Wyong Shire Council
CENTRAL COAST

RZ/12/2014

05 Supporting Studies

RZ/12/2014

A. Preliminary Traffic Assessment

Intersect Traffic 2011

PRELIMINARY TRAFFIC ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENTS
CENTRAL COAST

PREPARED FOR: DARKINJUNG LALC

NOVEMBER 2011

REF: 11/033; 11/034;11/035;11/036;11/037

PRELIMINARY TRAFFIC ASSESSMENT
PROPOSED RESIDENTIAL DEVELOPMENTS
CENTRAL COAST

Intersect Traffic Pty Ltd (ABN: 43 112 606 952)

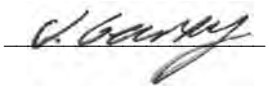
Address:
PO Box 268
East Maitland NSW 2323

Contact:
(Ph) 02 4933 5872
(Mob) 0423 324 188
Email: jeff@intersecttraffic.com.au

QUALITY ASSURANCE

This document has been prepared, checked and released in accordance with the Quality Control Standards established by Intersect Traffic Pty Ltd.

Issue	Date	Description	By
A	12/10/11	Draft	JG/DD
B	11/11/11	Edit	TB
C	13/11/11	Final Proof	JG
D		Approved	

This document has been authorised by 

Date November 2011

CONTENTS

PHOTOGRAPHS

FIGURES

TABLES

1. INTRODUCTION

Intersect Traffic Pty Ltd (Intersect) has been engaged by Darkinjung Local Aboriginal Land Council (Darkinjung LALC) to undertake preliminary traffic assessments for five potential residential developments on their lands in the Central Coast area.

The five sites being considered are as follows;

1. Bushell's Ridge – Corner of Wyee Road and Gosford Road.
2. Lake Munmorah / Crangan Bay – Corner Pacific Highway and Chain Valley Bay Road.
3. Halekulani – off Macleay Drive.
4. Norah Head – extension of Baynton Street and Victoria Street; and
5. The Lakes – off Budgewoi Drive.

Figure 1 below shows the location of these sites from a regional context.

The subject sites are currently not suitably zoned for residential purposes and therefore will need to be subject to a rezoning process. Early discussions with Wyong Council have indicated that they may be willing to rezone these as part of the new LEP process and this report is likely to be used to support submissions by Darkinjung LALC to Council on these sites.

The purpose of this document is to undertake a preliminary assessment of likely traffic and transport impacts for these sites and provide advice to the client in regard to constraints, opportunities, likely upgrade works and costs relating to addressing and/or mitigating these impacts.

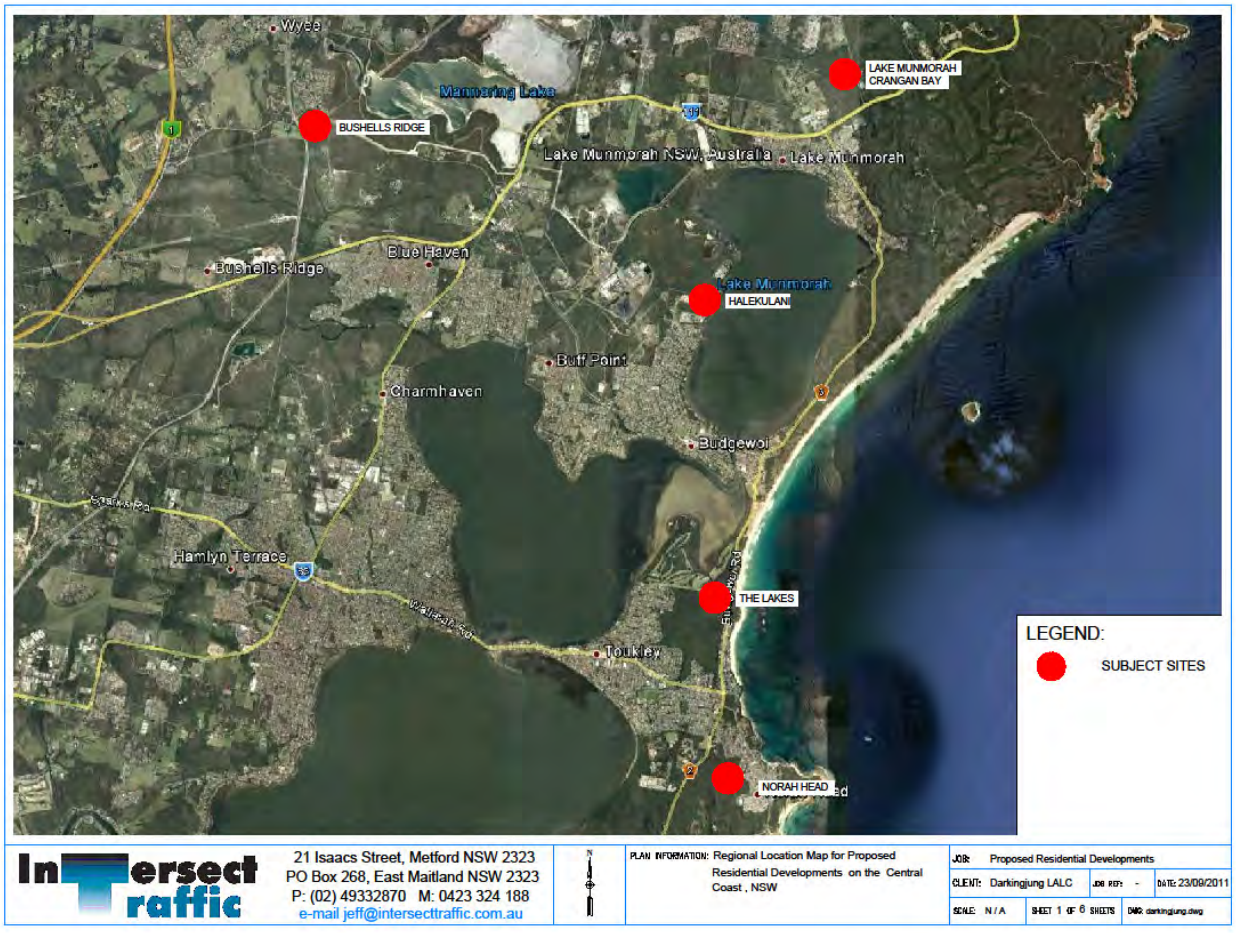


Figure 1 – Site Locations – Regional Context

2. BUSHELLS RIDGE RESIDENTIAL ESTATE

2.1 Site Location

The Bushells Ridge site is located on the corner of Wyee Road and Gosford Road at the southern end of the Wyee Township. The proposed residential estate is titled Part Lot 204 DP 1117900 and is currently zoned a mixture of 10(a) Investigation, 1(c) Non Urban Constrained Land and 7(g) Wetlands. ***Figure 2*** below shows the site location from a local context.

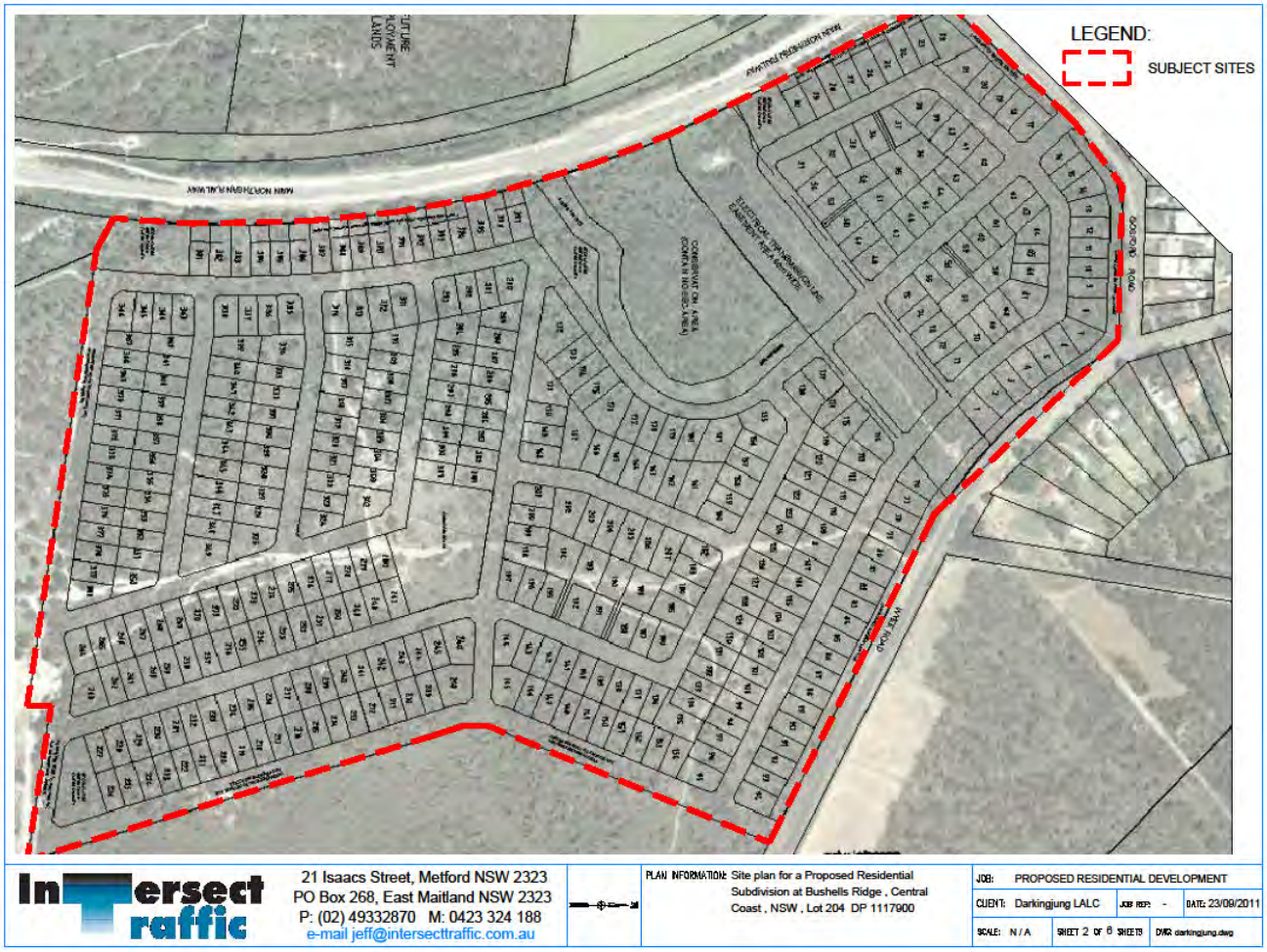


Figure 2 – Bushell's Ridge Residential Estate

2.2 Development Proposal

ADW Johnson have prepared a concept subdivision layout for the site proposing 397 lots with a single subdivision vehicular access off Gosford Street approximately 220 metres west of Wyee Road at the existing Jabbarup Road intersection (unformed). ***Figure 2*** shows the proposed concept plan.

Darkinjung have other industrial land off Bushells Ridge for which Intersect has previously provided preliminary traffic advice. This assessment assumes that this residential development proceeds prior to the industrial development as the previous advice regarding the industrial development included provision for additional residential development off Bushell's Ridge Road.

2.3 Existing Road Network

Gosford Road is a local collector road that primarily provides access to properties in the Bushell's Ridge area from and to the sub-arterial road network at Wyee. It is under the care and control of Wyong Council and is currently a sealed road approximately 8 metres wide with unsealed shoulders and table drains. At the time of inspection it was found to be in good condition. A 50 km/h speed zoning exists along the frontage of the site. ***Photograph 1*** below shows Gosford Road in the vicinity of the site.

Photograph 1 – Gosford Road in the vicinity of the site.

Wyee Road is a sealed two way two lane road that connects Doyalson to Morisset. It is a classified main road (MR 454) that contains both urban and rural construction forms. In the vicinity of the site it is sealed to a width of 7 metres with unsealed shoulders and table drains. Immediately north of Gosford Street, Wyee Road takes an urban form with kerb and gutter and longitudinal

drainage provided. At the time of inspection it was found to be in good condition. A 60 km/h speed zoning exists along the frontage of the site.

The Gosford Road / Wyee Road intersection in front of the site is a give way controlled T-intersection currently constructed to a rural BAR/BAL standard. Wyee Road is the major priority road on the intersection. It is likely that this will be the connection point to the sub-arterial road network for traffic generated by the residential estate therefore is the intersection most likely to be impacted on by traffic from the residential estate. ***Photograph 2*** below shows this intersection and Wyee Road.

Photograph 2 – Wyee Road / Gosford Road intersection, Bushell's Ridge

2.4 Traffic Volumes and Road Network Capacity

Current traffic volumes on the local road network have been sourced from the RTA and Wyong Council.

The latest data has been extrapolated to 2011 using a compound traffic growth rate of 2 % per annum. The peak hour traffic volume if not recorded has been assumed as 8 % of the AADT for arterial and sub-arterial roads or 15 % for local roads.

Table 1 – Existing Traffic Volume Data – Bushells Ridge

Road	Source	Count Year	AADT (vpd)	2011 AADT (vpd)	Peak Hour (vph)
Wyee Road	RTA	2004	7,391	8,490	679
Bushells Ridge Road	Council	2006	159	175	20

Intersect carried out a manual intersection count at the Wyee Road / Gosford Road intersection for intersection modelling purposes on Thursday 20/10/11. This count measured the peak hour traffic volumes on Wyee Road and Gosford Road as 1,653 vph (PM peak) and 75 vph (PM peak) respectively.

The capacity of roads is generally governed by the capacity of intersections on the road however Table 4.3 and 4.4 of the RTA's Guide to Traffic Generating Developments (see below) gives some guidance on the mid block capacity and expected levels of service on urban roads.

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

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

Table 4.4
Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Assuming a satisfactory level of service D on the road network and for the current lane provision on the local road network it is assumed that the local road network has the following road capacities.

Table 2 – Road Network Capacity – Bushells Ridge

Road	Lanes	Two way capacity (vph)
Wyee Road	2	2,200
Bushells Ridge Road	2	2,200

Based on current peak hour traffic volumes it can be seen that the local road network currently has some spare capacity to cater for additional development in the area.

2.5 Traffic Generation and Distribution

The RTA's Guide to Traffic Generating Developments provides guidance on the traffic generating potential of different land uses. For a residential dwelling it states;

Daily vehicle trips = 9 per dwelling;
Weekday peak hour vehicle trips = 0.85 per dwelling.

Accordingly, for a 397 residential lot development the likely traffic generation can be calculated as follows;

Daily vehicle trips = 9 x 397 = 3,573 vtpd.
Peak hour vehicle trips = 0.85 x 397 = 338 vtph.

Distributing this onto the local road network requires that assumptions be made in regard to likely trip destinations / sources as well as driver decisions. The data collected in the manual intersection count carried out by Intersect does however provide some guidance on likely traffic distribution. For the purposes of this assessment the following is assumed.

- In the AM peak 70 % of traffic is leaving the estate.
- In the PM peak 70 % of traffic is entering the estate.
- 90 % of traffic generated by the estate will proceed to or travel from Wyee Road.
- Trip movement distributions for estate traffic will mirror current distribution trends at the Wyee Road / Gosford Road intersection.

These assumptions result in the following PM peak traffic distributions at the Gosford Road / subdivision access road and the Wyee Road / Gosford Road intersections (see ***Figure 3***).

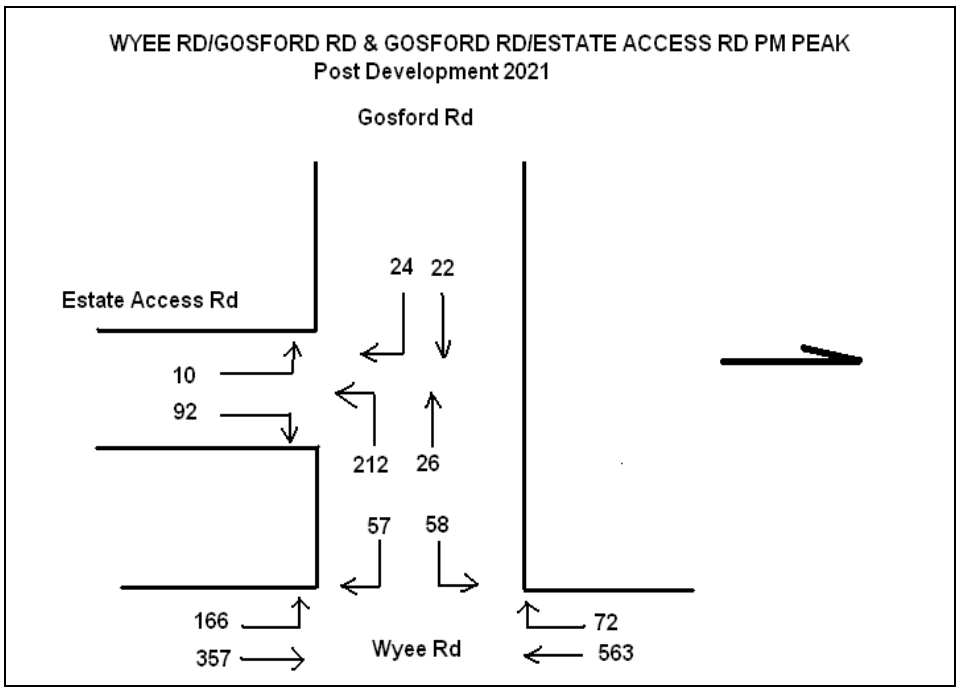


Figure 3 – PM development traffic distribution subdivision access & Wyee Road / Gosford Road _ Existing with Development & Post Development 2021.

2.6 Traffic Impacts and Considerations

2.6.1 Road Network Capacity

The road network's capacity to cater for the proposed development will be very much determined by the impact of the development at the intersections in the vicinity of the site. In this regard it is considered that the two main intersections to consider at this preliminary stage will be the subdivision access on Gosford Road and the Wyee Road / Gosford Road intersection. Given the size of the subdivision and the fact that the proposed access aligns with the extension of Jabbarup Road intersection as a four way cross intersection it is assumed Council will require either traffic signals or a roundabout at the subdivision access. For the purposes of this assessment a roundabout subdivision access is assumed as the traffic volumes are not excessive in Gosford Road.

Traffic signals have been assumed for the Wyee Road/Gosford Road intersection in place of an urban seagull or a roundabout due to the higher traffic volumes and physical constraints at the intersection (existing housing and underground utilities).

Both intersections have been modelled using the Sidra 5.1 – intersection modelling program. It has been assumed full development of the site will occur in 10 years time and a background traffic growth rate of 2 % per annum has also been assumed.

2.6.2 Intersection Capacity

Table 3 – Sidra modelling results – Estate Access/Gosford Road Post Development 2021

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Access Rd											
1	L	11	3.0	0.078	7.3	LOS A	0.4	3.0	0.13	0.59	38.2
3	R	97	3.0	0.078	7.4	LOS A	0.4	3.0	0.13	0.59	34.6
Approach		107	3.0	0.078	7.4	LOS A	0.4	3.0	0.13	0.59	34.9
East: Gosford Rd											
4	L	223	3.0	0.172	7.3	LOS A	1.0	6.8	0.12	0.59	38.3
5	T	27	3.0	0.172	7.3	LOS A	1.0	6.8	0.12	0.59	36.5
Approach		251	3.0	0.172	7.3	LOS A	1.0	6.8	0.12	0.59	38.1
West: Gosford Rd											
11	T	23	3.0	0.041	7.7	LOS A	0.2	1.5	0.26	0.58	35.6
12	R	25	3.0	0.041	7.8	LOS A	0.2	1.5	0.26	0.59	33.9
Approach		48	3.0	0.041	7.8	LOS A	0.2	1.5	0.26	0.58	34.7
All Vehicles		406	3.0	0.172	7.4	LOS A	1.0	6.8	0.14	0.59	36.7

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.

Table 4 – Sidra modelling results – Wyee Road / Gosford Road intersection Post Development 2021

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Wyee Rd											
1	L	175	5.0	0.176	13.5	LOS B	1.7	12.6	0.51	0.75	43.9
2	T	376	5.0	0.358	5.8	LOS A	4.2	30.6	0.58	0.50	49.4
Approach		551	5.0	0.358	8.2	LOS A	4.2	30.6	0.56	0.58	47.5
North: Wyee Rd											
8	T	593	5.0	0.565	6.8	LOS A	7.7	56.5	0.69	0.60	47.9
9	R	76	5.0	0.159	16.1	LOS B	0.9	6.7	0.61	0.75	41.7
Approach		668	5.0	0.565	7.8	LOS A	7.7	56.5	0.68	0.62	47.1
West: Gosford Rd											
10	L	61	5.0	0.226	25.1	LOS C	1.1	8.3	0.89	0.74	20.4
12	R	60	5.0	0.221	25.2	LOS C	1.1	8.1	0.89	0.74	20.4
Approach		121	5.0	0.226	25.2	LOS C	1.1	8.3	0.89	0.74	20.4
All Vehicles		1340	5.0	0.565	9.5	LOS A	7.7	56.5	0.65	0.61	45.3

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

This modelling shows that based on the RTA criteria for intersection performance (*Table 4.2 Guide to Traffic Generating Developments reproduced below*) that the existing intersections would continue to operate satisfactorily up until at least 2021 with the additional development traffic in the PM peak periods subject to the construction of a single lane roundabout at the subdivision access road's intersection with Gosford Road and traffic signals at the Wyee Road intersection with Gosford Road.

Table 4.2
Level of service criteria for intersections

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

2.6.3 Road Safety & Road Condition

The existing intersections were inspected on Monday 10th October 2011. In terms of road safety improvements, infrastructure improvements and usability the following observations were made:

1. The lack of pedestrian facilities at the Wyee Road intersection with Gosford Road. The proposed traffic signals will assist by including a pedestrian phase;
2. The lack of bus stop facilities such as bus shelters in indented bays. Buses were observed passing through and turning into Gosford Road;
3. Unformed footpaths at both locations especially the Wyee Road intersection with Gosford Road;
4. The lack of sealed parking in Wyee Road – two parking manoeuvres were observed with vehicles parking within the statutory No Stopping areas;
5. The existing pavements appear satisfactory however the approaches to the proposed signals will require widening for an estimated distance of 50m on each approach to support left and right turn movements through the proposed signals into Gosford Road;
6. Underground utilities within the Wyee Road intersection with Gosford Road may require relocation or be encased with concrete;
7. Underground drainage at the Wyee Road intersection with Gosford Road will require relocation and possible upgrading and new underground drainage at the subdivision access road intersection with Gosford Road;
8. A small number of cyclists were observed in Wyee Road and upgrading of the intersection with Gosford Road will require provision for cyclists.

An important point to note is that these upgrades will also be of benefit to existing road users therefore in a fair and reasonable development context be works that a new development would contribute to in varying proportions rather than fully fund the works.

2.6.4 Alternate Transport Modes

Bus services (Red Bus Company) were observed when the site was inspected and during the intersection count at Wyee Road and Gosford Road. The services were mainly school bus services (Red Bus Company and Hunter Valley Bus Company) however service buses use Wyee Road. It is anticipated that with completion of the new subdivision the demand will increase for both the school service and the normal service route necessitating the need for bus stops and shelters on Wyee Road and possibly Gosford Road. Bus stops and shelters can be incorporated into the costs for road construction within the new subdivision and into the costs for conversion of the Wyee Road intersection with Gosford Road into traffic signals.

Figure 4 - Red Bus Company Service Routes Wyee

A small number of cyclists were observes using Wyee Road and any infrastructure upgrading will require provision for cyclists to meet present day standards. These works can be incorporated into the traffic signal design.

Council may require a pedestrian/cycle link from Gosford Road intersection with the access road to the development to the existing road infrastructure in Jabbarup Road.

In regard to pedestrians it is envisaged the provision of infrastructure for cyclists will also be shared by pedestrians to some extent however there will be the need for pedestrian footpaths to be constructed as part of the infrastructure upgrade at the Wyee Road intersection with Gosford Road, again, this can be incorporated into the traffic signal design.

It may also be a condition required by Council that the development be linked to the proposed traffic signals on Wyee Road via Gosford Road by the provision of a concrete footpath for cyclists and pedestrians.

2.7 Conclusion

- The existing road network has sufficient capacity at both intersections to cater for the proposed development with the construction of traffic signals at the intersection of Wyee Road with Gosford Road and with construction of a single lane roundabout at the intersection of Gosford Road with the assess to the development;
- Council may require a concrete footpath to be constructed in Gosford Road from the access to the Estate to Wyee Road. If required the cost off this path should be proportioned between new and existing lots in the catchment area;
- Council may require and concrete footpath to be constructed from the access to the Estate to the end of Jabbarup Road, again, the cost off this path should be proportioned between new and existing lots in the catchment area.

Costing

Item	Description	Conceptual Cost	Proportional
1	Traffic Signals at Wyee Rd/Gosford Rd	$600,000	Shared based on traffic volumes
2	Additional pavement for turning lanes Wyee Rd at signals & pavement rehab.	$400,000	Shared based on traffic volumes
3	Roundabout Gosford Rd/Estate Access	$500,000	Shared based on traffic volumes
4	Pedestrian Cycle path Wyee Rd to Estate Access	$45,000	Shared based on catchment lots
5	Pedestrian path connection from Estate Access to Jabbarup Rd	$25,000	Shared based on catchment lots
	Total	$1,570,000	

3. LAKE MUNMORAH / CRANGAN BAY RESIDENTIAL ESTATE

3.1 Site Location

The Lake Munmorah / Crangan Bay site is located on the corner of the Pacific Highway and Chain Valley Bay Road at the north-eastern end of the Lake Munmorah Township. The proposed residential estate is titled Part Lot 642 DP 1027231 and Part Lot 100 DP 1044282 and is located on both sides of Chain Valley Bay Road adjacent to the Pacific Highway. The site is currently zoned a mixture of 7(b) Scenic Protection, 7(a) Conservation and 7(g) Wetlands Management. ***Figure 6*** below shows the site location from a local context.

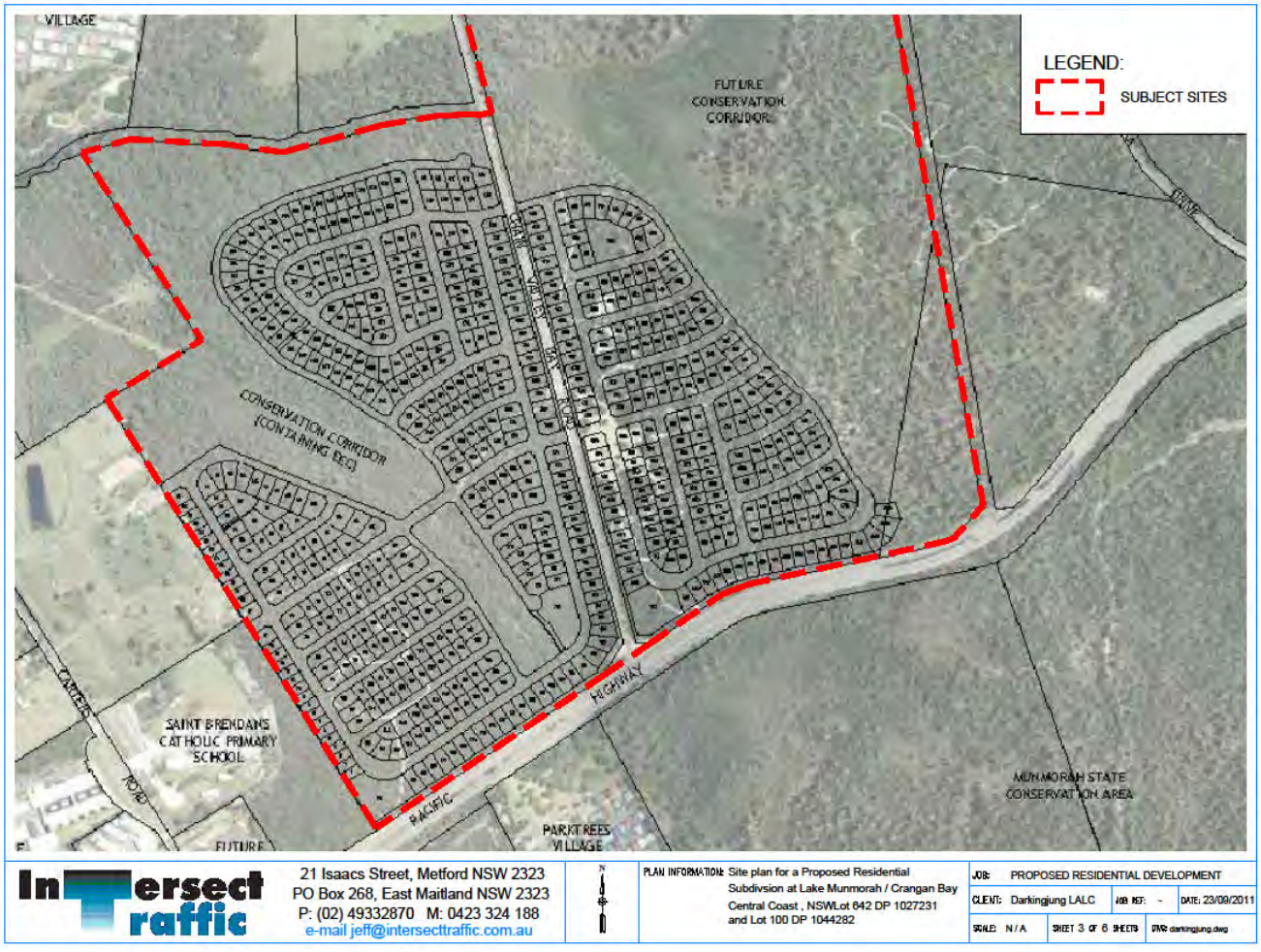


Figure 5 – Lake Munmorah / Crangan Bay Residential Estate.

3.2 Development Proposal

ADW Johnson has prepared a concept subdivision layout for the site proposing 618 lots with a two subdivision vehicular access off Chain Valley Bay Road approximately 300 metres and 600 metres north of the Pacific Highway. The adjoining St Brendans School (Carters Road) has requested access through the site to Chain Valley Bay Road and this has been provided in the concept plan. ***Figure 5*** above shows the proposed concept plan.

3.3 Existing Road Network

The Pacific Highway (SH 10) as part of the classified state highway network is under the care and control of the RTA. It is considered a major arterial road and therefore is constructed to a high standard. In the vicinity of the site it is a four lane two way highway standard road for which an 80 km/h speed zoning exists. It has generous lane widths in excess of 3.5 metres, a central median strip and wide sealed shoulders up to 2 metres wide. At the time of inspection it was in good condition.

Chain Valley Bay Road is a local road under the care and control of Wyong Council. It is a two lane two way rural road providing access to Chain Valley Bay and properties in this area. Under a functional road hierarchy it would be classified as a collector road. It is sealed to a width of 6 to 7 metres wide and at the time of inspection was found to be in only fair condition. Pavement failures were evident.

The Pacific Highway / Chain Valley Bay Road intersection is constructed as a channelised right and left turn intersection (CHR/CHL). Sight distance to the north was a little constrained particularly considering a right turn out of Chain Valley Bay necessitates the crossing of two lanes of traffic.

Photograph 3 – Chain Valley Bay Road in the vicinity of the site.

Photograph 4 – Pacific Highway / Chain Valley Bay Road intersection

3.4 Traffic Volumes and Road Network Capacity

Current traffic volumes on the local road network have been sourced from the RTA and Wyong Council.

The latest data has been extrapolated to 2011 using a compound traffic growth rate of 2 % per annum. The peak hour traffic volume if not recorded has been assumed as 8 % of the AADT for arterial and sub-arterial roads or 15 % for local roads.

Table 5 – Existing Traffic Volume Data – Lake Munmorah

Road	Source	Count Year	AADT (vpd)	2011 AADT (vpd)	Peak Hour (vph)
Pacific Highway	RTA	2004	15,811	18,161	1,450
Chain Valley Bay Road	Council	2003	2109	2471	370

Intersect carried out a manual intersection count at the Pacific Highway / Chain Valley Bay Road intersection for intersection modelling purposes on Friday 4/11/11. This count measured the AM peak hour traffic volumes on the Pacific Highway and Chain Valley Bay Road as 1,916 and 200 vph respectively.

The capacity of roads is generally governed by the capacity of intersections on the road however Table 4.3 and 4.4 of the RTA's Guide to Traffic Generating Developments (see below) gives some guidance on the mid block capacity and expected levels of service on urban roads.

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

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

Table 4.4
Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Assuming a satisfactory level of service D on the road network and for the current lane provision on the road network it is assumed that the road network has the following road capacities.

Table 6 – Road Network Capacity – Lake Munmorah

Road	Lanes	Two way capacity (vph)
Pacific Highway	4	4,400
Chain Valley Bay Road	2	2,200

Therefore based on current peak hour traffic volumes it can be seen that the local road network currently has spare capacity to cater for additional development in the area.

3.5 Traffic Generation and Distribution

The RTA's Guide to Traffic Generating Developments provides guidance on the traffic generating potential of different land uses. For a residential dwelling it states;

Daily vehicle trips = 9 per dwelling;
Weekday peak hour vehicle trips = 0.85 per dwelling.

Thus for a 618 residential lot development the likely traffic generation can be calculated as follows;

Daily vehicle trips = 9 x 618 = 5,562 vtpd.
Peak hour vehicle trips = 0.85 x 618 = 525 vph.

Distributing this onto the local road network requires that assumptions be made in regard to likely trip destinations / sources as well as driver decisions. The data collected in the manual intersection count carried out by Intersect does however provide some guidance on likely traffic distribution. For the purposes of this assessment the following is assumed for the AM peak.

- 80% of traffic will use the main access to the subdivision;
- 90 % of traffic is leaving the estate;
- 10% of traffic is entering the estate;
- 90 % of traffic generated by the estate will proceed to the Pacific Highway.
- Trip movement distributions for estate traffic will mirror current distribution trends at the Pacific Highway / Chain Valley Bay Road intersection.

These assumptions result in the following AM peak traffic distributions at the Chain Valley Bay Road / subdivision main access road (closest to the Pacific Highway) and the Pacific Highway / Chain Valley Bay Road intersections (see ***Figures 6 & 7***).

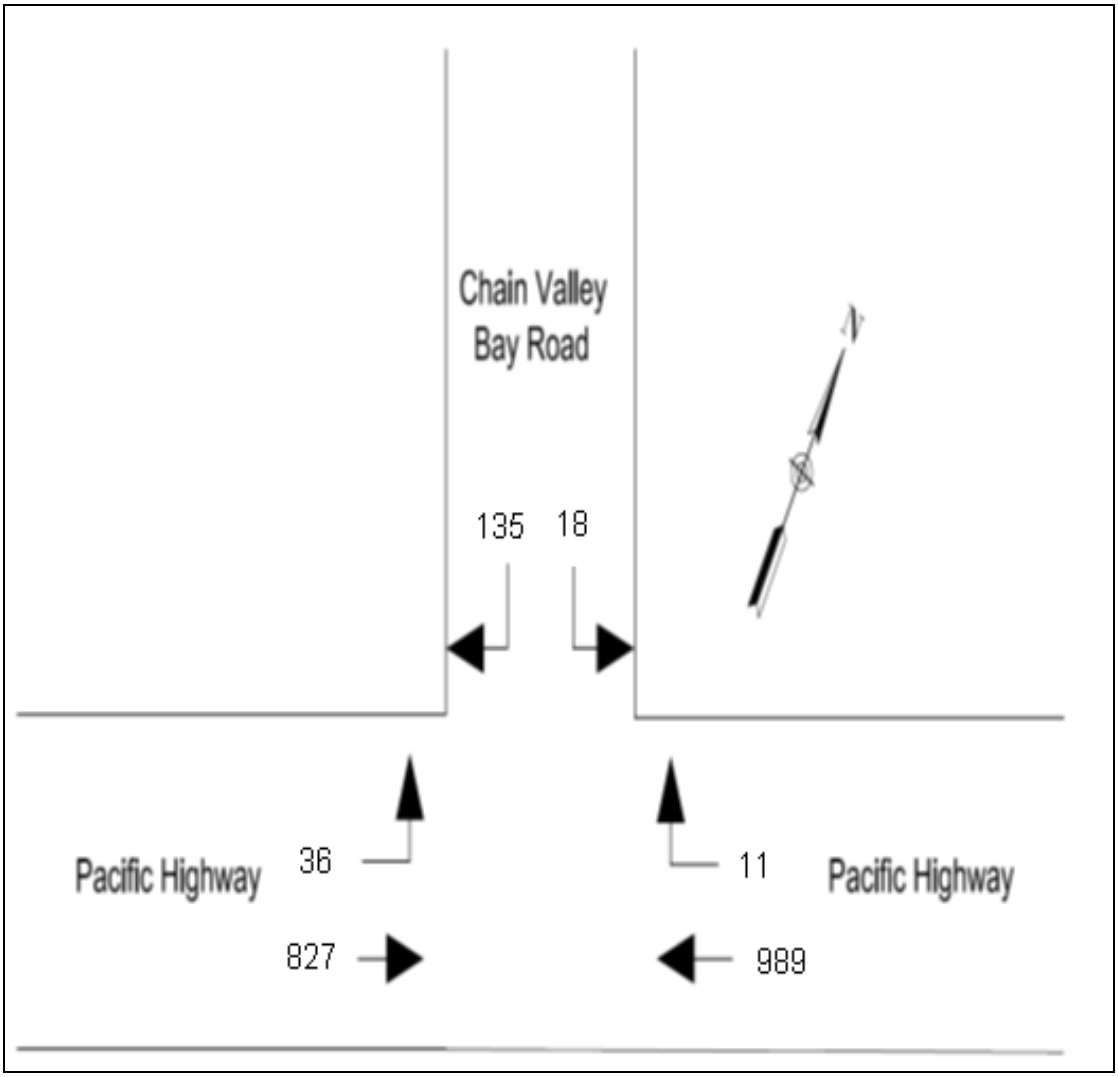


Figure 6 – Existing AM peak traffic at the Pacific Highway/Chain Valley Bay Road intersection 2011.

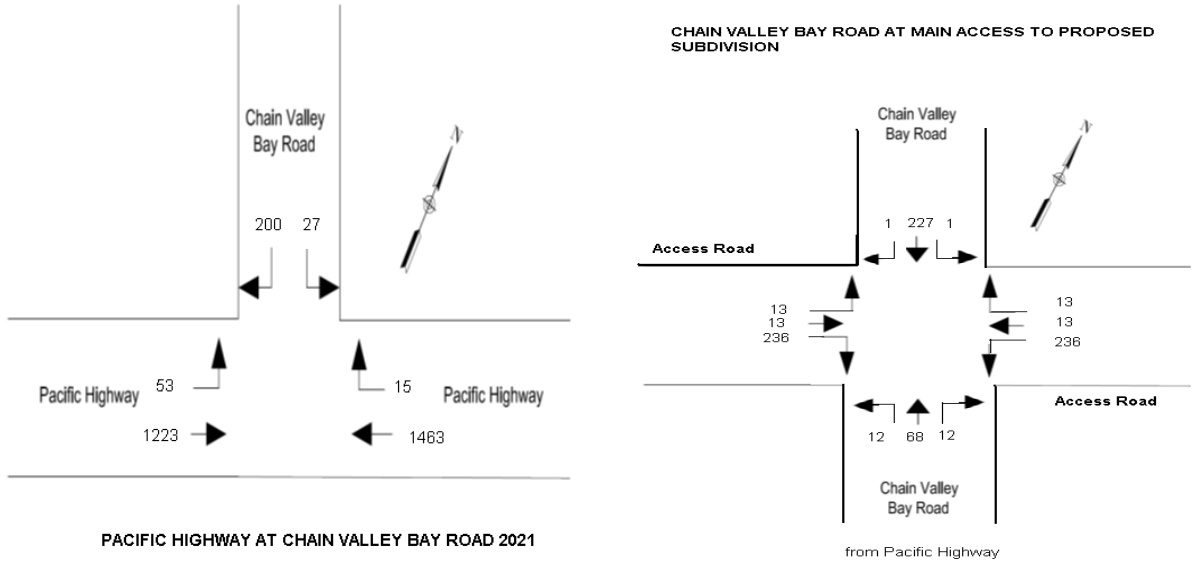


Figure 7 – AM Existing traffic with growth and development Pacific Hwy at Chain Valley Bay Rd and Chain Valley Road at the main access to the subdivision 2021

3.6 Traffic Impacts and Considerations

3.6.1 Road Network Capacity

The main constraint to this proposal is the capacity of the road network on the Pacific Highway and on Chain Valley Bay Road to cater for the additional traffic generated by the development. Section 3.4 above has determined that there is spare mid block capacity in the existing road network. Section 3.5 has determined that the proposed development will generate up to an additional 525 vph on the local road network.

This additional traffic will not result in the mid block traffic volumes on the Pacific Highway or Chain Valley Bay Road exceeding capacity limits. Therefore subject to satisfactory intersection performance the existing road network has sufficient spare capacity to cater for the proposal without the need for any upgrading.

To facilitate the additional traffic generated from the proposed subdivision it is anticipated that Council will require pavement widening and the installation of kerb & gutter with underground drainage in Chain Valley Bay Road to the northern end of the proposed subdivision.

3.6.2 Intersection Capacity

The road network's capacity to cater for the proposed development will be very much determined by the impact of the development at the intersections in the vicinity of the site. In this regard it is considered that the two main intersections to consider at this preliminary stage will be the subdivision accesses closest to the Pacific Highway on Chain valley Bay Road and the Pacific Highway / Chain Valley Bay Road intersection.

There are two access locations from the proposed subdivision onto Chain Valley Bay Road however for the purpose of this preliminary report only the closest access connection to Chain Valley Bay Road has been analysed. As a sensitivity test 80% of the subdivision is assumed to use this location.

Given the size of the subdivision and the fact that the main subdivision access is a four way cross intersection it is assumed Council will require either traffic signals or a roundabout at this access. For the purposes of this assessment a single lane roundabout access is assumed for this location.

In regard to the intersection of the Pacific Highway with Chain Valley Bay Road it is assumed that the RTA will require either a two (2) lane roundabout or traffic signals. For the purpose of this assessment traffic signals have been assumed due to the dominant highway movements and the wide pavement width on the highway.

The intersections have been modelled using the Sidra 5.1 – intersection modelling program. It has been assumed full development of the site will occur in 10 years time and a background traffic growth rate of 2 % per annum has also been assumed.

Table 7 – Sidra modelling results – Southern Subdivision access

MOVEMENT SUMMARY

Site: Chain Valley Bay Rd

Chain Valley Bay Road at Pacific Highway Lake Munmorah
Signals - Actuated Cycle Time = 52 seconds

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: RoadName											
5	T	1540	0.0	0.790	12.3	LOS B	16.5	115.2	0.87	0.78	42.2
6	R	16	0.0	0.076	25.9	LOS C	0.3	2.3	0.77	0.72	34.9
Approach		1556	0.0	0.790	12.4	LOS B	16.5	115.2	0.87	0.78	42.1
North: RoadName											
7	L	28	0.0	0.478	26.7	LOS C	5.3	37.1	0.86	0.81	34.6
9	R	211	0.0	0.478	26.6	LOS C	5.3	37.1	0.86	0.80	34.6
Approach		239	0.0	0.478	26.6	LOS C	5.3	37.1	0.86	0.80	34.6
West: RoadName											
10	L	56	0.0	0.060	15.6	LOS B	0.7	5.1	0.52	0.72	41.9
11	T	1287	0.0	0.660	11.1	LOS B	12.4	86.8	0.79	0.70	43.4
Approach		1343	0.0	0.660	11.3	LOS B	12.4	86.8	0.77	0.70	43.4
All Vehicles		3138	0.0	0.790	13.0	LOS B	16.5	115.2	0.83	0.75	41.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Table 8 – Sidra modelling results – Pacific Highway / Chain Valley Bay Road intersection.

MOVEMENT SUMMARY

Site: Chain Valley Bay Rd at main access

Chain Valley Bay Road at the Main Access to the Subdivision Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Chain Valley Bay Rd											
1	L	13	0.0	0.072	7.1	LOS A	0.4	2.7	0.14	0.57	49.7
2	T	72	0.0	0.072	6.1	LOS A	0.4	2.7	0.14	0.48	50.5
3	R	13	0.0	0.072	11.1	LOS B	0.4	2.7	0.14	0.81	46.3
Approach		97	0.0	0.072	6.9	LOS A	0.4	2.7	0.14	0.53	49.8
East: East Access Rd											
4	L	248	0.0	0.319	10.3	LOS B	1.9	13.5	0.65	0.76	46.8
5	T	14	0.0	0.319	9.3	LOS A	1.9	13.5	0.65	0.73	46.9
6	R	14	0.0	0.319	14.3	LOS B	1.9	13.5	0.65	0.85	43.9
Approach		276	0.0	0.319	10.4	LOS B	1.9	13.5	0.65	0.76	46.6
North: Chain Valley Bay Rd											
7	L	1	0.0	0.235	8.6	LOS A	1.3	9.3	0.48	0.67	48.2
8	T	239	0.0	0.235	7.7	LOS A	1.3	9.3	0.48	0.61	48.4
9	R	1	0.0	0.235	12.6	LOS B	1.3	9.3	0.48	0.83	45.6
Approach		241	0.0	0.235	7.7	LOS A	1.3	9.3	0.48	0.61	48.4
West: West Access Rd											
10	L	14	0.0	0.217	7.5	LOS A	1.2	8.4	0.27	0.54	48.6
11	T	14	0.0	0.217	6.6	LOS A	1.2	8.4	0.27	0.47	49.2
12	R	248	0.0	0.217	11.5	LOS B	1.2	8.4	0.27	0.68	45.5
Approach		276	0.0	0.217	11.0	LOS B	1.2	8.4	0.27	0.66	45.8
All Vehicles		889	0.0	0.319	9.5	LOS A	1.9	13.5	0.43	0.67	47.1

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

3.6.3 Road Safety

Road safety on the Pacific Highway will be enhanced by the installation of traffic signals by providing a pedestrian phase to assist with movements across the intersection. A pedestrian phase will also assist these movements across Chain Valley Bay Road.

Traffic speed on the approach to the Pacific Highway on Chain Valley Bay Road from the north will be an issue due to the straight road alignment and good sight distance. As mentioned previously a roundabout is proposed on Chain Valley Road at the access closest to the Pacific Highway, mainly due to capacity. To provide an acceptable level of road safety, construction of a single lane roundabout may also be required by Council at the access location at the north end of the proposed subdivision. This would ensure acceptable approach speeds to the new precinct. Although this intersection has not been modelled, it is anticipated that traffic volumes would also require a single lane roundabout at this location.

3.6.4 Alternate Transport Modes

There will be a need for pedestrian and cyclist access to the Pacific Highway and to assist these movements Council will probably request construction of an off-road pedestrian/cycle path on one side of Chain Valley Bay Road from the roundabout at the north end of the subdivision to the Pacific Highway.

From the extract below it can be seen that the Red Bus Company operates a service route on Chain Valley Road and to support this bus stops will be necessary on Chain Valley Bay Road between the two access locations to the proposed subdivision. These bus stops may not be necessary at this location if the Red Bus Company decides to extend the service into the proposed subdivision then however additional internal stops will be needed. This matter requires further attention prior to lodging the DA.

Figure 8 - Red Bus Company Service Routes

3.7 Conclusions

- Kerb & gutter with underground drainage will be necessary in Chain Valley Bay Road from the Pacific Highway to the northern end of the proposed subdivision;
- Traffic signals will be required on the Pacific Highway at the Chain Valley Bay Road intersection;
- Single lane roundabouts will be necessary at the two (2) subdivision access locations on Chain Valley Bay Road;
- An off-road pedestrian/cycle path will be required on one side of Chain Valley Bay Road from the northern end of the proposed subdivision to the Pacific Highway; and
- Bus stops and shelters will be required either in Chain Valley Bay Road or within the proposed subdivision.
- An important point to note is that these upgrades will also be of benefit to existing road users therefore in a fair and reasonable development context be works that a new development would contribute to in varying proportions rather than fully fund the works.

Costing

Item	Description	Conceptual Cost	Proportional
1	Kerb 7 Gutter & underground drainage Chain Valley Bay Road over proposed subdivision frontage	$790,000	Shared based on traffic volumes
2	Traffic signals at Pacific Hwy/Chain Valley Bay Rd	$1,000,000	Shared based on traffic volumes
3	Single lane roundabouts at two (2) accesses to Chain Valley Bay Rd	$200,000	Shared based on traffic volumes
4	Off-road pedestrian/cycle path in Chain Valley Bay Road over proposed subdivision frontage	$180,000	Full cost
5	Indented bus stops (2) Chain Valley Bay Road	$30,000	Full cost
	Total	$2,200,000	

4. HALEKULANI RESIDENTIAL ESTATE

4.1 Site Location

The Halekulani site is located on Macleay Drive between the Bevington Shores Manufactured Home Village and the Sunny Lake Shores Caravan Court north of the Halekulani village area. The proposed residential estate is titled Lot 616 DP 82112, Lot 589 DP 728958 and Lot 627 DP 727733. The site is currently zoned 7(b) Scenic Protection. ***Figure 9*** below shows the site location from a local context.

Figure 9 – Halekulani Residential Estate

4.2 Development Proposal

ADW Johnson has prepared a concept subdivision layout for the site proposing 132 lots with three separate subdivision vehicular access off Macleay Road. ***Figure 9*** above shows the proposed concept plan. It is noted that consideration is also being given to developing a manufactured home estate as an alternate proposal on the site given the similarities with the adjoining developments.

4.3 Existing Road Network

Macleay Drive in the vicinity of the site is a local access road under the care and control of Wyong Council. It is constructed as a rural sealed two lane two way road with table drains. At the time of inspection it was found to be in good condition.

The other roads leading to Macleay Drive from Budgewoi Road are all two lane two urban residential streets of varying widths and construction standard. All were found to be in fair to good condition. Access to Budgewoi Road (MR 336) the start of the sub-arterial road network is via a number of residential streets with give way controlled intersections though the most convenient and safe access is via the roundabout at Noela Place.

Budgewoi Road (MR 336) is part of the classified state road network under the care and control of the RTA. It is a two lane two way sealed road connecting Toukley to Doyalson and is in good condition. Lane widths are between 3 and 3.5 metres wide and where kerb and gutter and parking lanes are not provided within the village CBD's a 1 metre wide sealed shoulder exists.

Photograph 5 – Macleay Drive in the vicinity of the site.

4.4 Traffic Volumes and Road Network Capacity

Current traffic volumes on the local road network have been sourced from Wyong Council.

The latest data has been extrapolated to 2011 using a compound traffic growth rate of 2 % per annum. The peak hour traffic volume if not recorded has been assumed as 8 % of the AADT for arterial and sub-arterial roads or 15 % for local roads.

Table 9– Existing Traffic Volume Data – Halekulani

Road	Source	Count Year	AADT (vpd)	2011 AADT (vpd)	Peak Hour (vph)
Sunrise Avenue	Council	2011	2653	2653	398

The capacity of local roads in mainly residential areas is generally governed by the environmental capacity of the road as detailed in Table 4.6 of the RTA's Guide to Traffic Generating Developments (see below).

Table 4.6
Environmental capacity performance standards on residential streets

Road class	Road type	Maximum Speed (km/hr)	Maximum peak hour volume (veh/hr)
Local	Access way	25	100
	Street	40	200 environmental goal
			300 maximum
Collector	Street	50	300 environmental goal
			500 maximum

Note: Maximum speed relates to the appropriate design maximum speeds in new residential developments. In existing areas maximum speed relates to 85th percentile speed.

Based on this table it is considered that the local road network has the following road capacities.

Table 10 – Road Network Capacity (Environmental) – Halekulani

Road	Lanes	Two way capacity (vph)
Sunrise Avenue	2	500
Macleay Drive	2	300

In the surrounding street network Sunrise Avenue appears to be the main collector for the surrounding streets and it can be seen that it has some spare capacity to cater for additional development in the area without having an adverse impact on residential amenity.

4.5 Traffic Generation and Distribution

The RTA's Guide to Traffic Generating Developments provides guidance on the traffic generating potential of different land uses. For a residential dwelling it states;

Daily vehicle trips = 9 per dwelling;
Weekday peak hour vehicle trips = 0.85 per dwelling.

Thus for a 132 residential lot development the likely traffic generation can be calculated as follows;

Daily vehicle trips = 9 x 132 = 1,188 vtpd.
Peak hour vehicle trips = 0.85 x 132 = 113 vtph.

4.6 Traffic Impacts and Considerations

This traffic has been distributed onto Macleay Drive in the following proportions for the PM peak:

PM

- 80% of traffic arriving at the subdivision
- 15% of traffic leaving the subdivision
- 5% internal trips.

Arrivals to the subdivision have a number of options to access Macleay Drive depending on the trip destination. The same applies to the departure movement which also has access to Kalele Avenue, Wailele Avenue, Manoa Road, Huene Avenue and Sunrise Avenue. The resulting distribution of development traffic would filter through these streets to local destinations such as shopping centres and schools as well as the closest sub-arterial or arterial road for further destinations.

In peak PM periods 95% of the trips generated from the development (107 trips) would filter through these streets. As a sensitivity test, if all 107 trips arrived at the Sunrise Avenue/Macleay Drive intersection in PM peak this equates to less than 2 vehicles per minute two way movements. This would also approximately equate to the Road Network Capacity (Environmental) of 500 two way movements.

4.6.1 Road Network Capacity

As previously mentioned it is not anticipated that the main access road Macleay Drive or the surrounding road network will have capacity constraints due to the low peak hour volume and the alternative access streets available.

4.6.2 Intersection Capacity

As previously mentioned it is not anticipated that the main access road Macleay Drive or the surrounding road network will have intersection capacity constraints due to the low peak hour volume and the alternative access streets available. Some intersection upgrading may be required however this would mainly be minor pavement work and signposting/linemarking upgrades which would be minimal cost.

4.6.3 Road Safety

The approaches to the new subdivision have three long straights and three sharp bends which have the capacity to be road safety issues. Additionally the existing sealed pavement is approximately 6m in width with shoulders in varying degrees of condition.

It would be more appropriate to upgrade Macleay Drive to a 9m pavement width (say two 3.3m travelling lanes and 1.2m sealed shoulders) and also provide suitable widening at the bends.

4.6.4 Alternate Transport Modes

As mentioned in the section above, if Macleay Drive is widened to a 9m pavement with 1.2m sealed shoulders provision for cyclists and pedestrians would then be available on the road shoulder.

The inset below indicates that the Red Bus Company does service Sunrise Avenue however given the low number of residential dwelling proposed within the development the company may not find it financially viable to extend the service bus route. It is probable that the school bus route will enter or pass by the subdivision and for this reason it is recommended that consideration be given to the construction of 2 indented bus bays within the subdivision or on Macleay Drive adjacent to the subdivision for use by school students. The viability of this should be researched with the bus company prior to lodging the Development Application.

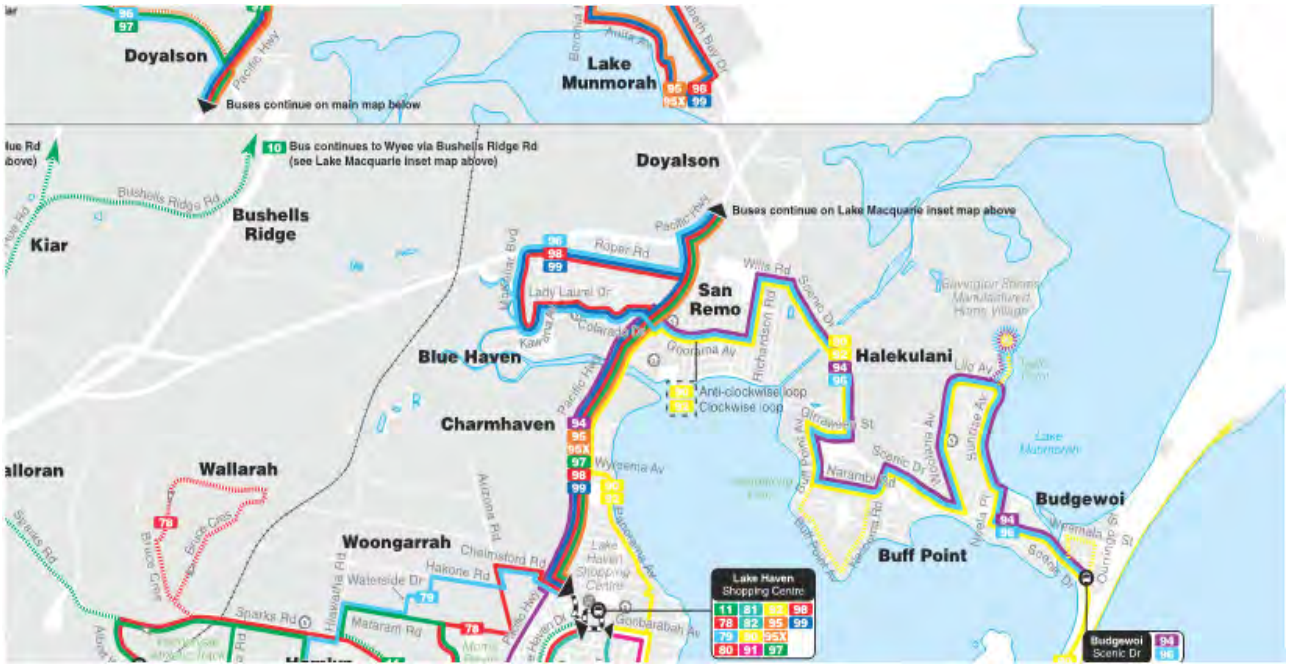


Figure 10 – Red Bus Company Bus Routes

4.7 Conclusions

- It is not anticipated that the proposed subdivision will impact on the surrounding road network and intersections within the adjacent residential area to the extent that upgrades will be required.
- It is recommended that Macleay Drive be upgraded to a 9m pavement width to cater for the additional traffic as well as widening treatment to the three (3) bends.
- The provision of 1.2m sealed shoulders in Macleay Drive will provide for pedestrian and cyclist movements.
- It is recommended that the Red Bus Company be contacted prior to lodgement of the Development Application to provide assistance with the provision of infrastructure (bus stops and shelters) for the school bus route.

Costing

Item	Description	Conceptual Cost	Proportional
1	Widening of Macleay Drive	$500,000	Shared based on traffic volumes
2	Indented Bus Stops with shelters	$30,000	Full cost
	Total	$530,000	

5. NORAH HEAD RESIDENTIAL ESTATE

5.1 Site Location

The Norah Head site is located at the end of Baynton Street and extends through to Victoria Street between the existing residential area and the Central Coast Highway (Wilfred Barrett Drive). The proposed residential estate is titled Part Lot 7343 DP 1157063, Part Lot 569 DP 755266 and Part Lot 7341 DP 1157063. The site is currently zoned 7(a) Conservation. Figure 11 below shows the site location from a local context.

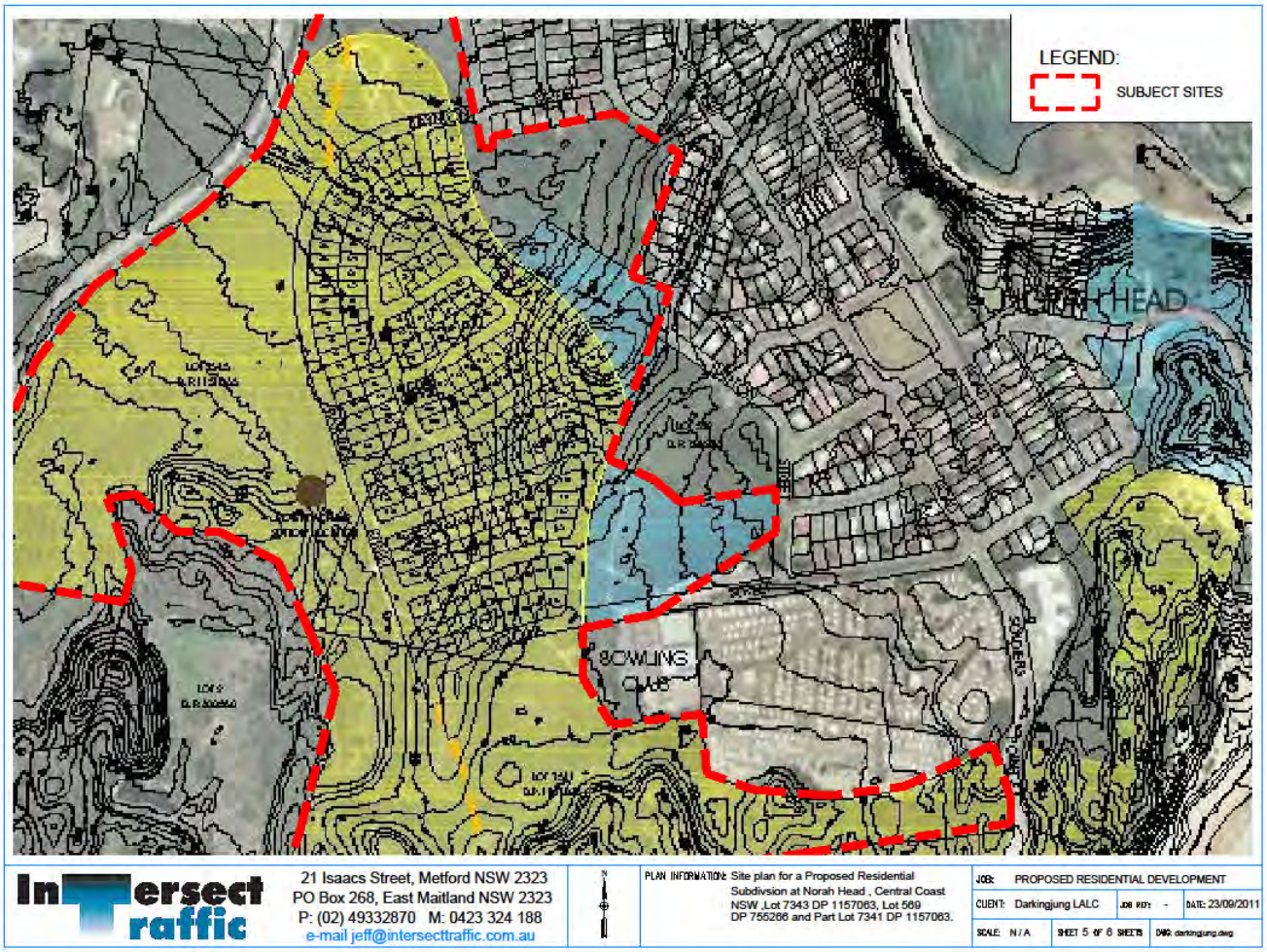


Figure 11 – Norah Head Residential Estate

5.2 Development Proposal

ADW Johnson has prepared a concept subdivision layout for the site proposing 197 lots with connections to existing streets Baynton Street and Victoria Street. ***Figure 11*** above shows the proposed concept plan.

5.3 Existing Road Network

The existing road network within Norah Head is characterised by typical residential street construction including sealed roads of varied width with kerb and gutter and longitudinal drainage. The exception however would be Victoria Street between Barton Street and the site which has been constructed as a sealed access road with unsealed shoulders and speed humps (see ***Photograph 6*** below). Currently it provides access to the Bowling Club. Denison Street near

Wilfred Barrett Drive is also more of a two lane two way rural road with table drains and no kerb and gutter.

Photograph 6 – Victoria Street near Bowling Club.

Wilfred Barrett Drive is a main road forming part of the Central Coast Highway. It is a two lane two way rural character road with sealed shoulders and table drains. A 60 km/h speed zoning applies in the vicinity of the site.

The Wilfred Barrett Drive / Denison Street intersection has been constructed as a painted rural seagull though it was noted during inspection that lane widths and auxiliary lanes seemed narrow and short when compared to current standards. ***Photograph 7*** below shows the Wilfred Barrett Drive / Denison Street intersection.

The Wilfred Barrett Drive / Bungary Road intersection is constructed as a BAR intersection and has no auxiliary turning lanes. It is also noted that Wilfred Barrett Drive at this location has two northbound lanes as it approaches the Main Road roundabout at Noraville some 200 metres further north.

Photograph 7 – Wilfred Barrett Drive / Denison Street intersection.

5.4 Traffic Volumes and Road Network Capacity

Current traffic volumes on the local road network have been sourced from the RTA and Wyong Council as well as manual counts carried out by Intersect as part of this assessment.

The latest data has been extrapolated to 2011 using a compound traffic growth rate of 2 % per annum. The peak hour traffic volume if not recorded has been assumed as 8 % of the AADT for arterial and sub-arterial roads or 15 % for local roads.

Table 11 – Existing Traffic Volume Data – Norah Head

Road	Source	Count Year	AADT (vpd)	2011 AADT (vpd)	Peak Hour (vph)
Wilfred Barrett Drive	RTA	2004	13,718	15,800	1,420
Denison Street	Council	1998	1756	2272	340

Intersect carried out a manual intersection count at the Wilfred Barrett Drive / Denison Street intersection on Friday 16th September 2011 for intersection modeling purposes to determine current traffic on the local road network. This count measured the peak hour traffic volumes on Wilfred Barrett Drive and Denison Street as 1,293 vph (PM peak) and 185 vph (PM peak) respectively.

The capacity of local roads in urban areas is generally governed by the environmental capacity of the road as detailed in Table 4.6 of the RTA's Guide to Traffic Generating Developments (see below).

Table 4.6
Environmental capacity performance standards on residential streets

Road class	Road type	Maximum Speed (km/hr)	Maximum peak hour volume (veh/hr)
Local	Access way	25	100
	Street	40	200 environmental goal
			300 maximum
Collector	Street	50	300 environmental goal
			500 maximum

Note: Maximum speed relates to the appropriate design maximum speeds in new residential developments. In existing areas maximum speed relates to 85th percentile speed.

However Wilfred Barrett Drive as a classified state highway would not be subject to an environmental capacity and thus mid block capacity will be related to efficiency and satisfactory levels of service. Tables 4.3 and 4.4 of the RTA's Guide to Traffic Generating Developments (see below) gives some guidance on the mid block capacity and expected levels of service on urban roads.

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

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

Table 4.4
Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Assuming a LOS D as satisfactory on Wilfred Barrett Drive and based on the above tables it is considered that the local road network has the following road capacities.

Table 12– Road Network Capacity – Norah Head

Road	Lanes	Two way capacity (vph)
Wilfred Barrett Drive	2	2,200
Denison Street (environmental)	2	500

Therefore based on current peak hour traffic volumes it can be seen that the local road network currently has spare capacity to cater for additional development in the area without having an adverse impact on road network efficiency or residential amenity.

5.5 Traffic Generation and Distribution

The RTA's Guide to Traffic Generating Developments provides guidance on the traffic generating potential of different land uses. For a residential dwelling it states;

Daily vehicle trips = 9 per dwelling;
Weekday peak hour vehicle trips = 0.85 per dwelling.

Thus for a 197 residential lot development the likely traffic generation can be calculated as follows;

Daily vehicle trips = 9 x 197 = 1,773 vtpd.
Peak hour vehicle trips = 0.85 x 197 = 168 vtph.

This traffic has been distributed onto the Wilfred Barrett Drive / Denison Street intersection in the same proportions as existing traffic into and out of Norah Head. The current distribution patterns are;

AM

- 60 % of traffic is leaving Norah Head
- 72 % of traffic leaving Norah Head heads north
- 74 % of traffic entering Norah Head approaches from the north.

PM

- 57 % of traffic is leaving Norah Head
- 67 % of traffic leaving Norah Head heads north
- 71 % of traffic entering Norah Head approaches from the north.

The resulting distribution of development traffic on the Wilfred Barrett Drive / Denison Street intersection is shown in ***Figure 12*** below.

It should be noted that this assessment has assumed all development traffic will utilise the Denison Street / Wilfred Barrett Drive intersection to access the sub-arterial road network. There is however another connection to Wilfred Barrett Drive via Bungary Road approximately 700 metres north of the Denison Street connection. Because of the local road network within Norah Head this access connection may be attractive to motorists sourced from the southern sections of the development particularly if their origin / destination is further north. Therefore it is considered this traffic distribution and the resulting assessment would be considered a worst case scenario for the Wilfred Barrett Drive / Denison Street intersection.

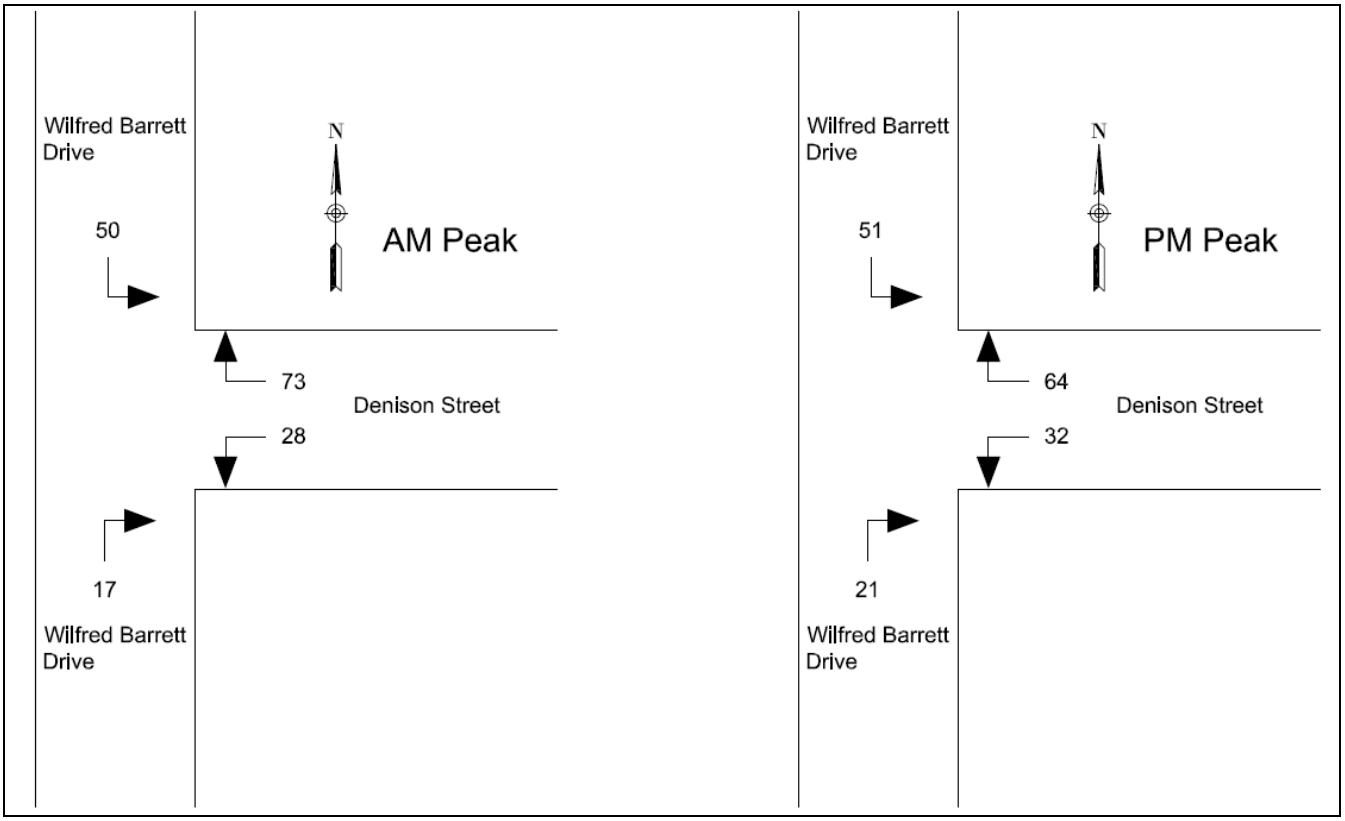


Figure 12 – AM and PM development traffic distribution Wilfred Barrett Drive / Denison Street

5.6 Traffic Impacts and Considerations

5.6.1 Road Network Capacity

The main constraint to this proposal is the capacity of the road network to Wilfred Barrett Drive to cater for the additional traffic generated by the development. Section 5.4 above has determined that there is spare mid block capacity in the existing road network. Section 5.5 has determined that the proposed development will generate up to an additional 168 vtph on the local road network.

This additional traffic will not result in the mid block traffic volumes in Norah Head exceeding environmental capacity limits nor will it cause the technical mid block capacity of Wilfred Barrett Drive to be reached. Therefore subject to satisfactory intersection performance the existing road network has sufficient spare capacity to cater for the proposal without the need for any upgrading.

5.6.2 Intersection Capacity

To assess the impact of the proposal on the main intersection connection to Wilfred Barrett Drive via Denison Street this intersection was modelled using the Sidra 5 intersection modelling program. Existing performance as well as performance to 2021 including development traffic was modelled for both the AM and PM peaks. Background traffic growth on Wilfred Barrett Drive was assumed at 2 % per annum while a 1 % per annum background traffic growth on Denison Street was also assumed. The results of the modelling for average delay (s), LOS and 95 % back of queue length are shown in ***Table 13*** below.

Table 13 – Sidra modelling results – Wilfred Barrett Drive / Denison Street intersection

MOVEMENT SUMMARY

Site: Norah Head 2021 AM Peak + development

Norah Head
Wilfred Barrett Drive / Denison Street
2021 AM peak + development
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Wilfred Barrett Drive											
2	T	641	10.0	0.350	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	36	5.0	0.059	13.0	LOS A	0.2	1.6	0.59	0.83	44.3
Approach		677	9.7	0.350	0.7	NA	0.2	1.6	0.03	0.04	58.9
East: Denison Street											
4	L	59	5.0	0.116	16.3	LOS B	0.4	2.9	0.61	1.00	42.6
6	R	152	5.0	0.580	32.4	LOS C	3.2	23.0	0.85	1.16	32.6
Approach		211	5.0	0.580	27.9	LOS B	3.2	23.0	0.78	1.12	34.9
North: Wilfred Barrett Drive											
7	L	104	5.0	0.058	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	634	10.0	0.346	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		738	9.3	0.346	1.2	NA	0.0	0.0	0.00	0.09	58.2
All Vehicles		1626	8.9	0.580	4.4	NA	3.2	23.0	0.11	0.21	53.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Norah Head 2021 PM Peak + development

Norah Head
Wilfred Barrett Drive / Denison Street
2021 PM peak + development
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Wilfred Barrett Drive											
2	T	692	10.0	0.378	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	46	5.0	0.085	13.9	LOS A	0.3	2.2	0.64	0.89	43.5
Approach		738	9.7	0.378	0.9	NA	0.3	2.2	0.04	0.06	58.6
East: Denison Street											
4	L	71	5.0	0.158	17.5	LOS B	0.5	4.0	0.66	1.00	41.7
6	R	141	5.0	0.641	39.4	LOS C	3.5	25.4	0.90	1.19	29.5
Approach		212	5.0	0.641	32.1	LOS C	3.5	25.4	0.82	1.13	32.7
North: Wilfred Barrett Drive											
7	L	114	5.0	0.064	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	707	10.0	0.386	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		821	9.3	0.386	1.2	NA	0.0	0.0	0.00	0.09	58.2
All Vehicles		1771	8.9	0.641	4.7	NA	3.5	25.4	0.11	0.20	53.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

This modelling shows that based on the RTA criteria for intersection performance (*Table 4.2 Guide to Traffic Generating Developments reproduced below*) that the existing intersection would continue to operate satisfactorily up until at least 2021 with the additional development traffic both in the AM and PM peak periods. Therefore there would be no nexus for an upgrade to the intersection from a performance perspective.

Table 4.2
Level of service criteria for intersections

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

It is also considered that the impact of the development on the Bungary Road / Wilfred Barrett Drive intersection would be minor and not adversely impact on the efficiency of the intersection to the extent that an upgrade would be required for performance issues.

5.6.3 Road Safety

The existing road network was inspected on Monday 10th October 2011. In terms of upgrading for road safety and usability the following observations were made;

- Victoria Street from Barton Street to the site will need to be reconstructed a length of 225 metres.
- The existing rural seagull intersection at the Wilfred Barrett Drive / Denison Street intersection is considered sub standard in terms of lane widths and auxiliary lane lengths. As such there is some risk that the RTA may require some upgrading works as part of any major development such as a large residential subdivision. This may only include some shoulder widening on the cemetery side to accommodate the additional width however given that within 10 years the intersection will be nearing capacity the RTA may consider upgrading the level of control as part of any upgrade works i.e. traffic signals or roundabout. It is highly unlikely they would want another connection to Wilfred Barrett Drive though.
- There is also some risk that the Bungary Road / Wilfred Barrett Drive intersection would meet the warrants for installation of auxiliary turning lanes as either a full blown CHR / AUL intersection or at least a CHR(s). However due to its proximity to the Main Road roundabout the RTA may also consider restricting this intersection to left in and left out only in the future.
- An important point however would be that all these upgrades will also be of benefit to existing traffic therefore would in a fair and reasonable development context be works that a new development would contribute to in varying proportions rather than fully fund the works.

5.6.4 Alternate Transport Modes

The Red Bus Company currently operates public transport services in the area and runs a number of routes into Norah Head via Denison Street. These routes and associated bus stops are within

easy walking distance of the proposed development therefore it is considered the site is already well serviced by public transport and no additional infrastructure would be warranted.

Figure 13 - Red Bus Company Service Routes for Norah Head

Similarly the area is already well served with pedestrian and cycle facilities (cycleways) therefore it would be expected that internal pedestrian and cycleway infrastructure be designed and provided within the development to link to the existing infrastructure. However it is considered that no additional external infrastructure would be warranted.

5.7 Conclusions

This preliminary assessment of a proposed 197 lot residential subdivision at Norah Head has concluded the following:

- The existing local road network has sufficient spare capacity to cater for the proposed development without the need for any major upgrade works except for the reconstruction and realignment of Victoria Street from Barton Street to the site to meet typical residential street standards.
- The Wilfred Barrett Drive / Denison Street intersection currently constructed as rural seagull would continue to operate satisfactorily with the additional development traffic up until at least 2021. However at this time it would be nearing capacity and would need to be monitored in terms of traffic accident history.
- Both the Wilfred Barrett Drive / Denison Street and Wilfred Barrett Drive / Bungary Road intersections would not meet current Austroads Design Guidelines in terms of geometric design and warrants for turning lanes respectively. As such there is some risk the RTA may see the development as a trigger to require upgrading to meet the current standards. Whilst this may only require some pavement widening to increase lane widths and lengths or provide additional turning lanes some changes to the level of control may also be sought. However it is considered that any upgrades of the intersections should be on a contribution basis as the improvements will also benefit existing traffic.
- The site is currently well serviced for alternate transport modes in the form of a reasonable public transport (bus) service to the site and excellent cycle and pedestrian facilities in and around the site. This will mean that the development should ensure that excellent pedestrian and cycle linkages are design into and provided within the development to

connect to the existing external infrastructure. However no additional external infrastructure for alternate transport modes is considered warranted.

Costing

Item	Description	Conceptual Cost	Proportional
1	Reconstruction & realignment Victoria St from Barton Street to site	$200,000	Shared based on traffic volumes
2	Pavement widening Wilfred St/Denison St	$200,000	Shared based on traffic volumes
3	Pavement widening Wilfred Barrett Drive/Bungary Road	$500,000	Shared based on traffic volumes
	Total	$900,000	

6. THE LAKES TOURIST PARK

6.1 Site Location

The Lakes site is located on Budgewoi Road immediately south west of The Lakes Surf Lifesaving Club approximately 1.2 km north of the Main Road roundabout at Noraville. The proposed tourist park is titled Lot 15 DP 1096145 and is currently zoned 6(a) Open Space. ***Figure 14*** below shows the site location from a local context.

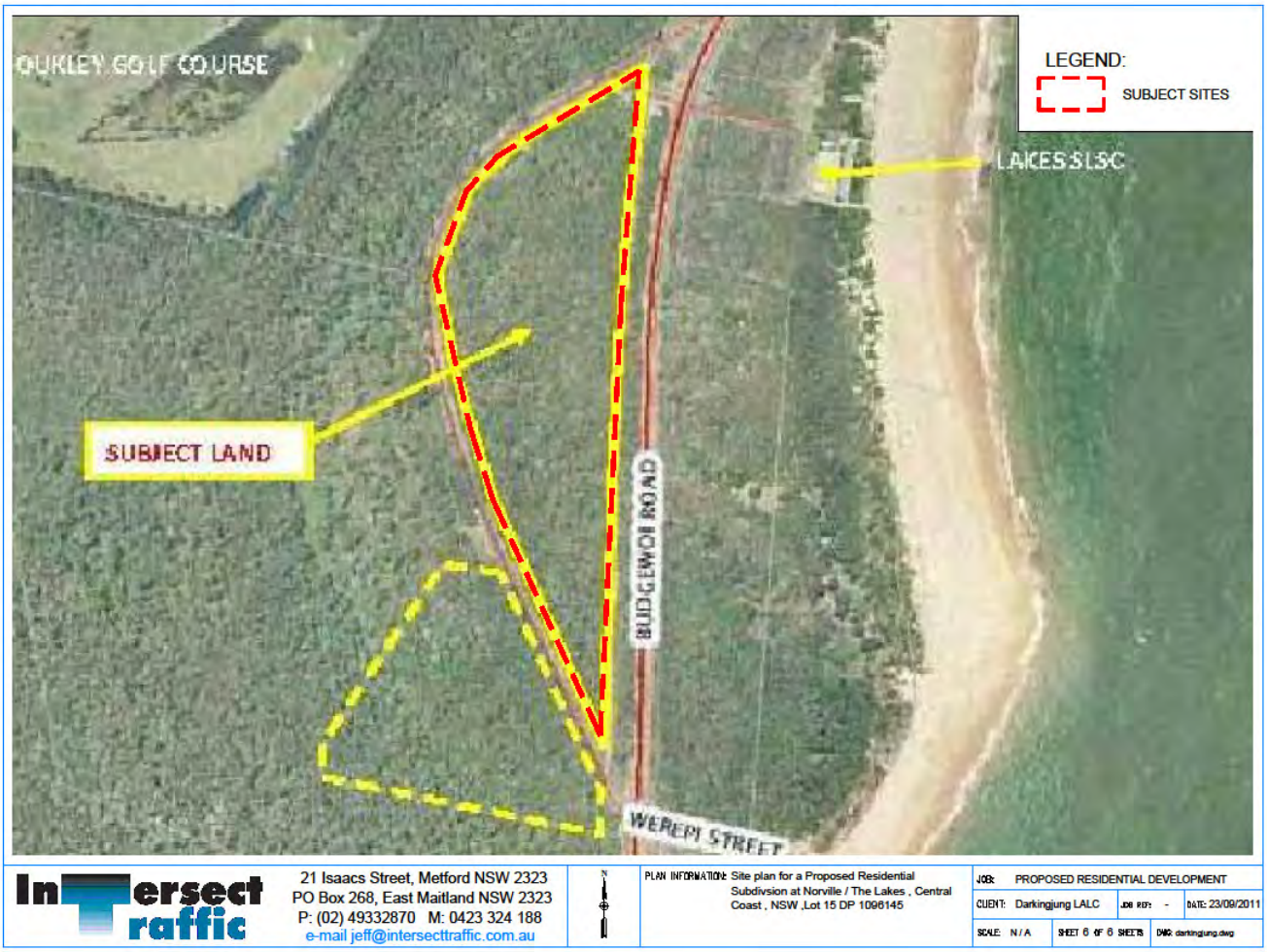


Figure 14 – The Lakes Tourist Park

6.2 Development Proposal

At this stage no firm concept plan has been prepared however it is known there is 4.7 ha of developable area on the site. For assessment purposes it has been assumed that the tourist park could cater for up to 200 caravans / RV's and cabins.

6.3 Existing Road Network

Budgewoi Road in the vicinity of the site is a two lane two way rural style road with generous lane widths (3.5 metres) and wide sealed shoulders. It is a classified state road (MR 336) under the care and control of the RTA that connects Toukley to The Entrance. At the time of inspection it was in good condition. ***Photograph 8*** below shows Budgewoi Road in the vicinity of The Lakes Surf Club access adjacent to the site.

Photograph 8 – Budgewoi Road

6.4 Traffic Volumes and Road Network Capacity

Current traffic volumes on the local road network have been sourced from the RTA.

The latest data has been extrapolated to 2011 using a compound traffic growth rate of 2 % per annum. The peak hour traffic volume if not recorded has been assumed as 10 % of the AADT.

Table 14 – Existing Traffic Volume Data – The Lakes

Road	Source	Count Year	AADT (vpd)	2011 AADT (vpd)	Peak Hour (vph)
Budgewoi Road	RTA	2004	13,718	15,800	1,420

Budgewoi Road as a classified state road would not be subject to an environmental capacity and thus mid block capacity will be related to efficiency and satisfactory levels of service. Tables 4.3 and 4.4 of the RTA's Guide to Traffic Generating Developments (see below) gives some guidance on the mid block capacity and expected levels of service on urban roads.

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

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

Table 4.4
Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Assuming a LOS D as satisfactory and based on the above tables it is considered that the local road network has the following road capacities.

Table 15 – Road Network Capacity – The Lakes

Road	Lanes	Two way capacity (vph)
Budgewoi Road	2	2,200

Therefore based on current peak hour traffic volumes it can be seen that the local road network currently has some spare capacity to cater for additional development in the area without having an adverse impact on road network efficiency or residential amenity.

6.5 Traffic Generation and Distribution

The RTA's Guide to Traffic Generating Developments does not provide trip generation rates for Tourist Park developments. Accordingly for the purpose of this assessment it is assumed that the generation rates are similar to Housing for Disabled persons in self care housing.

Daily vehicle trips = 2 per dwelling;
Weekday peak hour vehicle trips = 0.2 per dwelling.

Thus for a 200 space tourist park the likely traffic generation can be calculated as follows;

Daily vehicle trips = 2 x 200 = 400 vtpd.
Peak hour vehicle trips = 0.2 x 200 = 40 vtph.

The site was inspected on 10/10/11 to determine site conditions and possible entrance locations. In consideration of existing site distance and the proximity of the entrance to The Lakes Surf Lifesaving Club the safest location would be opposite the Surf Club's existing access making it a four leg intersection.

The present intersection appears to be a modified rural Seagull design with enhanced left-in and left-out lanes.

The only available data in regard to peak hour traffic generation in the RTA count on Budgewoi Road extrapolated to 2011. The Lakes Surf Lifesaving Club has approximately 350 existing car parks and would probably be full during peak tourist periods.

To assist in capacity analysis of the intersection for modelling the following volumes have been assumed for 2011 and for each leg of the proposed intersection:

1. Budgewoi Road north approach 710 vph
2. Budgewoi Road south approach 710 vph
3. Tourist Park access 40 vph
4. The Lakes Surf Lifesaving Club access 350 vph

These trips are considered coinciding peak hour volumes with the two entrances having a 90% out movement and a 10% in movement and a 50% directional split during peak. Given the proximity of the proposed development to the Surf Club it is assumed that all movements between the Proposed Tourist Park and the Surf Club would be pedestrian movements.

Additionally these volumes have been increased by 2% over the 10 year horizon to 2021 to account for completion of the proposed development.

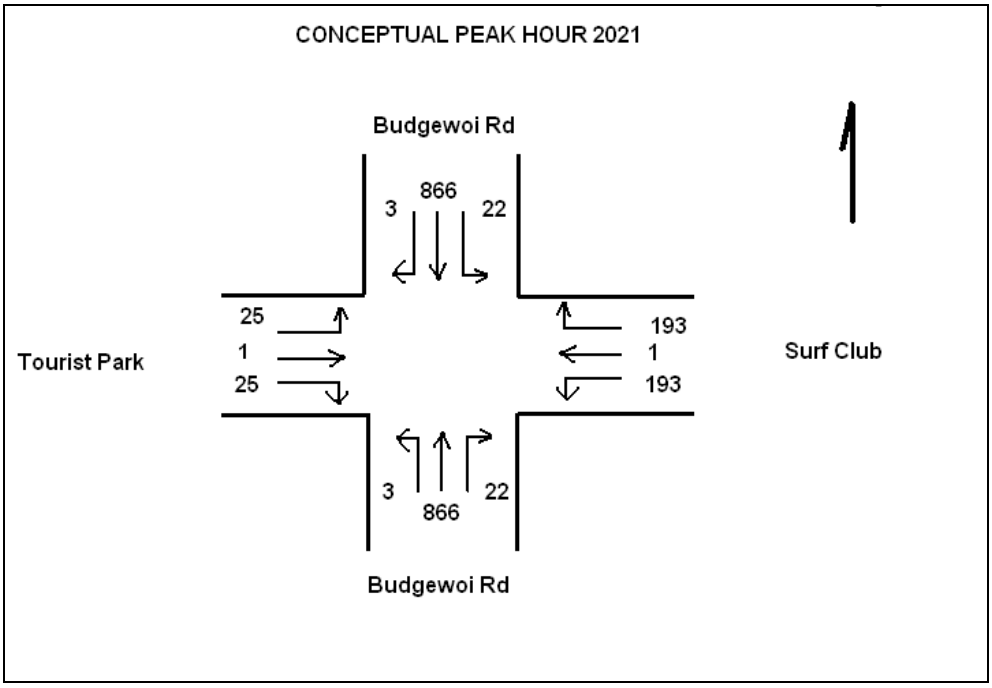


Figure 15 – Conceptual Peak Hour Traffic Movements 2011.

Given the high number of movements associated with the Surf Club, giveway and stop restrictions would create delay within the Club's carpark. Traffic signals would also create delay and are not considered appropriate for the rural surrounds. Accordingly, a roundabout was modelled for this intersection. A roundabout would also offer protection for pedestrians crossing from the Tourist Park to the Surf Club.

6.6 Traffic Impacts and Considerations

6.6.1 Road Network Capacity

The main constraint to this proposal is the capacity of Budgewoi Road to cater for the additional traffic generated by the development. Section 5.4 above has determined that there is spare mid block capacity in the existing road network. Section 5.5 has determined that the proposed development will generate an additional 400 vpd (approximately) on Budgewoi Road.

This additional traffic will not result in the mid block traffic volumes on Budgewoi Road exceeding environmental capacity. Therefore subject to satisfactory intersection performance the existing road network has sufficient spare capacity to cater for the proposal without the need for any upgrading.

6.6.2 Intersection Capacity

To assess the impact of the proposal on the main intersection connection to The Lakes Surf Lifesaving Club this intersection was modelled using the Sidra 5.1 intersection modelling program. Performance to 2021 including development traffic was modelled for an design peak which included sensitivity testing by assuming all peaks coincided, and the Lakes Surf Club generation was 100% of its carpark capacity. Background traffic growth was assumed at 2 % per annum for Budgewoi Road. The results of the modelling for average delay (s), LOS and 95 % back of queue length are shown in ***Table 16*** below.

Table 16 - Sidra modelling results – Roundabout Conversion

MOVEMENT SUMMARY

Site: The Lakes Tourist Park - Roundabout - Conversion

The Lakes Tourist Park Roundabout
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Budgewoi Rd											
1	L	3	0.0	0.823	12.1	LOS B	15.6	108.9	1.00	0.79	45.8
2	T	912	0.0	0.823	11.1	LOS B	15.6	108.9	1.00	0.79	45.7
3	R	23	0.0	0.823	16.8	LOS B	15.6	108.9	1.00	0.79	43.2
Approach		938	0.0	0.823	11.3	LOS B	15.6	108.9	1.00	0.79	45.7
East: Surf Club access											
4	L	203	0.0	0.786	36.2	LOS D	11.7	81.7	1.00	1.39	29.8
5	T	1	0.0	0.786	35.2	LOS D	11.7	81.7	1.00	1.39	29.9
6	R	203	0.0	0.786	40.9	LOS D	11.7	81.7	1.00	1.39	29.1
Approach		407	0.0	0.786	38.5	LOS D	11.7	81.7	1.00	1.39	29.5
North: Budgewoi Rd											
7	L	23	0.0	0.628	6.9	LOS A	7.8	54.7	0.39	0.52	49.1
8	T	912	0.0	0.628	5.9	LOS A	7.8	54.7	0.39	0.45	49.6
9	R	3	0.0	0.628	11.6	LOS B	7.8	54.7	0.39	0.75	46.4
Approach		938	0.0	0.628	6.0	LOS A	7.8	54.7	0.39	0.45	49.5
West: Tourist Park access											
10	L	26	0.0	0.175	19.0	LOS B	1.3	9.1	1.00	0.93	39.0
11	T	1	0.0	0.175	18.0	LOS B	1.3	9.1	1.00	0.93	39.1
12	R	26	0.0	0.175	23.7	LOS C	1.3	9.1	1.00	0.93	37.3
Approach		54	0.0	0.175	21.3	LOS C	1.3	9.1	1.00	0.93	38.1
All Vehicles		2337	0.0	0.823	14.1	LOS B	15.6	108.9	0.75	0.76	42.6

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

This modelling shows that based on the RTA criteria for intersection performance that a roundabout would operate satisfactorily up until at least 2021 with the additional development traffic.

6.6.3 Road Safety

The existing road network was inspected on 10/10/11 in terms of upgrading for road safety and it was observed that the main issue would be pedestrian and cyclist safety crossing from the proposed Tourist Park to the Surf Club.

The provision of at-grade pedestrian facilities on Budgewoi Road within the roundabout islands would assist pedestrians and cyclists crossing between the two facilities.

6.6.4 Alternate Transport Modes

To assist public transport at this location it is recommended that bus stops and shelters be installed on each leg of the approaches to the proposed intersection on Budgewoi Road.

Figure 16 - Red Bus Company Service Routes - The Lakes Tourist Park

The normal provision for cyclists would be incorporated into the roundabout design and there is additional off-road provision in the form of a sealed path on the west side of Budgewoi Road that passes through the proposed Tourist Park. Some upgrading of this path would be necessary as part of the Tourist Park development to bring it up to modern day standards.

6.7 Conclusions

- The existing local road network has sufficient spare capacity to cater for the proposed development with construction of a single lane roundabout on Budgewoi Road at the access to The Lakes Surf Club;
- Some remedial work will be necessary to the existing pedestrian/cycle path on the west side of Budgewoi Road to bring it up to modern day standard.

Costing

Item	Description	Conceptual Cost	Proportional
1	Construct single lane roundabout at the intersection with The Lakes Surf Club	$850,000	Shared based on traffic volumes
2	Remedial work to pedestrian/cycle path	$50,000	Full cost
	Total	$900,000	

7. RECOMMENDATIONS

These assessments of the likely traffic impacts of the proposed development sites are of a preliminary nature only but considered suitable for rezoning purposes. More detailed analysis would be required at development application stage when development concepts have been finalised. It would also be important to update traffic data collected in this analysis at development application stage particularly if there is a significant time delay to lodgement of the development applications.

Opinions in regard to likely requirements for road upgrading works have been based on Intersect's knowledge and experience in dealing with Council's in the Lower Hunter area for many years. At development application stage Council officers may have different opinions or Council standards may change from the time of this assessment. It is recommended that prior to lodging a DA preliminary meetings be held with relevant Council officers to clarify likely Council requirements.

Cost estimates provided have also been prepared using the best knowledge available to Intersect at the time of the assessment however Intersect's cost database for civil works is limited and it is recommended that the civil cost components in the estimates be reviewed by ADW Johnson's civil design officers.

JR Garry BE (Civil), Masters of Traffic
Director
Intersect Traffic Pty Ltd

RZ/12/2014

B. North Wyong Lands Conservation Strategy

PDA 2012

town planning and environmental consultants

maximising outcomes

North Wyong Lands Conservation Strategy

Prepared for:
Darkinjung LALC

Date:
October 2012

00009D_R2

www.pdaservices.com.au

PDA Services
1/142 Victoria Street
Taree NSW 2430

p | 0265501867
e | enquiry@pdaservices.com.au
abn 20885720929

property | development | assessment

Darkinjung Local Aboriginal Land Council

North Wyong Conservation Strategy

Prepared For:

Darkinjung Local Aboriginal Land Council

October 2012

00009D_R2.docx

www.pdaservices.com.au

p 02 6550 1867 | enquiry@pdaservices.com.au | 1/142 Victoria Street , PO Box 468 Taree NSW 2430 abn 20885720929

***Report Title*:**	**Darkinjung Local Aboriginal Land Council**
***Project Description*:**	**North Wyong Conservation Strategy**
***Client*:**	*Darkinjung Local Aboriginal Land Council*
***Report No.*:**	*00009D_R1*
Draft/Final:	Draft

PDA Services and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by the Darkinjung Local Aboriginal Land Council and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All maps and plans contained within this report are prepared for the exclusive use of Darkinjung Local Aboriginal Land Council to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

PDA Services accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

Prepared/Approved By:	*Tony Fish*
Position:	*Senior Environmental Planner*
Signed:	*A signed copy can be provided upon request*
Date:	19 October 2012

Document Distribution - 00009D_R1				
Version	**Copies**	**Format**	**Issued To**	**Date**
1	1	PDF	ADW Johnson	19/10/12

Table of Contents

Tables

Figures

Executive Summary

The Darkinjung Local Aboriginal Land Council (LALC)is located on the Central Coast of New South Wales. Covering an area of approximately 1,855km^2, its boundaries stretch from Catherine Hill Bay to the north, Hawkesbury River to the south, Pacific Ocean to the east and Watagan Mountains to the west.

Darkinjung LALC was created in 1984, under the provisions of the NSW Aboriginal Land Rights Act 1983 (ALRA). The Land Council is a community based organisation and is registered as a public benevolent institution.

A primary function of a Land Council is to acquire land and manage land. Acquisition generally occurs through the lodgement of a Land Claim over certain vacant Crown Land. Since inception, the Darkinjung LALC has been successful in securing a portfolio of approximately 6,000 hectares, with undetermined Land Claims over a further 9,000ha – making Darkinjung LALC the largest non-government landowner on the Coast. This land portfolio is expected to grow over the coming years as further claims are determined and is a similar situation with many other Land Council,.

In accordance with the ALRA, the Darkinjung LALC has prepared a Community Land and Business Plan 2012-2015 (Plan 2012-15) to reflect the needs of its members and the organisation's strategic priorities. These strategic priorities are to:

- Provide a foundation built on harmony, unity and respect through the development of programs and initiatives that enhances the social wellbeing and participation of the Darkinjung LALC community;
- Maintain, strengthen and celebrate our Culture, Heritage and Environment to sustain our identity for future generations;
- Continue to operate and function as a professional dynamic business built on respect, integrity, transparency and accountability; and
- Maintain economic sustainability through investments and management of current and future assets.

In response to the meeting the abovementioned relevant goals and strategies, Darkinjung LALC has recognised the need to establish a Darkinjung LALC Land Strategy. This Land Strategy would identify development opportunities and also conservation outcomes for Darkinjung owned land across the whole LALC area. The timing for the development of this Land Strategy is important as Darkinjung LALC moves from what has been largely a research and investigation phase (in relation to land matters), now transitioning into a development and delivery phase.

The preparation of this document also coincides with a number of legislative reviews including NSW planning reforms (e.g. "Green Paper"), Biobanking methodology, the protection and conservation of Aboriginal culture and heritage, Native Vegetation Act, Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999,. the NSW Aboriginal Land Rights Act, and local planning policies including the Central Coast Regional Strategy, North Wyong Shire Structure Plan and draft Wyong LEP 2012.

North Wyong Land Release Areas

In November 2010, the Department of Planning released the *Draft North Wyong Shire Structure Plan.* The release of this document prompted Darkinjung LALC to undertake urgent review of its land holdings within the Structure Plan area as most if it's holdings were identified within future conservation corridors. The

Darkinjung LALC review identified a number of parcels as having potential for future residential or employment uses.

These areas are:

- Bushells Ridge North and South (Employment land);
- Bushells Ridge East (Residential land);
- Railcorp/Link Road Employment Estate (Employment land);
- Lake Munmorah (Residential land);and
- Halekulani (Residential land).

In addition to the above development sites, Darkinjung LALC also identified significant conservation offset land, strategically located providing linkages north-south & east-west through North Wyong. It is noted that the Department's Draft Structure Plan, whilst referring to State significant clay resources in the Bushells Ridge area, does not identify this resource within the green corridors and linkages on the Draft Structure Plan map.

Darkinjung LALC provided a formal response to the Department's Draft Structure Plan in December 2010, outlining the future potential of the above development sites. This report provides further detail on the strategy for proposed conservation offset lands. .

A Conservation Strategy

Darkinjung LALC recognises that its role as a private land manager is important for habitat conservation and protecting threatened species and cultural heritage places.

This North Wyong Conservation Strategy forms part of the broader Darkinjung LALC Land Strategy as it relates to the proposed North Wyong Shire Land Release Areas.

The Conservation Strategy aims to outline the Darkinjung LALC's prepared approach to the future conservation and management of its lands that are to be retained for conservation purposes.

It is critical to the Conservation Strategy that the methodology for assessment of the Development sites and the Conservation sites be robust and accurate with regard to identifying the biodiversity values. The best available information/data will be used when assessing impacts of biodiversity loss and gains from offsets.

The Methodology for determining the adequacy of offset for development impacts has been developed through consideration of both Commonwealth and NSW Offsetting principles.

The conservation of Darkinjung lands will be carried out by the protection and management of land using such mechanisms as the Conservation Partners Program. This will require covenants to be provided on the lands to enable management of the lands for biodiversity improvement in accordance with Management Plans.

Lands identified for conservation are proposed to offset the biodiversity impacts on the development lands outlined above. The development lands and offset lands are shown in the attached **Proposed Offset Lands** figure. Also shown is the possible additional offset lands that may result from future successful land claims.

The ratio of offset to development lands for the Darkinjung owned sites is 1.3 to 1. The offset ratio could be improved if additional lands (subject to Land Claim and/or having significant mineral resources) are added at a later date. This report outlines the commitment of the Darkinjung LALC to conserving these important natural assets in the Wyong Shire.

As shown in the **Proposed Offset Lands** figure, the location of the conservation sites provide significant value to the enhancement of biodiversity corridors and linkages within the North Wyong locality and will contribute significantly to the retention and enhancement of biodiversity in the region.

Conservation Management

Darkinjung LALC has been successful in securing almost 6,000ha of former Crown land since 1983, with a further 9,000ha under Land Claim. This land, under Crown control, had little, if any, environmental management controls.

Since that time Darkinjung LALC has developed management programs, undertaken various forms of deterrent works, weed and pest management program's and revegetation works with a significant annual management budget. These measures have significantly 'improved' pre-existing environmental conditions under Crown control.

Much of the land being managed is located within 'strategic corridors' and forms (or can form) part of a broader conservation network, through the cooperation with other LALC's.

Site specific management plans will be prepared for the conservation sites. The plans will be based on management principles that will improve biodiversity values of the sites. The Management Plans will outline the extent of works for the sites and provide a program and budget estimates for the carrying out of such works.

Conclusion

Darkinjung LALC has significant holdings in the North Wyong Shire which it seeks to develop and conserve for the benefit of Aboriginal people and the broader community on the Central Coast. The development of some of these sites will help the LALC achieve the goals outlined in its Community Land and Business Plan 2012-2015 so as to ensure financial security and the delivery of long term sustainable outcomes for the community.

A significant point of difference between the Land Council and others in the development industry is that the Land Council already holds significant vegetated land, but requires the economic opportunity to provide sustainable management programs, whilst the development industry generally secures an economic site and then seeks to provide an environmental offset.

Darkinjung LALC recognises that a substantial proportion of its current (and possible future) land has significant biodiversity values and its conservation would greatly contribute to the retention and improvement of biodiversity and cultural heritage values in the Wyong Shire.

This Strategy has been prepared to outline the Darkinjung commitment to offsetting the impact of its future developments whilst retaining and managing such significant lands in perpetuity for the benefit of future generations.

The key to delivery of this Strategy is a conservation offset ratio that recognises the Function, Objectives and Goals of the Land Council and its position as a significant landowner across the region with the ability to deliver real outcomes.

Introduction

1.1 Background

The Darkinjung Local Aboriginal Land Council (LALC) is located on the Central Coast of New South Wales. Covering an area of approximately 1,855km^2, its boundaries stretch from Catherine Hill Bay to the north, Hawkesbury River to the south, Pacific Ocean to the east and Watagan Mountains to the west.

Darkinjung LALC was created in 1984, under the provisions of the NSW Aboriginal Land Rights Act 1983 (ALRA). The preamble to the ALRA states;

> *WHEREAS*:
>
> *(1) Land in the State of New South Wales was traditionally owned and occupied by Aborigines*:
>
> *(2) Land is of spiritual, social, cultural and economic importance to Aborigines*:
>
> *(3) It is fitting to acknowledge the importance which land has for Aborigines and the need of Aborigines for land*:
>
> *(4) It is accepted that as a result of past Government decisions the amount of land set aside for Aborigines has been progressively reduced without compensation*:

A primary function of a Land Council is to acquire land and manage land. Acquisition generally occurs through the lodgement of a Land Claim over certain vacant Crown Land.

Since inception, the Darkinjung LALC has been successful in securing a portfolio of approximately 6,000 hectares, with underdetermined Land Claims over a further 9,000ha – making Darkinjung LALC the largest non-government landowners on the Coast. This land portfolio is expected to grow over the coming years as further claims are determined. This is a similar situation with many other Land Councils.

Some of the land granted is “Legacy Land” – that is, former Crown land that has been previously used as landfill sites, quarries or generally left in a deteriorated state from the impacts of unauthorized dumping, vegetation removal for firewood, clearing for motorbike & 4WD tracks, uncontrolled weed growth etc . Now, as responsible land owners, Darkinjung LALC is responsible for site security, remediation and rehabilitation.

Darkinjung LALC has constantly focused on improving the health and wellbeing of the community. It achieves this objective by implementing policies and procedures through the operational functions of an Aboriginal Land Council, and in accordance with the NSW ALR Act.

The Darkinjung LALC is positioned within two Local Government Areas (LGA’s) these being Wyong Shire Council and Gosford City Council, with an estimated shared population of over 304,744 and an estimated shared Aboriginal population of over 9,000 (ABS Census 2011).

The geographical area of Darkinjung LALC has been gazetted by Parliament and is bounded by the Hawkesbury River in the South, the Pacific Ocean in the East, Lake Macquarie in the North and West to the Watagan Mountains. Darkinjung LALC shares its boundaries with neighbours Bahtabah LALC and Metropolitan LALC which were established around the traditional boundaries of the region.

The Darkinjung LALC region is rich in Aboriginal culture and heritage, largely due to the diverse landscapes ranging from vast coastal estuarine to mountainous peaks and fresh waterways. The Landscape is rich in resources of coal, sandstone, flora and fauna and as over 7000 thousand registered Aboriginal sites.

1.2 Current land management issues

It has been noted that some of the land granted is "Legacy Land" – that is, former Crown land that has been previously used as landfill sites, quarries or generally left in a deteriorated state from the impacts of unauthorized dumping, vegetation removal for firewood, clearing for motorbike & 4WD tracks, uncontrolled weed growth etc . Now, as responsible land owners, Darkinjung LALC is responsible for site security, remediation and rehabilitation.

Expenditure by Darkinjung LALC on land management activities continues to increase as land registers are updated – identifying those sites in need of immediate expenditure, by simply addition to the land portfolio and more concerning the increase in illegal dumping and other activities.

For the three years to June 2012, Darkinjung expenditure on land management activities totals approximately $300,000. Approximately $175,000 was spent within the period 2011-2012 alone. This expenditure is forecast to grow. Included in Appendix A is a recent extract from the local media highlighting this case.

Included in the figures to this report are some examples of current illegal dumping across the northern part of Wyong Shire and deterrent works by Darkinjung LALC. Included at Appendix A is a recent extract from the local media highlighting this problem.

1.3 Strategic Direction

The Darkinjung Local Aboriginal Land Council (Darkinjung LALC) has prepared a Community Land and Business Plan 2012-2015 (Plan 2012-15) to reflect the needs of its members and the organisation's strategic priorities.

These strategic priorities are to:

- Provide a foundation built on harmony, unity and respect through the development of programs and initiatives that enhances the social wellbeing and participation of the Darkinjung LALC community;
- Maintain, strengthen and celebrate our Culture, Heritage and Environment to sustain our identity for future generations;
- Continue to operate and function as a professional dynamic business built on respect, integrity, transparency and accountability; and
- Maintain economic sustainability through investments and management of current and future assets.

Darkinjung LALC follows a number of principles to help determine its decisions and actions. These principles are:

- Self Determination;
- Social and Restorative Justice;
- Equity and Equality;
- Accountability and Transparency;
- Advocacy; and

- Negotiated Partnership.

Darkinjung LALC is a lighthouse statutory authority that acknowledges and achieves its compliance obligations and is guided by the principles of Aboriginal self-determination and self-governance through the pursuit of social and restorative justice for Aboriginal people.

Darkinjung LALC has a land development program that will contribute funding to enable the achievement of its strategic priorities not only over the next three years of its current business plan, but also for generations to come.

1.4 Relevant Goals and Strategies

Plan 2012-15 outlines the goals and strategies that were considered to be of the highest priority for the Darkinjung community for the next three years.

The Plan 2012-15 identifies the need to establish a Land Strategy(page 23).

The relevant goals and strategies of Plan 2012-15 that provide a basis for establishing a Land Strategy are listed below.

Goal 2

To maintain, strengthen and celebrate our Culture, Heritage and Environment to sustain our identity for future generations.

Strategy 2.3

Maintain and regenerate land and sites within the Darkinjung LALC region.

Strategy 2.4

Continue to work in conjunction with all key stakeholders to provide preservation and protection of our Aboriginal Cultural Heritage sites and places including acquisition of Culturally significant land.

Goal 4

To maintain economic sustainability through investments and management of current and future assets.

Strategy 4.1

Negotiate and develop partnerships that enhance enterprise, employment, economic and social opportunities to ensure a sustainable future for Darkinjung LALC.

Strategy 4.2

Increase the economic base of the Darkinjung LALC through land claims and strategic acquisition, management and disposal strategies.

1.5 Land Strategy

In response to meeting the abovementioned relevant goals and strategies, Darkinjung LALC has recognised the need to establish a Darkinjung LALC Land Strategy. This land strategy would identify development opportunities and also conservation outcomes for Darkinjung owned land across the whole LALC area.

1.6 North Wyong Land Release Areas

Darkinjung LALC owned significant parcels of land in North Wyong that they have identified as having potential for future development. These areas are:

- **Bushells Ridge (North & South)**

  The Bushells Ridge site has an area of approximately 260ha and is currently zoned 4(e) Regional Industrial & Employment Development. Darkinjung LALC have lodged an application with the Department of Planning under the former Part 3A provisions. Director General Requirements (DGR's) outlining those matters requiring detailed investigations were issued in March 2011 and are currently being actioned.

  The initial concept plan lodged with the application detailed subdivision of the site into approximately 150 allotments for new employment uses. A refined plan now indicates approximately 100ha of developable land north of, and 92ha south of, a central conservation corridor of approximately 77ha, linking to other conservation lands in the locality.

  Bushells Ridge is well located, with frontage to the main north-south railway and close proximity to the F3 freeway. The site is also close to other major developments in the immediate area including the rezoning for 1,000 residential lots at Wyee (part of longer terms plans for an additional 2000 lots), proposed KORES (Wallarah No. 2) coal mine, and proposed RailCorp stabling yards. Part of the Part 3A site, and surrounds) may also contain State Significant clay deposits essential for the manufacture of roofing tiles.

- **Bushells Ridge East**

  The site has an area of approximately 43ha and is located at the southern entry to the existing Wyee Urban area. Land around Wyee has been identified for future growth, with 2,000 lots planned around the existing village over the next 25yrs.

  A concept subdivision for the subject land indicates a potential lot yield of approximately 400 lots, with adjacent land to be dedicated as conservation lands, connecting to other conservation lands in the locality.

- **Railcorp/ Link Road Employment Estate**

  This site has an area of approximately 38ha and is located adjacent to the main north-south railway and close proximity to the F3 freeway. Concept plans have been prepared detailing approximately 72 light industrial/employment lots. More recently RailCorp has approached Darkinjung LALC for the acquisition of approximately 11ha of the site for a train stabling yard and future administration building.

  The site has formed access via the Tooheys Road overpass, connecting the site to the Motorway Link Rd, then F3 Freeway. Rezoning of the site to industrial/employment lands is a logical and compatible use to the proposed adjacent train stabling yards.

- **Lake Munmorah**

  The site has a total area of approximately 163ha, with approximately 75ha identified as future residential potential. A concept plan has been prepared indicating a future lot yield of approximately 620 residential lots. The site is located adjacent to existing schools, and in close proximity to future retail and medical facilities, existing sporting and recreation facilities

  The site is located directly off the Pacific Highway, providing good access to transport facilities heading to higher order retail & service facilities located within Wyong Shire and the Lower Hunter;

  Development over part of the site will not compromise regional environmental corridors. Opportunity exits to secure long term, funded conservation/land management measures through the BioBanking Offset Scheme.

- **Halekulani**

  This site has an area of approximately 13.5ha. A development application has been lodged with Wyong Shire Council for a Manufactured Home Estate over this land, and is currently under assessment by Wyong Council.

1.7 Scope of this Report

This report constitutes the North Wyong Conservation Strategy. It outlines the proposed conservation measures to be implemented by Darkinjung LALC for offsetting the development of the lands stated above.

1.8 Timing

The current NSW Government was elected in March 2011. Since that time the new Government has been vigorous in its review of the many Acts,' Policies and Procedures (APP's) which impact on the performance of the State. Those APP's which affect directly or indirectly on the operations of the Land Council include, but not limited to, the following;

- NSW Planning reforms;
- Review of the Biobanking methodology;
- Review into the protection and conservation of Aboriginal culture and heritage;
- Native Vegetation Act reforms;
- Review of the NSW Aboriginal Land Rights Act (including the Land Claim process);

Other reviews also concurrently occurring include review of the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999 and more locally, planning policies including the Central Coast Regional Strategy, North Wyong Shire Structure Plan and draft Wyong LEP 2012.

In addition to the various reviews, the Government has developed State Plan *NSW 2021*. This Plan identifies and sets the goals and targets to be achieved over the next 10years that will ensure NSW becomes the Premier State.

Darkinjung LALC has reviewed NSW 2021 and though it's Community Land & Business Plan and Land Strategy will contribute to the attainment of not less than half of the Government's goals. This is demonstrated on the marked-up *NSW 2021* provided in the Appendix B.

The NSW State Government, through its Budget handed down in June 2012, recognised that much of the State's future growth, will result from confidence returning and investment into the construction industry. The Darkinjung Land Strategy will not only provide opportunity for the Land Council, but also for the broader community to participate in this growth that will drive the reviving economy.

The timing for the development of this Land Strategy is important not only for Darkinjung LALC as it moves from what has been largely a research and investigation phase (in relation to land matters), into a development and delivery phase, but also for this review to be considered and accepted and a time when many other key APP's are subject to review and the Government is seeking opportunities to deliver balanced and positive growth.

Conservation Strategy

2.1 Need for a Strategy

Conservation is a broad concept which involves scientific, ethical, moral, economic and political perspectives. Generally, conservation means the protection, preservation and careful management of natural resources.

Successful land conservation requires state agencies, local communities and individuals to adequately protect landscapes, wildlife habitat, cultural and historic sites and parks and recreational areas for present and future generations.

Darkinjung LALC recognises that its role as a private land manager is important for habitat conservation and protecting threatened species and cultural heritage places.

This North Wyong Conservation Strategy forms part of the broader Darkinjung LALC Land Strategy as it relates to the proposed North Wyong Land Release Areas.

The Conservation Strategy aims to outline the Darkinjung LALC's prepared approach to the future conservation and management of its lands that are to be retained for conservation purposes. It also justifies the impacts on biodiversity of other lands that are proposed to be developed as outlined in Section 1.5.

The strategy has been prepared following a review of:

- The New South Wales Aboriginal Land Council Biobanking and Development – A Guide for Local Aboriginal Land Councils;
- The New South Wales Aboriginal Land Council Information Sheet Sustainable Land Users – Conservation information sheet 8 (Appendix A);
- Information on the Office of Environment and Heritage website (www.environment.nsw.gov.au) on biodiversity certification;
- Information on the Office of Environment and Heritage website (www.environment.nsw.gov.au) on biobanking;
- The Biodiversity Certification Assessment Methodology (DECC February 2011);
- The Draft North Wyong Structure Plan; and
- Various assessments prepared for Darkinjung LALC that describe the ecological characteristics of those lands.

There is currently a review of offsetting requirements (Biobanking) being carried out in NSW and the Commonwealth are also reviewing their requirements. Darkinjung LALC recognises the need to implement a conservation strategy and also has specific requirements not currently catered for in the existing regulatory framework. Consequently this Strategy has been developed taking into account the principles for offsetting and sets an agenda for future management of conservation lands that will lead to an improved biodiversity outcome for the benefit of the whole community.

2.2 Biodiversity Offsets

2.2.1 What is a Biodiversity Offset?

Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with the biodiversity (BBOP 2012).

Biodiversity offsets counterbalance specific impacts of development on biodiversity. Offsets are undertaken away from the impact site and result in the legal protection of land and the implementation of management actions to remove threats.

2.2.2 Commonwealth Requirements

The draft EPBC Act Environmental Offsets Policy outlines the Australian Government's framework on the use of environmental offsets ('offsets') under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) including when they can be required, how they are determined and the framework under which they operate.

The policy will help to ensure that offsets deliver high-quality conservation outcomes for matters protected under the EPBC Act. The Government recognises that there are different ways to achieve good conservation outcomes and provide more flexibility in delivering those outcomes. For example, the enduring protection and management of important habitat for a threatened species can be achieved through the declaration of a national park, or through conservation land management by farmers, for whom this is a business opportunity, or Indigenous Rangers.

The draft policy identifies that suitable offsets must:

- deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed development;
- be efficient, effective, transparent, proportionate, scientifically robust and reasonable;
- be built around direct offsets but may include indirect offsets;
- be of a size and scale proportionate to the impacts being offset;
- be in proportion to the level of statutory protection that applies to the affected species or community;
- effectively manage the risks of the offset not succeeding; and
- have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

Offsets can help to achieve long-term conservation outcomes for matters protected under the EPBC Act, while providing flexibility for proponents seeking to undertake an action that will have unavoidable environmental impacts. Offsets are not intended to make proposals with unacceptable impacts acceptable. They simply provide an additional tool that can be used during project design and the Environmental Impact Assessment process.

Offsets must deliver an overall conservation outcome that *improves or maintains* the viability of the aspect of the environment that is protected by national environment law and affected by the proposed development. Offsets must:

- Contribute to the ongoing viability of the impacted protected matter, and
- Be improved or maintained as compared to before the action occurred.

When the matter protected is the whole of the environment (nuclear actions, proposals involving the Commonwealth and actions that affect Commonwealth areas), offsets must be targeted to the aspect of the environment that is being impacted.

An improved conservation outcome may be achieved by:

- revegetating environmentally degraded land;
- rehabilitating habitat that is in poor condition; or
- protecting habitat that is already in a good condition.

These types of direct offsets must improve the environmental value of the land through conservation management actions and securing the land on title in an enduring way for conservation. An *improved overall conservation outcome* is not achieved by an offset that simply increases the amount of habitat or ecological community that is *protected* by covenant or other mechanism. Protection must be matched by management of the protected matter that is impacted.

An appropriate offsets package is to consider:

- the scale and intensity of the impacts of the proposed action, including direct and indirect impacts;
- the maturity and health of relevant vegetation communities impacted by the proposed action;
- the composition and presence of relevant species impacted by the proposed action;
- the importance of the impacted site in context, whether of the landscape or of other values relevant to the matter protected. This would include factors such as the value the site may have in providing habitat important in allowing species to adapt to climate change;
- achieving the greatest long-term conservation gains. Wherever possible this would be in the context of a 'like-for-like' approach, which requires offsets to target the specific environmental value being impacted by the proposed action (for example, a particular type of foraging habitat for a threatened species);
- the approach of the relevant state or territory, with a view to complementing and building upon that approach; and
- the level of certainty that the offset will deliver the conservation gain said to be achievable. In the case of uncertainty, such as using a previously untested conservation technique, a greater variety and/or quantity of offsets may be required to minimise risk.

2.2.3 NSW Requirements

Offsetting is recognised in NSW as a practical tool for decision makers who balance the relative environmental, social and economic merits of development proposals. Formal offset arrangements in NSW are a feature of:

- developments under the EP&A Act using the Biobanking Scheme;
- land use planning under the EP&A Act using biodiversity certification; and.
- native vegetation regulation under the Native Vegetation Act 2003.

These regulatory schemes use a range of mechanisms to secure offsets including biobanking agreements, biodiversity certification agreements and property vegetation plans. Offsets are calculated using an assessment methodology which quantifies the impacts and determines the offset required. These outcomes must meet the improve, or maintain standard.

Biodiversity offsets are also commonly required for State Significant Developments under the EP&A Act. Offsets are secured under the mechanisms mentioned above as well as conservation agreements under the National Parks and Wildlife Act 1974 and planning agreements under the EP&A Act. The improve or maintain standard is not mandatory for these proposals. The Department of Planning and Infrastructure makes decisions on State Significant Developments by considering a range of social, economic and environmental factors (based on the advice of OEH). The BioBanking Assessment Methodology is increasingly being used by proponents and OEH to inform these decisions.

Biodiversity offsets may also be negotiated between a proponent and the consent authority, via a Voluntary Planning Agreement (VPA).

The NSW Office of Environment and Heritage provides the following principles as a useful framework for considering environmental impacts and developing offset proposals. The principles do not apply where legislation defines requirements for biodiversity offsets, as listed above.

1. Impacts must be avoided first by using prevention and mitigation measures.

Offsets are then used to address remaining impacts. This may include modifying the proposal to avoid an area of biodiversity value or putting in place measures to prevent offsite impacts.

2. All regulatory requirements must be met.

Offsets cannot be used to satisfy approvals or assessments under other legislation, e.g. assessment requirements for Aboriginal heritage sites, pollution or other environmental impacts (unless specifically provided for by legislation or additional approvals).

3. Offsets must never reward ongoing poor performance.

Offset schemes should not encourage landholders to deliberately degrade or mismanage offset areas in order to increase the value from the offset.

4. Offsets will complement other government programs.

A range of tools is required to achieve the NSW Government's conservation objectives, including the establishment and management of new national parks, nature reserves, state conservation areas and regional parks and incentives for private landholders.

5. Offsets must be underpinned by sound ecological principles.

They must:

- include the consideration of structure, function and compositional elements of biodiversity, including threatened species;
- enhance biodiversity at a range of scales;
- consider the conservation status of ecological communities; and
- ensure the long-term viability and functionality of biodiversity.

Biodiversity management actions, such as enhancement of existing habitat and securing and managing land of conservation value for biodiversity, can be suitable offsets. Reconstruction of ecological communities involves high risks and uncertainties for biodiversity outcomes and is generally less preferable than other management strategies, such as enhancing existing habitat.

6. Offsets should aim to result in a net improvement in biodiversity over time.

Enhancement of biodiversity in offset areas should be equal to or greater than the loss in biodiversity from the impact site.

Setting aside areas for biodiversity conservation without additional management or increased security is generally not sufficient to offset against the loss of biodiversity. Factors to consider include protection of existing biodiversity (removal of threats), time-lag effects, and the uncertainties and risks associated with actions such as revegetation.

Offsets may include enhancing habitat, reconstructing habitat in strategic areas to link areas of conservation value, or increasing buffer zones around areas of conservation value and removal of threats by conservation agreements or reservation.

7. Offsets must be enduring - they must offset the impact of the development for the period that the impact occurs.

As impacts on biodiversity are likely to be permanent, the offset should also be permanent and secured by a conservation agreement or reservation and management for biodiversity. Where land is donated to a public authority or a private conservation organisation and managed as a biodiversity offset, it should be accompanied by resources for its management. Offsetting should only proceed if an appropriate legal mechanism or instrument is used to secure the required actions.

8. Offsets should be agreed prior to the impact occurring.

Offsets should minimise ecological risks from time-lags. The feasibility and in-principle agreements to the necessary offset actions should be demonstrated prior to the approval of the impact. Legal commitments to the offset actions should be entered into prior to the commencement of works under approval.

9. Offsets must be quantifiable - the impacts and benefits must be reliably estimated.

Offsets should be based on quantitative assessment of the loss in biodiversity from the clearing or other development and the gain in biodiversity from the offset. The methodology must be based on the best available science, be reliable and used for calculating both the loss from the development and the gain from the offset. The methodology should include:

- the area of impact;
- the types of ecological communities and habitat/species affected;
- connectivity with other areas of habitat/corridors;
- the condition of habitat;
- the conservation status and/or scarcity/rarity of ecological communities;
- management actions;
- level of security afforded to the offset site;
- the best available information/data should be used when assessing impacts of biodiversity loss and gains from offsets. Offsets will be of greater value where:
    - they protect land with high conservation significance;
    - management actions have greater benefits for biodiversity;
    - the offset areas are not isolated or fragmented;
    - the management for biodiversity is in perpetuity (e.g. secured through a conservation agreement); and
    - Management actions must be deliverable and enforceable.

10. Offsets must be targeted.

They must offset impacts on the basis of like-for-like or better conservation outcome. Offsets should be targeted according to biodiversity priorities in the area, based on the conservation status of the ecological community, the presence of threatened species or their habitat, connectivity and the potential to enhance condition by management actions and the removal of threats. Only ecological communities that are equal or greater in conservation status to the type of ecological community lost can be used for offsets. One type of environmental benefit cannot be traded for another: for example, biodiversity offsets may also result in improvements in water quality or salinity but these benefits do not reduce the biodiversity offset requirements.

11. Offsets must be located appropriately.

Wherever possible, offsets should be located in areas that have the same or similar ecological characteristics as the area affected by the development.

12. Offsets must be supplementary.

They must be beyond existing requirements and not already funded under another scheme. Areas that have received incentive funds cannot be used for offsets. Existing protected areas on private land cannot be used for offsets unless additional security or management actions are implemented. Areas already managed by the government, such as national parks, flora reserves and public open space cannot be used as offsets.

13. Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract.

Offsets must be audited to ensure that the actions have been carried out, and monitored to determine that the actions are leading to positive biodiversity outcomes

2.3 Conservation Options

In preparing the North Wyong Conservation Strategy, the Darkinjung LALC has considered the regulatory and non – regulatory options available in developing the Conservation Strategy. The four primary options are:

- BioBanking (regulatory);
- Biocertification (regulatory);
- Conservation Partners Program (regulatory); and
- Gifting (non-regulatory).

Each of these options is described and discussed further below.

2.3.1 BioBanking

BioBanking is a regulated voluntary market-based scheme that provides a simplified biodiversity assessment process for development and an opportunity for rural landowners to generate income by managing land for conservation. The management of land is in perpetuity (forever).

BioBanking enables 'biodiversity credits' to be generated by landowners who commit to enhancing and protecting biodiversity on their land through a BioBanking agreement. The credits can then be sold, generating funds for the management of the site. Credits can be used by the purchaser to offset the impacts on biodiversity that are likely to occur as a result of development elsewhere. The credits generated by a landowner can also be sold to those seeking to invest in conservation outcomes, including philanthropic organisations and government.

The money generated from the sale of the credits is paid to the landowner as both profit and as a source of income to maintain and improve the biodiversity present on their land.

A BioBanking agreement only recognises the existence of known Aboriginal objects and/or Aboriginal places. It does not provide for the protection of Aboriginal objects or Aboriginal places. The protection of Aboriginal objects and Aboriginal places is dealt with by the National Parks and Wildlife Act 1974.

The number of credits provided at a Biobank site is determined through application of the Biobanking Assessment Methodology.

In considering the use of BioBanking in the Conservation Strategy, it has been identified that the Scheme:

- is development/conservation outcome orientated, not strategy focussed;
- Is market driven, no affinity with LALC model as there is no desire to sell biodiversity credits into the open market;
- Has a detailed methodology that leads to costly process;
- Requires funds for management to held by government. This is undesirable to the Darkinjung LALC;
- Is not flexible to allow inclusion of new lands (development or conservation); and
- Can create a significant ongoing management liability.

The NSW Office of Environment and Heritage has recently issued a discussion paper on Biobanking, with the period for public submissions closing July 2012. The purpose of this review is to seek public comment on the effectiveness of the current framework and consider suggestions for improvements to the system.

2.3.2 Bio Certification

Biodiversity certification is a regulated scheme that offers planning authorities a streamlined biodiversity assessment process for areas marked for development at the strategic planning stage, along with a range of secure options for offsetting impacts on biodiversity. It identifies areas of high conservation value at a landscape scale, and protects them, as well as identifying areas suitable for development.

Biodiversity certification delivers better environmental outcomes from urban development, at lower cost. By ensuring that conservation issues are considered early in the planning process, new urban areas will 'improve or maintain' biodiversity values. This means that areas of high conservation value are identified and protected, and, that any clearing or loss of other habitat is offset.

Where certification is conferred for development areas, it 'switches off' the requirement for Development Applications to address biodiversity issues.

Currently, each Development Application requires assessment of impacts on biodiversity and threatened species. This adds to the cost of every subdivision, every housing development, and every infrastructure project.

Environmentally sensitive areas could be identified and avoided up-front, impacts on less sensitive areas could be offset, and it would reduce development costs. The scale and type of all offsets will be agreed at the time the biodiversity certification proposal is approved and they will be secured as the development proceeds.

Biodiversity Certification provides greater certainty for landowners and developers, and reduces the time and cost of environmental assessment. It also delivers regional conservation priorities – protecting and connecting significant areas, delivering a network of conservation lands that are viable for the long term.

Biodiversity Certification must be supported by use of the Biodiversity Certification Assessment Methodology.

In considering the use of Biocertification in the Conservation Strategy, it has been identified that the Scheme:

- Is only available only to planning authorities;

- Is an untested process for a Land Strategy proposed by Darkinjung LALC;
- Has a detailed methodology that leads to costly process;
- Is not flexible to allow inclusion of new lands (development or conservation); and
- Does not consider cultural heritage values.

2.3.3 Conservation Partners Program

The Conservation Partners Program (CPP) is run by the Office of Environment and Heritage (OEH) and supports Aboriginal landholders in voluntarily protecting and managing native vegetation, wildlife habitat, geological features, historic heritage and Aboriginal cultural heritage on their properties. These long-term legal commitments are entered into voluntarily and complement the public National Park and reserve system. Landholders can choose from three protection options which recognise and formalise their commitment to conservation on their properties.

The CPP provides ongoing support to landowners who commit all or part of their properties for conservation. Technical advice begins with the application process and is continued through to developing management schemes and managing activities. Ongoing monitoring and support includes networking and training opportunities provided to landowners locally and routine property visits.

Land managers have the chance to increase their knowledge and ability to monitor changes on the property. They also have a chance to discuss management strategies with other land managers and learn from their experiences.

In considering the use of Offsetting using the CPP in the Conservation Strategy, it has been identified that the Program:

- Includes three (3) different options for land managers in being able to conserve and manage their land;
- Is recognised by law to provide appropriate legal protection of the land for conservation and require management of that land for conservation purposes; and
- Ensures the management of land for conservation purposes in perpetuity.

2.3.4 Gifting

In certain circumstances the National Parks and Wildlife Service may support the gifting of land to the National Reserve System. This is a particular opportunity of strategic advantage exists to include the land such as expansion of an existing reserve area or linking reserve areas.

In considering the use of Gifting in the Conservation Strategy, it has been identified that the Gifting:

- May result in access to lands being denied to Darkinjung people.

Strategy Framework

3.1 Methodology

More detail to be provided in Final Report.

It is critical to the Conservation Strategy that the methodology for assessment of the Development sites and the Conservation sites be robust and accurate with regard to identifying the biodiversity values. The best available information/data will be used when assessing impacts of biodiversity loss and gains from offsets.

An overview of the methodology used in determining the biodiversity impacts on the development sites is provided below:

Development Sites

- Determine the area of impact;
- Describe the key biodiversity components affected;
- Describes the developments impact on biodiversity (including direct, indirect, and cumulative impacts as appropriate), including on the key biodiversity components identified.
- Describe the impacts on the intrinsic, socio-economic and cultural values of biodiversity;
- Assess the types of ecological communities and habitat/species affected;
- Determine the condition of habitat;
- Determine the conservation status and/or scarcity/rarity of ecological communities;
- Describe the measure for avoidance of impacts, including those taken to avoid impacts and risks to highly irreplaceable and/or vulnerable biodiversity;
- Describe the measures for minimisation of impacts;
- Describe the measures for rehabilitation/restoration; and
- Identify any on site mitigation measures that would be implemented.

Conservation Sites

- Determine the area of site;
- Assess the types of ecological communities and habitat/species affected;
- Identify connectivity with other areas of habitat/corridors;
- Determine the condition of habitat;
- Determine the conservation status and/or scarcity/rarity of ecological communities;

- Outline the future management actions; and
- Outline level of security afforded to the offset site.

3.2 Development Site Impacts

A summary of the biodiversity impacts on the development sites in **Table 3.1** below. The proposed development sites are shown in **Figure Proposed Offset Lands.**

Detailed plans of the biodiversity values of each of the development sites are provided at **Appendix C.**

Table 3.1 - Biodiversity Impacts on Development Sites

Biometric Vegetation Community	EEC	DEVELOPMENT LANDS						
		Bushells Ridge North	Bushells Ridge South	Bushells Ridge East	Halekulani	Munmorah	Railcorp	Total
Banksia dry shrubland on coastal sands of the North Coast								**0.00**
Blackbutt - Smooth-barked Apple shrubby open forest on coastal sands of the southern North Coast							0.07	**0.07**
Coast Banksia - Coast Wattle dune scrub, Sydney Basin and South East Corner								**0.00**
Coastal floodplain sedgelands, rushlands, and forblands of the North Coast						0.63		**0.63**
Fern-leaved Banksia - Melaleuca sieberi Wallum Heath								**0.00**
Melaleuca nodosa closed shrubland on alluvium of the Central Coast, Sydney Basin								**0.00**
Melaleuca sieberi - Tall Saw-sedge closed shrubland in drainage lines on the Central Coast, Sydney Basin		1.43	0.26	2.16		0.08	1.44	**5.37**
Paperbark heath on indurated sands at Norah Head on the Central Coast, Sydney Basin								**0.00**
Paperbark swamp forest of the coastal lowlands of the North Coast and Sydney Basin								**0.00**

Table 3.1 - Biodiversity Impacts on Development Sites

Biometric Vegetation Community	EEC	DEVELOPMENT LANDS						
		Bushells Ridge North	Bushells Ridge South	Bushells Ridge East	Halekulani	Munmorah	Railcorp	Total
Scribbly Gum - Red Bloodwood heathy woodland on the coastal plains of the Central Coast, Sydney Basin		97.30	76.41	41.09	13.25	57.15	42.12	**327.32**
Smooth-barked Apple - Red Bloodwood open forest on coastal plains on the Central Coast, Sydney Basin			11.87					**11.87**
Swamp Mahogany swamp forest on coastal lowlands of the North Coast and northern Sydney Basin	Yes							**0.00**
Sydney Peppermint - Smooth-barked Apple shrubby open forest on coastal hills and plains of the southern North Coast and northern Sydney Basin								**0.00**
Undetermined		1.98	3.25					**5.23**
Total		**100.71**	**91.79**	**43.25**	**13.25**	**57.86**	**43.63**	**350.49**
Acacia bynoeana		18	2				7	**27**
Angophora inopina		3,135	2,244	13,677	1		60	**19,117**
Cryptostylis hunteriana		1						**1**
Tetratheca juncea		80	16	8		42	87	**233**
Wallum Froglet		3	1					**4**

3.3 Conservation Site Values

A summary of the biodiversity values of the conservation sites is provided in **Table 3.2** below. The proposed conservation sites are shown in **Figure Proposed Offset Lands.**

Detailed plans of the biodiversity values of each of the conservation sites are provided at **Appendix C.**

Table 3.2 - Biodiversity Values of Conservation Sites

Biometric Vegetation Community	EEC	Offset Lands									
		1	2	4	5	6	7	8	9	10	Total
Banksia dry shrubland on coastal sands of the North Coast											**0.00**
Blackbutt - Smooth-barked Apple shrubby open forest on coastal sands of the southern North Coast		1.76		15.28							**17.04**
Coast Banksia - Coast Wattle dune scrub, Sydney Basin and South East Corner											**0.00**
Coastal floodplain sedgelands, rushlands, and forblands of the North Coast								3.66			**3.66**
Fern-leaved Banksia - Melaleuca sieberi Wallum Heath											**0.00**
Melaleuca nodosa closed shrubland on alluvium of the Central Coast, Sydney Basin		2.83		29.02							**31.85**
Melaleuca sieberi - Tall Saw-sedge closed shrubland in drainage lines on the Central Coast, Sydney Basin			2.72		1.81	1.98	15.22		15.85	0.12	**37.70**
Paperbark heath on indurated sands at Norah Head on the Central Coast, Sydney Basin											**0.00**

Table 3.2 - Biodiversity Values of Conservation Sites

Biometric Vegetation Community	EEC	Offset Lands									
		1	2	4	5	6	7	8	9	10	Total
Paperbark swamp forest of the coastal lowlands of the North Coast and Sydney Basin											**0.00**
Scribbly Gum - Red Bloodwood heathy woodland on the coastal plains of the Central Coast, Sydney Basin		11.82	36.21	28.94	62.10	15.42	73.48	10.03	46.96	34.00	**318.96**
Smooth-barked Apple - Red Bloodwood open forest on coastal plains on the Central Coast, Sydney Basin		53.20		1.40	0.65						**55.25**
Spotted Gum - Grey Ironbark open forest on the foothills of the Central Coast, Sydney Basin		0.77									**0.77**
Swamp Mahogany swamp forest on coastal lowlands of the North Coast and northern Sydney Basin	Yes									1.39	**1.39**
Sydney Peppermint - Smooth-barked Apple shrubby open forest on coastal hills and plains of the southern North Coast and northern Sydney Basin											**0.00**
Grand Total		**70.38**	**38.93**	**74.64**	**64.56**	**17.40**	**88.70**	**13.69**	**62.81**	**35.51**	**466.62**

Table 3.2 - Biodiversity Values of Conservation Sites

Biometric Vegetation Community	EEC	Offset Lands									
		1	2	4	5	6	7	8	9	10	Total
Callistemon linearifolius				8							**8**
Angophora inopina		249	870	393	1,024	6,573	2,650				**11,759**
Eucalyptus parammattensis				439							**439**
Tetratheca juncea		138			1					6	**145**
Wallum Froglet		10			4				1		**15**

Strategy Detail

4.1 Overview

The conservation of Darkinjung lands will be carried out by using the following conservation options:

- Protection and management of land using the Conservation Partners Program, liked to a Voluntary Planning Agreement or other approved mechanism as part of any application seeking development outcomes.

Lands identified for conservation are proposed to offset the biodiversity impacts on the development lands outlined in Section 1.5.

All of the conservation sites are located within areas of habitat corridors or habitat linkages as shown on Map 4 of the Draft North Wyong Shire Structure Plan. The location of these sites on the Draft Structure Plan is shown on **Figure Proposed Offset Lands**.

4.2 Biodiversity Improvements

4.2.1 Overall

The conservation lands comprise 8 vegetation communities totalling an area of 466.62 hectares. One of these communities is an Endangered Ecological Community (EEC) being Swamp Mahogany swamp forest on coastal lowlands of the North Coast and northern Sydney Basin.

All of the conservation lands are located in areas identified as habitat corridor or habitat linkage as identified in the North Wyong Shire Structure Plan. These lands will contribute significantly to biodiversity values of adjoining vegetated areas by providing land managed for corridor and linkage purposes, including linkages to vegetated lands owned by the Bahtabah LALC to the north of the shire. In particular strengthening of the north –south vegetation corridors within the shire will be achieved.

The location of the overall offset sites and reference numbers and detailed biodiversity site plans are shown in **Appendix A.**

4.2.2 Offset Lands 2 and 4

These offset sites are located to the west of Lake Munmorah. These sites provide the following advantage to biodiversity in the region:

- Substantial parcel of land in an area identified as being within an area with green corridors and linkages with external linkages being considered (North Wyong Structure Plan, 2010)
- High biodiversity values
- Significant east west linkage in a coastal location
- Significant north - south linkage in a coastal location

4.2.3 Offsets Sites 5, 6 and 7

These offset sites are located in the Bushell's ridge area adjacent to identified future employment lands. These sites provide the following advantages to biodiversity in the region:

- Provides corridor linkage to Bahtabah lands to the north
- Substantial parcel of land in an area identified as being constrained and subject to further investigation and offset strategies (North Wyong Structure Plan, 2010)
- High biodiversity values
- Significant east west linkage

4.2.4 Offset Sites 8, 9 and 10

These offset sites are located to the north of Lake Munmorah adjacent to identified future residential lands. These sites provide the following advantages to biodiversity in the region:

- Provides a substantiative corridor linkage to between Lake Macquarie State Recreation Area and Munmorah State Conservation Area
- Substantial parcel of land in an area identified as being within an area with green corridors and linkages with external linkages being considered (North Wyong Structure Plan, 2010)
- High biodiversity values
- Significant east west linkage in a coastal location
- Includes 1.39 ha of conservation of an EEC

4.3 Compliance with Offsetting Principles

The proposed North Wyong Conservation Strategy complies with both the Commonwealth and NSW offsetting principles as shown in **Table 4.1** and **Table 4.2.**

Table 4.1 - Compliance with Commonwealth Offsetting Principles

	Principle	Compliance
1	Impacts must be avoided first by using prevention and mitigation measures deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed development.	Development proposals for the development sites have taken into account the opportunity to avoid impacts on biodiversity. Clearing has been limited as much as possible to one vegetation community that can be readily offset in the region.
2	Be efficient, effective, transparent, proportionate, scientifically robust and reasonable.	The conservation sites have been identified through a transparent process. They are owned by the Darkinjung LALC. The sites provide suitable offsets for the impacts from the proposed developments and provide reasonable offset for those impacts. This report provides the robust scientific information to support the offsets package.
3	Be built around direct offsets but may include indirect offsets.	The conservation sites provide direct offsets.
4	Be of a size and scale proportionate to the impacts being offset.	The conservation sites have a total area in excess of the amount of clearing on the development sites.
5	Be in proportion to the level of statutory protection that applies to the affected species or community.	The vegetation communities and threatened species on the conservation sites have the same level statutory protection as the development sites. In addition an Endangered Ecological Community will be protected.
6	Effectively manage the risks of the offset not succeeding.	Management plans will be established to ensure that the conservation sites will succeed in continuing to provide biodiversity value in the region.

Table 4.1 - Compliance with Commonwealth Offsetting Principles

	Principle	Compliance
7	Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	Governance arrangements are described in Sections 5.3 – 5.5. These arrangements will ensure that success of management of the sites is measured, monitored, audited and reported.

Table 4.2 - Compliance with NSW Offsetting Principles

	Principle	Compliance
1	Impacts must be avoided first by using prevention and mitigation measures.	The lands to be set aside for conservation purposes are recognised as having high biodiversity values. For development site areas of high biodiversity value will be avoided where appropriate.
2	All regulatory requirements must be met.	Whilst some conservation lands will be recognised as having cultural heritage values, the Conservation Strategy is based upon offsetting biodiversity impacts on development sites. The protection of cultural heritage is a supplementary advantage of conserving the sites. All regulatory requirements required for the development areas will be met through the relevant development approval process.
3	Offsets must never reward ongoing poor performance.	Darkinjung LALC has not record of poor performance in developing land or managing conservation lands. They are committed to long term management of the conservation sites.
4	Offsets will complement other government programs.	Government programs have been considered in the development of this Conservation Strategy.

Table 4.2 - Compliance with NSW Offsetting Principles

	Principle	Compliance
5	Offsets must be underpinned by sound ecological principles.	Sound ecological principles underpin the Conservation Strategy and have been incorporated in the methodology for assessing the biodiversity values of the conservation sites.
6	Offsets should aim to result in a net improvement in biodiversity over time.	The Conservation Strategy will achieve an initial net improvement in biodiversity and an increasing improvement in biodiversity over time through the implementation of effective management of conservation sites over time.
7	Offsets must be enduring - they must offset the impact of the development for the period that the impact occurs.	The Conservation Strategy will utilise legal mechanisms and instruments to secure the ownership and ongoing management of the conservation sites. Voluntary Conservation agreements would be established over the sites of gifting of the land to the State.
8	Offsets should be agreed prior to the impact occurring.	The Conservation Strategy will be reviewed every three (3) years. This review will enable the inclusion of additional development and conversation lands that may be acquired and included for development or conservation in the North Wyong Structure Plan.
9	Offsets must be quantifiable - the impacts and benefits must be reliably estimated.	The Conservation Strategy has quantified the impacts on biodiversity and the benefits that will result from the offsets.
10	Offsets must be targeted.	The conservation sites have been targeted and assessed due to their contribution to biodiversity improvement in the Wyong area.
11	Offsets must be located appropriately.	The conservation sites are generally located in areas that have the same or similar ecological characteristics as the area affected by the proposed developments.
12	Offsets must be supplementary.	The offsets will not include any areas funded under any other schemes. The lands will all be freehold title and owned, and managed, by the Darkinjung Local Aboriginal Land Council.

Table 4.2 - Compliance with NSW Offsetting Principles

	Principle	Compliance
13	Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract.	An auditing program will be developed to ensure management actions are carried out.

Management Commitments

5.1 Management Commitments

Darkinjung LALC has been successful in securing almost 6000ha of former Crown land since 1983. This land, under Crown control, had little, if any, environmental management controls.

Since that time Darkinjung LALC has developed management program, undertaken various forms of deterrent works, weed and pest management program's and revegetation works with a significant annual management budget. These measures have significantly 'improved' pre-existing environmental conditions under Crown control.

Much of the land being managed is located with 'strategic corridors' and forms (or can form) part of a broader conservation network, through the cooperation with other LALC's.

The conservation sites will be managed along with the other lands under the control of the Darkinjung LALC.

5.2 Management Principles

Darkinjung LALC will adopt the following management principles to guide development of the Management Plans for the conservation sites.

Weed Control

- *Principle 1*: To be undertaken by qualified bush regenerator
- *Principle 2*: To target species listed in the management plan
- *Principle 3*: To target any new weed species identified
- *Principle 4*: To be ongoing and not limited to a particular time frame
- *Principle 5*: To include slashing and burning to reduce weed biomass

Assisted Regeneration

- *Principle 1*: To be undertaken by qualified bush regenerator
- *Principle 2*: To us locally sourced native trees
- *Principle 3*: To be undertaken in areas outlined in the management plan
- *Principle 4*: To be continually monitored

Fire Management

- *Principle 1*: To be undertaken in conjunction with the RFS and comply with relevant guidelines
- *Principle 2*: To be developed to suit the vegetation communities
- *Principle 3*: To be developed to consider the protected and threatened species of the site and aid in their long term conservation
- *Principle 4*: To try and prevent intentionally lit fires starting outside of the prescribed burning periods

Feral Animal Control

- *Principle 1*: To coordinate feral animal control with other landholders adjoining a particular site
- *Principle 2*: To be undertaken by licensed shooter and trappers
- *Principle 3*: To be developed to suit any threatened species occurring at a site and aid in their long term conservation

Endangered Species Management

- *Principle 1*: Threatened species occurring at a site will be considered when undertaking or developing any management actions
- *Principle 2*: Management of Threatened species should be concurrent with any specific policies, recovery plans or existing management objectives for that species
- *Principle 3*: Endangered species management will be based on sound science and best practice guidelines
- *Principle 4*: Endangered species protection will be monitored

Manage Human Disturbance

- *Principle 1*: To identify causes of human disturbance to sites (eg. dumping of rubbish) and develop strategies to minimize such disturbance
- *Principle 2*: To provide an education program for the community as a tool for reducing human disturbance

Access

- *Principle 1*: To outline site access arrangements and protocols
- *Principle 2*: To consider fauna movement in the construction of fencing

5.3 Management Plans

Site specific management plans will be prepared for the conservation sites. The plans will be based on the principles outlines in **Section 5.1**.

The Management Plans will outline the extent of works for the sites and provide a program and budget estimates for the carrying out of such works.

5.4 Management

Darkinjung LALC will set up a management structure that will be responsible for the management of the conservations sites or alternatively outsource this responsibility to an external qualified company, or individual.

The management structure will be responsible for allocating the funds and coordinating the carrying out of works for each of the conservation sites.

At the end of each the management entity will prepare a report that outlines the works completed to during that year and evaluate against the requirements of the management plans. Where appropriate the management plans will be amended to reflect any changes to management requirements during that particular year.

5.5 Management Funding

Darkinjung LALC will provide a lump sum in a trust fund that will generate funds for the carrying out of management actions for the sites.

The management entity will be responsible for reporting on the trust fund capacity every twelve months to continue management of the sites in accordance with the management plans for the next five years.

5.6 Management Auditing and Reporting

Once the yearly management report is provided, Darkinjung LALC will engage an independent firm to audit the report and provide verification that the management process is being followed and outcomes achieved. This report will be provided to the Office of Environment and Heritage and Wyong Council annually.

Conclusion

6.1 Conclusion

Darkinjung LALC has significant holdings in the North Wyong Shire that it aspires to develop for the benefit of Aboriginal people and the broader community on the Central Coast. Such development will help the LALC achieve the goals outlined in its Community Land and Business Plan 2012-2015 so as to ensure financial security and the delivery of long term sustainable outcomes for the community.

Darkinjung LALC also recognises that a substantial proportion of its current and future lands has significant biodiversity values and its conservation would greatly contribute to the retention and improvement of biodiversity and cultural heritage values in the Wyong Shire. This Strategy has been prepared to outline the Darkinjung commitment to offsetting the impact of its future developments whilst retaining and managing such significant lands in perpetuity for the benefit of future generations.

The ratio of offset to development lands for the Darkinjung owned sites is 1.3 to 1. The offset ratio could be improved if additional lands are added at a later date. This report outlines the commitment of the Darkinjung LALC to conserving these important natural assets in the Wyong Shire.

The key to delivery of this Strategy is a conservation offset ratio that recognises the Function, Objectives and Goals of the Land Council and its position as a significant landowner across the region with the ability to deliver real outcomes.

References

www.environment.nsw.gov.au/biocertification

www.environment.nsw.gov.au/biobanking

Australian Government (2011) EPBC Act Environmental Offsets Policy – Consultation Draft

Business and Biodiversity Offsets Programme (BBOP) 2012 Standard on Biodiversity Offsets

Business and Biodiversity Offsets Programme (BBOP) 2012 *Resource Paper*: *No Net Loss and Loss-Gain Calculations in Biodiversity Offsets.*
Business and Biodiversity Offsets Programme (BBOP) 2009 *Biodiversity Offset Design Handbook*.

Business and Biodiversity Offsets Programme (BBOP) 2012 Guidance Notes to the Standard on Biodiversity Offsets.

Darkinjung Local Aboriginal Land Council (2012) 2012-2015 Community Land and Business Plan

DECCW (2010) - Transcript - Biodiversity Certification Video.

Gosford City Council (2008) Biodiversity Strategy

NSW Aboriginal Land Council (September 2011) - Biobanking and Development – A Guide for Local Aboriginal Land Councils

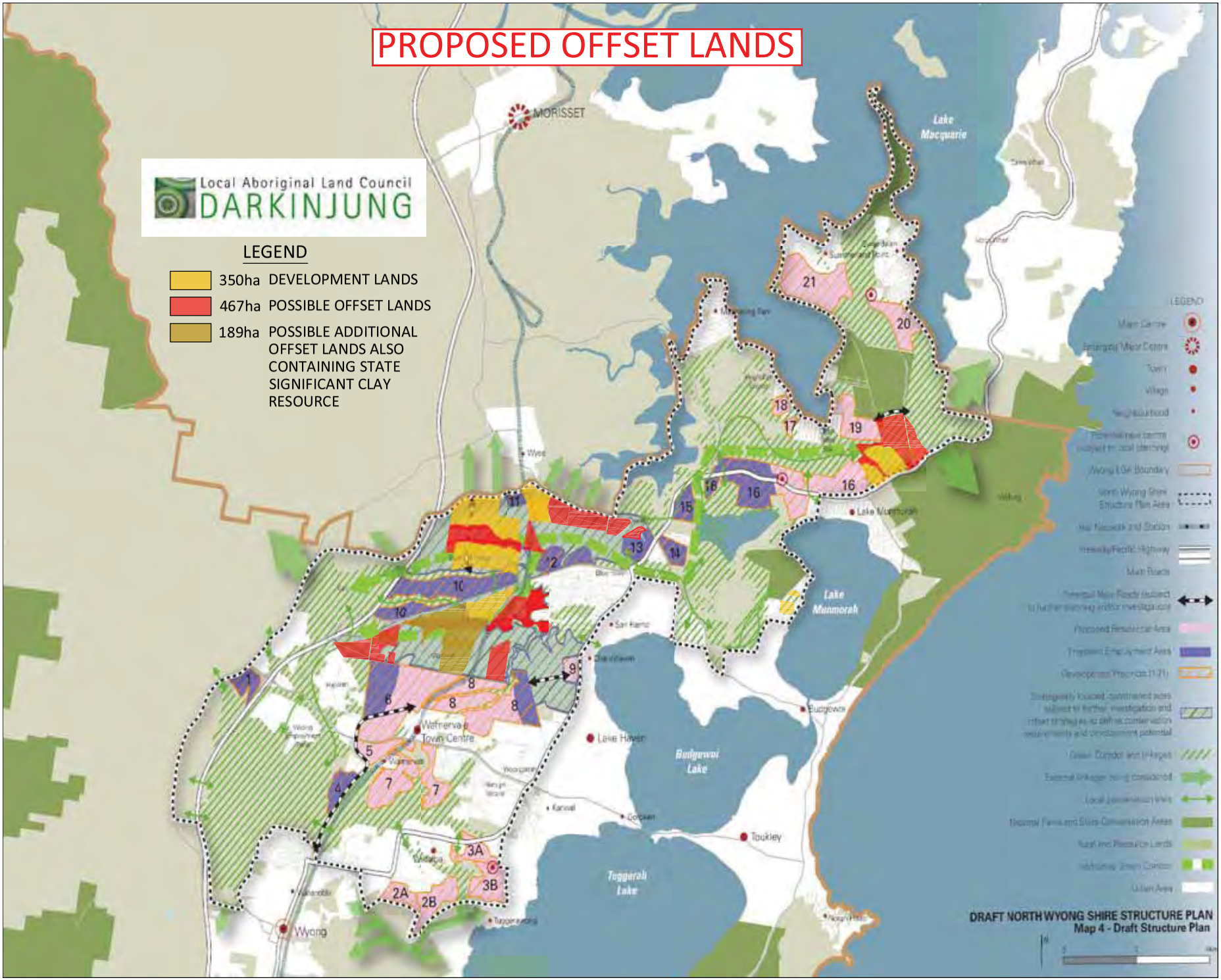
NSW Aboriginal Land Council Information Sheet (2011)Sustainable Land Uses Conservation information sheet 8

NSW Government (2006) Central Coast Regional Strategy

Wyong City Council (2010) Draft North Wyong Shire Structure Plan

Wyong Shire Council State of the Environment Report

Figures


PROPOSED OFFSET LANDS
Local Aboriginal Land Council
DARKINJUNG
LEGEND
350ha DEVELOPMENT LANDS
467ha POSSIBLE OFFSET LANDS
189ha POSSIBLE ADDITIONAL OFFSET LANDS ALSO CONTAINING STATE SIGNIFICANT CLAY RESOURCE
MORISSET
Lake Macquarie
Lake Munmorah
Budgewoi Lake
Tuggerah Lake
Wyong
Lake Haven
Toukley
Watanobbi Town Centre
DRAFT NORTH WYONG SHIRE STRUCTURE PLAN
Map 4 - Draft Structure Plan

North Wyong Region Management of Darkinjung LALC Lands – Illegal Dumping

North Wyong Region Management of Darkinjung LALC Lands – Illegal Dumping

North Wyong Region Management of Darkinjung LALC Lands – Deterrence Works

North Wyong Region Management of Darkinjung LALC Lands – Deterrence Works

Appendix A

ILLEGAL DUMPERS ARTICLE

CC Express 19-10-12

Illegal dumpers targeted

DARKINJUNG FIGHT TO SAVE BUSHLAND

Errol Smith

ILLEGAL dumping is causing millions of dollars worth of damage to Aboriginal-owned land in Wyong Shire.

Dumped material includes asbestos, concrete waste, building rubble, plastic and domestic waste.

The situation has become so serious that Darkinjung Aboriginal Land Council has formulated a multi-level plan to keep offenders out.

Targeting high-traffic illegal dump sites, they intend to erect high wire fences and gates equipped with security cameras.

Police and Wyong Council have also been approached to support their actions and increase patrols.

"We have to do something," Darkinjung ALC operating manager Suzanne Naden said. "It's a problem that is getting out of hand."

Darkinjung is the largest landowner in Wyong Shire.

Ms Naden said the land council didn't want to appear heavy-handed and was anxious to educate the community about the problems illegal dumping caused.

It has secured a grant under the Environment Protection Authority's clean-up and deterrence program and will start work as soon as possible.

"Our simple aim is to reduce the problem of illegal dumping, with a focus on deterring individuals," Ms Naden said. "We have forged a strong partnership with Wyong Shire Council."

Suzanne Naden is concerned about illegal dumping on Darkinjung land in the Wyee area.

Picture: WAIDE MAGUIRE

COUNCIL'S RESPONSE

WYONG Council's contract and project manager David Witherdin said illegal dumping was a major issue throughout the shire and the council appreciated any attempt by organisations to take positive steps to clean up their land.

Mr Witherdin said illegal dumping could result in on-the-spot fines and possible conviction in a court of law.

Appendix B

NSW 2021 GOALS

Darkinjung LALC's *Strategic Land Management Plan* supports at least half of the 32 stated NSW 2021 goals

NSW 2021
A PLAN TO MAKE NSW NUMBER ONE

NSW GOVERNMENT

NSW 2021
32 GOALS

REBUILD THE ECONOMY

1. Improve the performance of the NSW economy
2. Rebuild State finances
3. Drive economic growth in regional NSW
4. Increase the competitiveness of doing business in NSW
5. Place downward pressure on the cost of living
6. Strengthen the NSW skill base

RETURN QUALITY SERVICES

TRANSPORT
7. Reduce travel times
8. Grow patronage on public transport by making it a more attractive choice
9. Improve customer experience with transport services
10. Improve road safety

HEALTH
11. Keep people healthy and out of hospital
12. Provide world class clinical services with timely access and effective infrastructure

FAMILY & COMMUNITY SERVICES
13. Better protect the most vulnerable members of our community and break the cycle of disadvantage
14. Increase opportunities for people with a disability by providing supports that meet their individual needs and realise their potential

EDUCATION
15. Improve education and learning outcomes for all students

POLICE & JUSTICE
16. Prevent and reduce the level of crime
17. Prevent and reduce the level of re-offending
18. Improve community confidence in the justice system

RENOVATE INFRASTRUCTURE

19. Invest in critical infrastructure
20. Build liveable centres
21. Secure potable water supplies

STRENGTHEN OUR LOCAL ENVIRONMENT AND COMMUNITIES

22. Protect our natural environment
23. Increase opportunities for people to look after their own neighbourhoods and environments
24. Make it easier for people to be involved in their communities
25. Increase opportunities for seniors in NSW to fully participate in community life
26. Fostering opportunity and partnership with Aboriginal people
27. Enhance cultural, creative, sporting and recreation opportunities
28. Ensure NSW is ready to deal with major emergencies and natural disasters

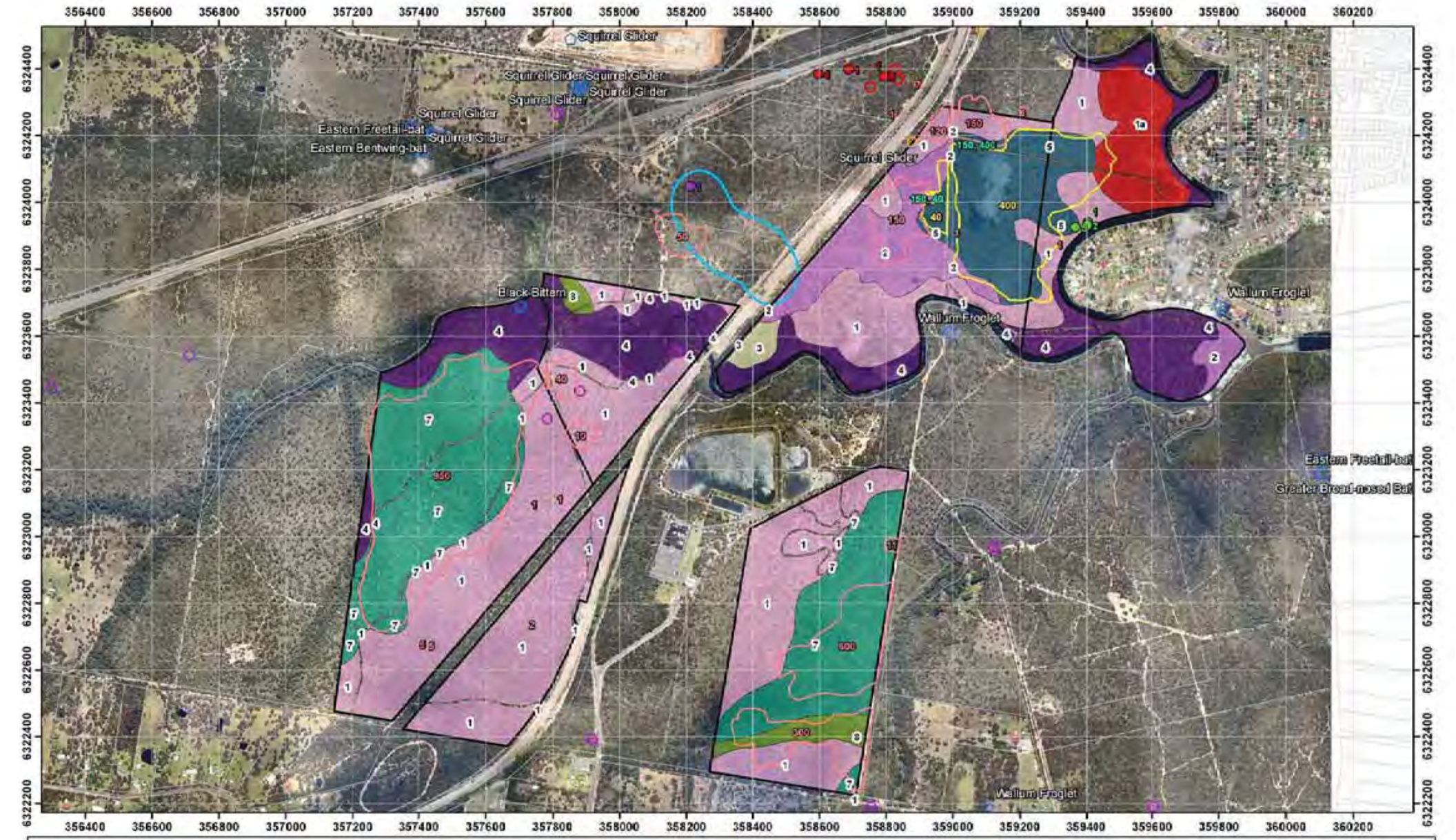
RESTORE ACCOUNTABILITY TO GOVERNMENT

29. Restore confidence and integrity in the planning system
30. Restore trust in State and Local Government as a service provider
31. Improve government transparency by increasing access to government information
32. Involve the community in decision making on government policy, services and projects

Local Aboriginal Land Council
DARKINJUNG

Appendix C

SITE PLANS SHOWING BIODIVERSITY VALUES



Legend

- Possible Offset Lands
- Cadastre
- 200m Riparian Corridor

Threatened Fauna
- (unconfirmed)

Threatened Fauna (confirmed)
- Wallum Froglet

Threatened Flora (unconfirmed)
- Acacia bynoeana
- Angophora inopina
- Tetratheca juncea

Threatened Flora (confirmed) Individual Nos labelled
- Acacia bynoeana
- Angophora inopina
- Callistemon linearifolius
- Cryptostylis hunteriana
- Grevillea parviflora
- Tetratheca juncea

- Angophora inopina
- Eucalyptus parammattensis
- Angophora inopina, Eucalyptus parammattensis overlap

Vegetation Zone

1, 10, 11, 12, 13, 14, 15, 17, 1a, 1b, 1c, 1d, 1e, 2, 3, 3a, 3b, 3c, 4, 5, 7, 7a, 8, 9

0 100 200 400 Metres

Datum/Projection: GDA 1994 MGA Zone 56

OL4-9

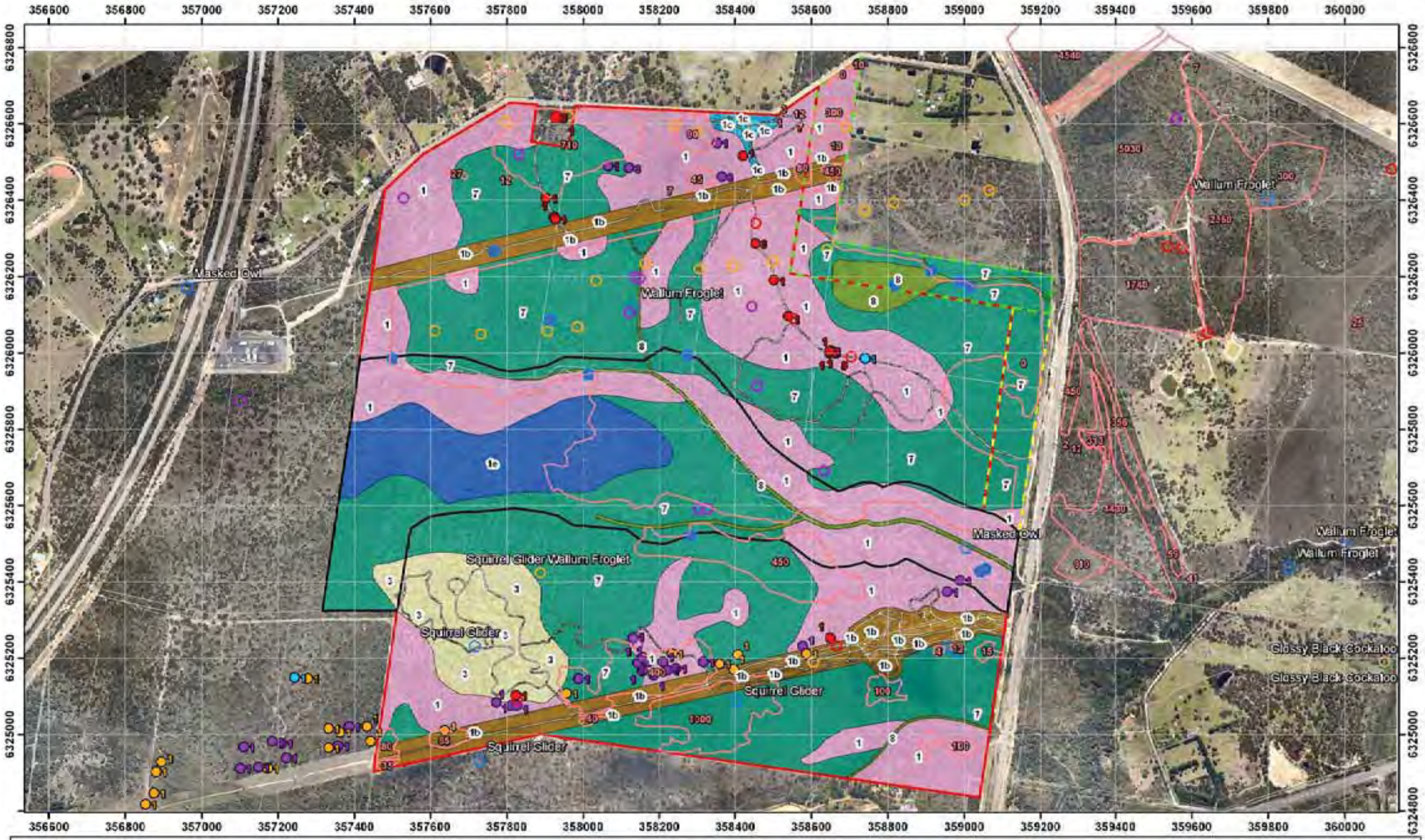
Data Sources: NearMap

nearmap.com

N

eco logical AUSTRALIA

www.ecoaus.com.au



Legend

- Possible Offset Lands
- Cadastre

Development Footprint

- Conservation
- Development
- Possible Future Rail

Threatened Fauna

- (unconfirmed)

Threatened Fauna (confirmed)

- Wallum Froglet

Threatened Flora (unconfirmed)

- Acacia bynoeana
- Angophora inopina
- Tetratheca juncea

Threatened Flora (confirmed) Individual Nos labelled

- Acacia bynoeana
- Angophora inopina
- Callistemon linearifolius
- Cryptostylis hunteriana
- Grevillea parviflora
- Tetratheca juncea

- Angophora inopina
- Eucalyptus parammattensis
- Angophora inopina, Eucalyptus parammattensis overlap

Vegetation Zone

1, 10, 11, 12, 13, 14, 15, 17, 1a, 1b, 1c, 1d, 1e, 2, 3, 3a, 3b, 3c, 4, 5, 7, 7a, 8, 9

0 100 200 400 Metres

Datum/Projection: GDA 1994 MGA Zone 56

OL10

Data Sources: NearMap

nearmap.com

N

eco logical AUSTRALIA www.ecoaus.com.au

Legend

- Possible Offset Lands
- Cadastre

Threatened Fauna
- (unconfirmed)

Threatened Fauna (confirmed)
- Wallum Froglet

Threatened Flora (unconfirmed)
- Acacia bynoeana
- Angophora inopina
- Tetratheca juncea

Threatened Flora (confirmed) Individual Nos labelled
- Acacia bynoeana
- Angophora inopina
- Callistemon linearifolius
- Cryptostylis hunteriana
- Grevillea parviflora
- Tetratheca juncea

- Angophora inopina
- Eucalyptus parammattensis
- Angophora inopina, Eucalyptus parammattensis overlap

Vegetation Zone

1, 10, 11, 12, 13, 14, 15, 17, 1a, 1b, 1c, 1d, 1e, 2, 3, 3a, 3b, 3c, 4, 5, 7, 7a, 8, 9

0 50 100 200
Metres

Datum/Projection:
GDA 1994 MGA Zone 56

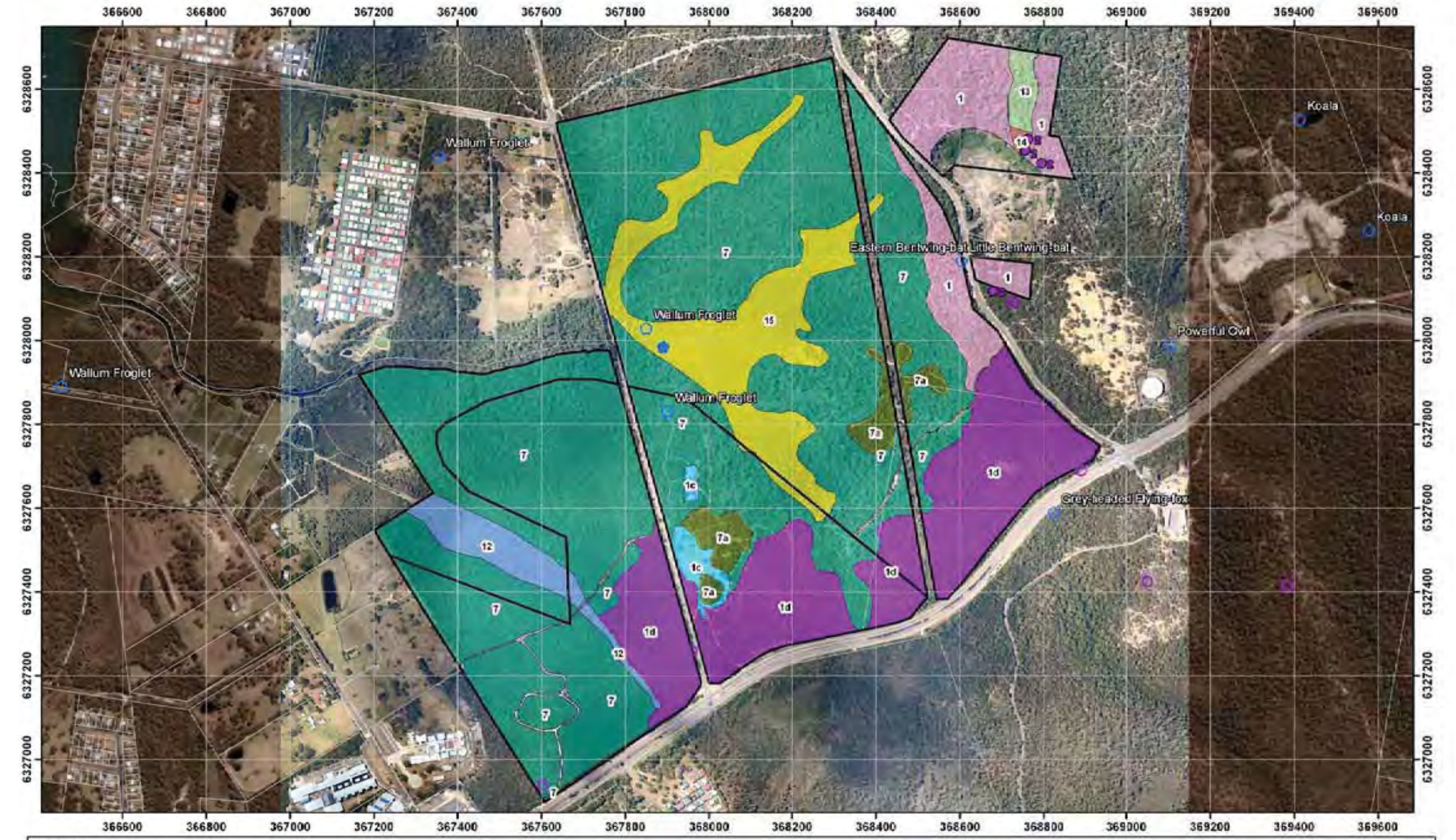
OL11-15

Data Sources:
NearMap

nearmap.com

N

eco logical AUSTRALIA
www.ecoaus.com.au



Legend

- Possible Offset Lands
- Cadastre

Threatened Fauna
- (unconfirmed)

Threatened Fauna (confirmed)
- Wallum Froglet

Threatened Flora (unconfirmed)
- Acacia bynoeana
- Angophora inopina
- Tetratheca juncea

Threatened Flora (confirmed) Individual Nos labelled
- Acacia bynoeana
- Angophora inopina
- Callistemon linearifolius
- Cryptostylis hunteriana
- Grevillea parviflora
- Tetratheca juncea

- Angophora inopina
- Eucalyptus parammattensis
- Angophora inopina, Eucalyptus parammattensis overlap

Vegetation Zone

1, 10, 11, 12, 13, 14, 15, 17, 1a, 1b, 1c, 1d, 1e, 2, 3, 3a, 3b, 3c, 4, 5, 7, 7a, 8, 9

OL16-22

0 50 100 200 Metres

Datum/Projection: GDA 1994 MGA Zone 56

Data Sources: NearMap

nearmap.com

N

eco logical AUSTRALIA www.ecoaus.com.au

Legend

Possible Offset Lands
Cadastre

Threatened Fauna
(unconfirmed)

Threatened Fauna (confirmed)
Wallum Froglet

Threatened Flora (unconfirmed)
Acacia bynoeana
Angophora inopina
Tetratheca juncea

Threatened Flora (confirmed) Individual Nos labelled
Acacia bynoeana
Angophora inopina
Callistemon linearifolius
Cryptostylis hunteriana
Grevillea parviflora
Tetratheca juncea

Angophora inopina
Eucalyptus parammattensis
Angophora inopina, Eucalyptus parammattensis overlap

Vegetation Zone

1	15	2	7		
10	17	3	7a		
11	1a	3a	8		
12	1b	3b	9		
13	1c	3c			
14	1d	4			
	1e	5			

0 40 80 160
Metres
Datum/Projection:
GDA 1994 MGA Zone 55

OL1-3

Data Sources:
NearMap

nearmap.com

N

eco logical AUSTRALIA
www.ecoaus.com.au