also placed on Nelson Bay Road for 7 days in the vicinity of the subject site, from Tuesday 6th December 2017 to Tuesday 13th December 2017. Confirming directional volumes by hour, vehicle and speed classifications. The survey data is included in **Appendix A – Traffic Survey Data**.

2. General Site Observations

The most significant observations from a traffic movement, efficiency and road safety perspective that were observed from the data monitoring and subsequent site observations were:

1. Road network traffic flows appear to be well within technical capacity limits of the road system;
2. Heavy vehicles were a small percentage within the traffic stream on Nelson Bay Road through Anna Bay; flows were around 6.5 to 7% of recorded total flows.
3. Bus movements were observed along Nelson Bay Road
4. Turning movements at the Nelson Bay Road /Port Stephens Drive roundabout, including heavy vehicles, operate well.

5. Nelson Bay Road carries a combined (two-way) volume of around 20,000 vehicles (19945) on weekdays.
6. The AM peak weekday westbound traffic flow was recorded at around 7 AM and 925 vph in two lanes.
7. The corresponding PM westbound peak was recorded around 4 PM and 740 vph in two lanes.
8. The 85th percentile speed was recorded as 82.5 kph (Noting the posted speed limit is 80 kph)
9. There are a number of U-turn facilities provided along Nelson Bay Road, alternating between small vehicle facilities, and U-turn bays suitable for larger vehicles (buses and trucks)
10. Observations at the Nelson Bay Road / Port Stephens Road roundabout indicate it currently operates at good levels of service at peak times.. (Austroads 2009) (See also Section 4 of this report.)

The above observations have been taken into account when considering the proposed new land use.

2.4 Cycling Facilities

The Review of Environmental Factors that accompanied the planning approval for the upgrade of Nelson Bay Road from Bobs Farm to Anna Bay, included noting provision of cycling facilities as part of that project. The treatment was essentially to provide cycling facilities in the form of 2 metre shoulders along the route in each direction.

Given the rural character of the area there are no specific pedestrian facilities in the vicinity.

2.5 Public Transport Services

The locality of Anna Bay is served by bus public transport through Port Stephens Coaches. While not of significant relevance to the project operations, there are bus services along Nelson Bay Road passing the site, travelling to and from the Nelson Bay / Salamander Bay area, to Newcastle Airport, and on the Newcastle City. Consequently the site is quite well served for the commuter needs of any employees choosing to travel by other than car. There are three services passing the site (Routes 130, 131, 135) with a fourth (Route 143) travelling through the nearby Nelson Bay Road /. Port Stephens Drive roundabout. A map illustrating the services is included in **Appendix B Port Stephens Public Transport Network.**

2.6 Authority Liaison

Liaison has been undertaken by the project planners with the NSW Department of Planning and Environment with respect to the Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement for the subject site. In preparing the SEARs NSW Roads and Maritime Services were consulted as part of this process and the following matters were noted as assessment requirements from a traffic and transport perspective:

The Department of Planning & Environment has issued Secretary's Environmental Assessment Requirements (SEAR's) under Section 78A(8A) of the *Environmental Planning and Assessment Act 1979* Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*

Traffic and Transport is noted as a general issue that the EIS must address including the following matters:

a. predictions of the road traffic generated by the construction and operation of the development, including a description of the types of vehicles likely to be used for transportation of quarry products;
b. assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road networks, detailing the nature of the traffic generated, transport routes, traffic volumes and potential impacts on local and regional roads;
c. description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road network (particularly the proposed transport routes) over the life of the development;
d. evidence of any consultation with relevant roads authorities, regarding the establishment of agreed contributions towards road upgrades or maintenance; and
e. description of access roads, specifically in relation to nearby Crown roads and fire trails;

The above matters raised in the project SEARs have been considered in preparing this Traffic Impact Statement. With respect to road authority liaison this is expected to occur during the review phase of the project.

3 Proposed Development

3.1 Project Description Plan

The concept plan for the project showing site boundary, internal access road to the sand materials and site access into and out of the site from Nelson Bay Road is illustrated in **Appendix C – Proposed Sand Mine DA Plans**. The Project proposes to extract windblown sand and provide ancillary development incorporating a caretaker's residence and machinery shed. The proposed development has a planned sand extraction rate of up to a maximum of 50,000 cubic metres per year and for a maximum lifetime of 30 years. The proposed development site is within 500 metres of another extractive industry site operating during the last 5 years and is prescribed as designated development.

3.2 Assumed Project Construction Details

It is understood the total period for the construction of site amenities, upgrade of on-site haul road, and upgrade of the access intersection, etc. will be in the order of 1 to 2 months for work within the site. It has been assumed also that any work required for any access would be able to be completed within this same 1 to 2 month period.

The work would include some site clearing, construction of site amenities, upgrade of on-site haul road, and upgrade of the access intersection etc. It is expected that the construction time work day would be a typical industrial work day of 7am to 6pm Monday to Friday, and 8am to 1pm Saturday. No Sunday or public holiday work is planned. A typical inventory of equipment to be used for this type of construction phase, would be truck and dog haulage, excavator, concrete truck, rigid vehicle bringing shed materials.

3.3 Traffic Generation

In relation to expected truck movements for the project it has been assumed there will be a maximum of 40 two way movements per day. (i.e. 40 movements in and 40 movement out of the site.) This equates to advice on planned truck payloads of 1400 tonnes per day, based on the proposed use of a 35 tonne (~ 22 cubic metre) truck and dog combination. This equates to 55 full days of activity over a year.

It may be the demands are spread over more days, but this represents the assumed (planned) maximum movements that could occur on any one day.

With the turning volumes assumed accessing the site at around 40 truck movements per day plus some light traffic, over an 11 hour operating day (7am to 6pm Monday to Friday, 8am to 1am Saturdays) this would be in the order of 5 movements into the site in any one hour assuming a uniform flow profile (4 trucks and 1 car). This compares with the peak westbound flow on Nelson Bay Road recorded in February 2018 at 925 vph, this represents only a 0.5% change in traffic volumes. Even doubling this flow would only represent around 1% of passing traffic flows. And so in terms of determining the appropriate site access treatment it will be the through traffic component that determines the type of treatment required.

A traffic flow of 925 vph falls within the Level of Service 'B' range (900 to 1400 vph), at just over the highest category Level of Service 'A' threshold of 900 vph. Even if a 3% per annum background growth figure is added to this base flow for 10 years, a NSW Roads and Maritime requirement in all traffic impact assessment work in NSW (i.e. 30% over the base flows) the resulting flow of around 1200 vph still falls within the LoS 'B' range for urban road peak hour flows.

The conclusion is that road capacity is not considered an issue for the project proposal.

3.4 Site Access

Access to the site will be at one point and left in left out only, and if any trucks need to travel east, there are several U-turn bays within a short distance to the west along Nelson Bay Road suitable for use by heavy vehicles. Trucks travelling to the site from the west can perform a U-turn at the Port Stephens Drive roundabout.

Given the very low traffic volumes forecasted as requiring access to the site it is proposed to modify the existing site access to conform to a Rural Basic Left (BAL) turn treatment as illustrated in **Figure 3-1 Proposed Site Access Treatment** overleaf. An evaluation of this treatment is provide in Section 4 of this report.

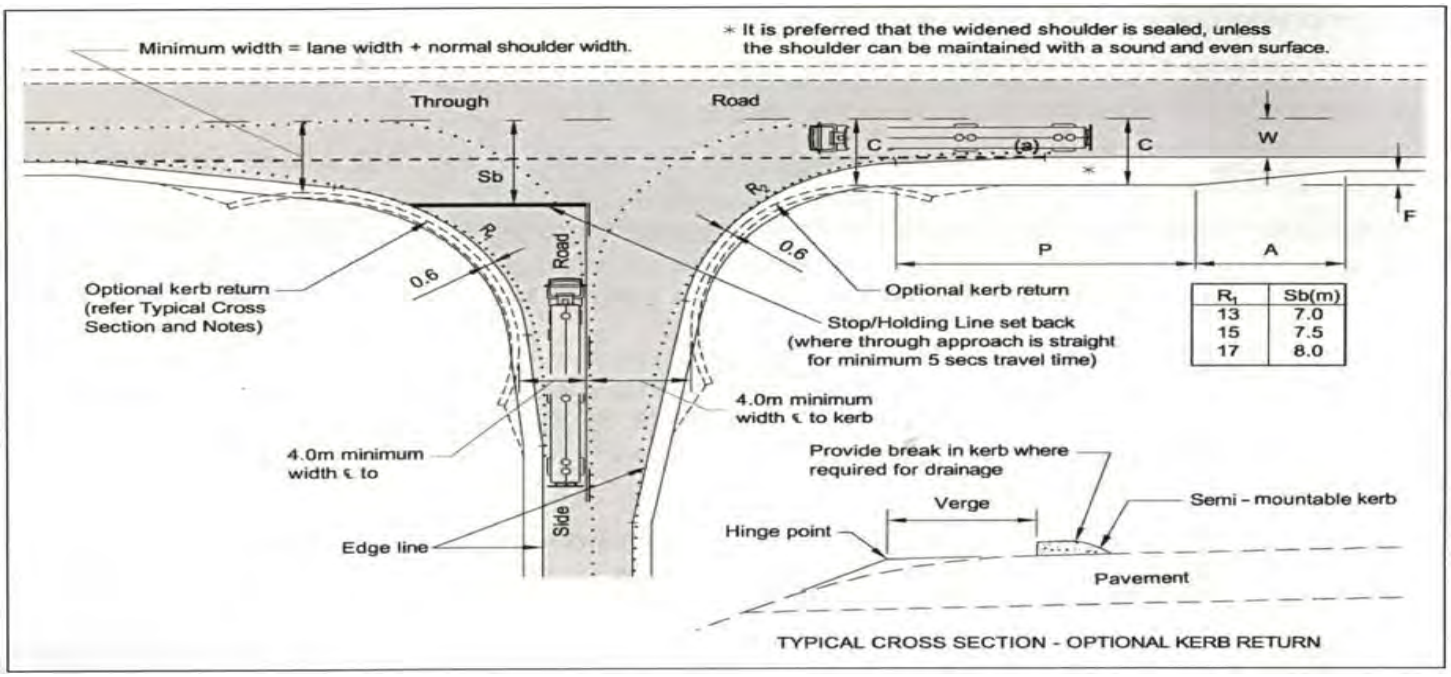


Figure 3-1 Proposed Site Access Treatment
Source: Austroads 2009

3.5 Traffic Assignment and Distribution

For the purposes of this assessment the following traffic assignment and distribution profiles have been considered. These have been based on what is considered to be a realistic flow profile for the operation.

1. 75% approach from west, departure to west, and
2. 25% approach from east and return to east.

In addition to the above scenario the following 'worst case' scenarios have also been considered;

3. 100% approach from west, departure to west, and
4. 100% approach from east and return to east.

It is expected that these 'worst case' scenarios are almost certain to never occur. They are included here as representing the absolute 'worst case' loading of both U-turn movements from the west at the Port Stephens Drive roundabout (3), and U-turn movements at say the Trotter Road U-turn bay (4). And so the peak hour loading for each of these scenarios would be 5 movements only into and out of the site in the peak hour.

4 Traffic Impact Assessment

4.1 Forecast Traffic Flows and Road Capacity

With the peak westbound flow on Nelson Bay Road recorded in February 2018 at 925 vph, the forecast traffic generation from the subject site represents only around a 0.5% change in current traffic volumes. Even doubling this flow would only represent around 1% of passing traffic flows which is still a quite minor variance.

The capacity and level of service results presented are drawn from the urban flow conditions and Levels of Service definitions as presented in the Guide to Traffic Generating Developments ((NSW RTA October 2002). These are reproduced below as **Table 4.1 – Urban Road peak hour flows per direction**. It can be seen that the ultimate capacity for a two lane urban road is 2200 vph at the acceptable technical limit of flow conditions under urban conditions of Level of Service 'D'.

Table 4.1 - Urban Road peak hour flows per direction

Level of service	One Lane (vph)	Two Lanes (vph)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Source: RTA Guide to Traffic Generating Developments, version 2.2 dated October 2002.

A traffic flow of 925 vph falls within the Level of Service 'B' range (900 to 1400 vph), at just over the threshold of 900 kph for the highest category Level of Service 'A'. Even if a conservatively high, 3% per annum background growth figure is added to this base flow for 10 years, a NSW Roads and Maritime Services (RMS) requirement in all traffic impact assessment work in NSW (i.e. 30% over the base flows) the resulting flow of around 1200 vph still falls within the LoS 'B' range for urban road peak hour flows. A more realistic 2% growth rate would only result in a westbound peak flow of around 1100 vph, still LoS 'B'

The conclusion is that road capacity is not considered an issue for the project proposal.

4.2 Traffic Planning and Management Issues

Background Growth

NSW RMS has for some time considered it necessary to make allowance for 'background growth' along its road corridors. This is slated as being required to take account of additional traffic flows from unknown sources that add to the base traffic flows. A conservative RMS 30 (i.e. 3% per annum) growth rate has been applied in this analysis.

Construction Traffic Management

As with operational traffic, construction traffic will utilise the Nelson Bay Road / Port Stephens Drive roundabout access the site from main road network. The proposed construction program will not require mobilisation of a major construction workforce. Rather the work required is anticipated will be completed over a 1 to 2 month period. Construction activities for the Project are planned to be undertaken between the hours of 7am to 6pm Monday to Friday, 8am to 1pm Saturday, with no Sunday or public holiday operations.

As such, significant construction traffic impacts are not expected as a result of the project.

4.3 Intersection Performance

The significant intersection of interest to the evaluation of the project proposal is the roundabout controlled junction of Nelson Bay Road and Port Stephens Drive.

When assessing intersection performance it is firstly useful to consider the Austroads threshold levels for intersection capacity under uninterrupted flow conditions. **Table 4.2 – Intersection Volumes Below which**

Capacity Analysis is Unnecessary, presents these thresholds. Where traffic flows fall within these limits intersection performance is essentially operating with little or no delay for approaching drivers other than to obey the requisite road rules.

Table 4.2 Intersection Volumes Below which Capacity Analysis is Unnecessary

Road Type	Light Crossing or turning volumes Maximum Design Hour Volumes, Two-way (vph)		
Two Lane through Roadway	400	500	650
Cross Road	250	200	100
Four Lane through roadway	1000	1500	2000
Cross road	100	50	25

Source: Guide to Traffic Management - Part 3 Traffic Studies and Analysis, Austroads 2009

For both the morning and afternoon peak periods, the survey results at the junction of Nelson Bay Road and Port Stephens Drive exceed the threshold values as illustrated in **Figure 4-1–Nelson Bay Road / Port Stephens Drive Existing Peak Hour Traffic Volumes**.

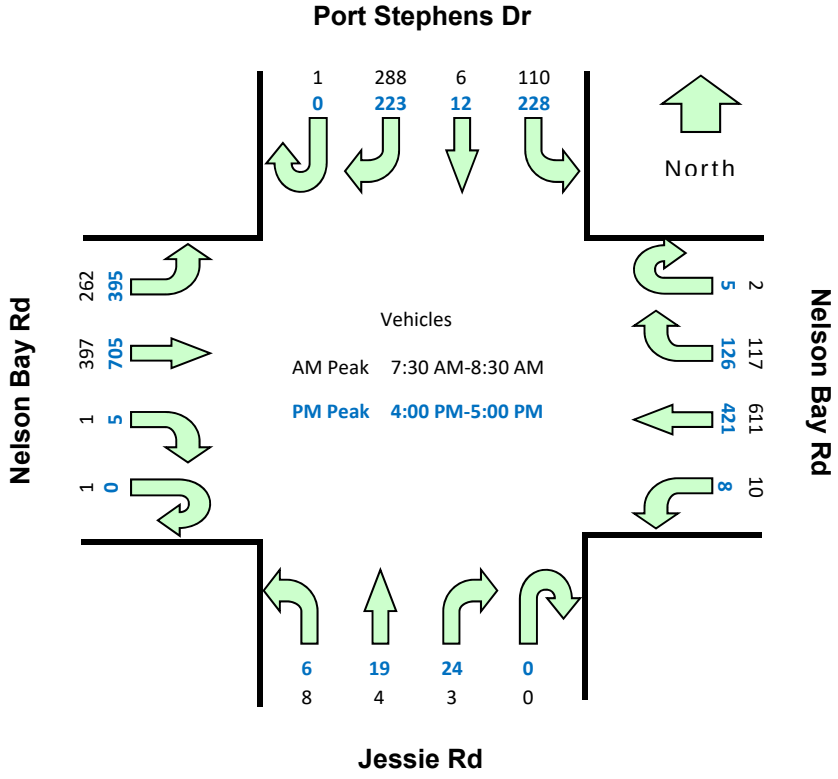


Figure 4-1–Nelson Bay Road / Port Stephens Drive Existing Peak Hour Traffic Volumes
Source TTS for BTF 2018

4.4 Sidra Intersection Modelling

For both the morning and afternoon peak periods, the following scenarios have been tested at the Nelson Bay Road / Port Stephens Drive / Jessie Road roundabout using the SIDRA Intersection Modelling Tool:

1. AM Existing
2. AM Existing + RMS 30
3. AM Existing + RMS 30 + 100% Site U-TURNS
4. AM Existing + RMS 30 + 100% Site U-TURNS 100% JESSIE RD TRUCKS
5. PM Existing
6. PM Existing + RMS 30
7. PM Existing + RMS 30 + 100% Site U-TURNS
8. PM Existing + RMS 30 + 100% Site U-TURNS 100% JESSIE RD TRUCKS

Scenarios 3 and 7 have tested all U-turns to return westbound to the subject site as being heavy vehicles. Scenarios 4 and 8 have added to 3 and 7 respectively 100% of Jessie Road flows as being heavy vehicles.

In all cases the forecast Level of Service on the Port Stephens Drive and Nelson Bay road approaches are at Level of Service 'A', and Jessie Road at LoS 'B' only for the AM Scenario 4 assumption of 100% of Jessie Road flows being heavy vehicles. **Figure 4-2 SIDRA Intersection Level of Service** Illustrates an overall summary of intersection performance.

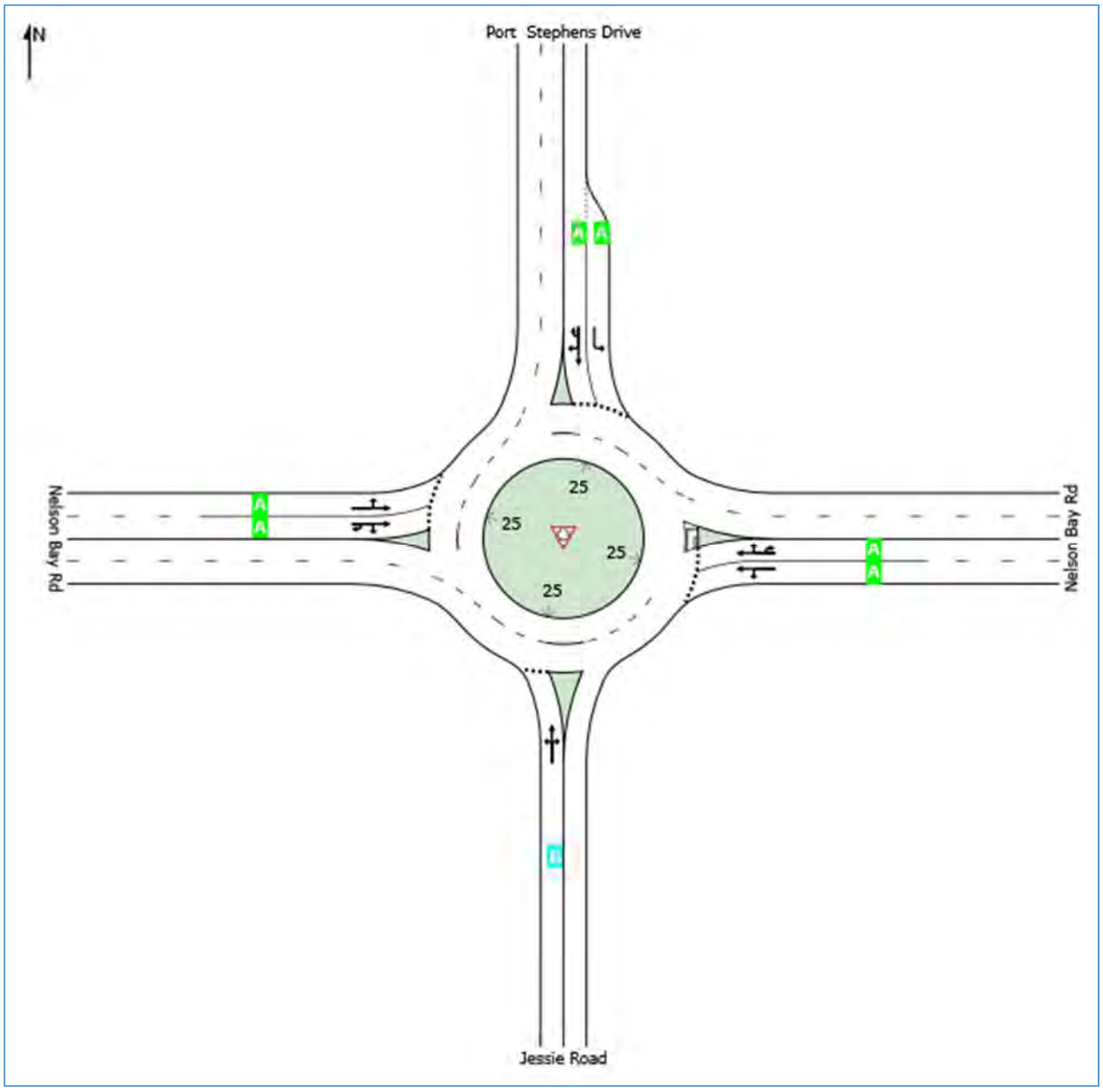


Figure 4-2 SIDRA Intersection Level of Service

Nelson Bay Rd & Port Stephens Dr AM Existing + RMS 30 + 100% Site U-TURNS 100% JESSIE RD TRUCKS

	South	East	North	West	Intersection
LOS	B	A	A	A	A

Source: SIDRA INTERSECTION 7.0 | Copyright © 2000-2017 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: MARK WAUGH PTY LTD (BTF) | Processed: Monday, March 5, 2018 12:33:44 PM
Project: C:\Users\mark.waugh\Documents\WORK\PROJECTS ACTIVE\ACTIVE\BTF2018239 Anna Bay TIS\SIDRA\Nelson Bay Rd Anna Bay Sand Extraction TIS.sip7

The conclusion from this analysis is that there will be no discernible change in traffic performance at this roundabout as a result of the forecast additional traffic from the subject site.

For the alternative 100% traffic flow from the east and returning to the east (which is very unlikely to occur in practice) the capacity of the U-turn facilities available is more than capable of catering for such flow levels the flows are as small as to not warrant specific intersection analysis.

By way of comparison, the Baylife Church site next door to the subject site is likely to generate higher traffic flows using a BAL access treatment. For example a congregation or gathering of say 50 people and a car occupancy of say 2.5 would generate 20 movements in and 20 movement out of that site.

The overall conclusion is that there will be no discernible traffic impacts from the operations of the project proposal. **(Note: A full version of the electronic SIDRA Intersection Modelling file can be supplied if required.)**

4.5 Recommended Site Access Layout

The Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (Austroads 2009) provides guidance on the warrants for various auxiliary lane treatments at intersections. **Figure 4-3 Warrant for turn treatments on major roads at unsignalised intersections** below illustrates the principles for a design speed of less than 100 kph. The posted speed limit on Nelson Bay Road is 80kph. The warrant relates turn treatments to a combination of major road traffic volume and turning volumes.

For the forecast traffic flows of only around 5 vehicle movements in the peak hour at the site access intersection a **BA**sic **L**eft turn treatment (BAL) is considered an appropriate turn treatment according to Austroads. This is the case even if it is assumed that the lane flow proportion in the near (left lane passing the site access is equivalent to the through and turn volumes heading west from the Roundabout at Port Stephens Drive. (I.e. around two thirds of the total westbound flow.) Given the two lane approach on Nelson Bay Road to the roundabout the median (right) lane is likely to cater for a higher proportion of the total flow.

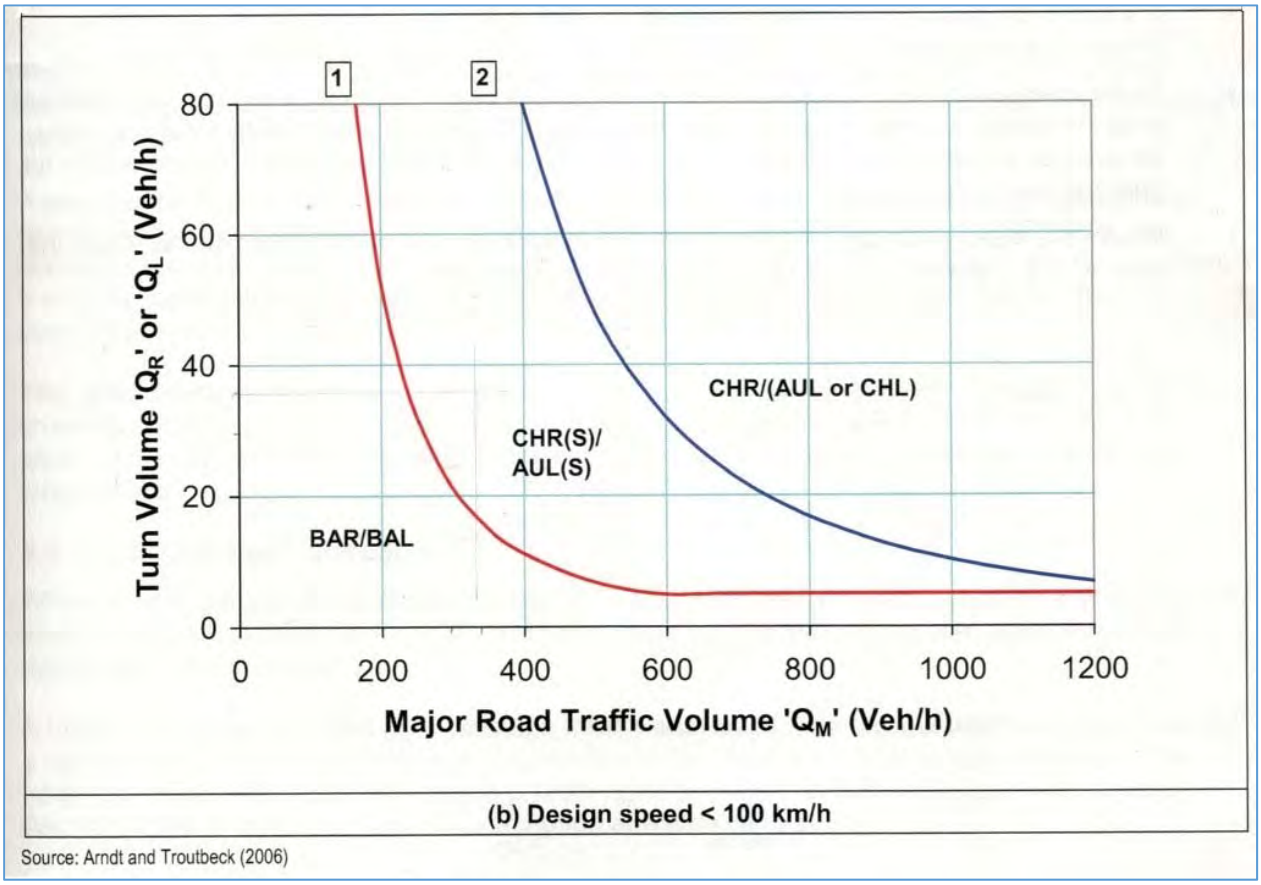
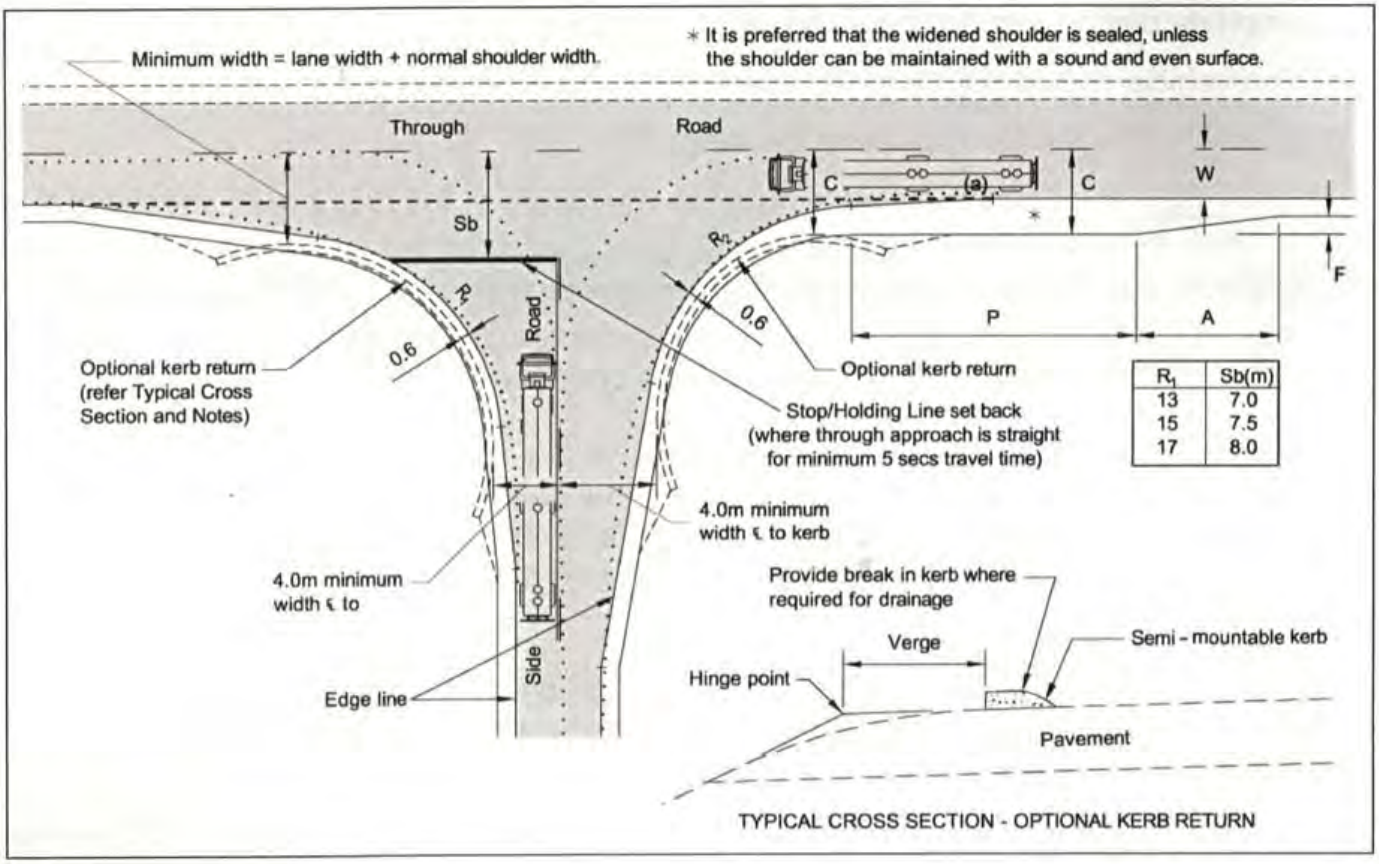


Figure 4-3 Warrant for turn treatments on major roads at unsignalised intersections
(Warrant for turn treatments less than 100kph)
Source: Austroads 2009

An illustration of the recommended Austroads Rural **BA**sic **L**eft turn treatment **(BAL)** highlighting critical geometry is reproduced in **Figure 4-4 BAsic Left (BAR) turn treatment on a two-lane rural road** overleaf.



R_1	Sb(m)
13	7.0
15	7.5
17	8.0

Notes:

1. R1 and R2 are determined by the swept path of the design vehicle.
2. The dimensions of the treatment are defined thus:

W = Nominal through lane width (m) (including widening for curves).

C = On straights – 6.0 m minimum.

On curves – 6.0 m plus curve widening (based on widening for the design turning vehicle plus widening for the design through vehicle).

A = $\frac{0.5VF}{3.6}$

V = Design speed of major road approach (km/h).

F = Formation/carriageway widening (m).

P = Minimum length of parallel widened shoulder (Table 8.1).

Figure 4-4 BAsic Left (BAR) turn treatment on a two-lane rural road
Source: Reproduced from AustRoads 2009

5 Summary and Conclusions

5.1 Summary

Tattersall Lander Pty Ltd on behalf of Hay Enterprises (NSW) Pty Ltd is seeking to develop a small scale sand mine with associated machinery shed, access roads and a caretakers residence at No. 4226 Nelson Bay Road Anna Bay NSW.

The Project is a proposed mine to access and remove as required, sand material that is threatening a main 33kV AusGrid transmission line that serves the Nelson Bay area. The sand has accumulated and continues to accumulate under the transmission lines through wind action. The proposal is 'designated' development, being an 'extractive industry' with a planned extraction rate of up to a maximum of 50,000 cubic metres per year and is within 500 metres of another extractive industry site operating during the last 5 years.
The work would include some site clearing, construction of site amenities, upgrade of on-site haul road, and upgrade of the access intersection etc. The operating life of the site is anticipated to be 30 years.

Existing Conditions

a. The subject site is located west of the roundabout controlled intersection of Nelson Bay Road and Port Stephens Drive at Anna Bay NSW.
b. Existing flow conditions on the adjacent road system providing access to the site are very good, and well within the technical and functional capacity limits of local roads.
c. Surveys of intersection flows indicate that the key roundabout at Nelson Bay Road / Port Stephens Drive operates at a very good Level of Service 'A'.

Proposed Development

d. It is expected that the construction time work day would be a typical industrial work day of 7 am to 6pm Monday to Friday, and 8am to 1pm Saturday. No Sunday or public holiday work is planned.
e. It is understood the total construction period for the project will be in the order of 1 to 2 months for work within the site. It has been assumed also that any work required for any access would be able to be completed within this same 1 to 2 month period.
f. A typical inventory of equipment to be used for this type of construction phase, would be truck and dog haulage, excavator, concrete truck, rigid vehicle bringing shed materials.
g. Expected truck movements for the project have been assumed as a maximum of 40 two way movements per day. (i.e. 40 movements in and 40 movement out of the site.) This equates to advice on planned truck payloads of 1400 tonnes per day, based on the proposed use of a 35 tonne (~ 22 cubic metre) truck and dog combination. This equates to 55 full days of activity over a year.
h. It may be the demands are spread over more days, but this analysis assumption represents the assumed (planned) maximum movements that could occur on any one day.
i. Expected traffic volumes in the peak hour based on a uniform flow profile over the operating day would be in the order of 5 movements into the site in any one hour assuming a uniform flow profile. With a peak westbound flow on Nelson Bay Road recorded in February 2018 at 925 vph, this represents only a 0.5% change in traffic volumes.
j. A traffic flow of 925 vph falls within the Level of Service 'B' range (900 to 1400 vph), at just over the highest category Level of Service 'A' threshold of 900 vph.
k. Applying a conservative 3% p.a. background growth rate to the 2018 flow for 10 years the resulting flow of around 1200 vph still falls within the LoS 'B' range for urban road peak hour flows.
l. SIDRA Intersection Modelling has been conducted on the Nelson Bay Road / Port Stephens Drive roundabout for a number of conservative scenarios with all result existing an overall Level of Service 'A' during peak periods.

Access Future Performance

m. A **BA**sic **L**eft turn treatment (BAL) is considered an appropriate turn treatment according to Austroads

5.2 Conclusion

The conclusion drawn from this assessment is that both road and intersection capacity are not considered issues for the project. Subject to the assessment and recommendations contained herein it is recommended that the project proposal be approved on traffic and transport considerations.

Appendix A. Traffic Survey Data

TRANS TRAFFIC SURVEY

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T. 1300 82 88 82 - F. 1300 83 88 83 - E. traffic@trafficsurvey.com.au - W. www.trafficsurvey.com.au

AUTOMATIC COUNT SUMMARY

Street Name :	Nelson Bay Rd	**Location :**	West of Port Stephens Drive
Suburb :	Anna Bay	**Start Date :**	00:00 Tue 06-February-2018
Metrocount ID	Y624M6HR	**Finish Date :**	00:00 Tue 13-February-2018
Site ID Number :	640	**Speed Zone :**	90 km/h
Prepared By :	Vo Son Binh	**Email:**	binh@trafficsurvey.com.au

GPS information		Lat 32° 46' 7.74 North Long 152° 3' 51.08 East	Direction of Travel		
			Combined	**Westbound**	**Eastbound**
Traffic Volume :		Weekdays Average	19,945	9,706	10,239
(Vehicles/Day)		7 Day Average	19,172	9,483	9,689
Weekday	**AM**	07:00	1463	925	658
Peak hour start	**PM**	16:00	1718	740	1054
Speeds :		85th Percentile	82.5	84.9	80.1
(Km/Hr)		Average	74.7	76.0	73.3
Classification % :		Light Vehicles up to 5.5m	94.0%	94.1%	94.0%

Location

GPS Information Load Google Map (internet required)

(Latitude, Longitude) -32.768816, 152.064189

Speed Data | Speed Graph | Speed Bin
Volume Data | Volume Graph | Classification

QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001
SAFETY SYSTEM CERTIFICATION DNV·GL AS/NZS 4801
ENVIRONMENTAL SYSTEM CERTIFICATION DNV·GL ISO 14001

QUALITY ASSURED COMPANY BY ISO 9001:2015
OH&S SYSTEM CERTIFIED TO ISO 4801:2001
ENVIRONMENT MANAGEMENT SYSTEM CERTIFIED TO ISO14001:2015

TRANS TRAFFIC SURVEY
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Site Nelson Bay Rd

Direction Combined

Back to Site Summary Page

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	12-02-18	06-02-18	07-02-18	08-02-18	09-02-18	10-02-18	11-02-18	Total	Average	Total	Average	Total	Average
AM Peak	07:00	07:00	07:00	07:00	08:00	11:00	11:00	N/A	11:00	N/A	07:00	N/A	11:00
PM Peak	16:00	16:00	16:00	16:00	15:00	12:00	12:00	N/A	16:00	N/A	16:00	N/A	12:00
00:00	49	55	70	69	82	105	113	543	78	325	65	218	109
01:00	35	35	32	37	34	75	78	326	47	173	35	153	77
02:00	36	28	37	45	35	61	49	291	42	181	36	110	55
03:00	80	54	61	62	69	50	47	423	60	326	65	97	49
04:00	187	177	187	204	197	111	87	1150	164	952	190	198	99
05:00	580	571	594	570	554	260	148	3277	468	2869	574	408	204
06:00	1104	1134	1185	1097	1046	451	344	6361	909	5566	1113	795	398
07:00	1528	1505	1483	1487	1314	833	520	8670	1239	7317	1463	1353	677
08:00	1349	1378	1353	1407	1413	1025	790	8715	1245	6900	1380	1815	908
09:00	1201	1208	1246	1313	1395	1224	1201	8788	1255	6363	1273	2425	1213
10:00	1130	1216	1201	1251	1332	1507	1538	9175	1311	6130	1226	3045	1523
11:00	1192	1190	1158	1205	1342	1525	1664	9276	1325	6087	1217	3189	1595
12:00	1143	1143	1169	1196	1465	1543	1604	9263	1323	6116	1223	3147	1574
13:00	1204	1216	1163	1266	1630	1329	1604	9412	1345	6479	1296	2933	1467
14:00	1297	1377	1340	1416	1765	1287	1574	10056	1437	7195	1439	2861	1431
15:00	1511	1604	1569	1612	1837	1269	1503	10905	1558	8133	1627	2772	1386
16:00	1671	1653	1747	1698	1821	1282	1422	11294	1613	8590	1718	2704	1352
17:00	1484	1557	1515	1569	1619	1076	1143	9963	1423	7744	1549	2219	1110
18:00	821	848	863	924	1152	675	704	5987	855	4608	922	1379	690
19:00	400	435	468	552	694	443	462	3454	493	2549	510	905	453
20:00	323	365	375	437	552	344	325	2721	389	2052	410	669	335
21:00	226	271	250	330	485	262	239	2063	295	1562	312	501	251
22:00	134	160	175	207	295	231	133	1335	191	971	194	364	182
23:00	78	97	105	106	171	135	52	744	106	557	111	187	94
Total	**18763**	**19277**	**19346**	**20060**	**22299**	**17103**	**17344**	**134192**	**19171**	**99745**	**19948**	**34447**	**17232**
% Heavy	**6.87%**	**6.77%**	**6.97%**	**6.61%**	**6.50%**	**3.88%**	**3.72%**	**5.98%**		**6.73%**		**3.80%**	

TRANS TRAFFIC SURVEY
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Site Nelson Bay Rd

Direction Eastbound

Back to Site Summary Page

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	12-02-18	06-02-18	07-02-18	08-02-18	09-02-18	10-02-18	11-02-18	Total	Average	Total	Average	Total	Average
AM Peak	08:00	08:00	08:00	08:00	11:00	11:00	11:00	N/A	11:00	N/A	08:00	N/A	11:00
PM Peak	16:00	16:00	16:00	16:00	16:00	12:00	12:00	N/A	16:00	N/A	16:00	N/A	12:00
00:00	31	30	39	45	52	65	63	325	46	197	39	128	64
01:00	19	21	14	19	19	41	39	172	25	92	18	80	40
02:00	18	12	19	22	19	28	24	142	20	90	18	52	26
03:00	16	12	17	25	26	21	21	138	20	96	19	42	21
04:00	34	45	37	47	49	34	37	283	40	212	42	71	36
05:00	121	115	147	132	151	87	78	831	119	666	133	165	83
06:00	358	349	384	365	331	243	188	2218	317	1787	357	431	216
07:00	544	537	547	548	514	494	328	3512	502	2690	538	822	411
08:00	633	664	648	687	659	574	451	4316	617	3291	658	1025	513
09:00	595	645	587	630	645	586	492	4180	597	3102	620	1078	539
10:00	525	599	578	613	626	793	659	4393	628	2941	588	1452	726
11:00	621	599	600	622	726	839	750	4757	680	3168	634	1589	795
12:00	616	568	600	590	802	843	819	4838	691	3176	635	1662	831
13:00	609	621	569	621	959	688	681	4748	678	3379	676	1369	685
14:00	656	673	676	704	1002	698	625	5034	719	3711	742	1323	662
15:00	805	847	833	866	1081	569	579	5580	797	4432	886	1148	574
16:00	1016	1054	1052	1044	1106	594	503	6369	910	5272	1054	1097	549
17:00	980	997	963	1035	1030	485	450	5940	849	5005	1001	935	468
18:00	557	549	573	616	761	382	353	3791	542	3056	611	735	368
19:00	237	254	280	325	501	248	225	2070	296	1597	319	473	237
20:00	167	194	201	254	371	183	158	1528	218	1187	237	341	171
21:00	134	174	147	193	337	123	121	1229	176	985	197	244	122
22:00	87	110	131	153	212	124	84	901	129	693	139	208	104
23:00	53	66	74	76	122	86	33	510	73	391	78	119	60
Total	**9432**	**9735**	**9716**	**10232**	**12101**	**8828**	**7761**	**67805**	**9689**	**51216**	**10239**	**16589**	**8301**
% Heavy	**6.85%**	**7.02%**	**7.20%**	**6.85%**	**6.51%**	**3.74%**	**3.11%**	**6.03%**		**6.87%**		**3.44%**	

TRANS TRAFFIC SURVEY
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Site Nelson Bay Rd

Direction Westbound

Back to Site Summary Page

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	12-02-18	06-02-18	07-02-18	08-02-18	09-02-18	10-02-18	11-02-18	Total	Average	Total	Average	Total	Average
AM Peak	07:00	07:00	07:00	07:00	07:00	10:00	11:00	N/A	07:00	N/A	07:00	N/A	11:00
PM Peak	15:00	15:00	15:00	15:00	14:00	12:00	14:00	N/A	15:00	N/A	15:00	N/A	15:00
00:00	18	25	31	24	30	40	50	218	31	128	26	90	45
01:00	16	14	18	18	15	34	39	154	22	81	16	73	37
02:00	18	16	18	23	16	33	25	149	21	91	18	58	29
03:00	64	42	44	37	43	29	26	285	41	230	46	55	28
04:00	153	132	150	157	148	77	50	867	124	740	148	127	64
05:00	459	456	447	438	403	173	70	2446	349	2203	441	243	122
06:00	746	785	801	732	715	208	156	4143	592	3779	756	364	182
07:00	984	968	936	939	800	339	192	5158	737	4627	925	531	266
08:00	716	714	705	720	754	451	339	4399	628	3609	722	790	395
09:00	606	563	659	683	750	638	709	4608	658	3261	652	1347	674
10:00	605	617	623	638	706	714	879	4782	683	3189	638	1593	797
11:00	571	591	558	583	616	686	914	4519	646	2919	584	1600	800
12:00	527	575	569	606	663	700	785	4425	632	2940	588	1485	743
13:00	595	595	594	645	671	641	923	4664	666	3100	620	1564	782
14:00	641	704	664	712	763	589	949	5022	717	3484	697	1538	769
15:00	706	757	736	746	756	700	924	5325	761	3701	740	1624	812
16:00	655	599	695	654	715	688	919	4925	704	3318	664	1607	804
17:00	504	560	552	534	589	591	693	4023	575	2739	548	1284	642
18:00	264	299	290	308	391	293	351	2196	314	1552	310	644	322
19:00	163	181	188	227	193	195	237	1384	198	952	190	432	216
20:00	156	171	174	183	181	161	167	1193	170	865	173	328	164
21:00	92	97	103	137	148	139	118	834	119	577	115	257	129
22:00	47	50	44	54	83	107	49	434	62	278	56	156	78
23:00	25	31	31	30	49	49	19	234	33	166	33	68	34
Total	9331	9542	9630	9828	10198	8275	9583	66387	9483	48529	9706	17858	8934
% Heavy	6.89%	6.52%	6.74%	6.35%	6.48%	4.02%	4.22%	5.93%		6.59%		4.13%	

TRANS TRAFFIC SURVEY

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TURNING MOVEMENT SURVEY

Intersection of Port Stephens Dr and Nelson Bay Rd, Nelson Bay

Date:	Tue 06-02-18
Weather:	Fine
Suburban:	Nelson Bay
Customer:	BTFF

North:	Port Stephens Dr
East:	Nelson Bay Rd
South:	Jessie Rd
West:	Nelson Bay Rd

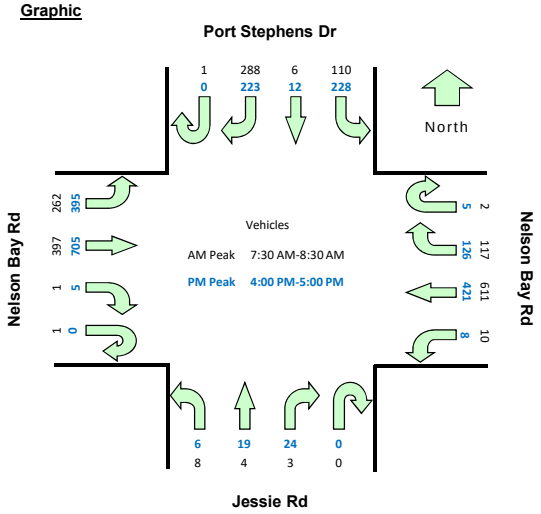
Survey Start	AM:	6:00	PM:	15:00
Vehicular Peakhour		**Pedestrians Peakhour**		
AM:	7:30 AM-8:30 AM	AM:	N/A	
PM:	4:00 PM-5:00 PM	PM:	N/A	

All Vehicles

Time		North Approach Port Stephens Dr				East Approach Nelson Bay Rd				South Approach Jessie Rd				West Approach Nelson Bay Rd				Hourly Total	
Period Start	**Period End**	**U**	**R**	**SB**	**L**	**U**	**R**	**WB**	**L**	**U**	**R**	**NB**	**L**	**U**	**R**	**EB**	**L**	**Hour**	**Peak**
6:00	6:15	0	56	2	7	1	8	139	1	0	1	0	3	1	2	27	10	1274	
6:15	6:30	0	66	0	11	2	17	123	2	0	0	1	1	0	2	31	25	1414	
6:30	6:45	0	66	1	10	1	14	146	3	0	0	0	0	2	1	47	42	1579	
6:45	7:00	0	61	1	11	0	34	159	0	0	0	0	1	0	0	68	67	1678	
7:00	7:15	0	91	2	25	1	16	173	1	0	0	0	2	0	1	52	34	1781	
7:15	7:30	0	102	1	15	2	24	189	1	0	0	0	2	0	1	71	38	1819	
7:30	7:45	0	71	1	20	2	25	163	1	0	1	0	1	0	0	94	53	1821	Peak
7:45	8:00	0	79	3	34	0	29	172	5	0	2	1	4	0	1	108	67	1776	
8:00	8:15	1	62	1	28	0	22	149	3	0	0	1	1	0	0	94	74	1636	
8:15	8:30	0	76	1	28	0	41	127	1	0	0	2	2	1	0	101	68	1579	
8:30	8:45	1	68	1	24	0	40	99	1	0	0	0	1	2	2	92	56	1528	
8:45	9:00	0	58	0	29	0	44	88	0	0	0	0	0	0	1	92	53	1585	
9:00	9:15	0	51	0	39	0	47	105	1	0	0	0	2	0	0	82	52	1607	
9:15	9:30	0	34	0	40	0	55	108	1	0	0	0	2	1	1	103	52		
9:30	9:45	0	55	1	45	0	40	113	1	0	2	0	1	0	1	109	76		
9:45	10:00	0	49	0	27	3	44	92	0	0	0	0	0	0	0	110	62		
15:00	15:15	0	81	1	50	5	50	125	0	0	1	1	0	0	0	125	78	2045	
15:15	15:30	1	69	1	40	5	41	120	0	0	0	1	0	1	1	140	79	2102	
15:30	15:45	0	80	2	59	4	35	134	0	0	3	1	1	0	0	119	81	2149	
15:45	16:00	2	53	7	44	2	43	117	5	0	7	7	4	0	4	132	83	2152	
16:00	16:15	0	71	8	53	1	25	107	4	0	6	5	2	0	1	177	114	2177	Peak
16:15	16:30	0	57	1	56	0	46	114	1	0	15	13	1	0	3	152	87	2102	
16:30	16:45	0	47	1	53	1	27	101	2	0	3	1	1	0	0	182	103	2084	
16:45	17:00	0	48	2	66	3	28	99	1	0	0	0	2	0	1	194	91	2031	
17:00	17:15	0	54	2	54	3	28	92	2	0	2	1	1	0	0	179	81	1939	
17:15	17:30	0	65	0	46	1	27	102	1	0	2	0	2	0	0	191	91	1741	
17:30	17:45	0	60	0	49	1	25	90	1	0	0	0	1	0	0	159	83	1498	
17:45	18:00	1	54	0	30	0	25	79	0	0	1	1	0	0	0	164	88	1263	
18:00	18:15	0	40	0	31	0	20	62	1	0	0	0	0	0	0	98	49	1025	
18:15	18:30	0	22	0	26	0	14	46	1	0	0	0	1	0	0	104	71		
18:30	18:45	0	20	0	22	1	15	47	0	0	1	2	1	0	0	78	47		
18:45	19:00	0	23	0	12	1	11	43	1	0	0	0	2	0	0	85	27		

Peak Time		North Approach Port Stephens Dr				East Approach Nelson Bay Rd				South Approach Jessie Rd				West Approach Nelson Bay Rd				Peak
Period Start	**Period End**	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	**total**
7:30	8:30	1	288	6	110	2	117	611	10	0	3	4	8	1	1	397	262	1821
16:00	17:00	0	223	12	228	5	126	421	8	0	24	19	6	0	5	705	395	2177

Graphic



Light Vehicles

Time		North Approach Port Stephens Dr				East Approach Nelson Bay Rd				South Approach Jessie Rd				West Approach Nelson Bay Rd			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
6:00	6:15	0	52	2	4	1	7	134	1	0	1	0	3	0	2	27	10
6:15	6:30	0	59	0	8	2	17	121	2	0	0	0	1	0	1	28	22
6:30	6:45	0	65	1	8	1	12	145	3	0	0	0	0	2	0	43	39
6:45	7:00	0	58	1	8	0	32	155	0	0	0	0	0	0	0	63	63
7:00	7:15	0	88	2	16	1	14	169	1	0	0	0	0	0	1	45	29
7:15	7:30	0	96	1	12	1	22	184	1	0	0	0	2	0	0	63	33
7:30	7:45	0	67	1	17	2	23	158	1	0	0	0	1	0	0	85	49
7:45	8:00	0	75	3	32	0	27	167	5	0	2	1	3	0	1	103	61
8:00	8:15	1	58	1	27	0	21	146	3	0	0	1	1	0	0	79	65
8:15	8:30	0	70	1	25	0	38	122	1	0	0	2	2	1	0	89	59
8:30	8:45	1	63	1	22	0	39	94	1	0	0	0	1	2	1	85	52
8:45	9:00	0	53	0	27	0	44	81	0	0	0	0	0	0	0	81	47
9:00	9:15	0	50	0	36	0	45	97	1	0	0	0	1	0	0	77	48
9:15	9:30	0	30	0	36	0	51	102	1	0	0	0	1	1	0	99	48
9:30	9:45	0	48	1	44	0	38	106	1	0	0	0	1	0	0	106	67
9:45	10:00	0	46	0	24	3	42	89	0	0	0	0	0	0	0	101	53
15:00	15:15	0	76	1	50	5	50	112	0	0	1	1	0	0	0	120	69
15:15	15:30	1	65	1	40	5	40	115	0	0	0	1	0	1	1	135	71
15:30	15:45	0	72	2	57	4	35	128	0	0	3	1	0	0	0	117	78
15:45	16:00	2	52	6	44	2	42	112	5	0	6	4	4	0	2	127	82
16:00	16:15	0	67	8	53	1	23	98	4	0	5	5	2	0	0	175	110
16:15	16:30	0	54	1	56	0	43	112	1	0	14	10	1	0	1	151	85
16:30	16:45	0	47	1	52	1	26	100	1	0	3	1	1	0	0	182	103
16:45	17:00	0	48	2	64	3	25	92	1	0	0	0	2	0	1	190	87
17:00	17:15	0	50	2	53	3	26	89	2	0	2	1	1	0	0	178	79
17:15	17:30	0	61	0	46	1	26	99	1	0	2	0	2	0	0	189	89
17:30	17:45	0	60	0	48	1	24	89	1	0	0	0	1	0	0	157	80
17:45	18:00	1	53	0	30	0	25	76	0	0	1	1	0	0	0	161	84
18:00	18:15	0	40	0	31	0	20	60	1	0	0	0	0	0	0	95	48
18:15	18:30	0	21	0	26	0	14	46	1	0	0	0	1	0	0	103	67
18:30	18:45	0	19	0	22	1	14	47	0	0	1	2	1	0	0	77	46
18:45	19:00	0	21	0	12	1	11	43	1	0	0	0	2	0	0	84	26

Heavy Vehicles

Time		North Approach Port Stephens Dr				East Approach Nelson Bay Rd				South Approach Jessie Rd				West Approach Nelson Bay Rd			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
6:00	6:15	0	4	0	1	0	1	5	0	0	0	0	0	1	0	0	0
6:15	6:30	0	7	0	2	0	0	2	0	0	0	1	0	0	1	3	3
6:30	6:45	0	1	0	1	0	2	0	0	0	0	0	0	0	1	4	3
6:45	7:00	0	2	0	0	0	1	4	0	0	0	0	1	0	0	5	4
7:00	7:15	0	2	0	7	0	1	3	0	0	0	0	2	0	0	7	5
7:15	7:30	0	2	0	1	0	1	3	0	0	0	0	0	0	1	6	5
7:30	7:45	0	3	0	2	0	1	5	0	0	1	0	0	0	0	9	4
7:45	8:00	0	4	0	2	0	1	2	0	0	0	0	1	0	0	5	6
8:00	8:15	0	3	0	1	0	0	3	0	0	0	0	0	0	0	13	9
8:15	8:30	0	5	0	3	0	3	4	0	0	0	0	0	0	0	11	9
8:30	8:45	0	4	0	1	0	1	4	0	0	0	0	0	0	1	7	3
8:45	9:00	0	5	0	2	0	0	7	0	0	0	0	0	0	1	11	6
9:00	9:15	0	1	0	3	0	0	7	0	0	0	0	1	0	0	4	4
9:15	9:30	0	4	0	4	0	1	6	0	0	0	0	1	0	1	4	4
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16:15	16:30	0	3	0	0	0	1	2	0	0	0	0	0	0	0	0	1
16:30	16:45	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0
16:45	17:00	0	0	0	2	0	2	6	0	0	0	0	0	0	0	4	4
17:00	17:15	0	4	0	1	0	1	3	0	0	0	0	0	0	0	1	1
17:15	17:30	0	4	0	0	0	0	3	0	0	0	0	0	0	0	1	2
17:30	17:45	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2	3
17:45	18:00	0	1	0	0	0	0	2	0	0	0	0	0	0	0	3	3
18:00	18:15	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	1
18:15	18:30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	4
18:30	18:45	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
18:45	19:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1

Bus

Time		North Approach Port Stephens Dr				East Approach Nelson Bay Rd				South Approach Jessie Rd				West Approach Nelson Bay Rd			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
6:00	6:15	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
6:45	7:00	0	1	0	3	0	1	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	1	0	2	0	1	1	0	0	0	0	0	0	0	0	0
7:15	7:30	0	4	0	2	1	1	2	0	0	0	0	0	0	0	2	0
7:30	7:45	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0
8:00	8:15	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0
8:15	8:30	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0
8:30	8:45	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	1
8:45	9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00	9:15	0	0	0	0	0	2	1	0	0	0	0	0	0	0	1	0
9:15	9:30	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
9:30	9:45	0	2	0	0	0	1	1	0	0	0	0	0	0	0	0	1
9:45	10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
15:00	15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
15:15	15:30	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	2
15:30	15:45	0	1	0	1	0	0	2	0	0	0	0	0	0	0	0	0
15:45	16:00	0	0	1	0	0	0	0	0	0	1	2	0	0	2	1	0
16:00	16:15	0	0	0	0	0	1	1	0	0	1	0	0	0	1	1	0
16:15	16:30	0	0	0	0	0	2	0	0	0	1	3	0	0	2	1	1
16:30	16:45	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
17:15	17:30	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
17:30	17:45	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
18:00	18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	18:45	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
18:45	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B. Public Transport Network Port Stephens

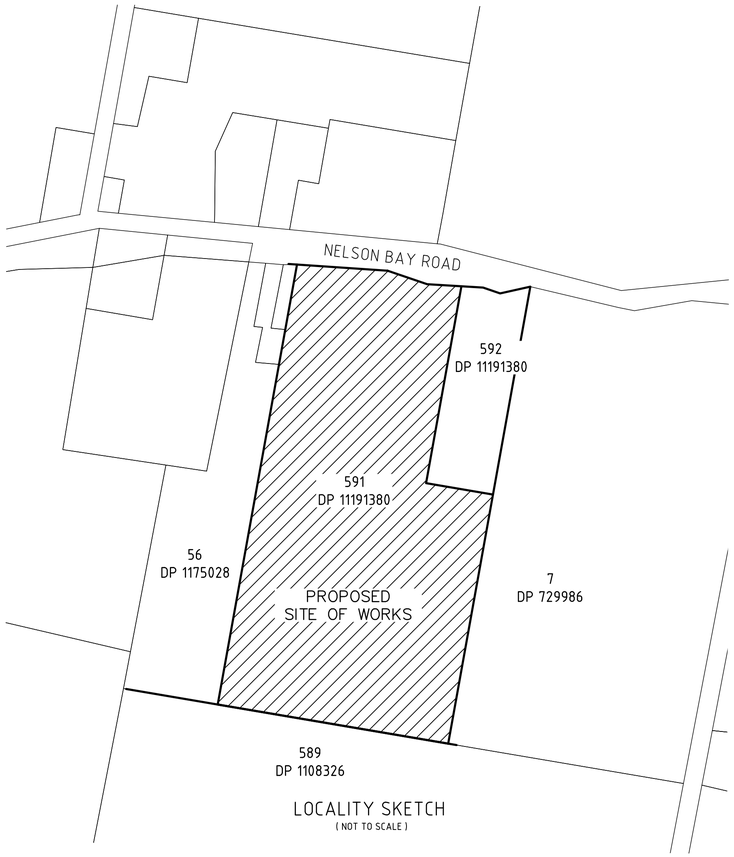
Source: Port Stephens Coaches Website, Mar 2018

Appendix C. Proposed Sand Mine DA Plans

PROPOSED SAND MINE

AND ANCILLARY DEVELOPMENT
BEING A CARETAKERS RESIDENCE & MACHINERY SHED

LOT 591 DP 119380
4226 NELSON BAY ROAD, ANNA BAY



LOCALITY SKETCH
(NOT TO SCALE)

Schedule of Drawings			
Sheet	File Number	Description	Revision
1	21800001	TITLE PAGE, LOCALITY SKETCH & TABLE OF CONTENTS	A
2	21800002	OVERALL LAYOUT	A
3	21800003	STAGING PLAN	A
4	21800004	SITE SECTION	A
5	21800005	ADJOINING MINING OPERATIONS	A
6	21800006	REHABILITATION PLAN	A

Designed By TATTERSALL LANDER PTY LTD
DEVELOPMENT CONSULTANTS IN ENGINEERING, SURVEYING & PLANNING
PO Box 580 RAYMOND TERRACE Phone (02) 4987 1500

S:\Clients\2017\217111\Dwg\217111 - Design.dwg

FILE : 21800001
JOB No. : 217111
SHEET No. :1 of 6
Plotted 12:10 10/01/18

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
A	Original Issue	DS	DS			

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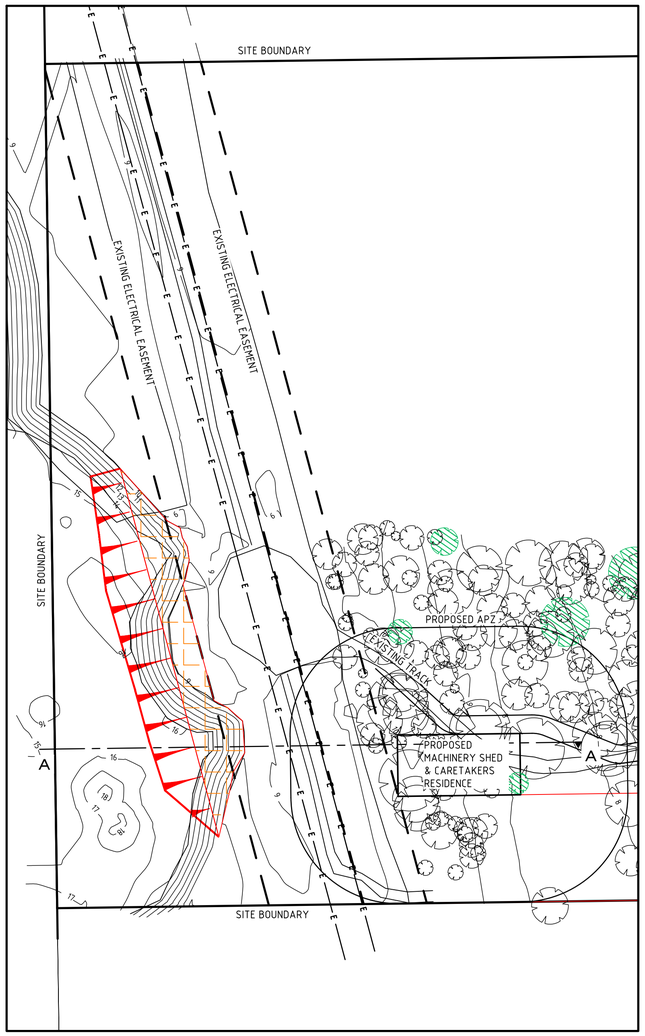
OVERALL LAYOUT
PROPOSED SAND MINE
LOT 591 DP1191380
4226 NELSON BAY RD, ANNA BAY

COUNCIL: PSC	REFERENCE: 21800002
PARISH	SHEET SIZE: A1
SCALE: 1:1000 on A1	SHEET No.: 2
DATE : Plotted 12:10 10/01/18	

CLIENT: HAY ENTERPRISES | JOB No.: 217111 | COMPUTER FILE : S:\Clients\2017\217111\Dwg\217111 - Design.dwg

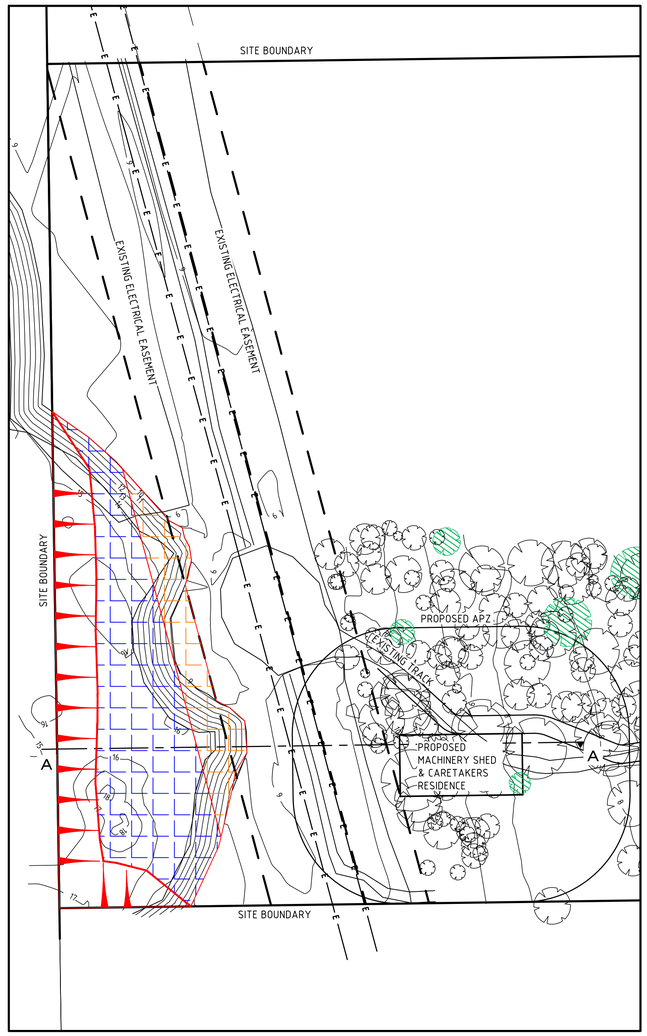
STAGE 1



1. PROPOSED APZ: MANAGE/CLEAR AS NECESSARY, CONSISTENT WITH RFS BUSHFIRE PROTECTION GUIDELINES
2. CONSTRUCT MACHINERY SHED/CARETAKERS RESIDENCE
3. EXCAVATE 10m BUFFER SOUTH OF EASEMENT
4. ESTABLISH WORKING ZONE IN 10m BUFFER

EXCAVATED AREA = 1234m^2
AREA OF BATTER = 1539m^2
CURRENT AVAILABLE SAND VOLUME = 1100m^3

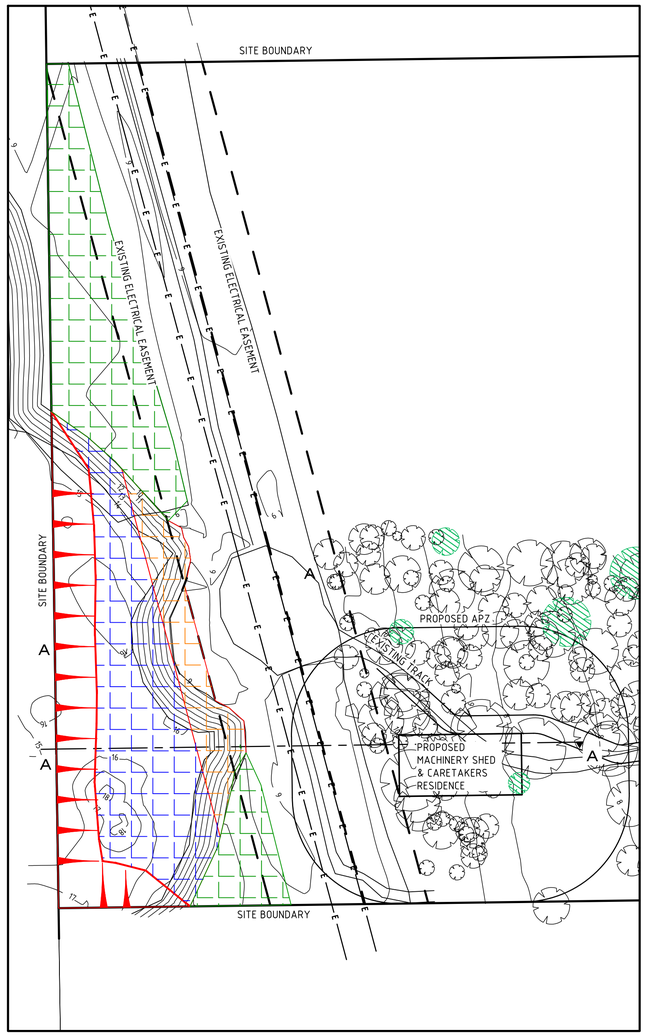
STAGE 2



1. EXCAVATE DUNE TO 9mAHD WITH BATTER TO THE BOUNDARY. SLOPE TO BE CONFIRMED BY GEOTECHNICAL ASSESSMENT.

ADDITIONAL EXCAVATED AREA = 3590m^2
ADDITIONAL AREA OF BATTER = 2297m^2
CURRENT AVAILABLE SAND VOLUME = 30,700m^3

STAGE 3



1. EXCAVATE SAND FROM CURRENTLY VEGETATED AREAS SOUTH OF ELECTRICAL EASEMENT AS DUNE ENCROACHES AND INUNDATES AREA.
2. CONTINUE TO EXCAVATE FROM ESTABLISHED WORKING AREA.
3. EXCAVATION TO BE LIMITED TO 9m AHD.

EXISTING VEGETATED AREA SOUTH OF EASEMENT = 3992m^2

LEGEND

DENOTES PROPOSED BATTER TO EXISTING

DENOTES EXISTING POWER EASEMENT

EXISTING CONTOURS 1m INTERVALS

STAGE 1 BASE OF EXTRACTION

STAGE 2 BASE OF EXTRACTION

STAGE 3 EXTENT OF CURRENT VEGETATION SOUTH OF EASEMENT

EXISTING TREES WITHIN & IN PROXIMITY TO BUSHFIRE APZ

EXISTING HOLLOW BEARING TREES

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
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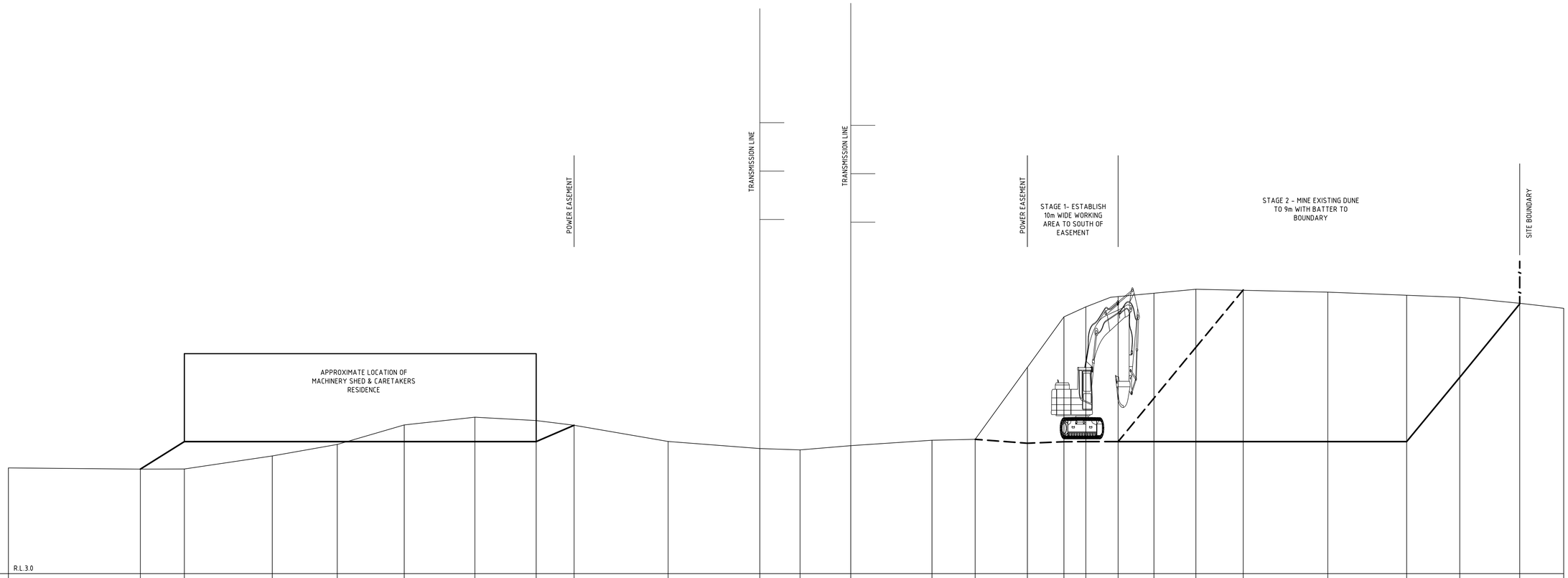
STAGING PLAN
PROPOSED SAND MINE
LOT 591 DP1191380
4226 NELSON BAY RD, ANNA BAY

COUNCIL: PSC	REFERENCE: 21800003
PARISH:	SHEET SIZE: A1
SCALE: 1:1000 on A1	SHEET No.: 3
DATE : Plotted 12:11 10/01/18	

CLIENT: HAY ENTERPRISES | JOB No.: 217111 | COMPUTER FILE : S:\Clients\2017\217111\Dwg\217111 - Design.dwg



STAGE 3 LEVEL	7.749	7.757	8.348	8.871	9.758	10.111	9.957	9.743	9.007	8.686	8.624	8.817	9.056	9.104	8.927	8.995	9	9	9	9	9	9	9	11.922	15.26	15.18
STAGE 2 LEVEL	7.749	7.757	8.348	8.871	9.758	10.111	9.957	9.743	9.007	8.686	8.624	8.817	9.056	9.104	8.927	8.995	9	9		13.287	15.898	15.795	15.653	15.558	15.289	15.061
STAGE 1 LEVEL	7.749	7.757	8.348	8.871	9.758	10.111	9.957	9.743	9.007	8.686	8.624	8.817	9.056	9.104	8.927	10.951	12.164		15.754	15.892	15.898	15.795	15.653	15.558	15.289	15.061
EXISTING LEVEL 8.291	7.749	7.757	8.348	8.871	9.758	10.111	9.957	9.743	9.007	8.686	8.624	8.817	9.063	9.104		14.672	15.127		15.754	15.926	15.898	15.795	15.653	15.558	15.289	15.061
CHAINAGE 0.000	15	20	30	37.388	45	53.034	60	64.309	75	85.423	90	95.764	105	109.909	115.848	120	122.490	126.162	130.232	135	140.384	150	158.964	165	171.815	176.817

SECTION A

H=1:250 V=1:100

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
A	Original Issue	DS	DS			

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SITE SECTIONS
PROPOSED SAND MINE
LOT 591 DP1191380
4226 NELSON BAY RD, ANNA BAY

COUNCIL: PSC	REFERENCE: 21800004
PARISH	SHEET SIZE: A1
SCALE: 1:1000 on A1	SHEET No.: 4
DATE : Plotted 12:11 10/01/18	

CLIENT: HAY ENTERPRISES | JOB No.: 217111 | COMPUTER FILE : S:\Clients\2017\217111\Dwg\217111 - Design.dwg

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
A	Original Issue					

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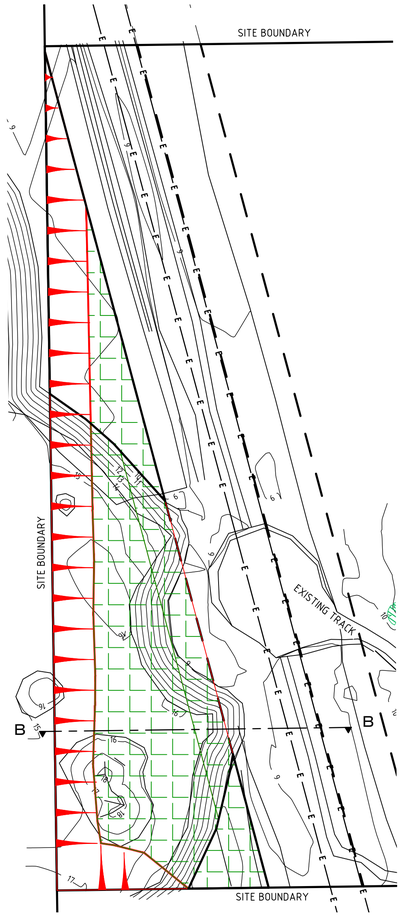
ADJOINING SAND EXTRACTION OPERATIONS

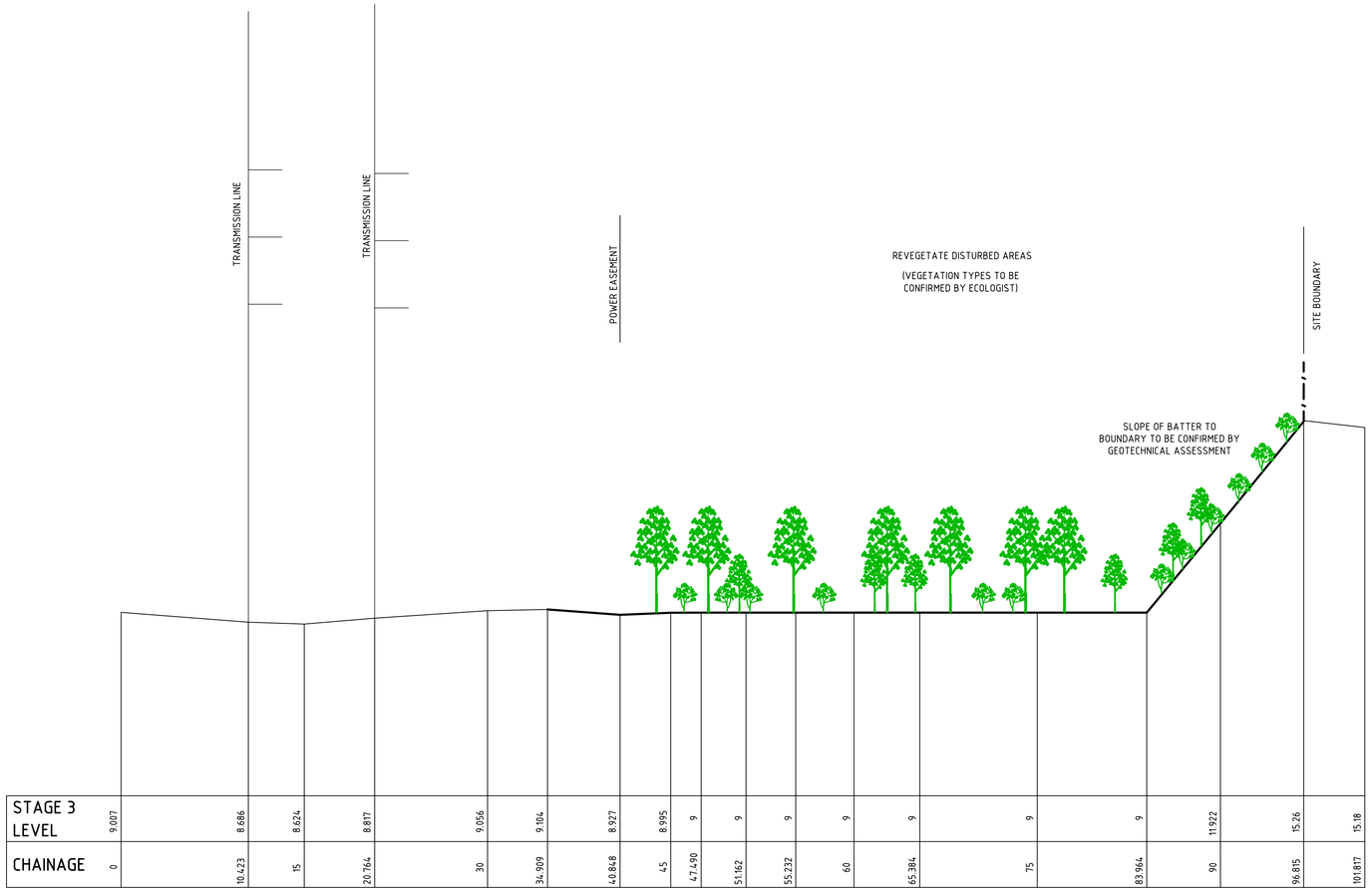
COUNCIL: PSC	REFERENCE: 21800005
PARISH:	SHEET SIZE: A1
SCALE: 1:4000 on A1	SHEET No.: 5
DATE : Plotted 12:12 10/01/18	

CLIENT: HAY ENTERPRISES | JOB No.: 217111 | COMPUTER FILE : S:\Clients\2017\217111\Dwg\217111 - Design.dwg



BATTERED AREAS
SLOPE STABILISING REVEGETATION

REVEGETATED AREA



STAGE 3 LEVEL	9.007	8.686	8.624	8.817	9.056	9.104	8.927	8.995	9	9	9	9	9	9	9	9	11.922	15.26	15.18	
CHAINAGE	0	10.423	15	20.764	30	34.909	40.848	45	47.490	51.162	55.232	60	65.384	75	83.964	90	96.815	101.817		

SECTION B
H=1:250 V=1:100

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
A	Original Issue	DS	DS			

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REHABILITATION PLAN
PROPOSED SAND MINE
LOT 591 DP1191380
4226 NELSON BAY RD, ANNA BAY

COUNCIL: PSC	REFERENCE: 21800006
PARISH	SHEET SIZE: A1
SCALE: 1:1000 on A1	SHEET No.: 6
DATE : Plotted 12:12 10/01/18	

CLIENT: HAY ENTERPRISES | JOB No.: 217111 | COMPUTER FILE : S:\Clients\2017\217111\Dwg\217111 - Design.dwg