ATTACHMENTS

Ordinary Meeting of Council

Tuesday 25 June 2019

6.00pm

City of Albany Council Chambers

TABLE OF CONTENTS

Attachment	Report No.	Description	Page No.
		Corporate and Community Services	
	CCS158	Financial Activity Statement-April 2019	1
	CCS159	List of Accounts for Payment – May 2019	9
	CCS160	Delegated Authority Reports	27
	CCS161	Rating Subsidy-Sporting and Community Organisation Recipient List for 2018-19	39
	CCS162	National Anzac Centre 2019 Exhibition Refresh-Confidential	41
		Development and Infrastructure Committee	
	DIS164	Local Planning Scheme Amendment No. 35-Lot 5780 Down Road South, Drome – this document in only available here:Agenda Minutes	56
	DIS165	Local Structure Plan No. 10-Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley-this document is only available here: Agenda Minutes	687
	DIS166	Intelligent Community Forum Report	1023
	DIS167	Draft Kalgan Rural Village Cost Apportionment Schedule Policy	1024
	DIS168	Planning and Building Reports-May 2019	1057

CITY OF ALBANY

MONTHLY FINANCIAL REPORT

(Containing the Statement of Financial Activity)

FOR THE PERIOD ENDED 30 APRIL 2019

LOCAL GOVERNMENT ACT 1995
LOCAL GOVERNMENT (FINANCIAL MANAGEMENT) REGULATIONS 1996

TABLE OF CONTENTS

Compliation Report

Statement of Financial Activity by Nature or Type

Note 1 Explanation of Material Variances

Note 2 Net Current Funding Position

Note 3 Cash Investments

Note 4 Receivables

Note 5 Capital Acquisitions

CITY OF ALBANY
COMPILATION REPORT
FOR THE PERIOD ENDED 30 APRIL 2019

Report Purpose
This report is prepared to meet the requirements of Local Government (Financial Management) Regulations 1996, Regulation 34.

Overview
No matters of significance are noted.

Statement of Financial Activity by reporting nature or type
Shows a surplus for the period ended 30 April 2019 of $14,040,847.

Note: The Statements and accompanying notes are prepared based on all transactions recorded at the time of preparation and may vary.

Preparation

Prepared by: S. Van Nierop
Financial Accountant

Reviewed by: D. Olde
Manager Finance

Date prepared: 14-May-2019

CITY OF ALBANY
STATEMENT OF FINANCIAL ACTIVITY
BY NATURE OR TYPE
FOR THE PERIOD ENDED 30 APRIL 2019

	Ref Note	Original Annual Budget	Revised Annual Budget	YTD Budget (a)	YTD Actual (b)	Var. $ (b)-(a)	Var. % (b)-(a)/(a)	Var.
		$	$	$	$	$	%	
Operating Revenues								
Rate Revenue		36,852,574	37,016,574	36,870,351	**36,868,631**	(1,720)	(0%)	
Grants & Subsidies		3,563,024	3,978,350	3,128,311	**3,047,873**	(80,438)	(3%)	
Contributions, Donations & Reimbursements		565,422	800,894	747,964	**1,103,487**	355,523	48%	▲
Profit on Asset Disposal		23,215	23,215	19,340	**4,268**	(15,072)	(78%)	
Fees and Charges		17,687,974	17,828,198	15,882,638	**16,617,527**	734,889	5%	▲
Interest Earnings		1,159,285	1,184,285	1,104,641	**1,204,622**	99,981	9%	
Other Revenue		314,860	220,860	205,715	**422,182**	216,467	105%	▲
		60,166,354	**61,052,376**	**57,958,960**	**59,268,588**			
Operating Expenses								
Employee Costs		(26,979,860)	(27,097,463)	(22,027,761)	**(21,304,852)**	722,908	3%	▼
Materials and Contracts		(18,388,877)	(19,277,378)	(15,176,850)	**(14,421,129)**	755,721	5%	▼
Utilities Charges		(1,893,062)	(2,023,062)	(1,557,261)	**(1,490,802)**	66,459	4%	
Depreciation (Non-Current Assets)		(17,343,216)	(15,757,994)	(13,125,233)	**(13,033,536)**	91,697	1%	
Interest Expenses		(751,576)	(751,576)	(418,987)	**(409,978)**	9,009	2%	
Insurance Expenses		(684,149)	(684,149)	(646,255)	**(675,131)**	(28,876)	(4%)	
Loss on Asset Disposal		(450,392)	(450,392)	(246,719)	**(163,954)**	82,765	34%	
Other Expenditure		(2,477,609)	(2,477,609)	(1,981,419)	**(1,840,356)**	141,063	7%	▼
Less: Allocated to Infrastructure		676,129	676,129	573,917	**1,141,858**	567,941	(99%)	▼
		(68,292,612)	**(67,843,494)**	**(54,606,567)**	**(52,197,879)**			
Contributions for the Development of Assets								
Grants & Subsidies		14,586,366	15,415,940	8,171,463	**7,502,415**	(669,048)	(8%)	▼
Contributions, Donations & Reimbursements		520,000	711,449	172,557	**616,005**	443,448	(257%)	▲
		15,106,366	**16,127,389**	**8,344,020**	**8,118,420**			
Net Operating Result		**6,980,108**	**9,336,271**	**11,696,413**	**15,189,129**			
Funding Balance Adjustment								
Add Back Depreciation		17,343,216	15,757,994	13,125,233	**13,033,536**	(91,697)	(1%)	
Adjust (Profit)/Loss on Asset Disposal		427,177	427,177	227,379	**159,686**	(67,693)	(30%)	
Adjust (Profit)/Loss on Value of Investments		0	0	0	**(26,654)**	(26,654)	-	
Movement From Current to Non-Current		0	0	0	**0**	0		
Add back Carrying Value of Investment Land		0	0	0	**0**	0		
Funds Demanded From Operations		**24,750,501**	**25,521,442**	**25,049,025**	**28,355,696**			
Capital Revenues								
Proceeds from Disposal of Assets		903,650	903,650	595,625	**340,985**	(254,640)	(43%)	▼
		903,650	**903,650**	**595,625**	**340,985**			
Acquisition of Fixed Assets								
Land and Buildings	5	(7,536,125)	(9,160,475)	(5,947,977)	**(3,071,278)**	2,876,699	48%	▼
Plant and Equipment	5	(3,244,935)	(2,853,189)	(1,973,170)	**(979,149)**	994,021	50%	▼
Furniture and Equipment	5	(707,900)	(757,900)	(624,680)	**(402,502)**	222,178	36%	▼
Infrastructure Assets - Roads	5	(6,007,199)	(5,753,525)	(5,408,413)	**(4,974,948)**	433,465	8%	▼
Infrastructure Assets - Other	5	(18,796,188)	(18,677,727)	(11,392,890)	**(6,361,620)**	5,031,270	44%	▼
		(36,292,347)	**(37,202,816)**	**(25,347,130)**	**(15,789,497)**			
Financing/Borrowing								
Debt Redemption		(2,230,544)	(2,230,544)	(1,329,274)	**(1,366,354)**	(37,079)	(3%)	
Loan Drawn Down		4,300,000	4,300,000	0	**0**	0		
Profit on Sale of Investments		0	0	0	**0**	0		
Self-Supporting Loan Principal		12,504	12,504	10,420	**12,504**	2,084	(20%)	
Self Supporting Loan Issued		0	0	0	**0**	0		
		2,081,960	**2,081,960**	**(1,318,854)**	**(1,353,850)**			
Demand for Resources		**(8,556,236)**	**(8,695,764)**	**(1,021,334)**	**11,553,334**			
Restricted Funding Movements								
Opening Funding Surplus(Deficit)		2,921,457	2,484,574	2,484,574	**2,487,512**	2,938	0%	
Restricted Cash Utilised - Loan		0	0	0	**0**	0		
Transfer to Reserves		(12,859,671)	(12,859,671)	0	**0**	0		
Transfer from Reserves		18,494,450	19,070,861	0	**0**	0		
		8,556,236	**8,695,764**	**2,484,574**	**2,487,512**			
Closing Funding Surplus/(Deficit)		**0**	**0**	**1,463,240**	**14,040,847**			

CITY OF ALBANY
NOTES TO THE STATEMENT OF FINANCIAL ACTIVITY
FOR THE PERIOD ENDED 30 APRIL 2019

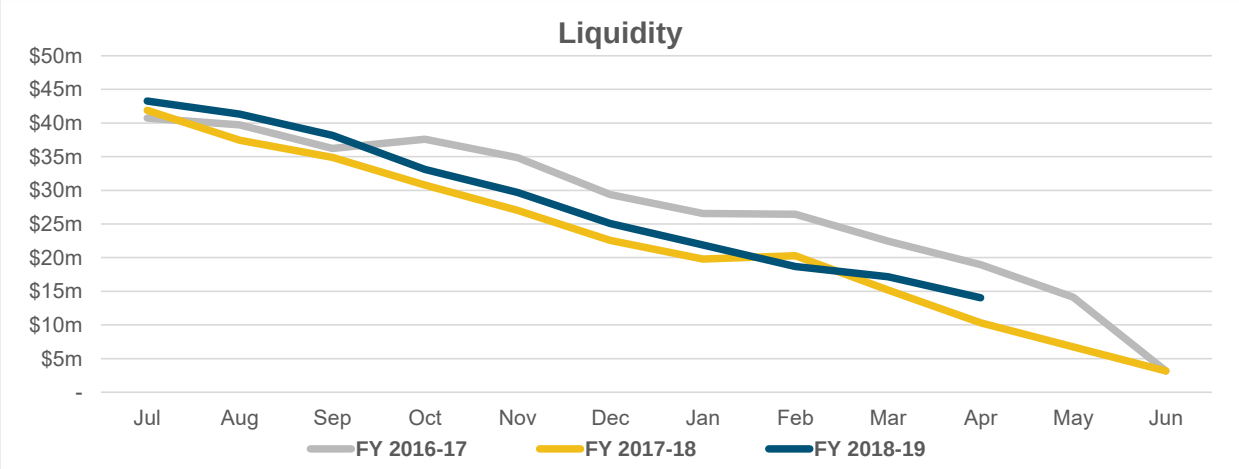
NOTE 1
EXPLANATION OF MATERIAL VARIANCES TO YTD BUDGET IN EXCESS OF $100,000

	Var. $	Var. %	Var.	Timing/ Permanent	Explanation of Variance
	$	%			
Operating Revenues					
Rate Revenue	(1,720)	0%			No material variance.
Grants & Subsidies	(80,438)	(3%)			No material variance.
Contributions, Donations & Reimbursements	355,523	48%	▲	Permanent	One-off unbudgeted grant funding received from the Department of Veterans Affairs for the Armistice Centenary - $228k
Profit on Asset Disposal	(15,072)	(78%)			No material variance.
Fees and Charges	734,889	5%	▲	Timing	Primarily a result of greater than anticipated revenue from the National ANZAC Centre (Field of Light driven) and refuse fees
Interest Earnings	99,981	9%			No material variance.
Other Revenue	216,467	105%	▲	Permanent	Primarily a result of revenue from Main Roads for Intersection Works and Dept of Transport contribution to Emu Point Marina Water Main Upgrade
Operating Expenses					
Employee Costs	722,908	3%	▼	Timing	No one significant variance in any one team. Generally timing delays in hiring replacement staff after resignations, once advertising, interviews and placement is concluded.
Materials and Contracts	755,721	5%	▼	Timing	A number of smaller variances under $10 000 in many areas across the City. No one single significant variance.
Utilities Charges	66,459	4%			No material variance.
Depreciation (Non-Current Assets)	91,697	1%			No material variance.
Interest Expenses	9,009	2%			No material variance.
Insurance Expenses	(28,876)	(4%)			No material variance.
Loss on Asset Disposal	82,765	34%			No material variance.
Other Expenditure	141,063	7%	▼	Timing	Less than expected YTD spend on Community Financial Assistance and Recreational Subsidy - Sport 4 All Kidsport Program
Less: Allocated to Infrastructure	567,941	(99%)	▼	Timing	Costs initially captured as operating costs allocated to capital work projects.
Contributions for the Development of Assets					
Grants & Subsidies	(669,048)	(8%)	▼	Timing	Timing of payment of grants.
Contributions, Donations & Reimbursements	443,448	(257%)	▲	Permanent	Unbudgeted Parks & Reserves Capital Grants, and Future Years Works Contributions
Funding Balance Adjustment					
Add Back Depreciation	(91,697)	(1%)			No material variance.
Adjust (Profit)/Loss on Asset Disposal	(67,693)	(30%)			No material variance.
Adjust (Profit)/Loss on Value of Investments	(26,654)	-			No material variance.
Movement From Current to Non-Current	0				No material variance.
Add back Carrying Value of Investment Land	0				No material variance.
Capital Revenues					
Proceeds from Disposal of Assets	(254,640)	(43%)	▼	Timing	Timing of asset purchase program
Acquisition of Fixed Assets					
Land and Buildings	2,876,699	48%	▼	Timing	Primarily timing of budget to actuals: Large variances to YTD budget include Down Rd land purchase, renewal of fitout at the library, and toilets/shower units for nominated fire sheds
Plant and Equipment	994,021	50%	▼	Timing	Primarily timing of Major Plant Purchases, and Passenger vehicle replacement program
Furniture and Equipment	222,178	36%	▼	Timing	Primarily timing of IT related equipment
Infrastructure Assets - Roads	433,465	8%	▼	Timing	Timing of completion of numerous road jobs
Infrastructure Assets - Other	5,031,270	44%	▼	Timing	No single job. Timing of payments for different elements of CPSP, Alison Hartman Gardens, Synthetic hockey pitch replacement, and various jobs on reserves and sporting grounds.
Financing/Borrowing					
Debt Redemption	(37,079)	(3%)			No material variance.
Loan Drawn Down	0				No material variance.
Profit on Sale of Investments	0				No material variance.
Self-Supporting Loan Principal	2,084	(20%)			No material variance.
Self Supporting Loan Issued	0				No material variance.
Restricted Funding Movements					
Opening Funding Surplus(Deficit)	2,938	0%			No material variance.
Restricted Cash Utilised - Loan	0				No material variance.
Transfer to Reserves	0				No material variance.
Transfer from Reserves	0				No material variance.

CITY OF ALBANY
NOTES TO THE STATEMENT OF FINANCIAL ACTIVITY
FOR THE PERIOD ENDED 30 APRIL 2019

NOTE 2
NET CURRENT FUNDING POSITION

	Ref Note	FOR THE PERIOD ENDED 30 APRIL 2019	FOR THE PERIOD ENDED 31 MARCH 2019	FOR THE PERIOD ENDED 30 APRIL 2018
		$	$	$
Current Assets				
Cash Unrestricted		14,955,981	17,741,438	12,808,466
Cash Restricted		26,627,647	26,528,022	26,351,514
Receivable - Rates and Rubbish	4	2,204,626	2,947,594	1,923,163
Receivables - Other		1,523,651	1,577,618	1,021,266
Investments - LG Unit Trust Shares		227,722	227,722	205,605
Accrued Income		159,899	242,622	326,855
Prepaid Expenses		77,923	69,204	23,004
Investment Land		158,000	158,000	158,000
Community Group Loan		0	0	12,120
Stock on Hand		1,351,256	1,277,030	814,299
		47,286,705	**50,769,252**	**43,644,291**
Less: Current Liabilities				
Payables		(1,515,481)	(1,891,040)	(1,497,926)
Borrowings		(873,612)	(1,005,249)	(881,997)
Accrued Expenses		(4,515)	(6,595)	(4,138)
Income in advance		(11,311)	(19,255)	(1,820)
Provisions		(5,149,766)	(5,110,287)	(4,590,489)
Retentions		(130,976)	(131,033)	(43,584)
		(7,685,662)	**(8,163,460)**	**(7,019,953)**
Add Back: Borrowings		873,612	1,005,249	881,997
(Less): Cash Backed Reserves		(26,048,086)	(26,048,086)	(25,992,610)
(Less): Loans Receivable (Current)		-	-	-
(Less): Unutilised - Loan		-	-	(841,758)
(Less): Investment land		(158,000)	(158,000)	(158,000)
(Less): Investments - LG Unit Trust Shares		(227,722)	(227,722)	(205,605)
		(25,560,197)	**(25,428,560)**	**(26,315,976)**
Net Current Funding Position		**14,040,847**	**17,177,232**	**10,308,362**

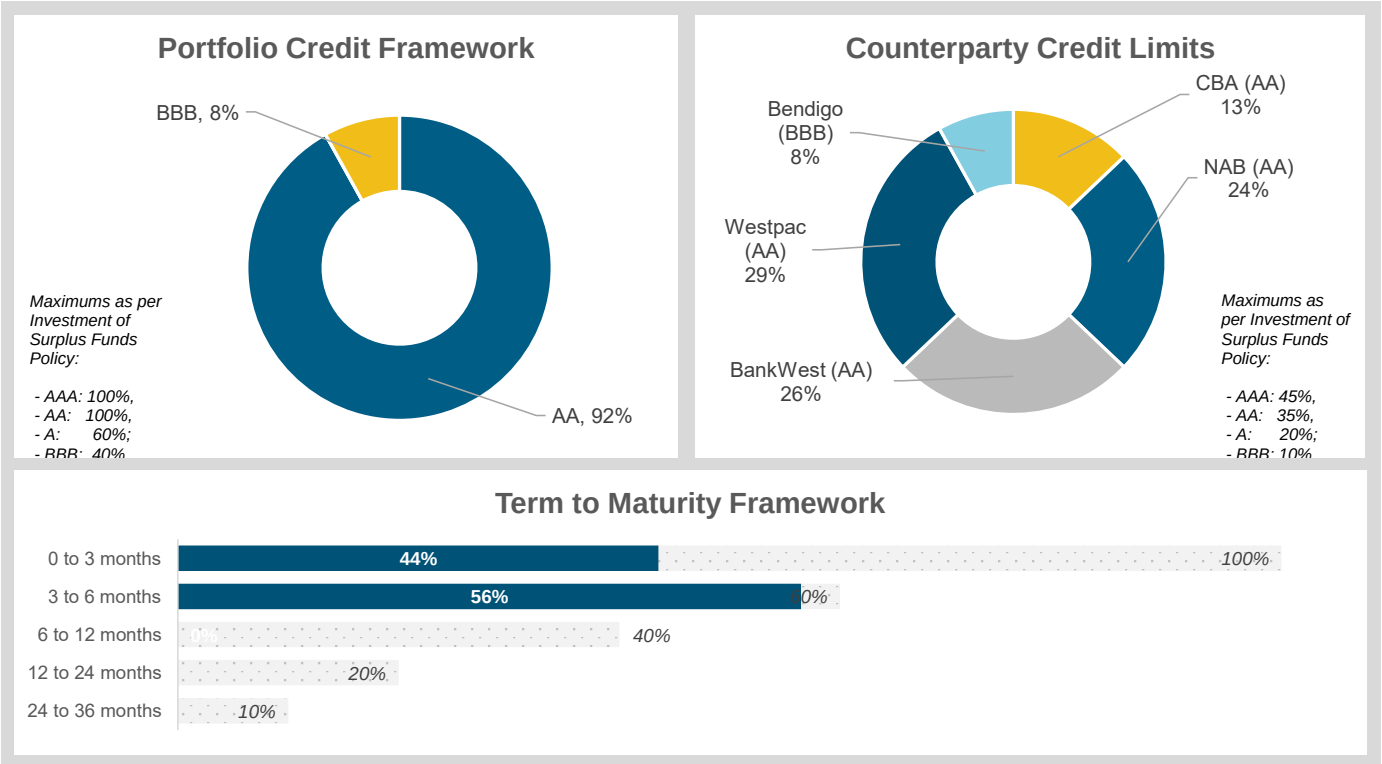


COMMENTS:

CITY OF ALBANY
NOTES TO THE STATEMENT OF FINANCIAL ACTIVITY
FOR THE PERIOD ENDED 30 APRIL 2019

NOTE 3
CASH INVESTMENTS

Investment Type	Institution	S&P Rating	Interest Rate	Deposit Date	Maturity	Investment Term Category	Amount Invested ($)	Expected Interest ($)
General Municipal	Bankwest	AA	2.60%	04-Feb-19	05-May-19	0 to 3 months	3,000,000	19,233
General Municipal	Westpac	AA	2.45%	04-Apr-19	03-Jul-19	0 to 3 months	3,000,000	18,123
							6,000,000	**37,356**
Restricted	Westpac	AA	2.70%	12-Nov-18	12-May-19	3 to 6 months	3,000,000	40,167
Restricted	Bankwest	AA	2.65%	05-Feb-19	05-Jun-19	3 to 6 months	3,000,000	26,137
Restricted	Bankwest	AA	2.50%	01-Mar-19	28-Jun-19	3 to 6 months	2,000,000	16,301
Restricted	NAB	AA	2.42%	09-Apr-19	08-Jul-19	0 to 3 months	3,000,000	17,901
Restricted	CBA	AA	2.17%	10-Apr-19	09-Jul-19	0 to 3 months	2,000,000	10,701
Restricted	NAB	AA	2.37%	29-Apr-19	28-Jul-19	0 to 3 months	2,500,000	14,610
Restricted	CBA	AA	2.50%	04-Mar-19	01-Aug-19	3 to 6 months	2,000,000	20,548
Restricted	NAB	AA	2.60%	06-Mar-19	02-Sep-19	3 to 6 months	2,000,000	25,644
Restricted	Westpac	AA	2.55%	18-Mar-19	18-Sep-19	3 to 6 months	3,000,000	38,564
Restricted	Bendigo	BBB	2.50%	17-Apr-19	17-Oct-19	3 to 6 months	2,500,000	31,336
							25,000,000	**241,910**
							31,000,000	**279,266**

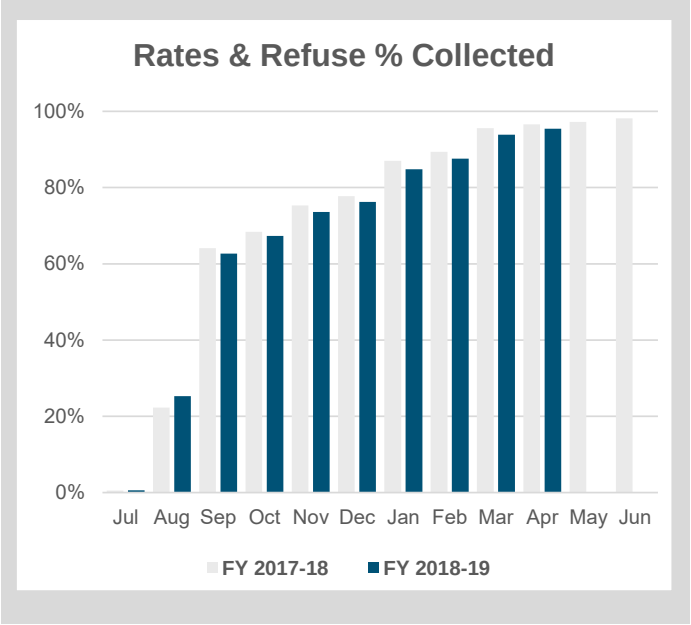


COMMENTS:

CITY OF ALBANY
NOTES TO THE STATEMENT OF FINANCIAL ACTIVITY
FOR THE PERIOD ENDED 30 APRIL 2019

NOTE 4
RECEIVABLES

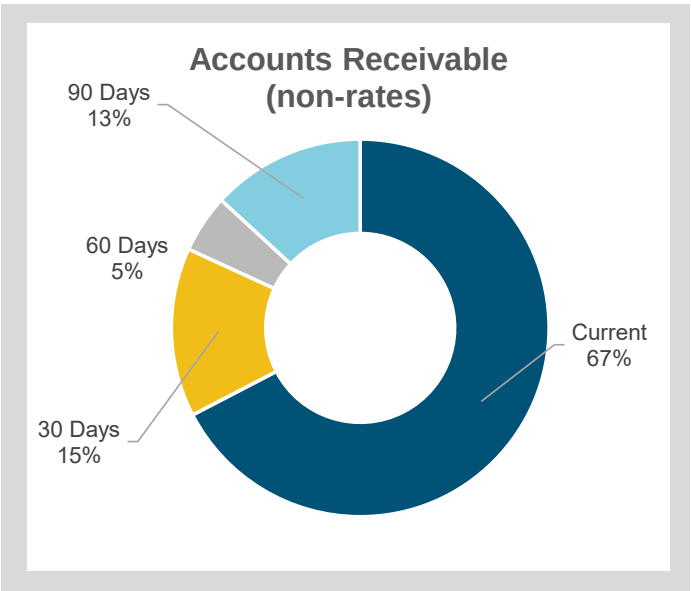
Rates & Refuse % Collected	$
Opening Arrears Previous Years	976,234
Rates Levied this year	36,868,631
Refuse Levied	6,269,692
ESL Levied	3,378,844
Other Charges Levied	468,190
Amount Levied	**47,961,590**
(Less): Collections (Prior Years)	(666,745)
(Less): Collections (Current Year)	(45,090,220)
Amount Collected	**(45,756,964)**
Total Rates & Charges Collectable	**2,204,626**
% Collected	*95.40%*



COMMENTS:

Accounts Receivable (non-rates)	$	%
Current	913,816	*67%*
30 Days	196,342	*14%*
60 Days	67,642	*5%*
90 Days	178,495	*13%*
	1,356,295	***100%***

Amounts shown above include GST (where applicable)

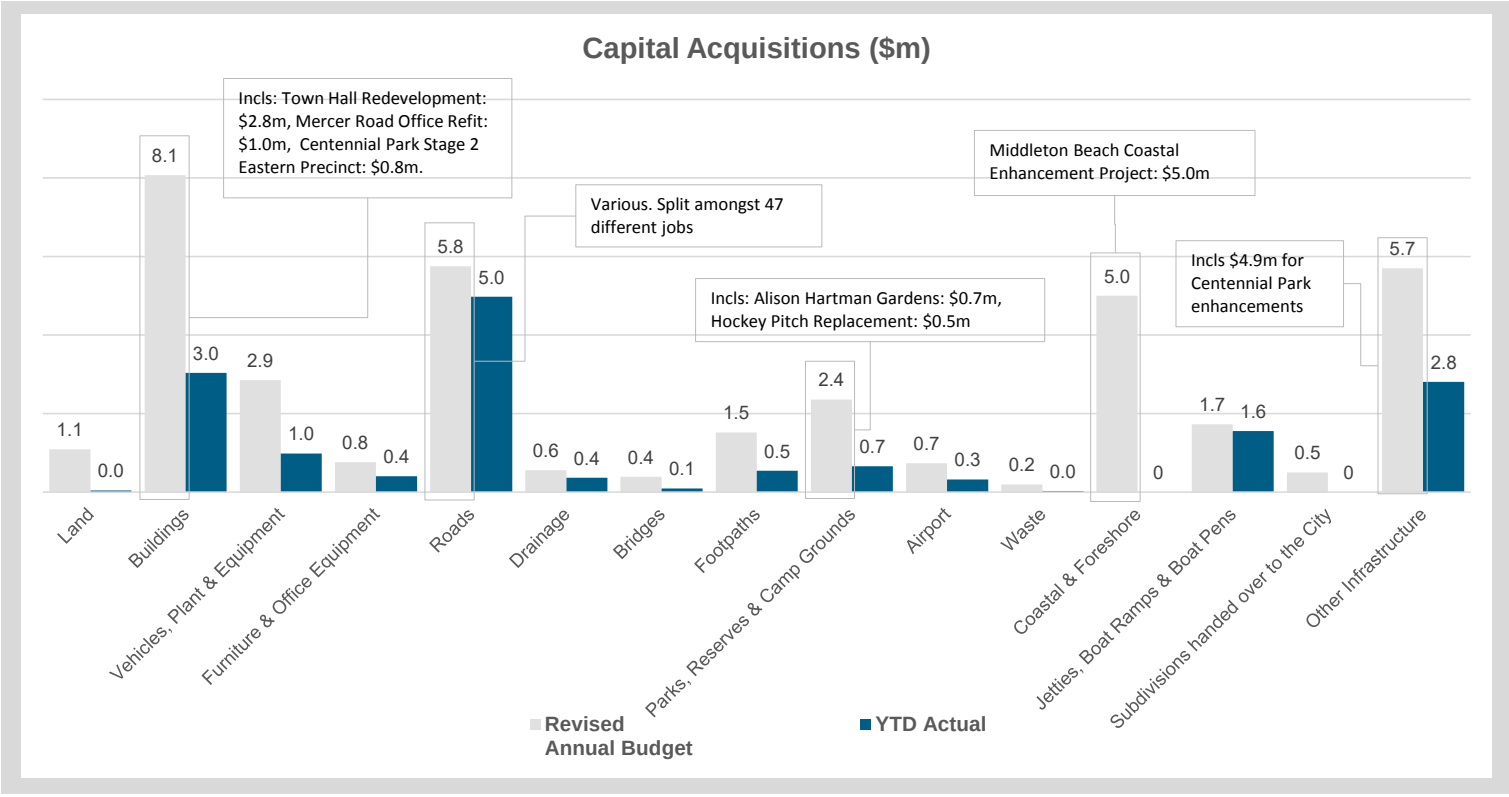


COMMENTS:

CITY OF ALBANY
NOTES TO THE STATEMENT OF FINANCIAL ACTIVITY
FOR THE PERIOD ENDED 30 APRIL 2019

NOTE 5
CAPITAL ACQUISITIONS

Capital Acquisitions	Original Annual Budget	Revised Annual Budget	YTD Budget (a)	YTD Actual (b)	Var. $ (b)-(a)	Var. % (b)-(a)/(a)	Var.
	$	$	$	$	$	%	
Property Plant & Equipment							
Land	25,000	1,089,000	1,064,000	**38,000**	(1,026,000)	(96%)	▼
Buildings	7,511,125	8,071,475	4,883,977	**3,033,278**	(1,850,699)	(38%)	▼
Vehicles, Plant & Equipment	3,244,935	2,853,189	1,973,170	**979,149**	(994,021)	(50%)	▼
Furniture & Office Equipment	707,900	757,900	624,680	**402,502**	(222,178)	(36%)	▼
Infrastructure							
Roads	6,007,199	5,753,525	5,408,413	**4,974,948**	(433,465)	(8%)	▼
Drainage	555,000	555,000	497,830	**364,884**	(132,946)	(27%)	▼
Bridges	135,000	393,000	135,000	**90,000**	(45,000)	(33%)	
Footpaths	963,161	1,515,326	993,322	**541,985**	(451,337)	(45%)	▼
Parks, Reserves & Camp Grounds	8,656,936	2,355,480	2,286,528	**658,166**	(1,628,362)	(71%)	▼
Airport	735,510	735,510	714,630	**320,221**	(394,409)	(55%)	▼
Waste	176,000	196,000	196,000	**25,108**	(170,892)	(87%)	▼
Coastal & Foreshore	5,000,000	5,000,000	0	**0**	0		
Jetties, Boat Ramps & Boat Pens	1,774,945	1,728,477	1,728,477	**1,552,268**	(176,209)	(10%)	▼
Subdivisions handed over to the City	500,000	500,000	0	**0**	0		
Other Infrastructure	299,636	5,698,934	4,841,103	**2,808,987**	(2,032,116)	(42%)	▼
Total Capital Acquisitions	**36,292,347**	**37,202,816**	**25,347,130**	**15,789,497**	(9,557,633)	(38%)	▼



COMMENTS:

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 28 APRIL 2019

REPORT ITEM CCS 159 REFERS

CREDIT CARD TRANSACTIONS

DATE	PAYEE	DESCRIPTION		AMOUNT
29/03/2019	Regional Express	Flights - M Cole - Tourism Meeting	$	486.65
29/03/2019	Regional Express	Flights - WA Museum Visit - P Smith	$	593.45
2/04/2019	The Albany Golf Club	Charity Golf Day Registration - CEO, D.Olde, Deputy Mayor and Cr Moir	$	300.00
3/04/2019	Regional Express	Flights - EEO Specialists Director - Equal Employment Opportunity Training for HR Staff	$	416.95
3/04/2019	CircuitWest Presentation	Registration - Showcase WA Conference - E David	$	429.00
3/04/2019	Regional Express	Flights - Mayor - RCAWA Meetings	$	510.25
3/04/2019	Regional Express	Flights - CEO - RCAWA Meetings	$	582.21
3/04/2019	Regional Express	Flights - EEO Specialists - Equal Employment Opportunity Training for HR Staff	$	1,856.64
4/04/2019	SAI Global	OH&S Standards - Planning for Emergencies in Facilities	$	226.89
4/04/2019	Margaret River / Busselton Tourism Association	Accommodation - P.Bockman / A.Blows - Staff Training	$	258.00
4/04/2019	PayPal Bank Ideas	Masterclass Registration - T Flett - Staff Training	$	275.00
4/04/2019	DWER - Water	Detailed Records for Lot 4743	$	300.00
4/04/2019	Regional Express	Flights - Showcase WA Conference - E Davis	$	440.55
4/04/2019	PayPal Bank Ideas	Conference Registration - Power to the People - T Flett	$	550.00
5/04/2019	Mailchimp	Monthly Subscription Charges - Media	$	212.99
5/04/2019	Airbnb	Accommodation - Power to the People Conference - T Flett	$	491.02
5/04/2019	Qantas Airways	Flights - Power to the People Conference - T Flett	$	824.30
11/04/2019	Swiftype.com	Monthly Website Fee - Albany Visitors Centre - H Fell	$	349.90
11/04/2019	Regional Express	Flights - Professor Fiona Wood - Great Southern Speakers Event	$	630.55
12/04/2019	Regional Express	Flights - Meeting with Renergi Bio Fuels - M.Richardson	$	395.79
13/04/2019	Goldsborough Apartment	Accommodation - FILEX Fitness Convention 2019 - J Pouwelsen, J Garrod	$	812.00
16/04/2019	Pelicans Holiday	Accommodation - L Hyde - Great Southern Award Judge	$	600.00
16/04/2019	Holiday Inn City Centre	Accommodation - Showcase Conference - E Davis	$	758.06
18/04/2019	Regional Express	Flights - Workers Compensation	$	464.17
18/04/2019	Regional Express	Travel - WA Museum Visit- P Smith	$	487.77
18/04/2019	Webjet	Flights - Waterwise Endorsement Presentation - M.Holt	$	543.59
19/04/2019	Albany Dog Rock Motel	Accommodation - O.Darby (Shire of Busselton) - Interviewing candidates for ED I&E Role	$	498.40
23/04/2019	University of WA	Training - E.Evans - Staff Training	$	1,100.00
23/04/2019	University of WA	Training - A.McEwan - Staff Training	$	1,100.00
24/04/2019	Mercure Hotel	Accommodation - D Olde - Staff Training	$	290.00
24/04/2019	Regional Express	Flights - CEO - Meeting with Renargi Energy, Western Power and WALGA Framework Seminar	$	464.17
24/04/2019	Regional Express	Flights - S Van Nierop - Staff Training	$	486.65
24/04/2019	Regional Express	Flights - D Olde - Staff Training	$	486.65
24/04/2019	Regional Express	Flights - E.Evans - Staff Training	$	552.25
27/04/2019	Survey Monkey	Advantage Subscription	$	348.00
		SUNDRY < $ 200.00	$	2,719.71
		TOTAL	**$**	**21,841.56**

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

TRUST PAYMENTS

DATE	NAME	DESCRIPTION	AMOUNT
18/04/2019	SEASIDE BAY PTY LTD	Return of Bond	$ 128,428.30
09/05/2019	ROYA NADERI	Return of Incomplete Works Bond	$ 1,452.00
09/05/2019	VOLBREGT JAN VAN DEN BERG	Return of Defects Bond	$ 11,063.00
		TOTAL	**$ 140,943.30**

PAYROLL TRANSACTIONS

DATE	DESCRIPTION	AMOUNT
16/04/2019	COA Salaries	$ 1,308.48
18/04/2019	COA Salaries	$ 2,094.30
24/04/2019	COA Salaries	$ 668,094.30
26/04/2019	COA Salaries	$ 1,025.38
26/04/2019	COA Superannuation	$ 119,069.30
09/05/2019	COA Salaries	$ 681,808.71
10/05/2019	COA Superannuation	$ 119,241.04
	TOTAL	**$ 1,592,641.51**

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

CHEQUE TRANSACTIONS

CHEQUE	DATE	NAME	DESCRIPTION		AMOUNT
32305	18/04/2019	RIGHT2DRIVE PTY LTD	Insurance Claim	$	2,162.79
32306	18/04/2019	DANIEL BOTMA	Insurance Claim	$	550.00
32307	18/04/2019	HOME GROUP WA	Crossover Subsidy	$	161.49
32308	18/04/2019	HOME GROUP WA	Crossover Subsidy	$	140.88
32309	18/04/2019	HOME GROUP WA	Crossover Subsidy	$	199.77
32310	18/04/2019	REBECCA WHEATLEY	Crossover Subsidy	$	170.33
32311	18/04/2019	DEPARTMENT OF TRANSPORT	Purchase of Amazing South Coast Number Plates	$	400.00
32312	18/04/2019	J FRATER	Refund	$	30.00
32313	18/04/2019	N MACDONALD	Refund	$	33.00
32314	18/04/2019	TELSTRA CORPORATION LIMITED	Telephone Charges	$	18,731.96
32315	18/04/2019	WATER CORPORATION	Water Charges	$	2,637.08
32316	02/05/2019	NATASHA GEORGE	Crossover Subsidy	$	190.94
32317	02/05/2019	TREVOR WILLIAMS	Crossover Subsidy	$	158.55
32318	02/05/2019	ALAN PIETERSEN	Crossover Subsidy	$	161.49
32319	02/05/2019	DEPARTMENT OF TRANSPORT	Purchase of Amazing South Coast Number Plates	$	600.00
32320	02/05/2019	PETTY CASH	Petty Cash Reimbursement	$	437.15
32321	02/05/2019	PETTY CASH	Petty Cash Reimbursement	$	81.15
32322	02/05/2019	PIVOTEL SATELLITE PTY LIMITED	Satellite Phone Charges	$	248.00
32323	02/05/2019	TELSTRA CORPORATION LIMITED	Telephone Charges	$	17,744.05
32324	02/05/2019	WATER CORPORATION	Water Charges	$	1,804.11
32325	09/05/2019	ANNA KIDDLE	Crossover Subsidy	$	176.22
32327	09/05/2019	DEPARTMENT OF TRANSPORT	Vehicle Registration	$	89.70
32328	09/05/2019	PETTY CASH	Petty Cash Reimbursement	$	197.75
32329	09/05/2019	PIVOTEL SATELLITE PTY LIMITED	Satellite Phone Charges	$	273.00
32330	09/05/2019	DJ RYDER	Rates Refund	$	710.76
32331	09/05/2019	WATER CORPORATION	Water Charges	$	573.23
32332	09/05/2019	THE WEST AUSTRALIAN	News Paper Deliveries	$	371.91
				$	**49,035.31**

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION		AMOUNT
EFT133524	18/04/2019	ABA SECURITY	Sscurity System Monitoring	$	91.91
EFT133525	18/04/2019	AD CONTRACTORS PTY LTD	Material Supply and Hire - C16012/C16015/C17015	$	183,250.73
EFT133526	18/04/2019	ADVERTISER PRINT	Printing Services - Various	$	5,399.00
EFT133527	18/04/2019	WELLSTEAD RURAL SERVICES	Fuel Supplies - Cape Riche Camping	$	49.84
EFT133528	18/04/2019	AKUBRA HATS PTY LTD	Merchandise Order - Forts Store	$	569.80
EFT133529	18/04/2019	OPTEON	Valuation Services	$	1,650.00
EFT133530	18/04/2019	ALBANY SWEEP CLEAN	Sweeping Services - C15014	$	2,708.00
EFT133531	18/04/2019	RETRAVISION ALBANY	Material Supply - Headphones	$	395.00
EFT133532	18/04/2019	ALBANY STOCK FEEDS AND OAKDALE FARM	Material Supply - Hay	$	15.50
EFT133533	18/04/2019	ALBANY PANEL BEATERS AND SPRAY PAINTERS	Insurance Excess Payment	$	300.00
EFT133534	18/04/2019	ALBANY AGRICULTURAL SOCIETY INCORPORATED	Cleaning Services - Western Pavillion	$	286.50
EFT133535	18/04/2019	ALBANY RSL SUB BRANCH	Merchandise Order - Forts Store	$	1,750.00
EFT133536	18/04/2019	ALBANY SCREEN PRINTERS	Merchandise Order - Forts Store	$	1,654.00
EFT133537	18/04/2019	ALBANY AUTO ONE	Vehicle Supplies - Seat Covers	$	230.00
EFT133538	18/04/2019	ALBANY SKIPS AND WASTE SERVICES PTY LTD	Skip Bin Hire - Depot	$	520.00
EFT133539	18/04/2019	ALBANY OFFICE PRODUCTS DEPOT	Stationery Supplies	$	724.01
EFT133540	18/04/2019	JW & DF WOODBURY	Merchandise Order - Visitor Centre	$	130.00
EFT133541	18/04/2019	ALBANY PSYCHOLOGICAL SERVICES	Professional Services - EAP	$	726.00
EFT133542	18/04/2019	ALBANY IRRIGATION & DRILLING	Irrigation Supplies	$	723.30
EFT133543	18/04/2019	ALBANY MOBILITY HIRE AND SALES	Delivery of Animal Hygiene Services - Q17036	$	370.00
EFT133544	18/04/2019	ALBANY FITNESS	Material Supply - Resistance Bands	$	59.90
EFT133545	18/04/2019	ALD FUEL INJECTION SERVICES	Material Supply - Washer	$	10.12
EFT133546	18/04/2019	ANDREW HALSALL PHOTOGRAPHY	Merchandise Order - Visitor Centre	$	314.10
EFT133547	18/04/2019	PAPERBARK MERCHANTS	Newspaper/Book/Magazine Supplies	$	144.00
EFT133548	18/04/2019	ARTISAN SOAP WORKS	Merchandise Order - Visitor Centre	$	138.10
EFT133549	18/04/2019	ATC WORK SMART	Casual Staff/Apprentice Fees	$	18,258.63
EFT133550	18/04/2019	AUSTRALIAN INSTITUTE OF PROJECT MANAGEMENT	Memberships - Major Projects	$	660.00
EFT133551	18/04/2019	BADGEMATE	Uniform Supplies - Name Badges	$	28.38
EFT133552	18/04/2019	BAREFOOT CLOTHING MANUFACTURERS	Uniform Supplies - Albany Heritage Park	$	255.85
EFT133553	18/04/2019	BARRETTS MINI EARTHMOVING & CHIPPING	Vegetation Maintenance - C17022	$	2,662.00
EFT133554	18/04/2019	J & PM BARBOUR	Merchandise Order - Forts Store and Visitor Centre	$	292.50
EFT133555	18/04/2019	BENNETTS BATTERIES	Battery Supplies	$	510.40
EFT133556	18/04/2019	ADVANCED TRAFFIC MANAGEMENT WA PTY LTD	Traffic Control Services - C17014	$	75,523.57
EFT133557	18/04/2019	BERTOLA HIRE ALBANY PTY LTD	Equipment Hire - Various	$	1,089.88
EFT133558	18/04/2019	BIG SKY PUBLISHING	Merchandise Order - Forts Store	$	582.72
EFT133559	18/04/2019	BLACK AND WHITE CONCRETING	Ramp Installation - Vancouver Arts Centre	$	7,800.00
EFT133560	18/04/2019	J. BLACKWOOD & SON PTY LTD	Material Supplies - Various	$	609.97
EFT133561	18/04/2019	A BLOWS	Staff Training	$	44.15
EFT133562	18/04/2019	BLUECOAST CONSULTING ENGINEERS PTY LTD	Drone Survey and Analysis - Emu Point to Middleton Beach	$	6,325.00
EFT133563	18/04/2019	BMT WESTERN AUSTRALIAN PTY LTD	AWAC Instrument Hire - March 2019	$	423.50
EFT133564	18/04/2019	ALBANY BOBCAT SERVICES	Equipment Hire - C16012	$	1,542.75
EFT133565	18/04/2019	BOOKEASY AUSTRALIA PTY LTD	BookEasy Marketing Fee - March 2019	$	220.00
EFT133566	18/04/2019	BP BIRD PLUMBING & GAS PTY LTD	Repairs and Maintenance - Oil Separator	$	102.00

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT133567	18/04/2019	BRANDNET PTY LTD	Merchandise Order - Forts Store	$ 12,098.70
EFT133568	18/04/2019	BROCKS	Professional Services - ALAC	$ 50.00
EFT133569	18/04/2019	DR PIA BRODERICK	Professional Services - EAP	$ 230.00
EFT133570	18/04/2019	HEAD TO TAIL PETS	Material Supply - Globes	$ 77.10
EFT133571	18/04/2019	BULLET GLASS COMPANY	Merchandise Order - Forts Store	$ 2,930.00
EFT133572	18/04/2019	BUNNINGS GROUP LIMITED	Hardware And Tool Supplies - Various	$ 519.26
EFT133573	18/04/2019	BUSY BLUE BUS	Shuttle Services - Field of Light - Q18024	$ 3,425.90
EFT133574	18/04/2019	JM BUSH & NA BUSH	Merchandise Order - Visitor Centre	$ 115.00
EFT133575	18/04/2019	THE BUSHFIRE FRONT INC.	Literary Purchase - Cyclone Alby	$ 80.00
EFT133576	18/04/2019	JL BYATT	Refund	$ 189.00
EFT133577	18/04/2019	C&C MACHINERY CENTRE	Material Supply - Idler and Belt	$ 234.20
EFT133578	18/04/2019	CALTEX AUSTRALIA PETROLEUM PTY LTD	Fuel Supplies	$ 28,121.74
EFT133579	18/04/2019	CAMTRANS ALBANY PTY LTD	Paving Supplies - Grey Street East	$ 8,302.50
EFT133580	18/04/2019	CAMLYN SPRINGS	Water Container Refills	$ 1,818.00
EFT133581	18/04/2019	J & S CASTLEHOW ELECTRICAL SERVICES	Electrical Services - C18019/C17018	$ 32,623.99
EFT133582	18/04/2019	CATALYSE RESEARCH & STRATEGY	Community Survey	$ 4,950.00
EFT133583	18/04/2019	CENTIGRADE SERVICES PTY LTD	Air-Conditioning Services - C18014/Q18016	$ 14,836.18
EFT133584	18/04/2019	CENTENNIAL STADIUM INC	Electricity Charges	$ 205.96
EFT133585	18/04/2019	CHADSON ENGINEERING PTY LTD	Material Supply - Test Tubes	$ 551.10
EFT133586	18/04/2019	THE CHAMBER OF ARTS AND CULTURE WA INCORPORATED	Registration - Public Art Talk	$ 44.00
EFT133587	18/04/2019	CLARK EQUIPMENT SALES PTY LTD	Material Supply - Hose	$ 76.35
EFT133588	18/04/2019	COATES HIRE OPERATIONS PTY LIMITED	Equipment Hire - Various	$ 4,999.05
EFT133589	18/04/2019	COLES SUPERMARKETS AUSTRALIA PTY LTD	Grocery Supplies - Various	$ 394.30
EFT133590	18/04/2019	CONSTRUCTION EQUIPMENT AUSTRALIA	Material Supply - Seals, Washers, O-Rings	$ 84.33
EFT133591	18/04/2019	COURIER AUSTRALIA	Freight Charges - April 2019	$ 66.85
EFT133592	18/04/2019	GREAT SOUTHERN COURIERS	Courier Services	$ 77.00
EFT133593	18/04/2019	CREATIVE PLAYING	Merchandise Order - Forts Store	$ 996.74
EFT133594	18/04/2019	HOLCIM (AUSTRALIA) PTY LTD	Concrete Supplies - C16010	$ 4,878.28
EFT133595	18/04/2019	THE LAMINEX GROUP	Decking Supplies	$ 89.57
EFT133596	18/04/2019	ZO ROSS HARFIELD	Rates Refund	$ 1,600.00
EFT133597	18/04/2019	D & K ENGINEERING	Fencing Repairs and Maintenance - Bakers Junction Waste Facility	$ 2,453.75
EFT133598	18/04/2019	DATA #3 LIMITED	Academic Licence Subscriptions - Library	$ 7,239.96
EFT133599	18/04/2019	DAVE LANFEAR CONSULTING PTY LTD	Regional Tennis Feasibility Study - Q18017	$ 18,422.56
EFT133600	18/04/2019	CGS QUALITY CLEANING	Cleaning Services - C14036	$ 46,455.68
EFT133601	18/04/2019	DE LAGE LANDEN PTY LIMITED	Monthly Equipment Rental - P16011	$ 6,319.50
EFT133602	18/04/2019	LANDGATE	Satellite Imagery - Capture WA	$ 7,391.27
EFT133603	18/04/2019	DESIGNER DIRT PTY LTD	Merchandise Order - Forts Store	$ 1,250.00
EFT133604	18/04/2019	DISTINCTLY TOURISM MANAGEMENT	Amazing South Coast Management Fees - April 2019	$ 7,150.00
EFT133605	18/04/2019	SANDRA DIXON	Professional Services - EAP	$ 300.00
EFT133606	18/04/2019	EMMA DOUGHTY	Councillor Allowances and Sitting Fees - April 2019	$ 2,909.50
EFT133607	18/04/2019	THE TRUSTEE FOR GRIFFITHS LIFESTYLE TRUST	Accommodation - Mini Break	$ 918.00
EFT133608	18/04/2019	DYLANS ON THE TERRACE	Catering - Various	$ 1,820.00
EFT133609	18/04/2019	ECOSCAPE AUSTRALIA PTY LTD	Sandpatch Recreation Plan - Q18040	$ 2,381.50

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT133610	18/04/2019	ENVIRO PIPES PTY LTD	Material Supply - Pipes	$ 5,849.10
EFT133611	18/04/2019	E-STRALIAN PTY LTD	Weekly E-Bike Lease	$ 259.92
EFT133612	18/04/2019	ETS VEGETATION MANAGEMENT	Slashing Services - Q18047	$ 6,282.10
EFT133613	18/04/2019	EVERTRANS	Repairs and Maintenance - Truck Floor	$ 2,909.50
EFT133614	18/04/2019	EYERITE SIGNS	Signage - Various	$ 1,265.00
EFT133615	18/04/2019	THE FIXUPPERY	Window Cleaning Services - Q16023	$ 1,516.00
EFT133616	18/04/2019	ALBANY FOOTBALL AND SPORTING CLUB	Welcome to Country - Storm the Beach Youth Week	$ 300.00
EFT133617	18/04/2019	FORM BUILDING A STATE OF CREATIVITY INC	Final Instalment - Field of Light	$ 101,200.00
EFT133618	18/04/2019	FRANGIPANI FLORAL STUDIO	Floral Arrangement - Memorial Service	$ 80.00
EFT133619	18/04/2019	FRONTLINE FIRE & RESCUE EQUIPMENT	Fire Equipment - Ball	$ 126.50
EFT133620	18/04/2019	BILL GIBBS EXCAVATIONS	Equipment Hire - C16012	$ 132,318.45
EFT133621	18/04/2019	JEFFREY ALLAN GIBB	Merchandise Order - Forts Store	$ 924.00
EFT133622	18/04/2019	GIBSON INTERNATIONAL LTD	SLA Character Posts And Tribute Wall - National Anzac Centre	$ 2,681.25
EFT133623	18/04/2019	GLOBAL INTEGRATED SOLUTIONS LIMITED	Ezicom Fees - Airport	$ 167.51
EFT133624	18/04/2019	ALISON GOODE	Councillor Allowances and Sitting Fees - April 2019	$ 2,909.50
EFT133625	18/04/2019	COLIN ASHTON-GRAHAM	Waste Education Report	$ 14,960.00
EFT133626	18/04/2019	GREAT SOUTHERN SPRINGS	Material Supply - Coil Springs	$ 1,020.00
EFT133627	18/04/2019	SOUTHERN SHARPENING SERVICES	Fire Equipment Maintenance - C14030	$ 9,078.05
EFT133628	18/04/2019	GREAT SOUTHERN PERSONNEL INC	Gardening Services - Lotteries House	$ 216.00
EFT133629	18/04/2019	GREAT SOUTHERN SUPPLIES	Paper and Uniform Supplies - Q17008/Q17028	$ 6,294.36
EFT133630	18/04/2019	GREAT SOUTHERN TURF	Turf Supply - C18001	$ 297.00
EFT133631	18/04/2019	GREAT SOUTHERN BOUNDARIES	Fencing - C18006	$ 4,125.00
EFT133632	18/04/2019	LEE GRIFFITH	Photography Services - Signage	$ 140.00
EFT133633	18/04/2019	RAY HAMMOND	Councillor Allowances and Sitting Fees - April 2019	$ 2,909.50
EFT133634	18/04/2019	HART SPORT	Material Supply - Water Noodle Kit	$ 206.50
EFT133635	18/04/2019	HARVEY NORMAN ALBANY	Material Supply - Xbox Controller	$ 68.00
EFT133636	18/04/2019	CA FULLER AND JK ROSE HEAT AND COOL SOLUTIONS	Screening Installation - Visitor Centre	$ 8,250.00
EFT133637	18/04/2019	HEMA MAPS PTY LTD	Merchandise Order - Visitor Centre	$ 124.51
EFT133638	18/04/2019	BILL HOLLINGWORTH	Councillor Allowances and Sitting Fees - April 2019	$ 2,909.50
EFT133639	18/04/2019	AFGRI EQUIPMENT AUSTRALIA PTY LTD	Material Supplies	$ 1,376.76
EFT133640	18/04/2019	HHG LEGAL GROUP	Legal Services - C16011	$ 3,979.80
EFT133641	18/04/2019	ICS GROUP AUTO ELECTRICAL & AIR CONDITIONING PTY LTD	Repairs and Maintenance - Compressor	$ 192.50
EFT133642	18/04/2019	QUBE LOGISTICS PTY LTD	Freight Charges - Chemical Delivery	$ 901.38
EFT133643	18/04/2019	IMPACT SERVICE PTY LTD	Casual Staff/Apprentice Fees	$ 858.00
EFT133644	18/04/2019	ISENTIA PTY LTD	Media Management Tool - March 2019	$ 1,494.35
EFT133645	18/04/2019	GARY JANSEN	Marking Services - Albany Highway Cycle Path	$ 1,575.20
EFT133646	18/04/2019	JOHN KINNEAR AND ASSOCIATES	Survey Services - C16016	$ 1,650.00
EFT133647	18/04/2019	JOHN MCLEAN MEDIA	Advertising - Anzac Centre	$ 1,650.00
EFT133648	18/04/2019	JUST SEW EMBROIDERY	Embroidery - Staff Uniform	$ 6.60
EFT133649	18/04/2019	JUST A CALL DELIVERIES	Internal Mail Deliveries	$ 738.19
EFT133650	18/04/2019	KIM ANGELA TOMLINSON	Professional Services - EAP	$ 280.00
EFT133651	18/04/2019	PETER J & JUDITH A KING	Rates Refund	$ 168.99
EFT133652	18/04/2019	KMART ALBANY	Material Supplies - Sports Person of the Year Award	$ 429.50

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT133653	18/04/2019	ALBANY WORLD OF CARS	Light Fleet Vehicle Purchase and Trade In	$ 16,664.10
EFT133654	18/04/2019	LATRO LAWYERS	Legal Services - C16011	$ 3,185.86
EFT133655	18/04/2019	THE LAWN LOPPER	Lawn Mowing Services - Day Care Centre	$ 290.00
EFT133656	18/04/2019	LEADING EDGE HIFI-ALBANY	Material Supply - Aerial	$ 49.95
EFT133657	18/04/2019	LEADING EDGE COMPUTERS ALBANY	Computer Repairs and Maintenance - Bush Fire Brigades	$ 195.00
EFT133658	18/04/2019	LOCAL GOVERNMENT SUPERVISORS ASSOCIATION OF WA INC	Staff Training - Works and Parks Conference	$ 1,204.50
EFT133659	18/04/2019	LOCHNESS LANDSCAPE SERVICES	Mowing Services - C16008/Q18047	$ 9,078.78
EFT133660	18/04/2019	LORLAINE DISTRIBUTORS PTY LTD	Cleaning Supplies	$ 30.31
EFT133661	18/04/2019	SOPHIE LYNCH	Lifeguard Services - Storm the Beach	$ 100.00
EFT133662	18/04/2019	M AND B SALES PTY LTD	Material Supply - Door	$ 958.37
EFT133663	18/04/2019	BUCHER MUNICIPAL PTY LTD	Material Supply - Hose Reel	$ 231.88
EFT133664	18/04/2019	SOUTH COAST WOODWORKS GALLERY	Merchandise Order - Forts Store	$ 1,155.00
EFT133665	18/04/2019	ALBANY CITY MOTORS	Material Supply - Filters	$ 1,243.64
EFT133666	18/04/2019	MANYPEAKS COMMUNITY AND RECREATION ASSOCIATION	Reimbursement of Electricity Charges	$ 132.13
EFT133667	18/04/2019	MARSHALL MOWERS	Repairs and Maintenance - Mower	$ 114.60
EFT133668	18/04/2019	BRIDGET MASON	Lifeguard Services - Storm the Beach	$ 100.00
EFT133669	18/04/2019	MCB CONSTRUCTION PTY LTD	Bus Shelters - C18021	$ 5,555.00
EFT133670	18/04/2019	MCGUFFIE TILT TRAY HIRE	Transportation Services - Tractor	$ 654.50
EFT133671	18/04/2019	MCLEODS	Regional Express Community Fare Agreement	$ 1,056.33
EFT133672	18/04/2019	MENTAL MEDIA PTY LTD	Audio Technology - Q17053	$ 3,039.96
EFT133673	18/04/2019	MERRIFIELD REAL ESTATE	Storage Unit Rental - Events	$ 200.00
EFT133674	18/04/2019	DIANA MILLER	Merchandise Order - Forts Store and Visitor Centre	$ 706.00
EFT133675	18/04/2019	MJB INDUSTRIES PTY LTD	Concrete Supplies - Q18011	$ 880.00
EFT133676	18/04/2019	ANTHONY MOIR	Councillor Allowances and Sitting Fees - April 2019	$ 2,909.50
EFT133677	18/04/2019	MOSTERT, DJ & H	Merchandise Order - Visitor Centre	$ 120.00
EFT133678	18/04/2019	MOUNT ROMANCE AUSTRALIA PTY LTD	Merchandise Order - Visitor Centre	$ 954.82
EFT133679	18/04/2019	NURRUNGA COMMUNICATIONS	Repairs and Maintenance - Fleet Vehicle	$ 631.77
EFT133680	18/04/2019	PSR NELSON	Refund	$ 50.00
EFT133681	18/04/2019	NEVILLES HARDWARE & BUILDING SUPPLIES	Material Supply - PLY	$ 257.60
EFT133682	18/04/2019	PR AND ER NEWMAN'S QUALITY CONCRETE PRODUCTS	Drainage Products - C18011	$ 4,132.92
EFT133683	18/04/2019	ALBANY NEWS DELIVERY	News Paper Deliveries	$ 140.75
EFT133684	18/04/2019	P NIELSEN	Staff Reimbursement	$ 225.60
EFT133685	18/04/2019	NIKANA CONTRACTING PTY LTD	Boat Harbour Skip Bin Hire	$ 2,626.80
EFT133686	18/04/2019	NLC PTY LTD	Novated Leases And Associated Costs	$ 1,351.30
EFT133687	18/04/2019	NSW DEPARTMENT OF INDUSTRY	Material Supply - Vial of RHDV	$ 374.00
EFT133688	18/04/2019	OCS SERVICES PTY LTD	Cleaning Services - C15015	$ 502.81
EFT133689	18/04/2019	OFFICEWORKS SUPERSTORES PTY LTD	Office Supplies/Materials	$ 160.75
EFT133690	18/04/2019	O'KEEFE'S PAINTS	Paint Supplies	$ 1,292.96
EFT133691	18/04/2019	SHIRE OF GNOWANGERUP	Introduction to Local Government Workshop	$ 462.00
EFT133692	18/04/2019	IXOM	Material Supply - Chlorine	$ 348.50
EFT133693	18/04/2019	PARISH LANE WINES	Refreshments - Civic Receptions	$ 600.00
EFT133694	18/04/2019	PENROSE PROFESSIONAL LAWNCARE	Lawn Mowing Services - Vancouver Arts Centre	$ 264.00
EFT133695	18/04/2019	AUSTRALASIAN PERFORMING RIGHT ASSOCIATION LIMITED	Background Music Licences	$ 1,174.94

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT133696	18/04/2019	PERTH SAFETY PRODUCTS PTY LTD	Road Signage - Various	$ 7,381.00
EFT133697	18/04/2019	PERIBO PTY LTD	Merchandise Order - Forts Store	$ 475.08
EFT133698	18/04/2019	PETER GRAHAM AND COMPANY LTD	Material Supply - Wand	$ 91.41
EFT133699	18/04/2019	PFD FOOD SERVICES PTY LTD	Tea and Coffee Supplies	$ 658.30
EFT133700	18/04/2019	HANSON CONSTRUCTION MATERIALS PTY LTD	Road Materials - C16015	$ 9,819.41
EFT133701	18/04/2019	PLANTAGENET NEWS	Advertising - Age Friendly Workshop	$ 126.00
EFT133702	18/04/2019	ALBANY PLAZA PHARMACY	First Aid Supplies	$ 97.48
EFT133703	18/04/2019	ALBANY PLUMBING AND GAS	Plumbing Services - C17020	$ 7,144.42
EFT133704	18/04/2019	@THE POOLSIDE	Catering - EA Negotiations	$ 409.50
EFT133705	18/04/2019	PRE-EMPTIVE STRIKE PTY LTD	Printing Services - Active Albany	$ 121.00
EFT133706	18/04/2019	PRINTSYNC BUSINESS SOLUTIONS	Printing Services - Lotteries House	$ 91.02
EFT133707	18/04/2019	RAECO INTERNATIONAL PTY LTD	Material Supply - Singlefold Matt	$ 268.93
EFT133708	18/04/2019	RED MOLLY MOVIES	Screening Rights - Australia Day 2020 Movie	$ 605.00
EFT133709	18/04/2019	REECE PTY LTD	Plumbing Supplies	$ 27.79
EFT133710	18/04/2019	REPLICA MEDALS & RIBBONS PTY LTD	Merchandise Order - Forts Store	$ 112.64
EFT133711	18/04/2019	RESINATE DESIGNS	Merchandise Order - Forts Store	$ 2,073.50
EFT133712	18/04/2019	R-GROUP INTERNATIONAL	IT Services - C17024	$ 13,513.50
EFT133713	18/04/2019	ROBERTS GARDINER ARCHITECTS	Design Services - Q18009	$ 1,406.54
EFT133714	18/04/2019	ROCKCLIFFE WINE	Refund	$ 80.00
EFT133715	18/04/2019	HAZEL ROOME	Professional Services - EAP	$ 825.00
EFT133716	18/04/2019	SBA PRECIOUS METALS PTY LTD	Merchandise Order - Forts Store	$ 220.00
EFT133717	18/04/2019	SEEK LIMITED	Advertising - Vacant Positions	$ 616.00
EFT133718	18/04/2019	SEEDESIGN STUDIO PTY LTD	Design Services - Alison Hartman Gardens	$ 561.00
EFT133719	18/04/2019	JOHN SHANHUN	Councillor Allowances and Sitting Fees - April 2019	$ 2,909.50
EFT133720	18/04/2019	G & L SHEETMETAL	Sheetmetal Supplies	$ 275.10
EFT133721	18/04/2019	SHIRE OF EAST PILBARA	Application for Design Compliance - Frenchman Bay	$ 150.00
EFT133722	18/04/2019	SIGMA CHEMICALS	Chemical Supplies	$ 2,971.53
EFT133723	18/04/2019	M DE KONING & D.H SNYDER & T YUEN	Pump Track Consultation and Report	$ 7,834.20
EFT133724	18/04/2019	SKILL HIRE WA PTY LTD	Casual Staff/Apprentice Fees	$ 12,866.53
EFT133725	18/04/2019	SKIPPER TRANSPORT PARTS	Material Supplies - Various	$ 914.81
EFT133726	18/04/2019	TRACY SLEEMAN	Councillor Allowances and Sitting Fees - April 2019	$ 2,909.50
EFT133727	18/04/2019	CHEY SLEEMAN	Design Services - Storm the Beach	$ 715.00
EFT133728	18/04/2019	SMITHS ALUMINIUM AND 4WD CENTRE	Manufacturing Services - Steel Tipper Tray Transfer	$ 4,485.00
EFT133729	18/04/2019	SANDIE SMITH	Councillor Allowances and Sitting Fees - April 2019	$ 2,909.50
EFT133730	18/04/2019	SOIL SOLUTIONS PTY LTD	Road Materials - C16015	$ 28,317.04
EFT133731	18/04/2019	SOUTHERN TOOL AND FASTENER CO	Hardware And Tool Supplies - Various	$ 1,066.36
EFT133732	18/04/2019	SOUTH COAST CRANE HIRE	Equipment Hire - CPSP and Lake Seppings	$ 1,446.50
EFT133733	18/04/2019	SPM ASSETS PTY LTD	SPM Assets Subscription	$ 6,141.30
EFT133734	18/04/2019	SPORTS MARKETING AUSTRALIA PTY LTD	2020 Golf of WA State Sand Green Championships	$ 7,260.00
EFT133735	18/04/2019	SPURR OF THE MOMENT DESIGN	Design Services - Signage	$ 132.00
EFT133736	18/04/2019	STATEWIDE BEARINGS	Material Supply - Ball Bearing	$ 187.26
EFT133737	18/04/2019	BLUESCOPE DISTRIBUTION PTY LTD	Material Supply - Steel	$ 42.61
EFT133738	18/04/2019	STEWART AND HEATON CLOTHING PTY LTD	Emergency Services Uniform Supplies	$ 1,103.05

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT133739	18/04/2019	REBECCA STEPHENS	Councillor Allowances and Sitting Fees - April 2019	$ 2,909.50
EFT133740	18/04/2019	ST JOHN AMBULANCE WESTERN AUSTRALIA LTD	First Aid - Q17058	$ 1,363.20
EFT133741	18/04/2019	GREGORY BRIAN STOCKS	Deputy Mayoral Allowances and Sitting Fee - March 2019	$ 4,760.83
EFT133742	18/04/2019	SUGGS TIMBER MACHINING	Professional Services - North Road Admin	$ 132.00
EFT133743	18/04/2019	ALBANY LOCK SERVICE	Key Upgrade - C14003	$ 11,183.20
EFT133744	18/04/2019	SUPLIME STAND UP PADDLEBOARD SCHOOL	Lessons - Youth Week	$ 300.00
EFT133745	18/04/2019	ROBERT SUTTON	Councillor Allowances and Sitting Fees - April 2019	$ 2,909.50
EFT133746	18/04/2019	T & C SUPPLIES	Hardware And Tool Supplies - Various	$ 3,413.71
EFT133747	18/04/2019	T-QUIP	Various Materials - Truck Repairs	$ 1,753.80
EFT133748	18/04/2019	PAUL TERRY	Councillor Allowances and Sitting Fees - April 2019	$ 2,909.50
EFT133749	18/04/2019	THREE ANCHORS	Catering - Storm the Beach	$ 530.00
EFT133750	18/04/2019	THURLBY HERB FARM	Merchandise Order - Forts Store	$ 1,262.41
EFT133751	18/04/2019	CENTAMAN SYSTEMS PTY LTD	Material Supply - Plastic Cards	$ 869.00
EFT133752	18/04/2019	TRAILBLAZERS	Material Supply - Gas Bottle	$ 53.35
EFT133753	18/04/2019	TRADELINK PLUMBING SUPPLIES	Material Supply - Pipes	$ 1,098.31
EFT133754	18/04/2019	TRUCKLINE	Major Plant Supplies	$ 83.85
EFT133755	18/04/2019	TRUCK CENTRE WA PTY LTD	Truck Repairs and Maintenance	$ 780.09
EFT133756	18/04/2019	TUAARI AMOR-KUITI	Drum Workshop - Youth Week	$ 120.00
EFT133757	18/04/2019	ALBANY TYREPOWER	Tyre Repairs and Maintenance - Q19001	$ 1,344.35
EFT133758	18/04/2019	VOEGELER CREATIONS	Merchandise Order - Visitor Centre	$ 1,566.00
EFT133759	18/04/2019	MARK & CARA-ANN WADE	Rates Refund	$ 177.06
EFT133760	18/04/2019	WA NATURALLY PUBLICATIONS	Merchandise Order - Visitor Centre	$ 365.88
EFT133761	18/04/2019	DEPARTMENT OF WATER AND ENVIRONMENTAL REGULATION	Licence Renewal 2019 - Waste Facility	$ 12,994.72
EFT133762	18/04/2019	KIYA WATT	Design Services - Mokare Project	$ 750.00
EFT133763	18/04/2019	WAXIWRAPS	Merchandise Order - Forts Store and Visitor Centre	$ 1,478.39
EFT133764	18/04/2019	VICTOR WEBB	Equipment Hire - Bouncy Castles	$ 660.00
EFT133765	18/04/2019	ALBANY & GREAT SOUTHERN WEEKENDER	Advertising - Various	$ 1,761.50
EFT133766	18/04/2019	WELLINGTON AND REEVES	Storage Unit - Op Shop Clothing Social Enterprise	$ 120.00
EFT133767	18/04/2019	DENNIS WELLINGTON	Mayoral Allowances and Sitting Fee - April 2019	$ 11,621.69
EFT133768	18/04/2019	WESTERN AUSTRALIAN LOCAL GOVERNMENT ASSOCIATION	Staff Training - Roadside Vegetation	$ 176.00
EFT133769	18/04/2019	LANDMARK LIMITED	Horticultural Supplies - Q18001	$ 326.92
EFT133770	18/04/2019	WEST AUSTRALIAN NEWSPAPERS LIMITED	Advertising - March 2019	$ 3,188.40
EFT133771	18/04/2019	WESTSHRED DOCUMENT DISPOSAL	Document Disposal - April 2019	$ 452.10
EFT133772	18/04/2019	HOLIDAY GUIDE PTY LTD	BookEasy Marketing Fee - March 2019	$ 673.00
EFT133773	18/04/2019	WIDEBAND NETWORKS PTY LTD	Internet Charges - NBN	$ 109.00
EFT133774	18/04/2019	WILD WEST SEEDS	Merchandise Order - Visitor Centre	$ 62.00
EFT133775	18/04/2019	DAVID PETER WILKINSON	Refund	$ 270.00
EFT133776	18/04/2019	WOOLWORTHS GROUP LIMITED	Groceries - Day Care Centre	$ 2,076.62
EFT133777	18/04/2019	WOOD AND GRIEVE ENGINEERS	Design Services - CPSP	$ 5,885.00
EFT133778	18/04/2019	WOODORIGINAL	Merchandise Order - Forts Store	$ 240.90
EFT133779	18/04/2019	WORKFORCE ROAD SERVICES P/L	Line Marking Services - Albany Highway	$ 9,149.80
EFT133780	18/04/2019	WORLDWIDE PRINTING SOLUTIONS	Printing Services - Holiday Program	$ 176.00
EFT133781	18/04/2019	L YATES	Staff Reimbursement	$ 161.73

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT133782	18/04/2019	ZENITH LAUNDRY	Laundry Services/Hire	$ 79.96
EFT133784	30/04/2019	WESTERN AUSTRALIAN TREASURY CORPORATION	Loan Payment	$ 48,683.34
EFT133785	02/05/2019	ACE ACCOMMODATION ALBANY	Accommodation - Field of Light Packages	$ 2,748.00
EFT133786	02/05/2019	ACORN TREES AND STUMPS	Mowing and Mulching Services - Douglas Road	$ 2,948.00
EFT133787	02/05/2019	AD CONTRACTORS PTY LTD	Material Supply and Hire - C16012/C16015/C17015	$ 29,285.08
EFT133788	02/05/2019	ADVERTISER PRINT	Printing Services - Logo Stationery	$ 6,212.00
EFT133789	02/05/2019	AKUBRA HATS PTY LTD	Merchandise Order - Forts Store	$ 112.20
EFT133790	02/05/2019	ALBANY HYDRAULICS	Material Supply - Solenoid	$ 469.30
EFT133791	02/05/2019	OPTEON	Valuation Services	$ 880.00
EFT133792	02/05/2019	ALBANY V-BELT AND RUBBER	Vehicle Parts Supply - Filters	$ 477.33
EFT133793	02/05/2019	ALBANY SWEEP CLEAN	Sweeping Services - C15014	$ 3,663.00
EFT133794	02/05/2019	ALBANY COMMUNITY HOSPICE	Payroll Deductions	$ 54.00
EFT133795	02/05/2019	ALBANY INDOOR PLANT HIRE AND SALES	Indoor Plant Hire	$ 2,041.38
EFT133796	02/05/2019	ALBANY PANEL BEATERS AND SPRAY PAINTERS	Heavy Fleet - Windscreen Replacement	$ 500.01
EFT133797	02/05/2019	COASTAL CRANES ALBANY	Equipment Hire - Crane	$ 2,246.75
EFT133798	02/05/2019	ALBANY OFFICE PRODUCTS DEPOT	Stationery Supplies	$ 1,481.25
EFT133799	02/05/2019	ALBANY IRRIGATION & DRILLING	Irrigation Supplies	$ 351.50
EFT133800	02/05/2019	ALBANY COMMUNITY FOUNDATION	Payroll Deductions	$ 10.00
EFT133801	02/05/2019	ALBANY RECORDS MANAGEMENT	Archival Services	$ 902.50
EFT133802	02/05/2019	ALBANY MOBILITY HIRE AND SALES	Delivery of Animal Hygiene Services - Q17036	$ 185.00
EFT133803	02/05/2019	CICERO MANAGEMENT PTY LTD	Accommodation - Staff Training	$ 209.00
EFT133804	02/05/2019	ALINTA	Gas Charges	$ 9.45
EFT133805	02/05/2019	AUSTRALIAN LIBRARY AND INFORMATION ASSOCIATION LTD	Institutional Membership 19/20	$ 1,218.00
EFT133806	02/05/2019	ROSALURY PTY LTD	Catering - Great Southern Art Award	$ 124.88
EFT133807	02/05/2019	ALL EVENTS HIRE AND PRODUCTION	Equipment Hire - Great Southern Art Award	$ 131.00
EFT133808	02/05/2019	PAPERBARK MERCHANTS	Newspaper/Book/Magazine Supplies	$ 895.03
EFT133809	02/05/2019	ATC WORK SMART	Casual Staff/Apprentice Fees	$ 25,589.67
EFT133810	02/05/2019	AUSTRALIAN TAXATION OFFICE	Payroll Deductions	$ 403,889.89
EFT133811	02/05/2019	AUSTRALIAN SERVICES UNION WA BRANCH	Payroll Deductions	$ 3,287.10
EFT133812	02/05/2019	AUSTSWIM LTD	Licence Renewal - Silver Swim Centre Recognition	$ 59.95
EFT133813	02/05/2019	AUSTRALIAN CRUISE ASSOCIATION	Membership - Cruise Ships	$ 548.90
EFT133814	02/05/2019	QUALITY SUITES BANKSIA GARDENS ALBANY	Accommodation - Taste Mini Break Package	$ 576.00
EFT133815	02/05/2019	BAREFOOT CLOTHING MANUFACTURERS	Merchandise Order - Forts Store	$ 1,642.00
EFT133816	02/05/2019	BARRETTS MINI EARTHMOVING & CHIPPING	Vegetation Maintenance - C17022	$ 3,520.00
EFT133817	02/05/2019	BATTERY WORLD	Battery Supplies	$ 29.95
EFT133818	02/05/2019	BELL ART AUSTRALIA	Merchandise Order - Visitor Centre	$ 516.75
EFT133819	02/05/2019	ADVANCED TRAFFIC MANAGEMENT WA PTY LTD	Traffic Control Services - C17014	$ 13,973.73
EFT133820	02/05/2019	BEST OFFICE SYSTEMS	Photocopier Rental - March 2019	$ 90.00
EFT133821	02/05/2019	BIBBULMUN TRACK FOUNDATION	Merchandise Order - Visitor Centre	$ 134.00
EFT133822	02/05/2019	BIO DIVERSE SOLUTIONS	Motor Sports Park - Q19008	$ 9,042.00
EFT133823	02/05/2019	BISSELTOE PRESS	Library Books	$ 57.75
EFT133824	02/05/2019	BLACK AND WHITE CONCRETING	Concrete Path Installation - Lake Weelara	$ 11,800.00
EFT133825	02/05/2019	J. BLACKWOOD & SON PTY LTD	Material Supplies - Various	$ 1,216.91

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT133826	02/05/2019	ALBANY BOBCAT SERVICES	Equipment Hire - C16012	$ 4,441.30
EFT133827	02/05/2019	P BOCKMAN	Staff Reimbursement	$ 11.50
EFT133828	02/05/2019	BRIDGESTONE AUSTRALIA LTD	Tyre Repairs and Maintenance - Q19001	$ 1,154.47
EFT133829	02/05/2019	BUNNINGS GROUP LIMITED	Hardware And Tool Supplies - Various	$ 236.34
EFT133830	02/05/2019	BUSBY INVESTMENTS PTY LTD	Vehicle Hire - CEO Meetings	$ 245.84
EFT133831	02/05/2019	BUSY BLUE BUS	Shuttle Services - Field of Light - Q18024	$ 5,911.70
EFT133832	02/05/2019	C&C MACHINERY CENTRE	Material Supply - Filters	$ 473.85
EFT133833	02/05/2019	CALTEX AUSTRALIA PETROLEUM PTY LTD	Fuel Supplies	$ 16,171.41
EFT133834	02/05/2019	CAMTRANS ALBANY PTY LTD	Paving Supplies - Grey Street East	$ 8,610.00
EFT133835	02/05/2019	DONNA CAMERON DESIGN	Design Services - Great Southern Art Award	$ 2,039.40
EFT133836	02/05/2019	CARSMART ALBANY	Fridge De-Gassing - Waste Facility	$ 3,488.00
EFT133837	02/05/2019	CENTIGRADE SERVICES PTY LTD	Air-Conditioning Services - C18014/Q18016	$ 6,133.67
EFT133838	02/05/2019	CHERRY BOOTS ALBANY	Merchandise Order - Forts Store	$ 283.00
EFT133839	02/05/2019	CHILD SUPPORT AGENCY	Payroll Deductions	$ 802.32
EFT133840	02/05/2019	CLARK TYRES	Tyre Repairs and Maintenance - Q19001	$ 155.00
EFT133841	02/05/2019	COLRAY EXHAUST AND TOWBAR	Material Supply - Elbow	$ 105.00
EFT133842	02/05/2019	COLES SUPERMARKETS AUSTRALIA PTY LTD	Grocery Supplies - Various	$ 103.44
EFT133843	02/05/2019	COURIER AUSTRALIA	Freight Charges - April 2019	$ 149.73
EFT133844	02/05/2019	ALBANY SIGNS	Signage - Various	$ 616.00
EFT133845	02/05/2019	HOLCIM (AUSTRALIA) PTY LTD	Concrete Supplies - C16010	$ 435.60
EFT133846	02/05/2019	ROGER HAYWARD CUNNINGTON	Merchandise Order - Forts Store	$ 108.00
EFT133847	02/05/2019	CUTTING EDGES PTY LTD	Material Supply - Bolts, Nuts, Washers	$ 484.25
EFT133848	02/05/2019	METATECH INTERNET PTY LTD	Web Hosting - Q18043	$ 1,058.40
EFT133849	02/05/2019	DE JONGE MECHANICAL PTY LTD	Light Fleet Vehicle Servicing - Q17009	$ 1,353.20
EFT133850	02/05/2019	HE DEKKER	Refund	$ 30.00
EFT133851	02/05/2019	DELL FINANCIAL SERVICES PTY LTD	Monthly Equipment Rental - IT	$ 577.87
EFT133852	02/05/2019	LANDGATE	Land Enquiries - Rates	$ 24,521.00
EFT133853	02/05/2019	DEPARTMENT OF BIODIVERSITY CONSERVATION AND ATTRACTIONS	Merchandise Order - Visitor Centre	$ 4,761.24
EFT133854	02/05/2019	DEPARTMENT OF TRANSPORT	Disclosure of Information Fees - Parking Control	$ 10.20
EFT133855	02/05/2019	G AND M DETERGENTS AND HYGIENE SERVICES ALBANY	Cleaning Services - Q16024	$ 325.10
EFT133856	02/05/2019	DISTINCTLY TOURISM MANAGEMENT	Professional Services - ATE	$ 2,386.63
EFT133857	02/05/2019	KEVIN DRAPER	Winner - Great Southern Art Award 2019	$ 5,000.00
EFT133858	02/05/2019	DUE SOUTH	Catering Supplies - Great Southern Art Award	$ 121.98
EFT133859	02/05/2019	DYLANS ON THE TERRACE	Catering - Strategic Workshop	$ 472.00
EFT133860	02/05/2019	EASIFLEET MANAGEMENT	Payroll Deductions	$ 15,661.20
EFT133861	02/05/2019	ELANDRIAL GAMES	Event Hosting - Library	$ 200.00
EFT133862	02/05/2019	EVERTRANS	Material Supply - Pin and Leg	$ 229.00
EFT133863	02/05/2019	EYERITE SIGNS	Signage - Various	$ 5,648.50
EFT133864	02/05/2019	DEPARTMENT OF FIRE AND EMERGENCY SERVICES	False Fire Alarm Attendance	$ 920.00
EFT133865	02/05/2019	ACE CAMERA CLUB	Photography Services - Great Southern Art Award	$ 320.00
EFT133866	02/05/2019	FLIPS ELECTRICS	Repairs and Maintenance - Pump Station	$ 1,500.00
EFT133867	02/05/2019	FOUNDATION ELECTRICAL PTY LTD	Material Supply - Tablets	$ 40.00
EFT133868	02/05/2019	FRANKS LOADER SERVICES	Equipment Hire - C16012	$ 1,360.13

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT133869	02/05/2019	FREMANTLE ARTS CENTRE PRESS	Merchandise Order - Forts Store	$ 1,911.96
EFT133870	02/05/2019	FRONTLINE FIRE & RESCUE EQUIPMENT	Fire Equipment - Speaker	$ 386.54
EFT133871	02/05/2019	GOLDSPAR AUSTRALIA PTY LTD	Multipoles - Alison Hartman Gardens	$ 12,289.75
EFT133872	02/05/2019	IMPERIAL GROUP PTY LTD	Field Of Light Dining Packages	$ 5,510.00
EFT133873	02/05/2019	J GARROOD	Staff Reimbursement	$ 346.20
EFT133874	02/05/2019	GLOBAL INTEGRATED SOLUTIONS LIMITED	Ezicom Fees - Airport	$ 36.19
EFT133875	02/05/2019	GODFREYS THE VACUUM CLEANER SPECIALISTS	Cleaning Supplies - Vacuum Cleaner and Filters	$ 388.90
EFT133876	02/05/2019	GOURMANDISE & CO	Catering - Peronne Exhibition	$ 600.00
EFT133877	02/05/2019	GREAT SOUTHERN PEST & WEED CONTROL	Pest Control Services - Q17027	$ 115.00
EFT133878	02/05/2019	SOUTHERN SHARPENING SERVICES	Fire Equipment Maintenance - C14030	$ 66.00
EFT133879	02/05/2019	GREAT SOUTHERN SAND AND LANDSCAPING SUPPLIES	Equipment Hire - C10612	$ 14,850.00
EFT133880	02/05/2019	GREAT SOUTHERN SUPPLIES	Paper and Uniform Supplies - Q17008/Q17028	$ 5,541.91
EFT133881	02/05/2019	GRIFFITHS ARCHITECTS PTY LTD	Architectural Consultancy Services - C18008	$ 12,375.55
EFT133882	02/05/2019	M GRISKONIS	Refund	$ 145.00
EFT133883	02/05/2019	GHD PTY LTD	Motor Sports Park Feasibility Study	$ 17,551.60
EFT133884	02/05/2019	SMITH CONSTRUCTIONS WA	Alison Hartman Gardens - C18020	$ 120,754.16
EFT133885	02/05/2019	ESTATE OF BRIAN C HEALY	Rates Refund	$ 1,752.33
EFT133886	02/05/2019	AFGRI EQUIPMENT AUSTRALIA PTY LTD	Material Supply - Bracket and Seal	$ 601.49
EFT133887	02/05/2019	HHG LEGAL GROUP	Legal Services - C16011	$ 13,635.09
EFT133888	02/05/2019	IMPACT SERVICE PTY LTD	Casual Staff/Apprentice Fees	$ 396.00
EFT133889	02/05/2019	JACK THE CHIPPER	Vegetation Maintenance - C17022	$ 635.25
EFT133890	02/05/2019	JAMES WALMSLEY DESIGN	Design Services - Vancouver Street Festival	$ 560.00
EFT133891	02/05/2019	JJ'S HIAB SERVICES & JJ'S GREAT SOUTHERN	Equipment Hire - Q16037	$ 2,816.00
EFT133892	02/05/2019	JOHN KINNEAR AND ASSOCIATES	Survey Services - C16016	$ 5,924.05
EFT133893	02/05/2019	REGAN KELLY	VAC Program - Music Class	$ 600.00
EFT133894	02/05/2019	KING RIVER VOLUNTEER BUSH FIRE BRIGADE	Reimbursement of Electricity Charges	$ 669.70
EFT133896	02/05/2019	KLB SYSTEMS	IT Supplies - C17024	$ 4,427.50
EFT133897	02/05/2019	LATRO LAWYERS	Legal Services - C16011	$ 328.90
EFT133898	02/05/2019	LEASEIT LIMITED	Photocopier Lease - May 2019	$ 1,094.50
EFT133899	02/05/2019	LIBBY SHEPPARD DESIGN	Merchandise Order - Visitor Centre	$ 357.34
EFT133900	02/05/2019	M AND B SALES PTY LTD	Material Supply - Timber	$ 252.21
EFT133901	02/05/2019	ALBANY EVENT HIRE	Equipment Hire - Great Southern Art Award	$ 588.90
EFT133902	02/05/2019	SOUTH COAST WOODWORKS GALLERY	Merchandise Order - Forts Store	$ 1,540.00
EFT133903	02/05/2019	ALBANY CITY MOTORS	Material Supply - Fuel Tank	$ 137.74
EFT133904	02/05/2019	MANYPEAKS COMMUNITY AND RECREATION ASSOCIATION	Reimbursement of Electricity Charges	$ 1,335.00
EFT133905	02/05/2019	ISAAC MCLELLAN	Workshop - Storm the Beach	$ 890.00
EFT133906	02/05/2019	SK MIER	Refund	$ 383.00
EFT133907	02/05/2019	JENNIFER MITCHELL	Merchandise Order - Visitor Centre	$ 909.00
EFT133908	02/05/2019	I MOOLMAN	Staff Reimbursement	$ 175.50
EFT133909	02/05/2019	CHAD & DANIELLE MORACHE	Rates Refund	$ 400.00
EFT133910	02/05/2019	NURRUNGA COMMUNICATIONS	Repairs and Maintenance - Fleet Vehicle	$ 2,596.01
EFT133911	02/05/2019	MULE CREATIVE	Sustainable Heroes Video - March and April 2019	$ 2,128.50
EFT133912	02/05/2019	PR AND ER NEWMAN'S QUALITY CONCRETE PRODUCTS	Drainage Products - C18011	$ 1,100.00

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT133913	02/05/2019	ALBANY NEWS DELIVERY	News Paper Deliveries	$ 256.70
EFT133914	02/05/2019	NLC PTY LTD	Novated Leases And Associated Costs	$ 1,351.30
EFT133915	02/05/2019	OCP SALES	Material Supply - Radio	$ 612.30
EFT133916	02/05/2019	OCS SERVICES PTY LTD	Cleaning Services - C15015	$ 34,781.32
EFT133917	02/05/2019	OFFICEWORKS SUPERSTORES PTY LTD	Office Supplies/Materials	$ 280.92
EFT133918	02/05/2019	WESLEY JOHN OLSON	Merchandise Order - Forts Store	$ 216.00
EFT133919	02/05/2019	K PACKARD	Refund	$ 256.00
EFT133920	02/05/2019	PARKS AND LEISURE AUSTRALIA	Awards Ceremony Attendance - Milpara Park	$ 60.50
EFT133921	02/05/2019	PERTH SAFETY PRODUCTS PTY LTD	Road Signage - Various	$ 4,149.20
EFT133922	02/05/2019	HANSON CONSTRUCTION MATERIALS PTY LTD	Road Materials - C16015	$ 1,219.38
EFT133923	02/05/2019	ALBANY PLUMBING AND GAS	Plumbing Services - C17020	$ 4,631.43
EFT133924	02/05/2019	@THE POOLSIDE	Catering - EA Negotiations	$ 351.00
EFT133925	02/05/2019	PORTION PACK FOODS LTD	Emergency Services Ration Packs	$ 423.50
EFT133926	02/05/2019	PRE-EMPTIVE STRIKE PTY LTD	Printing Services - Active Albany	$ 957.00
EFT133927	02/05/2019	PROMOTIONS ONLY	Material Supply - Lanyard	$ 5,302.00
EFT133928	02/05/2019	PROGRAMMED FACILITY MANAGEMENT PTY LTD	Retention Release - C17021	$ 5,645.77
EFT133929	02/05/2019	PROTECTOR FIRE SERVICES	Repairs and Maintenance - Hose	$ 126.50
EFT133930	02/05/2019	R & L BITUMEN SERVICE PTY LTD	Asphalt Services - C18010	$ 20,000.00
EFT133931	02/05/2019	DAVID RASTRICK	Entertainment - Great Southern Art Award	$ 300.00
EFT133932	02/05/2019	R-COM INTERNATIONAL PTY LTD	IT Services - SIP And Web App Service	$ 170.50
EFT133933	02/05/2019	REECE PTY LTD	Plumbing Supplies	$ 173.56
EFT133934	02/05/2019	WP REID	Professional Services - C16026	$ 616.00
EFT133935	02/05/2019	MERCEDES SALINAS	Rates Refund	$ 234.24
EFT133936	02/05/2019	ALBANY SCAFFOLD HIRE	Scaffold Hire - Youth Week	$ 3,960.00
EFT133937	02/05/2019	SEEK LIMITED	Advertising - Vacant Positions	$ 924.00
EFT133938	02/05/2019	SKILL HIRE WA PTY LTD	Casual Staff/Apprentice Fees	$ 7,943.13
EFT133939	02/05/2019	SOUTHCOAST SECURITY SERVICE	Security Services - C15016	$ 1,014.75
EFT133940	02/05/2019	SOUTH COAST ENVIRONMENTAL	Security Services - C15016	$ 2,376.00
EFT133941	02/05/2019	STAR SALES AND SERVICE	Material Supply - Pressure Cleaner	$ 213.60
EFT133942	02/05/2019	BLUESCOPE DISTRIBUTION PTY LTD	Material Supply - Steel	$ 31.33
EFT133943	02/05/2019	ST JOHN AMBULANCE WESTERN AUSTRALIA LTD	First Aid - Q17058	$ 160.00
EFT133944	02/05/2019	STRUCTERRE CONSULTING ENGINEERS	Design Services - Proudlove Parade Car Park	$ 2,145.00
EFT133945	02/05/2019	ALBANY LOCK SERVICE	Key Upgrade - C14003	$ 2,135.29
EFT133946	02/05/2019	SYNERGY	Electricity Charges	$ 55,649.55
EFT133947	02/05/2019	T & C SUPPLIES	Hardware And Tool Supplies - Various	$ 819.49
EFT133948	02/05/2019	NAKED BEAN COFFEE ROASTERS	Tea and Coffee Supplies	$ 165.00
EFT133949	02/05/2019	THE 12 VOLT WORLD	Material Supply - Battery Charger and Cord	$ 46.00
EFT133950	02/05/2019	THINKWATER ALBANY	Reticulation Supplies	$ 55.59
EFT133951	02/05/2019	THREE ANCHORS	Field Of Light Dining Packages	$ 1,300.00
EFT133952	02/05/2019	TIM WATERS DESIGN	Design Services - Mounts Logo	$ 1,320.00
EFT133953	02/05/2019	TOYOTA MATERIAL HANDLING AUSTRALIA PTY LTD	Various Materials - Truck Repairs	$ 1,160.08
EFT133954	02/05/2019	TRAILBLAZERS	Material Supply - Sunscreen and Bug Repellent	$ 213.45
EFT133955	02/05/2019	CAROLYN FRANCIS TRAPNELL	Merchandise Order - Visitor Centre	$ 855.00

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT133956	02/05/2019	JC TRAPPITT	Refund	$ 128.00
EFT133957	02/05/2019	TRUCKLINE	Major Plant Supplies	$ 69.50
EFT133958	02/05/2019	ALBANY TYREPOWER	Tyre Repairs and Maintenance - Q19001	$ 1,729.40
EFT133959	02/05/2019	MOORE STEPHENS PTY LTD	Auditing Services - P16012	$ 17,736.40
EFT133960	02/05/2019	ATLANTA VELD	Turtle Relocation - CPSP	$ 2,940.00
EFT133961	02/05/2019	SERENITAS COMMUNITIES HOLDINGS PTY LTD	Rates Refund	$ 531.07
EFT133962	02/05/2019	WA NATURALLY PUBLICATIONS	Merchandise Order - Visitor Centre	$ 83.40
EFT133963	02/05/2019	ALBANY & GREAT SOUTHERN WEEKENDER	Advertising - Various	$ 2,993.05
EFT133964	02/05/2019	WELLINGTON AND REEVES	Storage Unit - Op Shop Clothing Social Enterprise	$ 160.00
EFT133965	02/05/2019	WESTERN AUSTRALIAN MUSEUM	Staff Training - Roadside Vegetation	$ 23,365.10
EFT133966	02/05/2019	AD WHYTE & AS ZANARDO	Rates Refund	$ 98.47
EFT133967	02/05/2019	WORLDWIDE PRINTING SOLUTIONS	Printing Services - Holiday Program	$ 33.00
EFT133968	02/05/2019	WREN OIL	Waste Disposal	$ 33.00
EFT133969	02/05/2019	ZENITH LAUNDRY	Laundry Services/Hire	$ 19.48
EFT133970	09/05/2019	VEND LIMITED	Annual Subscription - POS Systems	$ 7,488.00
EFT133971	09/05/2019	ACCESS ICON PTY LTD	Construction Services - Napier Bush Fire Brigade Shed	$ 1,809.50
EFT133972	09/05/2019	ACORN TREES AND STUMPS	Fire Access Track Maintenance - Q18031	$ 3,300.00
EFT133973	09/05/2019	AD CONTRACTORS PTY LTD	Material Supply and Hire - C16012/C16015/C17015	$ 17,807.18
EFT133974	09/05/2019	ADVERTISER PRINT	Printing Services - Business Cards	$ 65.00
EFT133975	09/05/2019	WELLSTEAD RURAL SERVICES	Fuel Supplies - Cape Riche Camping	$ 119.15
EFT133976	09/05/2019	AUSTRALIAN AIRPORTS ASSOCIATION	WA Division Meeting - Staff Attendance	$ 180.00
EFT133977	09/05/2019	ALBANY INDUSTRIAL SERVICES PTY LTD	Equipment Hire - C17015/C16012	$ 9,390.15
EFT133978	09/05/2019	ALBANY STATIONERS OFFICE CHOICE	Professional Services - Laminate	$ 144.00
EFT133979	09/05/2019	RETRAVISION ALBANY	Material Supply - TV	$ 249.00
EFT133980	09/05/2019	ALBANY COMMUNITY RADIO INC.	Mast Rental - March to June 2019	$ 1,844.48
EFT133981	09/05/2019	ALBANY OFFICE PRODUCTS DEPOT	Stationery Supplies	$ 1,675.12
EFT133982	09/05/2019	JW & DF WOODBURY	Merchandise Order - Visitor Centre	$ 130.00
EFT133983	09/05/2019	ALBANY QUALITY LAWN MOWING	Lawn Mowing Services - Lotteries House	$ 110.00
EFT133984	09/05/2019	ALBANY MILK DISTRIBUTORS	Milk Supplies	$ 659.95
EFT133985	09/05/2019	ALBANY MOBILITY HIRE AND SALES	Delivery of Animal Hygiene Services - Q17036	$ 185.00
EFT133986	09/05/2019	ALINTA	Gas Charges	$ 32.05
EFT133987	09/05/2019	AUSTRALIAN LIBRARY AND INFORMATION ASSOCIATION LTD	Professional Membership 19/20	$ 349.00
EFT133988	09/05/2019	AMITY HEALTH LIMITED	Professional Services - EAP	$ 572.00
EFT133989	09/05/2019	ATC WORK SMART	Casual Staff/Apprentice Fees	$ 7,693.83
EFT133990	09/05/2019	AUSWEST 4WD DISMANTLERS	Material Supply - Wheel Nut Set	$ 55.00
EFT133991	09/05/2019	BAREFOOT CLOTHING MANUFACTURERS	Uniform Supplies - Albany Heritage Park	$ 807.50
EFT133992	09/05/2019	BATTERY WORLD	Battery Supplies	$ 263.10
EFT133993	09/05/2019	BENNETTS BATTERIES	Material Supply - Oil	$ 990.00
EFT133994	09/05/2019	ADVANCED TRAFFIC MANAGEMENT WA PTY LTD	Traffic Control Services - C17014	$ 18,467.55
EFT133995	09/05/2019	BEST OFFICE SYSTEMS	Photocopier Rental - April 2019	$ 40.00
EFT133996	09/05/2019	J. BLACKWOOD & SON PTY LTD	Material Supplies - Various	$ 275.94
EFT133997	09/05/2019	ALBANY BOBCAT SERVICES	Equipment Hire - C16012	$ 748.00
EFT133998	09/05/2019	GR BOETEL	Refund	$ 147.00

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT133999	09/05/2019	AIR BP	AV Gas Charges	$ 826.99
EFT134000	09/05/2019	BRANDNET PTY LTD	Merchandise Order - Forts Store	$ 3,315.88
EFT134001	09/05/2019	BLUE SKY RENEWABLES PTY LTD	ALAC Renewable Energy Feasibility Study - Q19012	$ 54,296.00
EFT134002	09/05/2019	BUNNINGS GROUP LIMITED	Hardware And Tool Supplies - Various	$ 460.07
EFT134003	09/05/2019	BUSY BLUE BUS	Shuttle Services - Field of Light - Q18024	$ 3,654.90
EFT134004	09/05/2019	CABCHARGE AUSTRALIA LIMITED	Taxi Charges	$ 520.06
EFT134005	09/05/2019	CALTEX AUSTRALIA PETROLEUM PTY LTD	Starcard Purchases - April 2019	$ 5,672.25
EFT134006	09/05/2019	CALTEX AUSTRALIA PETROLEUM PTY LTD	Fuel Supplies	$ 7,690.27
EFT134007	09/05/2019	CAMTRANS ALBANY PTY LTD	Paving Supplies - Grey Street East	$ 10,285.66
EFT134008	09/05/2019	J & S CASTLEHOW ELECTRICAL SERVICES	Electrical Services - C18019/C17018	$ 14,463.16
EFT134009	09/05/2019	CHERRY BOOTS ALBANY	Merchandise Order - Forts Store	$ 264.00
EFT134010	09/05/2019	CLEANAWAY PTY LIMITED	Rubbish Removal - P14021	$ 5,595.98
EFT134011	09/05/2019	CMM TECHNOLOGY	Lifeloc Calibration	$ 115.50
EFT134012	09/05/2019	COATES HIRE OPERATIONS PTY LIMITED	Equipment Hire - Various	$ 374.55
EFT134013	09/05/2019	COLES SUPERMARKETS AUSTRALIA PTY LTD	Grocery Supplies - Various	$ 227.92
EFT134014	09/05/2019	TANJA COLBY DESIGNS	Merchandise Order - Forts Store	$ 74.00
EFT134015	09/05/2019	COMMUNITY INFORMATION SUPPORT SERVICES LTD	Membership Renewal - My Community Directory 2019	$ 10,585.85
EFT134016	09/05/2019	CONSTRUCTION EQUIPMENT AUSTRALIA	Material Supply - Pump	$ 69.88
EFT134017	09/05/2019	COURIER AUSTRALIA	Freight Charges - April 2019	$ 136.38
EFT134018	09/05/2019	ALBANY SIGNS	Signage - Entry Door	$ 132.00
EFT134019	09/05/2019	DONNA FURN COYNE	Professional Services - Mokare Project	$ 2,500.00
EFT134020	09/05/2019	DOWNER EDI WORKS PTY LTD	Material Supply - Coldmix	$ 895.32
EFT134021	09/05/2019	HOLCIM (AUSTRALIA) PTY LTD	Concrete Supplies - C16010	$ 6,152.30
EFT134022	09/05/2019	AL CURNOW HYDRAULICS	Material Supply - Switch	$ 79.31
EFT134023	09/05/2019	CLAYTON JOHN DE JAGER	Rates Refund	$ 672.05
EFT134024	09/05/2019	GRYSTJE DOUST	Active Albany Program - Knit Happens	$ 480.00
EFT134025	09/05/2019	DYLANS ON THE TERRACE	Catering - Field of Light and OCM	$ 1,154.00
EFT134026	09/05/2019	EDEN GATE ESTATE	Merchandise Order - Forts Store	$ 138.00
EFT134027	09/05/2019	ANGELA EDWARDS	Cleaning Services - Q18034	$ 1,163.00
EFT134028	09/05/2019	BK & DE EDWARDS	Shuttle Services - Field of Light	$ 3,199.72
EFT134029	09/05/2019	E-STRALIAN PTY LTD	Weekly E-Bike Lease	$ 259.92
EFT134030	09/05/2019	EYERITE SIGNS	Signage - Various	$ 583.00
EFT134031	09/05/2019	CAROL ANN FARMER	Winner - Great Southern Art Award 2019	$ 1,000.00
EFT134032	09/05/2019	ALBANY FENCING COMPANY	Equipment Hire - Anzac Day	$ 814.00
EFT134033	09/05/2019	THE FIXUPPERY	Window Cleaning Services - Q16023	$ 2,267.01
EFT134035	09/05/2019	FRONTLINE FIRE & RESCUE EQUIPMENT	Fire Brigade Safety Equipment	$ 208.95
EFT134036	09/05/2019	GARAGE SALE TRAIL FOUNDATION LTD	Annual subscription to Garage Sale Trail	$ 6,794.70
EFT134037	09/05/2019	GLOBAL SYNTHETICS	Material Supply - Jutelok	$ 1,576.83
EFT134038	09/05/2019	GORDON WALMSLEY PTY LTD	Asphalt Services - C18010	$ 3,150.00
EFT134039	09/05/2019	GREEN SKILLS INCORPORATED	Environmental Maintenance Services - C16009	$ 1,901.27
EFT134040	09/05/2019	GREAT SOUTHERN PEST & WEED CONTROL	Pest Control Services - Q17027	$ 115.00
EFT134041	09/05/2019	SOUTHERN SHARPENING SERVICES	Fire Equipment Maintenance - C14030	$ 535.00
EFT134042	09/05/2019	GREAT SOUTHERN SAND AND LANDSCAPING SUPPLIES	Equipment Hire - C10612	$ 4,946.50

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT134043	09/05/2019	GREAT SOUTHERN SUPPLIES	Paper and Uniform Supplies - Q17008/Q17028	$ 174.00
EFT134044	09/05/2019	GREAT SOUTHERN TURF	Turf Supply - C18001	$ 429.00
EFT134045	09/05/2019	GREAT SOUTHERN TOURISM EVENTS	Albany Wine and Food Festival - Light It Up Feast	$ 458.40
EFT134046	09/05/2019	GREAT SOUTHERN GEOTECHNICS PTY LTD	Site Classification - CPSP	$ 715.00
EFT134047	09/05/2019	GSM AUTO ELECTRICAL	Repairs and Maintenance - Airport Generator	$ 62.25
EFT134048	09/05/2019	GHD PTY LTD	Economic Development Plan - Q18032	$ 1,902.63
EFT134049	09/05/2019	SMITH CONSTRUCTIONS WA	Alison Hartman Gardens - C18020	$ 139,519.04
EFT134050	9/05/2019	RUTH HALBERT	VAC Exhibition	$ 1,000.00
EFT134051	9/05/2019	HARPER ENTERTAINMENT DISTRIBUTION SERVICE	Merchandise Order - Forts Store	$ 291.21
EFT134052	9/05/2019	HAVOC BUILDERS PTY LTD	Building Services - C17028	$ 11,443.50
EFT134053	9/05/2019	JR AND A HERSEY PTY LTD	Safety Equipment - Gloves	$ 925.54
EFT134054	9/05/2019	HOBBS PAINTING AND DECORATING	Painting Services - Q18054	$ 1,430.00
EFT134056	9/05/2019	H+H ARCHITECTS	Design Services - C16007	$ 928.13
EFT134057	9/05/2019	HHG LEGAL GROUP	Legal Services - C16011	$ 3,979.80
EFT134058	9/05/2019	JOHN KINNEAR AND ASSOCIATES	Survey Services - C16016	$ 3,606.63
EFT134059	9/05/2019	JUST A CALL DELIVERIES	Internal Mail Deliveries	$ 660.00
EFT134060	9/05/2019	KANGA LOADERS WA	Material Supply - Solenoid	$ 231.00
EFT134061	9/05/2019	MOSS KILBY-GLENCROSS	Poster Distribution - Vancouver Street Festival	$ 150.00
EFT134062	9/05/2019	KING RIVER RECREATIONAL CLUB INC	Funding - Heritage Grant	$ 5,000.00
EFT134063	9/05/2019	ELIZABETH ANNE KIRKLAND	Winner - Great Southern Art Award 2019	$ 1,000.00
EFT134064	9/05/2019	KIRSTEN SIVYER	Professional Services - Art Classes and Great Southern Art Award Judge	$ 1,090.00
EFT134065	9/05/2019	KLB SYSTEMS	IT Supplies - C17024	$ 577.50
EFT134066	9/05/2019	KURRAH MIA PTY LTD	Welcome to Country - Great Southern Art Award	$ 200.00
EFT134067	9/05/2019	PHILLIP NORMAN LEE	Rates Refund	$ 142.37
EFT134068	9/05/2019	H LONCAR	Staff Reimbursement	$ 42.00
EFT134069	9/05/2019	LUNAR PAINTING SERVICES	Painting Services - Princess Royal Forts	$ 3,738.00
EFT134070	9/05/2019	M AND B SALES PTY LTD	Material Supply - Timber	$ 55.00
EFT134071	9/05/2019	MAIN ROADS	Bridge 4528 over Undeyup Creek Lower Denmark Road	$ 189,200.00
EFT134072	9/05/2019	ALBANY EVENT HIRE	Equipment Hire - National Youth Week and Field of Lights	$ 2,567.44
EFT134073	9/05/2019	ALBANY CITY MOTORS	Material Supply - Filters, Air Repair Kit	$ 959.74
EFT134074	9/05/2019	MARKETFORCE LIMITED	Advertising Services	$ 528.14
EFT134075	9/05/2019	MCB CONSTRUCTION PTY LTD	Relocation Services - Sea Container	$ 1,485.00
EFT134076	9/05/2019	MCGUFFIE TILT TRAY HIRE	Transportation Services - Roller	$ 286.00
EFT134077	9/05/2019	COLIN BRUCE MEIKLEJOHN	Binocular Purchase - Marine Drive Lookout	$ 1,000.00
EFT134078	9/05/2019	METCO FARM	Merchandise Order - Forts Store	$ 1,023.00
EFT134079	9/05/2019	MINORBA GRAZING CO	Material Supply - Pine	$ 481.60
EFT134080	9/05/2019	STEPHANIE ANNE WRIGHT MORRIGAN	Professional Services - EAP	$ 1,452.00
EFT134081	9/05/2019	MOUNT ROMANCE AUSTRALIA PTY LTD	Merchandise Order - Forts Store	$ 1,825.78
EFT134082	9/05/2019	MULE CREATIVE	Design Services - Trail Map	$ 891.00
EFT134083	9/05/2019	NATURAL AREA CONSULTING MANAGEMENT SERVICES	Material Supply - Tubes	$ 524.70
EFT134084	9/05/2019	PSR NELSON	Refund	$ 30.00
EFT134085	9/05/2019	PR AND ER NEWMAN'S QUALITY CONCRETE PRODUCTS	Drainage Products - C18011	$ 4,009.50
EFT134086	9/05/2019	KOMATSU AUSTRALIA PTY LTD	Material Supply - Hose	$ 2,470.18

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION	AMOUNT
EFT134087	9/05/2019	OCS SERVICES PTY LTD	Cleaning Services - C15015	$ 2,797.26
EFT134088	9/05/2019	OFFICEWORKS SUPERSTORES PTY LTD	Office Supplies/Materials	$ 270.64
EFT134089	9/05/2019	J PASSMORE	Staff Reimbursement	$ 182.00
EFT134090	9/05/2019	PAULS PET FOOD	Material Supply - Pet Food	$ 73.00
EFT134091	9/05/2019	PC MACHINERY PTY LTD	Material Supply - Belt	$ 64.35
EFT134092	9/05/2019	PERTH SAFETY PRODUCTS PTY LTD	Road Signage - Various	$ 1,496.00
EFT134093	9/05/2019	HANSON CONSTRUCTION MATERIALS PTY LTD	Road Materials - C16015	$ 2,564.57
EFT134094	9/05/2019	PLASTICS PLUS	Material Supply - Tread Matting	$ 539.00
EFT134095	9/05/2019	ALBANY PLUMBING AND GAS	Plumbing Services - C17020	$ 892.41
EFT134096	9/05/2019	J POUWELSEN	Staff Reimbursement	$ 741.69
EFT134097	9/05/2019	PRE-EMPTIVE STRIKE PTY LTD	Printing Services - Dining Out Guide	$ 1,672.00
EFT134098	9/05/2019	QUICK SHOT COFFEE	Catering - Anzac Albany	$ 58.50
EFT134099	9/05/2019	RAINBOW COAST NEIGHBOURHOOD CENTRE	Community Waste and Sustainability Grant - Waste Education Project	$ 1,100.00
EFT134100	9/05/2019	REECE PTY LTD	Plumbing Supplies	$ 40.00
EFT134101	9/05/2019	REXEL AUSTRALIA	Material Supply - Lamp and Heat Shrink	$ 151.48
EFT134102	9/05/2019	ROBERTS GARDINER ARCHITECTS	Design Services - Q18009	$ 2,109.80
EFT134103	9/05/2019	THE ROYAL LIFE SAVING SOCIETY WA INC	Call Centre Charges - April 2019	$ 1,069.09
EFT134104	9/05/2019	SKILL HIRE WA PTY LTD	Casual Staff/Apprentice Fees	$ 2,028.95
EFT134105	9/05/2019	SKIPPER TRANSPORT PARTS	Material Supplies - Various	$ 302.50
EFT134106	9/05/2019	SMITHS ALUMINIUM AND 4WD CENTRE	Manufacturing Services - Fire Blanket Box	$ 230.00
EFT134107	9/05/2019	S LEFROY	Staff Reimbursement	$ 33.85
EFT134108	9/05/2019	SOUTHERN TOOL AND FASTENER CO	Hardware And Tool Supplies - Various	$ 9.84
EFT134109	9/05/2019	SOUTHCOAST SECURITY SERVICE	Security Services - C15016	$ 20,326.96
EFT134110	9/05/2019	SOUTH COAST DIVING SUPPLIES	Professional Services - Emu Point Jetty	$ 1,068.75
EFT134111	9/05/2019	STAR SALES AND SERVICE	Material Supply - Line Paint	$ 2,840.00
EFT134112	9/05/2019	BLUESCOPE DISTRIBUTION PTY LTD	Material Supply - Steel	$ 200.44
EFT134113	9/05/2019	REBECCA STEPHENS	Councillor Reimbursement - Perth Metro Tour	$ 225.87
EFT134114	9/05/2019	STIRLING PRINT	Printing Services - Public Health Plan	$ 560.00
EFT134115	9/05/2019	ST JOHN AMBULANCE WESTERN AUSTRALIA LTD	First Aid - Q17058	$ 746.51
EFT134116	9/05/2019	ALBANY LOCK SERVICE	Key Upgrade - C14003	$ 236.60
EFT134117	9/05/2019	SYNERGY	Electricity Charges	$ 66,727.35
EFT134118	9/05/2019	T & C SUPPLIES	Hardware And Tool Supplies - Various	$ 1,041.65
EFT134119	9/05/2019	R TAYLOR	Staff Reimbursement	$ 50.50
EFT134120	9/05/2019	JENNY TAYLOR DESIGNS	Merchandise Order - Forts Store	$ 303.76
EFT134121	9/05/2019	THE 12 VOLT WORLD	Repairs and Maintenance - Light Circuit	$ 481.50
EFT134122	9/05/2019	THINKWATER ALBANY	Reticulation Supplies	$ 1,771.55
EFT134123	9/05/2019	TOTAL GREEN RECYCLING	E-Waste Services - Q17046	$ 4,966.83
EFT134124	9/05/2019	TOTALLY SPORTS AND SURF	Sports Equipment	$ 470.00
EFT134125	9/05/2019	TOYOTA MATERIAL HANDLING AUSTRALIA PTY LTD	Various Materials - Truck Repairs	$ 155.85
EFT134126	9/05/2019	TRUCKLINE	Major Plant Supplies	$ 21.22
EFT134127	9/05/2019	MOORE STEPHENS PTY LTD	Auditing Services - P16012	$ 1,760.00
EFT134128	9/05/2019	THE UNIVERSITY OF WESTERN AUSTRALIA	Sponsorship - Prescribed Burning Conference	$ 2,000.00
EFT134129	9/05/2019	UNITED BOOK DISTRIBUTORS	Merchandise Order - Forts Store	$ 837.42

CITY OF ALBANY
TRUST, CHEQUES AND ELECTRONIC FUND TRANSFER PAYMENTS
FOR THE PERIOD ENDING 15 MAY 2019

REPORT ITEM CCS 159 REFERS

ELECTRONIC FUND TRANSFER PAYMENTS

EFT	DATE	NAME	DESCRIPTION		AMOUNT
EFT134130	9/05/2019	IT VISION AUSTRALIA PTY LTD	Licence Renewal 2019 - Easysoft	$	1,010.56
EFT134131	9/05/2019	VOEGELER CREATIONS	Merchandise Order - Visitor Centre	$	576.00
EFT134132	9/05/2019	WARTHOG WA	Parts Washer - May 2019	$	125.00
EFT134133	9/05/2019	WRITING WA INC	Membership 2019 - Library	$	135.00
EFT134134	9/05/2019	WAUTERS ENTERPRISES PTY LTD	Construction Services - C18018	$	268,690.85
EFT134135	9/05/2019	ALBANY & GREAT SOUTHERN WEEKENDER	Advertising - Various	$	76.00
EFT134136	9/05/2019	MARJORIE JILL WILSON	Active Albany Program - Ukulele	$	160.00
EFT134137	9/05/2019	WOODORIGINAL	Merchandise Order - Forts Store	$	210.10
EFT134138	9/05/2019	WURTH AUSTRALIA PTY LTD	Material Supply - Various	$	283.33
EFT134139	9/05/2019	CHRISTOPHER YOUNG	VAC Exhibition	$	1,500.00
EFT134140	9/05/2019	EDVIGE MARIA BICE ZAMBONETTI	Rates Refund	$	153.67
EFT134141	9/05/2019	ZENITH LAUNDRY	Laundry Services/Hire	$	198.81
EFT134144	9/05/2019	FIBREGLASS WORX	Repairs and Maintenance - Dive Block Cover	$	950.00
				$	**3,339,386.62**

Document Number	Description	Date Sent / Received
EDR1996890	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: APPLICATION FOR DEPARTMENT OF PLANNING, LANDS AND HERITAGE FOR COASTWEST GRANT OF $50,000 EMU POINT FORESHORE MANAGEMENT PLAN - GRANT FUNDING IS 50/50 - CITY OF ALBANY WILL BE USING THE SAME FUNDING WE LEVERAGED FOR THE DEPARTMENT OF TRANSPORT COASTAL ADAPTATION AND PROTECTION GRANT APPLICATION SO THIS IS WITHIN EXISTING 2019/20 BUDGET. PARTIES: DEPARTMENT OF PLANNING, LANDS AND HERITAGE SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	17/04/2019
EDR1996895	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: EARLY CHILDHOOD (ECA) (WA BRANCH) ARE SEEKING MAYOR/COUNCIL ENDORSEMENT FOR ITS ADVOCACY CAMPAIGN FOR A WA PLAY STRATEGY. THE CITY'S COMMUNITY STRATEGIC PLAN AND PUBLIC HEALTH PLAN PROVIDE STRATEGIC FRAMEWORK FOR IMPROVING THE HEALTH AND WELLBEING OF COMMUNITY MEMBERS, WITH PARTICULAR EMPHASIS IN THE PUBLIC HEALTH PLAN ON PRIORITISING CHILDREN AND YOUNG PEOPLE. ADDITIONALLY, THE CITY HAS A KEY ROLE IN PROVISION OF PLAYGROUNDS, EARLY LEARNING ACTIVITIES THROUGH ALBANY PUBLIC LIBRARY AND ALBANY REGIONAL DAYCARE, AS WELL AS PARTNERING WITH OTHER AGENCIES AND COMMUNITY ORGANISATIONS TO DELIVER CHILDREN'S PHYSICAL ACTIVITY PROGRAMS. THE CITY IS INSTRUMENTAL IN THE DESIGN OF PUBLIC SPACES.	17/04/2019

Document Number	Description	Date Sent / Received
	ENDORSEMENT REQUIRES COMPLETION OF THE ATTACHED ENDORSEMENT FORM, AND PROVISION OF THE CITY'S LOGO TO ECA WHICH WILL APPEAR ON ITS WA PLAY STRATEGY CAMPAIGN WEBSITE (WWW.WAPLAY STRATEGY.COM). A NUMBER OF OTHER WA LOCAL GOVERNMENTS HAVE ENDORSE3D THE CAMPAIGN, INCLUDING THE CITIES OF CANNING, COCKBURN, FREMANTLE, JOONDALUP AND STIRLING. THERE IS NO ONUS UPON THE MAYOR TO PROVIDE COMMENT OR DELIVER ACTIVITIES AND NO FINANCIAL COMMITMENT OR OBLIGATION IS EXPECTED NOR REQUIRED. PARTIES: EARLY CHILDHOOD AUSTRALIA (WA BRANCH) SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	
EDR1996959	COPY OF EXECUTED DOCUMENTS ITEM: N/A RE: APPLICATION FOR DEVELOPMENT APPROVAL, RELOCATION OF TRANSPORTABLE FROM DEPOT TO ALBANY AIRPORT PRECINCT. CITY TO CHARGE A RENTAL ON THE TRANSPORTABLE OFFICE. PARTIES: N/A SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (2 COPIES)	18/04/2019
EDR1996964	COPY OF EXECUTED DOCUMENT ITEM: CEO DELEGATION ORDINARY COUNCIL MEETING 23/05/17 ITEM CCCS028 RE: AWARD OF TENDER C19001 PROVISION OF ELECTRICAL SERVICES (TECHNICAL) PARTIES: J&S CASTLEHOW SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	18/04/2019

Document Number	Description	Date Sent / Received
EDR1996967	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: APPLICATION FOR BUILDING PERMIT FOR PICNIC SHELTER AT FRENCHMAN'S BAY PARTIES: N/A SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	18/04/2019
EDR1997096	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: APPLICATION ONLY TO THE WASTE AUTHORITY FOR CIE GRANTS FUNDING ROUND 2019 FOR THE FOGO RECYCLING PROJECT FOR $100,000, WITH CITY OF ALBANY CONTRIBUTING $100,000 FROM WASTE MINIMISATION - OPERATING EXPENDITURE (WITHIN EXISTING 2019/20 BUDGET) AND ESTIMATED $205,000 IN KIND CONTRIBUTION IN STAFF TIME PARTIES: WASTE AUTHORITY SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	24/04/2019
EDR1997217	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: APPLICATION ONLY TO VOLUNTEERING WA FOR THE NATIONAL VOLUNTEER WEEK (MAY 2019) GRANT FUNDING FOR AN "ALBANY HERITAGE PARK HIGH TEA" ORGANISED BY THE NAC, TOTAL FUNDING REQUEST; $1,000. PARTIES: VOLUNTEERING WA SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	30/04/2019
EDR1997306	COPY OF EXECUTED DOCUMENT ITEM: CEO DELEGATION ORDINARY COUNCIL MEETING 23 MAY 2017 ITEM CCCS028 RE: AWARD OF TENDER C19008 PANEL OF SUPPLIERS - ROAD BUILDING MATERIALS	01/05/2019

Document Number	Description	Date Sent / Received
	PARTIES: HANSON, AD'S, NIGEL PALMER AND SOIL SOLUTIONS SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	
EDR1997307	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: AERODROME MANUAL - VERSION: 2019:001 - DATE OF ISSUE: APRIL 2019 PARTIES: CASA SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (3 COPIES)	01/05/2019
EDR1997419	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: APPLICATION FOR OCCUPANCY PERMIT RECEIVED. THIS IS CITY OF ALBANY OWNED BUILDING REQUIRES OWNER SIGNATURE ON THE BA9 FORM. PARTIES: WAUTERS ENTERPRISES PTY LTD SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	03/05/2019
EDR1997422	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: INFORMATION FROM THIS RETURN WILL ASSIS THE WA LOCAL GOVERNMENT GRANTS COMMISSION IN ASSESSING THE ROAD EXPENDITURE NEEDS OF THE CITY. PARTIES: DEPARTMENT OF LOCAL GOVERNMENT, SPORT AND CULTURAL INDUSTRIES SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	03/05/2019
EDR1997426	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: APPLICATION ONLY TO THE NATIONAL LIBRARY OF AUSTRALIA - COMMUNITY HERITAGE GRANTS 2019 PROGRAM FOR A SIGNIFICANCE ASSESSMENT (SA): -	03/05/2019

Document Number	Description	Date Sent / Received
	NLA GRANT FOR $4,500 - NLA WILL ALSO ASSIST WITH ADDITIONAL FUNDS FOR TRAVEL EXPENSE (APPROX $2,000-$3,000); - ADDITIONAL $3,000 (POSS. $4,000 IF REQUIRED) FUNDS WILL COME FROM 'ELLAM-INNES COLLECTION' (BUDGET LINE 1750820 - $13,214.78 WHICH IS ALLOCATED FOR THE COLLECTION AND EXHIBITION - DAVE HARRISON IS AWARE OF THIS) - NB: SA TOTAL OF $9,500-$11,500 IF SUCCESSFUL, WORK WILL COMMENCE IN NOVEMBER 2019 AND IF IT IS COMPLETED AND ACQUITTED BEFORE APRIL 2020, FURTHER FUNDING CAN BE APPLIED FOR (AS RECENT DISCUSSION FROM FRAN D'CASTRO, COMMUNITY HERITAGE GRANTS COORDINATOR). WE HAVE ONE YEAR TO COMPLETE AND ACQUIT. PARTIES: NATIONAL LIBRARY OF AUSTRALIA SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	
EDR1997427	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: APPLICATION ONLY TO THE BE CONNECTED NETWORK AND THE GOOD THINGS FOUNDATION (BE CONNECTED - CAPACITY BUILDING GRANTS - ROUND 4) BY THE ALBANY PUBLIC LIBRARY FOR FUNDING OF $50,000 (TOTAL PROJECT COST) PARTIES: BE CONNECTED NETWORK SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	03/05/2019
EDR1997428	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: APPLICATION FOR DEVELOPMENT APPROVAL FOR A NEW SIGN SHELTER NEAR PORT PARTIES: N/A SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	03/05/2019

Document Number	Description	Date Sent / Received
EDR1997634	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: PROPOSAL FOR A REDUCTION IN COSTS FOR THE PROVISION OF INTERNET AND TELEPHONY SERVICES PARTIES: N/A SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	09/05/2019
EDR1997636	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: CONTINUATION OF THE CITY OF ALBANY'S REGISTRATION AS A STATE ROAD TRAFFIC MANAGEMENT COMPANY PARTIES: MAIN ROADS WA SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	09/05/2019
EDR1997815	COPY OF EXECUTED DOCUMENT ITEM: ORDINARY COUNCIL MEETING 23 APRIL 2019 - SIGNING TO CERTIFY THAT ALPS WAS OFFICIALLY APPROVED BY COUNCIL RE: SIGN ALPS BACK PAGES AS REQUIRED BY REGULATION PARTIES: N/A SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICE AND DENNIS WELLINGTON MAYOR (1 COPY)	14/05/2019
EDR1997816	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: SIX DEVELOPMENT APPLICATIONS FOR FIRE AND EMERGENCY TOILET UNITS PARTIES: N/A SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY OF EACH)	14/05/2019

Document Number	Description	Date Sent / Received
EDR1997817	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: DEVELOPMENT APPLICATION FOR NEW BIKE SHELTER NORTH ROAD OFFICES - A133940 PARTIES: N/A SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	14/05/2019
EDR1997897	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: CERTIFICATE OF COMPLETION AND BLACKSPOT COMPLETION FORM FROM LOCKE STREET PARTIES: MAIN ROADS WA SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	15/05/2019
EDR1997899	COPY OF EXECUTED DOCUMENT ITEM: N/A RE: CERTIFICATE OF COMPLETION AND BLACKSPOT COMPLETION FORM FOR SYDNEY/KAMPONG ROAD PARTIES: MAIN ROADS WA SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER (1 COPY)	15/05/2019
NCSR1996859	COPY OF COMMON SEAL DOCUMENT ITEM: N/A RE: FINANCIAL ASSISTANCE AGREEMENT - MOTOR SPORTS PARK AT LOT 5780 DOWN ROAD SOUTH. GRANT FOR $1.4 MILLION WITH $90,000 BEING FOR CITY OF ALBANY PARTIES: THE DEPARTMENT OF LOCAL GOVERNMENT, SPORT AND CULTURAL INDUSTRIES SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER AND DENNIS WELLINGTON MAYOR (1 COPY)	16/04/2019

Document Number	Description	Date Sent / Received
NCSR1996906	COPY OF COMMON SEAL DOCUMENT ITEM: N/A RE: NOTIFICATION UNDER SECTION 70A REQUIRED AS PER CONDITION 8 OF WAPC APPROVAL 231.15 PARTIES: GARY DONALD WYLIE AND KAREN MARIE WYLIE SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER AND DENNIS WELLINGTON MAYOR (1 COPY)	17/04/2019
NCSR1996910	COPY OF COMMON SEAL DOCUMENT ITEM: N/A RE: DEED OF ASSIGNMENT OF LEASE - BRIAN EARNEST HAMMER AND COLLEEN JEAN SINCLAIR HAMMER (ASSIGNOR) AND BRIAN ERNEST HAMMER (ASSIGNEE). LOT 7442 A PORTION OF RESERVE 878 CHEYNE BEACH PARTIES: BRIAN ERNEST HAMMER AND COLLEEN JEAN SINCLAIR HAMMER SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER AND DENNIS WELLINGTON MAYOR (3 COPIES)	17/04/2019
NCSR1997024	COPY OF COMMON SEAL DOCUMENT ITEM: CCS122 ORDINARY COUNCIL MEETING FEBRUARY 2019, DELEGATE AUTHORITY TO THE CEO TO NEGOTIATE AN AGREEMENT WITH REX THAT INCORPORATES AN ANNUAL INCREASE BASED ON AN AGREED PERTH CPI COST INDEX, HAS MONTHLY EQUAL PAYMENT INSTALMENTS AND ENSURES THE CONTINUATION OF BOTH THE COMMUNITY FARE AND THE LEISURE PACKAGE FARES. RE: DEED OF VARIATION: AGREEMENT FOR PROVISION OF COMMUNITY FARES PARTIES: REGIONAL EXPRESS PTY LTD SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER AND DENNIS WELLINGTON MAYOR	23/04/2019

Document Number	Description	Date Sent / Received
NCSR1997220	COPY OF COMMON SEAL DOCUMENT ITEM: N/A RE: LDSI AMENDMENT NO15 - REZONING LOT422 AFFLECK ROAD, KALGAN FROM THE "GENERAL AGRICULTURE" ZONE TO THE "RURAL RESIDENTIAL" ZONE; AND AMENDING THE SCHEME MAPS ACCORDINGLY. NOW THE DOCUMENT IS READY TO BE SIGNED AND SEALED TO FORWARD AMENDMENT DOCUMENTATION AND SUBMISSIONS TO THE WA PLANNING COMMISSION WITH A REQUEST THAT THE HON. MINISTER FOR PLANNING REFUSE THE AMENDMENT. PARTIES: ARCHIPELAGO NOMINEES PTY LTD SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER AND DENNIS WELLINGTON MAYOR (3 COPIES)	30/04/2019
NCSR1997221	COPY OF COMMON SEAL DOCUMENT ITEM: CEO DELEGATION ORDINARY COUNCIL MEETING 23 MAY 2017 ITEM CCCS0283 RE: SIGNING OF CONTRACT FOR C19001 PROVISION OF ELECTRICAL SERVICES (TECHNICAL) PARTIES: J&S CASTLEHOW ELECTRICAL SERVICES SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER AND DENNIS WELLINGTON MAYOR (2 COPIES).	30/04/2019
NCSR1997222	COPY OF COMMON SEAL DOCUMENT ITEM: CEO DELEGATION ORDINARY COUNCIL MEETING 23 MAY 2017 CCCS028 RE: SIGNING OF CONTRACTS FOR C19006 - SUPPLY OF PRE-MIXED CONCRETE PARTIES: HOLCIM (AUSTRALIA) PTY LTD SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER AND DENNIS WELLINGTON MAYOR (2 COPIES)	30/04/2019
NCSR1997223	COPY OF COMMON SEAL DOCUMENT ITEM: ORDINARY COUNCIL MEETING 18 DECEMBER 2018 ITEM: DIS141	30/04/2019

Document Number	Description	Date Sent / Received
	RE: LAMD33 - AMENDING LOCAL PLANNING SCHEME - INCORPORATING PORTION OF LOT 1, FRENCHMAN BAY ROAD WITHIN 'ADDITIONAL USE' SITE NO. 33 PARTIES: C WALLRODT SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER AND DENNIS WELLINGTON MAYOR (3 COPIES)	
NCSR1997286	COPY OF COMMON SEAL DOCUMENT ITEM: N/A RE: DEED OF VARIATION LICENCE - NEIL SIMMONDS & SARAH SIMMONDS AS TRUSTEES FOR THE N&S SIMMONDS FAMILY TRUST TRADING AS @ THE POOLSIDE (ABN 68 650 531 613) AND NEIL AND SARAH SIMMONDS. PARTIES: - NEIL SIMMONDS & SARAH SIMMONDS AS TRUSTEES FOR THE N&S SIMMONDS FAMILY TRUST TRADING AS @ THE POOLSIDE (ABN 68 650 531 613) AND NEIL AND SARAH SIMMONDS. SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER AND DENNIS WELLINGTON MAYOR (2 COPIES)	01/05/2019
NCSR1997438	COPY OF COMMON SEAL DOCUMENT ITEM: N/A RE: DEED OF ASSIGNMENT OF LEASE OVER CHEYNE BEACH HOLIDAY ACCOMMODATION LEASE, RESERVE 878 LOT7; GA & DL LODGE (ASSIGNOR) AND PA & CM KELLEY (ASSIGNEE) PARTIES GEOFFREY ALLAN LODGE AND DIANA LUCILLE LODGE AND PAUL ANTHONY KELLEY AND CATHERINE MARY KELLEY SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER AND DENNIS WELLINGTON MAYOR (3 COPIES)	03/05/2019

Document Number	Description	Date Sent / Received
NCSR1997464	COPY OF COMMON SEAL DOCUMENT ITEM: N/A RE: TRANSFER OF LAND LOT 91 ON DEPOSITED PLAN 222006,LOT 76 ON DEPOSITED PLAN 26132 AND LOTS 877 & 893 ON DEPOSITED PLAN 159791 PARTIES: CSBP LIMITED SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER AND DENNIS WELLINGTON MAYOR (1 COPY)	06/05/2019
NCSR1997601	COPY OF COMMON SEAL DOCUMENT ITEM: N/A RE: FINANCIAL ASSISTANCE AGREEMENT - MOTOR SPORT PARK AT LOT 5780 DOWN ROAD SOUTH. PREVIOUSLY SIGNED. NEED TO RE-SIGN COPY WITH MINISTERS SIGNATURE NOW OBTAINED. PARTIES: HON M MURRAY MLA MINISTER FOR SPORT AND RECREATION SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICER AND DENNIS WELLINGTON MAYOR (1 COPY)	08/05/2019
NCSR1997639	COPY OF COMMON SEAL DOCUMENT ITEM: COUNCIL RESOLUTION ORDINARY COUNCIL MEETING 28 AUGUST 2018 ITEM CCS079 RE: COUNCIL AT ITS MEETING ON 28 AUGUST 2018, APPROVED A NEW NON-EXCLUSIVE LICENCE TO BEACH FISHING PTY LTD TRADING AS WESTERBERG BROS OVER LOT 14 CHEYNE ROAD, CHEYNE BEACH ON PORTION OF RESERVE 878. TERM FOR SIX YEARS AND EIGHT MONTHS, COMMENCING 1 APRIL 2019, TO RUN CONCURRENT WITH THE WESTERBERG BROS CURRENT CHEYNE BEACH COMMERCIAL FISHING LICENCE OVER LOTS 2 AND 3 CHEYNE ROAD. LICENCE RENT BEING $510 PLUS GST PA BASED ON 50% OF MINIMUM RATE DETERMINED BY COUNCIL EACH YEAR, INLINE WITH CURRENT WESTERBERG BROS LICENCE.	09/05/2019

Document Number	Description	Date Sent / Received
	PARTIES: BEACH FISHING PTY LTD, TRADING AS WESTERBERG BROS, DIRECTORS BEING TONY DAVID WESTERBERG AND JEFFREY NEIL WESTERBERG AS GUARANTORS SIGNED BY: ANDREW SHARPE CHIEF EXECUTIVE OFFICE AND DENNIS WELLINGTON MAYOR (3 COPIES)	
NCSR1997735	ITEM: N/A RE: DEED OF ASSIGNMENT ALBANY KINDERGARTEN ASSOCIATION INC AND LOWER KING COMMUNITY KINDERGARTEN ASSOCIATION INC PARTIES: ALBANY KINDERGARTEN ASSOCIATION INC AND LOWER KING KINDERGARTEN ASSOCIATION INC SIGNED BY: CHIEF EXECUTIVE OFFICER, ANDREW SHARPE AND MAYOR, DENNIS WELLINGTON	13/05/2019

DELEGATED AUTHORITY

COUNCIL POLICY – RATING SUBSIDY: SPORTING AND COMMUNITY ORGANISATIONS

Delegation: 2018:022 – Rates & Recover Debt, Write off Rate Debt, Exemptions

Adopted: OCM 22 MAY 2018 ITEM AR042

Delegated Power:

1. Waive, grant concessions or write off any money owed to the City, pursuant to the Local Government Act 1995, s6.12(1).

Council Policy:

Rating Subsidy: Sporting and Community Organisations

Reporting Requirements:

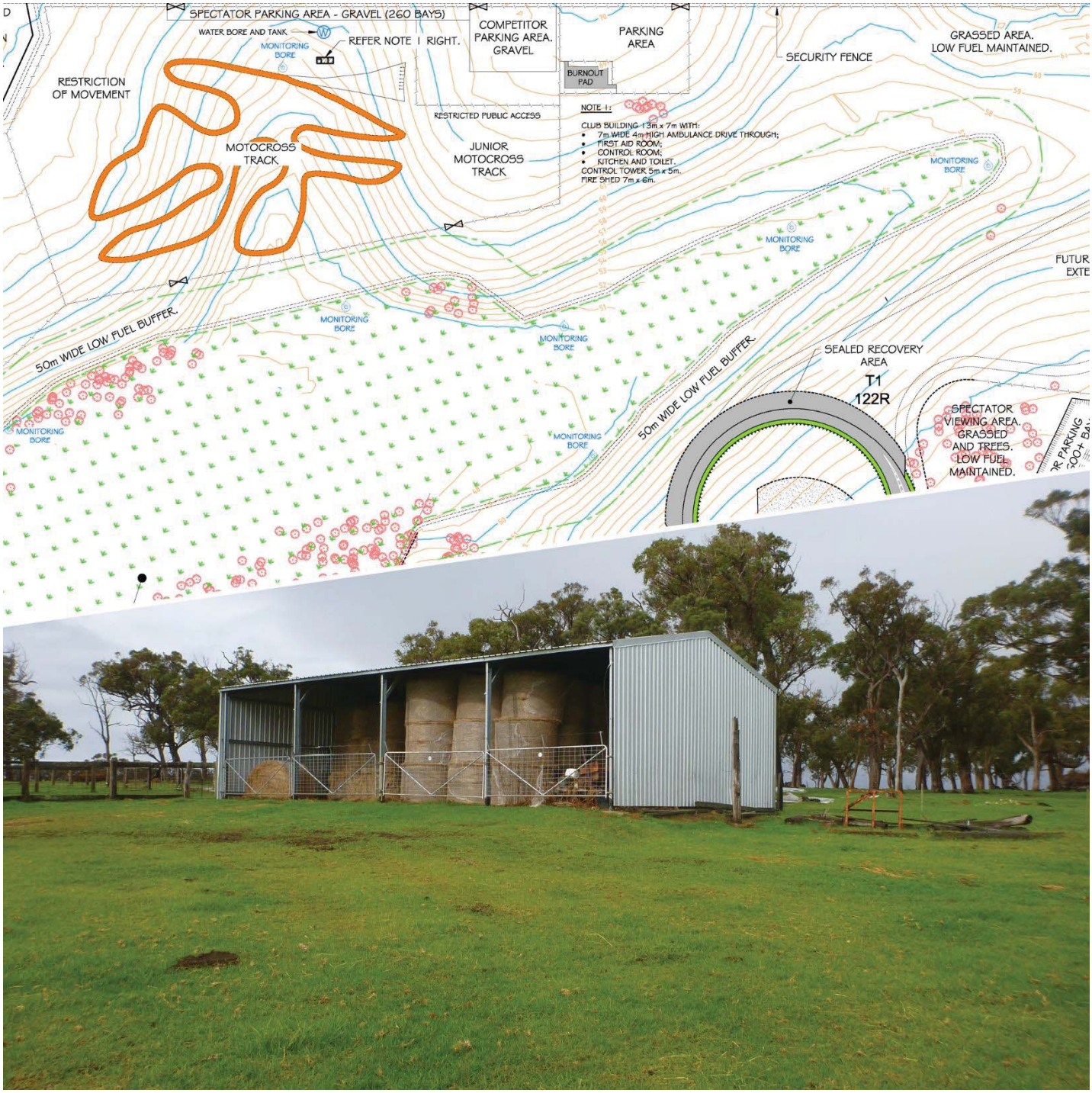
Report to file and to Council annually

Rating Subsidies for 2018/19 of $154,915.52 as per the attached list.

Michael Cole
Executive Director Corporate Services

27/5/2019

ASSESSMENT	SPORTING/COMMUNITY ORGANISATION	SUBSIDY
A133873	ALBANY ATHLETICS GROUP	$1,743.41
A179378	ALBANY BOATING & OFFSHORE FISHING CLUB	$1,212.37
A161280	ALBANY BOWLING CLUB	$4,729.25
A161537	ALBANY BRIDGE CLUB INC	$3,687.21
A149179	ALBANY CLUB INC (1932)	$7,664.99
A204735	ALBANY ENTERPRISE GROUP	$2,865.61
A174427	ALBANY EQUESTRIAN CENTRE	$8,181.00
A124369	ALBANY GIRL GUIDES ASSOCIATION	$1,021.00
A136770	ALBANY GOLF CLUB	$16,442.16
A14758	ALBANY HARNESS RACING CLUB INC	$8,266.17
A14780	ALBANY ITALIAN CLUB	$1,262.47
A82145	ALBANY KINDERGARTEN	$1,021.00
A156611	ALBANY LIGHT OPERA & THEATRE COMPANY	$1,950.82
A130471	ALBANY MARITIME FOUNDATION	$4,030.48
A204721	ALBANY MODEL AERO CLUB	$1,603.14
A140446	ALBANY MODEL RAILWAY	$1,502.94
A79732	ALBANY PLAY GROUP INCORPORATED	$1,021.00
A6791	ALBANY RACING CLUB INC	$12,023.52
A64947	ALBANY ROWING CLUB	$2,094.10
A150506	ALBANY SEA RESCUE SQUAD	$2,369.64
A187399	ALBANY SPEEDWAY CLUB	$1,737.65
A171336	ALBANY SPRINT KART CLUB	$1,202.31
A97368	ALBANY WOMENS' REST HOUSE ASSOCIATION	$1,021.00
A30213	CITY OF ALBANY BAND INC	$1,021.00
A155029	EMU POINT SPORTING CLUB	$9,518.62
A65539	GREEN RANGE COUNTRY CLUB	$2,257.22
A162430	JAYCEES WHALEWORLD (DISCOVERY BAY)	$1,419.78
A65999	KING RIVER HORSE & PONY CLUB	$1,803.53
A6037	KING RIVER RECREATION CENTRE	$1,442.82
A74368	LAWLEY PARK TENNIS CLUB	$4,468.74
A136225	LOWER GREAT SOUTHERN HOCKEY ASSOC	$1,432.80
A227280	LOWER KING COMMUNITY KINDERGARTEN	$1,072.10
A50479	MERRIFIELD PARK TENNIS CLUB	$2,379.66
A84446	MIDDLETON BEACH BOWLING CLUB	$8,316.27
A116479	NORTH ALBANY FOOTBALL CLUB	$2,474.84
A64820	PRINCESS ROYAL SAILING CLUB	$6,262.25
A92223	RAILWAYS FOOTBALL CLUB	$3,637.11
A64799	RIVERVIEW COUNTRY CLUB	$3,306.47
A74354	SCOUT ASSOC OF WA	$1,533.00
A104446	SENIOR CITIZENS CENTRE & MEALS ON WHEELS	$4,879.55
A64785	SOUTH COAST COUNTRY MUSIC CLUB INC	$1,103.00
A157843	SPECTRUM THEATRE INC	$1,510.96
A176287	STIRLING CLUB INC	$4,538.88
A64866	WA VETERAN CAR CLUB	$1,883.68
	2018/19 SUBSIDY TOTAL	**$154,915.52**



City of Albany

Planning Scheme No. 1

Scheme Amendment 35

May 2019

PLANNING AND DEVELOPMENT ACT 2005

RESOLUTION TO PREPARE AND ADVERTISE AMENDMENT TO LOCAL PLANNING SCHEME

CITY OF ALBANY

LOCAL PLANNING SCHEME NO. 1

AMENDMENT NO. 35

Resolved that the local government pursuant to section 75 of the *Planning and Development Act 2005*, amend the above Local Planning Scheme by

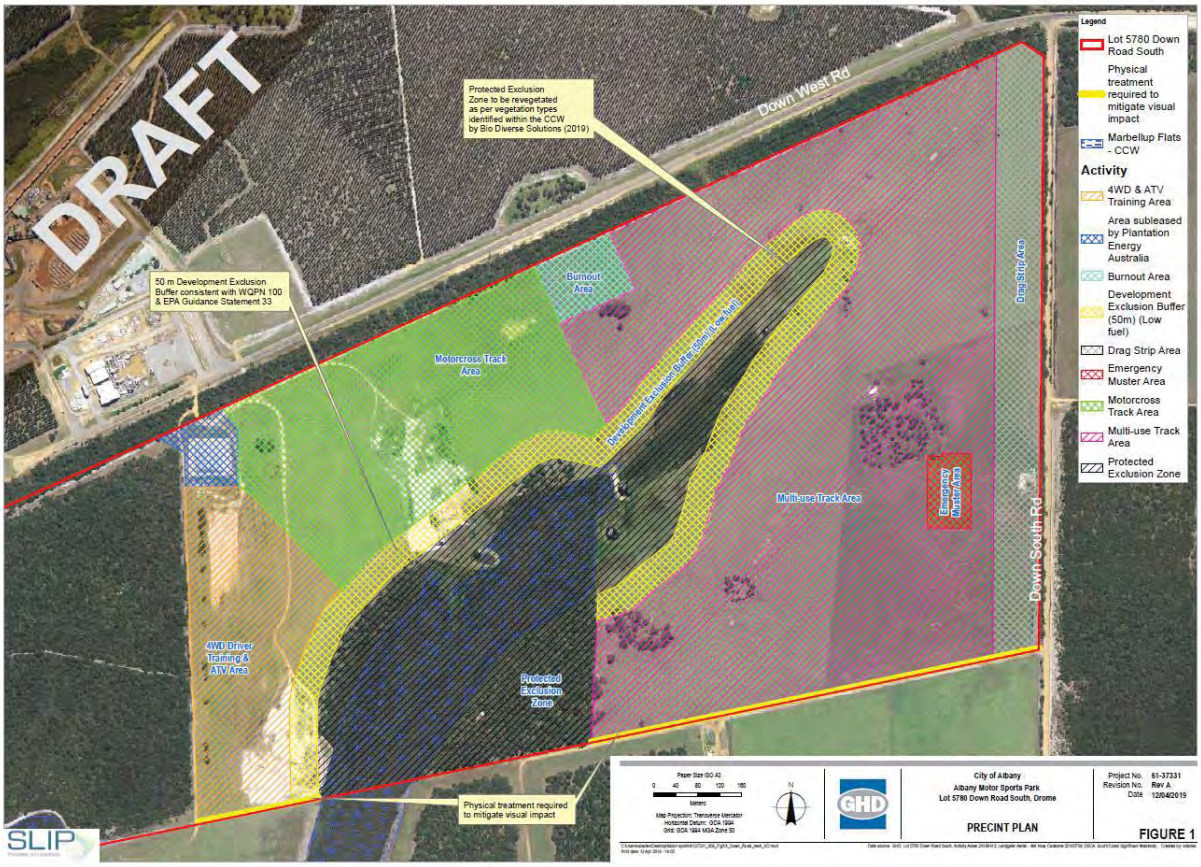
a) Rezoning Lot 5780 Down Road South, Drome, from 'Priority Agriculture Zone' to 'Special Use Zone';

b) Adding the following text to Schedule 4:

No.	Description of Land	Special Use	Conditions
SU26	Lot 5780 Down Road South, Drome	Motorsport based recreation and incidental uses	1. All development requires the development approval of the local government. 2. Applications for development approval shall be advertised in accordance with clause 64 of the deemed provisions. 3. All use and development is to be in accordance with the Albany Motorsport Park Precinct Plan and approved management plans. 4. Any application for development approval for the site shall be accompanied by an Environmental Management Plan for the site that addresses: (a) Noise Management Plan for construction and operation of the site. (b) Water Management Plan for construction and operation of the site. (c) Hydrocarbon Management Plan for operation of the site. (d) Waste Management Plan for construction and operation of the site. (e) Dust Management Plan for construction and operation of the site. (f) Acid Sulfate Soils (ASS) risk.

			(g) Protected Exclusion Zone Management Plan addressing management responsibilities, revegetation, and vegetation condition and wetland water quality monitoring. (h) Decommissioning Plan. (i) Construction Management Plan. 5. Any application for development approval for the site shall be accompanied by a visual impact assessment to determine the appropriate physical treatments to mitigate visual impact to Lot 5781 Down Road South, Drome. 6. Development shall be in accordance with an approved Bushfire Management Plan that has been implemented to the satisfaction of the Local Government, Department of Planning, Lands and Heritage, and the Department of Fire and Emergency Services. 7. Any application for development approval for the site shall be accompanied by a Traffic and Parking Management Plan for construction and operation of the site, including consideration of peak parking and traffic management during larger and special events (i.e. events attracting greater than 500 attendees).

c) Adding the following precinct plan to Schedule 4:



d) Amending the Scheme Map accordingly.

e) The amendment is considered to be a complex amendment for the following reasons:

(i) it is not consistent with the endorsed local planning strategy for the scheme;

(ii) it is of a scale and nature that may have an impact on the amenity of the locality and environs; and

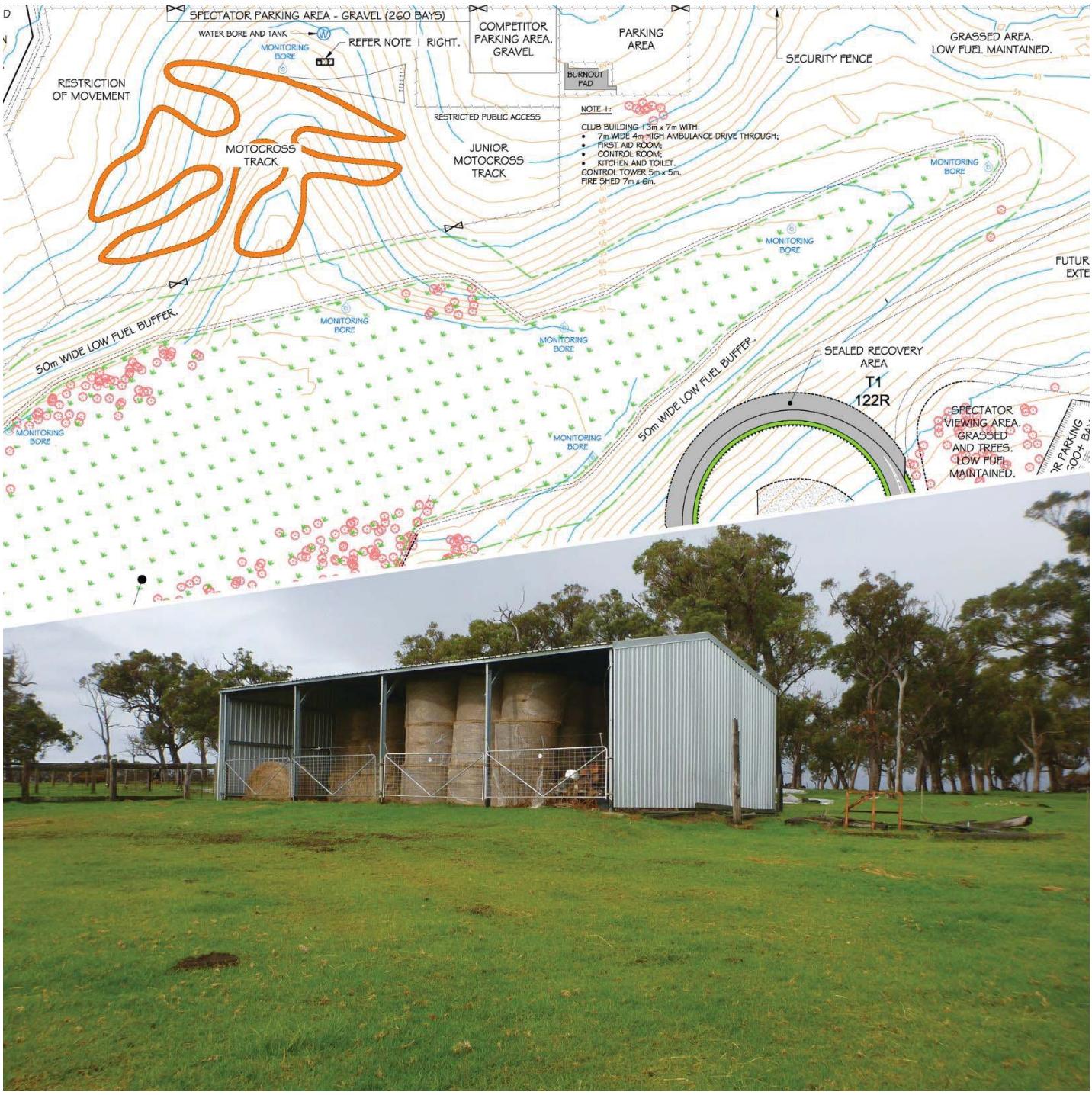
(iii) it may result in some environmental or social impacts on land within the Scheme area,

Dated this DD day of MMMM 20YY

CHIEF EXECUTIVE OFFICER

Proposal to Amend a Town Planning Scheme

1.	**Local Authority:**	City of Albany
2.	**Description of Scheme:**	Local Planning Scheme No. 1
3.	**Type of Scheme**	District Zoning Scheme
4.	**Serial No. of Amendment**	35
5.	**Amendment Type**	Complex
6.	**Proposal**	Rezone Lot 5780 Down Road South, Drome from 'Priority Agriculture Zone' to 'Special Use Zone' and add text and a precinct plan to Schedule 4.



City of Albany

Local Planning Scheme No. 1

Scheme Amendment 35

Scheme Amendment Report

May 2019

Table of contents

1. Executive summary 5
2. Introduction 7
3. Strategic and statutory framework 11
4. Site analysis 19
5. Consultation 33
6. Details of proposal 35
7. Conclusion 49

Table index

Table 1: Relevant State strategic policy documents 11
Table 2: Responses to Lower Great Southern Strategy 2016 14
Table 3: Vegetation associations within the site 21
Table 4: ARVS vegetation units within the site 21
Table 5: Average weekday and weekend traffic volumes (2017) - existing vehicles per day(vpd) (MRWA Traffic Map 2018) 32
Table 6: Record of consultation 33
Table 7: AMP indicative event profile 36
Table 8: Site generated traffic (typical) 37

Figure index

Figure 1: Location plan 8
Figure 2: City of Albany Local Planning Scheme No. 1 16
Figure 3: Acid sulfate soils risk and significant wetlands 20
Figure 4: Vegetation complex mapping 23
Figure 5: Vegetation condition mapping 24
Figure 6: Fauna habitat values 27
Figure 7: Residences within proximity of the site 31
Figure 8: Proposed clearing impact area 43
Figure 9: Drainage management plan 45

Appendices

Appendix A – References

Appendix B – Concept Plan

Appendix C – Proposed amendment to City of Albany Local Planning Scheme No. 1

Appendix D – Certificate of Title

Appendix E – Albany Motorsport Park – Site Feasibility Study

Appendix F – Flora and Fauna Survey

Appendix G – Bushfire Management Plan

Appendix H – Noise Management Plan

Appendix I – Agricultural Land Capability Assessment

1. Executive summary

Participation in motorsports is a popular recreational activity for many Australians. In Albany and the surrounding areas, motorsport is already known to be popular, with several well organised clubs, a national-level venue for speedway, a state-level venue for go-karts and widely recognised events such as the Albany Classic, Show 'n Shine and Race Wars. However, some motorsport disciplines, particularly motocross, lack suitable facilities in the region.

In 2016, the City of Albany undertook a demand study into the need for a multi-use motorsport park that demonstrated a strong need and desire for such as facility in the region. The draft *WA Motorsport Strategy* (WAMS) (DLGSCI, 2018) identified the proposed Albany Motorsport Park (AMP) as a regional level facility also serving local need. The strategy further recommended detailed planning and feasibility of developing the motorsport park be undertaken.

Recognising the interest in motorsports in the Great Southern, the Western Australian Government has committed $250,000 to undertake preliminary planning for a motorsport park (Watson, 2018) and a further commitment of $5.75 million in the 2020/21 forward estimates (GoWA, 2018) for its development.

A technical site feasibility study (GHD, 2018) was recently prepared for the City of Albany, in collaboration with the Department of Local Government, Sport and Cultural Industries (DLGSCI), to facilitate development of a multi-use motorsport park. A scheme amendment is proposed now for Lot 5780 Down Road South, Drome (the site) to provide the necessary land use planning framework to enable development of a suitable motorsport facility to meet regional and local demand and fulfil State Government commitments in the short to medium term.

In preparing the scheme amendment, GHD has engaged closely with relevant agencies on behalf of the City to discuss the merit of the proposal and requirements for lodgement of the scheme amendment.

The purpose of this report is to discuss the scheme amendment and key considerations for the site and its proposed role within the Albany area and broader Great Southern Region within a planning context.

1.1 Proposal

This amendment proposes to rezone Lot 5780 Down Road South, Drome from *Priority Agriculture* to *Special Use* with appropriate land use and development provisions proposed to be included in Schedule 4 of the LPS1 to guide future development.

1.2 Planning merit

The State Government through dedicated funding and in State strategic documents, including the WAMS, has recognised the need for a motorsport facility in the Great Southern region and specifically at Down Road. This amendment is proposed to facilitate a land-use planning pathway for the development of Lot 5780 Down Road South, Drome as a motorsport park.

The proposed amendment has planning merit for the following reasons:

- The proposal will achieve key objectives of the local planning strategy related to tourism and community infrastructure. Specifically, enabling diversification of the City's competitive advantages in tourism by providing a regional scale motorsport facility. The development has the potential to not only provide a formalised space for existing motorsport participants, but also to tap into latent demand and enable alternative businesses to establish on site to support the economic growth of Albany and the region.

- The proposal will meet currently unmet demand for motorsport facilities and support State Government strategic recommendations for establishment of a facility in the Great Southern region.
- The proposal is located to align with broader strategic intent of the City to protect urban and infill areas from inappropriate land uses and reduce land use conflict by siting the proposed activity in close proximity to an industrial area within an existing noise buffer.
- The proposal will facilitate productive use of the land for economic purposes. The land is currently zoned for agricultural priority activities however, findings of a site-specific land capability evaluation concluded that the removal of the *Priority Agriculture* zoning from the land is considered to have no significant effect on agricultural land protection objectives under the State and local planning framework. This presents an opportunity to develop the land for a use with higher economic value that brings benefit to the City, local communities and the broader region.

2. Introduction

2.1 Site details

The land subject to this amendment comprises Lot 5780 Down Road South (the site) in the locality of Drome, 20 kilometres north of the Albany town centre. The site is bounded by Down Road West to the north, Down Road South to the east, Lot 5781 Down Road South to the south (privately owned) and a local road reserve and the Avon-Albany rail reserve to the west. The site is located adjacent to the Mirambeena Timber Processing Precinct and sits within the industrial buffer area.

The regional context of the site and its location is shown in Figure 1.

A pending Mining Tenement held by Australia Silica Quartz Pty Ltd falls over a large portion of the site. The Mining Tenement status is classified as 'unsurveyed'. The site is 192.34 ha in area, approximately 52 ha of which is covered in well-established vegetation, which is proposed to be retained.

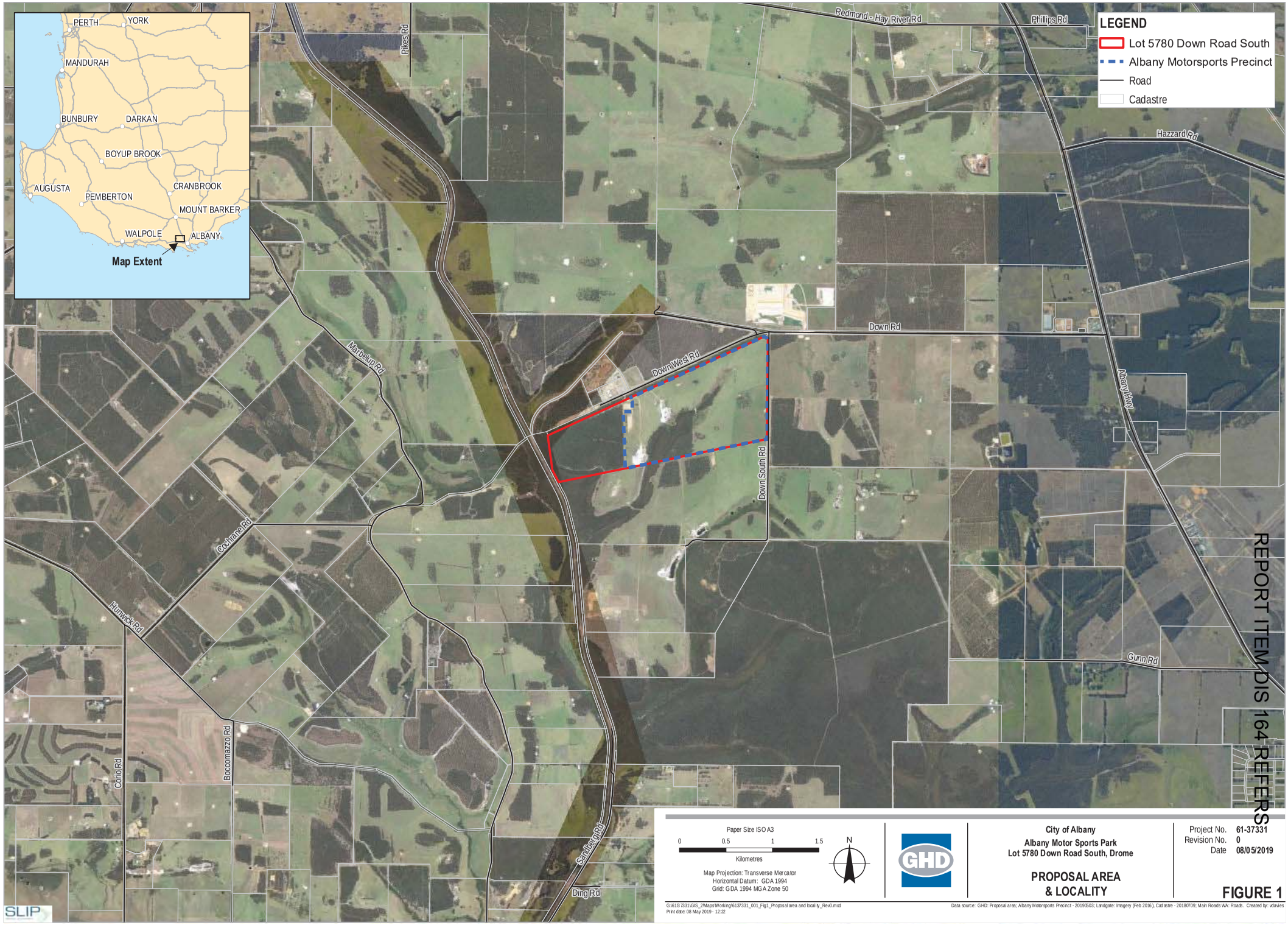
2.2 Existing land use

The site is currently being used for livestock grazing, sand extraction, wood chip storage and a drainage basin associated with the nearby operations of Plantation Energy Australia Pty Ltd.

2.3 Proponent and land ownership

The Great Southern Motorplex Group Inc. (GSMG), in partnership with the City of Albany, intends to develop the site as a regional motorsport facility. In October 2018, the City of Albany Council resolved to purchase the site. Settlement of the land purchase was concluded on 30 May 2019.

A copy of the Certificate of Title is provided in Appendix D.


PERTH
YORK
MANDURAH
BUNBURY
DARKAN
BOYUP BROOK
AUGUSTA
PEMBERTON
CRANBROOK
MOUNT BARKER
WALPOLE
ALBANY
Map Extent
LEGEND
Lot 5780 Down Road South
Albany Motorsports Precinct
Road
Cadastre
Redmond - Hay River Rd
Phillips Rd
Pikes Rd
Hazzard Rd
Down Rd
Down West Rd
Marbelup Rd
Albany Hwy
Down South Rd
Cockram Rd
Humwick Rd
Corio Rd
Boccomazzo Rd
Sandergan Rd
Ding Rd
Gunn Rd
SLIP
Paper Size ISO A3
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0.5
1
1.5
Kilometres
N
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50
GHD
City of Albany
Albany Motor Sports Park
Lot 5780 Down Road South, Drome
PROPOSAL AREA
& LOCALITY
Project No. 61-37331
Revision No. 0
Date 08/05/2019
FIGURE 1
G:\61\37331\GIS_2\Maps\Working\637331_001_Fig1_Proposal area and locality_Rev0.mxd
Print date: 08 May 2019 - 12:22
Data source: GHD: Proposal area, Albany Motorsports Precinct - 20190503; Landgate: Imagery (Feb 2016), Cadastre - 20180709; Main Roads WA: Roads. Created by: vdavies

2.4 Amendment rationale

The proposal will meet currently unmet demand for motorsport facilities in the Great Southern Region

The State Government through dedicated funding and in State strategic documents, including the WAMS, has recognised the need for a motorsport facility in the Great Southern region and specifically at Down Road. This amendment is proposed to facilitate a land-use planning pathway for the development of Lot 5780 Down Road South, Drome as a motorsport park.

The motorsport facility is identified in the WAMS as a regional level site and will facilitate tourism and broader participation in motorsports in the region. The City of Albany has identified tourism as a key competitive advantage for the City. The closure of the Albany Motorcycle Club's facilities at Roberts Road in 2011 has meant that motocross and enduro motorcycle riders currently lack a permanent formalised facility to pursue their sport in the lower Great Southern region. The project has the potential to not only provide a formalised space for existing motorsport participants, but also to tap into latent demand and enable alternative businesses to establish on site, such as commercial driver training and component testing. Findings of the *Motor Sport in the Lower Great Southern – Feasibility Study* (2016), prepared by GHD for the City of Albany in collaboration with the Department of Local Government, Sport and Cultural Industries, reinforced the potential of the motorsport facility to directly support the City in achieving its objective of diversification through tourism:

- Direct value added (DVA) of motorsports in the region could grow from $3.3 million currently to $3.7 million over 10 years. This is a small percentage (<1%) of Gross Regional Product and total household expenditure on "recreation and culture".
- Total expenditure by local motorsport participants could be expected to grow through increased participation rates and increased rates of expenditure. This could grow from an estimated $5.6 – $8.8 million currently, to $12.0 – $15.0 million in 10 years. Motorsport participants in the Lower Great Southern study area spend $7,000 – $11,000 per year on their sport (compared to a national average of $12,000 - $15,000 per year).
- There is presently insufficient information to estimate the potential boost caused by a motorsport park to the Study Area's $90 million tourism industry. However, data suggests that sports-related tourists spend up to 30 percent more than typical 'holiday' tourists.

The proposal is located to mitigate land use conflict and encroachment of incompatible uses

The preliminary studies undertaken as part of the land-use planning for a motorsport facility included a regional and site-specific feasibility study to determine a suitable location for the project. The feasibility studies took a holistic approach, considering environmental, planning, social, economic and strategic factors to assess the potential location for the motorsport facility. The current proposed location aligns with broader strategic intent of the City to support consolidation of serviced urban and infill areas from inappropriate land uses and reduce development conflicts by siting the proposed activity in close proximity to an existing industrial area within existing noise buffer contours. This scheme amendment application will assist in the development of a motorsport facility in an appropriate location that minimises land use conflict and encroachment of incompatible land uses on urban areas.

The proposal will facilitate productive use of the land for economic purposes

While the site is currently zoned *Priority Agriculture*, and recognising the need to protect suitable land for agricultural activities, the land capability assessment undertaken as part of the preliminary planning for the site found the land is not unique in terms of the nature of its soils

and landforms. The assessment concluded that the removal of the *Priority Agriculture* zoning from the land is considered to have no significant effect on agricultural land protection objectives under SPP 2.5 and LPS1.

The imperative for the land to remain zoned *Priority Agriculture* is therefore removed, representing an opportunity to develop the land for a use with higher economic value that brings benefit to the City, local communities and the broader region.

3. Strategic and statutory framework

3.1 State planning context

3.1.1 State Planning Policies

A summary of the proposed amendment against State Government strategic policy is provided in the table below.

Table 1: Relevant State strategic policy documents

Document	Summary	Assessment
SPP 2.0 Environment and natural resources policy	Overarching policy ensuring integration with environment and natural resource management with broader land use planning and decision-making. The policy sets out general measures for protection of the natural environment, supplemented by detailed policies for specific natural resource matters.	The site accommodates a significant portion of remnant vegetation. In addition, environmentally sensitive areas, conservation significant flora and fauna and water resources have been identified within and surrounding the site. The proposal will be referred to the EPA under Sections 48A and 38 of the EP Act to ensure appropriate environmental conditions are identified for the protection of environmental assets on site. A flora and fauna survey was undertaken for the site. The survey did not identify any unacceptable impacts based on the proposed concept for the site. Findings of the survey, as well as recommendations, are discussed in section 6.2.4.
SPP 2.5 Rural Planning	Protects and preserves rural land assets, including land zoned for agricultural purposes, as well as ensuring broad compatibility between land uses. The policy applies where an amendment to a local planning scheme is proposed. The policy notes regional facilities including sporting venues should not be visually dominant and should be visually	The site is currently zoned *Priority Agriculture*. The site is adjacent to the Mirambeena Strategic Industrial Area with no sensitive land uses in close proximity. It is therefore not expected that the use of the site for motorsports will have a significant visual impact. Nevertheless, the proposed amendment includes provisions for development on the site to address any potential visual impact concerns once the final layout of the site is confirmed. The City of Albany commissioned a land capability assessment (Appendix I) to evaluate the site-specific

Document	Summary	Assessment
	compatible with surrounding land uses.	capability of Lot 5780 for agricultural uses and to determine the uniqueness or otherwise of the site. The assessment concluded that the site is not unique in terms of the nature of its soils and landforms and the removal of the *Priority Agriculture* zoning from the land is considered to have no significant effect on agricultural land protection objectives under SPP 2.5. See section 6.2.3 for further information.
SPP 2.7 Public drinking water source	Ensures land use and development within identified public drinking water source areas (PDWSA) is compatible with the protection and long-term management of water resources for public water supply.	The site is located within a Priority 2 (P2) PDWSA within the Marbelup Brook Catchment Area. P2 areas are delineated to ensure no increased risk of pollution to the water source. The PDWSA is gazetted under the *Country Areas Water Supply Act 1947*. While not currently in use, the PDWSA is identified as a potential future water source option in the *Great Southern Regional Water Supply Strategy 2014.* The PDWSA is reflected in LPS1 as a PDWSA Special Control Area. Section 6.2.7 summarises the findings of the preliminary water management strategy. The strategy demonstrates that there are acceptable solutions for management of stormwater and wastewater to manage any adverse impacts on the PDWSA that would make development incompatible with the policy objective.
SPP 2.9 Water resources	Identifies measures to protect and manage water resources.	The site encompasses several water resources including proclaimed groundwater areas and a Conservation class wetland (Marbelup Flats). Section 6.2.5 summarises the findings of the preliminary water management strategy prepared as part of this amendment. The strategy demonstrates that there are acceptable solutions for management of water quality and quantity to meet the objectives of SPP 2.7.

Document	Summary	Assessment
		Further investigation and detailed design will be required at development stage, likely through a site-specific water management strategy (including targeted engineering controls).
SPP 3.7 Planning in bushfire prone areas	Directs how land use should address bushfire risk management through implementation of risk-based land use planning.	The site is within a designated bushfire prone area. As a regional attraction, the site is both a 'vulnerable' and 'high-risk' land use as well as a potential place of refuge in fire emergencies. A Bushfire Management Plan (BMP) including emergency evacuation plan has been prepared for the site and is discussed further in section 6.2.2. The BMP provides sufficient evidence that the rezoning proposal has, or can be made to have, a low to moderate bushfire hazard. The BMP further includes a Bushfire Emergency Evacuation Plan and identifies a preferred Emergency Access Way.
SPP 4.1 State industrial interface	Establishes a consistent approach to the securing of buffer areas to protect the certain uses from encroachment of incompatible land uses and provide safety and amenity of surrounding land uses. Draft SPP 4.1 Industrial Interface was released in November 2017 to update policy measures and provide greater clarity on implementation.	A noise assessment including draft noise management plan has been prepared to support the scheme amendment. Outcomes of the assessment are discussed in section 6.2.4. The noise assessment report concluded that for construction works, if carried out according to relevant Australian standards will have minimal impact, and vibrations are unlikely to be an issue. The report further identified the need for a noise management plan during operation of the site as a motorsports park to manage noise where it exceeds the assigned levels.
Draft government sewerage policy	Requires provision of reticulated sewerage to all new subdivision and development unless exempt under the policy and provides guidance where reticulated	Wastewater management will require on-site solutions due to lack of existing or potential connections to the Albany sewerage scheme. The site is defined under the draft policy as a sewage sensitive area, with the majority of the

Document	Summary	Assessment
	sewerage cannot be achieved.	site being within 1 km of a significant wetland (Marbelup Flats). The preliminary water management strategy has identified a potential wastewater management strategy that meets the requirements of the draft policy, as discussed in section 6.2.7.

3.1.2 State Planning Strategies

Lower Great Southern Strategy 2016

Released in 2016, the Lower Great Southern Strategy will guide land use planning for the region over the next twenty years. The proposed scheme amendment has considered and responded to relevant actions identified in the strategy, as identified below. Primarily, and in accordance with a key action for the City of Albany recognised in the strategy, the amendment will facilitate the development of a site for future regional private recreational facilities (e.g. motorsports).

Table 2: Responses to Lower Great Southern Strategy 2016

Objective/Action	Response
Priority agriculture - When preparing local planning schemes or amendments, local government to have regard to the extent of saline land when determining the best use of the land	The City of Albany commissioned a land capability assessment (Appendix I) to evaluate the site-specific capability of Lot 5780 for agricultural uses and to determine the uniqueness or otherwise of the site. The assessment concluded that removal of the *Priority Agriculture* zoning from the land is considered to have no significant effect on agricultural land protection objectives. One finding based on a 2018 report prepared by GHD noted that groundwater salinity in the local area is in the range of 500 – 1000 mg/L which is considered to be marginal for productive uses. See section 6.2.3 for further discussion of the site's agricultural capability.
Bushfire management - Planning proposals including rezoning, structure planning, subdivision and development to incorporate bushfire assessment and management measures as required by WAPC's policy framework	A BMP was prepared to support the proposed rezoning of Lot 5780 Down Road, Drome in accordance with SPP 3.7, the Guidelines for Planning in Bushfire Prone Areas as well as relevant Australian Standards to ensure relevant bushfire hazards were considered and can be managed.

Draft Western Australian Motorsport Strategy

The draft Western Australian Motorsport Strategy (WAMS) was released for public comment in August 2018 and identifies infrastructure needs of road/track based motorsport activities throughout the state. The Albany Motorsport Complex is identified in the WAMS as a proposed regional level site. The WAMS recommends the development of a land-use policy framework to support the development of motorsport within WA, including exploration of the development of a motorsport complex at Down Road, Albany noting the potential issues relating to the PDWSA and existing environmental assets. This amendment will facilitate the development of the site as a motorsport complex through application of relevant land use planning tools.

The WAMS further recommends water monitoring and development of an environmental management plan to ensure long-term management, protection and enhancement of the natural environment within the site. The proposed amendment sets out provisions under the *Special Use* zone requiring development of an environmental management plan and local water management strategy.

3.2 Local planning context

City of Albany Local Planning Scheme No. 1

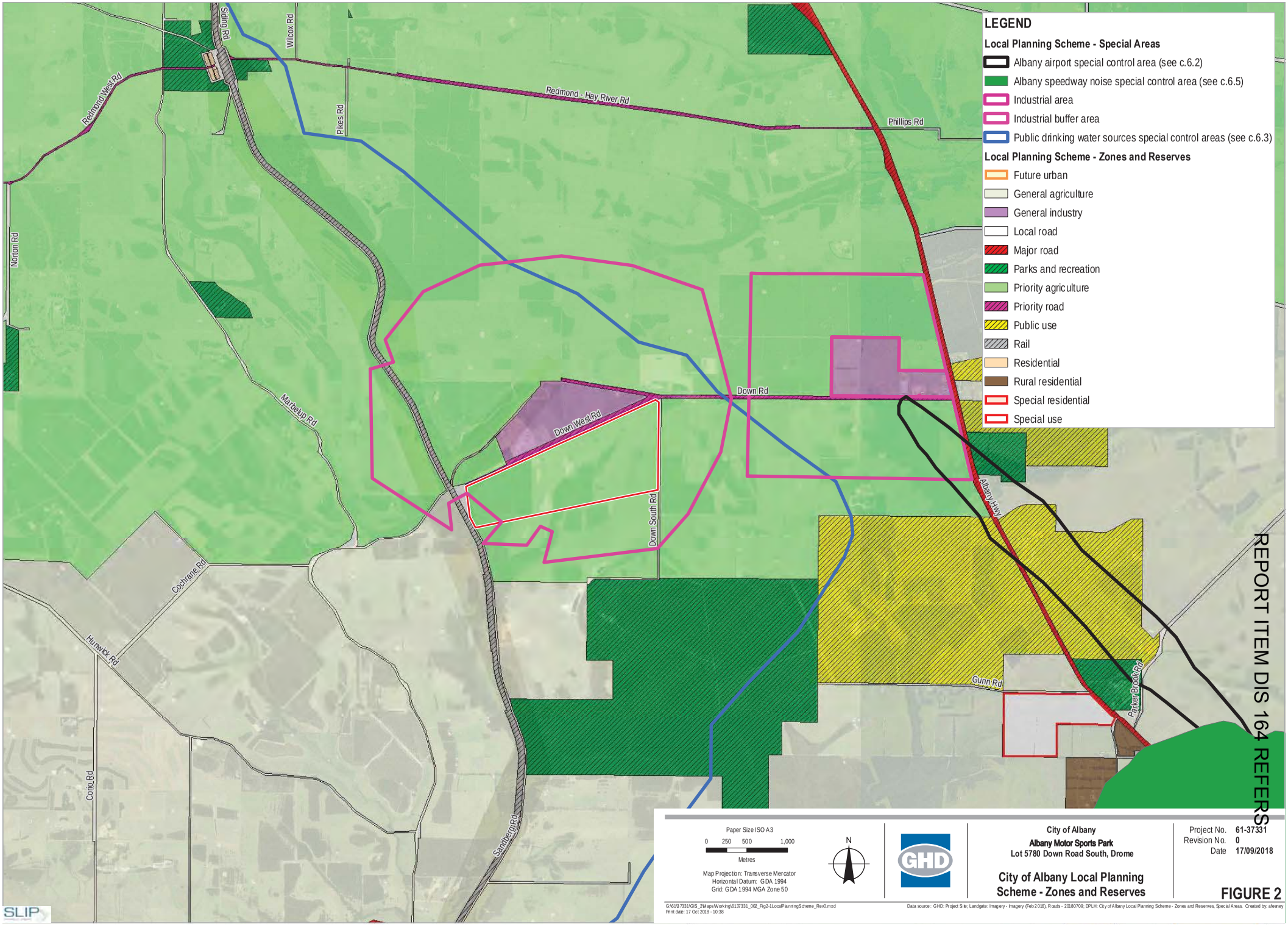
The site is zoned *Priority Agriculture* under LPS1. A motorsport park is a use not listed in the LPS1 Zoning Table (Table 1). Under the existing *Priority Agriculture* zone, a motorsport park would not be considered consistent with the objectives of the zone. On this basis, it is proposed to rezone the site to a *Special Use* zone, recognising that there is no zone within LPS1 that would adequately facilitate the development of the site for use as a motorsport park.

With the exception of a small portion of land to the south-west, the site is located within an Industrial Buffer Area (IA4BA) surrounding the Mirambeena Timber Processing Precinct (TPP – i.e. Albany Plantation Export Company (APEC) and Plantation Energy) to the north of Down Road West.

Development within the buffer is controlled by additional provisions set out in Schedule 11 of LPS, including:

- All development to be generally in accordance with the Development Guide Plan as endorsed by the CEO subject to minor variations which may be approved by the Local Government.
- No dwellings or other habitable structures shall be permitted within the Industry Buffer Area designated on the Scheme Map.

The concept plan for future development of the motorsport park includes club rooms and other structures that are incidental to motorsports activities. Whilst these structures would be defined as habitable structures, they are not considered incompatible with the Industrial Buffer Area as they are not for residential or accommodation uses. The structures will be used in conjunction with a noise generating activity; therefore are not noise sensitive.


LEGEND
Local Planning Scheme - Special Areas
Albany airport special control area (see c.6.2)
Albany speedway noise special control area (see c.6.5)
Industrial area
Industrial buffer area
Public drinking water sources special control areas (see c.6.3)
Local Planning Scheme - Zones and Reserves
Future urban
General agriculture
General industry
Local road
Major road
Parks and recreation
Priority agriculture
Priority road
Public use
Rail
Residential
Rural residential
Special residential
Special use
Siding Rd
Wilcox Rd
Redmond West Rd
Redmond - Hay River Rd
Pikes Rd
Phillips Rd
Norton Rd
Marbelup Rd
Down Rd
Down West Rd
Down South Rd
Albany Hwy
Cochrane Rd
Hunwick Rd
Coote Rd
Sandbergen Rd
Gunn Rd
Parker Brook Rd
Paper Size ISO A3
0 250 500 1,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50
N
GHD
City of Albany
Albany Motor Sports Park
Lot 5780 Down Road South, Drome
City of Albany Local Planning Scheme - Zones and Reserves
Project No. 61-37331
Revision No. 0
Date 17/09/2018
FIGURE 2
G:\61\37331\GIS_2\Maps\Working\637331_002_Fig2-1LocalPlanningScheme_Rev0.mxd
Print date: 17 Oct 2018 - 10:38
Data source: GHD: Project Site; Landgate: Imagery - Imagery (Feb 2016), Roads - 20180709; DPLH: City of Albany Local Planning Scheme - Zones and Reserves, Special Areas. Created by: afeeney
SLIP

3.3 Local planning policies

Down Road Timber Processing Precinct

The Down Road Timber Processing Precinct seeks to protect operations and opportunities for industrial uses in the area through identification of buffer areas precluding certain development types. The policy identifies a Special Use Area 17 – Inner Area, Special Use Area 17 – Outer Area and a Down Road Timber Processing Precinct Hazard Area. Commencing on January 1, 2009 no dwelling house, permanent dwelling unit or habitable structure shall be constructed within that area of a lot identified within Special Use Zone 17 – Inner Area or the Down Road Timber Processing Precinct Hazard Risk Area. The majority of the site is located within the buffer areas.

The concept plan for future development of the motorsport park includes club rooms and other structures that are incidental to motorsports activities. Whilst these structures would be defined as habitable structures, they are not considered incompatible with the Industrial Buffer Area as they are not for residential or accommodation uses. The structures will be used in conjunction with a noise generating activity; therefore are not noise sensitive.

3.4 City of Albany Local Planning Strategy

The City of Albany Local Planning Strategy (Strategy), endorsed in August 2010, sets out to guide long-term strategic land use in the City. The Strategy identifies the site as part of the agricultural hinterland.

Siting of the motorsport park has considered and responded to the Strategy's strategic objectives and actions including:

- Support the consolidation of serviced urban areas and facilitate staged fully-serviced urban frontal development nodes.
- Support urban infill development based on compatibility of land uses and infrastructure capacity.
- Protect areas designated as future fully-serviced urban areas from inappropriate land uses, subdivision and development.
- Reduce land use and development conflicts by protecting industry, infrastructure and special uses from incompatible land uses

Locating the motorsport park at Lot 5780 Down Road South, Drome ensures the facility does not encroach on key urban infill sites as well as providing sufficient protection of the proposed special use from incompatible and sensitive land uses. The proposed amendment will employ existing protective measures including the noise buffer zone surrounding neighbouring industrial activities to mitigate potential land use conflicts with sensitive land uses. This provides the City and its community with needed local and regional recreation facilities while supporting strategic key objectives.

3.5 Draft City of Albany Local Planning Strategy (advertised version)

The draft strategy, advertised in August 2018, provides the strategic justification for the proposed scheme amendment. The site is within an area identified in the draft strategy as 'Investigation Area 4 – Mirambeena Strategic Industrial Expansion Area'. The purpose of the investigation area is to identify land around Mirambeena Strategic Industrial Area for industrial expansion and identifies the need to prepare a structure plan to address various matters, including the extent of the expansion area. Development of a motorsport facility within proximity

of a strategic industrial area will not prejudice the use of surrounding land for industrial purposes. A submission on the advertised draft strategy noted that any study for the investigation area should include consideration of the land for the proposed motorsport park (AMP). The submission further notes that the AMP should be consistent with the local planning strategy.

The City has verbally acknowledged that this amendment is likely to be included in subsequent versions of the draft strategy.

The motorsport facility is identified in the WAMS as a regional level site and will facilitate tourism and broader participation in motor sports in the region. The City of Albany has identified tourism as a key competitive advantage for the City, with an objective of the draft strategy to:

- Facilitate the diversification of the City's competitive advantages in agriculture and tourism.

The motorsport park will contribute to the City's unique tourism market by providing a location for regional, national and international motorsport competitions and events providing broader economic benefit to the community and Great Southern region. The proposed amendment and subsequent development of a motorsport facility will provide economic benefit through sports-related tourism, directly contributing to the City's strategic objective of diversification through tourism.

4. Site analysis

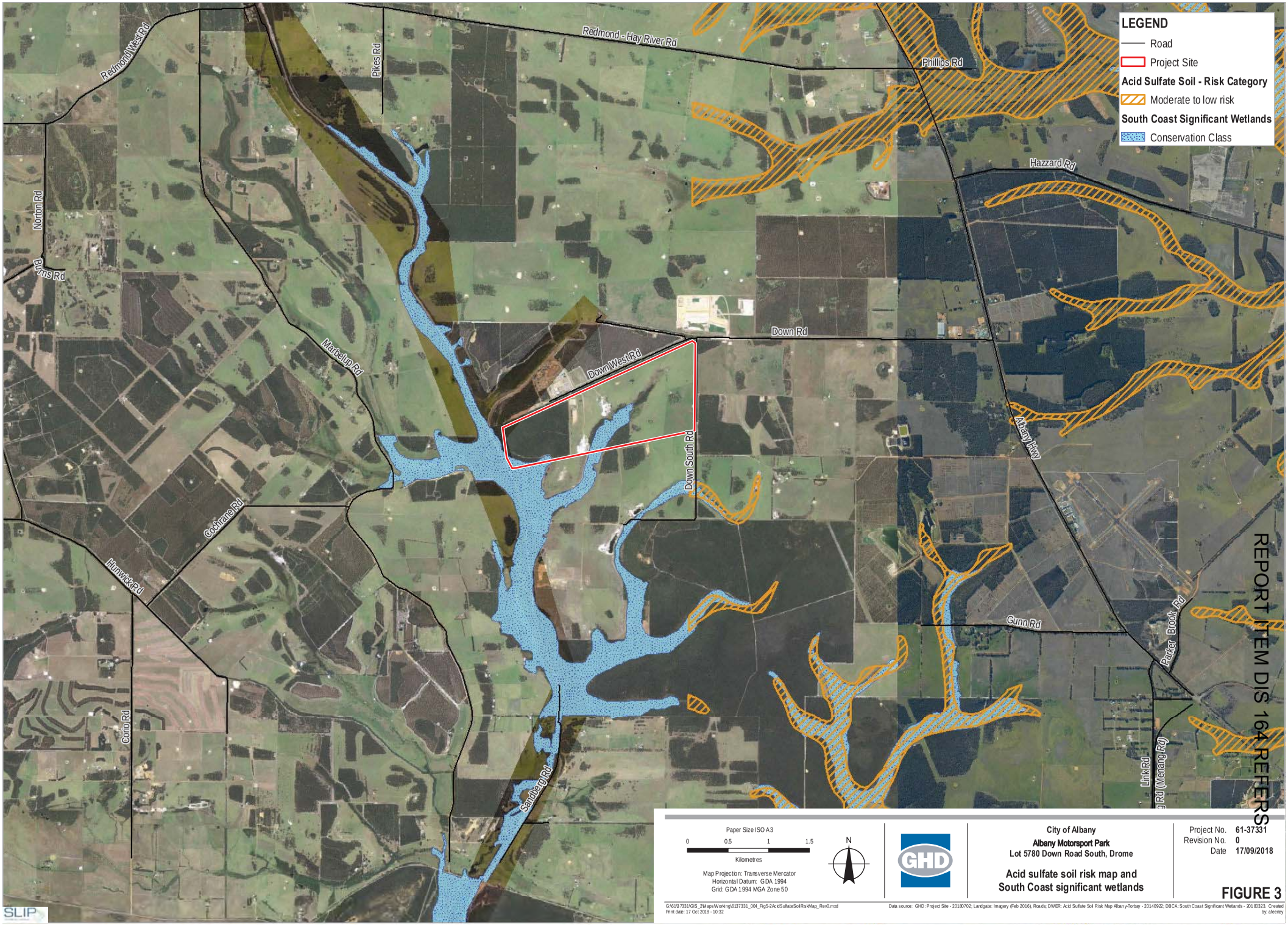
4.1 Topography, land form and soil

The surface elevation of the site ranges from approximately 41 m AHD to 73 m AHD. The lowest elevation is on the southern boundary and extends through the centre of the site within a gully (a tributary to Marbelup Brook) that lies in a north-easterly direction. The highest elevation occurs on the eastern boundary of the site.

Reference to the 1:50,000 Environmental Geology series map (Albany sheet) and the 1:250,000 Geological Series map (Mt Barker – Albany sheet) indicates the Project Site is underlain by Cainozoic sand of colluvial origin – “Qc: Colluvium – Sand, silt and clay” on the slopes and within the low lying areas of the Marbelup Brook “QA – Clay, silt, sand and gravel in watercourses” (Allen & Sofoulis, 1984).

A review of the DWER Acid Sulfate Soils (ASS) risk mapping for Albany-Torbay indicates the site is located directly adjacent to the boundary of this dataset. Tributaries of Marbelup Brook located approximately 750 m to the south of the site are mapped within areas of “Moderate to Low Risk” of ASS occurring within 3 m of the natural soil surface (Figure 3).

The tributaries of Marbelup Brook within the site may also have a “Moderate to Low Risk” of ASS occurring within 3 m of the natural soil surface.



REPORT ITEM DIS 164 REFERS

4.2 Vegetation

Regional biography

The site is located in the South West Botanical Province of Western Australia (Beard, 1990). The Southern Jarrah Forest IBRA subregion is characterised by “Jarrah-Marri forest on laterite gravels and, in the eastern part, by Wandoo - Marri woodlands on clayey soils. Eluvial and alluvial deposits support Agonis shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of species-rich shrublands” (Hearn, Williams, Comer, & Beecham, 2002, p. 382).

A Level 1 Flora Survey was undertaken between 31 October 2018 and 1 November 2018 by Bio Diverse Solutions using the *EPA Guidance Statement 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2016). The full Flora and Fauna Survey Report can be found in Appendix F.

Pre-European vegetation

Broad scale pre-European vegetation mapping of the Southern Jarrah Forest IBRA Region was completed by Beard (1979) at an association level. The mapping indicates that two vegetation associations are present within the site and lie within the Albany System Association (Table 3).

Table 3: Vegetation associations within the site

Vegetation association	Vegetation description	Structure description
51	Cyperaceae, Restionaceae, Juncaceae (mainly in the South-West)	Sedgeland
978	Jarrah, banksia or casuarina Eucalyptus marginata, Banksia spp., Allocasuarina spp.	Low forest, woodland or low woodland with scattered trees

Albany Regional Vegetation Survey

The mapping undertaken by Bio Diverse Solutions identified six vegetation type, five of which aligned with vegetation units described in the Albany Regional Vegetation Survey (ARVS) report by Sandiford and Barret (2010), as described in the table below. The ARVS provides a local and regional overview of the native vegetation within the area east, west and north of Albany. The sixth vegetation type included open paddock / agricultural land, including bare and sand extraction areas (see Figure 4).

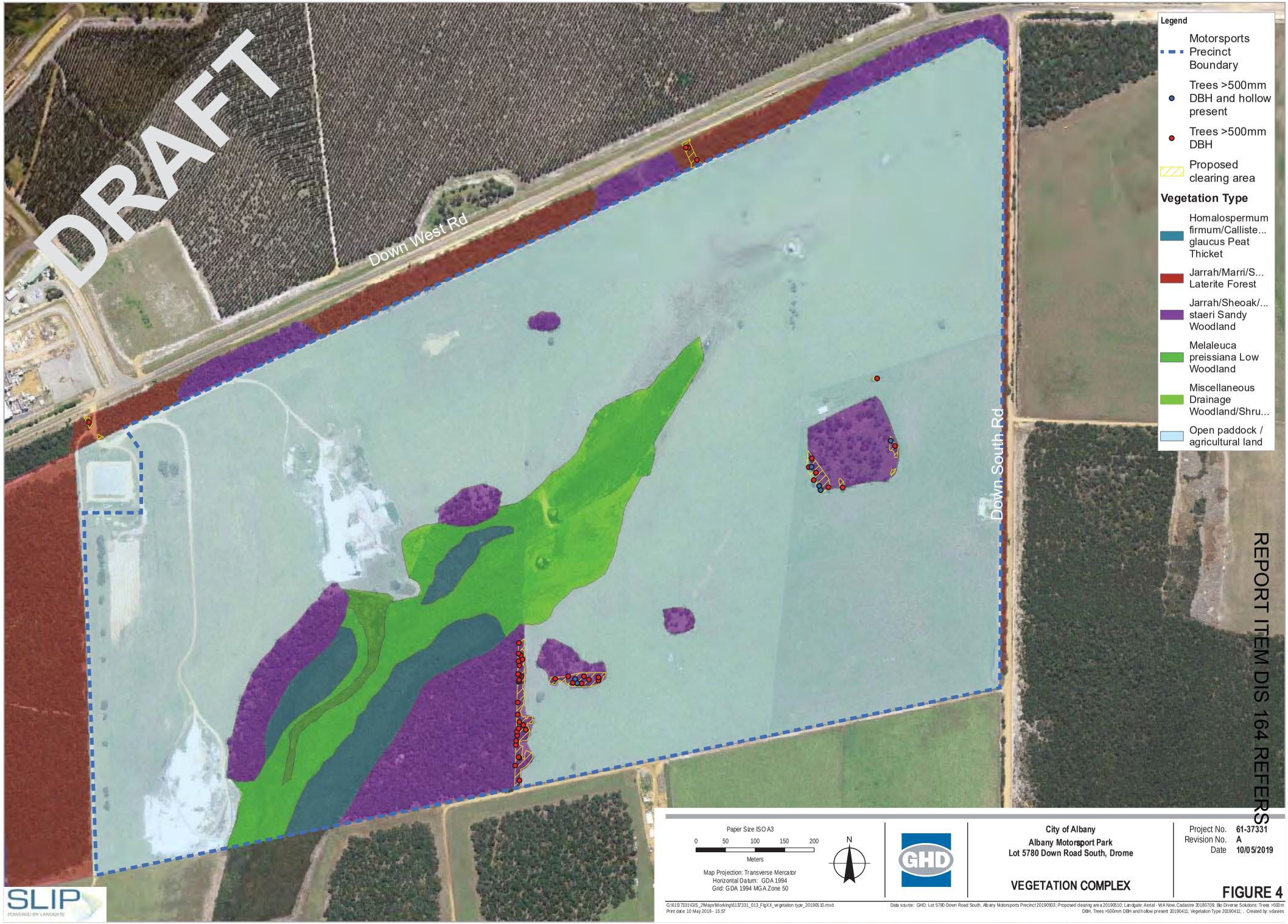
Table 4: ARVS vegetation units within the site

Map code	Vegetation unit	Soil type description
12	Jarrah/ Marri/ Sheoak Laterite Forest	Well drained shallow loamy/sandy soil with outcropping laterite, usually occurring on the crests and middle slopes of low relief hills and plateaus with occasional occurrences on lower slopes
13	Jarrah/ Sheoak/ *E. staeri* Sandy Woodland	Usually found on gentle middle to lower slopes on sandy soil overlying laterite

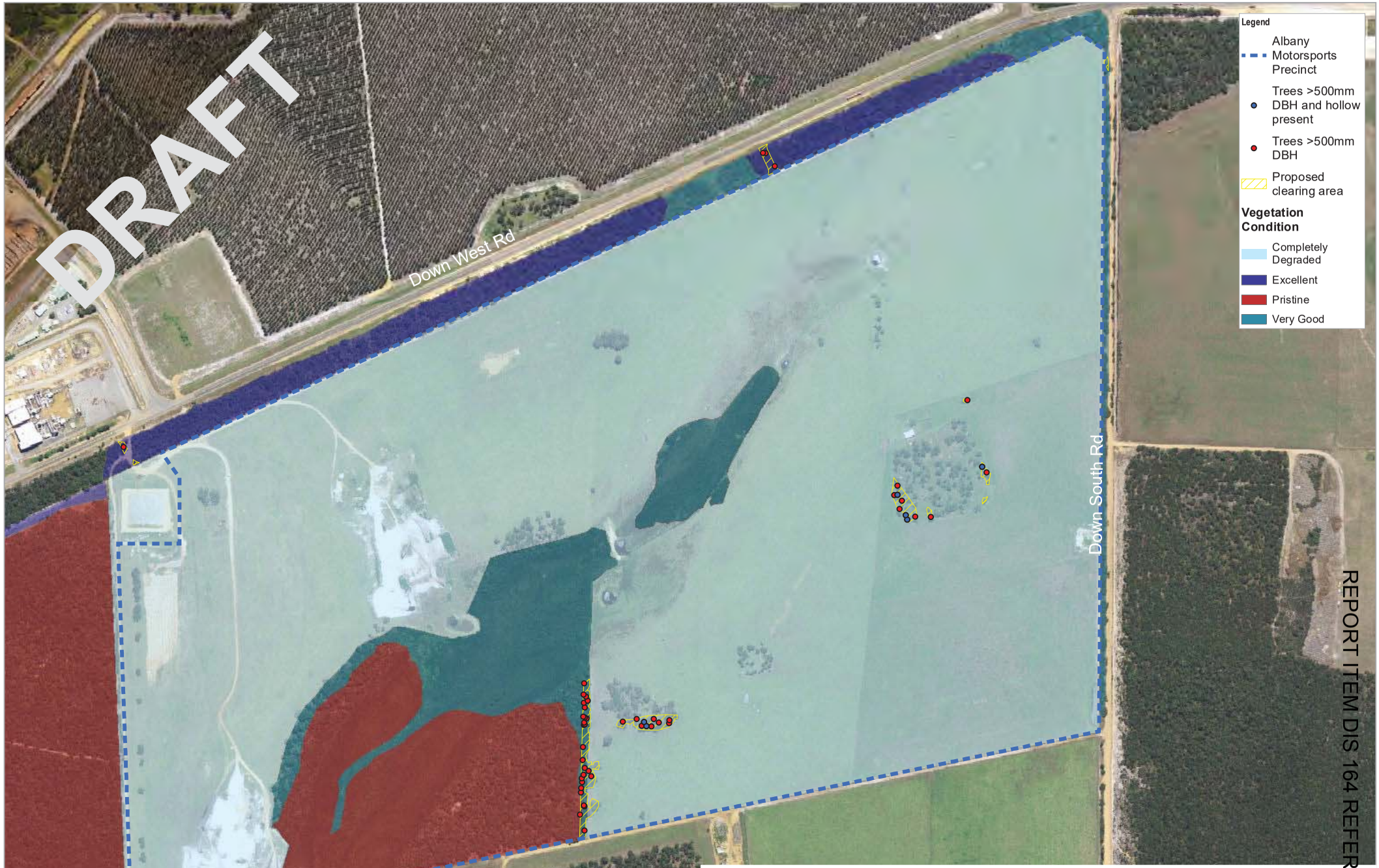
Map code	Vegetation unit	Soil type description
47	Homalospermum firmum/ *Callistemon glaucus* Peat Thicket	Occurs in drainage depressions below the seepage zone on dark brown peat or sandy peat that is waterlogged in winter and moist in summer
49	*Melaleuca preissiana* Low Woodland	Found throughout the survey area along drainage lines on dark grey sandy loam and occasionally on sandy peat soil
50	Miscellaneous Drainage Woodland/Shrubland	N/A

A search of relevant databases identified 17 Declared Rare Fauna (DRF), 41 Priority and one Presumed Extinct species as potentially being present within the site, as well as two Threatened Ecological Communities (TECs). Of the DRF and priority species potentially occurring in the area, none were found present. Based on the existing concept design (see Appendix B) the remnant vegetation areas will not be underdoing any development. The vegetation complexes identified within the survey area do not meet the key diagnostic features of the two TECs potentially occurring in the area. As there were no threatened flora of TECs identified within the survey area, there are no constraints to threatened species subject to the *Wildlife Conservation Act 1950*.

The vegetation in the creek/drainage area of the site is predominantly in Pristine and Very Good condition, based on the Keighery condition rating scale (Keighery 1994, Figure 5). To maintain the health of the creek, the survey recommends the protection of fringing vegetation. Fencing of the creek/drainage line to exclude access will enable maintenance of current vegetation conditions. The survey further concludes that adequate protection of flora can be achieved once the site is developed through the concept plan's proposed 50 m development exclusion buffer area. The survey notes that some restoration or management may be necessary to ensure weed species do not continue to encroach on the creek system and that the buffer should be extended to include the south eastern corner of the Jarrah/Marri Forest.



REPORT ITEM DIS 164 REFERS



REPORT ITEM DIS 164 REFERS

4.3 Fauna

A Level 1 Fauna Survey was undertaken between 29 October 2018 and 2 November 2018 by Bio Diverse Solutions using the *EPA Guidance Statement 56: Terrestrial Fauna and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2010). The full Level 1 Flora and Fauna Survey Report can be found in Appendix F. As the western remnant vegetation area is not proposed for development, significant trees within the area were not measures and mapped.

Targeted assessment was carried out for *Calyptorhynchus baudinii* (Baudin's Cockatoo), *Calyptorhynchus banksii naso* (Forest Red-tailed Black-Cockatoo), *Calyptorhynchus latirostris* (Carnaby's Cockatoo), *Dasyurus geoffreyi* (Chuditch), *Hydromys chrysogaster* (Water Rat), *Falsistrellus mackenziei* (Western False Pipistrelle), *Isoodon obesulus fusciventer* (Quenda), *Notamacropus irma* (Western Brush Wallaby), *Phascogale tapoatafa wambenger* (Brush-tailed Phascogale), *Pseudocheirus occidentalis* (Western Ringtail Possum), *Setonix brachyurus* (Quokka) and *Zephyrarchaea mainae* (Western Arachnid Spider).

Of the 40 species detected during the survey, three were introduced species: *Felis catus* (Cat), *Vulpes Vulpes* (Red Fox) and *Oryctolagus cuniculus* (Rabbit). Four of the detected species were threatened (Forest Red-tailed Black-Cockatoo, Baudin's Cockatoo, Quenda, Western Brush Wallaby). The most important habitat for these species are the creek line vegetation, surrounding remnant vegetation and the roadside vegetation along the northern site boundary. The survey notes that this provides further evidence for the need to maintain a 50 m development exclusion buffer.

Potential habitat was found for Carnaby's Black-Cockatoo, Chuditch, Water Rat, Western False Pipistrelle, Brush-tailed Phascogale, Western Ringtail Possum, Quokka, *Apus pacificus* (Fork-tailed Swift), *Falco peregrinus* (Peregrine Falcon), Falc*o peregrinus subsp. macropus* (Australian Peregrine Falcon), *Tringa nebularia* (Common greenshank),*Tyto novaehollandiae subsp. novae-hollandiae* (Masked Owl (southern subsp.)), *Galaxiella munda* (Western Mud Minnow), *Galaxiella nigrostriatal* (Black-stripe Minnow) and *Lepidogalaxias salamandroides* (Salamanderfish). The potential habitat areas include all remnant vegetation within the site, the creek system and the larger stands of paddock trees.

There is a high level of fauna activity within the vegetation surrounding the creek line from both threatened and non-threatened fauna species as well as the highest occurrence of significant trees containing hollows. However, as no vegetation clearing is proposed in this area, the survey concludes that the development is thought to have minimal impact.

The southern pocket of Jarrah/Marri remnant vegetation had the highest occurrences of Baudin's Cockatoo and Forest Red-tailed Black-Cockatoo feeding signs. The majority of feeding evidence consisted of *Corymbia calophylla* nuts. As the number of significant Black Cockatoo feeding sites across the survey area was relatively low this indicates that although the site contains potential foraging habitat for the three species it is marginal and not a favoured feeding area. The presence of significant feeding signs in the remnant vegetation in the south appears to indicate this area is anecdotally more attractive for food than the other vegetated areas. The survey concludes that this further strengthens the need for the proposed development exclusion buffer to be expanded to the south east to include all of the remnant vegetation surrounding the creek line.

There are several active hollows within the stand of paddock trees (located in the eastern area adjacent to the existing shed) that is currently proposed in the concept plan to be a spectator area and situated between the multi-use track and public parking. This area had a high level of bird activity, with multiple nests and hollows observed. The survey notes that clearing of trees is

not recommended and significant trees that contain active hollows or future Black Cockatoo hollows should be retained.

Under the definitions defined in the Black Cockatoo Referral Guidelines (DSEWPaC, 2012) individual trees of *Eucalyptus marginata*, *Corymbia calophylla*, *Eucalyptus staeri* and *Allocasuarina fraseriana* could be considered potential breeding, roosting and foraging trees. These guidelines also state that clearing of more than 1 ha of quality foraging habitat and clearing of a known night roost site or any clearing which may impact foraging or roosting habitat has a high likelihood of resulting in significant impacts. In such instance's referral under the EPBC Act is recommended.

Overall, the remnant vegetation areas of the survey area provide high quality habitat for a range of threatened and non-threatened species. The survey recommends that areas of remnant vegetation should be retained and appropriately protected based on the high-quality habitat value they provide. Where the western area of remnant vegetation is subject to development such as passive recreational activities, targeted surveys should be undertaken of proposed alignments to guide the development of the area.

4.4 Conservation areas

Conservation reserves

There are no DBCA Legislated Lands and Waters intercepted by the site. However, there are two sites within 5 km of the site including (DBCA 2007):

- Down Road Nature Reserve located approximately 900 m to the south, and
- Phillips Brook Nature Reserve located approximately 4.4 km to the north east.

Environmentally Sensitive Areas

The unnamed watercourse located within the site is a tributary of Marbelup Brook and is a Conservation Class wetland (GoWA 2018, see Figure 3). As per DWER guidance (DER 2014), a conservation category wetland is "a defined wetland and the area within 50 m of the wetland" and is declared to be an Environmentally Sensitive Area (ESA) under the *Environmental Protection Act 1986*.

There is an additional ESA located approximately 4.7 km to the north-east of the site.



Figure 12: Fauna habitat values

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Australia
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Overview Map Scale 1:100,000

Legend

Fauna Indicators

- Active Den
- Active Fox Den
- Baudins Cockatoo
- Brush Wallaby
- Brushtail Possum Scat
- Brushtail Possum Scratchings
- Cockatoo Hollow
- Forest Red-Tailed BC
- Fox Den
- Fox Scat
- Galah Hollow
- Hollow
- Possum Hollow
- Potential Den
- Potential den log
- Quenda
- Rabbit
- Unoccupied Hollow

- Subject Site
- Cadastre
- Camera

Scale
1:8,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
PO Box 484
Albany, WA 6331

Fauna Habitat Values

Assessor	QA Check	Drawn by
KB & BT	KK	BT
STATUS	**FILE**	**DATE**
FINAL	MSC0137-002	30/01/2019

REPORT ITEM DIS 164 REFERS

4.5 Hydrology and hydrogeology

Groundwater

On a regional scale, the 250K Map Series – Hydrogeology identifies a “sedimentary aquifer within intergranular porosity – extensive aquifers, major groundwater resources” underlying the site (DoW, 2002). Groundwater salinity in the local area is in the range of 500 – 1,000 mg/L, which is considered to be marginal for productive uses (GoWA 2018).

GHD prepared a conceptual hydrogeological model to understand surface and groundwater water flows and potential linkages. The model was prepared to support the preliminary water management plan as part of the site feasibility study (GHD 2018). The outcomes of the model (see Appendix E) noted:

- The groundwater levels observed in the shallow bores indicate that groundwater is present in the lower lying areas nearer the creek and will be most likely be supplying the creek with groundwater inflow.
- The groundwater levels and gradient, inferred from topography, supports that groundwater discharges into the creek.
- Shallow/perched groundwater may discharge and resurface via sandier layers that sit on top of more impermeable lateritic, coffee rock or clay layers; especially when there is significant slope.
- The discharging groundwater either expresses as surface water, or migrates within the deeper more permeable deposits.

Surface water

The site lies in the Marbelup Brook sub-catchment, which forms part of the wider Torbay Inlet Catchment in the Denmark Coast Basin within the South West Division (GoWA 2018).

The entire site and surrounds are located within the Marbelup Brook Surface Water Allocation Sub Area, which is a sub area of the Albany Coast Surface Water Allocation Area (GoWA 2018).

There is a significant upstream catchment within Lot 5780, of approximately 132 hectares, to the north and east. It is believed that these areas drain into the site via culverts along Down Road and Down Road West, particularly in larger storm events. Upstream land uses include agriculture and industrial sites with both woodlots and developed hardstand. Within the external upstream catchments is the CBH Mirambeena grain storage facility, which may have a potential impact. Within the site’s development area, the topography ranges from a maximum of 73 m AHD on the eastern boundary to a minimum of 41 m AHD in the creek line that bisects the southern boundary.

An unnamed watercourse is present within the site draining from the north-east and centre of the site to the south across the southern boundary to the Marbelup Brook which ultimately drains to Lake Powell. However, the natural drainage of the lower part of Marbelup Brook catchment has been modified which diverts the lower part of Marbelup Brook away from Lake Powell to the Torbay Inlet (DoW 2007).

During a site visit (3 July 2018) the watercourse was observed to be in a modified state, with cattle currently having access to the watercourse. Erosion was evident, particularly in the eastern extent of the watercourse. This area was also mostly devoid of native vegetation, with the exception of some sedges (*Juncus spp*). The western section of the watercourse contains native shrubs/ sedges and had a defined bed/ banks.

4.6 Heritage

4.6.1 Aboriginal heritage

A search of the Aboriginal Heritage Inquiry System found that there are no Registered Sites of Aboriginal heritage significance within the site or within a 5 km buffer of the site. There are also no sites lodged as 'Other Heritage Places' intersecting the site, however three 'Other Heritage Places' are located within 5 km of the site:

- King River (ID 4630),
- Down Road, Albany (ID 4632),
- Marbelup Brook (ID 29673).

The search of the Aboriginal Heritage Inquiry System provided the following information regarding Indigenous Land Use Agreements in the South West:

> *"On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boojarah #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).*
>
> *The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will 'impact' (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site"* (DPLH, 2018)

Section 5 of this report summarises consultation with DPLH regarding the ILUA and Aboriginal heritage.

4.6.2 Heritage (non-indigenous)

A search of the EPBC Protected Matters Search Tool did not identify any Commonwealth listed heritage sites in or within a 5 km buffer of the site.

A search of the Western Australian State Heritage Office Inherit database did not identify any State Registered Places within the site (DPLH 2018). The closest known site of heritage significance (Albany Airfield and 'Sigint' Radar System Place No 15574) was identified approximately 4.5 km from the site.

4.7 Infrastructure

4.7.1 Power

A 22 kV, three-phase overhead power line site within the property boundary, which includes an underslung overhead earth wire. This power line is part of the ALB 518.0 Mt Barker line and emanates from Albany Zone substation, located 10 km from the site. A 200 kVA pole top transformer is located on Down Road West and services the property to the north of the road. Preliminary investigation suggests the 200 kVA transformer is located too far from the proposed motorsport development to be of use.

4.7.2 Communications

Telstra communication cables exist along Down Road West within P6 and P8 pits. The site is reasonably well serviced by 3G and 4G mobile phone coverage, with some loss of coverage likely to occur in the valleys of the site.

4.7.3 Potable water

The Water Corporation's Lower Great Southern Towns Water Supply Scheme (LGSTWSS) runs along Albany Highway, with the nearest connection point approximately 4 km to the east at 66 Down Road (fertiliser distribution warehouse) (Water Corporation 2018).

It is noted that in the initial stages of development, it would be cost prohibitive to connect to the LGSTWSS. The concept therefore proposes to service drinking water needs on the site through a combination of collected rainwater and water carts (see section 6.2.7).

4.7.4 Wastewater

The Water Corporation's Albany sewerage scheme is not in close proximity to the site, with the nearest connection point being at Lancaster Road, McKail (being some 10 km distant). Wastewater management will require on-site solutions and is discussed further in section 6.2.7.

4.8 Surrounding land uses

The immediately surrounding land uses include a railway to the west, the wood chip processing facility on the north side of Down Road and land used for agricultural purposes (stock grazing) to the south and east. The Down Road Nature Reserve is located approximately 900 metres to the South. There is a tree plantation 2,500 metres to the east and the Mirambeena Strategic Industrial area is located approximately 2,000 metres to the east on Albany Highway.

There are four residential receptors within proximity of the AMP (SR01, SR02, SR03 and SR04) within 2 km of the site (see Figure 7).

PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Development area boundary

90



SCALE

0 500 1000 1500

Metres (at A3)

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CREATED	CHECKED	APPROVED
JF	JF	JF

MAP PROJECTION:	Universal Transverse Mercator
HORIZONTAL DATUM:	Geocentric Datum of Australia (GDA)
GRID:	Map Grid of Australia 1994, Zone 50

DATE	FILE LOCATION
15.04.2019	N:\AU\Albany WA\Projects\61\37331\Technical\Noise
REVISION	DRAWING NO.
0	

ALBANY MOTORSPORT PARK

NOISE SENSITIVE RECEPTOR LOCATIONS

FIGURE 7

Noise Assessment

GHD CLIENTS | PEOPLE | PERFORMANCE

REPORT ITEM DIS 164 REFERS

4.10 Traffic and access

Down Road West to the north and Down Road South to the east currently provide access to the site. Down Road is a single carriageway road that connects with Albany Highway approximately 4 km to the east. Albany Highway is a Primary Distributor Road with a speed limit of 110 km/h and can accommodate heavy vehicle traffic. Current traffic volumes for Down Road and Albany Highway are shown in the table below. A review of Main Roads WA crash analysis reporting system indicates one reported crash in 2013 at the Albany Highway/ Down Road intersection, which has since been upgraded and no crashes along Down Road in the last five-year period.

Down Road forms part of the Restricted Access Vehicle (RAV) network 7 and accommodates multi combination vehicles up to 36.5 m in length. Down Road accommodates RAVs serving the CBH grain storage facility, Plantation Energy and the APEC wood chipping facility.

Albany Highway also forms part of the RAV network 7 and accommodates multi combination vehicles up to 36.5 m in length.

Table 5: Average weekday and weekend traffic volumes (2017) - existing vehicles per day(vpd) (MRWA Traffic Map 2018)

Location	Average weekday (vpd)	Trucks	Average weekend (vpd)	Trucks
Down Road	844	34%	419	40%
Albany Highway	4,950	20%	3,520	16%

5. Consultation

Significant pre-lodgement consultation has been undertaken regarding the Albany Motorsport Park proposal, and the specific site which is the subject of this Scheme Amendment. This consultation has been led by the City of Albany, with support from GSMG and associated consultants. The record of consultation since July 2018 is shown below.

Table 6: Record of consultation

Date	Attendees	Discussion
20 July 2018	City of Albany Great Southern Motorplex Group (GSMG) Inc. Department of Local Government, Sport and Cultural Industries (DLGSCI)	• Project initiation meeting for site feasibility study
17 August 2018	City of Albany GSMG Inc. DLGSCI Department of Planning, Lands and Heritage (DPLH) Department of Water and Environmental Regulation (DWER) Great Southern Development Commission (GSDC) Office of Peter Watson, MLA	• Progress update on site feasibility study
20 September 2018	City of Albany Wagyl Kaip and Southern Noongar Working Party	• Briefing and presentation of proposed AMP
27 September 2018	City of Albany Councillors	• Briefing and presentation of draft *Site Technical Feasibility Study*
19 October 2018	City of Albany GSMG Inc. DLGSCI DPLH DWER GSDC Office of Peter Watson, MLA Water Corporation	• Presentation of final *Site Technical Feasibility Study*

Date	Attendees	Discussion
28 November 2018	City of Albany GSMG Inc. DPLH	• Pre-lodgement consultation meeting for Scheme Amendment with DPLH (Great Southern)
7 January 2019	Environmental Protection Authority (EPA)	• Pre-lodgement consultation for Scheme Amendment referral with EPA.
15 February 2019	City of Albany DWER	• Feedback on preliminary site water management plan and noise modelling
28 February 2019	City of Albany GSMG Inc. DLGSCI DPLH DWER GSDC Office of Peter Watson, MLA Main Roads WA Department of Biodiversity, Conservation and Attractions (DBCA) Department of Health (DoH)	• Progress update on site technical studies (specifically, bushfire management, water quality monitoring, flora & fauna) and Scheme Amendment.
11 April 2019	City of Albany GSMG Inc. EPA DWER DPLH	• Site visit specifically with EPA and DWER officers to discuss key environmental constraints and proposed management approaches.

In addition, the City of Albany provided several Ministerial briefing notes/letters regarding the project, namely:

- Briefing note for the Hon. Dave Kelly – Minister for Water, 19 December 2017
- Briefing note for the Hon. Mick Murray – Minister for Seniors and Ageing; Volunteering; Sport and Recreation, 27 February 2018
- Letter to the Hon. Mick Murray – Minister for Seniors and Ageing; Volunteering; Sport and Recreation, 23 March 2018

In reply, the City of Albany received the following responses:

- Letter from the Hon. Peter Water MLA – Member for Albany, 17 January 2018
- Letter from the Hon. Dave Kelly – Minister for Water; Fisheries; Innovation and ICT; Science, 9 February 2018

6. Details of proposal

6.1 Proposed amendment

The proposed scheme amendment will facilitate the development of the site for a multi-use motorsport park to cater for the growing needs of the Albany and Great Southern region. The approach taken to achieve this is to rezone Lot 5780 Down Road South, Drome from *Priority Agriculture* to *Special Use* (SU26) under LPS1.

This amendment proposes to rezone the entire site to a *Special Use* zone under LPS1. A *Special Use* zone has been identified as the most appropriate planning mechanism for the site, as use of the site for motorsports is not a defined use and not consistent with the objectives of any other zone within LPS1. Rezoning of the site to *Special Use (SU26)* will allow greater control of the development of the site to ensure appropriate consideration of environmental, interface and management issues.

Conditions for inclusion in Schedule 4 of the scheme provide a statutory framework to facilitate a management approach to use and development by prescribing the nature of management plans required, rather than specifying specific management approaches. This enables ongoing review and revision of management plans as required to incorporate contemporary benchmarks and technologies into managing environmental and amenity risks associated with the use and development of the land for a motorsports park.

A Precinct Plan has been prepared to provide a spatial framework for future land use and development. This provides for the spatial implementation of key assumptions that underpin the environmental studies and management plans prepared to support the scheme amendment.

6.2 Future development proposal

A preliminary concept plan has been prepared to demonstrate the future development of the site for use as a motorsport park, see Appendix B. The details associated with this plan are to be finalised as part of a future development application, however the plan broadly incorporates the following key elements:

1. Sealed, configurable multi-use track (3.5 km long × 12 m wide) for motor car racing, motorcycle racing, drifting, driver training and cycling:
   - Designed to comply with CAMS' Track Operator's Safety Guide (CAMS 2012) and Motorcycling Australia (MA) Track Guidelines (MA 2011)
   - To be licensed by CAMS for Fédération Internationalé de l'Automobile (FIA) Grade 2 and Fédération Internationalé Motocyclisme (FIM) Grade B (i.e. up to second-tier international motor racing)
2. A motocross circuit:
   - Designed and constructed in association with MA guidelines
3. A 1,000 foot drag racing strip:
   - Designed and constructed in accordance with FIA specifications for drag strips and in association with Australian National Drag Racing Association (ANDRA)
4. A 1,300 m^2 burnout area, and
5. An off-road four wheel drive (4WD) and all-terrain vehicle (ATV) training area.

6.2.1 Traffic and access

A traffic investigation was undertaken as part of the site technical feasibility study, and can be viewed in section 10 of the report in Appendix E. This section summarises the traffic and access impacts of the proposed development. Table 7 below outlines the expected usage of the AMP at full build out. For the purposes of sizing facilities and servicing infrastructure, a typical/frequent site attendance of 500 persons has been assumed (i.e. competitors, officials and spectators). For special events that anticipate a greater number of site attendees, additional management measures will need to be implemented.

The AMP is proposed to operate within the following hours:

- Typical day operation 8:00 am – 7:00 pm
- Typical evening operation 7:00 pm – 10:00 pm and only conducted if fixed or mobile lighting is available.

Table 7: AMP indicative event profile

Use	Level	Frequency	Duration	Entrants	Spectators
Driver training, schools, manufacturer testing		Week days	Day	50	0
Car test & tune day	Club	4 week days / month	Day	30	30
Car speed events	Club	1 weekend / month	Day	100	200 – 500
Car speed events	State	1 weekend / month	Day	100 – 200	200 – 1,000
Car speed events	National	1 weekend / year	Day	200 – 300	2,000 – 5,000
Super cars events	National	1 × 3 day weekend / year	Day	200 – 300	10,000 – 20,000
Bike test and tune day	Club	4 week days / month	Day	50	50
Bike speed events	Club	1 weekend / month	Day	100	200 – 500
Bike speed events – Champions Ride Day	State	1 weekend / month	Day	100	200 – 1,000
Bike speed events	National	1 weekend / year	Day	200	1,000 – 5,000
Motocross events	Club	3 days / week training 4 single days / month	Day	100 – 200	200 – 400
Motocross events	State	1 weekend / month	Day	200 – 300	500 – 1,000
Drifting day	Club	2 days / month	Day and evening	30	30
Drifting day	State	1 weekend / month	Day and evening	50	200 – 500
Burnout day	Club	1 weekend / month	Day or evening	30	30
Burnout day	State	1 × 3 day weekend / year	Day or evening	50	1,000 – 2,000

Use	Level	Frequency	Duration	Entrants	Spectators
Drag racing practice day	Club	4 week days / month	Day	30	100
Drag racing competition	Club	1 day / month	Day and evening	30	200 – 500
Drag racing competition	State	4 weekends / year	Day and evening	50	500 – 1,000
Drag racing competition	National	1 weekend / year	Day or evening	50	1,000 – 5,000
Motorkhana	Club	1 day / month	Day	50	200

Traffic

Assuming two people per vehicle, an overall attendance of 500 people would represent 250 vehicles in and 250 vehicles per hour (vph) out of which, five percent (13) are heavy vehicles transporting competition vehicles.

Table 8: Site generated traffic (typical)

Vehicle type	In (vph)	Out (vph)
Light vehicle	237	237
Heavy vehicle	13	13
Total	250	250

A capacity assessment of Down Road using Highway Capacity software (HCS7) indicates a level of service B, assuming AMP and peak hour traffic movement occur at the same time.

The intersection of Albany Highway/Down Road has recently been upgraded to accommodate CBH traffic (for grain haulage) and no further upgrade is anticipated to be required for general use of the AMP. Analysis has been undertaken assuming the AMP exit traffic occurs at the same time as the pm peak hour of the intersection and confirms no forecast delay or congestion.

Further analysis has been undertaken assuming a one percent growth rate on Albany Highway for ten years and the results indicate all levels of service remain the same for both the am and pm peak period.

Traffic management for larger events will require careful planning and consultation with relevant stakeholders and neighbouring businesses, as well as preparation of a detailed traffic management plan.

Access

Two access points are proposed to serve the site from Down Road West (see Appendix B). Entry to the AMP would be via the eastern entry point only. The western entry point is for separate controlled access to the small dam in the north-west corner of the site.

Traffic volumes on Down Road are approximately 840 vpd, of which, approximately 34 percent are trucks (large multi combination vehicles). A left turn lane in Down Road West is recommended at the access location to minimise the impacts on large trucks using Down Road during weekday use. Austroads Guide to Road Design indicates the length of the turn lane should be 180 m at 110 km/h or 120 m if a posted speed of 80 km/h is adopted.

The current speed limit on Down Road is 110 km/h. This is considered too high in view of the likely activity associated with the proposed AMP and should be reduced to a maximum of 80 km/h. Main Roads WA will need to be consulted regarding this matter. If a speed limit of 110 km/h is maintained, a review of aerial photography would indicate a suitable location for the

eastern access is approximately 240 m west of Down Road North, or 150-200 m if the speed limit is reduced to 80 km/h.

Parking

Two car parking areas are proposed to accommodate general event demand. Based on 500 spectators/competitors, an overall provision of 250-300 bays is forecast to be required. For larger events, overspill parking areas are provided which will be controlled and managed by event staff. All parking demand is proposed to be contained on site.

6.2.2 Bushfire risk

The site is located in a Bushfire Prone Area (DFES 2018), and requires compliance with State Planning Policy 3.7 (SPP 3.7). The proposed scheme amendment is considered a 'Strategic Planning Proposal' under SPP 3.7 and must be accompanied by a Bushfire Hazard Level (BHL) assessment and demonstrate compliance with bushfire protection criteria in the form of a BMP. The BMP was prepared in accordance with SPP 3.7, *Guidelines for Planning in Bushfire Prone Areas* and *AS 3959-2009.* The BMP provides sufficient evidence that the rezoning proposal has, or can be made to have, a low to moderate bushfire hazard. The BMP provides a detailed assessment of the proposal against the WAPC *Guidelines for Planning in Bushfire Prone Areas* protection criteria.

Consultation with the DPLH and DFES confirmed that use of the site as a motorsports park is deemed a 'high risk' land use, defined as land uses that may potentially ignite a bushfire, prolong its duration or increase its intensity, due to:

- Motorsport activities giving rise to risk of ignition and bushfire.
- Exposure of the community, fire fighters and environment to dangerous substances from vehicles igniting.

It is noted that although designated high risk, the controls and management procedures implemented through the BMP will reduce the risks of the AMP and its status should be refined in future stages of the development approval process.

The proposed use is further defined as a 'vulnerable' land use due to:

- Large numbers of people attending the AMP events (400-500 people club events, 10,000 people state events).
- Elderly demographic, children and mobility impaired people attending the AMP events.
- Presence of a function centre and clubrooms.
- Site evacuation challenges associated with visitors and spectators on site.

Additional access has been identified and a Bushfire Emergency Evacuation Plan (BEEP) prepared to respond to the proposal's designation as a vulnerable use and in accordance with the *Draft Position Statement: Tourism land uses within bushfire prone areas* (WAPC 2018). The BEEP will form part of the Emergency Management Plan, to be developed by the proponents of the site prior to operations.

Four access options were investigated for secondary access/egress in a bushfire event, with the favoured option for an Emergency Access Way being a link from Down Road South to Albany Highway. Verbal in-principle agreement for the link has been sought between the landowners and Main Roads WA to enable gazettal of an easement in gross to allow for emergency access/egress in a bushfire event.

Alternative access options for the entire Mirambeena precinct will be required to be investigated as part of a broader structure planning exercise.

6.2.3 Agricultural land capability

Land capability is a term used to express the ability of land to support a proposed use with minimal risk of degradation to its soil and water resources. The site is zoned *Priority Agriculture* under LPS1, designating the area as land considered to be of State, regional or local significance for food production purposes. This designation is based on the site's comparative advantage in terms of soils, climate, water and access to services. The City of Albany commissioned a land capability assessment (see Appendix I) to evaluate the site-specific capability of Lot 5780 for agricultural uses and to determine the uniqueness or otherwise of the site. The assessment concluded that the site is not unique in terms of the nature of its soils and landforms and the removal of the Priority Agriculture zoning from the land is considered to have no significant effect on agricultural land protection objectives under SPP 2.5 and LPS1. This conclusion is based on the following findings:

- The soil and landform conditions within Lot 5780 are generally consistent with the range and variations described by the earlier, broad-scale CSIRO mapping, apart from a greater proportion of pale sands on the valley sideslopes.
- Within the existing cleared portions of the property the capability of the land to support grazing is predominantly 'fair' and consistent with the earlier assessment by DPIRD based on its broad-scale soil-landscape mapping.
- Within the existing cleared portions of the property the capability of the land to support perennial horticulture (including viticulture) is a mix of 'fair', 'fair - high' and some 'low' capability land. Whilst generally consistent with the earlier assessment by DPIRD there is a greater percentage of low capability due to the poor ability of pale sands within lower parts of the landscape to retain nutrients against losses to drainage.
- The extent of remnant vegetation (approximately 38 percent of Lot 5780) is a significant constraint to the agricultural capability of the total property.
- As shown in Figure 2, Lot 5780 occurs near the southern edge of the most extensive portion of *Priority Agriculture* zoned land, and is within an industrial buffer zone. It is also within the Marbelup Catchment PDWSA where there are land use restrictions on horticultural activity.
- The City's Draft Local Planning Strategy (CoA 2018) indicates the intent for *Priority Agriculture* land is to protect better quality rural land for potential agricultural diversification, particularly for intensive agriculture where a suitable supply of water is available. GHD (2018) report however that groundwater salinity in the local area is in the range of 500 – 1,000 mg/L, which is considered to be marginal for productive uses.
- Lot 5780 is 192.4 ha in area and this represents just 0.23 percent of the total *Priority Agriculture* zoned land within the City of Albany.
- The lateritic uplands and minor valley sideslopes (DMc and S7h broad-scale map units) encompassed within Lot 5780 occur widely throughout the rural areas of the City of Albany and together cover 28,229 ha (or 33.7 percent) of its *Priority Agriculture* zone.

6.2.4 Noise

A Noise Assessment Report was prepared to support the scheme amendment and investigates noise implications for construction and use of the site as a motorsport park. The report (see Appendix H) encompasses identification of sensitive receptors, desktop assessment of construction noise and noise modelling to assess predicted noise impacts during operation of the site. The report recommends noise mitigation measures for construction and operational noise sources based on the current concept plan.

Noise monitoring was used to measure existing noise levels at the site and experienced by sensitive receptors (residential dwellings) within proximity of the proposed AMP site. The noise monitoring indicates that there are no existing sources considered 'significantly contributing' and the noise impacts from the AMP were therefore assessed in isolation.

Construction noise modelling

Construction noise impacts were assessed based on a number of factors, including:

- The intensity and location of construction activities,
- The type of equipment used,
- Existing local noise sources,
- Intervening terrain, and
- The prevailing weather conditions.

Based on predicted plant activity noise levels, noise levels exceeding the day L_{A10} assigned level of 45 dBA are not expected to impact on the closest noise sensitive receptors, with the exception of noisy equipment with a sound power level (SPL) higher than 115 dBA (i.e. concrete saw, jack hammers, dump trucks etc.)

In line with the *Environmental Protection (Noise) Regulations 1997*, construction will be carried out in accordance with control of environmental noise practices set out in Section 6 of *Australian Standard (AS) 2436-2010 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites* and equipment used will be the quietest reasonably available.

Construction activity may result in varying degrees of ground vibration depending on the equipment used and methods employed. The noise assessment report concluded that, given the distances involved between site works and the nearest receptors, vibrations affecting human comfort and building integrity are not expected to be an issue.

Operation noise modelling

Noise modelling was undertaken using Computer Aided Noise Abatement (CadnaA) to predict the effects of noise generated by motorsport events at the AMP with the aim of determining the noise impact at the nearest noise sensitive receptors. The noise model was based on the concept plan for the AMP as shown in Appendix B.

Results for both neutral and worst case meteorological conditions demonstrate that for some event combinations, predicted noise levels for the AMP may exceed the assigned noise levels.

Where noise levels for the AMP cannot practicably comply with the assigned noise levels, Division 3 of the *Environmental Protection (Noise) Regulations 1997* allows the venue occupier to apply for a special approval to exceed assigned levels in accordance with an approved Noise Management Plan (NMP). An example NMP has been prepared as part of the noise assessment report based on the concept plan and aligning with the *Guide to Management of Noise from Motor Sport Venues* (see Appendix H). The aim of requiring the AMP to operate in accordance with an NMP is to provide a mechanism to prevent further increase of events without consulting residents, and may not reduce noise levels from proposed operations.

Mitigation measures to reduce noise levels at AMP are limited, however further detailed design will consider the viability of constructing a barrier adjacent to the venue to reduce noise levels at sensitive receptors. Mitigation measures for any future residential development should align with SPP 5.4, including:

- Reducing outdoor levels by implementing ‘quiet house’ design measures relating to screening of outdoor areas with the residence itself (building orientation considerations) or screen walls.
- Reducing internal noise levels by implementing ‘deemed to comply packages’ relating to improving noise insulation of residences.
- Providing information to new residents within the development of the potential noise impacts from motorsport events (notifications on titles).

6.2.5 Air quality

It is anticipated that all roads and tracks proposed within the development with the exception of the motocross track will be sealed. It is therefore unlikely that the development will present any significant air quality issues relating to dust. Nevertheless, the proposed scheme amendment provides for a dust management plan prior to works, once the final layout for the motorsport park has been determined and as required by the local government in consultation with DWER.

Emissions from vehicles themselves would be quickly dispersed and not pose an issue. Any vehicle emitting excessive smoke or other emissions would be removed from competition until rectified.

6.2.6 Environmental impacts

A Flora and Fauna Survey was undertaken in October/November 2018 to gain an understanding of the flora and fauna present on site, their significance and the potential impact of the proposed development. Findings of the flora and fauna survey note that as the wetland and surrounding vegetation are to be protected through a 50 m development exclusion buffer and the majority of remnant vegetation will be retained, the development will not have an unacceptable impact on flora and fauna within the site. The survey recommends the following:

Flora

- Undertake restoration/ revegetation inside the proposed 50 m development exclusion buffer where applicable.
- Install fencing to exclude stock/ public access where fencing does not exist.
- Buffer extended to the south east to include all of the southern portion of Jarrah/ Marri remnant vegetation.
- Weed, dust, erosion and hygiene management plans developed and implemented.

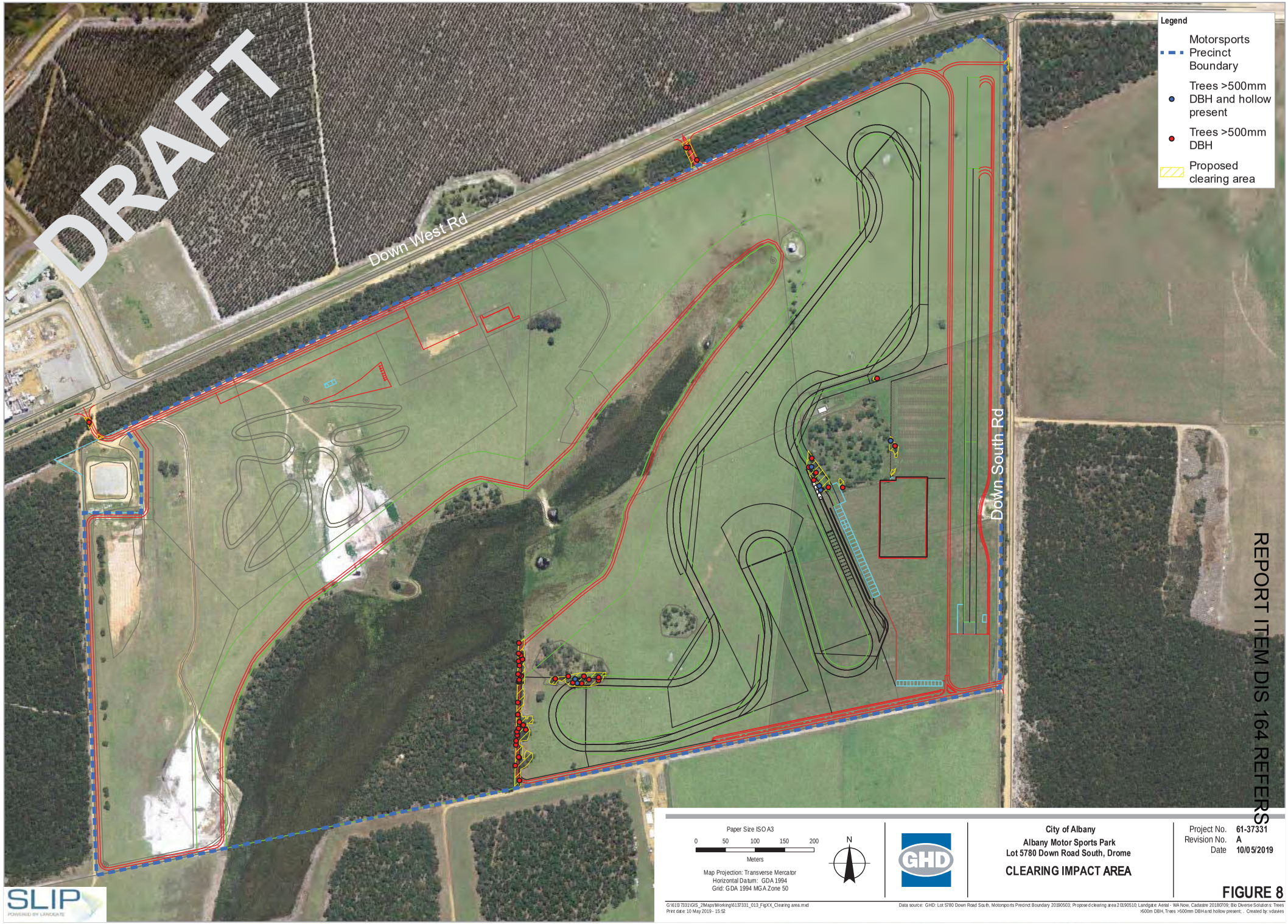
Fauna

- Fox and cat control.
- Buffer extended to the south east to include all of the southern portion of Jarrah/ Marri remnant vegetation.
- Where clearing in road reserves is proposed for public access, significant trees are to be retained where possible. Significant paddock trees should also be retained where possible.
- The creek system contains high value habitat and high fauna activity. The area is not proposed to be developed/ disturbed and should continue to be protected.
- If any development/ modification occurs within the creek area a targeted survey to identify the presence/ absence of *Galaxiella munda* (Western Mud Minnow), *Galaxiella*

nigrostriatal (Black-stripe Minnow) and *Lepidogalaxias salamandroides* (Salamanderfish) is required.

- Targeted fauna assessment for any proposed works in the remnant vegetation to the west.

The following section discusses management of the conservation category wetland and water systems on site.



REPORT ITEM DIS 164 REFERS

6.2.7 Water management

The site is within a Priority 2 area of the Marbelup Brook public drinking water source area. A risk assessment for the proposed development was undertaken in accordance with the Australian Drinking Water Guidelines (ADWG) (NHMRC, NRMMC 2011) and *Water Quality Protection Note 77: Risk Assessment of Public Drinking Water Source Area*s (DoE, 2005). A preliminary water management plan was prepared as part of the site feasibility study (GHD 2018, see section 8 of Appendix E) and provides management strategies to mitigate potential risks to storm water and groundwater quality and quantity.

The following section summarises the management strategies and controls proposed to prevent the use of the site as a motorsport park compromising water quality and quantity and to ensure the objectives of SPP 2.3 are met. A detailed local water management strategy for the site is recommended to be submitted as part of the development application.

Consultation with the Department of Water and Environment Regulation as well as Department of Health was undertaken as part of the pre-lodgement engagement for the proposed scheme amendment. Refer to section 5.

Drinking water supply

Connection to the existing LGSTWSS will be cost prohibitive in the initial stages of the project. It is therefore proposed to service drinking water needs on the site through a combination of collected rainwater and water carts.

Uncontaminated rainwater from the AMP buildings will be collected in standard 110,000 litre rainwater tanks. At source treatment by household-scale filtration and ultraviolet disinfection will be undertaken. This will allow a safe drinking water supply to the AMP facilities (i.e. clubrooms, canteen, etc.) and ablutions.

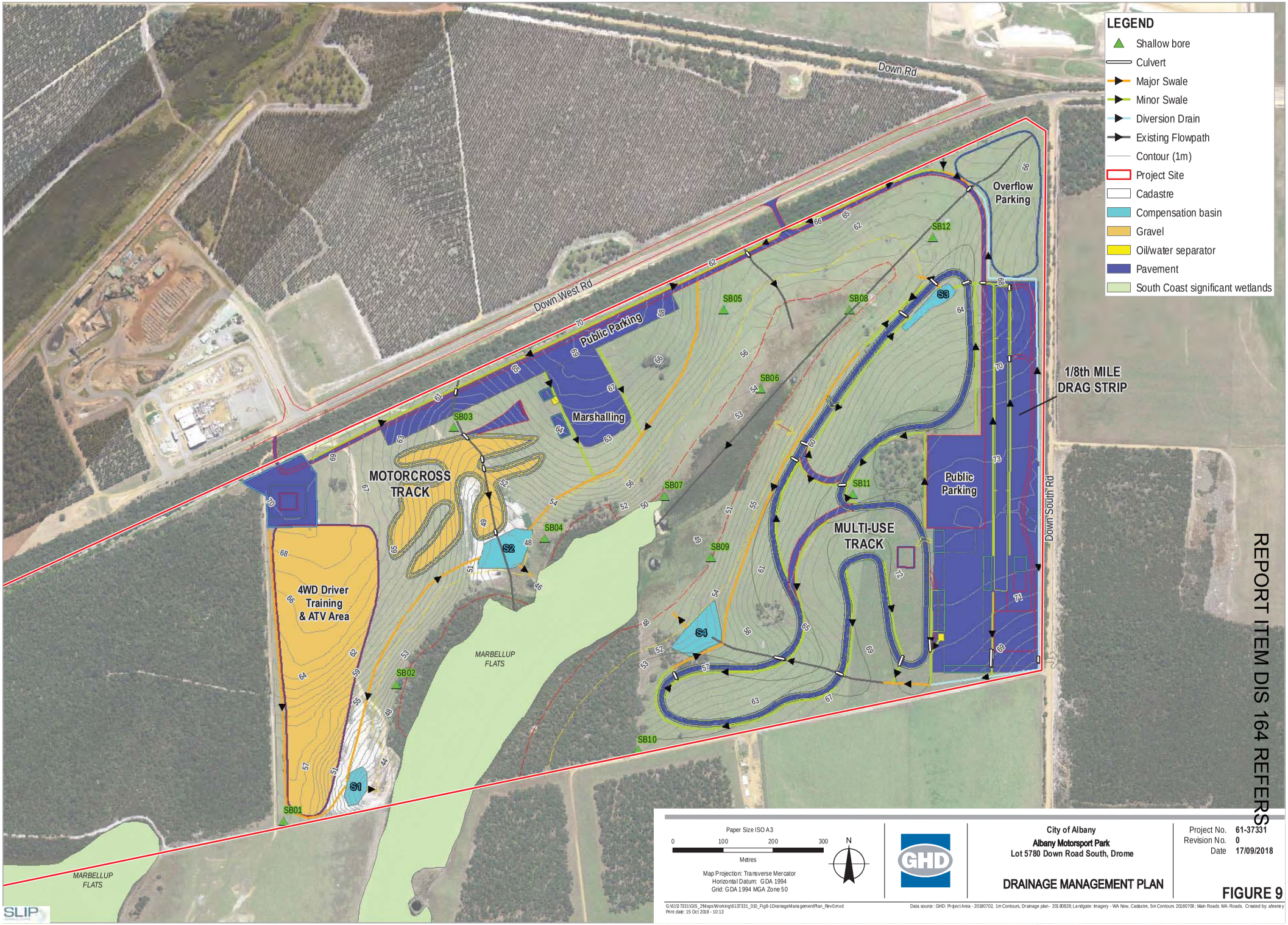
A preliminary water balance for the site suggests that rainfall alone will be insufficient to meet expected demand for regular attendance of 500 people. Where there is a shortfall, the AMP operators will need to purchase and cart water to the site. Water demands for other external uses (i.e. irrigation, dust suppression, etc.) will be met from site dams and groundwater bores.

Stormwater management

Stormwater quantity

The proposed stormwater management plan for the site is depicted in Figure 9 and consists of the following principles and elements:

- Where possible, uncontaminated runoff from impervious areas will be collected for drinking water, or targeted for infiltration near to the source.
- The release of (potentially) hydrocarbon impacted stormwater from high risk areas (e.g. maintenance areas, pits, etc.) is prevented by suitable engineering controls.
- Drainage swales to divert the (upstream) eastern boundary catchment around the drag strip and multi-use track, to minimise the potential for this water to impact on the site infrastructure.
- Suitable compensating (detention) basins to limit post-development peak discharge rates to pre-development rates from areas subject to development.
- Suitable swales, culverts and pipework to convey the runoff generated from the site to engineered locations for treatment / compensation before discharge to the waterway.
- Suitable buffer separations to the wetland/creek to minimise the potential for impacts of site-generated water impacting on the wetland.



REPORT ITEM DIS 164 REFERS

Stormwater quality

Stormwater quality issues requiring management within the site include:

- Sediment load: Erosion caused by high flow velocity can result in a loss of soil, damage to drainage swales, and increased sediment load to the receiving water body.
- Nutrient load: Increased nutrient loading to the receiving water body may result from over-application of fertilisers to landscaped areas.
- Gross: Suspended and dissolved pollutants: Including rubbish, hydrocarbons, dissolved metals, and pesticides.

Best Management Practices (BMPs) are design strategies targeted to manage total suspended solids, gross pollutants, total phosphorous (TP) and total nitrogen (TN) within stormwater discharged from urban catchments (DoW, 2007). Frequently occurring rainfall events are targeted, using source, in-transit and end-of-pipe controls to improve water quality. BMPs considered appropriate for the AMP development include:

- Construction of drainage swales and dry/ephemeral detention basins using weirs and low flow drain system, to reduce flow velocity, thus reducing erosion and sediment mobilisation, allowing sedimentation, reduce total flow discharged from each site, and allowing infiltration to groundwater.
- Construction of suitable bio-retention areas to allow for suitable water quality treatment.
- Planting and regeneration of low-lying native vegetation in swale drains for filtering of particulates and uptake of dissolved nutrients.
- Use of suitable soils within bio-retention areas that target the uptake of nutrients.
- Maximising infiltration by adopting a stormwater retention system to contain, and as a minimum, treat the first 15 mm of rainfall on site.
- Construction of compensating basins/storages to reduce peak flow rates and encourage infiltration.
- Minimising discharge rates, allowing the compensating basin to act as a sediment trap, to capture suspended solids and bound pollutants prior to discharge.

Spill control and pollution management

The preliminary water management strategy defines practices to be implemented to achieve spill control and pollution management in high risk areas of the AMP based on *WQPN 52: Stormwater management at industrial sites* (DoW, 2006) and *WQPN 100: Motor sport facilities near sensitive waters* (DoW, 2007). Control practices include operational measures such as separating uncontaminated stormwater from potentially contaminated stormwater, design measures including provision of buffers as well as practices specific to construction and maintenance on site.

An erosion and sediment control plan is recommended within the Construction Environmental Management Plan (CEMP) prior to commencement of works on site.

Wastewater management

Given the significant distance of the site from the nearest connection point of Water Corporation's Albany sewerage scheme, on-site management of wastewater will be required. On-site wastewater management will need to cater for human sewage as well as wastewater from vehicular activities.

The preliminary water management strategy reviewed potential wastewater management strategies and identified one potential solution that would enable the use of the site as a motorsport facility while meeting the requirements of the draft government sewerage policy. Further detailed investigations will be required into the most appropriate disposal system for the site, including a better understanding of the geotechnical conditions of the area. This should be undertaken prior to development on site.

The proposed use of the motorsport park will be mostly periodic (i.e. events based) with several different groups using the site. On-site wastewater treatment systems will typically consist of both a treatment system and a disposal system. These were preliminarily sized using the Department of Health's (DoH) Onsite wastewater system assessment tool for estimation purposes.

The calculator tool produced a required demand (hydraulic loading) of 17,500 L/day and aided in the sizing of the treatment and disposal systems. To determine the feasibility of on-site wastewater management, a sub-surface drip irrigation system was chosen as the most suitable option. This system will require a disposal/irrigation area of approx. 5000 m^2, which could be readily accommodated within the track design and facilities area.

The most suitable arrangement will be to have two wastewater treatment systems, one serving the motocross facilities, the other serving the multi-use track, and drag strip. Numbers in excess of system capacity (potentially up to 20,000 for national race events) would need to be catered for with portable facilities.

A minimum clearance of two metres between the maximum groundwater level and the discharge point of the disposal system will also be required. Therefore, wastewater facilities should be located at high ground on the site, where a greater clearance to groundwater is to be expected.

Water quality monitoring

The Preliminary Water Management Strategy proposes ongoing groundwater and surface water monitoring and includes a summary of proposed monitoring programs. The plan recommends preparation of an annual water quality report in accordance with ANZECC Guidelines (2000) and DWER quality assurance/control systems to be presented to the City and DWER.

Groundwater monitoring

Initial groundwater and water quality sampling was undertaken by Bio Diverse Solutions in February, May and September 2018. DWER has been consulted during the development of this monitoring plan. Further to this, GHD recommends the following;

- There is limited existing site-specific groundwater data, and pre-development data are limited. If the development proposal seeks approval to install a production bore for abstraction of groundwater as a water supply source for the development, then six-monthly groundwater monitoring for water levels and salinity will be a required.
- Groundwater monitoring should be conducted for three years following practical completion, to allow any groundwater level or quality changes as a result of development to be identified, and action taken if necessary.

Surface water monitoring

Continued surface water sampling is recommended to be undertaken prior to the construction of the AMP to develop a baseline for ongoing assessment. This monitoring should continue during construction and then following construction to assess the impact of the development on runoff water quality.

Operational controls

On site operational controls shall include but not limited to the following:

- Vehicle maintenance and refuelling to only be undertaken in the designated pit area where hydrocarbon interception/spill controls are implemented.
- Vehicle wash down to be undertaken on a bunded, impervious pad and runoff directed into a detention area containing a sediment trap and oil separator.
- Clean-up kits to be kept at strategic locations across the site in order to provide an immediate response to fuel, oil or chemical spills.
- On-site wastewater treatment (secondary standard) and disposal from toilets, washrooms and kitchens to be in accordance with the *Draft Government Sewerage Policy* and as noted in section 8.4 of the Preliminary Water Management Strategy.
- An adequate number of rubbish and recycling bins to be provided across the site and regularly maintained.
- Any landscaping on the site to be designed to minimise water, fertiliser and pesticide use.
- An emergency response plan to be prepared for situations that could place local water resources at risk.

7. Conclusion

The proposed rezoning of the site from *Priority Agricultural* to *Special Use* is justified in the context of the current local planning framework, overarching LPS1 objectives and local context.

Appendices

Appendix A – References

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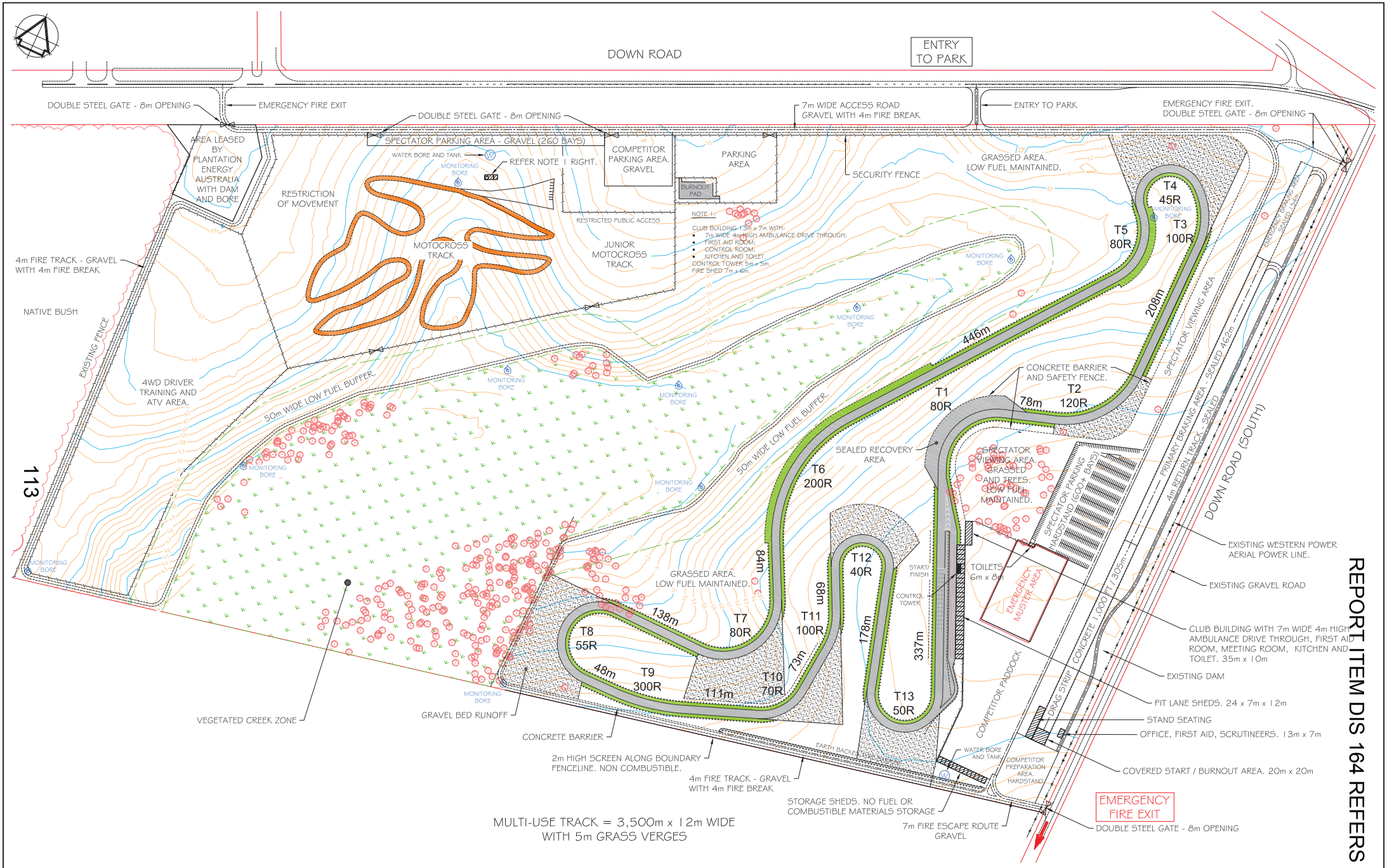
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Appendix B – Concept Plan



REV	DESCRIPTION	APPROVED	DATE
A	ISSUED FOR REVIEW		

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102 NORTH ROAD, YAKAMIA WA 6330
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PRELIMINARY

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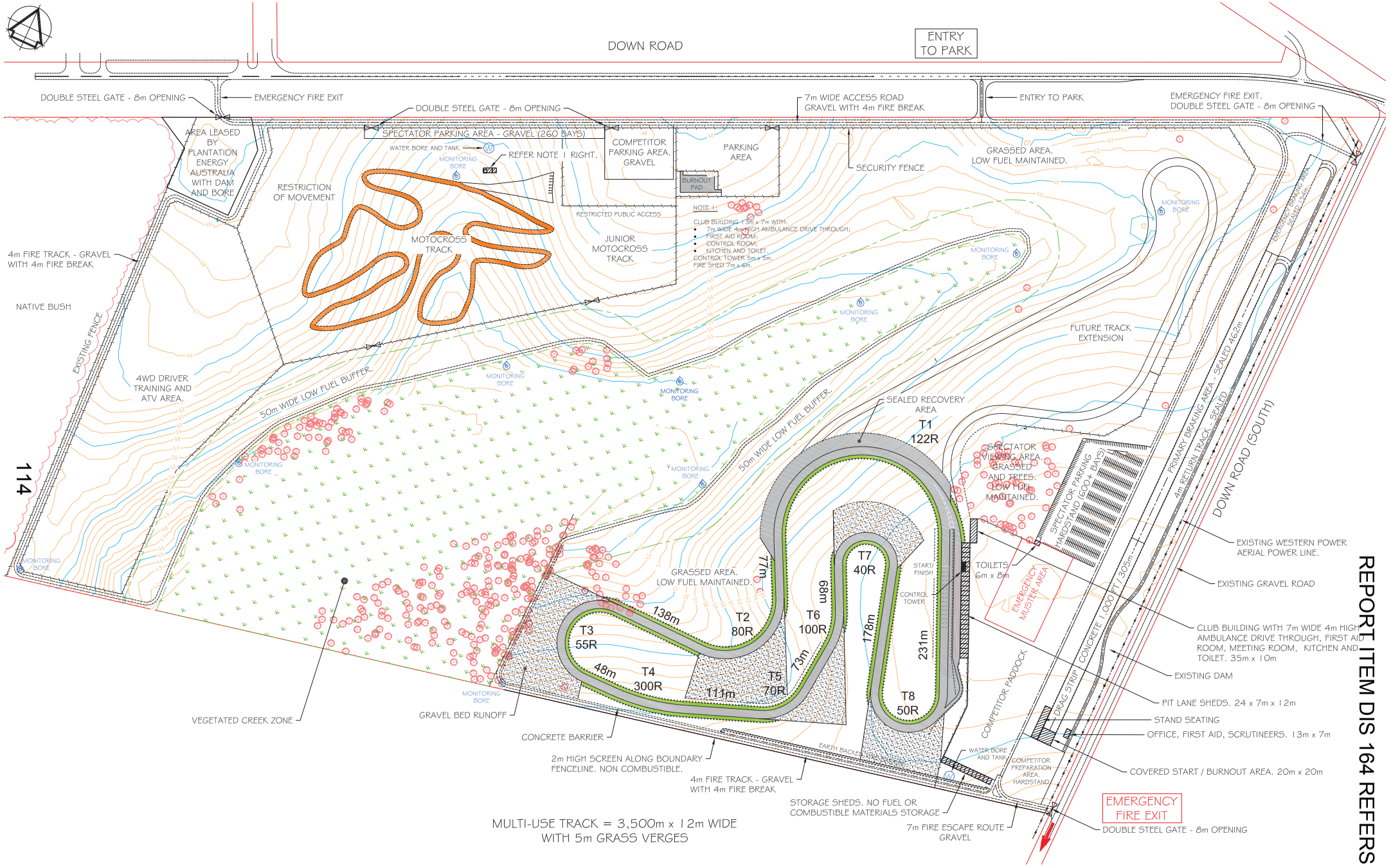
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PROJECT: **ALBANY MOTORSPORT PARK**
LOT 5780 DOWN ROAD, DROME, WA 6330

DRAWING NAME: **GENERAL SITE LAYOUT PLAN - 3.5 km TRACK**

DRAWING No	FILE REF	JOB No	SCALE	SHEET No	REV
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REV	DESCRIPTION	APPROVED	DATE
A	ISSUED FOR REVIEW		

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PRELIMINARY

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PROJECT: **ALBANY MOTORSPORT PARK**
LOT 5780 DOWN ROAD, DROME, WA 6330

DRAWING NAME: **GENERAL SITE LAYOUT PLAN - 2.2 km TRACK**

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Appendix C – Proposed amendment to City of Albany Local Planning Scheme No. 1

PLANNING AND DEVELOPMENT ACT 2005

RESOLUTION TO ADOPT AMENDMENT TO LOCAL PLANNING SCHEME

CITY OF ALBANY

LOCAL PLANNING SCHEME NO. 1

AMENDMENT NO. 35

Resolved that the local government pursuant to section 72 of the *Planning and Development Act 2005*, amend the above Local Planning Scheme by

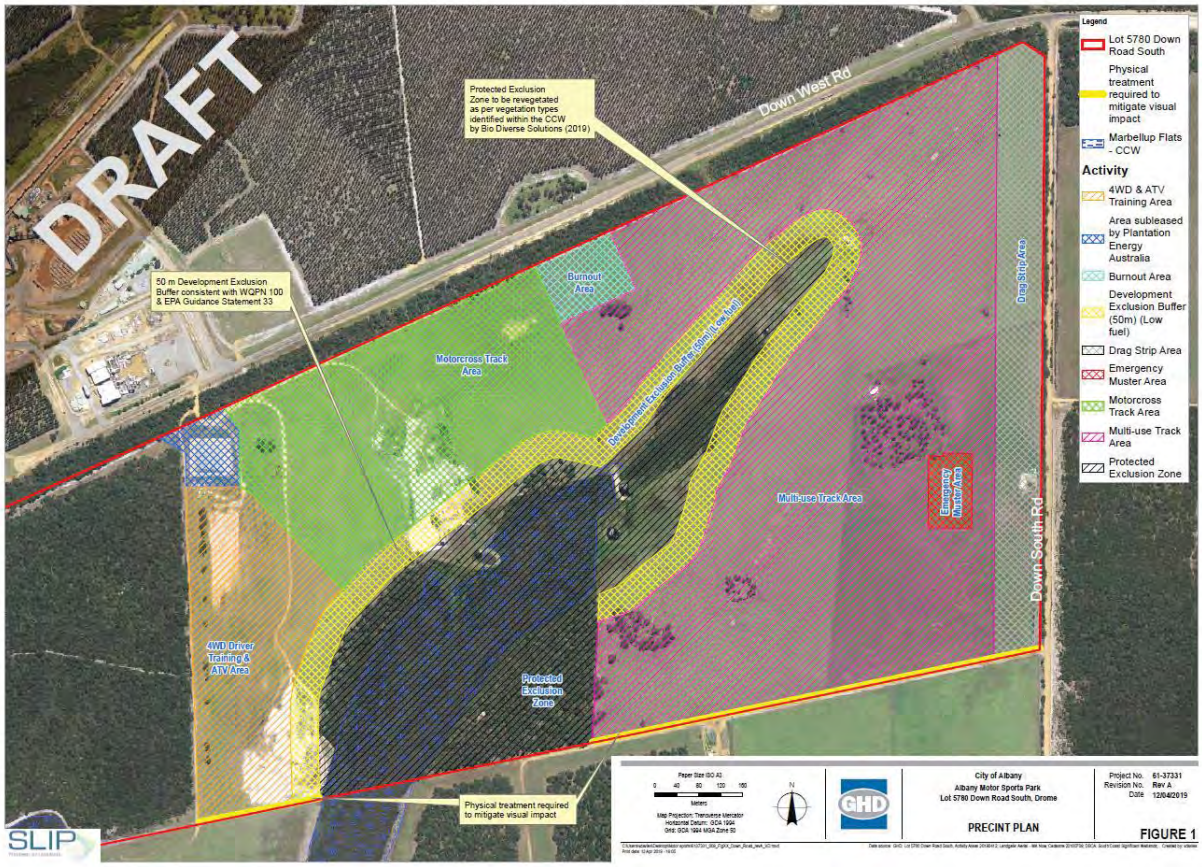
a) Rezoning Lot 5780 Down Road South, Drome, from 'Priority Agriculture Zone' to 'Special Use Zone';

b) Adding the following text to Schedule 4:

No.	Description of Land	Special Use	Conditions
SU26	Lot 5780 Down Road South, Drome	Motorsport based recreation and incidental uses	1. All development requires the development approval of the local government. 2. Applications for development approval shall be advertised in accordance with clause 64 of the deemed provisions. 3. All use and development is to be in accordance with the Albany Motor Sports Park Precinct Plan and approved management plans. 4. Any application for development approval for the site shall be accompanied by an Environmental Management Plan for the site that addresses: (a) Noise Management Plan for construction and operation of the site. (b) Water Management Plan for construction and operation of the site. (c) Hydrocarbon Management Plan for operation of the site. (d) Waste Management Plan for construction and operation of the site.

			(e) Dust Management Plan for construction and operation of the site. (f) Acid Sulfate Soils (ASS) risk. (g) Protected Exclusion Zone Management Plan addressing management responsibilities, revegetation, and vegetation condition and wetland water quality monitoring. (h) Decommissioning Plan. (i) Construction Management Plan. 5. Any application for development approval for the site shall be accompanied by a visual impact assessment to determine the appropriate physical treatments to mitigate visual impact to Lot 5781 Down Road South, Drome. 6. Development shall be in accordance with an approved Bushfire Management Plan that has been implemented to the satisfaction of the Local Government, Department of Planning, Lands and Heritage, and the Department of Fire and Emergency Services. 7. Any application for development approval for the site shall be accompanied by a Traffic and Parking Management Plan for construction and operation of the site, including consideration of peak parking and traffic management during larger and special events (i.e. events attracting greater than 500 attendees).

c) Adding the following precinct plan to Schedule 4:



d) Amending the Scheme Map accordingly.

e) The amendment is considered to be a complex amendment for the following reasons:

   a. it is not consistent with the endorsed local planning strategy for the scheme;

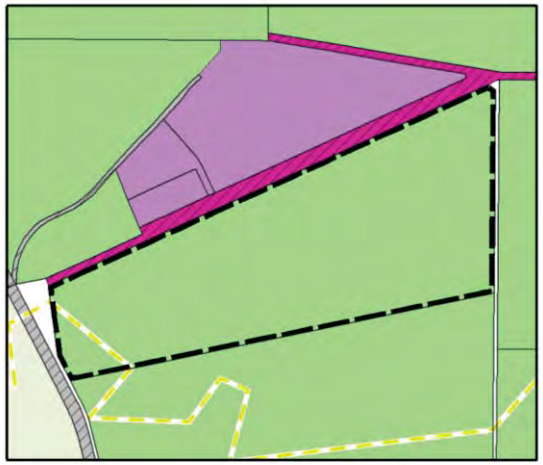
   b. it is of a scale and nature that may have an impact on the amenity of the locality and environs; and

   c. it may result in some environmental or social impacts on land within the Scheme area,

Dated this DD day of MMMM 20YY

CHIEF EXECUTIVE OFFICE

Existing Zoning



Legend

- Lot 5780 Down Road South, Drome
- Cadastre

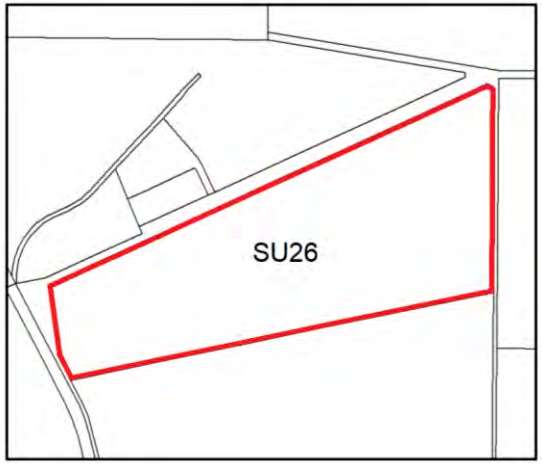
Special Areas

- Policy
- Special Control Area

Zones and Reserves

- General agriculture
- General industry
- Local road
- Priority agriculture
- Priority road
- Rail

Scheme Amendment Map



Legend

- Cadastre
- **Zones and Reserves**
- Special use

PREPARATION and ADVERTISEMENT

Prepared and advertised by resolution of the Council of the City of Albany at the Ordinary Meeting of the Council held on the [Insert Date]

……..
MAYOR

……..
CHIEF EXECUTIVE OFFICER

FINAL APPROVAL

Adopted for final approval by resolution of the City of Albany at the Ordinary Meeting of the Council held on the [Insert Day] day of [Insert Month] and [Year] and the Common Seal of the City of Albany was hereunto affixed by the authority of a resolution of the Council in the presence of:

……..
MAYOR

……..
CHIEF EXECUTIVE OFFICER

Recommended/Submitted for Final Approval

……..
MAYOR

……..
CHIEF EXECUTIVE OFFICER

Appendix D – Certificate of Title

REGISTER NUMBER	
5780/DP206199	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
4	7/7/2016

WESTERN AUSTRALIA

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

VOLUME 1352 FOLIO 224

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 5780 ON DEPOSITED PLAN 206199

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

SUSAN ELIZABETH PAGE OF 119 WANKE STREET KATANNING WA 6317

(T N357320) REGISTERED 17/6/2016

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. *J875978 NOTIFICATION CONTAINS FACTORS AFFECTING THE WITHIN LAND. LODGED 16/8/2006.
2. K809392 LEASE TO PLANTATION ENERGY AUSTRALIA PTY LTD OF LEVEL 2, 45 STIRLING HIGHWAY, NEDLANDS AS TO PORTION ONLY. EXPIRES: SEE LEASE. AS TO PORTION ONLY REGISTERED 22/12/2008.

*N538854 MORTGAGE OF LEASE K809392 TO GDF INTERNATIONAL SAS REGISTERED 24/1/2017.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 1352-224 (5780/DP206199)
PREVIOUS TITLE: 1352-224
PROPERTY STREET ADDRESS: 54 DOWN RD SOUTH, DROME.
LOCAL GOVERNMENT AUTHORITY: CITY OF ALBANY

NOTE 1: A000001A LAND PARCEL IDENTIFIER OF PLANTAGENET LOCATION 5780 (OR THE PART THEREOF) ON SUPERSEDED PAPER CERTIFICATE OF TITLE CHANGED TO LOT 5780 ON DEPOSITED PLAN 206199 ON 24-JUN-02 TO ENABLE ISSUE OF A DIGITAL CERTIFICATE OF TITLE.

NOTE 2: THE ABOVE NOTE MAY NOT BE SHOWN ON THE SUPERSEDED PAPER CERTIFICATE OF TITLE OR ON THE CURRENT EDITION OF DUPLICATE CERTIFICATE OF TITLE.

END OF PAGE 1 - CONTINUED OVER

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Landgate
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RECORD OF CERTIFICATE OF TITLE

REGISTER NUMBER: 5780/DP206199 VOLUME/FOLIO: 1352-224 PAGE 2

NOTE 3: N538854 DUP CT NOT PRODUCED FOR DOCUMENT N538854

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Appendix E – Albany Motorsport Park – Site Feasibility Study



City of Albany

Albany Motorsport Park
Site Feasibility Study –
Lot 5780 Down Road South, Drome

October 2018

WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY & BUILDINGS | TRANSPORTATION

Executive summary

Background

Participation in motorsports is a popular recreational activity for many Australians. In Albany and the surrounding areas, motorsport is already known to be popular, with several well organised clubs, a national-level venue for speedway, a state-level venue for go-karts and widely recognised events such as the Albany Classic, Show 'n Shine and Race Wars. However, some motorsport disciplines, particularly motocross, lack suitable facilities in the region.

Recently, an independent proposal has been advanced by the Great Southern Motorplex Group Inc. (GSMG) to develop a multi-use Albany Motorsport Park (AMP) near the Mirambeena timber processing precinct on Down Road. The Western Australian Government has committed $250,000 to undertake preliminary planning for the proposal (Watson, 2018) and a further commitment of $5.75 million in 2020/21 (GoWA, 2017) for its development.

In cooperation with the Department of Local Government, Sport and Cultural Industries (DLGSCI), the City of Albany has commissioned GHD to undertake this technical site feasibility assessment as part of the preliminary planning for the proposed AMP at Lot 5780, Down Road South, Drome (the 'Project Site'). The scope of works for the project included three main elements:

1. Site concept development

- The AMP concept design has been developed by the GSMG (including Roberts Gardiner Architects) and City of Albany. GHD has assisted with the concept design development.
- GHD has prepared a preliminary capital budget estimate, based on the GSMG concept design and these technical feasibility investigations.

2. Site technical feasibility investigations

GHD has undertaken the following technical investigations:

- Collation of background information, existing and surrounding land uses, planning restrictions (including bushfire planning provisions), approvals and buffer requirements,
- Traffic investigation for Down Road and the intersection with Albany Highway,
- Desktop geotechnical investigation of anticipated ground and groundwater conditions,
- Desktop investigation into anticipated power demands and servicing requirements,
- Desktop hydro(geo)logy investigation,
- Preliminary Water Management Plan for the site, particularly addressing the requirements of *Water Quality Protection Note (WQPN) 100: Motor sport facilities near sensitive waters*,
- Preliminary desktop Environmental Impact Assessment (EIA) and site walkover, and
- Preliminary desktop noise investigation and management plan.

3. Stakeholder consultation

Regular consultation with a small working group has occurred throughout the study period. A broader consultation workshop was also held on 17 August with representatives from City of Albany, DLGSCI, GSMG, Department of Planning, Lands and Heritage (DPLH), Department of Water and Environmental Regulation (DWER), Great Southern Development Commission (GSDC), and the office of Peter Watson MLA.

Site description

The Project Site is located approximately 20 km to the north of the Albany CBD and is 192.34 ha in size, of which approximately 52 ha at the western end is covered with well-established vegetation and not considered available for development.

The freehold owner of the property is Susan Elizabeth Page, as executor of the Will of Audrey Helen Old who died on 20 June 2015. The property is presently leased to Lindsay and Joy Black for grazing and sand quarrying purposes. A small portion in the north-west corner of the property (1.3655 ha) is also leased to Plantation Energy Australia Pty Ltd for the purpose of maintaining a detention basin for their site drainage.

Redacted text

Under the City of Albany Local Planning Scheme No. 1 the Project Site is zoned as '*Priority Agriculture*' and is located within an Industrial Buffer Area surrounding the Mirambeena timber processing facilities. The Project Site is also located within a Priority 2 (P2) public drinking water sources area (PDWSA) within the Marbelup Brook Catchment Area (DoP, 2014). In February 2018, the Minister for Water formally provided advice to the City of Albany that while a motorsport facility is incompatible with a P2 PDWSA, "there are measures that can be put in place to protect water quality should the City proceed to approve the development".

The Project Site is currently unserviced, with no connections to scheme water, sewerage, power or wired telecommunications.

Albany Motorsport Park concept design

At full development, the proposed AMP will consist of:

1. Sealed, configurable multi-use track (3.2 km long × 12 m wide) for motor car racing, motorcycle racing, drifting, driver training and cycling:
   – Designed to comply with CAMS' *Track Operator's Safety Guide* (CAMS, 2012) and Motorcycling Australia (MA) *Track Guidelines* (MA, 2011), and
   – To be licensed by Confederation of Australian Motor Sport (CAMS) for FIA Grade 2 and FIM Grade B (i.e. up to second-tier international motor racing).
2. A motocross circuit:
   – Designed and constructed in association with MA guidelines.
3. A 1/8th mile drag racing strip:
   – Designed and constructed in accordance with FIA specifications for drag strips and in association with Australian National Drag Racing Association (ANDRA).
4. A 1,300 m^2 burnout area,
5. An off-road four wheel drive (4WD) and all-terrain vehicle (ATV) training area,
6. Allowance for future speedway,
7. Allowance for future go-karts.



Figure ES-1: AMP concept site layout

REPORT ITEM DIS 164 REFERS

For the purposes of sizing facilities and servicing infrastructure, a typical / frequent site attendance of 500 persons has been assumed (i.e. competitors + officials + spectators). For special events that anticipate a greater number of site attendees, additional management measures will need to be implemented.

Governance and ownership arrangements for the AMP are still subject to further investigation, but for the purposes of this study it is assumed that the property, tracks and facilities will be owned by the City of Albany. The AMP will be leased to an operator-manager, for all operational and maintenance activities. The operator-manager will be a “not-for-profit” company consisting of a Board of Management and no other shareholders.

Preliminary capital cost estimate

Outlined in Table ES-1 is a summary of the capital cost estimate for the AMP concept design, including the likely staging of development. The preliminary cost estimate has been prepared for the purpose of budget setting and must not be used for any other purpose.

Table ES-1: Preliminary capital cost estimate

Area	TOTAL ($)	In-kind contribution	Stage 1	Stage 2	Stage 3
Motocross	2,973,000	382,000	437,000	1,673,000	449,000
Multi-use track	11,426,000	151,000	7,379,500	2,772,500	1,111,000
Drag strip	3,726,000	0	0	2,968,000	513,000
4WD / ATV area	444,000	133,000	0	300,000	0
Common / general items	5,261,000	270,000	3,016,000	1,189,200	436,800
TOTAL	**23,830,000**	**936,000**	**10,832,500**	**8,902,700**	**2,509,800**

Priorities and staging plan

The priority facilities in Stage 1 are:

1. The motocross track – to resolve the lack of safe, permanent, easily accessible facilities for the Albany Motorcycle Club and enable rider training, Club and State level competitions to be held on a track that is to be accredited and licenced by Motorcycling Australia (MA),
2. The multi-use track – to allow the operator-manager to generate revenue through driver training and track rental activities, provide a safe and scrutinised venue to local enthusiasts and provide a high level venue for State motor car, motorcycle and cycling events on a track to be approved and licenced by CAMS, and,
3. Enabling works, such as feasibility / planning / design works, and access roads.

Stages 2 and 3 contemplate the further development of the AMP site as patronage increases and the range of uses is broadened (for example, to include lighted evening events) and is dependent on further funding from various sources becoming available.

Summary of site feasibility assessment

To summarise, assess and prioritise the site feasibility issues investigated in this study, GHD has undertaken a preliminary risk assessment, using the City of Albany's *Risk & Opportunity Management Framework* (2018). This preliminary risk assessment captured 20 material risk issues, based on the feasibility investigations. Each risk has then been addressed by recommended remedial actions, controls and responsibility, with attention paid to the preferred hierarchy of controls. The residual risk level for each issue is targeted to be 'Low / acceptable', or 'Medium / monitor'. In the latter case, the proposed remedial actions will require on-going monitoring to assure their effectiveness.

A summary of the risk issues and initial and residual risk ratings is shown in Table ES-2.

Table ES-2: Summary of risk assessment

Risk issue	Initial risk rating	Residual risk rating
Zoning of Project Site	High	Low
Bushfire Prone Area	High	Medium
Security of Project Site	High	Medium
Visual amenity impacts	High	Low
Loss of fauna habitat (Black Cockatoos)	High	Medium
Heritage impacts	Medium	Medium
Adverse geotechnical conditions	High	Medium
Waste materials dumped on site	Medium	Low
General construction phase impacts	Medium	Low
Erosion and sediment pollution to Wetland (construction and operation phases)	Extreme	Medium
Hydrocarbon / chemical pollution to Wetland	Extreme	Medium
Drinking water availability	High	Medium
On-site wastewater management	High	Low
Noise impacts	High	Medium
Traffic impacts from special events	High	Medium
Crash risk with heavy vehicles on Down Rd	High	Medium
Power availability	High	Low
Telecommunications availability	Medium	Low

Based on this assessment, it can be concluded that the Albany Motorsport Park proposal at Lot 5780, Down Road South does not have any technical obstructions to its feasibility, pending regulatory approvals and implementation of the recommended remedial and control actions.

Recommended remedial and control actions

The recommended remedial and control actions for the AMP proposal are outlined below according to the phase of development – i.e. planning, design development, construction and operation.

Planning phase (2018 to 2020)

The following planning phase actions are recommended:

1. City of Albany to include reference to the AMP in the *Albany Local Planning Strategy*.
2. City of Albany and GSMG to continue the baseline water quality monitoring program.

3. GSMG and City of Albany to conduct a baseline flora and fauna survey and undertake environmental offset calculations.
4. City of Albany to seek comment from Wagyl Kaip on the AMP proposal.
5. GSMG to arrange for all waste materials on site to be sampled and removed by sub-Lessees, and site 'made good'.
6. GSMG and City of Albany to prepare a Bushfire Management Plan for the Project Site, including secondary road access from Down Road, north to Redmond-Hay River Road.
7. GSMG and City of Albany to seek MRWA approval for reduction of speed limit on Down Road to 80 km/h, west of CBH site. Also, install a westbound left turn lane on Down Road.
8. City of Albany to prepare a Scheme Amendment to change zoning to 'Special Use'.

Design development phase (2019 to 2021)

The following design development actions are recommended:

9. GSMG and City of Albany to undertake further geotechnical and ASS investigations on site.
10. Designer to incorporate all design elements of the Water Management Plan (refer section 8).
11. GSMG and Designer to liaise with Western Power and Telstra / NBN Co. for power and communications servicing to the Project Site.
12. GSMG and Designer to undertake detailed noise modelling.
13. Designer and GSMG to incorporate security fencing and gates around each separate area.

Construction phase (summer / autumn 2021)

The following construction actions are recommended:

14. GSMG and Constructor to prepare a Construction Environmental Management Plan (CEMP) to mitigate construction phase impacts.
15. GSMG and Constructor to undertake site re-vegetation and beautification.

Operational phase (post 2021)

The following operational actions are recommended:

16. GSMG to prepare an operational phase Environmental Management Plan (EMP).
17. GSMG to implement a Noise Management Plan (NMP).
18. For special events (i.e. >> 500 people), GSMG to undertake community advertising and liaison, additional traffic management controls, and hire additional portable generator(s), portaloos, water carts etc. to meet demand.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.2 and the assumptions and qualifications contained throughout the Report.

Table of contents

1. Introduction....1
   - 1.1 Background....1
   - 1.2 Purpose of this report....1
   - 1.3 Scope of works....3
   - 1.4 Previous studies and strategies....4
2. Site description....9
   - 2.1 Location....9
   - 2.2 Ownership....9
   - 2.3 Zoning and existing buffers....10
   - 2.4 Surrounding land uses....10
   - 2.5 Existing services....10
   - 2.6 Existing and historical uses....12
3. Albany Motorsport Park concept design....14
   - 3.1 Layout and facilities....14
   - 3.2 Events and usage....16
   - 3.3 Governance....17
   - 3.4 Servicing requirements....17
   - 3.5 Preliminary capital cost estimate....18
4. Planning approvals....22
   - 4.1 Scheme amendment....22
   - 4.2 Development application....22
   - 4.3 Bushfire....24
5. Preliminary environmental impact assessment....26
   - 5.1 Assessment of environmental aspects and impacts....26
   - 5.2 Commonwealth aspects and impacts....57
   - 5.3 Summary of the assessment....58
6. Geotechnical assessment....60
   - 6.1 Ground and groundwater conditions....60
   - 6.2 Geotechnical assessment....61
   - 6.3 Potentially adverse geotechnical conditions....64
   - 6.4 Recommendations for further site investigations....64
7. Hydrology and hydrogeology assessment....65
   - 7.1 Site assessment....65
   - 7.2 Groundwater monitoring results....65
   - 7.3 Conceptual hydro(geo)logical model....68
8. Preliminary water management plan....72
   - 8.1 Drinking water supply and risk assessment....72
   - 8.2 Stormwater quantity management....72

8.3 Stormwater quality management 80
8.4 On-site wastewater management 82
8.5 On-going water quality monitoring 83
8.6 On-site operational controls 85
9. Preliminary noise assessment and management plan 86
9.1 Noise criteria 86
9.2 Closest sensitive receptors 88
9.3 Noise modelling 88
9.4 Noise modelling results 90
9.5 Preliminary noise management plan 99
10. Traffic investigation 104
10.1 Road network 104
10.2 Traffic data 104
10.3 Crash data (1 January 2013 – 31 December 2017) 105
10.4 Site access 105
10.5 Parking 107
10.6 Traffic management for larger events 107
10.7 Consultation 108
10.8 Summary 108
11. Power and communications servicing 110
11.1 Existing services (DBYD information) 110
11.2 Preliminary estimate of power and communications requirements 112
11.3 Timeframes and cost 112
12. Summary of site feasibility assessment 114
12.1 Risk assessment 114
12.2 Recommended remedial and control actions 120
13. References 122

Table index

Table 1-1: Assessment of LGS facilities to meet user demand 5
Table 3-1: Indicative AMP event profile 16
Table 3-2: Preliminary capital cost estimate 18
Table 3-3: AMP staging plan 20
Table 5-1: Key environmental legislation relevant to the AMP project 27
Table 5-2: Information sources 28
Table 5-3: Climatic data for the Albany Airport (Station No. 9741) for years 1960 to 2014 (BoM 2018) 29
Table 5-4: Soil map units within the Project Site (GoWA, 2018) 30
Table 5-5: DWER data queries within the Project Site (GoWA, 2018) 34
Table 5-6: Vegetation associations present within the Project Site (Beard 1979) 41
Table 5-7: ARVS vegetation units present within the Project Site (Sandiford and Barrett 2010) 41
Table 5-8: Extent of Beard (1979) vegetation association within the Project Site (GoWA 2018) 44
Table 5-9: Flora of conservation significance within the Project Site 45
Table 5-10: Fauna of conservation significance within the Project Site 48
Table 5-11: Potentially contaminating land uses/ activities within 5 km of the Project Site 53
Table 5-12: Assessment of the Project Site against Matters of National Environmental Significance 57
Table 5-13: Environmental impact risk assessment 59
Table 6-1: Generalised subsurface profile at CBH Mirambeena site 60
Table 6-2: Summary of soil properties at CBH Mirambeena site 61
Table 6-3: Site classification in accordance with AS 2870-2011 63
Table 6-4: Preliminary CBR values 64
Table 7-1: Site bores and groundwater levels 67
Table 8-1: Example swale dimensions 75
Table 8-2: Benefits and constraints of swales 76
Table 8-3: Estimates of peak flows pre-development 78
Table 8-4: Preliminary basin sizing 79
Table 8-5: Summary of groundwater monitoring program 84
Table 8-6: Summary of surface water monitoring 84
Table 9-1: Assigned noise levels (dBA) 87
Table 9-2: Adjustment for intrusive or dominant noise characteristics () 87
Table 9-3: Assigned noise levels (dBA) for AMP 87

Table 9-4: Noise levels for various vehicle types 89
Table 9-5: Sound power levels (dBA) for various vehicle types 89
Table 9-6: Predicted day L_{A10} noise levels 90
Table 9-7: Predicted evening L_{A10} noise levels 90
Table 9-8: Requirements of a motorsport venue NMP 99
Table 10-1: Average weekday and weekend traffic volumes (2017) – existing vehicles per day (vpd) 104
Table 10-2: Site generates traffic (typical) 105
Table 10-3: Deceleration lane lengths (Austroads) 106
Table 10-4: Safe intersection sight distance based on design speed 107
Table 10-5: MRWA and City of Albany consultation 108
Table 11-1: Western Power timeframes 112
Table 12-1: Summary of risk assessment 116
Table 12-2: AMP risk assessment 117

Figure index

Figure 1-1: Proposed AMP location (the Project Site) 2
Figure 2-1: City of Albany Local Planning Scheme – Zones and Reserves 11
Figure 2-2: Images of Plantation Energy sub-lease area 12
Figure 3-1: AMP concept site layout 15
Figure 4-1: Scheme amendment process flowchart (WAPC, 2015) 23
Figure 4-2: Potential secondary access to Redmond-Hay River Road 25
Figure 5-1: Soil landscape mapping 32
Figure 5-2: Acid sulfate soil risk map 33
Figure 5-3: Public Drinking Water Source Areas 36
Figure 5-4: Groundwater Areas (RIWI Act) 37
Figure 5-5: Pre-European vegetation, ESAs, TEC & Reserves 40
Figure 5-6: ARVS – Vegetation Units 43
Figure 5-7: Clearing impact area 47
Figure 7-1: Hydrology and hydrogeology 66
Figure 7-2: Preliminary hydrogeological section 1 (A-B) 69
Figure 7-3: Preliminary hydrogeological section 2 (C-D) 70
Figure 8-1: Drainage management plan 73
Figure 10-1: Closest receptors for AMP noise assessment 88
Figure 9-2: Predicted L_{A10} noise levels – Motocross event 92

Figure 9-3: Predicted L_{A10} noise levels – Multi use track event 93
Figure 9-4: Predicted L_{A10} noise levels – Drag race event 94
Figure 9-5: Predicted L_{A10} noise levels – 4WD training 95
Figure 9-6: Predicted L_{A10} noise levels – Motocross and multi-use track events 96
Figure 9-7: Predicted L_{A10} noise levels – Motocross and drag race events 97
Figure 9-8: Predicted L_{A10} noise levels – Drag race and multi-use track events 98
Figure 10-1: Safe intersection sight distance 106
Figure 11-1: Existing 22 kV overhead power lines on Project Site (parallel to Down Road South) 110
Figure 11-2: Telstra mobile network coverage 111
Figure 12-1: CoA risk and opportunity management process (CoA, 2018) 114
Figure 12-2: Risk rating matrix (CoA, 2018) 115
Figure 12-3: Risk acceptance criteria (CoA, 2018) 115

Appendices

Appendix A – Stakeholder consultation
Appendix B – Preliminary capital cost estimate
Appendix C – Traffic capacity assessment
Appendix D – Groundwater information
Appendix E – Drinking water risk assessment
Appendix F – Conservation codes – flora and fauna
Appendix G – Heritage searches
Appendix H – DBYD search results
Appendix I – Site photos

Glossary

ADWG	Australian Drinking Water Guidelines
AEP	Annual exceedance probability
AHD	Australian height datum
ALARP	As low as reasonably practicable
AMP	Albany Motorsport Park
ANDRA	Australian National Drag Racing Association
ANZECC	Australian and New Zealand Environment and Conservation Council
APEC	Albany Plantation Export Company
ARI	Average recurrence interval
ARR	Australian Rainfall and Runoff
ARVS	Albany Regional Vegetation Survey
ASS	Acid sulfate soils
ATV	All-terrain vehicle
BAL	Bushfire attack level
BHL	Bushfire hazard level
BMP	Bushfire Management Plan
BOD	Biochemical oxygen demand
BoM	Bureau of Meteorology
CAMS	Confederation of Australian Motor Sport
CARS	Crash analysis reporting system
CBD	Central business district
CBR	California bearing ratio
(C)EMP	(Construction) environmental management plan
cfu	Colony forming units
CoA	City of Albany
DAA	Department of Aboriginal Affairs
DBCA	Department of Biodiversity, Conservation and Attractions
DBYD	Dial before you dig
DEE	Department of the Environment and Energy
DFES	Department of Fire and Emergency Services
DLGSCI	Department of Local Government, Sport and Cultural Industries
DoH	Department of Health
DoW	Department of Water
DPIRD	Department of Primary Industries and Regional Development

DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
DBYD	Dial before you dig
DCP	Dynamic cone penetrometer
DLVCHS	Distribution Low Voltage Contribution Headworks Scheme
DVA	Direct value added
EIA	Environmental impact assessment
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally sensitive area
EY	Exceedance year
FIA	Federation Internationale de l ’Automobile
FIM	Federation Internationale Motocyclisme
FTTP	Fibre to the premise
GoWA	Government of Western Australia
GSDC	Great Southern Development Commission
GSMG	Great Southern Motorsports Group
HV	High voltage
IBRA	Interim Biogeographic Regionalisation for Australia
IECA	International Erosion Control Association
ILUA	Indigenous Land Use Agreement
JDAP	Joint Development Assessment Panel
LGA	Local government area
LGS	Lower Great Southern (i.e. Albany, Denmark, Plantagenet)
LGSTWSS	Lower Great Southern Towns Water Supply Scheme
MA	Motorcycling Australia
MNES	Matters of National Environmental Significance
MRWA	Main Roads Western Australia
NHSA	Noongar Standard Heritage Agreement
NMP	Noise management plan
PDWSA	Public drinking water source area
PEC	Priority ecological communities
PMST	Protected Matters Search Tool
PTTx	Pole top transformer
RAV	Restricted access vehicle
RIWI Act	*Rights in Water and Irrigation Act 1914*

SIA	Strategic industrial area
SLK	Straight line kilometre
SMSB	Site main switchboard
SPP	State Planning Policy
SWAA	Surface Water Allocation Area
SWALSC	South West Aboriginal Land and Sea Council
SWASA	Surface Water Allocation Sub Area
TEC	Threatened ecological communities
TN	Total nitrogen
TP	Total phosphorus
TPP	Timber processing precinct (Mirambeena)
TSS	Total suspended solids
VMS	Variable message signs
WAER	Western Australian electrical requirements
WIN	Water Information Network/Reporting
WoNS	Weeds of National Significance
WQPN	Water quality protection note
WSUD	Water sensitive urban design
1LOP	1st level of protection (*Track Operator's Safety Guide* (CAMS, 2012)
2LOP	2nd level of protection (*Track Operator's Safety Guide* (CAMS, 2012)
3LOP	3rd level of protection (*Track Operator's Safety Guide* (CAMS, 2012)
4WD	Four wheel drive

1. Introduction

1.1 Background

Participation in motorsports is a popular recreational activity for many Australians, including residents in Albany and the Great Southern region. By one estimate, motorsport is the fourth most watched sport in Australia, with over 150,000 participants across the country (CAMS, 2014). Anecdotally, motorsport in Albany and the surrounding areas is already known to be popular, with several well organised clubs, a national-level venue for speedway, a state-level venue for go-karts and widely recognised events such as the Albany Classic, Show 'n Shine and Race Wars at Albany Airport. However, some motorsport disciplines lack suitable facilities in the region. In particular, the closure of Albany Motorcycle Club's facility at Roberts Road in 2011 has meant that motocross and enduro motorcycle riders currently lack a permanent formalised facility to pursue their sport in the lower Great Southern region.

By their nature, motorsports are very capital intensive, requiring significant investment in equipment and facilities by participants, clubs and supporting organisations such as local and state governments. Recently, an independent proposal has been advanced by the Great Southern Motorplex Group Inc. (GSMG) to develop a multi-use Albany Motorsport Park (AMP) near the Mirambeena timber processing precinct on Down Road. This proposal aims to:

- Promote and facilitate multiple motorsports on a club and state level in Albany and the Great Southern region,
- Provide a safe environment and venue for multiple motorsports clubs (and other compatible sports, such as cycling),
- Provide a venue to promote and facilitate commercial driver education and training,
- Provide a safe environment for companies to test and tune their vehicles,
- Promote Albany and the Great Southern region by attracting participants and tourists, and
- Boost the regional economy through increased visitors, funding and sponsorship for events.

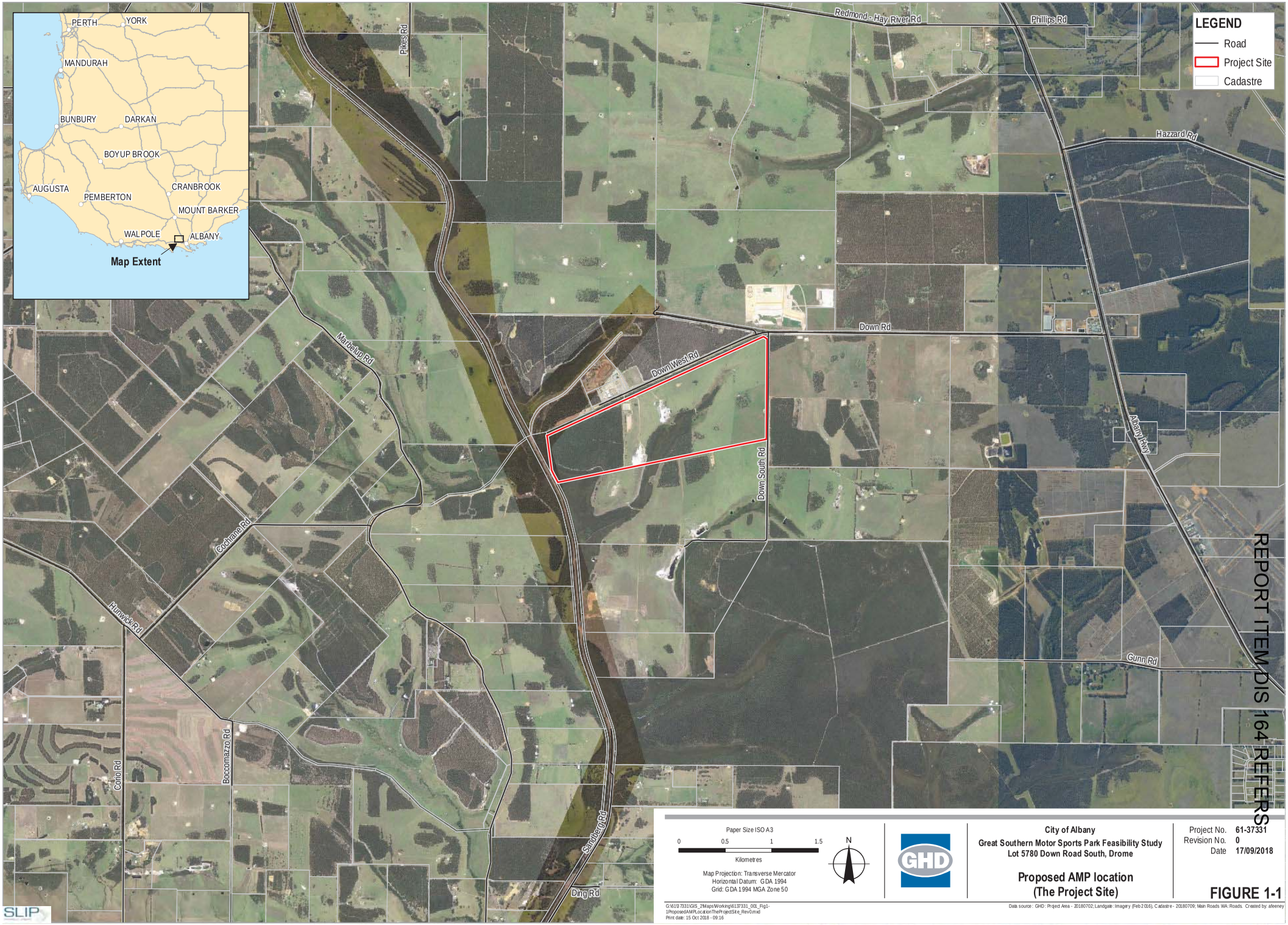
State Government commitment

Recognising the interest in motorsports in the Great Southern, the Western Australian Government has committed $250,000 to undertake preliminary planning for a motorplex (Watson, 2018) and a further commitment of $5.75 million in the 2020/21 forward estimates (GoWA, 2017) for its development.

In cooperation with the Western Australian Department of Local Government, Sport and Cultural Industries (DLGSCI), the City of Albany has commissioned GHD to undertake this technical site feasibility assessment as part of the preliminary planning for the proposed AMP at Lot 5780, Down Road South, Drome.

1.2 Purpose of this report

The purpose of this report is to document the technical site feasibility assessment for the proposed Albany Motorsport Park at Lot 5780 Down Road South, Drome (Figure 1-1) (the Project Site).



Paper Size ISO A3

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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GHD

City of Albany
Great Southern Motor Sports Park Feasibility Study
Lot 5780 Down Road South, Drome

Proposed AMP location
(The Project Site)

Project No. 61-37331
Revision No. 0
Date 17/09/2018

FIGURE 1-1

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Print date: 15 Oct 2018 - 09:16

Data source: GHD: Project Area - 20180702; Landgate: Imagery (Feb 2016), Cadastre - 20180709; Main Roads WA: Roads. Created by: afeeney

REPORT ITEM DIS 164 REFERS

1.3 Scope of works

The scope of works for the project included three main elements:

1. Site concept development

- The AMP concept design has been developed by the GSMG (including Roberts Gardiner Architects). Basic 3D earthworks design development has been undertaken by City of Albany. GHD has liaised and coordinated with the City of Albany and GSMG to assist with the concept design development.
- GHD has prepared a preliminary capital budget estimate, based on the GSMG concept design, the technical feasibility investigations outlined below and civil works quantities advised by City of Albany.

2. Site technical feasibility investigations

GHD has undertaken the following technical investigations, with support from the City of Albany and other relevant agencies:

1. Collation of background information, existing and surrounding land uses, planning restrictions (including bushfire planning provisions), approvals and buffer requirements,
2. Traffic investigation for Down Road and the intersection with Albany Highway,
3. Desktop geotechnical investigation of anticipated ground and groundwater conditions,
4. Desktop investigation into anticipated power demands and servicing requirements,
5. Desktop hydro(geo)logy investigation, including analysis of available data from the GSMG's groundwater and surface water monitoring program,
6. Preliminary Water Management Plan for the site, particularly addressing the requirements of *Water Quality Protection Note (WQPN) 100: Motor sport facilities near sensitive waters* (DoW, 2007),
7. Preliminary desktop Environmental Impact Assessment (EIA) and site walkover, and
8. Preliminary desktop noise investigation and management plan.

The following elements were undertaken by the City of Albany, and outcomes provided to GHD:

- Site feature / topographical survey, and
- Liaison with Department of Fire and Emergency Services (DFES) regarding compliance with *State Planning Policy (SPP) 3.7: Planning in Bushfire Prone Areas* (WAPC, 2015), and
- Liaison with Department of Aboriginal Affairs (DAA) and Wagyl Kaip.

Further detail on the study's scope of works is provided in the City of Albany Request for e-Quote P18008 (25 June 2018).

3. Stakeholder consultation

Regular consultation with a small working group has occurred throughout the study period. This group comprised representatives from the GSMG, City of Albany and DLGSCI.

A broader consultation workshop was also held on 17 August at City of Albany with representatives from City of Albany, DLGSCI, GSMG, Department of Planning, Lands and Heritage (DPLH), Department of Water and Environmental Regulation (DWER), Great Southern Development Commission (GSDC), the office of Peter Watson MLA.

Minutes of the consultation workshop are attached in Appendix A.

1.3.1 Limitations

This report: has been prepared by GHD for City of Albany and may only be used and relied on by City of Albany for the purpose agreed between GHD and the City of Albany as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than City of Albany arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by City of Albany and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.4 Previous studies and strategies

Significant work, over several years, has already been invested in the concept of a multi-use motorsports facility in the lower Great Southern region. Summarised below are some of the key findings and outcomes from the most recent and relevant studies, which have helped to inform the current AMP proposal and this site feasibility study.

1.4.1 City of Albany: Motor Sport in the Lower Great Southern – Feasibility Study (GHD, November 2016)

Motorsport user demand

- There are approximately 800 motorsport participants in the Lower Great Southern (LGS), of which about half are members of formal clubs. A wide variety of motorsport disciplines is enjoyed, with social events, burn-outs, circuit racing and drag racing being the most popular. On average, a typical participant is involved with 15 – 25 motorsport activities per year.
- Some local clubs and motorsport disciplines (i.e. speedway and karting) enjoy high quality facilities and minimal constraints to their sporting activities. Other clubs and motorsport disciplines, especially motorcycle / motocross, are significantly constrained by lack of suitable facilities in the local area. It is highly likely that user demand for these disciplines would increase, if suitable facilities were available.
- For circuit racing and drag racing, many participants are willing to travel to venues in Perth and Collie. Overall, there is a high “willingness to travel” to participate in motorsport events.
- At an appropriately designed facility, cycling could be a compatible sport and would increase the volume and frequency of user demand at the facility.

Motorsport infrastructure needs in the Lower Great Southern

The following table provides a concise 'traffic light' assessment of the adequacy of current facilities in the LGS region to meet user demand and support expanded future participation.

Table 1-1: Assessment of LGS facilities to meet user demand

Motorsport discipline	User demand	Adequacy of facilities	Comments
Circuit racing	High	Inadequate	No circuit racing venue in Study Area. High demand and high potential for expanded participation with improved facilities. Participants currently travel to Collie and Perth (Barbagallo Raceway).
Speed (hill climb, autocross, sprints, super sprints, drifting, regularity)	High	Inadequate	No sealed (non-street) racing venue in Study Area. High demand and high potential for expanded participation with improved facilities. Participants currently travel to Collie and Perth (Barbagallo Raceway).
Drag racing	High	Inadequate	No drag racing venue in Study Area. High demand and high potential for expanded participation with improved facilities. Participants currently travel to Collie and Kwinana (Perth Motorplex).
Rally or off-road racing	Low	Adequate	Low demand. Not identified during survey as a high priority.
Go-karting	Medium	Adequate	State-level facility meets local user demand, and also attracts intrastate competitors. Current venue is not significantly constrained.
Speedway	High	Adequate	National-level facility meets local user demand, and also attracts intrastate, interstate and international competitors. Current venue is not significantly constrained.
Motocross	High	Partially adequate	High demand and medium potential for expanded participation with improved facilities. No permanent / formalised venues in the Study Area. Current temporary venue is significantly constrained. Participants currently access / travel to Cranbrook and South West venues for competition events.
Other motorcycling	Medium	Partially adequate	No circuit racing venue in Study Area. No formalised areas for other off-road events, such as enduro motorcycling. Medium demand and medium potential for expanded participation with improved facilities. Participants currently access / travel to Cranbrook and South West venues for competition events.
Burn-outs and Social events – e.g. "Show 'n shine"	High	Inadequate	No / limited formalised areas for all weather burn-out events. High demand and high potential for expanded participation with improved facilities. No formalised areas for large scale social events, with supporting facilities – e.g. workshops, pits, burn-out pad.

Recommendations for motorsport development in the LGS region

In the long-term, it was recommended that the City of Albany support the development of a regional multi-use motorplex that could accommodate most motorsport disciplines, in a location that is properly zoned, planned and managed. Adopting a long-term planning approach will minimise the typical constraints faced by motorsport clubs and venues, as well as maximising the commercial benefits of shared facilities.

However, a regional multi-use motorplex will require appropriate commercial management and cannot be sustained by relying only on the expected revenue from local motorsport participants. To be successful, such a facility will need to attract significant and consistent revenue from outside of the Great Southern region – i.e. through activities such as driver training, vehicle testing and 'experiential' motorsports tourism. It was recommended that a regional multi-use motorplex should be operated as a business, which alongside its key commercial revenue-generating activities, is also able to provide a venue (for a fee) to local motorsports clubs.

To support the identified motorsport user demand in the Study Area, it was recommended that a multi-use motorplex consists of:

1. Sealed, lighted and configurable racing circuit for:
   – Four-wheel and two-wheel circuit racing,
   – Speed events, inc. drifting,
   – Driver education, and
   – (Bi)cycling (as a compatible sport).
2. Drag strip (min. 1/8th mile) and burn-out pad (40 m × 25 m) for:
   – Four-wheel and two-wheel drag racing,
   – Burn-out competitions,
   – Social / display events, and
   – Driver education.
3. Motocross (dirt) track, potentially with associated enduro track(s).

Desirable characteristics of a multi-use motorplex site

1. A site should be in reasonable proximity (15 – 20 km) to the Albany Health Campus.
2. A site should be securable and sectionable, such that it is able to host multiple events simultaneously.
3. A site should be sufficiently large to accommodate and contain major event crowds, with appropriate spectator areas, competitors' and officials' facilities, function rooms, parking, ablutions and catering facilities. This will minimise impacts on surrounding properties.
4. Access to the site, particularly for major events, should be planned in cooperation with City of Albany and Main Roads to minimise road network impacts.
5. A site should be appropriately located and zoned in the Albany Local Planning Scheme No.1 to minimise long-term encroachment by incompatible land uses.
6. The environmental setting of a site should seek to minimise vegetation clearing, noise and lighting impacts, and surface and groundwater impacts.

Potential socio-economic impacts of a regional multi-use motorplex

- The social / community nature of motorsport clubs is highly valued by participants. Local motorsport enthusiasts will have a permanent, formalised venue to enjoy their passion – avoiding the need to travel to Collie, Perth or other venues across the state – and potentially reduce dangerous driving behaviour on local streets.
- Local motorsport and cycling clubs will be able to share the facilities, lowering their running costs, providing a great venue for social / community / family events, and fostering increased sports participation for young people in the region.

- Commercial driver training / vehicle /component testing business(es) could be established, attracting new revenue and visitors to the region.
- National and international motorsport events would be hosted at the motorplex.
- The local economy would be boosted through increased visitors for motorsport events, and by increased expenditure by local motorsport participants:
  - Direct value added (DVA) of motorsports in the region could grow from $3.3 million currently to $3.7 million over 10 years. This is a small percentage (<<1%) of Gross Regional Product and total household expenditure on “recreation and culture”.
  - Total expenditure by local motorsport participants could be expected to grow through increased participation rates and increased rates of expenditure. This could grow from an estimated $5.6 – $8.8 million currently, to $12.0 – $15.0 million in 10 years. Motorsport participants in the LGS Study Area spend $7,000 – $11,000 per year on their sport (compared to a national average of $12,000 - $15,000 per year).
  - There is presently insufficient information to estimate the potential boost caused by a motorplex to the Study Area’s $90 million tourism industry. However, data suggests that sports-related tourists spend up to 30% more than typical ‘holiday’ tourists.

1.4.2 DLGSCI: WA Motorsport Strategy (DRAFT) (Dave Lanfear Consulting, August 2018)

Sport and Recreation WA (a division of DLGSCI) recently commissioned a state-wide motorsport strategy to guide the state government’s planning and investment decisions in the industry. The stated objectives of the Western Australian (WA) Motorsport Strategy are to:

1. Identify the infrastructure needs of road/track based motorsport activities,
2. Develop a hierarchy of motorsport facilities from State level (Wanneroo Raceway), regional level and district level of functionality and catchment,
3. Provide a plan that supports future investment in road/track based motorsport infrastructure,
4. Leverage the current financial commitments, and
5. Identify appropriate representative governance and management structures including sanctioning and licensing.

In relation to the proposed AMP, the WA Motorsport Strategy identifies it as a “regional” or “local” level facility and makes the following recommendations:

- Undertake more detailed planning and feasibility of developing a motorsport precinct at Down Road for regional based motorsport activity by:

a. Undertaking an initial assessment of the viability of developing a motorsport precinct for bitumen and no-bitumen activities, focusing on water monitoring and assessment for a two year period and environmental assessment based on advice from the Department of Water and Environmental Regulation. This will need to consider the implications on the capital and ongoing operational costs of operating a motorsport precinct, having regard to potential operational restrictions.

b. Rationalise current proposed infrastructure to limit activity to:

   (1) Small multi-functional bitumen circuit which can be subdivided to provide hill climb, driver and rider training/experience and club based competition. Initially the circuit should be developed between 1.6 km and 2.2 km to provide an effective club and driver/rider training circuit.

   (2) Burnout areas within a controlled affiliated facility – sanctioned by an appropriate body.

   (3) Motocross.

   (4) Clubhouse and maintenance shed.

   (5) Fenced competitors pit area with water and power supply, roofed assembly area, enclosed wash bays with concrete floor and silt traps.

   (6) Starting grid and starter's control tower, and public address system.

   (7) Bitumen car parking areas adjacent to the bitumen racing circuit (to potentially double up for additional driver and rider training).

   (8) Spectator infrastructure (banking incorporating limestone blocks).

c. Develop and implement an environmental management plan for the site. To be led by the City of Albany. Ensure that a long-term management plan is established and implemented to protect and enhance the natural environment within the Motorsport Complex.

- The above is predicated on the ability to develop the site. Should the site not be capable of being developed due to the high quality drinking water and potential environmental issues and/or the capital and lifecycle costs of the water mitigation strategies, alternative options will need to be explored across the Great Southern region to identify an alternative site which may accommodate a range of motorsport disciplines.

2. Site description

2.1 Location

The Project Site is located approximately 20 km to the north of the Albany CBD, at Lot 5780, Down Road South, Drome within the City of Albany municipality (refer Figure 1-1).

The Project Site is bounded by:

- Down Road West to the north,
- Down Road South to the east,
- Lot 5781, Down Road South to the south (private owner), and
- A local road reserve and the Avon-Albany rail reserve to the west.

Lot 5780 is 192.34 ha in size, of which approximately 52 ha at the western end is covered with well-established vegetation and not considered available for development.

2.2 Ownership

The freehold owner of the property is Susan Elizabeth Page, as executor of the Will of Audrey Helen Old who died on 20 June 2015, registered 1 December 2015. Certificate of Title of the property is Lot 5780, on Plan 206199 Volume 1352 Folio 224, located on Down Road South, Drome, Western Australia.

Redacted text

A pending Mining Tenement also exists over a large portion of Lot 5780. This Mining Tenement is an Exploration Licence (E 7005016) held by Australian Silica Quartz Pty Ltd since 22 August 2017, and currently has a status of 'unsurveyed' (DMIRS, 2018).

2.3 Zoning and existing buffers

Under the City of Albany Local Planning Scheme No. 1 the Project Site is zoned as '*Priority Agriculture*' and is located within an Industrial Buffer Area (IA4BA) surrounding the Mirambeena Timber Processing Precinct (TPP – i.e. Albany Plantation Export Company (APEC) and Plantation Energy) to the north of Down Road West (Figure 2-1) (DoP, 2014).

The land immediately adjacent to the Project Site is also predominantly zoned '*Priority Agriculture'* with the exception of the Albany Plantation Export Company (APEC) wood chip mill and Plantation Energy wood pellet production facility, which are zoned '*General Industry'*. The western boundary of the Project Site lies adjacent to a local road reserve and railway line which is zoned '*Major road, Rail'*. Land to the south-west of the railway is zoned '*General Agriculture'* (DPLH, 2018).

The Project Site is also located within a Priority 2 (P2) public drinking water sources special control area within the Marbelup Brook Catchment Area (DoP, 2014). This public drinking water source area (PDWSA) is gazetted under the *Country Areas Water Supply Act 1947*, however is not currently used. It has been identified as a potential future water source option in the *Great Southern Regional Water Supply Strategy 2014* (DoW, 2014). The Minister for Water has formally provided advice to the City of Albany (Kelly, 2018) that while a motorsport facility is incompatible with a P2 PDWSA (DoW, 2016), "there are measures that can be put in place to protect water quality should the City proceed to approve the development". These measures are further discussed in section 8 – Preliminary water management plan.

Approximately 900 m to the south of the Project Site, the Down Road Nature Reserve (Lot 7388 on P091191 and Lot 7676 on P217695) is zoned '*Parks and Recreation'* (DPLH, 2018).

2.4 Surrounding land uses

The immediately surrounding land uses include a railway to the west of the Project Site, APEC and Plantation Energy to the north of Down Road West and '*Priority Agriculture*' to the south and east. The CBH Mirambeena grain storage facility is also north of the site, on Down Road.

Further afield land uses are also largely '*Priority Agriculture*', or '*General Agriculture*'. The Down Road Nature Reserve is located approximately 900 m to the south; and the Water Corporation's Gunn Road tree plantation is located approximately 2,500 m to the east. The Mirambeena Strategic Industrial Area (SIA) is located approximately 2,000 m to the east on Albany Highway.

2.5 Existing services

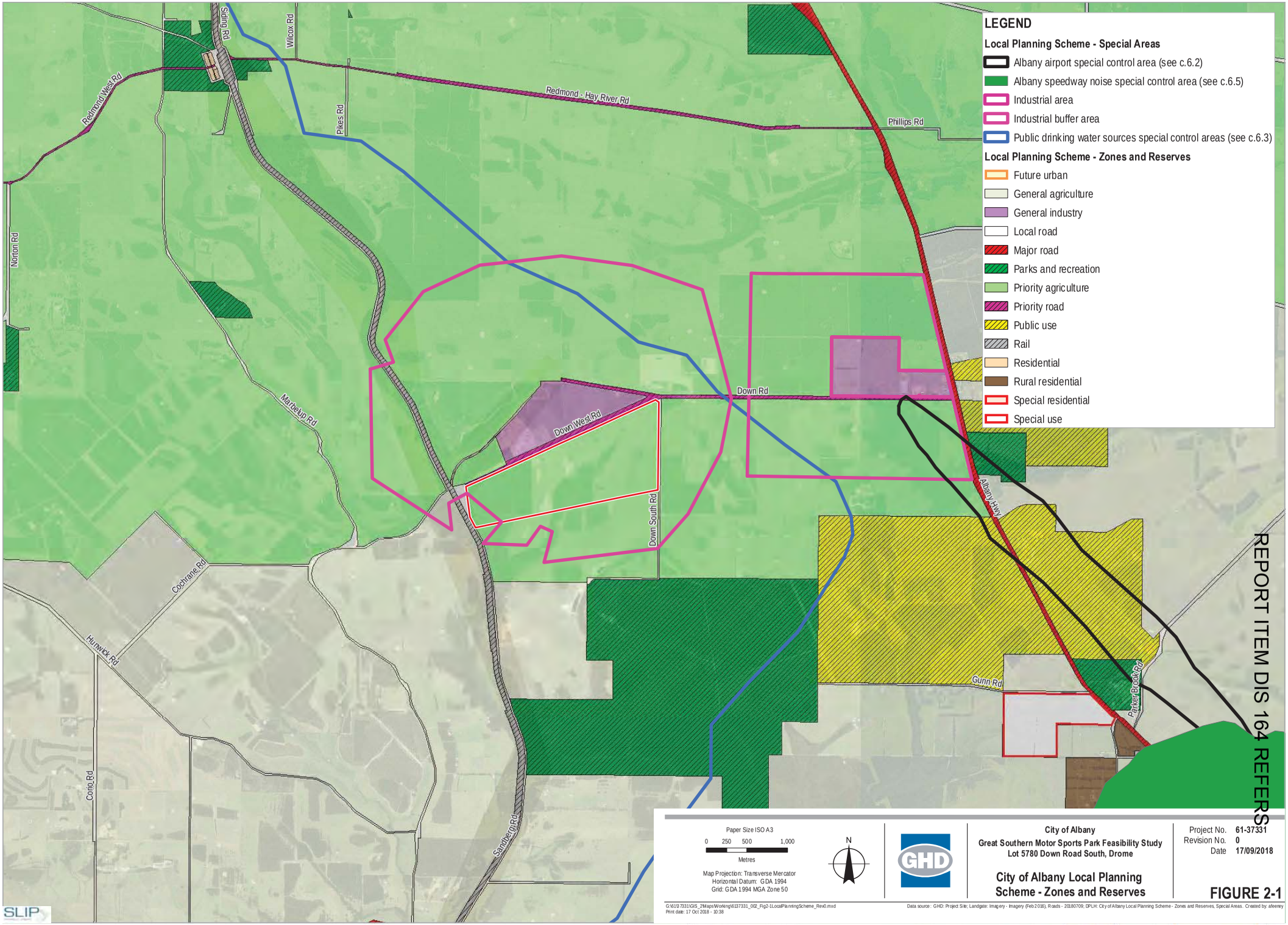
The Project Site is currently unserviced, with no connections to scheme water, sewerage, power or wired telecommunications. The site does receive reasonable 4G and 3G mobile phone coverage (refer to section 11.1.2).

The Water Corporation's Lower Great Southern Towns Water Supply Scheme (LGSTWSS) runs along Albany Highway, with the nearest connection point approximately 4 km to the east at 66 Down Road (fertiliser distribution warehouse) (Water Corporation, 2018). Drinking water supply is further discussed in section 8.1.

The Water Corporation's Albany sewerage scheme is not in close proximity to the site, with the nearest connection point being at Lancaster Road, McKail (being some 10 km distant). Wastewater management will require on-site solutions and is discussed further in section 8.4.

Western Power high voltage power lines currently run along the eastern boundary of the Project Site. Connection to power is further discussed in section 11.

Telstra fibre optic communications cables currently run along the northern side of Down Road West. Connection to telecommunications is discussed in section 11.2.1.


LEGEND
Local Planning Scheme - Special Areas
Albany airport special control area (see c.6.2)
Albany speedway noise special control area (see c.6.5)
Industrial area
Industrial buffer area
Public drinking water sources special control areas (see c.6.3)
Local Planning Scheme - Zones and Reserves
Future urban
General agriculture
General industry
Local road
Major road
Parks and recreation
Priority agriculture
Priority road
Public use
Rail
Residential
Rural residential
Special residential
Special use
Redmond West Rd
Siding Rd
Wilcox Rd
Pikes Rd
Redmond - Hay River Rd
Phillips Rd
Norton Rd
Marbelup Rd
Down Rd
Down West Rd
Down South Rd
Albany Hwy
Cochrane Rd
Hunwick Rd
Cono Rd
Sandbergen Rd
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FIGURE 2-1
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Print date: 17 Oct 2018 - 10:38
Data source: GHD: Project Site; Landgate: Imagery - Imagery (Feb 2016), Roads - 20180709; DPLH: City of Albany Local Planning Scheme - Zones and Reserves, Special Areas. Created by: afeeney
SLIP

2.6 Existing and historical uses

The perimeter of the Project Site is entirely fenced and is currently used for the primary purpose of cattle grazing. Historically the Project Site is likely to also have been used solely for the purpose of agriculture. The western end of the property consists of 52 ha of native vegetation that will be retained. An unnamed creek line runs from the north-east corner of the property through to the south-west corner, from where it joins into Marbelup Brook. A number of small dams are located across the property for stock watering. These will be retained and maintained for the AMP.

The Plantation Energy sub-leased area consists of a small retention basin, connected to their site drainage system on the other side of Down Road West. The sub-lease area is powered, and Plantation Energy operates a pump from the retention basin. This area is unfenced, although there is a locked access gate on the site perimeter fence, off Down Road West.

Adjacent to the Plantation Energy retention basin, there is presently a significant amount of rubbish (comprising of what appears to be decommissioned process vessels, oil drums, scrap metal, electrical cable, plastic, chemical containers, etc.), which will need to be removed prior to any property transactions. Several large stockpiles of woodchips are also present, which will also need to be removed. It is understood that the woodchip stockpiles are owned by Plantation Energy and the stockpile area sub-leased by Plantation Energy from Lindsay and Joy Black (although it is noted that the Black's formal lease over the property is expired). The GSMG understand that this area will need to be cleared and made good prior to the sale of the property.



Figure 2-2: Images of Plantation Energy sub-lease area

Mr Lindsay Black also has a current Planning Consent over two locations on this site for the purpose of extracting sand. Both sand pits are covered under the same Consent (No. P275225), which was approved on 14 September 2007. Access is via Down Road West, using the same gate as the Plantation Energy sub-lease area. The GSMG understand the Mr Black is imminently ceasing the quarrying activities and will make good the affected area (as required under the conditions of the Planning Consent).

3. Albany Motorsport Park concept design

3.1 Layout and facilities

The concept design for the Albany Motorsport Park (AMP) has been developed by the non-for-profit Great Southern Motorplex Group (GSMG) and Roberts Gardiner Architects. The GSMG has undertaken significant research into the requirements for track licensing by the Confederation of Australian Motor Sport (CAMS) and the specifications of:

- Fédération Internationalé de l'Automobile (FIA),
- Fédération Internationalé Motocyclisme (FIM),
- Motorcycling Australia (MA), and
- Australian National Drag Racing Association (ANDRA).

The proposed AMP will consist of:

1. Sealed, configurable multi-use track (3.2 km long × 12 m wide) for motor car racing, motorcycle racing, drifting, driver training and cycling:
   – Designed to comply with CAMS' *Track Operator's Safety Guide* (CAMS, 2012) and MA's *Track Guidelines* (MA, 2011), and
   – To be licensed by CAMS for FIA Grade 2 and FIM Grade B (i.e. up to second-tier international motor racing).
2. A motocross circuit:
   – Designed and constructed in association with MA guidelines.
3. A 1/8th mile drag racing strip:
   – Designed and constructed in accordance with FIA specifications for drag strips and in association with ANDRA.
4. A 1,300 m^2 burnout area,
5. An off-road four wheel drive (4WD) and all-terrain vehicle (ATV) training area,
6. Allowance for future speedway;
7. Allowance for future go-karts.

At full development, the AMP will also include associated facilities, such as:

- Toilets,
- Medical / first aid station,
- Manager's office,
- Meeting / briefing room
- Kitchen / canteen,
- Storage / grounds maintenance workshop,
- Vehicle scrutineers' workshop,
- Control tower,
- Spectators viewing areas,
- Grassed spectators' picnic area with shade and BBQs,
- Competitors parking, and
- Spectators parking.



Figure 3-1: AMP concept site layout

REPORT ITEM DIS 164 REFERS

3.2 Events and usage

Outlined below in Table 3-1 is the expected usage of the AMP, as conceptualised by the GSMG. For the purposes of sizing facilities and servicing infrastructure, **a typical / frequent site attendance of 500 persons has been assumed** (i.e. competitors + officials + spectators). This was determined through discussion with the GSMG on the nature and size of expected typical events. For special events that anticipate a greater number of site attendees, additional management measures will need to be implemented – for example:

- Community notices,
- Portable generators,
- Porta-loos,
- Drinking water carts,
- Temporary seating, and
- Traffic and parking management controls.

Table 3-1: Indicative AMP event profile

Use	Level	Frequency	Duration	Entrants	Spectators
Driver training, schools, manufacturer testing		Week days	Day	50	0
Car test & tune day	Club	4 week days / month	Day	30	30
Car speed events	Club	1 weekend / month	Day	100	200 – 500
Car speed events	State	1 weekend / month	Day	100 – 200	200 – 1,000
Car speed events	National	1 weekend / year	Day	200 – 300	2,000 – 5,000
Super cars events	National	1 × 3 day weekend / year	Day	200 – 300	10,000 – 20,000
Bike test and tune day	Club	4 week days / month	Day	50	50
Bike speed events	Club	1 weekend / month	Day	100	200 – 500
Bike speed events – Champions Ride Day	State	1 weekend / month	Day	100	200 – 1,000
Bike speed events	National	1 weekend / year	Day	200	1,000 – 5,000
Motocross events	Club	3 days / week training 4 single days / month	Day	100 – 200	200 – 400
Motocross events	State	1 weekend / month	Day	200 – 300	500 – 1,000
Drifting day	Club	2 days / month	Day and evening	30	30
Drifting day	State	1 weekend / month	Day and evening	50	200 – 500
Burnout day	Club	1 weekend / month	Day or evening	30	30
Burnout day	State	1 × 3 day weekend / year	Day or evening	50	1,000 – 2,000

Use	Level	Frequency	Duration	Entrants	Spectators
Drag racing practice day	Club	4 week days / month	Day	30	100
Drag racing competition	Club	1 day / month	Day and evening	30	200 – 500
Drag racing competition	State	4 weekends / year	Day and evening	50	500 – 1,000
Drag racing competition	National	1 weekend / year	Day or evening	50	1,000 – 5,000
Motorkhana	Club	1 day / month	Day	50	200
Tractor pull	State	2 weekends / year	Day	50	1,000 – 2,000

Duration of events:

- Typical day operation is 8:00 am – 6:00 pm, and
- Typical evening operation is 6:00 pm – 10:00 pm and only conducted if fixed or mobile lighting is available.

3.3 Governance

Governance and ownership arrangements for the AMP are still subject to further investigation, but for the purposes of this study it is assumed that the property will be owned by the City of Albany, as will the tracks and all permanent facilities constructed on the property. The AMP will be leased to an operator-manager by the City of Albany, with all operational and maintenance activities to be conducted by the operator-manager.

The operator-manager of the AMP will be a “not-for-profit” company consisting of a Board of Management and no other shareholders. The Directors will be representatives from the following:

- City of Albany Council,
- DLGSCI,
- The Member for Albany,
- Any other authority nominated by the City of Albany,
- A representative of the motorsports clubs involved in the AMP.

3.4 Servicing requirements

To successfully operate the AMP, the following servicing requirements are anticipated:

- Power – for buildings, control tower, lighting, security and competitors’ requirements (e.g. tools, motorcycle tyre warmers, battery chargers etc.),
- Telecommunications for office buildings,
- Lighting – either fixed or mobile lights for burnout pad, drifting circuit and drag strip,
- Parking – sealed or gravel hardstand for approx. 200 – 250 vehicles (competitors + officials + spectators), including single trailers and trucks,
- Drinking water – either by rainwater collection and/or water carts, and
- On-site wastewater treatment and disposal.

The deployment of these services is likely to occur in a staged delivery, commensurate with the progressive development of the Project Site.

3.5 Preliminary capital cost estimate

GHD has prepared the preliminary capital cost estimate set out in this section ("Cost Estimate") using information reasonably available to the GHD employee(s) who prepared this report; and based on assumptions and judgments made by GHD. The Cost Estimate has been prepared for the purpose of budget setting and must not be used for any other purpose.

The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD does not represent, warrant or guarantee that the project can or will be undertaken at a cost which is the same or less than the Cost Estimate.

Outlined in Table 3-2 is a summary of the capital cost estimate for the AMP, including the likely staging of development. An estimate for a similar concept design was independently prepared for the WA Motorsports Strategy (Lanfear, 2018) and came to $35.65 million.

Table 3-2: Preliminary capital cost estimate

Area	TOTAL ($)	In-kind contribution	Stage 1 ($)	Stage 2 ($)	Stage 3 ($)
Motocross	2,973,000	382,000	437,000	1,673,000	449,000
Multi-use track	11,426,000	151,000	7,379,500	2,772,500	1,111,000
Drag strip	3,726,000	0	0	2,968,000	513,000
4WD / ATV area	444,000	133,000	0	300,000	0
Common / general items	5,261,000	270,000	3,016,000	1,189,200	436,800
TOTAL	**23,830,000**	**936,000**	**10,832,500**	**8,902,700**	**2,509,800**

The full detail and assumptions contained in the estimate are attached in Appendix B. Where estimates of potential costs are provided with an indicated level of confidence, notwithstanding the conservatism of the level of confidence selected as the planning level, there remains a chance that the cost will be greater than the planning estimate, and any funding would not be adequate. The confidence level considered to be most appropriate for planning purposes will vary depending on the conservatism of the user and the nature of the project. The City of Albany should therefore select appropriate confidence levels to suit their particular risk profile.

3.5.1 Priorities and staging plan

Outlined below is Table 3-3 is an indicative staging plan for the AMP development. The priority facilities in Stage 1 are:

1. The motocross track – to resolve the lack of safe, permanent, easily accessible facilities for the Albany Motorcycle Club and enable rider training, Club and State level competitions to be held on a track that is to be accredited and licenced by Motorcycling Australia (MA),
2. The multi-use track – to allow the operator-manager to generate revenue through driver training and track rental activities, provide a safe and scrutinised venue to local enthusiasts such as the Great Southern Street Machine Association and provide a high level venue for State motor car, motorcycle and cycling events on a track to be approved and licenced by CAMS, and,
3. Enabling works, such as feasibility / planning / design works, critical environmental controls and access roads.

Stages 2 and 3 contemplate the further development of the AMP site as patronage increases and the range of uses is broadened (for example, to include lighted evening events) and is dependent on further funding from various sources becoming available.

Table 3-3: AMP staging plan

Stage 1 facilities	Stage 2 facilities	Stage 3 facilities
Motocross track, plus: Associated civil works (i.e. drainage, fencing, unsealed parking area, etc.), Scrutineers and first aid temporary building, Portable toilets for events, Portable power generator, Rainwater tank for drinking water, and Portable communications / public address system.	Motocross clubrooms, plus: Sealed parking area, On-site wastewater treatment plant, Power connection, and Public address system.	Motocross maintenance and storage shed.
Multi-use track (inc. drifting and burn-out), plus: Associated civil works (i.e. drainage, 1LOP barriers, 2LOP fencing), Control tower, Temporary pits / control accommodation, Temporary first aid accommodation, Portable toilets for events, Portable power generator, Rainwater tank for drinking water, and Portable communications / public address system.	Multi-use track buildings for: Pits area and control room, First aid room, Clubrooms and briefing room, Scrutineers workshop, On-site wastewater treatment plant, Power connection, and Public address system.	Multi-use track maintenance shed, and Multi-use track lighting.
	Drag strip (1/8th mile), plus: Associated civil works (i.e. drainage, fencing, barrier protections, etc.), Control tower, Rainwater tank for drinking water, and Communications / public address system.	Drag strip grandstand and landscaping, and Drag strip lighting.

REPORT ITEM DIS 164 REFERS

Stage 1 facilities	Stage 2 facilities	Stage 3 facilities
4WD / ATV training area, plus: Associated civil works (i.e. drainage, fencing, etc.).	4WD / ATV maintenance shed, plus: Power connection, and Rainwater tank for drinking water.	
Common / general items: Feasibility, planning and design costs, Property purchase costs, Secondary emergency access road, Internal (unsealed) access road and (unsealed) parking area, Perimeter fencing and gates, and Down Road access and gatehouse.	Common / general items: Asphalt seal to parking area, Asphalt seal to access road, and Overflow parking area.	Site revegetation, landscaping and beautification.

REPORT ITEM DIS 164 REFERS

4. Planning approvals

4.1 Scheme amendment

As identified in section 2.3, the proposed Project Site is currently zoned *Priority Agriculture* and hence a motorsport park would not be a permissible use. Based on advice from the DPLH and City of Albany Planning Department, the proposed site would need to be re-zoned as *Special Use* within the Albany Local Planning Scheme No.1. This change will require a formal Scheme amendment, which has a defined process and timeline under the Western Australian Planning Commission (WAPC) (refer to Figure 4-1). Key points to note in the Scheme amendment process are:

- Amendments can be defined as *basic, standard* or *complex*. The AMP proposal would likely be regarded as *standard* (particularly if the motorsports park concept is incorporated into the current draft of the Albany Local Planning Strategy).
- The amendment process is to be initiated by the relevant local government (i.e. City of Albany) and requires significant preparatory effort.
- All proposed amendments are referred to the Environmental Protection Authority (EPA), whom then determines whether the amendment needs to be assessed under the *Environmental Protection Act 1986*.
- Following advice from the EPA, the local government must then advertise the proposed amendment and accept public submissions for at least 42 days. This period extends to 60 days if the amendment is defined as *complex*.
- Following receipt and resolution of public submissions, the proposed amendment is then submitted by the local government to the WAPC, whom then has 60 days to make recommendations to the Minister.
- The Minister for Planning has final approval.

Given this defined approval process and the required consultation periods, it can be expected that a Scheme amendment process could take 6 – 12 months.

4.2 Development application

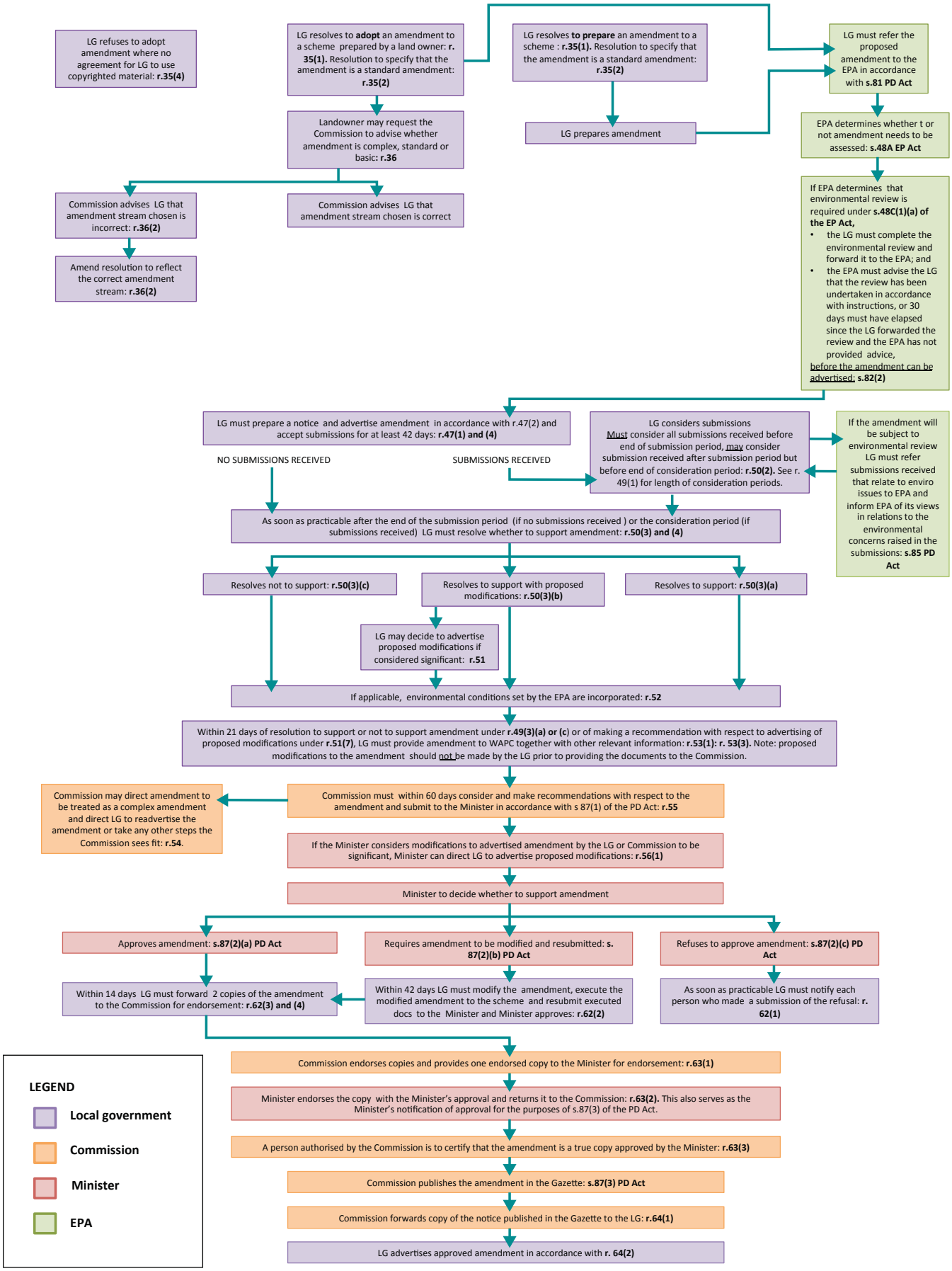
Once the Albany Local Planning Scheme No.1 is appropriately amended, the AMP proposal would then need to proceed with the normal development application process with City of Albany. For regional development applications, a project with value greater than $10 million would also be mandatorily referred to the Southern Joint Development Assessment Panel (JDAP).

As per usual practice and prior to any decision by Council, the AMP development application would be referred to relevant state government agencies, such as Main Roads, DFES, Department of Health and Department of Water and Environmental Regulation (e.g. for noise, vegetation clearing, impacts on PDWSAs, etc.) for advice.

Based on formal correspondence and discussions, it is expected that DWER would provide advice to Council opposing any motorsport development within a PDWSA. This is consistent with DWER policy, as expressed in:

- WQPN 76 (March 2006): Land use planning in Public Drinking Water Source Areas,
- WQPN 25 (April 2016): Land use compatibility tables for PDWSAs, and
- WQPN 100 (April 2007): Motor sport facilities near sensitive waters.

Process for standard amendments to local planning schemes flowchart



Under WQPN 25 (DoW, 2016), a permanent motorsport facility is listed as 'incompatible' with P1 and P2 areas, and 'compatible with conditions' for P3 areas. WQPN 100 provides advice on the environmental risks to water resources posed by motorsport facilities, such as:

- Clearing of native vegetation,
- Leaks / spills of chemicals and hydrocarbons,
- Turbid / contaminated stormwater runoff,
- Solid waste and wastewater from workshops and washdown areas, and
- Toilet amenities for large numbers of people.

WQPN 100 provides further advice on the measures (through design and operation of the facility) that could be deployed to manage and monitor the above environmental risks. Any development application for a motorsport facility in a PDWSA would need to address the issues raised in WQPN 100 for a reasonable assessment to be made by Council. The development application should also include consideration of the facilities required to meet the provisions of the *Draft Country Sewerage Policy* (1999).

Under Western Australian planning legislation, any decision made by Council on a development application cannot be appealed by a third party.

4.3 Bushfire

The Department of Fire and Emergency Services (DFES) Map of Bush Fire Prone Areas indicates the Project Site is located in a 'Bush Fire Prone Area' and additional planning and building requirements may apply to development on the site (DFES, 2018).

Initial consultation with DFES by the City of Albany (*pers. comms.* J. Van Der Mescht, Manager Planning and Land Information Services, City of Albany 29 August 2018) indicates the Project Site will likely be classified as a 'vulnerable land use' with a tourism benefit and therefore a Bushfire Management Plan (BMP) will be required to be developed in accordance with AS 3959-2009: *Construction of buildings in bushfire prone areas* and the *Guidelines for Planning in Bushfire Prone Areas* (WAPC, 2017).

DFES have recommended that, as a component of the BMP, a precinct-wide strategic secondary access is developed to provide connection to Redmond-Hay River Road to the north, as shown in Figure 4-2. This has been suggested as a preferred alternative to a secondary east-west connection to Albany Highway, as this would terminate in the same general area as the intersection of Down Road and Albany Highway.

The potential alignment shown in Figure 4-2 minimises the number of properties impacted, and minimises vegetation clearing. The relevant properties are:

- Lot 22 Down Road (CBH site), and
- Lot 5774 Redmond-Hay River Road (private owner).

No consultation has yet been undertaken with these property owners.

Given the strategic nature of this secondary access road for the broader precinct, it is proposed that the easement (approx. 3.5 km × 14 m wide) be acquired by the City as 'local road reserve'. Alternatively, 'easements in gross' could be negotiated as a short term solution, but this is not preferred.

As the Project Site is proposed to be a tourism use DFES have suggested it may also be considered a place of refuge in the event of a fire.



Figure 4-2: Potential secondary access to Redmond-Hay River Road

The Bushfire Management Plan will be a critical element in securing planning approvals for the proposed site. Development of the AMP layout and concept design will need to give close consideration to the requirements of the *Guidelines for Planning in Bushfire Prone Areas* (WAPC, 2017). Further site investigations, such as Bushfire Hazard Level (BHL) and Bushfire Attack Level (BAL) assessments, will also be required to support the BMP once the AMP site layout and buildings design are refined.

5. Preliminary environmental impact assessment

5.1 Assessment of environmental aspects and impacts

The key environmental factors considered relevant to the AMP project are outlined in this section. For each aspect, a baseline environmental description is included and, where appropriate, is followed by an assessment of potential environmental impacts. The aspects assessed include:

- Acid sulfate soils (ASS),
- Hydrology and hydrogeology – surface water, wetlands, drainage, groundwater and public drinking water sources,
- Reserves and conservation areas,
- Environmentally sensitive areas,
- Terrestrial flora and vegetation – vegetation type, vegetation extent and status, vegetation condition, clearing, significant flora, Threatened Ecological Communities (TEC) and Priority Ecological Communities (PEC),
- Weeds and Declared Plants,
- Fauna – threatened fauna, habitat values, habitat linkages,
- Dieback,
- Aboriginal heritage,
- European heritage,
- Contaminated sites, and
- Construction and operational phase impacts – dust emissions, noise and vibration, visual amenity, fire, pollution, waste and hazardous materials, traffic management, topsoil management, revegetation and landscaping.

Where relevant, recommendations are provided for additional investigations and mitigation measures.

5.1.1 Relevant legislative requirements

Key Commonwealth and Western Australian environmental legislation that may be relevant to the AMP project is listed in Table 5-1.

Table 5-1: Key environmental legislation relevant to the AMP project

Legislation	Responsible agency	Aspect
Commonwealth legislation		
Environment Protection and Biodiversity Conservation Act 1999	Department of the Environment and Energy (DEE)	Matters of National Environmental Significance including threatened flora and fauna
Native Title Act 1993	National Native Title Tribunal	Native title
State legislation		
Aboriginal Heritage Act 1972	Department of Lands, Planning and Heritage (DPLH)	Archaeological and ethnographic sites
Biodiversity Conservation Act 2016	DBCA	Protection of native flora and fauna
Biosecurity and Agricultural Management Act 2007	Department of Primary Industries and Regional Development (DPIRD)	Weeds and feral animals
Conservation and Land Management Act 1984	Department of Biodiversity, Conservation and Attractions (DBCA)	Use, protection and management of public lands and waters and its flora and fauna
Contaminated Sites Act 2003	Department of Water and Environment Regulation (DWER)	Management of contaminated sites
Environmental Protection Act 1986	Environmental Protection Authority (EPA) (Part IV) DWER (Part V)	Environmental impact assessment and management
Environmental Protection (Noise) Regulations 1997	DWER	Noise standards
Environmental Protection (Clearing of Native Vegetation) Regulations 2004	DWER	Clearing of native vegetation
Heritage of Western Australia Act 1990	Heritage Council of Western Australia	European heritage protection
Land Administration Act 1997 Department of Regional	DPLH	Administration of State Land
Rights in Water and Irrigation Act 1914	DWER	Access to and use of water resources; protection and management of river flows and drainage
Soil and Land Conservation Act 1945	DPIRD	Protection of soil and prevention/management of soil erosion

5.1.1 Methodology

Desktop assessment

A desktop assessment of the AMP project and Project Site was undertaken by viewing GIS spatial files and reviewing information from publically available, government managed databases. The information sources utilised in this assessment are presented in Table 5-2.

Table 5-2: Information sources

Aspect	Information source
Climate	Bureau of Meteorology (BoM) Climate Data Online (BoM, 2018).
Geology, landform and soils	DPIRD Soil landscape mapping (GoWA, 2018).
Acid Sulphate Soils	DWER Acid Sulfate Soil Risk Map, Albany – Torbay (GoWA, 2018).
Land use and reserves	DBCA Legislated Lands and Waters (GoWA, 2018). City of Albany Local Planning Scheme No. 1 (Department of Planning (DoP, 2014).
Environmentally Sensitive Areas	DWER Clearing Regulations – Environmentally Sensitive Areas (GoWA, 2018).
Vegetation	Beard vegetation mapping (1979). DPIRD Pre-European Vegetation (GoWA, 2018). Statewide Vegetation Statistics (GoWA, 2018). DBCA NatureMap (DBCA, 2018). Albany Regional Vegetation Survey (ARVS) (Sandiford & Barrett, 2010). FloraBase (WA Herbarium, DBCA, 1998)
Threatened and Priority Ecological Communities	DBCA Threatened Ecological Communities (TEC) (GoWA, 2018). *Pers. comms* Sandra Maciejewski, Reserves (Natural) Officer, City of Albany 8 August 2018. EPBC Act Protected Matters Search Tool (DEE, 2018).
Conservation Significant Flora and Fauna	DBCA NatureMap database (DBCA, 2018). EPBC Act Protected Matters Search Tool (DEE, 2018).
Surface water and Groundwater	DWER data layers (GoWA, 2018): Groundwater Salinity Statewide Hydrographic Catchments – Catchments Hydrographic Catchments – Sub-catchments Public Drinking Water Source Areas RIWI Act, Groundwater Areas RIWI Act, Rivers RIWI Act, Surface Water Areas and Irrigation Districts Surface Water Allocation Areas Surface Water Allocation Subareas. DBCA data layers (GoWA, 2018): Ramsar Sites South Coast Significant Wetlands.
Contaminated sites	DWER Contaminated Sites Database (DWER, 2018).
Heritage	DPLH Heritage Inquiry System Search Tool (DPLH, 2018). EPBC Act Protected Matters Search Tool (DEE, 2018). Heritage Council InHerit database (GoWA, 2018). State Register of Heritage Places (DPLH, 2018).
Matters of National Environmental Significance (MNES)	EPBC Act Protected Matters Search Tool (DEE, 2018).

Site walkover

A GHD Senior Environmental Scientist and Principal Engineer conducted a site walkover on 3 July 2018. The site walkover included a visual assessment of native vegetation, observations on drainage / flow paths and the presence of existing disturbances such as waste dumping within the Project Site. Photographs were taken at key points within the Project Site.

The findings from the site walkover have been incorporated (where appropriate) into the relevant following sections. The photographs from the site walkover have been included as Appendix I.

5.1.2 Physical environment

Climate

Albany is located on the south coast of Western Australia and the climate is broadly described as Mediterranean, with warm dry summers and mild wet winters. The nearest Bureau of Meteorology (BoM) official recording station is Albany Airport (Station No. 9741). A summary of climatic data for this station is provided in Table 5-3 (BoM, 2018).

Table 5-3: Climatic data for the Albany Airport (Station No. 9741) for years 1960 to 2014 (BoM 2018)

Climatic variable	Statistic
Mean annual maximum temperature range	15.8°C in July to 24.9°C in February
Mean annual minimum temperature range	7.5°C in July to 14.5°C in February
Mean annual rainfall	798.1 mm
Mean annual rain days per year	83.1

Topography, geology, landform and soils

The surface elevation of the Project Site ranges from approximately 41 m AHD to 73 m AHD. The lowest elevation is on the southern boundary and extends through the centre of the Project Site within a gully (a tributary to Marbelup Brook) that lies in a north-easterly direction. The highest elevation occurs on the eastern boundary of the Project Site.

The regional geology is discussed in section 6.1.1. The local geology is further delineated by DPIRD Soil Landscape Mapping identified in Table 5-4 and illustrated in Figure 5-1.

Table 5-4: Soil map units within the Project Site (GoWA, 2018)

Map unit symbol	Name	Landform	Geology	Soil
242KgDMc	Dempster Crest phase	Broad convex crests of sandy and lateritic spurs and ridges	Deeply weathered siltstone	Duplex sandy gravels; Grey deep sandy duplexes; Pale deep sand; Shallow gravels
242KgS7f	Minor Valleys S7 floor phase	Foot slopes and swampy valley floors of minor valleys	Colluvial and alluvial deposits over weathered sedimentary rocks	Wet and semi-wet soils; Pale deep sands; Grey deep sandy duplexes
242KgS7h	Minor Valleys S7 slope phase	Side slopes of minor valleys	Colluvium sedimentary rocks	Pale deep sands; Grey deep sandy duplexes
242ReDMc	Dempster Crest phase	Elongate crests	No information recorded	Sands and laterite

Acid sulfate soils

A review of the DWER ASS risk mapping for Albany-Torbay indicates the Project Site is located outside of the boundary of this dataset. Tributaries of Marbelup Brook located approximately 750 m to the south of the Project Site are mapped within areas of "*Moderate to Low Risk*" of ASS occurring within 3 m of the natural soil surface (Figure 5-2).

Therefore it is considered reasonable to assume that the tributaries of Marbelup Brook within the Project Site may also have a "*Moderate to Low Risk*" of ASS occurring within 3 m of the natural soil surface.

Potential impacts

The AMP project will potentially result in impacts to the physical environment. These impacts are expected to occur during the construction phase and are likely to be minor and temporary given appropriate management measures. Potential impacts include:

- Temporary risk of water and wind erosion as a consequence of the proposed works. Areas of the Project Site with lighter-texture soils (e.g. sandy soils) are likely to be vulnerable to water and wind erosion. Areas of the Project Site with dispersive soils (e.g. clay soils) may also be prone to water erosion, particularly during high intensity rainfall events.
- Undisturbed ASS does not pose a risk, and only become an issue where excavation occurs, works are required below the water table, or lowering of the water table is required. The AMP project will likely include excavations and dewatering. ASS investigations and an ASS management plan (if required) should be undertaken once further construction details are defined.

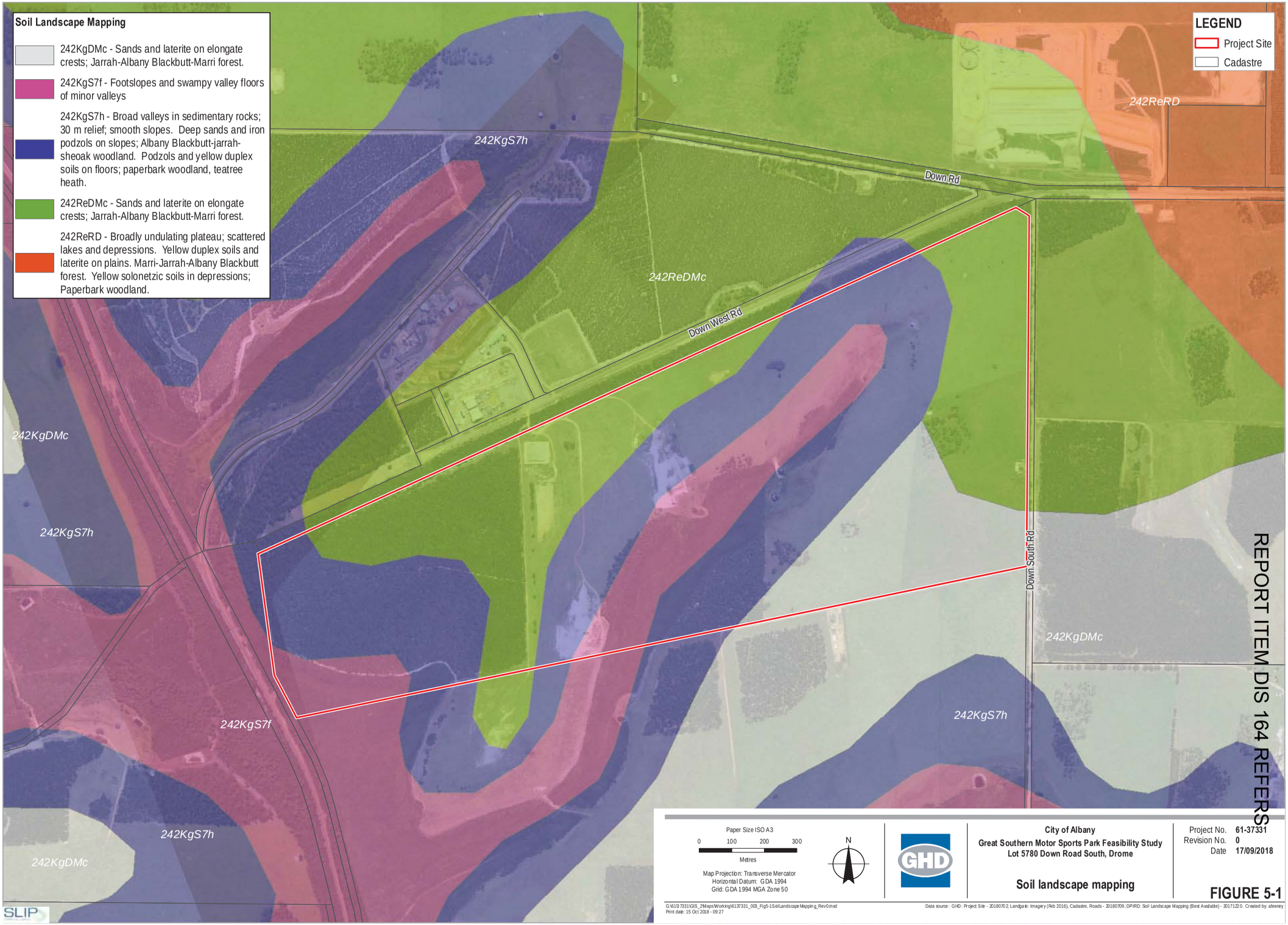
Management

It is anticipated that the potential impacts to the physical environment can be adequately managed for the construction and operational phase of the AMP project using standard techniques to maintain existing environmental conditions through the detailed design phase and the Preliminary Water Management Plan outlined in Section 8 including:

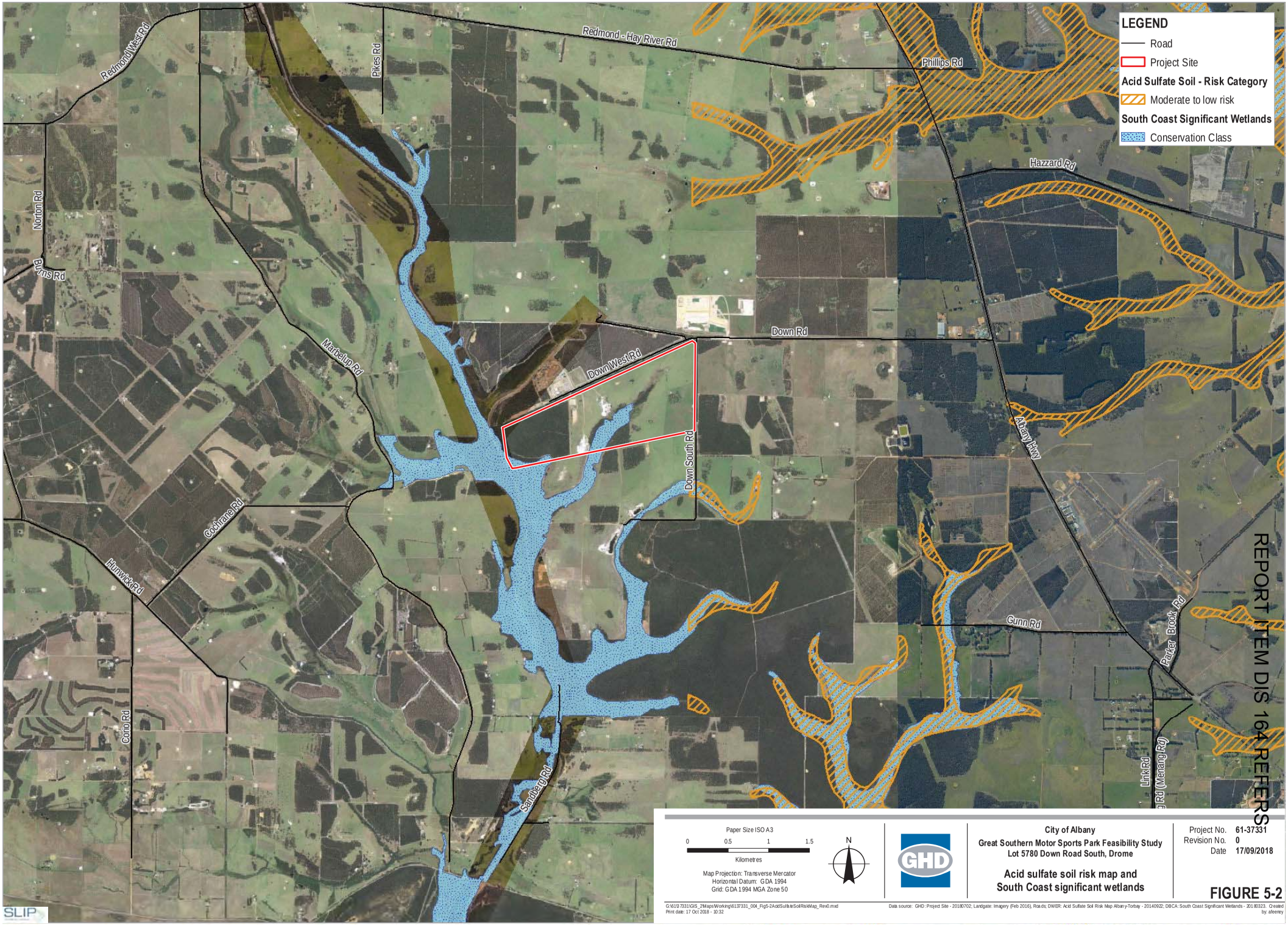
- Spill control and pollution management,
- Water sensitive urban design,

- Erosion and sediment control, and
- On-site wastewater management and operational controls.

Once ASS investigations are deemed required and subsequently completed, an ASS (and if required – dewatering) management plan should be prepared, if ASS is identified. The ASS (and dewatering) management plan is to be prepared in accordance with DWER guidelines *Treatment and Management of Soils and Water in Acid Sulfate Soil Landscapes* (DER, 2015).



REPORT ITEM DIS 164 REFERS



REPORT ITEM DIS 164 REFERS

5.1.3 Hydrology and hydrogeology

Desktop searches of the DWER hydrology layers were undertaken and are summarised in Table 5-5.

Table 5-5: DWER data queries within the Project Site (GoWA, 2018)

Aspect	Details	Result
Public Drinking Water Source Areas (PDWSA)	PDWSA is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the Metropolitan Water Supply, Sewage and Drainage Act 1909 or the Country Area Water Supply Act 1947.	Project Site lies within the Priority 2 Marbelup Brook Catchment Area (Figure 5-3).
Groundwater Areas	Groundwater areas proclaimed under the Rights in Water and Irrigation Act 1914 (RIWI).	Project Site lies within Albany Groundwater Area (Figure 5-4).
Surface Water Areas	Surface water areas proclaimed under the RIWI Act 1914.	None present.
Irrigation District	Irrigation Districts proclaimed under the RIWI Act 1914.	None present.
Rivers	Rivers proclaimed under the RIWI Act 1914.	None present.
Waterways Management Areas	Areas proclaimed under the Waterway Conservation Act 1976.	None present within the Project Site, however the Albany Waterways Management Area is located approx. 800 m to the north.
Clearing Control Catchments	Country Area Water Supply Act 1947 Part 2A.	None present.

Groundwater and hydrology

On a regional scale, the 250K Map Series – Hydrogeology identifies a "*sedimentary aquifer within intergranular porosity – extensive aquifers, major groundwater resources*" underlying the Site (DoW, 2002). Groundwater salinity in the local area is in the range of 500 – 1000 mg/L, which is considered to be marginal for productive uses (GoWA, 2018).

Bio Diverse Solutions has undertaken groundwater investigations for the Project Site, which are summarised in section 6.1.3.

Surface water and drainage

The Project Site lies in the Marbelup Brook sub-catchment which forms part of the wider Torbay Inlet Catchment in the Denmark Coast Basin within the South West Division (GoWA, 2018).

The entire Project Site and surrounds are located within the Marbelup Brook Surface Water Allocation Sub Area (SWASA), which is a sub area of the Albany Coast Surface Water Allocation Area (SWAA) (GoWA, 2018).

An unnamed water course is present within the Project Site, draining from the north-east and centre of the site to the south across the southern boundary to the Marbelup Brook, which ultimately drains to Lake Powell. However the natural drainage of the lower part of Marbelup Brook catchment has been modified which diverts the lower part of Marbelup Brook away from Lake Powell to the Torbay Inlet (DoW, 2007).

During the site visit the watercourse was observed to be in a modified state, with cattle currently having access to the watercourse. Erosion was evident, particularly in the eastern extent of the watercourse. This area was also mostly devoid of native vegetation, with the exception of some sedges (*Juncus* spp) (Plate 5-1). The western section of the watercourse contains native shrubs / sedges and had a defined bed / banks.



Plate 5-1: Eastern extent of the watercourse showing evidence of erosion and cattle access

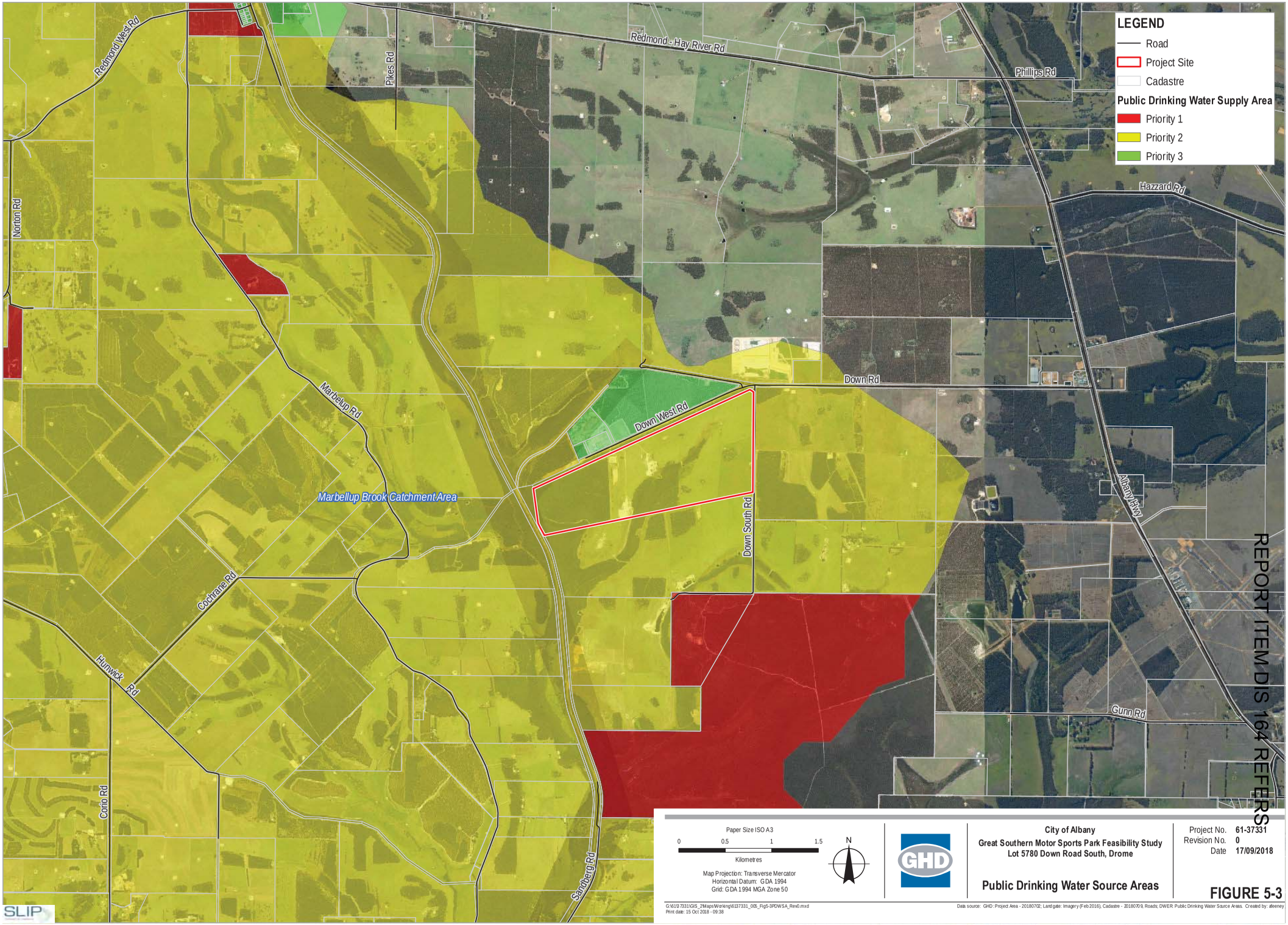
Wetlands

International and nationally important wetlands

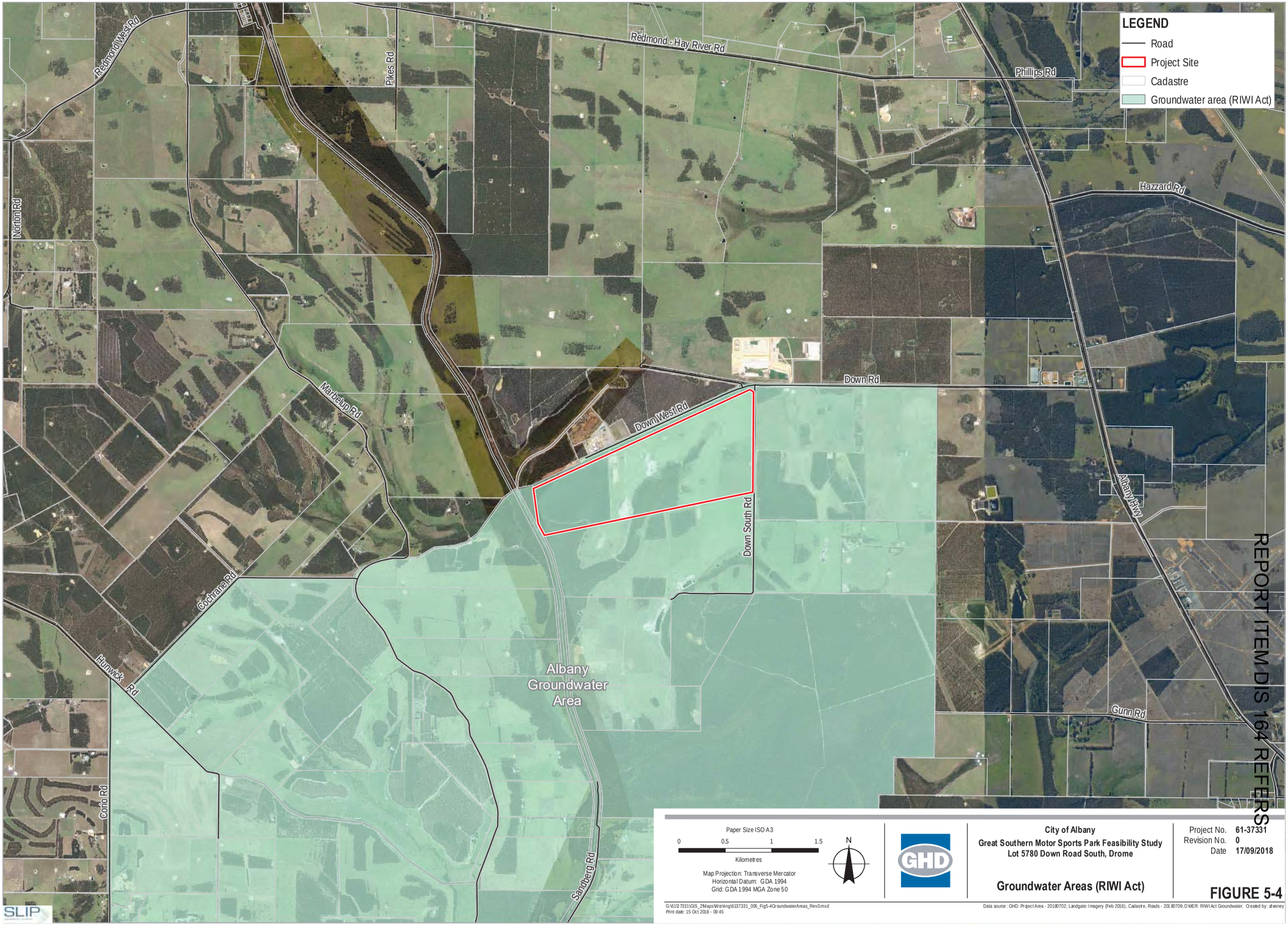
Desktop searches identified no internationally important (Ramsar) or Nationally Important listed wetlands within 5 km of the Project Site (GoWA, 2018).

South Coast Significant Wetlands

The unnamed water course located within the Project Site is a tributary of Marbelup Brook and is a Conservation Class wetland (Figure 5-2) (GoWA, 2018).



REPORT ITEM DIS 164 REFERS



REPORT ITEM DIS 164 REFERS

Potential impacts

The AMP project may cause disturbance or interruption to the natural drainage and surface run-off patterns, resulting in run-off to watercourses and wetlands potentially leading to issues in relation to contamination and sedimentation. However, the drainage design will aim to maintain existing hydrological regimes (refer to section 8).

Potential impacts to hydrology include:

- Groundwater – There may be the need for temporary lowering of groundwater levels during the construction phase of the AMP project. If so, a dewatering management plan should be prepared (generally included within the ASS management plan, if ASS is identified). No ongoing dewatering or abstraction of groundwater is considered likely during the operational phase of the AMP.
- Surface water – Marbelup Brook and associated tributaries. It is expected that the AMP project will utilise drainage features such as drains, basins, culverts and kerbing to avoid direct discharge of hardstand run-off into waterways. It is expected that the surface water hydrology will be maintained in its current regime with appropriate drainage design.
- Erosion/ sedimentation – During the construction phase and until revegetation has achieved a stable landform there is the potential for erosion and sedimentation. This is likely to be more pronounced in drainage areas.
- Vegetation – Clearing will not be undertaken within the watercourse. A 50 m development exclusion buffer will be maintained around the water course. Positive impacts on vegetation (improved vegetation health) within this buffer may be associated with removal of cattle (grazing/ trampling) and revegetation works.
- Pollution impacts associated with construction/ operational phase – The storage and handling of chemicals and hydrocarbons will require management to prevent pollution of soil, surface water and groundwater. Impacts associated with the operation phase of the AMP include runoff from hardstand areas, however, it is expected that with appropriate drainage design and management this can be minimised.

Management

It is anticipated that the potential impacts to hydrology can be adequately managed for the construction and operational phase of the AMP project using standard techniques to maintain existing environmental conditions through the detailed design phase and the Preliminary Water Management Plan outlined in section 8 including:

- 50 m development exclusion buffer around the water course,
- Site revegetation and removal of cattle access,
- Spill control and pollution management,
- Non-structural measures (refer section 8.3.4),
- Erosion and sediment control, and
- On-site wastewater management and operational controls.

5.1.4 Conservation reserves and Environmentally Sensitive Areas

Conservation reserves

There are no DBCA Legislated Lands and Waters intercepted by the Project Site. However there are two sites within 5 km of the Project Site including the following (GoWA, 2018):

- Down Road Nature Reserve located approximately 900 m to the south, and
- Phillips Brook Nature Reserve located approximately 4.4 km to the north east.

Environmentally Sensitive Areas

The unnamed water course located within the Project Site is a tributary of Marbelup Brook and is a Conservation Class wetland (Figure 5-2) (GoWA, 2018). As per DWER guidance (DER, 2014), a conservation category wetland is "*a defined wetland and the area within 50 m of the wetland"* and is declared to be an Environmentally Sensitive Area (ESA) under the *Environmental Protection Act 1986.*

There is also one mapped ESA located within 5 km; approximately 4.7 km to the north-east of the Project Site (Figure 5-5) (GoWA, 2018).

Potential impacts

A 50 m development exclusion buffer will be maintained around the water course to help mitigate potential impacts during the construction and operational phases of the AMP project.

It is anticipated that the potential impacts to this ESA can be managed through the implementation of a project-specific Construction Environmental Management Plan (CEMP) and EMP for construction and operational phases of the AMP.

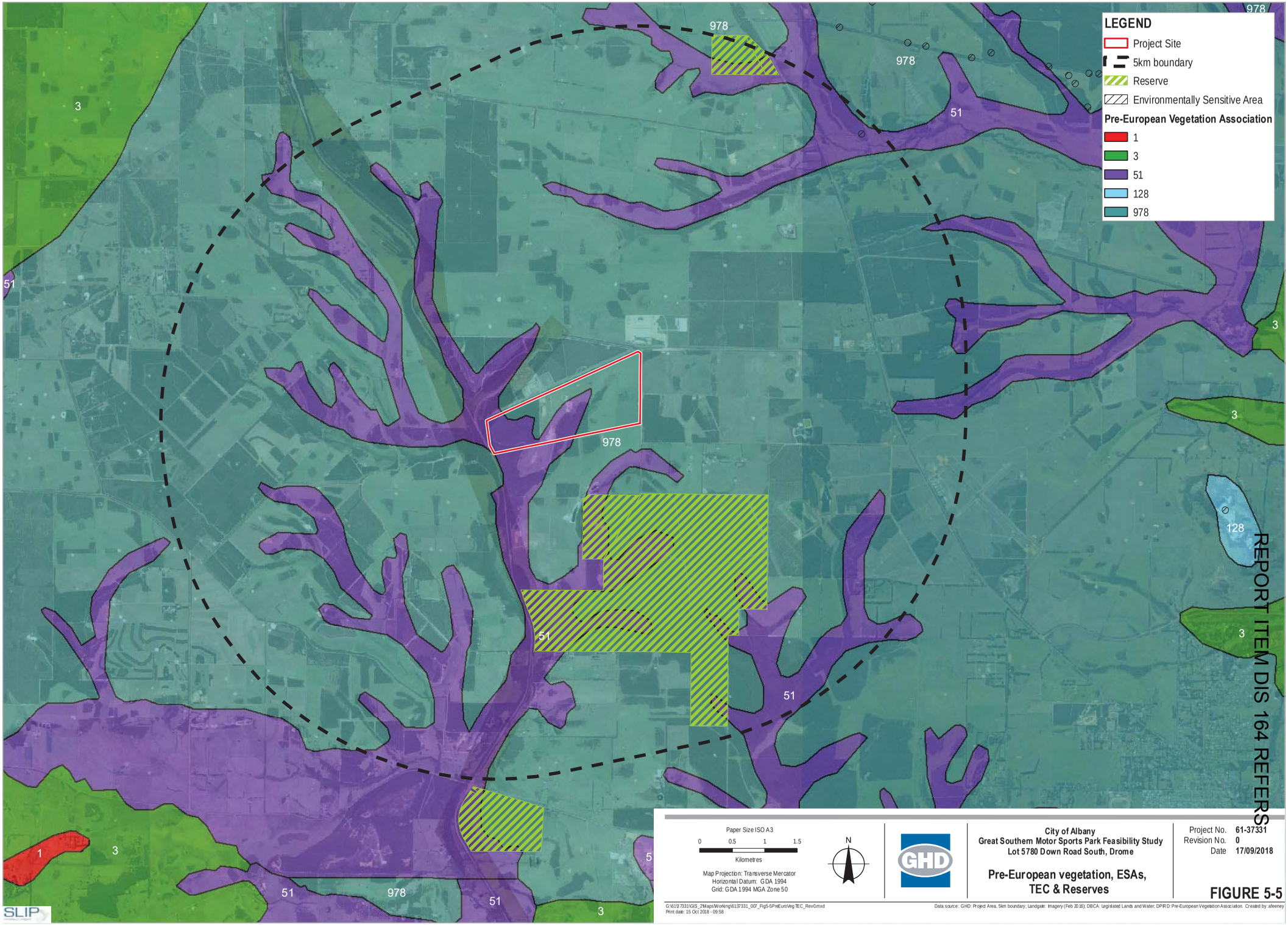
5.1.5 Vegetation and flora

Regional biography

The Project Site is located in the South West Botanical Province of Western Australia (Beard, 1990). The Southern Jarrah Forest IBRA subregion is characterised by "*Jarrah-Marri forest on laterite gravels and, in the eastern part, by Wandoo - Marri woodlands on clayey soils. Eluvial and alluvial deposits support Agonis shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of species-rich shrublands*" (Hearn, Williams, Comer, & Beecham, 2002, p. 382).

Pre-European vegetation

Broad scale pre-European vegetation mapping of the Southern Jarrah Forest IBRA Region was completed by Beard (1979) at an association level. The mapping indicates that two vegetation associations are present within the Project Site and lie within the Albany System Association (Table 5-6 and Figure 5-5).



REPORT ITEM DIS 164 REFERS

Table 5-6: Vegetation associations present within the Project Site (Beard 1979)

Vegetation association	Flora description	Structure description	Extent within the Project Site (ha)	Extent within the Project Site (%)
51	Cyperaceae, Restionaceae, Juncaceae (mainly in the South-West)	Sedgeland	66.34	34.5
978	Jarrah, banksia or casuarina *Eucalyptus marginata*, Banksia spp., Allocasuarina spp.	Low forest, woodland or low woodland with scattered trees	125.87	65.5
		Total	192.21	100.00

Albany Regional Vegetation Survey

The Albany Regional Vegetation Survey (ARVS) (Sandiford & Barrett, 2010) provides a local and regional overview of the native vegetation within a 124,415 ha area to the east, west and north of Albany. This survey described, mapped and assessed the conservation status of native vegetation within the ARVS area.

The Sandiford and Barrett (2010) mapping indicates that three ARVS vegetation units occur within the Project Site (Table 5-7).

Table 5-7: ARVS vegetation units present within the Project Site (Sandiford and Barrett 2010)

Map code	Vegetation unit	Soil type description	Extent within the Project Site (ha)	Extent within the Project Site (%)
12	Jarrah/ Marri/ Sheoak Laterite Forest	Well drained shallow loamy/ sandy soil, with outcropping laterite, usually occurring on the crests and middle slopes of low relief hills and plateaus with occasional occurrences on lower slopes	44.80	23.3
13	Jarrah/ Sheoak/ *E. staeri* Sandy Woodland	Usually found on gentle middle to lower slopes on sandy soil overlying laterite	8.14	4.2
47	Homalospermum firmum/ *Callistemon glaucus* Peat Thicket	Occurs in drainage depressions below the seepage zone on dark brown peat or sandy peat that is waterlogged in winter and moist in summer	16.39	8.5
	Total		69.33	36.0

The remaining extent (64%) within the Project Site aligns with cleared/ agricultural land.

Site Visit – Observed Vegetation

During the site visit the on-ground vegetation was compared to the ARVS mapping and considered to be consistent with the ARVS vegetation units and their mapped boundaries. The exception being a stand of marri / jarrah forest within the cleared paddocks that is not shown on the ARVS mapping but should be mapped as ARVS unit 12 (Plate 5-2, Figure 5-6).

The majority of the Project Site is cleared of native vegetation, and is currently used for cattle grazing. There are some stands of Marri / Jarrah Forest (aligning to ARVS Unit 12) within the paddocks (Plate 5-3). These were devoid of any native understorey and were in a Degraded condition. Within the Project Site there are some remnant patches of Marri / Jarrah Forest in Very – Good to Excellent condition, with a native shrub and understorey layer. These occur in the western extent of the Site and in a patch through the central section and along Down Road West.

Along Down Road South and along the northern side of the watercourse contains Jarrah / Sheoak / *Eucalyptus staeri* Woodland (ARVS Unit 13, Plate 5-4). This was generally in Very Good to Excellent condition.

The watercourse is mapped as ARVS Unit 47, the condition of vegetation along the watercourse varies depending on the degree of disturbance (Plate 5-5).



Plate 5-2 Stand of Marri / Jarrah Forest within cleared paddock.



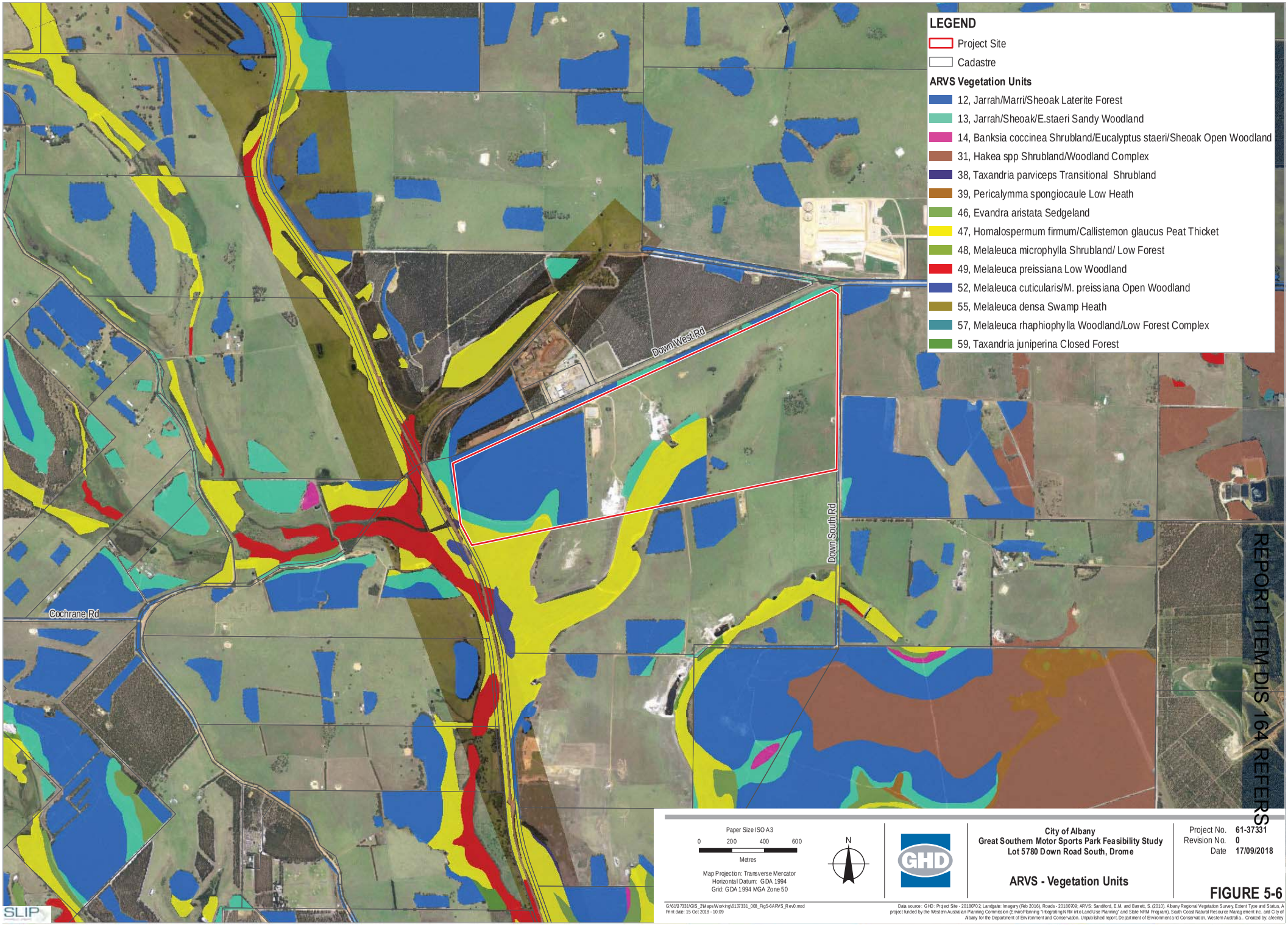
Plate 5-3 Marri / Jarrah Forest (ARVS Unit 12).



Plate 5-4 Vegetation along Down Road West Reserve that aligns with ARVS Unit 13.



Plate 5-5 Watercourse vegetation that aligns with ARVS unit 47.



REPORT ITEM DIS 164 REFERS

Paper Size ISO A3

0 200 400 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

City of Albany
Great Southern Motor Sports Park Feasibility Study
Lot 5780 Down Road South, Drome

ARVS - Vegetation Units

Project No. 61-37331
Revision No. 0
Date 17/09/2018

FIGURE 5-6

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Print date: 15 Oct 2018 - 10:09

Data source: GHD: Project Site - 20180702; Landgate: Imagery (Feb 2016), Roads - 20180709; ARVS: Sandford, E.M. and Barrett, S. (2010). Albany Regional Vegetation Survey, Extent Type and Status. A project funded by the Western Australian Planning Commission (Enviro\Planning "Integrating NRM into Land Use Planning" and State NRM Program). South Coast Natural Resource Management Inc. and City of Albany for the Department of Environment and Conservation. Unpublished report. Department of Environment and Conservation, Western Australia. . Created by: afeeney

Pre-European vegetation extent

The pre-European mapping has been adapted and digitised by Shepherd *et al*. (2002). The extent of the vegetation association has been determined by the State-wide vegetation remaining extent calculations maintained by the DBCA (latest update December 2017) (GoWA, 2018). As shown in Table 5-8, the current extents remaining of these vegetation associations are all greater than 30 per cent (%) of their pre-European extents at various levels (State, IBRA Bioregion, IBRA Subregion and Local Government Area (LGA)).

Table 5-8: Extent of Beard (1979) vegetation association within the Project Site (GoWA 2018)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	Current extent remaining in all DBCA managed lands (%)
Jarrah Forest IBRA Bioregion		4,506,660.26	2,406,938.58	53.41	69.52
51	State: Western Australia	59,085.59	32,867.25	55.63	69.21
	IBRA Bioregion: Jarrah Forest	19,962.06	7,187.97	36.01	32.26
	IBRA Subregion: Southern Jarrah Forest	19,899.01	7,124.92	35.81	31.66
	LGA: City of Albany	17,586.13	5,751.05	32.70	21.54
978	State: Western Australia	53,230.64	18,855.77	35.42	26.75
	IBRA Bioregion: Jarrah Forest	53,016.57	18,751.03	35.37	26.79
	IBRA Subregion: Southern Jarrah Forest	53,016.57	18,751.03	35.37	26.79
	LGA: City of Albany	52,154.39	18,719.90	35.89	26.94

Conservation significant ecological communities

Desktop searches did not identify any Threatened or Priority Ecological Communities within the Project Site. However one DBCA-listed Priority Ecological Community (PEC), "*Banksia coccinea* Shrubland/ *Eucalyptus staeri*/ Sheoak Open Woodland (ARVS Community type 14a)", was identified within a 5 km buffer of the Project Site (Figure 5-6) (GoWA, 2018).

This PEC has been further delineated in the ARVS mapping and has been previously identified in small populations to the south and west of the Project Site. The closest population is located approximately 800 m from the Project Site on the western side of the railway (Figure 5-6). The ARVS identified that this PEC has less than 30% of its total pre-clearing extent remaining in Western Australia (Sandiford & Barrett, 2010).

This DBCA-listed PEC forms part of the EPBC Act-listed Threatened Ecological Community (TEC) "Proteaceae dominated kwongkan shrublands of the southeast coastal floristic province of Western Australia" (DotE, 2014).

Flora diversity

The EPBC Act Protected Matters Search Tool (PMST) (DEE, 2018) and DBCA *NatureMap* (DBCA, 2018) database searches identified 108 vascular flora species (including subspecies and varieties) that have been previously recorded or have habitat likely to occur within 5 km of the Project Site. This total is comprised of 99 native species and nine introduced and/or naturalised species.

Conservation significant flora

Searches of the EPBC Act PMST (DEE, 2018) and DBCA *NatureMap* (DBCA, 2018) database identified the presence/potential presence of 14 conservation significant flora within 5 km of the Project Site (Table 5-9). The desktop searches recorded:

- Eight EPBC Act and/ or WC Act listed species,
- One Priority 1 species, and
- Five Priority 4 species.

Table 5-9: Flora of conservation significance within the Project Site

Scientific name	Common name	WA status/ rank	EPBC Act status
Banksia brownii	Feather-leaved Banksia	T – CR	EN
Banksia goodii	Good's Banksia	T – VU	VU
Banksia serra	Serrate-leaved Dryandra	P4	-
Caladenia harringtoniae	Harrington's Spider-Orchid	T – VU	VU
Centrolepis caespitosa		P4	-
Chordifex abortivus	Manypeaks Rush	T – VU	EN
Conostylis misera	Grass conostylis	T – VU	EN
Drakaea micrantha	Dward Hammer Orchid	T – EN	VU
Gonocarpus simplex		P4	-
Isopogon uncinatus	Albany cone bush	T – CR	EN
Laxmannia jamesii	James' Paperlily	P4	
Lysinema lasianthum		P4	
Sphenotoma drummondii	Mountain paper heath	T – EN	EN
Synaphea incurva		P1	

Information regarding conservation codes is provided in Appendix F.

Introduced flora

Eight Weeds of National Significance (WoNS) were identified in the desktop assessment as having habitat likely to occur within 5 km of the Project Site (DEE, 2018). These species include:

- *Asparagus asparagoides,*
- *Chrysanthemoides monilifera,*
- *Genista monspessulana,*
- *Lantana camara,*
- *Rubus fruticosus aggregate,*
- *Sagittaria platyphylla,*
- *Salix* spp. except *S. babylonica, S.x calodendron* and *S.x reichardtii , and*
- *Ulex europaeus.*

Potential impacts

Based on the current concept design the AMP project will result in direct loss of native vegetation. The Clearing Impact Area is approximately 2.05 ha and is required for a cross over on Down Road West, multi-use track and public parking areas. However the AMP is largely located within existing cleared areas which are currently used for agricultural purposes (cattle grazing) (Figure 3-1).

The pre-European vegetation association located within the Clearing Impact Area is 978: "*Jarrah, banksia or casuarina, Eucalyptus marginata, Banksia spp Allocasuarina spp."* (GoWA, 2018).

The ARVS mapping (Sandiford and Barrett, 2010) does not map all vegetation within the Clearing Impact Area however the vegetation units previously mapped include the following which are also shown in Figure 5-6:

- Jarrah/ Marri/ Sheoak Laterite Forest, and
- Jarrah/ Sheoak/ *E. staeri* Sandy Woodland.

There will be no clearing of riparian vegetation and there is a 50 m development exclusion buffer surrounding the watercourse as per DWER requirements for motorsports development sites near Conservation Category wetlands (DoW, 2007).

If not appropriately managed, the AMP project could potentially result in a range of indirect impacts on vegetation including:

- Introduction and/or spread of weeds and dieback into adjacent vegetation: given historical clearing and current level of disturbance within the Project Site, this is not likely to be a significant issue.
- Indirect impacts such as dust, surface water/ groundwater contamination (see section 5.1.3) and sedimentation of downstream drainage areas during the construction and operational phases of the AMP.

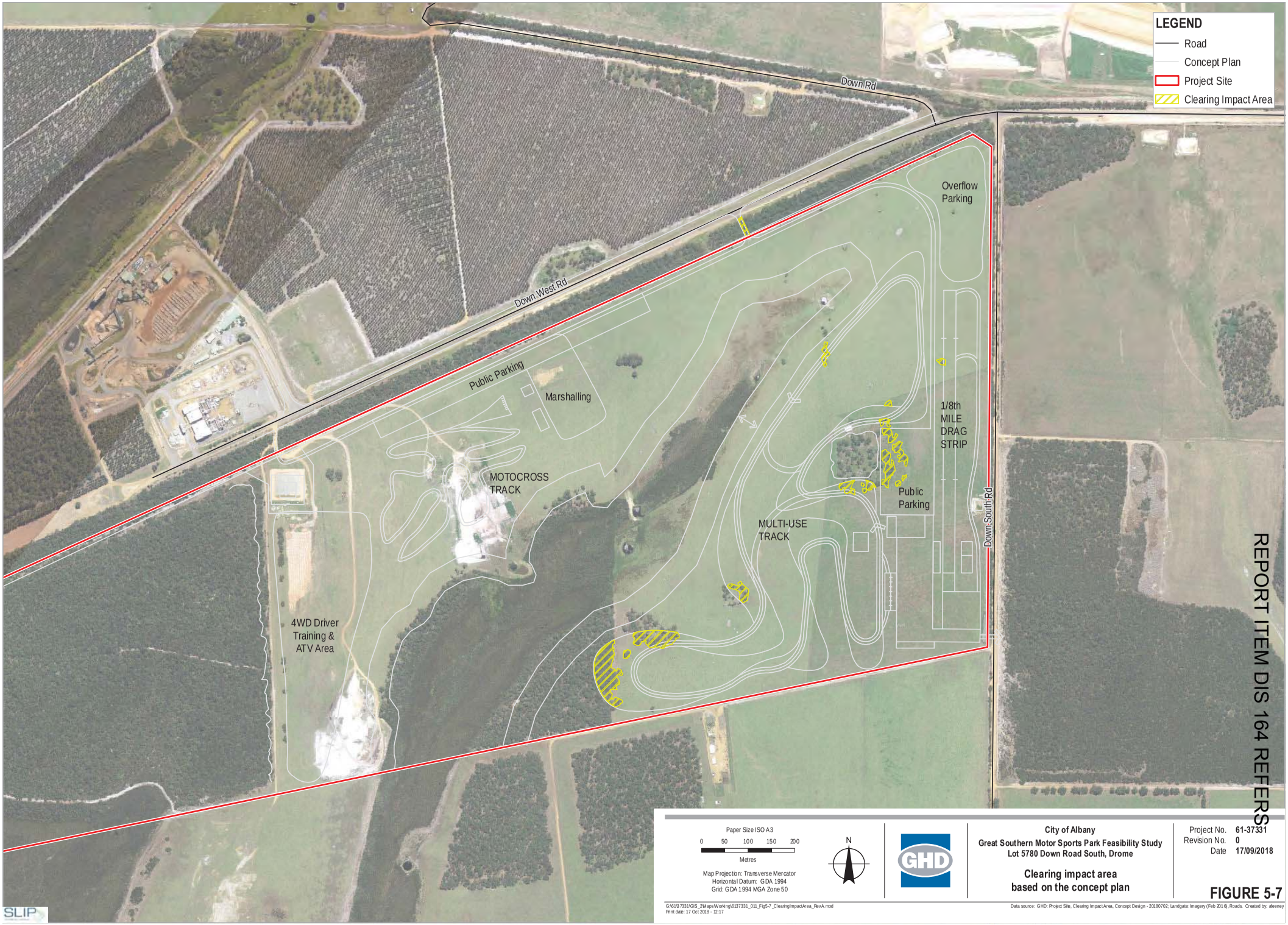
Management

Management will be required during design and construction of the AMP project to minimise both direct and indirect impacts on vegetation. Clearing will be kept to the minimum necessary to safely construct and operate the AMP.

No clearing is proposed for temporary work areas, such as site offices, storage areas or access tracks.

A baseline flora and vegetation survey is recommended to be undertaken prior to commencement of construction works so as to further delineate the vegetation types, species and condition within the Project Site. This will provide baseline information for any future vegetation and flora monitoring within the Project Site.

It is anticipated that the potential impacts to vegetation and flora can be managed through the implementation of a project-specific CEMP and EMP for construction and operational phases of the AMP.


LEGEND
Road
Concept Plan
Project Site
Clearing Impact Area
Down Rd
Down West Rd
Overflow Parking
Public Parking
Marshalling
MOTOCROSS TRACK
1/8th MILE DRAG STRIP
Public Parking
MULTI-USE TRACK
Down South Rd
4WD Driver Training & ATV Area
Paper Size ISO A3
0 50 100 150 200
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50
N
GHD
City of Albany
Great Southern Motor Sports Park Feasibility Study
Lot 5780 Down Road South, Drome
Clearing impact area based on the concept plan
Project No. 61-37331
Revision No. 0
Date 17/09/2018
FIGURE 5-7
G:\61\37331\GIS_2\Maps\Working\637331_011_Fig5-7_ClearingImpactArea_RevA.mxd
Print date: 17 Oct 2018 - 12:17
Data source: GHD: Project Site, Clearing Impact Area, Concept Design - 20180702; Landgate: Imagery (Feb 2016), Roads. Created by: afeeney
SLIP

5.1.6 Fauna

Fauna diversity

Searches of the EPBC Act PMST (DEE 2018) and DBCA *NatureMap* (DBCA 2018) databases identified 92 vertebrate fauna species (excluding marine species) that have previously been recorded within a 5 km buffer of the Project Site. This total is comprised of 80 native species and 12 introduced and/or naturalised species, including 70 birds, 12 mammals, six fish, three amphibians, and one reptile.

Conservation significant fauna

Searches of the EPBC Act PMST (DEE 2018) and DBCA *NatureMap* (DBCA 2018) database identified the presence/potential presence of 22 conservation significant fauna within 5 km of the Project Site (Table 5-10). The desktop searches recorded:

- 15 species listed under the EPBC Act and/or the WC Act,
- Nine migratory birds protected under international agreement (Schedule 5), and
- One DBCA Priority listed species.

Marine and migratory marine species have been excluded from further consideration as the Project Site is entirely terrestrial and not suitable habitat for these species.

Table 5-10: Fauna of conservation significance within the Project Site

Scientific name	Common name	WA status/ rank	EPBC Act rank	Type of presence
Birds				
Actitis hypoleucos	Common Sandpiper	IA	MI	Species or species habitat may occur within area
Botaurus piciloptilus	Australasian Bittern	T – EN	EN	Species or species habitat known to occur within area
Calidris acuminata	Sharp-tailed Sandpiper	IA	MI	Species or species habitat may occur within area
Calidris canutus	Red Knot	IA (& VU at subsp level)	EN & MI	Species or species habitat may occur within area
Calidris ferrunginea	Curlew Sandpiper	T – VU & IA	CR & MI	Species or species habitat may occur within area
Calidris melantos	Pectoral Sandpiper	IA	MI	Species or species habitat may occur within area
Calyptorhynchus banksia naso	Forest Red-tailed Black-Cockatoo	T – VU	VU	Species or species habitat known to occur within area
Calyptorhynchus baudinii	Baudin's Cockatoo	T – EN	EN	Breeding likely to occur within area
Calyptorhynchus latirostris	Carnaby's Cockatoo	T – EN	EN	Breeding likely to occur within area A flock of approximately 15 birds were observed during the site visit in the watercourse.
Cereopsis novaehollandiae subsp. *Grisea*	Cape Barren Goose (south-western)	T – VU	VU	Species or species habitat may occur within area

Scientific name	Common name	WA status/ rank	EPBC Act rank	Type of presence
Dasyornis longirostris	Western Bristlebird	T – VU	EN	Species or species habitat known to occur within area
Motacilla cinerea	Grey wagtail	IA	MI	Species or species habitat may occur within area
Numenius madagascariensis	Eastern Curlew	T – VU & IA	CR & MI	Species or species habitat may occur within area
Pandion haliaetus	Osprey	IA	MI	Species or species habitat may occur within area
Tringa nebularia	Common Greenshank	IA	MI	Species or species habitat likely to occur within area
Mammals				
Dasyurus geoffroii	Chuditch	T – VU	VU	Species or species habitat likely to occur within area
Isoodon obesulus fusciventer	Quenda, south-western brown bandicoot	P4	-	-
Parantechinus apicalis	Dibbler	T – EN	EN	Species or species habitat likely to occur within area
Pseudocheirus occidentalis	Western Ringtail possum	T – CR	CR	Species or species habitat known to occur within area
Fish				
Galaxiella munda	Mud Minnow	T – VU	-	-
Galaxiella nigrostriata	Black-stripe Minnow	T – EN	EN	-
Nannatherina balstoni	Balston's pygmy perch	T – VU	VU	Species or species habitat likely to occur within area
Invertebrates				
Westralunio carteri	Carter's Freshwater Mussel		VU	Species or species habitat may occur within area

Information regarding conservation codes is provided in Appendix F.

Introduced fauna

Twelve introduced species were identified in the desktop searches with species or species habitat likely to occur within a 5 km radius of the Project Site. These species include:

- *Anas platyrhynchos* (Mallard),
- *Columba livia* (Domestic pigeon),
- *Streptopelia senegalensis* (Laughing Turtle-dove),
- *Sturnus vulgaris* (Common Starling),
- *Canis lupus* (Dog),
- *Felis catus* (Cat),
- Feral Deer,
- *Mus musculus* (House mouse),

- *Oryctolagus cuniculus* (European Rabbit),
- *Rattus rattus* (Black Rat),
- *Sus scrofa* (Pig), and
- *Vulpes vulpes* (Fox).

Potential impacts

The potential impacts to fauna as a consequence of developing the AMP project are:

- Habitat loss – Based on the concept design the AMP project will result in the loss of approximately 2.05 ha of native vegetation of varying condition.

  The fauna habitat that may be impacted by the construction of the project includes:

  – Up to 2.05 ha of potential breeding, foraging and roosting habitat for Black Cockatoos.

  – There is also approximately 170 ha of fauna habitat that is considered highly modified, of low habitat value (cleared paddocks) that will be impacted by the AMP project. This habitat may be used opportunistically by fauna.

- Landscape fragmentation – the AMP is unlikely to have a significant impact on any important local or regional linkages.
- Injury and mortality – The detrimental impacts of roads on wildlife has been documented in Australia and abroad. Native fauna may be susceptible to injury/death during the construction and operational phases of the AMP project (e.g. habitat clearance).
- Secondary impact from dust, light, noise and vibration during construction and operation the Project Site. As activities undertaken during the operation of the Project Site will be intermittent it is considered that this will temporarily scare fauna away from the Project Site but is considered unlikely to have a permanent impact on fauna.

Management

Management will be required during design and construction of the AMP project to minimise both direct and indirect impacts on fauna habitat. Clearing will be kept to the minimum necessary to safely construct and operate the AMP.

A fauna survey including a targeted assessment for Black Cockatoo species is recommended to be undertaken prior to commencement of construction works. This will provide baseline information for any future fauna monitoring within the Project Site.

It is anticipated that the potential impacts to fauna habitat can be managed through the implementation of a project-specific CEMP and EMP for construction and operational phases of the AMP project.

5.1.7 Dieback

Phytophthora cinnamomi threatens over 2,300 different plant species in Western Australia. Once the pathogen infects the roots, the plant may begin to show symptoms of ‘dying back’, hence the common name used for the pathogen: Dieback. Dieback has a widespread but discontinuous range in areas with an annual rainfall above 400 mm (Dieback Working Group, 2016).

No site-specific dieback assessments or detailed mapping has been undertaken of the Project Site to date. However, given the level of previous disturbance it is expected that much of the Project Site will be considered dieback infested and/ or un-interpretable.

Potential impacts

The AMP project has the potential to spread dieback into adjacent and nearby areas of native vegetation during construction.

Management

Dieback will need to be managed through a project-specific CEMP.

5.1.8 Aboriginal heritage

A search of the Aboriginal Heritage Inquiry System found that there are no Registered Sites of Aboriginal heritage significance within the Project Site or within a 5 km buffer of the Project Site. There are also no sites lodged as 'Other Heritage Places' which intersect the Project Site, however three 'Other Heritage Places' are located within 5 km of the Project Site (Appendix G).

The search of the Aboriginal Heritage Inquiry System provided the following information regarding Indigenous Land Use Agreements in the South West:

> *"On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boojarah #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).*
>
> *The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will 'impact' (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site"* (DPLH, 2018).

Potential impacts

The AMP project does not impact upon any Registered sites of Aboriginal heritage significance. However, as part of these Feasibility Study investigations, the City of Albany has liaised with the Department of Aboriginal Affairs and advised Wagyl Kaip and Southern Noongar Group of the AMP proposal. Comments on the proposal have been invited.

At this stage, no further Aboriginal heritage investigations are seen to be necessary, pending feedback from Wagyl Kaip and Southern Noongar groups.

Due to the extent of earthworks required to complete the AMP project, there is low potential for sub-surface materials to be uncovered.

5.1.9 Heritage (non-indigenous)

A search of the EPBC Protected Matters Search Tool did not identify any Commonwealth listed heritage sites within, or within a 5 km buffer of the Project Site.

A search of the Western Australian State Heritage Office Inherit database did not identify any State Registered Places within the Project Site (DPLH, 2018). The closest known site of heritage significance (Albany Airfield and 'Sigint' Radar System Place No 15574) was identified approximately 4.5 km from the Project Site (Appendix G).

Potential impacts

No non-Indigenous heritage sites are considered likely to be impacted by the AMP project. As a result, no impacts were identified or recommendations warranted for this project factor.

5.1.10 Contamination

A review of the DWER Contaminated Sites Database undertaken in August 2018 indicates there are no sites currently classified under the *Contaminated Sites Act 2003*, within 5 km of the Project Site (including the Project Site itself) (DWER, 2018).

Potentially contaminating activities undertaken within the Project Site, as observed during the site walkover, include the following:

- A portion of the Project Site is currently leased by Plantation Energy for the purpose of a retention dam however it is understood that no water is discharged from this dam onto the Project Site (Plate 5-6),
- Storage/ dumping of materials was noted during the site visit; this includes used chemical drums and equipment (Plate 5-7 and Plate 5-8),
- Stockpiling of wood chips (Plate 5-9),
- Dumping of waste materials such as building rubble and possibly a risk of asbestos containing materials in previously excavated areas within the Project Site (Plate 5-10 and Plate 5-11).



Plate 5-6 Retention dam with area leased by Plantation Energy on the northern boundary.



Plate 5-7 Dumping of materials with the Project Site to the south of the retention dam.



Plate 5-8 Dumping of materials with the Project Site to the south of the retention dam.



Plate 5-9 Wood chip stockpiles to the south of the retention dam.



Plate 5-10 Sand excavation undertaken through the central part of the Project Site.



Plate 5-11 Dumping of waste materials (building rubble) within previously excavated areas.

There are also a number of industries in the surrounding area which may undertake potentially contaminating activities/ land uses as summarised in Table 5-11.

Table 5-11: Potentially contaminating land uses/ activities within 5 km of the Project Site

Industry	Distance from Project Site	Potential contaminating activities and associated potential contaminants of concern (DER, 2014)
Railway	Located immediately adjacent to the west of the Project Site (approx. 50 m)	Railway yards/marshalling yards and transport corridors: • Petroleum hydrocarbons • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylenes) • Phenolics (creosote) • Metals (e.g. arsenic, cadmium, chromium, iron, lead, zinc) Nutrients (e.g. nitrates, ammonia) • Carbamates • Organochlorine pesticides (e.g. pentachlorophenol) Organophosphates pesticides • Herbicides Asbestos • Additional contaminants according to what has been transported by rail
Plantation Energy and APEC	Plantation Energy is approx. 80 m and APEC is approx. 240 m to the north of the Project Site	Timber preserving/storage/saw mills wood product manufacturing: • Solvents (e.g. trichloroethene) • Polycyclic aromatic hydrocarbons (e.g. creosote, naphthalene) Organochlorine pesticides (e.g. chlordane, endosulfan, pentachlorophenol) • Aldrin and dieldrin • Metals (e.g. arsenic, copper, chromium VI, zinc) Boron • Ammonia Cresols

Industry	Distance from Project Site	Potential contaminating activities and associated potential contaminants of concern (DER, 2014)
United Farmers fertiliser	Approx. 3.0 km to the north-east of the Project Site	Fertiliser manufacture or storage: • Calcium phosphate, calcium sulfate, nitrates, ammonium sulfate, carbonates, potassium, copper, chloride, sulfur, sulfuric acid, nitrates, ammonia • Pentachlorophenol • Metals (e.g. boron, cadmium, cobalt, copper, magnesium, molybdenum, potassium, selenium, zinc)
Water Corporation wastewater irrigation tree farm	Approx. 2.4 km to the east of the Project Site	Biosolids application, organic fertiliser application: • Nutrients (e.g. nitrogen, phosphorus) • Metals (aluminium, arsenic, cadmium, chromium, cobalt, lead, nickel, potassium, zinc) • Phenols • Pathogens (e.g. *E. coli*, Enterococci)
Mount Romance Sandalwood Factory	Approx. 3.4 km to the north east of the Project Site	Production of sandalwood oil: • Distillation process • Water recycling facility • Biomass boiler (renewable energy)

Potential impacts

The Project Site largely traverses farmland and remnant vegetation. However based on a visual assessment of the Project Site it is evident that there has been previous stockpiling and dumping of materials predominantly confined to the north-west area of the Project Site.

It is the responsibility of the current Lessees to remove/ clean up materials stockpiled, stored or dumped within the Project Site prior to sale of the Site under the *Contaminated Sites Act 2003*. It is unknown if there has been any previous burial of waste materials within the Project Site.

Plantation Energy also currently lease a portion of the Project Site which is anticipated to continue if the AMP project goes ahead.

Project construction and ongoing operation may result in minor, localised contamination from the use and storage of hazardous substances.

Management

Prior to sale of the Project Site the existing dumped materials located within the Project Site will be removed by the Lessees and/ or previous owners.

In particular, it is recommended that any cement sheeting building materials (or other suspected materials) dumped onsite are sampled for asbestos identification by a NATA accredited laboratory. All waste materials on site will need to be managed in accordance with the *Landfill Waste Classification and Waste Definitions* (DWER, 2018) prior to removal offsite.

It is recommended that following removal of waste materials from the Project Site, the clean-up is confirmed via visual assessment of exposed soils (i.e. green waste removed during the clean-up) and sampling of soils to determine whether there are any residual contamination impacts (DER, 2014). If any contamination is identified during this process, it is recommended that further investigation and management is undertaken as per DWER guidelines for *Assessment*

and Management of Contaminated Sites (DER, 2014). If deemed warranted, this should also be reported to the DWER through a Form 1 submission as a suspected contaminated site.

Materials used within the Project Site will be handled, used and disposed of in accordance with their Materials Safety Data Sheet (MSDS) during the construction and operational phases of the AMP project. Any contamination identified during project works should be managed in accordance with a project-specific CEMP and if required reported to DWER Contaminated Site Branch under the *Contaminated Sites Act 2003*.

Furthermore, any pollution generating activities such as refuelling or storage of chemicals during construction works and ongoing site operation should also be managed in accordance with a project-specific CEMP and EMP for construction and operational phases of the AMP project.

Unexpected finds during the construction phase should be managed in accordance with the Unexpected Finds Protocol in the CEMP.

5.1.11 Construction and operational phase potential impacts

A range of impacts requiring consideration and management during the AMP project's construction and operational phases are predicted or possible. These include:

- Dust emissions,
- Noise and vibration,
- Visual amenity,
- Fire, and
- Pollution through the use of fuels, chemicals or from general construction litter (or unexpected finds).

The Project Site is located in an area which is zoned as "*Priority Agriculture*" and "*General Agriculture*" and is located within an Industrial Buffer Area surrounding the *General Industry* timber processing precinct to the north of Down Road West (refer section 2.4). The closest sensitive receptor is a residential dwelling approximately 1.4 km from the Project Site (refer section 9.2).

These impacts have the potential to be management issues during both the construction and operational phases of the AMP project. Management of these issues should be clearly defined through the preparation and implementation of a project-specific CEMP and EMP for construction and operational phases of the AMP project.

Dust emissions

Dust is likely to result from construction and materials cartage and storage operations, with impacts expected to be localised to the Project Site.

Dust lift may result from construction activities, particularly during summer. Dust emissions may result from traffic movement, vegetation clearing, earth moving, operation of vehicles and plant equipment, excavation and stockpiled materials. These are typically localised, short term impacts during construction.

Noise and vibration

It is expected there will be elevated noise and vibration during construction activities, from earth works, vehicle and machinery movement. However it is considered that noise and vibration during construction activities would be similar to those undertaken by the nearby APEC and Plantation Energy during their operational activities using heavy vehicles and wood processing machinery.

The construction phase of the AMP project will be temporary and is regulated under the *Environmental Protection (Noise) Regulations 1997*, which under Regulation 13, provide an exemption from compliance with the requirements of Regulation 7, for noise emitted from construction works on a construction site. Construction noise is managed by limiting working hours and the implementation of a CEMP for works outside of normal working hours.

Noise and vibration will be generated during the operational phase of the AMP and have been considered in Section 9 addressing a Preliminary Noise Assessment and Management Plan.

Visual amenity

The existing amenity of the Project Site includes remnant vegetation, agricultural areas, existing roads and railways and previously cleared areas.

Construction and operation of the AMP has the potential to impact on the amenity of the local area as a consequence of vegetation clearing, machinery movements, traffic noise exposure, light spill from street lighting and traffic, changes to the local road systems and some property access, and visibility of the AMP.

Residual amenity impacts are expected to be permanent, however the nearest residence is 1.4 km from the Project Site. Native vegetation present on the east, west and north of the Project Site also provides an existing visual barrier on these sides. To the south lies agricultural land.

Management of these issues should be clearly defined through the preparation and implementation of a CEMP and EMP. Operational impacts will be considered during the detailed design phase and may include additional landscaping, if required.

Fire ignition

Fire can pose a threat to human life, property and livestock as well as flora and fauna. The vegetation adjacent to the Project Site is considered to be susceptible to fire. The CEMP should give consideration to fire risk activities and preventative measures.

A Bushfire Management Plan (BMP) is also to be developed in accordance with AS 3959 and the *Guidelines for Planning in Bushfire Prone Areas* (WAPC, 2017) as per section 4.3.

Waste, litter and hazardous materials

There is a risk that the construction works will create temporary or localised pollution/ contamination as a result of fuel or chemical spills or mismanagement of construction materials. Construction works are likely to generate general waste and construction wastes. Poor management of waste materials may lead to litter or contamination of the Project Site and surrounds. This in turn may impact on the aesthetics of the area (e.g. visual amenity) and the health of terrestrial ecosystems.

Hazardous materials, including hydrocarbons, will be used during construction and operation of the Project Site. Spills and discharges of these hazardous materials may result in small scale contamination of soil, or may result in contamination of adjacent land. Consequently, hazardous materials will require management during construction. This should be managed through the following general actions:

- Any bulk fuel and oil stores should be bunded and managed in accordance with relevant Australian Standards, and
- All litter and construction waste should be contained in lidded bins and removed regularly to an approved waste facility.

5.2 Commonwealth aspects and impacts

Matters of National Environmental Significance (MNES) are factors that require legislated protection in order to conserve biodiversity, protect World Heritage and National Heritage Places, and comply with international treaties. An assessment, based on the findings of the desktop searches (DEE, 2018) and site visit, was undertaken to determine whether the AMP project will impact upon MNES and require referral to the Commonwealth (Table 5-12).

Table 5-12: Assessment of the Project Site against Matters of National Environmental Significance

MNES	Present	Impact and justification
World Heritage Properties	No	None
National Heritage Properties	No	None
Wetlands of International Significance	No	None
Listed Threatened Ecological Communities (TEC)	No Commonwealth or State listed TECs were identified within Project Site. The closest TEC is located approximately 800 m to the west of the Project Site. The ARVS mapping did not identify this TEC within the Project Site.	None
Listed Threatened Species	**Fauna** The following EPBC Act listed threatened fauna species and their habitats are 'Known to occur' and 'Breeding likely to occur' within the Project Site: Birds • Australasian Bittern (*Botaurus poiciloptilus*) (Endangered) • Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) (Endangered) • Carnaby's Cockatoo (*Caluptorhynchus latirostris*) (Endangered) • Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable)	The Clearing Impact Area is approximately 2.05 ha and, based on the ARVS mapping (Sandiford and Barrett, 2010) and site visit the vegetation types are considered to be suitable Black Cockatoo habitat.
	Mammals • Western Ringtail Possum (*Pseudocheirus occidentalis*) (Critically Endangered) An additional nine EPBC Act listed threatened fauna species were identified as 'Likely to occur' or 'May occur' within the Project Site.	Based on the ARVS mapping (Sandiford and Barrett, 2010) it is considered that the vegetation type within the Clearing Impact Area is unlikely to be core habitat for Australasian Bittern and Western Ringtail Possum.

MNES	Present	Impact and justification
	Flora One EPBC Act threatened flora was identified as species or species habitat is known to occur within the Project Site: • Brown's Banksia (*Banksia brownii*) (Endangered) Seven EPBC Act listed threatened flora species are 'Likely to occur' or 'May occur' within the Project Site.	Conservation significant flora may occur in areas of remnant vegetation, which should be confirmed as part of a baseline spring flora and vegetation survey.
Listed Migratory Species (excluding marine species)	There are no listed migratory terrestrial or wetlands species known to occur within the Project Site. Nine conservation significant species were identified as 'Likely to occur' or 'May occur' within the Project Site.	These species may pass through the Project Site, on an opportunistic basis (for resting/ foraging), but loss of the vegetation is considered unlikely to have a significant impact on available local or regional habitat.
Great Barrier Reef Marine Park	No	None
Commonwealth Marine Areas	No	None

The key MNES identified from the desktop searches and site visit relates to the clearing of approximately 2 ha of potential foraging habitat for Black Cockatoos. The relevant DEE guidance statement (SEWPaC, 2012) suggests 1 ha of clearing as a guide for high risk of referral for Federal assessment. However, it is likely that if the AMP proposal was referred to the DEE for assessment, the likely outcome would be 'not a controlled action'.

5.3 Summary of the assessment

This section provides an assessment of the impacts to the factors as described in section 5.1 as a result of construction and operation of the AMP project.

It is recommended a project-specific CEMP and EMP is prepared prior to construction of the AMP project and ongoing environmental management during operation of the AMP. The CEMP will address the environmental requirements for the construction works and include all regulatory environmental conditions that are required to be met.

An assessment of the potential impacts identified in section 5.1 was undertaken, considering likely duration and magnitude and the residual impact post mitigation. The following categories were applied:

- Low Risk Impacts: those considered to be temporary and/or not significantly different to existing site conditions and that can be appropriately managed to prevent long term environmental impacts. These impacts are unlikely to need to be offset.
- Medium Risk Impacts: those aspects that have the potential to have significant environmental impacts should management measures not be sufficient. Depending on the level of mitigation and management, these impacts may require offsets.
- High Risk Impacts: those aspects that result in a significant impact to the environment that cannot be mitigated. These impacts may still be acceptable, but will most likely require an offset for residual environmental impacts.

As shown in Table 5-13, many of the aspects assessed are considered to be minor risks once management is applied.

Table 5-13: Environmental impact risk assessment

Aspect	Discussion
Low risk impacts	
Physical environment (landform, soils, ASS)	These aspects are considered to be temporary and/or will not be substantially different from existing site conditions. It is expected that they can be appropriately managed through the preparation and implementation of a project-specific CEMP and EMP for construction and operational phases of the AMP.
Land use	
Conservation reserves and ESAs	
Dieback	
Weeds	
Aboriginal heritage	
Heritage (non-indigenous)	
Contamination	
Dust	
Noise and vibration	
Pollution	
Medium risk impacts	
Surface water and drainage	The project is likely impact to surface water flow and groundwater. Design and implement a drainage strategy to maintain existing surface water flows. Requires management during construction and operational phases through a Water Management Plan (Section 8).
Groundwater	
Wetlands	The Conservation Category waterway requires a 50 m development exclusion buffer which will be refined during the detailed design phase.
Visual amenity	The AMP will permanently alter the amenity of the Project Site. Requires management during construction and operational phases.
Fire	A Bushfire Management Plan will be required to be developed and implemented as per WAPC (2017) guidelines including the provision of a strategic precinct-wide secondary access.
High risk impacts	
Vegetation	The AMP will result in the permanent loss of approximately 2.05 ha of native vegetation.
Fauna	The AMP will result in the permanent loss of native vegetation that provides fauna habitat, potentially including habitat for the conservation significant Black Cockatoos and other species as discussed in Section 5.1.6 Fauna.

6. Geotechnical assessment

6.1 Ground and groundwater conditions

6.1.1 Regional geology

Reference to the 1:50,000 Environmental Geology series map (Albany sheet) and the 1:250,000 Geological Series map (Mt Barker – Albany sheet) indicates the Project Site is underlain by Cainozoic sand of colluvial origin – "*Qc: Colluvium – Sand, silt and clay"* on the slopes and within the low lying areas of the Marbelup Brook "*QA – Clay, silt, sand and gravel in watercourses*" (Allen & Sofoulis, 1984).

The sand is described as pale grey, fine to coarse, angular to sub-rounded quartz that is loose and moderately sorted and contains occasional pebbles of laterite. The thickness of the sand unit is not indicated on the maps, however the 1:250,000 map sheet indicates sand unit generally overlays laterite.

The local geology is further delineated by DPIRD Soil Landscape Mapping identified in Table 5-4 and illustrated in Figure 5-1.

6.1.2 Available information

GHD – 2014/15

GHD was appointed by CBH to carry out a site investigation for the new Mirambeena grain handling facility on Down Road, to the north-east of the Project Site.

The CBH site investigation comprised four boreholes, 27 test pits and a number of Dynamic Cone Penetrometer tests. The ground conditions observed at the CBH site are summarised in Table 6-1.

Table 6-1: Generalised subsurface profile at CBH Mirambeena site

Layer / unit	Typical depth to top of layer (m)	Typical layer thickness (m)	Description / remarks
Silty sand (topsoil)	0.0 (ground surface)	0.1	Loose to medium dense, grey / dark grey, fine grained with rootlets
Sand	0.1	0.2 to 0.5	Loose to medium dense, pale grey / brown, fine grained with occasional lateritic gravel
Gravel / clayey gravel	0.1 to 0.8	0.25 to 0.6	Dense to very dense, orange / brown, fine to coarse grained, clay of low to medium plasticity, locally weakly to moderately iron cemented
Sandy clay (locally clayey sand	0.5 to 1.0	> 6.0	Sandy clay: Stiff to very stiff, orange, mottled white / red, low to high plasticity, fine grained sand. Clayey sand: Medium dense, orange, mottled white / red, fine to medium grained, low plasticity

Geotechnical laboratory tests completed on samples recovered from the CBH site indicate the units described above have the range of geotechnical properties indicated in Table 6-2.

Table 6-2: Summary of soil properties at CBH Mirambeena site

Unit	Group symbol	Particle size distribution			Plasticity		CBR (%)
		% Fines	% Sand	% Gravel	LL (%)	LS (%)	
Sand / gravel	SP/GP	3 - 14	17 - 84	63 - 78	NP	-	15 - 35
Clayey sand / gravel	SC/GC	12 - 37	24 - 63	0 - 62	22 - 23	1.5 – 2.5	8
Sandy clay / clayey sand	CI/CH	58 - 80	18 - 42	1 - 2	47 - 58	9 - 11	2

Legend: LL = liquid limit LS = linear shrinkage NP = non-plastic
SP/GP = Poorly graded sand/gravel SC/GC = Clayey sand/gravel
CI/CH = Medium to high plasticity clay

Bio Diverse Solutions – 2018

Bio Diverse Solutions Pty Ltd were appointed by the Great Southern Motorplex Group (GSMG) to install 12 shallow monitoring bores within the site at the locations shown in Figure 7-1. The soil profiles noted in Bio Diverse Solutions' letter to GSMG are generally similar to those described in Table 6-1, except the presence of a patchy layer of cemented laterite approximately 500 mm thick, found at a depth of between 0.5 m and 1.2 m of the ground surface.

6.1.3 Groundwater

GHD's investigation on the nearby CBH site intersected groundwater in only one pit at a depth of 2.4 m. Drilling at the site was completed using drilling muds which precluded the observation of groundwater levels.

Monitoring data provided in the Bio Diverse Solutions letter indicates groundwater is present in the boreholes drilled in the lower lying areas, close to the watercourse which bisects the site. When intersected the groundwater was generally observed to be between 0.0 m and 1.0 m below the existing surface. Further discussion is provided in section 7.2.

6.2 Geotechnical assessment

6.2.1 Proposed development

Site facilities

While no details are provided, it has been assumed that the buildings at the Project Site will be single storey, relatively light masonry or steel clad/frame structures and likely to be founded on shallow footings. Significant areas of road pavement will be required for the development, ranging from car park areas to heavier pavements expected to be required for the multi-use track.

Site earthworks

Contour information available for the Project Site indicates that some cut to fill earthworks will be required. Differences in elevation in the order of 5 – 10 m are present in the south-east of the site where the drag strip, the multi-use track and their related infrastructure are proposed to be built.

Differences in elevation are greater in the north-western part of the site, however the land uses in this part of the site (4WD area and motocross track) mean that minimal earthworks are likely to be required to develop these areas for their intended use.

6.2.2 Excavations

Excavation conditions

The soils at the Project Site comprise an upper layer of generally granular material (sands and gravels) overlying a variably cemented layer of laterite, which in turn overlays generally sandy clay and clayey sand soils to depth.

Excavations within these materials are expected to be within the operating capacity of typical mechanical excavators (nominally 20 tonnes or greater). The majority of the laterite on the site is expected to be excavatable using hydraulic excavators, but may require local ripping or the use of a rock breaker to speed up the rate of excavation.

Re-use of excavated materials

The surficial topsoil layer and other soils containing significant quantities of organic matter should not be re-used as fill material, and should be removed and stockpiled for future landscaping purposes.

Materials excavated from the top 1 m to 2 m during earthworks of the elevated areas of the site are expected to comprise predominantly granular soils such as sand (particularly on the north-western side) and mixes of sand and gravel. These granular soils are considered suitable for re-use as engineered fill provided they are clean, and free of debris, deleterious and oversized (i.e. greater than 100 mm diameter) particles. The gravel soils should be reserved, where possible for use in pavement construction.

The clayey soils at the Project Site are sensitive to variations in moisture content which could result in handling and compaction difficulties if the materials become too wet and shrink / swell behavior with seasonal changes in moisture content. Excavations and stockpiles should be managed to ensure water does not infiltrate the clayey soils. If the clayey soils are re-used as engineered fill, the designer must consider the effects of surface movements due to the shrink / swell potential. To reduce these effects, the clayey soils should be allocated to the base of any fills and kept away from the pavement layers or the bottom of foundations. Alternatively foundations should be designed to tolerate the additional movement.

6.2.3 Site classification in accordance with AS 2870

The Project Site was assessed in accordance with *AS 2870-2011: Residential slabs and footings*. The assessment takes into account the differences in the site geology and potential earthworks on the site, both of which will impact the site classification.

AS 2870-2011 assigns a classification to a site based on the expected characteristic surface movement (Y_s) caused by the shrink / swell behaviour of reactive clayey soils. Y_s is impacted by:

- The plasticity of the soil – the more plastic the soil, the more it reacts to changes in moisture content and the worse the site class;
- The climate of the site – the rainfall and temperatures experienced at a site impact the depth to which soils will experience moisture changes. The greater the depth of soil (for a given plasticity) that is impacted by moisture change, the greater the Y_s and the worse the site class; and

- The amount of non-reactive soil (i.e. sand or gravel) overlying the clayey soils – sand or gravel above a clay layer reduces the depth of clay impacted by moisture change and therefore improves the site class.

For this site four scenarios have been considered. These scenarios allow for variations in the natural thickness of the granular materials above the clays and changes that will occur due to cut to fill earthworks.

- Case 1: Construction on predominantly inert, granular soils (natural or engineered fill) overlying the natural clayey soils at a depth of 1.5 m or greater,
- Case 2: Construction on predominantly inert, granular soils (natural / engineered fill) overlying the natural clayey soils at a depth of 1.0 m,
- Case 3: Construction on predominantly inert, granular soils (natural / engineered fill) overlying the natural clayey soils at a depth of 0.5 m, and
- Case 4: Construction immediately on clayey soils exposed during cut excavation or on clayey soils re-used as engineered fill.

In accordance with Table 2.5 of AS 2870-2011, the depth of design change (Hs) is taken as 1.5 m, corresponding to a Climatic Zone of 1 (wet coastal). A weight Atterberg Limit value has been used to assess the soil plasticity. The expected site classification for each of the four scenarios is summarised in Table 6-3.

Table 6-3: Site classification in accordance with AS 2870-2011

Case	Thickness of granular soils overlying clayey soils (m)	Site classification
Case 1	> 1.5	A
Case 2	1.0	S
Case 3	0.5	M
Case 4	0	M – H

6.2.4 Anticipated foundation conditions

Footings at the Project Site are expected to comprise lightly loaded, pad or strip reinforced concrete footings. The foundation subgrade will be dependent on the location of the structure and the proposed depth of cut/fill earthworks and could comprise sand/gravel or sandy clay.

Both foundation subgrades are suitable for footings, however the foundations proposed for clayey subgrade conditions will require a greater embedment depth and greater reinforcement in order to resist the shrink/swell movements of the clays. The alternative is to place granular fill to a depth of 1 m – 1.5 m below all structures. AS 2870-2011 should be consulted for guidance on suitable footing depths and reinforcement options for each site classification.

Footing widths ranging from 0.5 to 1.0 m have been considered, with a typical minimum embedding depth of 0.3 m below the final formation level for footings on granular soils and 0.6 m for clayey subgrades.

For the range of footing dimensions considered, a maximum allowable bearing pressure of 100 kPa is expected to be appropriate for the site, based on a minimum factor of safety of 3 against bearing capacity failure and a typical settlement tolerance of 20 mm.

Differential settlements under the recommended maximum bearing pressure would generally be anticipated to be less than 10 – 15 mm. A higher bearing capacity may be applicable following site specific investigations.

6.2.5 Pavement design consideration

Testing on the nearby CBH site indicates the following soaked CBR values for the various material types found on the Project Site may be appropriate for use in preliminary concept design. The values will require confirmation once site specific investigations are complete.

Table 6-4: Preliminary CBR values

Unit	Group symbol	CBR (%)
Sand / gravel	SP/GP	15/35
Clayey sand / gravel	SC/GC	8
Sandy clay / clayey sand	CI/CH	2

6.3 Potentially adverse geotechnical conditions

The Project Site is generally suitable for its intended use. No significant adverse geotechnical conditions are anticipated, however the following issues should be taken into account during design and construction:

- The site contains reactive clay soils which are likely to become more of a factor when the cut to fill earthworks are completed. Footings and pavements at the site must be designed to accommodate the lower bearing capacity/CBR and higher shrink/swell movements expected from these materials.
- The clayey soils on this site will become difficult to handle and compact if water is allowed to enter them. Appropriate drainage of excavations and filled surfaces is required to prevent this during construction.
- A perched water table may briefly develop in the upper layer of granular soils on this site following heavy rainfall. Excavations completed while the perched water table is present may require dewatering and are likely to be unstable if cut too steeply or if they are subject to significant groundwater inflows.
- Excavations at the site should be avoided following periods of high rainfall and no person should enter an excavation if groundwater is flowing into it.

6.4 Recommendations for further site investigations

Site specific investigations are required for the Project Site to confirm the geotechnical, ASS and groundwater conditions. GHD envisages these investigations would comprise a program of test pitting, supplemented by boreholes in areas where significant cuts are anticipated, where heavily loaded structures are proposed and where future drainage basins are proposed. A program of selective soil sampling and laboratory testing of the materials to confirm their ASS risk, and suitability for re-use as fill and founding soils is also recommended. A more definitive scope of work can be devised once the site layout and details of the structures are confirmed.

7. Hydrology and hydrogeology assessment

7.1 Site assessment

As previously highlighted in section 5.1.3 the site is located within the Marbelup Brook catchment on an unnamed upper gully/creek line which traverses the site from north-east to south-west. A summary of regional site geology and geotechnical conditions is detailed in section 6.1. A site visit was undertaken on 3 July 2018 by a GHD environmental scientist and engineer to observe and where possible verify any site specific features, natural or man-made, that might affect the overall understanding and conceptualisation of the site hydrology and hydrogeological conditions.

Further desktop review of available data was undertaken, which included:

- Site survey and AMP conceptual layout,
- Groundwater well data (DWER Water Information Reporting (WIN) database),
- Groundwater sampling by Biodiverse Solutions on 27 February and 4 September 2018,
- Aerial photography and topographical data, and
- Available hydrogeological information from adjacent sites.

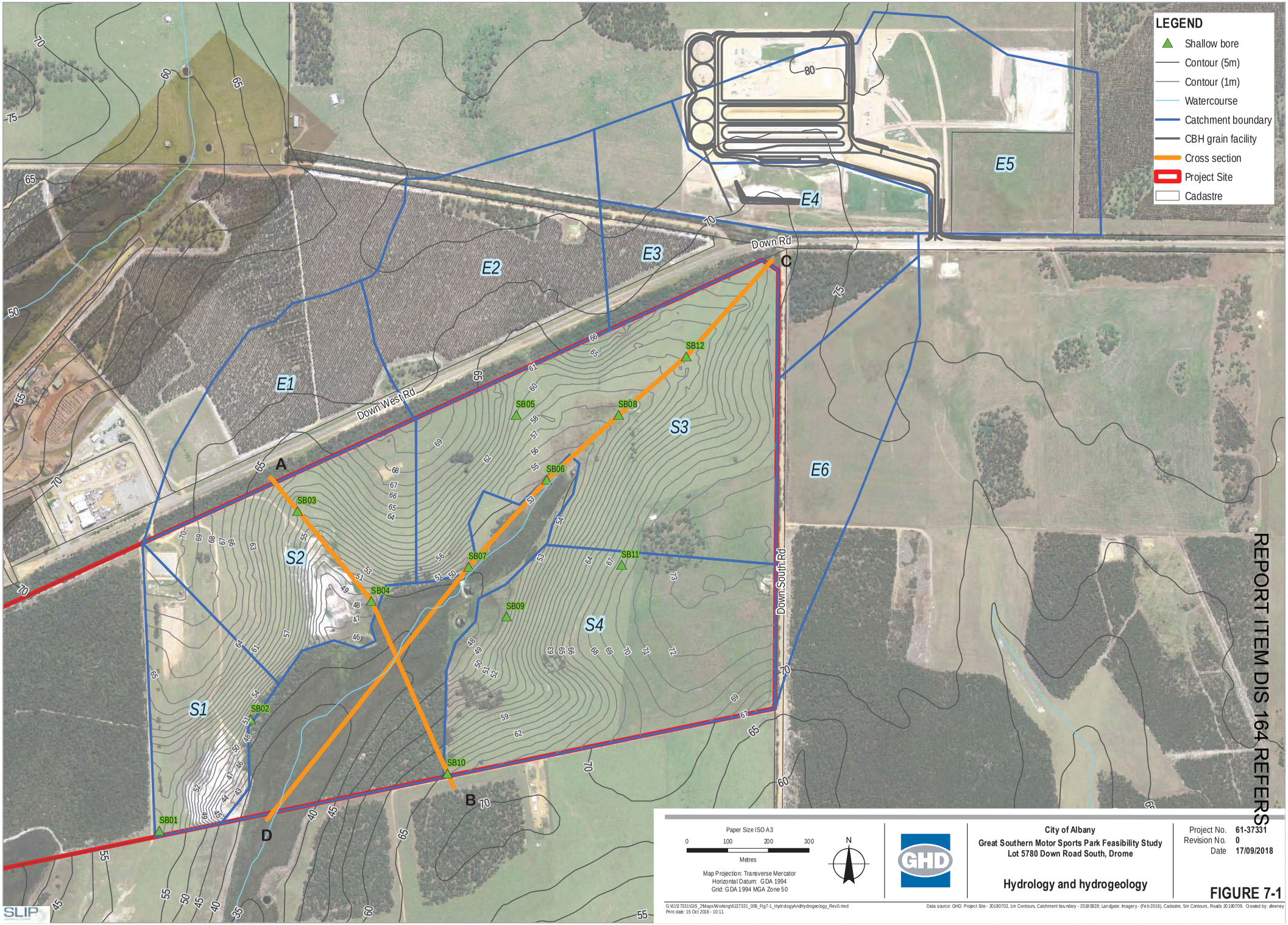
The site has existing features such as dams and quarries that need to be considered during development, some of which may offer potential flow and treatment opportunities from a stormwater management perspective. Preliminary drainage catchments have been delineated for the site and are shown in Figure 7-1. Lot 5780 has an area of 192.34 ha, with the estimated area being considered for development comprising of approximately 143 ha. There is a significant upstream catchment, of approximately 132 hectares, to the north and east. It is believed that these areas drain into the site via culverts along Down Road and Down Road West, particularly in larger storm events. Upstream land uses include agriculture and industrial sites with both woodlots and developed hardstand. Within the external upstream catchments is the CBH Mirambeena grain storage facility which may have a potential impact. Within Lot 5780's development area, the topography ranges from a maximum of 73 m AHD on the eastern boundary to a minimum of 41 m AHD in the creek line that bisects the southern boundary.

7.2 Groundwater monitoring results

GHD has an appreciation for the general site context in the surrounds, having undertaken previous studies in the Mirambeena Strategic Industrial Area and to the north of Lot 5780. A geotechnical study was undertaken in 2014 and 2015 for CBH Mirambeena grain storage facility to the north (shown on Figure 7-1).

As noted in section 6.1.3, GHD received monitoring bore installation information from Bio Diverse Solutions, which included a basic site lithological description of the soils on site to around 2 m depth. GHD has also received groundwater monitoring data, undertaken by Bio Diverse Solutions, in February, May and September 2018. The information provided is included in Appendix D and summarised in Table 7-1. The information at this stage is limited by the shallow nature of the investigation (approximately 2 m depth).

A search of DWER's WIN reporting online system for available bore data (within a 3 km radius) revealed no other relevant time series data.



REPORT ITEM DIS 164 REFERS

Table 7-1: Site bores and groundwater levels

Bore ID	Easting (m)	Northing (m)	Ground level – est. RL (mAHD)	Depth to Groundwater (m BGL) Feb 2018	Depth to Groundwater (m BGL) May 2018	Depth to Groundwater (m BGL) Sep 2018
SB01	567179.967	6133615.868	58.4	> 2.0	> 2.0	> 2.0
SB02	567404.995	6133889.541	49.6	> 2.0	> 2.0	> 2.0
SB03	567519.139	6134401.422	56.8	> 2.0	> 2.0	1.21
SB04	567700.649	6134179.907	48.2	> 2.0	0.91	0.30
SB05 (not surveyed)	568056.306	6134636.37	60.0	> 2.0	> 2.0	> 2.0
SB06	568131.287	6134478.244	53.6	0.87	0.70	0.00
SB07	567939.672	6134264.362	51.6	0.64	0.54	0.44
SB08	568308.576	6134637.482	56.5	> 2.0	1.55	0.18
SB09	568032.238	6134141.798	50.3	0.66	0.57	0.44
SB10	567886.921	6133756.724	62.7	> 2.0	> 2.0	> 2.0
SB11 (not surveyed)	568314.202	6134267.661	68.6	> 2.0	> 2.0	> 2.0
SB12	568474.386	6134781.396	60.2	> 2.0	> 2.0	1.04

Notes: BGL – below ground level - Where results shown as "> 2.0", this means the groundwater table was not intersected by the shallow groundwater monitoring bore (being only 2 m deep)

7.3 Conceptual hydro(geo)logical model

A conceptual model was developed for the site to gain an initial understanding of surface and groundwater water flows and potential linkages. The development of this model was limited by the first round of shallow bore data that was made available (refer Appendix D). As previously discussed in section 7.2 there were no relevant public data available for the Project Site (DWER WIN database) as the site and surrounding area is relatively undeveloped. Soil landscape mapping shown in Figure 5-1 and regional geology mapping were used to infer geological units and soil types in the absence of deeper borehole data. Cross sections showing the conceptual site geology and flow directions are shown below in Figure 7-2 (across the valley) and Figure 7-3 (down the line of the central waterway). Refer to Figure 7-1 for the location in plan of the cross sections.

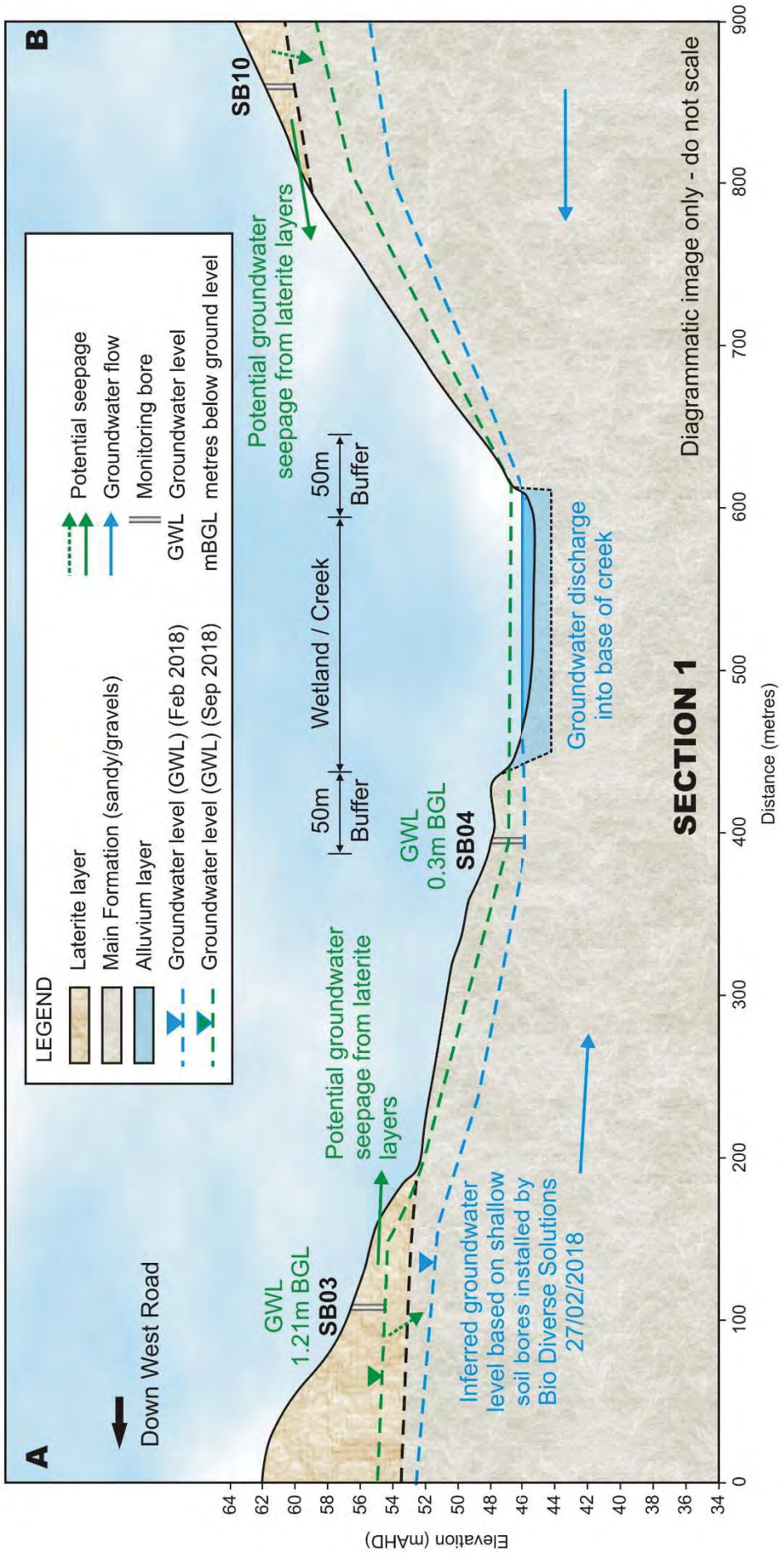


Figure 7-2: Preliminary hydrogeological section 1 (A-B)

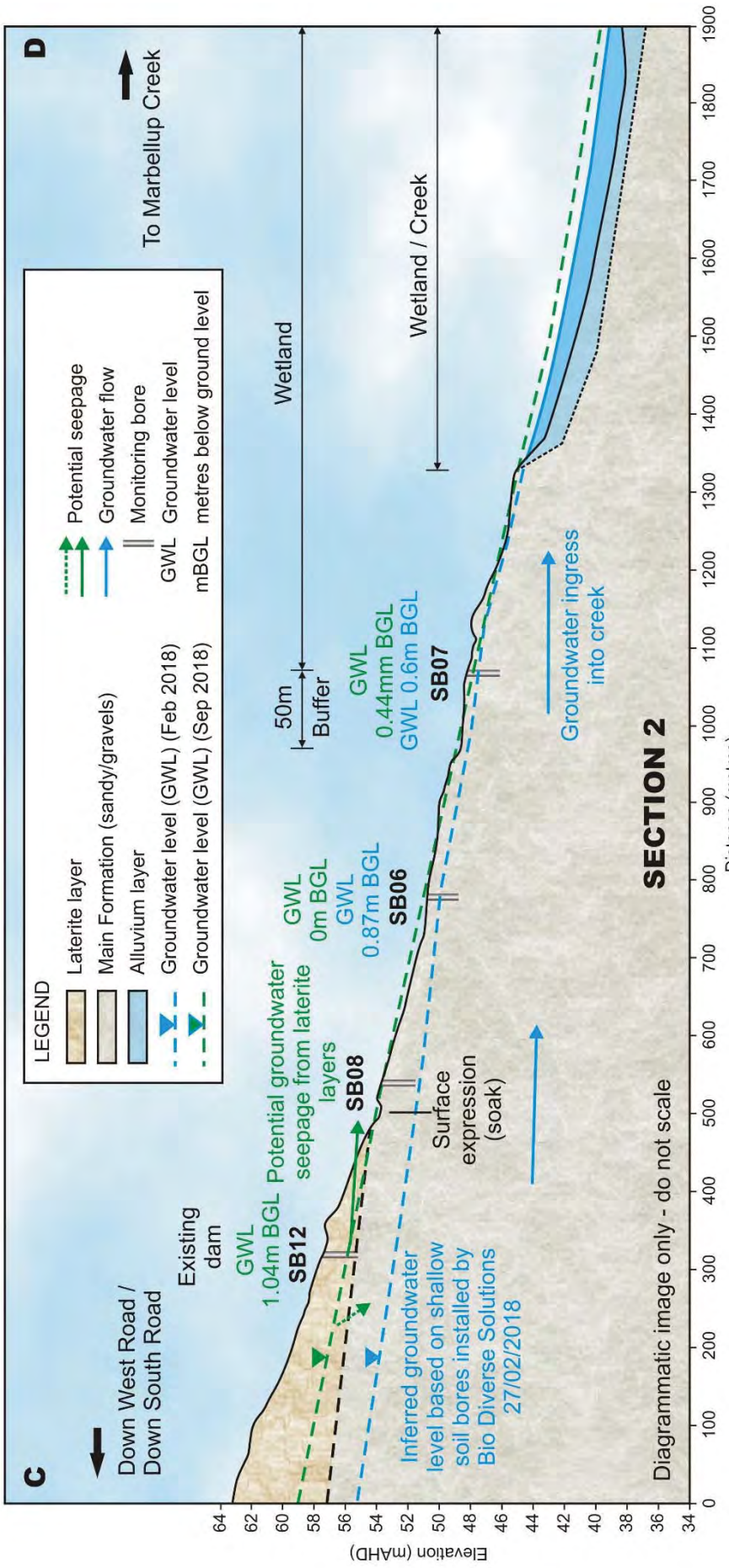


Figure 7-3: Preliminary hydrogeological section 2 (C-D)

The following key hydrogeological features are noted in the conceptual model:

- The groundwater levels observed in the shallow bores indicate that groundwater is present in the lower lying areas nearer the creek and will be most likely be supplying the creek with groundwater inflow.
- The groundwater levels and gradient, inferred from topography, supports that groundwater discharges into the creek.
- Shallow/perched groundwater may discharge and resurface via sandier layers that sit on top of more impermeable lateritic, coffee rock or clay layers; especially when there is significant slope.
- The discharging groundwater is either expressed as surface water, or migrates within the deeper more permeable deposits.

8. Preliminary water management plan

8.1 Drinking water supply and risk assessment

The Project Site is within a Priority 2 area of the Marbelup Brook public drinking water source area (see Figure 5-3 and section 2.3). A risk assessment for the proposed development was undertaken in accordance with the Australian Drinking Water Guidelines (ADWG) (NHMRC, NRMMC, 2011) and *Water Quality Protection Note 77: Risk Assessment of Public Drinking Water Source Areas* (DoE, 2005). The purpose of the risk assessment is to understand the hazards and events that could compromise drinking water quality. The assessment will help to identify preventative measures to safeguard the future drinking water source. The preliminary risk assessment is included in Appendix E. Recommended remedial measures are incorporated into the broader stormwater quantity and quality control outlined in sections 8.2 and 0.

8.1.1 Drinking water supply to the Project Site

The Water Corporation's Lower Great Southern Towns Water Supply Scheme (LGSTWSS) runs along Albany Highway, with the nearest connection point approximately 4 km to the east at 66 Down Road (fertiliser distribution warehouse) (Water Corporation, 2018). At least in the initial stages of the Project Site's development, it would be cost prohibitive to connect to the LGSTWSS. Hence, it is proposed to service drinking water needs on the site through a combination of collected rainwater and water carts.

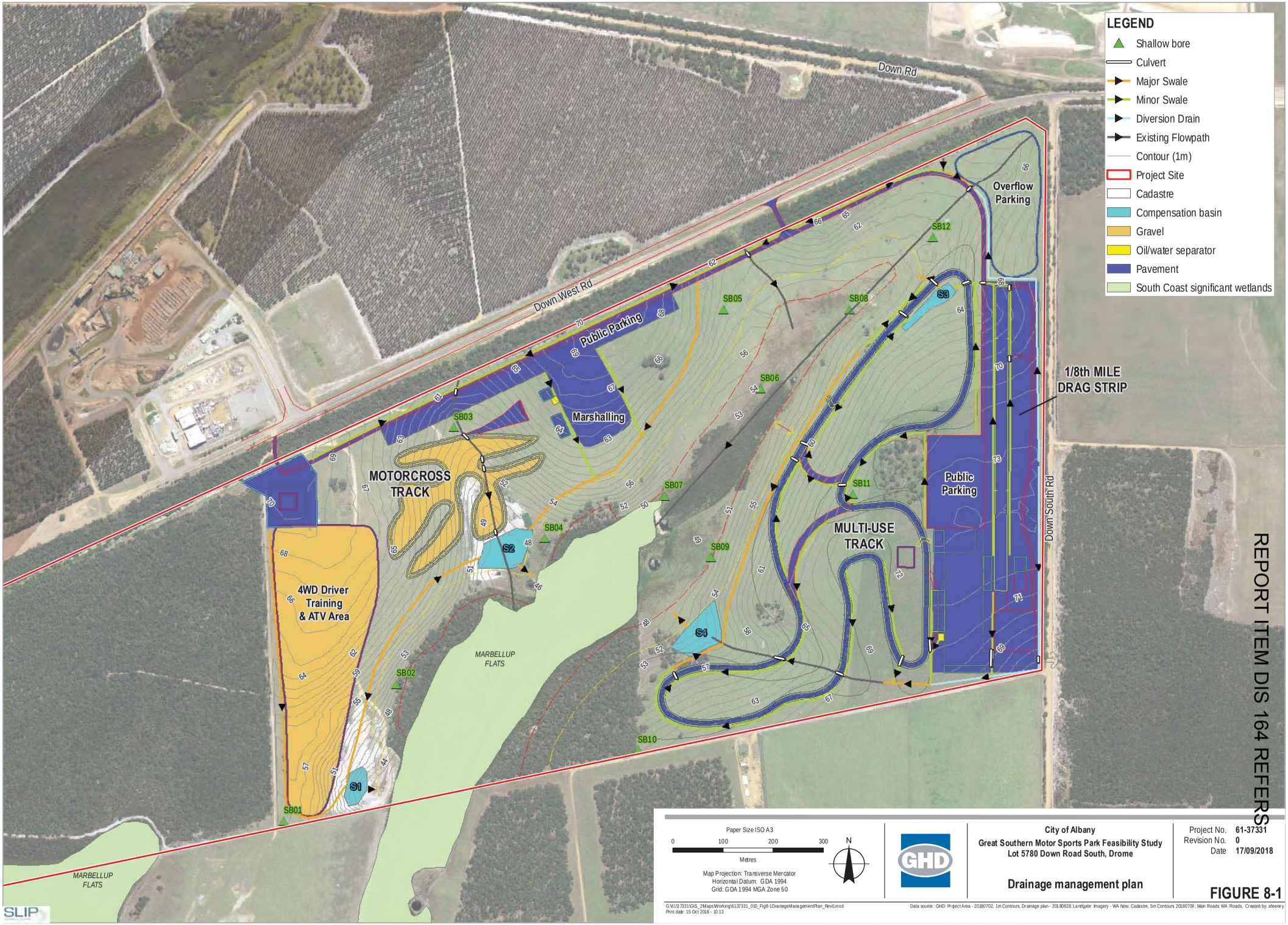
Uncontaminated rainwater from the AMP buildings will be collected in standard 110,000 litre rainwater tanks. At source treatment by household-scale filtration and ultraviolet disinfection will be undertaken. This will allow a safe drinking water supply to the AMP facilities (i.e. clubrooms, canteen, etc.) and ablutions.

A preliminary water balance for the site suggests that rainfall alone will be insufficient to meet expected demand for regular attendance of 500 people. Where there is a shortfall, the GSMG will need to purchase and cart water to the site. Water demands for other external uses (i.e. irrigation, dust suppression, etc.) will be met from site dams.

8.2 Stormwater quantity management

The proposed stormwater management plan for the site is depicted in Figure 8-1 and consists of the following principles and elements:

- Where possible, uncontaminated runoff from impervious areas will be collected for drinking water, or targeted for infiltration near to the source.
- The release of (potentially) hydrocarbon impacted stormwater from high risk areas (e.g. maintenance areas, pits, etc.) is prevented by suitable engineering controls.
- Drainage swales are used to divert the (upstream) eastern boundary catchment around the drag strip and multi-use track, so as to minimise the potential for this water to impact on the site infrastructure.
- Suitable compensating (detention) basins are used to limit post-development peak discharge rates to pre-development rates from areas subject to development.
- Suitable swales, culverts and pipework are used to convey the runoff generated from the site to engineered locations for treatment / compensation before discharge to the waterway.
- Suitable buffer separations to the wetland/creek are used to minimise the potential for impacts of site-generated water impacting on the wetland.


LEGEND
Shallow bore
Culvert
Major Swale
Minor Swale
Diversion Drain
Existing Flowpath
Contour (1m)
Project Site
Cadastre
Compensation basin
Gravel
Oil/water separator
Pavement
South Coast significant wetlands
Down Rd
Down West Rd
Down South Rd
Public Parking
Marshalling
MOTORCROSS TRACK
4WD Driver Training & ATV Area
MARBELLUP FLATS
MULTI-USE TRACK
Public Parking
Overflow Parking
1/8th MILE DRAG STRIP
SB01
SB02
SB03
SB04
SB05
SB06
SB07
SB08
SB09
SB10
SB11
SB12
S1
S2
S3
S4
Paper Size ISO A3
0 100 200 300
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50
N
GHD
City of Albany
Great Southern Motor Sports Park Feasibility Study
Lot 5780 Down Road South, Drome
Drainage management plan
Project No. 61-37331
Revision No. 0
Date 17/09/2018
FIGURE 8-1
G:\61\37331\GIS_2\Maps\Working\6137331_010_Fig8-1DrainageManagementPlan_Rev0.mxd
Print date: 15 Oct 2018 - 10:13
Data source: GHD: Project Area - 20180702, 1m Contours, Drainage plan - 20180828; Landgate: Imagery - WA Now, Cadastre, 5m Contours 20180709; Main Roads WA: Roads. Created by: afeeney
SLIP

8.2.1 Plan outline

The following preliminary plan is proposed in accordance with the principles and objectives of this technical feasibility study, the *Stormwater Management Manual for Western Australia* (DoW, 2007); and the *Subdivision and Development Guidelines 2018* (CoA, 2018).

1-year ARI event and smaller (1EY)

To retain and treat the 1-year ARI (1EY) event:

- Roofs and other impervious areas will be managed via a range of measures including:
  - Targeted infiltration in areas where there is sufficient separation to groundwater (i.e. soakage pits or infiltration galleries),
  - Targeted rainwater (roof water only) capture for potable (i.e. drinking) and non-potable uses (such as toilet flushing or vehicle wash down).
- Drainage swales will convey stormwater to compensation basins and will allow stormwater to be infiltrated as close to source as practical, in accordance with Water Sensitive Urban Design (WSUD) principles. Weirs, and vegetated swales will contribute to achieving WSUD objectives. Culverts will be installed to allow crossings of access tracks and raceway pavements.
- Direction of runoff to compensating basins targeting peak flow management to pre-development levels.

10-year ARI event (10% AEP)

To maintain site serviceability in the 10-year ARI (10% AEP) event:

- The compensating basin will be designed to detain the peak flow to pre-development levels, and maximise opportunities for infiltration prior to discharge from the site.
- Drainage swales will convey stormwater to compensation basins and will allow stormwater to be infiltrated as close to source as practical in accordance with WSUD principles. Weirs, and vegetated swales will contribute to achieving WSUD objectives. Culverts will be installed to allow crossings of access tracks.

100-year ARI event (1% AEP)

To protect from flooding in the 100-year ARI (1% AEP) event:

- Ensure suitable separation is provided between flooding levels and key site infrastructure such that a minimum freeboard of 300 mm is provided to prevent ingress of water into habitable buildings.
- The compensating basins will detain the peak flow to levels that will not adversely impact the downstream system, and maximise opportunities for infiltration prior to discharge from the site.
- Stormwater flows will exceed the capacity of the internal drainage swales, but will be contained within the swales freeboard.
- Ensure suitable overland flow paths are provided to minimise the potential for exposure of publicly accessible areas to flood waters.

8.2.2 Drainage swales

Stormwater runoff discharged from the site access roads and proposed facilities areas will be collected by swales located alongside the access track, and on the downstream of the facilities areas. The design levels of the facilities area are expected to generally follow the natural topography of the site, i.e. falling typically towards the wetland/creek. Any trapped low point, such as that associated with pockets of the motor cross track will be captured by pit and piped to discharge into swales or basins as dictated by site topography. Refer to the proposed stormwater management plan in Figure 8-1.

Swales are typically expected to be either V type or trapezoidal in design. Overall drains will, where space and topography permit, have batter slopes of 1V:6H. It is expected that side slopes will be limited to no great slopes than 1V:3H in areas restricted by space or topography. The widths and depths of swales will be determined by hydraulic modelling. A typical freeboard of 0.3 m (over the 10 year design event water level), which allows additional storage and conveyance beyond the 10 year ARI (10% AEP) serviceability is also expected to be required to ensure drains convey the major event flows to the discharge basins. Dimensions of swales likely to be required are summarised in Table 8-1. Typically Type A, B and C drains would be considered major drain/swales and Type C and D as minor drains/swales.

Table 8-1: Example swale dimensions

Swale	Base width (m)	Top width (m)	Side slope (V/H)	Typical gradient (%)	Max depth (m)
Type A	3	12	1:6	0.5 to 3%	0.7
Type B	3	15	1:6	0.5 to 3%	1.0
Type C	0	12	1:6	0.5 to 3%	1.0
Type D	0	6	1:3	0.5 to 3%	1.0
Type E	3	9	1:3	0.5 to 3%	1.0

Drainage swales are proposed in accordance with the Stormwater Management Manual for Western Australia (DoW, 2007), Subdivision and Development Guidelines (CoA, 2018) and *WQPN 52 – Stormwater Management at Industrial Sites* (DoW, 2006) whereby they provide both conveyance and treatment of stormwater, which is suitable for the site being located in an area with sensitive downstream receptors.

Swales will be broad and shallow, with vegetation covering the side slopes and base, perform an important function in disconnecting the impervious environment from the downstream environment, in this case the wetland/creek, protecting it from pollutants carried by frequent storm events. They do this by improving stormwater quality and reducing the peak flow, velocity and volume reaching the receiving environment.

In small rainfall events, swales detain and retain water, promoting infiltration close to source, and reducing volume and flow. The gentle slope and high hydraulic roughness of the swales also reduces stormwater velocity, attenuate peak flows and also prevent scouring. In larger, less frequent rainfall events, the swales protect infrastructure by conveying stormwater away to a central storage or outlet.

The reduced water velocity allows the physical processes for particulate removal to occur; infiltration, deposition and filtration of stormwater through vegetation. As coarse and medium sediments fall out of suspension, associated suspended solids and trace metals are also removed from the stormwater, reducing the pollutant loads from frequent events. Biochemical processes also act to improve water quality reaching the downstream environment, as nitrogen is removed through denitrification, bio storage through plant and bio-film uptake, and changes in soil storage. In addition to their conveyance and water quality functions, swales have the additional benefit over traditional pit and pipe drainage systems, of providing both habitat and aesthetic value to the site.

A summary of the benefits and constraints of swales are listed in Table 8-2.

Table 8-2: Benefits and constraints of swales

Potential benefits	Potential constraints
Provide water conveyance Retain and detain water Allow infiltration Reduces stormwater runoff peak flow, velocity and volume Removes coarse and medium sediments including suspended solids and trace metals Easy access for maintenance Protect downstream surface water bodies and receiving environments from frequent storm events Disconnect impervious environment from downstream environments Habitat value Aesthetic value Biochemical pollutant (nitrogen) removal	Uses more land area than conventional piped system Maintenance – vegetation mowing/replacement/weeding, gross pollutant trap emptying, sediment removal (other systems will also require this) Site topography may limit location and size

8.2.3 Diversion drains

Diversion drains are proposed to divert surface water runoff from catchments external to the Project Site, around the site or through the site such that it does not impact on the site. The diversion drains also aim to minimise the interaction of this surface water runoff with site runoff which will require treatment. It is expected that due to the nature of the site use it will likely have an increased potential of pollutant generation; in particular sediments and vehicular generated pollutants. Diversion drains may also be utilised to divert external catchments through the site and safely to the wetland/creek.

The external surface water catchments to the site consist of the adjacent APEC and CBH sites to the east and north of site, and areas of uncleared land.

The diversion drains would most likely be similar in size and shape to the major drainage swales proposed in section 8.2.2. The drains are proposed to be earthen utilising in-situ materials.

8.2.4 Compensating basins

Compensating basins are proposed to reduce peak discharge by providing temporary storage for stormwater and encouraging infiltration through permeable walls and floor close to source. The basins are sized such that the post-development peak discharge is maintained at or below pre-development level for the 10% AEP (10-year ARI) and that flows are similar to pre-development flows for the 1% AEP (100-year ARI) event.

Batter slopes of 1V:6H should be adopted where space permits as this will allow for the batter sides and floor to be vegetated and maintained more easily, also reducing potential erosion risks. The purpose of this vegetation is to stabilise banks, and provide water quality treatment by enhancing sedimentation and nutrient removal.

The proposed locations for compensating basins within the site are shown in Figure 8-1. Where possible these should utilise the natural topography of the site and generally have low (piped) and high (suitable overflow structure) outlets.

Where possible, depths of basins should be limited to no greater than 1.5 m (at top water level before the spillway activates) and where possible water depths within the basins should be minimised in minor storm events (10 year ARI/ 10% AEP and less) so as to reduce potential risks to the public but also target infiltration via a large base surface areas. Should this not be possible, consideration should be given to increasing basin side slopes (to 1V:3H) to facilitate an increase base infiltration surface in the basin. Basins with these slopes should be assessed for the possible need for appropriate fencing and signage for safety. Standing water in basins is to be minimised so as to assist with mosquito and midge control during risk periods. With this in mind, onsite infiltration testing at proposed drainage basin sites will be needed to support future design. Currently, basins are designed with an assumed 2 m/day infiltration rate.

The location of compensation basins should be such that they are installed out of the flood impacted area of the adjacent creek/wetland. An assessment of this risk should be undertaken during detailed design.

Basins should also be installed such that the base of the basin has a suitable separation to the maximum expected groundwater level in the location, so as to ensure suitable infiltration can be achieved.

8.2.5 Pit and pipe drainage

It is conceptualised that the use of pit and pipe drainage systems will be minimised wherever possible. However it is expected that use of pipework on buildings and within larger hardstand areas is possible (i.e. pit and marshalling areas along with pedestrian concourse areas). It is also expected that a number of culverts will be needed throughout the site to convey stormwater across access roadways and across parts of the proposed multi-use and motocross tracks as shown in Figure 8-1. Culverts are expected to be designed to convey events up to and including the minor event (10 year ARI/ 10% AEP) without overtopping. Suitable erosion protection should be provided at culvert outlets to ensure structural stability of any receiving waterway.

A significant culvert is likely to be required on the main internal access road to the multi-use track, where it crosses the main drainage line of the creek in the north-east corner of the Project Site.

For areas subject to higher risks of oil spills and hydrocarbons, installation of suitable oil spill separation areas/devices will be required. Currently, this is expected for the pits areas at both the multi-use track and motocross areas.

8.2.6 Hydrologic and hydraulic assessment

Pre-development

A preliminary hydrologic and hydraulic assessment has been undertaken to estimate the pre-development stormwater runoff from the Project Site for the future sizing of stormwater management structures.

The hydrological assessment includes mapping of catchments external to and within the site.

Figure 7-1 shows the catchments. A one-dimensional Drains model with ILSAX hydrology was used for calculation of runoff. Model parameters included:

- Paved (impervious) area depression storage = 1 mm,
- Supplementary area depression storage = 1 mm,
- Grassed (pervious) area depression storage = 5 mm, and
- Soil Type 3 (slow infiltration rates).

This assessment was determined in accordance with Australian Rainfall and Runoff (ARR) 2016 (Geoscience Australia, 2016), with design rainfall data from the ARR 2016 data hub and the Bureau of Meteorology (BoM, 2018).

The estimated peak flows for pre-development from various catchments are shown below in Table 8-3.

Table 8-3: Estimates of peak flows pre-development

Catchment	Area (ha)	Impervious fraction (%)	Peak flows (m^3/s)			
			1EY (1 yr ARI)	0.5 EY (2 yr ARI)	10% AEP (10 yr ARI)	1% AEP (100 yr ARI)
E1	19.8	3	0.06	0.08	0.43	2.44
E2	17.4	3	0.08	0.10	0.39	2.24
E3	15.3	3	0.01	0.02	0.36	1.97
E4	13.9	0	0.00	0.00	0.45	2.27
E5	36.4	60	0.00	0.00	0.00	0.67
E6	17.4	0	0.00	0.00	0.33	1.81
S1	14.1	0	0.00	0.00	0.31	1.64
S2	23.4	0	0.00	0.00	0.57	3.30
S3	44.9	0	0.00	0.00	1.02	6.07
S4	35.0	0	0.00	0.00	0.65	3.64
S5	25.1	0	0.00	0.00	0.90	4.18
TOTAL	262.7	-	0.03	0.03	1.82	17.0

Note: E denotes an external catchment, S denotes a catchment within the site or with a significant portion of the catchment within the site. TOTAL denotes the flows leaving the site via the creek/wetland which may be different to the individual catchments due to routing and storage within the site/model.

Post-development

A conceptual post-development Drains model was also developed to estimate preliminary basin sizes for the development. The basins were sized such that the total post-development flow off the site was equal to or less than the pre-development flow for the minor (10% AEP) design event and targeted appropriate compensation and management of major storms (i.e. the 1% AEP or 100 year ARI). Basin parameters included:

- Nominal depth of 1.5 metres to spillway levels and 2 m to top of wall.
- Basins equipped with a spillway that has sufficient capacity to handle 1% AEP flow.
- 1V:6H side slopes (this could be increased to a max of 1V:3H as required with suitable geotechnical assessment).
- 2 m/day infiltration rate in the absence of testing,
- Each basin would be equipped with a low flow piped discharge, designed to be:
  - Set above the peak 1 EY basin water level such that no discharge occurred for water quality management, and
  - Set and sized so as to ensure that the basin spillway didn't activate in events up to and including the 10% AEP.
- The intent is that basin does not activate the spillway in events up to and including the 10% AEP. Upstream external catchments would be directed into each of the basins as detailed in Figure 8-1.
- Post development flows are those of the combined catchment areas that contribute to the basin location.

The results of the basin sizing are shown below in Table 8-4.

Table 8-4: Preliminary basin sizing

	Cont. Catch	Catch Area (ha)	Predevelopment Flow (m^3/s)			Post Development Flow (m^3/s)			Approx. footprint (m^2)	Approx. storage volume (m^3)
			1EY	10% AEP	1% AEP	1EY	10% AEP	1% AEP		
S1	S1	14.1	0	0.22	1.64	0	0.13	2.08	2,800	3,000
S2	S2/S3*/ E1	51.5	0	1.06	6.59	0	0.33	6.55	6,200	7,300
S3	S3*	15.3	0	0.29	1.99	0	0.18	2.91	2,600	3,600
S4	S4	35.0	0	0.60	3.55	0	0.18	5.64	6,200	7,200

*Portion of S3 catchment only contributing to basin

8.3 Stormwater quality management

8.3.1 Overview

Stormwater quality issues requiring management within the site include:

- **Sediment Load**: Erosion caused by high flow velocity can result in a loss of soil, damage to drainage swales, and increased sediment load to the receiving water body.
- **Nutrient Load**: Increased nutrient loading to the receiving water body may result from over-application of fertilisers to landscaped areas.
- **Gross**: Suspended and dissolved pollutants: Including rubbish, hydrocarbons, dissolved metals, and pesticides.

If not responsibly managed, the development has the potential to negatively affect stormwater quality discharging from the catchment.

8.3.2 Best management practices

Best Management Practices (BMPs) are design strategies targeted to manage total suspended solids, gross pollutants, total phosphorous (TP) and total nitrogen (TN) within stormwater discharged from urban catchments (DoW, 2007). Frequently occurring rainfall events are targeted, using source, in-transit and end-of-pipe controls to improve water quality. BMPs considered appropriate for the AMP development include:

- Construction of drainage swales and dry/ephemeral detention basins using weirs and low flow drain system, to reduce flow velocity, thus reducing erosion and sediment mobilisation, allowing sedimentation, reduce total flow discharged from each site, and allowing infiltration to groundwater.
- Construction of suitable bio-retention areas to allow for suitable water quality treatment.
- Planting and regeneration of low-lying native vegetation in swale drains for filtering of particulates and uptake of dissolved nutrients.
- Use of suitable soils within bio-retention areas that target the uptake of nutrients.
- Maximising infiltration by adopting a stormwater retention system to contain, and as a minimum, treat the first 15 mm of rainfall on site.
- Construction of compensating basins/storages to reduce peak flow rates and encourage infiltration.
- Minimising discharge rates, allowing the compensating basin to act as a sediment trap, to capture suspended solids and bound pollutants prior to discharge.

8.3.3 Spill control and pollution management

To achieve spill control and pollution management in the high risk areas of the AMP, the following practices from *WQPN 52: Stormwater management at industrial sites* (DoW, 2006) and *WQPN 100: Motor sport facilities near sensitive waters* (DoW, 2007) will be implemented:

- Separation of uncontaminated stormwater from potentially contaminated stormwater (particularly roof water from other trafficked hardstands).
- Fuel / chemical storage and handling areas to be located within secondary containment areas that allow maximum recovery of any spilt materials.

- Paved areas exposed to rainfall where dust, litter or spilt substances accumulate should be regularly cleaned with methods that prevent fluid drainage or leaching into the surrounding environment. Litter, oil and sand traps (as appropriate to the site) are recommended at drain entry points. First-flush water diversion for dusty outdoor areas should be considered to capture initial stormwater run-off after any extended dry period.
- Turbidity should be controlled and where practical, stormwater should be treated (if necessary) then (in order of preference) used as a process water source, irrigated onto well-vegetated areas or infiltrated via on-site soak pits.
- Chemical solvents and non-degradable detergents used to clean equipment or pavements should not be released into stormwater systems.
- Rainwater should not be released from chemical or fuel storage compounds, unless first tested and found to be uncontaminated.
- Where the groundwater table is within five metres of the surface or soil permeability is poor (less than one metre per day), alternatives to water infiltration may be needed to avoid harmful effects due to water table mounding.

Water contamination barriers

The following water contamination barriers are proposed, to prevent any loss of hydrocarbons and chemicals from the site:

- A 50 metre buffer from the unnamed watercourse and Conservation Class wetland.
- A 200 metre from the unnamed water course and Conservation Class wetland to vehicle pits/maintenance and refuelling areas (as per DoW *WQPN 100*).
- Double bunded pit/vehicle services areas for hydrocarbon management. These areas will drain to treatment devices such as oil-water separators and/or interceptor traps prior to outlet to the site-wide drainage system.

8.3.4 Non-structural measures

There are a number of temporary and non-structural measures that may also be applied to the development project, as described below.

Construction

Construction sites can be a major source of silt and other pollutants. Proponents and builders should be encouraged to undertake good practice on building sites. Good practice for construction sites are to be documented in a CEMP and should include:

- Temporary bunds and silt fences to prevent silt runoff from sites under construction into the drainage system.
- Litter and waste storage bins to prevent litter to be blown by wind or washed away by rainfall.
- Establishing a washing-down area behind the bund or silt fence.
- Provide a stabilised entry and exit point to prevent vehicle tracking of soil from the building site onto roads.
- Position stockpiles of sand and soil stockpiles to prevent material being tracked, washed, of blown into roads, and then into the stormwater systems.

Maintenance

Regular maintenance of the drainage system should be undertaken prior to the start of the wet season. Cleaning of the stormwater drainage system and detention basins will provide an opportunity to remove gross pollutants and silt build up that may enter the receiving water bodies after heavy rainfall. In addition to transporting pollutants, drains with accumulated pollutants may also overflow, leading to localised flooding and erosion, as well as risks to human safety and constructed assets. Unlined open drains may be reshaped at this time if required.

Revegetation

Revegetation of the degraded creek/wetland area is strongly recommended as part of the development.

8.3.5 Erosion and sediment control

All reasonable and practicable measures need to be taken to protect adjacent properties and downstream environments from the adverse effects of sediment and sediment-laden water displaced from site (IECA, 2008).

It is acknowledged that sediment control measures can be expensive and introduce unwanted initial delays to a project when firstly being installed. Sediment control measures need to be appropriate for the given soil properties, expected weather conditions, required treatment standard, and the type, cost and scope of works.

With these considerations the following sediment control measures should be incorporated in the AMP site design to prevent sediment displacement from site (IECA, 2008):

- Dust control,
- Sediment fences,
- Coir logs, and
- Stockpile management.

The detailed design for the Project Site will need to be developed consistent with the requirements for erosion control in consideration of the site topography. When construction is undertaken the contractor will be required to have a suitable erosion and sediment control plan (within the CEMP) in place prior to works commencing and maintain these during and following construction during the site establishment period.

8.4 On-site wastewater management

Given the significant distance of the Project Site from the nearest connection point of Water Corporation's Albany sewerage scheme (refer section 2.5), on-site management of wastewater will be required. On-site wastewater management will need to cater for human sewage as well as grey and blackwater from vehicular activities.

The proposed use of the motorsports park will be mostly periodic (i.e. events based) with several different groups using the site. Preliminary estimates of events, site usage and spectator numbers were provided by GSMG and are discussed in section 3.2. On-site wastewater treatment systems will typically consist of both a treatment system and a disposal system. These were preliminarily sized using the Department of Health's (DoH) *Onsite wastewater system assessment tool* for estimation purposes.

The following inputs were used in the assessment:

- System capacity: 500 people (at each of the two main parts of the AMP – i.e. motocross track and multi-use track).
- Site category: Clubs (licensed), with a hydraulic loading of 35 L/person/day.

- Treatment system type: 'Secondary' wastewater treatment plant, with engineering certification to meet effluent quality of BOD < 20 mg/L; TSS < 30 mg/L; TN < 10 mg/L; TP < 1 mg/L; *E. coli* < 10 cfu/100mL; and free chlorine > 0.5 mg/L. This is to meet the requirements of *WQPN 100* (DoW, 2007).
- Site conditions: Clayey loam soil on a flat slope (< 10%), with a design irrigation rate = 3.5 mm/d.

The calculator tool produced a required demand (hydraulic loading) of 17,500 L/day and aided in the sizing of the treatment and disposal systems.

There are many vendors in the WA market for 'off the shelf' package wastewater treatment plants. For the purposes of the concept design and costing, a budget estimate was sought from MAK Water [(1)].

Selecting a disposal system and sizing the area needed will require a better understanding of the geotechnical conditions of the chosen location, and the area available. However, for the purpose of this concept design and costing, sub-surface drip irrigation was chosen as the most suitable option. This will require a disposal/irrigation area of approx. 5,000 m^2, which could be readily accommodated within the track design and facilities area.

The most suitable arrangement will be to have two wastewater treatment systems, one serving the motocross facilities, the other serving the multi-use track, and drag strip. Numbers in excess of system capacity (potentially up to 20,000 for national race events) would need to be catered for with portable facilities.

A minimum clearance of two metres between the maximum groundwater level and the discharge point of the disposal system will also be required. Therefore, wastewater facilities should be located at high ground on the site, where a greater clearance to groundwater is to be expected.

Demand requirements should be further investigated in future design stages, when the usage of the facility is better defined.

8.5 On-going water quality monitoring

Initial groundwater and water quality sampling was undertaken by Bio Diverse Solutions in February, May and September 2018. It is understood that DWER has been consulted during the development of this monitoring plan. Further to this, GHD recommends the following;

- There is limited existing site-specific groundwater data, and pre-development data are limited. If the development proposal seeks approval to install a production bore for abstraction of groundwater as a water supply source for the development, then six-monthly groundwater monitoring for water levels and salinity will be a required.
- Groundwater monitoring should be conducted for three years following practical completion, to allow any groundwater level or quality changes as a result of development to be identified, and action taken if necessary.

The program and parameters outlined in Table 8-5 below will provide a suitable representation of groundwater quality at the site. The groundwater bores established for pre-development monitoring will be used for construction phase and post-development monitoring.

[1] https://www.makwater.com.au/products/activated-sludge-bioreactor-plus/

Table 8-5: Summary of groundwater monitoring program

Site	Frequency	Duration	Parameters
Production bore and/or Shallow bores	Monthly	Pre-development 3 years post-development	Water level
	Quarterly	Pre-development 3 years post-development	In-situ pH, EC, temperature Unfiltered sample: pH, EC, TN, FRP, TKN, ammonia, TP, heavy metals (As, Cd, Cr, Cu, Pb, Ni, Zn, Hg) Filtered sample: NO_2/NO_3, PO_4

8.5.1 Surface water monitoring

It is recommended that surface water sampling is continued to be undertaken prior to the construction of the development. This would be used to develop a baseline for ongoing assessment. This monitoring should continue during construction and then following construction to assess the impact of the development on runoff water quality.

The recommended monitoring parameters are outlined in Table 8-6. Surface water monitoring program will involve the collection of grab samples from the compensating basins and the creek/wetland. Sampling should occur during or immediately following rainfall events. It is assumed the first flush will have the highest level of nutrients and chemicals, therefore sampling should occur at the time/after the first significant rainfall event of each wet season. Field notes should include details of the rainfall events, site conditions, time of sampling and time of sample testing.

While not listed in the below table, in the event of a major water quality incident at the site, it is recommended that increased monitoring be undertaken.

Table 8-6: Summary of surface water monitoring

Site	Frequency	Duration	Parameters
1. Compensating basins (outlet) 2. Upstream of the site (TBC) 3. Downstream of the site (TBC)	Event based	For 3 years post-development	In-situ pH, EC, temperature Unfiltered sample: pH, EC, TN, FRP, TKN, ammonia, TP, heavy metals (As, Cd, Cr, Cu, Pb, Ni, Zn, Hg) Filtered sample: NO_2/NO_3, PO_4

Samples should be taken and handled in accordance with the following Australian Standards:

- AS/NZ 5667.1:1998 Water quality - Sampling Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples.
- AS/NZ 5667.12:1999 Water quality - Sampling Part 12: Guidance on sampling bottom sediments.

8.5.2 Reporting

It is recommended that GSMG prepare an annual water quality report for each year of post-development monitoring, which will be presented to the City of Albany and DWER. This report will summarise the sampling results from the previous year.

Reporting and monitoring shall be in accordance with ANZECC *Guidelines* (2000) and the Department of Water quality assurance/quality control systems to allow inclusion into DWER's WIN database.

8.6 On-site operational controls

On site operational controls shall include but not limited to the following:

- Vehicle maintenance and refuelling to only be undertaken in the designated pit area where hydrocarbon interception/spill controls are implemented.
- Vehicle wash down to be undertaken on a bunded, impervious pad and runoff directed into a detention area containing a sediment trap and oil separator.
- Clean-up kits to be kept at strategic locations across the site in order to provide an immediate response to fuel, oil or chemical spills.
- On-site wastewater treatment (secondary standard) and disposal from toilets, washrooms and kitchens to be in accordance with the *Draft Government Sewerage Policy 2016* and as noted in section 8.4.
- An adequate number of rubbish and recycling bins to be provided across the site and regularly maintained.
- Any landscaping on the site to be designed to minimise water, fertiliser and pesticide use.
- An emergency response plan to be prepared for situations that could place local water resources at risk.

9. Preliminary noise assessment and management plan

9.1 Noise criteria

Environmental noise is managed through the *Environmental Protection (Noise) Regulations 1997* (the Regulations). The Regulations specify maximum allowable external noise levels at noise sensitive, commercial and industrial premises.

The Regulations (Regulation 7) define prescribed standards for noise emissions as follows:

> *7. (1) Noise emitted from any premises or public place when received at other premises –*
>
> > *(a) Must not cause or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind*
> >
> > *(b) Must be free of –*
> >
> > > *(i) Tonality (e.g. whining or droning)*
> > >
> > > *(ii) Impulsiveness (e.g. sirens)*
> > >
> > > *(iii) Modulation (e.g. banging or thumping)*

The assigned levels for noise sensitive premises (Regulation 8) are shown in Table 9-1.

Assigned noise levels (Table 9-1) are set differently for noise sensitive, commercial and industrial and utility premises. For noise sensitive premises an influencing factor (IF) is incorporated into the assigned noise levels. IF depends on land use zonings within circles of 100 m and 450 m radius from the noise receiver, including:

- Proportion of industrial land use zonings,
- Proportion of commercial zonings, and
- Presence of major roads (more than 15,000 vehicles per day) or secondary (6,000 to 15,000 vehicles per day).

For this assessment, it has been assumed that IF will be zero (based on the absence of major and secondary roads). The resultant assigned levels used for this assessment of the AMP are shown in Table 9-3.

As motorsport events are scheduled to occur during either the day or evening period (refer Table 3-1), the L_{A10} assigned level of 45 dBA day and 40 dBA evening criteria have been used in this assessment.

In the absence of existing noise level contribution from existing noise sources in the area other than the proposed Albany Motorsport Park, the assessment has been conducted such that the Albany Motorsport Park will not significantly contribute to received noise levels. As such, a 5 dBA penalty has been included, such that compliance with the L_{A10} assigned level of 40 dBA day and 35 dBA evening demonstrate that the Albany Motorsport Park will not significantly contribute to received noise levels.

Table 9-1: Assigned noise levels (dBA)

Type of premise receiving noise	Time of day	Assigned level		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ Max}$
Noise sensitive [2]	7.00 am to 7.00 pm Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	9.00 am to 7.00 pm Sunday and public holidays (Sunday)	40 + IF	50 + IF	65 + IF
	7.00 pm to 10.00 pm all days (Evenings)	40 + IF	50 + IF	55 + IF
	10.00 pm on any day to 7.00 am Monday to Saturday and 9.00 am Sunday and public holidays (Night)	35 + IF	45 + IF	55 + IF
Noise sensitive [3]	All hours	60	75	80

IF = influencing factor

Tonality, impulsiveness and modulation are defined in Regulation 9. Noise is to be taken to be free of these characteristics if:

a. The characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission.

b. The noise emission complies with the standard after the adjustments of Table 9-2 are made to the noise emission as measured at the point of reception.

Table 9-2: Adjustment for intrusive or dominant noise characteristics [4]

Tonality [5]	Impulsiveness [5]	Modulation [5]
+5 dB	+5 dB	+5 dB

Table 9-3: Assigned noise levels (dBA) for AMP

Type of premise receiving noise	Time of day	Assigned level		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ Max}$
Noise sensitive	7.00 am to 7.00 pm Monday to Saturday (Day)	45	55	65
	9.00 am to 7.00 pm Sunday and public holidays (Sunday)	40	50	65
	7.00 pm to 10.00 pm all days (Evenings)	40	50	55
	10.00 pm on any day to 7.00 am Monday to Saturday and 9.00 am Sunday and public holidays (Night)	35	45	55

[2] Highly sensitive areas include a building, or a part of a building, on the premises that is used for a noise sensitive purpose and any other part of the premises within 15 metres of that building or that part of the building.

[3] Any area other than highly sensitive area.

[4] Adjustment applies where noise emission is not music.

[5] Adjustments are cumulative to a maximum of 15 dB.

9.2 Closest sensitive receptors

Based on a review of aerial photography and site reconnaissance, there are three existing residences in the vicinity of the proposed AMP. These are shown in Figure 9-1, labelled SR01, SR02 and SR03. The red, orange and yellow contours represent 1000 m, 2000 m and 3000 m from the AMP boundary.

- SR01 is approx. 1,400 m from the drag strip and 2,200 m from the motocross track,
- SR02 is approx. 2,600 m from the motocross track and 3,700 m from the drag strip, and
- SR03 is approx. 3,500 m from the motocross track and 4,200 m from the drag strip.



Figure 9-1: Closest receptors for AMP noise assessment

9.3 Noise modelling

CadnaA, by Datakustik, is a computer program for the calculation, assessment and prognosis of noise exposure. CadnaA calculates environmental noise propagation according to the ISO 9613-2 algorithm.

The ISO 9613-2 algorithm also takes into account the presence of a well-developed moderate ground based temperature inversion, such as commonly occurs on clear, calm nights or downwind conditions which are favourable to sound propagation. As a result, predicted received noise levels are expected to represent a worst case scenario.

CadnaA considers local characteristics, site sources and the location of the receptor areas to predict noise levels. The method specified consists specifically of octave-band algorithms (with nominal mid band frequencies from 31.5 Hz to 8 kHz) for calculating the attenuation of sound.

9.3.1 Topography and ground absorption effects

In line with the location of Albany Motorsport Park, surrounding ground topography was modelled using 5 m ground contours.

A default ground absorption of 1.0 as specified in ISO 9613 was used in the modelling. In GHD's experience this has generally been found to be appropriate.

9.3.2 Noise sources

Noise sources from Albany Motorsport Park will be primarily from vehicles competing and preparing for various motorsport events, spectators and public address system.

Proposed events at Albany Motorsport Park include:

- Motocross events, to be held during the day period (between 8:00 am to 6:00 pm).
- Multi use track events, such as car test and tune days, car speed events, bike test and tune days, bike speed events and drifting days, to be held during the day and evening (between 6:00 pm to 10:00 pm).
- Drag racing practice days, drag racing competitions and burnout days, to be held during the day or evening.

It is important to note that no events are proposed to occur during the night period (between 10:00 pm to 7:00 am).

Noise levels for various vehicle types are outlined in Table 9-4. Sound power levels for the various vehicle types are provided in Table 9-5.

Table 9-4: Noise levels for various vehicle types

Vehicle type	Sound power level (dBA)	Operating time
Motocross bike - Seniors	129	Day
Motocross bike – Juniors	114	Day
Stock race car	120	Day/Evening
Drag race car	125	Day/Evening
4WD off road	105	Day

Table 9-5: Sound power levels (dBA) for various vehicle types

Vehicle type	Sound power level (dBA)									
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
Motocross bike - Seniors	-	82	102	113	116	118	120	114	100	129
Motocross bike – Juniors	-	75	81	92	102	103	104	100	91	114
Stock race car	118	122	132	125	109	110	105	91	96	120
Drag race car	123	127	137	130	114	115	110	96	101	125
4WD off road					105					

9.4 Noise modelling results

The calculated noise levels at the nearest noise sensitive premises were assessed to determine if predicted noise emissions complied with the assigned night time L_{A10} day and evening noise levels of 40 and 35 dBA, respectively.

In the absence of existing noise level contribution from other noise sources in the vicinity of Albany Motorsport Park, the assessment has been conducted such that Albany Motorsport Park will not significantly contribute to received noise levels. As such, compliance with the assigned day and evening L_{A10} noise levels of 40 dBA and 35 dBA demonstrates that Albany Motorsport Park will not significantly contribute to received noise levels.

There are three residences within close proximity to Albany Motorsport Park (Figure 9-1). For the purpose of this assessment, it has been assumed that if compliance is achieved at the nearest residences, compliance would be achieved further away.

Predicted day noise levels from various motorsport events are presented in Table 9-6. These results show that 40 dBA is predicted to be complied with at the closest residences (SR01, SR02 and SR03) for all event types except for at SR01. Noise levels are predicted to marginally exceed (by 1 dBA) the day criterion at SR01 when either a combined motocross and drag racing (MX + DR) or combined drag racing and multi-use track racing, such as circuit racing (DR + MUT), events are held.

Table 9-6: Predicted day L_{A10} noise levels

Event	SR01	SR02	SR03
Motocross (MX)	38	37	33
Multi use track (MUT)	37	29	28
Drag racing (DR)	38	27	25
4WD training (4WD)	15	16	13
MX + MUT *	40	37	34
MX + DR *	41	37	34
DR + MUT *	40	31	30

* includes 4WD training, however, 4WD training has no influence on received noise levels, as significantly quieter than other motorsport events.

Predicted evening noise levels from various motorsport events are presented in Table 9-7. These results show that 35 dBA is predicted to be complied with at two of the closest residences (SR02 and SR03) for all event types. Noise levels are predicted to exceed by up to 6 dBA the evening criterion at SR01 when either a drag racing or multi use track racing, or combination event, are held.

Table 9-7: Predicted evening L_{A10} noise levels

Event	SR01	SR02	SR03
Multi use track (MUT)	37	29	28
Drag racing (DR)	38	27	25
MUT + DR	41	31	30

The results presented in Table 9-6 and Table 9-7 demonstrate that for some event combinations, there may be occasions when the predicted noise levels from Albany Motorsport Park may exceed the assigned noise levels.

As such, it is recommended that Albany Motorsport Park prepare and submit a Noise Management Plan, in line with the requirements outlined in *Guide to Management of Noise from Motor Sport Venues* (DER, 2014).

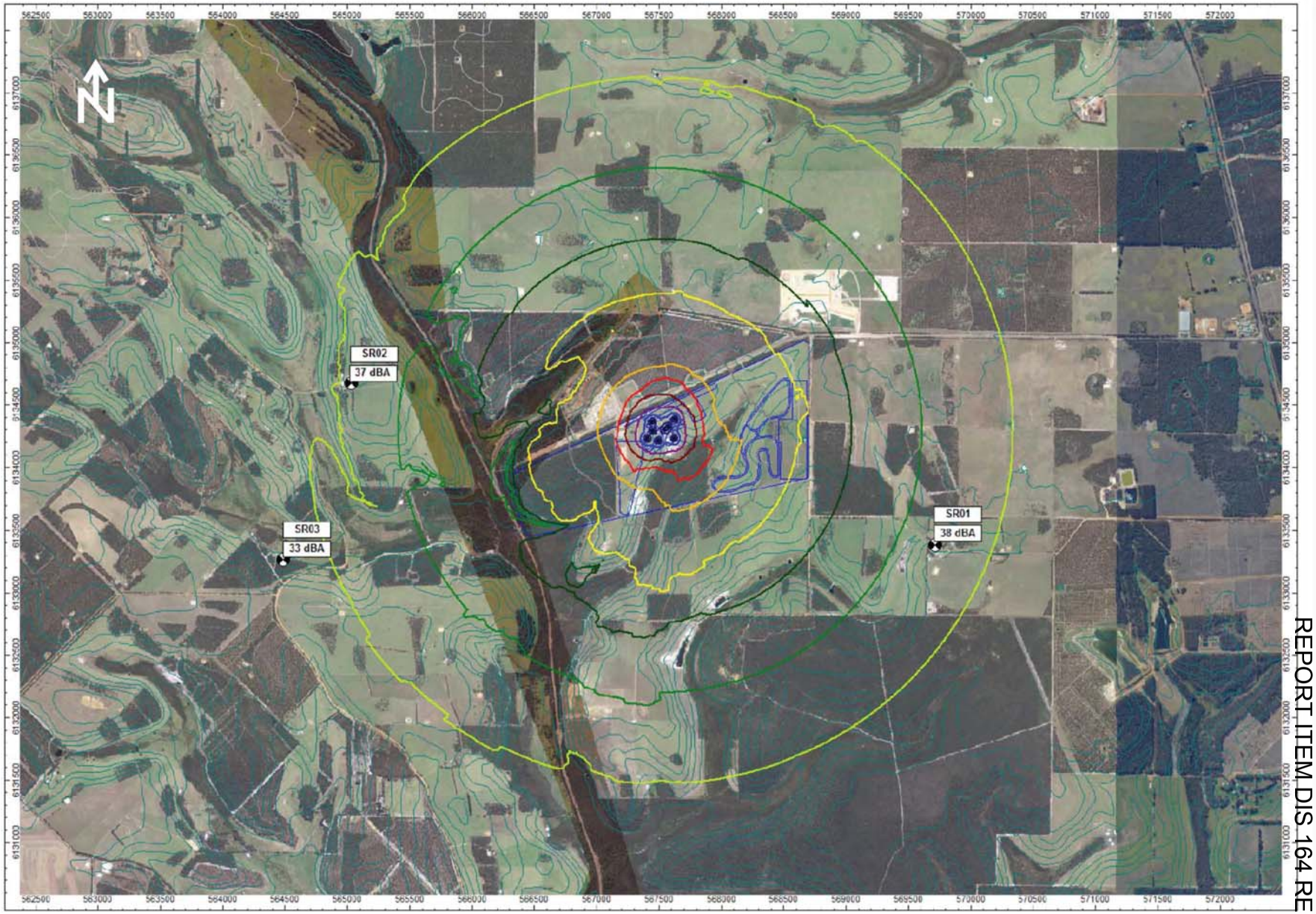
As part of the proposed Albany Local Planning Scheme No.1 amendment for the Project Site (refer section 4.1), the City of Albany should also consider extending the existing industrial noise buffer IA4BA (refer section 2.3) to incorporate the cumulative noise impacts of the Mirambeena TPP and AMP. Whilst this would not be a requirement under the *Environmental Protection (Noise) Regulations 1997*, it would provide the City with the ability to restrict incompatible land uses and residential development in proximity to the AMP.

PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (35 dBA)
- Day assigned level (40 dBA)



SCALE

0 500 1000 1500
Metres (at A3)

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED NOISE LEVELS
MOTOCROSS EVENT

Noise contours: LA10
Grid height: 1.5 m
ISO 9613 conditions

FIGURE 9-2

GHD CLIENTS | PEOPLE | PERFORMANCE

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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (35 dBA)
- Day assigned level (40 dBA)



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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED NOISE LEVELS
MULTI USE TRACK EVENT

Noise contours: LA10
Grid height: 1.5 m
ISO 9613 conditions

FIGURE 9-3

GHD CLIENTS | PEOPLE | PERFORMANCE

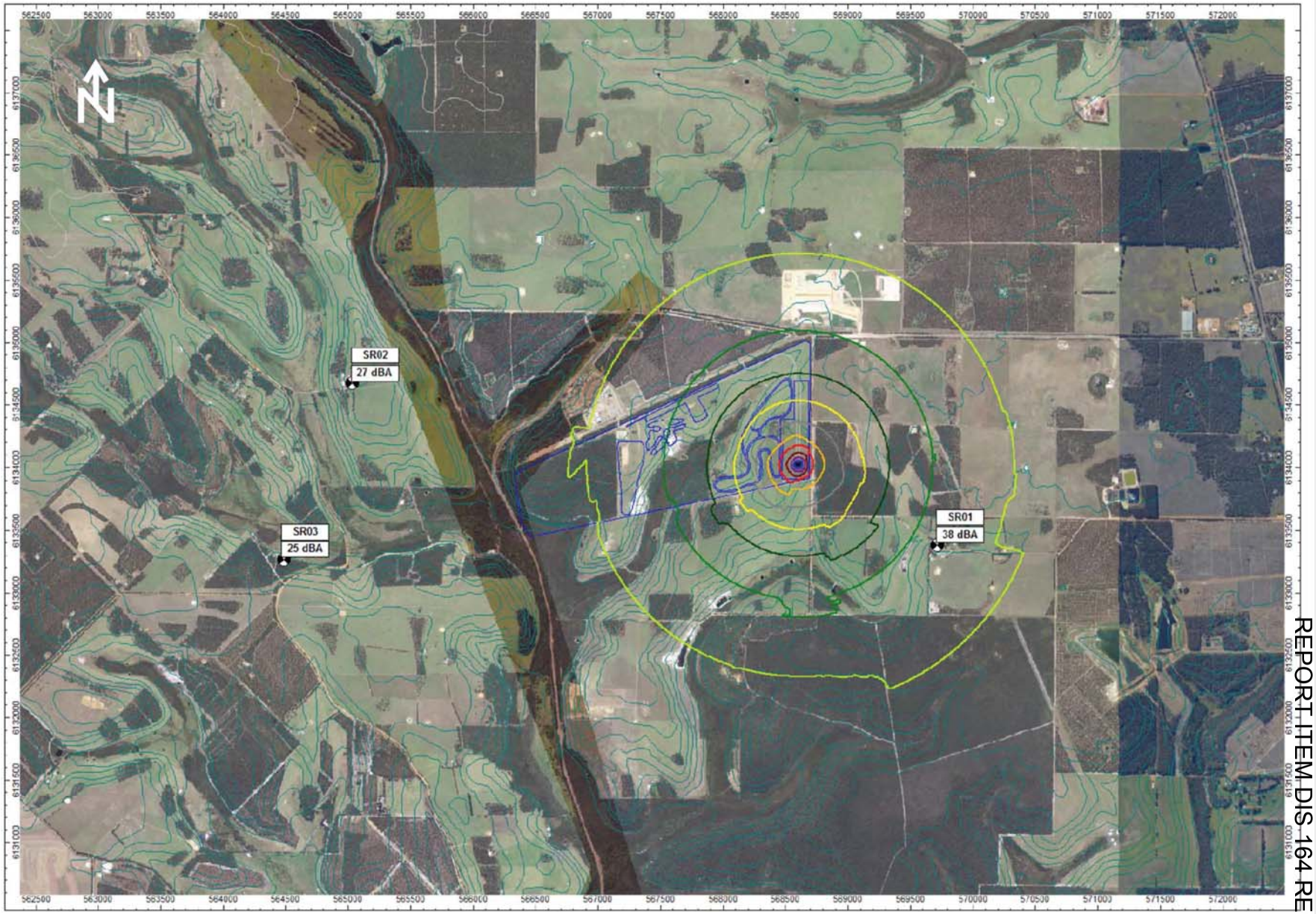
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (35 dBA)
- Day assigned level (40 dBA)



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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED NOISE LEVELS
DRAG RACE EVENT

Noise contours: LA10
Grid height: 1.5 m
ISO 9613 conditions

FIGURE 9-4

GHD CLIENTS | PEOPLE | PERFORMANCE

REPORT ITEM DIS 164 REFERS

PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (35 dBA)
- Day assigned level (40 dBA)



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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED NOISE LEVELS
4WD TRAINING

Noise contours: LA10
Grid height: 1.5 m
ISO 9613 conditions

FIGURE 9-5

GHD CLIENTS | PEOPLE | PERFORMANCE

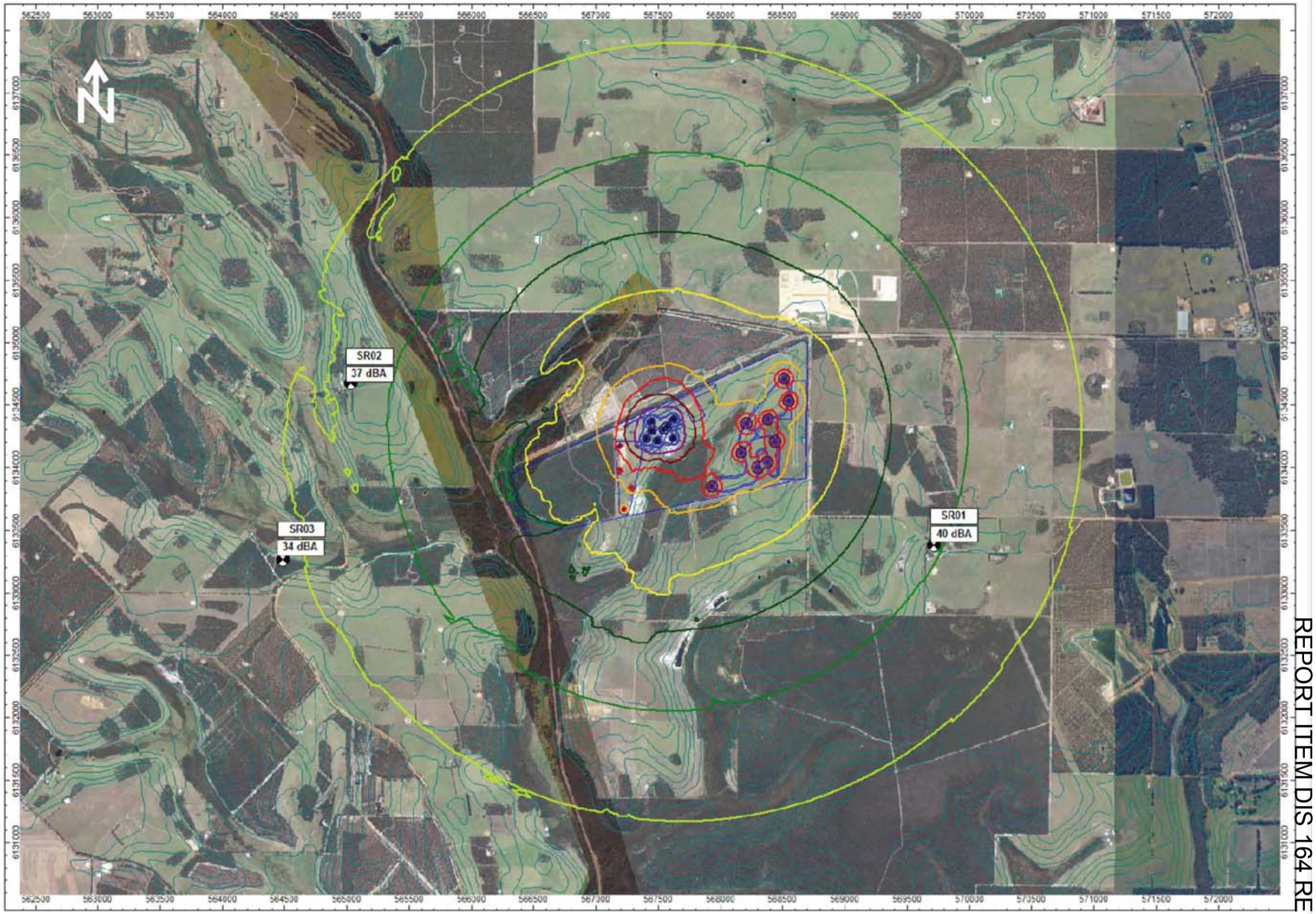
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (35 dBA)
- Day assigned level (40 dBA)



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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED NOISE LEVELS
MOTOCROSS AND MULTI USE TRACK EVENTS

Noise contours: LA10
Grid height: 1.5 m
ISO 9613 conditions

FIGURE 9-6

GHD CLIENTS | PEOPLE | PERFORMANCE

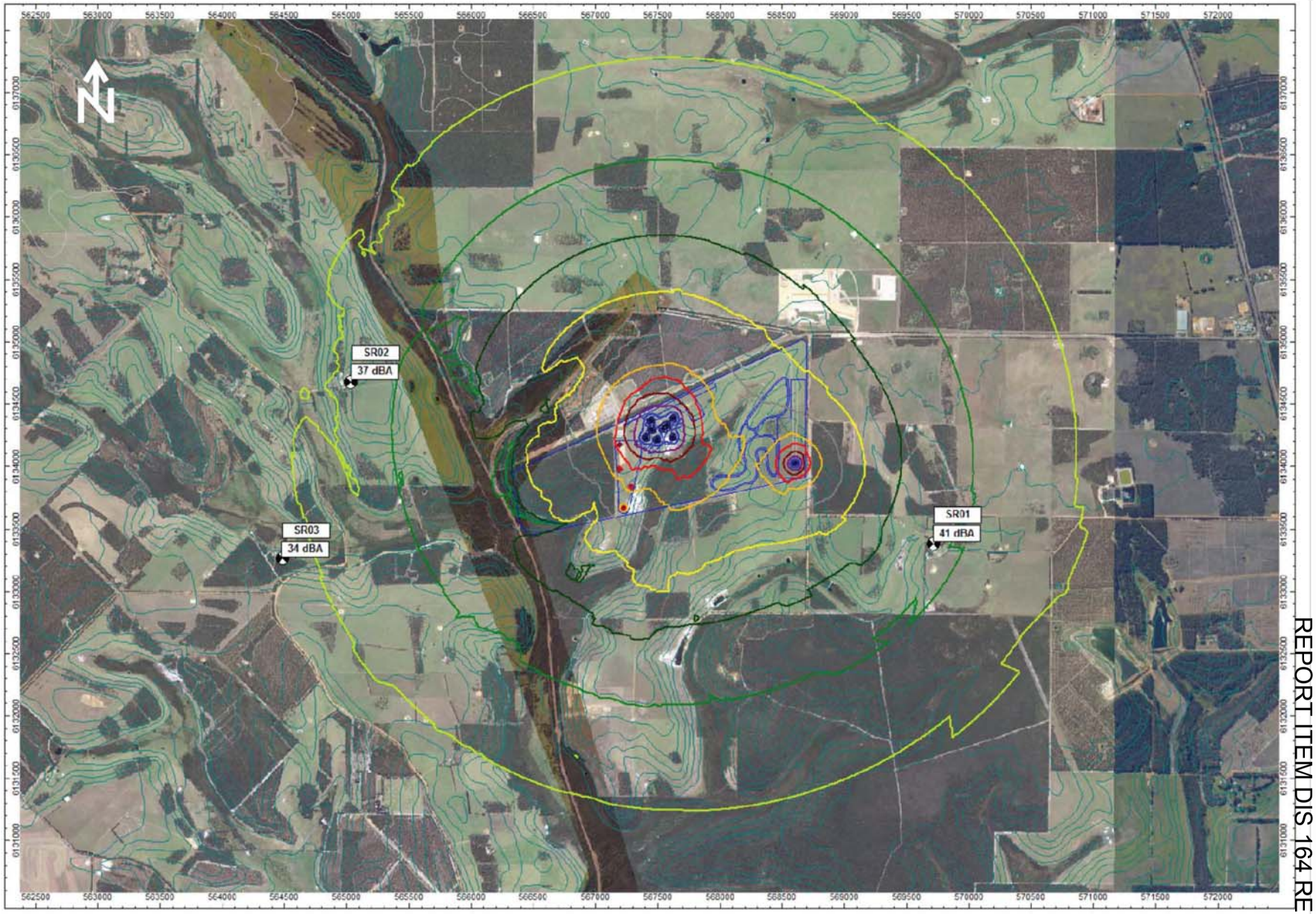
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (35 dBA)
- Day assigned level (40 dBA)



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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED NOISE LEVELS
MOTOCROSS AND DRAG RACE EVENTS

Noise contours: LA10
Grid height: 1.5 m
ISO 9613 conditions

FIGURE 9-7

GHD CLIENTS | PEOPLE | PERFORMANCE

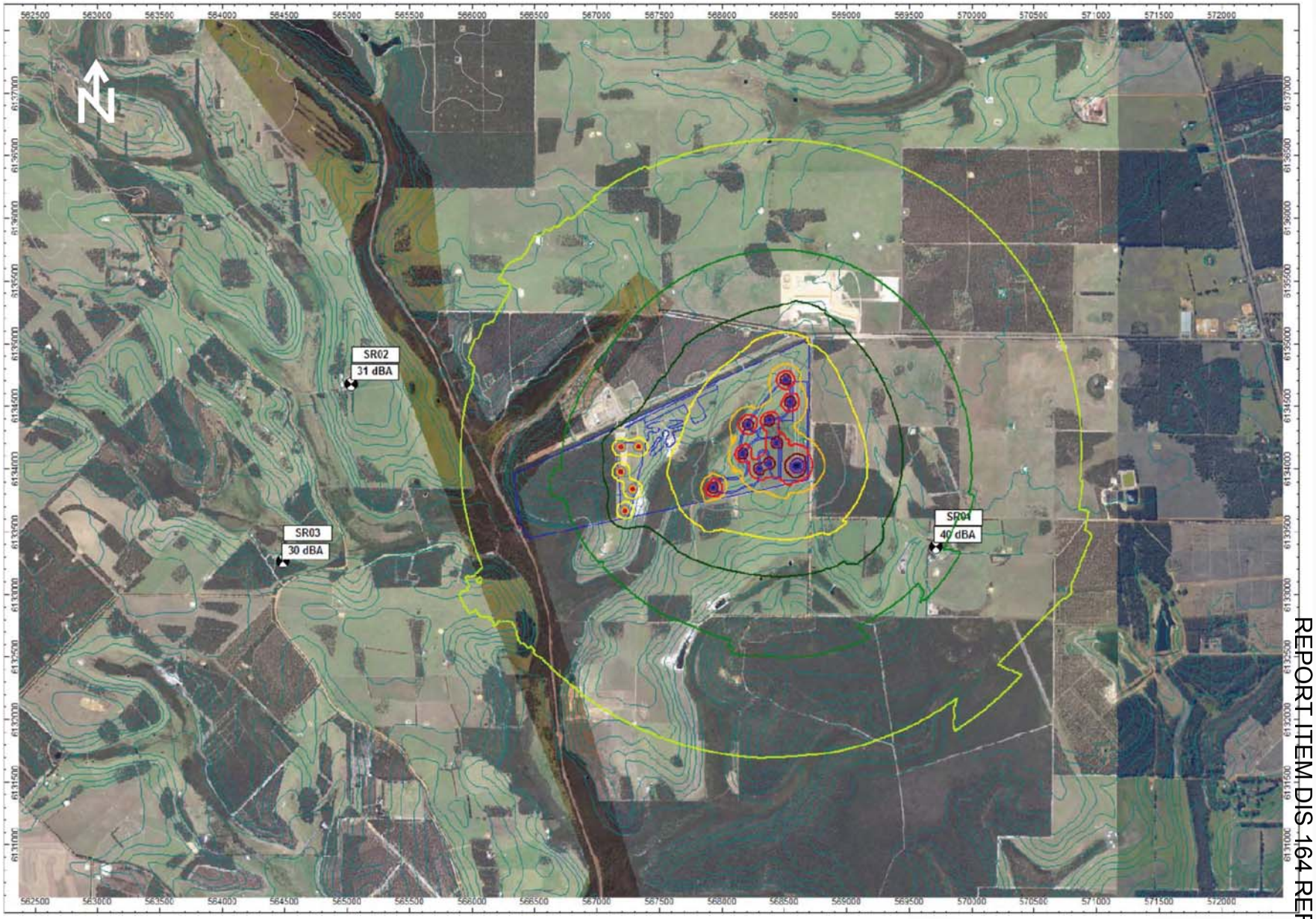
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (35 dBA)
- Day assigned level (40 dBA)



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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED NOISE LEVELS
DRAG RACE AND MULTI USE TRACK EVENTS

Noise contours: LA10
Grid height: 1.5 m
ISO 9613 conditions

FIGURE 9-8

GHD CLIENTS | PEOPLE | PERFORMANCE

REPORT.ITEM.DIS.164 REFERS

9.5 Preliminary noise management plan

The *Environmental Protection (Noise) Regulations 1997* set assigned (allowable) noise levels for various types of premises that receive noise from other premises. There are many activities that occur in the community that cannot, however, reasonably and practicably meet those assigned levels, but retain a degree of acceptance, either because of the temporary nature of the activity or the perceived community benefit.

In the case of a motorsport venue, good land use planning may be able to avoid noise problems in the first place – this may involve selection of a site for a new venue that is well away from sensitive receivers, or preventing encroachment by new residences into the noise-affected area around the venue.

Where a motorsport venue cannot practicably comply with the assigned noise levels, Division 3 of the Regulations allows the venue occupier to apply for a special approval. Under this approval the noise emissions from the venue are permitted to exceed the assigned levels in the Regulations provided the venue operates in accordance with an approved noise management plan (NMP) for the venue.

The NMP is usually prepared by the motorsport venue for approval by the Local Government Chief Executive Officer (CEO), as delegated under the Regulations, in order that the decision be made at the local level.

The requirements of an NMP for a motorsport venue are outlined in Table 9-8, with examples of a previously developed NMP provided as guidance for the Albany Motorsport Park.

Table 9-8: Requirements of a motorsport venue NMP

Requirement	Example of information required
Venue details	Name of venue Location of venue Occupier of venue Affiliations Venue maps
Types of racing activities covered by the NMP	Club race meetings State Title race meetings Practice sessions Vehicle tests Exhibitions / Blue Ribbon events Special events
Classes of vehicles	Motorcycles Late model sedans Sprint cars Super sedans Special exhibition vehicles Various other vehicles of smaller engine capacity
Scheduled race meetings and practice sessions	The following limits apply to scheduled race meetings and practice sessions at the speedway: 1. A race meeting or practice session can only take place between DATE and DATE ('season'). 2. Racing can only take place at a race meeting or practice session.

Requirement	Example of information required
	3. Racing vehicles are not to be operated at the venue at any time other than a race meeting or practice session. 4. No more than XX race meetings are to be held during a season. 5. Race meetings are to be held only on Friday or Saturday, except that a race meeting may be held on a Sunday preceding a public holiday. 6. In addition to the XX race meetings per season, a preliminary meeting may be held to conduct tests on racing vehicles to establish their compliance with this Noise Management Plan. 7. A race meeting can only be held on two consecutive days twice per season, that being either a Friday race meeting followed by a Saturday race meeting or a Saturday race meeting followed by a Sunday race meeting. 8. A race meeting can only be held on three consecutive days once per season, for the purpose of the 'State Titles' race meeting held over a long weekend during the season. 9. Races at a race meeting can only take place within a ten hour period on any one day. 10. The ten hour period must be between 9:00 am and 10.00 pm on any one day. 11. A practice session may be held in the six hour period immediately preceding the start of a race meeting, but is not to commence before 10.00 am. 12. In addition, a practice session may be held on Thursday once per season, for the purpose of the 'State Titles' race meeting held over a long weekend during the season.
Special events	Where a special event that is to be open to the public is proposed to be held at the venue, but the event cannot be conducted within the limits for scheduled race meetings and practice sessions, the occupier is to apply to the CEO for approval of the event under Regulation 18.
Access to race track	In order to prevent noise emissions due to unauthorised use of the race track by racing vehicles, the gates to the race track are to remain locked at all times other than: 1. In preparation for and during race meetings, practice sessions and special events approved by the CEO. 2. During maintenance or improvement of venue facilities.
Certification of racing vehicles	Each VEHICLE TYPE that is to race at a race meeting at the venue must have a current certificate indicating that its noise level does not exceed a noise limit ('noise limit') when tested in accordance with the noise test procedure. The noise level for a racing vehicle is to be obtained at or before the first meeting of the season at which that racing vehicle is entered to race. Vehicles that have been measured in accordance with accepted measurement procedures at another racing venue are deemed to have complied with the requirement for certification and testing for noise emissions providing the measurements have been conducted by a competent person. If the exhaust system or engine of a racing vehicle is modified or replaced after the level of noise emitted by the car had been measured, VENUE is to ensure that the level of noise emitted by the car is measured again and the vehicle complies before the car is raced at an event. Certification is valid for 12 months only.

Requirement	Example of information required
	Information provided in the certificate shall include: 1. Engine and chassis identification number 2. Exhaust type 3. Owner of vehicle 4. Date and location of testing 5. Individual and average measured sound pressure level.
Measuring individual noise level of racing vehicles	The level of noise emitted by a racing vehicle (the tested vehicle) is to be measured while the tested vehicle completes three consecutive laps of VENUE within a period that is not greater than four times the average lap time record. Average lap times are to be calculated during the previous racing season for races at the VENUE in the class of racing vehicle to which the vehicle belongs. 1. The measurements shall be made at a point that is: – Inside the inner boundary of the speedway track in use by the vehicle racing – Not less than 29 metres and not more than 31 metres from the inner boundary – On, or as close as practicable to, the shorter axis of the speedway track 2. With the measuring microphone not less than 1.2 metres or more than 1.4 metres above the ground plane.
Calculation of average noise level	The level of noise emitted by a racing vehicle is taken to be the level obtained by: 1. Adding together the maximum level of noise measured for the vehicle on each of the laps 2. Dividing the total resulting from that addition by three
Instruments	Instruments used to measure noise emissions shall: 1. Be calibrated in accordance with and otherwise comply with Schedule 4 of the Environmental Protection (Noise) Regulations 1997 2. Be operated by a person who is approved by the CEO 3. Preferably be a Type 1, although Type 2 instruments are acceptable provided allowance is made for their measurement tolerances. 4. Copies of the calibration certificates must be provided to the CEO on request.
Responsibility for noise measurement and certification	The Manager VENUE will ensure that only competent persons utilising equipment conforming to the requirements of Section 5.3.3 are engaged as required to assess compliance. Also, that all noise measurements, calculation, certification and testing requirements are met for speedway events under the control of VENUE to the requirements of the CEO.
Record of tests	The operator is to record all results from tests carried and retain those results in a form that shows (for each test): 1. Details of the racing vehicle tested, including engine and chassis identification number and exhaust type 2. The racing vehicle's owner 3. The date and location of the test 4. The calculated lap time 5. The actual time for the three laps of the test

Requirement	Example of information required
Scrutiny of racing vehicles	1. A Chief Steward shall be designated for the duration of a race meeting and practice session to verify noise certificates and to evaluate noise emissions from race vehicles. 2. The Chief Steward may reject a certificate and require a new test if not satisfied with the noise test on which the certificate is based or if he considers that a racing vehicle has been modified to the extent that the certificate is no longer representative of noise emission from the vehicle. 3. If a racing vehicle at the VENUE emits a level of noise that is conspicuously louder than that of the other racing vehicles in the same class at the meeting, the Chief Steward may require that vehicle to immediately cease racing and may prevent that vehicle from further racing at the VENUE until that vehicle's noise level has been shown to comply with the noise limit.
Public address system noise	The public address (PA) system consists of loudspeaker towers placed around the track, facing towards the track and angled down towards the track. The loudspeakers are not to be moved or adjusted by any person without the approval of the Chief Steward. Noise emissions from the public address system at the speedway are to be under the control of the Chief Steward, who is to designate persons who are authorised to use the system. The public address system controls are to be set to provide a suitable audience sound level during the preliminary meeting each year, with the assistance of such persons as the Chief Steward requires, ensuring the minimum practicable 'spill' of sound into nearby noise sensitive areas. The public address cabinet is to be locked for access only by the Chief Steward and his authorised assistants at all other times. The public address system will only be used during race meetings; it is not to be used during practice sessions or at any other time except in the case of an emergency.
Review of racing activities in response to noise complaint	If complaints are made during a racing activity the occupier will review racing activities to reduce noise where practicable for the remainder of that event.
Written instruction to members	The club management committee shall provide all club members with a written instruction explaining the noise issues and the members' responsibility to maintain the noise limitation requirements.
Notice of racing activities	Notice of the program for racing activities for a season is to be published and distributed to members of the public as follows: 1. The notice is to be published in the LOCAL NEWSPAPER, showing proposed dates of racing activities (where known) for the coming season and the telephone number for noise complaints. 2. In addition to (1), the notice is to be delivered to the address of each noise sensitive premises at locations within 1 km of the venue. 3. The notice is to be published and delivered during MONTH of the year in which the season starts. 4. A change to the racing program is to be published in the LOCAL NEWSPAPER and a notice provided in accordance with (2) above within four weeks before the changed meeting is to occur. 5. Notice of a special event approved by the CEO is to be given in accordance with the conditions of the approval.

Requirement	Example of information required
Complaint procedure	A designated telephone line will be manned during racing activities for the receipt of noise complaints. 1. A complaint received will be recorded on the noise complaint form (Attachment 3). 2. All complaints will be treated with due consideration and investigated and responded to as appropriate. 3. The occupier will as far as practicable provide advice to the complainant within 48 hours as to the outcomes of the investigation and where appropriate, any proposed modifications to operations. 4. The results of complaint investigations, details of measures taken or considered to reduce noise emissions and an outline of the responses given to the complainant shall be recorded on the noise complaint form. 5. Completed noise complaint forms will be retained at the speedway for the period of the approval and made available to the CEO on request. 6. Noise complaint details are to be provided to the LOCAL GOVT on the next business day following receipt of the complaint.
Record of vehicle tests	The occupier is to retain records of all tests of race vehicles for a period of two years.
Record of loud racing vehicles	The occupier is to make a record of all racing vehicles that have been required to cease racing by the steward and retain that record for two years in a form that shows: 1. Details of the racing vehicle required to cease racing. 2. The racing vehicle's owner. 3. The date and time at which the request to cease racing occurred. 4. The action taken by the driver of the racing vehicle following the request. 5. The action taken by the owner of the racing vehicle to remedy the excessive noise emissions.
Records to be forwarded on request	If requested to do so in writing by the CEO, the occupier is to forward a copy of all or any of the records within 21 days of the request.
Responsibilities	Club Committee: Appointment of Chief Steward Development of program for scheduled race meetings Chief Steward: Implementation of this Noise Management Plan Designation and training of stewards Control of public address system Head Scrutineer: Scrutiny of racing vehicles

10. Traffic investigation

10.1 Road network

As described in section 2.1, the Project Site is bounded by Down Road West to the north and Down Road South to the east.

10.1.1 Down Road

Down Road connects with Albany Highway to the east. It is a single carriageway road approximately nine metres (m) wide with one lane in each direction.

It is designated as an Access Road under the Main Roads WA Road Information Mapping system and is under the control of the City of Albany. A speed limit of 110 kilometres per hour (km/h) applies.

The western end of the AMP site is located opposite the exit from the Plantation Energy site and the APEC woodchip facility.

10.1.2 Albany Highway

Albany Highway is under the control of Main Roads WA and is designated a Primary Distributor. A speed limit of 110 km/h applies.

The intersection of Down Road / Albany Highway has been upgraded to accommodate traffic associated with CBH, Plantation Energy and APEC and includes a right and left turn lane in Albany Highway, a continuous left turn lane from Down Road into Albany Highway, and a right turn acceleration lane from Down Road onto Albany Highway.

10.1.3 Restricted Access Vehicle network

Down Road forms part of the Restricted Access Vehicle (RAV) network 7 and accommodates multi combination vehicles up to 36.5 m in length. Down Road accommodates RAVs serving the CBH grain storage facility, Plantation Energy and the APEC wood chipping facility.

Albany Highway also forms part of the RAV network 7 and accommodates multi combination vehicles up to 36.5 m in length.

10.2 Traffic data

10.2.1 Existing traffic

Traffic data has been sourced from the Main Roads WA web site and the City of Albany.

Table 10-1: Average weekday and weekend traffic volumes (2017) – existing vehicles per day (vpd)

Location	Average weekday (vpd)	Trucks	Average weekend (vpd)	Trucks
Down Road	844	34%	419	40%
Albany Highway	4,950	20%	3,520	16%

Source: Main Roads WA Traffic Map.

The existing high percentage of trucks on Down Road reflects the activity associated with Plantation Energy, APEC and CBH facility.

10.2.2 Site generated traffic

The assessment assumes **500** spectators/competitors in total. Events with larger numbers will be subject to specific traffic management measures. The indicative use of the venue, based on the business plan for AMP, is shown in section 3.2.

Based on an overall attendance of 500 people, it is assumed two people per vehicle so 250 vehicles in and 250 vehicles out, of which, 5% (13) are heavy vehicles transporting competition vehicles.

Table 10-2: Site generates traffic (typical)

Vehicle type	In (vph)	Out (vph)
Light vehicle	237	237
Heavy vehicle	13	13
Total	250	250

A capacity assessment of Down Road using Highway Capacity software (HCS7) indicates a level of service B, assuming AMP and peak hour traffic movement occur at the same time. No capacity issues are therefore anticipated.

The intersection of Albany Highway / Down Road has been upgraded to accommodate CBH traffic and no further upgrade is anticipated to be required for general use of the AMP. Analysis has been undertaken assuming the AMP exit traffic occurs at the same time as the pm peak hour of the intersection and confirms no forecast delay or congestion.

Further analysis has been undertaken assuming a 1% growth rate on Albany Highway for ten years and the results indicate all levels of service remain the same for both the am and pm peak period. Refer to Appendix C for detailed calculations.

10.3 Crash data (1 January 2013 – 31 December 2017)

Albany Highway / Down Road

A review of the Main Roads WA crash analysis reporting system (CARS) indicates one reported crash in 2013. The intersection has been upgraded recently.

Down Road (Albany Highway to end SLK 5.05)

There have been no reported crashes along Down Road in the five-year period. The crash assessment indicates there are no current reported safety issues at the Albany Highway / Down Road intersection or along Down Road.

10.4 Site access

Two access points are proposed to serve the Project Site from Down Road West. Entry to the AMP would be via the eastern entry point only. The western entry point is for separate controlled access (by Plantation Energy sub-Lessee) to the small dam in the north-west corner of the site.

Traffic volumes on Down Road are approximately 840 vpd, of which, approximately 34% are trucks (large multi combination vehicles). In order to minimise the impacts on large trucks using Down Road during weekday use, a left turn lane in Down Road West should be provided at the access location. Austroads Guide to Road Design indicates the length of the turn lane should be 180 m at 110 km/h or 120 m if a posted speed of 80 km/h is adopted (Table 10-3).

The current speed limit on Down Road is 110 km/h. It is considered this is too high in view of the likely activity associated with the proposed AMP and should be reduced to a maximum of 80 km/h. Main Roads WA will need to be consulted regarding this matter.

Site access should be constructed to accommodate construction traffic prior to the site construction phase.

Table 10-3: Deceleration lane lengths (Austroads)

Design speed of approach	Length of deceleration D – including diverge taper T									
	Stop condition1		Design speed of exit curve (km/h)2							
Road (km/h)	0	0	20	30	40	50	60	70	80	90
	Comf. 2.5 m/s^2	Max. 3.5 m/s^2	Comfortable average rate of deceleration 2.5m/s^2							
50	40	30	30	25	15					
60	55	40	50	40	30	15				
70	75	55	70	60	50	40	20			
80	100	70	95	85	75	60	45	25		
90	125	90	120	110	100	85	70	50	25	
100	155	110	150	140	130	115	100	80	55	30
110	185	135	180	175	160	150	130	110	90	60

Assuming a posted speed of 80 km/h on Down Road, the sight distance at the access location will require 5 m × 214 m. Adequate clearing will need to be undertaken if required (Figure 10-1 and Table 10-4).

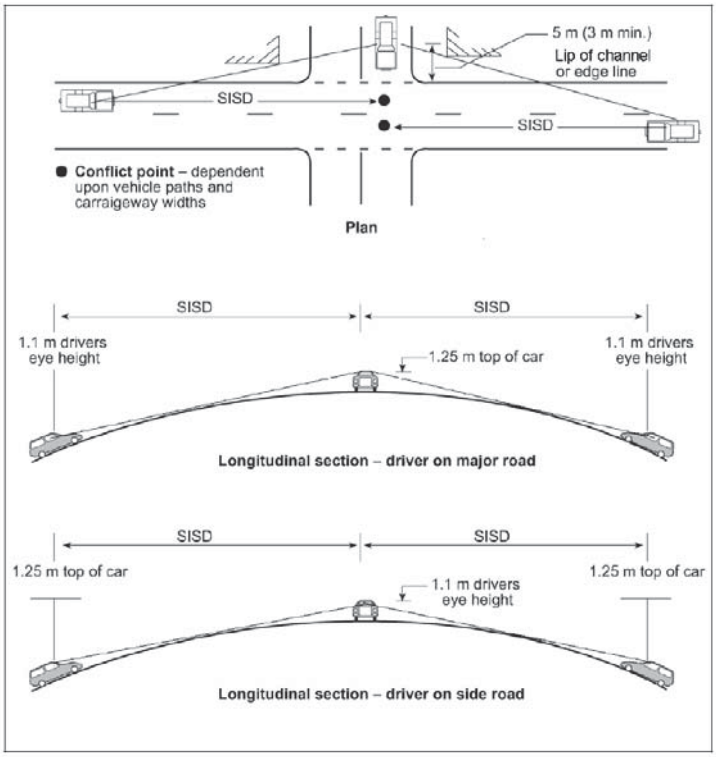


Figure 10-1: Safe intersection sight distance

Table 10-4: Safe intersection sight distance based on design speed

Design speed (km/h)	Based on safe intersection sight distance for cars1 h1 = 1.1; h2 = 1.25, d = 0.362; Observation time = 3 s					
	R_T = 1.5s[3]		R_T = 2.0s		R_T = 2.5s	
	SISD (m)	K	SISD (m)	K	SISD (m)	K
40	67	4.9	73	6	-	-
50	90	8.6	97	10	-	-
60	114	14	123	16	-	-
70	141	22	151	25	-	-
80	170	31	181	35	-	-
90	201	43	214	49	226	55
100	234	59	248	66	262	74
110	-	-	285	87	300	97
120	-	-	324	112	341	124
130	-	-	365	143	383	157

If a speed limit of 110 km/h is maintained, a review of aerial photography would indicate a suitable location for the eastern access is approximately 240 m west of Down Road North, or 150-200 m if the speed limit is reduced to 80 km/h.

10.5 Parking

Two car parking areas are proposed to accommodate general event demand. Based on 500 spectators/competitors, an overall provision of 250-300 bays is forecast to be required. For larger events, overspill parking areas are provided which will be controlled and managed by event staff. All parking demand will be contained within the site.

10.6 Traffic management for larger events

For larger events, careful planning will be required to accommodate the safe and orderly entry, exit and parking for competitors and spectators. This report does not cover detailed traffic management planning however, the planning will need to include:

- Consultation with Main Roads WA regarding requirements for the Albany Highway / Down Road intersection.
- Consultation with the City of Albany.
- Consultation with the Department of Fire and Emergency Services and WA Police.
- Consultation with adjacent businesses in Down Road.
- Variable Message Sign (VMS) requirements on Albany Highway.
- Directional signage to parking areas.
- Illumination of access and parking areas.
- Community notices, radio, newspaper, social media, etc.
- Speed limits and traffic control in Down Road.
- Emergency access requirements.
- Requirements for satellite parking and bus transfers.

Note: There are likely to be other considerations in addition to the above list.

10.7 Consultation

Preliminary consultation was undertaken with Main Roads WA (MRWA) and the City of Albany regarding the proposed traffic control measures. Responses to these queries are summarised in Table 10-5

Table 10-5: MRWA and City of Albany consultation

Query / issue	MRWA	City of Albany
In view of the access point to the AMP being in close proximity to CBH, APEC and Plantation Energy, would you consider reducing the speed limit on Down Road from 110 km/h to 80 km/h?	Yes, MRWA Great Southern Region would support a reduction in speed limit to 80 km/h, from say west of the entry to the CBH site. The change in speed limit would also need to be accompanied by some other directional signage for the AMP to assist in causing drivers to slow down. Final decision of speed limit changes are made by the MRWA Perth office, not the Regional office.	Yes, CoA is supportive. Again, from a point west of the CBH site entry.
Does Main Roads have any issue or concern with the existing Down Road/Albany Highway intersection noting it has recently been upgraded?	No, the existing Down Road/Albany Highway intersection does not require additional treatments.	-
Specific traffic management will be required for large events. Does Main Roads WA have any concerns?	MRWA has no concerns about specific traffic management for large events at the Down Road/Albany Highway intersection.	-
A left turn lane is likely to be required in Down Road West at the access point, is the City supportive?	-	Yes.

10.8 Summary

The reported crash history does not indicate a safety issue on Down Road or its intersection with Albany Highway.

Assuming competitor/spectator numbers of 500, the site is anticipated to generate 250 vph in and 250 vph out at the start and finish of events. No adverse impacts are anticipated for Down Road or its intersection with Albany Highway.

It is considered that the speed limit on Down Road near the site should be reduced from 110 km/h to a maximum of 80 km/h (west of the CBH entry) and should be progressed with Main Roads WA and the City of Albany. Complementary directional signage on Down Road should be installed for the AMP to assist in causing drivers to slow down.

If a speed limit of 110 km/h is maintained, a review of aerial photography would indicate a suitable location for the eastern access is approximately 240 m west of Down Road North, or 150-200 m if an 80 km/h speed limit is adopted.

Site access should include a deceleration lane suitable for the posted speed limit.

Traffic management as required will need to be planned and undertaken for events with competitor/ spectator numbers in excess of 500 in consultation with the City of Albany and Main Roads WA. Regular consultation should be undertaken with CBH, Plantation Energy, APEC and other businesses on Down Road to advise when large events are planned.

All parking should be contained on site and should be clearly signed for users.

11. Power and communications servicing

11.1 Existing services (DBYD information)

The following summarises the information received from the Western Power and Telstra in response to 'dial before you dig' (DBYD) enquiries. Plans that have been received are attached in Appendix H.

11.1.1 Power infrastructure

Adjacent to the Project Site is an existing 22 kV, three phase overhead power line, which includes an underslung overhead earth wire. This 22 kV power line is the ALB 518.0 Mt Barker line and emanates from Albany Zone Substation, which is located some 10 km from the site. Refer to Figure 11-1.



Figure 11-1: Existing 22 kV overhead power lines on Project Site (parallel to Down Road South)

On the Project Site, the 22 kV power line is located within the property boundary and therefore will need to be considered when working and operating within the vicinity of this network. Typical safety clearance from this network is 10 metres either side of the power pole. Any works near this power line should be done in consultation with Western Power.

On Down Road West, there is an existing 200 kVA PTTx (Pole Top Transformer) currently servicing the property on the northern side of the road, opposite to the Project Site and is located some 400 metres west from the Down Road intersection. On preliminary investigations, it would appear this existing 200 kVA transformer is located too far from the motocross part of the project to be of use. In saying this, it also appears the power supply to the two areas of the AMP needs to be from two separate Western Power supplies.

It is expected that a new padmount transformer with high voltage switchgear will be required in order to provide a large enough supply for both AMP areas. Western Power will provide the design documentation for the power connection and the Customer's supply point will be the transformer low voltage (LV) frame.

11.1.2 Communications

In reviewing the DBYD plans, there are Telstra communication cables with P6 and P8 pits along Down Road West, which could be the service connection point for the subject site. It also appears there is existing fibre within the Telstra network. An application into Telstra via their Smart Communities web portal will need to be made, to allow Telstra to provide a cost for this service, and again it would appear two separate connections will be required.

The Project Site is reasonably well serviced by 3G and 4G mobile phone coverage, as shown below in Figure 11-2 (Telstra, 2018). Some loss of service seems to occur in the valleys of the Project Site.

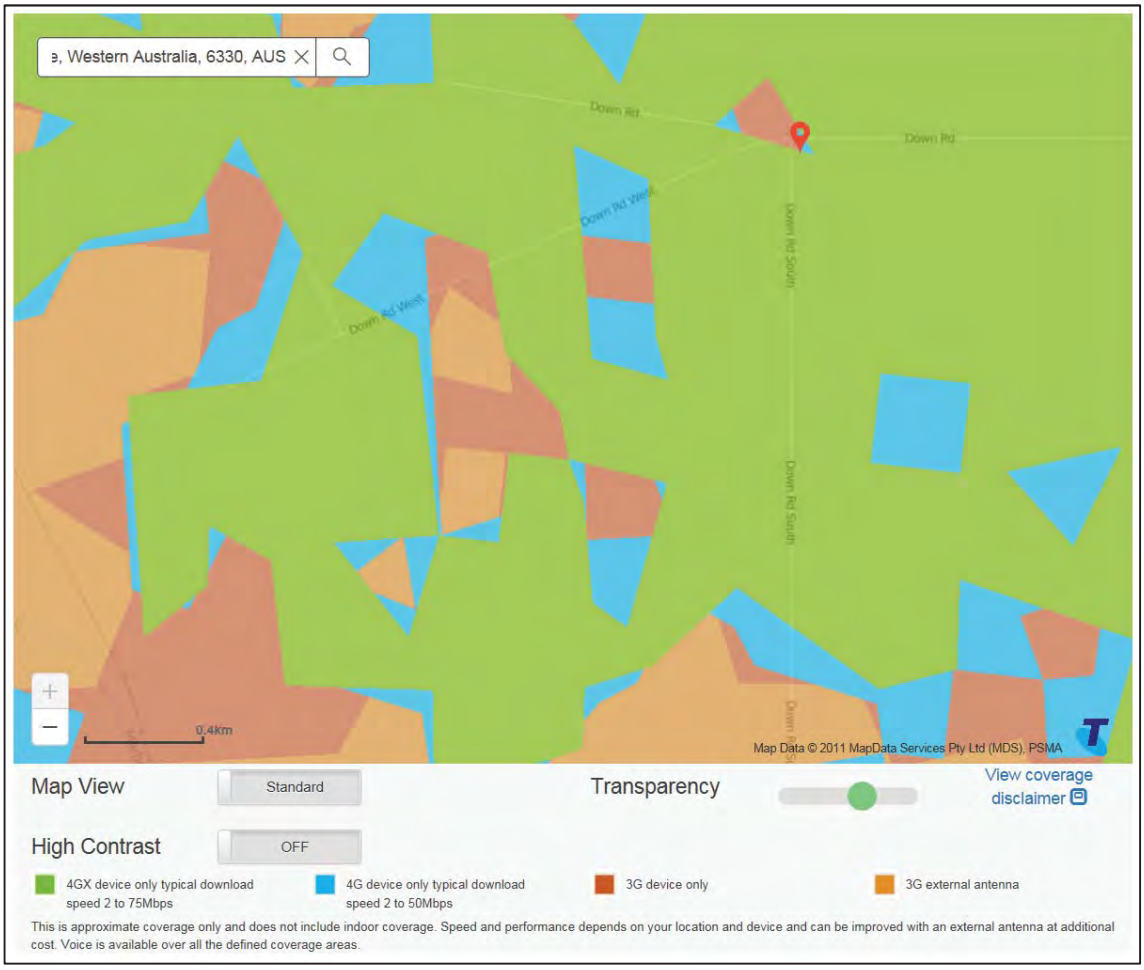


Figure 11-2: Telstra mobile network coverage

11.2 Preliminary estimate of power and communications requirements

It is understood that available facilities at the proposed AMP will include:

- Toilets,
- Medical / first aid station,
- Manager's office,
- Meeting / briefing room,
- Kitchen to prepare and sell food,
- Grounds maintenance workshop,
- Vehicle scrutineers' workshop,
- Control tower,
- Spectator viewing area,
- Grassed area with BBQs,
- Parking areas, and
- Tyre warmers and lighting.

It is also understood that temporary power will be provided by way of generators for larger events.

Initial maximum demand for the Project Site, calculated using PowerCAD and based upon the above preliminary power demands, is estimated to be 480 Amps per phase for the Multi-use Track area and some 200 Amps for the Motocross Track area. More definitive information on the loads will need to be provided to calculate the final maximum demand, including diversity factors within this calculation.

11.2.1 Communications

Telstra is likely to levy a fee to upgrade the existing network in order to create any new services. Sometime in the future, this network will eventually become owned by NBN Co and therefore future discussions will require a submission into Telstra and NBN Co to ensure timely delivery of advice and services.

11.3 Timeframes and cost

11.3.1 Timing

Table 11-1 summarises the timeline for design, approval and construction of required power infrastructure by Western Power.

Table 11-1: Western Power timeframes

	Item description	Estimated timeframe
0.	Authorisation to submit application to Western Power	
1.	Supply application submission. Requires: Single Line Diagram Load profile AS 6100 compliance (i.e. motors)	2 weeks
2.	Western Power to provide design (once all information has been provided)	6 weeks
3.	Quote to be reviewed and paid by Client	1 week
4.	Client to engage electrician (for CT metering etc.)	2 weeks
5.	Western Power works (subject to scheduling by Western Power) and Client to survey site.	8 weeks
		19 weeks

Telstra's timeline to provide their quotation from the time the Smart Communities application is made, is approximately 8 weeks and then 12 weeks for construction. Costs for Telstra communication services connection is difficult to ascertain, especially in the Country areas. GHD has managed to source a Telstra contact and an email has been sent, requesting an order of costs for the Telstra connection either copper or fibre to the premise (FTTP) and we are awaiting their response.

11.3.2 Cost

The below order of magnitude cost is provided pre-design and as such requires verification through the detailed design process.

- Western Power Application fee: $6,000 (this will be part of the quote that Western Power issue).
- Western Power Quote Motocross Track: $232,500 (based on full cost recoverable)**.
- Western Power Quote Multi-use Track: $258,000 (based on full cost recoverable)**.

** Western Power provides a revenue offset calculation, which could potentially reduce the above costs. This revenue offset calculation is difficult to ascertain until the maximum demands have been finalised; however it will be part of the SP (South Country Project) application process.

Some notes and exclusions:

- The existing 200 kVA pole top transformer (PTTx) on Down Road West is located too far from the motocross track area to be of use, so a new transformer is required for this area too.
- Based on sole use transformers and that all final electrical submains will be more than 400 metres from each motor track site area, in order to comply with zoning policies.
- The costs are based on the existing 22 kV powerline remaining inside the Project Site property (i.e. no relocation required).
- There are revenue offsets that could potentially lower the upfront costs, however this can only be calculated once the final maximum demands are determined.
- The SMSB (site main switchboard) costs are roughly estimated from GHD's experience, and these boards will be part of the private electrician's scope of works.
- Once the maximum demand has been determined, then the Western Power supply arrangement including the size of the transformers can be confirmed.
- Western Power will typically install a high voltage (HV) Switch when connecting a transformer to the power lines, being the worse cost scenario.
- The existing power supply to the Plantation Energy dam needs to be confirmed, as there is a risk that if private mains are crossing the road, then this would not comply with WAER (Western Australian Electrical Requirements).
- Subject to Western Power design and network information that is not currently known.

12. Summary of site feasibility assessment

12.1 Risk assessment

To summarise, assess and prioritise the site feasibility issues investigated in the preceding chapters, GHD has undertaken a preliminary risk assessment, using the City of Albany's *Risk & Opportunity Management Framework* (2018), as illustrated below.

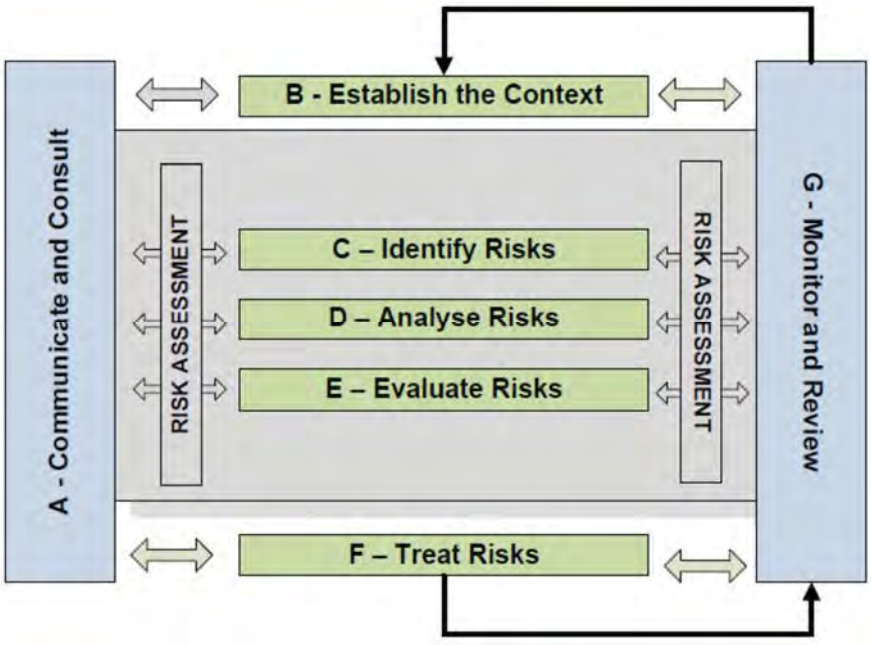


Figure 12-1: CoA risk and opportunity management process (CoA, 2018)

The risk assessment captures the risk issues identified in the preceding chapters and categorises them according to the following *Consequence* categories:

- Business interruption,
- Community,
- Environment,
- Financial,
- Legal and compliance,
- Organisation's operations,
- People health and safety,
- Property, and
- Reputation.

Each (unmitigated) risk is assessed within its category for consequences ranging from 'Insignificant' to 'Severe', and a likelihood ranging from 'Rare' to 'Almost certain'. Descriptors for each likelihood level and each consequence level within each category as documented in the *Risk & Opportunity Management Framework* (CoA, 2018). Where they exist, current risk controls are also documented.

The intersection of the likelihood and consequence ratings then determine the initial risk rating, as per the matrix shown in Figure 12-2.

LIKELIHOOD		CONSEQUENCES				
		1	2	3	4	5
		INSIGNIFICANT	MINOR	MODERATE	MAJOR	SEVERE
5	ALMOST CERTAIN	Medium (5)	High (10)	High b	Extreme (20)	Extreme (25)
4	LIKELY	Low (4)	Medium (8)	High (12)	High (16)	Extreme (20)
3	POSSIBLE	Low (3)	Medium (6)	Medium (9)	High (12)	High (15)
2	UNLIKELY	Low (2)	Low (4)	Medium (6)	Medium (8)	High (10)
1	RARE	Low (1)	Low (2)	Low (3)	Low (4)	Medium (5)

Figure 12-2: Risk rating matrix (CoA, 2018)

The risk assessment then captures the recommended remedial actions, controls and responsibility, with attention paid to the preferred hierarchy of controls (i.e. elimination > substitution > engineering control > administrative control > personal protective equipment). The residual risk is then assessed using the same risk rating matrix as Figure 12-2.

The residual risk level for each risk issue should then be considered according to the City's *risk acceptance criteria*, as shown below. The target is to reduce each risk issue to 'as low as reasonably practicable' (ALARP). For the purposes of this site feasibility assessment, this is interpreted to mean that all treated risks should have a residual risk level of 'Low / acceptable', or 'Medium / monitor'. In the latter case, the proposed remedial actions will require on-going monitoring to assure their effectiveness.

RISK ACCEPTANCE CRITERIA

** From the risk's rating, is the Management/Executive/Council willing to accept this risk?*
** Who will be responsible for accepting the level of risk?*

Level of Risk	Description	When is the risk acceptable?	Who is responsible*	Timeframe for Action
Low (1-4)	Acceptable	Risk acceptable with adequate controls, managed by routine procedures.	Responsible Officer *(as per risk register)*	Review controls every 6 months or As per risk register
Medium (5–9)	Monitor	Risk acceptable by observing, assessing and improving current controls and Council procedures.	Responsible Officer *(as per risk register)*	Review controls every 3 months or As per risk register
High (10 –16)	Urgent Attention Required	Risk acceptable by establishing and implementing new controls.	Executive Directors and CEO	Controls implemented within two weeks of reporting Review controls every month
Extreme (17-25)	Unacceptable	Risk only acceptable with excellent controls and all treatment plans to be explored and implemented where possible, managed by highest level of authority.	Audit & Risk Committee and Council	Controls implemented within 1 week of reporting Review of controls every 2 weeks

Figure 12-3: Risk acceptance criteria (CoA, 2018)

This preliminary risk assessment captured 20 material risk issues, based on the feasibility investigations of the preceding chapters. A summary of the initial and residual risk ratings is shown in Table 12-1, with the full risk assessment outlined in Table 12-2.

Table 12-1: Summary of risk assessment

Risk issue	Initial risk rating	Residual risk rating
Zoning of Project Site	High	Low
Bushfire Prone Area	High	Medium
Security of Project Site	High	Medium
Visual amenity impacts	High	Low
Loss of fauna habitat (Black Cockatoos)	High	Medium
Heritage impacts	Medium	Medium
Adverse geotechnical conditions	High	Medium
Waste materials dumped on site	Medium	Low
General construction phase impacts	Medium	Low
Erosion and sediment pollution to Wetland (construction and operation phases)	Extreme	Medium
Hydrocarbon / chemical pollution to Wetland	Extreme	Medium
Drinking water availability	High	Medium
On-site wastewater management	High	Low
Noise impacts	High	Medium
Traffic impacts from special events	High	Medium
Crash risk with heavy vehicles on Down Rd	High	Medium
Power availability	High	Low
Telecommunications availability	Medium	Low

Based on this assessment, it can be concluded that the Albany Motorsport Park proposal at Lot 5780, Down Road South does not have any technical obstructions to its feasibility, pending regulatory approvals and implementation of the recommended remedial and control actions.

Table 12-2: Albany Motorsport Park risk assessment

Guidewords	Risks (New & Existing)				Initial Risk Rating				Remedial Actions / Controls			Residual Risk Rating			
	Consequence Category	Risk Issue (Hazards or events that may have an impact on the project's objectives)	Asset Life Stage (when could the risk event occur?)	Current Controls	Consequence Rating	Likelihood	Risk Level		Actions or Improvements Recommended	Type of Control Measure	Responsible Party	Consequence Rating	Likelihood	Risk Level	
Position / Location	Legal & Compliance	Project Site is currently zoned 'Priority agriculture' under the Albany Local Planning Scheme 1. A motor sports park is not a compatible land use, and could not proceed.	Planning & Design	None.	3 - Moderate	A - Almost Certain	15	Urgent attention req'd	1. City of Albany to prepare a Scheme Amendment (standard or complex) to change zoning to 'Special Use'; for approval by WAPC and Minister. Also includes automatic referral to the EPA for assessment under the EP Act. 2. Include reference to the AMP in the Albany Local Planning Strategy, and particularly within Investigation Area 4 - Mirambeena SIA.	1 - Elimination	City of Albany	3 - Moderate	E - Rare	3	Acceptable
Fire / Explosion	Property	Project Site is located in a mapped Bushfire Prone Area, and will be classified as a "vulnerable land use" under SPP 3.7 *Planning in Bushfire Prone Areas* . Bushfire on the site, or adjacent properties, could damage site infrastructure, and/or cause injuries to people on the site.	Operation	Project Site is largely cleared, with multiple entry points and sealed road access (Down Rd).	4 - Major	C - Possible	12	Urgent attention req'd	1. Bushfire Management Plan to be developed for the Project Site. 2. Secondary road access to be provided from Down Rd, north to Redmond-Hay River Road. Will require easements through Lot 22 Down Road and Lot 5774 Redmond-Hay River Road. 3. Incorporate 'place of refuge' within the Project Site.	3 - Engineering Control	City of Albany, GSMG	4 - Major	D - Unlikely	8	Monitor
Security / Fencing	Property	Unauthorised / uncontrolled access to GSMSP, leading to theft, vandalisation, loss of revenue, and public safety concerns.	Operation	Standard farm fencing (approx. 900 mm high), with limited security treatments.	3 - Moderate	B - Likely	12	Urgent attention req'd	Security fencing (1800 mm high + 3 strands barbed wire) & gates around each separate area - i.e. 1) Motocross, 2) Multi-use track & drag strip, 3) 4WD/ATV area.	3 - Engineering Control	GSMG	3 - Moderate	D - Unlikely	6	Monitor
Visual Impacts	Environment	The GSMSP will permanently alter the visual amenity of the Project Site.	Operation	The Project Site is located adjacent to existing an Strategic Industrial Area with visual impacts. Limited nearby residents.	2 - Minor	A - Almost Certain	10	Urgent attention req'd	1. Construction Environmental Management Plan (CEMP) to mitigate construction phase impacts. 2. Site re-vegetation and beautification.	3 - Engineering Control	GSMG	2 - Minor	D - Unlikely	4	Acceptable
Flora / Fauna	Environment	The GSMSP will result in permanent loss of native vegetation (approx. 2 ha) that provides fauna habitat, potentially including habitat for the conservation significant Black Cockatoos and other species.	Construction	None.	4 - Major	B - Likely	16	Urgent attention req'd	1. Conduct a baseline flora and fauna survey (inc. targeted Black Cockatoo assessment) and undertake environmental offset calculations. 2. Negotiate need for and type of environmental offsets with DWER during Clearing Permit application - e.g. purchase offsets, nesting boxes, site re-vegetation to be negotiated as environmental offset. 3. Potentially conduct on-going vegetation monitoring (unlikely to be required).	4 - Administrative Control	GSMG	4 - Major	D - Unlikely	8	Monitor
Heritage	Legal & Compliance	Construction works on the site could reveal artefacts and/or sites of Aboriginal heritage significance. Would lead to suspension of works, additional costs for recovery and preservation of artefacts, or potentially re-design of site layout.	Construction	Search of Aboriginal Heritage Inquiry System completed.	3 - Moderate	D - Unlikely	6	Monitor	Project proposal has been referred to Wagyl Kaip by City of Albany, inviting comment.	4 - Administrative Control	Cityof Albany	3 - Moderate	D - Unlikely	6	Monitor
Excavation	Property	1. The site contains reactive clay soils. 2. The clayey soils will become difficult to handle and compact if water is allowed to enter them. 3. A perched water table may briefly develop in the upper layer of granular soils on this site following heavy rainfall.	Construction	Geotechnical data available from adjacent site (i.e. CBH).	3 - Moderate	B - Likely	12	Urgent attention req'd	1. Undertake further geotechnical and ASS investigations on site. 2. Appropriate drainage of excavations during construction. 3. Excavations in perched water table may require dewatering. 4. Avoid excavations following periods of high rainfall. 5. Footings and pavements designed to accommodate lower bearing capacity/CBR and higher shrink/swell movements.	3 - Engineering Control	City of Albany / GSMG, Constructor, Designer	3 - Moderate	D - Unlikely	6	Monitor

REPORT ITEM DIS 164 REFERS

Table 12-2: Albany Motorsport Park risk assessment

Guidewords	Risks (New & Existing)				Initial Risk Rating				Remedial Actions / Controls			Residual Risk Rating			
	Consequence Category	Risk Issue (Hazards or events that may have an impact on the project's objectives)	Asset Life Stage (when could the risk event occur?)	Current Controls	Consequence Rating	Likelihood	Risk Level		Actions or Improvements Recommended	Type of Control Measure	Responsible Party	Consequence Rating	Likelihood	Risk Level	
Contamination	Environment	Waste materials (e.g. used chemical drums, equipment, electrical cable, building rubble, etc.) currently stockpiled in north-western corner of site. May be a risk of asbestos-containing material, or other hazardous materials, causing environmental harm and/or injury/illness to people on site.	Construction	Private property, with secure access.	3 - Moderate	C - Possible	9	Monitor	All waste materials to be sampled (as per Landfill Waste Classification and Waste Definitions) and removed by sub-Lessees, and site 'made good'.	1 - Elimination	Lessees (Lindsay Black, Plantation Energy)	3 - Moderate	E - Rare	3	Acceptable
Dust / Fumes	Environment	General construction phase impacts (e.g. — dust, noise and vibration, visual amenity, fire, and pollution through the use of fuels, chemicals or from general construction litter) cause nuisance to nearby sensitive receptors.	Construction	None.	2 - Minor	B - Likely	8	Monitor	Construction Environmental Management Plan (CEMP) and operational phase Environmental Management Plan (EMP.	4 - Administrative Control	Constructor, GSMG	2 - Minor	D - Unlikely	4	Acceptable
Erosion	Environment	Runoff and sediment from excavations and track areas (esp. unsealed tracks) pollute surface water and Significant Wetland.	Construction	None.	4 - Major	A - Almost Certain	20	Unacceptable	1. Baseline water quality monitoring program. 2. Erosion and sediment control plan, inc. for construction activities.	3 - Engineering Control	GSMG, Constructor	4 - Major	D - Unlikely	8	Monitor
Erosion	Environment	Runoff and sediment from track areas (esp. unsealed tracks) pollute surface water and Significant Wetland.	Operation	None.	4 - Major	A - Almost Certain	20	Unacceptable	1. Baseline water quality monitoring program + on-going monitoring program with annual reporting to DWER and Water Corporation. 2. Minimum 50 m setback from boundary of Significant Wetland and water course. 3. Develop and implement a site Water Management Plan for on-going operational controls (inc. erosion and sediment control). 4. Vegetated swale drains and detention basins to attentuate flows and treatment of gross pollutants. 5. Diversion drains to take external catchment flow through the site to the water course.	3 - Engineering Control	GSMG	4 - Major	D - Unlikely	8	Monitor
Contamination	Environment	Hydrocarbons and other contaminants from pits and vehicle maintenance areas pollute Significant Wetland, surface water and groundwater.	Operation	None.	4 - Major	A - Almost Certain	20	Unacceptable	1. All pits and vehicle maintenance areas to be located > 200 m from boundary of 'Significant Wetland'. 2. Zero on-site fuel storage (i.e. all fuels must be brought in by partipants for events only). 3. All pits and vehicle maintenance areas to be impervious and bunded to drain directly to internal sumps for treatment (i.e. oil-water separators). 4. Develop and implement a site Water Management Plan for on-going operational controls. 5. Facilities to have 2 m clearance to max. groundwater level.	3 - Engineering Control	GSMG	4 - Major	D - Unlikely	8	Monitor
Utilities & Services	Community	Project Site currently has no safe potable water services for people / events on site.	Planning & Design	None.	3 - Moderate	A - Almost Certain	15	Urgent attention req'd	1. Install rainwater collection tanks + simple treatment units (i.e. filtration + UV disinfection) to meet demands associated with regular / typical events (i.e. < 500 people). 2. Cart in additional drinking water to fill tanks, if rainfall is insufficient. 3. Use water tankers for special events (i.e. >> 500 people).	1 - Elimination	GSMG	3 - Moderate	D - Unlikely	6	Monitor
Utilities & Services	Community	Project Site currently has no toilets or wastewater management, for people / events on site. Untreated wastewater would cause environmental damage to site water resources and PDWSA.	Planning & Design	None.	3 - Moderate	A - Almost Certain	15	Urgent attention req'd	1. Install ablutions and on-site secondary WWTP to meet demands associated with regular / typical events (i.e. < 500 people). 2. Use port-a-loos for special events (i.e. >> 500 people).	1 - Elimination	GSMG	3 - Moderate	E - Rare	3	Acceptable

REPORT ITEM DIS 164 REFERS

Table 12-2: Albany Motorsport Park risk assessment

Guidewords	Risks (New & Existing)				Initial Risk Rating				Remedial Actions / Controls			Residual Risk Rating			
	Consequence Category	Risk Issue (Hazards or events that may have an impact on the project's objectives)	Asset Life Stage (when could the risk event occur?)	Current Controls	Consequence Rating	Likelihood	Risk Level		Actions or Improvements Recommended	Type of Control Measure	Responsible Party	Consequence Rating	Likelihood	Risk Level	
Noise	Community	1. Excessive noise from typical / regular motorsports events adversely impacts surrounding residents and community, leading to Council complaints. 2. Noise associated with GSMSP deters other development(s) in the surrounding area.	Operation	Existing noise buffer (IA4BA) associated with Mirambeena Timber Processing Precinct includes Lots 5780 (Project Site), 6026 (to east), 5781 (to south), 4117 (to west). Planning controls prevent incompatible uses within noise buffer.	3 - Moderate	B - Likely	12	Urgent attention req'd	1. Undertake detailed noise modelling, once site concept plan is finalised. 2. Develop and implement Noise Management Plan. 3. All events to cease by 10:00 pm. 4. Expand noise buffer IA4BA to incorporate cumulative noise impacts of Mirambeena TPP and AMP.	4 - Administrative Control	GSMG, City of Albany / DPLH	3 - Moderate	C - Possible	9	Monitor
Traffic	Community	Traffic associated with special events at GSMSP (i.e. >> 500 people) creates congestion and delays at Albany Highway / Down Road intersection. Delays to trucks to/from CBH, APEC and PE.	Operation	1. Northbound and southbound acceleration lanes for exit onto Albany Highway. 2. Left turn and right turn lanes from Albany Highway into Down Road.	3 - Moderate	A - Almost Certain	15	Urgent attention req'd	1. Community advertising for special events. Liaison with CBH, APEC, PE, etc. 2. Traffic management controls at Albany Highway / Down Road.	3 - Engineering Control	GSMG, City of Albany	3 - Moderate	C - Possible	9	Monitor
Traffic	People Health & Safety	Large trucks travelling along Down Road at high speed (110 km/h) could collide with vehicles entering and exiting the GSMSP, due to: 1. Insufficient sight distances. 2. Insufficient road space for vehicles to slow down for GSMSP site entry. Leads to injuries / fatalities, and road closure.	Operation	None.	5 - Severe	C - Possible	15	Urgent attention req'd	1. Reduce speed limit to 80 km/h, west of CBH site. 2. Install westbound left turn lane on Down Road (min. 120 m). 3. Install other signage for AMP. 4. AMP site access to be min. 200 m west of Down Rd North intersection.	3 - Engineering Control	City of Albany, MRWA	5 - Severe	E - Rare	5	Monitor
Energy / Electrical	Community	Project Site currently has no power supply. Any site activities would require portable generators, or similar.	Planning & Design	None.	2 - Minor	A - Almost Certain	10	Urgent attention req'd	1. Liaise with Western Power for power servicing to the Project Site, to meet demands associated with regular / typical events (i.e. < 500 people). 2. Hire additional portable generator(s) to meet demand for special events (i.e. >> 500 people)	1 - Elimination	GSMG	1 - Insignificant	C - Possible	3	Acceptable
Energy / Electrical	People Health & Safety	Electrocution and equipment damage caused by accidental contact with 22 kV overhead power lines. Disruption to power supply to APEC and PE.	Construction	None.	5 - Severe	C - Possible	15	Urgent attention req'd	1. Consultation with Western Power prior to any site works. 2. Safety clearance zone = 10 m from power lines. 3. Construction Management Plan. 4. Special event management plan - safety clearance zone in overflow parking area.	4 - Administrative Control	Constructor, GSMG	5 - Severe	E - Rare	5	Monitor
Communications	Community	Project Site currently has no telephone and internet services (apart from mobile phone coverage).	Planning & Design	Mobile phone coverage.	2 - Minor	B - Likely	8	Monitor	1. Liaise with Telstra / NBN Co. for telecomms servicing to the Project Site, to meet demands associated with regular / typical events (i.e. < 500 people).	1 - Elimination	GSMG	1 - Insignificant	D - Unlikely	2	Acceptable

257

REPORT ITEM DIS 164 REFERS

12.2 Recommended remedial and control actions

Drawing on the risk assessment in section 12.1, the recommended remedial and control actions for the AMP proposal are outlined below according to the phase of development – i.e. planning, design development, construction and operation.

12.2.1 Planning phase (2018 to 2020)

The following planning phase actions are recommended:

1. City of Albany to include reference to the AMP in the *Albany Local Planning Strategy*, and particularly within Investigation Area 4 - Mirambeena SIA.
2. City of Albany and GSMG to continue the baseline water quality monitoring program.
3. GSMG and City of Albany to conduct a baseline flora and fauna survey (inc. targeted Black Cockatoo assessment) and undertake environmental offset calculations.
4. City of Albany to seek comment from Wagyl Kaip on the AMP proposal.
5. GSMG to arrange for all waste materials on site to be sampled (as per Landfill Waste Classification and Waste Definitions) and removed by sub-Lessees, and site 'made good'.
6. GSMG and City of Albany to prepare a Bushfire Management Plan for the Project Site, including:
   – Secondary road access from Down Road, north to Redmond-Hay River Road (requiring easements through Lot 22 Down Road and Lot 5774 Redmond-Hay River Road), and
   – 'Place of refuge' within the Project Site.
7. GSMG and City of Albany to seek MRWA approval for reduction of speed limit on Down Road to 80 km/h, west of CBH site. Also, install a westbound left turn lane on Down Road (min. 120 m length), together with directional signage for the AMP.
8. City of Albany to prepare a Scheme Amendment (standard or complex) to change zoning to 'Special Use'; for approval by WAPC and Minister. Also includes automatic referral to the EPA for assessment under the EP Act. The Scheme Amendment should consider expansion of noise buffer IA4BA to incorporate the cumulative noise impacts of the Mirambeena TPP and AMP.

12.2.2 Design development phase (2019 to 2021)

The following design development actions are recommended:

9. GSMG and City of Albany to undertake further geotechnical and ASS investigations on site. If necessary, the Designer is to accommodate footings and pavements with lower bearing capacity/CBR and higher shrink/swell movements.
10. Designer to incorporate all design elements of the Water Management Plan – i.e.:
    – Minimum 50 m setback from boundary of Significant Wetland and water course.
    – Vegetated swale drains and detention basins to attenuate flows and treatment of gross pollutants.
    – Diversion drains to take external catchment flow through/around the Project Site to the water course.
    – All pits and vehicle maintenance areas to be located > 200 m from boundary of Significant Wetland.
    – All pits and vehicle maintenance areas to be impervious and bunded to drain directly to internal sumps for treatment (i.e. oil-water separators).

– Facilities to have 2 m clearance to maximum groundwater level.

– Install rainwater collection tanks + simple treatment units (i.e. filtration + UV disinfection) to meet demands associated with regular / typical events (i.e. < 500 people). Cart in additional drinking water to fill tanks, if rainfall is insufficient. Use water tankers for special events (i.e. >> 500 people).

– Install ablutions and on-site secondary WWTPs to meet demands associated with regular / typical events (i.e. < 500 people). Use port-a-loos for special events (i.e. >> 500 people).

11. GSMG and Designer to liaise with Western Power and Telstra / NBN Co. for power and communications servicing to the Project Site, to meet demands associated with regular / typical events (i.e. < 500 people).
12. GSMG and Designer to undertake detailed noise modelling.
13. Designer and GSMG to incorporate security fencing (1800 mm high + 3 strands barbed wire) and gates around each separate area – i.e. 1) Motocross, 2) Multi-use track & drag strip, 3) 4WD/ATV area.

12.2.3 Construction phase (summer / autumn 2021)

The following construction actions are recommended:

14. GSMG and Constructor to prepare a Construction Environmental Management Plan (CEMP) to mitigate construction phase impacts, including:

– Erosion and sediment control.

– Appropriate drainage and dewatering of excavations during construction.

– Avoid excavations following periods of high rainfall.

– Consultation with Western Power prior to any site works and maintain safety clearance zone = 10 m from high voltage (HV) power lines.

15. GSMG and Constructor to undertake site re-vegetation and beautification.

12.2.4 Operational phase (post 2021)

The following operational actions are recommended:

16. GSMG to prepare an operational phase Environmental Management Plan (EMP), including:

– On-going water monitoring program with annual reporting to DWER and Water Corporation.

– On-going erosion and sediment controls.

– Zero on-site fuel storage (i.e. all fuels must be brought in by participants for events only).

– On-going vegetation monitoring (unlikely to be required).

17. GSMG to implement a Noise Management Plan, which includes cessation of all activities by 10:00 pm.
18. For special events (i.e. >> 500 people), GSMG to undertake:

– Community advertising and liaison with CBH, APEC, Plantation Energy and other Down Road businesses.

– Additional traffic management controls at Albany Highway / Down Road for special events, in liaison with Main Roads WA.

– Hire additional portable generator(s) to meet power demand.

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– Clearing Regulations – Environmentally Sensitive Areas (DWER-046)
– Contaminated Sites Database (DWER-059)
– DBCA Legislated Lands and Waters (DBCA-011)
– Groundwater Salinity Statewide (DWER-026)
– Hydrographic Catchments – Catchments (DWER-028)
– Hydrographic Catchments – Subcatchments (DWER-030)
– Legislated Lands and Waters (DBCA-011)
– Pre-European Vegetation (DPIRD-006)
– Public Drinking Water Source Areas (DWER-033)
– Ramsar Sites (DBCA-010)
– RIWI Act, Groundwater Areas (DWER-019)
– RIWI Act, Rivers (DWER-036)
– RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
– Soil Landscape Mapping – Best Available (DPIRD-027)
– South Coast Significant Wetlands (DBCA-018)
– Surface Water Allocation Areas (DWAID) (DWER-039)
– Surface Water Allocation Subareas (DWAID) (DWER-040)
– Threatened Ecological Communities (DBCA-038)

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Appendix F – Flora and Fauna Survey

Proposed Motorsport Park

Lot 5780 Down Road, Drome WA 6330

Reconnaissance Flora and Level 1 Fauna Survey Report



Bio Diverse Solutions

FINAL V1

07/02/2019

DOCUMENT CONTROL

Title: Reconnaissance Flora & Level 1 Fauna Survey, Lot 5780 Down Road, Drome WA
Author (s): Bianca Theyer
Reviewer (s): K. Kinnear, K. Bain, E. Hickman, C. Cramer
Job No.: MSC0137-002
Client: City of Albany

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TABLE OF CONTENTS

1. Introduction, scope and background information 1
1.1. Site location and Development Proposal 1
1.2. Geology and soils 2
1.3. Climate 2
1.4. Water 2
1.5. Existing Land use 2
2. Desktop Flora and Vegetation Values 4
2.1. Remnant Vegetation 4
2.2. Albany Regional Vegetation Survey (ARVS) 4
2.3. Survey Methods 4
2.4. Threatened Flora 5
2.5. Threatened Ecological Communities 5
2.5.1. Subtropical and Temperate Coastal Saltmarsh 5
2.5.2. The Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia 5
2.6. Survey Limitations and constraints 6
3. Flora and vegetation survey outcomes 7
3.1. Vegetation types 11
3.1.1. Vegetation Type 1 - Jarrah/Marri/Sheoak Laterite Forest 11
3.1.2. Vegetation Type 2 - Jarrah/Sheoak/Eucalyptus staeri Sandy Woodland 12
3.1.3. Vegetation Type 3 - Homalospermum firmum/Callistemon glaucus Peat Thicket 13
3.1.4. Vegetation Type 4 - Melaleuca preissiana Low Woodland 14
3.1.5. Vegetation Type 5 - Miscellaneous Drainage Woodland/Shrubland 15
3.1.6. Vegetation Type 6 - Open paddock / agricultural land 16
3.2. Extent and Conservation Significance of Vegetation Types 16
3.3. Vegetation Condition 19
3.4. Weeds and disturbance 19
3.5. Priority and Threatened Ecological Communities 22
1.1. Threatened Flora 22
4. Fauna 28
4.1. Desktop Assessment 28
4.2. Habitat Connectivity 28
4.3. Potential Breeding, Foraging and Roosting Black Cockatoo Habitat 28
4.4. Field Methodology 28
4.5. Survey Limitations and Constraints 30
4.6. Non-Threatened Fauna survey outcomes 30
4.7. Threatened fauna outcomes 34
4.8. Significant tree outcomes 42
5. Summary 57
5.1. Vegetation, Threatened Flora and Threatened Ecological Communities 57
5.2. Fauna (including threatened) 57
6. References 59
7. Appendices 62

LIST OF TABLES

Table 1: Flora species recorded within survey area.
Table 2: Condition Rating Scale (Keighery 1994).
Table 3: Weed species recorded from the survey area.
Table 4 Potential Priority and Threatened Ecological Communities within 15km of the survey area.
Table 5 Potential threatened flora located within 15km of the survey area.
Table 6: Fauna species recorded within survey area (presented in alphabetical order of family, then scientific name).
Table 7: Risk assessment and survey outcomes for potential threatened fauna within 15km of the survey area. Species are presented alphabetised under their relevant class.
Table 8: Significant (>500mm DBH) habitat trees with hollows, potential hollows, nests or evidence of fauna activity located within the survey area.

LIST OF FIGURES

Figure 1: Survey Area Locality.
Figure 2: Photographic representation of the land uses present within the survey area.
Figure 3: Photographic representation of the ARVS 12 vegetation type present within the survey area.
Figure 4: Photographic representation of the ARVS 13 vegetation type present within the survey area.
Figure 5: Photographic representation of the ARVS 47 vegetation type present within the survey area.
Figure 6: Photographic representation of the ARVS 49 vegetation type present within the survey area.
Figure 7: Photographic representation of the ARVS 50 vegetation type present within the survey area.
Figure 8: Photographic representation of the vegetation type present within the survey area.
Figure 9: Vegetation Complexes Mapping.
Figure 10: Vegetation Condition Mapping.
Figure 11: Species indicators throughout the survey area.
Figure 12: Fauna habitat values.
Figure 13: Threatened species indicators throughout the survey area.
Figure 14: Significant Tree with Hollows.
Figure 15: Significant habitat trees with hollows or evidence of fauna activity within the survey area.

1. Introduction, scope and background information

The City of Albany ("the client") commissioned Bio Diverse Solutions as Environmental Consultants to undertake a Reconnaissance Flora and Level 1 Fauna Survey within Lot 5780 Down Road, Drome WA. The scope of works included:

- Desktop assessment including all publicly available database searches and Parks and Wildlife database searches (provided by CoA);
- A Reconnaissance Flora Survey across the survey area through relevé sampling in vegetation types present, and mapping the boundaries of vegetation types;
- A Level 1 Fauna Survey across the survey area through low intensity sampling, reconnaissance surveys, and the identification, mapping and description of habitat types;
- Individual tree surveys throughout the survey area to identify breeding / nesting hollows and potential habitat trees, particularly for threatened fauna dependent on hollows, such as: the western ringtail possum, three species of threatened black cockatoos and two species of priority listed owls. GPS mark and measure every tree >500mm DBH (Significant trees) and compile excel data spreadsheet. Survey will be undertaken of every significant tree within 100m of the development footprint and within the proposed survey area;
- GIS mapping of: vegetation communities (including relevé locations), vegetation condition mapping according to the Keighery condition rating scale (Keighery 1994, Table 2), fauna habitat types and condition within the survey area;
- Preparation of Reconnaissance Flora and Level 1 Fauna and Vegetation Report, which will be aligned with the appropriate government agency legislation and guidelines.

Flora assessment was undertaken by Botanist Ellen Hickman on the 31st October and 1st November 2018. Fauna assessment was undertaken by Wildlife Ecologist Dr. Karlene Bain and Conservation and Wildlife Biologist Bianca Theyer (Bio Diverse Solutions) between the 29th of October and the 2nd November 2018.

1.1. Site location and Development Proposal

The "survey area" is defined as Lot 5780 Down Road and the adjacent roadside reserves situated along the northern and eastern cadastral boundaries of the lot. This site is the location of the proposed Motorsport Park, refer to current "Concept Plan' Appendix A. Refer to Figure 1 and Appendix A – Survey Area.



Figure 1: Survey Area Locality

The survey area is based upon the likelihood of disturbance through the Motorsport Park development process. These areas included the western precinct (remnant vegetation to the west) that is unlikely to be developed, the southern central precinct (creek / drainage line and surrounding vegetation), road reserves (located along the northern and eastern boundaries of the lot), and cleared / grazed paddock areas (internal to the subject site including stands of native trees).

1.2. Geology and soils

Database searches using the NRInfo Portal (Department of Primary Industries and Regional Development, 2018) shows the subject site lies within the King (242Kg) and Redmond (242Re) Systems and the Albany Sandplain Zone(242). The King System is described as "*Dissected siltstone and sandstone terrain, on the southern edge of the Albany Sandplain Zone, with shallow gravel, sandy gravel, grey sandy duplex and pale deep sand. Jarrah-marri-Sheoak woodland and Mallee-heath*" (DPIRD, 2018). The Redmond System is described as "*Undulating plateau with scattered depressions, in the east of the Albany Sandplain Zone. Sandy gravel, pale deep sand, non-saline wet soils and grey sandy duplex. Marri-jarrah forest, swamp yate-paperbark-sheoak woodland and heath*" (DPIRD, 2018). The Albany Sandplain Zone is described as having "*Gently undulating plain dissected by a number of short rivers flowing south. Eocene marine sediments overlying Proterozoic granitic and metamorphic rocks. Soils are sandy duplex soils, often alkaline and sodic, with some sands and gravels."* (DPIRD, 2018).

1.3. Climate

The Albany area is characterised by a Mediterranean climate with mild wet winters and mild to hot dry summers. The average annual temperature in Albany ranges from 11.8 – 19.5°C. The average summer temperature range between 14-22.9°C, whilst average winter temperatures range between 8.2-15.8°C. The annual mean rainfall for Albany is 927.1mm (BOM, 2019).

1.4. Water

The survey area lies within a Priority Two (P2) Public Drinking Water Source Area (WALGA, 2018*a*) and also partially contains the Marbellup Flats along the southern boundary which is a South Coast Significant Wetland (WALGA 2018*b*).

1.5. Existing Land use

The "survey area" is currently used for grazing cattle and for sand extraction purposes. There is also a stockpile area located in the north western corner of the property with wood chips and other materials stored here. Refer to Figure 2.



Figure 2: Photographic representation of the land uses present within the survey area.

2. Desktop Flora and Vegetation Values

2.1. Remnant Vegetation

The Survey area lies within the Jarrah Forest IBRA bioregion. Hearn *et al* (2002) describes the bioregion as; '*Duricrusted plateau of Yilgarn Craton characterised by Jarrah-Marri forest on laterite gravels and, in the eastern part, by Wandoo - Marri woodlands on clayey soils. Eluvial and alluvial deposits support Agonis shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of species-rich shrublands.'*

The vegetation has been mapped on a broad scale by J.S. Beard (Shepherd *et al.* 2002) in the 1970's, where a system was devised for state-wide mapping and vegetation classification based on geographic, geological, soil, climate structure, life form and vegetation characteristics (Sandiford and Barrett, 2010). Vegetation units were regarded as associations and were grouped into Vegetation Systems representing a particular pattern of association distribution within a given area. A GIS search of J.S. Beards (DEC, 2005) vegetation classification places the survey area within two System and Vegetation Associations (Source DEC Pre-European Vegetation GIS dataset, 2005):

- **System Association Name**: Albany
- **Vegetation Association Number:** 51
- **Vegetation Description:** Cyperaceae, Restionaceae, Juncaceae (mainly in the South-West).

- **System Association Name**: Albany
- **Vegetation Association Number:** 978
- **Vegetation Description:** Jarrah, Banksia or Casuarina *Eucalyptus marginata, Banksia spp., Allocasuarina spp.*

2.2. Albany Regional Vegetation Survey (ARVS)

The Albany Regional Vegetation Survey (ARVS) undertaken by Sandiford and Barret in 2010 identified the vegetation within the survey area as belonging to the Jarrah/Marri/Sheoak Laterite Forest (12), Jarrah/Sheoak/*E. staeri* Sandy Woodland (13), and *Homalospermum firmum* / *Callistemon glaucus* Peat Thicket (47) unit.

2.3. Survey Methods

Desktop inventory of potential threatened flora species likely to occur within 15km of the survey area was undertaken using the following databases:

- Database results provided by the City of Albany;
- Nature Map Database Search (combined data from DBCA, WA Museum and WA Herbarium);
- Protected matters search tool (DoE 2017*a*); and
- WA Herbarium records accessed through Flora Base (Western Australian Herbarium, DPaW).

The full species list compiled from all available data (Appendix B) is based on observations from a broader area than the survey area and is likely to include species that would not occur in the actual survey area due to a lack of suitable habitat. The data also includes very old records and in some cases the species in question may have become locally or regionally extinct.

The conservation significance of flora species has been assessed using data from the following sources:

- *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*). Administered by the Australian Government Department of the Environment (DoE);
- *Wildlife Conservation Act 1950* (*WC Act*). Administered by the Western Australian Department of Parks and Wildlife (DPaW); and
- DBCA Priority Flora list. A non-legislative list maintained by DBCA's Parks and Wildlife Service for management purposes.

Bio Diverse Solutions undertook the reconnaissance flora and vegetation survey between the 31st October and 1st November 2018 EPA Guidance Statement 51: *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2016). The area was surveyed using transects and traversed on foot. Along each transect, relevés were systematically surveyed within representative vegetation types to enable analysis and categorisation across the wider area. The flora was systematically recorded within the relevés and collections of plant specimens were made where further identification was required. For species that were not flowering and

where foliage or nuts / fruit couldn't be used for identification, potential habitat was used as an indication of the likelihood of species occurrence. The vegetation communities occurring within the survey area were mapped and described in detail using opportunistic mapping and relevé based surveys. Vegetation units were described based on structure, dominant taxa and cover characteristics as defined by relevé data and field observations.

A reconnaissance survey was deemed appropriate as the aim of this survey was to provide context and gather broader knowledge of the survey area. This type of survey aims to verify the desktop information obtained, and to characterise the flora / vegetation units present within the survey area. The targeted component of the flora survey aimed at identifying any potential threatened or priority species and communities within the survey area.

2.4. Threatened Flora

As a result of the above-mentioned database searches 17 DRF, 41 Priority and 1 Presumed Extinct species were identified as potentially being present within the survey area.

2.5. Threatened Ecological Communities

Database results also indicate that two Threatened Ecological Communities may be present within the survey area these being: *Subtropical and Temperate Coastal Saltmarsh* and *Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia*.

2.5.1. Subtropical and Temperate Coastal Saltmarsh

Consists of the assemblage of plants, animals and micro-organisms associated with saltmarsh in coastal regions of sub-tropical and temperate Australia (south of 23°S latitude). The habitat is located in coastal areas under tidal influence. In southern latitudes saltmarsh are the dominant habitat in the intertidal zone and often occur in association with estuaries. It is typically restricted to the upper intertidal environment, generally between the elevation of the mean high tide, and the mean spring tide. The community consists mainly of salt-tolerant vegetation (halophytes) including: grasses, herbs, reeds, sedges and shrubs. Succulent herbs and grasses generally dominate and vegetation is generally <0.5m tall with the exception of some reeds and sedges. Many species of non-vascular plants are also found in saltmarsh, including epiphytic algae, diatoms and cyanobacterial mats. Saltmarsh consists of many vascular plant species but is dominated by relatively few families. There is also typically a high degree of endemism at the species level. The two most widely represented coastal saltmarsh plant families are the Chenopodiaceae and Poaceae. Four structural saltmarsh forms are currently recognised based on dominance of a particular vegetation type:

- dominance by succulent shrubs (e.g. *Tecticornia)*
- dominance by grasses (e.g. *Sporobolus virginicus*)
- dominance by sedges and grasses (e.g. *Juncus kraussii, Gahnia trifida*)
- dominance by herbs (e.g. low-growing creeping plants such as *Wilsonia backhousei, Samolus repens, Schoenus nitens*) (DBCA, 2017*a*).

2.5.2. The Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia

The Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia is generally kwongkan / kwongan shrubland, ranging from sparse to dense, thicket-forming, where Proteaceaeous species form a significant component. It is confined to the southeast botanical province of Western Australia (*sensu* Hopper and Gioia, 2004) and primarily occurs on sandplains and marine plains and lower to upper slopes and ridges, as well as uplands across this region (Department of the Environment, 2014).

2.6. Survey Limitations and constraints

Experience of personnel

Dr Ellen Hickman has over 18 years' experience as a botanist, of particular note is her work as the Rare Flora Officer in the South Coast for the then named Department of Environment and Conservation (DEC).

Availability of local / regional contextual information

Vegetation types present within the local and regional area are well documented through the Albany Regional Vegetation Survey (ARVS). Detailed site-specific information is limited as it is privately owned land this is not considered a limiting factor for this survey.

Proportion of flora recorded and/or collected, and identification issues

The single season vegetation and flora survey was undertaken in November 2018 (Spring) with the targeted flora survey completed at the same time. Spring is considered the optimal time for undertake vegetation and flora surveys within the South-west region. The proportion of flora identified is considered high.

Survey effort and extent

Vegetation throughout the survey area was traversed by foot with opportunistic sampling and relevés utilised to classify the flora and vegetation present. The survey intensity was deemed appropriate for this stage of development.

Disturbances (e.g. fire or flood)

A section of the western vegetation block had been recently burnt, however vegetation types were still able to be established based on regenerating and existing flora present. This is not deemed to have affected the completeness of the survey.

Survey timing / season and, rainfall

As per the EPA Guidelines the survey was undertaken in Spring. The Albany area has seen a lower than average rainfall year, however this is not deemed to be a limiting factor for this survey.

Remoteness or access issues

No restrictions were encountered. All areas were accessible by vehicle and on foot.

3. Flora and vegetation survey outcomes

During the field survey 141 species, consisting of 41 families and 105 genera were found. The most common families were Fabaceae, Proteaceae, Myrtaceae, Poaceae and Cyperaceae. This list includes 123 native species (Table 1) and 18 introduced species (denoted with an *). No priority species were identified. The broadscale vegetation units are described in Section 3.1. with species identified within them outlined in Table 1 below (indicated by an **X**). Refer to Figure 9 for vegetation unit mapping. Relevé datasheets are presented in Appendix C.

Table 1: Flora species recorded within survey area.

Family	Genus	Species	Common Name	Vegetation Type					
				1	2	3	4	5	6
Anarthriaceae	*Anarthria*	*prolifera*		X	X				
Anarthriaceae	*Anarthria*	*scabra*			X				
Anarthriaceae	*Lyginia*	*barbata*			X				
Apiaceae	*Actinotus*	*glomeratus*			X				
Apiaceae	*Platysace*	*pendula*			X				
Apiaceae	*Xanthosia*	*rotundifolia*	Southern Cross	X	X				
Asparagaceae	*Laxmannia*	*jamesii*	James's Paperlily		X				
Asparagaceae	*Lomandra*	*sonderi*		X					
Asparagaceae	*Thysanotus*	*tenellus*		X					
Asteraceae	*Hypochaeris*	*radicata*	Flat Weed*		X				X
Campanulaceae	*Lobelia*	*tenuior*	Slender Lobelia		X				
Casuarinaceae	*Allocasuarina*	*fraseriana*	Sheoak	X	X				
Centrolepidaceae	*Centrolepis*	*strigosa*	Hairy Centrolepis		X				
Colchicaceae	*Burchardia*	*congesta*		X	X				
Cyatheaceae	*Cyathea*	*cooperi*	Tree Fern*				X		
Cyperaceae	*Baumea*	*preissii*						X	
Cyperaceae	*Cyathochaeta*	*avenacea*		X					
Cyperaceae	*Cyathochaeta*	*equitans*			X				
Cyperaceae	*Gahnia*	*decomposita*						X	
Cyperaceae	*Gymnoschoenus*	*anceps*				X			
Cyperaceae	*Lepidosperma*	*squamatum*		X					
Cyperaceae	*Mesomelaena*	*tetragona*	Semaphore Sedge	X					
Cyperaceae	*Tetraria*	*octandra*		X					
Dasypogonaceae	*Dasypogon*	*bromeliifolius*	Pineapple Bush	X	X				
Dasypogonaceae	*Kingia*	*australis*	Kingia	X					
Dennstaedtiaceae	*Histiopteris*	*incisa*	Bat's wing Fern					X	
Dennstaedtiaceae	*Pteridium*	*esculentum*	Bracken	X	X				
Dilleniaceae	*Hibbertia*	*cunninghamii*		X					
Dilleniaceae	*Hibbertia*	*pilosa*	Hairy Guinea Flower		X				
Droseraceae	*Drosera*	*macrantha*	Bridal Rainbow	X					
Droseraceae	*Drosera*	*menziesii*	Pink Rainbow			X	X		
Elaeocarpaceae	*Tetratheca*	*affinis*			X				
Ericaceae	*Brachyloma*	*baxteri*			X				

Table 1 continued.

Family	Genus	Species	Common Name	Vegetation Type					
				1	2	3	4	5	6
Ericaceae	*Leucopogon*	*distans*			X				
Ericaceae	*Leucopogon*	*verticillata*	Tassel Flower	X					
Fabaceae	*Acacia*	*baileyana*	Cootamundra Wattle*	X					
Fabaceae	*Acacia*	*hastulata*				X			
Fabaceae	*Acacia*	*longifolia*	Sydney Wattle*	X					
Fabaceae	*Acacia*	*myrtifolia*		X					
Fabaceae	*Bossiaea*	*linophylla*		X					
Fabaceae	*Bossiaea*	*ornata*	Broad Leaved Brown Pea		X				
Fabaceae	*Bossiaea*	*rufa*			X				
Fabaceae	*Daviesia*	*aphylla*			X				
Fabaceae	*Daviesia*	*flexuosa*		X					
Fabaceae	*Gompholobium*	*knightianum*			X				
Fabaceae	*Gompholobium*	*ovatum*		X					
Fabaceae	*Gompholobium*	*polymorphum*		X					
Fabaceae	*Gompholobium*	*scabrum*			X				
Fabaceae	*Hovea*	*chorizemifolia*	Holly-leaved Hovea	X					
Fabaceae	*Jacksonia*	*spinosa*			X				
Fabaceae	*Kennedia*	*coccinea*	Coral Vine		X				
Fabaceae	*Latrobea*	*genistoides*			X				
Fabaceae	*Ornithopus*	*compressus*	Yellow Serradella*					X	
Fabaceae	*Psoralea*	*pinnata*	African Scurfpea*		X	X	X		
Fabaceae	*Pultenaea*	*reticulata*			X				
Fabaceae	*Sphaerolobium*	*hygrophilum*				X		X	
Fabaceae	*Sphaerolobium*	*fornicatum*				X		X	
Fabaceae	*Sphaerolobium*	*rostratum* (albino form)				X		X	
Fabaceae	*Trifolium*	*glomeratum*	Cluster Clover*					X	X
Goodeniaceae	*Dampiera*	*leptoclada*	Slender-shooted Dampiera			X			
Goodeniaceae	*Dampiera*	*pedunculata*		X	X				
Goodeniaceae	*Scaevola*	*striata*	Royal Robe	X					
Haemodoraceae	*Anigozanthos*	*preissii*	Albany Catspaw		X				
Haemodoraceae	*Conostylis*	*setigera*	Bristle Cottonhead	X					
Haemodoraceae	*Haemodorum*	*spicatum*	Mardja		X				
Haemodoraceae	*Phlebocarya*	*ciliata*			X				
Hemerocallidaceae	*Agrostocrinum*	*scabrum*	Blue Grass Lily		X				
Hemerocallidaceae	*Johnsonia*	*lupulina*	Hooded Lily	X					
Iridaceae	*Patersonia*	*babianoides*		X					
Iridaceae	*Patersonia*	*occidentalis*	Purple Flag	X					
Iridaceae	*Watsonia*	*meriana var. bulbillifera*	Bugle Lily*		X				

Table 1 continued.

Family	Genus	Species	Common Name	Vegetation Type					
				1	2	3	4	5	6
Lentibulariaceae	*Utricularia*	*multifida*	Pink Petticoats			X			
Lentibulariaceae	*Utricularia*	*volubilis*	Twining Bladderwort			X			
Lindsaeaceae	*Lindsaea*	*linearis*	Screw Fern	X					
Loganiaceae	*Orianthera*	*serpyllifolia*		X					
Loganiaceae	*Phyllangium*	*paradoxum*			X				
Loranthaceae	*Nuytsia*	*floribunda*	Christmas Tree		X				
Myrtaceae	*Agonis*	*theiformis*		X					
Myrtaceae	*Beaufortia*	*decussata*	Gravel Bottlebrush	X					
Myrtaceae	*Callistemon*	*glaucus*	Albany Bottlebrush			X	X	X	
Myrtaceae	*Corymbia*	*calophylla*	Marri	X					
Myrtaceae	*Eucalyptus*	*marginata*	Jarrah	X	X				
Myrtaceae	*Eucalyptus*	*staeri*	Albany Blackbutt		X				
Myrtaceae	*Homalospermum*	*firmum*				X	X	X	
Myrtaceae	*Hypocalymma*	*robustum*	Swan River Myrtle		X				
Myrtaceae	*Kunzea*	*sulphurea*		X					
Myrtaceae	*Melaleuca*	*preissiana*	Moonah				X		
Myrtaceae	*Melaleuca*	*thymoides*		X	X				
Myrtaceae	*Taxandria*	*linearifolia*				X			
Myrtaceae	*Taxandria*	*parviceps*		X	X				
Orchidaceae	*Caladenia*	*flava*	Cowslip Orchid		X				
Orchidaceae	*Gastrodia*	*lacista*	Potato Orchid			X			
Orchidaceae	*Paracaleana*	*disjuncta*			X				
Orchidaceae	*Thelymitra*	*crinita*	Blue Lady Orchid	X					
Orchidaceae	*Thelymitra*	*mucida*	Plum Orchid	X					
Phyllanthaceae	*Poranthera*	*microphylla*	Small Poranthera		X				
Phytolaccaceae	*Phytolacca*	*octandra*	Red Ink Plant*		X	X		X	
Poaceae	*Anthoxanthum*	*odoratum*	Sweet Vernal Grass	X					
Poaceae	*Avena*	*barbata*	Bearded Oats*	X					
Poaceae	*Briza*	*maxima*	Blowfly Grass*	X					
Poaceae	*Bromus*	*diandrus*	Great Brome*	X	X				
Poaceae	*Eragrostis*	*curvula*	African Lovegrass*		X				
Poaceae	*Holcus*	*lanatus*	Yorkshire Fog*	X			X	X	
Poaceae	*Lagurus*	*ovatus*	Hare's Tail Grass*		X				
Poaceae	*Lolium*	*rigidum*	Wimmera Ryegrass*		X				X
Poaceae	*Cenchrus*	*clandestinus*	Kikuyu*	X	X				X
Polygalaceae	*Comesperma*	*virgatum*				X		X	
Polygalaceae	*Rumex*	*pulcher*	Fiddle Dock*		X				X
Proteaceae	*Adenanthos*	*cuneatus*	Coastal Jugflower	X	X				
Proteaceae	*Adenanthos*	*obovatus*	Basket Flower		X				

Table 1 continued.

Family	Genus	Species	Common Name	Vegetation Type					
				1	2	3	4	5	6
Proteaceae	*Banksia*	*attenuata*	Slender Banksia	X	X				
Proteaceae	*Banksia*	*formosa*	Showy Dryandra	X					
Proteaceae	*Banksia*	*grandis*	Bull Banksia	X					
Proteaceae	*Banksia*	*ilicifolia*	Holly-leaved Banksia		X				
Proteaceae	*Banksia*	*littoralis*	Swamp Banksia				X	X	
Proteaceae	*Banksia*	*quercifolia*	Oak-leaved Banksia		X				
Proteaceae	*Conospermum*	*caeruleum*	Blue Brother	X					
Proteaceae	*Hakea*	*amplexicaulis*	Prickly Hakea	X					
Proteaceae	*Hakea*	*ruscifolia*	Candle Hakea	X					
Proteaceae	*Hakea*	*varia*			X				
Proteaceae	*Isopogon*	*longifolius*		X					
Proteaceae	*Persoonia*	*longifolia*	Snottygobble	X					
Proteaceae	*Petrophile*	*diversifolia*		X					
Restionaceae	*Desmocladus*	*fasciculatus*		X					
Restionaceae	*Empodisma*	*gracillimum*				X	X	X	
Restionaceae	*Hypolaena*	*exsulca*			X				
Restionaceae	*Leptocarpus*	*tenax*	Slender Twine Rush			X		X	
Restionaceae	*Tremulina*	*tremula*			X				
Rhamnaceae	*Spyridium*	*globulosum*	Basket Bush	X					
Rubiaceae	*Opercularia*	*hispidula*	Hispid Stinkweed	X					
Rutaceae	*Boronia*	*crenulata*	Aniseed Boronia	X					
Rutaceae	*Boronia*	*molloyae*	Tall Boronia					X	
Rutaceae	*Boronia*	*spathulata*	Boronia	X					
Solanaceae	*Solanum*	*laciniatum*	Kangaroo Apple*	X				X	
Stylidiaceae	*Stylidium*	*diversifolium*	Touch-me-not		X				
Stylidiaceae	*Stylidium*	*piliferum*	Common Butterfly Triggerplant	X					
Stylidiaceae	*Stylidium*	*schoenoides*	Cow Kicks	X					
Stylidiaceae	*Stylidium*	*spinulosum*	Topsy-turvy Triggerplant		X				
Thymelaeaceae	*Pimelea*	*imbricata*			X				
Xanthorrhoeaceae	*Xanthorrhoea*	*platyphylla*		X					
Xyridaceae	*Xyris*	*lanata*						X	

3.1. Vegetation types

The flora and vegetation survey identified six vegetation types; Jarrah/Marri/Sheoak Laterite Forest (Vegetation Type 1) Jarrah/Sheoak/*Eucalyptus staeri* Sandy Woodland (Vegetation Type 2), *Homalospermum firmum/Callistemon glaucus* Peat Thicket (Vegetation Type 3), *Melaleuca preissiena* Low Woodland (Vegetation Type 4), Miscellaneous Drainage Woodland/Shrubland (Vegetation Type 5) and Open paddock / agricultural land (Vegetation Type 6), including bare and sand extraction areas. A full description is provided in the following sections.

3.1.1. Vegetation Type 1 - Jarrah/Marri/Sheoak Laterite Forest

Key defining features of this vegetation type are an overstorey of *Eucalyptus marginata* and *Allocasuarina fraseriana.* The relatively open and diverse shrub layer is dominated by *Banksia grandis, Agonis theiformis, Leucopogon verticillata, Xanthosia rotundifolia, Bossiaea linophylla, Nuytsia floribunda, Kingia australis, Hovea chorizemifolia, Taxandria parviceps* and *Xanthorrhoea platyphylla.* The sedges and herb layers are dominated by *Anarthria prolifera, Desmocladus fascicularis, Mesomelaena tetragona, Cyathochaeta equitans, Patersonia occidentalis, Haemodorum spicatum* and *Orianthera serpyllifolia.* The grass layer consists of introduced species such as *Briza maxima*, Avena barbata*, Holcus lanatus*, Bromus diandrus*.*

This vegetation type aligns with ARVS 12 and occurs within the remnant vegetation to the west and along the northern and eastern boundaries in the existing Down Road and Down Road South Road reserves (Figure 9). Please refer to Table 1 above for a full list of species identified during the survey and Figure 3 for images of this vegetation type.



Figure 3: Photographic representation of the vegetation type present within the survey area.

3.1.2. Vegetation Type 2 - Jarrah/Sheoak/Eucalyptus staeri Sandy Woodland

Key defining features of this vegetation type are an overstorey of *Eucalyptus marginata, Allocasuarina fraseriana, Eucalyptus staeri* and *Corymbia calophylla.* The relatively open and diverse shrub layer is dominated by *Banksia grandis, Pimelea imbricata, Hakea amplexicaulis, Leucopogon verticillata, Dasypogon bromeliifolius, Leucopogon distans, Boronia crenulata, Xanthosia rotundifolia* and *Gompholobium ovatum.* The sedges and herb layers are dominated by *Anarthria prolifera, Cyathochaeta equitans, Desmocladus fascicularis, Patersonia occidentalis, Lindsaea linearis, Dampiera pedunculata and Lepidosperma squamatum.* The grass layer consists of introduced species *Holcus lanatus*, Bromus diandrus*, Cenchrus clandestinus*, Anthoxanthum odoratum*, Lolium rigidum* and Lagurus ovatus*.*

This vegetation type aligns with ARVS 13 and occurs within the western remnant vegetation (western precinct), along the northern and eastern boundaries in the existing Down Road and Down Road South Road reserves, within remnant vegetation located to the north and south of the creek / drainage line (southern precinct) and in small isolated pockets throughout the paddocks (Figure 9). Please refer to Table 1 for a full list of species identified during the survey and Figure 4 for images of this vegetation type.



Figure 4: Photographic representation of the vegetation type present within the survey area.

3.1.3. Vegetation Type 3 - Homalospermum firmum/Callistemon glaucus Peat Thicket

The vegetation type is dominated by a shrub layer consisting of *Melaleuca preissiana, Callistemon glaucus, Homalospermum firmum* and *Banksia littoralis* over *Taxandria parviceps, Taxandria linearis* and *Acacia hastulata.* The sedges and herbs layers are dominated by *Empodisma gracillimum, Gymnoschoenus anceps* and *Dampiera leptoclada.* This vegetation unit aligns with ARVS 47 and occurs along the south-western boundary (recently burnt) and within the creek / drainage system located along the southern boundary (southern precinct) (Figure 9). Please refer to Table 1 for a list of species identified during the survey within this vegetation type and Figure 5 for images of this vegetation type.



Figure 5: Photographic representation of the vegetation type present within the survey area.

3.1.4. Vegetation Type 4 - Melaleuca preissiana Low Woodland

This vegetation type was dominated by a shrub layer of *Melaleuca preissiana* and *Psoralea pinnata** and occasional *Banksia littoralis* over *Taxandria linearis, Taxandria parviceps, Callistemon glaucus, Homalospermum firmum, Empodisma gracillimum* and *Holcus lanatus**. This vegetation type aligns with ARVS 49 and was found within the creek / drainage area (Figure 9). Please refer to Table 1 for a full list of species identified during the survey and Figure 6 for images of this vegetation type.



Figure 6: Photographic representation of the vegetation type present within the survey area.

3.1.5. Vegetation Type 5 - Miscellaneous Drainage Woodland/Shrubland

This vegetation type is dominated by *Taxandria linearis* and *Acacia hastulata* over *Homalospermum firmum*, *Callistemon glaucus* and *Boronia molloyae*. Dominant species in the sedge, herb and grass layer were *Drosera menziesii, Gahnia decomposita, Phytolacca octandra** and *Holcus lanatus**. This unit aligns with ARVS 50 and is located along the creek / drainage line situated between *Homalospermum firmum /Callistemon glaucus* Peat Thicket and *Melaleuca preissiana* Low Woodland vegetation types (Figure 9). Please refer to Table 1 for a full list of species identified during the survey and Figure 7 for images of this vegetation type.



Figure 7: Photographic representation of the vegetation type present within the survey area.

3.1.6. Vegetation Type 6 - Open paddock / agricultural land

This vegetation unit is situated internally throughout the survey area (Figure 9). It consists of grazed paddock areas / agricultural land. Species composition includes introduced paddock species such as *Cenchrus clandestinus* (Kikuyu), *Trifolium glomeratu* (Cluster Clover) *Hypochaeris radicata* (Flat Weed), *Lagurus ovatus* (Hare's Tail Grass), *Lolium rigidum* (Wimmera Ryegrass), *Rumex pulcher* (Fiddle Dock) and *Solanum laciniatum* (Kangaroo Apple). This unit also includes the bare areas associated with existing sand extraction operations. Please refer to Table 1 above for a full list of species identified during the survey and Figure 8 for images of this vegetation type.



Figure 8: Photographic representation of the vegetation type present within the survey area.

3.2. Extent and Conservation Significance of Vegetation Types

The vegetation types described above align with vegetation units described in the Albany Regional Vegetation Survey (ARVS) report by Sandiford and Barret (2010). This report outlines that the total remnant vegetation within the ARVS area (made up of IUCN I-IV, other Crown reserves and non-reserve areas) was 44093ha (Sandiford and Barret 2010). The local and regional extent and significance of the vegetation units is discussed below (taken from Tables 3.2 and 3.3 in Sandiford and Barret 2010).

ARVS Vegetation Unit 12

This ARVS unit aligns with Vegetation Type 1. The vegetation unit is the most common vegetation unit throughout the ARVS area with the total current extent at 13144ha (representing 29.8% of the total remnant vegetation in the ARVS survey area). Approximately 7879ha are found within non-reserve areas followed by Crown Reserves (3991.6ha) and IUCN I-IV Reserves (1273ha). Although this unit is the most widespread it may be restricted to the ARVS context / survey area, with its eastern range limit occurring +/- within 10km of the ARVS survey area boundary (Sandiford and Barret 2010). Other regional and local representation criteria are that the vegetation type contains Priority flora species. The vegetation unit does not contain specific habitats of significance such as wetland / riparian vegetation, wetlands of national significance etc. (Sandiford and Barret 2010).

ARVS Vegetation Unit 13

This ARVS unit aligns with Vegetation Type 2. This vegetation unit is the second most common unit throughout the ARVS area with the total extent being 5148ha (representing 29.8% of the total remnant vegetation in the ARVS survey area). 1936ha is found in Non-Reserve areas, 1878ha in Oter Crown Reserves and 1334 in IUCN Reserves. This unit is also potentially restricted to the ARVS context / survey area with its eastern range limit occurring +/- within 10km of the ARVS survey area boundary (Sandiford and Barret 2010). Other regional and local representation criteria are that the vegetation type contains Priority and Declared Rare Flora (DRF) species. The vegetation unit does not contain specific habitats of significance such as wetland / riparian vegetation, wetlands of national significance etc. (Sandiford and Barret 2010).

ARVS Vegetation Unit 47

This ARVS unit aligns with Vegetation Type 3. The total current extent within the ARVS unit as described by Sandiford and Barret (2010) is 2083ha, consisting of 1606ha in Non-Reserves, 263ha in IUCN Reserves and 214ha in Other Crown Reserves. This unit is not restricted nor is it near it's range limit. It does contain habitats of significance such including wetland/dampland/riparian habitats and wetlands of national significance (Sandiford and Barret 2010). This vegetation unit is associated with the Marbellup flats that extends from the southern boundary of the Down Road survey area and into surrounding areas.

ARVS Vegetation Unit 49

This ARVS unit aligns with Vegetation Type 4. The total current extent within the ARVS unit as described by Sandiford and Barret (2010) is 679ha, consisting of 476ha in Non-Reserves, 150ha in Other Crown Reserves and 53ha in IUCN Reserves. This vegetation unit has been classified as rare (<1500ha) as well being at its eastern range limit (+/- within 10km) of the ARVS survey area boundary (Sandiford and Barret 2010). Priority flora species are found within this vegetation unit as well as significant habitat (wetland/dampland/riparian habitats). At a site-specific scale (i.e Down Road survey area) the vegetation unit is associated with the Marbellup flats that extends from within the southern boundary and into surrounding areas.

ARVS Vegetation Unit 50

This ARVS unit aligns with Vegetation Type 5. The total current extent within the ARVS unit as described by Sandiford and Barret (2010) is 259ha, consisting of 161ha in Non-Reserves, 77ha in Other Crown Reserves and 21ha in IUCN Reserves. This unit is not including in Sandiford and Barret's conservation assessment (Table 3.3), however the vegetation unit is associated with the Marbellup flats that extends from within the southern boundary and into surrounding areas.

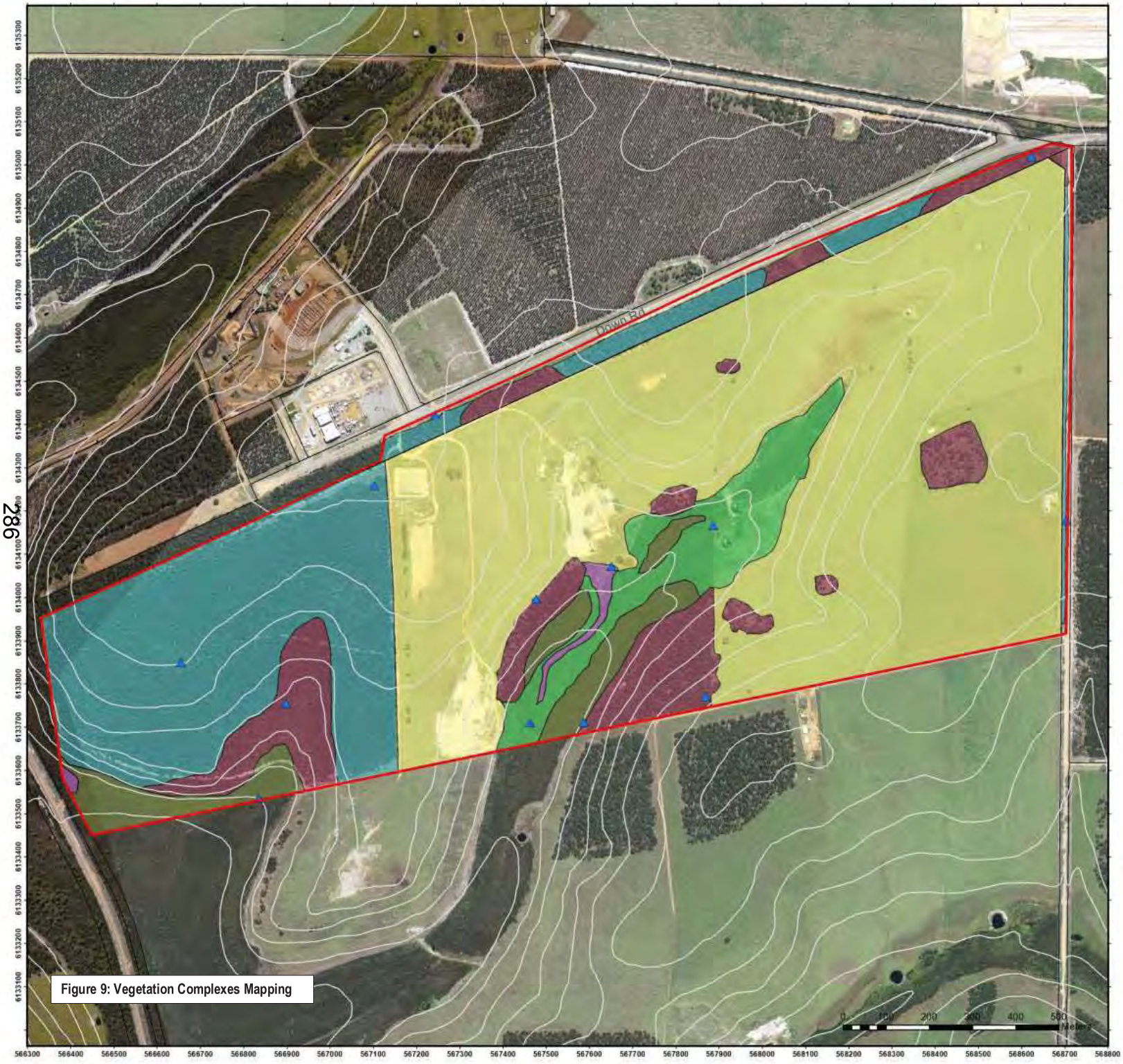


Figure 9: Vegetation Complexes Mapping

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Overview Map Scale 1:100,000

Legend

- Subject Site
- Cadastre
- 5m Contours
- Vegetation Releves

Vegetation Complexes

- Jarrah/Sheoak/Eucalyptus staeri Sandy Woodland
- Jarrah/Marri/Sheoak Laterite Forest
- Homalospermum firmum/Callistemon glaucus Peat Thicket
- Melaleuca preissiana Low Woodland
- Open paddock / agricultural land
- Miscellaneous Drainage Woodland/Shrubland

Scale
1:8,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

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City of Albany
PO Box 484
Albany, WA 6331

Vegetation Complexes Mapping

Assessor	QA Check	Drawn by
EH	KK	BT
STATUS	**FILE**	**DATE**
FINAL	MSC0137-002	06/02/2019

REPORT ITEM DIS 164 REFERS

3.3. Vegetation Condition

The vegetation condition for the survey area has been mapped using the Keighery condition rating scale (Keighery 1994, Table 2). Vegetation in the survey area has variable condition ranging from Pristine to Completely Degraded. The majority of the western remnant vegetation block has been classified as Pristine, with two small sections classified as Excellent along its north and south eastern boundaries. The vegetation situated immediately along the creek / drainage line has been classified as both Pristine and Very Good. Roadside vegetation has been classified as both Very Good and Excellent. The paddock areas and vegetation surrounding dams and remnant vegetation have been classified as Completely Degraded due to significant structural changes such as multiple disturbances be that either through fire, clearing, weed invasion and impacts from cattle. Stands of paddock trees have also been classified as Completely Degraded due to the complete loss of structure and solely consisting of a native overstorey. Overall 121.52ha were classified as Completely Degraded, 12.06ha as Very Good, 59.76ha as Pristine and 6.78ha as Excellent. Refer to Figure 10 for vegetation condition mapping.

Table 2: Condition Rating Scale (Keighery 1994).

Vegetation Condition Rating	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires; the presence of some more aggressive weeds; dieback; logging; & grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate to it. For example, disturbance to vegetation structure caused by very frequent fires; the presence of some very aggressive weeds at high density; partial clearing; dieback; & grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires; the presence of very aggressive weeds; partial clearing; dieback; & grazing.
Completely Degraded	Vegetation structure not intact; the area completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

3.4. Weeds and disturbance

Of the 141 species recorded within the survey area, 19 (12.7%) are introduced (Table 1). Of the 19-weed species identified across the survey area, none are a declared pest species under the *Biosecurity and Agriculture Management Act 2007.* Under the Environmental Weeds Strategy for Western Australia (*CALM 1999*) there are two weed species rated as Low, four species are rated as Mild, seven species are rated as Moderate, four species are rated as High and the remaining two species have no rating (Table 3). The strategy classifies weeds according to their relative level of threat to conservation (high medium or low) and this rating is based on their distribution, relative level of invasiveness and environmental impact.

Table 3: Weed species recorded from the survey area.

Family	Genus	Species	Vernacular	WA Weed Strategy rating (CALM 1999) / BAM Act
Asteraceae	*Hypochaeris*	*radicata*	Flat Weed	Moderate / Permitted - s11
Cyatheaceae	*Cyathea*	*cooperi*	Tree Fern	Low / Permitted - s11
Fabaceae	*Acacia*	*baileyana*	Cootamundra Wattle	Low / Permitted - s11
Fabaceae	*Acacia*	*longifolia*	Sydney Wattle	Permitted - s11
Fabaceae	*Ornithopus*	*compressus*	Yellow Serradella	Mild / Permitted - s11
Fabaceae	*Psoralea*	*pinnata*	African Scurfpea	Mild / Permitted - s11
Fabaceae	*Trifolium*	*glomeratum*	Cluster Clover	Moderate / Permitted - s11

Table 3 Continued

Family	Genus	Species	Vernacular	WA Weed Strategy rating (CALM 1999) / BAM Act
Iridaceae	*Watsonia*	*meriana var. bulbillifera*	Bugle Lily	High / Permitted - s11
Poaceae	*Avena*	*barbata*	Bearded Oats	Moderate / Permitted - s11
Poaceae	*Briza*	*maxima*	Blowfly Grass	Moderate / Permitted - s11
Poaceae	*Bromus*	*diandrus*	Great Brome	High / Permitted - s11
Poaceae	*Eragrostis*	*curvula*	African Lovegrass	High / Permitted - s11
Poaceae	*Holcus*	*lanatus*	Yorkshire Fog	Moderate / Permitted - s11
Poaceae	*Lagurus*	*ovatus*	Hare's Tail Grass	High / Permitted - s11
Poaceae	*Lolium*	*rigidum*	Wimmera Ryegrass	Moderate / Permitted - s11
Poaceae	*Cenchrus*	*clandestinus*	Kikuyu	Moderate / Permitted - s11
Polygalaceae	*Rumex*	*pulcher*	Fiddle Dock	Mild / Permitted - s11
Phytolaccaceae	*Phytolacca*	*octandra*	Red Ink Plant	Mild / Permitted - s11
Solanaceae	*Solanum*	*laciniatum*	Kangaroo Apple	Permitted - s11



Figure 10: Vegetation Condition Mapping

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Overview Map Scale 1:100,000

Legend

- Subject Site
- Cadastre
- 5m Contours

Vegetation Condition

- Completely Degraded
- Very Good
- Excellent
- Pristine

Scale
1:8,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT

City of Albany
PO Box 484
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Vegetation Condition Mapping

Assessor	*QA Check*	*Drawn by*
EH	KK	BT
STATUS	*FILE*	*DATE*
FINAL	MSC0137-002	13/12/2018

REPORT ITEM DIS 164 REFERS

3.5. Priority and Threatened Ecological Communities

While two threatened ecological communities were identified as potentially occurring within the survey area during the desktop assessment, neither of these were found to be present within the survey area (Table 4).

Table 4 Potential Priority and Threatened Ecological Communities within 15km of the survey area.

Community Name	Status	Description	Survey Outcome
Subtropical and Temperate Coastal Saltmarsh	Priority 3 (WA) VU (EPBC Act)	Consists of the assemblage of plants, animals and micro-organisms associated with saltmarsh in coastal regions of sub-tropical and temperate Australia (south of 23oS latitude). The habitat is coastal areas under tidal influence. In southern latitudes saltmarsh are the dominant habitat in the intertidal zone and often occur in association with estuaries. It is typically restricted to the upper intertidal environment, generally between the elevation of the mean high tide, and the mean spring tide. The community consists mainly of salt-tolerant vegetation (halophytes) including: grasses, herbs, reeds, sedges and shrubs. Succulent herbs and grasses generally dominate and vegetation is generally <0.5m tall with the exception of some reeds and sedges. Many species of non-vascular plants are also found in saltmarsh, including epiphytic algae, diatoms and cyanobacterial mats. Saltmarsh consists of many vascular plant species but is dominated by relatively few families. There is also typically a high degree of endemism at the species level. The two most widely represented coastal saltmarsh plant families are the Chenopodiaceae and Poaceae. Four structural saltmarsh forms are currently recognised based on dominance of a particular vegetation type: • dominance by succulent shrubs (e.g. *Tecticornia)* • dominance by grasses (e.g. *Sporobolus virginicus*) • dominance by sedges and grasses (e.g. *Juncus kraussii, Gahnia trifida*) • dominance by herbs (e.g. low-growing creeping plants such as *Wilsonia backhousei, Samolus repens, Schoenus nitens*) (DBCA, 2017*a*).	Not present within the survey area. The habitat described is not present in the creek line / drainage area. The structural composition on site does not meet any of the four described as being consists with this TEC.
Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia	Priority 3 (WA) EN (EPBC Act)	Consists of predominantly obligate seeding proteaceous shrubland and heath (kwongkan) and mallee heath on sandplain, duplex sand/clay and gravels overlying Eocene sediments, quartzite, schist, Yilgarn and Albany Fraser granite and greenstone ranges. Its flora is characterised by high species diversity and a high degree of endemism, particularly in the Stirling Range, Fitzgerald River National Park, Ravensthorpe Range and Russell Ranges. Due to the high levels of endemism, there are few species that exist across the entire range of the dense, obligate seeding Proteaceae dominated shrublands and kwongan of the Esperance Sandplains, however particular species have been identified as common dominant species in each of its ecodistricts (DBCA, 2017*a*).	Not present within the survey area. Species composition does not meet the diagnostic features of the TEC.

1.1. Threatened Flora

The scope for this survey was to provide the client with information on any threatened flora species that are potentially present within the survey area. For species that were not flowering and that require flowers for accurate identification, a risk assessment was undertaken of habitat suitability (Table 5). Species were deemed either likely or unlikely to occur in the area based on habitat suitability (e.g. soil type, vegetation type, density etc). None of the 17 DRF and 41 Priority species potentially occurring in the area were found to be present.

Table 5 Potential threatened flora located within 15km of the survey area.

Family	Species	Status (WA)	Habitat	Flowering period	Potentially Suitable Habitat Present	Survey Outcome / Comment
Asparagaceae	*Laxmannia jamesii*	P4	Grey sand. Winter-wet locations.	May-Jul	Y	Species detection within remnant vegetation to the west. Noted during the report writing process the species has been delisted.
Asparagaceae	*Thysanotus isantherus*	P4	Granite.	Nov - Dec	N	Survey timing suitable. No suitable habitat present. Species not found.
Brassicaceae	*Lepidium pseudotasmanicum*	P4	Loam, sand.	Feb or Dec	Y	Survey timing suitable. Species not found.
Centrolepidaceae	*Centrolepis caespitosa*	P4	White sand, clay. Salt flats, wet areas.	Oct-Dec	N	Survey timing suitable. No suitable habitat present. Species not found.
Dasypogonaceae	*Calectasia cyanea*	T	White, grey or yellow sand, gravel. Occurs in heathland on gentle slopes with *Allocasuarina humilis, Banksia grandis, Adenanthos cuneatus, Hakea ruscifolia and Melaleuca thymoides*.	Jun-Oct	Y	Survey outside of flowering period. Species not found.
Droseraceae	*Drosera fimbriata*	P4	White sand, clay. Salt flats, wet areas.	Oct-Dec	N	Survey timing suitable. No suitable habitat present. Species not found.
Ericaceae	*Andersonia auriculata*	P3	Grey or peaty sand, often over laterite. Swampy areas, granite outcrops.	Apr-Oct	Y	Survey outside of flowering period. Genus not found within the survey area. Species not found.
Ericaceae	*Andersonia sp. Jamesii (J. Liddelow 84)*	P3	Very limited publicly available information on this species			Genus not found within the survey area. Species not found.
Ericaceae	*Andersonia sp. Mitchell River (B.G. Hammersley 925)*	P3	Grey sand over laterite or granite.	Jun-Sept	Y	Survey outside of flowering period. Genus not found within the survey area. Species not found.
Ericaceae	*Leucopogon alternifolius*	P3	Grey/white sand. Swampy areas, seasonally wet areas	Aug-Dec	Y	Survey timing suitable. Species not found.

291

REPORT ITEM DIS 164 REFERS

Table 5 Continued.

Family	Species	Status (WA)	Habitat	Flowering period	Potentially Suitable Habitat Present	Survey Outcome / Comment
Ericaceae	*Leucopogon cymbiformis*	P2	White/grey or yellow sand, lateritic gravelly soils. Sandplains, wet flats, foothills	Jul-Nov or Feb-Mar	Y	Survey timing suitable. Species not found.
Ericaceae	*Lysinema lasianthum*	P4	Swamps, seasonally wet areas	Jul-Nov	Y	Survey timing suitable. Species not found.
Ericaceae	*Sphenotoma drummondii*	T	Stony or shallow soils over granite or quartzite. Steep rocky slopes, crevices of rocks	Sept-Dec	N	Survey timing suitable. No suitable habitat present. Species not found.
Fabaceae	*Acacia prismifolia*	X				Presumed extinct, Species not found.
Fabaceae	*Chorizema carinatum*	P3	Sand, sandy clay	Oct - Dec	Y	Survey timing suitable. Species not found.
Fabaceae	*Kennedia glabrata*	T	Soil pockets, sandy soils. Granite outcrops.	Aug-Nov	Y	Survey timing suitable. Species not found.
Haemodoraceae	*Conostylis misera*	T	White or grey sand, sandy loam. Winter-wet flats.	Oct-Nov	Y	Survey timing suitable. Species not found.
Haloragaceae	*Gonocarpus pusillus*	P4	Grey sandy clay. Winter-wet swamps	Nov-Dec	N	Survey timing suitable. No suitable habitat present. Species not found.
Haloragaceae	*Gonocarpus simplex*	P4	Peaty sand. Swamps, seasonally inundated areas	Nov-Dec	Y	Survey timing suitable. Species not found.
Juncaceae	*Juncus meianthus*	P3	Black sand, sandy clay. Creeks, seepage areas	Nov-Dec or Jan	N	Survey timing suitable. No suitable habitat present. Species not found.
Malvaceae	*Thomasia quercifolia*	P4	Alluvium, sand over limestone, rocky loam. Coastal areas.	Sept-Dec	N	Survey timing suitable. No suitable habitat present. Species not found.
Malvaceae	*Thomasia solanacea*	P4	Alluvium, sand over limestone, rocky loam. Coastal areas.	Sept-Dec	N	Survey timing suitable. No suitable habitat present. Species not found.
Myrtaceae	*Astartea transversa*	P2	Grey sand or peaty black sandy clay on winter-wet flats in heath	Jan and Apr-Jun	Y	Survey outside of flowering period. Genus not found within the survey area. Species not found.

REPORT ITEM DIS 164 REFERS

Table 5 Continued.

Family	Species	Status (WA)	Habitat	Flowering period	Potentially Suitable Habitat Present	Survey Outcome / Comment
Myrtaceae	*Melaleuca ringens*	P3	Sand. Limestone ridges & clifftops.	Sept-Oct	N	Survey timing suitable. No suitable habitat present. Species not found.
Myrtaceae	*Verticordia apecta*	T	Sandy clay with loam & broken granite. Slopes	Nov	N	Survey timing suitable. No suitable habitat present. Species not found.
Myrtaceae	*Verticordia fimbrilepis subsp. australis*	T	Shallow sand, clay loam. Granite outcrops	Oct-Dec	N	Survey timing suitable. No suitable habitat present. Species not found.
Orchidaceae	*Caladenia evanescens*	P1	Sand. Consolidated sand dunes.	Nov	N	Survey timing suitable. No suitable habitat present. Species not found.
Orchidaceae	*Caladenia granitora*	T	Shallow soil crevices on granite. Coastal areas	Oct-Nov	N	Survey timing suitable. No suitable habitat present. Species not found.
Orchidaceae	*Caladenia harringtoniae*	T	Sandy loam. Winter-wet flats, margins of lakes, creeklines, granite outcrops.	Oct-Nov	Y	Survey timing suitable. Species not found.
Orchidaceae	*Corybas abditus*	P3	Black peaty soils. Winter-wet swamps	Oct-Nov	Y	Survey timing suitable. Species not found.
Orchidaceae	*Corybas limpidus*	P4	Sand. Coastal dunes.	Aug-Sept	N	Survey outside of flowering period. No suitable habitat present. Species not found.
Orchidaceae	*Diuris drummondii*	T	Low-lying depressions, swamps.	Nov-Dec or Jan	Y	Survey timing suitable. Species not found.
Orchidaceae	*Drakaea micrantha*	T	White-grey sand.	Sept-Oct	Y	Survey outside of flowering period. Species not found.
Orchidaceae	*Microtis globula*	T	Peaty soils. Winter-wet swamps	Dec or Jan	Y	Survey outside of flowering period. Species not found.
Orchidaceae	*Microtis pulchella*	P4	Peaty sand. Winter-wet swamps	Nov-Dec or Jan	Y	Survey timing suitable. Species not found.
Orchidaceae	*Microtis quadrata*	P4	Poorly known taxa with unresolved distribution	Sept-Jan	Y	Survey timing suitable. Species not found.
Orchidaceae	*Prasophyllum paulinae*	P1	Low winter wet shrublands, in grasses and sedges in swamps	Sept-Nov	Y	Survey timing suitable. Species not found.

REPORT ITEM DIS 164 REFERS

Table 5 Continued.

Family	Species	Status (WA)	Habitat	Flowering period	Potentially Suitable Habitat Present	Survey Outcome / Comment
Orchidaceae	*Pterostylis heberlei*	P2	Recently described (2017) very limited publicly available information			Genus not found on site. Species not found.
Orchidaceae	*Thelymitra variegata*	P2	Sandy clay, sand, laterite	Jun-Sept	Y	Survey outside of flowering period. Species not found.
Proteaceae	*Adenanthos x cunninghamii*	P4	Grey sand. Coastal dunes & sandplains	Sept-Oct	N	Survey outside of flowering period. No suitable habitat present. Species not found.
Proteaceae	*Banksia brownii*	T	Sand over laterite, gravel, loam over granite. In gullies	Mar-Jul	Y	Survey outside of flowering period. Species distinguishable outside of flowering period. Species not found.
Proteaceae	*Banksia goodii*	T	Shallow white to grey sand over laterite, in low open forest or low woodland of Jarrah and Sheoak.	May, Nov	Y	Survey timing suitable. Species not found.
Proteaceae	*Banksia seneciifolia*	P4	Sandy loam, sand. Rocky hillsopes.	Jun or Aug	N	Survey outside of flowering period. No suitable habitat present. Species not found.
Proteaceae	*Banksia serra*	P4	Gravel, sand or clay loam over laterite. Hillslopes.	Jul-Sept	Y	Survey outside of flowering period. Species not found.
Proteaceae	*Banksia verticillata*	T	Sandy loam. On or beside granite outcrops.	Jan-Apr	N	Survey outside of flowering period. No suitable habitat present. Species not found.
Proteaceae	*Isopogon buxifolius var. buxifolius*	P2	Grey sand. Swampy areas.	Jul-Dec	Y	Survey timing suitable. Species not found.
Proteaceae	*Isopogon uncinatus*	T	Loam or sand on granite, peaty sand. Swampy depressions, hillslopes.	Oct-Nov	Y	Survey timing suitable. Species not found.
Proteaceae	*Lambertia orbifolia subsp. orbifolia*	T	Shallow grey or light brown sand, grey sandy loams over laterite, gravel. Gently undulating plains, low slopes, low ridges, along roadsides	May, Aug, Nov-Dec or Jan-Feb	Y	Survey timing suitable. Species not found.
Proteaceae	*Synaphea incurva*	P1	Gravelly loam, sandy soils. Slopes.	Sept-Nov	Y	Survey timing suitable. Species not found.
Proteaceae	*Synaphea intricata*	P3	Sand, peaty sand. Flats, swampy areas	Sept-Oct	Y	Survey outside of flowering period. Species not found.

REPORT ITEM DIS 164 REFERS

Table 5 Continued.

Family	Species	Status (WA)	Habitat	Flowering period	Potentially Suitable Habitat Present	Survey Outcome / Comment
Proteaceae	*Synaphea preissii*	P3	Sand, gravelly loam	Jul-Nov	Y	Survey timing suitable. Species not found.
Restionaceae	*Chordifex abortivus*	T	Sand. Low rises and undulating areas.	Sep-Oct	N	Survey outside of flowering period. No suitable habitat present. Species not found.
Restionaceae	*Leptocarpus crassipes*	P3	Swamps	Dec-Feb	Y	Survey outside of flowering period. Species not found.
Rhamnaceae	*Spyridium spadiceum*	P4	Sand or gravelly loam. Granitic hills	Aug-Dec or Jan-Feb/Apr	N	Survey timing suitable. No suitable habitat present. Species not found.
Rutaceae	*Boronia crassipes*	P3	Sand, peaty sand. Winter-wet swamps, creeklines.	Aug-Sept	Y	Survey outside of flowering period. Species not found.
Rutaceae	*Boronia virgata*	P4	Peaty sand or clay. Swampy or waterlogged places.	Aug-Dec	Y	Survey timing suitable. Species not found.
Stylidiaceae	*Stylidium falcatum*	P1	Sand, gravelly clay loam. Plains, lateritic ridges.	Oct-Nov	N	Survey timing suitable. No suitable habitat present. Species not found.
Stylidiaceae	*Stylidium gloeophyllum*	P4	Sandy clay loam, granite. Winter wet depressions, or fringing outcrops. Agonis, mallee, or Hakea shrubland with sedges	Oct-Dec	Y	Survey timing suitable. Species not found.
Thymelaeaceae	*Pimelea rosea subsp. annelsii*	P3	Sandy soils with gravel, laterite. Upper slopes	Sept-Nov	Y	Survey timing suitable. Species not found.

295

REPORT ITEM DIS 164 REFERS

4. Fauna

4.1. Desktop Assessment

Desktop inventory of potential fauna species likely to occur within 15 km of the survey area was undertaken using the following databases and applicable reports:

- DBCA's Nature Map Database Search (combined data from DBCA, Western Australian Museum and Birds Australia) (DPaW 2007-); and
- Protected matters search tool (DoE 2017*a*).

The list compiled from this data (Appendix B) is based on observations from a broader area than the survey area and is likely to include species that are vagrants or would not occur in the actual survey area due to a lack of suitable habitat or poor ecological connectivity. The databases also often included very old records and in some cases the species in question may have become locally or regionally extinct.

4.2. Habitat Connectivity

The South Coast Macro Corridor Network is a bioregional and landscape-scale approach to habitat connectivity that acknowledges that remnant vegetation can play a very important role in developing corridors between protected areas to help achieve long-term biodiversity management outcomes (Wilkins *et al*. 2006; DBCA, 2017*b*). The subject site lies within one of the major potential vegetation corridors known as the "Marbellup Link" which connects remnant vegetation to the existing protected areas. This particular proposed corridor links remnant vegetation to the north west of the site to the Mount Lindsay, as well as connecting to the "Coastal Corridor" which ultimately connects to Torndirrup National Park (WALGA, 2018*c*).

At a local level the remnant vegetation within the survey area provides a corridor for wildlife along the eastern and northern property boundaries and internal throughout the site. The remnant vegetation situated within the western and southern extents of the property also provide wildlife corridors / habitat connectivity external to the site to surrounding bushland areas. The riparian vegetation situated along the Marbellup Flats (located along the southern boundary) provides a corridor to the south into the Down Road South Nature Reserve.

The vegetation types / wildlife habitat present within the survey area are well represented locally and in nearby reserves. The Jarrah / Marri dominated woodland and forest present are one of the most abundant habitat types present within the ARVS survey area, providing a significant proportion of wildlife habitat. The *Homalospermum* and *Callistemon* dominated thickets present with the survey area are not as common at a regional level based on ARVS mapping. However, these habitat types are well represented in surrounding remnant vegetation and nearby reserves such as the Down Road Nature Reserve.

4.3. Potential Breeding, Foraging and Roosting Black Cockatoo Habitat

Desktop searches of publicly available information indicates that areas of the Jarrah and Marri dominated vegetation throughout the survey area is potential feeding / foraging habitat to Carnaby's Black Cockatoos (WALGA, 2018*d*). This dataset is based on vegetation containing plant species favoured by Carnaby's Black Cockatoos not point records of feeding (WALGA, 8018*d*). This dataset shows no confirmed or potential breeding or roosting areas for Carnaby's Black Cockatoos to be present within the survey area. Based on known habitat preferences for Baudin's Back Cockatoos and Forest Red-tailed Black Cockatoos the vegetation present in the survey area also holds potential for foraging, breeding and roosting for the two species (DSEWPaC (2012).

4.4. Field Methodology

Field survey work was carried out by Dr. Karlene Bain (Wildlife Ecologist) and Bianca Theyer (Conservation and Wildlife Biologist) from Bio Diverse Solutions between the 29th of October and the 2nd November 2018 in accordance with Guidance Statement 56: *Terrestrial Fauna Surveys* (EPA 2016*a*). A total of 44 survey hours over 5 days were dedicated to the fauna survey. Vegetation units observed during the site survey were used to define broad fauna habitat types across the site (See Section 3). The aim of the fauna survey was to gain an understanding of what species and habitat are present in the area and to determine the likelihood of threatened species utilising the area as well as the significance of the habitat to them. As the western remnant vegetation area is not set to be developed, significant trees were not measured and mapped throughout this area. Surveys in all areas consisted of systematic transects along which evidence of fauna activity was documented and potential habitat was identified. In all areas (other than the western remnant vegetation) each individual tree with a DBH

>500mm was measured, mapped and assessed for habitat potential. All evidence of threatened species was GPS'd and all hollows were GPS'd and described, with likely occupants noted.

Targeted assessment was carried out for *Calyptorhynchus baudinii* (Baudin's Cockatoo), *Calyptorhynchus banksii naso* (Forest Red-tailed Black-Cockatoo), *Calyptorhynchus latirostris* (Carnaby's Cockatoo), *Dasyurus geoffreyi* (Chuditch), *Hydromys chrysogaster* (Water Rat), *Falsistrellus mackenziei* (Western False Pipistrelle), *Isoodon obesulus fusciventer* (Quenda), *Notamacropus irma* (Western Brush Wallaby), *Phascogale tapoatafa wambenger* (Brush-tailed Phascogale), *Pseudocheirus occidentalis* (Western Ringtail Possum), *Setonix brachyurus* (Quokka) and *Zephyrarchaea mainae* (Western Arachnid Spider).

Targeted assessment techniques included:

- Survey for hollow-bearing trees and potential breeding trees for *Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo), *Calyptorhynchus baudinii* (Baudin's Cockatoo) and *Calyptorhynchus latirostris* (Carnaby's Black-Cockatoo), including identification of all suitable trees species within the survey area with a Diameter at Breast Height (DBH) of over 500mm;
- Surveys for foraging habitat for *Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo), *Calyptorhynchus baudinii* (Baudin's Cockatoo) and *Calyptorhynchus latirostris* (Carnaby's Black-Cockatoo), including observation of any actual foraging evidence such as chewed nuts, cones or stripped bark;
- Surveys for potential habitat trees for *Pseudocheirus occidentalis* (Western Ringtail Possum), through identification of dreys, hollows and tree scratchings;
- Surveys for potential habitat and evidence of *Setonix brachyurus* (Quokka), *Isoodon obesulus fusciventer* (Quenda) presence through the identification of diggings, scats and runnels and the use of remote cameras;
- Surveys for potential habitat and evidence of *Dasyurus geoffreyi* (Chuditch) presence through the identification of scats, activity around potential den logs and the use of remote cameras;
- Surveys for potential hollows for *Phascogale tapoatafa wambenger* (Brush-tailed Phascogale);
- Surveys for potential habitat and evidence of *Notamacropus irma* (Western Brush Wallaby) presence through the identification of scats and the use of remote cameras;
- Surveys for potential habitat and evidence of *Hydromys chrysogaster* (Water Rat) through identification of scats, feeding debris and the use of remote cameras;
- Surveys for potential habitat for *Zephyrarchaea mainae* through identifying areas of suspended leaf litter;
- Surveys for potential hollows for *Falsistrellus mackenziei*; and
- General signs of habitat utilisation and evidence for any other species.

In total five cameras were placed where evidence of fauna activity was observed, in order to provide further evidence of species presence within the survey area (Refer to Figure 12). Cameras 04 and 10 were out in the field for 4 consecutive nights, whilst cameras 01, 07 and 23 were out for 3 consecutive nights.

A summary of threatened species survey outcomes are presented in Table 6. Refer to the following sections for survey outcomes.

The assessment was carried out in a manner consistent with the following documents developed by the EPA and Department of Environment and Energy (DoEE) formerly the Department of Sustainability, Water, Population, and Communities (DSEWPaC) and Department of the Environment, Water, Heritage and the Arts (DEWHA):

- EPA (2016a) Technical Guidance: Terrestrial Fauna Surveys;
- EPA (2016b) Technical Guidance: Sampling Methods for Terrestrial Vertebrate Fauna;
- EPA (2016c) Technical Guidance: Sampling of Short-range Endemic Invertebrate Fauna;
- DEWHA (2010) Survey guidelines for Australia's threatened birds;
- DSWEPaC (2011) Survey Guidelines for Australia's Threatened Mammals; and
- DSWEPaC (2012) Referral Guidelines for Three Threatened Black Cockatoo Species.

The results presented are based upon opportunistic field data collected over a limited period of time and are indicative of the environmental condition of the site at the time. Some fauna species are reported as potentially occurring within the study area based on the presence of suitable habitat (quality and extent) within the study area or immediately adjacent. With respect to opportunistic observations, the possibility exists that certain species may not have been detected during field investigations due to seasonal inactivity during the field survey, species present

within micro habitats not surveyed, cryptic species able to avoid detection and transient wide-ranging species not present during the survey period.

4.5. Survey Limitations and Constraints

Experience of personnel

Dr Karlene Bain has over 20 years of fauna survey experience, Bianca Theyer has 3 years' experience.

Scope (what faunal groups were sampled and were there any constraints affecting this)

The scope was a Level 1 survey and this was completed. Targeted habitat assessments for Black Cockatoos, Western Ringtail Possum, Quokka, Quenda, Chuditch, Brush-tailed Phascogale, Western Brush Wallaby, Water Rat, Western Arachnid Spider and Western False Pipistrelle were also conducted.

Proportion of task achieved and completeness of survey

A Level 1 survey of the survey area was completed. Additional targeted survey may be required within the western block of vegetation if development is to occur within it.

Disturbances (e.g. fire or flood)

A section of the western vegetation block had been recently burnt, however habitat assessment for Black Cockatoos, Arboreal Mammals, Wallaby's and Water rat were not affected by this. Overall the western block had a lower sampling intensity (due to the lack of proposed development) and therefore it is not deemed to have affected the completeness of the survey.

Intensity of survey

A Level 1 (and supplementary targeted assessments) were deemed appropriate given the proposed development is to be restricted to previously disturbed paddock / agricultural areas.

Sources of information (recent or historic) and availability of contextual information

Site specific data is limited as it is privately owned land, this is not considered a limiting factor for this survey.

Resources (e.g. degree of expertise available)

All resources required for this survey were available.

Remoteness or access issues

No restrictions were encountered. All areas were accessible by vehicle and on foot.

4.6. Non-Threatened Fauna survey outcomes

A description of the broadly defined fauna habitats within the study area (based on vegetation units) is given in Section 3. The approximate extent of each identified unit is shown in the Site Vegetation Complexes Map (Figure 9). During the field survey 40 species of fauna were detected, of which three are introduced; *Felis catus* (Cat), *Vulpes Vulpes* (Red Fox) and *Oryctolagus cuniculus* (Rabbit). There were multiple dens (Fox and Rabbit) located within the northern road reserve (Figure 11), as well as the portion of remnant vegetation situated along the southern boundary (east of the creek line; Figure 11). Multiple nests and hollows for non-threatened bird species such as: *Cracticus tibicen* (Australian Magpie), *Grallina cyanoleuca* (Magpie Lark) and *Purpureicephalus spurius* (Red Capped Parrot) were detected throughout the site, as well as multiple hollows likely being utilised by *Trichosurus vulpecula* (Brushtail Possum). Two unoccupied hollows were detected within the remnant vegetation to the west as well as one active *Eolophus roseicapillus* (Galah) hollow. The subject site also provides suitable habitat for *Macropus fuliginosus* (Western Grey Kangaroo) and *Rattus fuscipes* (Bush Rat). Multiple hollows likely being utilised by *Trichosurus vulpecula* were identified across the survey area. Refer to Table 6 for a list of species detected throughout the survey area, Figure 11 for non-threatened species indicator images and Figure 12 for locations of species and / or evidence.

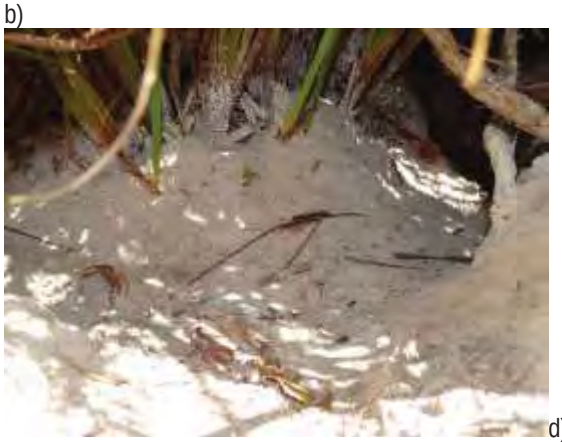


a)



b)


c)


d)


e)


f)

Figure 11: Species indicators throughout the survey area a) remote camera image of Fox near active den; b) remote camera image of a Kangaroo; c) and d) active fox den entrances; e) fox scat; f) Brushtail Possum scat.

Table 6: Fauna species recorded within survey area (presented in alphabetical order of family, then scientific name).

Family	Scientific name	Vernacular
Acanthizidae	*Gerygone fusca*	Western Gerygone
Accipitridae	*Lophoictinia isura*	Square-Tailed Kite
Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra
Anatidae	*Chenonetta jubata*	Australian Wood Duck
Ardeidae	*Egretta novaehollandiae*	White-Faced Heron
Artamidae	*Cracticus tibicen*	Australian Magpie
Cacatuidae	*Calyptorhynchus baudinii* (EN)	Baudin's Cockatoo
Cacatuidae	*Calyptorhynchus banksii naso* (VU)	Forest Red-tailed Black Cockatoo
Campephagidae	*Coracina novaehollandiae*	Black-Faced Cuckoo-Shrike
Canidae	*Vulpes vulpes* *	Red Fox
Columbidae	*Phaps elegans*	Brush Bronzewing
Corvidae	*Corvus coronoides*	Australian Raven
Cuculidae	*Cacomantis pallidus*	Pallid Cuckoo
Elapidae	*Notechis scutatus*	Tiger Snake
Eolophus	*Eolophus roseicapillus*	Galah
Estrildidae	*Stagonopleura oculata*	Red-Eared Firetail
Felidae	*Felis catus* *	Cat
Hylidae	*Litoria adelaidensis*	Slender Tree Frog
Leporidae	*Oryctolagus cuniculus* *	Rabbit
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo
Macropodidae	*Notamacropus irma* (P4)	Western Brush Wallaby
Maluridae	*Malurus elegans*	Red-Winged Fairy-Wren
Maluridae	*Malurus splendens*	Splendid Fairy-Wren
Meliphagidae	*Anthochaera lunulata*	Western Wattlebird
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater
Monarchidae	*Grallina cyanoleuca*	Magpie-Lark
Muridae	*Rattus fuscipes*	Bush Rat
Myobatrachidae	*Crinia glauerti*	Rattling Froglet; Clicking Froglet
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-Thrush
Peramelidae	*Isoodon obesulus fusciventer* (P4)	Quenda; Southern Brown Bandicoot
Petroicidae	*Eopsaltria georgiana*	White-breasted Robin
Phalangeridae	*Trichosurus vulpecula*	Australian Brushtail Possum
Psittacidae	*Purpureicephalus spurius*	Red capped parrot
Psittacidae	*Platycercus icterotis*	Western Rosella
Psittacidae	*Barnardius zonarius*	Australian Ringneck
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail
Threskiornithidae	*Threskiornis spinicollis*	Straw-Necked Ibis



Figure 12: Fauna habitat values

BIO DIVERSE SOLUTIONS
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Albany, WA 6330
Australia
Tel: 08 9842 1575
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Overview Map Scale 1:100,000

Legend

Fauna Indicators
- Active Den
- Active Fox Den
- Baudins Cockatoo
- Brush Wallaby
- Brushtail Possum Scat
- Brushtail Possum Scratchings
- Cockatoo Hollow
- Forest Red-Tailed BC
- Fox Den
- Fox Scat
- Galah Hollow
- Hollow
- Possum Hollow
- Potential Den
- Potential den log
- Quenda
- Rabbit
- Unoccupied Hollow

- Subject Site
- Cadastre
- Camera

Scale
1:8,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
PO Box 484
Albany, WA 6331

Fauna Habitat Values

Assessor	QA Check	Drawn by
KB & BT	KK	BT
STATUS	**FILE**	**DATE**
FINAL	MSC0137-002	30/01/2019

REPORT ITEM DIS 164 REFERS

4.7. Threatened fauna outcomes

Of the 40 species detected during the survey four species; *Calyptorhynchus banksii subsp. naso* (Forest Red-tailed Black Cockatoo)*, Calyptorhynchus baudinii* (Baudin's Cockatoo)*, Isoodon obesulus fusciventer* (Quenda)*,* and *Notamacropus irma* (Brush Wallaby) were identified on site. Potential habitat was found for *Calyptorhynchus latirostris* (Carnaby's Black-Cockatoo), *Apus pacificus* (Fork-tailed Swift), *Falco peregrinus* (Peregrine Falcon), *Falco peregrinus subsp. macropus* (Australian Peregrine Falcon), *Tringa nebularia* (Common greenshank),*Tyto novaehollandiae subsp. novae-hollandiae* (Masked Owl (southern subsp.)), *Dasyurus geoffroii* (Chuditch), *Falsistrellus mackenziei* (Western False Pipistrelle), *Hydromys chrysogaster* (Water-rat), *Phascogale tapoatafa* (Brush-tailed Phascogale), *Pseudocheirus occidentalis* (Western Ringtail Possum), *Setonix brachyurus* (Quokka), *Galaxiella munda* (Western Mud Minnow), *Galaxiella nigrostriatal* (Black-stripe Minnow) and *Lepidogalaxias salamandroides* (Salamanderfish). A risk assessment of habitat suitability and presence / absence of species is provided in the Table 7. Whilst locations of observed evidence of species presence is presented in Figure 13.

Arachnid

The threatened species *Zephyrarchaea mainae* (Western Arachnid Spider) requires suspended leaf litter lodged within Restionaceae species under *Agonis flexuosa*. There were no areas of suitable habitat identified during the survey.

Birds

Evidence of *Calyptorhynchus banksii subsp. naso,* and *Calyptorhynchus baudinii* feeding activity was found within the remnant vegetation on the southern boundary (southern precinct) of the survey area (Figure 12). The feeding debris wasn't fresh and occurred in low quantities with the area of feeding restricted to a small number of trees. The vegetation throughout the survey area contained a very high proportion of potential feed species for each of the three Black Cockatoos such as *Eucalyptus marginata, Corymbia calophylla, Eucalyptus staeri, Allocasuarina fraseriana* (DoE; 2017*b,* 2017*c,* 2017*d*). However, the southern area of remnant vegetation southern boundary (southern precinct) had the highest occurrences of *Calyptorhynchus baudinii* and *Calyptorhynchus banksii subsp. naso* feeding signs. No feeding signs for *Calyptorhynchus latirostris* (Carnaby's Black-Cockatoo) were detected during the survey.

The majority of feeding evidence was from *Corymbia calophylla* nuts (Figure 13) and this area of vegetation had the highest amount of significant (>500mm DBH) *Corymbia calophylla* trees present. This indicates that although the site contains potential high-quality foraging habitat (dominated by Jarrah and Marri) for the three Black Cockatoo species, the quality of forage is marginal and the area is not currently a favoured feeding site. One *Calyptorhynchus baudinii* individual was heard calling during the survey as it flew over the western remnant vegetation, but it did not land within the area. There was one potential Black Cockatoo hollow observed in the remnant vegetation to the west, no other signs of habitat utilisation (feeding signs etc.) were detected. 92 hollow-bearing trees and 586 potential habitat trees (>500mm DBH) were documented throughout the survey area. No other threatened bird species were identified on site. In total, based on vegetation types and the fauna habitat within there is approximately 64.15ha of suitable Black Cockatoo Habitat.

Potential habitat was identified in remnant vegetation areas across the site for *Apus pacificus*, *Falco peregrinus*, *Falco peregrinus subsp. Macropus, Tringa nebularia* and *Tyto novaehollandiae subsp. novae-hollandiae* yet evidence of species presence was not identified during the survey period.

Mammals

Evidence of *Isoodon obesulus fusciventer* through diggings and well-established runnels is present within the western remnant vegetation block as well as in surrounding creek line vegetation (Figure 13). Defined *Notamacropus irma* runnels were identified within the creek line vegetation (Figure 13) and scats were detected within the creek vegetation (Figure 13) as well as in a stand of paddock trees east of the creek line. Potential den logs for *Dasyurus geoffroii* (Chuditch) where detected in the remnant vegetation in the southern precinct (Figure 13), however no other evidence of species presence was detected.

There was no evidence of the presence of *Hydromys chrysogaster*, *Phascogale tapoatafa, Pseudocheirus occidentalis* or *Setonix brachyurus*. The high level of *Trichosurus vulpecula* (Brushtail Possum) activity throughout the survey area may be a limiting factor for these arboreal mammal species. The high level of *Vulpes vulpes* (Fox) activity and the presence of *Felis catus* (Feral Cat) may be a limiting factor for terrestrial mammal species.

Fish

Although no sampling was undertaken, the shallow creek system provides potential habitat for *Galaxiella munda, Galaxiella nigrostriatal* and *Lepidogalaxias salamandroides.*



Figure 13: Threatened species indicators throughout the survey area: a) Quenda Runnel; b) Quenda digging; c) potential habitat for *Galaxiella* and *Lepidogalaxias* species; d) Potential Chuditch den log; e) Wallaby runnel; f) Wallaby scat; g) and h) *Corymbia calophylla* nuts chewed by Black Cockatoos.

Table 7: Risk assessment and survey outcomes for potential threatened fauna within 15km of the survey area. Species are presented alphabetised under their relevant class.
Note: N = No, Y = Yes, P = Potential, L = Low, M = Medium, H = High

Class	Scientific Name	Vernacular	Cons Code WC / EPBC Acts	Survey Method	Habitat Present	Likelihood of Detection of Species if present	Species Present	Comment
Arachnid	*Zephyrarchaea mainae*	Western Archaeid Spider	VU / -	Search for suitable habitat including suspended leaf-litter litter lodged in the crown of Restionaceae species, L. gladiatum and L. effusum, which grow under long-unburnt stands of weeping peppermint (*Agonis flexuosa* (Willd.) Sweet; Rix and Harvey, 2009, 2012)	N	M	N	
Aves (Birds)	*Actitis hypoleucos*	Common sandpiper	IA/ MI	Survey for birds in suitable habitat; almost entirely coastal.	N	H	N	
	Apus pacificus	Fork-tailed Swift	IA / MI	Survey of potential habitat; almost exclusively aerial, flying from less than 1 m to at least 300 m above ground over inland plains but sometimes above foothills or in coastal areas. Mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh (Higgins 1999).	Y	H	N	Species not identified during survey. Suitable habitat present along creekline.
	Ardenna carneipes	Fleshy-footed Shearwater	VU & IA / MI	Assessment of habitat suitability including coastal areas and offshore islands	N	H	N	
	Atrichornis clamosus	Noisy Scrub-bird	EN / EN	Diurnal surveys of suitable habitat and potential foraging areas; dawn and dusk surveys and call back for calling birds. Preferred habitat includes low closed forests 5–15 m in height that are dominated by Eucalyptus or Agonis and Banksia littoralis and occur in the steep and wetter gullies, and drainage lines of hills and granite mountains and on the margins of freshwater lakes.	N	H	N	
	Botaurus poiciloptilus	Australasian Bittern	EN / EN	Dawn survey for calling males. Survey was conducted during the spring-summer breeding season for 1 hour prior to dawn and one hour after sunrise when calls are most often heard (Marchant & Higgins 1990). Weather was calm and clear, allowing for optimal listening conditions. In the south-west of Western Australia, the Australasian Bittern is found in beds of tall rush mixed with, or near, short fine sedge or open pools. The species also occurs around swamps, lakes, pools, rivers and channels fringed with lignum (Muehlenbeckia sp.), cane grass (Eragrostis sp.) or other dense vegetation (Marchant & Higgins 1990).	N	H	N	
	Calidris alba	Sanderling	IA / MI	Survey for birds in suitable habitat; almost entirely coastal.	N	H	N	
	Calidris canutus	Red knot	EN & IA / EN & MI	Survey for birds in suitable habitat; almost entirely coastal. Red Knots gather in large flocks on the coast in sandy estuaries with tidal mudflats	N	H	N	
	Calidris ferruginea	Curlew sandpiper	CR & IA / CR & MI	Survey for birds in suitable habitat; almost entirely coastal. Found on intertidal mudflats of estuaries, lagoons, mangroves, as well as beaches, rocky shores and around lakes, dams and floodwaters.	N	H	N	
	Calidris ruficollis	Red-necked stint	IA / MI	Survey of suitable habitat: mostly coastal areas, including sheltered inlets, bays, lagoons and estuaries with intertidal mudflats; ephemeral or permanent shallow wetlands near the coast or inland, and sometimes flooded paddocks or damp grasslands (Higgins & Davies 1996).	N	H	N	
	Calidris tenuirostris	Great knot	CR & IA / CR & MI	Survey for birds in suitable habitat; inhabit intertidal mudflats and sandflats in sheltered coasts, including bays harbours and estuaries.	N	H	N	
	Calyptorhynchus banksii subsp. naso	Forest Red-tailed Black Cockatoo	VU / VU	Dawn survey for roosting and foraging birds. Diurnal survey for nesting females, focusing on the hollows of large, mature trees. Remote cameras and diurnal assessment of the presence and extent of foraging habitat including vegetation containing proteaceous heath/woodland, eucalypt woodlands or forest (particularly Marri and Jarrah forest) and in areas dominated by Pinus spp. (Johnstone and Kirkby 1999).	Y	H	Y	Suitable foraging habitat is present throughout the survey area. Feeding debris and potential hollows and breeding / roosting trees located onsite. Refer to Figure 12.
	Calyptorhynchus baudinii	Baudin's Cockatoo	EN / EN	Dawn survey for roosting and foraging birds. Diurnal survey for nesting females, focusing on the hollows of large, mature trees. Remote cameras and diurnal assessment of the presence and extent of foraging habitat including vegetation containing proteaceous heath/woodland, eucalypt woodlands or forest (particularly Marri and Jarrah forest) and in areas dominated by Pinus spp. Overall Marri (Corymbia calophylla) is the primary food source with the birds using its seeds, flowers, nectar and buds.	Y	H	Y	Suitable foraging habitat is present throughout the survey area Feeding debris and potential hollows and breeding / roosting trees located onsite. Refer to Figure 12.

304

REPORT ITEM DIS 164 REFERS

Table 7 Continued.

Class	Scientific Name	Vernacular	Cons Code WC / EPBC Acts	Survey Method	Habitat Present	Likelihood of Detection of Species if present	Species Present	Comment
Aves (Birds)	*Calyptorhynchus latirostris*	Carnaby's Black-Cockatoo	EN / EN	Dawn sightings and calls to identify potential breeding and roosting trees. Breeding tree survey and identification of suitable tree species within the survey area with a diameter at breast height (DBH) of over 50cm; Survey for presence and extent of foraging habitat (proteaceous heath/woodland, eucalypt woodlands or forest) and search for evidence of foraging such as chewed nuts. Carnaby's Cockatoo has been observed feeding on a wide range of foods including the seeds of Banksias, Dryandras, Corymbia, Eucalyptus, Hakeas, Grevillea, Pinus, Callitris, Jacaranda, Helianthus, Macadamia, Prunus, Carya, Liquidambar, Mesomelaena spp., Citrullus and Erodium; flower buds, flowers and nectar of Banksia, Callistemon, Corymbia, Dryandra, Eucalyptus, Grevillea, Stenocarpus, Protea spp., insect larvae and insects (including weevils) from under bark, from wood of live and dead trees and shrubs, from galls and from flowers and flower stems, of Acacia spp. (including *A. saligna and A. pentedenia*) *Banksia spp., Eucalyptus spp., Jacksonia, Agonis and Xanthorrhoea*; also the flesh and juice of apples and persimmons.	Y	H	N	Suitable foraging habitat is present throughout the survey area Potential hollows and roosting trees located onsite. No feeding evidence identified. Species not identified during survey.
	Cereopsis novaehollandiae grisea	Cape Barren Goose (south-western),	VU / VU	The Cape Barren Goose (south-western) can be surveyed from land, sea or air. The recommended method for land-based surveys is to conduct area searches for birds or nests. The recommended method for sea-based surveys is to circumnavigate inhabited or potentially-inhabited islands in a boat. This latter method is effective because the geese usually occur in open habitats with low vegetation and tend to walk or fly away when approached. The recommended method for aerial surveys is to employ a helicopter or light plane to search the coastline and then inland areas of inhabited or potentially-inhabited islands. It is recommended that surveys of islands be conducted during late autumn, when few birds occur on the mainland, the weather is usually fine, and the breeding season has not yet begun (reducing the risk of disturbance to breeding pairs) (DEWHA 2010; Halse et al. 1995; Shaughnessy & Haberley 1994)	N	L	N	
	Charadrius leschenaultii	Greater Sand Plover	VU & IA / VU & MI	Survey for birds in suitable habitat; almost entirely coastal, inhabiting littoral and estuarine habitats. Mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons (Stewart et al. 2007). Seldom occur at shallow freshwater wetlands (Storr 1977).	N	H	N	
	Dasyornis longirostris	Western Bristlebird	EN / EN	Diurnal surveys of suitable habitat and potential foraging areas; dawn and dusk surveys and call back for calls. Preferred habitat includes floristically diverse low dense coastal heathland (McNee 1986).	N	H	N	
	Diomedea antipodensis	Antipodean Albatross	EN / VU	At sea, shipboard surveys during the non-breeding season. On land, observation from onshore vantage points using telescope. Detection of flying birds. Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	H	N	
	Diomedea dabbenena	Tristan Albatross	CR & IA / EN & MI	At sea, shipboard surveys in the non-breeding season. On land, observation from onshore vantage points using telescopes. Detection of flying birds. Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	H	N	
	Diomedea epomophora	Southern Royal Albatross	VU & IA / VU & MI	At sea, shipboard surveys. On land, observation from onshore vantage points (using telescopes). Detection of flying birds. Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	H	N	
	Diomedea exulans	Wandering Albatross	VU & IA / VU & MI	At sea, shipboard surveys. On land, area searches or transect surveys and observation from onshore vantage points using telescopes. Detection of flying birds and nests. Colony sites well documented (Department of Primary Industries, Water and Environment, Hobart). Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	H	N	
	Diomedea exulans subsp. exulans	Snowy Albatross	VU & IA / VU & MI	Assessment of habitat suitability including coastal areas and offshore islands	N	H	N	

REPORT ITEM DIS 164 REFERS

Table 7 Continued.

Class	Scientific Name	Vernacular	Cons Code WC / EPBC Acts	Survey Method	Habitat Present	Likelihood of Detection of Species if present	Species Present	Comment
Aves (Birds)	*Diomedea sanfordi*	Northern Royal Albatross	EN & IA / EN & MI	At sea, shipboard surveys. The use of berley during shipboard surveys may help to attract birds and draw them in for closer observation. On land, observation from onshore vantage points using telescopes. Detection of flying birds. Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	H	N	
	Falco peregrinus	Peregrine Falcon	OS / -	Survey of potential habitat; almost exclusively aerial whilst hunting (flying / hovering above vegetation).	Y	H	N	Suitable habitat throughout the majority of the survey area. Species not identified during survey.
	Falco peregrinus subsp. macropus	Australian Peregrine Falcon	OS / -	Survey of potential habitat; almost exclusively aerial whilst hunting (flying / hovering above vegetation).	Y	H	N	Suitable habitat throughout the majority of the survey area Species not identified during survey.
	Halobaena caerulea	Blue Petrel	- / VU	At sea, shipboard surveys. On land, area searches or transect surveys in potential breeding habitat to locate burrows with follow-up spotlighting at night when birds active at colony. Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens, as bodies are usually displaced by currents and winds. Colony sites are well documented (DEWHA 2010).	N	H	N	
	Hydroprogne caspia	Caspian Tern	IA / MI	Assessment of habitat suitability including coastal areas and offshore islands	N	M	N	
	Limosa lapponica	Bar-tailed Godwit	IA / MI	Survey for birds in suitable habitat; inhabit estuarine mudflats, beaches and mangroves.	N	M	N	
	Limosa lapponica baueri	Western Alaskan Bar-tailed Godwit	VU / VU	Observation using telescope from vantage points overlooking suitable foraging or roosting habitat at appropriate periods of the tidal cycle. Occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, salt lakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Higgins & Davies 1996).	N	L	N	
	Limosa lapponica menzbieri	Northern Siberian Bar-tailed Godwit	CR / CR	Observation using telescope from vantage points overlooking suitable foraging or roosting habitat at appropriate periods of the tidal cycle. The bar-tailed godwit (northern Siberian) occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, salt lakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Higgins & Davies 1996).	N	L	N	
	Macronectes giganteus	Giant Petrel	IA / EN & MI	Assessment of habitat suitability including coastal areas and offshore islands	N	H	N	
	Macronectes halli	Northern Giant Petrel	IA / VU & MI	At sea, shipboard surveys. On land, area searches or transect surveys and observation from onshore vantage points using telescopes. Detection of flying birds and nests. Colony sites well documented (Department of Primary Industries, Water and Environment, Hobart). Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	H	N	
	Numenius madagascariensis	Eastern Curlew	CR & IA / CR & MI	Observation using telescope from vantage points overlooking suitable foraging or roosting habitat at appropriate periods of the tidal cycle. During the non-breeding season in Australia, the eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (Zosteraceae). Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes within the mangroves. The birds are also found in coastal saltworks and sewage farms (Marchant & Higgins, 1993).	N	L	N	
	Oxyura australis	Blue-billed Duck	P4 / -	Diurnal surveys of suitable habitat. Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover.	N	H	N	
	Pachyptila turtur subantarctica	Fairy Prion	- / VU	At sea, shipboard surveys. On land, area searches or transect surveys and observation from onshore vantage points using telescopes. Detection of flying birds and burrows with follow-up spotlighting at night when birds are active at colony. Colony sites well documented (Department of Primary Industries, Water and Environment, Hobart). Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	M	N	

Table 7 Continued.

Class	Scientific Name	Vernacular	Cons Code WC / EPBC Acts	Survey Method	Habitat Present	Likelihood of Detection of Species if present	Species Present	Comment
Aves (Birds)	*Pandion cristatus*	Osprey, Eastern Osprey	IA / MI	Assessment of habitat suitability including coastal areas and offshore islands	N	H	N	
	Philomachus pugnax	Ruff	IA / MI	Survey for birds in suitable habitat; generally fresh, brackish of saline wetlands with exposed mudflats at the edges. It is found in terrestrial wetlands including lakes, swamps, pools, lagoons, tidal rivers, swampy fields and flood lands. They are occasionally seen on sheltered coasts, in harbours, estuaries, seashores and are known to visit sewage farms and saltworks	N	M	N	
	Phoebetria fusca	Sooty Albatross	EN & IA / VU & MI	At sea, shipboard surveys in the non-breeding season. On land, observation from onshore vantage points using telescopes. Detection of flying birds. Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	M	N	
	Plegadis falcinellus	Glossy Ibis	IA / MI	Survey for birds in suitable habitat; requires shallow water and mudflats, is found in well-vegetated wetlands, floodplains, mangroves and rice fields	N	M	N	
	Pluvialis fulva	Pacific Golden Plover	IA / MI	Surveys for birds in suitable habitat; coastal habitats, occasionally fresh, brackish or saline wetlands or claypans especially with muddy margins and often with submerged vegetation or short emergent grass. Other terrestrial habitats include short grass in paddocks, or ploughed or recently burnt areas (Marchant & Higgins 1993).	N	H	N	
	Pluvialis squatarola	Grey Plover	IA / MI	Surveys for birds in suitable habitat; sheltered embayments, estuaries and lagoons with mudflats and sandflats; terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes (Marchant & Higgins 1993).	N	H	N	
	Pterodroma mollis	Soft-plumaged Petrel	/ VU	At sea, shipboard surveys in non-breeding season. Detection of flying birds. Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	H	N	
	Sternula nereis nereis	Australian Fairy Tern	VU / VU	The Fairy Tern (Australian) nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline (Higgins & Davies 1996; Lindsey 1986a). The bird roosts on beaches at night (Higgins & Davies 1996). The Fairy Tern is similar to the Little Tern but differs in having a shorter tail, a bigger head with a larger bill and shorter, narrower wings. Fairy Tern are distinguishable in breeding plumage by their entirely yellow beaks (Higgins & Davies 1996) and the black patch at the eye which does not extend to a point at the bill (Cox & Close 1977).	N	H	N	
	Thalassarche carteri	Indian Yellow-nosed Albatross	EN & IA / VU & MI	At sea, shipboard surveys. On land, observation from onshore vantage points using telescopes. Detection of flying birds and nests. Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	H	N	
	Thalassarche cauta cauta	Shy Albatross	VU & IA / VU & MI	At sea, shipboard surveys. On land, area searches or transect surveys, and observation from onshore vantage points (using telescopes). Detection of flying birds and nests. Colony sites well documented (Department of Primary Industries, Water and Environment, Hobart). Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	H	N	
	Thalassarche cauta steadi	White-capped Albatross	VU & IA / VU & MI	At sea, shipboard surveys. On land, observation from onshore vantage points using telescopes. Detection of flying birds. Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	H	N	
	Thalassarche chlororhynchos	Atlantic Yellow-nosed Albatross	VU & IA / MI	Assessment of habitat suitability including coastal areas and offshore islands	N	H	N	
	Thalassarche impavida	Campbell Albatross	VU & IA / VU & MI	At sea, shipboard surveys during non-breeding season. On land, observation from onshore vantage points using telescope. Detection of flying birds. Surveys of beach cast birds may provide an opportunity to detect this species, though they provide little information on origins of specimens as bodies are usually displaced by currents and winds (DEWHA 2010).	N	H	N	
	Thalassarche melanophris	Black-browed Albatross	EN & IA / VU & MI	Shipboard surveys. Continuous 300 m wide survey transects while the vessel is in motion (Woehler 1997). Preferred habitat Marine. Rarely fly over land except when breeding. Fly low to moderately high, rising with updraft produced by wave fronts. Accompanies fishing boats.	N	H	N	

REPORT ITEM DIS 164 REFERS

Table 7 Continued.

Class	Scientific Name	Vernacular	Cons Code WC / EPBC Acts	Survey Method	Habitat Present	Likelihood of Detection of Species if present	Species Present	Comment
Aves (Birds)	*Thalasseus bergii*	Crested tern	IA / MI	Assessment of habitat suitability including coastal areas and offshore islands.	N	H	N	No evidence of species presence identified during the survey.
	Thinornis rubricollis	Hooded Plover	P4 / -	Dawn survey for birds within suitable habitat including sheltered sandy beaches and salt lakes	N	H	N	
	Tringa glareola	Wood Sandpiper	IA / MI	Survey for birds in suitable habitat; seen in small flocks or singly on inland shallow freshwater wetlands, often with other waders. They prefer ponds and pools with emergent reeds and grass, surrounded by tall plants or dead trees and fallen timber.	N	H	N	
	Tringa nebularia	Common greenshank	IA / MI	Dawn survey for calling birds and dawn survey of dam and creek line area for birds.	Y	H	N	Suitable habitat around existing dams and creek area. Species not identified during survey.
	Tyto novaehollandiae subsp. novaehollandiae	Masked Owl (southern subsp.)	P3 / -	Surveys for potential breeding hollows in suitable habitat; wide variety of lowland forests and woodlands that provide mature trees with hollows suitable for nesting and roosting, and nearby open areas for foraging (Schodde & Mason 1980, Peake et al. 1993). Nests in large hollows in old eucalypt trees (Kavanagh & Murray 1996). Sedentary and territorial (Schodde & Mason 1980). May occupy exclusive home ranges, and may mate for life (Kavanagh & Murray 1996).	Y	H	N	Suitable hollows throughout remnant vegetation areas. Species not identified during survey.
Fish (Actinopterygii)	*Galaxiella munda*	Western Mud Minnow	VU / -	Search for suitable habitat including small streams or shallow pools connected to streams (Pen et al. 1991).	Y	L	P	Suitable habitat present within creek; further surveys required to sample species if disturbances are likely to have direct or indirect impacts on the quality of the water and creekline habitat.
	Galaxiella nigrostriata	Black-stripe Minnow	P3 / -	Search for suitable habitat including small streams or shallow pools connected to streams (Pen et al. 1991).	Y	L	P	Suitable habitat present within creek; further surveys required to sample species if disturbances are likely to have direct or indirect impacts on the quality of the water and creekline habitat.
	Lepidogalaxias salamandroides	Salamanderfish	EN / -	Search for suitable habitat including small streams or shallow pools connected to streams	Y	L	P	Suitable habitat present within creek; further surveys required to sample species if disturbances are likely to have direct or indirect impacts on the quality of the water and creekline habitat.
	Nannatherina balstoni	Balston's Pygmy Perch	VU / VU	Search for suitable habitat including acidic, tannin-stained freshwater pools, streams and lakes in peat flats within 30 km of the coast of south-west Western Australia. The species prefers shallow water, and is commonly associated with tall sedge thickets and inundated riparian vegetation (Allen et al. 2002; Morgan et al. 1998).	N	H	N	
Mammalia	*Bettongia penicillata subsp. ogilbyi*	Woylie, Brush-tailed Bettong	CR / EN	Remote cameras and diurnal assessment of habitat, diggings and nest sites under dense bushes. Preferred habitat ranges from forest to grassland, coastal and inland.	Y	H	N	Suitable habitat present within areas of remnant vegetation. No evidence of species presence identified during the survey.
	Dasyurus geoffroii	Chuditch	VU / VU	Remote cameras and searches for faecal material and den sites in wooded habitat. Logs must have a diameter > 30 cm and a hollow with 7–20 cm diameter and 1 m length (Dunlop and Morris 2012)	Y	H	N	Potential den logs located onsite; high level of fox activity is likely to be a limiting variable. No other evidence of species presence identified.
	Falsistrellus mackenziei	Western False Pipistrelle	P4 / -	Surveys for potential hollows in suitable habitat; Preferred habitat of live mainly in wet sclerophyll forests of Karri, Jarrah and Tuart eucalypts. Roost in hollows in old trees, branches and stumps, in colonies	Y	L	N	This species is directly detectable only by echo meters or observation. Potential hollows have been identified as a part of the tree surveys.
	Hydromys chrysogaster	Water-rat (Rakali)	P4 / -	Remote cameras and diurnal assessment of habitat and evidence of feeding. Wide variety of freshwater habitats, from subalpine streams and other inland waterways to lakes, swamps, and farm dams.	Y	H	N	Some Cherax feeding debris onsite, but this was more consistent with bird feeding than Water Rat.

308

REPORT ITEM DIS 164 REFERS

Table 7 Continued.

Class	Scientific Name	Vernacular	Cons Code WC / EPBC Acts	Survey Method	Habitat Present	Likelihood of Detection of Species if present	Species Present	Comment
Mammalia	*Isoodon obesulus fusciventer*	Quenda	P4	Remote cameras and diurnal assessment of habitat and diggings. Inhabits a variety of habitats including forests, woodlands, shrublands and heathlands (Van Dyck and Strahan 2008). The main habitat requirement is for dense cover at ground level (Maxwell et al. 1996, Van Dyck and Strahan 2008).	Y	H	Y	Diggings in remnant vegetation and creek line habitat. Present throughout remnant vegetation areas.
	Macrotis lagotis	Bilby	VU / VU	Assessment of habitat and search for scat, burrows and diggings Preferred habitat is open tussock grassland on uplands and hills; mulga woodland/shrubland growing on ridges and rises, and hummock grassland (spinifex) growing on sandplains and dunes, drainage systems, salt lake systems and other alluvial areas.	N	L	N	
	Notamacropus irma	Western Brush Wallaby	P4 / -	Remote cameras and diurnal assessment of habitat suitability, faecal material and runnels/ pads. Preferred habitat includes open forest or woodland, particularly open, seasonally-wet flats with low grasses and open scrubby thickets.	Y	H	Y	Scats consistent with Western Brush Wallaby were found in open Jarrah remnant vegetation upslope of the creekline and in the adjoining paddock areas.
	Parantechinus apicalis	Dibbler	EN / EN	Remote cameras and diurnal assessment of habitat suitability and diggings. Dibblers have been recorded over an extensive area and it is likely that they can occupy a diverse range of habitats. Dibblers seem to prefer vegetation with a dense canopy greater than 1 m high which has been unburnt for at least 10 years or more (Baczocha & Start 1996).	Y	M	N	Suitable habitat in remnant vegetation surrounding riparian areas and int eh western block. No evidence of species presence identified during the survey.
	Phascogale tapoatafa wambenger	Brush-tailed Phascogale	CD / -	Remote cameras and diurnal assessment of habitat suitability, potential hollows and scratchings.	Y	H	N	Suitable habitat is present throughout the survey area. High level of Brushtail Possum activity likely to be a limiting variable.
	Pseudocheirus occidentalis	Western Ringtail Possum	CR / VU	Remote cameras and diurnal assessment of habitat suitability, hollows, dreys and search for faecal material. Suitable habitat in the southern forests includes Jarrah, Marri or Karri dominated forests. South coast habitat includes coastal heath, Jarrah/Marri woodland and forest, Peppermint Tree woodland, myrtaceous heaths and shrublands, Bullich dominated riparian zones and Karri forest (DBCA 2017).	Y	H	N	Suitable habitat is present throughout the survey area High level of Brushtail Possum activity likely to be a limiting variable. No evidence of species presence identified.
	Setonix brachyurus	Quokka	VU / VU	Remote cameras and diurnal assessment of habitat suitability, faecal pellets and runnels. Preferred habitat includes woodland, forest, coastal heath, thicket and riparian vegetation	Y	H	N	Suitable habitat within the remnant vegetation surrounding creek line. No evidence of species presence identified.
Petromyzontida	*Geotria australis*	Pouched Lamprey	P1 / -	Search for suitable habitat. Species is anadromous and requires estuaries and coastal waters connected to freshwater rivers and streams with slow flowing, fine sediment microhabitats where spawning and development of ammocoetes occurs.	N	H	N	

309

REPORT ITEM DIS 164 REFERS

4.8. Significant tree outcomes

There were 678 significant trees (>500mm DBH) identified throughout the survey area, 132 *Allocasuarina fraseriana,* 141 *Corymbia calophylla,* 398 *Eucalyptus marginata* and seven *Eucalyptus staeri*. Of these 678 trees 94 contained hollows (three in *Allocasuarina fraseriana*, 12 in *Corymbia calophylla,* 78 in *Eucalyptus marginata* and one in *Eucalyptus staeri*), with a further 21 trees in the stages of developing hollows in trunks and / or branches. The highest number of hollow bearing trees are located within the area of remnant vegetation along the southern boundary (southern precinct), the northern road reserve and the large stand of paddock trees in the eastern portion of the survey area (Refer to Figure 14).

Of the 94 hollow bearing trees no evidence was found to indicate current occupancy by any of the three Black Cockatoo species. Of the existing hollows 11 are either suitable for or have the potential to develop into Black Cockatoo hollows, based on their dimensions (Trees 158, 269, 351, 389, 546, 611, 633, 636, 675, 676 and 677; Table 8). There are an additional 2 trees that have hollows forming that have good Black Cockatoo hollow forming potential (Trees 17 and 26; Table 8). Of the significant trees identified throughout the site (except for the western remnant) 63 had no clear evidence of being occupied, 11 were occupied by *Trichosurus vulpecula,* 14 were occupied by non-threatened birds, and four occupied by feral bees. Assessment of the 94 potential or actual habitat trees (with hollows) are presented in Table 8 (please refer to Appendix D for the full list of trees identified on site). Corresponding photographs of hollows within significant trees are presented in Figure 15.



Figure 14: Significant Tree with Hollows

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Overview Map Scale 1:100,000

Legend

- Subject Site
- Cadastre

Significant Trees with Hollows

Hollow, Occupant

- N, Hollow forming
- Y, Bird (Non Threatened)
- Y, Feral Bees
- Y, Possum
- Y, Red-capped parrot
- Y, Unclear Evidence of Occupancy
- Y, Welcome swallows

Scale
1:8,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network, Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT

City of Albany
PO Box 484
Albany, WA 6331

Significant Trees with Hollows

Assessor	QA Check	Drawn by
KB & BT	KK	BT
STATUS	**FILE**	**DATE**
FINAL	MSC0137-002	10/12/2018

REPORT ITEM DIS 164 REFERS

Table 8: Significant (>500mm DBH) habitat trees with hollows, potential hollows, nests or evidence of fauna activity located within the survey area.

ID	Species	DBH (mm)	Northing	Eastings	Hollow Y/N	Location	Dimensions (cm)	Occupant	Fauna activity	Comments	Photo Id
1	*Eucalyptus marginata*	537	6133653.76	566393.75	Y	Trunk	15x12	Na		Beginnings of small hollow in upper branch 6x6cm; beginnings of hollow in fork of trunk.	1
2	*Eucalyptus marginata*	548	6133647.48	566397.94	N	Trunk	15x12	Termites	Termite mound/nest		2
5	*Eucalyptus marginata*	440	6133629.49	566405.46	Y	Trunk	18x13	Undetermined	Very low levels of bark disturbance around lower edge of hollow	Likely small bird. Too small for Black Cockatoos.	7
6	*Eucalyptus marginata*	463	6133637.55	566417.07	Y	Trunk	10x12	Undetermined	Very low levels of bark disturbance around lower edge of hollow		8
7	*Corymbia calophylla*	488	6133637.715	566423.83	N	Na	Na	Na	Large nest in canopy that looks like a raptor nest.	No fresh faecal material or feathers.	9
11	*Allocasuarina fraseriana*	453	6133607.284	566458.17	Y	Trunk	12x12	Not occupied		Hollow opens all the way thru trunk approx. 70cm deep. Possible *Falsistrellis* hollow.	10
15	*Allocasuarina fraseriana*	587	6133604.42	566480.99	Y	Branch	5x7	Not occupied	No scratching or chewing		12
17	*Corymbia calophylla*	969	6133607.95	566488.08	N	Na	Na	Na	Na	Large branch junction is beginning to form a hollow. Good potential for large hollow.	
23	*Allocasuarina fraseriana*	803	6133573.15	566562.71	N	Na	Na	Na	Na	Hollow butt.	13
26	*Corymbia calophylla*	830	6133553	566602.32	N	Na	Na	Na	Na	Large upper trunk and branches have good hollow forming potential.	
49	*Eucalyptus marginata*	962	6133995.374	567528.14	Y	Branch	15x15	Not occupied	Small amount of scratching	Shallow hollow; small hollow in branch forming as well.	22
55	*Eucalyptus marginata*	1357	6134059.876	567565.19	Y	Branch	5x4	Bird	Fresh chewing around entrance consistent with nesting activity.	Too small for Black Cockatoo.	24
57	*Eucalyptus marginata*	714	6134046.425	567538.41	Y	Trunk	3x2	Not currently occupied	No scratching	Tiny hollow.	25
76	*Eucalyptus marginata*	601	6133984.898	567475.07	N	Na	Na	Na	Stick nest, fresh faecal material and black feather	3 nests all close to each other. Magpies with juveniles calling from nearby area.	29
79	*Eucalyptus marginata*	680	6133972.03	567494.90	N	Na	Na	Na	Large stick nest high in canopy. Lots of fresh faecal material. Raptor-like		30
85	*Eucalyptus marginata*	604	6133943.376	567434.87	N	Na	Na	Na	Possum scratching		31
86	*Eucalyptus marginata*	572	6133940.983	567435.59	N	Na	Na	Na	Possum scratching		32
92	*Eucalyptus marginata*	854	6133904.848	567423.351	N	Na	Na	Na	Magpie chick in nest; faecal material;		34
95	*Eucalyptus marginata*	971	6133868.178	567415.472	Y	Branch	12x9	Not currently occupied	Bark disturbance around hollow entrance. No tracks up to hollow.	Small or medium bird.	35
98	*Eucalyptus marginata*	650	6133829.155	567389.865	N	Na	Na	Na	Magpie chick in nest; faecal material;		37
106	*Eucalyptus marginata*	933	6134381.77	568474.758	Y	Branch	15x13	Not currently occupied	Possum scratching	3 stick nests. One large and 2 medium. All unused. Hollow was checked for occupancy. Too shallow.	41
111	*Eucalyptus marginata*	539	6134354.927	568502.487	N	Na	Na	Na	Na	Small areas of bark have been stripped in the canopy. Possibly Black Cockatoos searching for invertebrates.	42
112	*Eucalyptus marginata*	533	6134341.702	568496.259	Y	Trunk	3x3	Not currently occupied	Na	Tiny hollow associated with dry side fissure.	43
113	*Eucalyptus marginata*	1098	6134332.801	568507.433	Y	Branch	25x23	Not currently occupied	Disturbed bark leading into hollow	Checked. Has historically been used. Angled branch and hollow. Bottom of branch has split and top portion of hollow has become unstable. Bottom of hollow shallow. Has potential to continue forming down into trunk.	196
122	*Eucalyptus marginata*	689	6134333.852	568455.075	Y	Branch	17x7	Not currently occupied	Old disturbance around entrance	Too small for Black Cockatoo.	44
126	*Eucalyptus marginata*	568	6134307.879	568436.677	Y	Branch	16x8	Not currently occupied	No scratching or chewing	Shallow hollow.	45
127	*Eucalyptus marginata*	602	6134303.73	568451.111	Y	Trunk	9x8	Red-capped parrot	Fresh chewing around hollow entrance	Red-capped parrot.	46

REPORT ITEM DIS 164 REFERS

Table 8 Continued.

ID	Species	DBH (mm)	Northing	Eastings	Hollow Y/N	Location	Dimensions	Occupant	Fauna activity	Comments	Photo Id
128	*Eucalyptus marginata*	669	6134302.155	568450.140	Y	Branch	4x3	Welcome swallows	Birds observed	Mudlark nest. 3 juveniles still being fed.	54, 59
132	*Eucalyptus marginata*	514	6134272.048	568463.545	Y	Trunk	6x8	Not currently occupied	Na	Good small-medium bird hollow.	60
149	*Eucalyptus marginata*	669	6134363.58	568418.221	Y	Branch	12x7	Bird	Fresh chewing around entrance consistent with medium bird.	Too small for Black Cockatoo.	65
156	*Eucalyptus marginata*	652	6134313.678	568374.098	Y	Butt	7x4	Feral Bees	Bees observed		66
158	*Eucalyptus marginata*	736	6134288.683	568373.734	Y	Trunk	43x46		Old nest remnants this season. Possible Wattlebird feathers	Checked. Shallow. Has potential to develop into Black Cockatoo hollow.	67
161	*Eucalyptus marginata*	592	6134266.179	568377.378	N	Na	Na	Na	Fresh feeding on jarrah nuts		68
166	*Eucalyptus marginata*	389	6134266.785	568425.820	Y	Trunk	9x6	Bird	Fresh chewing around entrance	Top and side entry into hollow.	70, 71
177	*Eucalyptus marginata*	1004	6133957.808	568019.393	Y	Branch	5x6	Not currently occupied	No scratching or chewing	Branch has small diameter. Potentially suitable for small bird or mammal.	72
188	*Corymbia calophylla*	861	6133929.747	567973.993	Y	Trunk	4x4	Small bird	Fresh chewing around entrance	Small hollow.	73
228	*Corymbia calophylla*	627	6133759.988	567867.734	N	Na	Na	Na	Red-tailed Black Cockatoo feeding debris		76
230	*Corymbia calophylla*	609	6133796.336	567872.650	N	Na	Na	Na	Possum scratching		77
236	*Corymbia calophylla*	613	6133832.199	567868.691	Y	Trunk	12x7	Small bird	Fresh chewing around entrance		78
241	*Corymbia calophylla*	793	6133867.066	567868.846	N	Na	Na	Na	Red-tailed Black Cockatoo feeding debris		80
256	*Corymbia calophylla*	572	6133969.756	567875.844	N	Na	Na	Na	Red-tailed Black Cockatoo and Baudin's feeding debris		87
265	*Eucalyptus marginata*	549	6133972.231	567858.074	Y	Trunk	24x42	Not currently occupied	Down feathers and egg remnants in hollow. Old small carnivore scat	Recently used.	94
268	*Eucalyptus marginata*	1131	6133941.597	567869.866	Y	Branch	14x14	Feral Bees	Bees observed; termite mound in base	Big old tree; good hollow forming potential.	97
269	*Corymbia calophylla*	766	6133934.997	567859.045	Y	Trunk	14x15	Possum	Possum scratching	Scratching up to hollow; double entrance. Large hollow potentially suitable for Black Cockatoos.	98
270	*Corymbia calophylla*	538	6133930.236	567864.508	Y	Trunk	8x7	Not currently occupied	Fresh chewing around entrance	Small birds; shallow hollow.	99
281	*Eucalyptus marginata*	1159	6133847.058	567854.958	Y	Branch	13x12	Possum	Possum scratching	Scratching up to hollow.	88,94
282	*Eucalyptus marginata*	615	6133830.877	567857.015	Y	Trunk	13x15	Undetermined	Fresh chewing around entrance	Checked.	102
288	*Eucalyptus marginata*	661	6133765.308	567858.336	Y	Trunk	28x32	Not currently occupied	No scratching or chewing	Shallow hollow.	103
310	*Eucalyptus marginata*	804	6133914.002	567819.888	Y	Branch	9x5	Small bird	Fresh chewing around entrance; possum scratching		104
313	*Eucalyptus marginata*	812	6133933.257	567836.044	Y	Trunk	26x34	Not currently occupied	Possum scratching	Small carnivore scat and active den at base of this tree.	106
314	*Eucalyptus marginata*	518	6133938.657	567843.150	Y	Trunk	15x15	Not currently occupied	Possum scratching	Scratching up to hollow; shallow hollow.	112
319	*Eucalyptus marginata*	615	6133961.469	567842.312	Y	Trunk	12x5	Not currently occupied	No scratching or chewing		113
321	*Eucalyptus marginata*	554	6133973.872	567844.761	Y	Trunk	25x12		Fresh chewing around entrance; possum scratching	Checked. Remnants of old bee hive; 2 well-formed hollows in trunk.	114,115
330	*Eucalyptus marginata*	632	6133937.601	567797.571	Y	Trunk	16x16	Not currently occupied	Possum scratching	Scratching doesn't go all the way to hollow.	117

313

REPORT ITEM DIS 164 REFERS

Table 8 Continued.

ID	Species	DBH (mm)	Northing	Eastings	Hollow Y/N	Location	Dimensions	Occupant	Fauna activity	Comments	Photo Id
331	*Eucalyptus marginata*	520	6133928.08	567812.321	Y	Trunk	12x12	Not currently occupied	No scratching or chewing	Shallow hollow.	118
332	*Corymbia calophylla*	1002	6133929.559	567812.277	Y	Branch	38x16	Possum	Den beneath tree; possum scratching up to and around hollow	Small carnivore scats. Old; den currently inactive.	120
334	*Corymbia calophylla*	894	6133919.901	567828.499	Y	Branch	20x18	Medium bird	Fresh chewing around entrance	Small diameter branch. Large entrance. Too small for Black Cockatoo.	119
351	*Eucalyptus marginata*	675	6133889.045	567765.960	Y	Trunk	18x20	Not currently occupied	Fresh chewing around entrance; possum scratching	2 hollows within 2 mod each other. Both potential Black Cockatoo hollows.	122,123
352	*Corymbia calophylla*	526	6133899.584	567778.094	Y	Trunk	16x11	Not currently occupied	Fresh disturbance around entrance		125
356	*Corymbia calophylla*	612	6133916.019	567793.109	N	Na	Na	Na	Baudin's feeding debris		126
361	*Eucalyptus marginata*	544	6133864.187	567805.042	Y	Branch	9x8	Not currently occupied	No scratching or chewing		127,128
366	*Eucalyptus marginata*	699	6133849.56	567803.293	Y	Branch	11x11	Small bird	Fresh chewing around entrance	Additional branch hollow 8x8 with fine scratching up to and into hollow; small mammal likely. Possibly arboreal Dasyurid.	129
369	*Eucalyptus marginata*	570	6133800.778	567802.620	Y	Trunk	12x10	Not currently occupied	Possum scratching	Shallow hollow.	130
387	*Eucalyptus marginata*	612	6133863.741	567713.06	Y	Trunk	20x18	Not currently occupied	Old nest	Small-med birds.	133
389	*Eucalyptus marginata*	640	6133842.831	567720.150	Y	Branch	26x26	Not currently occupied	Old nest	Potential Black Cockatoo hollow.	134
392	*Corymbia calophylla*	712	6133822.92	567726.642	Y	Branch	10x12	Small bird	Fresh chewing around entrance		135
393	*Eucalyptus marginata*	652	6133815.819	567746.070	Y	Branch	8x8	Small bird	Fresh chewing around entrance		136
431	*Eucalyptus marginata*	773	6133783.968	567642.126	Y	Branch	23x20	Not currently occupied	No scratching or chewing	Chimney	139
445	*Eucalyptus marginata*	856	6134159.281	568703.316	Y	Branch	32x27	Possum	Possum scratching	Dead. Additional hollows in nearby limbs; fresh scratching all way up to and into hollow.	140
447	*Allocasuarina fraseriana*	503	6134556.977	568705.232	N	Na	Na	Na	Sheoak nut feeding debris		141
458	*Eucalyptus marginata*	648	6135040.494	568684.752	Y	Trunk	8x4	Not currently occupied	Fresh chewing around hollow	Small bird nest this season; an additional hollow in small branch in upper canopy.	142,143
459	*Eucalyptus marginata*	808	6135029.307	568676.834	Y	Trunk	7x3	Not currently occupied	Fresh chewing around hollow	Small bird nest this season.	144
476	*Eucalyptus marginata*	764	6134975.031	568536.496	Y	Trunk	12x3	Not currently occupied	Possum scratching	Small amount of fresh chewing around entrance. Additional small hollow in branch looks like it has been used by small birds this season.	150
479	*Eucalyptus marginata*	915	6134979.989	568517.077	Y	Branch	4x5	Not currently occupied	No scratching or chewing		152
482	*Eucalyptus marginata*	761	6134959.102	568520.583	N	Na	Na	Na	Na	Large hollow in trunk that has become unusable due to opening in side of tree associated with hollow butt.	153-155
485	*Eucalyptus marginata*	644	6134963.068	568485.175	Y	Branch	24x10	Possum	Possum scratching	Scratching up to and into hollow.	156
491	*Eucalyptus marginata*	718	6134933.511	568386.037	Y	Trunk	7x5	Na	Scratching up to and into hollow	Too small entrance to see into with torch. Possible small dasyurid.	157
496	*Corymbia calophylla*	649	6134897.613	568370.955	Y	Branch	3x4	Not currently occupied	No scratching or chewing	Two upright branches may also have hollows forming.	158
499	*Eucalyptus marginata*	727	6134869.808	568322.723	Y	Branch	12x9	Not currently occupied	No scratching or chewing	Shallow hollow.	160
510	*Eucalyptus marginata*	561	6134807.47	568179.973	N	Na	Na	Na	Possum scratching and scat		161

REPORT ITEM DIS 164 REFERS

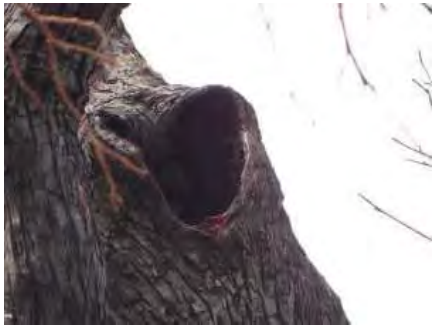
Table 8 Continued.

ID	Species	DBH (mm)	Northing	Eastings	Hollow Y/N	Location	Dimensions	Occupant	Fauna activity	Comments	Photo Id
518	*Eucalyptus marginata*	637	6134823.377	568152.735	Y	Branch	4x4	Not currently occupied	No scratching or chewing	Shallow hollow.	162
525	*Eucalyptus marginata*	660	6134901.376	568323.045	Y	Trunk	9x12	Feral Bees	Observed	Additional hollow forming higher.	163
527	*Eucalyptus marginata*	584	6134907.943	568334.758	Y	Branch	12x10	Not currently occupied	Fresh chewing around hollow	Some tracks leading up to hollow. Shallow and narrow hollow.	164
529	*Eucalyptus marginata*	558	6134378.086	567177.523	Y	Trunk	5x5	Not currently occupied	Small amount of scratching at side of hollow; cockatoo feeding debris around base of tree	Small and narrow.	166,67
530	*Eucalyptus marginata*	505	6134385.661	567190.573	Y	Trunk	8x7	Not currently occupied	No scratching or chewing	Spiderwebs across entrance; but chicken sized eggshell on ground.	168,169
531	*Eucalyptus marginata*	548	6134388.352	567200.137	Y	Trunk	18x12	Not currently occupied	No scratching or chewing	Spiderwebs across entrance.	170,171
546	*Eucalyptus marginata*	574	6134563.412	567576.047	Y	Branch	27x12	Not currently occupied	Possum scratching	Scratching not into hollow. Looks suitable for Black Cockatoo.	175
547	*Eucalyptus marginata*	790	6134552.962	567574.307	Y	Trunk	22x6	Not currently occupied	Scratching alongside hollow.		172
550	*Eucalyptus marginata*	622	6134543.133	567585.819	Y	Trunk	9x8	Possum	Possum scratching above and into hollow		173,74
556	*Eucalyptus marginata*	617	6134579.091	567602.888	Y	Branch	10x8	Not currently occupied	Fresh chewing around hollow	Medium bird has nested here this season.	177
565	*Corymbia calophylla*	889	6134588.987	567683.281	Y	Branch	35x32	Feral Bees	Bees observed		178,79
569	*Corymbia calophylla*	675	6134626.011	567708.676	Y	Branch	13x11	Not currently occupied	Possum scratching	Scratching around but not up to or into hollow. No bird chewing.	180
584	*Eucalyptus marginata*	661	6134674.879	567810.428	Y	Branch	7x3	Small bird	Fresh chewing around hollow	Additional hollow in adjoining branch. Slightly larger but no sign of recent activity.	181,82
585	*Eucalyptus marginata*	651	6134697.43	567857.248	Y	Branch	11x10	Not currently occupied	No scratching or chewing	Dead branch. Opens out to bottom. Section that is full hollow is very shallow.	183
609	*Eucalyptus marginata*	748	6134682.081	567882.599	Y	Branch	20x18	Not currently occupied	No scratching or chewing	Branch had dropped exposing the hollow. Shallow.	184
611	*Eucalyptus marginata*	493	6134672.174	567840.169	Y	Branch	35x30		Scratching alongside hollow.	Potential Black Cockatoo hollow. No signs of recent activity.	185
633	*Eucalyptus marginata*	608	6134356.943	567194.770	Y	Branch	26x26	Possum	Possum scratching	Scratching up to and into hollow; dead stag. Chimney hollow; good size for Black Cockatoo.	188
636	*Eucalyptus marginata*	912	6134367.973	567217.082	Y	Trunk	35x40	Not currently occupied	No scratching or chewing	Hollow shallow but has potential to become suitable for Black Cockatoos.	189
648	*Eucalyptus marginata*	1096	6134530.202	567559.132	Y	Branch	35x35	Not currently occupied	Scratching alongside hollow.	Dead top. Unstable.	190
672	*Eucalyptus marginata*	801	6134599.174	568342.655	Y	Trunk	28x30	Not currently occupied	Old nest remnants	Open hollow. Nest not this season.	192
675	*Eucalyptus marginata*	738	6134852.132	568621.931	Y	Trunk	9x8	Not currently occupied	Ravens	Large general hollow entrance. Main hollow inside is still quite shallow and narrow. Has good potential to form into a hollow suitable for Black Cockatoos.	193
676	*Eucalyptus marginata*	961	6134976.565	568583.213	Y	Branch	26x18	Possum	Possum scratching	Scratching up to and into hollow; dead stag. Side entrance hollow; good size for Black Cockatoo. Too unstable to climb.	194
677	*Eucalyptus marginata*	1151	6134888.714	568454.984	Y	Branch	22x26	Not currently occupied	No scratching or chewing	Good potential Black Cockatoo hollow.	195

REPORT ITEM DIS 164 REFERS


Tree ID: 1
Photo: 1


Tree ID: 2
Photo: 2


Tree ID: 5
Photo: 7


Tree ID: 6
Photo: 8


Tree ID: 7
Photo: 9


Tree ID: 11
Photo: 10


Tree ID: 15
Photo: 12


Tree ID: 23
Photo: 13


Tree ID: 49
Photo: 22


Tree ID: 55
Photo: 24


Tree ID: 57
Photo: 25


Tree ID: 76
Photo: 29

Figure 15: Significant habitat trees with hollows or evidence of fauna activity within the survey area.

316

REPORT ITEM DIS 164 REFERS


Tree ID: 79
Photo: 30


Tree ID: 85
Photo: 31


Tree ID: 86
Photo: 32


Tree ID: 92
Photo: 34


Tree ID: 95
Photo: 35


Tree ID: 98
Photo:


Tree ID: 106
Photo: 41


Tree ID: 111
Photo: 42


Tree ID: 112
Photo: 43


Tree ID: 122
Photo: 44


Tree ID: 126
Photo: 45


Tree ID: 127
Photo: 46

Figure 15 Continued.

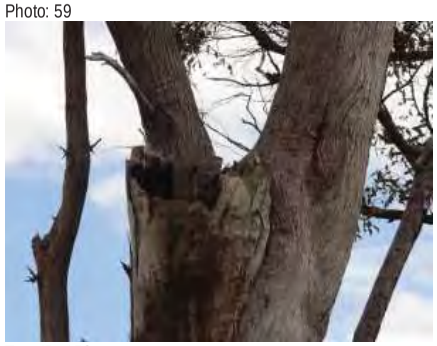

Tree ID: 128
Photo: 54


Tree ID: 128
Photo: 59


Tree ID: 132
Photo: 60


Tree ID: 149
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Tree ID: 156
Photo: 66


Tree ID: 158
Photo: 67


Tree ID: 161
Photo: 68


Tree ID: 166
Photo: 70


Tree ID: 166
Photo: 71


Tree ID: 177
Photo: 72


Tree ID: 188
Photo: 73



Tree ID: 228
Photo: 76

Figure 15 Continued.

REPORT ITEM DIS 164 REFERS



Tree ID: 230
Photo: 77



Tree ID: 236
Photo: 78



Tree ID: 241
Photo: 80



Tree ID: 256
Photo: 87



Tree ID: 265
Photo: 88



Tree ID: 265
Photo: 94



Tree ID: 268
Photo: 97



Tree ID: 269
Photo: 98



Tree ID: 270
Photo: 99



Tree ID: 281
Photo: 100



Tree ID: 281
Photo: 101



Tree ID: 282
Photo: 102

Figure 15 Continued.

REPORT ITEM DIS 164 REFERS


Tree ID: 288
Photo: 103


Tree ID: 310
Photo: 104


Tree ID: 313
Photo: 106


Tree ID: 314
Photo: 112


Tree ID: 319
Photo: 113


Tree ID: 321
Photo: 114


Tree ID: 321
Photo: 115


Tree ID: 330
Photo: 117


Tree ID: 331
Photo: 118


Tree ID: 332
Photo: 120


Tree ID: 334
Photo: 119


Tree ID: 351
Photo: 122

Figure 15 Continued.

REPORT ITEM DIS 164 REFERS


Tree ID: 351
Photo: 123


Tree ID: 352
Photo: 125


Tree ID: 356
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Tree ID: 361
Photo: 127


Tree ID: 361
Photo: 128


Tree ID: 366
Photo: 129


Tree ID: 369
Photo: 130


Tree ID: 387
Photo: 133


Tree ID: 389
Photo: 134


Tree ID: 392
Photo:135


Tree ID: 393
Photo: 136


Tree ID: 431
Photo: 139

Figure 15 Continued.

REPORT ITEM DIS 164 REFERS


Tree ID: 445
Photo: 140


Tree ID: 447
Photo: 141


Tree ID: 458
Photo: 142


Tree ID: 458
Photo: 143


Tree ID: 459
Photo: 144


Tree ID: 476
Photo: 150


Tree ID: 479
Photo: 152


Tree ID: 482
Photo: 155


Tree ID: 485
Photo: 156


Tree ID: 491
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Tree ID: 496
Photo: 158


Tree ID: 499
Photo: 160

Figure 15 Continued.

REPORT ITEM DIS 164 REFERS


Tree ID: 510
Photo: 161


Tree ID: 518
Photo: 162


Tree ID: 525
Photo: 163


Tree ID: 527
Photo: 164


Tree ID: 529
Photo: 166


Tree ID: 530
Photo: 168


Tree ID: 531
Photo: 170


Tree ID: 546
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Tree ID: 547
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Tree ID: 550
Photo: 173


Tree ID: 556
Photo: 177


Tree ID: 565
Photo: 178

Figure 15 Continued.


Tree ID: 569
Photo: 180


Tree ID: 584
Photo: 181


Tree ID: 584
Photo: 182


Tree ID: 585
Photo: 183


Tree ID: 609
Photo: 184


Tree ID: 611
Photo: 185


Tree ID: 633
Photo: 188


Tree ID: 636
Photo: 189


Tree ID: 648
Photo: 190


Tree ID: 675
Photo: 193


Tree ID: 676
Photo: 194


Tree ID: 677
Photo: 195

Figure 15 Continued.

REPORT ITEM DIS 164 REFERS

5. Summary

5.1. Vegetation, Threatened and Priority Flora and Ecological Communities

The scope for this survey was to provide the client with information on flora and vegetation types present and any potential threatened flora species or TECs present within the survey area. The survey area is comprised of six vegetation types. Of these six vegetation types three are associated with the Marbellup Flats, which is a South Coast Significant Wetland.

A total of 141 species were identified during the survey including 123 native and 18 introduced species. As some of the threatened species were not in their flowering period a risk assessment was carried out on the likelihood of the species presence, with those deemed unlikely to occur in the area due to unsuitable habitat (e.g. soil types, vegetation density etc). Of the 17 DRF and 41 Priority species potentially occurring in the area, none were found to be present. Based on the existing concept design the remnant vegetation areas will not be underdoing any development.

The vegetation complexes identified within the survey area do not meet the key diagnostic features of the two TECs potentially occurring in the area. As there were no threatened flora of TECs identified within the survey area, there are no constraints to threatened species subject to the *Wildlife Conservation Act 1950*.

Remnant vegetation condition within the survey area ranged from Completely Degraded to Pristine. Stands of isolated paddock trees within existing agricultural areas have been classified as Completely Degraded. Vegetation within the road reserves are both Excellent and Very Good. The majority of the vegetation in the western remnant is Pristine, and vegetation surrounding and within the creekline is Pristine and Very Good.

5.2. Fauna (including threatened)

The scope for this survey was to provide the client with information on fauna (including threatened) within the survey area and likelihood of habitat utilisation. The potential species list (Table 7) outlines presence / absence of species and outlines species that are unlikely to be present due to lack of suitable habitat (Table 7). The overall value of the habitat of the survey area is considered as high, due to the types of vegetation present and the associated fauna habitat, local and regional connectivity and for supporting both known and potential habitat values for conservation significant fauna species.

A total of 40 species were detected over 44 survey hours of these three introduced species were detected throughout the survey; *Felis catus* (Cat), *Vulpes Vulpes* (Red Fox) and *Oryctolagus cuniculus* (Rabbit). There is a high level of fox activity across the site, which may be a limiting factor to the presence of some mammal species. There was a high level of non-threatened bird activity throughout the site as evidenced though the number of species (27) observed. Multiple nests and hollows for non-threatened bird species such as: *Cracticus tibicen* (Australian Magpie), *Eolophus roseicapillus* (Galah), *Grallina cyanoleuca* (Magpie Lark) and *Purpureicephalus spurius* (Red Capped Parrot) were detected throughout the site. The subject site also provides suitable habitat for *Macropus fuliginosus* (Western Grey Kangaroo), *Rattus fuscipes* (Bush Rat) and *Trichosurus vulpecula* (Brushtail Possum). Multiple hollows likely being utilised by *Trichosurus vulpecula* were identified across the survey area.

Threatened species found within the survey area include *Calyptorhynchus banksii subsp. naso* (Forest Red-tailed Black Cockatoo), *Calyptorhynchus baudinii* (Baudin's Cockatoo), *Isoodon obesulus fusciventer* (Quenda), *and Notamacropus irma* (Brush Wallaby). The most important habitats for these species are the creek line vegetation, the surrounding remnant vegetation associated with the creek (situated along the southern boundary) and the roadside vegetation along the northern boundary. This is evident through the identification of runnels, scats, diggings, significant tress with hollows and Black Cockatoo feed signs. There was some anecdotal evidence of activity in the western remnant vegetation for *Isoodon obesulus fusciventer*, however activity levels were not significantly high. The creek system holds high habitat value for *Isoodon obesulus fusciventer,* and *Notamacropus Irma*,

Potential habitat for threatened species within the survey area includes all remnant vegetation within the site, the creek system and the larger stands of paddock trees throughout the paddock areas. There is a high level of fauna activity in vegetation surrounding the creek line from both threatened and non-threatened fauna species as well as the highest occurrence of significant trees that contain hollows. This indicates that the area contains highly attractive habitat for fauna.

There is suitable habitat for *Galaxiella munda* (Western Mud Minnow) and *Galaxiella nigrostriatal* (Black-stripe Minnow) and *Lepidogalaxias salamandroides* (Salamanderfish) within the creek system. If any development or habitat modification in the creek area is proposed in the future, a targeted trapping survey would need to be undertaken to identify the occurrence of these species.

Under the definitions defined in the Black Cockatoo Referral Guidelines (DSEWPaC, 2012) individual trees of *Eucalyptus marginata, Corymbia calophylla, Eucalyptus staeri, Allocasuarina fraseriana* could be considered potential breeding, roosting and foraging trees. The vegetation throughout the survey area contained potential feed tree species for each of the three Black Cockatoos, including: *Eucalyptus marginata, Corymbia calophylla, Eucalyptus staeri, Allocasuarina fraseriana* and other Proteaceous species (DoE; 2017*b,* 2017*c,* 2017*d*).

The southern pocket of Jarrah / Marri remnant vegetation had the highest occurrences of *Calyptorhynchus banksii subsp. naso* and *Calyptorhynchus baudinii,* feeding signs. The majority of feeding evidence consisted of *Corymbia calophylla* nuts. As the number of significant Black Cockatoo feeding sites across the survey area was relatively low this indicates that although the site contains potential high value foraging habitat for the three species it is currently not a favoured feeding area. The presence of significant feeding signs in the remnant vegetation in the south appears to indicate this area is anecdotally more attractive for food than the other vegetated areas. Clearing of trees is not recommended and significant trees that contain active hollows or future Black Cockatoo hollows should be retained.

The vegetation types / wildlife habitat present within the survey area are well represented locally and in nearby reserves. The Jarrah / Marri dominated woodland and forest present are one of the most abundant habitat types present within the ARVS survey area, providing a significant proportion of wildlife habitat. The *Homalospermum* and *Callistemon* dominated thickets present with the survey area are not as common at a regional level based on ARVS mapping. However, these habitat types are well represented in surrounding remnant vegetation and nearby reserves such as the Down Road Nature Reserve.

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7. Appendices

Appendix A – Survey Area and Current Proposed Concept design

Appendix B – Database Searches

Appendix C - Relevé Datasheets

Appendix D – Significant Trees

Appendix A

Survey Area and Current Proposed Concept design



BIO DIVERSE SOLUTIONS
29 Hercules Crescent
Albany, WA 6330
Australia
Tel: 08 9842 1575
Fax: 08 9842 1575



Overview Map Scale 1:100,000

Legend

- Subject Site
- Cadastre
- 5m Contours

Scale
1:8,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
C/o Matt Thompson
PO Box 484
Albany, WA 6331

Survey Area

Assessor	QA Check	Drawn by
	KK	BT
STATUS	FILE	DATE
FINAL	MSC0137-002	26/11/2018

REPORT ITEM DIS 164 REFERS


Roberts Gardiner
Architects
Albany Motorsport Park
National Design Study
Down Road Albany
1/8th MILE DRAG STRIP
Overflow Parking
Public Parking
Spectator Area
MULTI-USE TRACK - 3.2km
50m Buffer
ENTRY
DOWN RD
Overflow Parking
MOTOCROSS TRACK
Existing Riparian Vegetation
LOT 5780
4WD Driver Training & ATV Area
ENTRY

Appendix B

Database Searches

NatureMap Flora Species Report 15Km

Created By Guest user on 19/10/2018

Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Line'
Vertices	34° 55' 51" S,117° 44' 06" E 34° 55' 28" S,117° 45' 08" E 34° 56' 07" S,117° 45' 08" E 34° 56' 24" S,117° 43' 39" E 34° 56' 06" S,117° 43' 29" E 34° 55' 51" S,117° 44' 09" E
Group By	Family

Family	Species	Records
Acanthizidae	8	1520
Accipitridae	14	376
Acrobolbaceae	1	5
Actinopodidae	4	20
Aegothelidae	1	9
Aeshnidae	1	2
Agamidae	1	1
Agapanthaceae	1	2
Aizoaceae	1	1
Alariaceae	1	1
Alliaceae	1	1
Amaranthaceae	2	2
Amaryllidaceae	1	1
Amphisopodidae	1	1
Anapidae	1	2
Anarthriaceae	6	36
Anatidae	13	836
Ancylidae	1	3
Anhingidae	1	14
Anthracoideaceae	1	1
Apiaceae	10	47
Apocynaceae	1	1
Apodidae	1	2
Aracanidae	3	3
Araceae	2	3
Araliaceae	7	12
Araneidae	6	55
Archaeidae	1	20
Ardeidae	7	285
Argiolestidae	1	2
Arkyidae	2	3
Artamidae	2	105
Asparagaceae	26	82
Aspleniaceae	1	4
Asteraceae	40	61
Atherinidae	2	2
Atrichornithidae	1	1
Baetidae	1	2
Balaenopteridae	1	1
Bathysauridae	1	5
Belonidae	1	15
Berycidae	1	1
Boidae	1	4
Boraginaceae	2	2
Boryaceae	2	3
Bothriuridae	1	3
Brassicaceae	7	9
Bryaceae	3	3
Burramyidae	1	5
Cacatuidae	1	112
Caddidae	1	3
Caenidae	1	15
Callanthiidae	1	2
Callionymidae	1	1
Campanulaceae	7	23
Campephagidae	1	236
Candelariaceae	4	6
Canidae	1	1
Caprifoliaceae	2	2
Caprimulgidae	1	1
Carangidae	3	5
Carcharhinidae	2	2
Caryophyllaceae	5	7
Casuariidae	1	6
Casuarinaceae	2	6
Caulerpaceae	1	1
Ceinidae	1	10
Centrolepidaceae	8	20
Cephalotaceae	1	7
Cephaloziellaceae	1	1
Ceratiidae	1	1
Ceratopogonidae	1	9
Charadriidae	8	82
Cheilodactylidae	1	1
Cheloniidae	1	1
Cheluidae	1	5
Chenopodiaceae	5	9

Chernetidae	1	1
Chironemidae	2	2
Chironomidae	3	67
Cladoniaceae	16	40
Clinidae	3	5
Clupeidae	2	7
Coccocarpiaceae	1	1
Coenagrionidae	1	5
Colchicaceae	2	7
Columbidae	5	515
Congiopodidae	1	1
Congridae	1	1
Convolvulaceae	1	1
Corduliidae	1	1
Corixidae	1	7
Cortinariaceae	1	1
Corvidae	2	553
Cracticidae	4	690
Cuculidae	4	158
Culicidae	1	3
Cupressaceae	1	1
Cyperaceae	60	164
Cyprididae	2	5
Cypridopsidae	1	4
Dasyatidae	1	1
Dasyornithidae	1	1
Dasypogonaceae	5	23
Dasyuridae	5	27
Delphinidae	2	4
Dennstaedtiaceae	1	2
Desidae	3	4
Dicaeidae	1	1
Dicranaceae	3	7
Dicruridae	4	1299
Dilleniaceae	16	36
Dinolestidae	1	2
Diodontidae	2	4
Diomedeidae	2	2
Droseraceae	25	49
Dugesiidae	1	1
Dytiscidae	1	17
Echeneidae	1	1
Ecnomidae	1	14
Elaeocarpaceae	7	31
Elaphomycetaceae	2	2
Elapidae	7	23
Elopidae	1	1
Empididae	1	1
Engraulidae	1	7
Ephydridae	1	1
Ericaceae	50	305
Estrilidae	1	295
Euphorbiaceae	7	14
Exocoetidae	1	1
Fabaceae	136	489
Falconidae	8	116
Fissidentaceae	1	1
Funariaceae	1	2
Galaxiidae	4	28
Garypidae	1	1
Garypinidae	1	1
Gekkonidae	1	23
Gelastocoridae	1	2
Gelidiaceae	1	2
Gempylidae	1	1
Gentianaceae	3	3
Geotriidae	1	3
Geraniaceae	3	6
Gerreidae	1	2
Girellidae	1	1
Glossiphoniidae	1	3
Gnaphosidae	1	1
Gnathanacanthidae	1	1
Gobiidae	3	7
Gomphidae	1	4
Goodeniaceae	15	67
Gordiidae	1	1
Graphidaceae	1	3
Gripopterygidae	1	4
Gyrinidae	1	2
Gyrostemonaceae	1	2
Haematopodidae	2	22
Haemodoraceae	16	50
Halcyonidae	3	468
Halimedaceae	1	1
Haloragaceae	7	10
Hebridae	1	1
Hemerocallidaceae	10	25
Hemicorduliidae	1	5
Heterodontidae	1	3
Hirundinidae	3	527
Hydatellaceae	1	7
Hydraenidae	1	1
Hydrobiosidae	1	1
Hydrometridae	1	3
Hydrophilidae	1	12
Hydropsychidae	1	8
Hydroptilidae	1	3
Hylidae	2	8
Hypnidae	1	2
Hyriidae	1	1
Icmadophilaceae	1	1
Idiopidae	1	4
Iridaceae	18	29
Istiophoridae	1	1

Iulomorphidae	2	19
Ixodidae	1	1
Juncaceae	8	21
Juncaginaceae	1	1
Kyphosidae	1	1
Labridae	5	13
Lamiaceae	6	15
Lamnidae	1	1
Lamponidae	5	12
Laridae	6	158
Lauraceae	6	18
Lecanoraceae	4	5
Lecideaceae	2	2
Lentibulariaceae	3	7
Lepidogalaxiidae	1	1
Lepidoziaceae	1	2
Leporidae	1	1
Leptoceridae	1	16
Leptophlebiidae	1	3
Liagoraceae	1	1
Libellulidae	1	2
Lichinaceae	1	1
Limnodynastidae	2	59
Linaceae	2	2
Lindsaeaceae	1	4
Lobariaceae	1	2
Loganiaceae	6	23
Lophocoleaceae	2	11
Lophotidae	1	1
Loranthaceae	1	1
Lycopodiaceae	1	4
Lycosidae	5	30
Macropodidae	3	9
Maluridae	5	961
Malvaceae	9	25
Megalariaceae	1	2
Melanostomiidae	1	1
Meliphagidae	12	1735
Menyanthaceae	3	17
Mesophelliaceae	1	2
Micropholcommatidae	2	3
Mimetidae	1	1
Miturgidae	1	1
Molidae	1	6
Molossidae	1	1
Monacanthidae	13	23
Monoscutidae	1	3
Moridae	2	3
Motacillidae	2	4
Mugilidae	1	1
Mullidae	1	1
Muraenidae	2	2
Muridae	5	75
Mycoblastaceae	2	2
Myobatrachidae	6	75
Myrtaceae	83	361
Nannopercidae	2	22
Nemesiidae	1	84
Neobalaenidae	1	1
Neosebastidae	1	2
Neosittidae	2	22
Nomeidae	1	1
Notonectidae	1	2
Odacidae	2	2
Odontaspididae	1	1
Olacaceae	2	6
Oligochaeta	1	22
Onagraceae	2	6
Ophichthidae	2	8
Oplegnathidae	1	1
Orchidaceae	92	216
Orectolobidae	2	2
Orobanchaceae	3	6
Orsolobidae	2	48
Orthotrichaceae	1	1
Ostraciidae	1	1
Otariidae	3	4
Otididae	1	4
Oxalidaceae	2	3
Pachycephalidae	7	395
Palaemonidae	1	7
Pannariaceae	2	5
Papaveraceae	2	3
Paradoxosomatidae	1	9
Pararchaeidae	1	1
Parascylliidae	1	1
Parastacidae	4	34
Pardalotidae	4	182
Parmeliaceae	23	51
Passeridae	1	7
Pataecidae	1	1
Pegasidae	1	2
Pelecanidae	1	150
Pelecanoididae	1	1
Pempheridae	1	1
Pentacerotidae	1	1
Peramelidae	1	35
Percichthyidae	4	43
Percidae	1	1
Peronosporaceae	1	46
Perthidae	1	11
Pertusariaceae	1	1
Petroicidae	5	372
Phalacrocoracidae	5	193
Phalangeridae	1	3

Phasianidae	4	37
Philydraceae	1	1
Phreatoicidae	1	1
Phyllanthaceae	4	7
Physciaceae	2	2
Physeteridae	1	6
Physidae	1	3
Phytolaccaceae	1	2
Pinguipedidae	1	1
Pittosporaceae	6	51
Planorbidae	1	2
Plantaginaceae	7	8
Platycephalidae	1	1
Plesiopidae	1	1
Pleuronectidae	1	1
Plotosidae	1	1
Poaceae	52	85
Podargidae	2	18
Podicipedidae	4	68
Poeciliidae	1	2
Polycentropodidae	1	1
Polygalaceae	8	25
Polygonaceae	6	12
Pomatostomidae	1	1
Potamogetonaceae	1	1
Potoroidae	1	3
Pottiaceae	3	7
Primulaceae	3	6
Pristiophoridae	1	1
Procellariidae	4	6
Prodidomidae	2	3
Proteaceae	105	612
Pseudocheiridae	1	176
Psittacidae	15	1700
Psittaculidae	1	1
Pteridaceae	1	1
Pygopodidae	2	5
Pyralidae	1	1
Racopilaceae	1	1
Rajidae	1	1
Rallidae	11	213
Ramalinaceae	2	2
Ranunculaceae	2	4
Recurvirostridae	3	28
Resedaceae	1	1
Restionaceae	31	130
Rhamnaceae	4	12
Rhinobatidae	1	1
Rhizocarpaceae	1	1
Rosaceae	2	6
Rubiaceae	2	7
Russulaceae	1	2
Rutaceae	21	118
Santalaceae	9	31
Sapindaceae	1	7
Scincidae	11	69
Sciomyzidae	1	1
Scolopacidae	10	44
Scolopendridae	2	10
Scomberesocidae	1	1
Scombridae	3	3
Scorpididae	1	2
Scrophulariaceae	1	1
Scyliorhinidae	2	3
Sebastidae	1	1
Selaginellaceae	1	1
Sematophyllaceae	1	5
Serranidae	4	6
Sillaginidae	2	31
Simuliidae	1	14
Siphonocladaceae	1	2
Siphonotidae	1	1
Solanaceae	4	4
Soleidae	3	3
Sparassidae	2	5
Sphaeriidae	1	1
Spheniscidae	1	19
Sphyraenidae	1	1
Sphyrnidae	1	1
Stereocaulaceae	1	1
Stratiomyidae	1	2
Sturnidae	2	5
Stylidiaceae	38	154
Sulidae	1	6
Sylviidae	4	51
Syngnathidae	7	36
Synodontidae	2	2
Synthemistidae	1	2
Talitridae	1	1
Tarsipedidae	1	64
Telephlebiidae	1	5
Teloschistaceae	7	10
Tetragnathidae	2	2
Tetraodontidae	3	3
Tetrarogidae	1	2
Threskiornithidae	3	239
Thuidiaceae	2	3
Thylacomyidae	1	1
Thymelaeaceae	12	47
Tipulidae	1	10
Triakidae	3	5
Triglidae	2	7
Tripterygiidae	1	6
Trombidiformes	1	12
Turnicidae	2	15

Tytonidae	3	11
Uranoscopidae	2	4
Urodacidae	1	4
Urolophidae	4	10
Usneaceae	4	11
Varanidae	1	1
Veliferidae	1	1
Veliidae	1	10
Verbenaceae	1	1
Vespertilionidae	5	17
Xanthorrhoeaceae	2	2
Xyridaceae	3	20
Zamiaceae	1	3
Zeidae	1	5
Ziphiidae	1	1
Zodariidae	2	16
Zoridae	1	1
Zosteropidae	1	496
TOTAL	**1778**	**21267**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Acanthizidae					
1.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
2.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
3.	24262	*Acanthiza inornata (Western Thornbill)*			
4.	25530	*Gerygone fusca (Western Gerygone)*			
5.	24271	*Gerygone fusca subsp. fusca (Western Gerygone)*			
6.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
7.	24279	*Sericornis frontalis subsp. maculatus (White-browed Scrubwren)*			
8.	30948	*Smicrornis brevirostris (Weebill)*			
Accipitridae					
9.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
10.	24281	*Accipiter cirrocephalus subsp. cirrocephalus (Collared Sparrowhawk)*			
11.	25536	*Accipiter fasciatus (Brown Goshawk)*			
12.	24282	*Accipiter fasciatus subsp. fasciatus (Brown Goshawk)*			
13.	24285	*Aquila audax (Wedge-tailed Eagle)*			
14.	24288	*Circus approximans (Swamp Harrier)*			
15.	24289	*Circus assimilis (Spotted Harrier)*			
16.		*Elanus axillaris*			
17.	24290	*Elanus caeruleus subsp. axillaris (Australian Black-shouldered Kite)*			
18.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*			
19.	24295	*Haliastur sphenurus (Whistling Kite)*			
20.	47965	*Hieraaetus morphnoides (Little Eagle)*			
21.		*Lophoictinia isura*			
22.	48591	*Pandion cristatus (Osprey, Eastern Osprey)*		IA	
Acrobolbaceae					
23.		*Lethocolea pansa*			
Actinopodidae					
24.		*Missulena granulosa*			
25.		*Missulena hoggi*			
26.		*Missulena occatoria*			
27.		*Missulena torbayensis*			
Aegothelidae					
28.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
Aeshnidae					
29.		*Aeshnidae sp.*			
Agamidae					
30.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
Agapanthaceae					
31.	18380	*Agapanthus praecox subsp. orientalis*	Y		Y
Aizoaceae					
32.	2794	*Carpobrotus aequilaterus (Angular Pigface)*	Y		
Alariaceae					
33.	26805	*Ecklonia radiata*			
Alliaceae					
34.	1375	*Allium neapolitanum (Naples Onion)*	Y		
Amaranthaceae					
35.	2655	*Amaranthus albus (Tumbleweed)*	Y		
36.	2668	*Amaranthus powellii (Powell's Amaranth)*	Y		
Amaryllidaceae					
37.	44496	*Narcissus tazetta subsp. italicus*	Y		
Amphisopodidae					
38.		*Amphisopodidae sp.*			
Anapidae					
39.		*Chasmocephalon flinders*			
Anarthriaceae					
40.	1058	*Anarthria gracilis*			
41.	1060	*Anarthria laevis*			
42.	1062	*Anarthria prolifera*			
43.	1063	*Anarthria scabra*			
44.	1097	*Lyginia barbata*			

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45.	18049	*Lyginia imberbis*			
Anatidae					
46.	24310	*Anas castanea (Chestnut Teal)*			
47.	24312	*Anas gracilis (Grey Teal)*			
48.	24313	*Anas platyrhynchos (Mallard)*			
49.	24315	*Anas rhynchotis (Australasian Shoveler)*			
50.	25550	*Anas rhynchotis subsp. rhynchotis (Australasian Shoveler)*			
51.	24316	*Anas superciliosa (Pacific Black Duck)*			
52.	24318	*Aythya australis (Hardhead)*			
53.	24319	*Biziura lobata (Musk Duck)*			
54.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
55.	24322	*Cygnus atratus (Black Swan)*			
56.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
57.	24328	*Oxyura australis (Blue-billed Duck)*		P4	
58.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
Ancylidae					
59.		*Ancylidae sp.*			
Anhingidae					
60.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
Anthracoideaceae					
61.	45801	*Moreaua evandrae*			
Apiaceae					
62.	6203	*Actinotus glomeratus*			
63.	6206	*Actinotus omnifertilis*			
64.	6214	*Centella asiatica*			
65.	6218	*Daucus glochidiatus (Australian Carrot)*			
66.	6249	*Platysace compressa (Tapeworm Plant)*			
67.	6253	*Platysace filiformis*			
68.	6263	*Schoenolaena juncea*			
69.	6292	*Xanthosia rotundifolia (Southern Cross)*			
70.	6293	*Xanthosia singuliflora*			
71.	19330	*Xanthosia tasmanica*			
Apocynaceae					
72.	6565	*Alyxia buxifolia (Dysentery Bush)*			
Apodidae					
73.	25554	*Apus pacificus (Fork-tailed Swift, Pacific Swift)*		IA	
Aracanidae					
74.		*Aracana aurita*			
75.		*Caprichthys gymnura*			
76.		*Capropygia unistriata*			
Araceae					
77.	17659	*Alocasia brisbanensis*	Y		
78.	1049	*Zantedeschia aethiopica (Arum Lily)*	Y		
Araliaceae					
79.	18297	*Hedera helix*	Y		
80.	6223	*Hydrocotyle alata*			
81.	6226	*Hydrocotyle callicarpa (Small Pennywort)*			
82.	6229	*Hydrocotyle diantha*			
83.	19041	*Trachymene coerulea subsp. coerulea*			
84.	6279	*Trachymene ornata (Spongefruit)*			
85.	6280	*Trachymene pilosa (Native Parsnip)*			
Araneidae					
86.		*Arachnura higginsi*			
87.		*Araneus cyphoxis*			
88.		*Araneus senicaudatus*			
89.		*Austracantha minax*			
90.		*Backobourkia heroine*			
91.		*Nephila edulis*			
Archaeidae					
92.	42361	*Zephyrarchaea mainae (Main's assasin spider)*		T	
Ardeidae					
93.	25558	*Ardea ibis (Cattle Egret)*			
94.	41324	*Ardea modesta (great egret, white egret)*			
95.	24340	*Ardea novaehollandiae (White-faced Heron)*			

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96.	24341	*Ardea pacifica (White-necked Heron)*			
97.	24345	*Botaurus poiciloptilus (Australasian Bittern)*		T	
98.		*Egretta novaehollandiae*			
99.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
Argiolestidae					
100.		*Megapodagrionidae sp.*			
Arkyidae					
101.		*Arkys alticephala*			
102.		*Arkys walckenaeri*			
Artamidae					
103.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
104.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
Asparagaceae					
105.	1201	*Asparagus officinalis (Asparagus)*	Y		
106.	1302	*Laxmannia jamesii (James' Paperlily)*		P4	
107.	1304	*Laxmannia minor*			
108.	11464	*Laxmannia sessiliflora subsp. australis*			
109.		*Laxmannia sp.*			
110.	1222	*Lomandra brittanii*			
111.	1223	*Lomandra caespitosa (Tufted Mat Rush)*			
112.	1225	*Lomandra drummondii*			
113.	1229	*Lomandra integra*			
114.	14542	*Lomandra micrantha subsp. micrantha*			
115.	1234	*Lomandra nigricans*			
116.	1238	*Lomandra pauciflora*			
117.	1239	*Lomandra preissii*			
118.	1240	*Lomandra purpurea (Purple Mat Rush)*			
119.	1243	*Lomandra sericea (Silky Mat Rush)*			
120.	1244	*Lomandra sonderi*			
121.	1246	*Lomandra suaveolens*			
122.	1328	*Thysanotus dichotomus (Branching Fringe Lily)*			
123.	1333	*Thysanotus glaucifolius*			
124.	1335	*Thysanotus gracilis*			
125.	1336	*Thysanotus isantherus*		P4	
126.	1339	*Thysanotus multiflorus (Many-flowered Fringe Lily)*			
127.	1345	*Thysanotus pseudojunceus*			
128.	1351	*Thysanotus sparteus*			
129.	1356	*Thysanotus teretifolius*			
130.	1357	*Thysanotus thyrsoideus*			
Aspleniaceae					
131.	61	*Asplenium aethiopicum (Forked Spleenwort)*			
Asteraceae					
132.	7851	*Asteridea pulverulenta (Common Bristle Daisy)*			
133.	7871	*Brachyscome ciliaris*			
134.	7909	*Carduus pycnocephalus (Slender Thistle)*	Y		
135.	7939	*Conyza bonariensis (Flaxleaf Fleabane)*	Y		
136.	20074	*Conyza sumatrensis*	Y		
137.	7943	*Cotula australis (Common Cotula)*			
138.	7945	*Cotula coronopifolia (Waterbuttons)*	Y		
139.	13354	*Craspedia variabilis*			
140.	7961	*Dittrichia graveolens (Stinkwort)*	Y		
141.	7962	*Dittrichia viscosa*	Y		
142.	9352	*Hypochaeris radicata (Flat Weed, Cats-ear)*	Y		
143.	8092	*Ixiolaena viscosa (Sticky Ixiolaena)*			
144.	8099	*Leontodon saxatilis (Hairy Hawkbit)*	Y		
145.	8127	*Olearia axillaris (Coastal Daisybush)*			
146.	8131	*Olearia ciliata (Fringed Daisy Bush)*			
147.	8133	*Olearia elaeophila*			
148.	8149	*Olearia rudis (Rough Daisybush)*			
149.	44401	*Olearia sp. Eremicola (Diels & Pritzel s.n. PERTH 00449628)*			
150.	42281	*Pithocarpa cordata*			
151.	8165	*Pithocarpa pulchella (Beautiful Pithocarpa)*			
152.	18352	*Pithocarpa pulchella var. melanostigma*			
153.	8175	*Podolepis gracilis (Slender Podolepis)*			
154.	8182	*Podotheca angustifolia (Sticky Longheads)*			
155.	8184	*Podotheca gnaphalioides (Golden Long-heads)*			
156.	8622	*Reichardia picroides*	Y		Y

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157.	13300	*Rhodanthe citrina*			
158.	20665	*Senecio angulatus*	Y		
159.	8204	*Senecio elegans (Purple Groundsel)*	Y		
160.	13554	*Senecio glastifolius*	Y		
161.	8215	*Senecio minimus (Toothed Fireweed)*			
162.	20663	*Senecio multicaulis subsp. multicaulis*			
163.	8218	*Senecio ramosissimus (Auricled Groundsel)*			
164.	8220	*Senecio vulgaris (Common Groundsel)*	Y		
165.	9367	*Sonchus hydrophilus (Native Sowthistle)*			
166.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
167.	25902	*Symphyotrichum squamatum (Bushy Starwort)*	Y		
168.	45613	*Taraxacum khatoonae*	Y		
169.	8251	*Trichocline spathulata (Native Gerbera)*			
170.	38388	*Ursinia anthemoides subsp. anthemoides*	Y		
171.	8257	*Vellereophyton dealbatum (White Cudweed)*	Y		
Atherinidae					
172.		*Atherinosoma sp.*			
173.		*Atherinosoma wallacei*			
Atrichornithidae					
174.	24358	*Atrichornis clamosus (Noisy Scrub-bird, tjimiluk)*		T	
Baetidae					
175.		*Baetidae sp.*			
Balaenopteridae					
176.	24048	*Balaenoptera musculus subsp. brevicauda (Pygmy Blue Whale)*		T	
Bathysauridae					
177.		*Saurida tumbil*			
Belonidae					
178.		*? ?*			
Berycidae					
179.		*Centroberyx gerrardi*			
Boidae					
180.	25240	*Morelia spilota subsp. imbricata (Carpet Python)*			
Boraginaceae					
181.	6681	*Echium plantagineum (Paterson's Curse)*	Y		
182.	31013	*Halgania anagalloides var. Southern (A.E. Orchard 1609)*			
Boryaceae					
183.	1271	*Borya nitida (Pincushions)*			
184.	1273	*Borya sphaerocephala (Pincushions)*			
Bothriuridae					
185.		*Cercophonius sulcatus*			
Brassicaceae					
186.	2999	*Brassica rapa*	Y		
187.	2994	*Brassica x juncea (Indian Mustard)*	Y		
188.	3002	*Cakile maritima (Sea Rocket)*	Y		
189.	19989	*Lepidium didymum*	Y		
190.	3027	*Lepidium foliosum (Leafy Peppercress)*			
191.	3061	*Raphanus raphanistrum (Wild Radish)*	Y		
192.	3068	*Sinapis arvensis (Charlock)*	Y		
Bryaceae					
193.	32417	*Ptychostomum angustifolium*			
194.	32424	*Rosulabryum albolimbatum*			
195.	32426	*Rosulabryum campylothecium*			
Burramyidae					
196.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
Cacatuidae					
197.		*Eolophus roseicapillus*			
Caddidae					
198.		*Hesperopilio mainae*			
Caenidae					
199.		*Caenidae sp.*			
Callanthiidae					

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200.		*Callanthias australis*			
Callionymidae					
201.		*Foetorepus calauropomus*			
Campanulaceae					
202.	7396	*Isotoma hypocrateriformis (Woodbridge Poison)*			
203.	7399	*Isotoma scapigera (Long-scaped Isotome)*			
204.	9289	*Lobelia anceps (Angled Lobelia)*			
205.	7403	*Lobelia heterophylla (Wing-seeded Lobelia)*			
206.	7405	*Lobelia rarifolia*			
207.	7406	*Lobelia rhombifolia (Tufted Lobelia)*			
208.	37440	*Monopsis debilis var. depressa*	Y		
Campephagidae					
209.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
Candelariaceae					
210.	27641	*Candelaria concolor*			
211.	27642	*Candelariella antennaria*			
212.		*Candelariella sp.*			
213.	27644	*Candelariella xanthostigma*			
Canidae					
214.	24040	*Vulpes vulpes (Red Fox)*	Y		
Caprifoliaceae					
215.	35322	*Centranthus ruber subsp. ruber*	Y		
216.	7365	*Lonicera japonica (Japanese Honeysuckle)*	Y		
Caprimulgidae					
217.	24368	*Eurostopodus argus (Spotted Nightjar)*			
Carangidae					
218.		*Naucrates ductor*			
219.		*Seriola lalandi*			
220.		*Trachurus declivis*			
Carcharhinidae					
221.		*Carcharhinus obscurus*			
222.		*Prionace glauca*			
Caryophyllaceae					
223.	19825	*Petrorhagia dubia*	Y		
224.	15972	*Silene gallica var. gallica*	Y		
225.	11803	*Silene gallica var. quinquevulnera*	Y		
226.	2912	*Spergula arvensis (Corn Spurry)*	Y		
227.	2918	*Stellaria media (Chickweed)*	Y		
Casuariidae					
228.	24470	*Dromaius novaehollandiae (Emu)*			
Casuarinaceae					
229.	1728	*Allocasuarina fraseriana (Sheoak, Kondil)*			
230.	1732	*Allocasuarina humilis (Dwarf Sheoak)*			
Caulerpaceae					
231.	26573	*Caulerpa racemosa*			
Ceinidae					
232.		*Ceinidae sp.*			
Centrolepidaceae					
233.	1116	*Aphelia brizula*			
234.	1117	*Aphelia cyperoides*			
235.	43548	*Aphelia sp. Albany (B.G. Briggs 596)*			
236.	1121	*Centrolepis aristata (Pointed Centrolepis)*			
237.	1123	*Centrolepis caespitosa*		P4	
238.	1129	*Centrolepis glabra (Smooth Centrolepis)*			
239.	1132	*Centrolepis mutica*			
240.	13125	*Centrolepis strigosa subsp. strigosa*			
Cephalotaceae					
241.	3148	*Cephalotus follicularis (Albany Pitcher Plant)*			
Cephaloziellaceae					
242.		*Cephaloziella exiliflora*			
Ceratiidae					

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243.		*Ceratias tentaculatus*			
Ceratopogonidae					
244.		*Ceratopogonidae sp.*			
Charadriidae					
245.	25575	*Charadrius leschenaultii (Greater Sand Plover)*		IA	
246.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
247.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
248.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
249.	24382	*Pluvialis fulva (Pacific Golden Plover)*		IA	
250.	24383	*Pluvialis squatarola (Grey Plover)*		IA	
251.	48135	*Thinornis rubricollis (Hooded Plover, Hooded Dotterel)*		P4	
252.	24386	*Vanellus tricolor (Banded Lapwing)*			
Cheilodactylidae					
253.		*Nemadactylus macropterus*			
Cheloniidae					
254.	25335	*Caretta caretta (Loggerhead Turtle)*		T	
Cheluidae					
255.	43380	*Chelodina colliei (South-western Snake-necked Turtle)*			
Chenopodiaceae					
256.	2471	*Atriplex prostrata (Hastate Orache)*	Y		
257.	33480	*Dysphania pumilio (Clammy Goosefoot)*			
258.	2578	*Rhagodia baccata (Berry Saltbush)*			
259.	11341	*Rhagodia baccata subsp. baccata*			
260.	2639	*Suaeda australis (Seablite)*			
Chernetidae					
261.		*Nesidiochernes slateri*			
Chironemidae					
262.		*Chironemus georgianus*			
263.		*Threpterius maculosus*			
Chironomidae					
264.		*Chironominae sp.*			
265.		*Orthocladiinae sp.*			
266.		*Tanypodinae sp.*			
Cladoniaceae					
267.	27663	*Cladia aggregata*			
268.	27668	*Cladia schizopora*			
269.	27671	*Cladonia angustata*			
270.	27673	*Cladonia capitellata*			
271.	28205	*Cladonia capitellata var. capitellata*			
272.	28208	*Cladonia cervicornis subsp. verticillata*			
273.	27677	*Cladonia crispata*			
274.	27681	*Cladonia glebosa*			
275.	27683	*Cladonia imbricata*			
276.	27684	*Cladonia krempelhuberi*			
277.	27690	*Cladonia praetermissa*			
278.	27692	*Cladonia rigida*			
279.	27693	*Cladonia scabriuscula*			
280.	27695	*Cladonia subradiata*			
281.	30457	*Notocladonia cochleata*			
282.	28071	*Thysanothecium scutellatum*			
Clinidae					
283.		*Cristiceps aurantiacus*			
284.		*Cristiceps australis*			
285.		*Heteroclinus roseus*			
Clupeidae					
286.		*Sardinella lemuru?*			
287.		*Sardinops neopilchardus*			
Coccocarpiaceae					
288.	27699	*Coccocarpia erythroxili*			
Coenagrionidae					
289.		*Coenagrionidae sp.*			
Colchicaceae					
290.	12770	*Burchardia congesta*			

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291.	1385	*Burchardia multiflora (Dwarf Burchardia)*			
Columbidae					
292.	24399	*Columba livia (Domestic Pigeon)*	Y		
293.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
294.	24409	*Phaps chalcoptera (Common Bronzewing)*			
295.	25587	*Phaps elegans (Brush Bronzewing)*			
296.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
Congiopodidae					
297.		*Perryena leucometopon*			
Congridae					
298.		*Scalanago lateralis*			
Convolvulaceae					
299.	13732	*Cuscuta campestris (Golden dodder)*	Y		
Corduliidae					
300.		*Corduliidae sp.*			
Corixidae					
301.		*Corixidae sp.*			
Cortinariaceae					
302.	41681	*Cortinarius basipurpureus*			
Corvidae					
303.	25592	*Corvus coronoides (Australian Raven)*			
304.	24417	*Corvus coronoides subsp. perplexus (Australian Raven)*			
Cracticidae					
305.	25595	*Cracticus tibicen (Australian Magpie)*			
306.	25596	*Cracticus torquatus (Grey Butcherbird)*			
307.	25597	*Strepera versicolor (Grey Currawong)*			
308.	24426	*Strepera versicolor subsp. plumbea (Grey Currawong)*			
Cuculidae					
309.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
310.	24427	*Cacomantis flabelliformis subsp. flabelliformis (Fan-tailed Cuckoo)*			
311.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
312.	24432	*Chrysococcyx lucidus subsp. plagosus (Shining Bronze Cuckoo)*			
Culicidae					
313.		*Culicidae sp.*			
Cupressaceae					
314.	97	*Callitris roei (Roe's Cypress Pine)*			
Cyperaceae					
315.	739	*Baumea acuta (Pale Twig-rush)*			
316.	741	*Baumea articulata (Jointed Rush)*			
317.	743	*Baumea juncea (Bare Twigrush)*			
318.	746	*Baumea riparia*			
319.	747	*Baumea rubiginosa*			
320.	753	*Carex appressa (Tall Sedge)*			
321.	761	*Caustis pentandra (Thick Twist Rush)*			
322.	768	*Cyathochaeta avenacea*			
323.	17618	*Cyathochaeta equitans*			
324.	783	*Cyperus congestus (Dense Flat-sedge)*	Y		
325.	815	*Cyperus tenellus (Tiny Flatsedge)*	Y		
326.	834	*Evandra aristata*			
327.	835	*Evandra pauciflora*			
328.	20216	*Ficinia nodosa (Knotted Club Rush)*			
329.	899	*Gahnia ancistrophylla (Hooked-leaf Saw Sedge)*			
330.	902	*Gahnia decomposita*			
331.	907	*Gahnia trifida (Coast Saw-sedge)*			
332.	908	*Gymnoschoenus anceps*			
333.	20200	*Isolepis cernua var. setiformis*			
334.	912	*Isolepis cyperoides*			
335.	916	*Isolepis inundata (Swamp Club Rush)*			
336.	917	*Isolepis marginata (Coarse Club-rush)*			
337.	10831	*Isolepis prolifera (Budding Club-rush)*	Y		
338.	925	*Lepidosperma angustatum*			
339.	931	*Lepidosperma drummondii*			
340.	932	*Lepidosperma effusum (Spreading Sword-sedge)*			
341.	933	*Lepidosperma gladiatum (Coast Sword-sedge, Kerbin)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
342.	934	*Lepidosperma gracile (Slender Sword Sedge)*			
343.	14642	*Lepidosperma obtusum*			
344.		*Lepidosperma sp.*			
345.	945	*Lepidosperma squamatum*			
346.	946	*Lepidosperma striatum*			
347.	953	*Mesomelaena graciliceps*			
348.	956	*Mesomelaena stygia*			
349.	957	*Mesomelaena tetragona (Semaphore Sedge)*			
350.	970	*Schoenus acuminatus*			
351.	975	*Schoenus bifidus*			
352.	978	*Schoenus brevisetis*			
353.	979	*Schoenus caespititius*			
354.	983	*Schoenus cruentus*			
355.	984	*Schoenus curvifolius*			
356.	985	*Schoenus discifer*			
357.	986	*Schoenus efoliatus*			
358.	996	*Schoenus laevigatus*			
359.	997	*Schoenus lanatus (Woolly Bog-rush)*			
360.	1001	*Schoenus multiglumis*			
361.	1005	*Schoenus obtusifolius*			
362.	17614	*Schoenus plumosus*			
363.	1017	*Schoenus subbulbosus*			
364.	1018	*Schoenus subfascicularis*			
365.	1020	*Schoenus sublateralis*			
366.	1021	*Schoenus sublaxus*			
367.	1022	*Schoenus submicrostachyus*			
368.	1023	*Schoenus tenellus*			
369.	1034	*Tetraria capillaris (Hair Sedge)*			
370.	1036	*Tetraria octandra*			
371.	35582	*Tetraria sp. Mt Madden (C.D. Turley 40 BP/897)*			
372.	43207	*Tricostularia exsul*			
373.	1038	*Tricostularia neesii*			
374.	20428	*Tricostularia sp. south coast (R.T. Wills 1423)*			
Cyprididae					
375.		*Candonocypris novaezelandiae*			
376.		*Ilyodromus ellipticus*			
Cypridopsidae					
377.		*Sarscypridopsis aculeata*			
Dasyatidae					
378.		*Dasyatis brevicaudata*			
Dasyornithidae					
379.	24440	*Dasyornis longirostris (Western Bristlebird)*		T	
Dasypogonaceae					
380.	1212	*Baxteria australis*			
381.	1213	*Calectasia cyanea (Blue Tinsel Lily)*		T	
382.	45758	*Calectasia demarzii (Demarz's Tinsel Lily)*			
383.	1218	*Dasypogon bromeliifolius (Pineapple Bush)*			
384.	1221	*Kingia australis (Kingia, Pulonok)*			
Dasyuridae					
385.	24088	*Antechinus flavipes subsp. leucogaster (Yellow-footed Antechinus, Mardo)*			
386.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
387.	24111	*Sminthopsis gilberti (Gilbert's Dunnart)*			
388.	25515	*Sminthopsis griseoventer (Grey-bellied Dunnart)*			
389.		*Sminthopsis murina*			
Delphinidae					
390.	24052	*Delphinus delphis (Common Dolphin)*			
391.	30954	*Tursiops aduncus (Indo-Pacific Bottlenose Dolphin)*			
Dennstaedtiaceae					
392.	13758	*Histiopteris incisa*			
Desidae					
393.		*Badumna microps*			
394.		*Baiami torbayensis*			
395.		*Desis hartmeyeri*			Y
Dicaeidae					
396.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			

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Dicranaceae					
397.	32335	*Campylopus bicolor*			
398.	32461	*Campylopus bicolor var. bicolor*			
399.	32338	*Campylopus introflexus*	Y		
Dicruridae					
400.	24443	*Grallina cyanoleuca (Magpie-lark)*			
401.	25610	*Myiagra inquieta (Restless Flycatcher)*			
402.	48096	*Rhipidura albiscapa (Grey Fantail)*			
403.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
Dilleniaceae					
404.	5108	*Hibbertia acerosa (Needle Leaved Guinea Flower)*			
405.	5109	*Hibbertia amplexicaulis*			
406.	5117	*Hibbertia cuneiformis (Cutleaf Hibbertia)*			
407.	5118	*Hibbertia cunninghamii*			
408.	5119	*Hibbertia depressa*			
409.	20051	*Hibbertia diamesogenos*			
410.	5126	*Hibbertia furfuracea*			
411.	5131	*Hibbertia gracilipes*			
412.	5132	*Hibbertia grossulariifolia*			
413.	5137	*Hibbertia inconspicua*			
414.	5143	*Hibbertia lineata*			
415.	5144	*Hibbertia microphylla*			
416.	5159	*Hibbertia pulchra*			
417.	20031	*Hibbertia pulchra var. crassinervia*			
418.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			
419.		*Hibbertia sp.*			
Dinolestidae					
420.		*Dinolestes lewini*			
Diodontidae					
421.		*Allomycterus pilatus*			
422.		*Diodon nicthemerus*			
Diomedeidae					
423.	30836	*Diomedea exulans subsp. exulans (Snowy Albatross)*		T	
424.	34007	*Thalassarche chlororhynchos (Atlantic Yellow-nosed Albatross)*		T	
Droseraceae					
425.	3094	*Drosera dichrosepala (Rusty Sundew)*			
426.	13200	*Drosera enodes*			
427.	13218	*Drosera erythrogyne*			
428.	3096	*Drosera fimbriata (Manypeaks Sundew)*		P4	
429.	3098	*Drosera glanduligera (Pimpernel Sundew)*			
430.	3102	*Drosera huegelii (Bold Sundew)*			
431.	19256	*Drosera intricata*			
432.	3105	*Drosera leucoblasta (Wheel Sundew)*			
433.	3106	*Drosera macrantha (Bridal Rainbow)*			
434.	3109	*Drosera menziesii (Pink Rainbow)*			
435.	11853	*Drosera menziesii subsp. menziesii*			
436.	48710	*Drosera micrantha*			
437.	3110	*Drosera microphylla (Golden Rainbow)*			
438.	3111	*Drosera modesta (Modest Rainbow)*			
439.	3112	*Drosera myriantha (Star Rainbow)*			
440.	3113	*Drosera neesii (Jewel Rainbow)*			
441.	3118	*Drosera pallida (Pale Rainbow)*			
442.	3122	*Drosera platypoda (Fan-leaved Sundew)*			
443.	3124	*Drosera pulchella (Pretty Sundew)*			
444.	3128	*Drosera ramellosa (Branched Sundew)*			
445.	13186	*Drosera roseana*			
446.	3130	*Drosera scorpioides (Shaggy Sundew)*			
447.		*Drosera sp.*			
448.	3131	*Drosera stolonifera (Leafy Sundew)*			
449.	8914	*Drosera sulphurea (Sulphur-flowered Sundew)*			
Dugesiidae					
450.		*Dugesiidae sp.*			
Dytiscidae					
451.		*Dytiscidae sp.*			
Echeneidae					

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452.		*Remora remora*			
Ecnomidae					
453.		*Ecnomidae sp.*			
Elaeocarpaceae					
454.	4524	*Platytheca galioides*			
455.	4526	*Tetratheca affinis*			
456.	4536	*Tetratheca hispidissima*			
457.	4544	*Tetratheca setigera*			
458.	4546	*Tetratheca virgata*			
459.	4547	*Tremandra diffusa*			
460.	4548	*Tremandra stelligera*			
Elaphomycetaceae					
461.	39900	*Elaphomyces chlorocarpus*			
462.	39901	*Elaphomyces symeae*			
Elapidae					
463.	25251	*Echiopsis curta (Bardick)*			
464.	25250	*Elapognathus coronatus (Crowned Snake)*			
465.	43384	*Hydrophis platurus (Yellow-bellied Seasnake)*			
466.	25252	*Notechis scutatus (Tiger Snake)*			
467.	25255	*Parasuta nigriceps*			
468.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
469.	30818	*Rhinoplocephalus bicolor (Square-nosed Snake)*			
Elopidae					
470.		*Elops hawaiensis*			
Empididae					
471.		*Empididae sp.*			
Engraulidae					
472.		*Engraulis australis*			
Ephydridae					
473.		*Ephydridae sp.*			
Ericaceae					
474.	6295	*Acrotriche cordata (Coast Ground Berry)*			
475.	6301	*Andersonia auriculata*		P3	
476.	6306	*Andersonia caerulea (Foxtails)*			
477.	25844	*Andersonia caerulea subsp. caerulea*			
478.	19623	*Andersonia depressa*			
479.	6317	*Andersonia micrantha*			
480.	6320	*Andersonia simplex (Spiked Andersonia)*			
481.	41737	*Andersonia sp. Jamesii (J. Liddelow 84)*		P4	
482.	16997	*Andersonia sp. Mitchell River (B.G. Hammersley 925)*		P3	
483.	6321	*Andersonia sprengelioides*			
484.	6323	*Astroloma ciliatum (Candle Cranberry)*			
485.	6334	*Astroloma pallidum (Kick Bush)*			
486.	46733	*Brachyloma baxteri*			
487.	6352	*Cosmelia rubra (Spindle Heath)*			
488.	6355	*Leucopogon alternifolius*		P3	
489.	6358	*Leucopogon assimilis*			
490.	6360	*Leucopogon australis (Spiked Beard-heath)*			
491.	6384	*Leucopogon cymbiformis*		P2	
492.	6385	*Leucopogon denticulatus*			
493.	6387	*Leucopogon distans*			
494.	6394	*Leucopogon gibbosus*			
495.	6396	*Leucopogon glabellus*			
496.	6399	*Leucopogon gracilis*			
497.	6402	*Leucopogon hirsutus*			
498.	40940	*Leucopogon obovatus subsp. obovatus*			
499.	40941	*Leucopogon obovatus subsp. revolutus*			
500.	6425	*Leucopogon oxycedrus*			
501.	6427	*Leucopogon parviflorus (Coast Beard-heath)*			
502.	6428	*Leucopogon pendulus*			
503.	6435	*Leucopogon polystachyus*			
504.	6436	*Leucopogon propinquus*			
505.	6440	*Leucopogon racemulosus*			
506.	6441	*Leucopogon reflexus (Heart-leaf Beard-heath)*			
507.	10755	*Leucopogon rubricaulis*			
508.	14637	*Leucopogon sp. Coujinup (M.A. Burgman 1085)*			

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509.	34718	*Leucopogon sp. Southern Forests (B.G. Hammersley 1000)*			
510.	6449	*Leucopogon tamariscinus*			
511.	6454	*Leucopogon verticillatus (Tassel Flower)*			
512.	6456	*Lysinema ciliatum (Curry Flower)*			
513.	6457	*Lysinema conspicuum*			
514.	6459	*Lysinema fimbriatum*			
515.	6460	*Lysinema lasianthum*		P4	
516.	34736	*Lysinema pentapetalum*			
517.	6464	*Needhamiella pumilio*			
518.	31931	*Sphenotoma capitata*			
519.	6467	*Sphenotoma dracophylloides*			
520.	31952	*Sphenotoma gracilis (Swamp Paper-heath)*			
521.	31951	*Sphenotoma parviflora*			
522.	48617	*Styphelia sp. Albany (M. Hislop 2218)*			
523.	6476	*Styphelia tenuiflora (Common Pinheath)*			
Estrilidae					
524.	24645	*Stagonopleura oculata (Red-eared Firetail)*			
Euphorbiaceae					
525.	4585	*Amperea ericoides*			
526.	4588	*Amperea volubilis*			
527.	4636	*Euphorbia paralias (Sea Spurge)*	Y		
528.	4638	*Euphorbia peplus (Petty Spurge)*	Y		
529.	4648	*Euphorbia terracina (Geraldton Carnation Weed)*	Y		
530.	4666	*Monotaxis occidentalis*			
531.	4695	*Ricinocarpos glaucus*			
Exocoetidae					
532.		*Cypselurus sp.*			
Fabaceae					
533.	15429	*Acacia alata var. alata*			
534.	15466	*Acacia applanata*			
535.	3239	*Acacia biflora*			
536.	3247	*Acacia browniana*			
537.	11731	*Acacia browniana var. browniana*			
538.	3262	*Acacia cochlearis (Rigid Wattle)*			
539.	3275	*Acacia crassiuscula*			
540.	3282	*Acacia cyclops (Coastal Wattle)*			
541.	17858	*Acacia dealbata*	Y		
542.	16975	*Acacia decurrens*	Y		
543.	11192	*Acacia drummondii subsp. elegans*			
544.	3331	*Acacia extensa (Wiry Wattle)*			
545.	3363	*Acacia hastulata*			
546.	3383	*Acacia incurva*			
547.	3413	*Acacia leioderma*			
548.	3424	*Acacia littorea*			
549.	17861	*Acacia longifolia*	Y		
550.	3428	*Acacia luteola*			
551.	10955	*Acacia melanoxylon*	Y		
552.	3453	*Acacia myrtifolia*			
553.	3482	*Acacia paradoxa (Kangaroo Thorn)*	Y		
554.	3497	*Acacia prismifolia*		X	
555.	3502	*Acacia pulchella (Prickly Moses)*			
556.	15482	*Acacia pulchella var. goadbyi*			
557.	15483	*Acacia pulchella var. pulchella*			
558.	3504	*Acacia pycnantha (Golden Wattle)*	Y		
559.	3523	*Acacia robiniae*			
560.	3564	*Acacia subcaerulea*			
561.	3569	*Acacia sulcata*			
562.	13504	*Acacia sulcata var. sulcata*			
563.	3576	*Acacia tetragonocarpa*			
564.	3588	*Acacia uliginosa*			
565.	15487	*Acacia varia var. varia*			
566.	3602	*Acacia willdenowiana (Grass Wattle)*			
567.	3689	*Aotus intermedia*			
568.	3690	*Aotus passerinoides*			
569.	14396	*Bossiaea aquifolium subsp. aquifolium*			
570.	3707	*Bossiaea dentata*			
571.	3713	*Bossiaea linophylla*			
572.	3714	*Bossiaea ornata (Broad Leaved Brown Pea)*			

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573.	14291	*Bossiaea praetermissa*			
574.	3718	*Bossiaea rufa*			
575.	10861	*Callistachys lanceolata (Wonnich)*			
576.	14724	*Callistachys sp. south-coast variant (M. Carter 180)*			
577.	18156	*Chamaecytisus palmensis (Tagasaste)*	Y		
578.	13112	*Chorizema aciculare subsp. aciculare*			
579.	13113	*Chorizema carinatum*		P3	
580.	3754	*Chorizema diversifolium*			
581.	3757	*Chorizema glycinifolium*			
582.	3758	*Chorizema ilicifolium (Holly Flame Pea)*			
583.	12765	*Chorizema nanum*			
584.	3760	*Chorizema reticulatum (Showy Flame Pea)*			
585.	3761	*Chorizema rhombeum*			
586.	14586	*Chorizema spathulatum*			
587.	3763	*Chorizema uncinatum*			
588.	3791	*Daviesia alternifolia*			
589.	3799	*Daviesia cordata (Bookleaf)*			
590.	3811	*Daviesia flexuosa*			
591.	3812	*Daviesia gracilis*			
592.	15505	*Daviesia incrassata subsp. incrassata*			
593.	3817	*Daviesia inflata*			
594.	3818	*Daviesia lancifolia*			
595.	3840	*Daviesia spinosissima*			
596.	3867	*Dipogon lignosus (Dolichos Pea)*	Y		
597.	3872	*Euchilopsis linearis (Swamp Pea)*			
598.	3876	*Eutaxia epacridoides*			
599.	20214	*Eutaxia myrtifolia*			
600.	3879	*Eutaxia parvifolia*			
601.	3880	*Eutaxia virgata*			
602.	3891	*Gastrolobium bilobum (Heart Leaf Poison)*			
603.	3893	*Gastrolobium brownii*			
604.	20490	*Gastrolobium coriaceum*			
605.	19190	*Gastrolobium cuneatum*			
606.	20511	*Gastrolobium minus*			
607.	20503	*Gastrolobium rubrum*			
608.	20500	*Gastrolobium sericeum*			
609.	3932	*Gastrolobium velutinum (Stirling Range Poison)*			
610.	3948	*Gompholobium capitatum*			
611.	10909	*Gompholobium confertum*			
612.	3950	*Gompholobium knightianum*			
613.	3951	*Gompholobium marginatum*			
614.	3953	*Gompholobium ovatum*			
615.	3954	*Gompholobium polymorphum*			
616.	3955	*Gompholobium preissii*			
617.	11083	*Gompholobium scabrum*			
618.	3958	*Gompholobium venustum (Handsome Wedge-pea)*			
619.	11115	*Gompholobium villosum*			
620.	3961	*Hardenbergia comptoniana (Native Wisteria)*			
621.	3964	*Hovea chorizemifolia (Holly-leaved Hovea)*			
622.	3965	*Hovea elliptica (Tree Hovea)*			
623.	3968	*Hovea trisperma (Common Hovea)*			
624.	3992	*Isotropis cuneifolia (Granny Bonnets)*			
625.	19700	*Isotropis cuneifolia subsp. cuneifolia*			
626.	4028	*Jacksonia spinosa*			
627.	4036	*Kennedia carinata*			
628.	4037	*Kennedia coccinea (Coral Vine)*			
629.	37960	*Kennedia coccinea subsp. calcaria*			
630.	37961	*Kennedia coccinea subsp. esotera*			
631.	4047	*Lathyrus tingitanus (Tangier Pea)*	Y		
632.	4048	*Latrobea brunonis*			
633.	4049	*Latrobea diosmifolia*			
634.	4050	*Latrobea genistoides*			
635.	17757	*Latrobea sp. South Coast (A.M. Ashby 1949)*			
636.	8564	*Lotus subbiflorus*	Y		
637.	4063	*Lotus uliginosus (Greater Lotus)*	Y		
638.	4076	*Medicago lupulina (Black Medic)*	Y		
639.	4079	*Medicago polymorpha (Burr Medic)*	Y		
640.	4114	*Ornithopus pinnatus (Slender Serradella)*	Y		
641.	17114	*Paraserianthes lophantha subsp. lophantha*			
642.	4140	*Phyllota barbata*			

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643.	4155	*Psoralea pinnata (African Scurfpea)*	Y		
644.	4164	*Pultenaea aspalathoides*			
645.	4172	*Pultenaea ericifolia*			
646.	4181	*Pultenaea reticulata*			
647.	4186	*Pultenaea tenuifolia*			
648.	4187	*Pultenaea verruculosa*			
649.	4200	*Sphaerolobium alatum*			
650.	17551	*Sphaerolobium drummondii*			
651.	4202	*Sphaerolobium fornicatum*			
652.	4204	*Sphaerolobium grandiflorum*			
653.	20302	*Sphaerolobium hygrophilum*			
654.	4206	*Sphaerolobium macranthum*			
655.	4207	*Sphaerolobium medium*			
656.	4208	*Sphaerolobium nudiflorum*			
657.	17547	*Sphaerolobium pubescens*			
658.	17548	*Sphaerolobium rostratum*			
659.	4211	*Sphaerolobium vimineum (Leafless Globe Pea)*			
660.	4292	*Trifolium campestre (Hop Clover)*	Y		
661.	4293	*Trifolium cernuum (Drooping Flower Clover)*	Y		
662.	4295	*Trifolium dubium (Suckling Clover)*	Y		
663.	4307	*Trifolium repens (White Clover)*	Y		
664.	17115	*Trifolium repens var. repens*	Y		
665.	4315	*Trifolium tomentosum (Woolly Clover)*	Y		
666.	4317	*Ulex europaeus (Gorse)*	Y		
667.	11474	*Vicia sativa subsp. nigra*	Y		
668.	4325	*Viminaria juncea (Swishbush, Koweda)*			
Falconidae					
669.	25621	*Falco berigora (Brown Falcon)*			
670.	24471	*Falco berigora subsp. berigora (Brown Falcon)*			
671.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
672.	24472	*Falco cenchroides subsp. cenchroides (Australian Kestrel, Nankeen Kestrel)*			
673.	25623	*Falco longipennis (Australian Hobby)*			
674.	24474	*Falco longipennis subsp. longipennis (Australian Hobby)*			
675.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
676.	24475	*Falco peregrinus subsp. macropus (Australian Peregrine Falcon)*		S	
Fissidentaceae					
677.	32369	*Fissidens tenellus*			
Funariaceae					
678.	32370	*Funaria hygrometrica*			
Galaxiidae					
679.		*Galaxias maculatus*			
680.	34028	*Galaxias occidentalis (Western Minnow)*			
681.	34026	*Galaxiella munda (mud minnow, western dwarf galaxias)*		T	
682.	34027	*Galaxiella nigrostriata (Black-stripe Minnow, black-striped dwarf galaxias)*		T	
Garypidae					
683.		*Synsphyronus magnus*			
Garypinidae					
684.		*Protogarypinus giganteus*			
Gekkonidae					
685.	24980	*Christinus marmoratus (Marbled Gecko)*			
Gelastocoridae					
686.		*Gelastocoridae sp.*			
Gelidiaceae					
687.	27196	*Pterocladia rectangularis*			
Gempylidae					
688.		*Thyrsites atun*			
Gentianaceae					
689.	6542	*Centaurium tenuiflorum*	Y		
690.	6543	*Cicendia filiformis (Slender Cicendia)*	Y		
691.	41660	*Schenkia australis*			
Geotriidae					
692.	34030	*Geotria australis (Pouched Lamprey)*		P1	
Geraniaceae					
693.	4339	*Geranium molle (Dove's Foot Cranesbill)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
			Y		
694.	4342	*Pelargonium australe (Wild Geranium)*			
695.	4343	*Pelargonium capitatum (Rose Pelargonium)*	Y		
Gerreidae					
696.		*Parequula melbournensis*			
Girellidae					
697.		*Girella zebra*			
Glossiphoniidae					
698.		*Glossiphoniidae sp.*			
Gnaphosidae					
699.		*Megamyrmecion penicillatum*			Y
Gnathanacanthidae					
700.		*Gnathanacanthus goetzeei*			
Gobiidae					
701.		*Callogobius mucosus*			
702.		*Favonigobius lateralis*			
703.		*Pseudogobius olorum*			
Gomphidae					
704.		*Gomphidae sp.*			
Goodeniaceae					
705.	7411	*Anthotium humile (Dwarf Anthotium)*			
706.	7439	*Dampiera fasciculata (Bundled-leaf Dampiera)*			
707.	7452	*Dampiera leptoclada (Slender-shooted Dampiera)*			
708.	7454	*Dampiera linearis (Common Dampiera)*			
709.	7462	*Dampiera pedunculata*			
710.	7487	*Diaspasis filifolia (Thread-leaved Diaspasis)*			
711.	7508	*Goodenia filiformis (Thread-leaved Goodenia)*			
712.	7517	*Goodenia incana (Hoary Goodenia)*			
713.	7523	*Goodenia leptoclada (Thin-stemmed Goodenia)*			
714.	7572	*Lechenaultia expansa*			
715.	7614	*Scaevola globulifera*			
716.	7626	*Scaevola nitida (Shining Fanflower)*			
717.	7646	*Scaevola striata (Royal Robe)*			
718.	13175	*Scaevola striata var. striata*			
719.	7665	*Velleia trinervis*			
Gordiidae					
720.		*Gordiidae sp.*			
Graphidaceae					
721.	41267	*Halegrapha mucronata*			
Gripopterygidae					
722.		*Gripopterygidae sp.*			
Gyrinidae					
723.		*Gyrinidae sp.*			
Gyrostemonaceae					
724.	2787	*Gyrostemon sheathii*			
Haematopodidae					
725.	25627	*Haematopus fuliginosus (Sooty Oystercatcher)*			
726.	24487	*Haematopus longirostris (Pied Oystercatcher)*			
Haemodoraceae					
727.	11931	*Anigozanthos bicolor subsp. decrescens*			
728.	1407	*Anigozanthos flavidus (Tall Kangaroo Paw)*			
729.	1413	*Anigozanthos preissii (Albany Catspaw)*			
730.	1418	*Conostylis aculeata (Prickly Conostylis)*			
731.	11826	*Conostylis aculeata subsp. aculeata*			
732.	1441	*Conostylis misera (Grass Conostylis)*		T	
733.	1447	*Conostylis pusilla*			
734.	1453	*Conostylis serrulata*			
735.	1454	*Conostylis setigera (Bristly Cottonhead)*			
736.	11597	*Conostylis setigera subsp. setigera*			
737.	1468	*Haemodorum laxum*			
738.	1474	*Haemodorum sparsiflorum*			
739.	1475	*Haemodorum spicatum (Mardja)*			
740.	1478	*Phlebocarya ciliata*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
741.	1481	*Tribonanthes australis*			
742.	1485	*Tribonanthes violacea*			
Halcyonidae					
743.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
744.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
745.	24309	*Todiramphus sanctus subsp. sanctus (Sacred Kingfisher)*			
Halimedaceae					
746.	47213	*Halimeda versatilis*			
Haloragaceae					
747.	33620	*Glischrocaryon angustifolium*			
748.	6160	*Gonocarpus paniculatus*			
749.	6162	*Gonocarpus pusillus*		P4	
750.	6166	*Gonocarpus simplex*		P4	
751.	6171	*Haloragis digyna*			
752.	34676	*Meionectes brownii (Swamp Raspwort)*			
753.	34964	*Trihaloragis hexandra subsp. hexandra*			
Hebridae					
754.		*Hebridae sp.*			
Hemerocallidaceae					
755.	23474	*Agrostocrinum hirsutum*			
756.	1276	*Caesia micrantha (Pale Grass Lily)*			
757.	1277	*Caesia occidentalis*			
758.	1285	*Corynotheca micrantha (Sand Lily)*			
759.	12012	*Corynotheca micrantha var. panda*			
760.	1297	*Johnsonia lupulina (Hooded Lily)*			
761.	1299	*Johnsonia teretifolia (Hooded Lily)*			
762.	1260	*Stypandra glauca (Blind Grass)*			
763.	1361	*Tricoryne elatior (Yellow Autumn Lily)*			
764.	29478	*Tricoryne sp. South Coast (T.E.H. Aplin 2653)*			
Hemicorduliidae					
765.		*Hemicorduliidae sp.*			
Heterodontidae					
766.		*Heterodontus portusjacksoni*			
Hirundinidae					
767.	24491	*Hirundo neoxena (Welcome Swallow)*			
768.	48060	*Petrochelidon ariel (Fairy Martin)*			
769.	48061	*Petrochelidon nigricans (Tree Martin)*			
Hydatellaceae					
770.	1139	*Trithuria bibracteata*			
Hydraenidae					
771.		*Hydraenidae sp.*			
Hydrobiosidae					
772.		*Hydrobiosidae sp.*			
Hydrometridae					
773.		*Hydrometridae sp.*			
Hydrophilidae					
774.		*Hydrophilidae sp.*			
Hydropsychidae					
775.		*Hydropsychidae sp.*			
Hydroptilidae					
776.		*Hydroptilidae sp.*			
Hylidae					
777.	25378	*Litoria adelaidensis (Slender Tree Frog)*			
778.	25388	*Litoria moorei (Motorbike Frog)*			
Hypnidae					
779.		*Hypnos monopterygium*			
Hyriidae					
780.		*Hyriidae sp.*			
Icmadophilaceae					
781.	28060	*Siphula coriacea*			

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Idiopidae					
782.		*Aganippe rhaphiduca*			
Iridaceae					
783.	18279	*Babiana angustifolia*	Y		
784.	11445	*Ferraria crispa subsp. crispa*	Y		
785.	18392	*Freesia alba x leichtlinii*	Y		
786.	1524	*Gladiolus undulatus (Wild Gladiolus)*	Y		
787.	29193	*Iris laevigata*	Y		Y
788.	1533	*Ixia paniculata*	Y		
789.	1534	*Ixia polystachya (Variable Ixia)*	Y		
790.	1542	*Patersonia babianoides*			
791.	1547	*Patersonia lanata (Woolly Patersonia)*			
792.	1550	*Patersonia occidentalis (Purple Flag, Koma)*			
793.	30471	*Patersonia occidentalis var. angustifolia*			
794.	30476	*Patersonia occidentalis var. latifolia*			
795.	1553	*Patersonia umbrosa (Yellow Flags)*			
796.	14432	*Patersonia umbrosa var. umbrosa*			
797.	1558	*Sparaxis bulbifera*	Y		
798.	13103	*Watsonia borbonica*	Y		
799.	18108	*Watsonia meriana var. bulbillifera*	Y		
800.	18118	*Watsonia meriana var. meriana*	Y		
Istiophoridae					
801.		*Makaira indica*			
Iulomorphidae					
802.		*Atelomastix mainae*			
803.		*Samichus decoratus*			
Ixodidae					
804.		*Ixodes australiensis*			
Juncaceae					
805.	1178	*Juncus bufonius (Toad Rush)*	Y		
806.	1180	*Juncus capitatus (Capitate Rush)*	Y		
807.	1185	*Juncus kraussii (Sea Rush)*			
808.	14631	*Juncus meianthus*		P3	
809.	1186	*Juncus microcephalus*	Y		
810.	1187	*Juncus oxycarpus*	Y		
811.	1188	*Juncus pallidus (Pale Rush)*			
812.	1190	*Juncus planifolius (Broadleaf Rush)*			
Juncaginaceae					
813.	18587	*Triglochin nana*			
Kyphosidae					
814.		*Kyphosus gladius MS*			
Labridae					
815.		*Achoerodus gouldii*			
816.		*Austrolabrus maculatus*			
817.		*Haletta semifasciata*			
818.		*Ophthalmolepis lineolatus*			
819.		*Siphonognathus argyrophanes*			
Lamiaceae					
820.	6855	*Hemigenia humilis*			
821.	6865	*Hemigenia podalyrina*			
822.	6880	*Leonotis leonurus (Lion's Ear)*	Y		
823.	6904	*Microcorys virgata*			
824.	6913	*Prostanthera canaliculata*			
825.	6939	*Westringia dampieri*			
Lamnidae					
826.	34031	*Carcharodon carcharias (Great White Shark)*		T	
Lamponidae					
827.		*Lampona cylindrata*			
828.		*Lampona foliifera*			
829.		*Lampona punctigera*			
830.		*Lampona torbay*			Y
831.		*Prionosternum scutatum*			
Laridae					
832.		*Chroicocephalus novaehollandiae*			

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833.	48587	*Hydroprogne caspia (Caspian Tern)*		IA	
834.	24511	*Larus novaehollandiae subsp. novaehollandiae (Silver Gull)*			
835.	25638	*Larus pacificus (Pacific Gull)*			
836.	24522	*Sterna bergii (Crested Tern)*			
837.	48597	*Thalasseus bergii (Crested Tern)*		IA	
Lauraceae					
838.	2951	*Cassytha flava (Dodder Laurel)*			
839.	2952	*Cassytha glabella (Tangled Dodder Laurel)*			
840.	11857	*Cassytha glabella forma glabella*			
841.	2954	*Cassytha micrantha*			
842.	2957	*Cassytha racemosa (Dodder Laurel)*			
843.	11242	*Cassytha racemosa forma pilosa*			
Lecanoraceae					
844.	27698	*Clauzadeana macula*			
845.	27803	*Lecanora farinacea*			
846.		*Lecanora sp.*			
847.	28037	*Ramboldia stuartii*			
Lecideaceae					
848.	27826	*Lecidea sarcogynoides*			
849.		*Lecidea sp.*			
Lentibulariaceae					
850.	7145	*Utricularia menziesii (Redcoats)*			
851.	7148	*Utricularia multifida*			
852.	7153	*Utricularia tenella*			
Lepidogalaxiidae					
853.	47983	*Lepidogalaxias salamandroides (Salamanderfish)*		T	
Lepidoziaceae					
854.		*Kurzia compacta*			
Leporidae					
855.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
Leptoceridae					
856.		*Leptoceridae sp.*			
Leptophlebiidae					
857.		*Leptophlebiidae sp.*			
Liagoraceae					
858.	27030	*Liagora wilsoniana*			
Libellulidae					
859.		*Libellulidae sp.*			
Lichinaceae					
860.		*Pterygiopsis sp.*			
Limnodynastidae					
861.	25410	*Heleioporus eyrei (Moaning Frog)*			
862.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
Linaceae					
863.	4362	*Linum marginale (Wild Flax)*			
864.	4363	*Linum trigynum (French Flax)*	Y		
Lindsaeaceae					
865.	59	*Lindsaea linearis (Screw Fern)*			
Lobariaceae					
866.	27997	*Pseudocyphellaria neglecta*			
Loganiaceae					
867.	6504	*Logania buxifolia*			
868.	6515	*Logania vaginalis (White Spray)*			
869.	46255	*Orianthera campanulata*			
870.	46314	*Orianthera serpyllifolia*			
871.	46315	*Orianthera serpyllifolia subsp. serpyllifolia*			
872.	16177	*Phyllangium paradoxum*			
Lophocoleaceae					
873.		*Chiloscyphus semiteres*			
874.		*Chiloscyphus semiteres var. semiteres*			

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Lophotidae					
875.		*Eumecichthys fiski*			Y
Loranthaceae					
876.	2401	*Nuytsia floribunda (Christmas Tree, Mudja)*			
Lycopodiaceae					
877.	12783	*Lycopodiella serpentina*			
Lycosidae					
878.		*Artoria cingulipes*			
879.		*Artoria flavimana*			
880.		*Artoriopsis eccentrica*			
881.		*Tasmanicosa leuckartii*			
882.		*Venatrix pullastra*			
Macropodidae					
883.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
884.	48022	*Notamacropus irma (Western Brush Wallaby)*		P4	
885.	24145	*Setonix brachyurus (Quokka)*		T	
Maluridae					
886.	25650	*Malurus elegans (Red-winged Fairy-wren)*			
887.	24551	*Malurus pulcherrimus (Blue-breasted Fairy-wren)*			
888.	25654	*Malurus splendens (Splendid Fairy-wren)*			
889.	25655	*Stipiturus malachurus (Southern Emu-wren)*			
890.	24554	*Stipiturus malachurus subsp. westernensis (Southern Emu-wren)*			
Malvaceae					
891.	48634	*Commersonia corniculata*			
892.	40863	*Commersonia corylifolia (Hazel-leaved Rulingia)*			
893.	40920	*Commersonia grandiflora*			
894.	36522	*Malva pseudolavatera*	Y		
895.	5092	*Thomasia pauciflora (Few Flowered Thomasia)*			
896.	5094	*Thomasia purpurea*			
897.	5096	*Thomasia quercifolia (Oak Leaved Thomasia)*		P4	
898.	5100	*Thomasia solanacea*		P4	
899.	5105	*Thomasia triphylla*			
Megalariaceae					
900.	27850	*Megalaria grossa*			
Melanostomiidae					
901.		*Opostomias micripnus*			Y
Meliphagidae					
902.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
903.	24561	*Anthochaera carunculata (Red Wattlebird)*			
904.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
905.	24567	*Epthianura albifrons (White-fronted Chat)*			
906.	47962	*Glyciphila melanops (Tawny-crowned Honeyeater)*			
907.	25661	*Lichmera indistincta (Brown Honeyeater)*			
908.	24582	*Lichmera indistincta subsp. indistincta (Brown Honeyeater)*			
909.	24583	*Manorina flavigula (Yellow-throated Miner)*			
910.	25663	*Melithreptus brevirostris (Brown-headed Honeyeater)*			
911.	24587	*Melithreptus chloropsis (Western White-naped Honeyeater)*			
912.	48071	*Phylidonyris niger (White-cheeked Honeyeater)*			
913.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
Menyanthaceae					
914.	36178	*Liparophyllum lasiospermum*			
915.	36177	*Ornduffia albiflora*			
916.	36181	*Ornduffia parnassifolia*			
Mesophelliaceae					
917.		*Castoreum radicatum*			
Micropholcommatidae					
918.		*Raveniella peckorum*			
919.		*Taphiassa robertsi*			
Mimetidae					
920.		*Australomimetus diabolicus*			
Miturgidae					
921.		*Mituliodon tarantulinus*			

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Molidae					
922.		*Ranzania laevis*			
Molossidae					
923.	24183	*Mormopterus loriae (Little Northern Freetail-bat)*			
Monacanthidae					
924.		*Acanthaluteres brownii*			
925.		*Acanthaluteres vittiger*			
926.		*Anacanthus barbatus*			
927.		*Brachaluteres jacksonianus*			
928.		*Cantheschenia longipinnis*			
929.		*Eubalichthys caeruleoguttatus*			
930.		*Eubalichthys cyanoura*			
931.		*Eubalichthys mosaicus*			
932.		*Meuschenia freycineti*			
933.		*Meuschenia galii*			
934.		*Meuschenia hippocrepis*			
935.		*Parika scaber*			
936.		*Scobinichthys granulatus*			
Monoscutidae					
937.		*Hypomegalopsalis tanisphyros*			
Moridae					
938.		*Lotella sp.*			Y
939.		*Pseudophycis barbata*			
Motacillidae					
940.	24599	*Anthus australis subsp. australis (Australian Pipit)*			
941.	24600	*Anthus cervinus (Red-throated Pipit)*			
Mugilidae					
942.		*Liza vaigiensis*			
Mullidae					
943.		*Upeneus tragula*			
Muraenidae					
944.		*Gymnothorax prasinus*			
945.		*Gymnothorax richardsoni*			
Muridae					
946.	24215	*Hydromys chrysogaster (Water-rat, Rakali)*		P4	
947.	24223	*Mus musculus (House Mouse)*	Y		
948.	24230	*Pseudomys albocinereus (Ash-grey Mouse)*			
949.	24243	*Rattus fuscipes (Western Bush Rat)*			
950.	24245	*Rattus rattus (Black Rat)*	Y		
Mycoblastaceae					
951.	35477	*Tephromela alectoronica*			
952.	28068	*Tephromela atra*			
Myobatrachidae					
953.	25398	*Crinia georgiana (Quacking Frog)*			
954.	25399	*Crinia glauerti (Clicking Frog)*			
955.	25401	*Crinia pseudinsignifera (Bleating Froglet)*			
956.	25402	*Crinia subinsignifera (South Coast Froglet)*			
957.	25404	*Geocrinia leai (Ticking Frog)*			
958.	25433	*Pseudophryne guentheri (Crawling Toadlet)*			
Myrtaceae					
959.	5315	*Actinodium cunninghamii (Albany Daisy)*			
960.	5316	*Agonis flexuosa (Peppermint, Wonil)*			
961.	17202	*Agonis flexuosa var. flexuosa*			
962.	19789	*Agonis theiformis*			
963.	20361	*Astartea arbuscula (Minute Astartea)*			
964.	20125	*Astartea corniculata*			
965.	20127	*Astartea glomerulosa (Early Astartea)*			
966.	45213	*Astartea pulchella*			
967.	20283	*Astartea scoparia (Common Astartea)*			
968.	42820	*Astartea transversa*		P2	
969.	5364	*Baeckea pygmaea*			
970.	5376	*Beaufortia anisandra (Dark Beaufortia)*			
971.	5379	*Beaufortia cyrtodonta (Stirling Range Bottlebrush, Stirling Range Beaufortia)*			
972.	5381	*Beaufortia decussata (Gravel Bottlebrush)*			

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973.	5392	*Beaufortia sparsa (Swamp Bottlebrush)*			
974.	5394	*Callistemon glaucus*			
975.	5415	*Calothamnus lateralis*			
976.	5425	*Calothamnus preissii*			
977.	5430	*Calothamnus schaueri*			
978.	5440	*Calytrix asperula (Brush Starflower)*			
979.	5458	*Calytrix flavescens (Summer Starflower)*			
980.	48451	*Calytrix hirta*			
981.	5491	*Chamelaucium ciliatum*			
982.	5501	*Conothamnus neglectus*			
983.	17104	*Corymbia calophylla (Marri)*			
984.	5519	*Darwinia oederoides*			
985.	5533	*Darwinia vestita (Pom-pom Darwinia)*			
986.	45244	*Ericomyrtus serpyllifolia*			
987.	5550	*Eucalyptus angulosa (Ridge-fruited Mallee, Kwararl)*			
988.	5605	*Eucalyptus cornuta (Yate, Yeid)*			
989.	5616	*Eucalyptus decurva (Slender Mallee)*			
990.	5625	*Eucalyptus diversicolor (Karri)*			
991.	5627	*Eucalyptus doratoxylon (Spearwood Mallee, Keidjngund)*			
992.	5643	*Eucalyptus falcata (Silver Mallet, Dulyumuk)*			
993.	18216	*Eucalyptus globulus*	Y		
994.	11458	*Eucalyptus goniantha subsp. goniantha (Jerdacuttup Mallee)*			
995.	5704	*Eucalyptus macrandra (Long-flowered Marlock, Dwed)*			
996.	13547	*Eucalyptus marginata subsp. marginata (Jarrah)*			
997.	5709	*Eucalyptus megacarpa (Bullich, Pulidj)*			
998.	42063	*Eucalyptus notactites*			
999.	5723	*Eucalyptus occidentalis (Flat-topped Yate, Moidj)*			
1000.	5739	*Eucalyptus patens (Swan River Blackbutt, Dwuda)*			
1001.	5776	*Eucalyptus staeri (Albany Blackbutt)*			
1002.	5816	*Homalospermum firmum*			
1003.	5817	*Hypocalymma angustifolium (White Myrtle, Kudjid)*			
1004.	5818	*Hypocalymma cordifolium*			
1005.	13106	*Hypocalymma scariosum*			
1006.	5827	*Hypocalymma strictum*			
1007.	44873	*Kunzea ambigua*	Y		
1008.	17512	*Kunzea clavata*			
1009.	5832	*Kunzea ericifolia (Spearwood, Pondil)*			
1010.	17506	*Kunzea ericifolia subsp. ericifolia*			
1011.	5835	*Kunzea micrantha*			
1012.	5841	*Kunzea recurva*			
1013.	5850	*Leptospermum laevigatum (Coast Teatree)*	Y		
1014.	5853	*Leptospermum oligandrum*			
1015.	18184	*Melaleuca croxfordiae*			
1016.	5902	*Melaleuca densa*			
1017.	5905	*Melaleuca diosmifolia*			
1018.	5938	*Melaleuca microphylla*			
1019.	5946	*Melaleuca pauciflora*			
1020.	5948	*Melaleuca pentagona*			
1021.	5952	*Melaleuca preissiana (Moonah)*			
1022.	13277	*Melaleuca ringens*		P3	
1023.	5968	*Melaleuca spathulata*			
1024.	5971	*Melaleuca striata*			
1025.	5980	*Melaleuca thymoides*			
1026.	5987	*Melaleuca viminea (Mohan)*			
1027.	11109	*Pericalymma crassipes*			
1028.	6006	*Pericalymma ellipticum (Swamp Teatree)*			
1029.	15501	*Pericalymma spongiocaule*			
1030.	6014	*Regelia inops*			
1031.	6027	*Rinzia schollerifolia (Cranberry Rinzia)*			
1032.	20100	*Taxandria angustifolia*			
1033.	20105	*Taxandria conspicua subsp. conspicua*			
1034.	20114	*Taxandria fragrans*			
1035.	20115	*Taxandria juniperina*			
1036.	20135	*Taxandria linearifolia*			
1037.	20134	*Taxandria marginata*			
1038.	20133	*Taxandria parviceps*			
1039.	12424	*Verticordia fimbrilepis subsp. australis*		T	
1040.	6084	*Verticordia habrantha (Hidden Featherflower)*			
1041.	15618	*Verticordia plumosa var. plumosa*			

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Nannopercidae					
1042.		*Edelia vittata*			
1043.	34033	*Nannatherina balstoni (Balston's Pygmy Perch)*		T	
Nemesiidae					
1044.		*Aname tepperi*			
Neobalaenidae					
1045.	24072	*Caperea marginata (Pygmy Right Whale)*			
Neosebastidae					
1046.		*Maxillicosta scabriceps*			
Neosittidae					
1047.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
1048.	24606	*Daphoenositta chrysoptera subsp. pileata (Varied Sittella, Black-capped Sitella)*			
Nomeidae					
1049.		*Cubiceps cf. baxteri*			Y
Notonectidae					
1050.		*Notonectidae sp.*			
Odacidae					
1051.		*Odax acroptilus*			
1052.		*Odax cyanomelas*			
Odontaspididae					
1053.	34034	*Carcharias taurus (Grey Nurse Shark)*		T	
Olacaceae					
1054.	2365	*Olax benthamiana*			
1055.	2366	*Olax phyllanthi*			
Oligochaeta					
1056.		*Oligochaeta sp.*			
Onagraceae					
1057.	6133	*Epilobium hirtigerum (Hairy Willow Herb)*			
1058.	14292	*Oenothera stricta subsp. stricta*	Y		
Ophichthidae					
1059.		*Muraenichthys breviceps*			
1060.		*Ophisurus serpens*			
Oplegnathidae					
1061.		*Oplegnathus woodwardi*			
Orchidaceae					
1062.	1581	*Caladenia corynephora*			
1063.	10776	*Caladenia ensata*			
1064.	15348	*Caladenia flava subsp. flava*			
1065.	15350	*Caladenia flava subsp. sylvestris*			
1066.	15353	*Caladenia heberleana*			
1067.	15362	*Caladenia longicauda subsp. crassa*			
1068.	1603	*Caladenia longiclavata (Clubbed Spider Orchid)*			
1069.	15371	*Caladenia nana subsp. nana*			
1070.	15372	*Caladenia nana subsp. unita*			
1071.	1609	*Caladenia pectinata (King Spider Orchid)*			
1072.	15375	*Caladenia pholcoidea*			
1073.	1610	*Caladenia plicata (Crab-lipped Spider Orchid)*			
1074.	15379	*Caladenia serotina*			
1075.	1589	*Caladenia x ericksoniae*			
1076.	33160	*Calochilus uliginosus*			
1077.	12935	*Corybas abditus*		P3	
1078.	12946	*Corybas limpidus*		P4	
1079.	1627	*Cryptostylis ovata (Slipper Orchid)*			
1080.	15114	*Cyanicula gemmata*			
1081.	15404	*Cyanicula sericea*			
1082.	10964	*Cyrtostylis robusta*			
1083.	10942	*Cyrtostylis tenuissima*			
1084.	19649	*Disa bracteata*	Y		
1085.	1632	*Diuris emarginata (Tall Donkey Orchid)*			
1086.	1633	*Diuris laevis (Nannygoat Orchid)*			
1087.	46873	*Diuris littoralis*			
1088.	1640	*Drakaea glyptodon (King-in-his-carriage)*			
1089.	15406	*Drakaea gracilis*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1090.	11156	*Drakaea livida*			
1091.	1642	*Drakaea thynniphila*			
1092.	1643	*Elythranthera brunonis (Purple Enamel Orchid)*			
1093.	1644	*Elythranthera emarginata (Pink Enamel Orchid)*			
1094.	1645	*Epiblema grandiflorum (Babe-in-a-cradle)*			
1095.	1646	*Eriochilus dilatatus (White Bunny Orchid)*			
1096.	15412	*Eriochilus dilatatus subsp. multiflorus*			
1097.	15415	*Eriochilus scaber subsp. scaber*			
1098.	15416	*Eriochilus valens*			
1099.	12932	*Gastrodia lacista*			
1100.	1653	*Leporella fimbriata (Hare Orchid)*			
1101.	15418	*Leptoceras menziesii*			
1102.	1656	*Lyperanthus serratus (Rattle Beak Orchid)*			
1103.	1657	*Microtis alba (White Mignonette Orchid)*			
1104.	34158	*Microtis alboviridis*			
1105.	1658	*Microtis atrata (Swamp Mignonette Orchid)*			
1106.	8814	*Microtis brownii*			
1107.	12199	*Microtis familiaris*			
1108.	1659	*Microtis globula (South-coast Mignonette Orchid)*		T	
1109.	15419	*Microtis media subsp. media*			
1110.	1660	*Microtis orbicularis (Dark Mignonette Orchid)*			
1111.	1662	*Microtis pulchella (Beautiful Mignonette Orchid)*		P4	
1112.	23483	*Paracaleana brockmanii*			
1113.	23504	*Paracaleana disjuncta*			
1114.	23500	*Paracaleana hortiorum*			
1115.	1667	*Paracaleana nigrita (Flying Duck Orchid)*			
1116.	20460	*Pheladenia deformis*			
1117.	15424	*Praecoxanthus aphyllus*			
1118.	1668	*Prasophyllum brownii*			
1119.	11066	*Prasophyllum cucullatum (Hooded Leek Orchid)*			
1120.	1671	*Prasophyllum elatum (Tall Leek Orchid)*			
1121.	1672	*Prasophyllum fimbria (Fringed Leek Orchid)*			
1122.	1674	*Prasophyllum giganteum (Bronze Leek Orchid)*			
1123.	16688	*Prasophyllum gracile*			
1124.	1676	*Prasophyllum hians (Yawning Leek Orchid)*			
1125.	1677	*Prasophyllum macrostachyum (Laughing Leek Orchid)*			
1126.	1680	*Prasophyllum parvifolium (Autumn Leek Orchid)*			
1127.	48478	*Prasophyllum paulinae (Pauline's Laughing Leek Orchid)*		P1	
1128.	1681	*Prasophyllum regium (King Leek Orchid)*			
1129.	44084	*Prasophyllum sp. early (G. Brockman GBB 1626)*			
1130.	1683	*Prasophyllum triangulare (Dark Leek Orchid)*			
1131.	17267	*Pterostylis brevisepala*			
1132.	48485	*Pterostylis heberlei*		P2	
1133.	44725	*Pterostylis microphylla*			
1134.	11118	*Pterostylis pyramidalis (Snail Orchid)*			
1135.	1694	*Pterostylis rogersii (Curled-tongue Shell Orchid)*			
1136.		*Pterostylis sp.*			
1137.	18655	*Pterostylis sp. crinkled leaf (G.J. Keighery 13426)*			
1138.	10998	*Pterostylis turfosa (Bird Orchid)*			
1139.	1698	*Pterostylis vittata (Banded Greenhood)*			
1140.	16367	*Pyrorchis nigricans (Red beaks, Elephants ears)*			
1141.	10856	*Thelymitra benthamiana (Leopard Orchid)*			
1142.	1703	*Thelymitra canaliculata (Blue Sun Orchid)*			
1143.	1705	*Thelymitra crinita (Blue Lady Orchid)*			
1144.	1706	*Thelymitra cucullata (Swamp Sun Orchid)*			
1145.	1707	*Thelymitra flexuosa (Twisted Sun Orchid)*			
1146.	11143	*Thelymitra graminea*			
1147.	11053	*Thelymitra macrophylla*			
1148.	1710	*Thelymitra mucida (Plum Orchid)*			
1149.	1715	*Thelymitra spiralis (Curlylocks)*			
1150.	1716	*Thelymitra tigrina (Tiger Orchid)*			
1151.	20727	*Thelymitra uliginosa*			
1152.	1717	*Thelymitra variegata (Queen of Sheba)*		P2	
1153.	20737	*X Cyanthera glossodioides*			
Orectolobidae					
1154.		*Orectolobus hutchinsi*			
1155.		*Sutorectus tentaculatus*			
Orobanchaceae					
1156.	15037	*Bartsia trixago*	Y		

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1157.	7122	*Orobanche minor (Lesser Broomrape)*	Y		
1158.	7090	*Parentucellia viscosa (Sticky Bartsia)*	Y		
Orsolobidae					
1159.		*Australobus torbay*			
1160.		*Tasmanoonops mainae*			
Orthotrichaceae					
1161.	36218	*Zygodon menziesii*			
Ostraciidae					
1162.		*Lactoria concatenatus*			
Otariidae					
1163.	24208	*Arctocephalus forsteri (New Zealand Fur Seal, long-nosed fur-seal)*		S	
1164.	24209	*Arctocephalus tropicalis (Subantarctic fur-seal)*		T	
1165.	24210	*Neophoca cinerea (Australian Sea-lion)*		T	
Otididae					
1166.	24610	*Ardeotis australis (Australian Bustard)*			
Oxalidaceae					
1167.	4356	*Oxalis pes-caprae (Soursob)*	Y		
1168.	4358	*Oxalis purpurea (Largeflower Wood Sorrel)*	Y		
Pachycephalidae					
1169.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
1170.	24613	*Colluricincla harmonica subsp. rufiventris (Grey Shrike-thrush)*			
1171.	25677	*Falcunculus frontatus (Crested Shrike-tit)*			
1172.	24618	*Oreoica gutturalis (Crested Bellbird)*			
1173.	34011	*Oreoica gutturalis subsp. gutturalis (Crested Bellbird (southern))*			
1174.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
1175.	24624	*Pachycephala rufiventris subsp. rufiventris (Rufous Whistler)*			
Palaemonidae					
1176.		*Palaemonidae sp.*			
Pannariaceae					
1177.	18016	*Degelia flabellata*		P2	
1178.	27709	*Degelia subcrustata*			
Papaveraceae					
1179.	2969	*Fumaria capreolata (Whiteflower Fumitory)*	Y		
1180.	31532	*Fumaria muralis subsp. muralis*	Y		
Paradoxosomatidae					
1181.		*Akamptogonus novarae*			
Pararchaeidae					
1182.		*Ozarchaea westraliensis*			
Parascylliidae					
1183.		*Parascyllium variolatum*			
Parastacidae					
1184.	33939	*Cherax cainii (Marron)*			
1185.		*Cherax destructor*			
1186.		*Cherax preissii*			
1187.		*Parastacidae sp.*			
Pardalotidae					
1188.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
1189.	24625	*Pardalotus punctatus subsp. punctatus (Spotted Pardalote)*			
1190.	24626	*Pardalotus punctatus subsp. xanthopyge (Yellow-rumped Pardalote)*			
1191.	25682	*Pardalotus striatus (Striated Pardalote)*			
Parmeliaceae					
1192.	27743	*Flavoparmelia diffractaica*			
1193.	27748	*Flavoparmelia rutidota*			
1194.	27787	*Hypogymnia subphysodes*			
1195.	28218	*Hypogymnia subphysodes var. austerodioides*			
1196.	28219	*Hypogymnia subphysodes var. subphysodes*			
1197.	27852	*Menegazzia caesiopruinosa*			
1198.	27855	*Menegazzia subpertusa*			
1199.	27919	*Parmelinopsis minarum*			
1200.	27923	*Parmotrema cooperi*			
1201.	30458	*Parmotrema reticulatum*			
1202.	29035	*Xanthoparmelia atrobarbatica*			

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1203.	28107	*Xanthoparmelia australasica*			
1204.	28110	*Xanthoparmelia burmeisteri*			
1205.	28122	*Xanthoparmelia dichotoma*			
1206.	29033	*Xanthoparmelia glabrans*			
1207.	28151	*Xanthoparmelia mexicana*			
1208.	28155	*Xanthoparmelia mougeotina*			
1209.	29036	*Xanthoparmelia pulla*			
1210.		*Xanthoparmelia sp.*			
1211.	28330	*Xanthoparmelia subprolixa*			
1212.	28181	*Xanthoparmelia taractica*			
1213.	28182	*Xanthoparmelia tasmanica*			
1214.	28191	*Xanthoparmelia xanthomelaena*			
Passeridae					
1215.	24642	*Passer montanus (Eurasian Tree Sparrow)*	Y		
Pataecidae					
1216.		*Neopataecus waterhousii*			
Pegasidae					
1217.		*Pegasus lancifer*			
Pelecanidae					
1218.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
Pelecanoididae					
1219.	24649	*Pelecanoides urinatrix subsp. exsul (Common Diving Petrel)*			
Pempheridae					
1220.		*Pempheris multiradiata*			
Pentacerotidae					
1221.		*Paristiopterus gallipavo*			
Peramelidae					
1222.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
Percichthyidae					
1223.		*Bostockia porosa*			
1224.		*Maccullochella peelii*			Y
1225.		*Nannoperca vittata*			
1226.		*Polyprion americanus*			Y
Percidae					
1227.		*Perca fluviatilis*			
Peronosporaceae					
1228.		*Phytophthora cinnamomi*			
Perthidae					
1229.		*Perthiidae sp.*			
Pertusariaceae					
1230.	27949	*Pertusaria leucostomoides*			
Petroicidae					
1231.	24651	*Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*			
1232.	24652	*Eopsaltria georgiana (White-breasted Robin)*			
1233.	25693	*Microeca fascinans (Jacky Winter)*			
1234.	48066	*Petroica boodang (Scarlet Robin)*			
1235.	24659	*Petroica goodenovii (Red-capped Robin)*			
Phalacrocoracidae					
1236.		*Microcarbo melanoleucos*			
1237.	25697	*Phalacrocorax carbo (Great Cormorant)*			
1238.	24666	*Phalacrocorax melanoleucos subsp. melanoleucos (Little Pied Cormorant)*			
1239.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
1240.	25699	*Phalacrocorax varius (Pied Cormorant)*			
Phalangeridae					
1241.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
Phasianidae					
1242.	24671	*Coturnix pectoralis (Stubble Quail)*			
1243.	25701	*Coturnix ypsilophora (Brown Quail)*			
1244.	24673	*Coturnix ypsilophora subsp. australis (Brown Quail)*			
1245.	24672	*Coturnix ypsilophora subsp. cervina (Brown Quail)*			
Philydraceae					

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1246.	1173	*Philydrella pygmaea (Butterfly Flowers)*			
Phreatoicidae					
1247.		*Phreatoicidae sp.*			
Phyllanthaceae					
1248.	4675	*Phyllanthus calycinus (False Boronia)*			
1249.	4689	*Poranthera ericoides (Heath Poranthera)*			
1250.	4690	*Poranthera huegelii*			
1251.	4691	*Poranthera microphylla (Small Poranthera)*			
Physciaceae					
1252.	27597	*Buellia disciformis*			
1253.	28308	*Pyxine fallax*			
Physeteridae					
1254.	24073	*Physeter macrocephalus (Sperm Whale)*		T	
Physidae					
1255.		*Physidae sp.*			
Phytolaccaceae					
1256.	2793	*Phytolacca octandra (Red Ink Plant)*	Y		
Pinguipedidae					
1257.		*Parapercis haackei*			
Pittosporaceae					
1258.	3157	*Billardiera floribunda (White-flowered Billardiera)*			
1259.	25798	*Billardiera fusiformis (Australian Bluebell)*			
1260.	3159	*Billardiera laxiflora*			
1261.	3165	*Billardiera variifolia*			
1262.	25779	*Billardiera venusta*			
1263.	16322	*Pittosporum undulatum*	Y		
Planorbidae					
1264.		*Planorbidae sp.*			
Plantaginaceae					
1265.	4717	*Callitriche stagnalis (Common Starwort)*	Y		
1266.	19625	*Cymbalaria muralis subsp. muralis*	Y		
1267.	14282	*Gratiola pubescens*			
1268.	7303	*Plantago lanceolata (Ribwort Plantain)*	Y		
1269.	7108	*Veronica arvensis (Wall Speedwell)*	Y		
1270.	7110	*Veronica distans*			
1271.	7112	*Veronica plebeia (Creeping Speedwell)*			
Platycephalidae					
1272.		*Neoplatycephalus conatus*			
Plesiopidae					
1273.		*Paraplesiops meleagris*			
Pleuronectidae					
1274.		*Ammotretis rostratus*			
Plotosidae					
1275.		*Cnidoglanis macrocephalus*			
Poaceae					
1276.	185	*Aira cupaniana (Silvery Hairgrass)*	Y		
1277.	186	*Aira elegantissima*	Y		
1278.	187	*Aira praecox (Early Hairgrass)*	Y		
1279.	194	*Amphipogon amphipogonoides*			
1280.	195	*Amphipogon avenaceus*			
1281.	197	*Amphipogon debilis*			
1282.	20184	*Amphipogon laguroides subsp. laguroides*			
1283.	20196	*Amphipogon setaceus*			
1284.	200	*Amphipogon turbinatus*			
1285.	202	*Anthoxanthum odoratum (Sweet Vernal Grass)*	Y		
1286.	17233	*Austrostipa campylachne*			
1287.	17242	*Austrostipa juncifolia*			
1288.	244	*Briza maxima (Blowfly Grass)*	Y		
1289.	245	*Briza minor (Shivery Grass)*	Y		
1290.	248	*Bromus catharticus (Prairie Grass)*	Y		
1291.	249	*Bromus diandrus (Great Brome)*	Y		
1292.	250	*Bromus hordeaceus (Soft Brome)*	Y		
1293.	48259	*Cortaderia selloana subsp. selloana*			

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			Y		
1294.	287	*Dactylis glomerata (Cocksfoot)*	Y		
1295.	299	*Deyeuxia quadriseta (Reed Bentgrass)*			
1296.	306	*Dichelachne crinita (Longhair Plumegrass)*			
1297.	311	*Digitaria ciliaris (Summer Grass)*	Y		
1298.	11105	*Echinochloa crus-galli*	Y		
1299.	348	*Ehrharta erecta (Panic Veldt Grass)*	Y		
1300.	349	*Ehrharta longiflora (Annual Veldt Grass)*	Y		
1301.	353	*Eleusine indica (Crowsfoot Grass)*	Y		
1302.	373	*Eragrostis brownii (Brown's Lovegrass)*			
1303.	376	*Eragrostis curvula (African Lovegrass)*	Y		
1304.	17043	*Glyceria declinata*	Y		
1305.	444	*Holcus lanatus (Yorkshire Fog)*	Y		
1306.	449	*Hordeum leporinum (Barley Grass)*	Y		
1307.	20019	*Lachnagrostis filiformis*			
1308.	467	*Lagurus ovatus (Hare's Tail Grass)*	Y		
1309.	10957	*Lolium perenne x rigidum*	Y		
1310.	478	*Lolium rigidum (Wimmera Ryegrass)*	Y		
1311.	485	*Microlaena stipoides (Weeping Grass)*			
1312.	492	*Neurachne alopecuroidea (Foxtail Mulga Grass)*			
1313.	516	*Parapholis incurva (Coast Barbgrass)*	Y		
1314.	527	*Paspalum dilatatum*	Y		
1315.	557	*Piptatherum miliaceum (Rice Millet)*	Y		
1316.	571	*Poa annua (Winter Grass)*	Y		
1317.	577	*Poa poiformis (Coastal Poa)*			
1318.	578	*Poa porphyroclados*			
1319.	40426	*Rytidosperma occidentale*			
1320.	40427	*Rytidosperma setaceum*			
1321.	19453	*Setaria parviflora*	Y		
1322.	613	*Setaria verticillata (Whorled Pigeon Grass)*	Y		
1323.	624	*Spinifex hirsutus (Hairy Spinifex)*			
1324.	8710	*Sporobolus africanus (Parramatta Grass)*	Y		
1325.	667	*Tetrarrhena laevis (Forest Ricegrass)*			
1326.	11137	*Vulpia fasciculata*	Y		
1327.	724	*Vulpia myuros (Rat's Tail Fescue)*	Y		
Podargidae					
1328.	25703	*Podargus strigoides (Tawny Frogmouth)*			
1329.	24679	*Podargus strigoides subsp. brachypterus (Tawny Frogmouth)*			
Podicipedidae					
1330.	25704	*Podiceps cristatus (Great Crested Grebe)*			
1331.	24680	*Podiceps cristatus subsp. australis (Great Crested Grebe)*			
1332.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
1333.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
Poeciliidae					
1334.		*Gambusia affinis*			
Polycentropodidae					
1335.		*Polycentropodidae sp.*			
Polygalaceae					
1336.	4550	*Comesperma calymega (Blue-spike Milkwort)*			
1337.	4552	*Comesperma confertum*			
1338.	4554	*Comesperma flavum*			
1339.	4557	*Comesperma nudiusculum*			
1340.	4559	*Comesperma polygaloides (Small Milkwort)*			
1341.	4564	*Comesperma virgatum (Milkwort)*			
1342.	8395	*Polygala myrtifolia (Myrtleleaf Milkwort)*	Y		
1343.	4578	*Polygala virgata*	Y		
Polygonaceae					
1344.	13911	*Persicaria decipiens*			
1345.	2429	*Rumex acetosella (Sorrel)*	Y		
1346.	2430	*Rumex brownii (Swamp Dock)*	Y		
1347.	2432	*Rumex conglomeratus (Clustered Dock)*	Y		
1348.	17994	*Rumex obtusifolius subsp. obtusifolius*	Y		
1349.	12017	*Rumex pulcher subsp. pulcher (Fiddle Dock)*	Y		
Pomatostomidae					
1350.	24683	*Pomatostomus superciliosus (White-browed Babbler)*			
Potamogetonaceae					

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1351.	110	*Potamogeton drummondii*			
Potoroidae					
1352.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
Pottiaceae					
1353.	32315	*Barbula calycina*			
1354.	36137	*Pseudocrossidium crinitum*			
1355.	32451	*Triquetrella papillata*			
Primulaceae					
1356.	36375	*Lysimachia arvensis (Pimpernel)*	Y		
1357.	6483	*Samolus junceus*			
1358.	6484	*Samolus repens (Creeping Brookweed)*			
Pristiophoridae					
1359.		*Pristiophorus cirratus*			
Procellariidae					
1360.	41326	*Ardenna carneipes (Flesh-footed Shearwater, Fleshy-footed Shearwater)*		T	
1361.	24690	*Macronectes giganteus (Southern Giant Petrel)*		IA	
1362.		*Pterodroma macroptera subsp. macoptera*			
1363.	24711	*Puffinus assimilis subsp. assimilis (Little Shearwater)*			
Prodidomidae					
1364.		*Molycria quadricauda*			
1365.		*Nomindra leeuweni*			
Proteaceae					
1366.	10824	*Acidonia microcarpa*			
1367.	1769	*Adenanthos apiculatus*			
1368.	1773	*Adenanthos cuneatus (Coastal Jugflower)*			
1369.	1791	*Adenanthos obovatus (Basket Flower)*			
1370.	1794	*Adenanthos sericeus (Woolly Bush)*			
1371.	11685	*Adenanthos sericeus subsp. sericeus (Coastal Woollybush)*			
1372.	16876	*Adenanthos x cunninghamii*		P4	
1373.	32684	*Banksia arctotidis*			
1374.	1800	*Banksia attenuata (Slender Banksia, Piara)*			
1375.	32676	*Banksia biterax*			
1376.	1806	*Banksia brownii (Feather-leaved Banksia)*		T	
1377.	1811	*Banksia coccinea (Scarlet Banksia)*			
1378.	32616	*Banksia dallanneyi subsp. sylvestris*			
1379.	1814	*Banksia dryandroides (Dryandra-leaved Banksia)*			
1380.	32525	*Banksia formosa (Showy Dryandra)*			
1381.	1817	*Banksia gardneri (Prostrate Banksia)*			
1382.	11764	*Banksia gardneri var. brevidentata*			
1383.	11532	*Banksia gardneri var. gardneri*			
1384.	1818	*Banksia goodii (Good's Banksia)*		T	
1385.	1819	*Banksia grandis (Bull Banksia, Pulgarla)*			
1386.	1822	*Banksia ilicifolia (Holly-leaved Banksia)*			
1387.	1830	*Banksia littoralis (Swamp Banksia, Pungura)*			
1388.		*Banksia marginata*			
1389.	32207	*Banksia mucronulata (Swordfish Dryandra)*			
1390.	32202	*Banksia nivea (Honeypot Dryandra, Pudjarn)*			
1391.	11941	*Banksia nutans var. cernuella*			
1392.	1837	*Banksia occidentalis (Red Swamp Banksia)*			
1393.	1841	*Banksia praemorsa (Cut-leaf Banksia)*			
1394.	1844	*Banksia quercifolia (Oak-leaved Banksia)*			
1395.	32085	*Banksia seneciifolia*		P4	
1396.	32084	*Banksia serra (Serrate-leaved Dryandra)*		P4	
1397.	32080	*Banksia sessilis var. sessilis*			
1398.	1851	*Banksia sphaerocarpa (Round-fruit Banksia)*			
1399.	12111	*Banksia sphaerocarpa var. sphaerocarpa (Fox Banksia)*			
1400.	32044	*Banksia squarrosa (Pingle)*			
1401.	32045	*Banksia squarrosa subsp. squarrosa*			
1402.	1854	*Banksia verticillata (Albany Banksia)*		T	
1403.	1862	*Conospermum caeruleum (Blue Brother)*			
1404.	15610	*Conospermum caeruleum subsp. caeruleum*			
1405.	1863	*Conospermum capitatum*			
1406.	14723	*Conospermum coerulescens subsp. adpressum*			
1407.	1872	*Conospermum flexuosum (Tangled Smokebush)*			
1408.	17109	*Conospermum flexuosum subsp. flexuosum*			
1409.	1873	*Conospermum floribundum*			
1410.	1879	*Conospermum petiolare*			

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1411.	1883	*Conospermum teretifolium (Spider Smokebush)*			
1412.	1944	*Franklandia fucifolia (Lanoline Bush)*			
1413.	1987	*Grevillea depauperata*			
1414.	2005	*Grevillea fasciculata*			
1415.	2052	*Grevillea occidentalis*			
1416.	2078	*Grevillea pulchella (Beautiful Grevillea)*			
1417.	15991	*Grevillea pulchella subsp. pulchella*			
1418.	2112	*Grevillea trifida*			
1419.	2115	*Grevillea umbellulata*			
1420.	2128	*Hakea amplexicaulis (Prickly Hakea)*			
1421.	2137	*Hakea ceratophylla (Horned Leaf Hakea)*			
1422.	2150	*Hakea cucullata (Hood Leaved Hakea)*			
1423.	12227	*Hakea drupacea*			
1424.	2160	*Hakea ferruginea*			
1425.	2162	*Hakea florida*			
1426.	2169	*Hakea lasiantha (Woolly Flowered Hakea)*			
1427.	2174	*Hakea linearis*			
1428.	2191	*Hakea oleifolia (Dungyn)*			
1429.	2197	*Hakea prostrata (Harsh Hakea)*			
1430.	2203	*Hakea ruscifolia (Candle Hakea)*			
1431.	2212	*Hakea sulcata (Furrowed Hakea)*			
1432.	2214	*Hakea trifurcata (Two-leaf Hakea)*			
1433.	16640	*Hakea tuberculata*			
1434.	2215	*Hakea undulata (Wavy-leaved Hakea)*			
1435.	2216	*Hakea varia (Variable-leaved Hakea)*			
1436.	2222	*Isopogon attenuatus*			
1437.	2223	*Isopogon axillaris*			
1438.	12908	*Isopogon buxifolius var. buxifolius*		P2	
1439.	2226	*Isopogon cuneatus (Coneflower)*			
1440.	16880	*Isopogon formosus subsp. formosus*			
1441.	2233	*Isopogon longifolius*			
1442.	2237	*Isopogon sphaerocephalus (Drumstick Isopogon)*			
1443.	2238	*Isopogon teretifolius (Nodding Coneflower)*			
1444.	2242	*Isopogon uncinatus*		T	
1445.	14878	*Lambertia echinata subsp. citrina*			
1446.	2248	*Lambertia inermis (Chittick, Djidiok)*			
1447.	2250	*Lambertia orbifolia (Round-leaf Honeysuckle)*			Y
1448.	19187	*Lambertia orbifolia subsp. orbifolia*		T	
1449.	2253	*Lambertia uniflora*			
1450.	2262	*Persoonia elliptica (Spreading Snottygobble)*			
1451.	2264	*Persoonia graminea*			
1452.	2267	*Persoonia longifolia (Snottygobble)*			
1453.	2282	*Petrophile acicularis*			
1454.	2292	*Petrophile divaricata*			
1455.	2293	*Petrophile diversifolia*			
1456.	2300	*Petrophile longifolia (Long Leaved Cone Bush)*			
1457.	2302	*Petrophile media*			
1458.	2306	*Petrophile rigida*			
1459.	17765	*Petrophile squamata subsp. squamata*			
1460.	12910	*Stirlingia seselifolia*			
1461.	2318	*Stirlingia tenuifolia*			
1462.	2322	*Synaphea favosa*			
1463.	2323	*Synaphea gracillima*			
1464.	16859	*Synaphea incurva*		P1	
1465.	16866	*Synaphea intricata*		P3	
1466.	12911	*Synaphea obtusata*			
1467.	2324	*Synaphea petiolaris (Synaphea)*			
1468.	16864	*Synaphea petiolaris subsp. petiolaris*			
1469.	2326	*Synaphea polymorpha (Albany Synaphea, Pinda)*			
1470.	2327	*Synaphea preissii*		P3	
Pseudocheiridae					
1471.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum, ngwayir)*		T	
Psittacidae					
1472.		*Barnardius zonarius*			
1473.	25713	*Cacatua galerita (Sulphur-crested Cockatoo)*			
1474.	24725	*Cacatua roseicapilla subsp. assimilis (Galah)*			
1475.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
1476.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black Cockatoo)*		T	
1477.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo, White-tailed Long-billed Black*			

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		Cockatoo)		T	
1478.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
1479.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
1480.	24738	*Neophema elegans (Elegant Parrot)*			
1481.	24739	*Neophema petrophila (Rock Parrot)*			
1482.	25720	*Platycercus icterotis (Western Rosella)*			
1483.	24745	*Platycercus icterotis subsp. icterotis (Western Rosella)*			
1484.	24747	*Platycercus spurius (Red-capped Parrot)*			
1485.	25722	*Polytelis anthopeplus (Regent Parrot)*			
1486.		*Purpureicephalus spurius*			
Psittaculidae					
1487.	48085	*Psittacula krameri (Indian Ringnecked Parrot, Rose-ringed Parakeet)*	Y		
Pteridaceae					
1488.	31	*Cheilanthes austrotenuifolia*			
Pygopodidae					
1489.	24994	*Aprasia striolata (Lined Worm-lizard)*			
1490.	25008	*Pygopus lepidopodus (Common Scaly Foot)*			
Pyralidae					
1491.		*Pyralidae sp.*			
Racopilaceae					
1492.	32480	*Racopilum cuspidigerum var. convolutaceum*			
Rajidae					
1493.		*Raja sp.*			
Rallidae					
1494.	25727	*Fulica atra (Eurasian Coot)*			
1495.	24761	*Fulica atra subsp. australis (Eurasian Coot)*			
1496.	25729	*Gallinula tenebrosa (Dusky Moorhen)*			
1497.	25730	*Gallirallus philippensis (Buff-banded Rail)*			
1498.	24765	*Gallirallus philippensis subsp. mellori (Buff-banded Rail)*			
1499.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
1500.	24767	*Porphyrio porphyrio subsp. bellus (Purple Swamphen)*			
1501.	24769	*Porzana fluminea (Australian Spotted Crake)*			
1502.	25732	*Porzana pusilla (Baillon's Crake)*			
1503.	24771	*Porzana tabuensis (Spotless Crake)*			
1504.	48141	*Tribonyx ventralis (Black-tailed Native-hen)*			
Ramalinaceae					
1505.	27653	*Catinaria atropurpurea*			
1506.	28030	*Ramalina glaucescens*			
Ranunculaceae					
1507.	2929	*Clematis pubescens (Common Clematis)*			
1508.	2933	*Ranunculus muricatus (Sharp Buttercup)*	Y		
Recurvirostridae					
1509.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
1510.	25734	*Himantopus himantopus (Black-winged Stilt)*			
1511.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
Resedaceae					
1512.	3084	*Reseda lutea (Cutleaf Mingnonette)*	Y		
Restionaceae					
1513.	17685	*Chaetanthus aristatus*			
1514.	1065	*Chaetanthus leptocarpoides*			
1515.	17687	*Chaetanthus tenellus*			
1516.	17705	*Chordifex abortivus*		T	
1517.	17828	*Chordifex isomorphus*			
1518.	17689	*Chordifex laxus*			
1519.	46358	*Desmocladus confertospicatus*			
1520.	17691	*Desmocladus fasciculatus*			
1521.	16595	*Desmocladus flexuosus*			
1522.	1067	*Empodisma gracillimum*			
1523.	1070	*Hypolaena exsulca*			
1524.	1071	*Hypolaena fastigiata*			
1525.	19918	*Hypolaena grandiuscula*			
1526.	17054	*Leptocarpus crassipes*		P3	
1527.	46381	*Leptocarpus crebriculmis*			

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1528.	46375	*Leptocarpus decipiens*			
1529.	46376	*Leptocarpus denmarkicus*			
1530.	46380	*Leptocarpus kraussii*			
1531.	19833	*Leptocarpus laxus*			
1532.	1080	*Leptocarpus scariosus*			
1533.	46377	*Leptocarpus scoparius*			
1534.	1082	*Leptocarpus tenax (Slender Twine Rush)*			
1535.	46383	*Leptocarpus tephrinus*			
1536.	46379	*Leptocarpus thysananthus*			
1537.	1084	*Lepyrodia drummondiana*			
1538.	1087	*Lepyrodia hermaphrodita*			
1539.	1089	*Lepyrodia monoica*			
1540.	1092	*Loxocarya cinerea*			
1541.	17682	*Melanostachya ustulata*			
1542.	14915	*Sporadanthus strictus*			
1543.	17684	*Tremulina tremula*			
Rhamnaceae					
1544.	4828	*Spyridium globulosum (Basket Bush)*			
1545.	14355	*Spyridium majoranifolium*			
1546.	4833	*Spyridium spadiceum*		P4	
1547.	33438	*Trymalium odoratissimum subsp. trifidum*			
Rhinobatidae					
1548.		*Trygonorrhina fasciata*			
Rhizocarpaceae					
1549.	28041	*Rhizocarpon polycarpum*			
Rosaceae					
1550.	18320	*Cotoneaster pannosus*	Y		
1551.	20506	*Rubus anglocandicans*	Y		
Rubiaceae					
1552.	7348	*Opercularia hispidula (Hispid Stinkweed)*			
1553.	18255	*Opercularia vaginata (Dog Weed)*			
Russulaceae					
1554.		*Cystangium pisiglarea*			
Rutaceae					
1555.	4403	*Boronia alata (Winged Boronia)*			
1556.	4412	*Boronia crassipes*		P3	
1557.	4413	*Boronia crenulata (Aniseed Boronia)*			
1558.	29274	*Boronia crenulata subsp. crenulata*			
1559.	11503	*Boronia crenulata var. crenulata*			
1560.	4416	*Boronia denticulata*			
1561.	4423	*Boronia heterophylla (Kalgan Boronia)*			
1562.	4426	*Boronia juncea*			
1563.	16630	*Boronia juncea subsp. laniflora*			
1564.	16631	*Boronia juncea subsp. micrantha*			
1565.	16632	*Boronia juncea subsp. minima*			
1566.	4428	*Boronia megastigma (Scented Boronia)*			
1567.	4429	*Boronia molloyae (Tall Boronia)*			
1568.	4441	*Boronia spathulata (Boronia)*			
1569.	4442	*Boronia stricta*			
1570.	4443	*Boronia subsessilis*			
1571.	4447	*Boronia virgata*		P4	
1572.	4448	*Chorilaena quercifolia (Chorilaena)*			
1573.	4451	*Crowea angustifolia (Crowea)*			
1574.	17729	*Crowea angustifolia var. platyphylla*			
1575.	18547	*Rhadinothamnus anceps*			
Santalaceae					
1576.	2335	*Choretrum lateriflorum (Dwarf Sour Bush)*			
1577.	10907	*Exocarpos odoratus (Scented Ballart)*			
1578.	10765	*Exocarpos sparteus (Broom Ballart, Djuk)*			
1579.	17703	*Leptomeria ellytes*			
1580.	2345	*Leptomeria ericoides*			
1581.	2347	*Leptomeria lehmannii*			
1582.	2350	*Leptomeria pauciflora (Sparse-flowered Currant Bush)*			
1583.	2353	*Leptomeria scrobiculata*			
1584.	2355	*Leptomeria squarrulosa*			

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Sapindaceae					
1585.	4757	*Dodonaea ceratocarpa*			
Scincidae					
1586.	25027	*Ctenotus australis*			
1587.	25031	*Ctenotus catenifer*			
1588.	25049	*Ctenotus labillardieri*			
1589.	25096	*Egernia kingii (King's Skink)*			
1590.	25100	*Egernia napoleonis*			
1591.	30919	*Hemiergis gracilipes (skink)*			
1592.	25117	*Hemiergis peronii subsp. peronii*			
1593.	41416	*Liopholis pulchra subsp. pulchra (South-western Rock Skink, Spectacled Rock Skink)*			
1594.	42413	*Lissolepis luctuosa (Western Swamp Skink)*			
1595.	25203	*Tiliqua occipitalis (Western Bluetongue)*			
1596.	25207	*Tiliqua rugosa subsp. rugosa*			
Sciomyzidae					
1597.		*Sciomyzidae sp.*			
Scolopacidae					
1598.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
1599.	24780	*Calidris alba (Sanderling)*		IA	
1600.	25738	*Calidris canutus (Red Knot, knot)*		IA	
1601.	24784	*Calidris ferruginea (Curlew Sandpiper)*		T	
1602.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
1603.	24790	*Calidris tenuirostris (Great Knot)*		T	
1604.	30932	*Limosa lapponica (Bar-tailed Godwit)*		IA	
1605.	24802	*Philomachus pugnax (Ruff, reeve)*		IA	
1606.	24806	*Tringa glareola (Wood Sandpiper)*		IA	
1607.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
Scolopendridae					
1608.		*Cormocephalus aurantiipes*			
1609.		*Cormocephalus michaelseni*			
Scomberesocidae					
1610.		*Scomberesox saurus*			
Scombridae					
1611.		*Auxis thazard*			
1612.		*Thunnus alalunga*			
1613.		*Thunnus maccoyii*			
Scorpididae					
1614.		*Tilodon sexfasciatum*			
Scrophulariaceae					
1615.	7292	*Myoporum oppositifolium (Twin-leaf Myoporum)*			
Scyliorhinidae					
1616.		*Aulohalaelurus labiosus*			
1617.		*Aulohalaelurus labiosus?*			
Sebastidae					
1618.		*Helicolenus percoides*			
Selaginellaceae					
1619.	6	*Selaginella gracillima (Tiny Clubmoss)*			
Sematophyllaceae					
1620.	32483	*Sematophyllum subhumile var. contiguum*			
Serranidae					
1621.		*Acanthistius serratus*			
1622.		*Caesioperca rasor*			
1623.		*Caesioscorpis theagenes*			
1624.		*Epinephelides armatus*			
Sillaginidae					
1625.		*Sillaginodes punctata*			
1626.		*Sillago bassensis*			
Simuliidae					
1627.		*Simuliidae sp.*			
Siphonocladaceae					
1628.	26770	*Dictyosphaeria sericea*			

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Siphonotidae					
1629.		*Siphonotus flavomarginatus*			
Solanaceae					
1630.	6950	*Anthocercis viscosa (Sticky Tailflower)*			
1631.	11505	*Anthocercis viscosa subsp. viscosa*			
1632.	7017	*Solanum laciniatum (Kangaroo Apple)*	Y		
1633.	7022	*Solanum nigrum (Black Berry Nightshade)*	Y		
Soleidae					
1634.		*Aseraggodes haackeanus*			
1635.		*Synaptura hediste*			
1636.		*Zebrias cancellatus*			
Sparassidae					
1637.		*Isopeda leishmanni*			
1638.		*Isopedella cana*			
Sphaeriidae					
1639.		*Sphaeriidae sp.*			
Spheniscidae					
1640.	24818	*Eudyptula minor subsp. novaehollandiae (Little Penguin)*			
Sphyraenidae					
1641.		*Sphyraena barracuda*			
Sphyrnidae					
1642.		*Sphyrna lewini*			
Stereocaulaceae					
1643.	41263	*Lepraria squamatica*			
Stratiomyidae					
1644.		*Stratiomyidae sp.*			
Sturnidae					
1645.	25752	*Sturnus vulgaris (Common Starling)*	Y		
1646.	24824	*Sturnus vulgaris subsp. vulgaris (Common Starling)*	Y		
Stylidiaceae					
1647.	7673	*Levenhookia pauciflora (Deceptive Stylewort)*			
1648.	7676	*Levenhookia pusilla (Midget Stylewort)*			
1649.	39881	*Stylidium acuminatum subsp. meridionale*			
1650.	7684	*Stylidium amoenum (Lovely Triggerplant)*			
1651.	39880	*Stylidium angustifolium subsp. glaucifolium*			
1652.	7687	*Stylidium assimile (Bronze-leaved Triggerplant)*			
1653.	7689	*Stylidium beaugleholei*			
1654.	7695	*Stylidium caespitosum (Fly-away Triggerplant)*			
1655.	7696	*Stylidium calcaratum (Book Triggerplant)*			
1656.	7708	*Stylidium crassifolium (Thick-leaved Triggerplant)*			
1657.	7712	*Stylidium despectum (Dwarf Triggerplant)*			
1658.	31355	*Stylidium diademum*			
1659.	7718	*Stylidium diversifolium (Touch-me-not)*			
1660.	7724	*Stylidium falcatum (Slender Beaked Triggerplant)*		P1	
1661.	7725	*Stylidium fasciculatum (Pale Beaked Triggerplant)*			
1662.	20691	*Stylidium gloeophyllum*		P4	
1663.	7734	*Stylidium guttatum (Dotted Triggerplant)*			
1664.	7735	*Stylidium hirsutum (Hairy Triggerplant)*			
1665.	7738	*Stylidium imbricatum (Tile Leaved Triggerplant)*			
1666.	7742	*Stylidium inundatum (Hundreds and Thousands)*			
1667.	7745	*Stylidium junceum (Reed Triggerplant)*			
1668.	7757	*Stylidium luteum (Yellow Triggerplant)*			
1669.	25851	*Stylidium nymphaeum*			
1670.	7774	*Stylidium piliferum (Common Butterfly Triggerplant)*			
1671.	7776	*Stylidium plantagineum (Plantagenet Triggerplant)*			
1672.	7778	*Stylidium pritzelianum (Royal Triggerplant)*			
1673.	7782	*Stylidium pulchellum (Thumbelina Triggerplant)*			
1674.	7784	*Stylidium pygmaeum (Pygmy Triggerplant)*			
1675.	7785	*Stylidium repens (Matted Triggerplant)*			
1676.	7796	*Stylidium scandens (Climbing Triggerplant)*			
1677.	7798	*Stylidium schoenoides (Cow Kicks)*			
1678.		*Stylidium sp.*			
1679.	7799	*Stylidium spathulatum (Creamy Triggerplant)*			
1680.	7800	*Stylidium spinulosum (Topsy-turvy Triggerplant)*			
1681.	11223	*Stylidium spinulosum subsp. spinulosum*			

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1682.	7802	*Stylidium squamosotuberosum (Fleshy-rhizomed Trigger Plant)*			
1683.	25804	*Stylidium thryonides*			
1684.	7808	*Stylidium violaceum (Violet Triggerplant)*			
Sulidae					
1685.	48008	*Morus serrator (Australasian Gannet)*			
Sylviidae					
1686.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
1687.	24831	*Acrocephalus australis subsp. gouldi (Australian Reed Warbler)*			
1688.	25758	*Megalurus gramineus (Little Grassbird)*			
1689.	24838	*Megalurus gramineus subsp. gramineus (Little Grassbird)*			
Syngnathidae					
1690.		*Leptoichthys fistularius*			
1691.	34039	*Phycodurus eques (Leafy Sea Dragon)*		P2	
1692.		*Phyllopteryx taeniolatus*			
1693.		*Solegnathus lettiensis*			
1694.		*Stigmatopora argus*			
1695.		*Vanacampus phillipi*			
1696.		*Vanacampus poecilolaemus*			
Synodontidae					
1697.		*Saurida grandisquamis*			
1698.		*Saurida undosquamis*			
Synthemistidae					
1699.		*Synthemistidae sp.*			
Talitridae					
1700.		*Talitridae sp.*			
Tarsipedidae					
1701.	24167	*Tarsipes rostratus (Honey Possum, Noolbenger)*			
Telephlebiidae					
1702.		*Telephlebiidae sp.*			
Teloschistaceae					
1703.	27625	*Caloplaca cinnabarina*			
1704.	27638	*Caloplaca marina*			
1705.		*Caloplaca sp.*			
1706.	45301	*Jackelixia ligulata*			
1707.	28065	*Teloschistes chrysophthalmus*			
1708.	44996	*Xanthoria coomae*			
1709.	28194	*Xanthoria parietina*			
Tetragnathidae					
1710.		*Pinkfloydia harveii*			
1711.		*Tetragnatha caudifera*			Y
Tetraodontidae					
1712.		*Contusus brevicaudus*			
1713.		*Omegophora armilla*			
1714.		*Torquigener vicinus*			
Tetrarogidae					
1715.		*Gymnapistes marmoratus*			
Threskiornithidae					
1716.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
1717.	24843	*Plegadis falcinellus (Glossy Ibis)*		IA	
1718.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
Thuidiaceae					
1719.	32442	*Thuidium sparsum*			
1720.	32486	*Thuidium sparsum var. hastatum*			
Thylacomyidae					
1721.	24168	*Macrotis lagotis (Bilby, Dalgyte, Ninu)*		T	
Thymelaeaceae					
1722.	5231	*Pimelea angustifolia (Narrow-leaved Pimelea)*			
1723.	11928	*Pimelea ciliata subsp. ciliata*			
1724.	5239	*Pimelea clavata*			
1725.	5243	*Pimelea ferruginea*			
1726.	5249	*Pimelea hispida (Bristly Pimelea)*			
1727.	5251	*Pimelea imbricata*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1728.	11533	*Pimelea imbricata var. imbricata*			
1729.	11472	*Pimelea lehmanniana subsp. lehmanniana*			
1730.	5255	*Pimelea longiflora*			
1731.	18115	*Pimelea rosea subsp. annelsii*		P3	
1732.	18117	*Pimelea rosea subsp. rosea*			
1733.	5270	*Pimelea tinctoria*			
Tipulidae					
1734.		*Tipulidae sp.*			
Triakidae					
1735.		*Furgaleus macki*			
1736.		*Galeorhinus galeus*			
1737.		*Mustelus antarcticus*			
Triglidae					
1738.		*Lepidotrigla papilio*			
1739.		*Pterygotrigla polyommata*			
Tripterygiidae					
1740.		*Lepidoblennius marmoratus*			
Trombidiformes					
1741.		*Acariformes sp.*			
Turnicidae					
1742.	48147	*Turnix varius (Painted Button-quail)*			
1743.	24851	*Turnix velox (Little Button-quail)*			
Tytonidae					
1744.	25762	*Tyto alba (Barn Owl)*			
1745.	24852	*Tyto alba subsp. delicatula (Barn Owl)*			
1746.	24855	*Tyto novaehollandiae subsp. novaehollandiae (Masked Owl (southwest))*		P3	
Uranoscopidae					
1747.		*Kathetostoma laeve*			
1748.		*Kathetostoma nigrofasciatum*			
Urodacidae					
1749.		*Urodacus novaehollandiae*			
Urolophidae					
1750.		*Trygonoptera mucosa*			
1751.		*Urolophus gigas*			
1752.		*Urolophus paucimaculatus*			
1753.		*Urolophus sp.*			
Usneaceae					
1754.	28086	*Usnea dasaea*			
1755.	28087	*Usnea inermis*			
1756.	28088	*Usnea maculata*			
1757.	18015	*Usnea pulvinata*		P1	
Varanidae					
1758.	25225	*Varanus rosenbergi (Heath Monitor)*			
Veliferidae					
1759.		*Metavelifer multiradiatus*			
Veliidae					
1760.		*Veliidae sp.*			
Verbenaceae					
1761.	6733	*Lantana camara (Common Lantana)*	Y		
Vespertilionidae					
1762.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
1763.	24187	*Chalinolobus morio (Chocolate Wattled Bat)*			
1764.	24189	*Falsistrellus mackenziei (Western False Pipistrelle, Western Falsistrelle)*		P4	
1765.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
1766.	24206	*Vespadelus regulus (Southern Forest Bat)*			
Xanthorrhoeaceae					
1767.	1280	*Chamaescilla corymbosa (Blue Squill)*			
1768.	1256	*Xanthorrhoea preissii (Grass tree, Palga)*			
Xyridaceae					
1769.	1144	*Xyris flexifolia*			
1770.	1149	*Xyris lacera*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1771.	1150	*Xyris lanata*			
Zamiaceae					
1772.	85	*Macrozamia riedlei (Zamia, Djiridji)*			
Zeidae					
1773.		*Zeus faber*			
Ziphiidae					
1774.	24080	*Mesoplodon layardii (Strap-toothed Beaked Whale)*			
Zodariidae					
1775.		*Holasteron reinholdae*			Y
1776.		*Storosa tetrica*			
Zoridae					
1777.		*Argoctenus bidentatus*			
Zosteropidae					
1778.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

NatureMap Fauna Species Report 15Km

Created By Guest user on 19/10/2018

Kingdom	Animalia
Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Line'
Vertices	34° 55' 54" S,117° 43' 56" E 34° 55' 28" S,117° 45' 08" E 34° 56' 06" S,117° 45' 09" E 34° 56' 22" S,117° 43' 39" E 34° 56' 06" S,117° 43' 28" E 34° 55' 54" S,117° 43' 58" E
Group By	Family

Family	Species	Records
Acanthizidae	8	1520
Accipitridae	14	376
Actinopodidae	4	20
Aegothelidae	1	9
Aeshnidae	1	2
Agamidae	1	1
Amphisopodidae	1	1
Anapidae	1	2
Anatidae	13	836
Ancylidae	1	3
Anhingidae	1	14
Apodidae	1	2
Aracanidae	3	3
Araneidae	6	55
Archaeidae	1	20
Ardeidae	7	285
Argiolestidae	1	2
Arkyidae	2	3
Artamidae	2	105
Atherinidae	2	2
Atrichornithidae	1	1
Baetidae	1	2
Balaenopteridae	1	1
Bathysauridae	1	5
Belonidae	1	15
Berycidae	1	1
Boidae	1	4
Bothriuridae	1	3
Burramyidae	1	5
Cacatuidae	1	112
Caddidae	1	3
Caenidae	1	15
Callanthiidae	1	2
Callionymidae	1	1
Campephagidae	1	236
Canidae	1	1
Caprimulgidae	1	1
Carangidae	3	5
Carcharhinidae	2	2
Casuariidae	1	6
Ceinidae	1	10
Ceratiidae	1	1
Ceratopogonidae	1	9
Charadriidae	8	82
Cheilodactylidae	1	1
Cheloniidae	1	1
Cheluidae	1	5
Chernetidae	1	1
Chironemidae	2	2
Chironomidae	3	67
Clinidae	3	5
Clupeidae	2	7
Coenagrionidae	1	5
Columbidae	5	515
Congiopodidae	1	1
Congridae	1	1
Corduliidae	1	1
Corixidae	1	7
Corvidae	2	553
Cracticidae	4	690
Cuculidae	4	158
Culicidae	1	3
Cyprididae	2	5
Cypridopsidae	1	4
Dasyatidae	1	1
Dasyornithidae	1	1
Dasyuridae	5	27
Delphinidae	2	4
Desidae	3	4
Dicaeidae	1	1
Dicruridae	4	1299
Dinolestidae	1	2
Diodontidae	2	4
Diomedeidae	2	2
Dugesiidae	1	1

Dytiscidae	1	17
Echeneidae	1	1
Ecnomidae	1	14
Elapidae	7	23
Elopidae	1	1
Empididae	1	1
Engraulidae	1	7
Ephydridae	1	1
Estrilidae	1	295
Exocoetidae	1	1
Falconidae	8	116
Galaxiidae	4	28
Garypidae	1	1
Garypinidae	1	1
Gekkonidae	1	23
Gelastocoridae	1	2
Gempylidae	1	1
Geotriidae	1	3
Gerreidae	1	2
Girellidae	1	1
Glossiphoniidae	1	3
Gnaphosidae	1	1
Gnathanacanthidae	1	1
Gobiidae	3	7
Gomphidae	1	4
Gordiidae	1	1
Gripopterygidae	1	4
Gyrinidae	1	2
Haematopodidae	2	22
Halcyonidae	3	468
Hebridae	1	1
Hemicorduliidae	1	5
Heterodontidae	1	3
Hirundinidae	3	527
Hydraenidae	1	1
Hydrobiosidae	1	1
Hydrometridae	1	3
Hydrophilidae	1	12
Hydropsychidae	1	8
Hydroptilidae	1	3
Hylidae	2	8
Hypnidae	1	2
Hyriidae	1	1
Idiopidae	1	4
Istiophoridae	1	1
Iulomorphidae	2	19
Ixodidae	1	1
Kyphosidae	1	1
Labridae	5	13
Lamnidae	1	1
Lamponidae	5	12
Laridae	6	158
Lepidogalaxiidae	1	1
Leporidae	1	1
Leptoceridae	1	16
Leptophlebiidae	1	3
Libellulidae	1	2
Limnodynastidae	2	59
Lophotidae	1	1
Lycosidae	5	30
Macropodidae	3	9
Maluridae	5	961
Melanostomiidae	1	1
Meliphagidae	12	1735
Micropholcommatidae	2	3
Mimetidae	1	1
Miturgidae	1	1
Molidae	1	6
Molossidae	1	1
Monacanthidae	13	23
Monoscutidae	1	3
Moridae	2	3
Motacillidae	2	4
Mugilidae	1	1
Mullidae	1	1
Muraenidae	2	2
Muridae	5	75
Myobatrachidae	6	75
Nannopercidae	2	22
Nemesiidae	1	84
Neobalaenidae	1	1
Neosebastidae	1	2
Neosittidae	2	22
Nomeidae	1	1
Notonectidae	1	2
Odacidae	2	2
Odontaspididae	1	1
Oligochaeta	1	22
Ophichthidae	2	8
Oplegnathidae	1	1
Orectolobidae	2	2
Orsolobidae	2	48
Ostraciidae	1	1
Otariidae	3	4
Otididae	1	4
Pachycephalidae	7	395
Palaemonidae	1	7
Paradoxosomatidae	1	9
Pararchaeidae	1	1
Parascylliidae	1	1
Parastacidae	4	34
Pardalotidae	4	182
Passeridae	1	7
Pataecidae	1	1
Pegasidae	1	2

Pelecanidae	1	150
Pelecanoididae	1	1
Pempheridae	1	1
Pentacerotidae	1	1
Peramelidae	1	35
Percichthyidae	4	43
Percidae	1	1
Perthidae	1	11
Petroicidae	5	372
Phalacrocoracidae	5	193
Phalangeridae	1	3
Phasianidae	4	37
Phreatoicidae	1	1
Physeteridae	1	6
Physidae	1	3
Pinguipedidae	1	1
Planorbidae	1	2
Platycephalidae	1	1
Plesiopidae	1	1
Pleuronectidae	1	1
Plotosidae	1	1
Podargidae	2	18
Podicipedidae	4	68
Poeciliidae	1	2
Polycentropodidae	1	1
Pomatostomidae	1	1
Potoroidae	1	3
Pristiophoridae	1	1
Procellariidae	4	6
Prodidomidae	2	3
Pseudocheiridae	1	177
Psittacidae	15	1700
Psittaculidae	1	1
Pygopodidae	2	5
Pyralidae	1	1
Rajidae	1	1
Rallidae	11	213
Recurvirostridae	3	28
Rhinobatidae	1	1
Scincidae	11	69
Sciomyzidae	1	1
Scolopacidae	10	44
Scolopendridae	2	10
Scomberesocidae	1	1
Scombridae	3	3
Scorpididae	1	2
Scyliorhinidae	2	3
Sebastidae	1	1
Serranidae	4	6
Sillaginidae	2	31
Simuliidae	1	14
Siphonotidae	1	1
Soleidae	3	3
Sparassidae	2	5
Sphaeriidae	1	1
Spheniscidae	1	19
Sphyraenidae	1	1
Sphyrnidae	1	1
Stratiomyidae	1	2
Sturnidae	2	5
Sulidae	1	6
Sylviidae	4	51
Syngnathidae	7	36
Synodontidae	2	2
Synthemistidae	1	2
Talitridae	1	1
Tarsipedidae	1	64
Telephlebiidae	1	5
Tetragnathidae	2	2
Tetraodontidae	3	3
Tetrarogidae	1	2
Threskiornithidae	3	239
Thylacomyidae	1	1
Tipulidae	1	10
Triakidae	3	5
Triglidae	2	7
Tripterygiidae	1	6
Trombidiformes	1	12
Turnicidae	2	15
Tytonidae	3	11
Uranoscopidae	2	4
Urodacidae	1	4
Urolophidae	4	10
Varanidae	1	1
Veliferidae	1	1
Veliidae	1	10
Vespertilionidae	5	17
Zeidae	1	5
Ziphiidae	1	1
Zodariidae	2	16
Zoridae	1	1
Zosteropidae	1	496
TOTAL	**578**	**17247**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Acanthizidae					
1.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
2.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
3.	24262	*Acanthiza inornata (Western Thornbill)*			
4.	25530	*Gerygone fusca (Western Gerygone)*			
5.	24271	*Gerygone fusca subsp. fusca (Western Gerygone)*			
6.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
7.	24279	*Sericornis frontalis subsp. maculatus (White-browed Scrubwren)*			
8.	30948	*Smicrornis brevirostris (Weebill)*			
Accipitridae					
9.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
10.	24281	*Accipiter cirrocephalus subsp. cirrocephalus (Collared Sparrowhawk)*			
11.	25536	*Accipiter fasciatus (Brown Goshawk)*			
12.	24282	*Accipiter fasciatus subsp. fasciatus (Brown Goshawk)*			
13.	24285	*Aquila audax (Wedge-tailed Eagle)*			
14.	24288	*Circus approximans (Swamp Harrier)*			
15.	24289	*Circus assimilis (Spotted Harrier)*			
16.		*Elanus axillaris*			
17.	24290	*Elanus caeruleus subsp. axillaris (Australian Black-shouldered Kite)*			
18.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*			
19.	24295	*Haliastur sphenurus (Whistling Kite)*			
20.	47965	*Hieraaetus morphnoides (Little Eagle)*			
21.		*Lophoictinia isura*			
22.	48591	*Pandion cristatus (Osprey, Eastern Osprey)*		IA	
Actinopodidae					
23.		*Missulena granulosa*			
24.		*Missulena hoggi*			
25.		*Missulena occatoria*			
26.		*Missulena torbayensis*			
Aegothelidae					
27.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
Aeshnidae					
28.		*Aeshnidae sp.*			
Agamidae					
29.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
Amphisopodidae					
30.		*Amphisopodidae sp.*			
Anapidae					
31.		*Chasmocephalon flinders*			
Anatidae					
32.	24310	*Anas castanea (Chestnut Teal)*			
33.	24312	*Anas gracilis (Grey Teal)*			
34.	24313	*Anas platyrhynchos (Mallard)*			
35.	24315	*Anas rhynchotis (Australasian Shoveler)*			
36.	25550	*Anas rhynchotis subsp. rhynchotis (Australasian Shoveler)*			
37.	24316	*Anas superciliosa (Pacific Black Duck)*			
38.	24318	*Aythya australis (Hardhead)*			
39.	24319	*Biziura lobata (Musk Duck)*			
40.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
41.	24322	*Cygnus atratus (Black Swan)*			
42.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
43.	24328	*Oxyura australis (Blue-billed Duck)*		P4	
44.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
Ancylidae					
45.		*Ancylidae sp.*			
Anhingidae					
46.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
Apodidae					
47.	25554	*Apus pacificus (Fork-tailed Swift, Pacific Swift)*		IA	
Aracanidae					
48.		*Aracana aurita*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
49.		*Caprichthys gymnura*			
50.		*Capropygia unistriata*			
Araneidae					
51.		*Arachnura higginsi*			
52.		*Araneus cyphoxis*			
53.		*Araneus senicaudatus*			
54.		*Austracantha minax*			
55.		*Backobourkia heroine*			
56.		*Nephila edulis*			
Archaeidae					
57.	42361	*Zephyrarchaea mainae (Main's assasin spider)*		T	
Ardeidae					
58.	25558	*Ardea ibis (Cattle Egret)*			
59.	41324	*Ardea modesta (great egret, white egret)*			
60.	24340	*Ardea novaehollandiae (White-faced Heron)*			
61.	24341	*Ardea pacifica (White-necked Heron)*			
62.	24345	*Botaurus poiciloptilus (Australasian Bittern)*		T	
63.		*Egretta novaehollandiae*			
64.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
Argiolestidae					
65.		*Megapodagrionidae sp.*			
Arkyidae					
66.		*Arkys alticephala*			
67.		*Arkys walckenaeri*			
Artamidae					
68.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
69.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
Atherinidae					
70.		*Atherinosoma sp.*			
71.		*Atherinosoma wallacei*			
Atrichornithidae					
72.	24358	*Atrichornis clamosus (Noisy Scrub-bird, tjimiluk)*		T	
Baetidae					
73.		*Baetidae sp.*			
Balaenopteridae					
74.	24048	*Balaenoptera musculus subsp. brevicauda (Pygmy Blue Whale)*		T	
Bathysauridae					
75.		*Saurida tumbil*			
Belonidae					
76.		*? ?*			
Berycidae					
77.		*Centroberyx gerrardi*			
Boidae					
78.	25240	*Morelia spilota subsp. imbricata (Carpet Python)*			
Bothriuridae					
79.		*Cercophonius sulcatus*			
Burramyidae					
80.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
Cacatuidae					
81.		*Eolophus roseicapillus*			
Caddidae					
82.		*Hesperopilio mainae*			
Caenidae					
83.		*Caenidae sp.*			
Callanthiidae					
84.		*Callanthias australis*			
Callionymidae					
85.		*Foetorepus calauropomus*			
Campephagidae					

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
86.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
Canidae					
87.	24040	*Vulpes vulpes (Red Fox)*	Y		
Caprimulgidae					
88.	24368	*Eurostopodus argus (Spotted Nightjar)*			
Carangidae					
89.		*Naucrates ductor*			
90.		*Seriola lalandi*			
91.		*Trachurus declivis*			
Carcharhinidae					
92.		*Carcharhinus obscurus*			
93.		*Prionace glauca*			
Casuariidae					
94.	24470	*Dromaius novaehollandiae (Emu)*			
Ceinidae					
95.		*Ceinidae sp.*			
Ceratiidae					
96.		*Ceratias tentaculatus*			
Ceratopogonidae					
97.		*Ceratopogonidae sp.*			
Charadriidae					
98.	25575	*Charadrius leschenaultii (Greater Sand Plover)*		IA	
99.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
100.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
101.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
102.	24382	*Pluvialis fulva (Pacific Golden Plover)*		IA	
103.	24383	*Pluvialis squatarola (Grey Plover)*		IA	
104.	48135	*Thinornis rubricollis (Hooded Plover, Hooded Dotterel)*		P4	
105.	24386	*Vanellus tricolor (Banded Lapwing)*			
Cheilodactylidae					
106.		*Nemadactylus macropterus*			
Cheloniidae					
107.	25335	*Caretta caretta (Loggerhead Turtle)*		T	
Cheluidae					
108.	43380	*Chelodina colliei (South-western Snake-necked Turtle)*			
Chernetidae					
109.		*Nesidiochernes slateri*			
Chironemidae					
110.		*Chironemus georgianus*			
111.		*Threpterius maculosus*			
Chironomidae					
112.		*Chironominae sp.*			
113.		*Orthocladiinae sp.*			
114.		*Tanypodinae sp.*			
Clinidae					
115.		*Cristiceps aurantiacus*			
116.		*Cristiceps australis*			
117.		*Heteroclinus roseus*			
Clupeidae					
118.		*Sardinella lemuru?*			
119.		*Sardinops neopilchardus*			
Coenagrionidae					
120.		*Coenagrionidae sp.*			
Columbidae					
121.	24399	*Columba livia (Domestic Pigeon)*	Y		
122.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
123.	24409	*Phaps chalcoptera (Common Bronzewing)*			
124.	25587	*Phaps elegans (Brush Bronzewing)*			
125.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
Congiopodidae					

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
126.		*Perryena leucometopon*			
Congridae					
127.		*Scalanago lateralis*			
Corduliidae					
128.		*Corduliidae sp.*			
Corixidae					
129.		*Corixidae sp.*			
Corvidae					
130.	25592	*Corvus coronoides (Australian Raven)*			
131.	24417	*Corvus coronoides subsp. perplexus (Australian Raven)*			
Cracticidae					
132.	25595	*Cracticus tibicen (Australian Magpie)*			
133.	25596	*Cracticus torquatus (Grey Butcherbird)*			
134.	25597	*Strepera versicolor (Grey Currawong)*			
135.	24426	*Strepera versicolor subsp. plumbea (Grey Currawong)*			
Cuculidae					
136.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
137.	24427	*Cacomantis flabelliformis subsp. flabelliformis (Fan-tailed Cuckoo)*			
138.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
139.	24432	*Chrysococcyx lucidus subsp. plagosus (Shining Bronze Cuckoo)*			
Culicidae					
140.		*Culicidae sp.*			
Cyprididae					
141.		*Candonocypris novaezelandiae*			
142.		*Ilyodromus ellipticus*			
Cypridopsidae					
143.		*Sarscypridopsis aculeata*			
Dasyatidae					
144.		*Dasyatis brevicaudata*			
Dasyornithidae					
145.	24440	*Dasyornis longirostris (Western Bristlebird)*		T	
Dasyuridae					
146.	24088	*Antechinus flavipes subsp. leucogaster (Yellow-footed Antechinus, Mardo)*			
147.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
148.	24111	*Sminthopsis gilberti (Gilbert's Dunnart)*			
149.	25515	*Sminthopsis griseoventer (Grey-bellied Dunnart)*			
150.		*Sminthopsis murina*			
Delphinidae					
151.	24052	*Delphinus delphis (Common Dolphin)*			
152.	30954	*Tursiops aduncus (Indo-Pacific Bottlenose Dolphin)*			
Desidae					
153.		*Badumna microps*			
154.		*Baiami torbayensis*			
155.		*Desis hartmeyeri*			Y
Dicaeidae					
156.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
Dicruridae					
157.	24443	*Grallina cyanoleuca (Magpie-lark)*			
158.	25610	*Myiagra inquieta (Restless Flycatcher)*			
159.	48096	*Rhipidura albiscapa (Grey Fantail)*			
160.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
Dinolestidae					
161.		*Dinolestes lewini*			
Diodontidae					
162.		*Allomycterus pilatus*			
163.		*Diodon nicthemerus*			
Diomedeidae					
164.	30836	*Diomedea exulans subsp. exulans (Snowy Albatross)*		T	
165.	34007	*Thalassarche chlororhynchos (Atlantic Yellow-nosed Albatross)*		T	
Dugesiidae					

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
166.		*Dugesiidae sp.*			
Dytiscidae					
167.		*Dytiscidae sp.*			
Echeneidae					
168.		*Remora remora*			
Ecnomidae					
169.		*Ecnomidae sp.*			
Elapidae					
170.	25251	*Echiopsis curta (Bardick)*			
171.	25250	*Elapognathus coronatus (Crowned Snake)*			
172.	43384	*Hydrophis platurus (Yellow-bellied Seasnake)*			
173.	25252	*Notechis scutatus (Tiger Snake)*			
174.	25255	*Parasuta nigriceps*			
175.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
176.	30818	*Rhinoplocephalus bicolor (Square-nosed Snake)*			
Elopidae					
177.		*Elops hawaiensis*			
Empididae					
178.		*Empididae sp.*			
Engraulidae					
179.		*Engraulis australis*			
Ephydridae					
180.		*Ephydridae sp.*			
Estrilidae					
181.	24645	*Stagonopleura oculata (Red-eared Firetail)*			
Exocoetidae					
182.		*Cypselurus sp.*			
Falconidae					
183.	25621	*Falco berigora (Brown Falcon)*			
184.	24471	*Falco berigora subsp. berigora (Brown Falcon)*			
185.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
186.	24472	*Falco cenchroides subsp. cenchroides (Australian Kestrel, Nankeen Kestrel)*			
187.	25623	*Falco longipennis (Australian Hobby)*			
188.	24474	*Falco longipennis subsp. longipennis (Australian Hobby)*			
189.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
190.	24475	*Falco peregrinus subsp. macropus (Australian Peregrine Falcon)*		S	
Galaxiidae					
191.		*Galaxias maculatus*			
192.	34028	*Galaxias occidentalis (Western Minnow)*			
193.	34026	*Galaxiella munda (mud minnow, western dwarf galaxias)*		T	
194.	34027	*Galaxiella nigrostriata (Black-stripe Minnow, black-striped dwarf galaxias)*		T	
Garypidae					
195.		*Synsphyronus magnus*			
Garypinidae					
196.		*Protogarypinus giganteus*			
Gekkonidae					
197.	24980	*Christinus marmoratus (Marbled Gecko)*			
Gelastocoridae					
198.		*Gelastocoridae sp.*			
Gempylidae					
199.		*Thyrsites atun*			
Geotriidae					
200.	34030	*Geotria australis (Pouched Lamprey)*		P1	
Gerreidae					
201.		*Parequula melbournensis*			
Girellidae					
202.		*Girella zebra*			
Glossiphoniidae					
203.		*Glossiphoniidae sp.*			

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Gnaphosidae				
204.	*Megamyrmecion penicillatum*			Y
Gnathanacanthidae				
205.	*Gnathanacanthus goetzeei*			
Gobiidae				
206.	*Callogobius mucosus*			
207.	*Favonigobius lateralis*			
208.	*Pseudogobius olorum*			
Gomphidae				
209.	*Gomphidae sp.*			
Gordiidae				
210.	*Gordiidae sp.*			
Gripopterygidae				
211.	*Gripopterygidae sp.*			
Gyrinidae				
212.	*Gyrinidae sp.*			
Haematopodidae				
213. 25627	*Haematopus fuliginosus (Sooty Oystercatcher)*			
214. 24487	*Haematopus longirostris (Pied Oystercatcher)*			
Halcyonidae				
215. 30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
216. 25549	*Todiramphus sanctus (Sacred Kingfisher)*			
217. 24309	*Todiramphus sanctus subsp. sanctus (Sacred Kingfisher)*			
Hebridae				
218.	*Hebridae sp.*			
Hemicorduliidae				
219.	*Hemicorduliidae sp.*			
Heterodontidae				
220.	*Heterodontus portusjacksoni*			
Hirundinidae				
221. 24491	*Hirundo neoxena (Welcome Swallow)*			
222. 48060	*Petrochelidon ariel (Fairy Martin)*			
223. 48061	*Petrochelidon nigricans (Tree Martin)*			
Hydraenidae				
224.	*Hydraenidae sp.*			
Hydrobiosidae				
225.	*Hydrobiosidae sp.*			
Hydrometridae				
226.	*Hydrometridae sp.*			
Hydrophilidae				
227.	*Hydrophilidae sp.*			
Hydropsychidae				
228.	*Hydropsychidae sp.*			
Hydroptilidae				
229.	*Hydroptilidae sp.*			
Hylidae				
230. 25378	*Litoria adelaidensis (Slender Tree Frog)*			
231. 25388	*Litoria moorei (Motorbike Frog)*			
Hypnidae				
232.	*Hypnos monopterygium*			
Hyriidae				
233.	*Hyriidae sp.*			
Idiopidae				
234.	*Aganippe rhaphiduca*			
Istiophoridae				
235.	*Makaira indica*			
Iulomorphidae				
236.	*Atelomastix mainae*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
237.		*Samichus decoratus*			
Ixodidae					
238.		*Ixodes australiensis*			
Kyphosidae					
239.		*Kyphosus gladius MS*			
Labridae					
240.		*Achoerodus gouldii*			
241.		*Austrolabrus maculatus*			
242.		*Haletta semifasciata*			
243.		*Ophthalmolepis lineolatus*			
244.		*Siphonognathus argyrophanes*			
Lamnidae					
245.	34031	*Carcharodon carcharias (Great White Shark)*		T	
Lamponidae					
246.		*Lampona cylindrata*			
247.		*Lampona foliifera*			
248.		*Lampona punctigera*			
249.		*Lampona torbay*			Y
250.		*Prionosternum scutatum*			
Laridae					
251.		*Chroicocephalus novaehollandiae*			
252.	48587	*Hydroprogne caspia (Caspian Tern)*		IA	
253.	24511	*Larus novaehollandiae subsp. novaehollandiae (Silver Gull)*			
254.	25638	*Larus pacificus (Pacific Gull)*			
255.	24522	*Sterna bergii (Crested Tern)*			
256.	48597	*Thalasseus bergii (Crested Tern)*		IA	
Lepidogalaxiidae					
257.	47983	*Lepidogalaxias salamandroides (Salamanderfish)*		T	
Leporidae					
258.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
Leptoceridae					
259.		*Leptoceridae sp.*			
Leptophlebiidae					
260.		*Leptophlebiidae sp.*			
Libellulidae					
261.		*Libellulidae sp.*			
Limnodynastidae					
262.	25410	*Heleioporus eyrei (Moaning Frog)*			
263.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
Lophotidae					
264.		*Eumecichthys fiski*			Y
Lycosidae					
265.		*Artoria cingulipes*			
266.		*Artoria flavimana*			
267.		*Artoriopsis eccentrica*			
268.		*Tasmanicosa leuckartii*			
269.		*Venatrix pullastra*			
Macropodidae					
270.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
271.	48022	*Notamacropus irma (Western Brush Wallaby)*		P4	
272.	24145	*Setonix brachyurus (Quokka)*		T	
Maluridae					
273.	25650	*Malurus elegans (Red-winged Fairy-wren)*			
274.	24551	*Malurus pulcherrimus (Blue-breasted Fairy-wren)*			
275.	25654	*Malurus splendens (Splendid Fairy-wren)*			
276.	25655	*Stipiturus malachurus (Southern Emu-wren)*			
277.	24554	*Stipiturus malachurus subsp. westernensis (Southern Emu-wren)*			
Melanostomiidae					
278.		*Opostomias micripnus*			Y
Meliphagidae					
279.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			

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280.	24561	*Anthochaera carunculata (Red Wattlebird)*			
281.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
282.	24567	*Epthianura albifrons (White-fronted Chat)*			
283.	47962	*Glyciphila melanops (Tawny-crowned Honeyeater)*			
284.	25661	*Lichmera indistincta (Brown Honeyeater)*			
285.	24582	*Lichmera indistincta subsp. indistincta (Brown Honeyeater)*			
286.	24583	*Manorina flavigula (Yellow-throated Miner)*			
287.	25663	*Melithreptus brevirostris (Brown-headed Honeyeater)*			
288.	24587	*Melithreptus chloropsis (Western White-naped Honeyeater)*			
289.	48071	*Phylidonyris niger (White-cheeked Honeyeater)*			
290.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
Micropholcommatidae					
291.		*Raveniella peckorum*			
292.		*Taphiassa robertsi*			
Mimetidae					
293.		*Australomimetus diabolicus*			
Miturgidae					
294.		*Mituliodon tarantulinus*			
Molidae					
295.		*Ranzania laevis*			
Molossidae					
296.	24183	*Mormopterus loriae (Little Northern Freetail-bat)*			
Monacanthidae					
297.		*Acanthaluteres brownii*			
298.		*Acanthaluteres vittiger*			
299.		*Anacanthus barbatus*			
300.		*Brachaluteres jacksonianus*			
301.		*Cantheschenia longipinnis*			
302.		*Eubalichthys caeruleoguttatus*			
303.		*Eubalichthys cyanoura*			
304.		*Eubalichthys mosaicus*			
305.		*Meuschenia freycineti*			
306.		*Meuschenia galii*			
307.		*Meuschenia hippocrepis*			
308.		*Parika scaber*			
309.		*Scobinichthys granulatus*			
Monoscutidae					
310.		*Hypomegalopsalis tanisphyros*			
Moridae					
311.		*Lotella sp.*			Y
312.		*Pseudophycis barbata*			
Motacillidae					
313.	24599	*Anthus australis subsp. australis (Australian Pipit)*			
314.	24600	*Anthus cervinus (Red-throated Pipit)*			
Mugilidae					
315.		*Liza vaigiensis*			
Mullidae					
316.		*Upeneus tragula*			
Muraenidae					
317.		*Gymnothorax prasinus*			
318.		*Gymnothorax richardsoni*			
Muridae					
319.	24215	*Hydromys chrysogaster (Water-rat, Rakali)*		P4	
320.	24223	*Mus musculus (House Mouse)*	Y		
321.	24230	*Pseudomys albocinereus (Ash-grey Mouse)*			
322.	24243	*Rattus fuscipes (Western Bush Rat)*			
323.	24245	*Rattus rattus (Black Rat)*	Y		
Myobatrachidae					
324.	25398	*Crinia georgiana (Quacking Frog)*			
325.	25399	*Crinia glauerti (Clicking Frog)*			
326.	25401	*Crinia pseudinsignifera (Bleating Froglet)*			
327.	25402	*Crinia subinsignifera (South Coast Froglet)*			
328.	25404	*Geocrinia leai (Ticking Frog)*			

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329.	25433	*Pseudophryne guentheri (Crawling Toadlet)*			
Nannopercidae					
330.		*Edelia vittata*			
331.	34033	*Nannatherina balstoni (Balston's Pygmy Perch)*		T	
Nemesiidae					
332.		*Aname tepperi*			
Neobalaenidae					
333.	24072	*Caperea marginata (Pygmy Right Whale)*			
Neosebastidae					
334.		*Maxillicosta scabriceps*			
Neosittidae					
335.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
336.	24606	*Daphoenositta chrysoptera subsp. pileata (Varied Sittella, Black-capped Sitella)*			
Nomeidae					
337.		*Cubiceps cf. baxteri*			Y
Notonectidae					
338.		*Notonectidae sp.*			
Odacidae					
339.		*Odax acroptilus*			
340.		*Odax cyanomelas*			
Odontaspididae					
341.	34034	*Carcharias taurus (Grey Nurse Shark)*		T	
Oligochaeta					
342.		*Oligochaeta sp.*			
Ophichthidae					
343.		*Muraenichthys breviceps*			
344.		*Ophisurus serpens*			
Oplegnathidae					
345.		*Oplegnathus woodwardi*			
Orectolobidae					
346.		*Orectolobus hutchinsi*			
347.		*Sutorectus tentaculatus*			
Orsolobidae					
348.		*Australobus torbay*			
349.		*Tasmanoonops mainae*			
Ostraciidae					
350.		*Lactoria concatenatus*			
Otariidae					
351.	24208	*Arctocephalus forsteri (New Zealand Fur Seal, long-nosed fur-seal)*		S	
352.	24209	*Arctocephalus tropicalis (Subantarctic fur-seal)*		T	
353.	24210	*Neophoca cinerea (Australian Sea-lion)*		T	
Otididae					
354.	24610	*Ardeotis australis (Australian Bustard)*			
Pachycephalidae					
355.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
356.	24613	*Colluricincla harmonica subsp. rufiventris (Grey Shrike-thrush)*			
357.	25677	*Falcunculus frontatus (Crested Shrike-tit)*			
358.	24618	*Oreoica gutturalis (Crested Bellbird)*			
359.	34011	*Oreoica gutturalis subsp. gutturalis (Crested Bellbird (southern))*			
360.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
361.	24624	*Pachycephala rufiventris subsp. rufiventris (Rufous Whistler)*			
Palaemonidae					
362.		*Palaemonidae sp.*			
Paradoxosomatidae					
363.		*Akamptogonus novarae*			
Pararchaeidae					
364.		*Ozarchaea westraliensis*			
Parascylliidae					
365.		*Parascyllium variolatum*			

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Parastacidae					
366.	33939	*Cherax cainii (Marron)*			
367.		*Cherax destructor*			
368.		*Cherax preissii*			
369.		*Parastacidae sp.*			
Pardalotidae					
370.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
371.	24625	*Pardalotus punctatus subsp. punctatus (Spotted Pardalote)*			
372.	24626	*Pardalotus punctatus subsp. xanthopyge (Yellow-rumped Pardalote)*			
373.	25682	*Pardalotus striatus (Striated Pardalote)*			
Passeridae					
374.	24642	*Passer montanus (Eurasian Tree Sparrow)*	Y		
Pataecidae					
375.		*Neopataecus waterhousii*			
Pegasidae					
376.		*Pegasus lancifer*			
Pelecanidae					
377.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
Pelecanoididae					
378.	24649	*Pelecanoides urinatrix subsp. exsul (Common Diving Petrel)*			
Pempheridae					
379.		*Pempheris multiradiata*			
Pentacerotidae					
380.		*Paristiopterus gallipavo*			
Peramelidae					
381.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
Percichthyidae					
382.		*Bostockia porosa*			
383.		*Maccullochella peelii*			Y
384.		*Nannoperca vittata*			
385.		*Polyprion americanus*			Y
Percidae					
386.		*Perca fluviatilis*			
Perthidae					
387.		*Perthiidae sp.*			
Petroicidae					
388.	24651	*Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*			
389.	24652	*Eopsaltria georgiana (White-breasted Robin)*			
390.	25693	*Microeca fascinans (Jacky Winter)*			
391.	48066	*Petroica boodang (Scarlet Robin)*			
392.	24659	*Petroica goodenovii (Red-capped Robin)*			
Phalacrocoracidae					
393.		*Microcarbo melanoleucos*			
394.	25697	*Phalacrocorax carbo (Great Cormorant)*			
395.	24666	*Phalacrocorax melanoleucos subsp. melanoleucos (Little Pied Cormorant)*			
396.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
397.	25699	*Phalacrocorax varius (Pied Cormorant)*			
Phalangeridae					
398.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
Phasianidae					
399.	24671	*Coturnix pectoralis (Stubble Quail)*			
400.	25701	*Coturnix ypsilophora (Brown Quail)*			
401.	24673	*Coturnix ypsilophora subsp. australis (Brown Quail)*			
402.	24672	*Coturnix ypsilophora subsp. cervina (Brown Quail)*			
Phreatoicidae					
403.		*Phreatoicidae sp.*			
Physeteridae					
404.	24073	*Physeter macrocephalus (Sperm Whale)*		T	
Physidae					
405.		*Physidae sp.*			

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Pinguipedidae					
406.		*Parapercis haackei*			
Planorbidae					
407.		*Planorbidae sp.*			
Platycephalidae					
408.		*Neoplatycephalus conatus*			
Plesiopidae					
409.		*Paraplesiops meleagris*			
Pleuronectidae					
410.		*Ammotretis rostratus*			
Plotosidae					
411.		*Cnidoglanis macrocephalus*			
Podargidae					
412.	25703	*Podargus strigoides (Tawny Frogmouth)*			
413.	24679	*Podargus strigoides subsp. brachypterus (Tawny Frogmouth)*			
Podicipedidae					
414.	25704	*Podiceps cristatus (Great Crested Grebe)*			
415.	24680	*Podiceps cristatus subsp. australis (Great Crested Grebe)*			
416.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
417.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
Poeciliidae					
418.		*Gambusia affinis*			
Polycentropodidae					
419.		*Polycentropodidae sp.*			
Pomatostomidae					
420.	24683	*Pomatostomus superciliosus (White-browed Babbler)*			
Potoroidae					
421.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
Pristiophoridae					
422.		*Pristiophorus cirratus*			
Procellariidae					
423.	41326	*Ardenna carneipes (Flesh-footed Shearwater, Fleshy-footed Shearwater)*		T	
424.	24690	*Macronectes giganteus (Southern Giant Petrel)*		IA	
425.		*Pterodroma macroptera subsp. macoptera*			
426.	24711	*Puffinus assimilis subsp. assimilis (Little Shearwater)*			
Prodidomidae					
427.		*Molycria quadricauda*			
428.		*Nomindra leeuweni*			
Pseudocheiridae					
429.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum, ngwayir)*		T	
Psittacidae					
430.		*Barnardius zonarius*			
431.	25713	*Cacatua galerita (Sulphur-crested Cockatoo)*			
432.	24725	*Cacatua roseicapilla subsp. assimilis (Galah)*			
433.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
434.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black Cockatoo)*		T	
435.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)*		T	
436.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
437.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
438.	24738	*Neophema elegans (Elegant Parrot)*			
439.	24739	*Neophema petrophila (Rock Parrot)*			
440.	25720	*Platycercus icterotis (Western Rosella)*			
441.	24745	*Platycercus icterotis subsp. icterotis (Western Rosella)*			
442.	24747	*Platycercus spurius (Red-capped Parrot)*			
443.	25722	*Polytelis anthopeplus (Regent Parrot)*			
444.		*Purpureicephalus spurius*			
Psittaculidae					
445.	48085	*Psittacula krameri (Indian Ringnecked Parrot, Rose-ringed Parakeet)*	Y		

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Pygopodidae					
446.	24994	*Aprasia striolata (Lined Worm-lizard)*			
447.	25008	*Pygopus lepidopodus (Common Scaly Foot)*			
Pyralidae					
448.		*Pyralidae sp.*			
Rajidae					
449.		*Raja sp.*			
Rallidae					
450.	25727	*Fulica atra (Eurasian Coot)*			
451.	24761	*Fulica atra subsp. australis (Eurasian Coot)*			
452.	25729	*Gallinula tenebrosa (Dusky Moorhen)*			
453.	25730	*Gallirallus philippensis (Buff-banded Rail)*			
454.	24765	*Gallirallus philippensis subsp. mellori (Buff-banded Rail)*			
455.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
456.	24767	*Porphyrio porphyrio subsp. bellus (Purple Swamphen)*			
457.	24769	*Porzana fluminea (Australian Spotted Crake)*			
458.	25732	*Porzana pusilla (Baillon's Crake)*			
459.	24771	*Porzana tabuensis (Spotless Crake)*			
460.	48141	*Tribonyx ventralis (Black-tailed Native-hen)*			
Recurvirostridae					
461.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
462.	25734	*Himantopus himantopus (Black-winged Stilt)*			
463.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
Rhinobatidae					
464.		*Trygonorrhina fasciata*			
Scincidae					
465.	25027	*Ctenotus australis*			
466.	25031	*Ctenotus catenifer*			
467.	25049	*Ctenotus labillardieri*			
468.	25096	*Egernia kingii (King's Skink)*			
469.	25100	*Egernia napoleonis*			
470.	30919	*Hemiergis gracilipes (skink)*			
471.	25117	*Hemiergis peronii subsp. peronii*			
472.	41416	*Liopholis pulchra subsp. pulchra (South-western Rock Skink, Spectacled Rock Skink)*			
473.	42413	*Lissolepis luctuosa (Western Swamp Skink)*			
474.	25203	*Tiliqua occipitalis (Western Bluetongue)*			
475.	25207	*Tiliqua rugosa subsp. rugosa*			
Sciomyzidae					
476.		*Sciomyzidae sp.*			
Scolopacidae					
477.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
478.	24780	*Calidris alba (Sanderling)*		IA	
479.	25738	*Calidris canutus (Red Knot, knot)*		IA	
480.	24784	*Calidris ferruginea (Curlew Sandpiper)*		T	
481.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
482.	24790	*Calidris tenuirostris (Great Knot)*		T	
483.	30932	*Limosa lapponica (Bar-tailed Godwit)*		IA	
484.	24802	*Philomachus pugnax (Ruff, reeve)*		IA	
485.	24806	*Tringa glareola (Wood Sandpiper)*		IA	
486.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
Scolopendridae					
487.		*Cormocephalus aurantiipes*			
488.		*Cormocephalus michaelseni*			
Scomberesocidae					
489.		*Scomberesox saurus*			
Scombridae					
490.		*Auxis thazard*			
491.		*Thunnus alalunga*			
492.		*Thunnus maccoyii*			
Scorpididae					
493.		*Tilodon sexfasciatum*			
Scyliorhinidae					
494.		*Aulohalaelurus labiosus*			
495.		*Aulohalaelurus labiosus?*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Sebastidae					
496.		*Helicolenus percoides*			
Serranidae					
497.		*Acanthistius serratus*			
498.		*Caesioperca rasor*			
499.		*Caesioscorpis theagenes*			
500.		*Epinephelides armatus*			
Sillaginidae					
501.		*Sillaginodes punctata*			
502.		*Sillago bassensis*			
Simuliidae					
503.		*Simuliidae sp.*			
Siphonotidae					
504.		*Siphonotus flavomarginatus*			
Soleidae					
505.		*Aseraggodes haackeanus*			
506.		*Synaptura hediste*			
507.		*Zebrias cancellatus*			
Sparassidae					
508.		*Isopeda leishmanni*			
509.		*Isopedella cana*			
Sphaeriidae					
510.		*Sphaeriidae sp.*			
Spheniscidae					
511.	24818	*Eudyptula minor subsp. novaehollandiae (Little Penguin)*			
Sphyraenidae					
512.		*Sphyraena barracuda*			
Sphyrnidae					
513.		*Sphyrna lewini*			
Stratiomyidae					
514.		*Stratiomyidae sp.*			
Sturnidae					
515.	25752	*Sturnus vulgaris (Common Starling)*	Y		
516.	24824	*Sturnus vulgaris subsp. vulgaris (Common Starling)*	Y		
Sulidae					
517.	48008	*Morus serrator (Australasian Gannet)*			
Sylviidae					
518.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
519.	24831	*Acrocephalus australis subsp. gouldi (Australian Reed Warbler)*			
520.	25758	*Megalurus gramineus (Little Grassbird)*			
521.	24838	*Megalurus gramineus subsp. gramineus (Little Grassbird)*			
Syngnathidae					
522.		*Leptoichthys fistularius*			
523.	34039	*Phycodurus eques (Leafy Sea Dragon)*		P2	
524.		*Phyllopteryx taeniolatus*			
525.		*Solegnathus lettiensis*			
526.		*Stigmatopora argus*			
527.		*Vanacampus phillipi*			
528.		*Vanacampus poecilolaemus*			
Synodontidae					
529.		*Saurida grandisquamis*			
530.		*Saurida undosquamis*			
Synthemistidae					
531.		*Synthemistidae sp.*			
Talitridae					
532.		*Talitridae sp.*			
Tarsipedidae					
533.	24167	*Tarsipes rostratus (Honey Possum, Noolbenger)*			
Telephlebiidae					
534.		*Telephlebiidae sp.*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Tetragnathidae					
535.		*Pinkfloydia harveii*			
536.		*Tetragnatha caudifera*			Y
Tetraodontidae					
537.		*Contusus brevicaudus*			
538.		*Omegophora armilla*			
539.		*Torquigener vicinus*			
Tetrarogidae					
540.		*Gymnapistes marmoratus*			
Threskiornithidae					
541.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
542.	24843	*Plegadis falcinellus (Glossy Ibis)*		IA	
543.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
Thylacomyidae					
544.	24168	*Macrotis lagotis (Bilby, Dalgyte, Ninu)*		T	
Tipulidae					
545.		*Tipulidae sp.*			
Triakidae					
546.		*Furgaleus macki*			
547.		*Galeorhinus galeus*			
548.		*Mustelus antarcticus*			
Triglidae					
549.		*Lepidotrigla papilio*			
550.		*Pterygotrigla polyommata*			
Tripterygiidae					
551.		*Lepidoblennius marmoratus*			
Trombidiformes					
552.		*Acariformes sp.*			
Turnicidae					
553.	48147	*Turnix varius (Painted Button-quail)*			
554.	24851	*Turnix velox (Little Button-quail)*			
Tytonidae					
555.	25762	*Tyto alba (Barn Owl)*			
556.	24852	*Tyto alba subsp. delicatula (Barn Owl)*			
557.	24855	*Tyto novaehollandiae subsp. novaehollandiae (Masked Owl (southwest))*		P3	
Uranoscopidae					
558.		*Kathetostoma laeve*			
559.		*Kathetostoma nigrofasciatum*			
Urodacidae					
560.		*Urodacus novaehollandiae*			
Urolophidae					
561.		*Trygonoptera mucosa*			
562.		*Urolophus gigas*			
563.		*Urolophus paucimaculatus*			
564.		*Urolophus sp.*			
Varanidae					
565.	25225	*Varanus rosenbergi (Heath Monitor)*			
Veliferidae					
566.		*Metavelifer multiradiatus*			
Veliidae					
567.		*Veliidae sp.*			
Vespertilionidae					
568.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
569.	24187	*Chalinolobus morio (Chocolate Wattled Bat)*			
570.	24189	*Falsistrellus mackenziei (Western False Pipistrelle, Western Falsistrelle)*		P4	
571.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
572.	24206	*Vespadelus regulus (Southern Forest Bat)*			
Zeidae					
573.		*Zeus faber*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Ziphiidae					
574.	24080	*Mesoplodon layardii (Strap-toothed Beaked Whale)*			
Zodariidae					
575.		*Holasteron reinholdae*			Y
576.		*Storosa tetrica*			
Zoridae					
577.		*Argoctenus bidentatus*			
Zosteropidae					
578.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

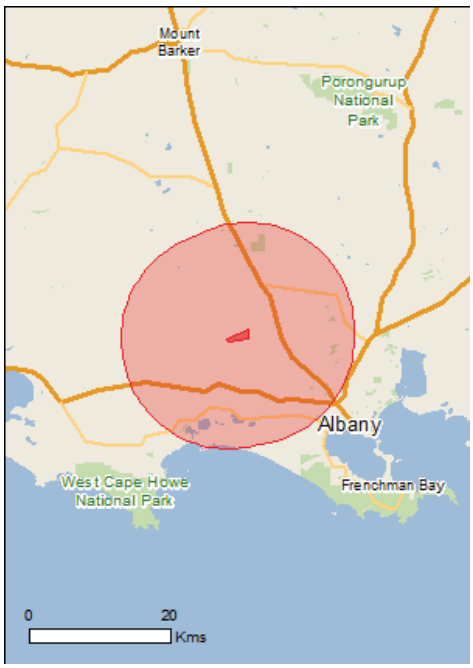
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 19/10/18 18:23:43

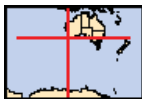
Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



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Coordinates
Buffer: 15.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	58
Listed Migratory Species:	41

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	65
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	11
Regional Forest Agreements:	1
Invasive Species:	26
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia	Endangered	Community may occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Cereopsis novaehollandiae grisea Cape Barren Goose (south-western), Recherche Cape Barren Goose [25978]	Vulnerable	Species or species habitat may occur within area
Dasyornis longirostris Western Bristlebird [515]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area

Fish

Name	Status	Type of Presence
Nannatherina balstoni Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat may occur within area
Parantechinus apicalis Dibbler [313]	Endangered	Species or species habitat likely to occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat known to occur within area
Other		
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Banksia brownii Brown's Banksia, Feather-leaved Banksia [8277]	Endangered	Species or species habitat known to occur within area
Banksia goodii Good's Banksia [16727]	Vulnerable	Species or species habitat known to occur within area
Banksia verticillata Granite Banksia, Albany Banksia, River Banksia [8333]	Vulnerable	Species or species habitat likely to occur within area
Caladenia granitora [65292]	Endangered	Species or species habitat may occur within area
Caladenia harringtoniae Harrington's Spider-orchid, Pink Spider-orchid [56786]	Vulnerable	Species or species habitat may occur within area
Calectasia cyanea Blue Tinsel Lily [7669]	Critically Endangered	Species or species habitat known to occur within area
Chordifex abortivus Manypeaks Rush [64868]	Endangered	Species or species habitat likely to occur within area
Conostylis misera Grass Conostylis [21320]	Endangered	Species or species habitat known to occur within area
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat likely to occur

REPORT ITEM DIS 164 REFERS

Name	Status	Type of Presence within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
Isopogon uncinatus Albany Cone Bush, Hook-leaf Isopogon [20871]	Endangered	Species or species habitat known to occur within area
Kennedia glabrata Northcliffe Kennedia [16452]	Vulnerable	Species or species habitat likely to occur within area
Sphenotoma drummondii Mountain Paper-heath [21160]	Endangered	Species or species habitat may occur within area
Verticordia apecta Hay River Featherflower, Scruffy Verticordia [65545]	Critically Endangered	Species or species habitat may occur within area
Verticordia fimbrilepis subsp. australis Southern Shy Featherflower [24630]	Vulnerable	Species or species habitat known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Sharks		
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Hydroprogne caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Breeding known to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area

Name	Threatened	Type of Presence
[Lagenorhynchus obscurus](#) Dusky Dolphin [43]		Species or species habitat may occur within area
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
[Manta alfredi](#) Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
[Manta birostris](#) Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
[Megaptera novaeangliae](#) Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat may occur within area
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Cereopsis novaehollandiae grisea Cape Barren Goose (south-western), Recherche Cape Barren Goose [25978]	Vulnerable	Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Breeding known to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or

Name	Threatened	Type of Presence
		related behaviour may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Fish		
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence within area

REPORT ITEM DIS 164 REFERS

Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Down Road	WA
Gledhow	WA
Lake Powell	WA
Marbelup	WA
Mill Brook	WA
Phillips Brook	WA
Shelter Island	WA
Sleeman Creek	WA
Unnamed WA01998	WA
Unnamed WA23088	WA
Unnamed WA23923	WA

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom,		Species or species

REPORT ITEM DIS 164 REFERS

Name	Status	Type of Presence
Common Broom, French Broom, Soft Broom [20126]		habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

REPORT ITEM DIS 164 REFERS

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-34.929797 117.739282,-34.924801 117.752156,-34.934934 117.752242,-34.939296 117.727952,-34.93803 117.727008,-34.934512 117.726407,-34.929727 117.739282,-34.929797 117.739282

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

CONSERVATION CODES

For Western Australian Flora and Fauna

Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016.*

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

T **Threatened species**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR **Critically endangered species**

Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN **Endangered species**

Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU **Vulnerable species**

Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX Extinct species

Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P **Priority species**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

1 **Priority 1: Poorly-known species**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

2 **Priority 2: Poorly-known species**

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

3 **Priority 3: Poorly-known species**

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

4 **Priority 4: Rare, Near Threatened and other species in need of monitoring**

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

[1] The definition of flora includes algae, fungi and lichens
[2]Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

Appendix C

Relevé Datasheets

REPORT ITEM DIS 164 REFERS

MOTORPLEX
~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

SITE_ID:

Date: 31/10/18 Res/Loc: DOWN RD 6134259·33 mE
Recorder: EJH Wp: 1 5671103·513 mN
VegCode: J/M/Sh

Condition: (Pristine) Excellent Very Good Good Degraded ARVS 12
Aspect: N NE E SE S (SW) W NW
Slope: Flat (Gentle) Mod Steep
Geology: Gnei Gran (Lat) Lime Silt
Rock: 0 <2 2-10 10-20 20-50 >50
Soil Colour: Dark Brown Dark Grey (Light Grey) (Light Brown) Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS (S) SCL (SL) SP ZCL ZL ZS
Hydrology: Good drain Poor drain Perm wet Seasonal wet
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank Slope Lower (Slope Middle) Slope Upper Swale Swamp Tidal Flat Tor Valley Flat

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30	S	Eucmar, Allfra	
T_3	<10			
M_1	>8			
M_2	<8			
S_1	>2	V	Bangra,	
S_2	1-2	V	Agothe, Hakamp, Boslin, Taxpar, Leuver, Hakrus, Petdiv, Perlon.	
S_3	0.5-1	M	Xanrot,	Borspa, Xanpla,
S_4	<0.5			
V	NA	S	Anapro,	Tetoct, Desfas
H	NA	M	Patocc, Opehis, Conset,	Damped, Linlin, Oriser, Spysch, Dromac
G	NA			

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:
Photos 154-155 = DSCN4800-4801
157-158 = DSCN4803-4804

Entered by..... Access [ ] / Max [ ]

MOTORPLEX
~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

SITE_ID:

Date: 31/10/18 Res/Loc: DOWN RD 6134001·7 mE
Recorder: EJH Wp: 16 5666991·018 mN
VegCode: J/M/Sh

Condition: (Pristine) Excellent Very Good Good Degraded ARVS 12
Aspect: N NE E SE S SW W NW
Slope: Flat (Gentle) Mod Steep
Geology: Gnei Gran (Lat) Lime Silt
Rock: 0 (<2) 2-10 10-20 20-50 >50
Soil Colour: Dark Brown Dark Grey (Light Grey) Light Brown Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS (S) SCL SL SP ZCL ZL ZS
Hydrology: Good drain Poor drain Perm wet Seasonal wet
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank Slope Lower (Slope Middle) Slope Upper Swale Swamp Tidal Flat Tor Valley Flat

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30	S	Eucmar Allfra	
T_3	<10			
M_1	>8			
M_2	<8			
S_1	>2	V		Bangra, Agothe, Banfor;
S_2	1-2	S	Boslin, Leuvert,	Taxpar, Hakamp, Perlon, Davfle,
S_3	0.5-1	V	Xanrot,	
S_4	<0.5			
V	NA	S	Anapro,	Tetoct, Desfas, Lepsqu, Harvar,
H	NA	V	Patocc, Opehis,	Damped, Patbab,
G	NA			

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:
Photo 182 = DSCN4828

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MOTORPLEX
~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

SITE_ID:

Date: 31/10/18 Res/Loc: DOWN RD 6134422·75 mE
Recorder: EJH Wp: 53 5672243·83 mN
VegCode: J/M/Sh

Condition: Pristine (Excellent) Very Good Good Degraded ARVS 12
Aspect: N NE E SE S (SW) W NW
Slope: Flat (Gentle) Mod Steep
Geology: Gnei Gran (Lat) Lime Silt
Rock: 0 (<2) 2-10 10-20 20-50 >50
Soil Colour: Dark Brown Dark Grey (Light Grey) Light Brown Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS (S) SCL SL SP ZCL ZL ZS
Hydrology: (Good drain) Poor drain Perm wet Seasonal wet
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank Slope Lower (Slope Middle) Slope Upper Swale Swamp Tidal Flat Tor Valley Flat

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30	S	Eucmar, Allfra	
T_3	<10			
M_1	>8			
M_2	<8			
S_1	>2	V	Nuyflo,	
S_2	1-2	M	Agothe, Leuver, Hakamp, Beadec, Kinaus, Taxpar, Hakrus, Perlon, Acamyr	
S_3	0.5-1	V	Howcho,	Xanpla, Dasbro,
S_4	<0.5			
V	NA	S	Desfas, Tetoct, Anapro, Anasca, Meslet,	Lepsqu.
H	NA	S	Patocc, Linlin, Dromac, Opehis, Haespi, Conset,	
G	NA	S	Brimax*	

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:
Eucmar has servere insect damage
Photo 223 = DSCN4871

Entered by..... Access [ ] / Max [ ]

MOTORPLEX
~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

SITE_ID:

Date: 1/11/2018 Res/Loc: DOWN RD 6134178 mE
Recorder: EJH Wp: 14 5668704·63 mN
VegCode: J/M/Sh

Condition: Pristine Excellent (Very Good) Good Degraded ARVS 12
Aspect: N NE E (SE) S SW W NW
Slope: Flat (Gentle) Mod Steep
Geology: Gnei Gran (Lat) Lime Silt
Rock: 0 (<2) 2-10 10-20 20-50 >50
Soil Colour: Dark Brown Dark Grey (Light Grey) Light Brown Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS (S) SCL SL SP ZCL ZL ZS
Hydrology: (Good drain) Poor drain Perm wet Seasonal wet
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank Slope Lower (Slope Middle) Slope Upper Swale Swamp Tidal Flat Tor Valley Flat

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30	V	Eucmar, Allfra, Eucsta	
T_3	<10			
M_1	>8			
M_2	<8			
S_1	>2			
S_2	1-2	S	Taxpar, Leuver,	Boslin, Agothe, Spyglo, Propin* Nuyflo, Acalon*, Acamyr,
S_3	0.5-1	S	Xanpla,	Xanrot, Isolon, Petdiv
S_4	<0.5			
V	NA	S	Cyaequ.	Anapro,
H	NA	S	Patocc, Scastr, Pteesc*, Johlup,	
G	NA	S	Avebar*, Hollan*, Brodia*, Brimax*	

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:

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REPORT ITEM DIS 164 REFERS

MOTORPLEX

~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

SITE_ID:

Date: 1/11/18 Res/Loc: DOWN RD 6133996·44 mE
Recorder: EJH Wp: 11 5667478·463 mN
VegCode: J/sh/Esta

Condition: Pristine Excellent (Very Good) Good Degraded ARVS 13
Aspect: N NE E SE S (SW) W NW
Slope: Flat (Gentle) Mod Steep
Geology: Gnei Gran Lat Lime Silt
Rock: 0 <2 2-10 10-20 20-50 >50
Soil Colour: Dark Brown Dark Grey (Light Grey) Light Brown Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS (S) SCL SL SP ZCL ZL ZS
Hydrology: (Good drain) Poor drain Perm wet Seasonal wet
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank (Slope Lower) Slope Middle Slope Upper Swale Swamp Tidal Flat Tor Valley Flat

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30	V	Eucmar, Allfra	
T_3	<10			
M_1	>8			
M_2	<8			
S_1	>2	V	Banatt,	Banili,
S_2	1-2	S	Taxpar,	Agothe, Putret, Leuver, Psopin*
S_3	0.5-1	V	Xanrot,	Adecun,
S_4	<0.5			
V	NA	S	Cyaequ,	Hypevs, Desfas,
H	NA	S	Patocc,	Opehis, Hyprad* Rumpul
G	NA	S	Hollan*	Brodia* Ferrub* Antodo*, Lolrig* Leggou*

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:
Weedy along the fence adjacent to paddock, but soon becomes clean bushland as slopes towards wetland.

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MOTORPLEX

~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

SITE_ID:

Date: 31/10/18 Res/Loc: DOWN RD 6135018·06 mE
Recorder: EJH Wp: 59 5668623·331 mN
VegCode: J/sh/Esta

Condition: Pristine Excellent (Very Good) Good Degraded ARVS 13
Aspect: N NE E (SE) S SW W NW
Slope: Flat (Gentle) Mod Steep
Geology: Gnei Gran Lat Lime Silt
Rock: 0 <2 2-10 10-20 20-50 >50
Soil Colour: Dark Brown Dark Grey (Light Grey) Light Brown Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS (S) SCL SL SP ZCL ZL ZS
Hydrology: (Good drain) Poor drain Perm wet Seasonal wet
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank (Slope Lower) Slope Middle Slope Upper Swale Swamp Tidal Flat Tor Valley Flat

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30	S	Eucsta,	Allfra,
T_3	<10			
M_1	>8			
M_2	<8			
S_1	>2			
S_2	1-2	S	Taxpar,	Adecun, Melthy, Agothe
S_3	0.5-1	S	Dasbro,	
S_4	<0.5			
V	NA	M	Anasca,	Cyaequ,
H	NA	S	Patocc,	Opehis, Watmer*
G	NA		Pencla*	

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:
Photo 226 = DSCN4874

Entered by..... Access [ ] / Max [ ]

MOTORPLEX

~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

SITE_ID:

Date: 3/10/18 Res/Loc: DOWN RD 6133755·23 mE
Recorder: EJH Wp: 10 5668998·151 mN
VegCode: J/sh/Esta

Condition: (Pristine) Excellent Very Good Good Degraded ARVS 13
Aspect: N NE E SE (S) SW W NW
Slope: (Flat) Gentle Mod Steep
Geology: Gnei Gran Lat Lime Silt
Rock: (0) <2 2-10 10-20 20-50 >50
Soil Colour: Dark Brown Dark Grey (Light Grey) Light Brown Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS S SCL (SL) SP ZCL ZL ZS
Hydrology: (Good drain) Poor drain Perm wet Seasonal wet
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank (Slope Lower) Slope Middle Slope Upper Swale Swamp Tidal Flat Tor Valley Flat

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30	V	Eucmar, Eucsta,	Allfra
T_3	<10			
M_1	>8			
M_2	<8			
S_1	>2	V	Bangra,	Banatt, Banili, Nuyfle,
S_2	1-2	S	Banque, Pimimb,	Taxpar, Adecun, Comsca, Adeobo, Melthy, Jacspi,
S_3	0.5-1	V	Dasbro,	Latgen, Dawfle,
S_4	<0.5	V	Leudis,	Xanrot,
V	NA	D	Anasca,	Lygbar,
H	NA	V	Damped,	Burcon,
G	NA			

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:
Photos 174-176 = DSCN4820-22

Entered by..... Access [ ] / Max [ ]

MOTORPLEX

~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

SITE_ID:

Date: 1/11/18 Res/Loc: DOWN RD 6133971·11 mE
Recorder: EJH Wp: 1 5667869·822 mN
VegCode: J/sh/Esta

Condition: (Pristine) Excellent Very Good Good Degraded ARVS 13
Aspect: N NE E SE S SW (W) NW
Slope: Flat (Gentle) Mod Steep
Geology: Gnei Gran Lat Lime Silt
Rock: 0 <2 2-10 10-20 20-50 >50
Soil Colour: Dark Brown Dark Grey Light Grey (Light Brown) Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS (S) SCL SL SP ZCL ZL ZS
Hydrology: (Good drain) Poor drain Perm wet Seasonal wet
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank (Slope Lower) Slope Middle Slope Upper Swale Swamp Tidal Flat Tor Valley Flat

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30	S	Corcal,	Allfra, Eucmar,
T_3	<10			
M_1	>8			
M_2	<8			
S_1	>2	V	Bangra	
S_2	1-2	S	Hakamp, Leuver,	Agothe, Boslin, Ferlon, Acamyr Taxpar, Hibcun, Kinaus,
S_3	0.5-1	S	Barcle,	Dasbro, Concae,
S_4	<0.5	S	Xanrot, Comova,	Brabax, Tetaff,
V	NA	S	Desfas, Lepsqu	Anapro, Hypevs, Anasca, Tetoch,
H	NA	M	Patocc, Linlin,	Opehis, Burcon, Damlin, Conset, Oiiser, Patbab, Compol, Agrsca,
G	NA			

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:

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MOTORPLEX
~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

SITE_ID:

Date: 31/10/18 | Res/Loc: DOWN RD | 6133536·26 mE | VegCode: Hom fir / Cal glau
Recorder: EJH | Wp: 20 | 5668835·499 mN

Condition: (Pristine) Excellent Very Good Good Degraded — ARVS 47
Aspect: N NE E SE S SW W NW
Slope: (Flat) Gentle Mod Steep
Geology: Gnei Gran Lat Lime Silt
Rock: 0 <2 2-10 10-20 20-50 >50
Soil Colour: Dark Brown (Dark Grey) Light Grey Light Brown Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS (S) SCL SL SP ZCL ZL ZS Peat
Hydrology: Good drain Poor drain Perm wet (Seasonal wet)
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank Slope Lower Slope Middle Slope Upper Swale (Swamp) Tidal Flat Tor (Valley Flat)

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30			
T_3	<10	E	Mel pre	
M_1	>8			
M_2	<8			
S_1	>2	M	Cal gla, Hom fir, Tax lin	
S_2	1-2			
S_3	0.5-1			
S_4	<0.5			
V	NA	M	Emp gra	
H	NA	V	Dro men, Cas lac, Lob ten, Utr mul, Utr vol,	
G	NA			

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:
Photo 194 = DSCN4842, Photo 213 = DSCN4861

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MOTORPLEX
~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

Date: 1/11/18 | Res/Loc: DOWN RD | 6134071·29 mE | VegCode: Mel pre
Recorder: EJH | Wp: 10 | 5676511·257 mN

Condition: Pristine Excellent Very Good Good (Degraded) — ARVS 49
Aspect: N NE E SE S (SW) W NW
Slope: Flat (Gentle) Mod Steep
Geology: Gnei Gran Lat Lime Silt
Rock: 0 <2 2-10 10-20 20-50 >50
Soil Colour: Dark Brown (Dark Grey) Light Grey Light Brown Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS (S) SCL SL SP ZCL ZL ZS Peat
Hydrology: Good drain Poor drain Perm wet (Seasonal wet)
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank Slope Lower Slope Middle Slope Upper Swale Swamp Tidal Flat Tor (Valley Flat)

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30			
T_3	<10			
M_1	>8			
M_2	<8			
S_1	>2	E	Mel pre	
S_2	1-2	M	Pso pin*, Tax lin, Tax par,	
S_3	0.5-1			
S_4	<0.5			
V	NA			
H	NA			
G	NA	M	Hol lan*	

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:

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MOTORPLEX
~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

SITE_ID:

Date: 1/11/18 | Res/Loc: DOWN RD | 6133711·69 mE | VegCode: Hom fir / Cal gla
Recorder: EJH | Wp: 2 | 5675881·11 mN

Condition: (Pristine) Excellent Very Good Good Degraded — ARVS 47
Aspect: N NE E SE S SW W NW
Slope: (Flat) Gentle Mod Steep
Geology: Gnei Gran Lat Lime Silt
Rock: 0 <2 2-10 10-20 20-50 >50
Soil Colour: (Dark Brown) Dark Grey Light Grey Light Brown Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS S SCL SL SP ZCL ZL ZS Peat
Hydrology: Good drain Poor drain Perm wet (Seasonal wet)
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank Slope Lower Slope Middle Slope Upper Swale (Swamp) Tidal Flat Tor Valley Flat

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30			
T_3	<10			
M_1	>8			
M_2	<8			
S_1	>2	M	Hom fir, Cal gla, Tax par, Tax lin, Ban lit,	
S_2	1-2			
S_3	0.5-1	S	Aca has,	Sph hyg, Sph fur, Sph ros,
S_4	<0.5			
V	NA	D	Emp gra,	Lep ten, Gah dec, Bau pre, Cym anc,
H	NA	S	Dam lep,	
G	NA			

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:

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REPORT ITEM DIS 164 REFERS

MOTORPLEX
~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

SITE_ID:

Date: 1/11/18 Res/Loc: DOWN RD 613966·32 mE
Recorder: EJH Wp: 8 5678887·19 mN
VegCode: Tax lin

Condition: Pristine Excellent (Very Good) Good Degraded ARUS 50
Aspect: N NE E SE S SW W NW
Slope: (Flat) Gentle Mod Steep
Geology: Gneiss Gran Lat Lime Silt
Rock: 0 <2 2-10 10-20 20-50 >50
Soil Colour: (Dark Brown) Dark Grey Light Grey Light Brown Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS S SCL SL SP ZCL ZL ZS Peat
Hydrology: Good drain Poor drain Perm wet (Seasonal wet)
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank Slope Lower Slope Middle Slope Upper Swale (Swamp) Tidal Flat Tor Valley Flat

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30			
T_3	<10			
M_1	>8			
M_2	<8			
S_1	>2			
S_2	1-2	D	Tax lin,	Hom fir, Cal glau
S_3	0.5-1	S	Aca has	
S_4	<0.5			
V	NA	S	Dro men,	
H	NA	S	Phy oct*,	Tri glo*, His inc, Orn pin,
G	NA	S	Hol lan*	

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:

Entered by..... Access [ ] / Max [ ]

MOTORPLEX
~~ALBANY REGIONAL~~ VEGETATION SURVEY – Relevé

SITE_ID:

Date: 1/11/18 Res/Loc: DOWN RD 613915·1 mE
Recorder: EJH Wp: 4 5678673·018 mN
VegCode: Tax lin

Condition: (Pristine) Excellent Very Good Good Degraded ARUS 50
Aspect: N NE E SE S SW W NW
Slope: (Flat) Gentle Mod Steep
Geology: Gneiss Gran Lat Lime Silt
Rock: 0 <2 2-10 10-20 20-50 >50
Soil Colour: (Dark Brown) Dark Grey Light Grey Light Brown Orange/Brown White Yellow Yellow/Grey
Soil Type: C CL CLS CS L LS S SCL SL SP ZCL ZL ZS Peat
Hydrology: Good drain Poor drain Perm wet (Seasonal wet)
Landform: Breakaway Cliff Drainage Depression Dune Gully Hill Crest Plain Ridge Riparian Bank Slope Lower Slope Middle Slope Upper Swale (Swamp) Tidal Flat Tor Valley Flat

Lyr	Ht	Cvr	Dominant	Others
T_1	>30			
T_2	10-30			
T_3	<10			
M_1	>8			
M_2	<8			
S_1	>2			
S_2	1-2	M	Tax lin,	Bor mol, Cal glau
S_3	0.5-1			
S_4	<0.5			
V	NA	D	Gah dec,	Emp gra,
H	NA			
G	NA			

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% E <5% Emergent

Other Notes:
LOST CAMERA!!!

Entered by..... Access [ ] / Max [ ]

Appendix D

Significant Trees

ID	Species	DBH	Northing	Eastings	Hollow y/n	Location	Dimensions	Occupant	Fauna activity	Comments	Photo Id
1	Eucalyptus marginata	537	6133653.76	566393.753	Y	Trunk	Na	Na		Beginnings of small hollow in upper branch 6x6cm; beginnings of hollow in fork of trunk 15x12	1
2	Eucalyptus marginata	548	6133647.48	566397.942	N	Trunk	15x12	Termites	Termite mound/nest		2
3	Eucalyptus marginata	477	6133643.55	566395.131	N		Na	Na	Na	Hollow butt, dead crown, most of primary crown lost.	
4	Eucalyptus marginata	580	6133640.33	566405.361	N		Na	Na	Na		
5	Eucalyptus marginata	440	6133629.5	566405.462	Y	Trunk	18x13	?	Very low levels of bark disturbance around lower edge of hollow	Likely small bird. Too small for cockatoos	4,5,6,7
6	Eucalyptus marginata	463	6133637.55	566417.077	Y	Tunk	10x12	?	Very low levels of bark disturbance around lower edge of hollow		8
7	Corymbia calophylla	488	6133637.71	566423.833	N	Na	Na	Na	Large nest in canopy that looks like a raptor nest.	No fresh faecal material or feathers	9
8	Eucalyptus marginata	767	6133627.87	566440.161	N	Na	Na	Na	Primary crown lost. Trunk broken off had potential to form hollows		
9	Corymbia calophylla	778	6133627.46	566447.233	N	Na	Na	Na	Good hollow forming potential		
10	Eucalyptus marginata	509	6133608.62	566440.28	N	Na	Na	Na	Minimal hollow forming potential		
11	Allocasuarina fraseriana	453	6133607.28	566458.176	Y	Trunk	12x12	Not occupied		Hollow opens all the way thru trunk approx 70cm deep. Possible falsistrellis hollow.	10
12	Corymbia calophylla	732	6133613.19	566462.405	N	Na	Na	Na	Na	Dead.	
13	Allocasuarina fraseriana	589	6133602.22	566463.972	N	Na	Na	Na	Na	Heavily fire damaged trunk.	
14	Allocasuarina fraseriana	530	6133620.49	566474.094	N	Na	Na	Na	Na	Dry side N	
15	Allocasuarina fraseriana	587	6133604.42	566480.994	Y	Branch	5x7	Not occupied	No scratching or chewing		12
16	Allocasuarina fraseriana	727	6133601.22	566489.235	N	Na	Na	Na	Na	Minimal hollow forming potential	
17	Corymbia calophylla	969	6133607.95	566488.085	N	Na	Na	Na	Na	Large branch junction is beginning to form a hollow. Good potential for large hollow.	
18	Allocasuarina fraseriana	653	6133603.07	566503.192	N	Na	Na	Na	Na	Minimal hollow forming potential	
19	Allocasuarina fraseriana	573	6133589.28	566512.081	N	Na	Na	Na	Na	Minimal hollow forming potential	
20	Allocasuarina fraseriana	724	6133609.6	566518.96	N	Na	Na	Na	Na	Minimal hollow forming potential	
21	Allocasuarina fraseriana	575	6133603.89	566523.716	N	Na	Na	Na	Na	Minimal hollow forming potential	
22	Allocasuarina fraseriana	623	6133577.43	566542.471	N	Na	Na	Na	Na	Minimal hollow forming potential	
23	Allocasuarina fraseriana	803	6133573.15	566562.711	Y	Na	Na	Na	Na	Hollow butt.	13
24	Corymbia calophylla	567	6133566.92	566574.901	N	Na	Na	Na	Na	Minimal hollow forming potential; insubstantial crown	
25	Allocasuarina fraseriana	645	6133561.43	566588.055	N	Na	Na	Na	Na	Minimal hollow forming potential	
26	Corymbia calophylla	830	6133552.96	566602.322	N	Na	Na	Na	Na	Large upper trunk and branches have good hollow forming potential	
27	Eucalyptus marginata	498	6133569.72	566664.1	N	Na	Na	Na	Na		
28	Allocasuarina fraseriana	580	6133561.52	566688.896	N	Na	Na	Na	Na	Minimal hollow forming potential	
29	Eucalyptus marginata	628	6133561.17	566687.883	N	Na	Na	Na	Na	Minimal hollow forming potential	
30	Eucalyptus marginata	580	6133547.64	566694.625	N	Na	Na	Na	Na	Small hollows beginning to form in trunk forks	
31	Corymbia calophylla	1004	6133564.2	566705.553	N	Na	Na	Na	Na	Hollows beginning to form. One small one in trunk and a large on at lower limb junction	
32	Allocasuarina fraseriana	574	6133554.17	566754.026	N	Na	Na	Na	Na	Minimal hollow forming potential	
33	Allocasuarina fraseriana	728	6133564.6	566767.774	N	Na	Na	Na	Na		
34	Allocasuarina fraseriana	660	6133574.58	566714.335	N	Na	Na	Na	Na		
35	Allocasuarina fraseriana	996	6133581.41	566600.554	N	Na	Na	Na	Na	Fire formed hollow in upper trunk. Very shallow	
36	Corymbia calophylla	1211	6134286.03	567283.468	N	Na	Na	Na	Possum scratching; low level baudinii feeding debris. Beak imprints but minimal disturbance to rim or seed capsules.	Good hollow forming potential	
37	Corymbia calophylla	1088	6134289.28	567292.263	N	Na	Na	Na	low level baudinii feeding debris. Beak imprints but minimal disturbance to rim or seed capsules.	Good hollow forming potential	
38	Eucalyptus staeri	660	6133828.69	567434.537	Y	Branch	7x7	Not currently occupied	Small amount of bark disturbance around entrance.		
39	Eucalyptus marginata	680	6133900.76	567459.394	N	Na	Na	Na	Na	Hollow butt	
40	Allocasuarina fraseriana	809	6133925.19	567460.445	N	Na	Na	Na	Na		
41	Eucalyptus marginata	780	6133928.86	567449.348	N	Na	Na	Na	Na		
42	Eucalyptus marginata	572	6133936.03	567460.391	N	Na	Na	Na	Na	Hollow forming in trunk at junction with broken branch	
43	Allocasuarina fraseriana	534	6133939.41	567473.613	N	Na	Na	Na	Na		
44	Eucalyptus marginata	852	6133932.35	567474.24	N	Na	Na	Na	Na	Good hollow forming potential	
45	Eucalyptus marginata	814	6133957.68	567512.589	N	Na	Na	Na	Na		
46	Eucalyptus marginata	553	6133970.33	567508.947	N	Na	Na	Na	Na	Hollow butt; hollows forming in broken limbs	
47	Allocasuarina fraseriana	525	6133973.36	567509.49	N	Na	Na	Na	Na	Minimal hollow forming potential	
48	Allocasuarina fraseriana	538	6133985.27	567524.937	N	Na	Na	Na	Na		
49	Eucalyptus marginata	962	6133995.37	567528.144	Y	Branch	15x15	Not occupied	Small amount of scratching	Shallow hollow; small hollow in branch forming aswell	21,22
50	Eucalyptus marginata	495	6133994.99	567521.66	N	Na	Na	Na	Na	Minimal hollow forming potential	
51	Allocasuarina fraseriana	1212	6133997.83	567532.12	N	Na	Na	Na	Na	Large proportion of base lost through burning	
52	Eucalyptus marginata	556	6133989.34	567539.845	N	Na	Na	Na	Na		
53	Allocasuarina fraseriana	524	6134046.28	567566.031	N	Na	Na	Na	Na		
54	Allocasuarina fraseriana	552	6134059.37	567569.169	N	Na	Na	Na	Na	Minimal hollow forming potential	
55	Eucalyptus marginata	1357	6134059.88	567565.19	Y	Branch	5x4	Bird	Significant disturbance to bark around hollow entrance but nothing leading up to it.	Too small for cockatoo	23,24
56	Eucalyptus marginata	649	6134050.48	567537.931	N	Na	Na	Na	Na		
57	Eucalyptus marginata	714	6134046.43	567538.416	Y	Trunk	3x2	Not currently occupied	No scratching	Tiny hollow.	25
58	Eucalyptus marginata	756	6134043.76	567537.449	N	Na	Na	Na	Na		
59	Allocasuarina fraseriana	1059	6134044.44	567530.333	N	Na	Na	Na	Na	Large proportion of base lost through burning	
60	Eucalyptus marginata	532	6134048.93	567527.599	N	Na	Na	Na	Na	Heavy blossom	
61	Eucalyptus marginata	524	6134032.34	567527.547	N	Na	Na	Na	Na		
62	Eucalyptus marginata	626	6134017.28	567515.188	N	Na	Na	Na	Na		
63	Allocasuarina fraseriana	647	6134018.24	567509.626	N	Na	Na	Na	Na	Minimal hollow forming potential	
64	Allocasuarina fraseriana	572	6134018.36	567507.843	N	Na	Na	Na	Na	Minimal hollow forming potential	
65	Allocasuarina fraseriana	628	6134021.1	567501.96	N	Na	Na	Na	Na	Minimal hollow forming potential	
66	Allocasuarina fraseriana	550	6134013.21	567501.866	N	Na	Na	Na	Na	Minimal hollow forming potential	
67	Allocasuarina fraseriana	537	6134006.9	567504.014	N	Na	Na	Na	Na		
68	Eucalyptus marginata	782	6134008.78	567503.94	N	Na	Na	Na	Na	Good hollow forming potential	
69	Allocasuarina fraseriana	558	6133999.8	567502.442	N	Na	Na	Na	Na	Dead. Minimal hollow forming potential	
70	Eucalyptus marginata	629	6133991.55	567501.742	N	Na	Na	Na	Possum scratching	Hollow starting to form in elbow.	
71	Allocasuarina fraseriana	552	6133992.78	567492.234	N	Na	Na	Na	Na		
72	Allocasuarina fraseriana	879	6133991.61	567487.071	N	Na	Na	Na	Na		
73	Eucalyptus marginata	598	6133986.35	567484.923	N	Na	Na	Na	Na		
74	Allocasuarina fraseriana	645	6133991.22	567480.624	N	Na	Na	Na	Na		
75	Eucalyptus marginata	500	6133985.54	567476.554	N	Na	Na	Na	Na		
76	Eucalyptus marginata	601	6133984.9	567475.079	N	Na	Na	Na	Stick nest, fresh faecal material and black feather	3 nests all close to each other. Magpies with juveniles calling from nearby area.	29
77	Eucalyptus marginata	498	6133985.61	567465.847	N	Na	Na	Na	Na		
78	Eucalyptus marginata	576	6133978.9	567476.042	N	Na	Na	Na	Na		
79	Eucalyptus marginata	680	6133972.03	567494.9	N	Na	Na	Na	Large stick nest high in canopy. Lots of fresh faecal material. Raptor-like		30
80	Eucalyptus marginata	515	6133965.79	567481.867	N	Na	Na	Na	Na		
81	Eucalyptus marginata	610	6133960.7	567466.154	N	Na	Na	Na	Na		
82	Allocasuarina fraseriana	659	6133973.75	567463.674	N	Na	Na	Na	Na		
83	Eucalyptus marginata	581	6133956.14	567447.372	N	Na	Na	Na	Na		
84	Eucalyptus marginata	832	6133944.8	567435.084	N	Na	Na	Na	Na		
85	Eucalyptus marginata	604	6133943.38	567434.872	N	Na	Na	Na	Possum scratching		31
86	Eucalyptus marginata	572	6133940.98	567435.595	N	Na	Na	Na	Possum scratching		32

ID	Species	DBH	Northing	Eastings	Hollow y/n	Location	Dimensions	Occupant	Fauna activity	Comments	Photo Id
87	Eucalyptus marginata	576	6133940.93	567445.141	N	Na	Na	Na	Na		
88	Allocasuarina fraseriana	603	6133923.56	567437.11	N	Na	Na	Na	Na		
89	Eucalyptus marginata	540	6133922.92	567427.025	N	Na	Na	Na	Na		
90	Eucalyptus marginata	638	6133919.46	567425.937	N	Na	Na	Na	Na		
91	Eucalyptus marginata	659	6133915.4	567430.2	N	Na	Na	Na	Na		
92	Eucalyptus marginata	854	6133904.85	567423.351	N	Na	Na	Na	Magpie chick in nest; faecal material;		33,34
93	Eucalyptus marginata	773	6133892.5	567418.097	N	Na	Na	Na	Na		
94	Eucalyptus marginata	940	6133893.88	567411.738	N	Na	Na	Na	Na		
95	Eucalyptus marginata	971	6133868.18	567415.473	Y	Branch	12x9	Not currently occupied	Bark disturbance around hollow entrance. No tracks up to hollow.	Small or medium bird	35
96	Allocasuarina fraseriana	601	6133836.19	567404.043	N	Na	Na	Na	Na		
97	Eucalyptus marginata	568	6133821.77	567398.998	N	Na	Na	Na	Na		
98	Eucalyptus marginata	650	6133829.16	567389.865	N	Na	Na	Na	Magpie chick in nest; faecal material;		36,37
99	Eucalyptus marginata	510	6133902.49	567408.864	N	Na	Na	Na	Na		
100	Eucalyptus marginata	733	6133967.61	567447.451	N	Na	Na	Na	Na		
101	Eucalyptus marginata	683	6133995.23	567471.916	N	Na	Na	Na	Possum scratching		
102	Eucalyptus marginata	912	6134438.13	568484.345	N	Na	Na	Na	Na	Large hollow forming in trunk. Checked with climbing gear.	
103	Eucalyptus marginata	645	6134401.4	568462.977	N	Na	Na	Na	Na		
104	Eucalyptus marginata	631	6134398.44	568465.36	N	Na	Na	Na	Na	Good hollow forming potential	
105	Eucalyptus marginata	563	6134403.63	568472.307	N	Na	Na	Na	Na	Dry side; minimal hollow forming potential	
106	Eucalyptus marginata	933	6134381.77	568474.758	Y	Branch	15x13	Not currently occupied	Possum scratching	3 stick nests. One large and 2 medium. All unused. Hollow was checked for occupancy. Too shallow	41
107	Eucalyptus marginata	678	6134377.56	568483.811	N	Na	Na	Na	Na	Broken limb may form large hollow	
108	Allocasuarina fraseriana	620	6134370.07	568493.279	N	Na	Na	Na	Na	Minimal hollow forming potential	
109	Eucalyptus marginata	490	6134364.4	568483.14	N	Na	Na	Na	Possum scratching		
110	Eucalyptus marginata	857	6134371.65	568458.254	Y	Branch	7x8	Not currently occupied	Possum scratching	Too small for possum; hollow butt.	
111	Eucalyptus marginata	539	6134354.93	568502.488	N	Na	Na	Na	Na	Small areas of bark have been stripped in the canopy. Possibly cockatoos searching for invertebrates.	42
112	Eucalyptus marginata	533	6134341.7	568496.26	Y	Trunk	3x3	Not currently occupied	Na	Tiny hollow associated with dry side fissure.	43
113	Eucalyptus marginata	1098	6134332.8	568507.433	Y	Branch	25x23	Not currently occupied	Disturbed bark leading into hollow	Checked. Has historically been used. Angled branch and hollow. Bottom of branch has split and top portion of hollow has become un	196
114	Eucalyptus marginata	695	6134323.82	568514.725	N	Na	Na	Na	Na		
115	Allocasuarina fraseriana	598	6134319.1	568500.986	N	Na	Na	Na	Na	Minimal hollow forming potential	
116	Eucalyptus marginata	640	6134266.42	568499.215	N	Na	Na	Na	Na		
117	Allocasuarina fraseriana	579	6134280.97	568479.976	N	Na	Na	Na	Na		
118	Eucalyptus marginata	650	6134291.01	568474.745	N	Na	Na	Na	Na		
119	Allocasuarina fraseriana	585	6134299.11	568487.282	N	Na	Na	Na	Na		
120	Eucalyptus marginata	535	6134333.53	568471.026	N	Na	Na	Na	Na		
121	Eucalyptus marginata	599	6134332.4	568468.531	N	Na	Na	Na	Na		
122	Eucalyptus marginata	689	6134333.85	568455.075	Y	Branch	17x7	Not currently occupied	Old disturbance around entrance	Too small for cockatoo	44
123	Allocasuarina fraseriana	984	6134334.1	568446.58	N	Na	Na	Na	Na	Entire core of tree is hollow, but open	
124	Eucalyptus marginata	632	6134334.55	568440.077	N	Na	Na	Na	Na		
125	Eucalyptus marginata	506	6134326.14	568434.963	N	Na	Na	Na	Na		
126	Eucalyptus marginata	568	6134307.88	568436.678	Y	Branch	16x8	Not currently occupied	No scratching or chewing	Shallow hollow	45
127	Eucalyptus marginata	602	6134303.73	568451.111	Y	Trunk	9x8	Red-capped parrot	Fresh chewing around hollow entrance	Red-capped parrot	46
128	Eucalyptus marginata	669	6134302.16	568450.14	Y	Branch	4x3	Welcome swallows	Birds observed	Mudlark nest. 3 juveniles still being fed	47-59
129	Eucalyptus marginata	523	6134272.4	568469.594	N	Na	Na	Na	Na		
130	Allocasuarina fraseriana	734	6134266.56	568473.231	N	Na	Na	Na	Na	Minimal hollow forming potential	
131	Allocasuarina fraseriana	506	6134266.02	568460.464	N	Na	Na	Na	Na	Minimal hollow forming potential	
132	Eucalyptus marginata	514	6134272.05	568463.545	Y	Trunk	6x8	Not currently occupied	Na	Good small-medium bird hollow	60
133	Eucalyptus marginata	537	6134272.05	568457.882	N	Na	Na	Na	Na		
134	Eucalyptus marginata	590	6134269.74	568451.137	N	Na	Na	Na	Na	2 small but shallow hollows forming in dead branches	
135	Eucalyptus marginata	699	6134264.77	568449.562	N	Na	Na	Na	Na		
136	Eucalyptus marginata	768	6134261.65	568439.017	Y	Branch	11x15	Not currently occupied	No scratching or chewing	Chimney hollow in dead branch. Checked Shallow	
137	Eucalyptus marginata	909	6134272.42	568438.336	Y	Branch	12x14	Not currently occupied	No scratching or chewing	Chimney hollow in upper canopy. Checked. shallow.	
138	Allocasuarina fraseriana	559	6134299.97	568427.884	N	Na	Na	Na	Na		
139	Eucalyptus marginata	648	6134314.75	568414.084	N	Na	Na	Na	Na		
140	Eucalyptus marginata	615	6134320.49	568419.403	N	Na	Na	Na	Na		
141	Eucalyptus marginata	589	6134323.65	568423.263	Y	Trunk	12x4	Small bird	Fresh chewing around hollow entrance	Hollow butt	
142	Eucalyptus marginata	633	6134343.78	568405.847	N	Na	Na	Na	Na	Dry side; minimal hollow forming potential	
143	Eucalyptus marginata	729	6134347.17	568402.876	N	Na	Na	Na	Na		
144	Eucalyptus marginata	543	6134352.65	568404.385	N	Na	Na	Na	Na		
145	Eucalyptus marginata	618	6134359.66	568406.523	N	Na	Na	Na	Na		
146	Eucalyptus marginata	595	6134359.85	568412.68	N	Na	Na	Na	Na		
147	Eucalyptus marginata	651	6134365.34	568404.76	N	Na	Na	Na	Na		
148	Allocasuarina fraseriana	616	6134374.23	568400.056	N	Na	Na	Na	Na		
149	Eucalyptus marginata	669	6134363.58	568418.222	Y	Branch	12x7	Bird	Fresh chewing around entrance consistent with medium bird.	Too small for cockatoo	64,65
150	Eucalyptus marginata	663	6134370.27	568416.138	N	Na	Na	Na	Na		
151	Eucalyptus marginata	522	6134361.08	568432.342	N	Na	Na	Na	Na		
152	Eucalyptus marginata	826	6134362.72	568437.91	N	Na	Na	Na	Na		
153	Eucalyptus marginata	662	6134361.5	568384.122	N	Na	Na	Na	Na	Small hollows forming	
154	Eucalyptus marginata	705	6134353.8	568385.094	N	Na	Na	Na	Na	Hollow butt	
155	Eucalyptus marginata	550	6134346.99	568377.882	N	Na	Na	Na	Na	Shallow hollow forming in small branch in canopy	
156	Eucalyptus marginata	652	6134313.68	568374.098	Y	Butt	7x4	Feral Bees	Bees observed		66
157	Eucalyptus marginata	579	6134302.99	568373.887	N	Na	Na	Na	Na		
158	Eucalyptus marginata	736	6134288.68	568373.735	Y	Trunk	43x46		Old nest remnants this season. Possible Wattlebird feathers	Checked. Shallow. Has potential to develop into cockatoo hollow	67, ph image
159	Eucalyptus marginata	513	6134287.94	568368.764	N	Na	Na	Na	Na		
160	Allocasuarina fraseriana	508	6134278.93	568381.096	N	Na	Na	Na	Na	Minimal hollow forming potential	
161	Eucalyptus marginata	592	6134266.18	568377.378	N	Na	Na	Na	Fresh feeding on jarrah nuts		68
162	Eucalyptus marginata	595	6134256.45	568386.71	Y	Branch	17x16	Not currently occupied	No scratching or chewing	Chimney hollow. Shallow	
163	Eucalyptus marginata	675	6134249.53	568389.203	Y	Branch	6x6	Not currently occupied	No scratching or chewing	Side hollow. Shallow.	
164	Eucalyptus marginata	543	6134253.9	568401.807	N	Na	Na	Na	Na		
165	Eucalyptus marginata	617	6134253.51	568426.336	N	Na	Na	Na	Na		
166	Eucalyptus marginata	389	6134266.79	568425.821	Y	Trunk	9x6	Bird	Fresh chewing around entrance	Top and side entry into hollow.	70,71
167	Eucalyptus marginata	489	6134276.53	568400.037	N	Na	Na	Na	Na	Multiple tiny hollows forming	
168	Eucalyptus marginata	586	6134325.29	568398.986	N	Na	Na	Na	Na	Small elbow hollow forming in canopy	
169	Eucalyptus marginata	531	6134334.49	568384.216	N	Na	Na	Na	Na		
170	Eucalyptus marginata	495	6134340	568381.371	N	Na	Na	Na	Na		
171	Eucalyptus marginata	519	6134046.67	568125.48	N	Na	Na	Na	Na		
172	Eucalyptus marginata	555	6134038.15	568128.129	N	Na	Na	Na	Na	2 leaders	
173	Eucalyptus marginata	651	6134028.86	568126.026	N	Na	Na	Na	Na	Multiple small hollows forming in elbows where branches have dropped off. Shallow	
174	Allocasuarina fraseriana	512	6134034.78	568173.274	N	Na	Na	Na	Na		

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175	Allocasuarina fraseriana	516	6134049.1	568161.59	N	Na	Na	Na	Na		
176	Eucalyptus marginata	572	6134046.86	568140.905	N	Na	Na	Na	Na		
177	Eucalyptus marginata	1004	6133957.81	568019.393	Y	Branch	5x6	Not currently occupied	No scratching or chewing	Branch has small diameter. Potentially suitable for small bird or mammal	72
178	Corymbia calophylla	670	6133951.88	568013.129	N	Na	Na	Na	Na		
179	Corymbia calophylla	754	6133945.55	568022.042	N	Na	Na	Na	Possum scratching		
180	Allocasuarina fraseriana	509	6133927.74	568013.534	N	Na	Na	Na	Na	Top dead. Minimal hollow forming potential	
181	Eucalyptus marginata	636	6133932.7	568013.699	N	Na	Na	Na	Na	Leaning. Scrawny canopy	
182	Corymbia calophylla	904	6133928.88	567997.249	N	Na	Na	Na	Possum scratching		
183	Eucalyptus marginata	558	6133947.41	567997.996	N	Na	Na	Na	Na		
184	Eucalyptus marginata	527	6133957.67	567994.06	N	Na	Na	Na	Na		
185	Eucalyptus marginata	543	6133934.5	567988.974	N	Na	Na	Na	Na		
186	Eucalyptus marginata	565	6133922.62	567985.244	N	Na	Na	Na	Na	Leaning with upslope roots exposed	
187	Eucalyptus marginata	838	6133923.09	567977.488	Y	Branch	20x18	Possum	Possum scratching	Scratching up to hollow.	
188	Corymbia calophylla	861	6133929.75	567973.993	Y	Trunk	4x4	Small bird	Fresh chewing around entrance	Small hollow	73
189	Eucalyptus marginata	691	6133923.78	567970.077	N	Na	Na	Na	Na		
190	Corymbia calophylla	564	6133934.45	567962.167	N	Na	Na	Na	Na		
191	Corymbia calophylla	812	6133940.51	567954.775	N	Na	Na	Na	Na		
192	Corymbia calophylla	976	6133930.17	567940.447	N	Na	Na	Magpie	Observed	Stick nest high in canopy	
193	Corymbia calophylla	733	6133955.28	567946.467	N	Na	Na	Na	Na		
194	Eucalyptus marginata	659	6133958.85	567938.916	N	Na	Na	Na	Na		
195	Corymbia calophylla	785	6133964.19	567929.034	N	Na	Na	Na	Na		
196	Eucalyptus marginata	618	6133965.49	567926.828	N	Na	Na	Na	Na		
197	Eucalyptus marginata	543	6133967.65	567928.783	N	Na	Na	Na	Na		
198	Corymbia calophylla	621	6133974.73	567943.089	N	Na	Na	Na	Na	Old stick nest	
199	Corymbia calophylla	584	6133988.69	567951.185	N	Na	Na	Na	Na		
200	Eucalyptus marginata	705	6133994.61	567939.213	Y	Branch	17x15	Possum	Scratching up to hollow	Dead tree	
201	Eucalyptus marginata	500	6133992.48	567928.904	N	Na	Na	Na	Possum scratching	Heavy blossom	
202	Corymbia calophylla	619	6133986.96	567926.174	N	Na	Na	Na	Na		
203	Corymbia calophylla	543	6133987.4	567921.547	N	Na	Na	Na	Na		
204	Corymbia calophylla	678	6133991.14	567930.812	N	Na	Na	Na	Na		
205	Eucalyptus marginata	583	6133985.76	567938.988	N	Na	Na	Na	Possum scratching		
206	Corymbia calophylla	549	6133979.7	567933.497	N	Na	Na	Na	Na		
207	Eucalyptus marginata	526	6133979.17	567931.231	N	Na	Na	Na	Na		
208	Corymbia calophylla	633	6133960.35	567960.092	N	Na	Na	Na	Na		
209	Corymbia calophylla	723	6133983.88	567965.525	N	Na	Na	Na	Na		
210	Corymbia calophylla	1092	6133852.33	567886.34	N	Na	Na	Na	Possum scratching		
211	Corymbia calophylla	919	6133844.05	567890.589	N	Na	Na	Na	3 leaders		
212	Corymbia calophylla	747	6133796.61	567879.819	N	Na	Na	Na	Na		
213	Corymbia calophylla	632	6133789.73	567971.743	N	Na	Na	Na	Na		
214	Eucalyptus marginata	605	6134262.07	567823.544	N	Na	Na	Na	Na		
215	Eucalyptus marginata	633	6134251	567828.969	N	Na	Na	Na	Na		
216	Allocasuarina fraseriana	578	6134245.21	567833.508	N	Na	Na	Na	Na		
217	Eucalyptus marginata	507	6134238.02	567835.15	N	Na	Na	Na	Na		
218	Allocasuarina fraseriana	609	6134227.34	567821.943	N	Na	Na	Na	Na		
219	Allocasuarina fraseriana	563	6134229.19	567809.283	N	Na	Na	Na	Na		
220	Allocasuarina fraseriana	560	6134238.8	567812.015	N	Na	Na	Na	Na		
221	Eucalyptus marginata	667	6134247.57	567790.765	N	Na	Na	Na	Na		
222	Eucalyptus marginata	540	6134243.33	567783.129	N	Na	Na	Na	Na		
223	Eucalyptus marginata	641	6134242.41	567788.849	N	Na	Na	Na	Na		
224	Allocasuarina fraseriana	557	6134217.01	567791.662	N	Na	Na	Na	Na		
225	Allocasuarina fraseriana	526	6134213.17	567791.15	N	Na	Na	Na	Na		
226	Eucalyptus marginata	500	6134224.94	567756.298	N	Na	Na	Na	Na		
227	Corymbia calophylla	935	6133758.55	567879.783	N	Na	Na	Na	Na		
228	Corymbia calophylla	627	6133759.99	567867.735	N	Na	Na	Na	Red-tailed Black Cockatoo feeding debris		76
229	Corymbia calophylla	539	6133783.44	567872.868	N	Na	Na	Na	Na		
230	Corymbia calophylla	609	6133796.34	567872.65	N	Na	Na	Na	Possum scratching		77
231	Corymbia calophylla	845	6133798.17	567878.552	N	Na	Na	Na	Na		
232	Corymbia calophylla	979	6133805.47	567865.82	N	Na	Na	Na	Na	Good hollow forming potential	
233	Corymbia calophylla	583	6133818.44	567873.929	N	Na	Na	Na	Na		
234	Eucalyptus marginata	526	6133825.38	567874.534	N	Na	Na	Na	Na		
235	Corymbia calophylla	539	6133827.72	567871.879	N	Na	Na	Na	Na		
236	Corymbia calophylla	613	6133832.2	567868.691	Y	Trunk	12x7	Small bird	Fresh chewing around entrance		78
237	Corymbia calophylla	605	6133834.67	567876.177	N	Na	Na	Na	Na		
238	Corymbia calophylla	724	6133840.83	567875.742	N	Na	Na	Na	Na		
239	Corymbia calophylla	650	6133846.31	567878.526	N	Na	Na	Na	Na		
240	Corymbia calophylla	591	6133857.11	567880.006	N	Na	Na	Na	Na		79
241	Corymbia calophylla	793	6133867.07	567868.847	N	Na	Na	Na	Red-tailed Black Cockatoo feeding debris		80,81,82
242	Corymbia calophylla	565	6133869.89	567877.087	N	Na	Na	Na	Na		83
243	Corymbia calophylla	552	6133887.1	567874.841	N	Na	Na	Na	Na	Double leader	84
244	Corymbia calophylla	553	6133890.18	567877.329	N	Na	Na	Na	Na		85
245	Corymbia calophylla	549	6133894.55	567871.151	N	Na	Na	Na	Na		86
246	Eucalyptus marginata	631	6133910.74	567863.53	N	Na	Na	Na	Na	Hollows forming in dead leader	
247	Corymbia calophylla	509	6133925.39	567878.608	N	Na	Na	Na	Na		
248	Corymbia calophylla	568	6133926.22	567879.996	N	Na	Na	Na	Na		
249	Corymbia calophylla	498	6133928.72	567879.439	N	Na	Na	Na	Na		
250	Corymbia calophylla	531	6133936.96	567880.058	N	Na	Na	Na	Na		
251	Corymbia calophylla	540	6133935.26	567882.94	N	Na	Na	Na	Na		
252	Eucalyptus marginata	500	6133938.17	567877.771	N	Na	Na	Na	Na		
253	Corymbia calophylla	694	6133952.85	567879.969	N	Na	Na	Na	Na		
254	Corymbia calophylla	519	6133963.26	567884.804	N	Na	Na	Na	Na		
255	Corymbia calophylla	669	6133960.29	567878.666	N	Na	Na	Na	Na	Double leader	
256	Corymbia calophylla	572	6133969.76	567875.844	N	Na	Na	Na	Red-tailed Black Cockatoo and Baudin's feeding debris		87
257	Corymbia calophylla	599	6133969.81	567882.119	N	Na	Na	Na	Na		
258	Corymbia calophylla	647	6133973	567878.456	N	Na	Na	Na	Na		
259	Corymbia calophylla	618	6133990.86	567879.128	N	Na	Na	Na	Na		
260	Corymbia calophylla	526	6133989.22	567878.053	N	Na	Na	Na	Red-tailed Black Cockatoo feeding debris		
261	Corymbia calophylla	503	6134005.86	567883.593	N	Na	Na	Na	Na		
262	Corymbia calophylla	598	6134013.94	567883.038	N	Na	Na	Na	Na		

ID	Species	DBH	Northing	Eastings	Hollow y/n	Location	Dimensions	Occupant	Fauna activity	Comments	Photo Id
263	Corymbia calophylla	665	6134008.67	567872.096	N	Na	Na	Na	Na		
264	Corymbia calophylla	531	6133990.83	567854.769	N	Na	Na	Na	Na		
265	Eucalyptus marginata	549	6133972.23	567858.074	Y	Trunk	24x42	Not currently occupied	Down feathers and egg remnants in hollow. Old small carnivore scat	Recently used	88-94
266	Corymbia calophylla	728	6133963.49	567868.302	N	Na	Na	Na	Na		
267	Eucalyptus marginata	735	6133956.75	567871.811	N	Na	Na	Na	Na	Dead top	
268	Eucalyptus marginata	1131	6133941.6	567869.866	Y	Branch	14x14	Feral Bees	Bees observed; termite mound in base	Big old tree; good hollow forming potential	95, 96,97
269	Corymbia calophylla	766	6133935	567859.046	Y	Trunk	14x15	Possum	Possum scratching	Scratching up to hollow; double entrance. Large hollow potentially suitable for cockatoos.	98
270	Corymbia calophylla	538	6133930.24	567864.509	Y	Trunk	8x7	Not currently occupied	Fresh chewing around entrance	Small birds; shallow hollow	99
271	Corymbia calophylla	794	6133903.61	567868.126	N	Na	Na	Na	Na		
272	Eucalyptus marginata	745	6133901.74	567859.858	N	Na	Na	Na	Na	Small hollows forming in dead limbs	
273	Eucalyptus marginata	643	6133898.98	567858.066	N	Na	Na	Na	Na		
274	Allocasuarina fraseriana	840	6133897.54	567857.449	N	Na	Na	Na	Na		
275	Corymbia calophylla	713	6133898.4	567860.869	N	Na	Na	Na	Na		
276	Eucalyptus marginata	814	6133896.66	567867.715	N	Na	Na	Na	Na	Dry side	
277	Corymbia calophylla	660	6133884.63	567869.181	N	Na	Na	Na	Na	3 leaders. Middle one dead	
278	Eucalyptus marginata	571	6133883.9	567852.83	N	Na	Na	Na	Na		
279	Allocasuarina fraseriana	694	6133888.99	567846.234	N	Na	Na	Na	Na		
280	Corymbia calophylla	585	6133859.88	567861.261	N	Na	Na	Na	Na		
281	Eucalyptus marginata	1159	6133847.06	567854.959	Y	Branch	13x12	Possum	Possum scratching	Scratching up to hollow	100,101
282	Eucalyptus marginata	615	6133830.88	567857.015	Y	Trunk	13x15		Fresh chewing around entrance	Check.	102
283	Eucalyptus marginata	768	6133814.09	567856.178	N	Na	Na	Na	Na		
284	Allocasuarina fraseriana	620	6133800.49	567855.191	N	Na	Na	Na	Na		
285	Eucalyptus marginata	760	6133798.39	567859.429	N	Na	Na	Na	Na		
286	Corymbia calophylla	527	6133794.83	567859.019	N	Na	Na	Na	Na		
287	Eucalyptus marginata	564	6133792.68	567859.274	N	Na	Na	Na	Na		
288	Eucalyptus marginata	661	6133765.31	567858.337	Y	Trunk	28x32	Not currently occupied	No scratching or chewing	Shallow hollow	103
289	Corymbia calophylla	699	6133749.78	567855.049	N	Na	Na	Na	Na		
290	Corymbia calophylla	667	6133745.56	567847.626	N	Na	Na	Na	Na		
291	Corymbia calophylla	540	6133752.96	567842.786	N	Na	Na	Na	Na		
292	Eucalyptus marginata	670	6133767.43	567836.573	N	Na	Na	Na	Na		
293	Eucalyptus marginata	565	6133784.99	567833.391	N	Na	Na	Na	Na		
294	Allocasuarina fraseriana	558	6133776	567831.958	N	Na	Na	Na	Na		
295	Allocasuarina fraseriana	620	6133791.35	567825.882	N	Na	Na	Na	Na	Hollow forming in first branch division	
296	Eucalyptus marginata	771	6133801.31	567831.016	N	Na	Na	Na	Na		
297	Eucalyptus marginata	900	6133806.86	567836.997	N	Na	Na	Na	Na		
298	Eucalyptus marginata	579	6133816.28	567824.04	N	Na	Na	Na	Na		
299	Allocasuarina fraseriana	777	6133822.58	567823.624	N	Na	Na	Na	Na		
300	Allocasuarina fraseriana	663	6133834.32	567820.533	N	Na	Na	Na	Na		
301	Allocasuarina fraseriana	750	6133841.6	567821.695	N	Na	Na	Na	Na		
302	Allocasuarina fraseriana	635	6133853.12	567824.871	N	Na	Na	Na	Na		
303	Eucalyptus marginata	496	6133853.21	567821.069	N	Na	Na	Na	Na		
304	Allocasuarina fraseriana	543	6133859.7	567821.863	N	Na	Na	Na	Na		
305	Eucalyptus marginata	765	6133859.57	567830.036	N	Na	Na	Na	Na		
306	Eucalyptus marginata	598	6133872.05	567838.437	N	Na	Na	Na	Na		
307	Allocasuarina fraseriana	513	6133894.5	567833.309	N	Na	Na	Na	Na		
308	Allocasuarina fraseriana	649	6133892.97	567834.379	N	Na	Na	Na	Na		
309	Allocasuarina fraseriana	698	6133901.94	567837.545	N	Na	Na	Na	Na		
310	Eucalyptus marginata	804	6133914	567819.888	Y	Branch	9x5	Small bird	Fresh chewing around entrance; possum scratching		104,105
311	Corymbia calophylla	895	6133915.36	567828.624	N	Na	Na	Na	Na		
312	Eucalyptus marginata	588	6133913.56	567832.568	N	Na	Na	Na	Na		
313	Eucalyptus marginata	812	6133933.26	567836.045	Y	Trunk	26x34	Not currently occupied	Possum scratching	Small carnivore scat and active den at base of this tree	106-111
314	Eucalyptus marginata	518	6133938.66	567843.151	Y	Trunk	15x15	Not currently occupied	Possum scratching	Scratching up to hollow; shallow hollow	112
315	Eucalyptus marginata	711	6133934.95	567849.812	N	Na	Na	Na	Na		
316	Corymbia calophylla	684	6133933.16	567849.031	N	Na	Na	Na	Na		
317	Corymbia calophylla	629	6133938.02	567848.781	N	Na	Na	Na	Na		
318	Allocasuarina fraseriana	554	6133949.02	567847.359	N	Na	Na	Na	Na		
319	Eucalyptus marginata	615	6133961.47	567842.313	Y	Trunk	12x5	Not currently occupied	No scratching or chewing		113
320	Allocasuarina fraseriana	604	6133964.79	567844.261	N	Na	Na	Na	Na		
321	Eucalyptus marginata	554	6133973.87	567844.761	Y	Trunk	25x12		Fresh chewing around entrance; possum scratching	Check. Remnants of old bee hive; 2 well formed hollows in trunk	114,115
322	Eucalyptus marginata	770	6133980.05	567841.065	N	Na	Na	Na	Na		
323	Allocasuarina fraseriana	600	6133965.82	567834.39	N	Na	Na	Na	Na		
324	Eucalyptus marginata	619	6133958.15	567828.661	N	Na	Na	Na	Na		
325	Eucalyptus marginata	578	6133949.05	567816.008	N	Na	Na	Na	Na		
326	Eucalyptus marginata	901	6133960.02	567811.55	N	Na	Na	Na	Na		
327	Corymbia calophylla	511	6133956.42	567809.253	N	Na	Na	Na	Na		
328	Allocasuarina fraseriana	585	6133957.01	567808.7	N	Na	Na	Na	Na		
329	Eucalyptus marginata	509	6133946.95	567805.444	N	Na	Na	Na	Na		
330	Eucalyptus marginata	632	6133937.6	567797.572	Y	Trunk	16x16	Not currently occupied	Possum scratching	Scratching doesn't go all the way to hollow.	117
331	Eucalyptus marginata	520	6133928.08	567812.321	Y	Trunk	12x12	Not currently occupied	No scratching or chewing	Shallow hollow	118
332	Corymbia calophylla	1002	6133929.56	567812.277	Y	Branch	38x16	Possum	Den beneath tree; possum scratching up to and around hollow	small carnivore scats. Old; den currently inactive	120
333	Corymbia calophylla	708	6133926.11	567826.633	N	Na	Na	Na	Na		
334	Corymbia calophylla	894	6133919.9	567828.499	Y	Branch	20x18	Medium bird	Fresh chewing around entrance	Small diameter branch. Large entrance. Too small for cockatoo.	119,120
335	Eucalyptus marginata	582	6133914.05	567830.711	N	Na	Na	Na	Na		
336	Eucalyptus marginata	800	6133912.36	567826.336	N	Na	Na	Na	Na		
337	Allocasuarina fraseriana	728	6133906.71	567836.971	N	Na	Na	Na	Na		
338	Eucalyptus marginata	754	6133890.86	567819.911	Y	Trunk	?	?	No scratching or chewing	Upper trunk broken off. Hollow not visible from ground and too unstable to climb.	
339	Allocasuarina fraseriana	554	6133867.67	567824.814	N	Na	Na	Na	Na		
340	Allocasuarina fraseriana	667	6133864.38	567811.023	N	Na	Na	Na	Na		
341	Allocasuarina fraseriana	524	6133867.91	567808.809	N	Na	Na	Na	Na		
342	Allocasuarina fraseriana	553	6133877.64	567810.659	N	Na	Na	Na	Na		
343	Allocasuarina fraseriana	615	6133884.27	567806.601	N	Na	Na	Na	Na		
344	Corymbia calophylla	563	6133910.15	567811.384	N	Na	Na	Na	Na		
345	Allocasuarina fraseriana	523	6133911.03	567809.351	N	Na	Na	Na	Na		
346	Allocasuarina fraseriana	885	6133940.35	567774.391	N	Na	Na	Na	Na		
347	Allocasuarina fraseriana	808	6133928.26	567765.524	N	Na	Na	Na	Na		
348	Allocasuarina fraseriana	633	6133916.95	567755.978	N	Na	Na	Na	Na		
349	Allocasuarina fraseriana	505	6133912.53	567738.139	N	Na	Na	Na	Na		
350	Eucalyptus marginata	523	6133897.96	567773.193	N	Na	Na	Na	Na		

ID	Species	DBH	Northing	Eastings	Hollow y/n	Location	Dimensions	Occupant	Fauna activity	Comments	Photo Id
351	Eucalyptus marginata	675	6133889.05	567765.961	Y	Trunk	18x20	Not currently occupied	Fresh chewing around entrance; possum scratching	2 hollows within 2 mod each other. Both potential cockatoo hollows	122,123
352	Corymbia calophylla	526	6133899.58	567778.095	Y	Trunk	16x11	Not currently occupied	Fresh disturbance around entrance		125
353	Allocasuarina fraseriana	607	6133906.59	567775.355	N	Na	Na	Na	Na		
354	Allocasuarina fraseriana	589	6133911.47	567778.728	N	Na	Na	Na	Na		
355	Eucalyptus marginata	500	6133924.05	567785.178	N	Na	Na	Na	Na		
356	Corymbia calophylla	612	6133916.02	567793.11	N	Na	Na	Na	Baudins feeding debris		126
357	Allocasuarina fraseriana	676	6133906.13	567795.271	N	Na	Na	Na	Na		
358	Eucalyptus marginata	587	6133901.3	567798.605	N	Na	Na	Na	Na	Hollow butt	
359	Eucalyptus marginata	631	6133866.25	567792.15	N	Na	Na	Na	Na		
360	Eucalyptus marginata	721	6133865.97	567780.643	N	Na	Na	Na	Na		
361	Eucalyptus marginata	544	6133864.19	567805.043	Y	Branch	9x8	Not currently occupied	No scratching or chewing		127,128
362	Allocasuarina fraseriana	739	6133859.09	567790.115	N	Na	Na	Na	Na		
363	Eucalyptus marginata	710	6133856.18	567784.318	N	Na	Na	Na	Na		
364	Allocasuarina fraseriana	690	6133850.33	567779.337	N	Na	Na	Na	Na		
365	Eucalyptus marginata	590	6133856.25	567795.391	N	Na	Na	Na	Na		
366	Eucalyptus marginata	699	6133849.56	567803.293	Y	Branch	11x11	Small bird	Fresh chewing around entrance	Additional branch hollow 8x8 with fine scratching up to and into hollow; small mammal likely. Possibly arboreal Dasyurid.	129
367	Eucalyptus marginata	590	6133843.41	567815.044	N	Na	Na	Na	Na		
368	Eucalyptus marginata	500	6133800.16	567808.842	N	Na	Na	Na	Na		
369	Eucalyptus marginata	570	6133800.78	567802.621	Y	Trunk	12x10	Not currently occupied	Possum scratching	Shallow hollow	130
370	Eucalyptus marginata	575	6133800.41	567818.089	N	Na	Na	Na	Na		
371	Allocasuarina fraseriana	550	6133772.98	567828.16	N	Na	Na	Na	Na		
372	Allocasuarina fraseriana	1022	6133755.91	567809.99	N	Na	Na	Na	Na		
373	Allocasuarina fraseriana	541	6133767.89	567804.237	N	Na	Na	Na	Na		
374	Allocasuarina fraseriana	719	6133780.68	567792.696	N	Na	Na	Na	Na		
375	Allocasuarina fraseriana	710	6133800.16	567779.388	N	Na	Na	Na	Na		
376	Eucalyptus marginata	853	6133803.97	567773.4	N	Na	Na	Na	Na		
377	Eucalyptus marginata	992	6133819.8	567762.293	N	Na	Na	Na	Na		
378	Allocasuarina fraseriana	1053	6133817.44	567761.101	N	Na	Na	Na	Na		
379	Eucalyptus marginata	796	6133821.05	567752.5	N	Na	Na	Na	Na		
380	Eucalyptus marginata	765	6133834.36	567749.67	N	Na	Na	Na	Na		
381	Allocasuarina fraseriana	520	6133838.69	567750.305	N	Na	Na	Na	Na		
382	Corymbia calophylla	609	6133844.36	567734.711	N	Na	Na	Na	Na		
383	Corymbia calophylla	553	6133861.04	567739.358	Y	Trunk	22x14	Possum	Possum scratching	Scratching up to hollow.	
384	Eucalyptus marginata	636	6133866.74	567733.361	N	Na	Na	Na	Na		
385	Eucalyptus marginata	533	6133871.53	567733.497	N	Na	Na	Na	Na		
386	Corymbia calophylla	533	6133866.31	567718.251	N	Na	Na	Na	Na		
387	Eucalyptus marginata	612	6133863.74	567713.06	Y	Trunk	20x18	Not currently occupied	Old nest	Small-med birds	133
388	Eucalyptus marginata	570	6133840.75	567716.564	N	Na	Na	Na	Na		
389	Eucalyptus marginata	640	6133842.83	567720.151	Y	Branch	26x26	Not currently occupied	Old nest	Potential cockatoo hollow	134
390	Corymbia calophylla	553	6133836.86	567716.919	N	Na	Na	Na	Na		
391	Eucalyptus marginata	524	6133823.1	567729.892	N	Na	Na	Na	Na		
392	Corymbia calophylla	712	6133822.92	567726.643	Y	Branch	10x12	Small bird	Fresh chewing around entrance		135
393	Eucalyptus marginata	652	6133815.82	567746.071	Y	Branch	8x8	Small bird	Fresh chewing around entrance		136
394	Eucalyptus marginata	529	6133806	567739.812	N	Na	Na	Na	Na		
395	Eucalyptus marginata	565	6133807.68	567732.962	N	Na	Na	Na	Na		
396	Corymbia calophylla	619	6133788.76	567739.194	N	Na	Na	Na	Na		
397	Eucalyptus marginata	822	6133786.15	567738.167	N	Na	Na	Na	Na		
398	Eucalyptus marginata	530	6133790.74	567748.229	N	Na	Na	Na	Na		
399	Eucalyptus marginata	538	6133785.71	567763.197	N	Na	Na	Na	Na		
400	Allocasuarina fraseriana	748	6133779.56	567767.636	N	Na	Na	Na	Na		
401	Eucalyptus marginata	559	6133768.42	567769.687	N	Na	Na	Na	Na		
402	Eucalyptus marginata	578	6133752.92	567752.214	N	Na	Na	Na	Na		
403	Corymbia calophylla	640	6133752	567748.347	N	Na	Na	Na	Na		
404	Eucalyptus marginata	595	6133757.37	567736.614	N	Na	Na	Na	Na		
405	Eucalyptus marginata	623	6133778.24	567726.68	N	Na	Na	Na	Na		
406	Eucalyptus marginata	743	6133789.34	567718.491	N	Na	Na	Na	Na		
407	Eucalyptus marginata	929	6133800.39	567718.545	N	Na	Na	Na	Na	Large elbow hollow forming	
408	Eucalyptus marginata	549	6133806.18	567711.86	N	Na	Na	Na	Na		
409	Corymbia calophylla	1072	6133816.43	567704.599	N	Na	Na	Na	Na		
410	Corymbia calophylla	745	6133816.62	567693.233	N	Na	Na	Na	Na		
411	Eucalyptus marginata	731	6133819.07	567689.129	N	Na	Na	Na	Na		
412	Eucalyptus marginata	603	6133822.42	567673.829	N	Na	Na	Na	Na		
413	Eucalyptus marginata	892	6133815.7	567668.713	N	Na	Na	Na	Na		
414	Eucalyptus marginata	713	6133807.95	567661.148	N	Na	Na	Na	Na		
415	Eucalyptus marginata	640	6133792.96	567665.713	N	Na	Na	Na	Na		
416	Eucalyptus marginata	652	6133788.33	567674.048	N	Na	Na	Na	Na		
417	Eucalyptus marginata	742	6133779.84	567684.275	N	Na	Na	Na	Na		
418	Eucalyptus marginata	633	6133773.69	567686.598	N	Na	Na	Na	Na		
419	Eucalyptus marginata	1003	6133774.08	567696.2	N	Na	Na	Na	Na		
420	Eucalyptus marginata	508	6133750.37	567707.547	N	Na	Na	Na	Na		
421	Eucalyptus marginata	527	6133754.46	567691.801	N	Na	Na	Na	Na		
422	Eucalyptus marginata	625	6133746.97	567688.418	N	Na	Na	Na	Na		
423	Corymbia calophylla	523	6133744.77	567689.273	N	Na	Na	Na	Na		
424	Eucalyptus marginata	568	6133735.51	567681.749	N	Na	Na	Na	Na		
425	Corymbia calophylla	1046	6133740.83	567662.356	N	Na	Na	Na	Na		
426	Corymbia calophylla	774	6133754.54	567657.392	N	Na	Na	Na	Na		
427	Eucalyptus marginata	719	6133761.54	567664.333	N	Na	Na	Na	Na		
428	Corymbia calophylla	514	6133770.48	567654.551	N	Na	Na	Na	Na		
429	Eucalyptus marginata	673	6133768.21	567658.479	N	Na	Na	Na	Na		
430	Corymbia calophylla	779	6133784.35	567653.335	N	Na	Na	Na	Na		
431	Eucalyptus marginata	773	6133783.97	567642.126	Y	Branch	23x20	Not currently occupied	No scratching or chewing	Chimney	139
432	Eucalyptus marginata	758	6133747.05	567646.48	N	Na	Na	Na	Na		
433	Eucalyptus marginata	879	6133739.15	567639.533	N	Na	Na	Na	Na		
434	Eucalyptus marginata	713	6133739.11	567625.245	N	Na	Na	Na	Possum scratching		
435	Eucalyptus marginata	658	6133732.8	567609.383	N	Na	Na	Na	Na		
436	Eucalyptus marginata	558	6133743.9	567604.689	N	Na	Na	Na	Na		
437	Corymbia calophylla	585	6133721.75	567607.402	N	Na	Na	Na	Na		
438	Corymbia calophylla	512	6133706.78	567635.874	N	Na	Na	Na	Na		

ID	Species	DBH	Northing	Eastings	Hollow y/n	Location	Dimensions	Occupant	Fauna activity	Comments	Photo Id
439	Corymbia calophylla	609	6133704.75	567660.351	N	Na	Na	Na	Na		
440	Allocasuarina fraseriana	934	6134512.77	568699.298	N	Na	Na	Na	Na		
441	Eucalyptus marginata	588	6134498.69	568701.305	N	Na	Na	Na	Na		
442	Eucalyptus marginata	564	6134420	568705.298	N	Na	Na	Na	Na		
443	Allocasuarina fraseriana	605	6134341.63	568696.918	N	Na	Na	Na	Na		
444	Eucalyptus marginata	659	6134193.77	568694.379	N	Na	Na	Na	Possum scratching		
445	Eucalyptus marginata	856	6134159.28	568703.317	Y	Branch	32x27	Possum	Possum scratching	Dead. Additional hollows in nearby limbs; fresh scratching all way up to and into hollow.	140
446	Eucalyptus marginata	540	6134025.58	568696.655	N	Na	Na	Na	Na		
447	Allocasuarina fraseriana	503	6134556.98	568705.232	N	Na	Na	Na	Sheoak nut feeding debris		141
448	Eucalyptus marginata	498	6134582.82	568705.582	N	Na	Na	Na	Na		
449	Eucalyptus marginata	627	6134608	568703.704	N	Na	Na	Na	Na		
450	Eucalyptus marginata	500	6134617.32	568700.084	N	Na	Na	Na	Na		
451	Allocasuarina fraseriana	509	6134708.72	568706.218	N	Na	Na	Na	Na		
452	Allocasuarina fraseriana	638	6134814.57	568703.783	N	Na	Na	Na	Na		
453	Allocasuarina fraseriana	571	6134898.15	568705.882	N	Na	Na	Na	Na		
454	Eucalyptus marginata	668	6135008.26	568702.596	N	Na	Na	Na	Na		
455	Eucalyptus marginata	615	6135010.89	568699.745	N	Na	Na	Na	Na		
456	Eucalyptus marginata	617	6135030.01	568694.633	N	Na	Na	Na	Na		
457	Eucalyptus marginata	497	6135049.74	568688.567	N	Na	Na	Na	Na		
458	Eucalyptus marginata	648	6135040.49	568684.752	Y	Trunk	8x4	Not currently occupied	Fresh chewing around hollow	Small bird nest this season; an additional hollow in small branch in upper canopy.	142,143
459	Eucalyptus marginata	808	6135029.31	568676.834	Y	Trunk	7x3	Not currently occupied	Fresh chewing around hollow	Small bird nest this season	144
460	Eucalyptus marginata	827	6135021.44	568673.675	N	Na	Na	Na	Na		
461	Allocasuarina fraseriana	736	6135029.47	568672.801	N	Na	Na	Na	Na		
462	Eucalyptus marginata	505	6135009.8	568634.767	N	Na	Na	Na	Na		
463	Eucalyptus marginata	588	6135014.16	568627.356	N	Na	Na	Na	Possum scratching		
464	Eucalyptus marginata	627	6135018.65	568629.448	N	Na	Na	Na	Na		
465	Eucalyptus marginata	693	6135018.09	568618.598	N	Na	Na	Na	Na	2 hollows forming. One in trunk one in branch.	
466	Eucalyptus marginata	566	6135027.9	568616.939	N	Na	Na	Na	Na		
467	Eucalyptus marginata	521	6135023.66	568613.598	N	Na	Na	Na	Na		
468	Eucalyptus marginata	497	6135026.82	568608.99	N	Na	Na	Na	Na		
469	Allocasuarina fraseriana	753	6135012.11	568603.244	N	Na	Na	Na	Na		
470	Eucalyptus marginata	733	6135002.89	568604.356	N	Na	Na	Na	Na		
471	Eucalyptus marginata	564	6135007.9	568589.94	N	Na	Na	Na	Na		
472	Eucalyptus marginata	521	6135001.48	568571.557	N	Na	Na	Na	Na		
473	Allocasuarina fraseriana	663	6135001.21	568556.09	N	Na	Na	Na	Na		
474	Eucalyptus marginata	615	6134976.84	568545.117	N	Na	Na	Na	Possum scratching		
475	Eucalyptus staeri	924	6134988.01	568533.917	N	Na	Na	Na	Na		
476	Eucalyptus marginata	764	6134975.03	568536.496	Y	Trunk	12x3	Not currently occupied	Possum scratching	Small amount of fresh chewing around entrance. Additional small hollow in branch looks like it has been used by small birds this seas	150
477	Eucalyptus marginata	699	6134970.85	568520.538	N	Na	Na	Na	Na	Hollow crown recently broken off.	
478	Eucalyptus marginata	855	6134996.45	568528.415	N	Na	Na	Na	Na		
479	Eucalyptus marginata	915	6134979.99	568517.077	Y	Branch	4x5	Not currently occupied	No scratching or chewing		152
480	Allocasuarina fraseriana	640	6134972.35	568515.574	N	Na	Na	Na	Na		
481	Allocasuarina fraseriana	543	6134957.96	568519.114	N	Na	Na	Na	Na		
482	Eucalyptus marginata	761	6134959.1	568520.584	N	Na	Na	Na	Na	Large hollow in trunk that has become unusable due to opening in side of tree associated with hollow butt	153-155
483	Eucalyptus staeri	544	6134955.76	568510.547	N	Na	Na	Na	Na		
484	Allocasuarina fraseriana	583	6134953.38	568493.153	N	Na	Na	Na	Na		
485	Eucalyptus marginata	644	6134963.07	568485.176	Y	Branch	24x10	Possum	Possum scratching	Scratching up to and into hollow	156
486	Eucalyptus marginata	501	6134976.02	568477.853	N	Na	Na	Na	Na		
487	Eucalyptus staeri	602	6134946.13	568486.151	N	Na	Na	Na	Na		
488	Eucalyptus staeri	617	6134927.18	568442.457	N	Na	Na	Na	Na		
489	Eucalyptus marginata	646	6134944.78	568439.818	N	Na	Na	Na	Na		
490	Allocasuarina fraseriana	575	6134945.35	568433.693	N	Na	Na	Na	Na		
491	Eucalyptus marginata	718	6134933.51	568386.037	Y	Trunk	7x5	Na	Scratching up to and into hollow	Too small entrance to see into with torch. Possible small dasyurid	157
492	Allocasuarina fraseriana	756	6134918.37	568370.74	N	Na	Na	Na	Na		
493	Allocasuarina fraseriana	728	6134912.61	568374.935	N	Na	Na	Na	Na		
494	Allocasuarina fraseriana	654	6134904.19	568380.946	N	Na	Na	Na	Na		
495	Eucalyptus marginata	537	6134898.61	568389.956	N	Na	Na	Na	Na		
496	Corymbia calophylla	649	6134897.61	568370.956	Y	Branch	3x4	Not currently occupied	No scratching or chewing	Two upright branches may also have hollows forming	158
497	Eucalyptus marginata	643	6134870.98	568340.544	N	Na	Na	Na	Na		
498	Allocasuarina fraseriana	532	6134873.38	568332.341	N	Na	Na	Na	Na		
499	Eucalyptus marginata	727	6134869.81	568322.724	Y	Branch	12x9	Not currently occupied	No scratching or chewing	Shallow hollow	160
500	Allocasuarina fraseriana	743	6134867.01	568320.721	N	Na	Na	Na	Na		
501	Allocasuarina fraseriana	650	6134864.8	568296.337	N	Na	Na	Na	Na		
502	Allocasuarina fraseriana	508	6134856.69	568300.198	N	Na	Na	Na	Na		
503	Eucalyptus marginata	536	6134849.47	568269.119	N	Na	Na	Na	Na		
504	Eucalyptus marginata	596	6134845.95	568255.486	N	Na	Na	Na	Na		
505	Eucalyptus marginata	659	6134851.13	568248.494	N	Na	Na	Na	Na		
506	Eucalyptus marginata	727	6134863.62	568247.327	N	Na	Na	Na	Na		
507	Eucalyptus marginata	528	6134829.52	568243.635	N	Na	Na	Na	Na		
508	Eucalyptus marginata	538	6134827.89	568213.907	N	Na	Na	Na	Na		
509	Eucalyptus marginata	696	6134815.46	568194.669	N	Na	Na	Na	Na		
510	Eucalyptus marginata	561	6134807.47	568179.974	N	Na	Na	Na	Possum scratching and scat		161
511	Eucalyptus marginata	519	6134801.25	568153.697	N	Na	Na	Na	Fox cub seen		
512	Eucalyptus marginata	569	6134805.09	568150.438	N	Na	Na	Na	Na	Hollow forming in elbow	
513	Eucalyptus marginata	725	6134804.82	568137.727	N	Na	Na	Na	Na		
514	Eucalyptus marginata	735	6134781.9	568128.02	N	Na	Na	Na	Na		
515	Eucalyptus marginata	628	6134801.99	568102.902	N	Na	Na	Na	Na		
516	Eucalyptus marginata	592	6134799.47	568105.045	N	Na	Na	Na	Na		
517	Eucalyptus staeri	605	6134812.4	568122.301	N	Na	Na	Na	Na		
518	Eucalyptus marginata	637	6134823.38	568152.736	Y	Branch	4x4	Not currently occupied	No scratching or chewing	Shallow hollow	162
519	Allocasuarina fraseriana	830	6134828.31	568161.407	N	Na	Na	Na	Na		
520	Eucalyptus marginata	769	6134827.95	568165.494	N	Na	Na	Na	Na		
521	Allocasuarina fraseriana	534	6134832.74	568181.602	N	Na	Na	Na	Na		
522	Eucalyptus marginata	594	6134845.21	568196.292	N	Na	Na	Na	Na		
523	Eucalyptus marginata	618	6134855.3	568210.89	N	Na	Na	Na	Na		
524	Eucalyptus marginata	525	6134876.19	568252.475	N	Na	Na	Na	Na		
525	Eucalyptus marginata	660	6134901.38	568323.045	Y	Trunk	9x12	Feral Bees	Observed	Additional hollow forming higher.	163
526	Eucalyptus marginata	623	6134891.45	568319.07	N	Na	Na	Na	Na		

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527	Eucalyptus marginata	584	6134907.94	568334.758	Y	Branch	12x10	Not currently occupied	Fresh chewing around hollow	Some tracks leading up to hollow. Shallow and narrow hollow	164
528	Eucalyptus marginata	964	6134925.57	568359.54	N	Na	Na	Na	Na		
529	Eucalyptus marginata	558	6134378.09	567177.524	Y	Trunk	5x5	Not currently occupied	Small amount of scratching at side of hollow; cockatoo feeding debris around base of tree	Small and narrow	166,67
530	Eucalyptus marginata	505	6134385.66	567190.573	Y	Trunk	8x7	Not currently occupied	No scratching or chewing	Spiderwebs across entrance; but chicken sized eggshell on ground	168,169
531	Eucalyptus marginata	548	6134388.35	567200.138	Y	Trunk	18x12	Not currently occupied	No scratching or chewing	Spiderwebs across entrance	170,171
532	Eucalyptus marginata	872	6134394.43	567210.415	N	Na	Na	Na	Na		
533	Eucalyptus marginata	1085	6134424.57	567268.711	N	Na	Na	Na	Na		
534	Eucalyptus marginata	612	6134424.5	567266.802	N	Na	Na	Na	Na		
535	Eucalyptus marginata	513	6134431.87	567293.599	N	Na	Na	Na	Na		
536	Eucalyptus marginata	585	6134452.32	567342.947	N	Na	Na	Na	Na		
537	Allocasuarina fraseriana	545	6134454.64	567353.934	N	Na	Na	Na	Na		
538	Eucalyptus marginata	626	6134455.11	567360.809	N	Na	Na	Na	Na		
539	Eucalyptus marginata	677	6134462.55	567378.476	N	Na	Na	Na	Na		
540	Eucalyptus marginata	663	6134466.37	567378.459	N	Na	Na	Na	Na		
541	Eucalyptus marginata	501	6134482.27	567404.254	N	Na	Na	Na	Na		
542	Allocasuarina fraseriana	699	6134490.06	567412.032	N	Na	Na	Na	Na		
543	Eucalyptus marginata	582	6134513.5	567487.327	N	Na	Na	Na	Na		
544	Eucalyptus marginata	524	6134528.33	567524.358	N	Na	Na	Na	Na		
545	Eucalyptus marginata	578	6134526.43	567524.11	N	Na	Na	Na	Na		
546	Eucalyptus marginata	574	6134563.41	567576.047	Y	Branch	27x12	Not currently occupied	Possum scratching	Scratching not into hollow. Looks suitable for cockatoo	175
547	Eucalyptus marginata	790	6134552.96	567574.307	Y	Trunk	22x6	Not currently occupied	Scratching alongside hollow.		172
548	Eucalyptus marginata	610	6134548.8	567574.438	N	Na	Na	Na	Na		
549	Eucalyptus marginata	636	6134550.71	567578.148	N	Na	Na	Na	Na		
550	Eucalyptus marginata	622	6134543.13	567585.819	Y	Trunk	9x8	Possum	Possum scratching above and into hollow		173,74
551	Corymbia calophylla	528	6134565.04	567596.385	N	Na	Na	Na	Na		
552	Corymbia calophylla	657	6134630.88	567567.506	N	Na	Na	Na	Possum scratching		
553	Corymbia calophylla	653	6134552.77	567603.491	N	Na	Na	Na	Na		
554	Eucalyptus marginata	602	6134573.14	567601.164	N	Na	Na	Na	Na	Small hollow forming	
555	Eucalyptus marginata	531	6134575.42	567607.529	N	Na	Na	Na	Na	Small hollow forming	
556	Eucalyptus marginata	617	6134579.09	567602.888	Y	Branch	10x8	Not currently occupied	Fresh chewing around hollow	Medium bird has nested here this season	177
557	Eucalyptus marginata	617	6134576.82	567623.018	N	Na	Na	Na	Na		
558	Eucalyptus marginata	762	6134587.43	567625.185	N	Na	Na	Na	Na		
559	Eucalyptus marginata	805	6134596.26	567650.511	N	Na	Na	Na	Na		
560	Eucalyptus marginata	637	6134592.77	567657.105	N	Na	Na	Na	Na		
561	Corymbia calophylla	520	6134603.76	567657.46	N	Na	Na	Na	Na		
562	Corymbia calophylla	503	6134607.5	567663.589	N	Na	Na	Na	Na		
563	Eucalyptus marginata	785	6134602.19	567668.378	N	Na	Na	Na	Na		
564	Corymbia calophylla	659	6134601.09	567678.588	N	Na	Na	Na	Na		
565	Corymbia calophylla	889	6134588.99	567683.281	Y	Branch	35x32	Feral Bees	Bees observed		178,79
566	Corymbia calophylla	713	6134602.37	567688.973	N	Na	Na	Na	Na		
567	Corymbia calophylla	565	6134610.68	567710.402	N	Na	Na	Na	Na		
568	Corymbia calophylla	565	6134619.54	567701.781	N	Na	Na	Na	Na		
569	Corymbia calophylla	675	6134626.01	567708.677	Y	Branch	13x11	Not currently occupied	Possum scratching	Scratching around but not up to or into hollow. No bird chewing	180
570	Corymbia calophylla	610	6134633.42	567727.45	N	Na	Na	Na	Na		
571	Corymbia calophylla	511	6134628.66	567734.195	N	Na	Na	Na	Na		
572	Eucalyptus marginata	665	6134637.02	567747.757	N	Na	Na	Na	Na		
573	Corymbia calophylla	640	6134641.3	567739.343	N	Na	Na	Na	Na		
574	Eucalyptus marginata	775	6134645.19	567747.117	N	Na	Na	Na	Na		
575	Eucalyptus marginata	650	6134650.12	567754.004	N	Na	Na	Na	Na		
576	Eucalyptus marginata	618	6134644.42	567764.362	N	Na	Na	Na	Na		
577	Eucalyptus marginata	505	6134636.58	567769.571	N	Na	Na	Na	Na		
578	Eucalyptus marginata	564	6134635.11	567770.498	N	Na	Na	Na	Na		
579	Eucalyptus marginata	968	6134642.97	567787.013	N	Na	Na	Na	Na		
580	Eucalyptus marginata	532	6134658.36	567783.75	N	Na	Na	Na	Na		
581	Eucalyptus marginata	620	6134656.57	567788.986	N	Na	Na	Na	Na		
582	Eucalyptus marginata	510	6134659.47	567796.324	N	Na	Na	Na	Na		
583	Eucalyptus marginata	581	6134665.96	567798.844	N	Na	Na	Na	Na		
584	Eucalyptus marginata	661	6134674.88	567810.428	Y	Branch	7x3	Small bird	Fresh chewing around hollow	Additional hollow in adjoining branch. Slightly larger but no sign of recent activity	181,82
585	Eucalyptus marginata	651	6134697.43	567857.248	Y	Branch	11x10	Not currently occupied	No scratching or chewing	Dead branch. Opens out to bottom. Section that is full hollow is very shallow.	183
586	Eucalyptus marginata	597	6134683.69	567867.693	N	Na	Na	Na	Na		
587	Eucalyptus marginata	511	6134697.53	567875.307	N	Na	Na	Na	Na		
588	Eucalyptus staeri	726	6134712.08	567883.386	N	Na	Na	Na	Na		
589	Eucalyptus marginata	579	6134708.24	567894.763	N	Na	Na	Na	Na		
590	Eucalyptus marginata	581	6134706.1	567901.637	N	Na	Na	Na	Na		
591	Eucalyptus marginata	548	6134711.93	567914.437	N	Na	Na	Na	Na		
592	Eucalyptus marginata	593	6134717.72	567913.272	N	Na	Na	Na	Na		
593	Allocasuarina fraseriana	638	6134713.04	567924.593	N	Na	Na	Na	Na		
594	Eucalyptus marginata	803	6134725.07	567939.029	N	Na	Na	Na	Na		
595	Eucalyptus marginata	590	6134714.6	567942.358	N	Na	Na	Na	Na		
596	Eucalyptus marginata	723	6134727.4	567958.505	N	Na	Na	Na	Na	Dominant leader dead	
597	Eucalyptus marginata	721	6134758.99	568007.865	N	Na	Na	Na	Na	Dominant leader dead	
598	Eucalyptus marginata	974	6134746.25	568003.444	N	Na	Na	Na	Na		
599	Allocasuarina fraseriana	604	6134756.73	568021.312	N	Na	Na	Na	Na		
600	Eucalyptus marginata	701	6134747.97	568024.623	N	Na	Na	Na	Na		
601	Eucalyptus marginata	826	6134750.07	568038.035	N	Na	Na	Na	Na		
602	Eucalyptus marginata	550	6134727.5	568001.176	N	Na	Na	Na	Na		
603	Allocasuarina fraseriana	530	6134718.87	567992.73	N	Na	Na	Na	Na		
604	Eucalyptus marginata	549	6134697.22	567944.908	N	Na	Na	Na	Na		
605	Eucalyptus marginata	507	6134684.54	567906.205	N	Na	Na	Na	Na		
606	Eucalyptus marginata	632	6134685.42	567902.196	N	Na	Na	Na	Na		
607	Eucalyptus marginata	785	6134680.36	567895.618	N	Na	Na	Na	Na	Hollow butt	
608	Eucalyptus marginata	684	6134677.57	567888.019	N	Na	Na	Na	Na		
609	Eucalyptus marginata	748	6134682.08	567882.6	Y	Branch	20x18	Not currently occupied	No scratching or chewing	Branch had dropped exposing the hollow. Shallow noe	184
610	Eucalyptus marginata	605	6134662.29	567841.984	N	Na	Na	Na	Na		
611	Eucalyptus marginata	493	6134672.17	567840.169	Y	Branch	35x30		Scratching alongside hollow.	Potential cockatoo hollow. No signs of recent activity	185
612	Eucalyptus marginata	668	6134662.48	567828.211	N	Na	Na	Na	Na		
613	Eucalyptus marginata	564	6134647.98	567817.947	N	Na	Na	Na	Na		

ID	Species	DBH	Northing	Eastings	Hollow y/n	Location	Dimensions	Occupant	Fauna activity	Comments	Photo Id
614	Eucalyptus marginata	720	6134635.11	567804.129	N	Na	Na	Na	Na		
615	Eucalyptus marginata	673	6134635.71	567814.272	N	Na	Na	Na	Na		
616	Eucalyptus marginata	603	6134628.97	567809.838	N	Na	Na	Na	Na		
617	Eucalyptus marginata	559	6134631.3	567795.606	N	Na	Na	Na	Na		
618	Eucalyptus marginata	612	6134619.66	567764.191	N	Na	Na	Na	Na		
619	Corymbia calophylla	513	6134608.29	567742.916	N	Na	Na	Na	Na		
620	Corymbia calophylla	651	6134602.99	567739.771	N	Na	Na	Na	Na		
621	Corymbia calophylla	564	6134606.94	567730.21	N	Na	Na	Na	Na		
622	Eucalyptus marginata	561	6134607.73	567728.389	N	Na	Na	Na	Na		
623	Eucalyptus marginata	511	6134603.88	567723.702	N	Na	Na	Na	Na		
624	Corymbia calophylla	731	6134601.7	567733.642	N	Na	Na	Na	Na		
625	Corymbia calophylla	602	6134592.11	567726.173	N	Na	Na	Na	Na		
626	Corymbia calophylla	533	6134582.36	567709.294	N	Na	Na	Na	Na		
627	Corymbia calophylla	641	6134578.2	567702.23	N	Na	Na	Na	Na		
628	Corymbia calophylla	520	6134579.6	567693.381	N	Na	Na	Na	Na		
629	Eucalyptus marginata	567	6134569.86	567660.518	N	Na	Na	Na	Na		
630	Corymbia calophylla	520	6134567.93	567652.01	N	Na	Na	Na	Na		
631	Corymbia calophylla	763	6134550.88	567632.246	N	Na	Na	Na	Na		
632	Eucalyptus marginata	591			N	Na	Na	Na	Na		
633	Eucalyptus marginata	608	6134356.94	567194.771	Y	Branch	26x26	Possum	Possum scratching	Scratching up to and into hollow; dead stag. Chimney hollow; good size for cockatoo	188
634	Allocasuarina fraseriana	880	6134366.68	567201.351	N	Na	Na	Na	Na		
635	Allocasuarina fraseriana	982	6134372.75	567205.378	N	Na	Na	Na	Na		
636	Eucalyptus marginata	912	6134367.97	567217.083	Y	Trunk	35x40	Not currently occupied	No scratching or chewing	Hollow shallow but has potential to become suitable for cockatoos	189
637	Allocasuarina fraseriana	575	6134422.26	567346.641	N	Na	Na	Na	Na		
638	Allocasuarina fraseriana	570	6134432.03	567349.566	N	Na	Na	Na	Na		
639	Eucalyptus marginata	556	6134447.93	567388.078	N	Na	Na	Na	Na		
640	Allocasuarina fraseriana	526	6134461.93	567402.375	N	Na	Na	Na	Na		
641	Eucalyptus marginata	638	6134463.04	567405.814	N	Na	Na	Na	Na		
642	Allocasuarina fraseriana	638	6134464.41	567418.882	N	Na	Na	Na	Na		
643	Eucalyptus marginata	598	6134471.17	567456.773	N	Na	Na	Na	Na		
644	Eucalyptus marginata	668	6134498.02	567504.856	N	Na	Na	Na	Na		
645	Eucalyptus marginata	631	6134502.26	567497.888	N	Na	Na	Na	Na		
646	Eucalyptus marginata	575	6134501.83	567504.26	N	Na	Na	Na	Na		
647	Eucalyptus marginata	672	6134512.49	567530.27	N	Na	Na	Na	Na		
648	Eucalyptus marginata	1096	6134530.2	567559.132	Y	Branch	35x35	Not currently occupied	Scratching alongside hollow.	Dead top. Unstable	190
649	Eucalyptus marginata	575	6134532.34	567560.841	N	Na	Na	Na	Na		
650	Allocasuarina fraseriana	511	6134343.74	567134.355	N	Na	Na	Na	Na		
651	Eucalyptus marginata	653	6134363.85	567152.171	N	Na	Na	Na	Na		
652	Corymbia calophylla	549	6134154.9	567174.357	N	Na	Na	Na	Na		
653	Corymbia calophylla	605	6134147.23	567175.184	N	Na	Na	Na	Na		
654	Eucalyptus marginata	510	6134131.87	567174.706	N	Na	Na	Na	Na		
655	Eucalyptus marginata	736	6134103.19	567172.142	N	Na	Na	Na	Na		
656	Eucalyptus marginata	551	6134068	567175.131	N	Na	Na	Na	Na		
657	Eucalyptus marginata	566	6134009.45	567177.185	N	Na	Na	Na	Na		
658	Eucalyptus marginata	635	6133889.33	567179.992	N	Na	Na	Na	Na		
659	Eucalyptus marginata	686	6133868.98	567181.559	N	Na	Na	Na	Na		
660	Eucalyptus marginata	610	6133717.41	567183.328	N	Na	Na	Na	Na		
661	Corymbia calophylla	828	6134539.24	567914.037	N	Na	Na	Na	Na		
662	Corymbia calophylla	1005	6134529.9	567900.97	N	Na	Na	Na	Na		
663	Corymbia calophylla	539	6134530.54	567909.953	N	Na	Na	Na	Na		
664	Corymbia calophylla	505	6134530.04	567914.349	N	Na	Na	Na	Na		
665	Corymbia calophylla	548	6134533.59	567920.501	N	Na	Na	Na	Na		
666	Corymbia calophylla	551	6134535.98	567921.137	N	Na	Na	Na	Na		
667	Corymbia calophylla	526	6134540.77	567924.994	N	Na	Na	Na	Na		
668	Corymbia calophylla	607	6134542.77	567935.171	N	Na	Na	Na	Na		
669	Corymbia calophylla	514	6134536.44	567941.448	N	Na	Na	Na	Na		
670	Corymbia calophylla	773	6134525.65	567933.759	N	Na	Na	Na	Na		
671	Corymbia calophylla	646	6134502.68	567935.44	N	Na	Na	Na	Na		
672	Eucalyptus marginata	801	6134599.17	568342.655	Y	Trunk	28x30	Not currently occupied	Old nest remnants	Open hollow. Nest not this season	192
673	Allocasuarina fraseriana	589	6134565.49	568344.507	N	Na	Na	Na	Na		
674	Eucalyptus marginata	1057	6134526.85	568597.501	N	Na	Na	Na	Na	Small hollows forming in narrow upper brsnches	
675	Eucalyptus marginata	738	6134852.13	568621.931	Y	Trunk	9x8	Not currently occupied	Ravens	Large general hollow entrance. Main hollow inside is still quite shallow and narrow. Has good potential to form into a hollow suitable f	193
676	Eucalyptus marginata	961	6134976.57	568583.214	Y	Branch	26x18	Possum	Possum scratching	Scratching up to and into hollow; dead stag. Side entrance hollow; good size for cockato. Too unstable to climb	194
677	Eucalyptus marginata	1151	6134888.71	568454.984	Y	Branch	22x26	Not currently occupied	No scratching or chewing	Good potential cockatoo hollow	195
678	Eucalyptus marginata	785	6134855.71	568460.19	N	Na	Na	Na	Na		

Appendix G – Bushfire Management Plan



Albany Motorsport Park
Lot 5780 Down Road
Drome

Bushfire Management Plan

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TITLE

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CONTENTS

1. EXECUTIVE SUMMARY 1
2. INTRODUCTION 2
2.1. LOCATION 2
2.2. DEVELOPMENT PROPOSAL 3
2.3. STATUTORY FRAMEWORK 6
2.4. SUITABLY QUALIFIED BUSHFIRE CONSULTANT 7
3. OBJECTIVES 8
4. SPATIAL CONSIDERATION OF BUSHFIRE THREAT 9
4.1. CLIMATE 9
4.2. TOPOGRAPHY 9
4.3. ENVIRONMENTAL CONSIDERATION 9
4.4. BUSHFIRE FUELS – VEGETATION 10
5. BUSHFIRE ASSESSMENT OUTPUTS 12
5.1. BUSHFIRE HAZARD LEVEL MAPPING 12
5.2. POTENTIAL BUSHFIRE IMPACTS 12
5.3. METHOD 1 BAL CALCULATION 15
5.4. FIRE DANGER INDEX 16
5.5. SLOPE UNDER CLASSIFIED VEGETATION 16
5.6. AS3959 BAL ALLOCATION 16
6. IDENTIFICATION OF BUSHFIRE ISSUES PERTINENT TO THE AMP SITE 20
6.1. BUSHFIRE RISKS 20
6.2. WATER SOURCES FOR BUSHFIRE 21
6.3. INTERNAL FIRE SERVICE ACCESS AND FIREBREAK NETWORK 21
7. BUSHFIRE RISK ASSESSMENT – HIGH RISK LAND USE 23
8. VULNERABLE LAND USE AND ACCESS 25
8.1. ACCESS 25
8.2. BUSHFIRE EMERGENCY EVACUATION PLAN 25
8.3. BUSHFIRE EMERGENCY EVACUATION PLAN INPUTS 26
9. ASSESSMENT TO THE BUSHFIRE PROTECTION CRITERIA 29
9.1. BARRIER FENCING 34
9.2. FUEL REDUCTION STRATEGY 34
10. IMPLEMENTATION OF THE BMP 35
10.1. DEVELOPER RESPONSIBILITY 35
10.2. LOCAL GOVERNMENT RESPONSIBILITY 36
11. DISCLAIMER 37
12. CERTIFICATION 37
13. REFERENCES 38



LIST OF TABLES

Table 1: Bushfire protection criteria applicable to the site
Table 2: Classified Vegetation to AS3959
Table 3: Potential bushfire impacts (BHL)
Table 4: BAL ratings
Table 5: Summary of Risk Assessment AMP
Table 6: Bushfire protection criteria applicable to the site
Table 7: Vehicular Access Technical Requirements (WAPC, 2017)
Table 8: Implementation actions AMP
Table 9: Implementation Actions City of Albany

LIST OF FIGURES

Figure 1: Location Plan
Figure 2: AMP proposed Concept Plan (TBC)
Figure 3: OBRM Mapping
Figure 4: Vegetation Classes Summary
Figure 5: Bushfire Hazard Level Methodology
Figure 6: Pre-development BHL
Figure 7: Post development BHL
Figure 8: BAL Contour Plan (East)
Figure 9: BAL Contour Plan (West)
Figure 10: May 2018 Redmond Fire Scar and the subject site
Figure 11: Internal Access Plan
Figure 12: 10 kW/m^2 and 2 kW/m^2 locations

APPENDICES

Appendix 1: Draft Governance Model AMP
Appendix 2: Flora Survey Vegetation Complex mapping and Vegetation Condition Mapping (BDS, 2018)
Appendix 3: Vegetation classifications to AS3959
Appendix 4: Bore water supply test certificate
Appendix 5: Risk Assessment AMP
Appendix 6: OSH Policy and risk assessment template
Appendix 7: Access Options
Appendix 8: ELA Bushfire Emergency Evacuation Plan
Appendix 9: ELA Method 2 BAL Calculations
Appendix 10. WAPC APZ standards
Appendix 11: ELA peer review



1. Executive Summary

The City of Albany commissioned Bio Diverse Solutions and Eco Logical Australia to prepare a Bushfire Management Plan (BMP) for the proposed Albany Motorsport Park (AMP) at Lot 5780 Down Road, Drome WA 6330. The City of Albany Local Planning Scheme (LPS) No.1 outlines the area zoned as 'Priority Agriculture' and is located within the Drome Industrial Buffer Area. It is proposed through the Scheme Amendment Process to rezone the area to 'Special use' under LPS1.

This BMP has been prepared to assess the subject site against the current and endorsed Guidelines for Planning in Bushfire Prone Areas Vers 1.3 (WAPC, 2017) and State Planning Policy 3.7 (SPP 3.7; WAPC, 2015). Such planning takes into consideration standards and requirements specified in various documents such as Australian Standard (AS) 3959-2009, Western Australian Planning Commission (WAPC) Guidelines for Planning in Bushfire Prone Areas Vers 1.3 (WAPC, 2017) and SPP 3.7 (WAPC, 2015). These policies, plans and guidelines have been developed by WAPC to ensure uniformity to planning in designated "Bushfire Prone Areas" and consideration of the relevant bushfire hazards when identifying or investigating land for future development.

The concept plan outlines a multi-use development, the details of this plan will be finalised as part of the future Development Application, the plan includes:

- Motocross track and clubrooms;
- A multi-use 3.5km bitumen race track for race events such as for motor car racing, motorcycle racing, drifting, driver training and cycling;
- A 1000 foot drag strip for drag racing;
- A 1300m^2 burnout area;
- A function building and club rooms;
- Spectator viewing areas;
- Pit marshalling areas and storage sheds;
- Site parking; and
- An off-road four-wheel drive and all-terrain vehicle training area.

The staging of the development of the AMP includes a 2 staged process:

Stage 1: Development of the motocross track in the north of the site, development of the multiuse track for state motor car, motorcycle and cycling events; and enabling works such as feasibility, planning, design works and access roads.

Stage 2: Contemplate the further development of the AMP site as patronage increases and the range of uses in broadened (e.g. lighted evening events, international events) and is dependent on further funding. (GHD, 2018)

The proposed Motorsport Park is located in a Bushfire Prone Area (SLIP, 2018) and as such triggers compliance with requirements of State Planning Policy 3.7 – Planning in Bushfire Prone Areas (SPP 3.7). The proposed scheme amendment is considered a 'Strategic Planning Proposal' under SPP 3.7 and must be accompanied by a Bushfire Hazard Level (BHL) Assessment and demonstrate compliance with bushfire protection criteria in the form of a BMP. The BMP is to provide sufficient evidence that the rezoning proposal has, or can be made to have a low to moderate Bushfire Hazard Level.

The external bushfire risks to the site are the continuous remnant vegetation and plantations located to the west and north west, east, north and south east. The creek central to the subject site drains to the south west and risks of bushfire in this direction is also evident. Remnant vegetation located internal to the subject site in the west was burnt in the recent May 2018 bushfires. The external remnant forest areas (including plantations) present Extreme Bushfire Hazard levels (as defined by WAPC) to the AMP development. To the south and east of the site is predominantly farmland areas grazed by cattle which present moderate BHL risks.

The subject site was assessed as having internal areas of Forest Type A, Woodland Type B, Grassland Type G, Shrubland Type C and Scrub Type D. Bushfire Hazard Level (BHL) Mapping has allocated extreme,

moderate and low hazard level across the site with the post development BHL moderate or low in development areas of the AMP.

BAL contouring across the subject site has allocated BAL ratings of BAL-29 or less applies to buildings within the proposed concept plan. All internal woodland and grassland areas (previously grazed paddocks) will be managed and maintained in low fuel state (slashed/mowed to <100mm for grasses and trees to WAPC APZ standards) and documented through the Operational Management Plan (OMP) prior to the AMP operating.

To mitigate bushfire risks to the site the following parameters are to be employed:

- Fuel hazard reduction burning in the internal western remnant bushland (rotation 8-10 years and governed by CoA Emergency services priorities and resources). Refer to Section 9.2 of this report.
- Excluding bushfire from the central creek area to reduce the risk of peat fires on the subject site (no planned burning, mineral earth firebreaks, low fuel buffers).
- Reducing risks of ignition from the motorsport events (internal) as outlined in Section 7 of this report.
- Reducing risk of ignition from external sources through liaison with neighbours and consultation with the Local Bushfire Brigade (Highway Brigade located 5km away near Albany Airport).
- Modifying and maintaining the existing internal areas of Grassland Type G and Woodland Type B to a low fuel state at all times (as per WAPC Standards).
- Traffic control during events to ensure safe and timely evacuation of personnel from the site in event of bushfire.
- Consideration of purchase of fast attack light unit for the AMP site and to be placed adjacent to any practise areas (non-event days).
- Event days will have full fire safety crews, ambulance and safety personnel strategically located around the track.
- Documentation of control measures in the OMP as outlined in this BMP report for the site.
- Lease arrangements from the CoA to the AMP controlling body to define management controls of the development site as defined in the implementation table Section 10 of this report.

Consultation with Department of Fire and Emergency Services (DFES) and Department of Planning, Lands and Heritage (DPLH) confirmed that they deemed the AMP to be a “High risk” land use. SPP 3.7 outlines that certain land uses may potentially ignite a bushfire, prolong its duration or increase its intensity. Such land uses are defined as ‘High Risk’. The proposed Albany Motorsport Park (AMP) is defined a high-risk industry due to:

- Motorsport activities giving rise to risk of ignition and bushfire; and
- Exposure of the community, fire fighters and environment to dangerous substances from vehicles igniting.

A summary of recommendations from the brief risk assessment process includes:

- A detailed Operational Management Plan (OMP) to be developed by AMP which includes risk assessments (refer to example Appendix 5) as per Confederation of Australian Motor Sport (CAMS) policy and regulations to ensure there are actions to minimize risks of ignition from internal sources of the park.
- The OMP will be reviewed and endorsed by the CAMS prior to operation of the Albany Motorsport Park.
- Restricting public access through the site to spectator viewing areas and competitor areas, access around the whole of the site is restricted to emergency and safety services.
- Practice days and non-events are to be controlled and regulated by AMP and documented in the OMP for the site.
- Hazard reduction burning only occurs in the western remnant vegetation block, restrictions of fire in central creek area (peat fire risk) through 8m firebreak at edge of fencing of remnant vegetation (restrict grass fires passing into remnant vegetation).
- Controlled re-fueling of vehicles in designated areas, documented in OMP.

- Observing and complying with "Total fire ban days" and "Vehicle movement restrictions/bans" as set by LGA.
- No events held during Catastrophic Fire Danger Rating (FDR) days.

It is noted that although designated as a High-risk industry through the definition of SPP 3.7, the controls and management procedures implemented through the risk management process will reduce the risks of the AMP. The proposed uses associated with the AMP will be controlled and governed through:

- Designed to comply with CAMS' Track Operator's Safety Guide (CAMS 2012) and Motorcycling Australia (MA) Track Guidelines (MA 2011).
- To be licensed by CAMS for Fédération Internationalé de l'Automobile (FIA) Grade 2 and Fédération Internationalé Motocyclisme (FIM) Grade B (i.e. up to second-tier international motor racing).
- Motocross track designed and constructed in association with Motocross Australia guidelines.
- Drag strip designed and constructed in accordance with FIA specifications for drag strips and in association with Australian National Drag Racing Association (ANDRA).

Consideration of the High-risk nature of the AMP site is an ongoing process to be refined in future stages of the development approval process and to be addressed under a Bushfire Risk Management Plan (BRMP) if required or requested from the approving agency.

The proposal is defined as 'Vulnerable Land Use' (as per SPP 3.7) due to:

- Large numbers of people attending the AMP events (400-500 people club events, 10,000 people state events);
- Elderly demographic, children and mobility impaired people attending the AMP events;
- Presence of a function centre and clubrooms; and
- Site evacuation challenges associated with visitors and spectators on site.

Access internal the site will be provided in alternative directions to separate destinations to Down Road to the north and Down Road South. Multiple gates will also facilitate access/egress from the site on the north and eastern boundaries. Down Road is essentially a long cul-de-sac (dead end road terminating to the north west of the subject site), as is Down South Road (terminating to the south of the subject site). The surrounding public road network is a legacy to previous precinct planning and development approvals. During the preparation of this BMP report four access options were investigated to the north, west, and south.

The most favourable option for an Emergency Access Way (EAW) is to link Down Road South and Albany Highway. It is to be constructed to enable a secondary access/egress for the AMP site. Consultation undertaken by CoA during the preparation of this BMP has sought verbal in-principle agreement for the linking EAW by Main Roads Western Australia (MRWA), Water Corporation Western Australia (WCWA) (landowner), and Lindsay Black (landowner). This will be gazetted as an easement in gross to allow for emergency access/egress in a bushfire event. This will give the AMP an alternative access route, which presently does not exist. The alternative access for the whole of the precinct has not been investigated for the preparation of this report and the CoA have indicated this would be investigated during a future Structure Plan process for the whole of the precinct. The EAW will be an easement in gross to a minimum of 12m wide and measures 4.38km which does not meet the Acceptable Solutions (WAPC, 2017) and therefore has been assessed as non-compliant.

A Bushfire Emergency Evacuation Plan (BEEP) has been prepared to support this development and provides contingency actions in accordance with the requirements of the *Draft Position Statement: Tourism land uses within bushfire prone areas* (WAPC, 2018). These contingencies include early closure of the site, off-site evacuation and as a last resort, refuge on site in a suitable building / open space.

The aim of the BEEP is early, safe and timely evacuation of the site prior to bushfire events and no events held on site during Catastrophic Fire Danger Rating (FDR) days (i.e. consider evening events, "Total Fire Ban" days and "Restricted vehicle movement days" (harvest bans). Contingency planning for evacuation is via an on-site open-air refuge (located in an area subject to a radiant heat flux of ≤2 kW/m^2) for large events and clubroom buildings built to the ABCB handbook (ABCB, 2014) and BAL-29 (located in an area subject to a

radiant heat flux of ≤10 kW/m^2). This is compliant with the WAPC *Draft Position Statement: Tourism land uses within bushfire prone areas* (WAPC, 2018). The BEEP will form part of the Emergency Management Plan for the site which will be developed by AMP prior to operations of the site.

An assessment to the WAPC Guidelines for Planning in Bushfire Prone Areas Vers 1.3, (WAPC,2017) bushfire protection criteria is summarised in Table 1 over the page.

Table 1: Bushfire protection criteria applicable to the site

Element	Acceptable Solution	Applicable or not Yes/No	Meets Acceptable Solution
Element 1 – Location	A1.1 Development Location	Yes	Compliant. BAL 29 or less applied to development footprint, Low to Moderate BHL post development.
Element 2 – Siting and Design	A2.1 Asset Protection Zone	Yes	Compliant. APZ applies to whole of development area to WAPC guidelines and contained within the subject site.
Element 3 – Vehicular Access	A3.1 Two Access Routes	Yes	Internal compliant, external non-compliant. Two access to 2 destinations addressed using BEEP as per WAPC *Draft Position Statement: Tourism land uses within bushfire prone areas* (WAPC, 2018).
	A3.2 Public Road	No	Not assessed existing public road network to be used.
	A3.3 Cul-de-sacs	No	N/A
	A3.4 Battle axes	No	N/A
	A3.5 Private driveways	Yes	Compliant, all internal access to 6m pavement with 12m horizontal clearance.
	A3.6 Emergency Access Ways	Yes	Non-compliant external alternative emergency access via easement in gross 4.38km from site to Albany Highway, via a performance-based assessment.
	A3.7 Fire Service Access Ways	Yes	All internal FSAs to 8m width and linking around the subject site.
	A3.8 Firebreaks	Yes	All firebreaks to CoA FMN or to 8m as defined in report.
Element 4 – Water	A4.1 Reticulated areas	No	N/A
	A4.2 Non-reticulated areas	Yes	Compliant, Bore and Tank supply internal to the site.
	A4.3 Individual lots in non-reticulated areas	No	N/A

The City of Albany is presently pursuing the purchase of Lot 5780 Down Road Drome. Once purchased, the property, tracks and all permanent facilities and infrastructure constructed on the property will be owned by the City of Albany. The Albany Motorsport Park (AMP) will then be leased to an operator-manager by the City of Albany, with all operational and maintenance activities to be conducted by the operator-manager. Responsibilities for implementation are documented in Section 10 of this report and outlines responsibilities for the AMP Developer (occupiers of the development area) and the City of Albany as land managers. Measures outlined in this report are to be implemented in subsequent stages of planning and development.

2. Introduction

The City of Albany commissioned Bio Diverse Solutions in consultation with Eco Logical Australia to prepare a Bushfire Management Plan (BMP) for the proposed Albany Motorsport Park at Lot 5780 Down Road, Drome WA 6330. This BMP has been prepared to assess the subject site against the current and endorsed Guidelines for Planning in Bushfire Prone Areas Vers 1.3 (WAPC, 2017) and State Planning Policy 3.7 (SPP 3.7; WAPC, 2015). Such planning takes into consideration standards and requirements specified in various documents such as Australian Standard (AS) 3959-2009, Western Australian Planning Commission (WAPC) Guidelines for Planning in Bushfire Prone Areas Vers 1.3 (WAPC, 2017) and SPP 3.7 (WAPC, 2015). These policies, plans and guidelines have been developed by WAPC to ensure uniformity to planning in designated "Bushfire Prone Areas" and consideration of the relevant bushfire hazards when identifying or investigating land for future development.

Consultation with Department of Fire and Emergency Services (DFES) and Department of Planning, Lands and Heritage (DPLH) confirmed that they deemed the AMP to be a "High risk". SPP 3.7 outlines that certain land uses may potentially ignite a bushfire, prolong its duration or increase its intensity. Such land uses are defined as 'High Risk'.

The proposed Albany Motorsport Park (AMP) is defined a high-risk industry as per SPP 3.7 due to:

- Motorsport activities giving rise to risk of ignition and bushfire; and
- Exposure of the community, fire fighters and environment to dangerous substances from vehicles igniting.

Consideration of the High-risk nature of the AMP site is an ongoing process to be refined in future stages of the development approval process and to be addressed under a Bushfire Risk Management Plan (BRMP) if required

The proposal is defined as 'Vulnerable Land Use' (as per SPP 3.7) due to:

- Large numbers of people attending the AMP events (400-500 people club events, 10,000 people state events);
- Elderly demographic, children and mobility impaired people attending the AMP events;
- Presence of a function centre and clubrooms; and
- Site evacuation challenges associated with visitors and spectators on site.

The BEEP prepared to support this development provides contingency actions in accordance with the requirements of the *Draft Position Statement: Tourism land uses within bushfire prone areas* (WAPC, 2018). These contingencies include early closure of the site, off-site evacuation and as a last resort, refuge on site in a suitable building / open space. Eco Logical Australia has been engaged to provide Level 3 BPAD practitioners input into the BMP and prepare the Bushfire Emergency Evacuation Plan (BEEP) for the site.

2.1. Location

The "Subject Site" is defined as Lot 5780 Down Road, in the locality of Drome, refer to Figure 1. The development location of the proposed Albany Motorsport Park is the open paddock areas of Lot 5780, refer to current "Concept Plan' Figure 2. The subject site is located 31 km from the Albany CBD in the Drome Industrial zone and is approximately 192.20ha in size. The site is currently used for agricultural pursuits (grazing of cattle).



Figure 1: Location Plan

2.2. Development Proposal

Lot 5780 Down Road, Drome is the proposed Albany Motorsport Park site. The concept plan covers approximately 142.8ha of the site as shown in Figure 2 and outlines a multi-use development. The details of this plan will be finalised as part of the future Development Application, the plan includes:

- Motocross track and clubrooms;
- A multi-use 3.5km bitumen race track for race events such as for motor car racing, motorcycle racing, drifting, driver training and cycling;
- A 1000 foot drag strip for drag racing;
- A 1300m^2 burnout area;
- A function building and club rooms;
- Spectator viewing areas;
- Pit marshalling areas and storage sheds;
- Site parking; and
- An off-road four wheel drive and all-terrain vehicle training area.

The staging of the development of the AMP includes a 2 staged process:

Stage 1: Development of the motocross track development in the north of the site, development of the multiuse track for state motor car, motorcycle and cycling events; and enabling works such as feasibility, planning, design works and access roads.

Stage 2: Contemplate the further development of the AMP site as patronage increases and the range of uses in broadened (e.g. lighted evening events, international events) and is dependent on further funding. (GHD, 2018).

The City of Albany Local Planning Scheme (LPS) No.1 outlines the area zoned as 'Priority Agriculture' and is located within the Drome Industrial Buffer Area. It is proposed through the Scheme Amendment Process to rezone the area to 'Special use' under LPS1. The proposed Motorsport Park is located in a Bushfire Prone Area (SLIP, 2018) and as such is required to comply with requirements of State Planning Policy 3.7 – Planning in Bushfire Prone Areas (SPP 3.7). The proposed scheme amendment is considered a 'Strategic Planning Proposal' under SPP 3.7 and must be accompanied by a Bushfire Hazard Level (BHL) Assessment, demonstrate compliance with bushfire protection criteria in the form of a BMP. The BMP is to provide sufficient evidence that the rezoning proposal has, or can be made to have a low to moderate Bushfire Hazard Level.

The proposed Motorsport Park is also classified according to SPP 3.7 as 'High Risk' and 'Vulnerable Land Use' and therefore in accordance with SPP 3.7 requires the consultation of a Level 3 BPAD Accredited Bushfire Practitioner. Eco Logical Australia has been engaged to provide Level 3 BPAD practitioner input into the BMP and prepare a Bushfire Emergency Evacuation Plan (BEEP).

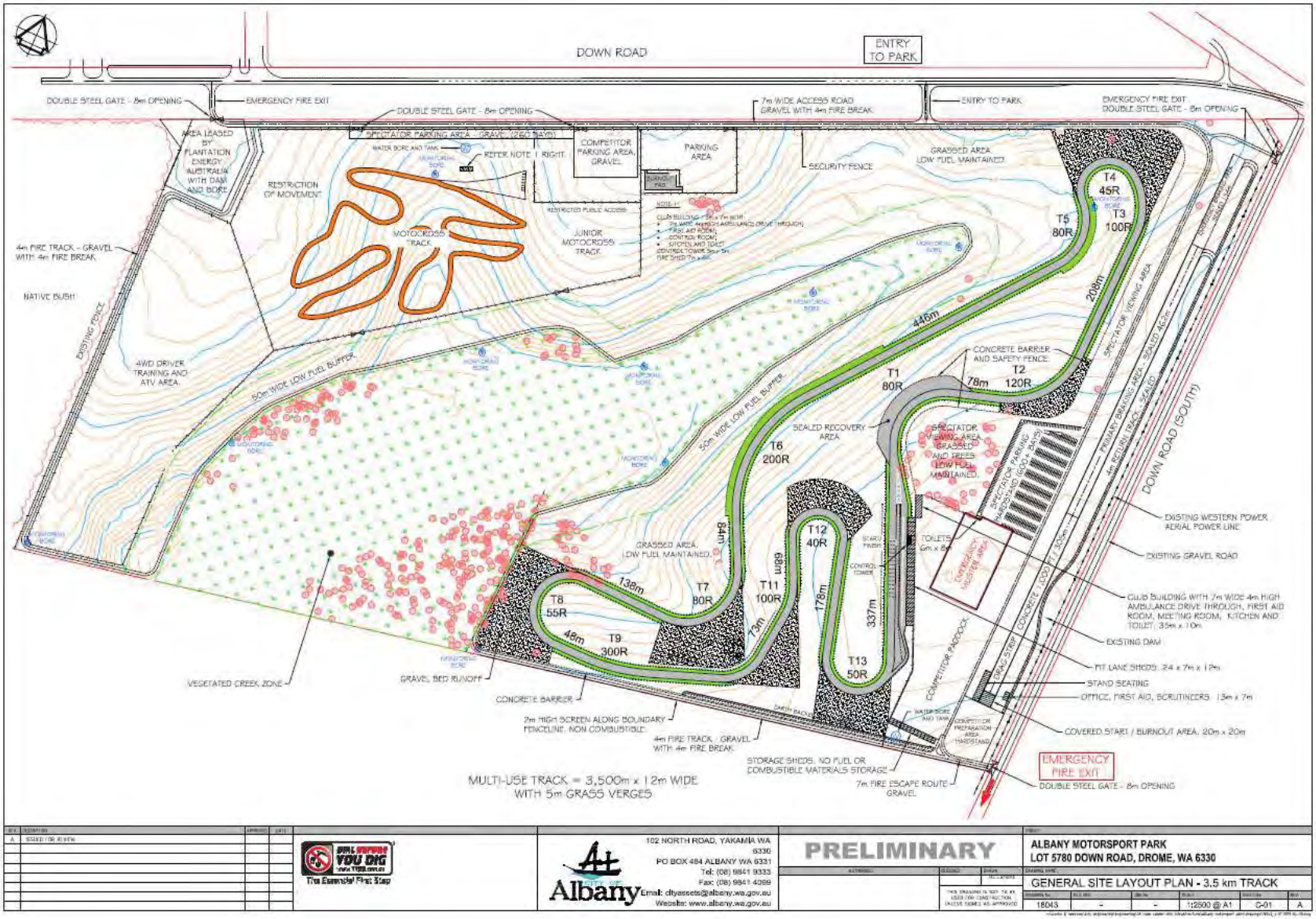


Figure 2: AMP General Site Layout Plan (Concept Plan)

2.3. Statutory Framework

This document and the recommendations contained within are aligned to the following policy and guidelines:

- *Planning and Development Act 2005*;
- *Planning and Development Regulations 2009;*
- *Planning and Development (Local Planning Scheme) Regulations 2015;*
- State Planning Policy 3.7 Planning in Bushfire Prone Areas;
- Guidelines for Planning in Bushfire Prone Areas;
- *Fire and Emergency Services Act 1998*.
- AS 3959-2009 "Construction of Buildings in Bushfire Prone Areas" current and endorsed standards;
- *Bushfires Act 1954*;
- *Draft Position Statement: Tourism land uses within bushfire prone areas* (WAPC, 2018); and
- City of Albany Annual Fire Management Notice.

The publicly released Bushfire Prone Area Mapping (SLIP, 2018) shows that the Subject Site is located within a Bushfire Prone Area (situated within 100m of >1 ha of bushfire prone vegetation). The WA Bushfire Prone Area Mapping is shown on Figure 3.



Figure 3: Bushfire Prone Area Mapping (SLIP, 2018)

2.4. Suitably Qualified Bushfire Consultant

This BMP has been prepared by Kathryn Kinnear (nee White), who has 10 years operational fire experience with the (formerly) DEC (1995-2005) and has the following accreditation in bushfire management:

- Incident Control Systems;
- Operations Officer;
- Prescribed Burning Operations;
- Fire and Incident Operations;
- Wildfire Suppression 1, 2 & 3;
- Structural Modules – Hydrants and hoses, Introduction to Structural Fires, and Fire extinguishers; and
- Ground Controller.

Kathryn Kinnear currently has the following tertiary Qualifications:

- BAS Technology Studies & Environmental Management;
- Diploma Business Studies; and
- Graduate Diploma in Environmental Management.

Kathryn Kinnear is an accredited Level 2 Bushfire Practitioner (Accreditation No: BPAD30794). Bio Diverse Solutions are Bronze Corporate Members of the Fire Protection Australia Association and Kathryn is a suitably qualified Bushfire Practitioner to prepare this Bushfire Management Plan.

Level 3 Bushfire Practitioner Bruce Horkings (Eco Logical Australia, FPAA BPAD 29962-L3) and Daniel Panickar (Eco Logical Australia, FPAA BPAD 37802-L2) were commissioned to assist in the preparation of this report specifically in relation to the “High Risk Industry” (as defined by SPP3.7) nature of the proposal, prepare the performance based assessment for “Vulnerable Land use”, to prepare the Bushfire Emergency Evacuation Plan (BEEP), and undertake a technical peer review of the BMP report.

3. Objectives

The objectives of this BMP are to assess the bushfire risks associated with the proposed Concept Plan to reduce the occurrence of, and minimise the impact of bushfires, thereby reducing the threat to life, property and the environment. It also aims to guide the design by assessing the proposed Concept Plan against the Bushfire Protection Criteria as outlined in the Guidelines.

The BMP aims to:

- Achieve consistency with objectives and policy measures of SPP 3.7 (WAPC, 2015);
- Assess any building requirements to AS3959 (current and endorsed standards) and BAL Construction;
- Assess the proposal as a “High Risk Industry” and Vulnerable Land use” as outlined in the Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017);
- Assess the proposal against the Bushfire Protection Criteria Acceptable Solutions as outlined in the Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017);
- Understand and document the extent of the bushfire risk to the subject site;
- Prepare bushfire risk management measures for bushfire management of all land within the subject site with due regard to people, property, infrastructure and the environment;
- Nominate individuals and organisations responsible for implementation of fire management and associated works within the subject site; and
- Ensure alignment to the recommended assessment procedure which evaluates the effectiveness and impact of proposed, as well as existing, bushfire risk management measures and strategies.

4. Spatial consideration of bushfire threat

4.1. Climate

The Albany area is characterised by a Mediterranean climate with mild wet winters and mild to hot dry summers. The average annual temperature in Albany ranges from 11.8 – 19.5°C. The average summer temperature range between 14-22.9°C, whilst average winter temperatures range between 8.2-15.8°C. The annual mean rainfall for Albany is 927.1mm (BOM, 2019).

4.2. Topography

The subject site has an undulating topography within the existing agricultural areas, sloping from a high point of 75m AHD along the eastern boundary to 40m AHD within the creek line (east - west). It then ascends to 70m AHD in a north westerly direction towards Down Road. The remnant vegetation block to the west slopes in a north-south / north-south westerly direction from 70m AHD from the northern boundary to 30m AHD to the southern boundary. Topographic contours (5 metre contours) are shown on Figure 4.

The effective slopes (measured as per AS3959) for the subject site are generally low in the central (creek line), eastern and some northern (grassland) areas ranging from 0.4 to 4.6 degrees downslope. The effective slope in the western grassland areas ranges from 5.1 to 6.5 degrees downslope. The effective slopes in the remnant vegetation in the west range from upslope in the south eastern and north eastern corners to downslope from 2 degrees to 14.3 degrees downslope. The effective slopes for the Subject Site and surrounding areas are shown on Figure 4.

4.3. Environmental consideration

A reconnaissance flora, vegetation and Level 1 fauna survey was undertaken in spring 2018 by Bio Diverse Solutions (Bio Diverse Solutions, 2018) and identified six vegetation types across the subject site; Jarrah/Marri/Sheoak Laterite Forest, Jarrah/Sheoak/*Eucalyptus staeri* Sandy Woodland, *Homalospermum firmum/Callistemon glaucus* Peat Thicket, *Melaleuca preissiana* Low Woodland, Miscellaneous Drainage Woodland/Shrubland and Open paddock / agricultural land including bare and sand extraction areas. Of the 141 flora species recorded within the survey area, 19 (12.7%) are introduced (weeds).

The vegetation types described above align with vegetation units described in the Albany Regional Vegetation Survey (ARVS) report by Sandiford and Barret (2010). The vegetation types / wildlife habitat present within the survey area are well represented locally and in nearby reserves. The Jarrah / Marri dominated woodland and forest present are one of the most abundant habitat types present within the ARVS survey area, providing a significant proportion of wildlife habitat. The *Homalospermum* and *Callistemon* dominated thickets present within the survey area are not as common at a regional level based on ARVS mapping. However, these habitat types are well represented in surrounding remnant vegetation and nearby reserves such as the Down Road Nature Reserve. A copy of the vegetation complex mapping and vegetation condition mapping is provided in Appendix 2.

Potential habitat for threatened species within the survey area includes all remnant vegetation within the site, the creek system and the larger stands of paddock trees throughout the paddock areas. There is a high level of fauna activity in vegetation surrounding the creek line from both threatened and non-threatened fauna species as well as the highest occurrence of significant trees that contain hollows. This indicates that the area contains highly attractive habitat for fauna.

The southern pocket of Jarrah / Marri remnant vegetation had the highest occurrences of *Calyptorhynchus banksii subsp. naso* (Red Tailed Black Cockatoo) and *Calyptorhynchus baudinii* (Baudin's Black Cockatoo), feeding signs. The majority of feeding evidence consisted of *Corymbia calophylla* nuts. As the number of significant Black Cockatoo feeding sites across the survey area was relatively low this indicates that although the site contains potential high value foraging habitat for the three species it is currently not a favoured feeding area. The presence of significant feeding signs in the remnant vegetation in the south appears to indicate this area is anecdotally more attractive for food than the other vegetated areas.

Assessment of the proposal by governing environmental agencies will occur through the Scheme Amendment process with referral under the WA *Environmental Protection Act* (*EPA Act)*.

4.4. Bushfire fuels – Vegetation

Site assessment occurred on the 14th February 2019 by Kathryn Kinnear (BPAD 30794). All vegetation within 150m of the site / proposed development was classified in accordance with Clause 2.2.3 of AS 3959-2009. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified in Appendix 3 and shown on the Vegetation Classes Map Figure 4. A summary of the vegetation classifications and plot data is provided in Table 2.

Table 2: Classified Vegetation to AS3959

Plot Number	Vegetation Classification Table 2.3 AS3959	Effective Slope AS3959	Location on Vegetation Classes Mapping
1	Low fuel or non-vegetated areas exclusion 2.2.3.2 (e)	N/A	North of subject site in APEC and Plantation Energy site, roads and buildings
2	Low fuel or non-vegetated areas Exc 2.2.3.2 (f)	N/A	Firebreaks internal t the site, adjacent private property areas maintained in a low fuel state.
3	Forest Type A (04)	Upslope	Internal to the site in north west, external to the north, east and south
4	Forest Type A (04)	Downslope >0-5 degrees	Internal to the site to the west and central creek area. External to the south and south east.
5	Forest Type A (04)	Downslope >10-15 degrees	External to the site to the west and north west. Internal along western ridgeline.
6	Grassland Type G (26)	Downslope >5-10 degrees	Internal to the site in the west.
7	Grassland Type G (26)	Downslope >0-5 degrees	Internal to the site in the north, east and north east. External to the south east.
8	Grassland Type G (26)	Upslope	Internal to the site in the north and south east. External to the north, north east and
9	Woodland Type B (06)	Upslope	Internal to the site in the east in grazed paddock areas, external to the north.
10	Woodland Type B (06)	Downslope >0 to 5 degrees	Internal to the site adjacent in the east in grazed paddock areas.
11	Woodland Type B (06)	Downslope >5 to 10 degrees	Internal adjacent to central creek area (central to the site). External to the south east.
12	Shrubland Type C (12)	Downslope >0 to 5 degrees	Central creek areas in the north east.
13	Scrub Type D (13)	Downslope >0 to 5 degrees	Central creek areas in the subject site and in the south west internal and external to the site in wet areas.
14	Scrub Type D (13)	Upslope	External to the site near Down Road and Down South Road, east in property.

Plot 1 and 2 is allocated exclusion Clauses 2.2.3.2 of AS3959 and therefore does not have an effective slope allocation.

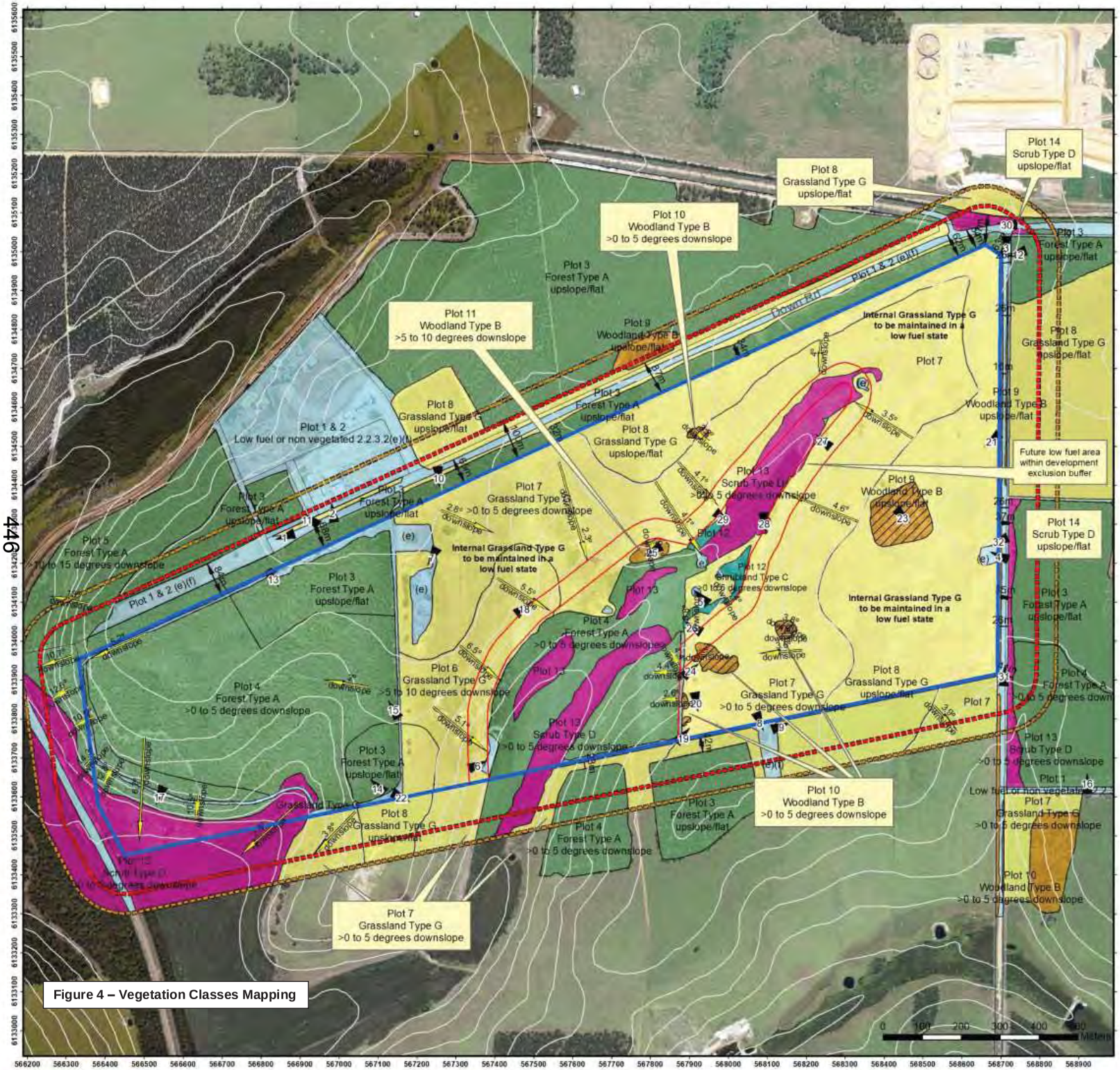


Figure 4 – Vegetation Classes Mapping

This BAL Plan was prepared by:
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Jurisdiction: Level 2 - WA

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Overview Map Scale 1:100,000

Legend

- Subject Site
- 100m Assessment Boundary
- 150m Assessment Boundary
- Cadastre
- 5m Contours
- Low Fuel Buffer
- Future Low Fuel
- Separation Distance
- Slope Degrees

Vegetation

- Forest Type A
- Woodland Type B
- Shrubland Type C
- Scrub Type D
- Grassland Type G
- Low fuel or non vegetated 2.2.3.2

Scale
1:9,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
Lot 5780 Down Road
Drome, WA 6330

Vegetation Classes

BAL Assessor	QA Check	Drawn by
KK	KK	BT
STATUS	FILE	DATE
FINAL	COA0020	10/05/2019

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5. Bushfire Assessment Outputs

5.1. Bushfire Hazard Level Mapping

The BHL process provides an indication of the likely impact of a bushfire event as it interacts with the bushfire hazards within and adjacent to the site. The BHL is a measure of the likely intensity of a bushfire and the likely level of bushfire attack on a site by categorizing the hazard (WAPC, 2017). The allocation of category of the bushfire hazard is determined as per Table 3 of the Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017). Refer to Figure 5 below.

Table 3: BHL and classified vegetation (as per AS-3959)

HAZARD LEVEL	CHARACTERISTICS
Extreme	• Class A: Forest • Class B: Woodland (05) • Class D: Scrub • Any classified vegetation with a greater than 10 degree slope
Moderate	• Class B: Open woodland (06), Low woodland (07), Low open woodland (08), Open shrubland (09)* • Class C: Shrubland • Class E: Mallee/Mulga • Class G: Grassland, including sown pasture and crops • Vegetation that has a low hazard level but is within 100 metres of vegetation classified as a moderate or extreme hazard, is to adopt a moderate hazard level.
Low	• Low threat vegetation may include areas of maintained lawns, golf courses, public recreation reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks. • Managed grassland in a minimal fuel condition (insufficient fuel is available to significantly increase the severity of the bushfire attack). For example, short-cropped grass to a nominal height of 100 millimetres. • Non-vegetated areas including waterways, roads, footpaths, buildings and rock outcrops.

Figure 5: BHL Assessment allocation of category (WAPC, 2017).

5.2. Potential Bushfire Impacts

The potential bushfire impact to the site / proposed development from each of the identified vegetation plots are identified below and shown on the Bushfire Hazard Assessment Mapping Figure 6 Pre-Development BHL, and Figure 7 Post Development BHL.

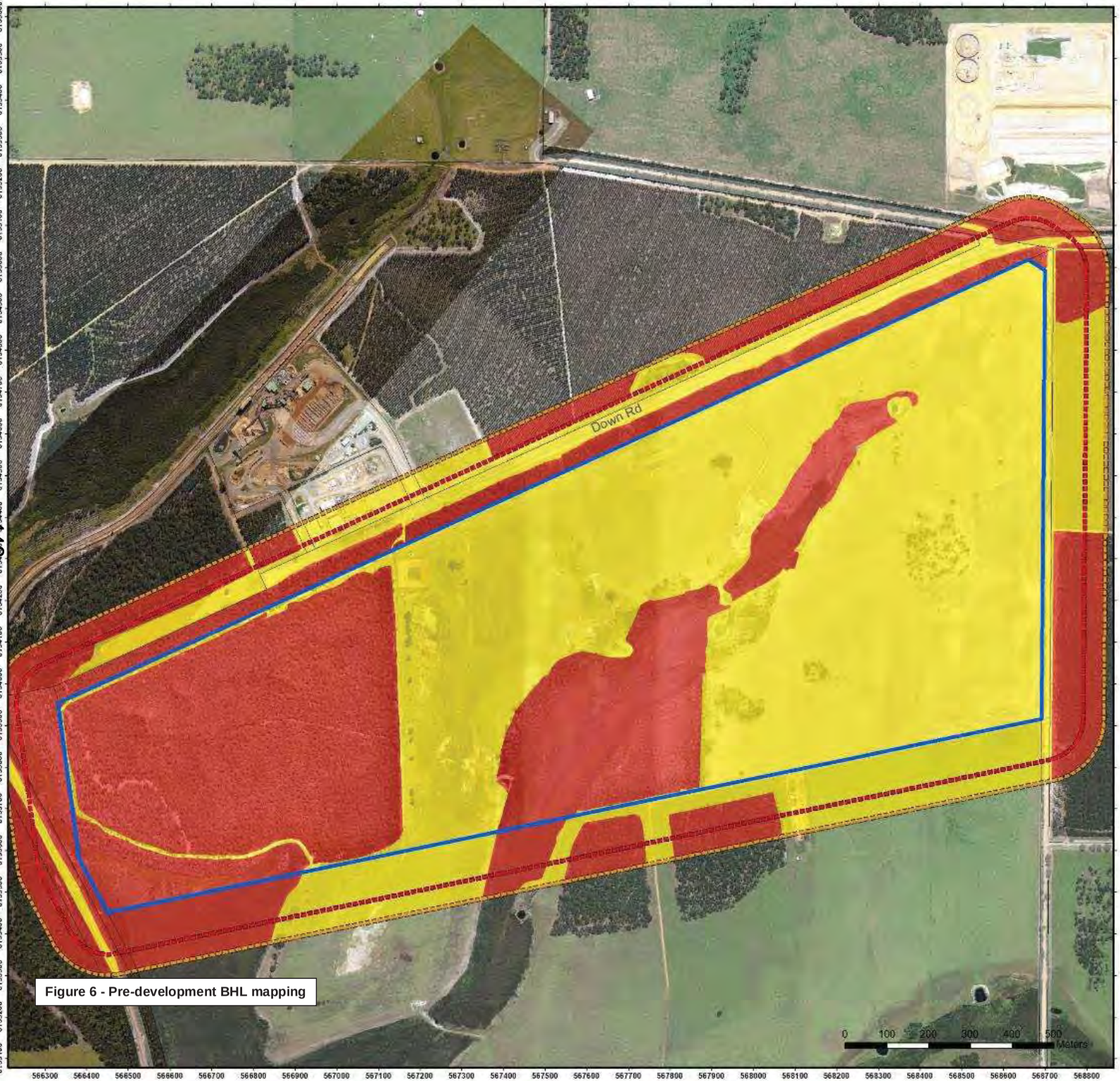


Figure 6 - Pre-development BHL mapping

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Overview Map Scale 1:250,000

Legend

- Subject Site
- 100m Assessment Boundary
- 150m Assessment Boundary
- Cadastre

Bushfire Hazard Level

- Extreme
- Moderate
- Low

Scale
1:9,000 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
Lot 5780 Down Road
Drome, WA 6330

BHL - Pre Development

BAL Assessor	QA Check	Drawn by
KK	KK	BT
STATUS	**FILE**	**DATE**
FINAL	COA0020	10/05/2019

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Figure 7 - Post development BHL mapping

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Overview Map Scale 1:250,000

Legend

- Subject Site
- 100m Assessment Boundary
- 150m Assessment Boundary
- Cadastre
- Low Fuel Buffer

Bushfire Hazard Level

- Extreme
- Moderate
- Low

Scale
1:9,000 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
Lot 5780 Down Road
Drome, WA 6330

BHL - Post Development

BAL Assessor	QA Check	Drawn by
KK	KK	BT
STATUS	**FILE**	**DATE**
FINAL	COA0020	10/05/2019

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Table 3: Potential bushfire impacts (BHL)

Plot number	Vegetation Type (Table 2.3)	Effective Slope (Table 2.4.3)	BHL Pre Development	BHL Post Development
1	Low fuel or non-vegetated areas exclusion 2.2.3.2 (e)	N/A	Moderate	Moderate
2	Low fuel or non-vegetated areas exclusion 2.2.3.2 (f)	N/A	Moderate	Moderate
3	Forest Type A	Upslope	Extreme	Extreme
4	Forest Type A	Downslope >0 to 5 degrees	Extreme	Extreme
5	Forest Type A	Downslope >15 to 20 degrees	Extreme	Extreme
6	Grassland Type G	Downslope >5 to 10 degrees	Moderate	Moderate / Low
7	Grassland Type G	Downslope >0 to 5 degrees	Moderate	Moderate / Low
8	Grassland Type G	Upslope	Moderate	Moderate / Low
9	Woodland Type B (06)	Upslope	Moderate	Moderate / Low
10	Woodland Type B (06)	Downslope >0 to 5 degrees	Moderate	Moderate / Low
11	Woodland Type B (06)	Downslope >5 to 10 degrees	Moderate	Moderate
12	Shrubland Type C	Downslope >0 to 5 degrees	Moderate	Moderate
13	Scrub Type D	Downslope >0 to 5 degrees	Extreme	Extreme
14	Scrub Type D	Upslope	Extreme	Extreme

Notes on BHL Assessment:

- The BHL assessment was prepared by an Accredited Level 2 Bushfire Planning Practitioner (BPAD30794);
- The BHL Assessment and BHL Map has been prepared in accordance with Department of Planning (WAPC) Guidelines for Planning in Bushfire Prone Areas Version 1.3 (WAPC, 2017) Appendix 2; and
- Subject Site is located in a Bushfire Prone Area (SLIP, 2018).

5.3. Method 1 BAL Calculation

A Method 1 BAL calculation (in the form of BAL contours) has been completed for the proposed development in accordance with AS 3959-2009 methodology. The BAL rating gives an indication of the level of bushfire attack (i.e. the radiant heat flux) that may be received by proposed buildings and subsequently informs the standard of building construction required to increase building tolerance to potentially withstand such impacts in line with the assessed BAL. The Bushfire Attack Level (BAL) has been calculated using the Method 1 procedure as outlined in AS3959. This incorporates the following factors:

- WA adopted Fire Danger Index (FDI);
- Vegetation Classes;
- Slope under classified vegetation; and
- Distance between proposed development site and classified vegetation.

The outcomes of the above inputs then allocate a specified BAL construction/setback for proposed buildings.

5.4. Fire Danger Index

The Western Australian adopted FDI is 80 as outlined in AS3959 and endorsed by Australasian Fire and Emergency Services Authorities Council. The FDI input for this project is also therefore 80.

5.5. Slope under Classified Vegetation

Slope under classifiable vegetation (Effective Slope) was assessed in accordance with Section 2.2.5 of AS3959. Table 2 summarises the slopes assigned to each plot of classifiable vegetation for the BAL calculation.

5.6. AS 3959 BAL Allocation

The assessed BAL ratings for the development are depicted as BAL contours, BAL ratings for the subject site are presented in Table 3 with BAL Contours shown on Figures 8 and 9. All proposed buildings will be located in areas subject to a BAL rating of BAL-29 or lower.

Table 4: BAL ratings

Plot number	Vegetation Type	Effective Slope	Applicable BAL Rating to AMP Concept Plan
1	Low fuel or non-vegetated areas exclusion 2.2.3.2 (e)	N/A	BAL-LOW
2	Low fuel or non-vegetated areas exclusion 2.2.3.2 (f)	N/A	BAL-LOW
3	Forest Type A	Upslope	BAL-29 or less can apply.
4	Forest Type A	Downslope >0 to 5 degrees	BAL-29 or less can apply.
5	Forest Type A	Downslope >15 to 20 degrees	BAL-29 or less can apply.
6	Grassland Type G	Downslope >5 to 10 degrees	N/A all internal grasslands will be maintained in a low fuel condition at all times.
7	Grassland Type G	Downslope >0 to 5 degrees	N/A all internal grasslands will be maintained in a low fuel condition at all times.
8	Grassland Type G	Upslope	N/A all internal grasslands will be maintained in a low fuel condition at all times.
9	Woodland Type B (06)	Upslope	All internal woodland areas to be modified and maintained in a low fuel condition at all times. External Woodland areas BAL-29 or less can apply.
10	Woodland Type B (06)	Downslope >0 to 5 degrees	All internal woodland areas to be modified and maintained in a low fuel condition at all times. External Woodland areas BAL-29 or less can apply.
11	Woodland Type B (06)	Downslope >5 to 10 degrees	BAL-29 or less can apply.
12	Shrubland Type C	Downslope >0 to 5 degrees	BAL-29 or less can apply.
13	Scrub Type D	Downslope >0 to 5 degrees	BAL-29 or less can apply.
14	Scrub Type D	Upslope	BAL 29 or less can apply.

Assumptions made in BAL Contour Mapping:

- The subject site will be developed according to the guiding principles in the Concept Plan; and
- The Albany Motorsport Park will modify and maintain grasslands and woodland areas (east) internal to the site in a low fuel state at all times (i.e. slashed to <100mm).

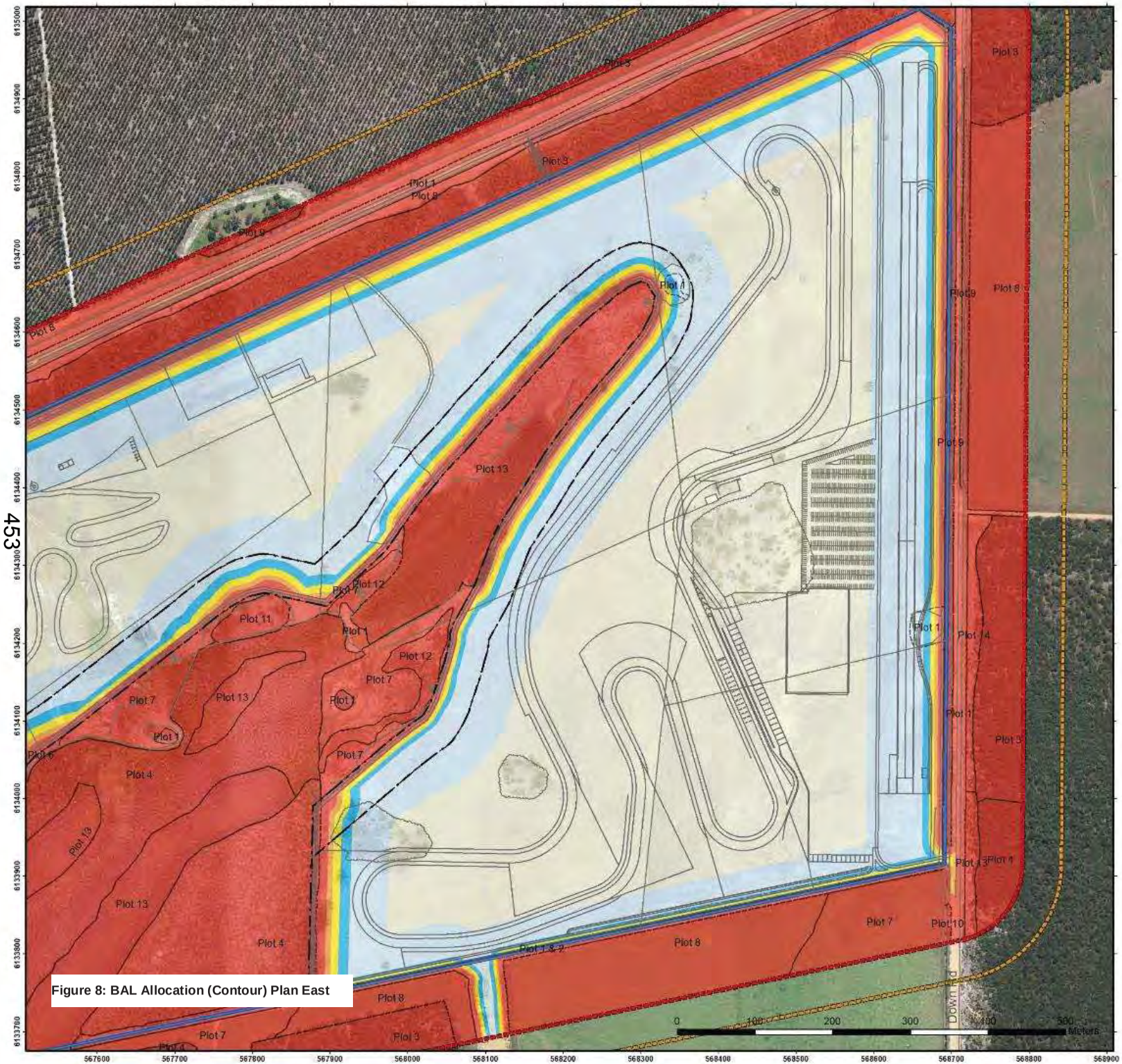


Figure 8: BAL Allocation (Contour) Plan East

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Overview Map Scale 1:100,000

Legend

- Subject Site
- 100m Assessment Boundary
- 150m Assessment Boundary
- Cadastre
- Low Fuel Buffer

BAL Contours

- BAL-FZ
- BAL-40
- BAL-29
- BAL-19
- BAL-12.5
- BAL-LOW

Scale
1:4,750 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
Lot 5780 Down Road
Drome, WA 6330

BAL Contour - East

BAL Assessor	QA Check	Drawn by
KK	KK	BT
STATUS	**FILE**	**DATE**
FINAL	COA0020	10/05/2019

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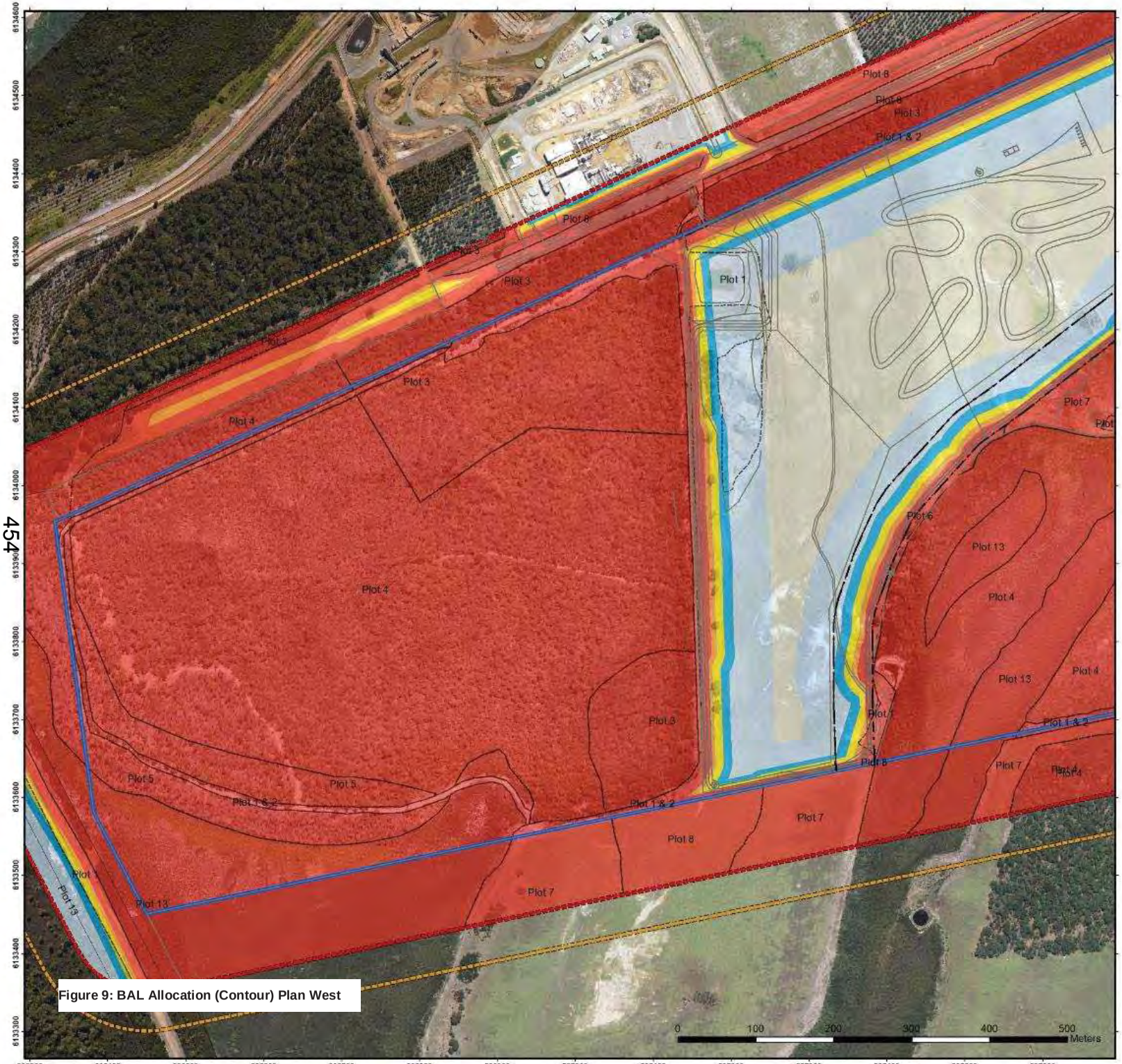


Figure 9: BAL Allocation (Contour) Plan West

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Overview Map Scale 1:100,000

Legend

- Subject Site
- 100m Assessment Boundary
- 150m Assessment Boundary
- Cadastre
- Low Fuel Buffer

BAL Contours

- BAL-FZ
- BAL-40
- BAL-29
- BAL-19
- BAL-12.5
- BAL-LOW

Scale
1:4,750 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
Lot 5780 Down Road
Drome, WA 6330

BAL Contour - West

BAL Assessor	QA Check	Drawn by
KK	KK	BT
STATUS	**FILE**	**DATE**
FINAL	COA0020	10/05/2019

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6. Identification of bushfire issues pertinent to the AMP site

6.1. Bushfire risks

The external bushfire risks to the site are the continuous remnant vegetation and plantations located to the west and north west, east, north and south east. The creek central to the subject site drains to the south west and risks of bushfire this direction are also evident. Remnant vegetation located internal to the subject site in the west was burnt in the recent May 2018 fires (refer to Redmond fire scar as Figure 10 below, courtesy of CoA, Emergency Services).

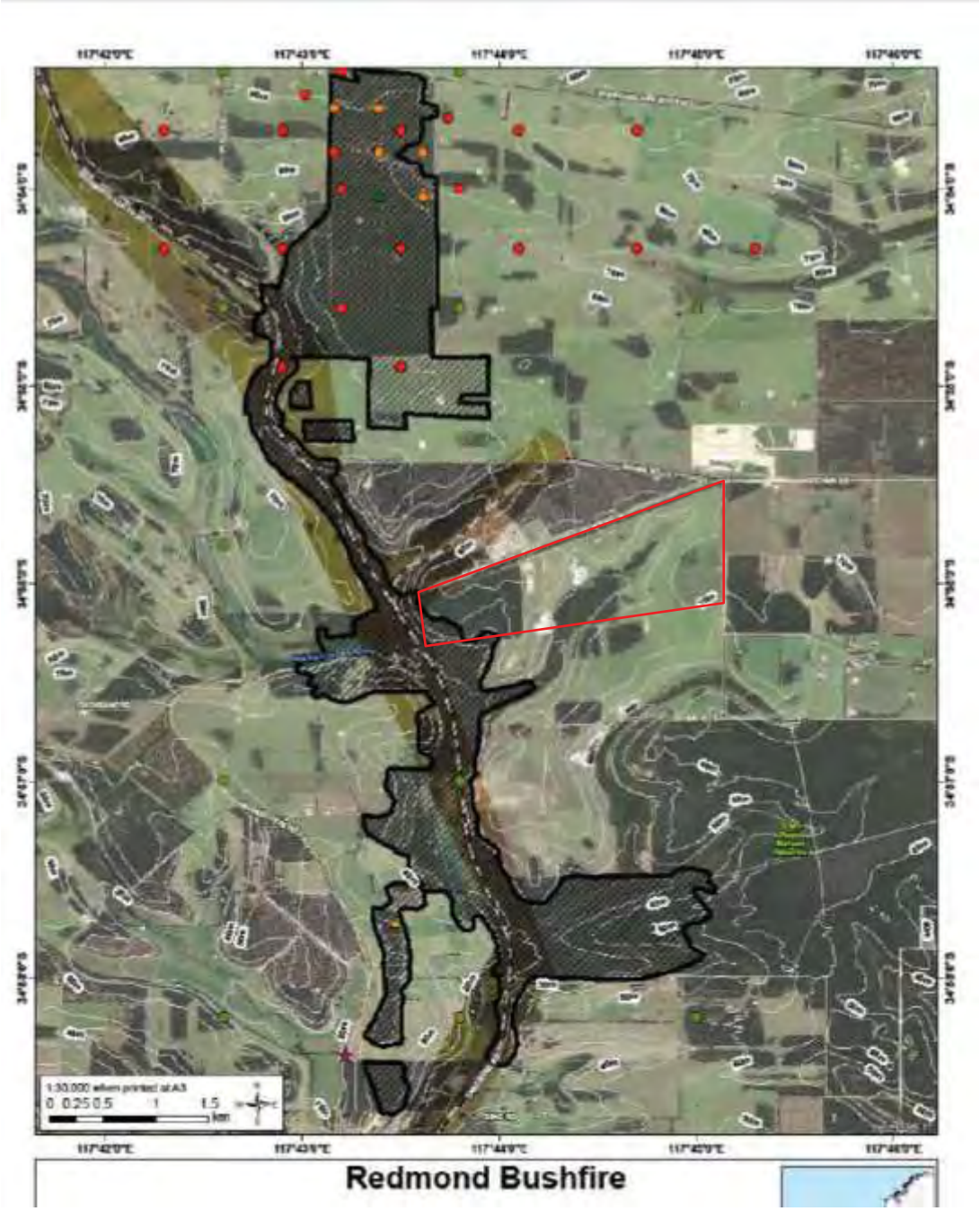


Figure 10 – May 2018 Redmond Fire Scar and the subject site (CoA, 2019)

The external remnant forest areas (including plantations) present Extreme Bushfire Hazard Levels (as per the definition of bushfire hazards in the Guidelines) to the AMP development. To the south and east

of the site is predominantly farmland areas grazed by cattle which present Low BHL risks. Under hot, dry and unstable conditions (Severe to Catastrophic bushfire weather) the subject site is most at risk from bushfire from the north, north east, north west and west. Risk of ignition of bushfire events is detailed in Section 7 of this report.

To mitigate bushfire risks to the site the following parameters are to be employed:

- Fuel hazard reduction burning in the internal western remnant bushland (rotation 8-10 years and governed by CoA Emergency services priorities and resources). Refer to Section 9.1.2 of this report.
- Excluding bushfire from the central creek area to reduce the risk of peat fires on the subject site (no planned burning, mineral earth firebreaks, low fuel buffers).
- Reducing risks of ignition from the motorsport events (internal) as outlined in Section 7 of this report.
- Reducing risk of ignition from external sources of through liaison with neighbours and consultation with the Local Bushfire Brigade (Highway Brigade located 5km away near Albany Airport).
- Modifying and maintaining the existing internal areas of Grassland Type G and Woodland Type B to a low fuel state at all times (as per WAPC Standards).
- Traffic control during events to ensure safe and timely evacuation of personnel from the site in event of bushfire. This will ensure all gates are accessible for emergency access/egress.
- Consideration of purchase of fast attack light unit for the AMP site and to be placed adjacent to any practise areas (non-event days).
- Event days will have full fire safety crews, ambulance and safety personnel strategically located around the track.
- Documentation of control measures in the OMP as outlined in this BMP report for the site.
- Lease arrangements from the CoA to the AMP controlling body to define management controls of the development site as defined in the implementation table Section 10 of this report.

6.2. Water Sources for bushfire

Water supply will be through on-site resources via bore extraction. A copy of a monitoring bore testing for water sources in the northern area of the precinct is provided in Appendix 4. Storage of water for fire fighting will be located in the north and the eastern precincts and tanks are to be a minimum of 110,000L (DFES to confirm). Water tanks are shown conceptually at the northern motocross precinct and at the southern boundary. A test water supply bore was drilled in April 2019, refer to bore test log in Appendix 4. This indicates that water is available for supply at a suitable depth and rate of supply. A suitably qualified Fire Engineer will need to be engaged by the AMP prior to DA to ensure hydrants and supply pressure are to the required standards, to be approved by the CoA at Development Approval Stages.

6.3. Internal fire service access and firebreak network

A network of Fire Service Access (FSA) and Firebreaks are to be developed during construction phases and prior to operations of the AMP. Details of management of the maintenance of the internal FSA, Firebreak networks and internal service roads is to be documented in the OMP in the AMP lease area. FSA's outside of the lease area are to be maintained by CoA and documented in their reserve's management plan for the area.

To facilitate in access and evacuation of the site there are additional gates along northern and eastern boundaries. Refer to the Internal Access Plan Figure 11.



Figure 11: Internal Access Plan

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Kathlyn Kinnear, Bio Diverse Solutions
Accreditation No: BPAD30794
Jurisdiction: Level 2 - WA

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

BIO DIVERSE SOLUTIONS

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Overview Map Scale 1:250,000

Legend

- Cadastre
- Turnaround Point
- Access Points
- Gate
- Low Fuel Buffer
- Internal Access Road
- Fire Service Access & 4m wide firebreaks

Scale
1:8,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
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Drome, WA 6330

Internal Access & Fuel Management Plan

BAL Assessor	QA Check	Drawn By
KK	KK	BT
STATUS	FILE	DATE
FINAL	COA0020	10/05/2019

REPORT ITEM DIS 164 REFERS

7. Bushfire risk assessment – high risk land use

Consultation with Department of Fire and Emergency Services (DFES) and Department of Planning, Lands and Heritage (DPLH) confirmed that they deemed the AMP to be a "High risk". SPP 3.7 outlines that certain land uses may potentially ignite a bushfire, prolong its duration or increase its intensity. Such land uses are defined as 'High Risk'. The proposed Albany Motorsport Park (AMP) is defined a high-risk industry due to:

- Motorsport activities giving rise to risk of ignition and bushfire; and
- Exposure of the community, fire fighters and environment to dangerous substances from vehicles igniting.

A risk assessment has been prepared by Bio Diverse Solutions and is detailed in Appendix 5 of this report. A summary of the risk assessment is provided below in Table 5.

Data has been gathered from following sources for the risk assessment:

- 20km radius of the subject site on originating fire causes (sources CoA Emergency Services, Parks and Wildlife & DFES);
- Consultation with CoA Emergency Services, DFES land use planning unit, DFES Regional Services Albany and Parks and Wildlife Albany office;
- CAMS risk register; and
- Great Southern Motorsport Group Inc (cross section of sporting codes).

Table 5: Summary of Risk Assessment AMP

Risk No.	Hazard -Bushfire originating/causing fire	Risk rating
1	Ignition Vehicles/Bikes combusting on track due to crashes including fuel or oil line leaks on track	Substantial/high risk
2	Grinding sparks in pits or near fuel sources (hot works)	Low risk
3	Smoking public viewing areas or in pits near fuels	Low risk
4	Vehicles (exhausts) near dry vegetation or slashing/mowing rocky ground (maintenance)	Low risk
5	Electrical faults building faults	Moderate risk
6	Electrical faults from extension cords/cables (pits/trailers)	Moderate risk
7	Re-fueling area (designated and controlled)	Very high risk
8	Substandard race vehicles using the facility	Low risk
9	Re-ignition of previously controlled fires (peat Central creek area)	Substantial risk
10	Water pump failure causing spark/ignition	Substantial risk
11	Gas Barbecues and camp fires causing ignition (unattended, faulty)	High risk
12	Tyre barriers igniting from crash from vehicle	High risk
13	Re-ignition of previously controlled fires (May and November non-prohibited periods)	Moderate risk
14	External: Ignition from trains under heavy loads sparks associated with braking	Low risk
15	External: Aircraft Crash	Low risk
16	External: Western powerlines transmission	High risk
17	External: Ignition from stockpiled woodchips north of site at Plantation Energy site.	High risk
18	External: Ignition from Blue gum slash burning (cause of May 2018 fire)	High risk
19	External and Internal: Lightning strikes	High risk
20	Illegally lit fires (deliberate)	Moderate risk

A summary of recommendations from the risk assessment process includes:

- A detailed Operational Management Plan (OMP) is to be developed by AMP which includes risk assessments (refer to example from Confederation of Australian Motor Sport (CAMS) prior Appendix 6) as per CAMS policy and regulations to ensure there are actions to minimize risks of ignition from internal sources of the park.
- The operational plan will be reviewed and endorsed by the CAMS prior to operation of the Albany Motorsport Park.
- Restricting public access through the site to spectator viewing areas and competitor areas, access around the whole of the site is restricted to emergency and safety services.
- Practice days and non-events are to be controlled and regulated by AMP and documented in the Operational Management Plan for the site.
- Hazard reduction burning only occurs in the western remnant vegetation block, restrictions of fire in central creek area (peat fire risk) through 8m Fire Service Access (4m pavement and 4m mineral earth firebreak) at edge of fencing of remnant vegetation (restrict grass fires into remnant vegetation).
- Controlled re-fueling in designated areas, documented in Operational Procedures Manual.
- No fuel storage on site, only fuel will be in vehicles during race events.
- Observing and complying with “Total fire ban days” and “vehicle movement bans” as set by LGA.
- No events held during catastrophic Fire Danger Rating (FDR) days.

The proposed uses associated with the AMP will be controlled and governed through:

- Designed to comply with CAMS’ Track Operator’s Safety Guide (CAMS 2012) and Motorcycling Australia (MA) Track Guidelines (MA 2011).
- To be licensed by CAMS for Fédération Internationalé de l’Automobile (FIA) Grade 2 and Fédération Internationalé Motocyclisme (FIM) Grade B (i.e. up to second-tier international motor racing).
- Motocross track designed and constructed in association with Motocross Australia guidelines.
- Drag strip designed and constructed in accordance with FIA specifications for drag strips and in association with Australian National Drag Racing Association (ANDRA).

Consideration of the High-risk nature of the AMP site is an ongoing process to be refined in future stages of the development approval process and to be addressed under a Bushfire Risk Management Plan (BRMP) if required.

8. Vulnerable Land Use and Access

8.1. Access

Access will be provided in alternative directions from the site to separate destinations to Down Road to the north and Down Road South in the south. Down Road is essentially a long cul-de-sac (dead end road terminating to the north west of the subject site), as is Down Road South (terminating to the south of the subject site). The public road network is a legacy issue associated with previous precinct planning and development approvals.

During the preparation of this BMP report, four access options were investigated to the north, west, and south. A summary of the Access Options and mapping is provided in Appendix 7. The alternative access for the whole of the precinct in Drome has not been investigated for the preparation of this report and the CoA have indicated this would be investigated during a future Structure Plan process. An Emergency Access Way (EAW) (outlined as Option 4 in Appendix 7) is to be constructed to enable safe access/egress to Albany Highway. This will give the AMP an alternative access route, which presently does not exist. The EAW will be an easement in gross to a minimum of 12m wide and measures 4.38km from the site (south east corner) to Albany Highway which does not meet the Acceptable Solutions (WAPC, 2017) and therefore has been assessed as non-compliant.

The BEEP prepared to support this development provides contingency actions in accordance with the requirements of the *Draft Position Statement: Tourism land uses within bushfire prone areas* (WAPC, 2018). These contingencies include early closure of the site, off-site evacuation and as a last resort, refuge on site in a suitable building / open space.

It is noted the following will apply for the proposed EAW:

- Traffic control for evacuation, contracted and documented in Operational Management Plan.
- Consultation during the preparation of this plan occurred with Main Roads Western Australia (MRWA), Water Corporation Western Australia (WCWA), & Lindsay Black (landowner) in principle agreement for the EAW is currently being sought by the CoA as stated in email from J Van Der Mescht Appendix 7. Legal agreements/ documentation will be sought in following stages (i.e. Development approval stages).
- The conditions of Scheme Amendment to document land owner agreements in subsequent DA documentation.
- It is 5km to Highway Volunteer Bushfire Brigade (located near Albany Airport).
- Water bombers and air attack facilities are located at Albany Airport.
- A public road is presently deemed not viable by CoA, it may be investigated in the future for wider precinct in the future through a Structure Planning process.
- Regular inspections along EAW (condition, gates etc) by AMP representatives prior to events occurring, documented in the OMP.

8.2. Bushfire Emergency Evacuation Plan

The aim of the BEEP is early, safe and timely evacuation of the site prior to bushfire events and no events are to be held on site during Catastrophic Fire Danger Rating (FDR) days. The BEEP has been prepared to support the proposed development will address on-site and off-site refuges, triggers for evacuation and roles and responsibilities for staff and stakeholders. Refer to Appendix 8. As the proposed development progresses beyond the rezoning phase, the BEEP will be updated for each stage including further specific details.

As previously identified. the design of the site does not allow for alternative access and is a legacy issue. As a result of legacy issues of the surrounding public road network, these constraints are addressed by the BEEP providing contingency measures to address identified risks including:

- Clear triggers for off and onsite evacuation (to be updated to support future planning applications);
- Clear triggers & guidelines for scheduling events or cancelling based on such factors as Fire Danger Rating (FDR), evening events during certain times of the year, 'Total Fire Ban' days and "Restricted vehicle movement days" (harvest bans);
- An on-site refuge for use in an emergency (i.e. a building constructed to the requirements of a 'community refuge' as per the Australian Building Codes Board 'Design and Construction of Community Bushfire Refuges' that can accommodate the number of people using that part of the facility (i.e. 200-500 for a club event);
- The proposed building located within the site and position to limit radiant heat exposure to <10 kW/m^2 and constructed to BAL-29; and
- Open air refuge with the capacity for a large event (upto 10,000 approx.) located in area where radiant heat exposure is limited to <2 kW/m^2.and preferably shaded with non-combustible material.

This is compliant with the WAPC *Draft Position Statement: Tourism land uses within bushfire prone areas* (WAPC 2018). The BEEP will form part of the Emergency Management Plan for the site which will be developed by AMP prior to operations of the site.
The current locations of the proposed building and open air refuge locations are indicative only and may change as development design progresses.

8.3. Bushfire Emergency Evacuation Plan inputs

The BEEP will be updated to support future planning applications and could consider the following inputs underpinning the drivers for evacuation:

- Off site / On site evacuation time for different event sizes and locations within overall site;
- Potential fire scenarios under different Fire Danger Ratings (FDR);
- Bushfire modelling to determine the 10 kW/m^2 and 2 kW/m^2 line used an FFDI value of 80 and a flame temperature of 1200K;
- In determining the required capacity for any refuge building and open space dimensions an area of 0.75 m^2 to 1m^2 per person has been used; and
- Address potential numbers for people onsite ranging from 200-500 for club events up to 10,000 for state events.

ELA has identified suitable on-site refuge locations (see Figure 12) in the event of a bushfire. Early evacuation is always preferable however, in the event that this cannot occur, a building located within the 10 kW/m^2 zone (and constructed to specified standards) will provide a 'safer-place' option for onsite users. For larger events, open space areas that provide radiant heat exposure limited to <2 kW/m^2.is also identified. These areas (10kW/m^2 and 2 kW/m^2) have been determined using a Method 2 BAL assessment (refer to Appendix 9). A designated outdoor emergency assembly area and refuge building have been incorporated into the master plan design as indicated in Figure 12.

Triggers for evacuation will be identified in the BEEP and will be updated to support future planning applications in accordance with SPP 3.7. This will include: potential closures of the site under certain Fire Danger Ratings (FDR), triggers for off-site evacuation and procedures for staff and visitors in the event of an emergency etc.

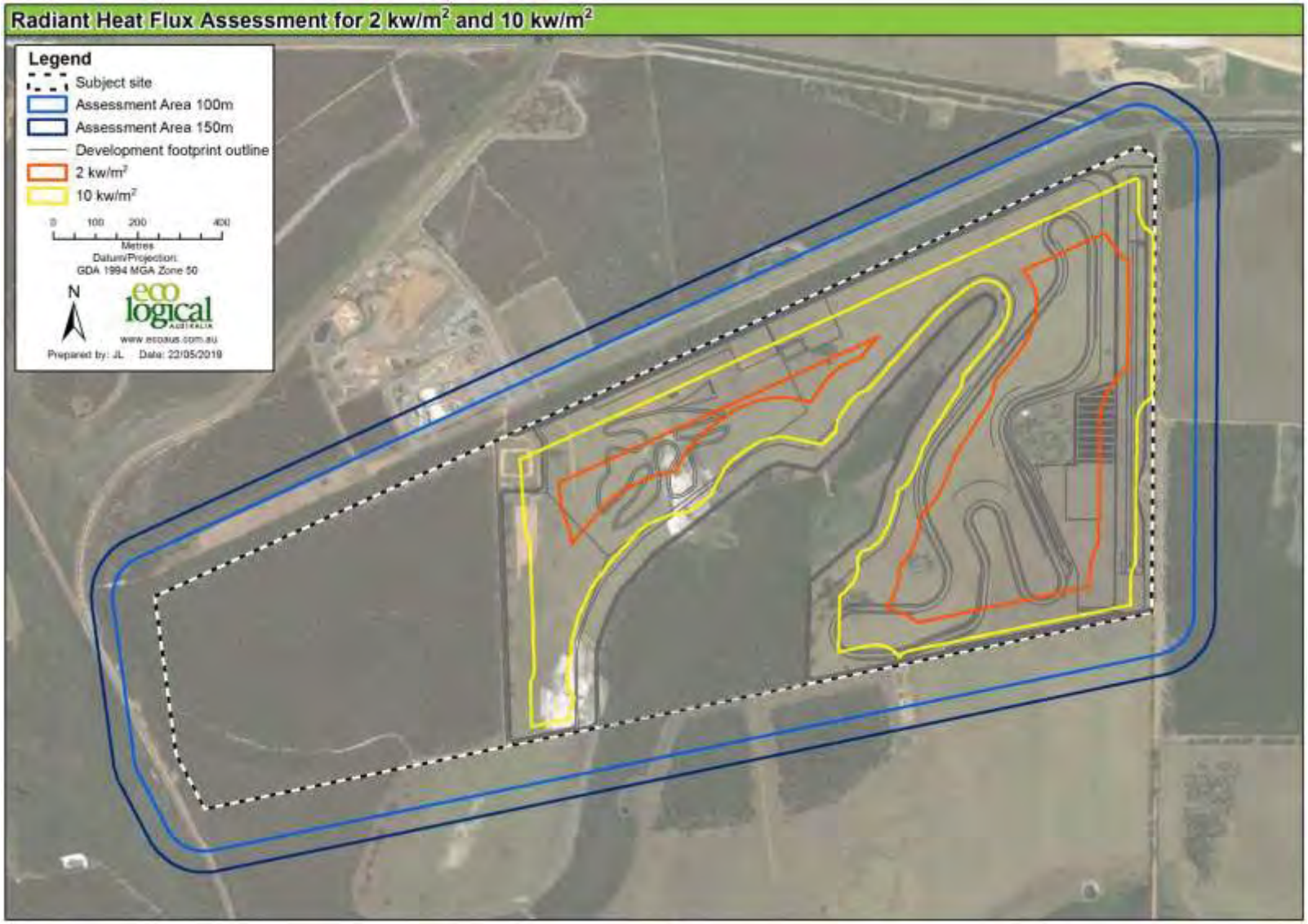


Figure 12: 10 kW/m² and 2 kW/m² locations

462

REPORT ITEM DIS 164 REFERS

It is to be noted by the AMP governing body:

- Emergency Management Plan for the site which will be developed by AMP prior to operations of the site and will include the BEEP which will be finalised in consultation with CoA Emergency Management Services, DFES Albany Region and LEMC at Development Approval Stages; and
- CoA Emergency Management Services to ensure the BEEP and Emergency Management Plan for the AMP site is referred and registered through the Local Emergency Management Committee (LEMC).

9. Assessment to the bushfire protection criteria

The Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017) outlines bushfire protection criteria which subdivision and development proposals are assessed for compliance. The bushfire protection criteria (Appendix 4, WAPC, 2017) are a performance-based criteria utilised to assess bushfire risk management measures and they outline four elements, being:

- Element 1: Location
- Element 2: Siting and Design of Development;
- Element 3: Vehicle Access; and
- Element 4: Water.

(WAPC, 2017)

The development is required to meet the "Acceptable Solutions" of each Element of the bushfire protection criteria (WAPC, 2017). The proposal has been assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4. As stated in Section 7 of this report the subject site has one way in and one-way out due to the legacy of the surrounding road network. A performance-based assessment has been detailed in Section 9.2 and a summary of the Performance Principle and Acceptable Solutions assessment is provided in Table 6.

Table 6: Bushfire protection criteria applicable to the site

Element	Acceptable Solution	Applicable or not Yes/No	Meets Acceptable Solution
Element 1 – Location	A1.1 Development Location	Yes	Compliant. The proposed AMP concept plan is located in an area (post development) which all infrastructure will be in either Moderate or Low BHL. BAL Contour mapping indicates that all infrastructure and development can be located in BAL 29 or less with no BAL 40 prevailing over the development. Refer to Figure 8 and 9. Proposal meets acceptable solution A1.1.
Element 2 – Siting and Design	A2.1 Asset Protection Zone	Yes	Compliant. APZ standards will apply to the development footprint and the buffer (50m) areas. Low fuel standards are to be to WAPC APZ standards (refer to Appendix 10) at all times. Maintenance and management of the site is to be documented in the Operational Management Plan for the site. Proposal meets acceptable solution A2.1.
Element 3 – Vehicular Access	A3.1 Two Access Routes	Yes	Non-compliant. Access internal the site will be provided in alternative directions to separate destinations to Down Road to the north and Down Road South (south east). Multiple gates will also facilitate access/egress from the site in the north and eastern boundaries. Refer to internal Access Plan Figure 11. Down Road is essentially a long cul-de-sac (dead end road terminating to the north west of the subject site), as is Down South Road (terminating to the south of the subject site). The surrounding public road network is a legacy to previous precinct planning and development approvals. During the preparation of this BMP report, four access options were investigated to the north, west, and south. A summary of the Access Options and mapping is provided in Appendix 7. A 12m wide Emergency Access Way (Option 4) is to be constructed to enable a secondary access/egress to Albany Highway. This will be gazetted as an easement in gross to allow for emergency access/egress in a bushfire event. The BEEP prepared to support this development provides contingency actions in accordance with the requirements of the *Draft Position Statement: Tourism land uses within bushfire prone areas* (WAPC, 2018). These contingencies include early closure of the site, off-site evacuation and as a last resort, refuge on site in a suitable building / open space.

REPORT ITEM DIS 164 REFERS

Table 6 cont.

Element	Acceptable Solution	Applicable or not Yes/No	Meets Acceptable Solution
Element 3 – Vehicular Access cont.	A3.2 Public Road	No	No public roads are proposed. Not assessed to A3.2.
	A3.3 Cul-de-sacs	No	No cul-de-sacs are proposed. Not assessed to A3.3.
	A3.4 Battle axes	No	No cul-de-sacs are proposed. Not assessed to A3.4.
	A3.5 Private driveways	Yes	Compliant. Internal driveways and access ways in and around the site are to confirm to public road standards and will be a minimum of 12m wide horizontal clearance with a 6m trafficable surface. Standards for the internal driveways/public access roads meet the minimum requirements as set by the guidelines as shown in Table 7 Vehicle Access Technical Requirements. Detail on the internal access driveways will be documented in the detailed civil engineering drawings to be approved by CoA at Development Approval Stages. Proposal is deemed compliant to A3.5.
	A3.6 Emergency Access Ways	Yes	Non-compliant. An Emergency Access Way is to be constructed to enable a secondary access/egress to Albany Highway. This will be gazetted as an easement in gross to allow for emergency access/egress in a bushfire event. This will give the AMP an alternative access route, which presently does not exist. The alternative access for the whole of the precinct has not been investigated for the preparation of this report and the CoA have indicated this would be investigated during a future Structure Plan process for the whole of the precinct. The EAW to Albany Highway from Down Road South (Option 4) will be an easement in gross to a minimum of 12m wide and measures 4.38km in length (from the site to Albany Highway) which does not meet the Acceptable Solutions (WAPC, 2017) and therefore has been assessed as non-compliant. Standards for the EAW are to meet Table 7 Vehicle Access Technical Requirements and documented in the detailed civil engineering drawings to be approved by CoA at Development Approval Stages. The BEEP prepared to support this development provides contingency actions in accordance with the requirements of the *Draft Position Statement: Tourism land uses within bushfire prone areas* (WAPC, 2018). These contingencies include early closure of the site, off-site evacuation and as a last resort, refuge on site in a suitable building / open space.

REPORT ITEM DIS 164 REFERS

Table 6 cont.

Element	Acceptable Solution	Applicable or not Yes/No	Meets Acceptable Solution
Element 3 – Vehicular Access cont.	A3.7 Fire Service Access Ways	Yes	Compliant Fire Service Access Ways (FSA's) will be located internal to the site to enable fire appliances to easily access the site during motorsport events and non-event days. Refer to the Access Plan Figure 11. FSA's are to be 8m wide horizontal clearance with a 4m wide trafficable surface (noting 1m wide stabilised shoulders can apply as per Table 7). Standards for the internal FSA's are to meet table 7 Vehicle Access Technical Requirements and documented in the detailed civil engineering drawings to be approved by CoA at Development Approval Stages. Proposal is deemed compliant to A3.7.
	A3.8 Firebreaks	Yes	Compliant. A network of strategic fire breaks and FSA access to 8m is proposed for the site and has been prepared in consultation with CoA Emergency Management Services and AMP representatives. Refer to the Access Plan Figure 11. Existing firebreaks are evident across the site and are to be maintained by the leasees until AMP and CoA are managers of Lot 5780 Down Road. CoA to ensure this is documented in any temporary lease agreements once in ownership of the land. Proposal is deemed compliant to A3.8.
Element 4 – Water	A4.1 Reticulated areas	No	N/A not assessed to A 4.1.
	A4.2 Non-reticulated areas	Yes	Compliant Water supply will be through on-site resources via bore extraction to tank storage and pumped to facilities around the site. Bore water supply is known to the area, a copy of a monitoring bore testing for water sources in the northern area of the precinct is provided in Appendix 4. Storage of water dedicated for fire fighting will be located in the north and the eastern precincts and tanks are to be a minimum of 110,000L. A suitably qualified Fire Engineer will be engaged by the AMP prior to DA to ensure hydrants and supply pressure are to the required standards, to be approved by the CoA at Development Approval Stages. Proposal is deemed compliant to A4.2.
	A4.3 Individual lots in non-reticulated areas	No	N/A not assessed to A4.3.

REPORT ITEM DIS 164 REFERS

Table 7: Vehicular Access Technical Requirements (WAPC, 2017)

Technical requirements	Private Driveways	Emergency Access Ways (EAW)	Fire Service Access Ways (FSA)
Minimum trafficable surface (m)	4	*6	*6
Horizontal clearance (m)	6	6	6
Vertical clearance (m)	4.5	4.5	4.5
Maximum grades	1 in 10	1 in 10	1 in 10
Minimum weight capacity (t)	15	15	15
Maximum crossfall	1 in 33	1 in 33	1 in 33
Curves minimum inner radius (m)	8.5	8.5	8.5

*Denotes the width can include a 4m wide paving with one metre wide constructed road shoulders

9.1. Barrier Fencing

In November 2010 the Australian Bushfire CRC issued a "Fire Note" (Bushfire CRC, 2010) which outlined the potential for residential fencing systems to act as a barrier against radiant heat, burning debris and flame impingement during bushfire. The research aimed to observe, record, measure and compare the performance of commercial fencing of Colourbond steel and timber (treated softwood and hardwood).

The findings of the research found that:

"*.. Colourbond steel fencing panels do not ignite and contribute significant heat release during cone calorimeter exposure"* (exposure to heat)

.."Colourbond steel (fencing) had the best performance as a non-combustible material. It maintained structural; integrity as a heat barrier under all experimental exposure conditions, and it did not spread flame laterally and contribute to fire intensity during exposure"

It is also noted that non-combustible fences are recommended by WAPC (APZ standards: Fences and sheds within the APZ are constructed using non-combustible materials e.g. colourbond iron, brick, limestone, metal post and wire). The AMP will be required to build non-combustible fences through-out the site and will be documented through the OMP.

9.2. Fuel Reduction Strategy

The following parameters/strategies are recommended for the property. Sampling and fuel calculation should be as per the recommended methodology as outlined by DFES:

- Forest fuels are maintained to maximum of 15 t/ha in Forest (Type A) vegetation types;
- Woodland fuels are maintained to maximum of 8 t/ha in Woodland (Type B) vegetation types;
- Fuel reduction can be achieved through slashing or hazard reduction burning;
- Hazard reduction burning in the western remnant native vegetation area should be carried out in consultation with DFES and the CoA in accordance with the *Bushfires Act 1954*. This will be the responsibility of the landowner (CoA) and documented through their reserve's management plan;
- Hazard reduction burning in the western remnant native vegetation (Jarrah/Marri vegetation) is generally recommended to be a rotation 8-10 years over a series of cells;
- Slashing/mowing all internal grassland and woodland areas to maintain in a low fuel status;
- Observing no vehicle movement bans and total fire bans during slashing operations; and
- Hazard reduction burning only occurs in the western remnant vegetation block, restrictions of fire in central creek area (to reduce risk of peat fires) through an 8m firebreak/FSA at edge of fencing of remnant vegetation (restrict grass fires into remnant vegetation).

10. Implementation of the BMP

Implementation of this BMP will be the responsibility of the AMP and City of Albany. A draft governance document is provided in Appendix 1, which will be further refined through the development process. Table 8 and 9 outline responsibilities for implementation of this BMP report, noting there are further standards requirements documented throughout this BMP report.

10.1. Developer Responsibility

It is recommended the AMP governing body be responsible for the following:

Table 8: Implementation actions AMP

Developer – Prior to issue of titles			
No	**Implementation Action**	**Prior to D/A**	**Prior to operations**
1	A detailed Operational Management Plan (OMP) to be developed by AMP which includes risk assessments (refer to example Appendix 5) as per Confederation of Australian Motor Sport (CAMS) OSH policy and governing regulations to ensure there are actions to minimize risks of ignition and potential bushfire from internal sources of the park.	✓	
2	OMP to outline maintenance requirements across the lease area especially in regards to management and maintenance of Fire Service Access, fire breaks, low fuel areas, inspections of the secondary Emergency Access Ways from Down Road South to Albany Highway	✓	
3	OMP to outline arrangement in place for communication to local brigades and neighbours in relation to external bushfire risks.	✓	
4	The OMP will be reviewed and endorsed by the CAMS prior to operation of the AMP.	✓	
5	AMP governing body to ensure that events are not held on Catastrophic FDR days, Total fire ban days and vehicle movement restrictions as regulated by CoA or DFES.	✓	
6	Consideration of purchase of fast attack light unit for the AMP site and to be placed adjacent to any practise areas (non-event days).		✓
7	Practice days and non-events are to be controlled and regulated by AMP and documented in the OMP for the site.	✓	
8	Event days will have full fire safety crews, ambulance and safety personnel strategically located around the track and documented through the OMP.	✓	
9	Restricting public access through the site to spectator viewing areas and competitor areas, access around the whole of the site is restricted to emergency and safety services.		✓
10	Controlled re-fueling in designated areas for all motorsport park precincts and documented in OMP.	✓	
11	Traffic control for evacuation, contracted and documented in Operational Management Plan.	✓	✓
12	Site construction activities are to confirm to the BMP report and detailed in contractual arrangements with any contractors.		✓
13	Refuge buildings for (club days) 200-500 people built to AS 3959 BAL-29 and conform to the ABCB handbook.		✓
14	Emergency Management Plan for the site which will be developed by AMP prior to operations of the site and will include the BEEP which will be finalised in consultation with CoA Emergency management Services, DFES Albany region and LEMC at Development Approval Stages.		✓

Table 8 cont.

No	Implementation Action	Prior to D/A	Prior to operations
15	Standards for the internal driveways/public access roads, EAW and FSA's are to meet Table 7 Vehicle Access Technical Requirements and documented in the detailed civil engineering drawings to be approved by CoA at Development Approval Stages.	✓	
16	Existing firebreaks are evident across the site and are to be maintained to the CoA FMN standards by the AMP and maintenance documented in the OMP. Once operational the firebreaks are to confirm to the standards as outlined in the Access mapping Figure 11.	✓	✓
17	Fire Engineer will be engaged by the AMP prior to DA to ensure hydrants and supply pressure are to the required standards.	✓	✓
18	Update and review the BMP and BEEP as any changes occur, prior to Development Approval or every 5 years.	✓	✓

10.2. Local Government Responsibility

It is recommended the City of Albany shall be responsible for the following:

Table 9: Implementation actions City of Albany

LGA– Clearance of conditions			
No	**Implementation Action**	**Lease arrangements**	**Land manager**
1	Restricting public access through the site to spectator viewing areas and competitor areas, access around the whole of the site is restricted to emergency and safety services.	✓	
2	A Management Plan be developed for the remnant vegetation (future CoA managed land) outside of AMP lease area, particularly in relation to maintenance of Fire Service Access (outside of the AMP lease area), fire control and hazard reduction protocols as outlined in this document.		✓
3	Ensure the secondary access for the AMP is gazetted as an easement in gross (min of 12m horizontal clearance and 6m trafficable surface) prior to any operations or construction of the AMP site.	✓	
4	CoA Emergency Management Services to ensure the BEEP and Emergency management Plan for the AMP site is referred and registered through the Local Emergency Management Committee (LEMC).		
5	Existing firebreaks are evident across the site and are to be maintained to the CoA FMN by the leasees until AMP and CoA are managers of Lot 5780 Down Road. CoA to ensure this is documented in any temporary lease agreements once in ownership of the land.		
6	Developing and maintaining District Fire Fighting Facilities and related infrastructure.	N/A, ongoing	
7	Provide advice on standards and methods to achieve community fire protection to owners/occupiers of land through issue and enforcement of the current Fire Management Notice (yearly advice brochure updated annually).	N/A, ongoing	
8	CoA, through their Bush Fire Brigade Organisation is the Controlling Authority for fire suppression and prescribed burning operations on the area.	N/A, ongoing	

11. Disclaimer

The recommendations and measures contained in this assessment report are based on the requirements of the Australian Standards 3959 – Building in Bushfire Prone Areas, WAPC State Planning Policy 3.7 (WAPC, 2015), WAPC Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017), and CSIRO's research into Bushfire behaviour. These are considered the minimum standards required to balance the protection of the proposed dwelling and occupants with the aesthetic and environmental conditions required by local, state and federal government authorities. They DO NOT guarantee that a building will not be destroyed or damaged by a bushfire. All surveys and forecasts, projections and recommendations made in this assessment report and associated with this proposed dwelling are made in good faith on the basis of the information available to the fire protection consultant at the time of assessment. The achievement of the level of implementation of fire precautions will depend amongst other things on actions of the landowner or occupiers of the land, over which the fire protection consultant has no control. Notwithstanding anything contained within, the fire consultant/s or local government authority will not, except as the law may require, be liable for any loss or other consequences (whether or not due to negligence of the fire consultant/s and the local government authority, their servants or agents) arising out of the services rendered by the fire consultant/s or local government authority.

AS3959 disclaimer: It should be borne in mind that the measures contained within this Standard (AS3959) cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the unpredictable nature and behaviour of fire and extreme weather conditions.

Building to AS3959 is a standard primarily concerned with improving the ability of buildings in designated bushfire prone areas to better withstand attack from bushfire thus giving a measure of protection to the building occupants (until the fire front passes) as well as to the building itself.

(AS3959)

12. Certification

I hereby certify that I have undertaken the assessment of the above site and determined the Bushfire Attack Level stated above in accordance with the requirements of AS 3959 (Incorporating Amendment Nos 1, 2 and 3) and the Guidelines for Planning in Bushfire Prone Areas Ver 1.3 (WAPC, 2017).

SIGNED, ASSESSOR: ..... DATE: 23/05/2019

Kathryn Kinnear, Bio Diverse Solutions
Accredited Level 2 Bushfire Practitioner (Accreditation No: BPAD30794)

Please refer to Appendix 11 for the certification of this BMP report from Level 3 BPAD practitioners, Eco Logical Australia.

13. References

AS 3959 Australian Standard, Construction of buildings in bushfire-prone areas, Building Code of Australia, Primary Referenced Standard, Australian Building Codes Board and Standards Australia.

Australian Building Codes Board (ABCB) (2014) Design and Construction of Community Bushfire Refuges. Australian Government and States and Territories of Australia. ABCB, GPO 9839, Canberra ACT 2601

Bio Diverse Solutions (2018) Reconnaissance Flora and Level 1 Fauna Survey, Lot 5780 Down Road, Drome. Unpublished report prepared for the City of Albany

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Western Australian Planning Commission (WAPC, 2015) State Planning Policy 3.2 Planning in Bushfire Prone Areas. Department of Planning WA and Western Australian Planning Commission.

Western Australian Planning Commission (WAPC, 2018) *Draft Position Statement: Tourism land uses within bushfire prone areas*

State Land Information Portal (SLIP) (2018) Map of Bushfire Prone Areas. Office of Bushfire Risk Management (OBRM) data retrieved from:
https://maps.slip.wa.gov.au/landgate/bushfireprone/

Appendices

Appendix 1: Draft Governance Model for AMP

Appendix 2: Flora survey vegetation complex mapping and vegetation condition mapping (BDS, 2018)

Appendix 3: Vegetation classifications to AS3959

Appendix 4: Bore Test Certificate

Appendix 5: BDS Risk Assessment AMP

Appendix 6: CAMS OSH policy and risk assessment template

Appendix 7: Access options

Appendix 8: Bushfire Emergency Evacuation Plan

Appendix 9: ELA Method 2 BAL Calculations ELA

Appendix 10: WAPC APZ standards

Appendix 11: ELA peer review

Appendix 1

Draft governance model AMP

ALBANY MOTORSPORT PARK

1 DRAFT GOVERNANCE MODEL

Once purchased, the property, tracks and all permanent facilities and infrastructure constructed on the property will be owned by the City of Albany. The Albany Motorsport Park (AMP) will then be leased to an operator-manager by the City of Albany, with all operational and maintenance activities to be conducted by the operator-manager.

The operator-manager of the AMP is to be a “not-for-profit” company consisting of a Board of Management and no other shareholders. Although the name has yet to be firmly defined, the current title for reporting purposes is Albany Motoring Venues Inc. (AMV). A Chairman of the Board of Directors will be elected by the directors.

1. AMV to have 6 Directors and no general members:
   - 2 representing the City of Albany;
   - 1 representing Department of Local Government, Sport and Cultural Industries;
   - 1 representing Great Southern Street Machine Association;
   - 1 representing Albany Motorcycle Club;
   - 1 representing Albany Cycling Club.

2. Directors to be nominated by the City of Albany CEO to a two year term and to have appropriate business management skills.

3. AMV to employ a full-time venue manager.

4. AMV leases the AMP from CoA on agreed terms.

5. AMV to be responsible for:
   - management and maintenance of the infrastructure;
   - operation of the venue to the various user groups;
   - marketing the venue;
   - establish an ongoing maintenance fund;
   - ensure the venue is profitable;
   - reporting to CoA.

6. AMV to produce and administer a “Venue Procedures Manual”.

7. AMV to produce and administer a “Code of Conduct Manual”.

8. AMV to ensure users of the venue have the appropriate training and qualifications.

9. AMV to ensure the tracks are certified by CAMS, MA and ANDRA.

10. AMV to purchase and have available the required maintenance equipment.

11. Grounds maintenance to be carried out by trained volunteers.

This model is in line with and has been developed to adhere to Government of Western Australia Public Sector Commission guidelines and framework for good governance for WA boards and committees. The model is also based heavily on the success of the Collie Motorplex, which has demonstrated ability for ongoing sustainability and avoids key issues associated with similar facilities run by clubs, such as poor scheduling of events, conflicts of interest and event bias. In particularly, the model avoids well known critical conflicts and poor asset management and operations capacity demonstrated by the WA Sporting Car Club, responsible for the operations of Barbagallo Raceway in Neerabup.

GREAT SOUTHERN MOTORPLEX GROUP Inc.
14 MARCH 2019
(comments have been extracted from Keston Technologies “Business Plan for the Management and Operation of the Proposed Albany Motorsport Park, Down Road, Drome, WA” dated February 2019)

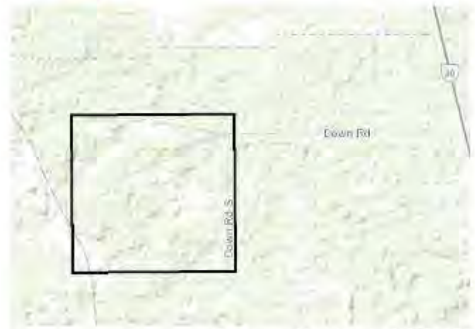
Appendix 2

Flora Vegetation Complexes and Vegetation Condition Mapping



480

BIO DIVERSE SOLUTIONS
29 Hercules Crescent
Albany, WA 6330
Australia
Tel: 08 9842 1575
Fax: 08 9842 1575



Overview Map Scale 1:100,000

Legend

- Subject Site
- Cadastre
- 5m Contours
- Vegetation Releves

Vegetation Complexes

- Jarrah/Sheoak/Eucalyptus staeri Sandy Woodland
- Jarrah/Marri/Sheoak Laterite Forest
- Homalospermum firmum/Callistemon glaucus Peat Thicket
- Melaleuca preissiana Low Woodland
- Open paddock / agricultural land
- Miscellaneous Drainage Woodland/Shrubland

Scale
1:8,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
PO Box 484
Albany, WA 6331

Vegetation Complexes Mapping

Assessor	QA Check	Drawn by
EH	KK	BT
STATUS	FILE	DATE
FINAL	MSC0137-002	06/02/2019

REPORT ITEM DIS 164 REFERS



BIO DIVERSE SOLUTIONS
29 Hercules Crescent
Albany, WA 6330
Australia
Tel: 08 9842 1575
Fax: 08 9842 1575



Overview Map Scale 1:100,000

Legend

- Subject Site
- Cadastre
- 5m Contours

Vegetation Condition

- Completely Degraded
- Very Good
- Excellent
- Pristine

Scale
1:8,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
PO Box 484
Albany, WA 6331

Vegetation Condition Mapping

Assessor	QA Check	Drawn by
EH	KK	BT
STATUS	FILE	DATE
FINAL	MSC0137-002	13/12/2018

REPORT ITEM DIS 164 REFERS

Appendix 3

Vegetation Classifications to AS3959

Vegetation classification to AS3959

Site Details			
Address:	Lot 5780 Down Road		
Suburb:	Drome	**State:**	W.A.
Local Government Area:	City of Albany		
Stage of WAPC Planning	Scheme Amendment and Rezoning		
Report use:	Preparation of the BMP for AMP		

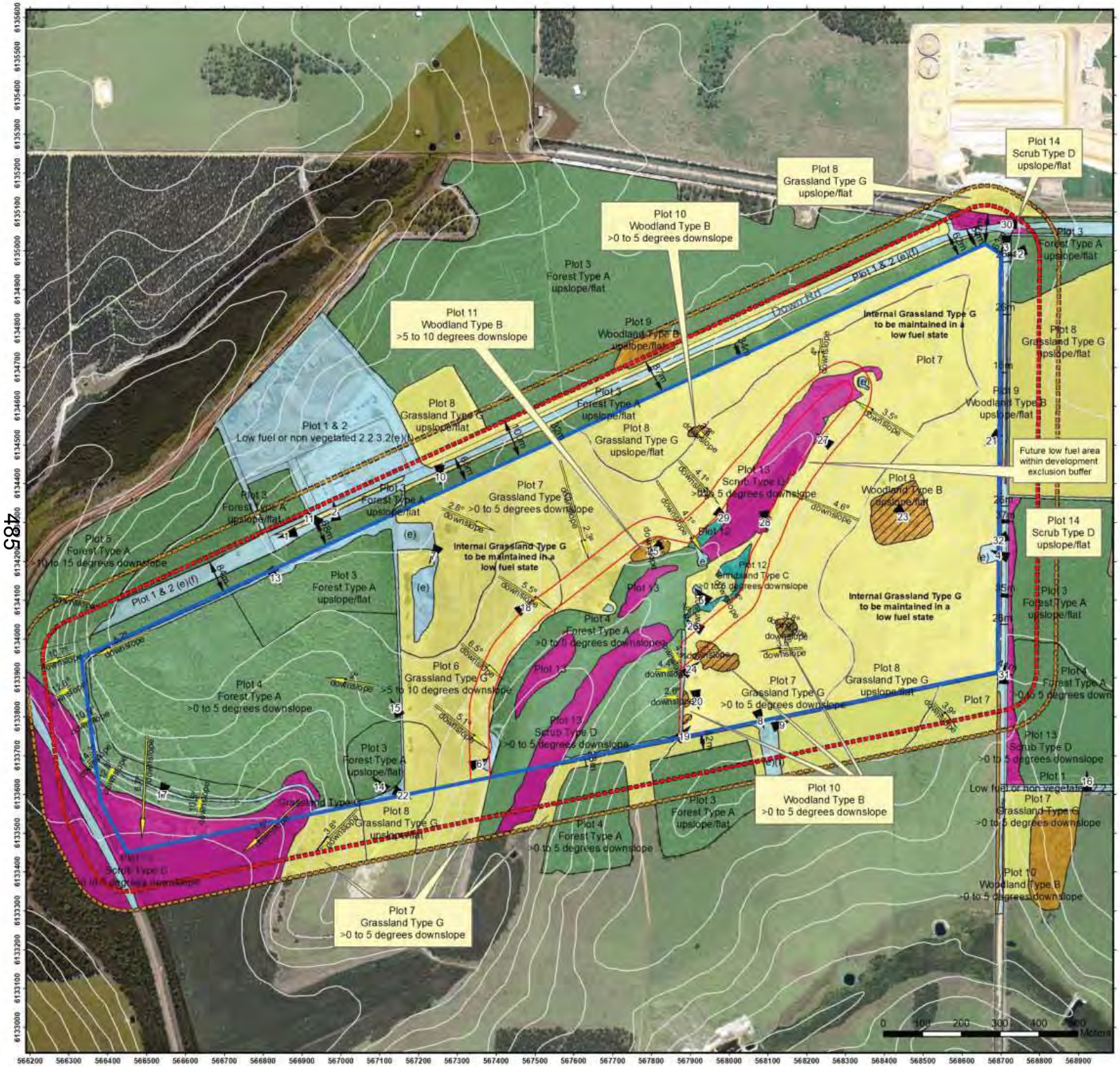
BMP Plan Details			
Report / Job Number:	COA0020	**Report Version:**	FINAL
Assessment Date:	14/02/2019	**Report Date:**	10/05/2019
BPAD Practitioner	Kathryn Kinnear	**Accreditation No.**	BPAD 30794

BIO DIVERSE SOLUTIONS

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

Vegetation Classification

Site assessment occurred on the 14th February 2019 by Kathryn Kinnear (BPAD 30794). All vegetation within 150m of the site / proposed development was classified in accordance with Clause 2.2.3 of AS 3959. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified in the following pages and shown on the Vegetation Classes Map Page 2.



485

This BAL Plan was prepared by:
Kathryn Kinnear, Bio Diverse Solutions
Accreditation No. BPAD30794
Jurisdiction: Level 2 - WA

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

BIO DIVERSE SOLUTIONS

29 Hercules Crescent
Albany, WA 6330
Australia
Tel: 08 9842 1575
Fax: 08 9842 1575



Overview Map Scale 1:100,000

Legend

- Subject Site
- 100m Assessment Boundary
- 150m Assessment Boundary
- Cadastre
- 5m Contours
- Low Fuel Buffer
- Future Low Fuel
- Separation Distance
- Slope Degrees

Vegetation

- Forest Type A
- Woodland Type B
- Shrubland Type C
- Scrub Type D
- Grassland Type G
- Low fuel or non vegetated 2.2.3.2

Scale
1:9,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
Lot 5780 Down Road
Drome, WA 6330

Vegetation Classes

BAL Assessor	QA Check	Drawn by
KK	KK	BT
STATUS	FILE	DATE
FINAL	COA0020	10/05/2019

REPORT ITEM DIS 164 REFERS

Plot	1	Classification or Exclusion Clause	Low fuel or non-vegetated areas exclusion 2.2.3.2 (e)



Location: Internal and external to the site.

Description: Hardstand areas, roads, driveways, dams, and buildings. Excluded as per AS3959 exclusion clause 2.2.3.2 (e).

Photo Id 1: View of Down Road to the west where it terminates west of Plantation Energy site.

Plot	1 cont.	Classification or Exclusion Clause	Low fuel or non-vegetated areas exclusion 2.2.3.2 (e)



Additional Photo of Plot 1.

Photo Id 2: View to the north of the Plantation Energy site.

Plot	1 cont.	Classification or Exclusion Clause	Low fuel or non-vegetated areas exclusion 2.2.3.2 (e)



Additional Photo of Plot 1.

Photo Id 3: View to the south along Down Road South.

Plot	1 cont.	Classification or Exclusion Clause	Low fuel or non-vegetated areas exclusion 2.2.3.2 (e)



Additional Photo of Plot 1.

Photo Id 4: View of existing internal dam located along eastern boundary.

Plot	1 cont.	Classification or Exclusion Clause	Low fuel or non-vegetated areas exclusion 2.2.3.2 (e)



Additional Photo of Plot 1.

Photo Id 5: View of existing internal dam/soak located in the central creek area.

Plot	1 cont.	Classification or Exclusion Clause	Low fuel or non-vegetated areas exclusion 2.2.3.2 (e)



Additional Photo of Plot 1.

Photo Id 6: View of existing internal dam/soak located along the southern boundary.

Plot	1 cont.	Classification or Exclusion Clause	Low fuel or non-vegetated areas exclusion 2.2.3.2 (e)



Additional Photo of Plot 1.

Photo Id 7: View of hardstand area in the north west of the site.

Plot	2	Classification or Exclusion Clause	Low fuel or non-vegetated areas exclusion 2.2.3.2 (f)



Location: Located around existing buildings to the south and north of the subject site. Along established firebreaks.

Description: Maintained vegetation & low fuel areas associated with existing surrounding farms and development sites. Includes low fuel firebreaks.

As per exclusion clause 2.2.3.2 (f) of AS3959.

Excluded as per AS3959 exclusion clause 2.2.3.2 (f).

Photo Id 8: View to the south/south east of adjacent farm/shed area.

Plot	2 cont.	Classification or Exclusion Clause	Low fuel or non-vegetated areas exclusion 2.2.3.2 (f)



Additional Photo of Plot 2.

Photo Id 9: View along the southern boundary showing low fuel fire break and adjacent driveways access maintained in a low fuel condition.

Plot	3	Classification or Exclusion Clause	Forest Type A



Location: Located internal to the subject site in the north and south east corners of the western remnant vegetation block. External to the site in the north, and north east.

Separation Distance: Nil internal,

Description: Jarrah, Marri and Sheoak low forest. Midstorey dominated by *Banksia, Agonis, Hakea* and *Leucopogon*. Understorey of native shrubs, sedges and grasses. Multilayered. Includes Blue gum plantations external to the site.

Average vegetation height: 8 -13m.

Vegetation Coverage: 30-70%.

Available fuel loading: 25-35t/ha.

Effective slope: Upslope.

Photo Id 10: View to the south of fringing vegetation along Down Road.

Plot	3 cont.	Classification or Exclusion Clause	Forest Type A
			**Additional Photo of Plot 3.**

Photo Id 11: View to the north west of Blue Gum Plantations located north of Down Road.

Plot	3 cont.	Classification or Exclusion Clause	Forest Type A
			**Additional Photo of Plot 3.**

Photo Id 12: View to the west of Forest Type A along Down Road South.

Plot	3 cont.	Classification or Exclusion Clause	Forest Type A



Additional Photo of Plot 3.

Photo Id 13: View to the south east of internal Forest located in the north west of the site.

Plot	3 cont.	Classification or Exclusion Clause	Forest Type A



Additional Photo of Plot 3.

Photo Id 14: View to the north west of Forest Type A located in the south west (internal) of the site.

Plot	4	Classification or Exclusion Clause	Forest Type A



Location: Internal in remnant vegetation along creekline and in the remnant to the west. External to the east and south east.

Separation distance: Nil internal and 35-41m to the east.

Dominant species & description: Jarrah, Marri and Sheoak low forest. Midstorey dominated by *Banksia, Agonis, Hakea* and *Leucopogon*. Understorey of native shrubs, sedges and grasses. Multilayered. In creekline dominated by *Taxandria linearfolia* and Native Willow

Average vegetation height: 8-13m.

Vegetation Coverage: 30-70%.

Available fuel loading: 25-35t/ha.

Effective slope: Downslope >0 to 5 degrees.

Photo Id 15: View to the north west of Forest Type A.

Plot	4 cont.	Classification or Exclusion Clause	Forest Type A



Additional Photo of Plot 4.

Photo Id 16: View to the north of Forest Type A located to the east/south east of the site in private property.

Plot	5	Classification or Exclusion Clause	Forest Type A



Location: Internal to the subject site along a ridge in the western remnant vegetation block. Extends to the north of the subject site. Recently burnt (May 2018 bushfires).

Separation distance: Nil.

Dominant species & description: Jarrah, Marri and Sheoak low forest. Midstorey dominated by *Banksia, Agonis, Hakea* and *Leucopogon*. Understorey of native shrubs, sedges and grasses. Multilayered.

Average vegetation height: 8-13m.

Vegetation Coverage: 30-70%.

Available fuel loading: 28-35t/ha.

Effective slope: Downslope > 10 to 15 degrees.

Photo Id 17: View to the south of Forest Type A recently burnt (May 2018).

Plot	6	Classification or Exclusion Clause	Grassland Type G



Location: Internal to the west of the creekline area.

Separation distance: Nil.

Dominant species & description: Kikuyu, Cape Weed, Clovers, *Hypochaeris sp.,* and patches of Fiddle Dock, Inkweed and Burr (mainly in rehabilitated areas.

Average vegetation height: 50-500mm.

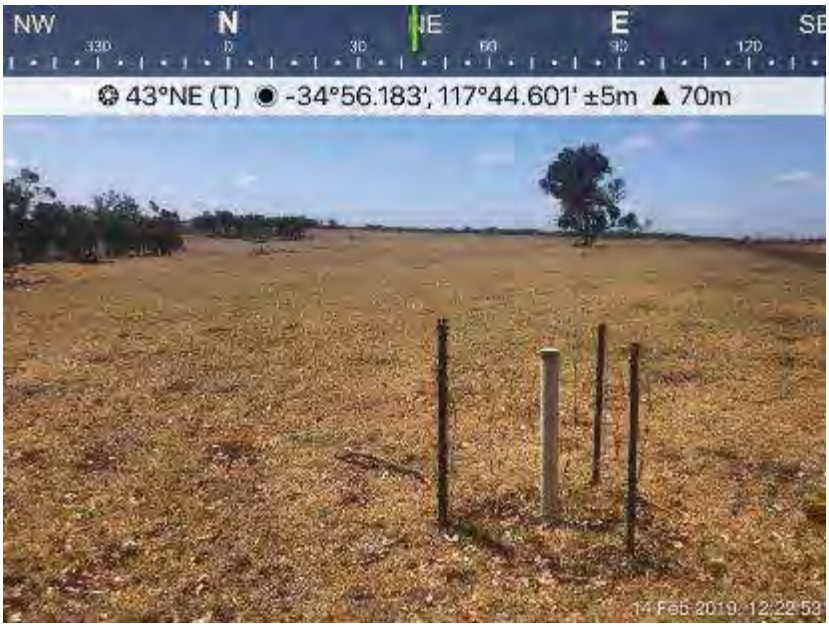
Vegetation Coverage: <10% trees.

Available fuel loading: 4.5t/ha.

Effective slope: Downslope >5 to 10 degrees.

Photo Id 18: View to the north east of internal paddock areas in the west of the subject site.

Plot	7	Classification or Exclusion Clause	Grassland Type G



Location: Internal to the site in the east, north and west, also located to the south in adjacent property.

Separation distance: Nil internal, 0-6m to the south.

Dominant species & description: Kikuyu, Cape Weed, Clovers, *Hypochaeris sp.,* and patches of Fiddle Dock, Inkweed and Burr (mainly in rehabilitated areas.

Average vegetation height: 50-500mm.

Vegetation Coverage: <10% trees.

Available fuel loading: 4.5t/ha.

Effective slope: Downslope >0 to 5 degrees.

Photo Id 19: View to the north east of internal paddock areas from the southern boundary.

Plot	7	Classification or Exclusion Clause	Grassland Type G



Additional Photo of Plot 7.

Photo Id 20: View of Plot 7 on the eastern side of the remnant vegetation (Plot 4), note rocky ground.

Plot	8	Classification or Exclusion Clause	Grassland Type G



Location: Internal to the site to the east. To the north, south and east of the subject site in adjacent properties and road reserves.

Separation distance: Nil internal, 26m to the east, 0-6m to the south and 32-71m to the north.

Dominant species & description: Kikuyu, Cape Weed, Clovers, *Hypochaeris sp.,* and patches of Fiddle Dock, Inkweed and Burr (mainly in rehabilitated areas.

Average vegetation height: 50-500mm.

Vegetation Coverage: <10% trees.

Available fuel loading: 4.5t/ha.

Effective slope: Upslope.

Photo Id 21: View along internal fenceline in the east (central) area of internal paddocks.

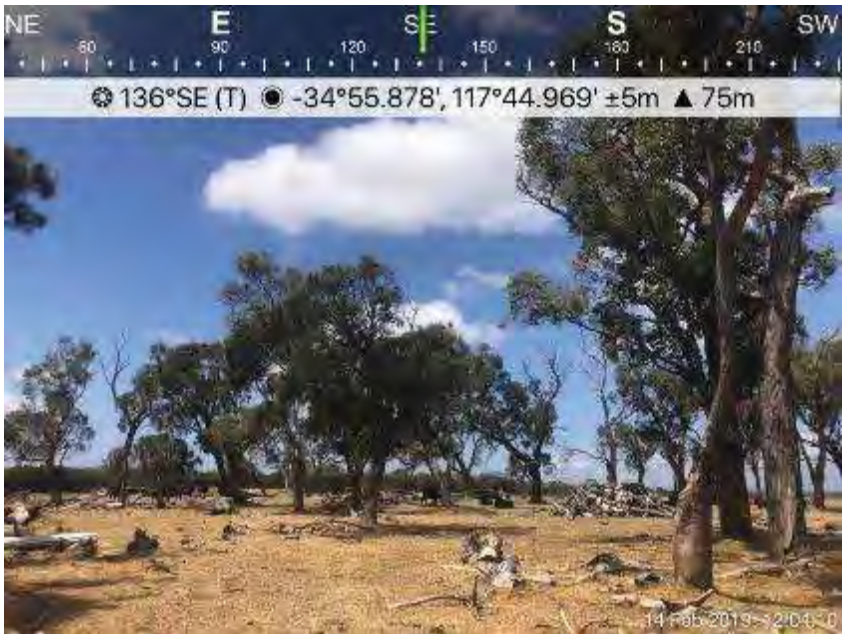
Plot	8	Classification or Exclusion Clause	Grassland Type G



Additional Photo of Plot 8.

Photo Id 22: View to the south east along ridgeline located south/south west of the subject site.

Plot	9	Classification or Exclusion Clause	Woodland Type B (06)



Location: Internal to the site in small isolated patches. North in adjacent property and east along Down Road South.

Separation distance: Nil internal and Down Road South, 87m to the north.

Dominant species & description: Stands of Marri and Jarrah trees in open paddock areas. Grazed and disturbed understorey. Not multilayered.

Average vegetation height: 12-15m.

Vegetation Coverage: 10-30%.

Available fuel loading: 15-25t/ha.

Effective slope: Upslope.

Note: Central paddock areas will be maintained as low fuel near track and facilities.

Photo Id 23: View to the south east through open woodland areas (central paddock areas in the east).

Plot	9 cont.	Classification or Exclusion Clause	Woodland Type B (06)



Additional Photo of Plot 9.

Photo Id 32: View along Down Road South.

Plot	10	Classification or Exclusion Clause	Woodland Type B (06)



Location: Internal to the site in small isolated patches.

Separation distance: Nil.

Dominant species & description: Stands of Marri and Jarrah trees in open paddock areas. Grazed and disturbed understorey. Not multilayered. Noted as future low fuel.

Average vegetation height: 12-15m.

Vegetation Coverage: 10-30%.

Available fuel loading: 15-25t/ha.

Effective slope: Downslope >0 to 5 degrees.

Photo Id 24: View to the north east through Plot 10.

Plot	11	Classification or Exclusion Clause	Woodland Type B (06)



Location: Internal to the subject site situated the north of the creek.

Separation distance: Nil.

Dominant species & description: Stands of Marri and Jarrah trees in open paddock areas. Grazed and disturbed understorey. Not multilayered. Noted as future low fuel.

Average vegetation height: 12-15m.

Vegetation Coverage: 10-30%.

Available fuel loading: 15-25t/ha.

Effective slope: Downslope >5 to 10 degrees.

Photo Id 25: View to the south west through Plot 11 located on the north of the central creek area.

Plot	12	Classification or Exclusion Clause	Shrubland Type C



Location: Internal to the site situated along creek line area.

Separation distance: Nil.

Dominant species & description: Taxandria, Homalospermum, Callistemon, native sedges and introduced grasses.

Average vegetation height: 1-1.5m.

Vegetation Coverage: 30% foliage cover.

Available fuel loading: 15t/ha.

Effective slope: Downslope >0 to 5 degrees.

Photo Id 26: View through Shrubland Type C located around central creek area (southern edge).

Plot	13	Classification or Exclusion Clause	Scrub Type D



Location: Internal in creek area.

Separation distance: Nil.

Dominant species & description: *Melaleuca, Callistemon, Homalospermum*, *Banksia*, *Taxandria, Acacia* and native sedges.

Average vegetation height: 3-4m.

Vegetation Coverage: >30% foliage cover.

Available fuel loading: 25t/ha.

Effective slope: Downslope >0 to 5 degrees.

Note: Although this currently presents as Shrubland Type C, future revegetation within the creek area is expected to result in Scrub Type D vegetation type.

Photo Id 27: View through future Scrub Type D located around central creek area (eastern edge).

Plot	13 cont.	Classification or Exclusion Clause	Scrub Type D
			**Additional Photo of Plot 13.**

Photo Id 28: View of Scrub Type D located along central creek area (southern edge). Note 4m height staff.

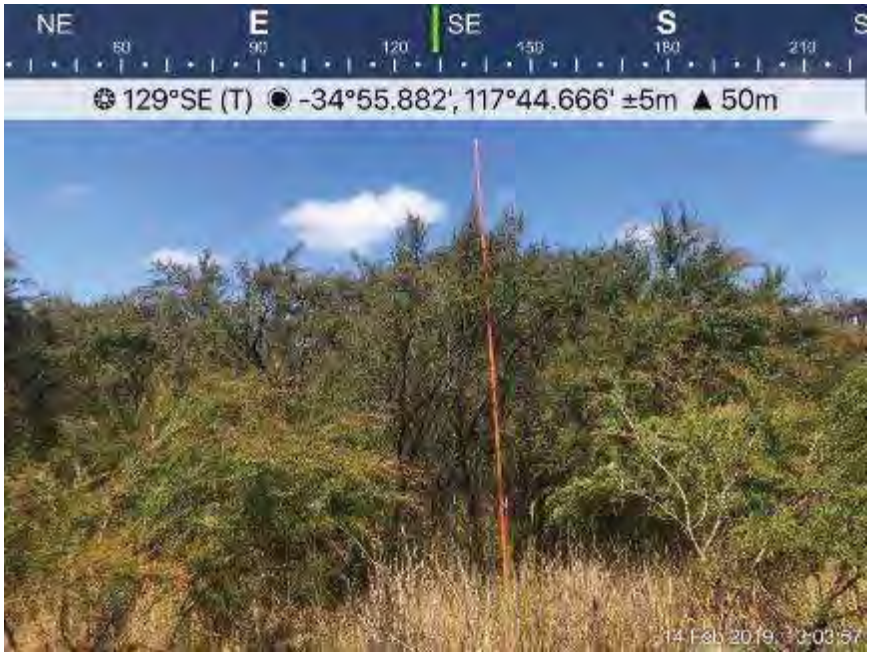
Plot	13 cont.	Classification or Exclusion Clause	Scrub Type D
			**Additional Photo of Plot 13.**

Photo Id 29: View through Plot 13 on the northern side of the central creek area. Note 4m height staff.

Plot	14	Classification or Exclusion Clause	Scrub Type D



Location: External to the east along Down South Road and to the North at the Down Road and Down Road South intersection.

Separation distance: 26m to the east 54-63m to the north.

Dominant species & description: Predominately Taxandria (Tea tree) and Taylorina, some native sedges and introduced grasses.

Average vegetation height: 2-4m.

Vegetation Coverage: >30% foliage cover.

Available fuel loading: 25t/ha.

Effective slope: Upslope.

Photo Id 30: View along Down Road at the intersection of Down Road South (note 1.5m high sign).

Plot	14 cont.	Classification or Exclusion Clause	Scrub Type D



Additional Photo of Plot 14..

Photo Id 31: View along Down Road of adjacent property, low fuel firebreak in foreground, regrowth Tea Tree Scrub in background.

Comments on Vegetation Classifications:

- Distances from vegetation were made based on surface fuels to edge of lot (subject site) boundary;
- Effective slopes were measured in the field using a Nikon Forestry Pro and represented on the respective plots;
- Method 1 (AS3959) Simplified procedure was used for vegetation classification Assessment process;
- All vegetation was classified within the subject site and within 150m of the lot boundaries to AS3959 Table 2.3; and
- The perimeter of the vegetation was measured using field GPS and notations on field GIS maps.

CERTIFICATION

I hereby certify that I have undertaken the assessment of the above site and determined the Bushfire Attack Level stated above in accordance with the requirements of AS 3959 (Incorporating Amendment Nos 1, 2 and 3).

SIGNED, ASSESSOR: .... DATE: 10/05/2019

Kathryn Kinnear, Bio Diverse Solutions
Accredited Level 2 Bushfire Practitioner (Accreditation No: BPAD30794)

Appendix 4

Bore water supply test certificate

WA DRILLING SERVICES

Details of Person carrying out the works

Driller	Phil Putland		
Driller License	48	Driller Classification	Class 2
Address	PO Box 5150 ALBANY WA 6331		
Telephone	0427 882 561		
Email	danic@omninet.net.au		

Location of Well

Client	City of Albany
Address	Po Box 484
	Albany WA 6330
Location	Proposed motor race track Downe Rd

S3493037	
E11773965+.7	

Construction Details (all measurements taken from ground level)

Production casing detail					
Material	Nominal bore	Diameter O.D (mm)	Wall thickness (mm)	Depth From (m)	Depth To (m)
PVC	100mm	114mm	7mm	0	17
				23.78	35.78

Screen/slots				
Screens/slot (type)	Diameter O.D. (mm)	Aperture (mm)	Top of screen (m)	Bottom of screen (m)
PVC	114mm	.5mm	17.78	23.78
Open Hole				

Gravel pack details		
Gravel size	From (m)	To (m)
.85-2mm	20	35.78

Annular Fill		
Material Type	From (m)	To (m)
Drill cuttings		
Bentinite Pellets	19	20

Cementing detail		
Casing diameter (mm O.D.)	Depth	
	From (m)	To (m)
5%Cement Bentinite Grout	19	0
Head works Concrete Block	.500mm x .500mm	

From (m)	To (m)	Strata description
0	2	Sandy clay with gravel
3	5	sandy clay
6	9	clayey sand
10	12	silty sandy clay
13	28	siltstone sandstone
29	32	clay dark grey, Werillup Formation
32	40	clay and shale siltstone
40	EoH	basement granite

Particulars of well

Drilling start: 09-05-19 Drilling completion: 10-05-19

Drilling method used:
- [ ] Rotary air
- [x] Rotary mud
- [ ] Other

Well Development

Duration of development	3hrs
Conductivity	110m/s
Recommended Supply	2ltrs sec
SWL TOC	7.720mtrs
Drawdown	20mtrs
Recommended Pumping	100ltrs min
Set Pump	21mtrs

Appendix 5

Risk Assessment AMP

Albany Motorsport Park Risk Assessment

Risk No.	Hazard -Bushfire originating/causing fire	Probability of event occurring	Exposure of Visitors	Possible consequences if event occurs	Risk rating	Control measure
Internal to the site						
1	Ignition Vehicles/Bikes combusting on track due to crashes Inc fuel or oil line leaks on track	Almost Certain	Occasional	Very serious	Substantial/high	• Low fuel grass areas • Buffer areas low fuel to vegetation • Requirements outlined in Operators safety manual (CAMS) • Fire extinguishers located around the track and pit areas. • Safety crews on site every meeting and fire unit for unsupervised non track days during summer. • Spark arrestors on Motocross bikes. • No events on Total fire ban periods and Catastrophic & Extreme FDI. Consider twilight events. • Restrict public access and vehicle movement near the central creek area (safety and fire crews only).
2	Grinding sparks in pits or near fuel sources (hot works)	Very unlikley (designated re-fuelling areas)	Rare	Disaster	Low risk	• Operators safety manual (CAMS). • No storage of fuels on site. • Designated re-fueling areas (controlled zone). • Fire extinguishers strategically located. • Fire extinguishers each event participant. • Requirements outlined in Operators safety manual (CAMS). • Ensure control measures instigated during unsupervised non track days during summer.
3	Smoking public viewing areas or in pits near fuels	Unlikely (smoke free site)	Rare	Disaster	Low risk	• No smoking on site • Fire extinguishers strategically located. • Security enforcement to general public.
4	Vehicles (exhausts) near dry vegetation or slashing/mowing rocky ground (maintenance)	Likely	Rare	Very serious	Low risk	• Operations manual to define slashing procedures • Fast attack unit on site. • No slashing on high winds and hot days, Total fire ban periods and Catastrophic & Extreme FDI. • Observe no vehicle movement bans and total fire bans in Operators safety manual (CAMS).

Risk No.	Hazard -Bushfire originating/causing fire	Probability of event occurring	Exposure of Visitors	Possible consequences if event occurs	Risk rating	Control measure
Internal cont.						
5	Electrical faults building faults	Possible	Occasional	Very serious	Moderate	• New buildings to be constructed, less risk of faults. • Regular building inspections. • Compliance in new building, safety certification on electrical elements. (regulated) • All buildings built to BAL 29 on site.
6	Electrical faults from extension cords/cables (pits/trailers)	Possible	Occasional	Very serious	Moderate	• Worksafe procedures in place - Tagged and tested extension cords only from all event participants. • Fire extinguishers strategically located in pit area and with each event participant. • RCD protection on all power supply on site. (regulated). • Pit inspections & participant gear inspections for compliance during events.
7	Re-fuelling area (designated and controlled)	Likely	Occasional	Very serious	Very high risk	• Designated area for each site. • Low fuel non-combustible area. • Requirements outlined in Operators safety manual (CAMS) • Safety crews on site every meeting. • Fire unit for unsupervised non-track days during summer. • No events on Total fire ban periods and Catastrophic & Extreme FDI. • Restrict public access and vehicle movement near refuelling area.
8	Substandard race vehicles using the facility	Remotely possible	Very rare	Serious	Low risk	• Race scrutineering controls • Designated practice area • Requirements outlined in Operators safety manual (CAMS) •

Risk No.	Hazard -Bushfire originating/causing fire	Probability of event occurring	Exposure of Visitors	Possible consequences if event occurs	Risk rating	Control measure
Internal cont.						
9	Re-ignition of previously controlled fires (peat Central creek area)	Possible	Infrequent	Very serious/Disaster	Substantial	• No controlled burning in creek area. • Restrict public access and vehicle movement near the central creek area (safety and fire crews only). • Barriers non combustible material to central creek area. • Access (FSA) to creek/remnant vegetation area from fire crews, turnarounds and 6-8m wide horizontal clearance, 4m trafficable surface. • Gates for fire access. • Low fuel buffer areas (50m) from vegetated areas. • No hazard reduction burning in central creek/remnant vegetation area. • 8m firebreak around central remnant vegetation area to restrict grass fires from entering the area.
10	Water pump failure causing spark/ignition	Possible	Infrequent	Very serious/Disaster	Substantial	• Ensure pumps adjacent bores are regularly maintained and inspected. • Located in low fuel area, non-combustible materials • No fuel storage near. • Not located near buildings.
11	Gas Barbecues and camp fires causing ignition (unattended, faulty)	Very likely	Occasional	Very serious/Disaster	High risk	• No camping on site • No barbeques, unless in organized near kitchen (register) facility. • Condition on lease • No informal BBQ's from participants • Inspections in pit areas. • Requirements outlined in Operators safety manual (CAMS) • CoA licensed vendors for food catering
12	Tire barriers igniting from crash from vehicle	Very likely	Occasional	Very serious/Disaster	High risk	• Tires to be placed in accordance with DFES practice note • Use concrete barriers and sand traps instead of tire barriers • No storage of tyres on site. • Refer to DFES guideline of storage of tires.

REPORT ITEM DIS 164 REFERS

Risk No.	Hazard -Bushfire originating/causing fire	Probability of event occurring	Exposure of Visitors	Possible consequences if event occurs	Risk rating	Control measure
External						
13	Re-ignition of previously controlled fires (May and November non-prohibited periods)	Very likely	Occasional	Serious injury	Moderate	• Monitor and liaison with brigade fire control officer. • Restrictions of burning within 20m of site? • Monitor weather conditions prior to event, documented in operations manual and fire warden for site. • Liaison with neighbours during summer periods. • Scheduling of events - No events on Total fire ban periods and Catastrophic & Extreme FDI. Consider twilight events.
14	External: Ignition from trains under heavy loads sparks associated with braking	Conceivable but very unlikely	Rare	Serious	Low risk	• Train movements low • Low fuel areas adjacent to railway • Monitor weather conditions prior to event, documented in operations manual and fire warden for site. • Liaison with neighbours during summer periods.
15	External: Aircraft Crash	Conceivable but very unlikely	Rare	Serious	Low risk	• Flight path 1km west • Plane movements mostly through weekdays • Monitor weather conditions prior to event, documented in operations manual and fire warden for site.
16	External: Western powerlines transmission	Very likely	Occasional	Very serious	High risk	• Underground power supply to site? • Major transmission lines to the east • Monitor weather conditions and fires in area • Liaison with Chief Fire Control Officer • Radio for Warden?
						•

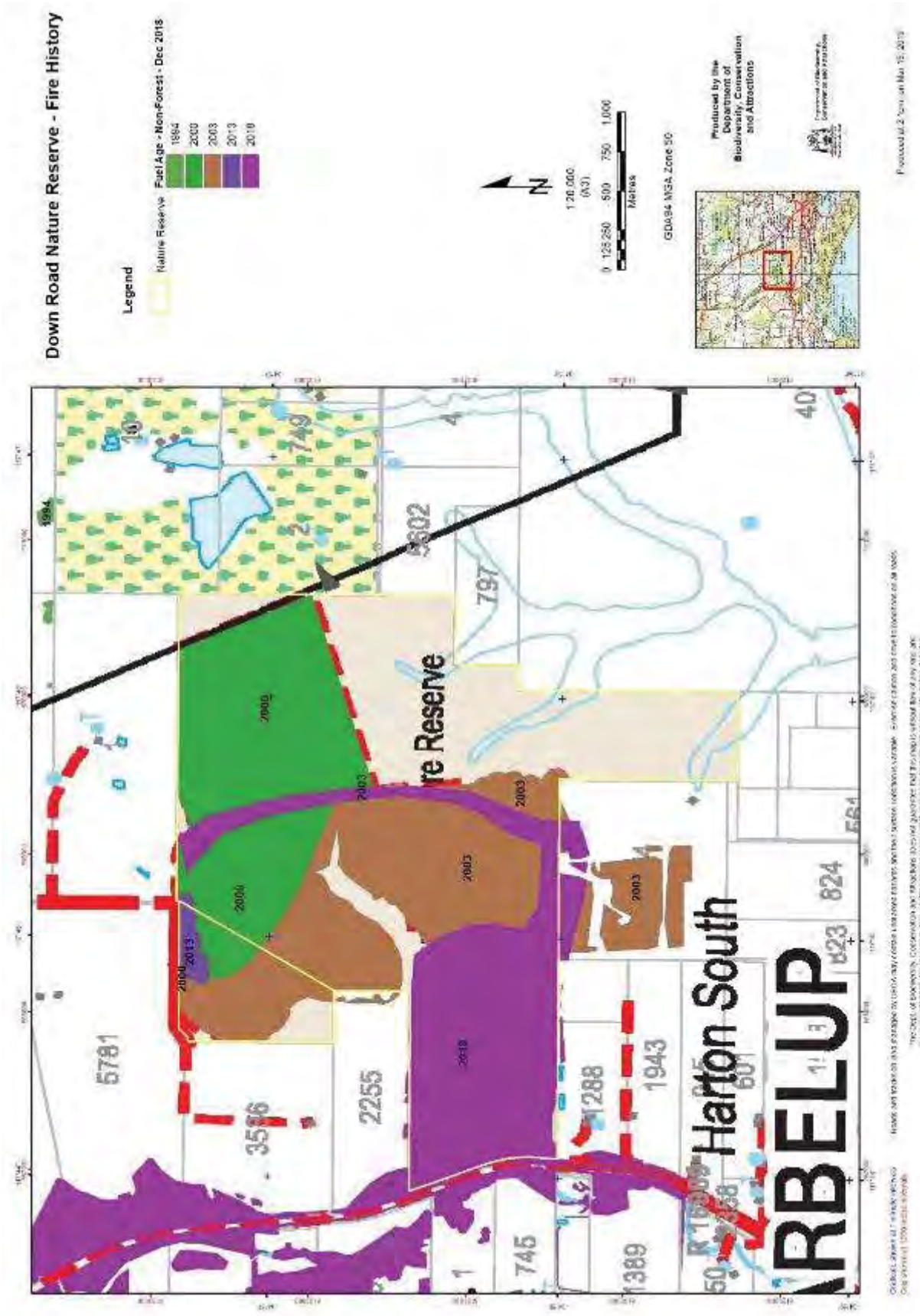
Risk No.	Hazard -Bushfire originating/causing fire	Probability of event occurring	Exposure of Visitors	Possible consequences if event occurs	Risk rating	Control measure
External						
17	External: Ignition from stockpiled woodchips north of site	Very likely	Occasional	Very serious	High risk	• Plantation energy stockpiles of woodchips • Safety measures and fire control procedures in place. • Low fuel environment north f subject site. • Water supply in lease area of subject site for sprinkler system • Storage controls for woodchips, monitors and wardens in place. • No woodchips stored on Motorsport park site. • Copy of emergency response procedure to Albany motorsport park • Liaison with APEC and plantation energy.
18	External: Ignition from Blue gum slash burning (cause of May 2018 fire)	Very likely	Occasional	Very serious	High risk	• Monitor and liaison with brigade fire control officer. • Restrictions of burning within 20m of site? • Monitor weather conditions prior to event, documented in operations manual and fire warden for site. • Liaison with neighbours during summer periods. • Scheduling of events - No events on Total fire ban periods and Catastrophic & Extreme FDI. Consider twilight events.
19	External and Internal: Lightning strikes	Very likely	Occasional	Very serious	High risk	• Monitor and liaison with brigade fire control officer. • Monitor weather conditions prior to event, documented in operations manual and fire warden for site. • Liaison with neighbours during summer periods. • Scheduling of events - No events on Total fire ban periods and Catastrophic & Extreme FDI. Consider twilight events.

Risk No.	Hazard -Bushfire originating/causing fire	Probability of event occurring	Exposure of Visitors	Possible consequences if event occurs	Risk rating	• Control measure
20	Illegally lit fires (deliberate)	Unusual but possible	Occasional	Very serious	Moderate risk	• Monitor and liaison with brigade fire control officer. • Monitor weather conditions prior to event, documented in operations manual and fire warden for site. • Liaison with neighbours during summer periods. • Scheduling of events - No events on Total fire ban periods and Catastrophic & Extreme FDI. Consider twilight events.

Probability – Almost Certain, Likely, Possible Unlikely
Exposure – Very rare, infrequent, occasional, frequent, continuous
Consequence- Catastrophe, Disaster, Very Serious, Serious, Important, Noticeable
Risk – Very High, High, Substantial, Moderate and Low

Data has been gathered from following sources:

- 20km radius of the subject site on originating fire causes (DBCA, CoA & DFES)
- CAMS risk register
- Great Southern Motorsport Group Inc (cross section of sporting codes)



Kindly provided by Department of Biodiversity Conservation and Attractions (2019)

Appendix 6

CAMS Occupational health and safety policy

Example of CAMS risk assessment forms

Occupational Health & Safety Policy

Scope

This policy applies to all CAMS Staff and Volunteers working for CAMS.

Policy Objective

This Policy shows CAMS' commitment to ensuring the health and safety of staff, contractors and volunteers who work for CAMS, and for minimising the risk to competitors, participants, officials, contractors, and visitors at CAMS Events, to the extent reasonably practicable.

Policy Statement

1. The Working Environment

CAMS will use its best endeavours to achieve a working environment that, to the extent reasonably practicable, eliminates or reduces risks to health and safety by:

- conducting risk assessments on hazards and risks relating to the work of Staff and Volunteers;
- monitoring the health and safety of Staff and Volunteers;
- seeking advice on safety matters when required;
- promoting safety and welfare to Staff and Volunteers;
- working with Staff who are returning to work after illness or injury to assist their rehabilitation;
- providing training to Staff on work health and safety on induction and then as required;
- providing training and instruction to Volunteers as to the safe performance of their work as required;
- ensuring contractors comply with their health and safety obligations by requiring them in CAMS contracts to address risks and have in place control measures to eliminate or reduce risks arising from their work;
- ensuring those conducting Permitted Events adopt any work health and safety policies required by CAMS and address risks and have in place control measures to eliminate or reduce risks arising from their Permitted Event/s;
- consulting with Staff and Volunteers on work health and safety matters;
- reporting to the Board Members on work health and safety.

2. The Motor Sport Environment

CAMS recognises that motor sport may present risks to the health and safety of competitors, officials, contractors, and visitors at CAMS Events. CAMS seeks to reduce those potential risks by:

- having a health and safety program ('the program'), which will protect and enhance the health and safety of all relevant CAMS stakeholders;
- having CAMS Board Members, Staff, Volunteers and CAMS-associated and affiliated organisations working together to develop and implement the program;
- providing training to Volunteers as required;
- applying the program at all CAMS Events and, to the extent possible, Permitted Events;
- reviewing the program annually or more frequently if required;
- reporting on compliance and implementation to the Board Members.

3. Procedures

3.1 Best Practice

CAMS aims to be recognised as the motor sport leader in safety as it relates to its Staff and Volunteers.

3.2 Leadership

All CAMS managers and those in leadership positions, including senior volunteers, will provide the leadership needed to reach these goals.

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3.3 Managers and Senior Volunteers

CAMS Managers and Senior Volunteers are committed to the provision and maintenance of a healthy and safe workplace, and to the extent reasonably practicable and as appropriate, will:

- consult and participate with CAMS Staff, Volunteers and associated stakeholders in the health and safety program;
- use risk identification, assessment and control principles to reach CAMS health and safety objectives;
- inform and train CAMS Staff and Volunteers and associated stakeholders in relevant policies, procedures and health and safety obligations;
- participate in CAMS induction and implement all safety procedures;
- allocate appropriate resources for the program.

3.4 Staff and Volunteers

CAMS Staff and Volunteers will:

- participate and support CAMS in its efforts to reach its health, safety and where relevant, rehabilitation objectives;
- follow reasonable health and safety instructions from managers, supervisors or senior volunteers;
- report any serious incidents, accidents, injuries or hazards in the workplace to supervisors or designated representatives;
- aim to work in a way that does not endanger the safety of themselves and/or others;
- properly use and maintain safety equipment;
- make sure other CAMS Staff and Volunteers and visitors follow safety rules in the workplace;
- participate in all CAMS induction programs when required, and follow all safety procedures.

3.5 CAMS Staff and CAMS Appointed Officials at Permitted Events

- CAMS Staff and CAMS Appointed Officials will conduct themselves in a safe manner and in line with local safety policies and procedures when attending Permitted Events on behalf of CAMS. In the absence of these, CAMS' organisational procedures will apply;
- CAMS Staff and CAMS Appointed Officials have the right to cease work at any Permitted Event if the staff member or CAMS Appointed Official has concerns that risks to health and safety have not been appropriately eliminated or reduced.

3.6 Consultation

CAMS consults on work health and safety with its Staff, Volunteers and stakeholders in a number of different ways and in accordance with any Consultation Policy.

3.7 Dispute Resolution

Any disputes as to work health and safety matters that are not addressed by other CAMS policies or procedures will be at the first instance addressed through informal mediation between the parties. If this is unsuccessful the CAMS CEO will refer the matter to formal mediation, and may then arbitrate the dispute if required.

Definitions

The following definitions apply to this policy:

Staff

A paid employee of CAMS who conducts work for CAMS including at CAMS Events and Permitted Events.

CAMS Appointed Officials

Officials appointed by CAMS to work at a CAMS Event or a Permitted Event, namely Stewards of Meetings, Race Directors, Technical Commissioners and any other official expressly appointed by CAMS.

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Contractor

A contractor or subcontractor engaged by CAMS.

Senior Volunteers

A volunteer who is a Board Member of CAMS, or a Chair of any CAMS Commission, Committee, State Executive, Working Group, Panel or is otherwise appointed by CAMS to a senior voluntary position.

Volunteers

Unpaid/Honorary representatives working for CAMS on authorised and approved CAMS business, including senior volunteers, Commission and Committee members and CAMS Appointed Officials.

Board Members (The Board)

Directors of the CAMS Board, which also includes the President and FIA delegate.

CAMS Events

Motor sport events conducted by CAMS excluding Permitted Events.

Permitted Events

Motor sport events that are not conducted by CAMS but are conducted pursuant to a licence, permit or authority issued by CAMS.

Note: OH&S Policies on specific issues

Policies, procedures, operational safety requirements and safe work methods on specific occupational health and safety issues, consistent with the principles in this policy, will be issued as appropriate.



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Sanctioned Event – Targeted Risk Assessment

Form TRA-01

Event / Venue		**Type of Work being performed** *e.g. refuelling, waving flag, walking to work area*
Area / Location		
Date		

RISK MATRIX	**Consequence**			
Likelihood	**1 Insignificant**	**2 Minor**	**3 Moderate**	**4 Major**
A - Almost Certain	High	High	*Extreme*	*Extreme*
B - Likely	Medium	High	High	*Extreme*
C - Possible	Low	Medium	High	*Extreme*
D – Unlikely	Low	Low	Medium	High

ACTIONS REQUIRED FOLLOWING ASSESSMENT OF RISK:

Extreme risk	Immediate actions required
High risk	Senior Management (Senior Event Official) attention needed
Medium risk	Management (Organiser) responsibility must be specified
Low risk	Manage by current procedures / continue current process

Note: "Management" and "Official" are considered to be like terms

See reverse for descriptions of Likelihood and Consequence outcomes

IDENTIFIED RISKS:

Description of identified Risks	Likelihood (A-D)	Consequence (1-4)	Resultant Risk	Controls / Treatment performed What has been done about it ?	Who will Implement?	Who will Check?	Who confirmed actions were completed (sign)
Example: spectator could be hit by debris from car	*C*	*3*	*HIGH*	*Debris fence, move spectators further back, additional crowd control officials*	*Organiser Marshals*	*Race Sec*	
1.							
2.							
3.							
4.							

REPORT ITEM DIS 164 REFERS

LIKELIHOOD/CONSEQUENCE DESCRIPTIONS:

Likelihood		Consequence	Personal Injury	Administrative
A - Almost certain	Action will probably occur numerous times or in many circumstances	4 – Major Consequence	Death, permanent or extensive injury requiring hospitalisation to one or more people.	Significant hardship to Organisation
B - Likely	Action may occur occasionally or in some circumstances	3 – Moderate Consequence	Serious injury requiring hospitalisation; broken limbs or stand down for duration of event	Significant rejigging of organisational plans required
C - Possible	Action may occur in exceptional circumstances and has been known to occur elsewhere	2 – Minor Consequence	Medical attention on-site or ongoing attention to injury may be required	Minor rearrangement of plans required to address the situation
D - Unlikely	Whist theoretically possible is not known to have occurred	1 – Insignificant Consequence	Minor first aid, if at all. No ongoing medical attention	Localised assessment of affected issue to be considered

POINTS TO REMEMBER:

What can cause injury or death?

- slips/trips
- Collapse of structures
- Dangerous or flammable Materials
- Electrical cables
- Heavy equipment
- Public access / egress / behaviour
- Weather (e.g. Rain / Hail / Wind / Thunderstorms)
- Projectiles

Four Risk Treatments

- Avoid: Don't do the activity
- Treat: Reduce by use of controls
- Accept: If low or if consequences can be tolerated.
- Transfer: (Caution – not possible to transfer duty of care.)

Levels of Control Methods

- Avoid ← Try to start here
- Substitute
- Isolate
- Reduce by physical controls
- Reduce by admin warning and rules
- Use Personal Protection Equipment ← Last resort

WHO DID YOU TALK TO IN ASSESSING AND IDENTIFYING THIS RISK?

Date	Name	Position	Signature

Completed by:_____ Signed:_____ Date:_____

Appendix 7

Access options AMP

Albany Motorsport Park Access Options

Option No.	Location/direction	Comments	Bushfire risks and features	Outcome/feasibility
Option 1	North to Redmond Road then east to Albany Highway PL 05775 PL 5774 PL5778	Originally desired by DFES and destination is Redmond VBFB Fire shed.	• Moderate BHL through the paddocks some small isolated patches of remnant vegetation extreme BHL. • Redmond VBFB Fire shed not a safe destination, shed is not attended. • Shed surrounded by Extreme BHL risks and no parking or facilities. • Redmond Road is narrow carriageway with Extreme BHL along the length (both sides Forest Type A). • 3.55km to construct to link Redmond Road to Down Road.	Land owner not willing to entertain idea of access on their land. Refer to letter from XXX. (? JVM) Not feasible.
Option 2	West from Down Road west to Marbelup Road P054723 RRnth-A Railway RRsth-PL02358 PL4117 PL4118	Undeveloped road reserve	• High slopes in excess of 15° west of down road prior to crossing railway line. • Railway to cross, not easily approved and costly to construct. • Low lying native vegetation (wetland) west of railway line. • Extensive native vegetation clearing in road reserve required to link public roads. • Extreme BHL with Extreme slopes to pass through. • 2.28km to construct from Down Road to Marbelup Rd.	Not deemed feasible due to large environmental constraints to overcome. Extreme Bushfire risks to overcome.
Option 3	South then linking east to Gun Road. D04385 PL00749 D0438451 D084694 Down Rd E NR 20948 PL01248 815	Formed CoA road then Class A Nature Reserve Down Road Nature Reserve 20948	• Extreme BHL to pass through in NR Reserve area. • Clearing native vegetation would be required in Class A Nature Reserve • Wetland/low lying areas to negotiate • Western powerline alignment? • 4.64 km to construct from Down Road South to Gunn Road	Not deemed feasible due to extensive environmental constraints in Class A nature Reserve to overcome. Extreme Bushfire risks to overcome.
Option 4	South along Down Road then east to Albany Highway PL 2026 D043845 PL04638 D084694	Formed CoA road then Private property and Water Corp land.	• Two areas of remnant vegetation at west end of PP on north of alignment (6m firebreak present) are extreme BHL • Paddock areas along majority of central area of route Mod BHL. • BG Plantations recently harvested on east end. • BG Plantation present Extreme BHL, however a 25m corridor can be achieved from plantations. • Sightlines at entry/exit point are good. • Eastern passing lane terminating. Traffic control would be required. • 4.07 km from Down Road South to Albany Hwy. • 1.8km Constructed all weather in W/C land. 2.27 Km to construct.	Water corporation and MRWA supports this arrangement in principle. See attached correspondence. Private Property owner in principle support. Most likely feasible option. 12m Easement in Gross refer to attached email from Jan Van Der Mescht.



This BAL Plan was prepared by:
Kathryn Kinnear, Bio Diverse Solutions
Accreditation No: BPAD30794
Jurisdiction: Level 2 - WA

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

BIO DIVERSE SOLUTIONS

29 Hercules Crescent
Albany, WA 6330
Australia
Tel: 08 8842 1575
Fax: 08 8842 1575



Overview Map Scale 1:100,000

Legend

- Subject Site
- Cadastre

Access Options

- Option 1
- Option 2
- Option 3
- Option 4

Scale
1:15,000@ A1
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2017
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
City of Albany
Lot 5780 Down Road
Drome, WA 6330

Access Options

BAL Assessor	QA Check	Drawn by
KK	KK	BT
STATUS	FILE	DATE
FINAL	COA0020	21/02/2019

REPORT ITEM DIS 164 REFERS

Hi Kath,

I can confirm that the secondary access for the AMP will be in the form of a 12m easement in Gross to Albany Highway from Down South Road as per Option 4 of the attached mapping.

We will now commence work on getting an "in principle agreement" from Lyndsay Black, Water Corporation and MRWA in place.

Regards

Jan Van Der Mescht / Manager Planning and Land Information Services

janv@albany.wa.gov.au
(08) 6820 3047
(08) 9841 4099
PO BOX 484, Albany, WA, 6331
102 North Road,Yakamia
www.albany.wa.gov.au



Please consider the environment before printing this email

From: Kathryn Kinnear <kath@biodiversesolutions.com.au>
Sent: Monday, 11 March 2019 11:10 AM
To: Jan Van Der Mescht <janv@albany.wa.gov.au>
Cc: Theo Newhouse <theo.newhouse@bigpond.com>; Michael Cole <michael.cole@albany.wa.gov.au>
Subject: AMP Secondary Access easement
Importance: High

Hi Jan
Can you please confirm via return written advice that the secondary access for the AMP will be in the form of a 12m easement to Albany Highway from Down South Road as per Option 4 of the attached mapping? AMP have indicated this emergency access will only operate with traffic control during events.

As per our stakeholder pre-application meeting with DFES and DPLH the other day, if you can provide some "in principle agreement" from Lyndsay Black, Water Corporation and MRWA that will greatly assist in the approvals process of the BMP report for AMP.

Kind regards,

Kathryn Kinnear
Director/Bushfire & Env. Consultant
29 Hercules Cres

Appendix 8

ELA Bushfire Emergency Evacuation Plan

1. Location details

Facility type:

- Motorsport Park in land zoned as "Priority Agriculture" area

Location:

- Lot 5780 Down Road, Drome, Western Australia

Infrastructure:

- A motorsport Park including a motorcycle track and raceway track plus associated buildings.

Occupation (number of people):

- Maximum occupants:
  - 200-500 people (club event)
  - 10,000 people (full event)

Access:

- Four different internal driveways accessing four separate points along Down Road West and Down Road South; and
- An Emergency Access Way is to be constructed to enable access/ egress to Albany Hwy. The EAW is to the south of Down Road South.

Fire Weather Forecast Area:

- South West Land Division Fire District
- Stirling Coast Region

2. Communications

Mobile:

- Mobile reception is available – however, mobile communications can become unreliable during bushfire/emergency events due to the volume of usage

Landline / NBN:

- Landline: to be confirmed
- Satellite phone: to be confirmed

Radio:

- ABC: 630 AM

Internet Sites:

- Preparing your Property – DFES Link
- Emergency WA – www.emergency.wa.gov.au
- DFES on Facebook - www.facebook.com/dfeswa
- DFES on Twitter - www.twitter.com/dfes_wa
- National Bushfires app - www.bushfireblankets.com/bushfire-app.html

3. Contacts

Fire reporting	000
Warden	to be confirmed / to be confirmed
DFES (Emergency Information)	13 33 37
SES (Emergency Assistance)	132 500
SES (Local)	9841 2400
WA Police	000
Police Station (Local – Albany)	9892 9300
WA Ambulance	000
Ambulance (Local)	9841 4212
Albany Hospital	9892 2222
Bureau of Meteorology (BoM) Recorded Information	1300 659 213

4. Evacuation preparedness

- All staff must be briefed during the Bushfire Danger Period (November-April) on the bushfire evacuation procedures with updated advice provided when the fire danger exceeds Very High or a fire warning is issued by Emergency Services (currently DFES) for the locality.
- This Evacuation Plan is to be displayed in all buildings around the Motorsport Park.

BUSHFIRE PREPAREDNESS MATRIX

ACTION	LOW/ MOD	HIGH	VERY HIGH	SEVERE	EXTREME	CATASTROPHIC
Warden to perform daily check (after 4pm) on the DFES and BoM websites to determine the Fire Danger Rating (FDR) for the following day and weekly prediction. Update staff and parents if there is a likelihood of the site being closed to due to Catastrophic Fire Danger Rating.						
Warden to monitor Emergency WA / or DFES website or ABC Radio or 'National Bushfires' app for fire incidents		Min. 1pm	Min. 1pm, 3pm	Min. 9am, 11am, 1pm, 3pm (or more frequently if fire event in locality)	Facility to be closed	Facility to be closed
Complete building preparedness checks			By 10am	By 8am		

5. Evacuation triggers

A decision to evacuate off-site is to be determined by:

- Instructions from Police, DFES, other Emergency Services, the Warden or the manager of the Motorsport Park.
- the Bushfire Evacuation Matrix (overleaf) or public bushfire warnings in conjunction with confirmation from DFES / Emergency Services.

Minimum time for evacuation is to be confirmed. To travel from the Motorsport Park to Albany, will take approximately 25 minutes.

SEE EVACUATION DECISION MATRIX (OVERLEAF)

6. Evacuation Procedures

Every bushfire attack is different. The response to each must therefore be specific and be in response to bushfire warnings

Bushfire Warning Notification

- Emergency WA website, SMS or the 'National Bushfires' App (for smartphones) will provide initial notification of a fire and evacuation instructions.
- DFES, Police (or other incident personnel) may also attempt to notify the Motorsport Park.
- The Motorsport Park is also responsible to ensure any visitors are aware of a fire warning has been issued

Off-site refuge

- Off-site evacuation is always safer, provided adequate time is available to complete it safely. Confirm with Lead Agency (DFES or other Emergency Service) prior to evacuating and follow all directions.
- Off-site evacuation is to occur by buses to the nominated off-site refuge at to be confirmed.
- Evacuation well in advance of a fire's predicted arrival time is safer than remaining on-site.

On-site safer Location

- Evacuating to the nominated Safer Location may be required where it is not possible to evacuate to the off-site refuge.
- The on-site safer location are the club rooms adjacent to the motorbike track or to the open space adjacent to the main race track.
- A building (site location to be determined later) ensuring that the building is subject to a radiant heat flux of <10 kW/m^2, is accessible by emergency service vehicles and has an approximate floor space of 375 m^2 for 500 people (assuming a minimum of 0.75m^2 per person).
- The open space on-site safer location is within an area that is subject to a radiant heat flux of <2 kW/m^2. This area is 10,634 m^2 which is sufficient to accommodate up to 10,000 people (maximum amount of people for a full event, assuming a minimum of 1m^2 per person).

7. Staff welfare during shelter in offsite refuge and on-site safer location

- The Facility Manager/Warden and Accredited First Aid Officers nominated will be in charge of spectator/ users welfare. Serious medical needs will require emergency response via 000.

8. Building Preparedness Checks

- Include such tasks as ensuring reduced fuel loads around buildings, routine maintenance is up to date including cleaning of gutters, fire breaks are in place, and static water supply is available.
- Checklists on tasks for completion before the fire season is provided within the schools College Bushfire Plan
- Detailed information and checklists are available on the DFES website including the '*The Homeowner's Bushfire Survival Manual*' and the '*Prepare Act Survive Booklet*' published by DFES:
  https://www.dfes.wa.gov.au/safetyinformation/fire/bushfire/BushfireManualsandGuides/DFES_Bushfire-Homeowners_Survival_Manual.pdf

  https://www.dfes.wa.gov.au/safetyinformation/fire/bushfire/BushfireManualsandGuides/DFES-Fire-Chat-Bushfire-Preparedness-Toolkit.pdf

9. Notes on Fire Danger Rating and Total Fire Ban Declaration



- The Fire Danger Rating (FDR) gives an indication of the potential consequences of a fire, if a fire was to start.
- The rating is based on predicted conditions such as the forecast temperature, humidity, wind and dryness of the landscape.
- The higher the fire danger rating, the more dangerous the conditions.
- During the Bushfire Danger Period (1st November – 30th April) the forecast FDR for the following day is typically released around 4pm but can be changed as weather conditions unfold.
- Both predicted and current FDR are available from the DFES and BoM websites.

A 'Total Fire Ban' (known as TFB) is a separate declaration (i.e. a particular day or part thereof may have both 'Severe' FDR and a TFB.

10. What to do if caught in a bushfire

The following provide current guidelines* on what to do if caught in a bushfire in a building or on foot. Each requires a different response involving critical decisions for your survival.

What to do if caught in a bushfire IN A BUILDING

Outside your building

- Ensure you drink plenty of water so you do not dehydrate
- Block your downpipes, (a sock full of sand/soil will help) and fill your gutters with water
- Move flammable items such as outdoor furniture, doormats,
- Gas cylinders should have the valve facing away from the building
- Do not stand on the roof with a hose. In bush fires, often more people are injured by falling from roofs than suffering burns
- Patrol the outside of the building, putting out any embers and spot fires that may start. An ember or spark can reach your home hours before the fire front arrives
- Just before the fire arrives, wet down timber decks and gardens close to the building
- Move any firefighting equipment to a place where it will not get burnt.

Inside your building

- Continue to drink water so you do not dehydrate
- Close doors, windows, vents, blinds and curtains to prevent flames, smoke and embers from entering
- Put tape across the inside of the windows so they stay in place if they break
- Shut off gas at the meter or bottle
- Move furniture away from the windows to prevent any embers that enter the building from igniting
- Fill sinks, bath and buckets with water for putting out any fires that may start inside
- Place wet towels around window and door edges to stop smoke and embers from entering
- Put a ladder next to the access hole to the roof space so you can check for spot fires.

During the fire

- When the fire arrives, go inside to protect you from the radiant heat
- Ensure you have torches ready as it is likely to become completely dark and you will not be able to see
- Patrol the inside of the building, including the roof space for sparks and embers
- Remember – if your life is at risk, call Triple Zero (000) immediately.

After the fire

- Once the fire has passed, you may need to patrol the property for hours. Go outside and put out any part of the building which is alight.
- An ember or spark from a fire can impact on a house many hours after the main fire front has passed and small spot fires can quickly get out of control.

What to do if caught in a bushfire ON FOOT / IN VEHICLE

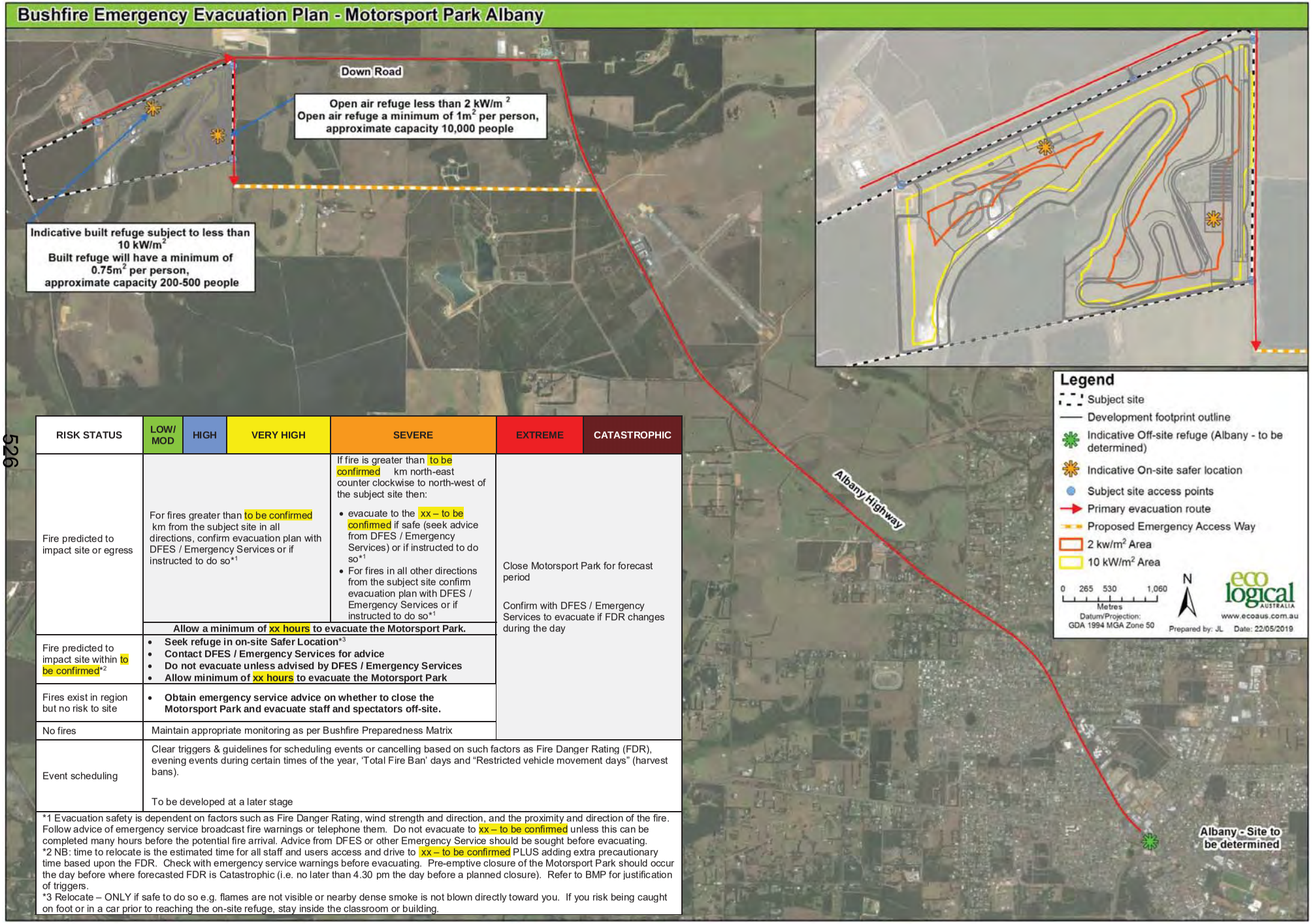
- Try to move on to bare or burnt ground at least 100 m from where fire is likely to burn, if this is not feasible find the largest bare or burnt ground possible
- Do not run uphill or away from the fire unless you know a safe refuge is able to be reached before the fire arrives. Try and position yourself downhill of the on-coming fire.
- Move across the slope out of the path of the fire front and work your way downslope towards the back of the fire or onto burnt ground.
- Do not attempt to run through flames unless you can see clearly behind them. This generally means that the flames are less than 1 metre high and less than 1 to 2 metres deep at the back or on the flanks of the fire.
- Lulls in the fire often result in the flames in these parts being low enough to step or run through to the burnt ground beyond.
- When conditions become severe use every possible means to protect yourself from radiation. In bare ground cover yourself, use wheel ruts, depressions, large rocks or logs to give protection.
- Take refuge in ponds, running streams or culverts, but behind solid objects such a rock
- Remain calm and do not run blindly from the fire. If you become exhausted you are much more prone to heat stroke and you may easily overlook a safe refuge. Consider an alternative course of action.

* adapted from NSW RFS bushfire training modules.

DRAFT

REPORT ITEM DIS 164 REFERS

Bushfire Emergency Evacuation Plan - Motorsport Park Albany



RISK STATUS	LOW/ MOD	HIGH	VERY HIGH	SEVERE	EXTREME	CATASTROPHIC
Fire predicted to impact site or egress	For fires greater than to be confirmed km from the subject site in all directions, confirm evacuation plan with DFES / Emergency Services or if instructed to do so*1			If fire is greater than to be confirmed km north-east counter clockwise to north-west of the subject site then: • evacuate to the xx – to be confirmed if safe (seek advice from DFES / Emergency Services) or if instructed to do so*1 • For fires in all other directions from the subject site confirm evacuation plan with DFES / Emergency Services or if instructed to do so*1	Close Motorsport Park for forecast period Confirm with DFES / Emergency Services to evacuate if FDR changes during the day	
	Allow a minimum of xx hours to evacuate the Motorsport Park.					
Fire predicted to impact site within to be confirmed*2	• **Seek refuge in on-site Safer Location***3 • **Contact DFES / Emergency Services for advice** • **Do not evacuate unless advised by DFES / Emergency Services** • **Allow minimum of xx hours to evacuate the Motorsport Park**					
Fires exist in region but no risk to site	• **Obtain emergency service advice on whether to close the Motorsport Park and evacuate staff and spectators off-site.**					
No fires	Maintain appropriate monitoring as per Bushfire Preparedness Matrix					
Event scheduling	Clear triggers & guidelines for scheduling events or cancelling based on such factors as Fire Danger Rating (FDR), evening events during certain times of the year, 'Total Fire Ban' days and "Restricted vehicle movement days" (harvest bans). To be developed at a later stage					

*1 Evacuation safety is dependent on factors such as Fire Danger Rating, wind strength and direction, and the proximity and direction of the fire. Follow advice of emergency service broadcast fire warnings or telephone them. Do not evacuate to xx – to be confirmed unless this can be completed many hours before the potential fire arrival. Advice from DFES or other Emergency Service should be sought before evacuating.
*2 NB: time to relocate is the estimated time for all staff and users access and drive to xx – to be confirmed PLUS adding extra precautionary time based upon the FDR. Check with emergency service warnings before evacuating. Pre-emptive closure of the Motorsport Park should occur the day before where forecasted FDR is Catastrophic (i.e. no later than 4.30 pm the day before a planned closure). Refer to BMP for justification of triggers.
*3 Relocate – ONLY if safe to do so e.g. flames are not visible or nearby dense smoke is not blown directly toward you. If you risk being caught on foot or in a car prior to reaching the on-site refuge, stay inside the classroom or building.

REPORT ITEM DIS 164 REFERS

Appendix 9

ELA Method 2 BAL Assessment

NBC Bushfire Attack Assessment Report V2.1

AS3959 (2009) Appendix B - Detailed Method 2

Printed: 11/04/2019 **Assessment Date:** 27/02/2019

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

Site Street Address: Albany Motorsport Complex, Albany

Assessor: Bruce Horkings; Ecological Australia

Local Government Area: WA **Alpine Area:** No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001
Rate of Fire Spread: Noble et al., 1980
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005
Peak Elevation of Receiver: Tan et al., 2005
Peak Flame Angle: Tan et al., 2005

Run Description: Plot 10 - 10 kW/m2

Vegetation Information

Vegetation Type:	Woodland	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	15	**Overall Fuel Load(t/ha):**	25

Site Information

Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	56

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K)**	1200

Calculation Parameters

Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80

Program Outputs

Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	7.93
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	26263
Radiant Heat(kW/m2):	9.85	**Flame Angle (degrees):**	78
Flame Length(m):	16.22	**Maximum View Factor:**	0.114
Rate Of Spread (km/h):	2.03	**Inner Protection Area(m):**	56
Transmissivity:	0.773	**Outer Protection Area(m):**	0

Run Description:	Plot 10 - 2 kW/m2		
Vegetation Information			
Vegetation Type:	Woodland	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	15	**Overall Fuel Load(t/ha):**	25
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	138
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	VERY LOW	**Peak Elevation of Receiver(m):**	8.06
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	26263
Radiant Heat(kW/m2):	1.99	**Flame Angle (degrees):**	84
Flame Length(m):	16.22	**Maximum View Factor:**	0.025
Rate Of Spread (km/h):	2.03	**Inner Protection Area(m):**	138
Transmissivity:	0.711	**Outer Protection Area(m):**	0

Run Description:	Plot 11 - 10 kW/m2		
Vegetation Information			
Vegetation Type:	Woodland	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	10 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	15	**Overall Fuel Load(t/ha):**	25
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	67
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	10.51
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	37083
Radiant Heat(kW/m2):	9.96	**Flame Angle (degrees):**	76
Flame Length(m):	21.66	**Maximum View Factor:**	0.117
Rate Of Spread (km/h):	2.87	**Inner Protection Area(m):**	67
Transmissivity:	0.761	**Outer Protection Area(m):**	0

Run Description:	Plot 11 - 2 kW/m2		
Vegetation Information			
Vegetation Type:	Woodland	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	10 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	15	**Overall Fuel Load(t/ha):**	25
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	160
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	VERY LOW	**Peak Elevation of Receiver(m):**	10.75
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	37083
Radiant Heat(kW/m2):	1.98	**Flame Angle (degrees):**	83
Flame Length(m):	21.66	**Maximum View Factor:**	0.025
Rate Of Spread (km/h):	2.87	**Inner Protection Area(m):**	160
Transmissivity:	0.697	**Outer Protection Area(m):**	0

Run Description:	Plot 12 - 10 kW/m2		
Vegetation Information			
Vegetation Type:	Shrubland/Short Heath	**Vegetation Group:**	Shrub & Heath
Vegetation Slope:	5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	15	**Overall Fuel Load(t/ha):**	15
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	37
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	4.48
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	31357
Radiant Heat(kW/m2):	9.89	**Flame Angle (degrees):**	81
Flame Length(m):	9.07	**Maximum View Factor:**	0.111
Rate Of Spread (km/h):	4.05	**Inner Protection Area(m):**	37
Transmissivity:	0.801	**Outer Protection Area(m):**	0

Run Description:	Plot 12 - 2 kW/m2		
Vegetation Information			
Vegetation Type:	Shrubland/Short Heath	**Vegetation Group:**	Shrub & Heath
Vegetation Slope:	5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	15	**Overall Fuel Load(t/ha):**	15
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	102
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	VERY LOW	**Peak Elevation of Receiver(m):**	4.52
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	31357
Radiant Heat(kW/m2):	1.98	**Flame Angle (degrees):**	86
Flame Length(m):	9.07	**Maximum View Factor:**	0.024
Rate Of Spread (km/h):	4.05	**Inner Protection Area(m):**	102
Transmissivity:	0.733	**Outer Protection Area(m):**	0

Run Description:	Plot 13 - 10 kW/m2		
Vegetation Information			
Vegetation Type:	Scrub/Tall Heath	**Vegetation Group:**	Shrub & Heath
Vegetation Slope:	5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	25
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	50
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	6.69
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	75988
Radiant Heat(kW/m2):	9.79	**Flame Angle (degrees):**	79
Flame Length(m):	13.63	**Maximum View Factor:**	0.112
Rate Of Spread (km/h):	5.88	**Inner Protection Area(m):**	50
Transmissivity:	0.78	**Outer Protection Area(m):**	0

Run Description:	Plot 13 - 10 kW/m2		
Vegetation Information			
Vegetation Type:	Scrub/Tall Heath	**Vegetation Group:**	Shrub & Heath
Vegetation Slope:	5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	25
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	126
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	VERY LOW	**Peak Elevation of Receiver(m):**	6.78
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	75988
Radiant Heat(kW/m2):	2	**Flame Angle (degrees):**	84
Flame Length(m):	13.63	**Maximum View Factor:**	0.025
Rate Of Spread (km/h):	5.88	**Inner Protection Area(m):**	126
Transmissivity:	0.718	**Outer Protection Area(m):**	0

Run Description:	Plot 14 - 10 kW/m2		
Vegetation Information			
Vegetation Type:	Scrub/Tall Heath	**Vegetation Group:**	Shrub & Heath
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	25
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	45
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	5.73
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	53816
Radiant Heat(kW/m2):	9.71	**Flame Angle (degrees):**	80
Flame Length(m):	11.63	**Maximum View Factor:**	0.11
Rate Of Spread (km/h):	4.17	**Inner Protection Area(m):**	45
Transmissivity:	0.787	**Outer Protection Area(m):**	0

Run Description:	Plot 14 - 2 kW/m2		
Vegetation Information			
Vegetation Type:	Scrub/Tall Heath	**Vegetation Group:**	Shrub & Heath
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	25
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	116
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	VERY LOW	**Peak Elevation of Receiver(m):**	5.79
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	53816
Radiant Heat(kW/m2):	1.99	**Flame Angle (degrees):**	85
Flame Length(m):	11.63	**Maximum View Factor:**	0.025
Rate Of Spread (km/h):	4.17	**Inner Protection Area(m):**	116
Transmissivity:	0.724	**Outer Protection Area(m):**	0

Run Description:	Plot 3 - 10 kW/m2		
Vegetation Information			
Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	64
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	9.65
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	43400
Radiant Heat(kW/m2):	9.78	**Flame Angle (degrees):**	77
Flame Length(m):	19.8	**Maximum View Factor:**	0.115
Rate Of Spread (km/h):	2.4	**Inner Protection Area(m):**	47
Transmissivity:	0.764	**Outer Protection Area(m):**	17

Run Description:	Plot 3 - 2 kW/m2		
Vegetation Information			
Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	153
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	VERY LOW	**Peak Elevation of Receiver(m):**	9.83
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	43400
Radiant Heat(kW/m2):	1.98	**Flame Angle (degrees):**	83
Flame Length(m):	19.8	**Maximum View Factor:**	0.025
Rate Of Spread (km/h):	2.4	**Inner Protection Area(m):**	120
Transmissivity:	0.702	**Outer Protection Area(m):**	33

Run Description:	Plot 4 - 10 kW/m2		
Vegetation Information			
Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	76
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	12.61
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	61280
Radiant Heat(kW/m2):	9.83	**Flame Angle (degrees):**	74
Flame Length(m):	26.23	**Maximum View Factor:**	0.117
Rate Of Spread (km/h):	3.39	**Inner Protection Area(m):**	56
Transmissivity:	0.754	**Outer Protection Area(m):**	20

Run Description:	Plot 4 - 2 kW/m2		
Vegetation Information			
Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	175
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	VERY LOW	**Peak Elevation of Receiver(m):**	12.99
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	61280
Radiant Heat(kW/m2):	2	**Flame Angle (degrees):**	82
Flame Length(m):	26.23	**Maximum View Factor:**	0.026
Rate Of Spread (km/h):	3.39	**Inner Protection Area(m):**	138
Transmissivity:	0.689	**Outer Protection Area(m):**	37

Run Description:	Plot 5 - 10 kW/m2		
Vegetation Information			
Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	15 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	108
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	VERY LOW	**Peak Elevation of Receiver(m):**	22.31
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	122176
Radiant Heat(kW/m2):	9.93	**Flame Angle (degrees):**	68
Flame Length(m):	48.12	**Maximum View Factor:**	0.121
Rate Of Spread (km/h):	6.76	**Inner Protection Area(m):**	81
Transmissivity:	0.735	**Outer Protection Area(m):**	27

Run Description:	Plot 5 - 2 kW/m2		
Vegetation Information			
Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	15 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	240
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	VERY LOW	**Peak Elevation of Receiver(m):**	23.62
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	122176
Radiant Heat(kW/m2):	1.99	**Flame Angle (degrees):**	79
Flame Length(m):	48.12	**Maximum View Factor:**	0.026
Rate Of Spread (km/h):	6.76	**Inner Protection Area(m):**	186
Transmissivity:	0.681	**Outer Protection Area(m):**	54

Run Description:	Plot 6 - 10 kW/m2		
Vegetation Information			
Vegetation Type:	Grassland	**Vegetation Group:**	Grassland
Vegetation Slope:	10 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	4.5	**Overall Fuel Load(t/ha):**	4.5
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	39
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	110
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	4.79
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	66286
Radiant Heat(kW/m2):	9.86	**Flame Angle (degrees):**	81
Flame Length(m):	9.7	**Maximum View Factor:**	0.111
Rate Of Spread (km/h):	28.51	**Inner Protection Area(m):**	39
Transmissivity:	0.797	**Outer Protection Area(m):**	0

Run Description:	Plot 6 - 2 kW/m2		
Vegetation Information			
Vegetation Type:	Grassland	**Vegetation Group:**	Grassland
Vegetation Slope:	10 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	4.5	**Overall Fuel Load(t/ha):**	4.5
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	105
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	110
Program Outputs			
Category of Attack:	VERY LOW	**Peak Elevation of Receiver(m):**	4.83
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	66286
Radiant Heat(kW/m2):	2	**Flame Angle (degrees):**	85
Flame Length(m):	9.7	**Maximum View Factor:**	0.025
Rate Of Spread (km/h):	28.51	**Inner Protection Area(m):**	105
Transmissivity:	0.731	**Outer Protection Area(m):**	0

Run Description:	Plot 7 - 10 kW/m2		
Vegetation Information			
Vegetation Type:	Grassland	**Vegetation Group:**	Grassland
Vegetation Slope:	5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	4.5	**Overall Fuel Load(t/ha):**	4.5
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	34
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	110
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	4.04
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	46945
Radiant Heat(kW/m2):	9.94	**Flame Angle (degrees):**	82
Flame Length(m):	8.17	**Maximum View Factor:**	0.11
Rate Of Spread (km/h):	20.19	**Inner Protection Area(m):**	34
Transmissivity:	0.806	**Outer Protection Area(m):**	0

Run Description:	Plot 7 - 2 kW/m2		
Vegetation Information			
Vegetation Type:	Grassland	**Vegetation Group:**	Grassland
Vegetation Slope:	5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	4.5	**Overall Fuel Load(t/ha):**	4.5
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	96
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	110
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	4.07
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	46945
Radiant Heat(kW/m2):	1.99	**Flame Angle (degrees):**	86
Flame Length(m):	8.17	**Maximum View Factor:**	0.024
Rate Of Spread (km/h):	20.19	**Inner Protection Area(m):**	96
Transmissivity:	0.737	**Outer Protection Area(m):**	0

Run Description:	Plot 8 - 10 kW/m2		
Vegetation Information			
Vegetation Type:	Grassland	**Vegetation Group:**	Grassland
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	4.5	**Overall Fuel Load(t/ha):**	4.5
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	30
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	110
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	3.4
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	33248
Radiant Heat(kW/m2):	9.79	**Flame Angle (degrees):**	82
Flame Length(m):	6.87	**Maximum View Factor:**	0.108
Rate Of Spread (km/h):	14.3	**Inner Protection Area(m):**	30
Transmissivity:	0.815	**Outer Protection Area(m):**	0

Run Description:	Plot 8 - 2 kW/m2		
Vegetation Information			
Vegetation Type:	Grassland	**Vegetation Group:**	Grassland
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	4.5	**Overall Fuel Load(t/ha):**	4.5
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	87
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	110
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	3.43
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	33248
Radiant Heat(kW/m2):	1.99	**Flame Angle (degrees):**	86
Flame Length(m):	6.87	**Maximum View Factor:**	0.024
Rate Of Spread (km/h):	14.3	**Inner Protection Area(m):**	87
Transmissivity:	0.743	**Outer Protection Area(m):**	0

Run Description:	Plot 9 - 10 kW/m2		
Vegetation Information			
Vegetation Type:	Woodland	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	15	**Overall Fuel Load(t/ha):**	25
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	47
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	6.09
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	18600
Radiant Heat(kW/m2):	9.7	**Flame Angle (degrees):**	80
Flame Length(m):	12.36	**Maximum View Factor:**	0.111
Rate Of Spread (km/h):	1.44	**Inner Protection Area(m):**	47
Transmissivity:	0.784	**Outer Protection Area(m):**	0

Run Description:	Plot 9 - 2 kW/m2		
Vegetation Information			
Vegetation Type:	Woodland	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	15	**Overall Fuel Load(t/ha):**	25
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	120
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80
Program Outputs			
Category of Attack:	VERY LOW	**Peak Elevation of Receiver(m):**	6.16
Level of Construction:	BAL LOW	**Fire Intensity(kW/m):**	18600
Radiant Heat(kW/m2):	1.99	**Flame Angle (degrees):**	85
Flame Length(m):	12.36	**Maximum View Factor:**	0.025
Rate Of Spread (km/h):	1.44	**Inner Protection Area(m):**	120
Transmissivity:	0.722	**Outer Protection Area(m):**	0

Appendix 10

WAPC APZ standards to apply

Standards for an Asset Protection Zone (APZ) (WAPC, 2017)

Fences: Within the APZ are constructed from non-combustible materials (e.g. iron, brick, limestone, metal post and wire). It is recommended that solid or slatted non-combustible perimeter fences are used.

Objects: Within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e. windows and doors.

Fine Fuel load: Combustible dead vegetation matter less than 6 millimetres in thickness reduced to and maintained at an average of two tonnes per hectare.

Trees (> 5 metres in height): Trunks at maturity should be a minimum distance of 6 metres from all elevations of the building, branches at maturity should not touch or overhang the building, lower branches should be removed to a height of 2 metres above the ground and or surface vegetation, canopy cover should be less than 15% with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy. See Figure 10 (WAPC Figure 16, Appendix 4) below.

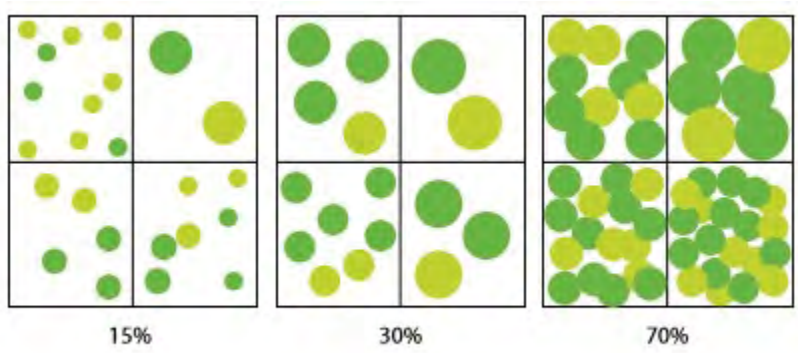


Figure 1 – Tree Canopy Cover

(WAPC, 2017)

Shrubs (0.5 metres to 5 metres in height): Should not be located under trees or within 3 metres of buildings, should not be planted in clumps greater than 5m2 in area, clumps of shrubs should be separated from each other and any exposed window or door by at least 10 metres. Shrubs greater than 5 metres in height are to be treated as trees.

Ground covers (<0.5 metres in height): Can be planted under trees but must be properly maintained to remove dead plant material and any parts within 2 metres of a structure, but 3 metres from windows or doors if greater than 100 millimetres in height. Ground covers greater than 0.5 metres in height are to be treated as shrubs. –

Grass: Should be managed to maintain a height of 100 millimetres or less.

Appendix 11

ELA Peer Review

Level 1, Bishop's See 235 St Georges Terrace Perth WA 6000
t: (08) 6218 2200

23 May 2019

Our ref: 12360

To whom it may concern,

Peer review of Bushfire Management Plan
Albany Motorsport Park: Lot 5780 Down Road, Drome

Eco Logical Australia (ELA) was engaged by Bio Diverse Solutions (BDS) to undertake a technical peer review of a Bushfire Management Plan (BMP) for the proposed development of the above-mentioned site.

ELA has not physically inspected the site, however, has reviewed data and photographs taken by BDS during their site assessments.

The technical peer review was undertaken by ELA Senior Bushfire Consultants Daniel Panickar (BPAD 37802) and Bruce Horkings (BPAD 29962). Bruce is a BPAD Level 3 accredited practitioner in NSW and has attended the relevant FPA workshop held in Sydney specifically for NSW based consultants undertaking BPAD Level 3 accredited works in WA.

BDS engaged ELA to undertake a technical peer review of the final Bushfire Management Plan (BMP), prepare a Bushfire Emergency Evacuation Plan (BEEP) and provide a letter documenting the completion of the review.

PEER REVIEW

The peer review process began at the inception of the project with the provision of ongoing technical advice and guidance in the development of the report. The final version of the BMP (dated 23 May 2019) was assessed against Policy Measures 6.2 and 6.3 of *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7; WAPC December 2015) with consideration given to Policy measure 6.6, and is technically consistent with the identified requirements of SPP 3.7 and *Guidelines for Planning in Bushfire Prone Areas v 1.3* (the Guidelines; WAPC December 2017).

The proposed development meets the bushfire protection criteria of the Guidelines using Acceptable Solutions where possible. Compliance with the Acceptable Solutions for *Element 3: Vehicular Access* is not possible and as such, the BEEP prepared to support this development provides contingency actions in accordance with the requirements of the D*raft Position Statement: Tourism land uses within bushfire*

prone areas (WAPC, 2018). These contingencies include early closure of the site, off-site evacuation and as a last resort, refuge on site in a suitable building / open space.

ELA note there are a few minor typographical errors in the report, however these do not detract from the overall outcomes of the plan.

BUSHFIRE EMERGENCY EVACUATION PLAN

The BEEP developed by ELA was produced in a usable poster style to be located at relevant locations in the site.

The aim of the BEEP is early, safe and timely evacuation of the site prior to bushfire events and no events are to be held on site during Catastrophic Fire Danger Rating (FDR) days. The BEEP has been prepared to support the proposed development will address on-site and off-site refuges, triggers for evacuation and roles and responsibilities for staff and stakeholders. As the proposed development progresses beyond the rezoning phase, the BEEP will be updated for each stage including further specific details.

As previously identified. the design of the site does not allow for alternative access and is a legacy issue. As a result of legacy issues of the surrounding public road network, these constraints are addressed by the BEEP providing contingency measures to address identified risks including:

- Clear triggers for off and onsite evacuation (to be updated to support future planning applications);
- Clear triggers & guidelines for scheduling events or cancelling based on such factors as Fire Danger Rating (FDR), evening events during certain times of the year, 'Total Fire Ban' days and "Restricted vehicle movement days" (harvest bans);
- An on-site refuge for use in an emergency (i.e. a building constructed to the requirements of a 'community refuge' as per the Australian Building Codes Board 'Design and Construction of Community Bushfire Refuges' that can accommodate the number of people using that part of the facility (i.e. 200-500 for a club event);
- The proposed building located within the site and position to limit radiant heat exposure to <10 kW/m^2 and constructed to BAL-29; and
- Open air refuge with the capacity for a large event (upto 10,000 approx.) located in area where radiant heat exposure is limited to <2 kW/m^2 and preferably shaded with non-combustible material.

This is compliant with the W*APC Draft Position Statement: Tourism land uses within bushfire prone areas* (WAPC 2018). The BEEP will form part of the Emergency Management Plan for the site which will be developed prior to operation of the site.

CONCLUSION

The peer review undertaken by ELA of the Bushfire Management Plan written by BDS (dated 23 May 2019) concludes that this report meets the technical requirements of SPP 3.7 and the Guidelines. Furthermore, the BMP incorporates a Bushfire Emergency Evacuation Plan developed by a suitably accredited Bushfire Planning Practitioner.

CV's of the ELA bushfire consultants involved in this project are included below.

Yours sincerely,



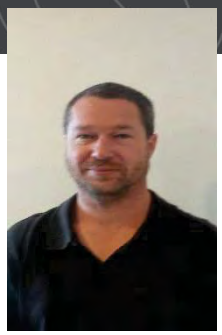
Daniel Panickar
Manager and Bushfire Lead - WA (BPAD 37802)

BPAD Bushfire Planning & Design Accredited Practitioner Level 2



Bruce Horkings
Senior Bushfire Consultant (BPAD 29962)

BPAD Bushfire Planning & Design Accredited Practitioner Level 3



Bruce Horkings SENIOR BUSHFIRE CONSULTANT

Bruce holds a Post Graduate Diploma in Bushfire Protection from the University of Western Sydney, and also both an Associate Degree in Forestry Management and Diploma of Conservation and Land Management from Melbourne University. Bruce has over 14 years' experience in the environmental and bushfire realm with a focus on bushfire consulting over the last 10 years in Western Australia, Victoria and New South Wales and is an accredited Level 3 Bushfire Planning and Design (BPAD) practitioner.

Work undertaken includes bushfire site assessments and production of reports including constraints & analysis, Bushfire Protection Assessments, Bushfire Management Plans, Evacuations Plans and acceptable and performance-based solutions in line with current state standards and Australian Standard AS 3959. Most recently he has been involved with complex projects involving detailed bushfire weather analysis, short fire run modelling and landscape based modelling using SPARK.

He has a good working knowledge of bushfire planning legislation in many states and territories across the country especially WA, NSW and Vic and specialises in complex assessments, bushfire modelling and the development of performance solution response. Bruce is experienced in bushfire site assessment and analysis, project management, tender preparation and assessment, and detailed technical analysis of building design and construction materials against AS 3959.

QUALIFICATIONS

- Post Graduate Diploma of Bushfire Protection, University of Western Sydney (2013)
- Development and Building in Bushfire Prone Areas, UTS Centre for Local Government (2013)
- Associate Degree of Forestry Management, Melbourne University (2006)
- Diploma of Conservation and Land Management, Melbourne University (2004-2006)

PROJECT EXPERIENCE

- Development of a detailed bushfire risk analysis at a landscape and local scale of built assets, critical infrastructure and research facilities for CSIRO in Canberra with a corresponding Bushfire Operations Plan to implement risk mitigation measures to enhance resilience from bushfire for the rural site and surrounding residential developments.
- Use and development of the landscape bushfire modelling tool SPARK developed by CSIRO for projects where thousands of bushfire scenarios are assessed.
- Creation of a Short Fire Run models (point ignition) to demonstrate bushfire behaviour as part of developing performance solutions where the standard fire models found in AS 3959 over predict this scenario.
- Development of performance based solutions to demonstrate compliance to various state based bushfire planning requirements.
- Completion of hundreds of bushfire assessments across the country.
- Assessment of Defence projects from Bushfire Management Plans to compliance with bushfire specifications detailed in the Manual of Fire Protection Engineering (MFPE) and state-based requirements.
- Analysis of building design and construction materials against AS 3959 for residential and non-residential buildings.



Daniel Panickar **MANAGER AND BUSHFIRE LEAD - WA**

Daniel is an experienced environmental and bushfire consultant with over eight years' experience in the consulting industry. Initially trained as an ecologist and environmental planner, Daniel has gained invaluable experience in fire ecology, flora and fauna surveys and environmental approvals. Since being involved in the industry, Daniel's skills have diversified to include bushfire management planning and team management and he has held senior roles including lead ecologist and lead bushfire consultant. Daniel currently manages ELA's Western Australian operations.

Daniel also possesses well-developed project management skills and has managed over 50 land development projects throughout Western Australia and has been responsible for undertaking field investigations, managing sub-consultants and provision of advice regarding bushfire and environmental approvals.

Daniel has worked on over 500 bushfire management projects across Australia and is an accredited Level 2 Bushfire Planning and Design (BPAD) practitioner with experience in Bushfire Attack Level (BAL) assessments, preparation of Bushfire Management Plans, Bushfire Emergency Evacuation Plans, Bushfire Risk Assessments and providing expert advice at Joint Development Assessment Panel (JDAP) meetings and State Administrative Tribunal (SAT) hearings.

Daniel's experience in environmental approvals and bushfire planning, particularly in the land development and infrastructure sectors allow him to provide accurate, pragmatic advice regarding opportunities and constraints, and develop innovative solutions to facilitate development in potentially problematic areas. This experience has been acknowledged through Daniel's membership on the Fire Protection Association Australia (FPAA) WA Bushfire Working Group, National Environmental Law Association (NELA) WA State Committee and the Urban Development Institute of Australia (UDIA) Outlook Committee.

QUALIFICATIONS

Bachelor of Science (Environmental Biology; Honours), Curtin University of Technology, 2011

Graduate Diploma in Bushfire Protection, Western Sydney University, in progress

Level 2 accredited Bushfire Planning and Design (BPAD) practitioner, 2016

PUBLICATIONS

Panickar, D 2018, 'Bushfire protection and environmental management for mine sites in arid and semi-arid regions', *Goldfields Environmental Management Group, Kalgoorlie, 16-18 May*.

PROJECT EXPERIENCE

Land development

Daniel has been involved in over 100 urban development projects across WA, NSW and QLD. A few detailed examples are provided below, and some other key projects have been listed further to this.

The Hales: Satterley Property Group: Environmental project manager to ensure the project meets the requirements of all relevant environmental legislation whilst meeting project timeframes and yield objectives. Undertook and/or coordinated all environmental surveys within the development site (ecological and bushfire assessments, groundwater monitoring and contaminated sites investigations). Provided ongoing strategic environmental and bushfire management advice and prepared all required environmental approvals documentation including a native vegetation clearing permit application and referral to the Commonwealth Department of the Environment. Prepared the Bushfire Management Plan for the estate.

Shorehaven: Peet Limited: Led and coordinated all bushfire assessments within the development site. Provided ongoing strategic advice to reduce bushfire risk and maintain visual amenity and prepared/reviewed Bushfire Management Plans, Bushfire Attack Level Assessments and associated Native Vegetation Clearing permits to facilitate development. Assisted in negotiations with adjacent landowners to clear vegetation and reduce bushfire risk to the Shorehaven site.

Sienna Wood: Stockland: Undertook a bushfire hazard level assessment of the estate (including wetlands of conservation significance, revegetation areas and Aboriginal heritage areas). Provision of advice to the project team regarding redesigning road networks and landscaping areas (including natural streams and wetlands) to achieve a layout that was fully compliant with bushfire planning guidelines and State legislation while maintaining the integrity of the planning vision for the estate. The final Bushfire Management Plan prepared for the estate was endorsed by the Department of Fire and Emergency Services (DFES), the Department of Parks and Wildlife (Parks and Wildlife) and local government and approved for use.

Redevelopment of St Vincent's Aged Care Facility: Catholic Homes Inc.: Undertook a bushfire hazard level assessment, prepared a Bushfire Management and Evacuation Plan and coordinated geotechnical investigations. Site constraints compromised the ability to achieve a compliant bushfire management outcome and a strategy was developed whereby vegetation on neighbouring land would be cleared and landscaped to facilitate a compliant outcome. Organised meetings between the Western Australia Planning Commission, the project team and other relevant stakeholders to negotiate a favourable outcome. All stakeholders agreed with my proposed approach and following the preparation of the revised development design; the DA was lodged successfully.

Rezoning support – 119 Hammond Road: Private land developer: Managed and undertook an environmental opportunities and constraints analysis to inform proposed rezoning of the site. Facilitated environmental and bushfire planning approvals for the site which included undertaking a flora, vegetation and black cockatoo survey and preparation of a Bushfire Management Plan.

Frenchman Bay Resort: Private land developer: Developed a Bushfire Management Plan and Bushfire Emergency Evacuation Plan to support a resort in Frenchman Bay (an extreme bushfire risk area). Method 2 Bushfire Attack Level (BAL) assessments and performance-based bushfire management solutions were developed to facilitate development and ensure a safer outcome for future guests. The plans were approved by the City of Albany and Department of Fire and Emergency Services.

Some other key land development projects Daniel has been involved in as an environmental and bushfire consultant are:

- Butler North District Open Space, Butler;
- Baldivis District Open Space;
- Catalina Estate, Clarkson;
- Brightwood Estate, Baldivis;
- Flamewood Estate, Brabham;
- Mason Green Estate, Piara Waters;
- The Village at Wellard Estate, Wellard;
- Newhaven Estate, Piara Waters;
- Beenyup Grove Estate, Byford;
- Allara Estate, Eglinton;
- Burns Beach Estate, Burns Beach;
- Holland Park Estate, Piara Waters;
- Numerous BP and Caltex service stations across Western Australia;

- Chinatown Revitalisation Project, Broome;
- Glenmore Park/Mulgoa, Western Sydney;
- New Breeze Estate, Bardia (NSW).

Department of Defence

Daniel has been involved in ecological surveys and the preparation of bushfire management reports for numerous Department of Defence bases across Australia. Some key projects are highlighted below. Daniel also has baseline security clearance from the Department of Defence.

Preparation of bushfire construction advice (Campbell Barracks and RAAF Base Townsville): Assessed proposed building upgrades, refurbishments and new structures at Campbell Barracks, Western Australia and RAAF Base Townsville, Queensland. All structures were assessed for bushfire risk and treatments were prescribed based on State and National guidelines as well as relevant construction standards.

Preparation of Bushfire Management Plans for HMAS Stirling and Exmouth properties: Project manager and author for a new Bushfire Risk Management Plan, Emergency Evacuation Plan and Operations Plan for the entirety of Defence's operations on Garden Island and Exmouth, Western Australia. The project involved close liaison with Defence, Department of Biodiversity Conservation and Attractions, Department of Fire and Emergency Services and local stakeholders. Risk workshops were organised and facilitated to discuss risks and responses prior to finalisation.

Preparation of Bushfire Management Plans for RAAF Base Learmonth and Lancelin Defence Training Area: Project manager and author for a new Bushfire Risk Management Plan, Emergency Evacuation Plan, Bushfire Prevention Plan and Operations Plan for the entirety of Defence's operations at Learmonth and Lancelin, Western Australia. State of the art fire spread modelling was also undertaken to identify impacts associated with Defence activities on the base and surrounding properties. The project involved close liaison with Defence, Department of Fire and Emergency Services and local stakeholders. Risk workshops were organised and facilitated to discuss risks and responses prior to finalisation.

Preparation of Bushfire Management Plans for HMAS Albatross, Bhewerre Ridge and Beecroft Air Weapons Range properties: Prepared bushfire risk management plans and strategies for these three Defence properties in Shoalhaven NSW. Developed Emergency Evacuation Plans for HMAS Albatross and the high-risk Bhewerre Ridge properties as part of the works package.

Weed surveys for HMAS Stirling Garden Island: Managed and coordinated weed surveys throughout Garden Island, Western Australia to inform annual weed control programs and identify new species of invasive plants on the naval base and surrounding island.

Appendix H – Noise Management Plan

City of Albany

Albany Motorsport Park

Noise Assessment

May 2019

WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY & BUILDINGS | TRANSPORTATION

Table of contents

1. Introduction....1
1.1 Project background....1
1.2 Project description....1
1.3 Scope of work....4
1.4 Approach....4
1.5 Limitations....4
2. Noise sources....6
2.1 Events and usage....6
2.2 Noise sources....7
3. Noise criteria....8
3.1 Construction noise....8
3.2 Operational noise....8
3.3 Noise sensitive receptors....10
4. Noise monitoring....12
4.1 Noise monitoring locations....12
4.2 Unattended noise monitoring methodology....13
4.3 Noise monitoring results....13
5. Construction noise and vibration assessment....17
5.1 Construction noise....17
5.2 Construction vibration....18
6. Operational noise assessment....20
6.1 Noise model objective....20
6.2 Noise modelling software package....20
6.3 Noise model configuration....20
6.4 Noise sources....21
6.5 Noise modelling results....23
7. Managing noise impacts....47
7.1 Regulation – Approved noise management plan....47
7.2 Mitigation measures....48
8. Conclusions....51

Table index

Table 2-1 Indicative AMP event profile....6
Table 3-1 Assigned noise levels (dBA)....9
Table 3-2 Adjustment for intrusive or dominant noise characteristics[]....10

Table 3-3 Assigned noise levels (dBA) for AMP 10
Table 3-4 Receptor locations 10
Table 4-1 Noise monitoring location summary 12
Table 4-2 Daily L_{Aeq} noise levels, dBA 15
Table 4-3 Overall L_{Aeq} noise levels, dBA 16
Table 5-1 Predicted plant activity noise levels (dBA) 17
Table 5-2 Typical vibration levels for construction equipment 19
Table 6-1 Meteorological conditions for noise modelling 21
Table 6-2 Event type and vehicle noise levels, dBA 22
Table 6-3 Sound power levels (dBA) 22
Table 6-4 Predicted day L_{A10} noise levels – Neutral meteorological conditions 23
Table 6-5 Predicted evening L_{A10} noise levels – Neutral meteorological conditions 24
Table 6-6 Predicted day L_{A10} noise levels – Worst case meteorological conditions 35
Table 6-7 Predicted evening L_{A10} noise levels – Worst case meteorological conditions 36
Table 7-1 Outdoor and indoor noise criteria, dBA 49
Table 7-2 Package A and B noise insulation measures outlined in SPP 5.4 49

Figure index

Figure 1-1 Albany Motorsport Park general site layout plan 3
Figure 3-1 Noise sensitive receptor locations 11
Figure 4-1 Noise monitoring locations 14
Figure 6-1 Predicted day L_{A10} noise levels – Neutral meteorological conditions - 4WD training 25
Figure 6-2 Predicted day L_{A10} noise levels – Neutral meteorological conditions - Burnouts 26
Figure 6-3 Predicted day L_{A10} noise levels – Neutral meteorological conditions - Drag racing events 27
Figure 6-4 Predicted day L_{A10} noise levels – Neutral meteorological conditions - Driver training 28
Figure 6-5 Predicted day L_{A10} noise levels – Neutral meteorological conditions - Multi use track events 29
Figure 6-6 Predicted day L_{A10} noise levels – Neutral meteorological conditions - Motocross events 30
Figure 6-7 Predicted day L_{A10} noise levels – Neutral meteorological conditions - Multi use track and drag race events 31
Figure 6-8 Predicted day L_{A10} noise levels – Neutral meteorological conditions - Motocross and multi use track events 32

Figure 6-9 Predicted day L_{A10} noise levels – Neutral meteorological conditions - Motocross and drag race events 33

Figure 6-10 Predicted day L_{A10} noise levels – Neutral meteorological conditions - Motocross, multi use track and drag race events 34

Figure 6-11 Predicted day L_{A10} noise levels – Worst case meteorological conditions - 4WD training 37

Figure 6-12 Predicted day L_{A10} noise levels – Worst case meteorological conditions - Burnouts 38

Figure 6-13 Predicted day L_{A10} noise levels – Worst case meteorological conditions - Drag racing events 39

Figure 6-14 Predicted day L_{A10} noise levels – Worst case meteorological conditions - Driver training 40

Figure 6-15 Predicted day L_{A10} noise levels – Worst case meteorological conditions - Multi use track events 41

Figure 6-16 Predicted day L_{A10} noise levels – Worst case meteorological conditions - Motocross events 42

Figure 6-17 Predicted day L_{A10} noise levels – Worst case meteorological conditions - Multi use track and drag race events 43

Figure 6-18 Predicted day L_{A10} noise levels – Worst case meteorological conditions - Motocross and multi use track events 44

Figure 6-19 Predicted day L_{A10} noise levels – Worst case meteorological conditions - Motocross and drag race events 45

Figure 6-20 Predicted day L_{A10} noise levels – Worst case meteorological conditions - Motocross, multi use track and drag race events 46

Appendices

Appendix A - Glossary of noise terminology

Appendix B – Monitoring results

Appendix C – Example Noise Management Plan

Glossary of acronyms and terms

4WD	Four wheel drive
ADR	Australian Design Rule
AMP	Albany Motorsport Park
ANDRA	Australian National Drag Racing Association
AS	Australian Standard
ATV	All-terrain vehicle
BoM	Bureau of Meteorology
CadnaA	Computer Aided Noise Abatement software used for calculating predicted noise emissions
CAMS	Confederation of Australian Motor Sports
CEO	Chief Executive Officer
CONCAWE	Conservation of Clean Air and Water in Europe
DWER	Department of Water and Environmental Regulation
FIA	Fédération Internationalé de l'Automobile
FIM	Fédération Internationalé Motocyclisme
GHD	GHD Pty Ltd
GSMG	Great Southern Motorplex Group Inc.
IF	Influencing Factor
MA	Motorcycling Australia

Note: Refer to Appendix A for an explanation of the noise terminology used throughout this report.

1. Introduction

1.1 Project background

Participation in motorsports is a popular recreational activity for many Australians, including residents in Albany and the Great Southern region. By one estimate, motorsport is the fourth most watched sport in Australia, with over 150,000 participants across the country[1]. Anecdotally, motorsport in Albany and the surrounding areas is already known to be popular, with several well organised clubs, a national-level venue for speedway, a state-level venue for go-karts and widely recognised events such as the Albany Classic, Show 'n Shine and Race Wars at Albany Airport. However, some motorsport disciplines lack suitable facilities in the region. In particular, the closure of Albany Motorcycle Club's facility at Roberts Road in 2011 has meant that motocross and enduro motorcycle riders currently lack a permanent formalised facility to pursue their sport in the lower Great Southern region.

By their nature, motorsports are very capital intensive, requiring significant investment in equipment and facilities by participants, clubs and supporting organisations such as local and state governments. Recently, an independent proposal has been advanced by the Great Southern Motorplex Group Inc. (GSMG) to develop a multi-use Albany Motorsport Park (AMP) near the Mirambeena timber processing precinct on Down Road. This proposal aims to:

- Promote and facilitate multiple motorsports on a club and state level in Albany and the Great Southern region.
- Provide a safe environment and venue for multiple motorsports clubs (and other compatible sports, such as cycling).
- Provide a venue to promote and facilitate commercial driver education and training.
- Provide a safe environment for companies to test and tune their vehicles.
- Promote Albany and the Great Southern region by attracting participants and tourists.
- Boost the regional economy through increased visitors, funding and sponsorship for events.

1.2 Project description

The concept design for the Albany Motorsport Park has been developed by the non-for-profit Great Southern Motorplex Group (GSMG) and Roberts Gardiner Architects. The GSMG has undertaken significant research into the requirements for track licensing by the Confederation of Australian Motor Sport (CAMS) and the specifications of:

- Fédération Internationalé de l'Automobile (FIA)
- Fédération Internationalé Motocyclisme (FIM)
- Motorcycling Australia (MA)
- Australian National Drag Racing Association (ANDRA)

The proposed AMP will consist of:

1. Sealed, configurable multi-use track (3.5 km long × 12 m wide) for motor car racing, motorcycle racing, drifting, driver training and cycling:

[1] CAMS. (2014). *Economic contribution of the Australian motor sport industry*. Malvern East: Confederation of Australian Motor Sport.

  - Designed to comply with CAMS' *Track Operator's Safety Guide*[2] and MA's *Track Guidelines*[3].
  - To be licensed by CAMS for FIA Grade 2 and FIM Grade B (i.e. up to second-tier international motor racing).
2. A motocross circuit designed and constructed in association with MA guidelines.
3. A 1,000 foot drag racing strip designed and constructed in accordance with FIA specifications for drag strips and in association with ANDRA.
4. A 1300 m^2 burnout area
5. An off-road four wheel drive (4WD) and all-terrain vehicle (ATV) training area

At full development, the AMP will also include associated facilities, such as:

- Toilets
- Manager's office
- Medical / first aid station
- Meeting / briefing room
- Kitchen / canteen
- Storage / grounds maintenance workshop
- Vehicle scrutineers' workshop
- Control tower
- Spectators viewing areas
- Grassed spectators' picnic area with shade and BBQs
- Competitors parking
- Spectators parking

[2] CAMS. (2012). *Track Operator's Safety Guide*. Malvern East: Confederation of Australian Motor Sports.
[3] MA. (2011). *Track Guidelines*. South Melbourne: Motorcycling Australia.

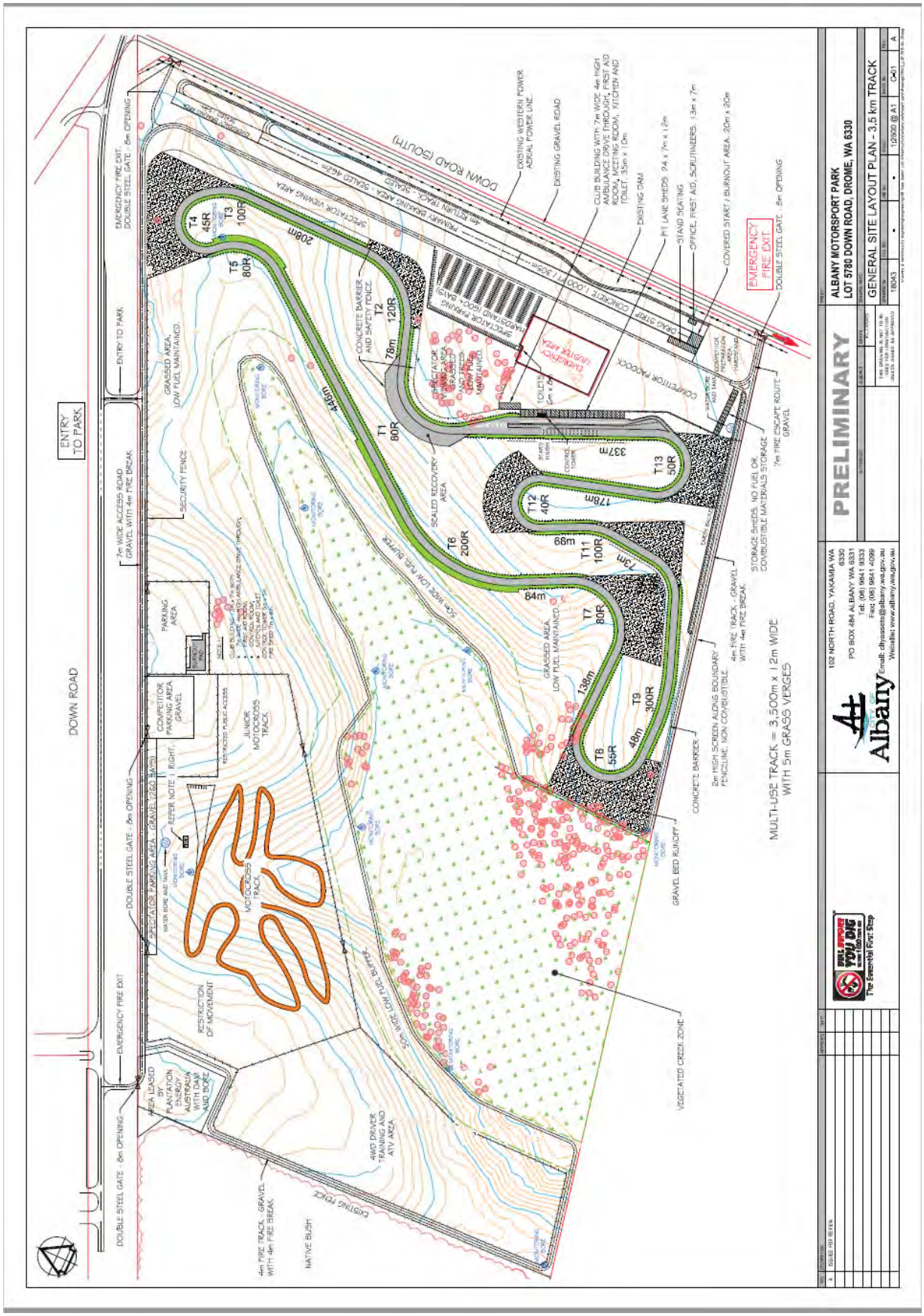


Figure 1-1 Albany Motorsport Park general site layout plan

1.3 Scope of work

GHD Pty Ltd (GHD) was commissioned by City of Albany to prepare planning approvals documentation for the proposed Albany Motorsport Park. As part of this commission, GHD was required to assess the potential acoustic impacts for the construction and operation of the AMP.

This report assesses the potential noise and vibration impacts from construction and operation of the AMP. The report's scope is to:

- Identify noise sensitive locations potentially impacted by the construction and operation of the AMP.
- Describe the existing noise environment at noise sensitive locations potentially impacted by the construction and operation of the AMP.
- Identify noise and vibration sources associated with construction and operation of the AMP.
- Develop an environmental noise model to predict noise impacts from the operation of the AMP using CadnaA noise modelling software, for a variety of proposed motorsport events.
- Assess the potential noise impacts on nearby noise sensitive receptors and compare the impacts with assigned noise levels.
- Identify opportunities for attenuation of noise impacts from the AMP on noise sensitive areas should predicted noise impacts exceed the assigned noise levels.

1.4 Approach

The approach adopted by GHD for the assessment of noise impacts from the Albany Motorsport Park is summarised in the following points. Each point is described in detail in the subsequent sections of this report.

- Outline of the AMP, including proposed events and anticipated operational noise sources (Section 2).
- Identification of the relevant noise criteria and guidelines applicable to the AMP assessment (Section 3).
- Investigation of the existing noise environment, including identification of sensitive receptors, noise logging and assessment of noise monitoring to determine background and various time related noise levels (Section 4).
- Desktop assessment of construction noise and vibration (Section 5).
- Noise modelling for the assessment of predicted noise impacts during operation of the AMP (Section 6).
- Recommend in-principle noise mitigation measures for construction and operational noise sources (Section 7).
- Conclusions drawn from the above assessment (Section 8, subject to the scope of works (Section 1.3) and Limitations (Section 1.5).

1.5 Limitations

This report has been prepared by GHD for City of Albany and may only be used and relied on by City of Albany for the purpose agreed between GHD and the City of Albany as set out in Section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than City of Albany arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD accepts no responsibility for the integrity of the software coding of the approved noise model (CadnaA) used.

GHD has prepared this report on the basis of information provided by City of Albany and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of insects and other noise sources) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

2. Noise sources

2.1 Events and usage

Outlined in Table 2-1 is the expected usage of the Albany Motorsport Park, as conceptualised by the GSMG. For the purposes of sizing facilities and servicing infrastructure, a typical / frequent site attendance of 500 persons has been assumed (i.e. competitors + officials + spectators). This was determined through discussion with the GSMG on the nature and size of expected typical events.

Table 2-1 Indicative AMP event profile

Use	Level	Frequency	Duration	Entrants	Spectators
Driver training, schools, manufacturer testing		Week days	Day	50	0
Car test and tune day	Club	4 week days / month	Day	30	30
Car speed events	Club	1 weekend / month	Day	100	200 – 500
Car speed events	State	1 weekend / month	Day	100 – 200	200 – 1000
Car speed events	National	1 weekend / year	Day	200 – 300	2000 – 5000
Supercars events	National	1 × 3 day weekend / year	Day	200 – 300	10,000 – 20,000
Bike test and tune day	Club	4 week days / month	Day	50	50
Bike speed events	Club	1 weekend / month	Day	100	200 – 500
Bike speed events – Champions Ride Day	State	1 weekend / month	Day	100	200 – 1000
Bike speed events	National	1 weekend / year	Day	200	1000 – 5000
Motocross events	Club	3 days / week training 4 single days / month	Day	100 – 200	200 – 400
Motocross events	State	1 weekend / month	Day	200 – 300	500 – 1000
Drifting day	Club	2 days / month	Day and evening	30	30
Drifting day	State	1 weekend / month	Day and evening	50	200 – 500
Burnout day	Club	1 weekend / month	Day or evening	30	30
Burnout day	State	1 × 3 day weekend / year	Day or evening	50	1000 – 2000
Drag racing practice day	Club	4 week days / month	Day	30	100
Drag racing competition	Club	1 day / month	Day and evening	30	200 – 500
Drag racing competition	State	4 weekends / year	Day and evening	50	500 – 1000
Drag racing competition	National	1 weekend / year	Day or evening	50	1000 – 5000
Motorkhana	Club	1 day / month	Day	50	200

Duration of events:

- Typical day operation is 8:00 am – 6:00 pm
- Typical evening operation is 6:00 pm – 10:00 pm and only conducted if fixed or mobile lighting is available
- The 4WD training area, burnout pit, multi use track and drag racing strip are expected to be in operation year round.
- The motocross season commences in autumn (usually around April) and concludes in spring (usually around September) each year. During out of season period, no motocross events will be held.

2.2 Noise sources

Noise sources from Albany Motorsport Park will be primarily from vehicles competing and preparing for various motorsport events, spectators and the public address system.

Referring to Table 2-1, proposed events at Albany Motorsport Park have been grouped into the following for the purpose of noise assessment:

- Driver training, schools and manufacturer testing, to be held during the day on the multi use track – minimal noise impact as vehicles will be road registered and comply with Australia Design Rule (ADR) requirements for vehicle noise emissions.
- Multi use track events, such as car test and tune days, car speed events, bike test and tune days, bike speed events and drifting days, to be held during the day and evening. Noise impacts assessed based on vehicles competing in such events meeting the maximum CAMS noise level requirement of 95 dBA at a distance of 30 m (equating to a sound power level of 129.3 dBA).
- Motocross events, to be held during the day on the motocross track. Noise impacts assessed based on noise levels from senior class motocross bikes.
- Drag racing practice days and drag racing competitions, to be held during the day or evening at the drag racing strip. Many classes of drag racing vehicles have no imposed noise limits, and as such assessment has been completed using the CAMS noise level requirement.
- Burnout day at the burnout pit, to be held during the day and evening. Vehicles competing in such burnout days have no imposed noise limits, and as such assessment has been completed using the CAMS noise level requirement.
- 4WD and all-terrain vehicle (ATV) off road training, to be held during the day. Noise levels based on road registered 4WD vehicles.

It is important to note that no events are proposed to occur during the night period (between 10:00 pm to 7:00 am Monday to Saturday).

3. Noise criteria

Environmental noise is managed through the *Environmental Protection (Noise) Regulations 1997* (the Regulations). The Regulations specify maximum allowable external noise levels at noise sensitive, commercial and industrial premises.

3.1 Construction noise

The Regulations state that for construction work carried out between 7.00 am and 7.00 pm on any day which is not a Sunday or public holiday:

- Construction work must be carried out in accordance with control of environmental noise practices set out in Section 6 of Australian Standard (*AS) 2436-2010 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites*.
- The equipment used for construction must be the quietest reasonably available.
- The Chief Executive Officer (CEO) (of the Department of Water and Environmental Regulation (DWER)) may request that a noise management plan be submitted for the construction work at any time and complied with during construction activities.

For construction work done outside these hours:

- The construction work must be carried out in accordance with control of environmental noise practices set out in Section 6 of *AS 2436-2010*.
- The equipment used for construction must be the quietest reasonably available.
- The contractor must advise all nearby sensitive receptors likely to receive noise levels which fail to comply with the assigned levels under Regulation 8 (Table 3-1) of the work to be done at least 24 hours before it commences.
- The contractor must show that it was reasonably necessary for the work to be done out of hours.
- The contractor must submit to the CEO a noise management plan at least seven days prior to the commencement of out of hours work and the plan must be approved by the CEO before work commences. The plan must include details of:
  - Reasons for the construction work needing to be completed out of hours.
  - Details of activities which are likely to result in noise emissions that lead to exceedance of assigned levels.
  - Predictions of the noise emissions on the site.
  - Details of measures used to control noise (including vibration) emissions.
  - Procedures to be adopted for monitoring noise (including vibration) emissions.
  - Complaint response procedures to be adopted.

3.2 Operational noise

The Regulations (Regulation 7) define prescribed standards for noise emissions as follows:

> *7. (1) Noise emitted from any premises or public place when received at other premises –*
>
> > *(a) Must not cause or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind*

(b) Must be free of –

(i) Tonality (e.g. whining or droning)

(ii) Impulsiveness (e.g. sirens)

(iii) Modulation (e.g. banging or thumping)

The assigned levels for noise sensitive premises (Regulation 8) are shown in Table 3-1.

Assigned noise levels (Table 3-1) are set differently for noise sensitive, commercial and industrial and utility premises. For noise sensitive premises an influencing factor (IF) is incorporated into the assigned noise levels. IF depends on land use zonings within circles of 100 m and 450 m radius from the noise receiver, including:

- Proportion of industrial land use zonings
- Proportion of commercial zonings
- Presence of major roads (more than 15,000 vehicles per day) or secondary (6000 to 15,000 vehicles per day)

For this assessment, it has been assumed that IF will be zero (based on the absence of major and secondary roads). The resultant assigned levels used for this assessment of the AMP are shown in Table 3-3.

As motorsport events are scheduled to occur during either the day or evening period (refer Table 2-1), the L_{A10} assigned level of 45 dBA day and 40 dBA evening criteria have been used in this assessment.

Table 3-1 Assigned noise levels (dBA)

Type of premise receiving noise	Time of day	Assigned level		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ Max}$
Noise sensitive [4]	7.00 am to 7.00 pm Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	9.00 am to 7.00 pm Sunday and public holidays (Sunday)	40 + IF	50 + IF	65 + IF
	7.00 pm to 10.00 pm all days (Evenings)	40 + IF	50 + IF	55 + IF
	10.00 pm on any day to 7.00 am Monday to Saturday and 9.00 am Sunday and public holidays (Night)	35 + IF	45 + IF	55 + IF
Noise sensitive [5]	All hours	60	75	80

IF = influencing factor

Tonality, impulsiveness and modulation are defined in Regulation 9. Noise is to be taken to be free of these characteristics if:

a. The characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission.

b. The noise emission complies with the standard after the adjustments of Table 3-2 are made to the noise emission as measured at the point of reception.

[4] Highly sensitive areas include a building, or a part of a building, on the premises that is used for a noise sensitive purpose and any other part of the premises within 15 metres of that building or that part of the building.
[5] Any area other than highly sensitive area.

Table 3-2 Adjustment for intrusive or dominant noise characteristics[6]

Tonality(7)	Impulsiveness(7)	Modulation(7)
+5 dB	+5 dB	+5 dB

Table 3-3 Assigned noise levels (dBA) for AMP

Type of premise receiving noise	Time of day	Assigned level		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive	7.00 am to 7.00 pm Monday to Saturday (Day)	45	55	65
	9.00 am to 7.00 pm Sunday and public holidays (Sunday)	40	50	65
	7.00 pm to 10.00 pm all days (Evenings)	40	50	55
	10.00 pm on any day to 7.00 am Monday to Saturday and 9.00 am Sunday and public holidays (Night)	35	45	55

3.3 Noise sensitive receptors

A number of residential receptors were identified in proximity to the AMP, as listed in Table 3-4 and shown in Figure 3-1.

Table 3-4 Receptor locations

ID	Location (MGA 94)		Distance from nearest AMP boundary (m)	Worst case wind direction (°)
	Easting (m)	Northing (m)		
SR01	569713	6133385	1150	310
SR02	567355	6132573	1120	10
SR03	564483	6133265	1930	80
SR04	565029	6134675	1920	100

[6] Adjustment applies where noise emission is not music.
[7] Adjustments are cumulative to a maximum of 15 dB.

PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Development area boundary

578



SCALE

0 500 1000 1500

Metres (at A3)

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MAP PROJECTION: Universal Transverse Mercator
HORIZONTAL DATUM: Geocentric Datum of Australia (GDA)
GRID: Map Grid of Australia 1994, Zone 50

DATE	FILE LOCATION
15.04.2019	N:\AU\Albany WA\Projects\61\37331\Technical\Noise

REVISION	DRAWING NO.
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ALBANY MOTORSPORT PARK

NOISE SENSITIVE RECEPTOR LOCATIONS

FIGURE 3-1

Noise Assessment

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4. Noise monitoring

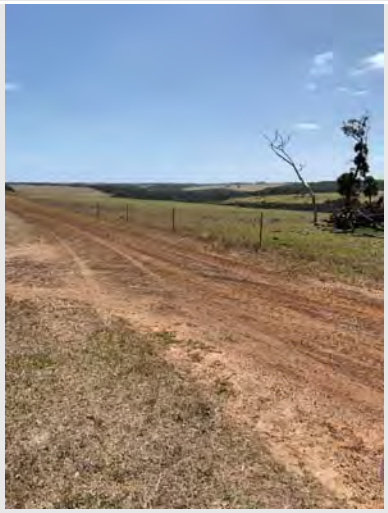
4.1 Noise monitoring locations

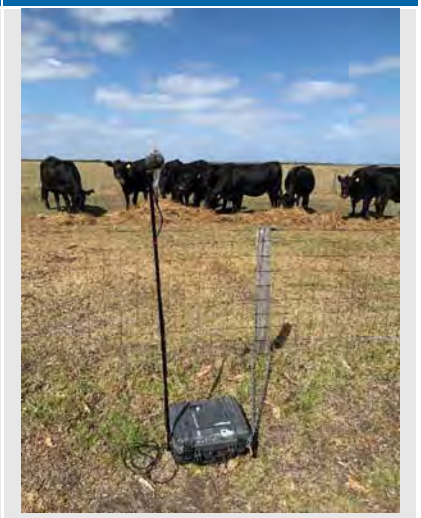
Noise monitoring was used to measure existing noise levels experienced by receptors located within the project area. Unattended noise monitoring was undertaken at three sites within the vicinity of the proposed Albany Motorsport Park.

Monitoring locations were chosen so as to be located at existing residential locations which are considered will be most affected by the Project. The monitoring locations were also identified as being safe and secure for unattended equipment, minimising the risk of theft or vandalism.

A summary of relevant information such as site coordinates, distance to the nearest boundary of the site and a photo of noise logger setup is provided in Table 4-1. The three monitoring locations are shown in Figure 4-1.

Table 4-1 Noise monitoring location summary

Site ID	Address	Easting (m)	Northing (m)	Distance of logger to AMP (m)	Noise logger setup
Site A	35552 Albany Hwy, DROME WA 6330	569713	6133385	1150	
Site B	114 Down Rd South, DROME WA 6330	567355	6132573	1120	

Site ID	Address	Easting (m)	Northing (m)	Distance of logger to AMP (m)	Noise logger setup
Site C	727 Marbelup North Rd, MARBELUP WA 6330	565029	6134675	1920	

4.2 Unattended noise monitoring methodology

Unattended noise logging for Sites A, B, and C was conducted from 5 to 14 March 2019. The instruments were programmed to accumulate environmental noise data continuously over sampling periods of 15-minutes for the entire monitoring period. Details of the noise logger setup are as follows:

– Model – Svan 955

– Type – Type 1

– Time interval – 15 minutes

– Frequency weighting – A weighted

Prior to deployment and at monitoring completion, the loggers were calibrated with a sound pressure level of 94 dB at 1 kHz using a Larson Davis CAL200 sound level calibrator. The data collected by the loggers was downloaded and analysed and any invalid data removed.

All noise sampling activities were undertaken with consideration to the specifications outlined in *AS 1055-1997 - Description and Measurement of Environmental Noise*.

4.3 Noise monitoring results

Sampled noise levels for the monitoring period are provided graphically in Appendix B along with the corresponding meteorological conditions during the monitoring period at each site, including precipitation and wind speed and direction for each site. Data excluded during filtering for sample periods of rainfall of > 0.2 mm and/or wind speed > 18 km/h at the noise logger have been highlighted in Appendix B.

Daily noise monitoring results for each site are shown in Table 4-2, with entries significantly affected by meteorological conditions removed.

PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Development area boundary

581



SCALE

0 500 1000 1500

Metres (at A3)

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MAP PROJECTION: Universal Transverse Mercator
HORIZONTAL DATUM: Geocentric Datum of Australia (GDA)
GRID: Map Grid of Australia 1994, Zone 50

DATE	FILE LOCATION
15.04.2019	N:\AU\Albany WA\Projects\61\37331\Technical\Noise

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ALBANY MOTORSPORT PARK

NOISE MONITORING LOCATIONS

FIGURE 4-1

Noise Assessment

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Table 4-2 Daily L_{Aeq} noise levels, dBA

Site ID	Site A			Site B			Site C		
Date	L_{Aeq} day	L_{Aeq} evening	L_{Aeq} night	L_{Aeq} day	L_{Aeq} evening	L_{Aeq} night	L_{Aeq} day	L_{Aeq} evening (dBA)	L_{Aeq} night (dBA)
Tuesday 5 March 2019	43.9	33.7	37.2	54.8	29.8	33.9	54.9	33.5	39.1
Wednesday 6 March 2019	47.4	35.0	32.4	50.3	31.3	31.1	55.8	44.1	32.2
Thursday 7 March 2019	43.9	30.3	38.3	47.6	26.4	34.8	54.0	29.2	38.1
Friday 8 March 2019	45.2	35.8	36.1	57.9	29.0	34.2	52.2	38.7	37.5
Saturday 9 March 2019	46.3	32.3	43.4	48.5	31.9	57.5	50.2	35.1	37.3
Sunday 10 March 2019	46.2	33.5	41.5	70.2	30.9	38.7	51.6	29.4	38.5
Monday 11 March 2019	46.9	30.6	41.0	51.7	26.7	33.8	82.6	32.6	40.5
Tuesday 12 March 2019	48.9	34.6	40.6	50.8	26.5	33.8	76.1	35.0	76.0
Wednesday 13 March 2019	44.6	-	-	55.0			81.4	78.7	76.8
Thursday 14 March 2019	-	-	-				75.6		

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Table 4-3 provides the rating background level (RBL) for each location. The RBL is defined as:

The overall single figure background level representing each assessment period (day/evening/night) over the whole monitoring period, defined as the median value of:

- *All the day assessment background levels over the monitoring period for the day (7.00 am to 7.00 pm).*
- *All the evening assessment background levels over the monitoring period for the evening (7.00 pm to 10.00 pm).*
- *All the night assessment background levels over the monitoring period for the night (10.00 pm to 7.00 am).*

Table 4-3 Overall L_{Aeq} noise levels, dBA

Site ID	L_{Aeq} day	L_{eq} Evening (dB)	L_{eq} Night (dB)
Site A	46.2	33.6	39.9
Site B	61.3	29.6	48.7
Site C	76.0	69.2	69.9

Noise monitoring and observations indicate a noise environment for each location as follows:

- **Site A: 35552 Albany Hwy, DROME WA 6330** – A rural environment with the main sources of noise occasional vehicle traffic on farm roads, livestock (in the distance) and sounds of nature (birds, insects and wind in trees). The APEC wood chip mill was in operation during the noise monitoring. The Plantation Energy pellet facility was not in operation during the noise monitoring.
- **Site B: 114 Down Rd South, DROME WA 6330** – A rural environment with the main sources of noise occasional vehicle traffic on farm roads, livestock and sounds of nature (birds, insects and wind in trees).. Elevated noise levels during the day and night period are most likely due to vehicle traffic on farm roads, such as tractors and quad bikes, and livestock. The APEC wood chip mill was in operation during the noise monitoring. The Plantation Energy pellet facility was not in operation during the noise monitoring.
- **Site C: 727 Marbelup North Rd, MARBELUP WA 6330** - A rural environment with the main sources of noise occasional vehicle traffic on farm roads, livestock and sounds of nature (birds, insects and wind in trees). Elevated noise levels during all periods is most likely due to vehicle traffic on farm roads, such as tractors and quad bikes, and livestock, which was located very close to the noise logger location. The APEC wood chip mill was in operation during the noise monitoring. The Plantation Energy pellet facility was not in operation during the noise monitoring.

Noise monitoring at sensitive receptors in the vicinity of the Albany Motorsport Park indicates there were no existing noise sources, operating at the time of the noise monitoring, which need to be considered as ‘significantly contributing’. On this basis, the assessment has been completed for noise impacts from the Albany Motorsport Park in isolation.

5. Construction noise and vibration assessment

5.1 Construction noise

Construction noise impacts associated with the Albany Motorsport Park were estimated using the following distance attenuation relationship:

$$SPL = SWL - 20\log(d) + 10\log(Q) - 11$$

where: d = Distance between the source and receptor (m)
Q = Directivity index (2 for a flat surface)
SPL = Sound pressure level at the distance from the source (dB)
SWL = Sound power level of the source (dB)

Typical noise levels produced by construction plant anticipated to be used on-site were sourced from *AS 2436 –2010 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites*.

Propagation calculations take into account sound intensity losses due to spherical spreading, with additional minor losses such as atmospheric absorption, directivity and ground absorption ignored in the calculations. As a result, predicted received noise levels are expected to slightly overstate actual received levels and thus provide a measure of conservatism.

Received noise produced by anticipated activities during the construction of the AMP are shown in Table 5-1 for a variety of distances, with no noise barriers or acoustic shielding in place and with each plant item operating at full power. The sound pressure levels shown are maximum levels produced when machinery is operated under full load.

The magnitude of off-site noise impact associated with construction will be dependent upon a number of factors:

- The intensity and location of construction activities
- The type of equipment used
- Existing local noise sources
- Intervening terrain
- The prevailing weather conditions

Construction machinery will move about the AMP site area, altering the directivity of the noise source with respect to individual receptors. During any given period the machinery items used in the AMP area will operate at maximum sound power levels for only brief times. At other times the machinery may produce lower sound levels while carrying out activities not requiring full power. It is unlikely that all construction equipment would be operating at their maximum sound power levels at any one time. Finally, certain types of construction machinery will be present in the AMP area for only brief periods during construction.

Table 5-1 Predicted plant activity noise levels (dBA)

Plant	Estimated SWL (dBA)	Estimated SPL (dBA) at distance (m)						
		50	250	500	750	1000	2000	3000
Backhoe	104	62	48	42	39	36	30	26
Backhoe (with auger)	106	64	50	44	41	38	32	28
Bulldozer	108	66	52	46	43	40	34	30

Plant	Estimated SWL (dBA)	Estimated SPL (dBA) at distance (m)						
		50	250	500	750	1000	2000	3000
Compactor	113	71	57	51	48	45	39	35
Compressor (silenced)	101	59	45	39	36	33	27	23
Concrete agitator truck	109	67	53	47	44	41	35	31
Concrete pump truck	108	66	52	46	43	40	34	30
Concrete saw	117	75	61	55	52	49	43	39
Concrete vibratory screed	115	73	59	53	50	47	41	37
Crane (mobile)	104	62	48	42	39	36	30	26
Excavator	107	65	51	45	42	39	33	29
Front end loader	113	71	57	51	48	45	39	35
Generator (diesel)	104	57	43	37	34	31	25	21
Grader	110	68	54	48	45	42	36	32
Hand tools (electric)	102	60	46	40	37	34	28	24
Hand tools (pneumatic)	116	74	60	54	51	48	42	38
Jack hammers	121	79	65	59	56	53	47	43
Rock breaker	118	76	62	56	53	50	44	40
Roller (vibratory)	108	66	52	46	43	40	34	30
Scraper	116	74	60	54	51	48	42	38
Truck (>20 tonnes)	107	65	51	45	42	39	33	29
Truck (dump)	117	75	61	55	52	49	43	39
Truck (water cart)	107	65	51	45	42	39	33	29
Vehicle (commercial, 4WD)	106	64	50	44	41	38	32	28
Welder	105	63	49	43	40	37	31	27

The closest noise sensitive receptor to any potential noise source during construction of the plant is located approximately 1120 m from the AMP. From Table 5-1, noise levels exceeding the day L_{A10} assigned level of 45 dBA are not expected to impact on the closest noise sensitive receptors, with the exception of noisy equipment with a sound power level (SWL) higher than 115 dBA.

In line with the Regulations, construction will be carried out in accordance with control of environmental noise practices set out in Section 6 of Australian Standard (*AS) 2436-2010 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites* and equipment used will be the quietest reasonably available (basis for numbers in Table 5-1).

5.2 Construction vibration

Vibration impacts discussed essentially focus on potential structural damage to properties in close proximity of the AMP area and/or potentially affected by construction activities.

The separation distance between construction activities and the potentially most impacted sensitive receptors is 1120 m.

The nature and levels of vibration from the site will vary with the activities being carried out on site. Table 5-2 outlines typical vibration levels for different plant activities that may be generated on the site, sourced from the NSW Roads and Traffic Authority (RTA) *Environmental Noise Management Manual*[8].

[8] Roads and Traffic Authority (RTA), 2001. *Environmental Noise Management Manual*. Sydney, December 2001.

Table 5-2 Typical vibration levels for construction equipment

Plant item	Peak particle velocity at 10 m (mm/s)
Backhoe	1.0
Bulldozer	2.5-4.0
Compactor (7 tonne)	5.0-7.0
Front end loader	6.0-8.0
Jack hammer	0.5
Roller (15 tonne)	7.0-8.0

Construction activity may result in varying degrees of ground vibration depending on the equipment used and methods employed. Operation of construction equipment causes ground vibration which spreads through the ground and diminishes in strength with distance. Buildings founded on the soil in the vicinity of the construction site respond to these vibrations with varying outcomes.

From Table 5-2, equipment proposed for site preparation and construction of the AMP will generate low levels of vibration which are unlikely to result in any vibration risks to structures. The lower limit for vibrations resulting in building damage (5 mm/s) is normally not exceeded by general construction activities at distances greater than 20 m from the nearest sensitive receptor.

Given the distances involved between site works and the nearest receptors, vibrations affecting human comfort and building integrity are not expected to be an issue.

6. Operational noise assessment

6.1 Noise model objective

The objective of noise modelling is to determine the noise impact at the nearest noise sensitive receptors resulting from Albany Motorsport Park during events and practice, under both neutral and adverse weather conditions.

Noise modelling was undertaken using Computer Aided Noise Abatement (CadnaA) to predict the effects of noise generated by motorsport events.

6.2 Noise modelling software package

CadnaA, by Datakustik, is a computer program for the calculation, assessment and prognosis of noise exposure. CadnaA calculates environmental noise propagation according to the CONCAWE algorithm.

CONCAWE is a mathematical model developed to predict community noise levels from petrochemical and industrial plant for a range of meteorological conditions. A full description of the mathematical model is provided in the report prepared for the Conservation of Clean Air and Water in Europe (CONCAWE)[9] The CONCAWE prediction method is widely used in a range of environmental scenarios for predicting noise impacts of industrial facilities.

CadnaA considers local characteristics, site sources and the location of the receptor areas to predicted noise levels. The method specified consists of octave band algorithms (with nominal mid band frequencies from 31.5 Hz to 8 kHz) for calculating the attenuation of sound. The algorithms used in this model account for the following physical features:

- Geometrical divergence,
- Atmospheric absorption,
- Ground effect,
- Reflection from surfaces, and
- Screening by obstacles.

In assessing meteorological conditions, the CONCAWE method has been applied instead of ISO 9613-2 weather correction. Modelling results are based on available information provided and should only be used as a guide for comparative purposes.

6.3 Noise model configuration

6.3.1 Proposed plant layout

The noise model developed for this assessment was based on the project layout of the AMP as provided (see Figure 1-1).

6.3.2 Topography and ground absorption effects

In line with the proposed location of the AMP, the site and surrounding ground topography was included in the modelled using 1 m ground contours.

[9] Manning, 1991. *CONCAWE Report No. 4/81 – The propagation of noise from petroleum and petrochemical complexes to neighbouring communities.*

Ground absorption was taken into account in the calculations. A general ground absorption coefficient of 0.7 was used throughout the model to represent the surrounding ground type mainly comprising of mixed vegetation and soil.

6.3.3 Meteorological conditions

The meteorological conditions selected for the model can have a significant effect on the result. As such, EPA requires compliance with the assigned noise levels to be demonstrated for 98% of the time, during day and night periods, for the month of the year in which the worst case weather conditions prevail[10]. EPA specifies the use of the meteorological conditions outlined in Table 6-1.

Table 6-1 Meteorological conditions for noise modelling

Meteorology	Calm	Worst case	
	Day and night	Day	Evening / Night
Wind speed	0 m/s	4 m/s	3 m/s
Stability	D-class	E-class	F-class
Temperature	20°C	20°C	15°C
Relative humidity	70%	50%	50%

As sensitive receptors are located in several directions from the AMP, assessment under worst case wind direction for each receptor has been undertaken.

6.4 Noise sources

An outline of expected motorsport events is provided in Section 2. Corresponding noise levels for various event types are outlined in Table 6-2. Sound power levels for the various vehicle types are provided in Table 6-3.

[10] EPA (Environmental Protection Authority), 2007. *Guidance for the Assessment of Environmental Factors – No. 8 - Environmental Noise – Draft*, Perth, May 2007.

Table 6-2 Event type and vehicle noise levels, dBA

Event type	Worst case sound power level	Operating time
Driving training, school and manufacturer testing	95	Day
Multi use track events – car and bike events	129	Day and evening
Motocross events	129	Day
Drag racing practice days and events	129	Day and evening
Burnout days	129	Day and evening
4WD off road training	105	Day

Table 6-3 Sound power levels (dBA)

Vehicle type	Sound power level (dBA)									
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
Road registered car or motorbike					95					95
Multi use track – cars and bike events					129					129
Motocross bike (senior class)		82	102	113	116	118	120	114	100	129
Drag race/burn out - cars and bikes					129					129
4WD off road					105					129

6.4.1 Driving training, school and manufacturer testing

Noise modelling has been conducted for driver training, driver school and manufacturer testing, with 20 cars or motorbikes operating continuously and simultaneously with noise sources spaced around the multi use track. Noise levels from road registered cars and motorbikes have been assumed as a sound power level of 95 dBA.

6.4.2 Multi use track events – Car and bike events, including drifting and motorkhana events

Noise modelling has been conducted for multi use track events for cars or motorbikes, with 20 cars or motorbikes operating continuously and simultaneously with noise sources spaced around the multi use track. Noise levels which meet CAMS requirements have been assumed, equating to a sound power level of 129 dBA.

6.4.3 Motocross events

Noise modelling has been conducted for a Senior Open race event, with 16 motocross bikes operating continuously and simultaneously with noise sources spaced around the motocross track and modelled heights of either 0.5 m, 2.5 m and 5 m to represent course terrain and jumps. Noise levels from senior class motocross bikes have been assumed as a sound power level of 129 dBA.

6.4.4 Drag racing practice days and events

Noise modelling has been conducted for drag racing practice and competition days, with two drag racing cars or bikes operating continuously and simultaneously on the drag racing track. Noise levels which meet CAMS requirements have been assumed, equating to a sound power level of 129 dBA.

6.4.5 Burnout days

Noise modelling has been conducted for burnout events with one car or bike operating continuously at the burnout pit. Noise levels which meet CAMS requirements have been assumed, equating to a sound power level of 129 dBA.

6.4.6 4WD off road training

Noise modelling has been conducted for 4WD off road driver training, with five 4WD vehicles operating continuously and simultaneously with noise sources spaced around the 4WD training area. Noise levels from road registered 4WD vehicles have been assumed as a sound power level of 105 dBA.

6.5 Noise modelling results

The calculated noise levels at the nearest noise sensitive premises were assessed to determine if predicted noise emissions complied with the assigned night time L_{A10} day and evening noise levels of 45 and 40 dBA, respectively.

There are four residences within close proximity to Albany Motorsport Park. For the purpose of this assessment, it has been assumed that if compliance is achieved at the nearest residences, compliance would be achieved further away.

6.5.1 Neutral meteorological conditions

Predicted day noise levels from various motorsport events under neutral meteorological conditions are presented in Table 6-4. Table 6-4 shows predicted marginal exceedance of the day assigned noise level of 45 dBA (up to 2 dBA) as orange text and predicted exceedances of greater than 2 dBA as red text.

From Table 6-4:

- All events are predicted to comply with the assigned levels at SR03 and SR04.
- Marginal non-compliance (2 dBA) is predicted at SR01 for multi use track (MUT) events and at SR02 for motocross (MX) and combined motocross and drag racing (MX+DR) events.
- Non-compliance (3 to 4 dBA) is predicted at SR01 for combined multi use track and drag racing (MUT+DR), combined motocross and multi use track (MX+MUT) and combined motocross, multi use track and drag racing (MX+MUT+DR) events.
- Non-compliance (3 to 4 dBA) is predicted at SR02 for MX+MUT and MX+MUT+DR events.

Table 6-4 Predicted day L_{A10} noise levels – Neutral meteorological conditions

Event	SR01	SR02	SR03	SR04
4WD training (4WD)	13	22	13	15
Burnouts (BURN)	32	35	23	30
Drag racing (DR)	43	35	26	29
Driver training (DT)	13	9	1	6
Multi use track (MUT)	47	43	35	40
Motocross (MX)	37	47	27	35
MUT + DR *	49	44	35	40
MX + MUT *	48	48	36	41
MX + DR *	44	47	30	36
MX + MUT + DR #	49	49	36	42

* includes 4WD training

includes 4WD training and burnouts

Predicted day noise level contours for each event type are presented in Figure 6-1 to Figure 6-10.

Predicted evening noise levels from various motorsport events under neutral meteorological conditions are presented in Table 6-5. Table 6-5 shows predicted marginal exceedance of the evening assigned noise level of 40 dBA (up to 2 dBA) as orange text and predicted exceedances of greater than 2 dBA as red text.

From Table 6-5:

- All events are predicted to comply with the assigned levels at SR03 and SR04, except for marginal non-compliance at SR04 for MUT+DR events (including 4WD training and burnouts).
- Non-compliance (3 to 9 dBA) is predicted at SR01 for DR, MUT, MUT+DR (including 4WD training) and MUT+DR (including 4WD training and burnouts).
- Non-compliance (3 to 5 dBA) is predicted at SR02 for MUT, MUT+DR (including 4WD training) and MUT+DR (including 4WD training and burnouts).

Table 6-5 Predicted evening L_{A10} noise levels – Neutral meteorological conditions

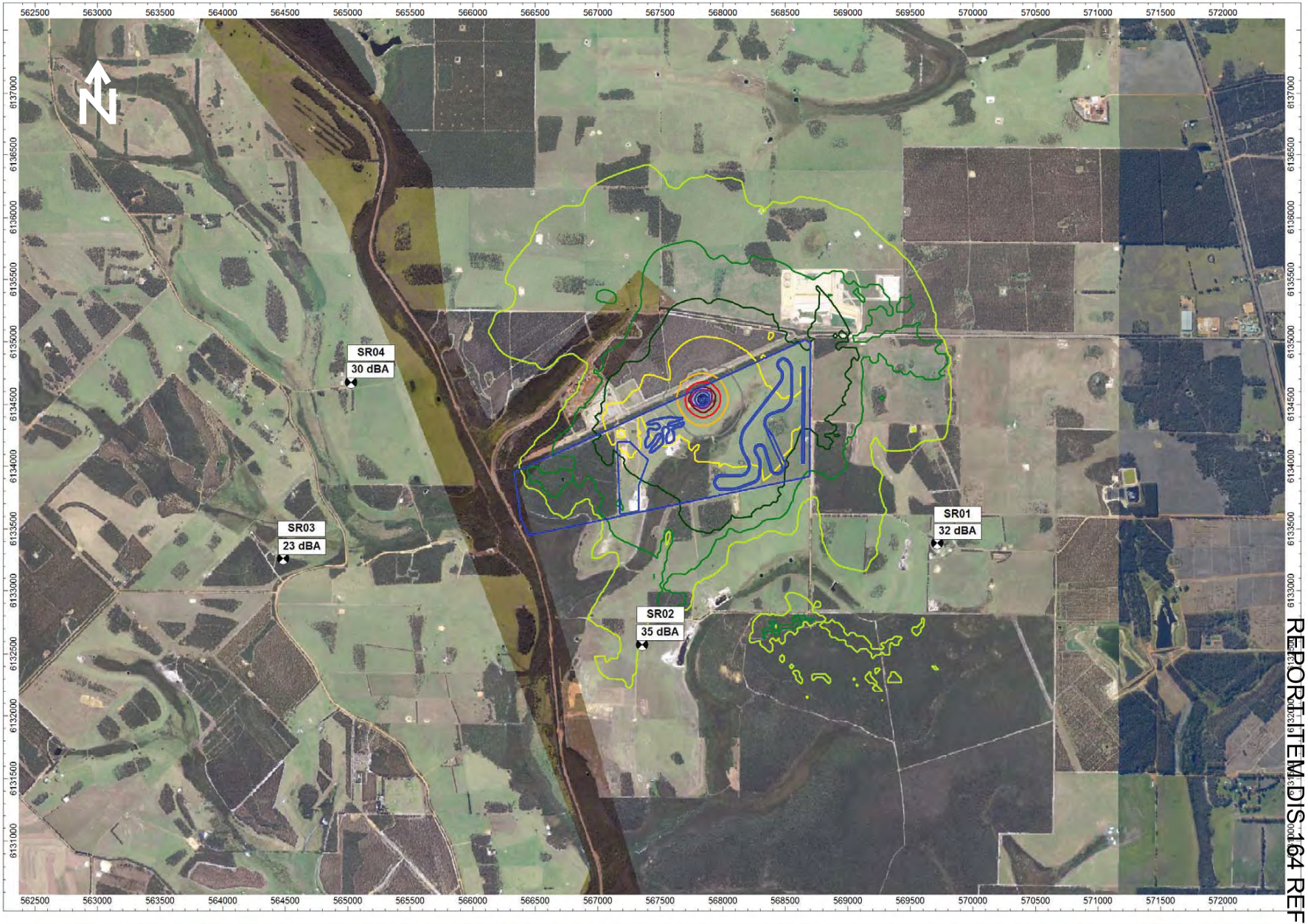
Event	SR01	SR02	SR03	SR04
Drag racing (DR)	**43**	35	26	29
Multi use track (MUT)	**47**	**43**	35	40
MUT + DR *	**49**	**44**	35	40
MUT + DR #	**49**	**45**	36	**41**

* includes 4WD training

includes 4WD training and burnouts

The results presented in Table 6-4 and Table 6-5 demonstrate that for some event combinations, there may be occasions when the predicted noise levels from Albany Motorsport Park may exceed the assigned noise levels.


PREDICTED NOISE LEVELS
35 dBA
40 dBA
45 dBA
50 dBA
55 dBA
60 dBA
65 dBA
70 dBA
75 dBA
80 dBA
85 dBA
90 dBA
LEGEND
Noise sensitive receptor
Line noise source
Point noise source
Development area boundary
Evening assigned level (40 dBA)
Day assigned level (45 dBA)
SR04
15 dBA
SR03
13 dBA
SR01
13 dBA
SR02
22 dBA
SCALE
0 500 1000 1500
Metres (at A3)
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HORIZONTAL DATUM: Geocentric Datum of Australia (GDA)
GRID: Map Grid of Australia 1994, Zone 50
DATE 15.04.2019
FILE LOCATION N:\AU\Albany WA\Projects\61\37331\Technical\Noise
REVISION 0
DRAWING NO.
ALBANY MOTORSPORT PARK
Noise Assessment
PREDICTED DAY NOISE LEVELS
4WD TRAINING
Noise contours: L_{A10}
Grid height: 1.4 m
Neutral meteorological conditions
FIGURE 6-1
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ALBANY MOTORSPORT PARK

Noise Assessment

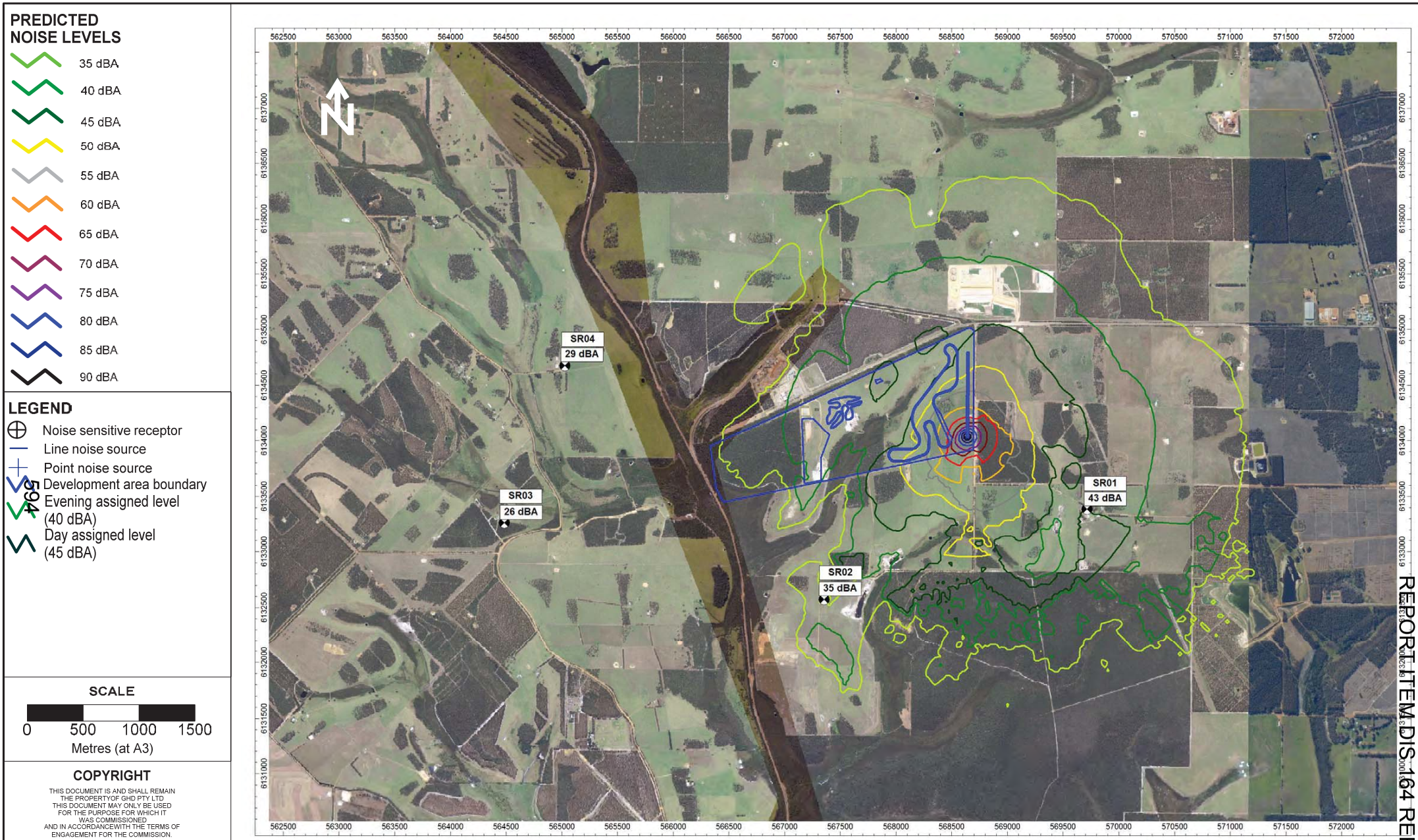
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BURNOUT EVENT

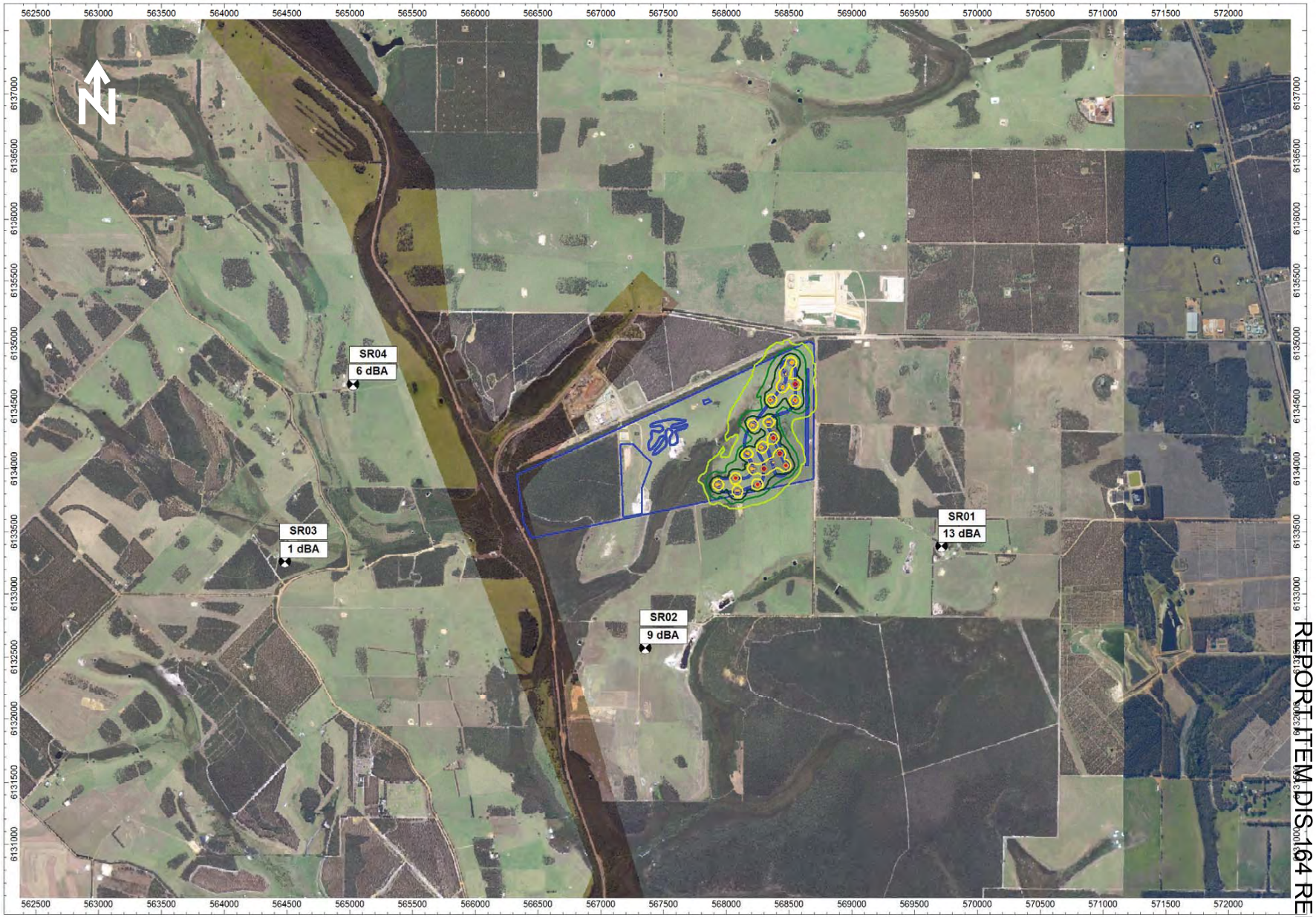
Noise contours: L_{A10}
Grid height: 1.4 m
Neutral meteorological conditions

FIGURE 6-2

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PREDICTED NOISE LEVELS
35 dBA
40 dBA
45 dBA
50 dBA
55 dBA
60 dBA
65 dBA
70 dBA
75 dBA
80 dBA
85 dBA
90 dBA
LEGEND
Noise sensitive receptor
Line noise source
Point noise source
Development area boundary
Evening assigned level (40 dBA)
Day assigned level (45 dBA)
SR04
29 dBA
SR03
26 dBA
SR02
35 dBA
SR01
43 dBA
SCALE
0 500 1000 1500
Metres (at A3)
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Noise Assessment
PREDICTED DAY NOISE LEVELS
DRAG RACING EVENT
Noise contours: L_{A10}
Grid height: 1.4 m
Neutral meteorological conditions
FIGURE 6-3
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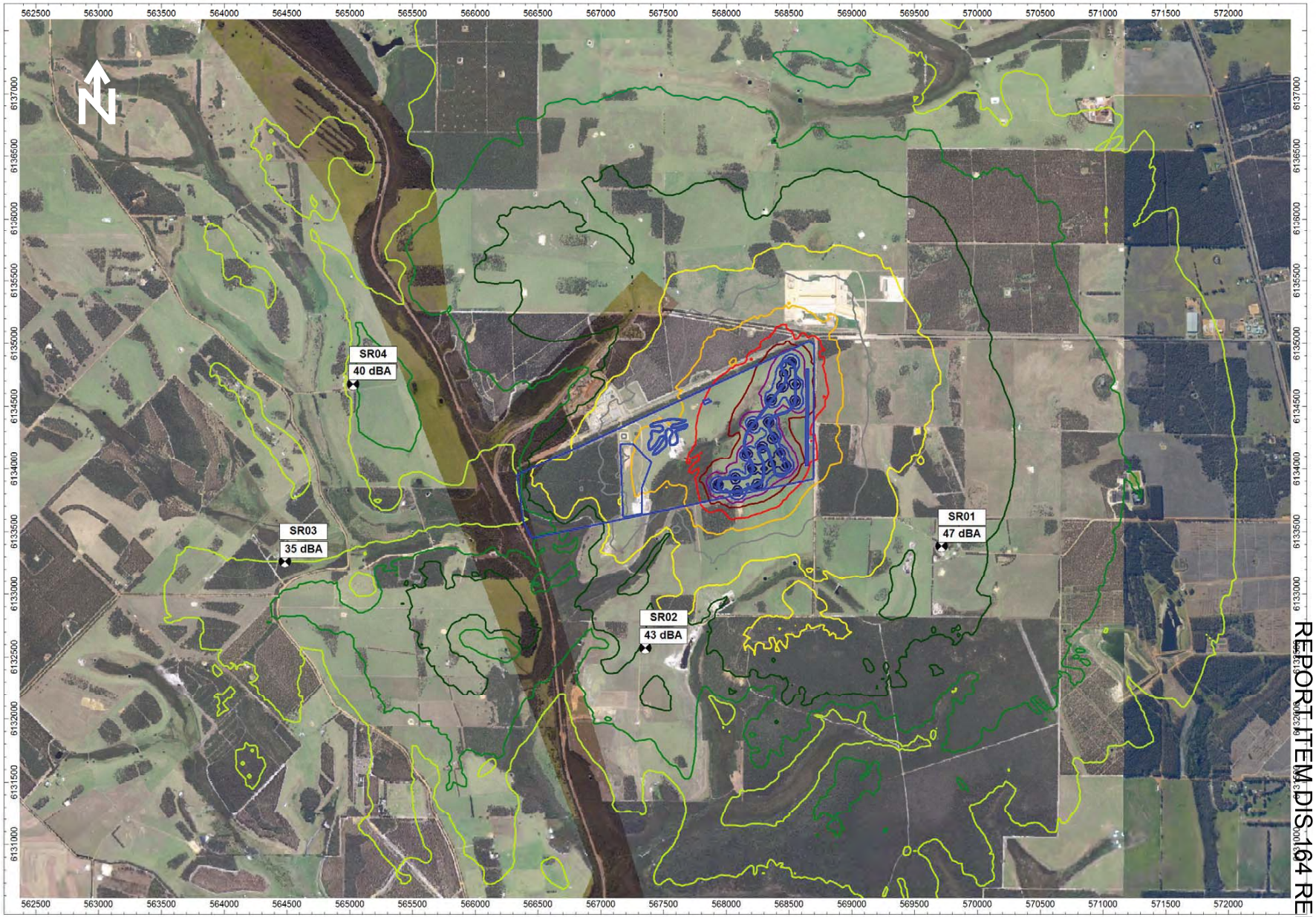

PREDICTED NOISE LEVELS
35 dBA
40 dBA
45 dBA
50 dBA
55 dBA
60 dBA
65 dBA
70 dBA
75 dBA
80 dBA
85 dBA
90 dBA
LEGEND
Noise sensitive receptor
Line noise source
Point noise source
Development area boundary
595
Evening assigned level (40 dBA)
Day assigned level (45 dBA)
SR04
6 dBA
SR03
1 dBA
SR02
9 dBA
SR01
13 dBA
562500 563000 563500 564000 564500 565000 565500 566000 566500 567000 567500 568000 568500 569000 569500 570000 570500 571000 571500 572000
6137000 6136500 6136000 6135500 6135000 6134500 6134000 6133500 6133000 6132500 6132000 6131500 6131000
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REVISION 0
DRAWING NO.
ALBANY MOTORSPORT PARK
Noise Assessment
PREDICTED DAY NOISE LEVELS
DRIVER TRAINING
Noise contours: L_{A10}
Grid height: 1.4 m
Neutral meteorological conditions
FIGURE 6-4
GHD CLIENTS | PEOPLE | PERFORMANCE
REPORT ITEM DIS 164 REFERS

PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- 596 Evening assigned level (40 dBA)
- Day assigned level (45 dBA)



SCALE

0 500 1000 1500

Metres (at A3)

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GRID:	Map Grid of Australia 1994, Zone 50

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS
MULTI USE TRACK EVENT

Noise contours: L_{A10}
Grid height: 1.4 m
Neutral meteorological conditions

FIGURE 6-5

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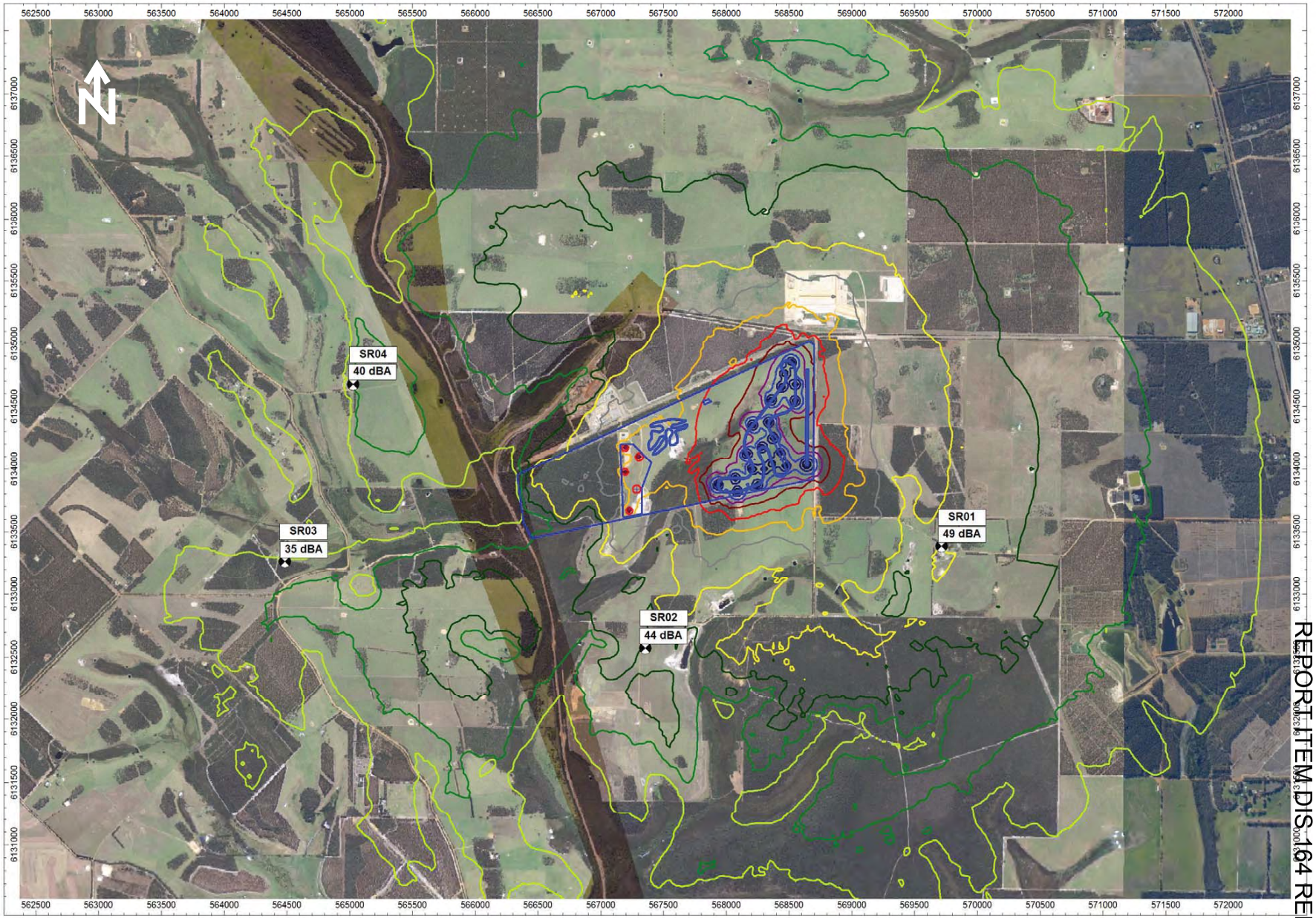

PREDICTED NOISE LEVELS
35 dBA
40 dBA
45 dBA
50 dBA
55 dBA
60 dBA
65 dBA
70 dBA
75 dBA
80 dBA
85 dBA
90 dBA
LEGEND
Noise sensitive receptor
Line noise source
Point noise source
Development area boundary
Evening assigned level (40 dBA)
Day assigned level (45 dBA)
SR04
35 dBA
SR03
27 dBA
SR02
47 dBA
SR01
37 dBA
SCALE
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DATE 15.04.2019
FILE LOCATION N:\AU\Albany WA\Projects\61\37331\Technical\Noise
REVISION 0
DRAWING NO.
ALBANY MOTORSPORT PARK
Noise Assessment
PREDICTED DAY NOISE LEVELS
MOTOCROSS EVENT
Noise contours: L_{A10}
Grid height: 1.4 m
Neutral meteorological conditions
FIGURE 6-6
GHD CLIENTS | PEOPLE | PERFORMANCE
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (40 dBA)
- Day assigned level (45 dBA)



SCALE

0 500 1000 1500

Metres (at A3)

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS
MULTI USE TRACK AND DRAG RACING EVENTS

Noise contours: L_{A10}
Grid height: 1.4 m
Neutral meteorological conditions

FIGURE 6-7

GHD CLIENTS | PEOPLE | PERFORMANCE

REPORT ITEM DIS 164 REFERS



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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS
MOTOCROSS AND MULTI USE TRACK EVENTS

Noise contours: L_{A10}
Grid height: 1.4 m
Neutral meteorological conditions

FIGURE 6-8

GHD CLIENTS | PEOPLE | PERFORMANCE

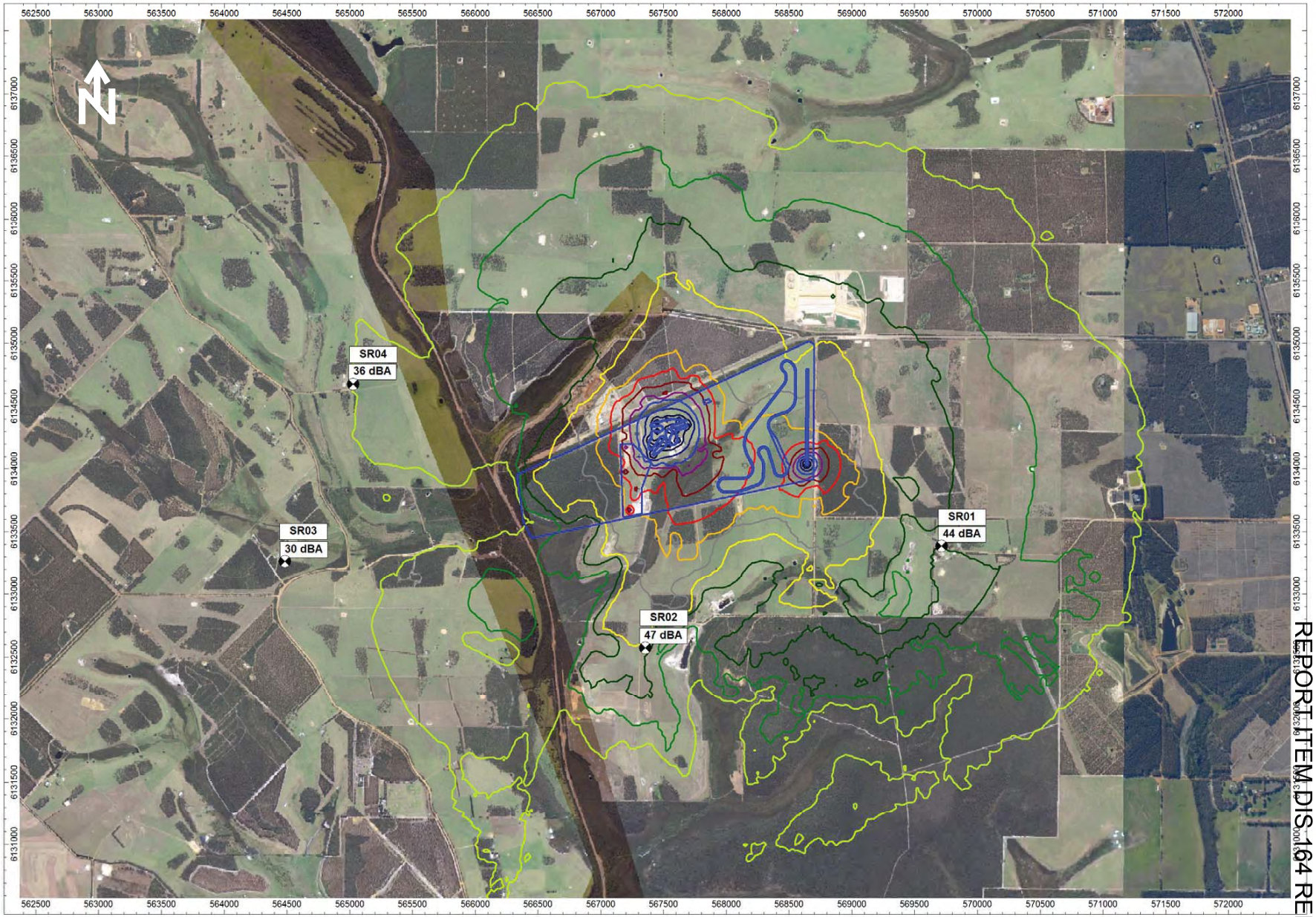
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (40 dBA)
- Day assigned level (45 dBA)



SCALE

0 500 1000 1500

Metres (at A3)

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS
MOTOCROSS AND DRAG RACING EVENTS

Noise contours: L_{A10}
Grid height: 1.4 m
Neutral meteorological conditions

FIGURE 6-9

GHD CLIENTS | PEOPLE | PERFORMANCE

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS
MOTOCROSS, MULTI USE TRACK AND DRAG RACING EVENTS

Noise contours: L_{A10}
Grid height: 1.4 m
Neutral meteorological conditions

FIGURE 6-10

GHD CLIENTS | PEOPLE | PERFORMANCE

REPORT ITEM DIS 164 REFERS

6.5.2 Worst case meteorological conditions

Predicted day noise levels from various motorsport events under worst case meteorological conditions are presented in Table 6-6. Table 6-6 shows predicted marginal exceedance of the day assigned noise level of 45 dBA (up to 2 dBA) as orange text and predicted exceedances of greater than 2 dBA as red text.

From Table 6-6:

- All events are predicted to comply with the assigned levels at SR03.
- Marginal non-compliance (2 dBA) is predicted at SR04 for MUT and MUT+DR events.
- Non-compliance (5 to 11 dBA) is predicted at SR01 for DR, MUT, MUT+DR, MX+MUT, MX+DR and MX+MUT+DR events.
- Non-compliance (6 to 10 dBA) is predicted at SR02 for MUT, MX, MUT+DR, MX+MUT, MX+DR and MX+MUT+DR events.
- Non-compliance (3 to 4 dBA) is predicted at SR04 for MX+MUT and MX+MUT+DR events.

Predicted day noise level contours for each event type are presented in Figure 6-11 to Figure 6-20. In each figure, worst case wind direction is presented for the most impacted receptor.

Table 6-6 Predicted day L_{A10} noise levels – Worst case meteorological conditions

Event	SR01	SR02	SR03	SR04
Worst case wind direction (°)	310	10	80	100
4WD training (4WD)	21	29	20	22
Burnouts (BURN)	39	42	30	37
Drag racing (DR)	**50**	42	33	36
Driver training (DT)	20	16	8	13
Multi use track (MUT)	**55**	**51**	42	**47**
Motocross (MX)	44	**53**	34	41
MUT + DR *	**56**	**51**	43	**47**
MX + MUT *	**55**	**55**	43	**48**
MX + DR *	**51**	**53**	37	43
MX + MUT + DR #	**56**	**55**	43	**49**

* includes 4WD training

includes 4WD training and burnouts

Predicted evening noise levels from various motorsport events under worst case meteorological conditions are presented in Table 6-7. Table 6-7 shows predicted marginal exceedance of the evening assigned noise level of 40 dBA (up to 2 dBA) as orange text and predicted exceedances of greater than 2 dBA as red text.

From Table 6-7:

- All events are predicted to comply with the assigned levels at SR03.
- Non-compliance (10 to 16 dBA) is predicted at SR01 for DR, MUT, MUT+DR (including 4WD training) and MUT+DR (including 4WD training and burnouts) events.
- Non-compliance (11 to 12 dBA) is predicted at SR02 for MUT, MUT+DR (including 4WD training) and MUT+DR (including 4WD training and burnouts) events.
- Non-compliance (7 to 8 dBA) is predicted at SR04 for MUT, MUT+DR (including 4WD training) and MUT+DR (including 4WD training and burnouts) events.

Table 6-7 Predicted evening L_{A10} noise levels – Worst case meteorological conditions

Event	SR01	SR02	SR03	SR04
Worst case wind direction (°)	310	10	80	100
Drag racing (DR)	**50**	42	33	36
Multi use track (MUT)	**55**	**51**	42	**47**
MUT + DR *	**56**	**51**	43	**47**
MUT + DR #	**56**	**52**	43	**48**

The results presented in Table 6-6 and Table 6-7 demonstrate that for some event combinations, there may be occasions when the predicted noise levels from Albany Motorsport Park may exceed the assigned noise levels.

PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- 40 Evening assigned level (40 dBA)
- Day assigned level (45 dBA)



SCALE

0 500 1000 1500

Metres (at A3)

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ALBANY MOTORSPORT PARK

Noise Assessment

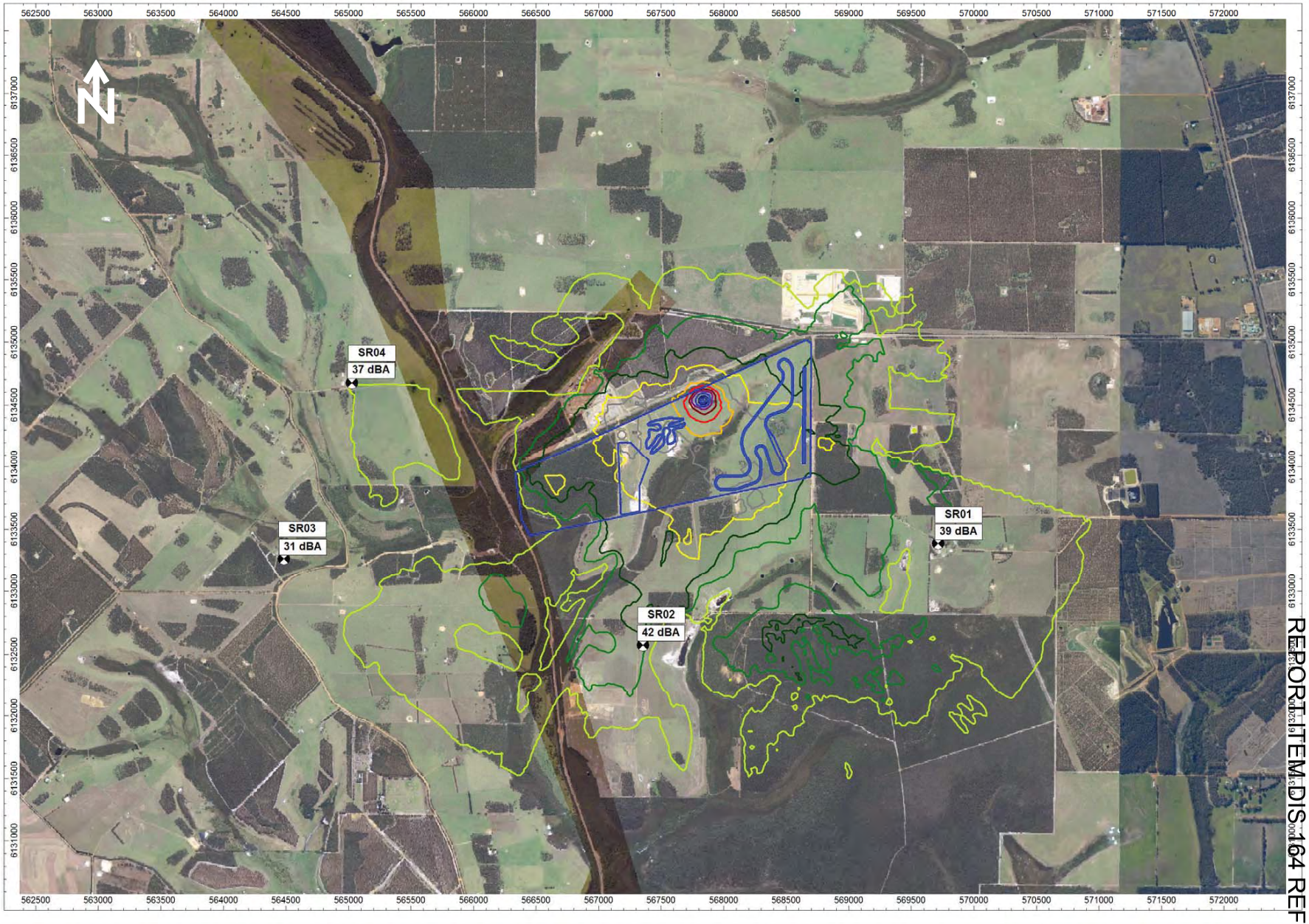
PREDICTED DAY NOISE LEVELS
4WD TRAINING

Noise contours: L_{A10}
Grid height: 1.4 m
Worst case meteorological conditions

FIGURE 6-11

GHD CLIENTS | PEOPLE | PERFORMANCE

REPORT ITEM DIS 164 REFERS



PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (40 dBA)
- Day assigned level (45 dBA)

SCALE

0 500 1000 1500

Metres (at A3)

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS
BURNOUT EVENT

Noise contours: L_{A10}
Grid height: 1.4 m
Worst case meteorological conditions

FIGURE 6-12

GHD CLIENTS | PEOPLE | PERFORMANCE

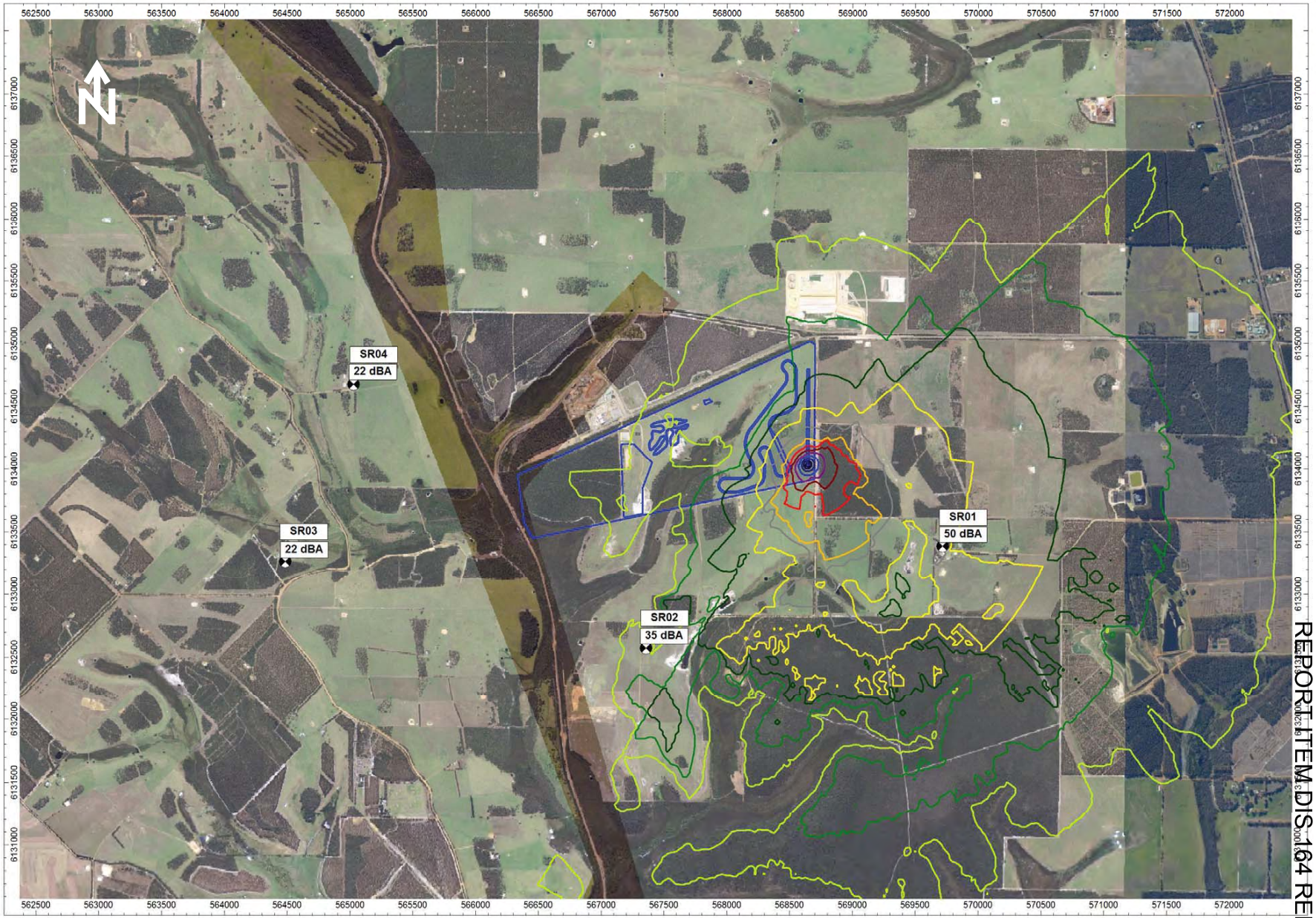
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (40 dBA)
- Day assigned level (45 dBA)



SCALE

0 500 1000 1500

Metres (at A3)

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS
DRAG RACING EVENT

Noise contours: L_{A10}
Grid height: 1.4 m
Worst case meteorological conditions

FIGURE 6-13

GHD CLIENTS | PEOPLE | PERFORMANCE

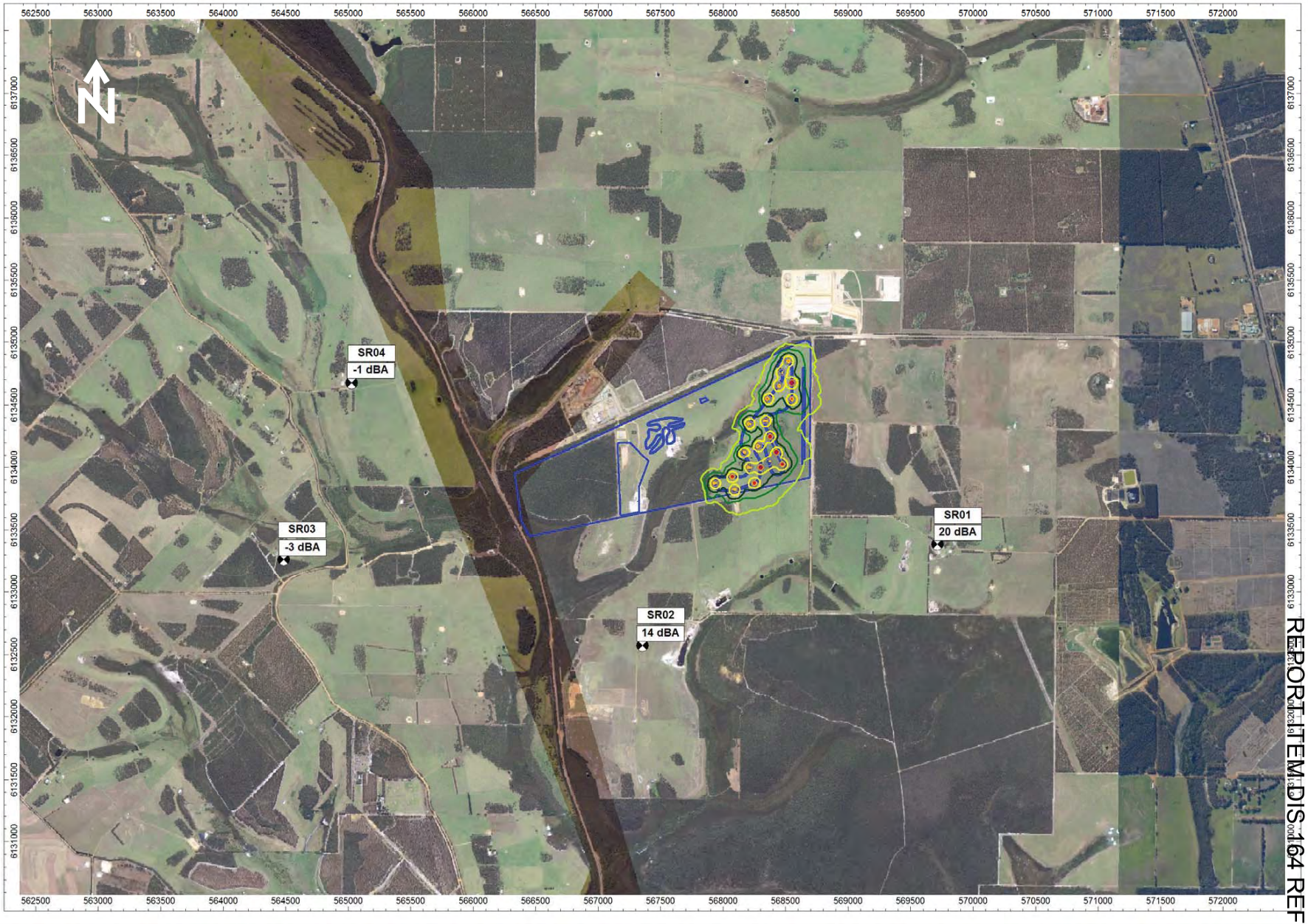
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (40 dBA)
- Day assigned level (45 dBA)



SCALE

0 500 1000 1500

Metres (at A3)

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS
DRIVER TRAINING

Noise contours: L_{A10}
Grid height: 1.4 m
Worst case meteorological conditions

FIGURE 6-14

GHD CLIENTS | PEOPLE | PERFORMANCE

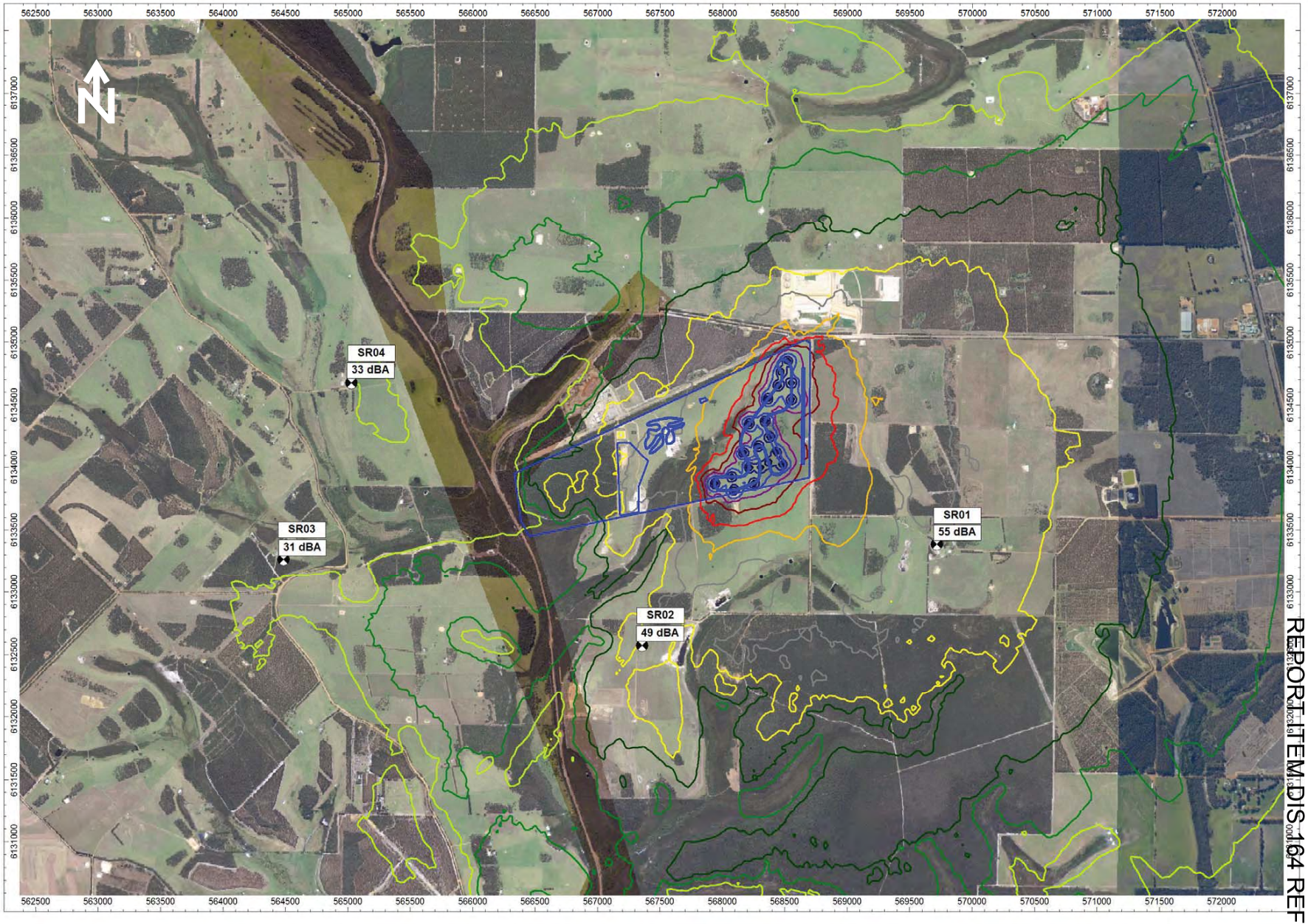
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (40 dBA)
- Day assigned level (45 dBA)



SCALE

0 500 1000 1500

Metres (at A3)

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS
MULTI USE TRACK EVENT

Noise contours: L_{A10}
Grid height: 1.4 m
Worst case meteorological conditions

FIGURE 6-15

GHD CLIENTS | PEOPLE | PERFORMANCE

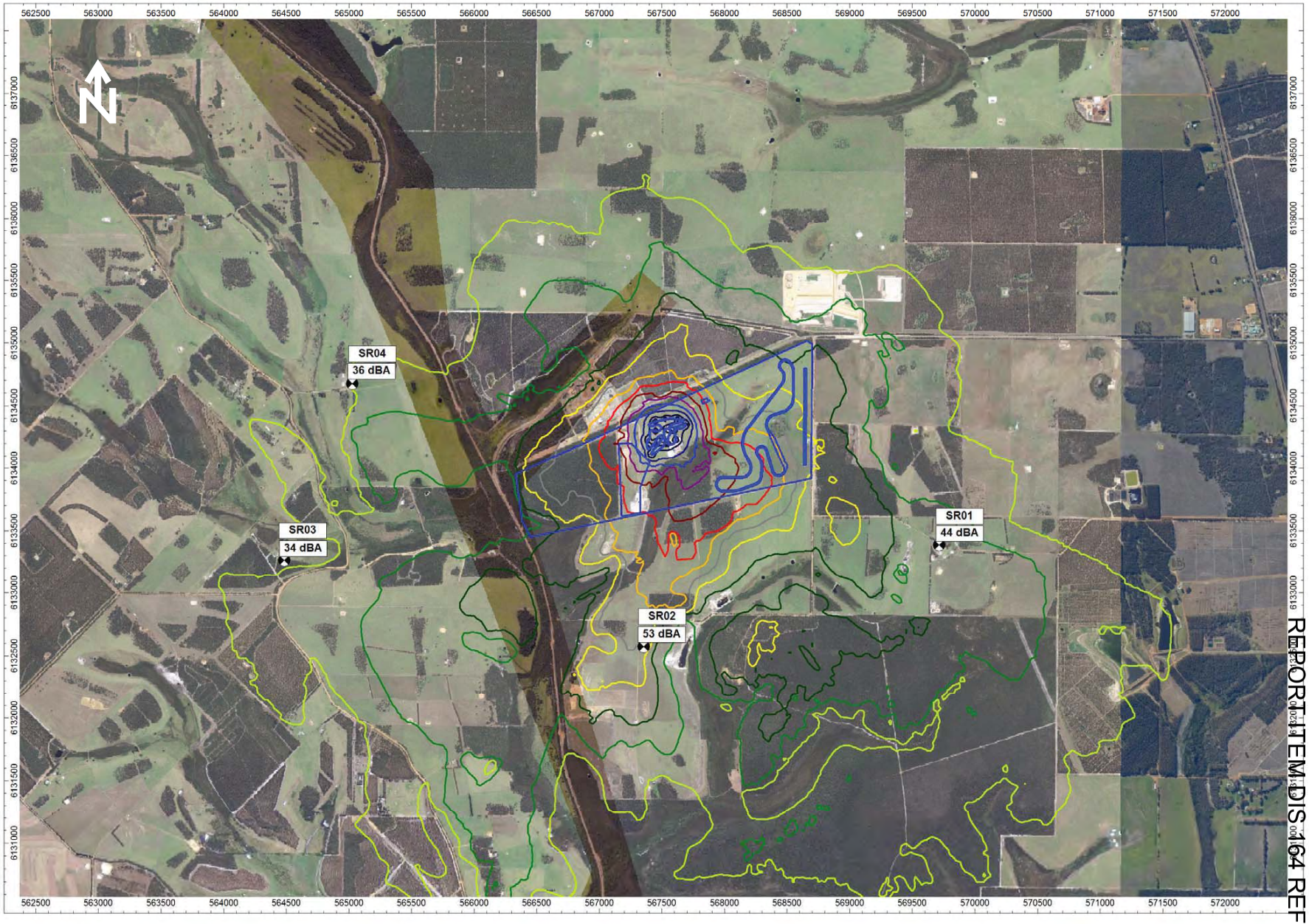
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- 40 Evening assigned level (40 dBA)
- Day assigned level (45 dBA)



SCALE

0 500 1000 1500

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Noise Assessment

PREDICTED DAY NOISE LEVELS
MOTOCROSS EVENT

Noise contours: L_{A10}
Grid height: 1.4 m
Worst case meteorological conditions

FIGURE 6-16

GHD CLIENTS | PEOPLE | PERFORMANCE

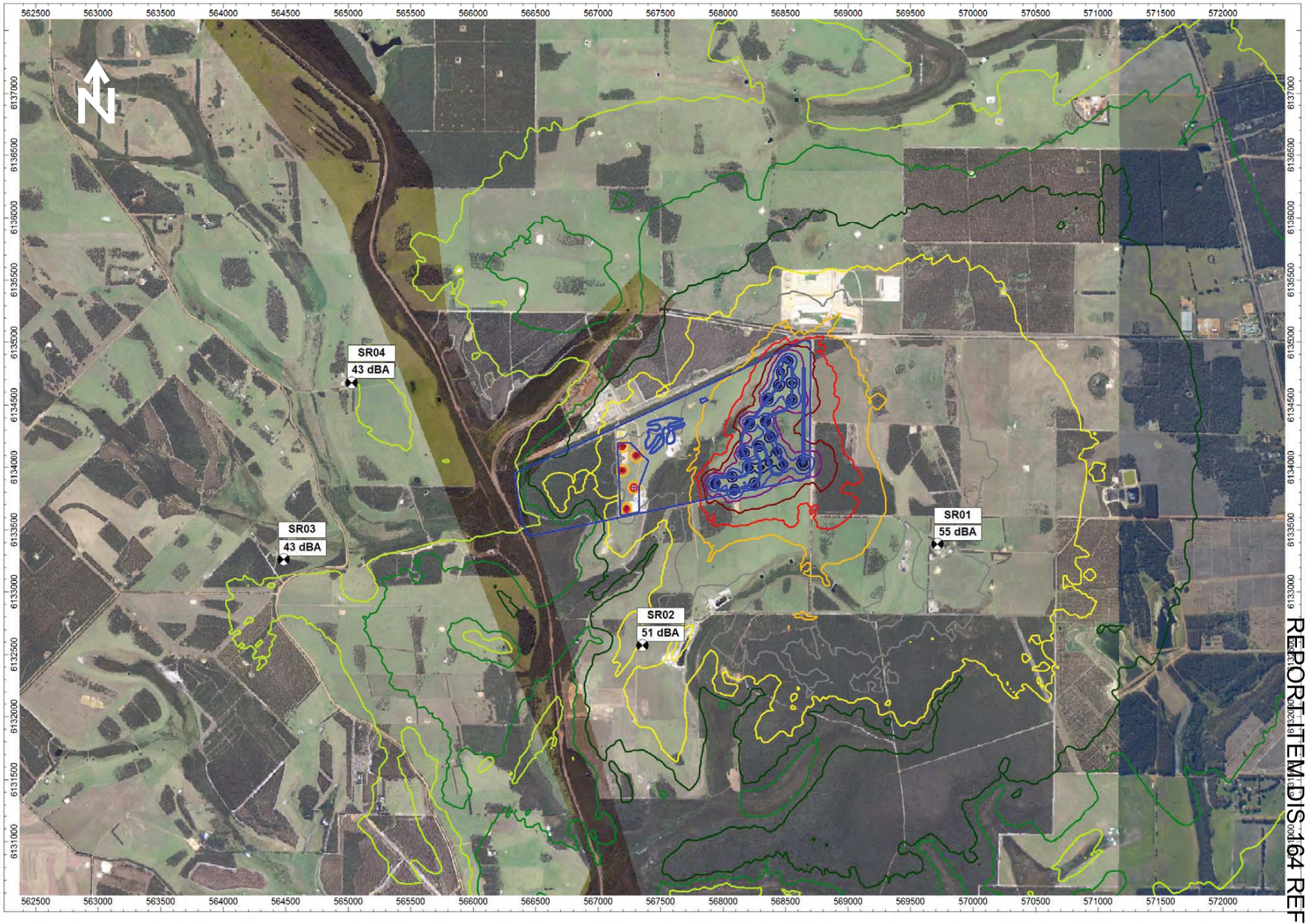
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- 6919 Evening assigned level (40 dBA)
- Day assigned level (45 dBA)



SCALE

0 500 1000 1500

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS
MULTI USE TRACK AND DRAG RACING EVENTS

Noise contours: L_{A10}
Grid height: 1.4 m
Worst case meteorological conditions

FIGURE 6-17

GHD CLIENTS | PEOPLE | PERFORMANCE

REPORT ITEM DIS 164 REFERS

PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (40 dBA)
- Day assigned level (45 dBA)



SCALE

0 500 1000 1500

Metres (at A3)

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS
MOTOCROSS AND MULTI USE TRACK EVENTS

Noise contours: L_{A10}
Grid height: 1.4 m
Worst case meteorological conditions

FIGURE 6-18

GHD CLIENTS | PEOPLE | PERFORMANCE

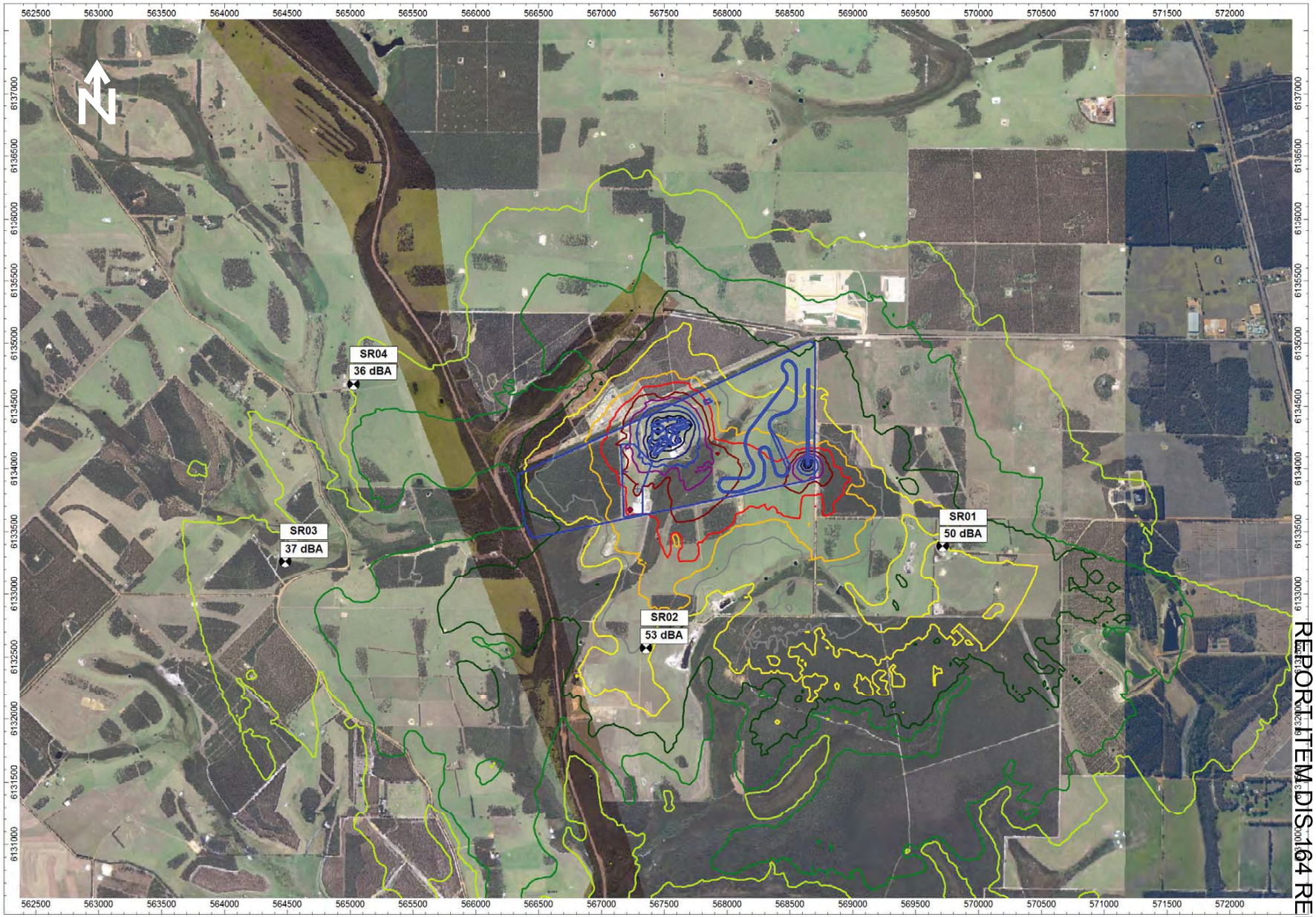
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- 612 Evening assigned level (40 dBA)
- Day assigned level (45 dBA)



SCALE

0 500 1000 1500

Metres (at A3)

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS
MOTOCROSS AND DRAG RACING EVENTS

Noise contours: L_{A10}
Grid height: 1.4 m
Worst case meteorological conditions

FIGURE 6-19

GHD CLIENTS | PEOPLE | PERFORMANCE

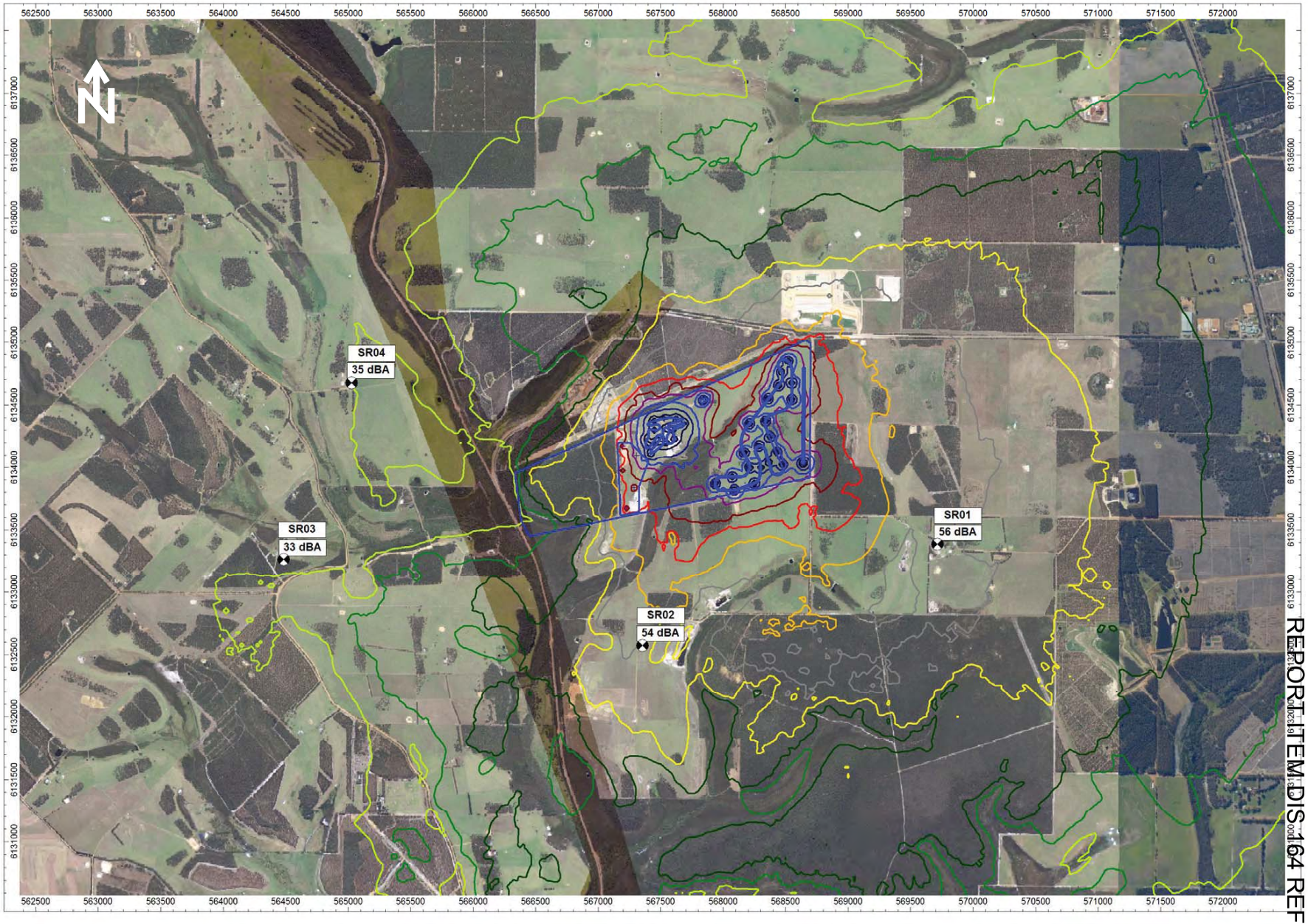
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PREDICTED NOISE LEVELS

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA
- 90 dBA

LEGEND

- Noise sensitive receptor
- Line noise source
- Point noise source
- Development area boundary
- Evening assigned level (40 dBA)
- Day assigned level (45 dBA)



SCALE

0 500 1000 1500

Metres (at A3)

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ALBANY MOTORSPORT PARK

Noise Assessment

PREDICTED DAY NOISE LEVELS MOTOCROSS, MULTI USE TRACK AND DRAG RACING EVENTS

Noise contours: L_{A10}
Grid height: 1.4 m
Worst case meteorological conditions

FIGURE 6-20

GHD CLIENTS | PEOPLE | PERFORMANCE

REPORT ITEM DIS 164 REFERS

7. Managing noise impacts

The results presented in Table 6-4 and Table 6-5 for neutral meteorological conditions and in Table 6-6 and Table 6-7 for worst case demonstrate that for some event combinations, there may be occasions when the predicted noise levels from Albany Motorsport Park exceed the assigned noise levels at the nearest sensitive receptors.

As such, it is recommended that appropriate management and mitigation measures are implemented for the project.

7.1 Regulation – Approved noise management plan

The *Environmental Protection (Noise) Regulations 1997* set assigned (allowable) noise levels for various types of premises that receive noise from other premises. There are many activities that occur in the community that cannot, however, reasonably and practicably meet those assigned levels, but retain a degree of acceptance, either because of the temporary nature of the activity or the perceived community benefit.

In the case of a motor sport venue, good land use planning may be able to avoid noise problems in the first place – this may involve selection of a site for a new venue that is well away from sensitive receivers, or preventing encroachment by new residences into the noise-affected area around the venue.

Where a motor sport venue cannot practicably comply with the assigned noise levels, Division 3 of the Regulations allows the venue occupier to apply for a special approval. Under this approval the noise emissions from the venue are permitted to exceed the assigned levels in the Regulations provided the venue operates in accordance with an approved noise management plan (NMP) for the venue.

Regulation 16 of the *Environmental Protection (Noise) Regulations 1997* allows the Chief Executive Officer (CEO) of DWER (or delegated power such as local government CEO) to request preparation and submission of a NMP for a motor sport venue (that belongs to a recognised motor sports organisation[11].

Regulation 16 includes the following:

- CEO to approve or refuse the NMP, but before approving it must seek comment from the affected residents within a kilometre of the venue and other local governments likely to be affected.
- NMP must contain certain elements:
  - A map of the venue and area
  - Description of the types of races
  - Maximum number of race meetings and practice sessions and times of the day
  - Measures to control noise emissions
  - How the community is to be informed of the race meeting program
  - Who is responsible for implementing the NMP
  - Complaints response procedure
- The CEO is be able to require the noise certification of race vehicles (if appropriate for that venue).

[11] *Guide to Management of Noise from Motor Sport Venues - Environmental Protection (Noise) Regulations 1997, Department of Environment Regulation*, 168 St Georges Terrace, Perth, Western Australia, July 2014.

- The CEO is able to charge fees to cover the cost of assessing the application and for noise monitoring and also to waive or reduce the fees payable.
- The CEO is able to amend or revoke the NMP, after consultation.

The status of the NMP would be that the normal assigned levels do not apply to the noise emissions as long as the venue operates as per the NMP. If the emissions were outside the NMP, for example a meeting went outside the nominated hours, the noise emissions have to comply with Regulation 7 and the normal enforcement measures under the *Environmental Protection Act 1986* would apply.

Whilst the introduction of a formal NMP may not reduce noise levels from Albany Motorsport Park, such measures will prevent noise impacts increasing due to increased number of events etc. without consultation with affected residents.

An example Noise Management Plan, prepared in line with requirements outlined in *Guide to Management of Noise from Motor Sport Venues*, has been provided in Appendix C.

7.2 Mitigation measures

As previously outlined, noise modelling indicates levels from operation of Albany Motorsport Park may lead to noise impacts which exceed assigned levels within the surrounding area.

As discussed above, introduction of a requirement for Albany Motorsport Park to operate according to a noise management plan provides a mechanism to prevent further increase of events without consulting residents, but may not reduce noise levels from proposed operations.

Mitigation measures to reduce noise levels at source from Albany Motorsport Park are limited and include:

- Scheduling of events and practice to minimise noise impacts on the existing residents. Future events scheduling at Albany Motorsport Park should take into consideration predicted noise impacts, such as not scheduling events to commence prior to 9:00 am on Sunday.
- Construction of a barrier (earth bund or similar) adjacent to the venue to reduce noise levels at local residents. Further assessment will be completed as the design is progressed.

Mitigation measures are able to be implemented at existing properties and during any future residential development in the area. Mitigation measures in place or available for consideration include:

- The existing buffer around the industrial area prevents the construction of any habitable dwellings, reducing the likelihood of sensitive receptors being developed in an area impacted by noise from the Albany Motorsport Park in the future.
- Construction of a barrier (noise wall or similar) adjacent to the proposed development (for new developments).
- Reducing outdoor levels by implementing ‘quiet house’ design measures outlined in SPP 5.4[12] relating to screening of outdoor areas with the residence itself (building orientation considerations) or screen walls. Refer to Section 7.2.1.
- Reducing internal noise levels by implementing ‘deemed to comply packages’ outlined in SPP 5.4 relating to improving noise insulation of residences. Refer to Section 7.2.1.
- Providing information to new residents within the development of the potential noise impacts from motorsport events (notifications on titles). Refer to Section 7.2.2.

[12] Department of Planning, 2014, *Implementation Guidelines for State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning,* December 2014.

7.2.1 Reducing outdoor and indoor noise levels through building design

Noise levels resulting Albany Motorsport Park are predicted to exceed assigned noise levels at existing residences or new residential areas within the vicinity. Noise mitigation measures outlined in SPP 5.4 pertain to reducing transport noise resulting from major roads and railways. In determining the required level of mitigation to maintain outdoor and indoor amenity, assessment has been made against outdoor and indoor criteria established by SPP 5.4, outlined in Table 7-1. Assessment has been made against predicted L_{A10} noise levels, as L_{A10} noise levels are considered to most closely represent L_{Aeq} criteria specified in SPP 5.4.

This approach has been reviewed and agreed to by DWER Noise Branch during previous assessments for motorsport facilities.

Table 7-1 Outdoor and indoor noise criteria, dBA

Time of day	Outdoor noise criteria	Indoor noise criteria
Day (6:00 am to 10:00 pm)	55	40
Night (10:00 pm to 6:00 am)	50	35

Reducing outdoor noise levels by screening outdoor areas

Outdoor noise levels are reduced by 5-10 dBA by screening outdoor areas such that the building forms a barrier between the noise from motorsport events. Such screening is achieved by either:

- Locating outdoor living areas so as to maximise the screening effects of buildings and any barrier walls.
- Designing walls to screen part or all of the affected property.

To ensure an appropriately sized outdoor area is adequately screened may require designated building envelopes to be specified for each lot.

Night time outdoor levels are not predicted to be affected as events conclude by 10.00 pm.

Reducing indoor noise levels by improving noise insulation of buildings

With regard to indoor noise levels, a typical residence would see indoor levels approximately 15 dBA lower than outdoor levels (a predicted outdoor level of 65 dBA will result in indoor noise level approximately 50 dBA).

Indoor noise levels are reduced by increasing insulation to reduce noise levels within a residence. SPP 5.4 outlines two ‘deemed to comply’ packages for residential development, Package A and Package B, as outlined in Table 7-2. A reduction of approximately 5 dBA is typically achieved by implementing design Package A and approximately 10 dBA reduction for implementing design Package B.

Table 7-2 Package A and B noise insulation measures outlined in SPP 5.4

Area type	Orientation	Package A measures
Bedrooms	Facing venue	6 mm laminated glazing Casement or awning windows No external doors Closed eaves No vents to outside walls/eaves Mechanical ventilation/air conditioning
	Side on to venue	6 mm laminated glazing Closed eaves Mechanical ventilation/air conditioning

Living and work areas	Facing venue	6 mm laminated glazing Casement or awning windows 35 mm (minimum) solid core external doors with acoustic seals Sliding doors must be fitted with acoustic seals Closed eaves No vents to outside walls/eaves Mechanical ventilation/air conditioning
	Side on to venue	6 mm glazing Closed eaves Mechanical ventilation/air conditioning
Area type	**Orientation**	**Package B measures**
Bedrooms	Facing venue	10 mm laminated glazing Casement or awning windows No external doors Closed eaves No vents to outside walls/eaves Mechanical ventilation/air conditioning
	Side on to venue	6 mm laminated glazing Casement or awning windows Closed eaves Mechanical ventilation/air conditioning
Living and work areas	Facing venue	10 mm laminated glazing Casement or awning windows 40 mm (minimum) solid core external doors with acoustic seals Sliding doors must be fitted with acoustic seals Closed eaves No vents to outside walls/eaves Mechanical ventilation/air conditioning
	Side on to venue	6 mm laminated glazing Casement or awning windows Closed eaves Mechanical ventilation/air conditioning

7.2.2 Information to residents

As the noise impacts from Albany Motorsport Park will be present at the time of sale of blocks in any future developments, the mechanism of memorials on land titles to inform residents of potential noise impacts from the venue is available.

Memorials on titles will be required to be issued for the development area, where impacted by Albany Motorsport Park. Information can be provided to prospective residents on the frequency of events and measures which are available to increase the acoustic performance of homes to reduce noise impacts (if desired).

8. Conclusions

The results presented in this assessment demonstrate that for some event combinations, there may be occasions when the predicted noise levels from Albany Motorsport Park may exceed the assigned noise levels.

The existing buffer in place for the industrial area provides restriction on new residential development in proximity to the Albany Motorsport Park.

Noise from the Albany Motorsport Park is able to be reduced at source by including noise bunds or similar to screen noise from the closest existing sensitive receptors. Provision of such mitigation measures will be examined as the design process proceeds.

This assessment predicts exceedance of the assigned noise levels during certain event types is likely, even with mitigation using noise bunds or similar. As such consideration will be made to the preparation of a Noise Management Plan, prepared in line with requirements outlined in this report, as the project progresses.

Appendices

Appendix A - Glossary of noise terminology

Term	Definition
Ambient noise	Level of noise from all sources, including background noise from near and far and the source of interest
A-weighted	A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. A-weighted sound level is described as LA dB.
Background noise	Noise level from sources other than the source of concern.
dB	Decibel is the unit that describes the sound pressure and sound power levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.
Hz	Units for frequency are known as Hertz.
Impulsive noise	An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness is: “A variation in the emission of a noise where the difference between L_{Apeak} and $L_{Amax,\ slow}$ is more than 15 dB when determined for a single representative event”.
L_{Aslow}	This is the noise level in decibels, obtained using A-weighting and S time weighting as specified in AS1259.1-1990. Unless assessing modulation, all measurements use the slow time weighting characteristic.
L_{Afast}	This is the noise level in decibels, obtained using A-weighting and F time weighting as specified in AS1259.1-1990. This is used when assessing the presence of modulation only.
L_{Apeak}	This is the maximum reading in decibels using A-weighting and P time weighting as specified in S1259.1-1990.
L_{Amax}	L_{Amax} level is the maximum A-weighted noise level during a particular measurement.
L_{A1}	L_{A1} level is the A-weighted noise level which is exceeded for 1% of the measurement period and is considered to represent the average of the maximum noise levels measured.
L_{A10}	L_{A10} level is the A-weighted noise level which is exceeded for 10% of the measurement period and is considered to represent the intrusive noise level.
L_{A90}	L_{A90} level is the A-weighted noise level which is exceeded for 90% of the measurement period and is considered to represent the background noise level.
L_{Aeq}	The equivalent steady state A-weighted sound level (‘equal energy’) in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the average noise level.
L_{Amax} assigned level	Means an assigned level which, measured as a L_{Aslow} value, is not to be exceeded at any time.
L_{A1} assigned level	Means an assigned level which, measured as a L_{Aslow} value, is not to be exceeded for more than 1% of the representative assessment period.
L_{A10} assigned level	Means an assigned level which, measured as a L_{Aslow} value, is not to be exceeded for more than 10% of the representative assessment period.
Linear	Sound levels measured without any weightings are referred to as ‘linear’ and the units are expressed as dB(lin).
L linear, peak	Maximum reading in decibels obtained using P-time-weighting characteristic as specified in AS 1259.1-1990.
Maximum design sound level	The level of noise above which most people occupying the space start to become dissatisfied with the level of noise.

Term	Definition
Modulating noise	A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is: Is more than 3 dB L_{Afast} or is more than 3 dB L_{Afast} in any one-third octave band Is present for at least 10% of the representative assessment period Is regular, cyclic and audible
One-third octave band	Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20,000 Hz inclusive.
Representative assessment period	Means a period of time not less than 15 minutes and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.
Reverberation time	Of an enclosure, for a sound of a given frequency or frequency band, the time that would be required for the reverberantly decaying sound pressure level in the enclosure to decrease by 60 decibels.
RMS	Root mean square level; used to represent the average level of a wave form such as vibration.
Satisfactory design sound level	The level of noise that has been found to be acceptable by most people for the environment in question and also to be not intrusive.
Sound pressure level (SPL)	The sound pressure level of a noise source is dependent upon its surroundings (influenced by distance, ground absorption, topography, meteorological conditions etc.) and is what the human ear actually hears. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.
Sound power level (SWL)	Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure levels at known distances. Noise modelling incorporates source sound power levels as part of the input data.
Specific noise	Relates to the component of the ambient noise that is of interest. This can be referred to as the noise of concern or the noise of interest
Tonal noise	A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is: The presence in the noise emission of tonal characteristics where the difference between - The A-weighted sound pressure level in any one-third octave band The arithmetic average of the A-weighted sound pressure levels in the two adjacent one-third octave bands is greater than 3 dB when the sound pressure levels are determined as L_{Aeq},T levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as L_{Aslow} levels. This is relatively common in most noise sources.

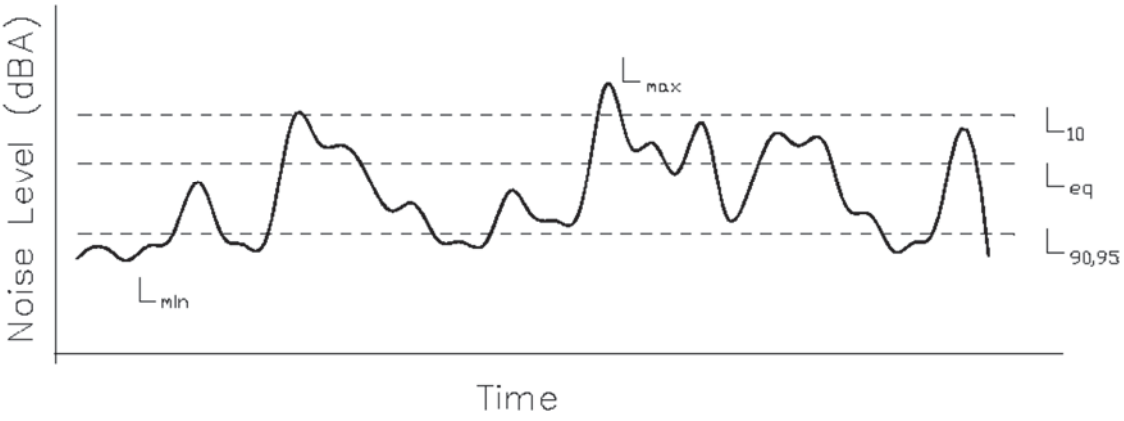
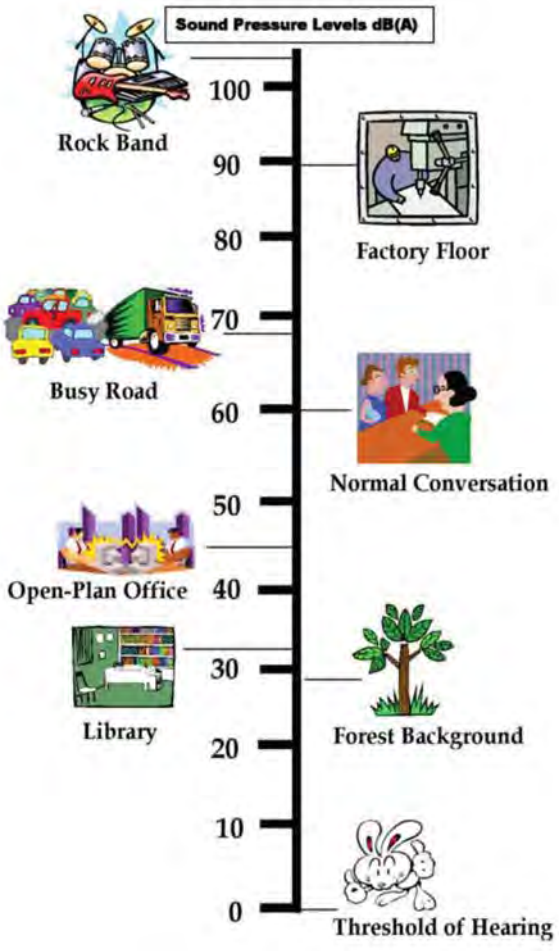


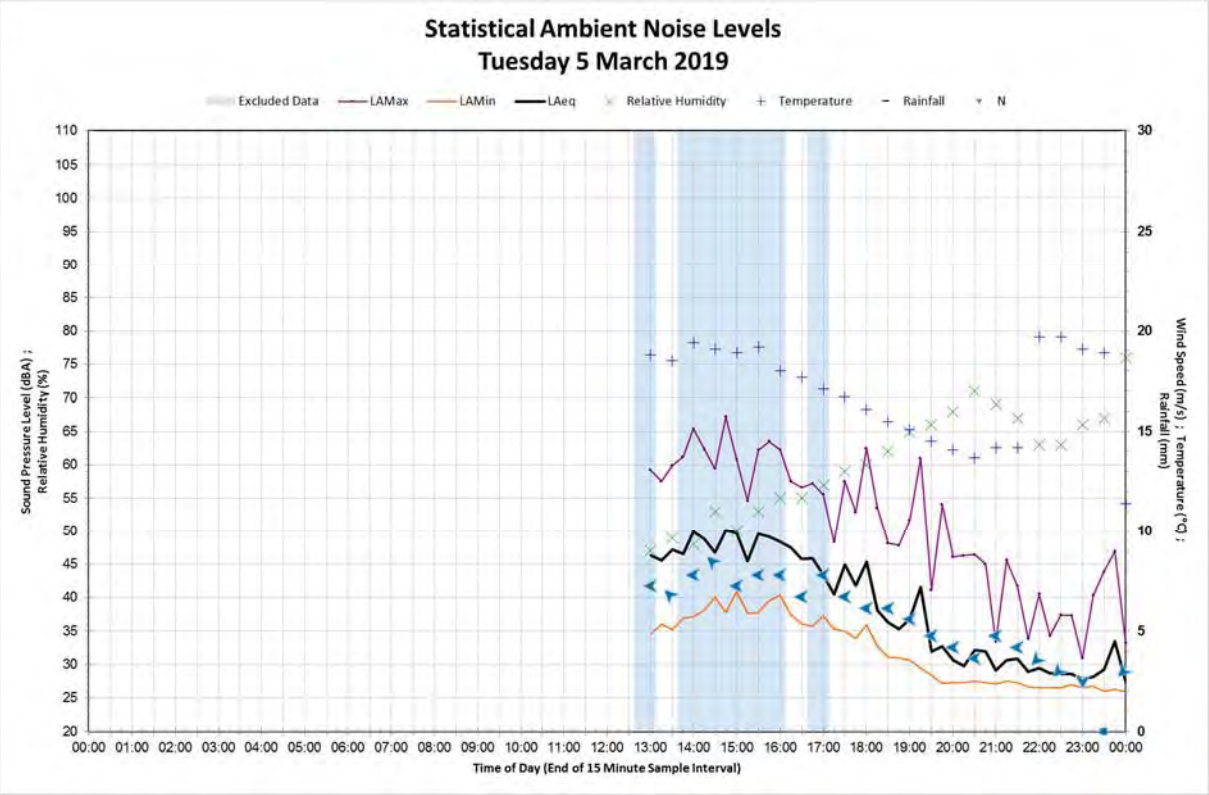
Chart of Noise Level Descriptors

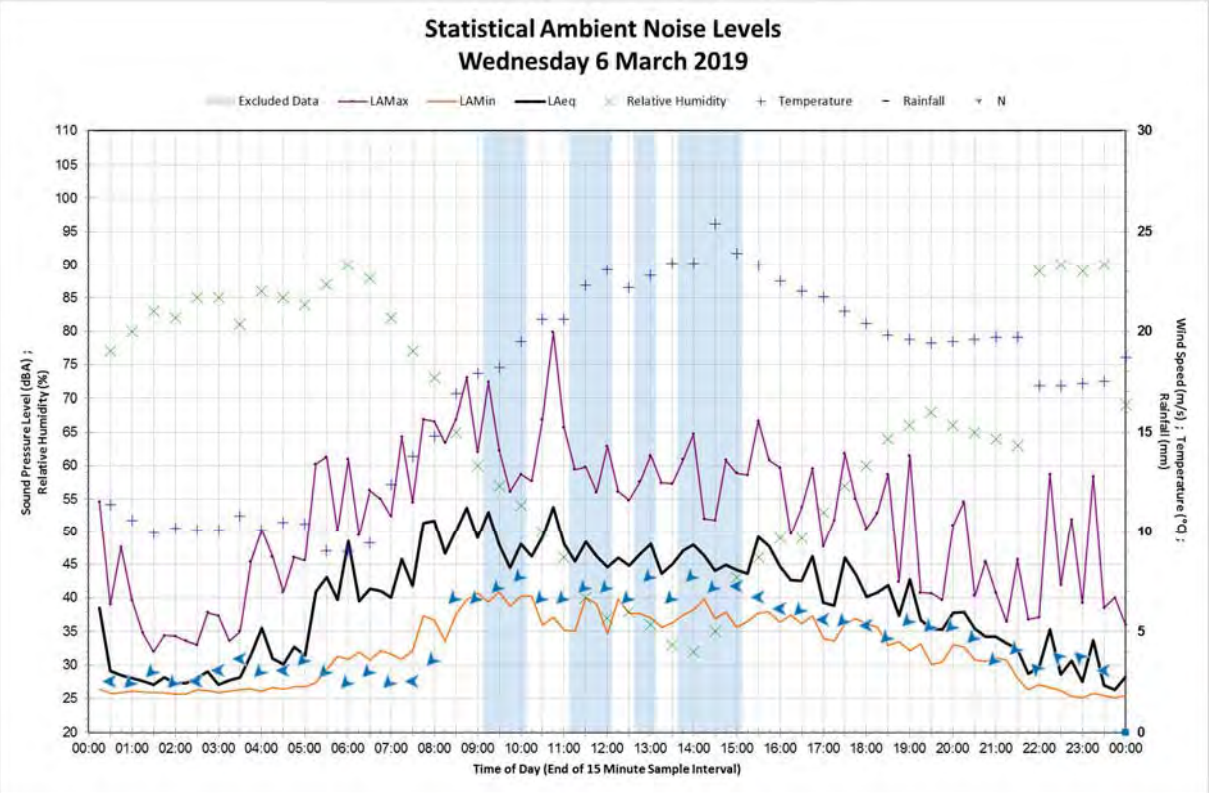


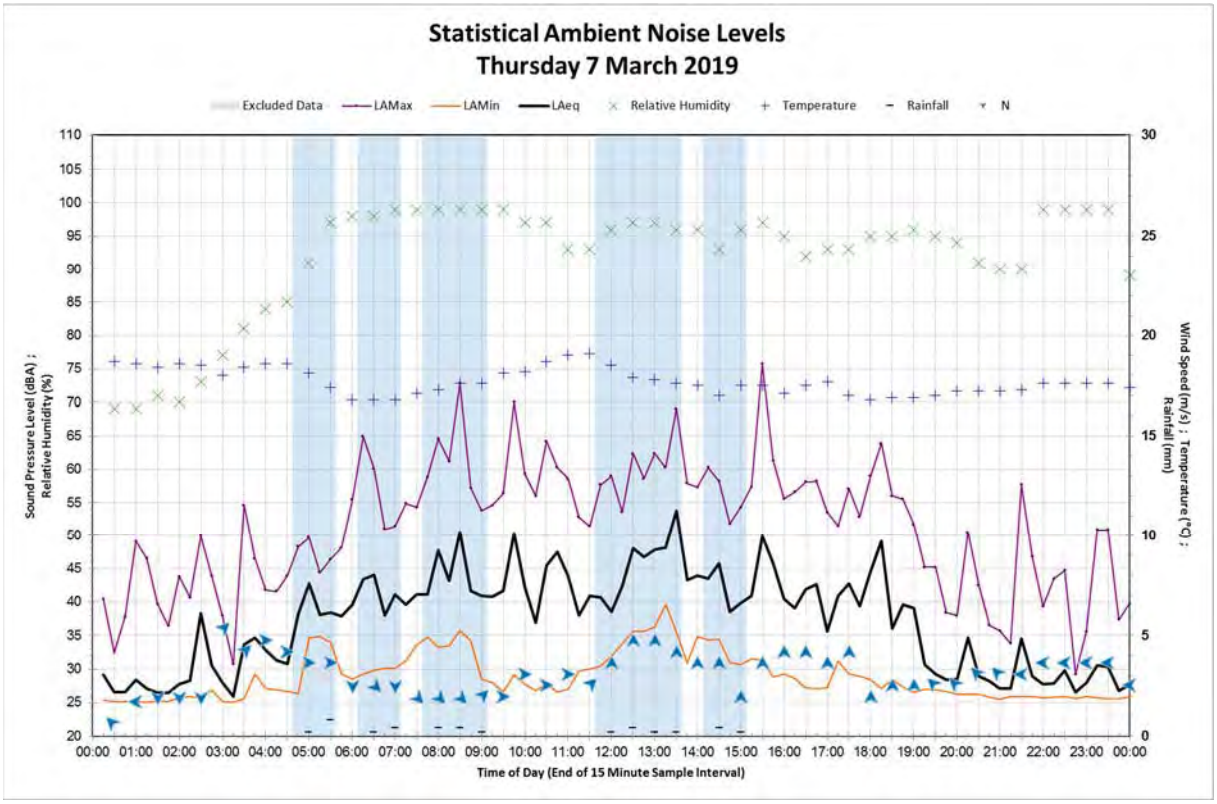
Typical Noise Levels

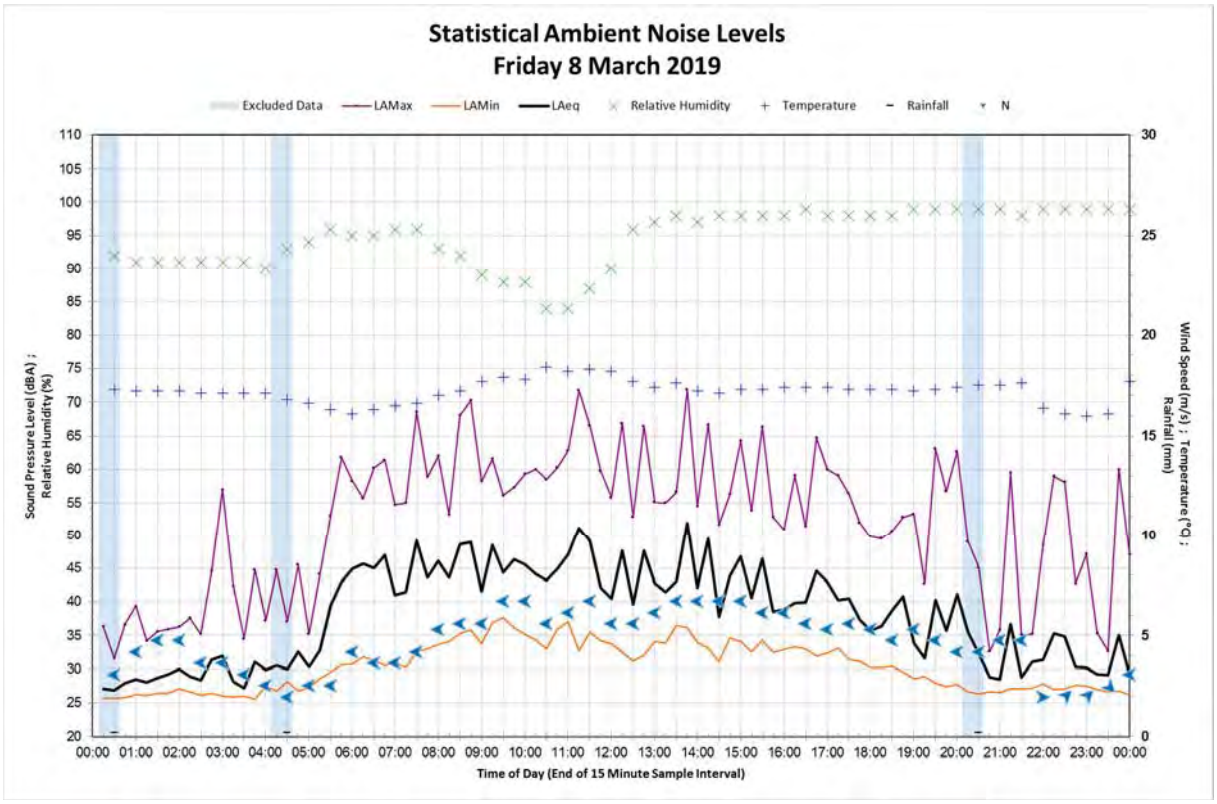
Appendix B – Monitoring results

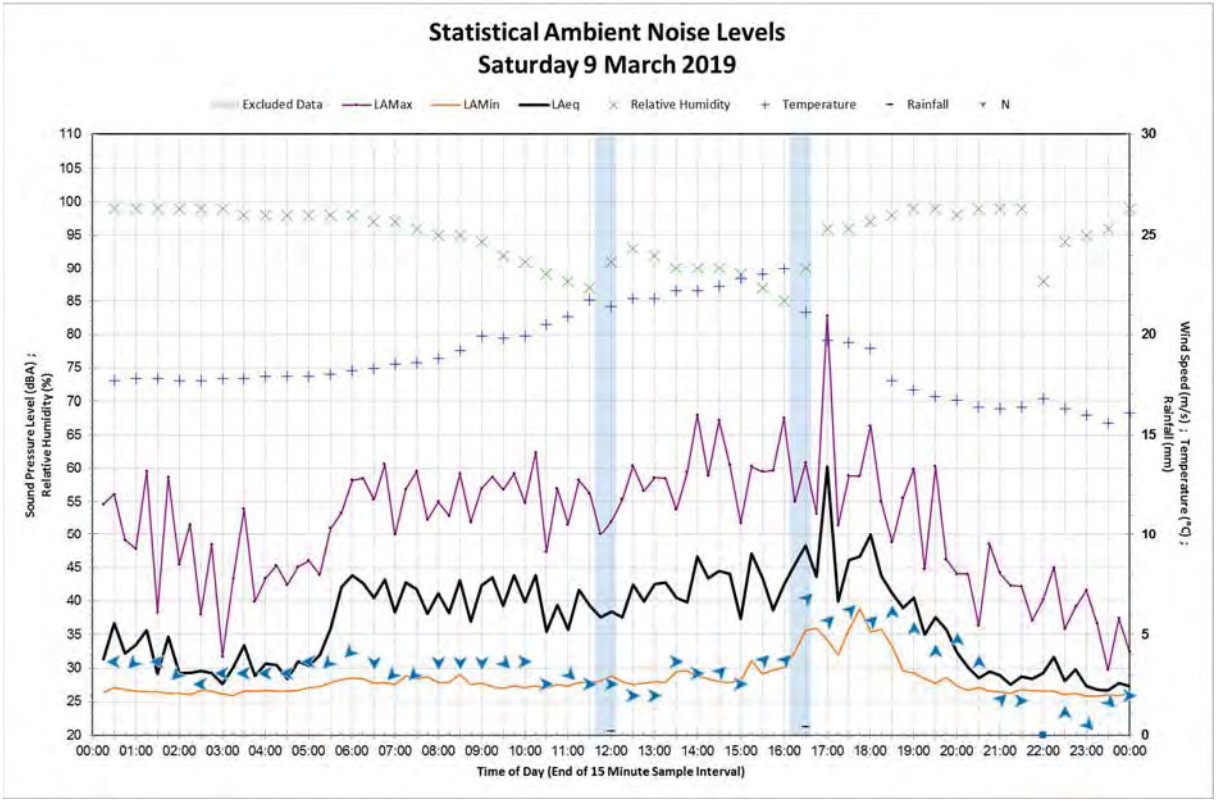
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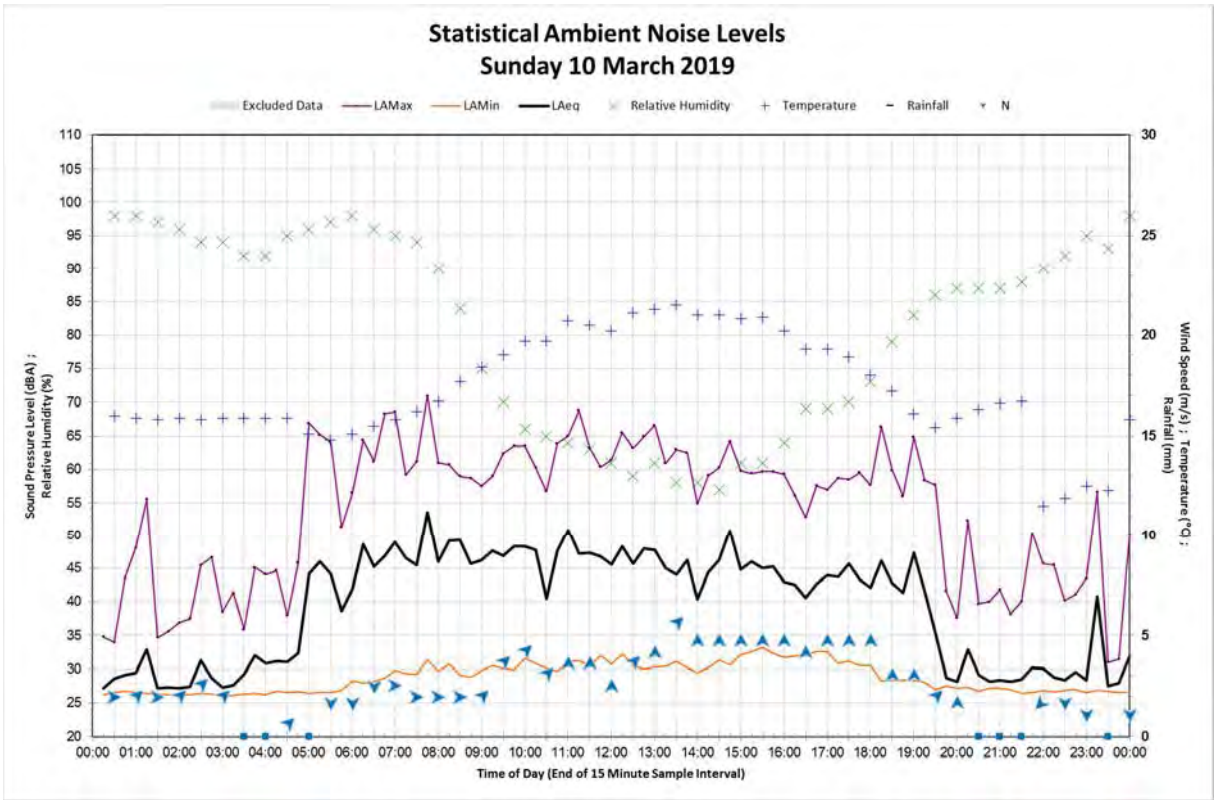


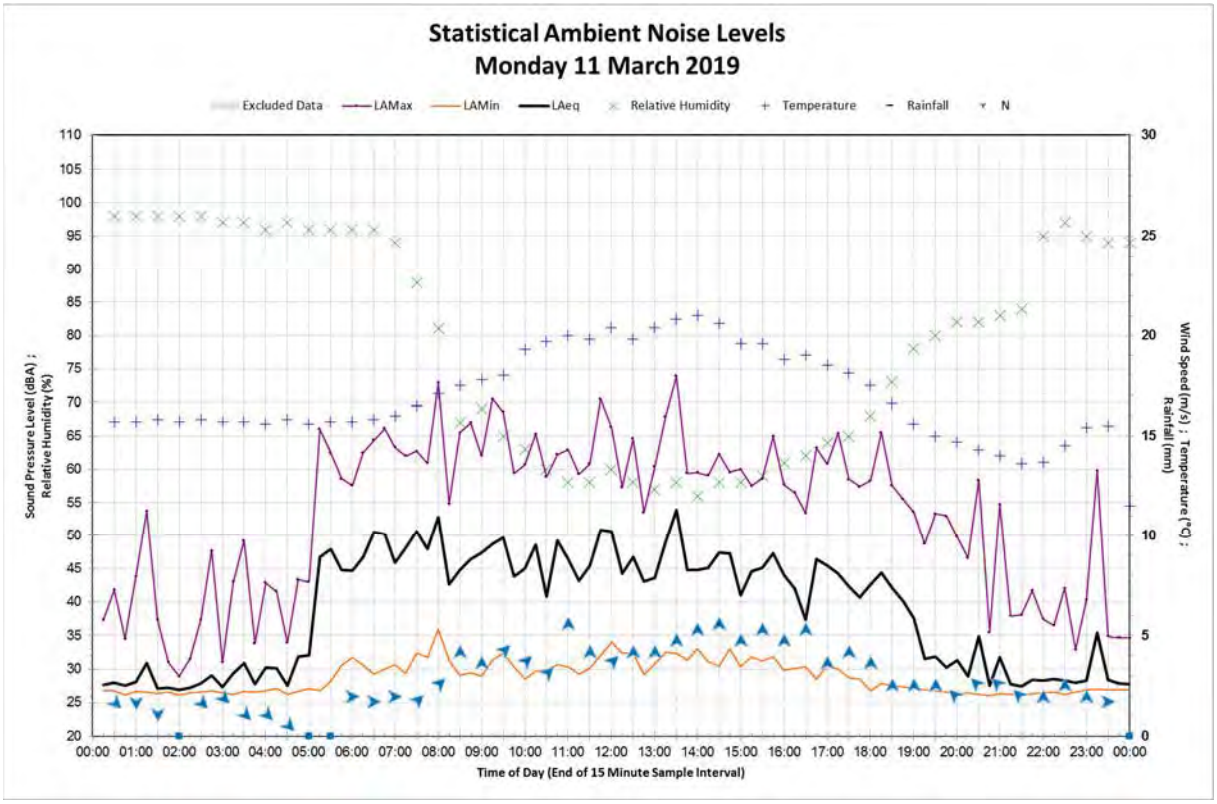


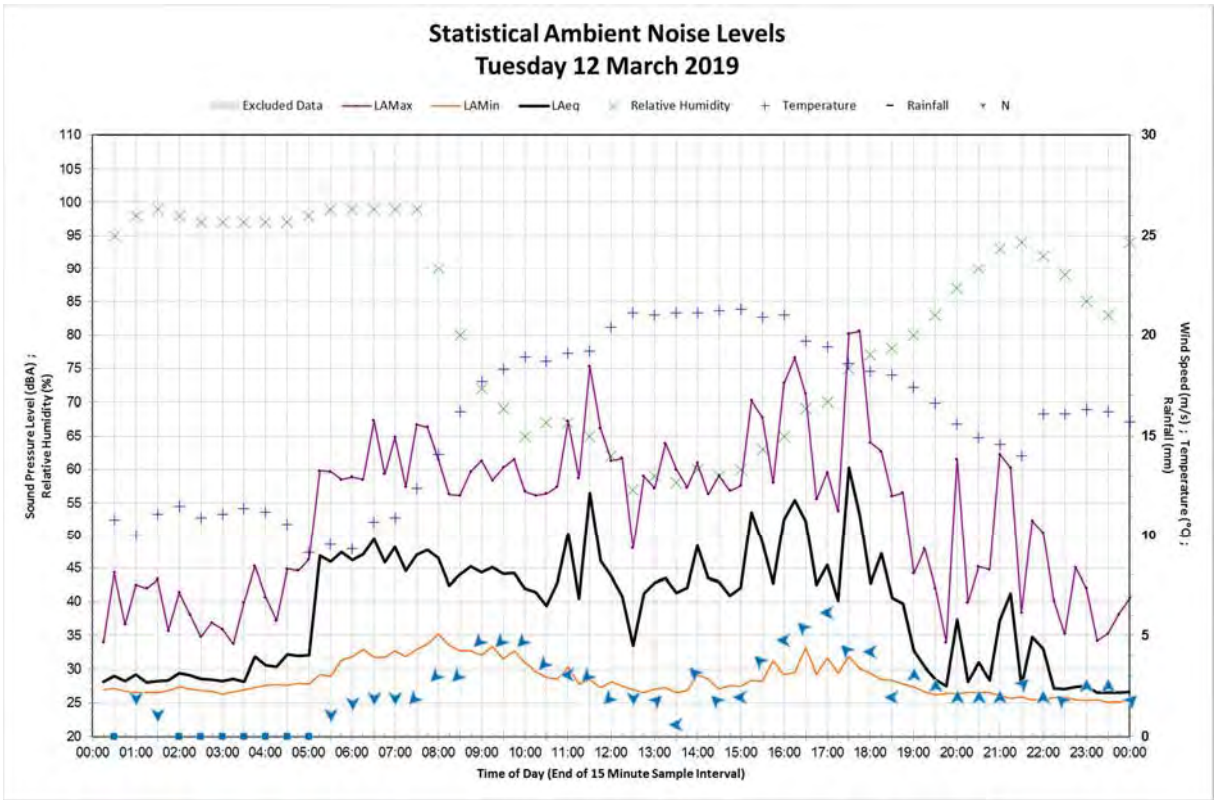

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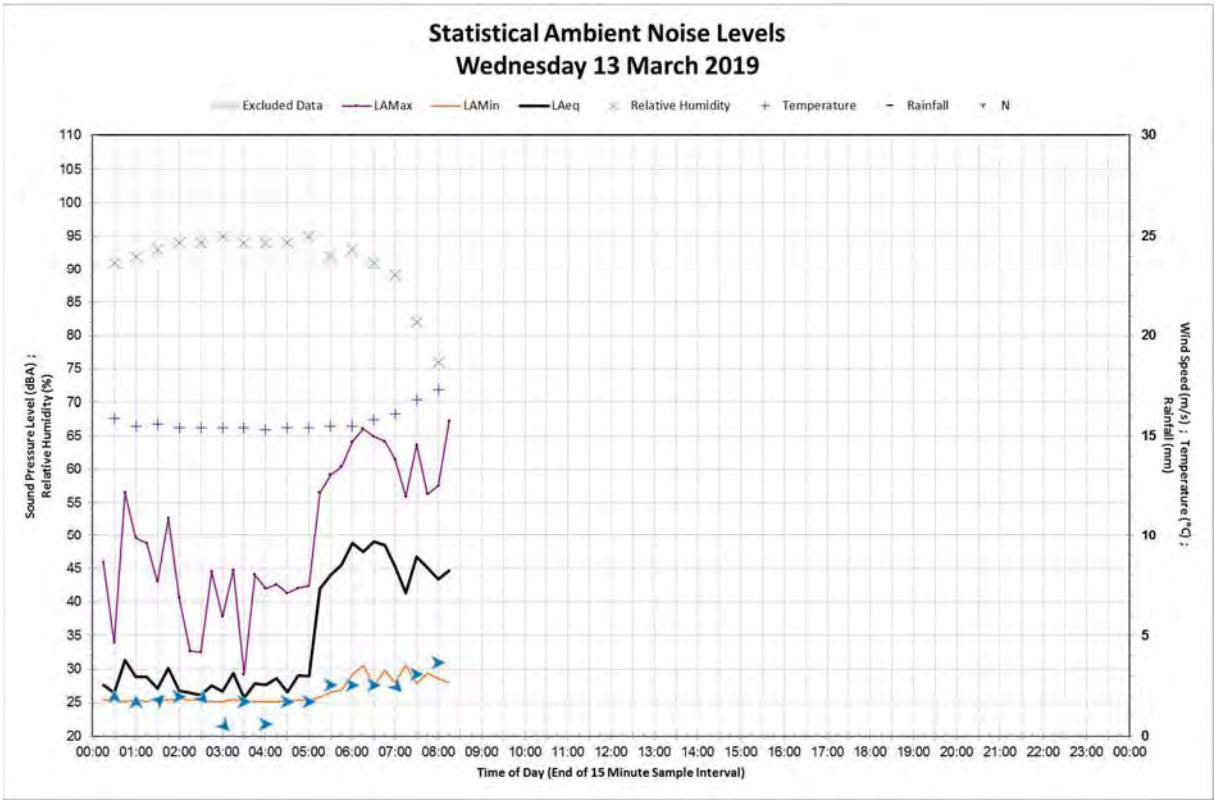

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Statistical Ambient Noise Levels
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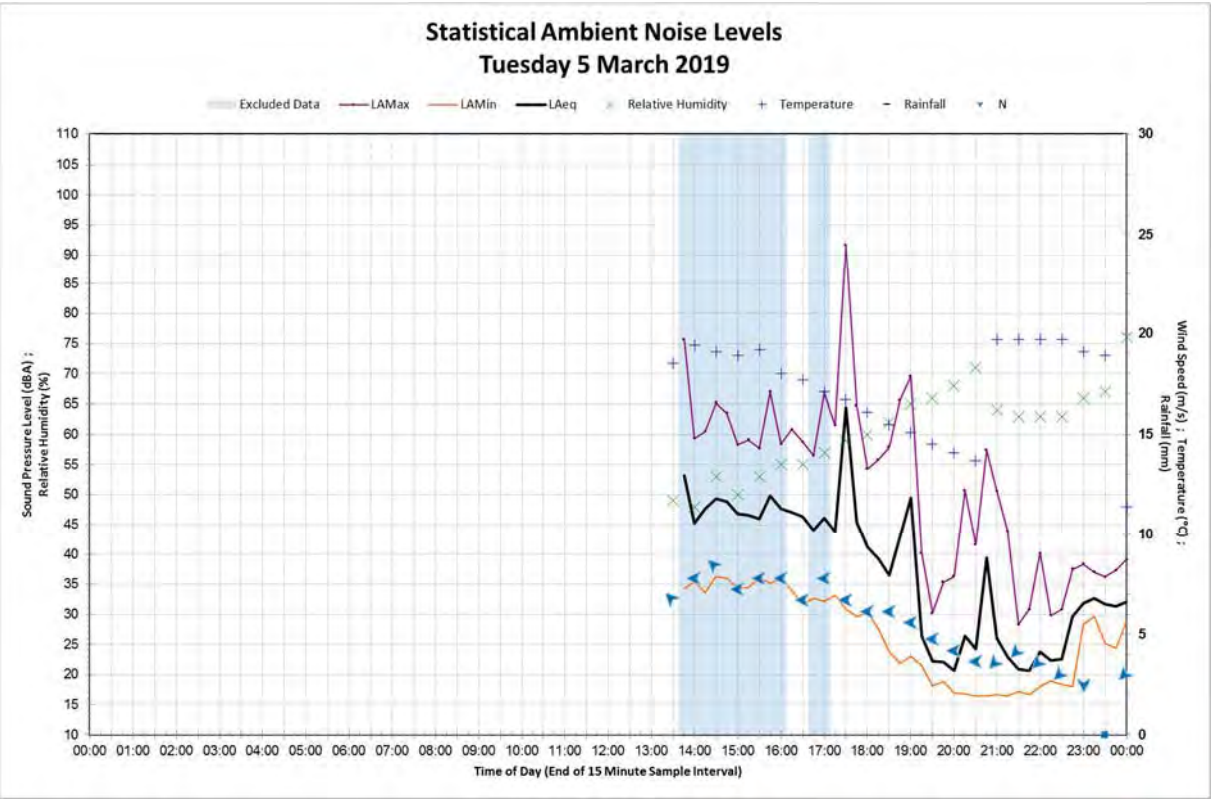

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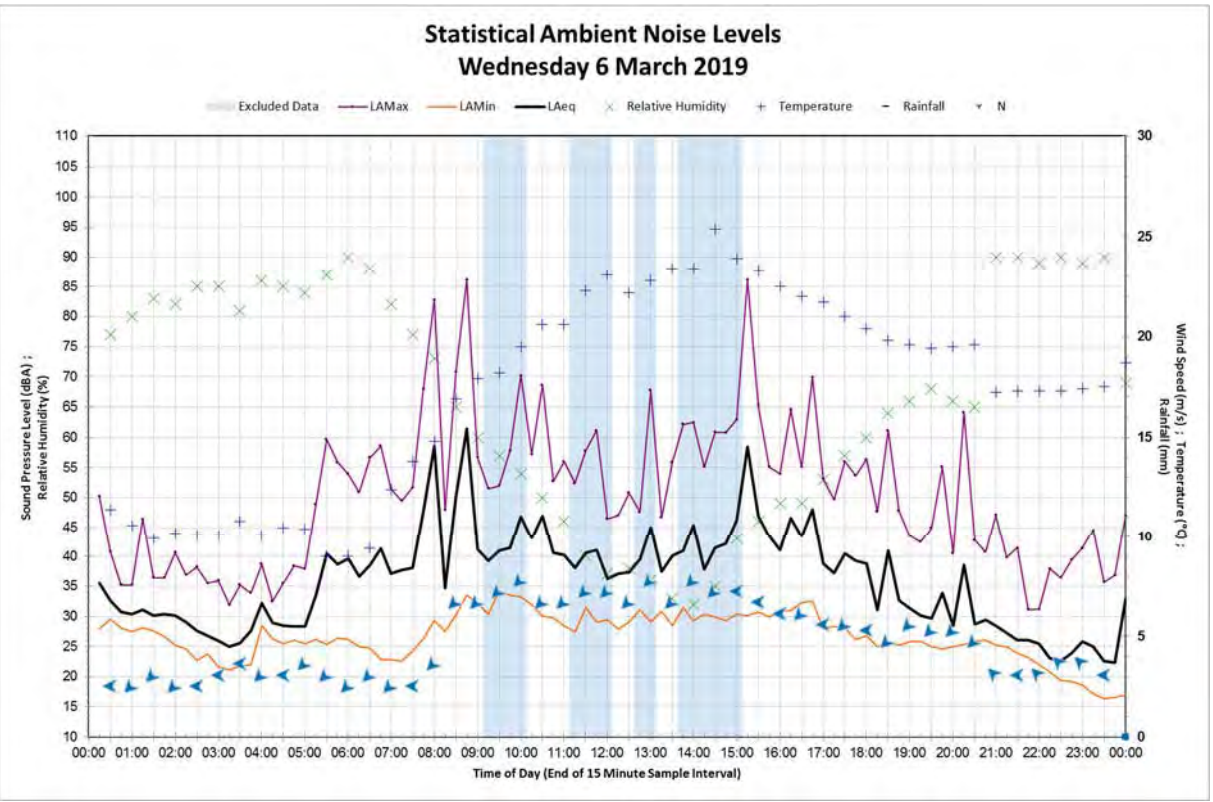

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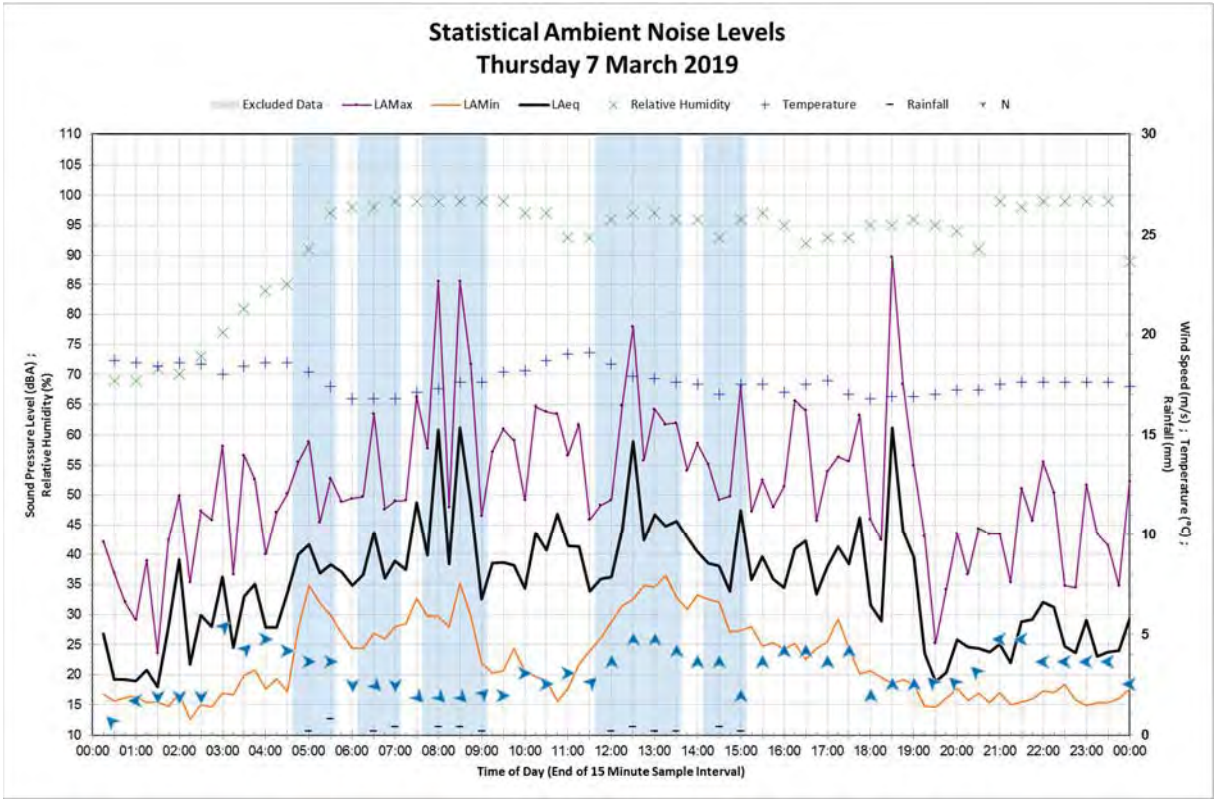

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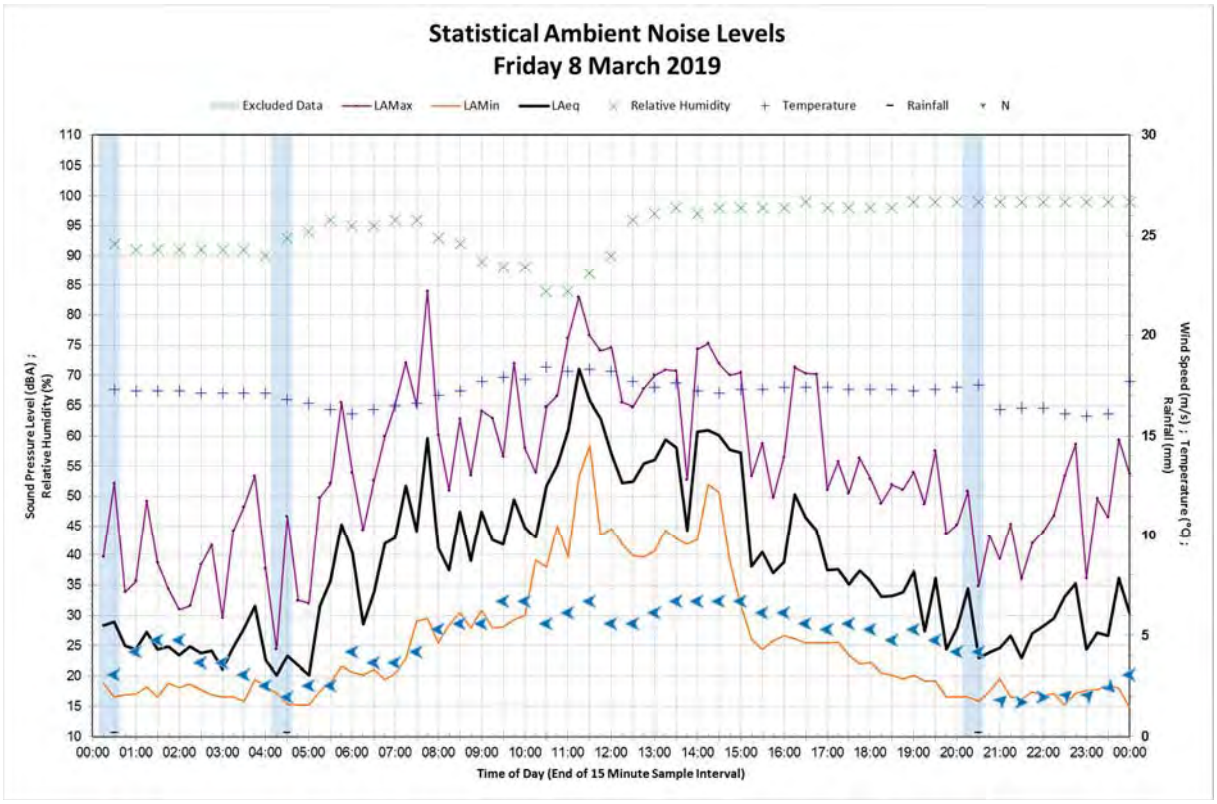

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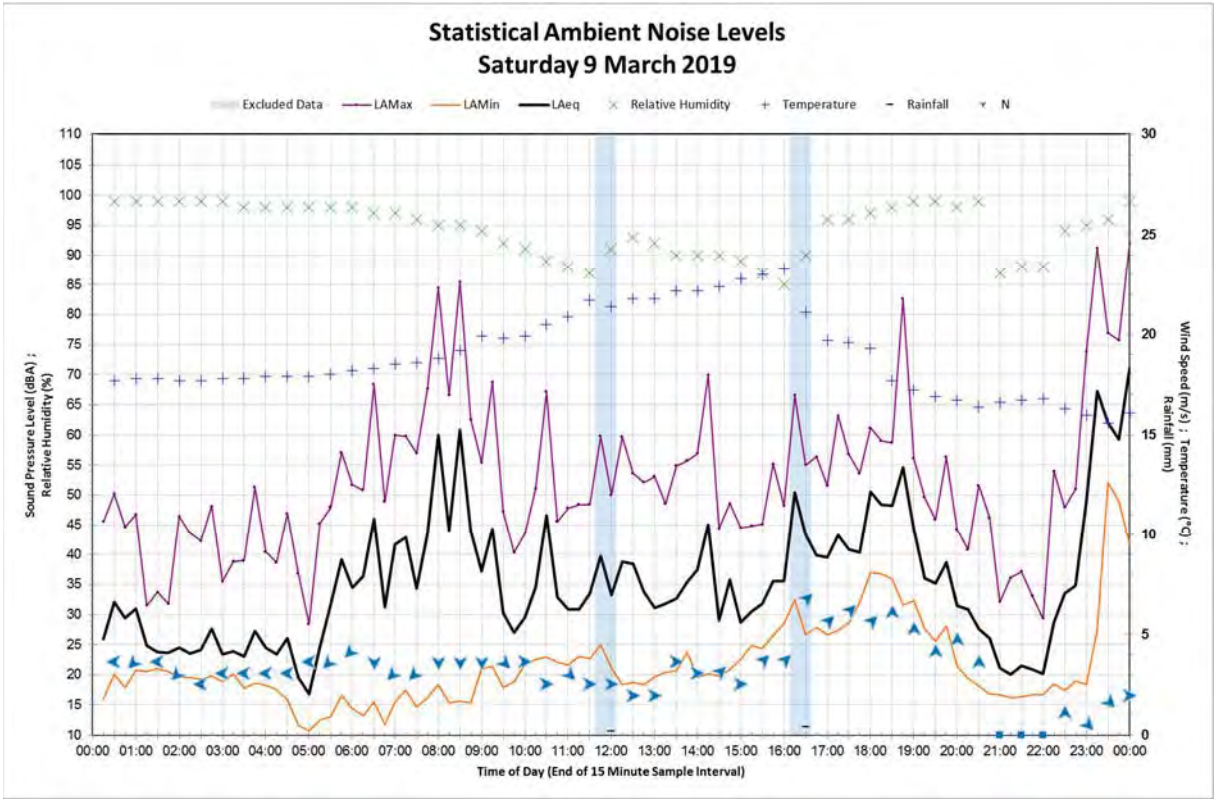
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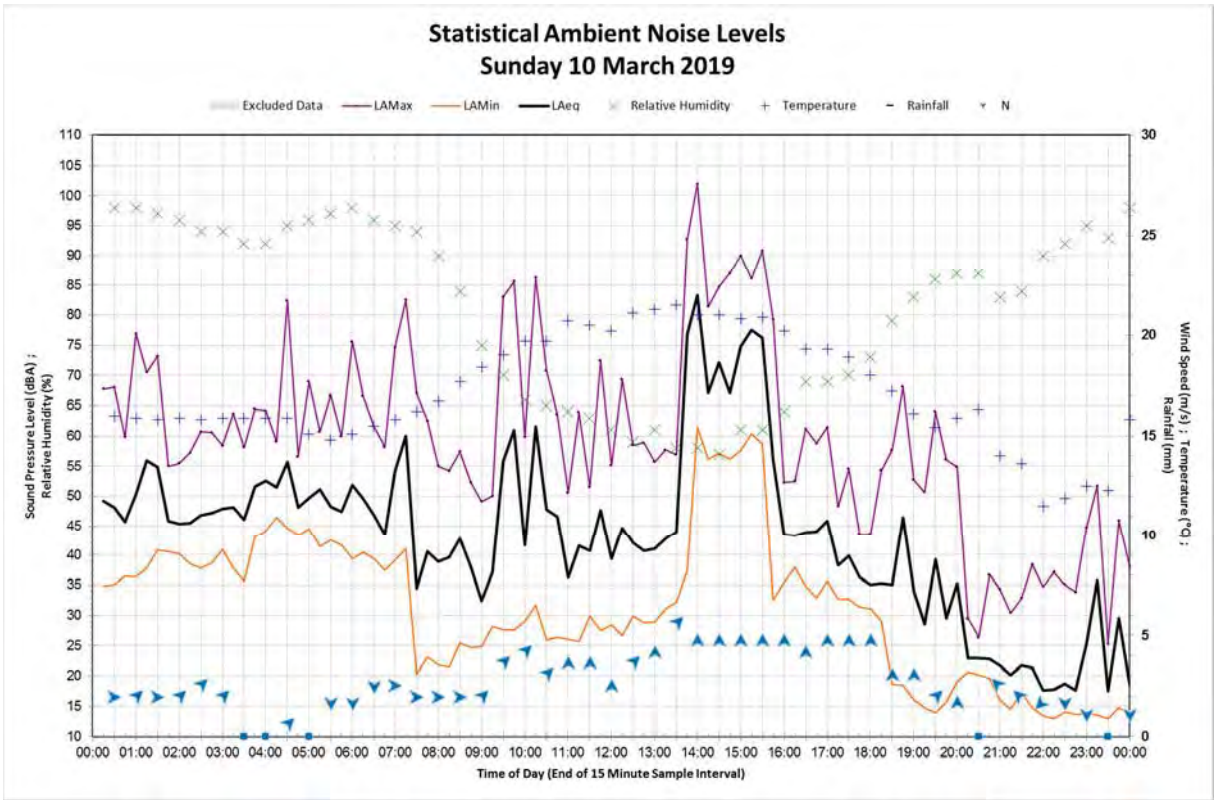


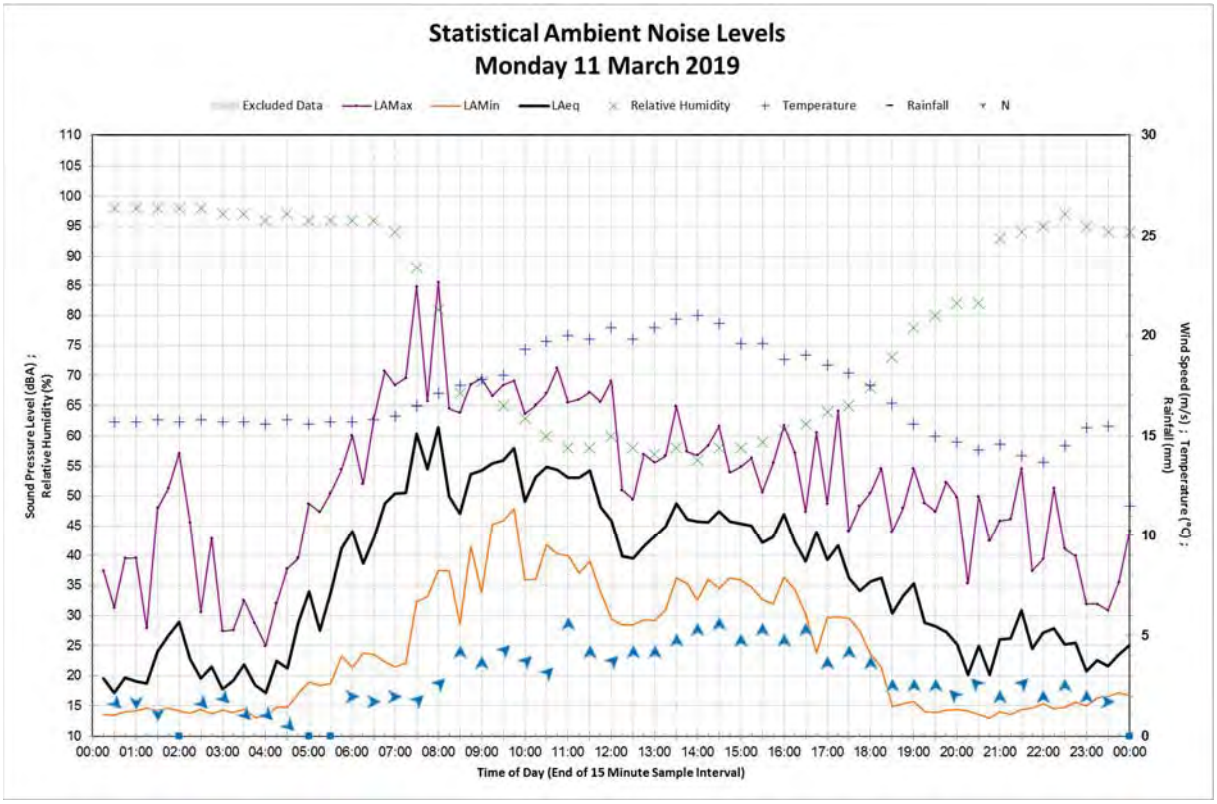


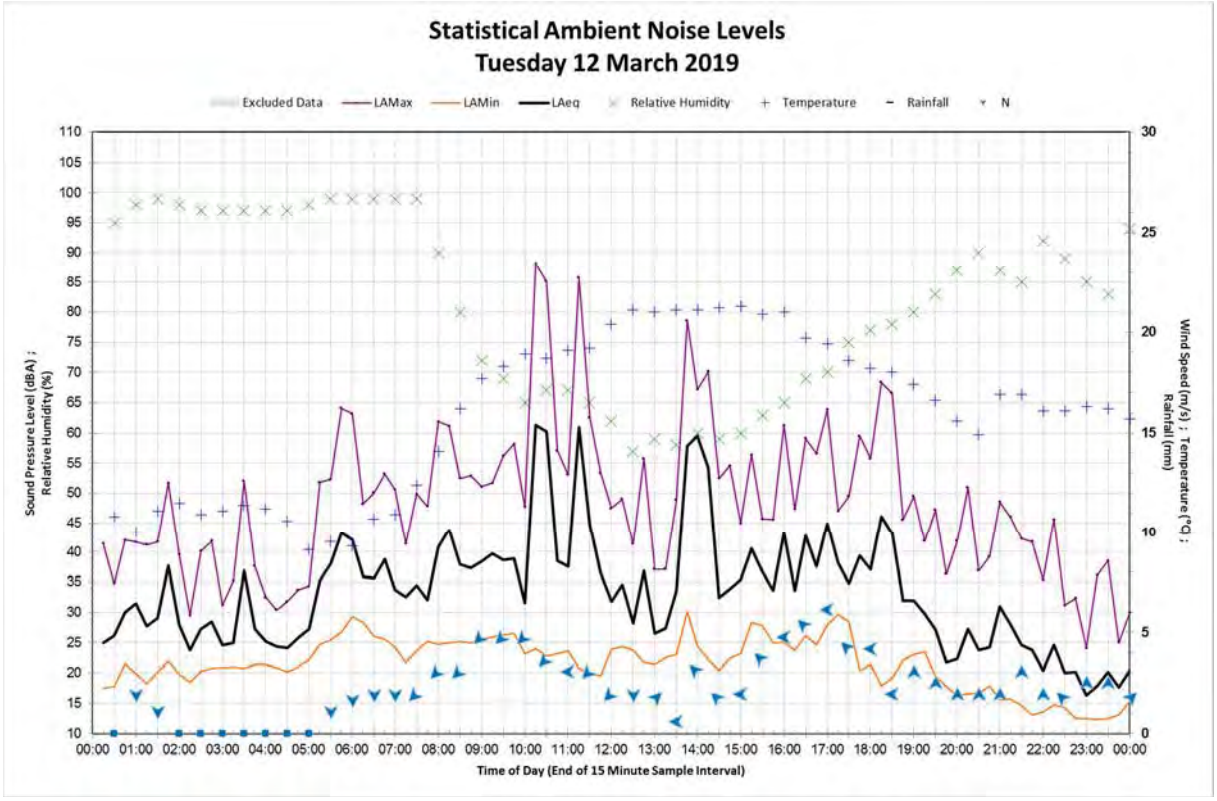

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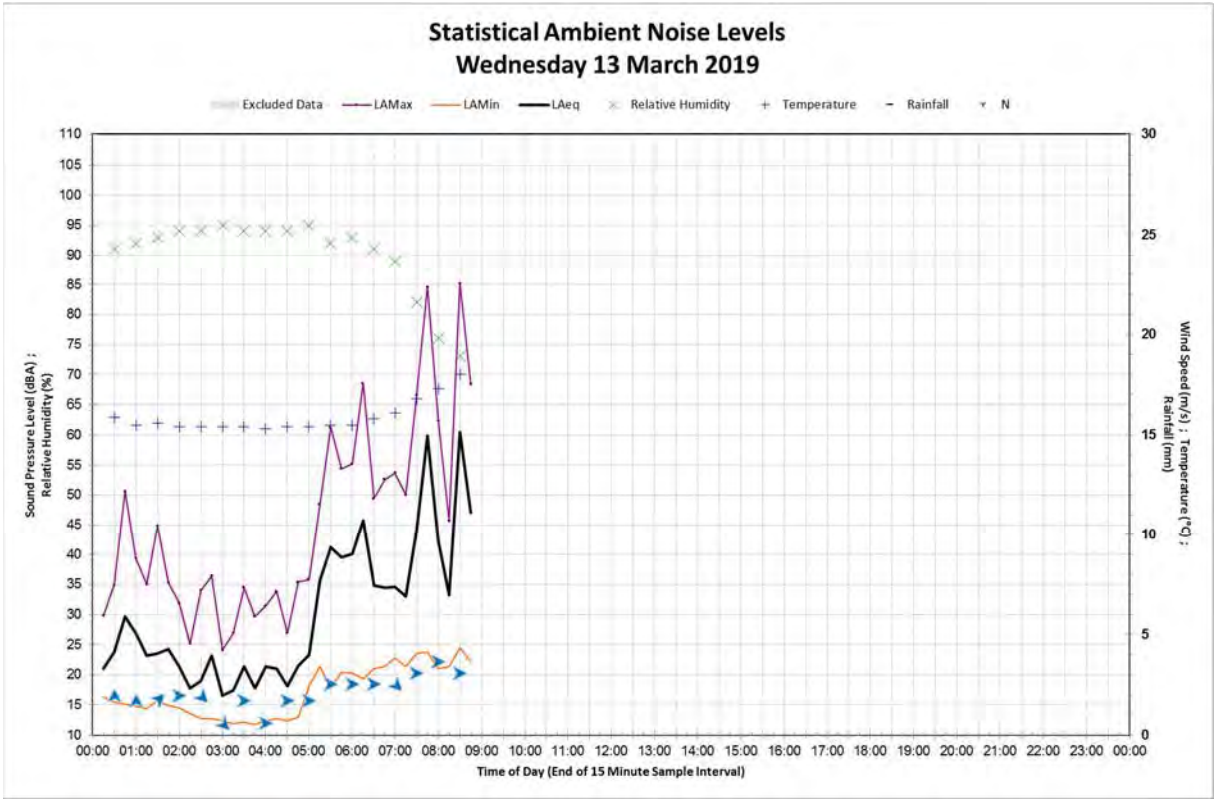

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Statistical Ambient Noise Levels
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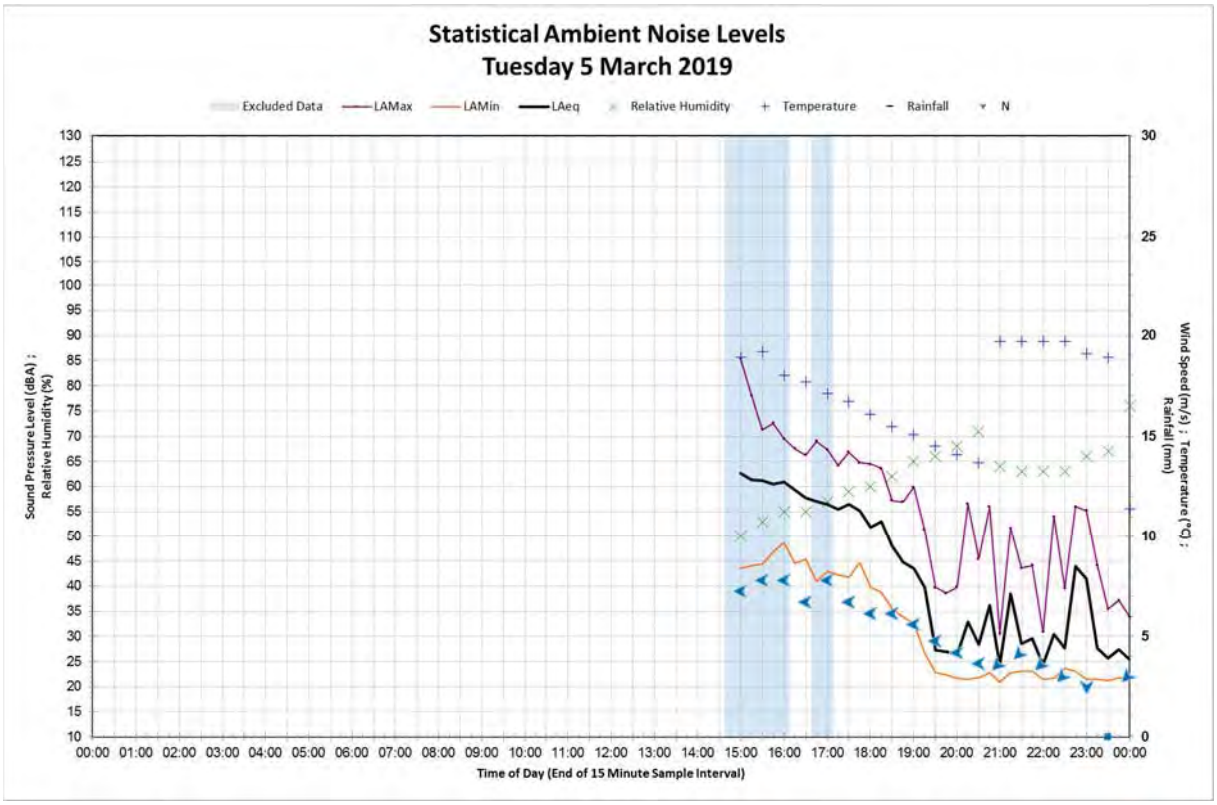

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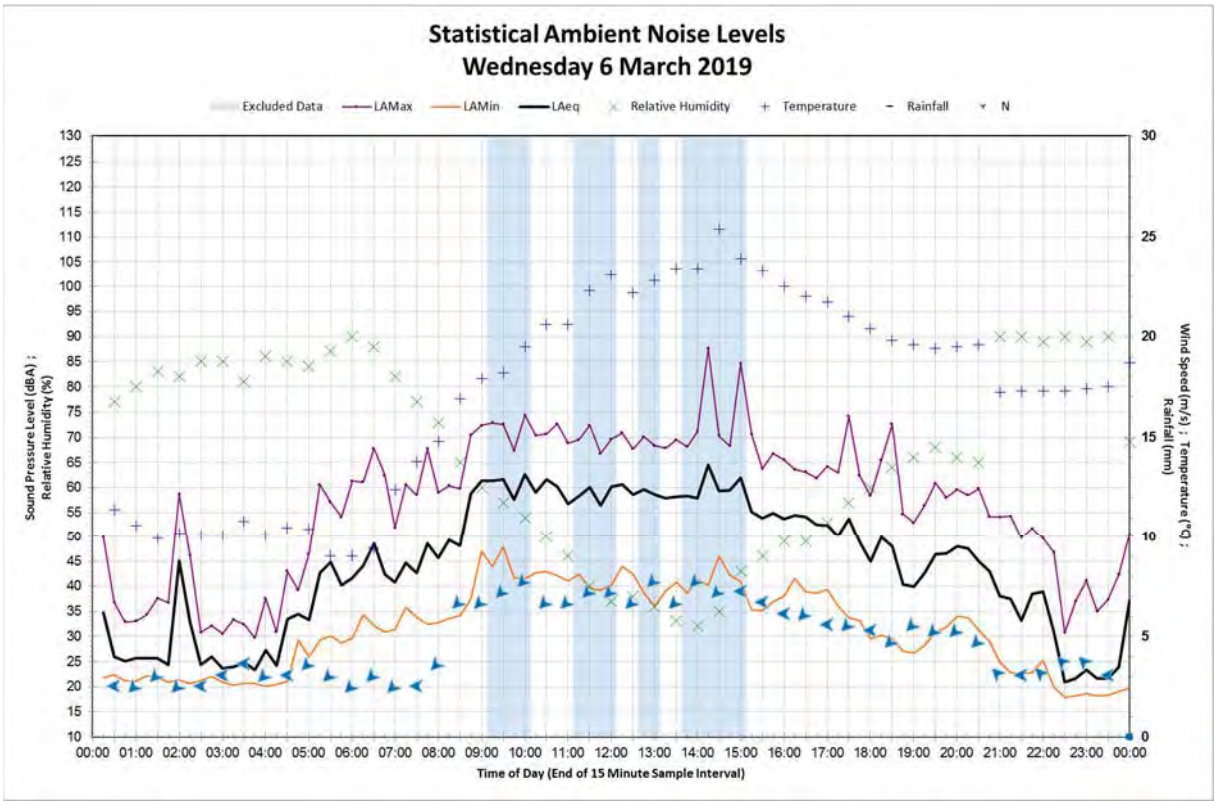

Statistical Ambient Noise Levels
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Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)

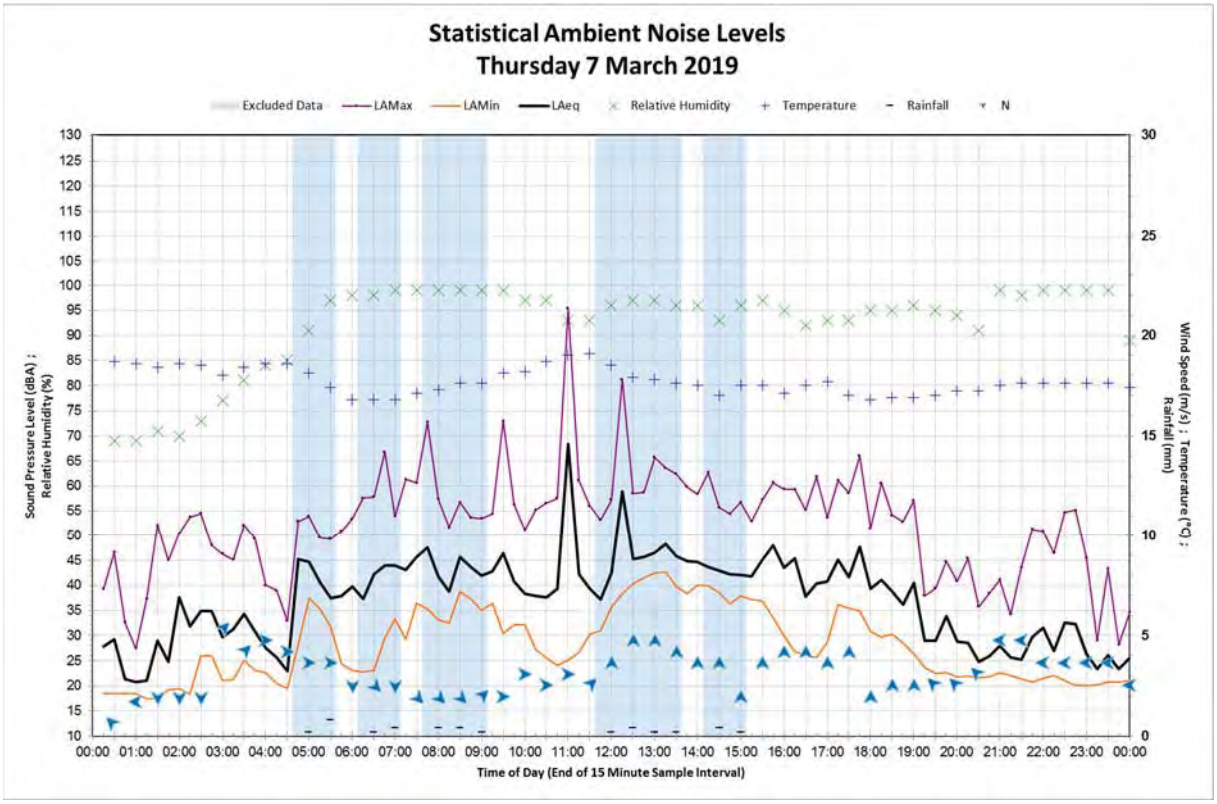

Statistical Ambient Noise Levels
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Excluded Data
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LAMin
LAeq
Relative Humidity
Temperature
Rainfall
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Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)

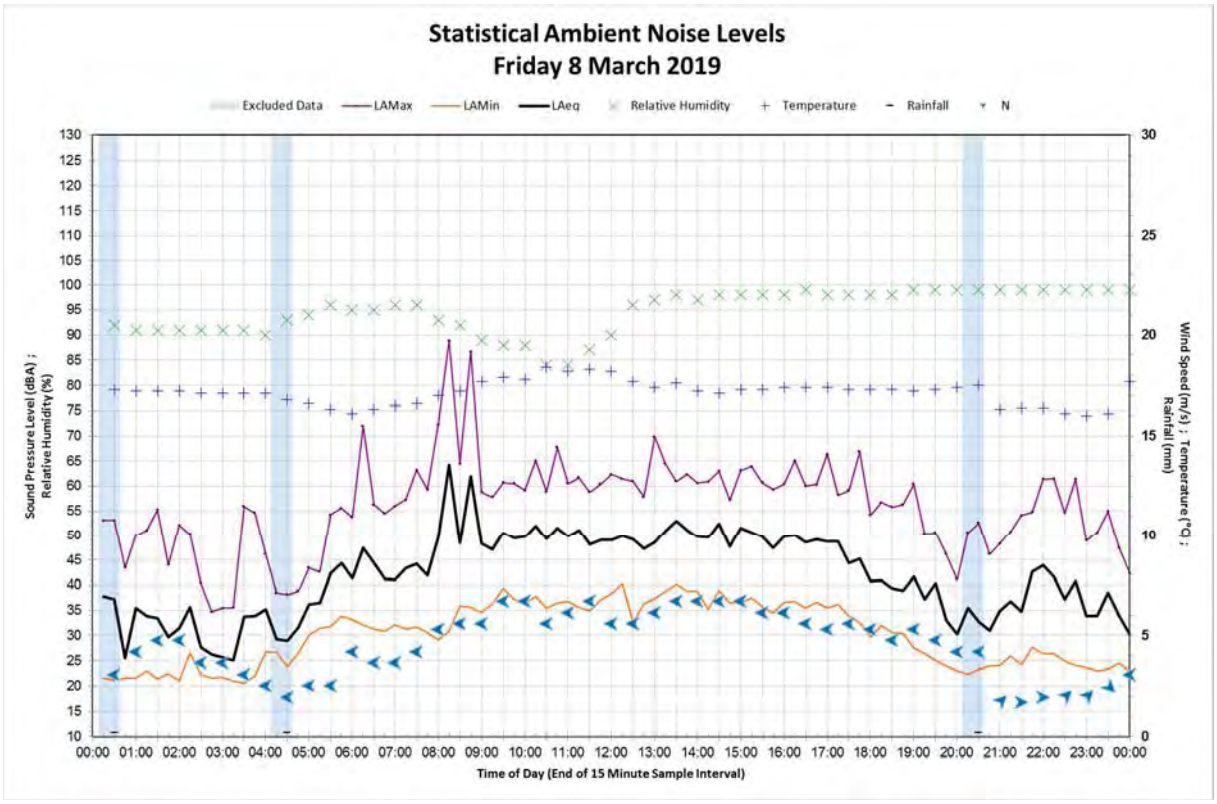

Statistical Ambient Noise Levels
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LAeq
Relative Humidity
Temperature
Rainfall
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Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)

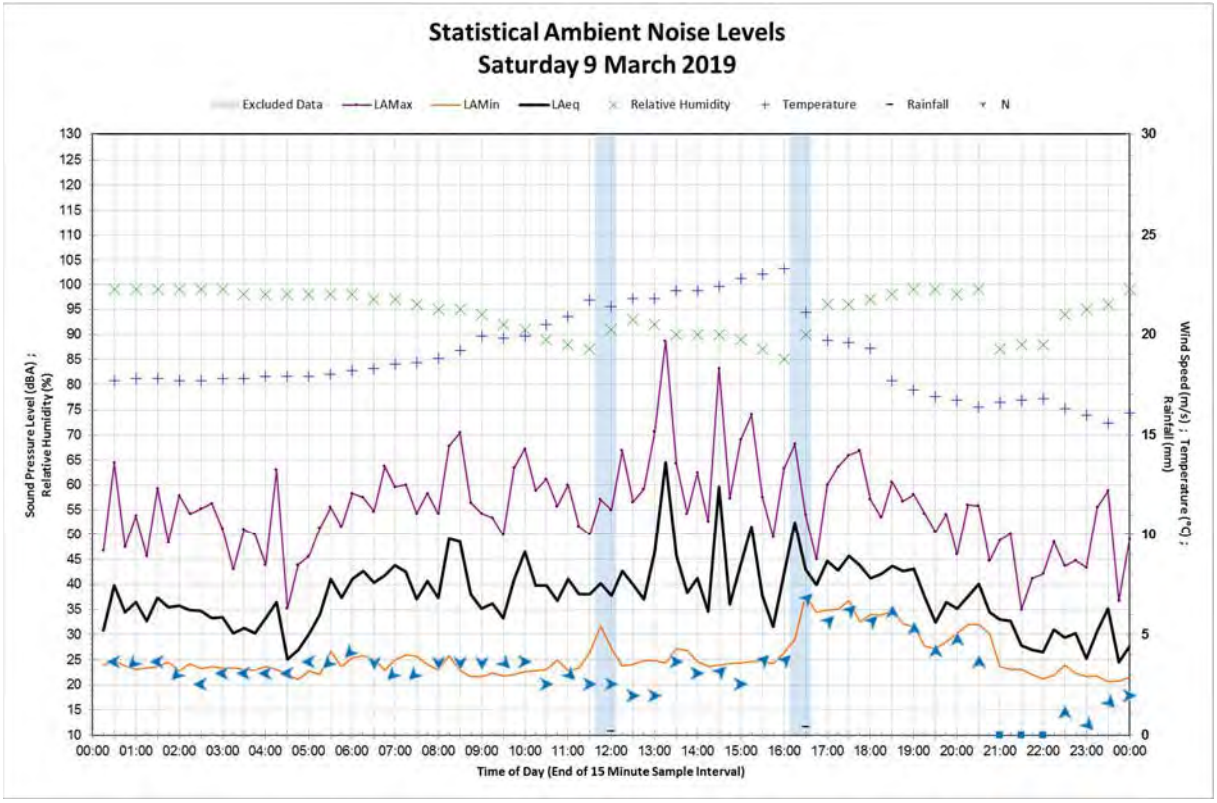
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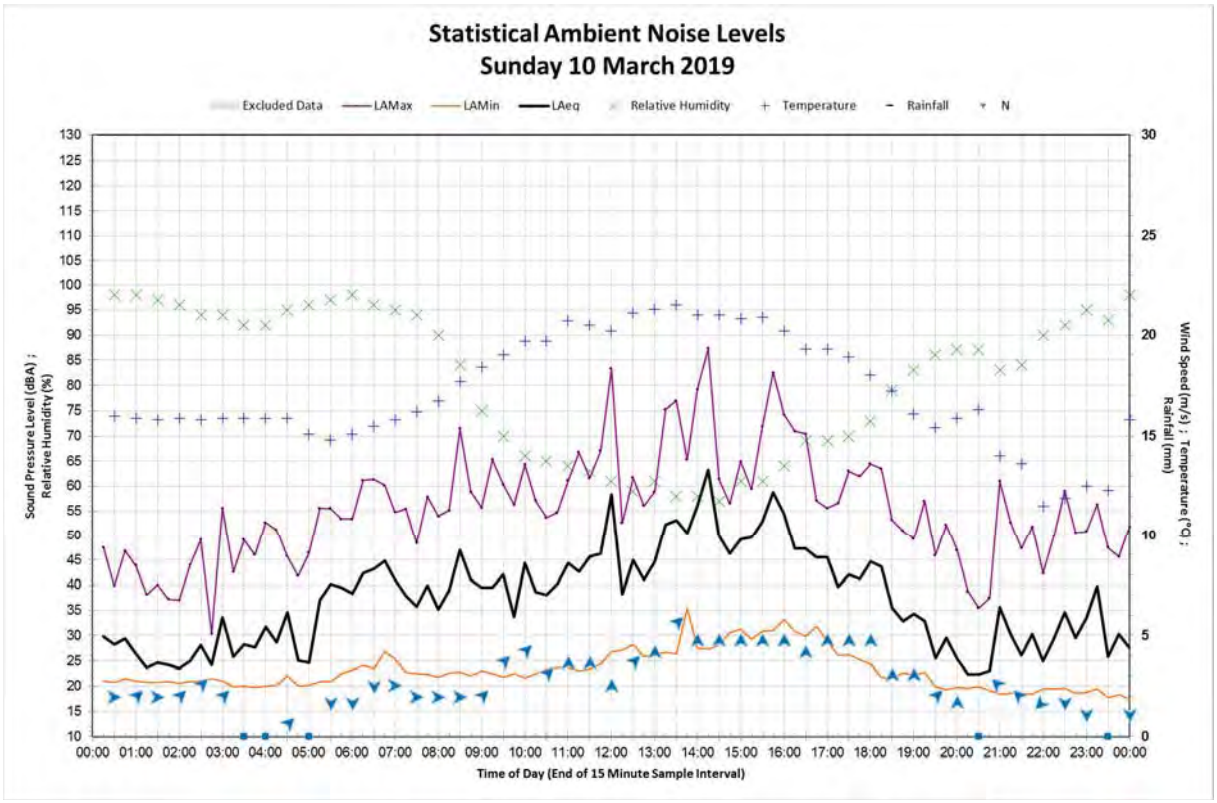


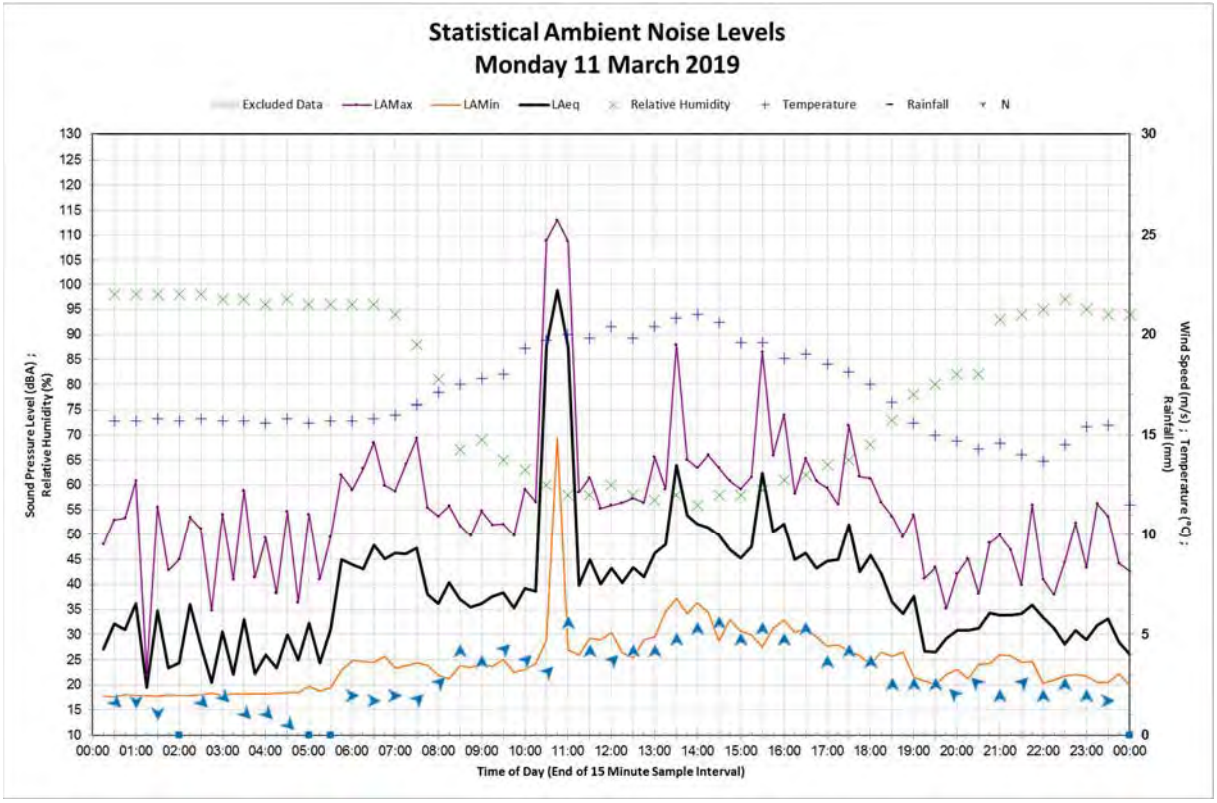


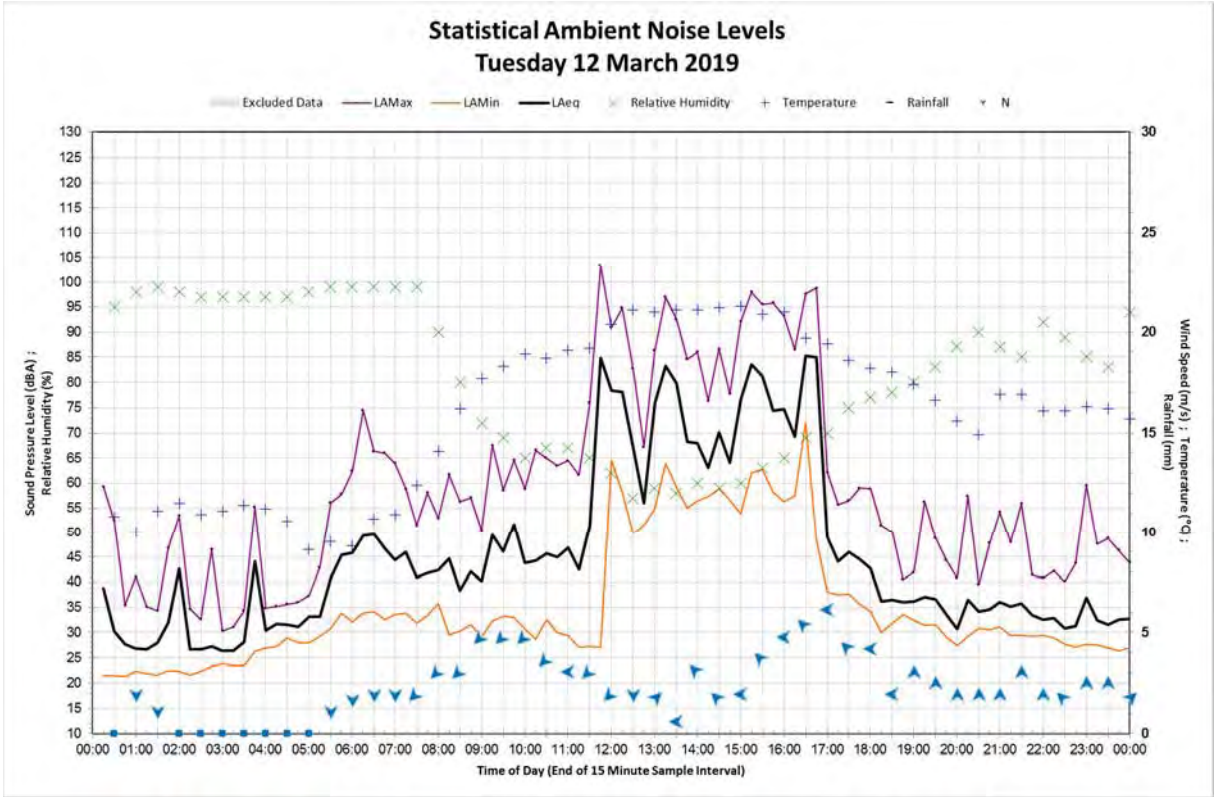

Statistical Ambient Noise Levels
Thursday 7 March 2019
Excluded Data
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LAMin
LAeq
Relative Humidity
Temperature
Rainfall
N
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)

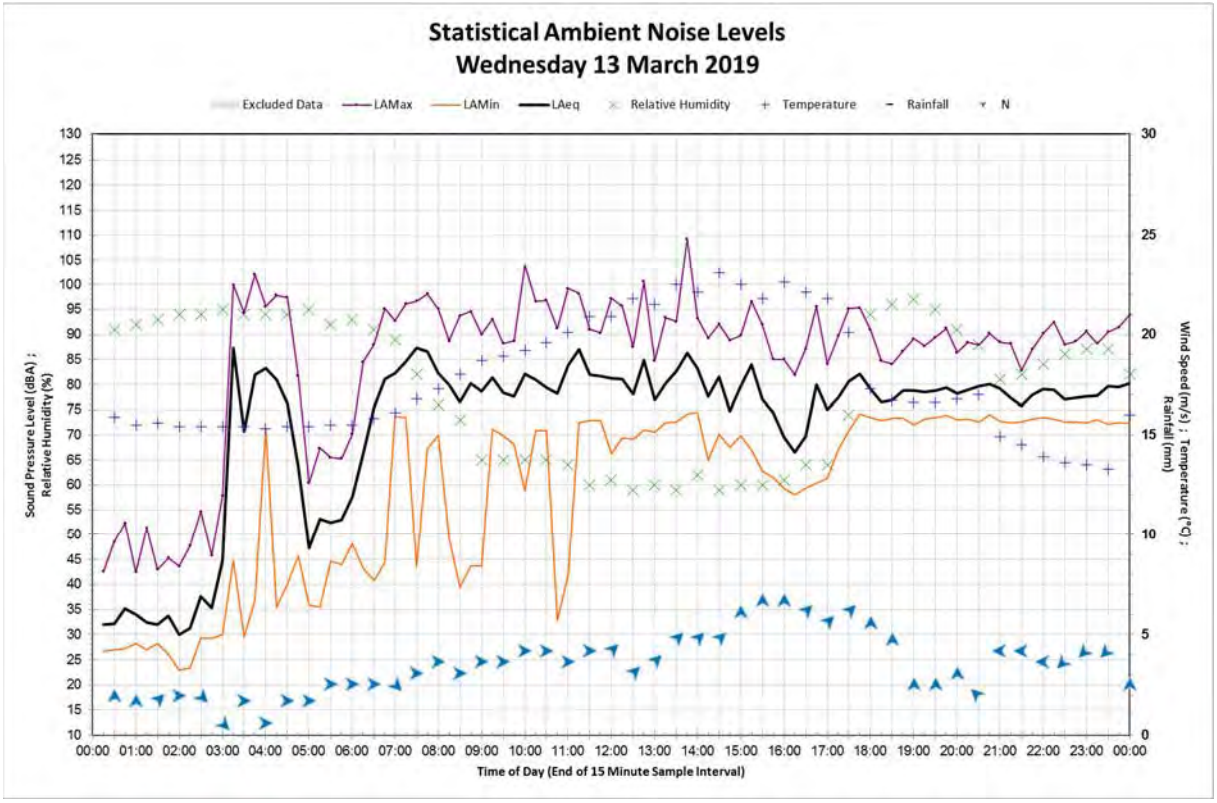

Statistical Ambient Noise Levels
Friday 8 March 2019
Excluded Data
LAMax
LAMin
LAeq
Relative Humidity
Temperature
Rainfall
N
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)

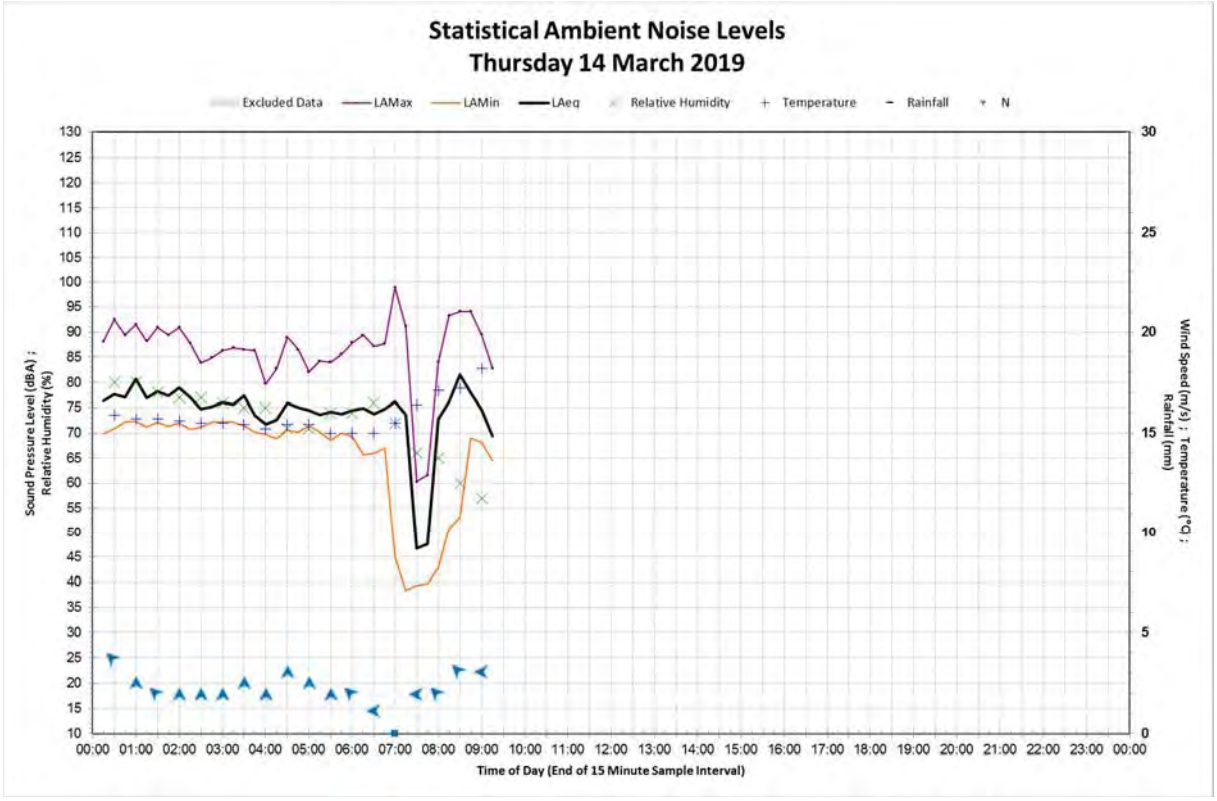

Statistical Ambient Noise Levels
Saturday 9 March 2019
Excluded Data
LAMax
LAMin
LAeq
Relative Humidity
Temperature
Rainfall
N
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
Sunday 10 March 2019
Excluded Data
LAMax
LAMin
LAeq
Relative Humidity
Temperature
Rainfall
N
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
Monday 11 March 2019
Excluded Data
LAMax
LAMin
LAeq
Relative Humidity
Temperature
Rainfall
N
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
Tuesday 12 March 2019
Excluded Data
LAMax
LAMin
LAeq
Relative Humidity
Temperature
Rainfall
N
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
Wednesday 13 March 2019
Excluded Data
LAMax
LAMin
LAeq
Relative Humidity
Temperature
Rainfall
N
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
Thursday 14 March 2019
Excluded Data
LAMax
LAMin
LAeq
Relative Humidity
Temperature
Rainfall
N
Sound Pressure Level (dBA) ; Relative Humidity (%)
Wind Speed (m/s) ; Temperature (°C) ; Rainfall (mm)
Time of Day (End of 15 Minute Sample Interval)

Appendix C – Example Noise Management Plan

GREAT SOUTHERN MOTORPLEX GROUP Inc.

EXAMPLE NOISE MANAGEMENT PLAN

ALBANY MOTORSPORT PARK

This noise management plan ('the NMP') has been approved by the Chief Executive Officer (CEO) of the City of Albany ('the CEO') for the purposes of Division 3 of the *Environmental Protection (Noise) Regulations 1997.*

1. VENUE DETAILS

Name of venue	Albany Motorsport Park ('the venue')
Location of venue	Down Road DROME WA
Venue Owner	City of Albany
Venue Manager	Great Southern Motorplex Group Inc. (Venue Manager)
Occupier of venue	Venue Manager
Affiliations	Confederation of Australian Motor Sports (CAMS) Fédération Internationalé de l'Automobile (FIA) Fédération Internationalé Motocyclisme (FIM) Motorcycling Australia (MA) Australian National Drag Racing Association (ANDRA)
Venue maps	**Attachment 1** – Map of venue showing facilities

2. APPLICATION

The NMP applies:

1. While the Venue Manager is the leaseholder of the venue
2. To racing activities at the venue organised by the Venue Manager.
3. To the emission of noise during a racing activity at the venue.
4. From the date of approval by the CEO until the expiration of the approval.

Regulation 7 of the *Environmental Protection (Noise) Regulations 1997* does not apply to noise emitted from the venue during a racing activity if the activity is conducted in accordance with the NMP.

The Venue Manager must ensure that the conditions and ancillary measures designated as such in the CEO's approval notice are implemented.

3. TYPES OF RACING ACTIVITIES AND CLASSES OF VEHICLES

3.1 Types of racing activities covered by the NMP

- Car test and tune days, coaching and driver assessment
- Car speed events (Club, State and National)
- Supercars event (National)
- Bike test and tune days, coaching and rider assessment
- Bike speed events (Club, State and National)
- Motocross training, coaching and rider assessment
- Motocross events (Club and State)
- Drifting days (Club and State)
- Burnout days (Club and State)
- Drag racing practice
- Drag racing competition (Club, State and National)
- Motorkhana events (Club)
- Special events
- Cycling events
- Driver and rider training
- 4WD and ATV training

3.2 Classes of vehicles

Vehicles that may compete in events at this venue must comply with the relevant governing body specification. These governing bodies being Confederation of Australian Motor Sport (CAMS), Motorcycling Australia (MA), Motorcycling Western Australia (MWA) and Australian National Drag Racing Association (ANDRA).

4. LIMITATIONS ON RACING ACTIVITIES

4.1 Scheduled race meetings and practice sessions

The following limits apply to scheduled race meetings and practice sessions at the venue:

1. Multi-use track driver training may take place on week days when not a test and tune day or practice day between the hours of 9.00am and 5.00pm.
2. 4WD and ATV driver training may take place on week days between the hours of 9.00am and 5.00pm.
3. Multi-use track individual test and tune of cars and motorcycles may take place on week days when the track is not used by driver training between the hours of 10.00am and 4.00pm.
4. Motocross practice and training sessions may take place three days per week between the hours of 10.00am and 2.00pm.

5. Motocross Club events may take place one weekend per month between the hours of 8.00am and 4.00pm.
6. Motocross State events may take place one weekend per month between the hours of 8.00am and 4.00pm.
7. Multi-use track car racing Club events may take place one weekend per month between the hours of 9.00am and 6.00pm.
8. Multi-use track car racing State events may take place one weekend per month when not a club weekend between the hours of 9.00am and 6.00pm.
9. Multi-use track car racing National events may take place two weekends per year when not a club or state weekend between the hours of 9.00am and 6.00pm.
10. Multi-use track car racing International events may take place one three day weekend per four years, when no other event is held at the AMP, between the hours of 9.00am and 6.00pm. This will be a “special event”.
11. Multi-use track National supercar events may be held on a three day weekend once per year, when no other event is held at the AMP, between the hours of 9.00am and 6.00pm.
12. Multi-use track International supercar events may be held on a three day weekend once per four year, when no other event is held at the AMP, between the hours of 9.00am and 6.00pm. This will be a “special event”.
13. Multi-use track motorcycle racing Club events may take place one weekend per month between the hours of 9.00am and 6.00pm.
14. Multi-use track motorcycle racing State events may take place one weekend per month when not a club weekend between the hours of 9.00am and 6.00pm.
15. Multi-use track motorcycle racing National events may take place two weekends per year when not a club or state weekend between the hours of 9.00am and 6.00pm.
16. Multi-use track motorcycle racing International events may take place one three day weekend per four years, when no other event is held at the AMP, between the hours of 9.00am and 6.00pm. This will be a “special event”.
17. Burnout Pad Club events may take place two Saturdays per month between the hours of 9.00am and 6.00pm.
18. Burnout Pad State events may take place three day weekend per year between the hours of 9.00am and 6.00pm.
19. Drag Strip drag racing practice may be held four weekdays per month between the hours of 1.00pm and 3.00pm.
20. Drag Strip drag racing Club events may be held one Saturday per month between the hours of 10.00am and 4.00pm.
21. Drag Strip drag racing State events may be held four weekends per year between the hours of 10.00am and 4.00pm.
22. Drag Strip drag racing National events may be held one weekend per year, when no events are held on the multi-use track, between the hours of 10.00am and 4.00pm.
23. Racing can only take place at a race meeting or practice session.
24. Racing vehicles are not to be operated at the venue at any time other than a race meeting, practice session or tuning day.

25. Race meetings are to be held only on Saturday and/or Sunday, except that a race meeting may be held on a Monday of a long weekend or an approved “Special Event” and on a Friday evening for a programmed drag racing event.
26. In addition to the programmed race meetings per season, a preliminary meeting may be held to conduct tests on racing vehicles to establish their compliance with this Noise Management Plan.
27. A race meeting can only be held on three consecutive days for the purpose of the ‘State Titles’ race meeting held over a long weekend during the season.
28. In addition, a practice session may be held on Thursday for the purpose of the ‘State Titles’ race meeting held over a 3 day weekend during the season.

4.2 Special events

Where a special event that is to be open to the public is proposed to be held at the venue, but the event cannot be conducted within the limits for scheduled race meetings and practice sessions, the Venue Manager is to apply to the CEO for approval of the event under Regulation 18.

5. MEASURES TO CONTROL NOISE EMISSIONS

5.1 Access to race track

In order to prevent noise emissions due to unauthorised use of the race track by racing vehicles, the gates to the race track are to remain locked at all times other than:

1. In preparation for and during race meetings, practice sessions and special events approved by the CEO.
2. During maintenance or improvement of venue facilities.

5.2 Certification of racing vehicles

Each vehicle that is to race at a race meeting at the venue must have a current certificate indicating that its noise level does not exceed a noise limit of $L_{A\ slow}$ 95 dBA (‘noise limit’) when tested in accordance with the noise test procedure.

The noise level for a racing vehicle is to be obtained at or before the first meeting of the season at which that racing vehicle is entered to race.

Vehicles that have been measured in accordance with accepted measurement procedures (Section 5.3) at another racing venue are deemed to have complied with the requirement for certification and testing for noise emissions providing the measurements have been conducted by a competent person.

If the exhaust system or engine of a racing vehicle is modified or replaced after the level of noise emitted by the vehicle had been measured, the Venue Manager is to ensure that the level of noise emitted by the vehicle is measured again and the vehicle complies before the vehicle is raced at an event.

Certification is valid for 12 months only.

Information provided in the certificate shall include:

1. Engine and chassis identification number

2. Exhaust type
3. Owner of vehicle
4. Date and location of testing
5. Individual and average measured sound pressure level

5.3 Noise test procedure

5.3.1 Measuring individual racing vehicles

The level of noise emitted by a racing vehicle (the tested vehicle) is to be measured while the tested vehicle completes three consecutive laps of the venue within a period that is not greater than four times the average lap time record.

Average lap times are to be calculated during the previous racing season for races at the speedway in the class of racing vehicle to which the vehicle belongs.

1. The measurements shall be made at a point that is:
   - Inside the inner boundary of the venue track in use by the vehicle racing
   - Not less than 29 metres and not more than 31 metres from the inner boundary
   - On, or as close as practicable to, the shorter axis of the track
2. With the measuring microphone not less than 1.2 m or more than 1.4 m above the ground plane.

5.3.2 Calculation of average noise level

The level of noise emitted by a racing vehicle is taken to be the level obtained by:

1. Adding together the maximum level of noise measured for the vehicle on each of the laps referred to in Section 5.3.1.
2. Dividing the total resulting from that addition by three

5.3.3 Instruments

Instruments used to measure noise emissions shall:

1. Be calibrated in accordance with and otherwise comply with Schedule 4 of the *Environmental Protection (Noise) Regulations 1997*
2. Be operated by a person who is approved by the CEO
3. Preferably be a Type 1, although Type 2 instruments are acceptable provided allowance is made for their measurement tolerances.
4. Copies of the calibration certificates must be provided to the CEO on request.

5.4 Responsibility for noise measurement and certification

The Venue Manager will ensure that only competent persons utilising equipment conforming to the requirements of Section 5.3.3 are engaged as required to assess compliance. Also, that all noise measurements, calculation, certification and testing requirements are met for venue events under the control of Venue Manager to the requirements of the CEO.

5.5 Record of tests

The operator is to record all results from tests carried and retain those results in a form that shows (for each test):

1. Details of the racing vehicle tested, including engine and chassis identification number and exhaust type
2. The racing vehicle's owner
3. The date and location of the test
4. The calculated lap time
5. The actual time for the three laps of the test
6. The point of measurement
7. The measured noise levels
8. The signature of the noise test operator

Records of tests are to be provided to the CEO on request.

5.6 Scrutiny of racing vehicles

1. An Accredited Scrutineer shall be designated for the duration of a race meeting and practice session to verify noise certificates and to evaluate noise emissions from race vehicles.
2. The Accredited Scrutineer may reject a certificate and require a new test if not satisfied with the noise test on which the certificate is based or if he considers that a racing vehicle has been modified to the extent that the certificate is no longer representative of noise emission from the vehicle.
3. If a racing vehicle at the event emits a level of noise that is conspicuously louder than that of the other racing vehicles in the same class at the meeting, the Accredited Scrutineer may require that vehicle to immediately cease racing and may prevent that vehicle from further racing at the speedway until that vehicle's noise level has been shown to comply with the noise limit.

5.7 Public address system noise

The public address (PA) system consists of loudspeaker towers placed around the track, facing towards the track and angled down towards the track.

The loudspeakers are not to be moved or adjusted by any person without the approval of the Venue Manager.

Noise emissions from the public address system at the venue are to be under the control of the Venue Manager, who is to designate persons who are authorised to use the system.

The public address system controls are to be set to provide a suitable audience sound level during the preliminary meeting each year, with the assistance of such persons as the Venue Manager requires, ensuring the minimum practicable 'spill' of sound into nearby noise sensitive areas.

The public address cabinet is to be locked for access only by the Venue Manager and his authorised assistants at all other times.

The public address system will only be used during race meetings; it is not to be used during practice sessions or at any other time except in the case of an emergency.

5.8 Review of racing activities in response to noise complaint

If complaints are made during a racing activity the Venue Manager will review racing activities to reduce noise where practicable for the remainder of that event.

5.9 Written instruction to members

The Venue Manager shall provide all clubs and approved groups committees using the venue with a written instruction explaining the noise management issues and the Albany Motorsport Park Code of Conduct document which the venue user committee shall explain to all participants at a briefing prior to starting the event each day.

6. NOTICE OF RACING ACTIVITIES

Notice of the program for racing activities for a season is to be published and distributed to members of the public as follows:

1. On the Albany Motorsport Park Facebook and Web Page.
2. In addition to (1), the notice is to be delivered to the address of each noise sensitive premises at locations within 1 km of the venue.
3. The notice is to be published and delivered during the month of the year in which the season starts.
4. Notice of a special event approved by the CEO is to be given in accordance with the conditions of the approval.

7. COMPLAINT PROCEDURE

1. A designated telephone line will be manned during racing activities for the receipt of noise complaints.
2. A complaint received will be recorded on the noise complaint form.
3. All complaints will be treated with due consideration and investigated and responded to as appropriate.

4. The Venue Manager will as far as practicable provide advice to the complainant within 48 hours as to the outcomes of the investigation and where appropriate, any proposed modifications to operations.
5. The results of complaint investigations, details of measures taken or considered to reduce noise emissions under Measure 5.5 and an outline of the responses given to the complainant shall be recorded on the noise complaint form.
6. Completed noise complaint forms will be retained at the venue for the period of the approval and made available to the CEO on request.
7. Noise complaint details are to be provided to the City of Albany on the next business day following receipt of the complaint.

8. RECORDS

8.1 Record of vehicle tests

The Venue Manager is to retain records of all tests of race vehicles under Measure 5.2 for a period of two years.

8.2 Record of loud racing vehicles

The Venue Manager is to make a record of all racing vehicles that have been required to cease racing by the Accredited Scrutineer under Measure 5.4 (Item 3) and retain that record for two years in a form that shows:

1. Details of the racing vehicle required to cease racing.
2. The racing vehicle's owner.
3. The date and time at which the request to cease racing occurred.
4. The action taken by the driver of the racing vehicle following the request.
5. The action taken by the owner of the racing vehicle to remedy the excessive noise emissions.

8.3 Records to be forwarded on request

If requested to do so in writing by the CEO, the Venue Manager is to forward a copy of all or any of the records made under Measure 8.2 within 21 days of the request.

9. RESPONSIBILITIES

Venue Manager:	Implementation of this Noise Management Plan
	Implementation of AMP Code of Conduct
	Control of public address system
	Development of program for scheduled race meetings
Club Committees:	Appointment of Accredited Event Scrutineer
	Development of program for scheduled race meetings

	Designation of accredited event marshals and stewards
Event Scrutineer:	Scrutiny of racing vehicles

Appendix I – Agricultural Land Capability Assessment

AGRICULTURAL LAND CAPABILITY ASSESSMENT

Lot 5780, 54 Down Road South, Drome, City of Albany

Prepared for

CITY OF ALBANY

by

Land Assessment Pty Ltd

LAND ASSESSMENT PTY LTD
P.O. Box 117 SUBIACO, WA 6008
Phone: (08) 9388 2427
Email: landass@iinet.net.au

LA Report No 1902
11 March 2019

CONTENTS

Page

1.0 BACKGROUND 1

2.0 NATURE OF THE LAND 5

2.1 Current Use and Surroundings 5

2.2 Landforms and Soils 5

2.2.1 Broad-scale mapping 5

2.2.2 More-detailed land unit mapping 8

2.3 Vegetation 8

2.4 Water Resources 11

2.4.1 Water for agricultural activity on-site 11

2.4.2 Catchment perspective 11

3.0 AGRICULTURAL CAPABILITY 12

3.1 Overview-Agriculture within Albany 12

3.2 Capability Assessment Methodology and Determining PAL ... 12

3.3 Broad-scale Assessment 14

3.4 Site-Specific Assessment 16

3.5 Comparison of Broad-scale and Site-specific Assessments ... 18

4.0 CONCLUSIONS 20

5.0 REFERENCES 22

ATTACHMENTS

A Site location figure, results summary and representative photographs

B Field Test Bore Logs (Biodiverse Solutions 2018)

TABLES

1. Broad-Scale Mapping Units 7
2. Abbreviated Legend and Areas 9
3. Land Unit Descriptions 10
4. Land Capability Classes 13
5. Proportional Capability Codes 13
6. Broad-scale Land Capability Assessment 14
7. Site-Specific Agricultural Capability Ratings 16
8. Agricultural Capability Comparison 18

LIST OF FIGURES

1. Location Plan 1
2. Priority Agricultural Land (State or Regional Significance)..... 2
3. Local Planning Scheme (Overview) 3
4. Local Planning Scheme (Detail)..... 4
5. Soil Landscape Mapping..... 6
6. Land Unit Mapping..... 9
7. Broad-scale Agricultural Capability Assessments (Figures a – b)..... 15
8. Site-specific Agricultural Capability Assessments (Figures a – b)..... 17

1.0 BACKGROUND

In cooperation with the Great Southern Motorplex Group Inc. (GSMG) and the Department of Local Government, Sport and Cultural Industries (DLGSCI), the City of Albany is currently supporting the development of a proposed multi-use Albany Motorsport Park (AMP) near the Mirambeena timber processing precinct on Down Road. The subject land, Lot 5780 Down Road South, is 192.34 ha in area and located approximately 20 km to the north-west of the Albany CBD (Figure 1).



Figure 1: LOCATION PLAN

The City of Albany has completed a technical site feasibility assessment for the Albany Motorsport Park (GHD, 2018) that identified a number of matters requiring further investigation. These matters included the fact that under Local Planning Scheme No 1 (LPS 1) the subject land is currently zoned 'Priority Agriculture' and a motorsport park would not be a permissible use under that zoning category.

In accordance with State Planning Policy (SPP) 2.5 'Rural Planning', a 'Priority Agriculture' zone identifies land considered to be of local, State and /or regional significance for agricultural production. The objectives for the Priority Agriculture zone within LPS1 include; *Prevent land uses and development within the zone that may adversely impact on the continued use of the zone for a diversity of agricultural purposes*.

In light of the above, a Scheme Amendment is to be prepared in order to rezone the land to "Special Use" and facilitate the proposed AMP development.

Associated with the Scheme Amendment process, the City of Albany engaged Land Assessment Pty Ltd to prepare an Agricultural Land Capability Assessment (ALCA) for the subject land in accordance with the requirements of the Department of Primary Industries and Regional Development (DPIRD) and van Gool *et al.* (2005). The latter reference is a document outlining the Department's current methodology for determining land capability.

This consultant has had discussions with DPIRD (Mr Timothy Overheu) in relation to the identification of 'Priority Agricultural Land' within the planning system, and its requirements for an Agricultural Land Capability Assessment for the subject land.

As part of its input to the Lower Great Southern Strategy (WAPC 2016) DPIRD identified Priority Agricultural Land 'PAL' based on an interpretation of its regional scale mapping of soil-landscapes and their capability to support agricultural land uses. The PAL interpretations are irrespective of considerations of location, lot size, water availability or existing land use. The result is depicted within the relevant portion of the regional map of Priority Agricultural Land (Figure 2).

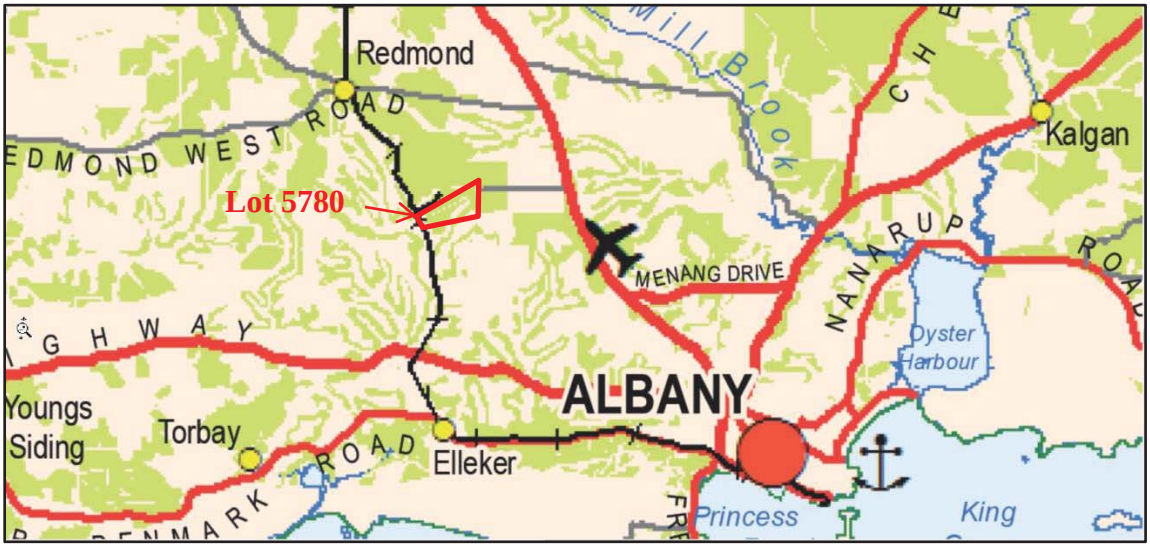


Figure 2: PRIORITY AGRICULTURAL LAND (of State or Regional Significance)

Source: Lower Great Southern Strategy (WAPC 2016) – enlargement of its Figure 3.

In accordance with SPP 2.5, regionally defined areas of priority agricultural land should be rationalised to cadastral boundaries and, where appropriate, reflected as a 'Priority Agriculture' zone within Local Planning Schemes. Additional areas considered to be of 'local agricultural significance' based on factors other than just soil qualities can also be identified. Restrictions on subdivision and non-agricultural land use activity within the 'Priority Agriculture' zone can then be administered through the Scheme.

The City of Albany's Local Planning Scheme (LPS 1) shows 74.5 5% of this local government area is designated agricultural land, with approximately 26% (83,855 ha) zoned 'Priority Agriculture' and the remaining 74% (237,540 ha) zoned 'General Agriculture' (Figure 3).

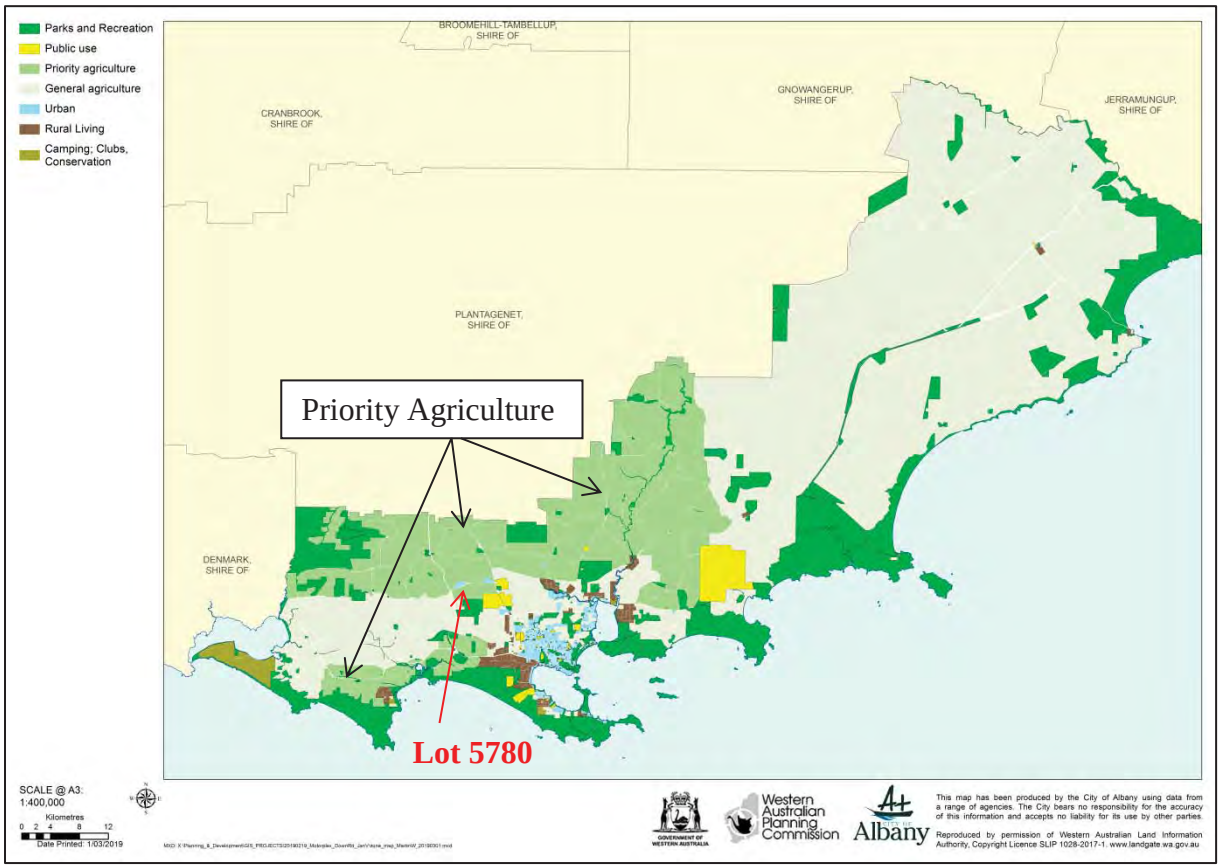


Figure 3: LOCAL PLANNING SCHEME (OVERVIEW)

Figures 3 and 4 (overleaf) show Lot 5780 occurs at the southern edge of the most extensive portion of the City of Albany's Priority Agriculture Land, which extends inland and towards Mount Barker within the adjoining Shire of Plantagenet.

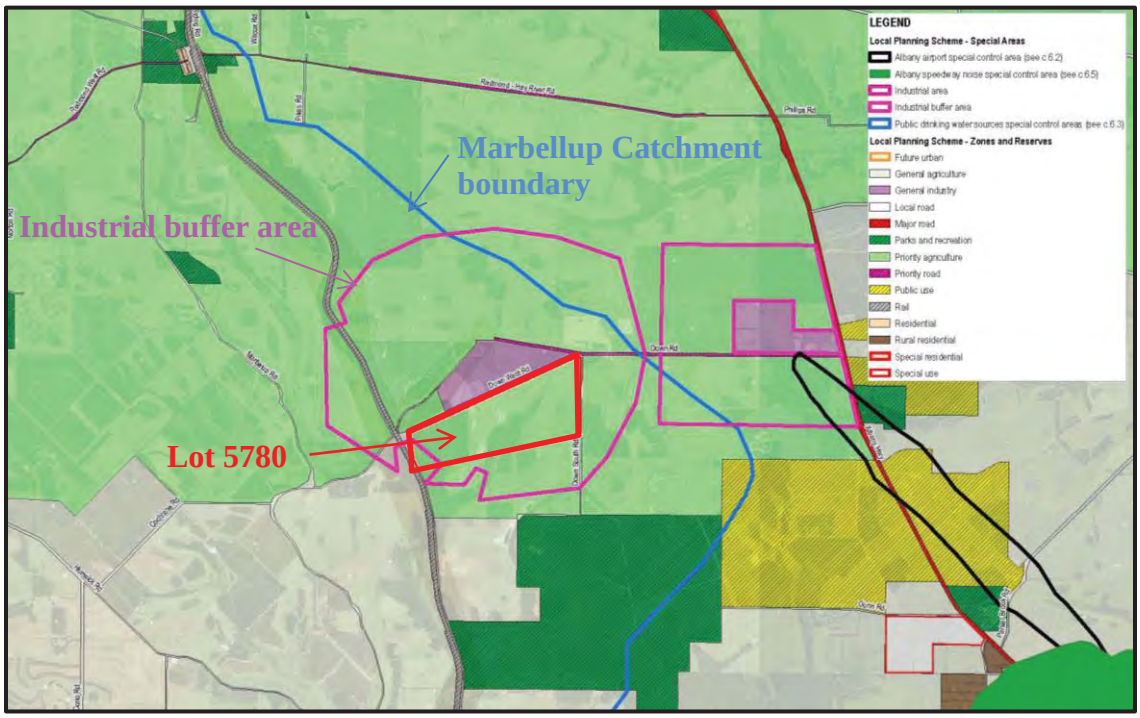


Figure 4: LOCAL PLANNING SCHEME – (DETAIL)

Source: *City of Albany - Albany Motorsport Park Site Feasibility Study* (GHD 2018)

The focus of the Department of Primary Industries and Regional Development (DPIRD) in relation to land use planning matters is on preserving large agricultural lots to facilitate continued access and investment in more intensive food production (T Overheu pers comm).

Given the broad scale of the soil-landscape mapping on which the DPIRD assessment of the best quality agricultural land is based (see Figure 2), the Department generally recommends that proponents of specific developments have an independent land evaluation report compiled discussing the capability of the subject land.

Furthermore, in relation to Lot 5780, and as part of a pre-fieldwork discussion between this consultant and Mr Timothy Overheu of DPIRD, it was concluded that the Agricultural Land Capability Assessment should particularly address the uniqueness' or otherwise' of the subject land within the context of the City's supply of land zoned 'Priority Agriculture'.

2.0 NATURE OF THE LAND

2.1 Current Use and Surroundings

The central to eastern portion of Lot 5780 extends over approximately 140 ha and is currently leased to a local farmer, Mr L Black. This land is predominantly used for cattle grazing although some sand extraction activity has occurred in areas which are now subject to varying stages of rehabilitation. A small (1.6 ha) portion of Lot 5780 is leased to Plantation Energy Australia Pty Ltd for the purpose of maintaining a drainage detention basin.

The western portion of the property, covering an additional 52 ha is bordered by the Avon-Albany railway line reserve and remains under remnant native vegetation. A further 22 ha of remnant vegetation occurs within the currently leased 140 ha central to eastern portion. Outside of the areas of remnant vegetation, and subject to seasonal conditions, the remaining 118 ha of cleared land with established pasture supports up to 80 cattle (breeders) and receives about 200 kg of potash super each year (pers comm L Black). There are no areas of cropping within Lot 5780.

In common with Lot 5780, land to the south and east is also zoned 'Priority Agriculture' and used for livestock grazing, but with some cropping in the more extensive flatter terrain.

The Down Road Timber Processing Precinct, occurring directly north of Lot 5780, is zoned for general industrial purposes and includes a tree plantation and processing facilities of the Albany Plantation Forest Company and the Albany Plantation Export Company. To the east of the Timber Processing Precinct, and directly north of the intersection of Down Road and Down South Road, the CBH Mirambeena grain storage facility occurs within land zoned 'Priority Agriculture'.

2.2 Landforms and Soils

2.2.1 Broad-scale mapping

DPIRD's agricultural capability interpretations for the Albany area are based on soil - landscape mapping initially surveyed by CSIRO (Churchward et al 1988) at a publication scale of 1:100,000.

Figure 5 overleaf depicts the relevant enlarged portion of that mapping with map units then described in Table 1.

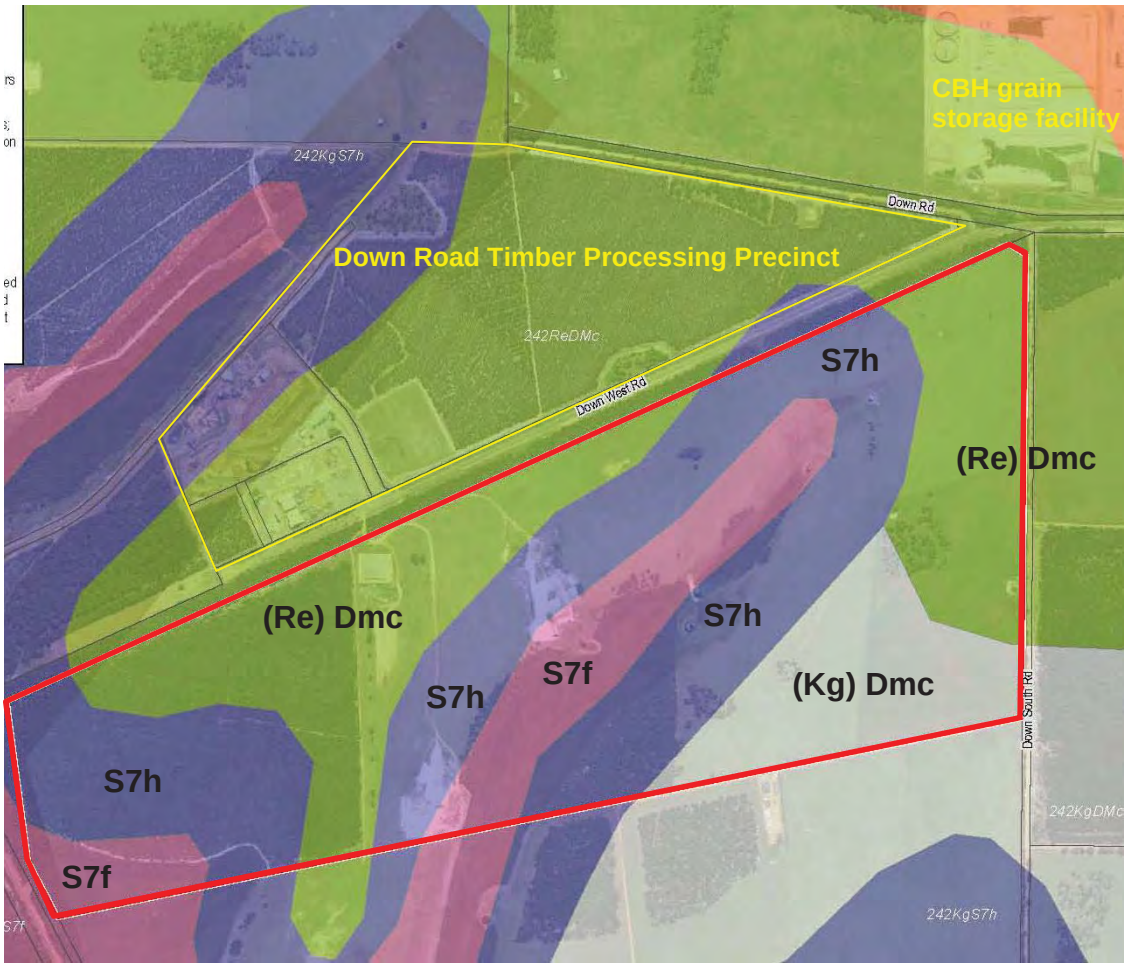


Figure 5: SOIL-LANDSCAPE MAPPING

Source: Adapted from *City of Albany – Albany Motorsport Park Site Feasibility Study* (GHD 2018) and based on original mapping from *Landforms and Soils of the South Coast and Hinterland, Western Australia*. (Churchward et al 1988) as depicted within Shared Land Information Platform (SLIP) http://spatial.agric.wa.gov.au/slip

Figure 5 shows the subject land encompasses the upper portion of a shallowly incised, minor valley (S7) occurring between flat to very gently inclined upland lateritic terrain (DMc).

The Dempster crest, map unit has mainly gravelly duplex soils, and occurs as part of either the Redmond (Re) or King (Kg) soil-landscape systems.

The minor valley (S7), which is also part of the King soil-landscape system, has component sideslopes (S7h) with pale sands and deep sandy duplex soils, leading to a valley floor (S7f) with predominantly wet and semi wet soils.

Table 1: BROAD-SCALE MAPPING UNITS

REDMOND SYSTEM (242Re)	
Undulating plateau with scattered depressions, in the east of the Albany Sandplain Zone. Sandy gravel, pale deep sand, non-saline wet soils and grey sandy duplex. Marri-jarrah forest, swamp yate-paperbark-sheoak woodland and heath.	
DMc	**Dempster crest phase*** (61.7 ha or 32 % of Lot 5780) Sands and laterite on elongate crests; Duplex sandy gravels, Grey deep sandy duplexes, Pale deep sands and Shallow gravels.
KING SYSTEM (242 Kg)	
Dissected siltstone and sandstone terrain, on the southern edge of the Albany Sandplain Zone, with shallow gravel, sandy gravel, grey sandy duplex and pale deep sand. Jarrah-marri-sheoak woodland and mallee-heath.	
DMc	**Dempster crest phase*** (23.8 ha or 12 % of Lot 5780) Sands and laterite on elongate crests; Duplex sandy gravels, Grey deep sandy duplexes, Pale deep sands and Shallow gravels.
S7h	**Minor Valleys S7 slope phase** (78.6 ha or 41 % of Lot 5780) Sideslopes of minor valleys in sedimentary rocks; Pale deep sands and Grey deep sandy duplexes.
S7f	**Minor Valleys S7 floor phase** (28.1 ha or 15 % of Lot 5780) Footslopes and swampy valley floors of minor valleys in sedimentary rocks; Wet and Semi-wet soils, Pale deep sands and Grey deep sandy duplexes.

* In relation to the Dempster crest (DMc) map unit occurrence in both the Redmond and King systems, there is no significant difference in the component soils and their agricultural capability. The Redmond and King land systems generally differ only in the degree of landscape dissection, however within an intergrade area such as around Lot 5780, the landform is consistent over both occurrences of map unit DMc.

The broad-scale map units encompassed within Lot 5780 occur widely throughout the rural areas of the City of Albany. Data analyisis by the City's GIS technical staff show the upland lateritic areas, Dempter crest DMc map unit, occupy 20,624 ha or 24.6 % of the City's Priority Agriculture zone, and a further 13,362 ha or 5.6 % of the General Agriculture zone. Likewise, the sideslopes of the minor valley, S7h map unit, are well represented and occur within 7,606 ha (9 %) of the Priority Agriculture zone and a further 4,408 ha (2 %) of the General Agriculture zone.

2.2.2 More-detailed land unit mapping

Given the broad scale of soil-landscape mapping in Figure 5, some 'on-ground' variation can be expected in soil and landform conditions. More detailed mapping, or 'ground truthing' of the conditions described in the earlier mapping was therefore undertaken as a basis for the 'property-specific' assessment of agricultural capability for Lot 5780.

Soil and landform conditions were examined through aerial photo interpretation and field survey work conducted on 21 February. Soils were examined at twenty five 'soil auger observation sites' and classified in accordance with the WA Soil Group nomenclature (Schoknecht and Pathan 2013).

Attachment A contains a site location figure, site results summary, and representative photographs of land units. Additional soils data, included in Attachment B, was provided by interpretation and classification of bore log records associated with the installation of shallow groundwater monitoring bores (Biodiverse Solutions 2018).

The resulting mapping of land units within the subject land is shown overleaf in Figure 6, with descriptions of each land unit (soil-landform type) provided in subsequent Tables 2 and 3.

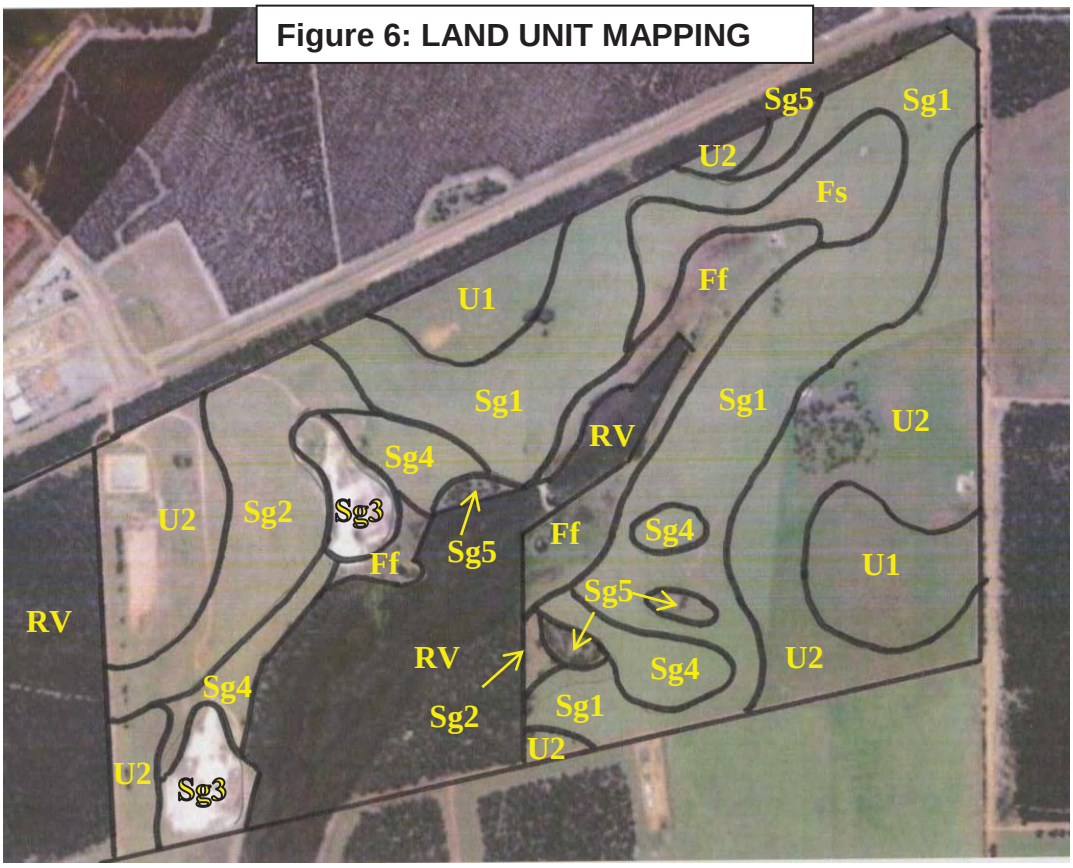
2.3 Vegetation

The original native vegetation is a Marri-jarrah forest, swamp yate-paperbark-sheoak woodland and heath within areas of the Redmond soil-landscape system, and a Jarrah-marri-sheoak woodland and mallee-heath within areas of the King soil-landscape system.

The western portion of the property, covering approximately 52 ha remains under remnant vegetation and a further 22 ha occurs within the currently leased 140 ha central to eastern portion. Much of the latter 22 ha vegetated area is associated with the lower portions of the minor valley (unit S7f in Figure 5) and is a Conservation Class wetland (cited in GHD 2018).

The presence of a Conservation Class wetland, coupled with location of Lot 5780 within the Marbellup Brook Catchment (a public drinking water source area – see Section 2.4) suggest that approval for any further clearing of vegetation to facilitate agriculture would be unlikely.

Figure 6: LAND UNIT MAPPING



Note: Image above excludes the far western portion of the property which remains under remnant vegetation and has not been mapped into land units.

Table 2: ABBREVIATED LEGEND AND AREAS

Land Unit	Simplified Description (see also Table 3 overleaf)	Area (ha)	Approx % of mapped	% of Lot
	Upland lateritic terrain			
U1	Duplex sandy gravels	11	8	6
U2	Sandy duplex soils (with gravel) and shallow gravel	32	23	17
	Side-slopes of valley			
Sg1	Sandy duplex soil or pale shallow sand; gravel at > 30 cm.	34	24	18
Sg2	Sandy duplex soil or pale shallow sand; gravel at < 30 cm.	10	7	5
Sg3	Disturbed areas; shallow sandy duplex or pale shallow sand	6	4	3
Sg4	Pale deep sands	8	6	4
Sg5	Shallow gravel and surface laterite	3	2	2
	Floor of valley			
Fs	Pale deep sands	6	4	3
Ff	Semi-wet soils	8	6	4
3RV	**Remnant Vegetation**			
	- within mapped area	22	16	11
	- within remaining unmapped western portion	52	-	27
	TOTAL	192	100	100

TABLE 3. LAND UNIT DESCRIPTIONS

Upland lateritic terrain of broad crests and adjacent slopes with less than 5% gradient. (U) – equivalent to DMc; Dempster crest phase.	
U1	Moderately well drained duplex sandy gravels (with brown gravelly loamy sand to sandy loam topsoil).
U2	Moderately well to well drained grey deep sandy duplex soils (with gravel above clay layer) and less commonly shallow gravel or gravelly pale deep sands; minor surface laterite.
Side-slopes of concave valley associated with the un-named tributary of Marbelup Brook (S) - equivalent to S7h; Minor valley – slope phase.	
Sg	Slopes with predominantly gentle gradients (5 -10%) and; Sg1 well drained, grey deep sandy duplex soil (with gravel) or pale shallow sand (over gravel). Gravel layer at more than 30 cm depth. Sg2 moderately well drained, grey deep sandy duplex soil (with gravel) or pale shallow sand (over gravel). Gravel layer at less than 30 cm). Sg3 moderately well drained, grey shallow sandy duplex soil or pale shallow sand (over gravel) within disturbed / rehabilitated areas). Sg4 rapidly drained, pale deep sands. Sg5 well drained shallow gravel and scattered areas of surface laterite.
Floor of valley associated with the un-named tributary of Marbelup Brook (F) - equivalent to S7f; Minor valley – floor phase.	
Fs	Footslopes with very gentle gradients (1 – 3 %) and well drained, pale deep sand.
Ff	Flat terrain within valley headwater area or margins of lower-lying remnant vegetation encompassing the tributary stream, with imperfect to poorly drained semi wet soils (sands or humic sands).
Remnant Vegetation (RV) – occurring within the wettest portions of the valley floor and also uncleared portions of upland terrain and valley side-slopes within the western portion of Lot 5780 Downs Road – soils not mapped or assessed for agricultural capability as part of this study.	

2.4 Water Resources

2.4.1 Water for Agricultural Activity On-site

The site location figure within Attachment A shows the location of a number of small dams or soaks within Lot 5780. Most of these are associated with the un-named watercourse traversing the property, and are used for stock watering apart from the dam closest to Down West Road within the area leased to Plantation Energy Australia Pty Ltd for the purpose of maintaining a drainage detention basin.

Whilst sufficient to support the watering of up to 80 head of cattle, the existing dams within Lot 5780 are of insufficient size to provide a potential source of water for the irrigation of horticultural crops. Furthermore GHD (2018) report that groundwater salinity in the local area is in the range of 500 – 1000 mg/L which is considered to be marginal for productive uses.

2.4.2 Catchment Perspective

The central to eastern portion of Lot 5780 encompasses an un-named watercourse, a tributary of Marbellup Brook which ultimately drains to Lake Powell and forms part of the wider Torbay Inlet Catchment. Both the Lake Powell and Torbay Inlet wetlands are nutrient enriched due to a range of factors including the leaching of nutrients from pale sands in areas of the catchment used for extensive agriculture (grazing). These wetlands are the subject of a restoration plan termed '*Watershed Torbay'* (Department of Water 2006).

As shown in Figure 4, Lot 5780 is also located within a Priority 2 (P2) public drinking water sources special control area within the Marbellup Brook Catchment Area (DoPLH, 2014). This public drinking water source area (PDWSA) is not currently used but has been identified as a potential future water source option in the *Great Southern Regional Water Supply Strategy 2014* (DoW, 2014).

In the context of the agricultural capability of Lot 5780, the *Marbellup Brook Catchment Area Drinking Water Source Protection Plan* (DoW, 2007) notes that low density grazing already covers a large portion of the catchment and there are several existing horticulture enterprises. The Plan recommends that any future expansion or intensification of horticultural operations be assessed by the Department of Water and is unlikely to be supported unless it can be demonstrated that the risk to water quality is reduced. Accordingly, in relation to water protection objectives, within the P2 areas perennial forms of horticulture (such as orchards and vineyards) are designated 'Compatible with conditions' and annual forms of horticulture (such as market gardens) are designated 'Incompatible'.

3.0 AGRICULTURAL CAPABILITY

3.1 Overview-Agriculture within Albany

The City of Albany's Draft Local Planning Strategy (CoA 2019) reports;

- The Great Southern is the second largest food producing region in the State with the main commodities being grain and livestock, although horticulture and viticulture are emerging as significant contributors.

- Within the City of Albany agriculture is the third largest industry when measured in value added terms. Approximately 55% of the total value of agricultural production is derived from either broad acre crops or horticulture with the remaining 45% being derived from livestock or livestock products.

- Under LPS1 all farm related land uses are permissible or discretionary in both the 'General Agriculture' and 'Priority Agriculture' zones.

- With its relatively cooler temperate climate, the Albany hinterland area is considered to have strong potential for agricultural expansion.

- The Department of Primary Industries and Regional Development have undertaken an investigation into potential locations for horticulture development in the Lower Great Southern, with priority areas for irrigated agriculture precincts within or near the City of Albany being identified at Manypeaks, and Redmond/Narrikup (i.e. not affecting the subject land).

3.2 Capability Assessment Methodology and Determining PAL

'Land capability' is a term used to express the ability of land to support a proposed use with minimal risk of degradation to its soil and water resources. A general methodology for capability assessment has been developed by the (now) Department of Primary Industries and Regional Development (Wells and King 1989, and more recently by van Gool et al 2005) and forms the basis for the land use evaluations in both this report and the earlier DPIRD input to the *Lower Great Southern Strategy* (WAPC 2016).

Specific land use rating tables are used to compare soil and landform qualities of relatively homogeneous mapped areas (mapping units) against the optimal desired requirements of that form of land use. Using data from the best available soil-landscape or land unit mapping, factors considered in the rating tables include rooting depth, soil water storage and drainage, and risks associated with nutrient export, erosion and waterlogging. Based on the 'degree of fit', mapping units are assigned a capability class ranging from 'very high' capability (class one) to 'very low' capability (class five).

The capability classes are described in Table 4. At a specific property level, land unit mapping (such as that shown in Figure 6) delineates sufficiently homogeneous areas to allow the assessment to be expressed in terms of the simple five class system.

Table 4: LAND CAPABILITY CLASSES

Capability class	General description
1 Very high	Very few physical limitations present and easily overcome. Risk of land degradation is negligible.
2 High	Minor physical limitations affecting either productive land use and/or risk of degradation. Limitations overcome by careful planning.
3 Fair	Moderate physical limitations significantly affecting productive land use and/or risk of degradation. Careful planning and conservation measures required.
4 Low	High degree of physical limitation not easily overcome by standard development techniques and/or resulting in high risk of degradation. Extensive conservation measures required.
5 Very low	Severe limitations. Use is usually prohibitive in terms of development costs or the associated risk of degradation.

The simple five class system works well for expressing land capability when the field survey work is intensive and detailed land units can be mapped. However, there is inevitably a greater degree of variability of landform and soil conditions within broad-scale soil-landscape mapping units such as those used for the Department's inputs to the *Lower Great Southern Strategy* (WAPC 2016). For agricultural capability assessments based on broad-scale mapping, the concept of 'proportional capability codes' is used (Table 5).

Table 5: PROPORTIONAL CAPABILITY CODES

Category A land: Generally high capability	
A1	>70% of the area has high capability (is Class 1 or 2)
A2	50-70% of the area has high capability (is Class 1 or 2)
Category B land: Generally fair or moderate capability	
B1	>70% of the area has moderate to high capability (is Class 1, 2 or 3)
B2	50-70% of the area has moderate to high capability (is Class 1, 2 or 3)
Category C land: Generally low capability	
C1	50-70% of the area has low capability (is Class 4 or 5)
C2	>70% of the area has low capability(is Class 4 or 5)

Instead of assigning a single specific (high, moderate or low) capability rating to all areas of a particular broad-scale map unit, the proportional capability codes are used

to more conservatively express the capability as a range (e.g. 50-70%) of the total area expected to contain land of a certain capability rating.

For priority agricultural land (PAL), DPIRD identified areas of agricultural land considered to be of 'State and Regional' significance as part of its input to the Lower Great Southern Strategy (WAPC 2016). These areas extend into Lot 5780 as shown in Figure 2 where they correspond to the broad-scale soil-landscape mapping units (Re) DMc and (Kg) S7h.

Based on consideration of other locally determined factors, these areas of PAL have been extended to include agricultural land considered to be of 'Local' significance and are reflected as the 'Priority Agriculture' zone within the Local Planning Scheme (DoPLH, 2014).

3.3 Broad-scale Assessment

DPIRD's agricultural land use capability interpretations for the broad-scale map units shown earlier in Figure 5 are summarised in Table 6.

Table 6: BROAD-SCALE AGRICULTURAL CAPABILITY ASSESSMENT

Soil-Landscape Map Unit	Area within Lot 5780	Perennial Horticulture	Annual Horticulture	Grazing	Dryland Cropping
DMc Dempster – crest phase*	85.6 ha (44.5 %)	B1	B1	B2	B2
S7h Minor valley - slope phase	78.6 ha (40.9%)	A2	B1	B1	B1
S7f Minor valley - floor phase	28.1 ha (14.6 %)	C1	B2	B2	C1

* Capability codes are the same for occurrence of DMc within both Kg and Re systems

Codes
A1 = >70% of land has high capability; A2 = 50-70% high capability;
B1 = >70% moderate to high capability; B2 = 50-70% moderate to high capability;
C1 = 50-70% low capability; and C2 = >70% low capability land.

Source for Table 6 and Figures 7a and 7b-: Shared Land Information Platform (SLIP) http://spatial.agric.wa.gov.au/slip based on interpretations by DPIRD (land unit database) current from 12 March 2018.

Figures 7a and 7b illustrate the agricultural capability for two of these agricultural land uses, grazing and perennial horticulture. Dryland cropping and annual horticulture are not considered further in this report for the cleared portions of Lot 5780. This is because cropping is restricted to much larger areas due to economies of scale, and annual horticulture (e.g. vegetable growing) is not permitted within the proclaimed Marbellup Brook Public Drinking Water Supply Area (refer section 2.4.2).

FIGURE 7. BROAD-SCALE AGRICULTURAL CAPABILITY ASSESSMENTS

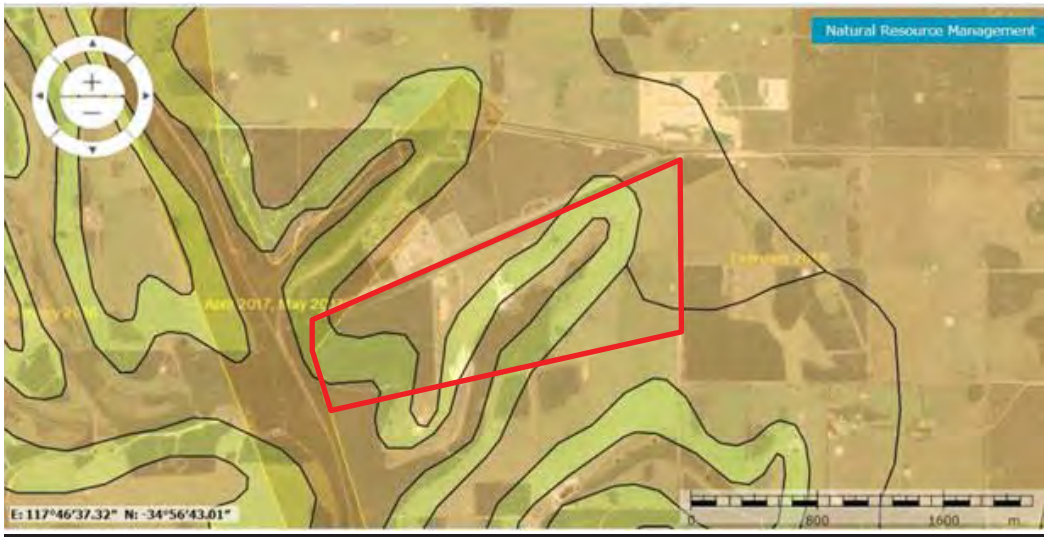


FIGURE 7a. LAND CAPABILITY FOR GRAZING

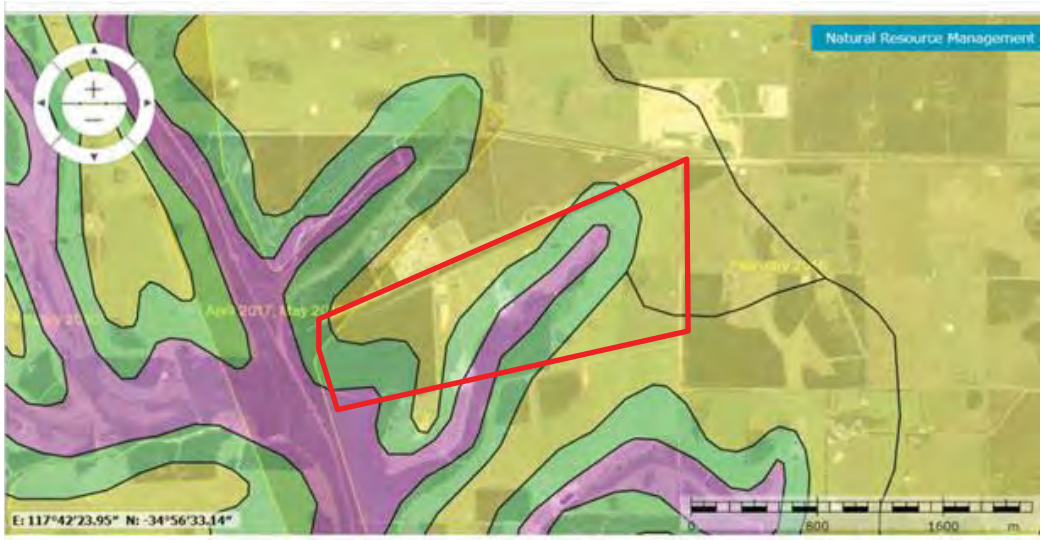


FIGURE 7b. LAND CAPABILITY FOR PERENNIAL HORTICULTURE*

***(*Note** Horticultural capability ratings are based on consideration of landform and soil factors only. Availability of water supply for irrigation needs to be considered separately. DPIRD also provide a generally more favourable assessment for viticulture, which is a form of perennial horticulture).*

3.4 Site-Specific Assessment

This consultant's agricultural land use capability interpretations for the more detailed land unit mapping shown earlier in Figure 6, and based on site-specific data (Attachment A), are summarised in Table 7.

TABLE 7. SITE-SPECIFIC AGRICULTURAL CAPABILITY RATINGS

Land Unit	Area in Lot 5780	Grazing	Perennial Horticulture	Comments
U1	11 ha (6 %)	Fair - High	Fair	Relatively good nutrient rertention ability within topsoil and generally not subject to erosion, but limited rooting depth and possible susceptibility to waterlogging where lateritic layer and underlying clay are more competent.
U2	32 ha (17 %)	Fair	Fair	More variable than U1 and grey sandy topsoils generally less retentive of nutrients.
Sg1	34 ha (18 %)	Fair	Fair - High	Minor areas subject to gully erosion. Grey sandy topsoils generally low ability to retain moisture and nutrients.Better rooting depth and less susceptible to waterlogging than upland areras.
Sg2	10 ha (5 %)	Fair	Fair	Similar to Sg1 but lesser rooting depth.
Sg3	6 ha (3 %)	Low	Low	Most of these areas have been subject to sand extraction and limited land rehabilitation. Limited rooting depth and sandy topsoils have low ability to retain moisture and nutrients.
Sg4	8 ha (4 %)	Fair	Fair	Minor areas subject to gully erosion and potential wind erosion if depleted of vegetative cover. Sands have good rooting depth, and are not susceptible to waterlogging but a poor ability to retain nutrients and moisture.
Sg5	3 ha (2 %)	Low	Low	Limited rooting depth and difficult for cultivation. Scattered tree cover over parts.
Fs	6 ha (3 %)	Fair	Fair - High	Lesser gradient and closer to watertable than Sg4. Sands have poor ability to retain nutrients and moisture.
Ff	8 ha (4 %)	Fair - High	Low	Winter-wet flats are susceptible to subsoil waterlogging but provide good seasonal (summer) pasture for grazing livestock. Horticultural activity likely to require drainage and sandy subsoils present a high risk of nutrient export to the nearby tributary of Marbelup Brook.
RV	74 ha (38 %)	Not Assessed	Not Assessed	Encompasses areas within valley floor as well as side-slopes and upland terrain, but unlikely to obtain approval for land clearing and therefore not relevant in terms of agricultural potential or capability.

Figures 8a and 8b illustrate the agricultural capability for grazing and perennial horticulture based on the site-specific land unit mapping.

Figure 8: SITE-SPECIFIC AGRICULTURAL CAPABILITY ASSESSMENTS

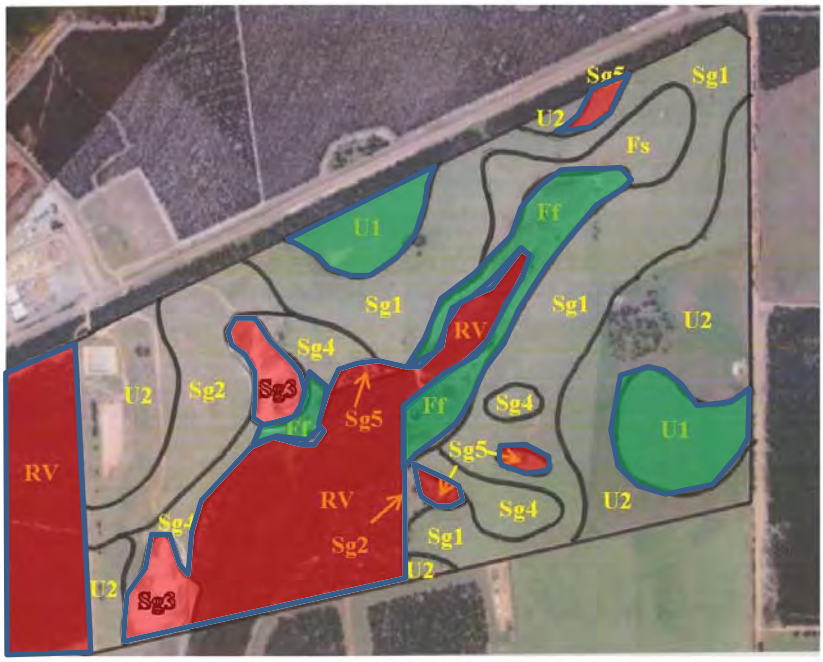


Figure 8a: LAND CAPABILITY FOR GRAZING

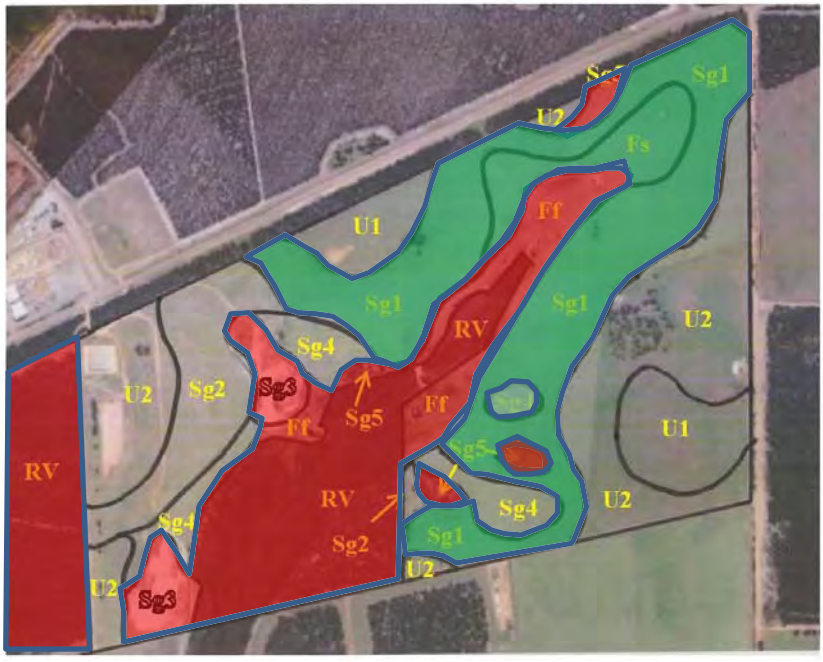


Figure 8b: LAND CAPABILITY FOR PERENNIAL HORTICULTURE*

Red = Low capability **Green** = Fair to High capability **Remainder** = Fair capability

(*Note** Horticultural capability ratings are based on consideration of landform and soil factors only. Availability of water supply for irrigation needs to be considered separately. Water resource information (section 2.4) indicates conditions for a suitable water supply to support commercial scale irrigation are unfavourable**).

3.5 Comparison of Broad-scale and Site-specific Assessments

In order to consider the relative uniqueness or otherwise of Lot 5780 in terms of its agricultural capability, Table 8 presents a comparison of the assessment based on the site-specific land unit mapping, with that based on the broad-scale soil-landscape mapping which extends over all rural areas of the City of Albany.

To provide a common base for comparison, the assessment results from both studies (Tables 6 and 7) have been simplified into three code categories, A, B and C.

- Category A land (grouping A1 and A2 proportional capability codes from Table 5) represents land of generally 'high' capability, and includes the 'fair to high' rating in Table 7 from the site-specific study.

- Category B land (grouping B1 and B2 proportional capability codes from Table 5) represents land of generally 'fair or moderate' capability, and includes the 'fair' rating in Table 7 from the site-specific study.

- Category C land (grouping C1 and C2 proportional capability codes from Table 5) represents land of generally 'low' capability, and includes the 'low' and 'not assessed' ratings in Table 7 from the site-specific study.

TABLE 8: AGRICULTURAL CAPABILITY COMPARISON (Broad-scale vs Site-Specific)

CAPABILITY CODE GROUP	AGRICULTURAL CAPABILITY RATING* for;			
	GRAZING		PERENNIAL HORTICULTURE	
	Broad-scale Assessment	Site-specific Assessment	Broad-scale Assessment	Site-specific Assessment
Category A land: Generally high capability	**Nil**	**10 % (19.2 ha)**	**40.9 % (78.6 ha)**	**21 % (40.4 ha)**
Category B land: Generally fair or moderate capability	**100 % (192.3 ha)**	**47 % (90.4 ha)**	**44.5 % (85.6 ha)**	**32 % (61.5 ha)**
Category C land: Generally low capability	**Nil**	**43 % (82.7ha)**	**14.6 % (28.1 ha)**	**47 % (90.4 ha)**

***** Capability assessment focuses on soil and landform conditions and does not directly consider water availability, conservation value of any area, and required set-backs from water bodies.

It should be noted that for the site-specific study, areas of remnant vegetation (RV) were designated as 'not assessed' in terms of their agricultural capability. This is because regardless of the underlying soil and landform conditions, regulatory approval for clearing it is highly unlikely to be granted and hence these areas are effectively not capable of being used for agricultural production.

For the capability assessment based on the broad-scale soil-landscape mapping, areas of remnant vegetation were not separated out (see Figures 7a and 7b). This is because for the purpose of a broad-scale comparison of Lot 5780 with all other areas of the 'Priority Agriculture' zone within the City of Albany it is not practical to take vegetation cover into consideration.

In relation to Grazing

The earlier agricultural capability assessment based on broad-scale mapping indicates all of the land is of Category B 'fair' capability for grazing.

The site-specific study shows however that while the total property contains about 10 % Category A 'high' capability land for this form of agriculture, the remainder is comprised of roughly equal portions of land with Category B 'fair' or Category C 'low' capability, with the latter being significantly constrained for grazing, primarily due to remnant vegetation

In relation to Perennial Horticulture

The earlier agricultural capability assessment based on broad-scale mapping indicates about 40% of Lot 5780 is Category A 'high' capability and about 45 % is Category B 'fair' capability land for perennial horticulture.

Setting aside the question of a water supply for irrigation, the site-specific study shows Lot 5780 contains a lesser amount, about 20 %, of Category A 'high' capability land and roughly 30 % Category B 'fair' capability land for this form of intensive agriculture. The remaining roughly 50% of Lot 5780 is Category C 'low' capability land and is significantly constrained for horticulture (including viticulture). This is not only due to the extent of remnant vegetation but also the poor ability of grey sandy soils within lower parts of the landscape to retain nutrients against losses to drainage (and hence ultimately into Marbellup Brook).

4.0 CONCLUSIONS

In accordance with State Planning Policy 2.5, the Priority Agriculture zoning extending over Lot 5780 designates land comnsidered to be of State, regional or local significance for food production purposes due to its comparative advantage in terms of soils, climate, water (rain or irrigation) and access to services.

Following on from DPIRD's recommendation for an independent site-specific agricultural capability evaluation of Lot 5780 in the context of its proposed rezoning to "Special Use" to facilitate the proposed Albany Motorsport Park, the following points address the uniquness (or otherwise) of the land;

- The soil and landform conditions within Lot 5780 are generally consistent with the range and variations described by the earlier, broad-scale CSIRO mapping, apart from a greater proportion of pale sands on the valley sideslopes.

- Within the existing cleared portions of the property the capability of the land to support grazing is predominantly 'fair' and consistent with the earlier assessment by DPIRD based on its broad-scale soil-landscape mapping.

- Within the existing cleared portions of the property the capability of the land to support perennial horticulture (including viticulture) is a mix of 'fair', 'fair - high' and some 'low' capability land. Whilst generally consistent with the earlier assessment by DPIRD there is a greater percentage of low capability due to the poor ability of pale sands within lower parts of the landscape to retain nutrients against losses to drainage.

- The extent of remnant vegetation (approximately 38 % of Lot 5780) is a significant constraint to the agricultural capability of the total property.

- As shown in Figures 3 and 4, Lot 5780 occurs near the southern edge of the most extensive portion of Priority Agriculture zoned land, and is within an industrial buffer zone. It is also within a public drinking water supply area (Marbellup Catchment PWDSA) where there are land use restrictions on horticultural activity.

- The City's Draft Local Planning Strategy (CoA 2019?) indicates the intent for Priority Agriculture land is to protect better quality rural land for potential agricultural diversification, particiularly for intensive agriculture where a suitable supply of water is available. GHD (2018) report however that groundwater salinity in the local area is in the range of 500 – 1000 mg/L which is considered to be marginal for productive uses.

- Lot 5780 is 192.4 ha in area and this represents just 0.23 % of the total Priority Agriculture zoned land within the City of Albany.

- The lateritic uplands and minor valley sideslopes (DMc and S7h broad-scale map units) encompassed within Lot 5780 occur widely throughout the rural areas of the City of Albany and together cover 28,229 ha (or 33.7 %) of its Priority Agriculture zone.

In terms of the nature of its soils and landforms, and hence its agricultural capability, Lot 5780 is therefore not unique, and its potential removal from the City's Priority Agriculture zone is considered to have no significant effect on the agricultural land protection objectives under State Planning Policy 2.5 (WAPC 2016) or the City of Albany's Local Planning Scheme (DoPLH 2014).

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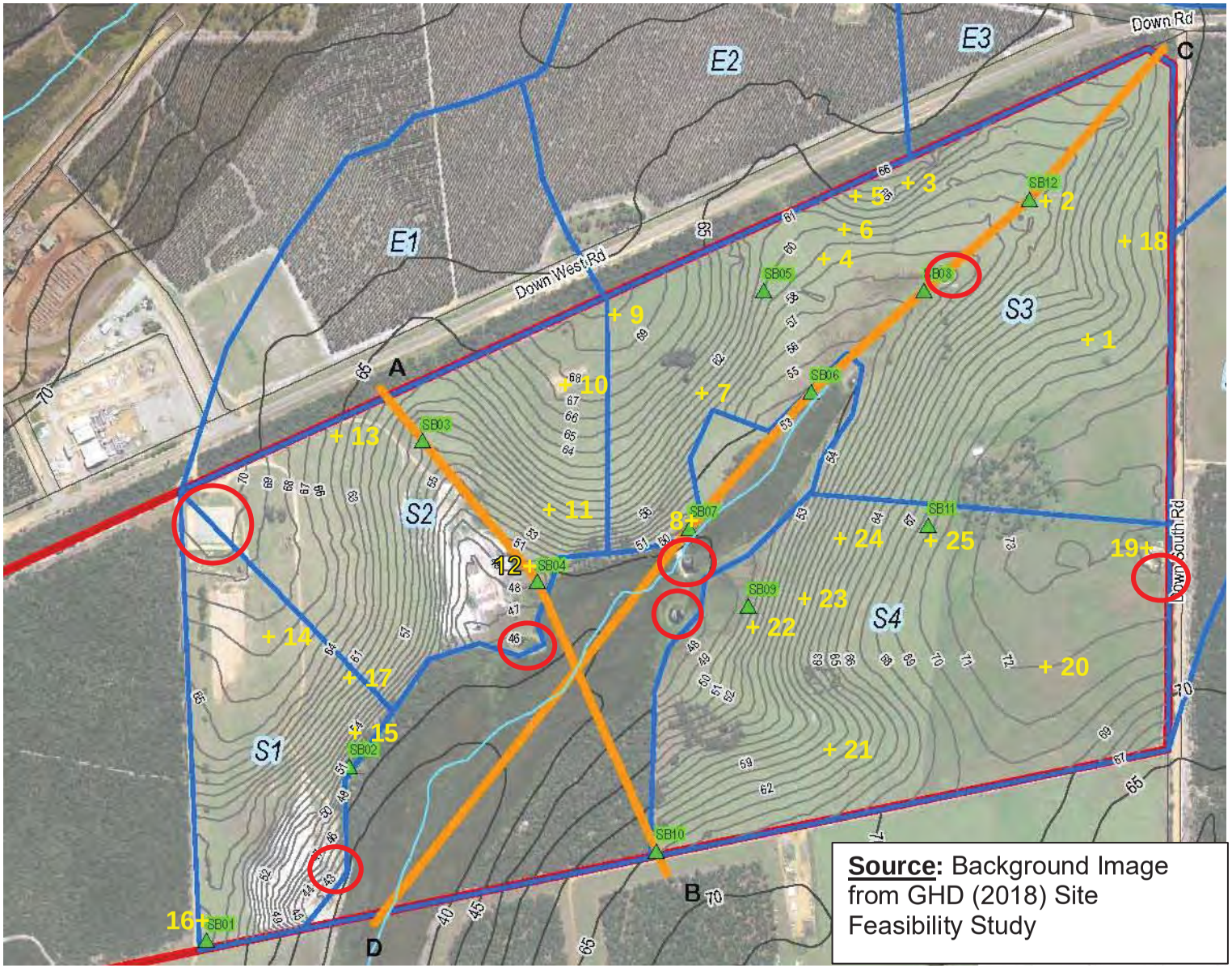
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Western Australian Planning Commission (2016) *Rural Planning* State Planning Policy 2.5

ATTACHMENT A

Site location figure, results summary and representative photographs

SITE LOCATION FIGURE



Source: Background Image from GHD (2018) Site Feasibility Study

Dam or Soak

Internal Catchment Boundary (See GHD 2018 Site Feasibility Study)

Cross section (See GHD 2018 Site Feasibility Study)

+ 20 **Land Assessment Site** (This Study)

+ SB10 **BioDiverse Solutions Site** (See GHD 2018 Site Feasibility Study)

675

REPORT ITEM DIS 164 REFERS

SITE RESULTS SUMMARY

LA Site	BDS Site	Broadscale mapping	Site Drainage status	Landform	WA Soil Group*	Land unit
1		ReDMc	Well	Gentle mid slope 5 - 7%	Grey deep sandy duplex (with gravel above texture contrast/ clay layer) OR Pale shallow sand (over lateritic gravel at 50 cm).	Sg1
2	SB12	KgS7h	Well	Very gently sloping drainage headwater 2%	Pale deep sand (over lateritic gravel at 180 cm)	Fs
3		ReDMc	Well	Upper slope 8 - 10 %	Shallow (brown) gravel and scattered areas of Bare rock	Sg5
4		KgS7h	Well - Rapid	Gentle lower slope 3 %	Pale deep sand	Fs
5		KgS7h	Well	Gentle crest 0 - 4 %	Shallow (brown) gravel and scattered areas of Bare rock	U2
6		KgS7h	Well	Gentle mid slope 8%	Pale shallow sand (over lateritic gravel at 65-90 cm).	Sg1
7		KgS7h	Well	Gentle mid slope 9%	Grey deep sandy duplex (with gravel above texture contrast/ clay layer) OR Pale shallow sand (over lateritic gravel at 45 cm).	Sg1
8	SB7	KgS7f	Imperfect to poor	Margin of drainage area	Semi wet soil (pale deep sand with watertable at 64 cm – Feb 27 2018 - refer Attachment C).	Ff
9		ReDMc	Moderately well	Crest 0 - 2 % gradient	Duplex sandy gravel (brownish loamy sand to sandy loam gravelly topsoil above laterite at 20 cm and then clay at greater depth).	U1
10		ReDMc	Moderately well	Upper slope 4-5%	Duplex sandy gravel (as above, with laterite at 40 cm)*.	U1
11		KgS7h	Well - Rapid	Gentle mid slope 5%	Pale deep sand	Sg4
12	SB4	KgS7f	Imperfect	Lower slope 2 - 3%, Margin of drainage area	Semi wet soil (pale deep sand - no watertable within 2 m but slightly moist beyond 1 m – Feb 27 2018- refer Attachment C).	Ff
13		ReDMc	Moderately well	Gentle mid to upper slope 6%	Grey deep sandy duplex (with gravel above texture contrast / clay layer) OR Pale shallow sand (over lateritic gravel at 25cm).	Sg2
14		ReDMc	Moderately well	Broad crest 0 - 2 %	Grey deep sandy duplex (with lateritic gravel at 18 cm above clay at greater depth).	U2
15	SB2	KgS7h	Well - Rapid	Gentle to mod slope 10% at edge of valley.	Pale deep sand - no watertable within 2m – Feb 27 2018 - refer Attachment C	Sg4
16	SB1	ReDMc	Moderately well	Gently undulating crest 0 - 3 %.	Gravelly pale deep sand (gravel layer at 30 cm, over laterite then more gravel until clay at 150 cm - refer Attachment C).	U2
17		KgS7h	Moderately well	Gentle mid slope 7%	Grey deep sandy duplex (with gravel above texture contrast / clay layer) OR Pale shallow sand (over lateritic gravel at 15cm).	Sg2
18		ReDMc	Well	Very gentle upper slope 2% gradient.	Shallow (brown) gravel	U2

LA Site	BDS Site	Broadscale mapping	Site Drainage status	Landform	WA Soil Group*	Land unit
19		ReDMc	Moderately well	Broad crest 0 - 2 %.	Grey deep sandy duplex (with lateritic gravel layer at 20 cm above clay at greater depth).	U2
20		KgDMc	Moderately well	Broad crest 0 - 2 %.	Duplex sandy gravel (as for sites 9 and 10 above, with laterite at 20 cm).	U1
21		KgDMc	Well - Rapid	Gentle mid slope 4 - 5%	Pale deep sand	Sg4
22	SB9	KgS7h	Well	Gentle lower slope 4 - 5% at edge of valley floor	Semi wet soil OR Pale shallow sand (over lateritic gravel at 70 cm). Watertable at 66 cm – Feb 27 2018 -. refer Attachment C)	Sg1/Ff
23		KgS7h	Well - Rapid	Gentle mid slope 10%	Pale deep sand	Sg4
24		KgS7h/DMc	Well	Gentle mid slope 10%	Grey deep sandy duplex (with gravel above texture contrast/ clay layer) OR Pale shallow sand (over lateritic gravel at 40 cm).	Sg1
25	SB11	KgDMc	Moderately well	Gentle upper slope 3%	Grey deep sandy duplex (with lateritic gravel at 30 cm above clay at greater depth - refer Attachment C).	U2
	SB3	ReDMc		Gentle lower slope at edge of valley	Deep sandy gravel (light brown to brown) - refer Attachment C	Sg2
	SB5	KgS7h		Gentle midslope	Gravelly pale deep sand (gravel layer at 70 cm, then sand below). - refer Attachment C	Sg1
	SB6	KgS7f		Edge of valley floor	Semi wet soil (grey deep sand) with watertable at 87 cm – Feb 27 2018 - refer Attachment C.	Ff
	SB8	KgS7f/S7h		Valley floor headwater area	Grey sand (Semi wet?) moist, although no watertable within 2 m - Feb 27 2018 - refer Attachment C).	Ff
	SB9	KgS7h		Gentle lower slope	Semi wet soil (grey deep sand with gravel at 60 cm then laterite and watertable at 66 cm – Feb 27 2018 -refer Attachment C).	Ff
	SB10	KgDMc		Very gentle upper slope 2%	Shallow (brown) gravel (over laterite and then cemented siltstone / sandstone)- refer Attachment C.	U2

* WA Soil Groups as per Schoknect and Pathan (2013). Depth of hand auger borings at Land Assessment (LA) sites within the property was often restricted by a lateritic gravel or stone layer, however roadside exposures along Down Road show the gravel / laterite layer (with a sandy or sandy loam matrix) is approximately 30 cm thick and occurs over clay. Soils initially identified as Pale shallow sand (over lateritic gravel) were therefore generally classified as deep grey sandy duplexes unless field test bore logs from the installation of shallow bores (Biodiverse Solutions – BDS sites SB1 – SB12 – refer Attachment C) provided data indicating different (non-clayey) soil conditions below the gravel / laterite layer.

REPORT ITEM DIS 164 REFERS



1 Overview of property, looking westwards from near site 1.



2. Overview of property, looking south east from near site 17.



3. Land unit U1 – looking northwards from site 20.



4. Land unit U2 – looking northwards from near site 14

REPORT ITEM DIS 164 REFERS



5. Land unit Sg1 – view east from near site 1.



6. Land unit Sg2 – view east from near site 7.



7. Land unit Sg3 – view south-east from between sites 13 and 17.



8. Land unit Sg3. - view east over terrain between sites 15 and 16.

REPORT ITEM DIS 164 REFERS



9. Land unit Sg4 – site 21.



10. **Land unit Sg4** – near site 21



11. Land unit Sg5 – west of site 21



12. Land unit Fs – near site 2 and SB12



13. Land unit Ff – near sites 22 and SB9.



14. Land unit Ff – near sites 8 and SB7.



15. Dam within Land unit U2 – site 19



16. Exposed soil profile – edge of dam at site 19 showing subsoil clay beneath laterite boulder layer within upland terrain land unit U2.

REPORT ITEM DIS 164 REFERS



17. Exposed soil profile – roadside cutting along Down Road showing subsoil clay below gravel / laterite layer within upland terrain (U) land units.



18. Grey deep sandy duplex soil (with gravel layer above clay) OR Pale shallow sand over gravel – typical of much of valley sidelsope areas.



19. Pale deep sands – within land units Sg4 and Fs.



20. Dam / soakage area - within land unit Ff near site 8.

REPORT ITEM DIS 164 REFERS

ATTACHMENT B

Field Test Bore Logs

Source: Biodiverse Solutions – Appendix D of Albany Motorsport Park Site Feasibility Study (GHD 2018).

BIO DIVERSE SOLUTIONS

Soil Profile Sampling

Location: Lot 5780 Down Road

Date tested: 27/02/2018

Sampled by: Kathryn Kinnear

Weather: Windy, cool 21 degrees Overcast

Location	Site description	Depth of profile (mm)	Soil Description
SB1	South west corner Open Paddock	0-150 150-300 300-500 500-1200 1200-1500 1500-2000	Dark grey sandy top soil, veg matter. Grey silty sand. Orange, light brown sandy gravel pebbles 10-30mm. Laterite rock . Light brown pebbles 10-30mm, orange sandy silty gravel. Light brown sandy clay, slightly moist. No WT.
SB02	Paddock near creek west side Jarrah/Cas/Marri Forrest adjacent	0-50 50-200 200-800 800-1200 1200-1500 1500-2000 2000-2500	Dark grey sandy top soil, veg matter. Grey sandy silt. Light grey sandy silt, slightly moist. Cream sandy silt, slightly moist Laterite rock. Moist light brown orange sandy silt gravel, pebbles 10-30mm, minor clay. Light grey silty sand. No WT.
SB03	Open paddock North in minor Drainage swale	0-50 50-500 500-1000 1000-1200 1200-1600 1600-1800 1800-2000	Light brown slightly moist silty sand top soil, veg matter. Light brown silty gravel, pebbles 5-10mm. Brown silty gravel pebbles 20-30mm. Dark brown gravelly silt pebbles 20-30mm. Grey silty sand. Light grey moist silty sand. Light brown/orange silty sand, gravel pebbles 10-30mm. No WT.
SB04	Paddock near Creek in Depression area.	0-50 50-200 700-900 900-1300 1300-1500 1500-1800 1800-2000	Dark brown peaty organic matter. Dark grey silty sand slightly moist. Light grey silty sand moist. Laterite rock, moist dark brown gravelly silt (coffee rock) mottled orange. Light brown silty clay wet. Light grey moist clay. White clay not wet. No WT.
SB05	North paddock Area	0-50 50-200 200-700 700-900 900-1500 1500-1800 1800-1900 1900-2000	Slightly moist dark brown peaty sandy silt top soil, veg matter. Dry dark grey silty sand. Dry light grey silty sand. Dry gravelly silty sand orange pebbles. Dry cream quartz gravelly silty sand pebbles 30-50mm. Pink/orange silty sand gravel, cemented compacted gavel pebbles 10-30mm. Moist dark clayey sand. Dry compacted silty gravel orange/pink. No WT.

Location	Site description	Depth of profile (mm)	Soil Description
SB06	Near creek North side In reed beds	0-100 100-400 400-700 700-1800 1800-2000	Dark brown peaty organic matter moist. Dark grey silty sand moist. Grey silty sand moist. Light grey slty sand wet (smell). Wet brown silty sand (smell) WT 870mm BGL
SB07	Near creek Crossing North side	0-200 200-400 400-600 600-1800 1800-2000	Dark brown/black peaty moist. Black/dark grey peaty sand moist. Dark grey silty sand moist. Light brown silty sand smell. Cream wet silty sand smell. WT 640mm BGL
SB08	Mid creek near dam	0-50 50-200 200-500 500-900 900-1200 1200-1400 1400-1800 1800-2000	Slightly moist dark brown peaty silt, veg matter. Dark brown sandy peaty silt moist. Dark grey silty sand moist. Grey slightly moist silty sand. Dark brown cemented silt, coffee rock. Dark grey moist to wet silty sand. Grey silty sand wet. Dark brown silt minor pebbles 10mm. No WT.
SB09	South side of creek	0-50 50-200 200-600 600-700 700-1100 1100-1300 1300-2000	Dark brown peaty organic matter moist. Dark grey silty sand. Grey silty sand. Light brown gravelly silt. Laterite rock. Wet silt pebbles 30-40mm. White moist clayey silt. WT 660mm BGL
SB010	South boundary east of bush line in paddock	0-50 50-300 300-500 500-1200 1200-2000	Brown silty sand organic matter dry. Brown silty sand gravels 40-50mm, boulders 200mm Laterite, dry. Brown/orange silty sandy gravel cemented Laterite. Light brown/orange cemented silt. White mottles sandstone dry. Light brown/orange cemented silt. White mottles sandstone dry. No WT.
SB011	Mid paddock, top of hill eastern side of site	0-50 50-300 300-400 400-1200 1200-1800 1800-2000	Dark brown silty sand dry. Grey silty sand dry. Light brown silty gravel pebble 30-50mm. Light brown cemented silt Laterite. Light brown, mottles pink * white clay dry. Orange mottled red dry clay. No WT.
SB012		0-400 400-1000 1000-1500 1500-1800 1800-2000	Grey sandy silt organic matter dry. Light grey silty sand. Cream silty sand slightly moist. Dark brown sandy silt, slightly moist gravel minor pebbles. Light brown silty clayey slightly moist boulder Laterite gravels 40mm. No WT.

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6136995-3429

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	B Benjamin	C Thompson		J Foley		13/05/2019

Terry Road

Chester Pass Road

Henry Street

Mercer Road

Range Road

Talyuberlup Way

687

R5-R10

R5-R10

R30-R60

R20-R30

R20-R30

R15-R30

Lot 10

Lot 521

LOCAL STRUCTURE PLAN

Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

LEGEND

- Local Structure Plan Boundary
- Integrator Arterial Road
- Neighbourhood Connector Road
- Local Road
- Parks and Recreation
- Public Use - School
- Residential
- Drainage
- Light Industry Precinct A
- Light Industry Precinct B
- Community Purpose Site
- 200m Buffer to Sensitive Uses
- Emergency Access Way

REV	DESCRIPTION	YYMMDD
D	ADD EMERGENCY A. WAY.	171118
C	MINOR MODIFICATIONS	171023
B	MINOR MODIFICATIONS	171022
A	LOCAL STRUCTURE PLAN	171012

DRAWING NUMBER EP 170520 06 | REV D | SCALE 1:7500 SHEET A3

NORTH

0 150 300m

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All areas and dimensions are subject to detail design + survey.

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REPORT ITEM DIS 165 REFERS

Chester Pass Road

Terry Road

Lot 10

Lot 521

Henry Street

Range Road

Mercer Road

Talyuberlup Way

LEGEND

- Local Structure Plan Boundary
- Integrator Arterial Road
- Neighbourhood Connector Road
- Local Road
- Indicative Road / Intersection
- Close Road
- Parks and Recreation - Active
- Parks and Recreation - Passive
- Public Use - School
- Residential (min. R20)
- Drainage
- Waterway/Drain Upgraded to Living Stream
- Light Industry
- General Industry
- Community Purpose Site

LOCAL STRUCTURE PLAN

Lot 10 Chester Pass Road and Lot 521 Mercer Road

Walmsley

REV	DESCRIPTION	YYMMDD
G	BASINS, SCHOOL, POS	190519
F	VARIOUS MODIFICATIONS	190411
E	NOTES AND MODS	180515
D	ADD EMERGENCY A. WAY.	171118
C	MINOR MODIFICATIONS	171023
B	MINOR MODIFICATIONS	171022
A	LOCAL STRUCTURE PLAN	171012

NORTH

DRAWING NUMBER EP 170520 06 REV G

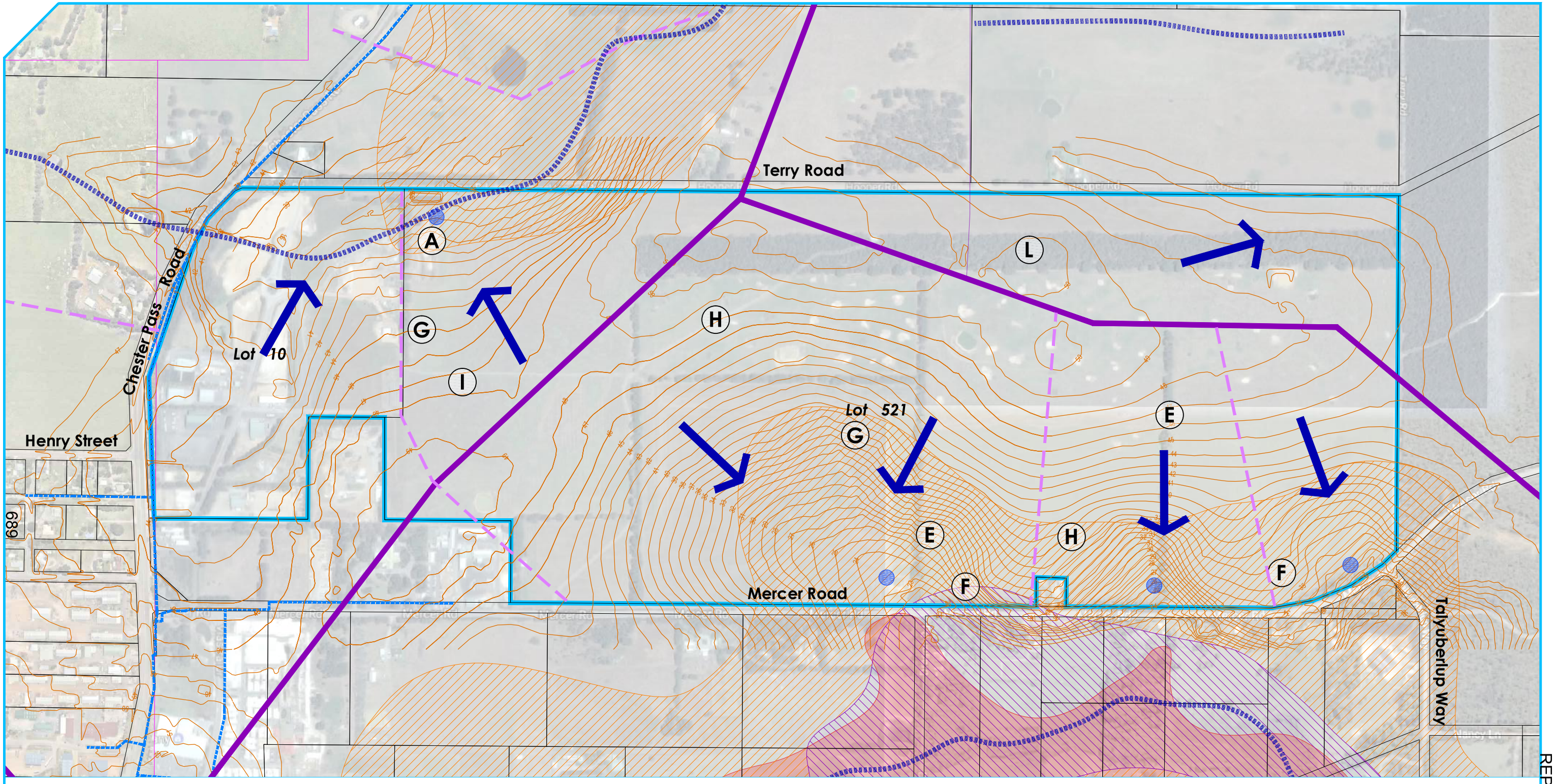
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0 150 300m

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A Undertake enhancement of the seasonal watercourse within the Structure Plan area to create a "living stream". Consider the preferred tenure and management of the seasonable watercourse at the subdivision stage.

B Adopt water sensitive urban design with post development flows to be as close as possible to the pre-development flow.

C Stormwater to be retained on lots for up to the 1 in 1 year, 1 hour ARI event. Support measures including rainwater tanks and soakwells.

D Stormwater run-off from roads to be designed to accommodate the 1 in 5 year ARI event through roadside bioretention swales with overflow in larger flood events directed to detention basins.

E Relevant roads to be designed to accommodate flood routes for a 1 in 100 ARI year event.

F At the detailed design stage, consider utilising stormwater for the irrigation of public open space and street trees.

G All lots to be connected to the reticulated water system.

H All residential lots to be connected to the reticulated sewerage system.

I Where industrial lots are 1 hectare or above, they will serviced with an approved method of effluent disposal.

J Buildings to be raised at least 0.3 metre above the ground level.

K Support an education strategy including the provision of information on Waterwise gardens and water-efficient appliances.

L Native vegetation to be conserved and incorporated into Public Open Space.

LEGEND

- Subject Land
- Contours
- Drainage Path
- Seasonal Water Course / Living Stream
- Indicative Detention Basin
- Catchment Boundary
- Sub-catchment Boundary
- Moderate to High Risk Acid Sulphate Soils within 3m of Natural Soil Surface *(Department of Environmental Regulation 2015)*
- Waterlogging Risk 10-30% (Moderate - Very High Risk) *(Department of Agriculture and Food; Fisheries and Regional Development 2017)*
- Waterlogging Risk 50-70% (Moderate - Very High Risk) *(Department of Agriculture and Food; Fisheries and Regional Development 2017)*

LOCAL WATER MANAGEMENT STRATEGY
Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

SCALE 1:7500
SHEET A3

NORTH 0 150 300m

REV	DESCRIPTION	YYMMDD
B	ADD F, MOD TO NOTE L	171118
A	LWMS	171006

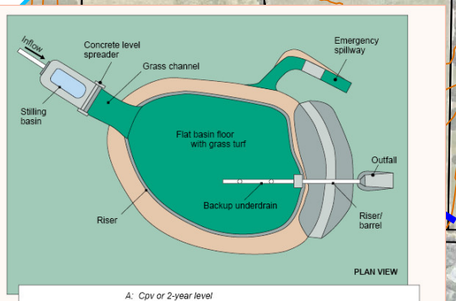
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REPORT ITEM DIS 165 REFERS



Typical Treatment/Storage Basin

Catchment Boundary
Sub-catchment Boundary
Sub-catchment Boundary
Terry Road
Sub-catchment Boundary
Catchment Boundary
Basin 5
Catchment 5 24.9ha
CHESTER PASS ROAD
Basin 1
Catchment 1 20.4ha
Lot 10
Existing 29.2ha
Catchment Boundary
Catchment 2 67.3ha
Lot 521
Sub-catchment Boundary
Catchment 3 21.4ha
Catchment 4 14.5ha
Henry Street
Basins 2A, 2B, 2C, 2D
Basin 3
Basin 4
Mercer Road
Proportional Contribution to downstream storage/treatment
All treatment zones & basins to have highflow bypasses
Talyuberlup Road
downstream erosion mitigation needed

Design Data

Basins	Catchment Area (ha)	Volume (20% AEP) (m3)	TWL Area (m2)	Site Area (m2)	2% Treatment Area (m2)
Basin 1	49.6	3808	4400	5720	6944
Basin 2 (A+B+C+D)	67.3	3900	4900	6370	6999
Basin 3	21.4	1192	2000	2600	2226
Basin 4	14.5	800	1500	1950	1508
Basin 5	24.9	1476	3937	5118	2590

Runoff Co-efficients	
Pre	0.15
Post	0.52

STORMWATER MANAGEMENT STRATEGY

REV B

SITE PLAN
Lot 10 Chester Pass Road
and Lot 521 Mercer Road
Walmsley

WOOD & GRIEVE ENGINEERS
NOW PART OF
Stantec

Legend
Existing Basins
Proposed Basins
Proposed Living Stream
Major Flows (1% AEP)
67.3ha
Catchment Areas

SCALE 1:10,000
SHEET A3
0 200 400m

REV	DESCRIPTION	YYMMDD	DRAWN	APPRVD
A	CONTEXT PLAN	090403	SJ	ST

DRAWING NUMBER EP 170520 09 REV A

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Ardess-Walmsley Local Structure Plan



Prepared by Edge Planning & Property for Ardess 1607 Pty Ltd and Ten Year Developments Pty Ltd

www.edgeplanning.com.au

January 2018

City of Albany Local Structure Plan No. 10

ENDORSEMENT PAGE

This Structure Plan is prepared under the provisions of the *City of Albany Local Planning Scheme No. 1*.

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

..... Date

Signed for and on behalf of the Western Australian Planning Commission:

.....

an officer of the Commission duly authorised by the Commission pursuant to section 16 of the *Planning and Development Act 2005* for that purpose, in the presence of:

..... Witness

..... Date

..... Date of Expiry

TABLE OF AMENDMENTS TO LOCAL STRUCTURE PLAN			
Amendment No.	Summary of the Amendment	Amendment type	Date Approved by WAPC

PRE-LODGEMENT CONSULTATION		
Agency	Consultation	Method of consultation
City of Albany	March - December 2017	Meetings, emails and phone calls
Main Roads Western Australia	June, September and November 2017	Meetings, emails and phone calls
Department of Education	June and November 2017	Emails and phone calls
Department of Water and Environmental Regulation	June and November 2017	Emails and phone calls
Department of Planning, Lands and Heritage	June, July and December 2017	Meetings, emails and phone calls

EXECUTIVE SUMMARY

The *Ardess-Walmsley Local Structure Plan* has been prepared to facilitate new urban development, to guide subdivision and development within the Structure Plan area (to be called the 'site'), to coordinate with surrounding development and to support an amendment to the *City of Albany Local Planning Scheme No. 1*. The amendment proposes to facilitate the permissibility of the transport depot use in the Ardess Industrial Estate (Industrial Area IA1).

The site consists of the established Ardess Industrial Estate (Lot 10 Chester Pass Road, Walmsley) and Lot 521 Mercer Road, Walmsley. The site is strategically significant to Albany given its location, size, identification in the *Albany Local Planning Strategy* as Future Urban, opportunities to create jobs, provide housing and connect roads and infrastructure to other development areas.

The Structure Plan proposes:

- significant residential development, an expanded light industrial area (employment land), a primary school and public open space (POS);
- substantial new residential lots, a range of densities, lot sizes and housing;
- retaining valuable native vegetation in the east-west bush corridor as POS along with two additional large areas of POS;
- improved vehicle, pedestrian and cycling connections and permeability through extending the surrounding road and pathway network including the extension of Range Road;
- safe and convenient access for pedestrians, cyclists and motorists; and
- coordinating with existing and proposed development.

The Structure Plan recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form that will create environmentally responsive urban development.

Structure Plan summary table

Item	Data	Structure Plan reference (section number)
Total area covered by the Structure Plan	178.3348 hectares	Part Two, section 1.2.2
Area of each land use:[1] Residential Light Industry Public open space Primary school	 94.24 hectares 58.4648 hectares 21.63 hectares 4 hectares	 Part Two, section 3.3 Part Two, section 3.7 Part Two, section 3.2 Part Two, section 3.6
Estimated lot yield Residential Light Industry Total	 1320 30 lots 1350 lots	 Part Two, section 3.3 Part Two, section 3.7
Estimated number of dwellings	1320 dwellings	Part Two, section 3.3
Estimated residential density	14 dwellings per hectare	Part Two, section 3.3
Estimated population[2]	3300	Part Two, section 3.3
Number of primary schools	1	Part Two, section 3.6
Number of high schools	0	Part Two, section 3.6

Notes: (1) Roads not included in above area calculations. (2) Assumes 2.5 persons per dwelling.

This Structure Plan comprises two parts. Part One is the implementation section, while Part Two is the explanatory section with associated technical appendices.

CONTENTS

PART ONE	IMPLEMENTATION	PAGE
1	Structure Plan area	6
2	Structure Plan content	6
3	Interpretation and Scheme relationship	6
4	Operation	6
5	Land use and subdivision requirements	6
6	Development requirements	7
7	Other requirements	8
Plan 1	Local Structure Plan	After page 8
PART TWO	**EXPLANATORY SECTION**	9
1.0	**Planning background**	9
1.1	Introduction and purpose	9
1.2	Land description	9
1.3	Planning framework	10
2.0	**Site conditions and constraints**	13
2.1	Biodiversity and natural area assets	13
2.2	Landform and soils	14
2.3	Groundwater and surface water	16
2.4	Bushfire hazard	16
2.5	Heritage	17
2.6	Servicing	17
2.7	Context and other land use constraints and opportunities	18
3.0	**Land use and subdivision requirements**	20
3.1	Land use	20
3.2	Public open space	20
3.3	Residential	22
3.4	Movement networks	23
3.5	Water management	25
3.6	Education facilities	26
3.7	Activity centres and employment	26
3.8	Infrastructure coordination, servicing and staging	27
3.9	Developer contributions arrangements	28
3.10	Implementation	28
4.0	**Conclusion**	29
	APPENDICES	
1	Location Plan	
2	Site Plan	
3	Context Plan	
4	Certificates of Title	
5	Existing Zoning Plan	
6	Local Planning Scheme No. 1 Schedule 11 – Area IA1	
7	Albany Local Planning Strategy – Strategic Plan: Urban	
8	Ardess Service Industry Estate Development Plan	
9	Environmental Assessment and Land Capability Report	
10	Albany Greenways	
11	Local Water Management Strategy	
12	Contribution Plan	

ARDESS-WALMSLEY LOCAL STRUCTURE PLAN

PART ONE - IMPLEMENTATION

1. Structure Plan area

This Structure Plan shall apply to Lot 10 Chester Pass Road, Walmsley and Lot 521 Mercer Road, Walmsley being the land contained within the inner edge of the line denoting the Structure Plan boundary on the Structure Plan map (Plan 1).

2. Structure Plan content

This Structure Plan comprises:

a) Part 1 - Implementation section - This section contains the Structure Plan map and statutory planning provisions and requirements.
b) Part 2 – Non-statutory (explanatory) section - This section to be used as a reference guide to interpret and justify the implementation of Part One.
c) Appendices – Technical reports and supporting plans and maps.

3. Interpretation and Scheme relationship

Unless otherwise specified in this part, the words and expressions used in this Structure Plan shall have the respective meanings given to them in the *City of Albany Local Planning Scheme No. 1* (the Scheme) including any amendments gazetted thereto.

The Scheme prevails over the Structure Plan in the case of any inconsistency.

4. Operation

The date the Structure Plan comes into effect is the date the Structure Plan is approved by the Western Australia Planning Commission (WAPC).

5. Land use and subdivision requirements

The Structure Plan map (Plan 1) outlines land use, zones and reserves applicable within the Structure Plan area.

5.1 Land Use Permissibility

Land use permissibility within the Structure Plan area shall be in accordance with the corresponding zone or reserve under the Scheme.

The land uses, zones and reserves designated under the Structure Plan map (Plan 1) are to plan for the co-ordination of future subdivision and development of the Structure Plan area.

The Structure Plan shall be given due regard by the local government when assessing development applications. Once incorporated into the Scheme, the use and development controls of the Structure Plan will have force and effect.

The Structure Plan map (Plan 1) provides designations guiding the preferred locations for future land uses and future key infrastructure including roads. The designations are indicative and will be refined through detailed investigations and design at the time of rezoning, subdivision and/or development as appropriate.

Land within the Structure Plan area that is zoned 'General Agriculture' requires rezoning to 'Future Urban' via an amendment to the Scheme.

It is expected that the expanded light industrial area will be rezoned to 'Light Industry' while the land east of Range Road will be rezoned to 'Future Urban'.

5.2 Residential

Plan 1 identifies residential density codes for the Structure Plan area.

A range of R-Codes will apply to residential areas shown on the Structure Plan. This will provide flexibility, allowing the final R Code to be applied closer to the time when the land will be subdivided.

On average, the Structure Plan area could accommodate approximately 14 dwellings per hectare. There are opportunities to create additional lots subject to market demand.

5.3 Light industry

The main access to the Ardess Industrial Estate is via a single entry road onto Chester Pass Road. Secondary access is permitted between the estate and Terry Road for as-of-right vehicles.

5.4 Public open space

A minimum of 10 per cent public open space (POS) will be provided in residential areas in accordance with WAPC policy. POS is to be provided generally in accordance with Plan 1. The POS will provide a range of opportunities suitable for sporting activities, nature space, playgrounds and other facilities.

There may also be opportunities for joint community/school recreational use of the primary school oval.

5.5 Subdivision

Subdivision of the land shall generally be in accordance with the Structure Plan (Plan 1). approved by the WAPC with any minor variations approved by the WAPC.

The minimum lot size is 1 hectare in the area classified and then zoned as 'Light Industry'.

For land zoned 'General Agriculture', other than the creation of super lots, further subdivision will not be supported prior to rezoning to the 'Future Urban' zone.

5.6 Conditions of subdivision approval

At the time of subdivision the following conditions may be recommended, as applicable, requiring the preparation and/or implementation of the following:

a) Urban Water Management Plan.
b) Bushfire Management Plan.
c) A Local Development Plan to address matters in section 6.2.
d) Revegetation/landscaping plan.
e) Preventing direct vehicular access between lots and Range Road/Terry Road.
f) All residential lots being connected to the reticulated sewerage system.
g) Notification on titles advising that reticulated sewerage is not provided to light industrial lots and setting out that uses need to be 'dry industries'.

6. Development requirements

6.1 General

Development will be controlled by the Scheme and will be guided by the Structure Plan (Plan 1), the *Residential Design Codes* (for residential development), any approved Local Development Plan and any relevant Local Planning Policies.

The proposed predominant land use within the Structure Plan area will be residential development. It is also proposed to further develop and expand the Ardess Industrial Estate as a key employment area.

6.2 Residential development

The orientation and design of buildings should be sympathetic to existing landform.

6.3 Light industrial development

Development in the area classified as 'Light Industry' will be serviced with on-site wastewater disposal. Existing and proposed industries will be 'dry-type' light industrial uses. Development is required to have low wastewater generation and low volume of process water for disposal. Development shall comply with the *State Government Sewerage Policy*.

On-site waste water disposal shall utilise alternative treatment effluent disposal systems unless the applicant can provide advice to the local government that soil conditions are conducive to the operation of septic tanks and leach drains and will not result in unacceptable loss of nutrients to surrounding waterways, or create a risk to public health.

The local government will require stormwater disposal measures to be implemented to ensure that maximum

retention and infiltration occurs on site through the use of individual soakwells, retention basins or other measures as deemed necessary. Oil and grease traps are to be provided within each building site to the satisfaction of the local government to ensure that nutrient export off the site is kept to a minimum.

The landowner shall retain and manage the landscaping strip adjoining the Chester Pass Road boundary of the site.

Industrial uses are required to meet industrial buffer standards (including as relevant risk, noise, dust, emissions and other potential nuisances) and to not create detrimental impact on surrounding land uses.

Development that incorporates restricted access vehicles will be advised that there is no guarantee that restricted access vehicles will be permitted to use Chester Pass Road between Menang Drive and the main roundabout (intersection with Albany Highway, North Road and Hanrahan Road) following the Albany Ring Road being completely constructed and operational to the Port of Albany. Associated development approvals may also contain conditions or advice relating to future limitations of access for restricted access vehicles.

6.4 Local Development Plans

Local Development Plans will be required to support applications for subdivision and development relating to the following:

a) Residential development adjoining Range Road to address access, car parking, built form, possible mixed uses and landscaping.
b) Lots located between Terry Road and the bush corridor to address access, built form, bushfire management and landscaping.
c) Lots adjoining Mercer Road, if there is no service road, to address access, built form and landscaping.
d) Where residential lot sizes are 260m^2 or less.

7. Other requirements

7.1 Developer contributions

The local government will have due regard to a Contribution Plan prepared for the site and area.

7.2 Staging

The Ardess Industrial Estate is long established industrial estate. It is initially proposed to expand the industrial area eastwards to the extension of Range Road.

The Structure Plan proposes a substantial residential area east of Range Road. It is likely that the development will be staged over the next couple of decades. The staging will be flexible and should adapt to competing development fronts and the varying attractivity and cost of subdividing other development.

Lot 521 is zoned 'General Agriculture'. Accordingly, it will need to be rezoned prior to residential subdivision and development proceeding.

Chester Pass Road

Terry Road

Henry Street

669

Lot 10

R5-R10

R5-R10

R30-R60

R20-R30

Lot 521

R15-R30

R20-R30

Mercer Road

Range Road

Talyuberlup Way

Mason Rd

Mason Rd

Google

LOCAL STRUCTURE PLAN

Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

LEGEND

- Local Structure Plan Boundary
- Integrator Arterial Road
- Neighbourhood Connector Road
- Local Road
- Parks and Recreation
- Public Use - School
- Residential
- Drainage
- Light Industry Precinct A
- Light Industry Precinct B
- Community Purpose Site
- 200m Buffer to Sensitive Uses
- Emergency Access Way

REV	DESCRIPTION	YYMMDD
D	ADD EMERGENCY A. WAY.	171118
C	MINOR MODIFICATIONS	171023
B	MINOR MODIFICATIONS	171022
A	LOCAL STRUCTURE PLAN	171012

DRAWING NUMBER EP 170520 06 | REV D | SCALE 1:7500 SHEET A3

NORTH

0 150 300m

Issued for design intent only.
All areas and dimensions are subject to detail design + survey.

edge PLANNING & PROPERTY

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REPORT ITEM DIS 165 REFERS

PART TWO - EXPLANATORY SECTION

1. PLANNING BACKGROUND

1.1 Introduction and purpose

The purpose of the Structure Plan is to:

- create new urban development which is characterised by its setting, range of views and conservation of environmental/landscape character;
- provide a statutory land use plan for the area;
- provide a comprehensive framework for land use to facilitate future subdivision and development;
- facilitate an urban form that provides for housing, light industry, other uses and infrastructure that is responsive to the character of the site and locality;
- provide additional industrial lots and employment opportunities;
- provide for fully serviced residential development, ranging from low to higher density development;
- provide a range of public parkland catering for recreation, and nature activities by the local community;
- provide an integrated water management system that minimises risk to public health and enhances the quality of water flowing to Oyster Harbour; and
- protect, enhance and manage the environmental values of the site including native vegetation and fauna.

In order to proceed to the subdivision and development of the land, it is necessary to prepare a Local Structure Plan in accordance with the *Planning and Development (Local Planning Schemes) Regulations 2015.*

The Structure Plan, provided in Plan 1, shows how the site can be broadly subdivided and developed. The Structure Plan seeks to provide for the orderly and proper planning of the site in terms of land use, servicing and design.

The Structure Plan allocates land uses which are complementary to the surrounding area and within the site. More detailed planning and investigations will occur at the scheme amendment, subdivision and development application stages.

The Structure Plan proposes an extension of the established Ardess Industrial Estate, a significant residential development with a range of residential densities, a primary school and three POS areas.

The proposed light industrial area will require on-site effluent disposal, while the residential area will be developed once reticulated sewerage has been established in the area.

The site is strategically significant to Albany given:

- the *Albany Local Planning Strategy* identifies Lot 10 as 'Industry' and Lot 521 as 'Future Urban', while it is understood the draft *Albany Local Planning Strategy* will show an expanded light industrial area along with a future urban area for the site;
- it is located 5km from the Albany central area, near an activity centre, employment areas and other facilities;
- it is surrounded by existing or planned urban development;
- it is critically important in providing connections to planned urban development and the extension of Range Road;
- it is a large land parcel unlike most land in the adjacent *Yakamia-Lange Structure Plan* area;
- it is an ideal site for residential and employment uses; and
- it is well connected to the State, regional and district road network.

1.2 Land description

1.2.1 Location

The Structure Plan area is located approximately 5 kilometres north of the Albany central area in the locality of Walmsley (see Appendix 1). The site is generally bordered by Chester Pass Road, Terry Road, Reserve 27179 and Mercer Road (Appendix 2). It is well located with

respect to the State and regional road network, providing easy and convenient vehicular access between the site and Albany and other parts of the Great Southern.

The site adjoins and is near various uses as outlined on the Context Plan including a transport depot, City depot and dog pound, industry, commercial, rural and other urban uses (Appendix 3). To the east of Lot 521 is Reserve 27179 which contains remnant vegetation.

From a spatial and geographical perspective, the site provides a logical location for urban development including residential and employment uses.

1.2.2 Area and land use

The site is 178.3348 hectares in area. Lot 10 Chester Pass Road is 25.7335 hectares in area and Lot 521 is 152.6013 hectares in area. This compares with the smaller and more fragmented land ownership to the south of Mercer Road and within the *Yakamia-Lange Structure Plan* area.

The site consists of multiple land uses. Lot 10 Chester Pass Road comprises the Ardess Industrial Estate and cleared land used to keep current and old farm machinery and sand/gravel piles. The industrial area comprises of sheds, office buildings, car parks, an internal road network and cleared areas for future development. Businesses within the industrial area include Albany Freight Lines, Designer Dirt (landscaping supplies) and Ardess Nursery.

The Ardess Industrial Estate is subject to various leases.

Lot 521 Mercer Road encompasses the majority of the site and comprises predominantly cleared rural land used for grazing cattle. There are no dwellings on Lot 521 Mercer Road. There are two small to medium sized sheds (one used to store hay and farm machinery and the other an old shearing shed), a set of cattle yards and a strip of remnant vegetation in the northern part of Lot 521.

A variety of land uses surround the Structure Plan area (refer to Appendix 3).

1.2.3 Legal description and ownership

Copies of the Certificate of Titles are provided in Appendix 4. The Structure Plan consists of two lots which are summarised in Table 1:

Table 1 – Legal Description

Lot	Deposited Plan	Volume	Folio	Area	Ownership
Lot 10 Chester Pass Road, Walmsley	99325	2192	1	25.7335ha	Ardess 1607 Pty Ltd
Lot 521 Mercer Road, Walmsley	76829	2822	563	152.6013ha	Ten Year Developments Pty Ltd

1.3 Planning framework

1.3.1 Zoning and reservations

The *City of Albany Local Planning Scheme No. 1* (LPS1) zones Lot 10 Mercer Road as 'Light Industry' with the land identified as Industrial Area 'IA1'. Site specific controls are set out in Schedule 11 – Industry Area for Area No. IA1. Lot 521 Mercer Road is zoned 'General Agriculture'. The current zoning is shown in Appendix 5, while provisions relating to the Ardess Industrial Estate are outlined in Appendix 6.

1.3.2 Regional and sub-regional structure plan

There are no regional or sub-regional structure plans that apply to the Local Structure Plan area.

1.3.3 Planning strategies

Strategic planning for the area identifies the site in providing housing, employment and facilities to support the district and support employment growth.

The *Albany Local Planning Strategy* (ALPS) sets the vision and long term land use planning direction for the City of Albany. The Strategic Plan: Urban, shown in Appendix 7, classifies the site as 'Industry' and 'Future Urban'.

The site is given a 'Priority 3' designation which is described in ALPS as follows:

> 'Priority 3 areas are logical extensions of the Priority 2 areas locations and/or existing urban areas and include parts of McKail, Gledhow, Warrenup, Walmsley and Big Grove. Priority 3 areas are expected to be rezoned with local structure planning undertaken in the near future. These areas are capable of producing lots within the medium term.'

ALPS sets a number of strategic objectives, principles and actions which include:

- To provide for a range of easily accessible community services and facilities.
- Facilitate a diversity of housing to align with the future population and social needs.
- Facilitate opportunities for local employment and economic growth by providing appropriate locations for establishing and growing business.
- To maintain an adequate supply and range of serviced industrial land in appropriate locations.
- To maintain the sustainable use of existing industrial sites.
- To integrate transport and land use planning in the City.

Page 155 of ALPS in part states 'The ALPS also supports the ongoing development of the existing Milpara and Terry (Hooper) Road Estates' (Ardess Industrial Estate).

The Structure Plan is consistent with the strategic direction set by ALPS.

1.3.4 State and regional strategies and policies

The Structure Plan is consistent with the State and regional planning framework including:

- *State Planning Strategy 2050* – this has a vision of sustained growth and prosperity. Page 20 states 'The vision of sustained growth and prosperity envisages a future where Western Australians enjoy high standards of living, improved public health and an excellent quality of life for present and future generations';
- *State Planning Policy 1 State Planning Framework Policy (Variation No. 2);*
- *State Planning Policy 2 Environment and Natural Resources Policy*;
- *State Planning Policy No. 2.9 Water Resources*;
- *State Planning Policy 3.7 Planning in Bushfire Prone Areas*;
- *State Planning Policy No. 3 Urban Growth and Settlement* – promotes a sustainable settlement pattern, job creation, building on and within existing communities and the cost-effective use of infrastructure;
- *State Planning Policy 4.1 State Industrial Buffer Policy*;
- *Liveable Neighbourhoods* – promotes connected communities and a walkable community (further outlined below);
- *Development Control Policy 2.2 Residential Subdivision* – lots are required to be both suitable and capable of residential development;
- *Development Control Policy 4.1 Industrial Subdivision* – the location and configuration of the site and the development are consistent with DC4.1 including lot design, servicing and the efficient movement of traffic;
- *Guidelines for Planning in Bushfire Prone Areas;*
- *Visual Landscape Planning in Western Australia Manual;*
- *EPA Guidance Statement No 3 Separation Distances Between Industrial and Sensitive Land Uses*;
- *Guidelines for Separation of Agriculture and Residential Land Uses*;

- *Environmental Protection Bulletin 13 Guidance for the use of the Albany Regional Vegetation Survey in Environmental Impact Assessment*;
- *Great Southern Regional Planning and Infrastructure Framework* - identifies Albany as a regional centre. An initiative to support economic development is to 'Make land available to facilitate the establishment of new industries in designated estates or precincts in Albany' (page 9); and
- *Lower Great Southern Strategy 2016*.

Liveable Neighbourhoods is the State Government's key policy for the design and assessment of Structure Plans for new urban development. The Policy sets out a wide number of objectives and planning requirements relating to neighbourhood structure, roads and access, POS, commercial and shopping areas, schools and management of stormwater.

The Structure Plan is consistent with the aims of *Liveable Neighbourhoods* including it:

- facilitates ease of access in particular walking and cycling, through a network of connected streets that are safe, efficient and pleasant;
- fosters a sense of community, place and local identity through the creation of an urban village in a bush setting, bordered by open spaces (bush corridor on Lot 521, Reserve 27179 and proposed POS adjoining Mercer Road);
- supports public transport system, when feasible in Albany, through higher residential densities near Range Road and adjoining employment uses;
- provides a variety of lot sizes and housing types to cater for diverse housing needs at housing densities that support provision of local services;
- conserves and incorporates key environmental areas into designs including native vegetation;
- integrates the design of POS and stormwater management systems; and
- maximises the use of land for housing relevant for the site's context and setting.

1.3.5 Local planning policies

The Council has endorsed a number of Local Planning Policies and various policies are of relevance to future development on the site.

1.3.6 Other approvals and decisions

The existing *Ardess Service Industry Estate Development Plan* is provided in Appendix 8. This plan has largely been implemented through the formation of civil works and associated development of the Ardess Industrial Estate. Following WAPC approval of the Structure Plan, the Development Plan will be rescinded.

The local government has issued various development and associated approvals in the Ardess Industrial Estate.



View from the Ardess Industrial Estate access way towards Chester Pass Road

2. SITE CONDITIONS AND CONSTRAINTS

2.1 Biodiversity and natural area assets

2.1.1 Overview

Bio Diverse Solutions (Environmental Consultants) prepared an *Environmental Assessment Report and Land Capability Assessment* to guide future environmental management and guide the formation of the Structure Plan (see Appendix 9). The assessments identify the measures proposed to mitigate and manage the environmental features of the site and focus on the natural areas to be retained within the site. The assessment concluded that the site has no significant environmental constraints to facilitate urban development.

The Structure Plan recognises the importance of the key environmental and landscape attributes of the area. It incorporates these in an urban form that creates an environmentally responsive urban development that meets the EPA, WAPC and local government environmental requirements. Consequently, the environmental outcomes of the Structure Plan are considerable. It is expected that future subdivision/development will have negligible environmental impacts given:

- the site is largely cleared;
- existing native vegetation will be conserved in POS;
- there are opportunities to undertake environmental repair through replanting;
- there are appropriate buffers to sensitive land uses;
- subdivision will be appropriately serviced including residential lots will be connected to reticulated sewerage;
- stormwater will be appropriately managed; and
- noise, dust and stormwater will be effectively managed.

2.1.2 Native vegetation

The majority of the site has been cleared. The main area containing native vegetation is in the north of Lot 521 where it is proposed to retain the vegetation as POS. There are no Ramsar listed sites, Wetlands of National Importance or Declared Rare or Priority species of vegetation. Nevertheless, the remaining native vegetation has value and it is proposed to retain these areas where possible.

There are two areas of remnant vegetation within the site. A broad scale vegetation survey of these two areas was conducted by Bio Diverse Solutions on 29 August 2017. The strip of vegetation running parallel with the northern boundary of the site (approximately 13 hectares in size) comprises Low Open Jarrah/Marri/Sheoak Forest in good condition. The small area of remnant vegetation in the south-east corner comprises mixed Eucalypt Forest in a degraded condition.

A search of publicly available databases through WA Atlas, Nature Map, and EPBC Protected Matter Search Tool indicates that no threatened, priority or declared rare flora is present on the site, or within the surrounding Nature Reserves and remnant vegetation.

A key element in preserving biodiversity is connectivity, largely based on connecting natural areas through retaining and/or enhancing native vegetation. Environmental corridors can be for ecological, recreational or utilitarian purposes or for multiple purposes (City of Albany: 2002).

Considerable work has been undertaken to identify and manage environmental corridors. This includes *Albany Greenways* (2002). Appendix 10 shows greenways in and around Albany including the bush corridor on Lot 521 Mercer Road. There are opportunities to connect the bush corridor on Lot 521 Mercer Road to the north and west. This includes planting native vegetation on the western section of Terry Road adjoining the site and opportunities through the *Warrenup-Walmsley Local*

Structure Plan to provide revegetation in drainage lines, as part of POS and within relevant road reserves.

Bio Diverse Solutions advise 'all efforts should be made to conserve existing native vegetation. There is support however to clear, as required, replanted vegetation which is Blue gums given they are generally unsuitable in an urban area.'

The following management measures are proposed to reduce the likelihood of impacts to vegetation and flora and to retain the key existing biological values of the site:

- remnant vegetation will be retained within the vegetation strip in the north-east of the site and in the south-east corner of the site. Inclusion of the native vegetation within POS will provide the most effective way of managing the conservation values of the native vegetation;
- access crossings within the vegetation strip will be limited to facilitate retention and natural regeneration of vegetation and to prevent adverse impacts particularly for transient fauna;
- there will be revegetation using native species, where currently there is very little native species and diversity, in the two southern areas of POS along with other areas to promote fauna habitat, flora diversity and biodiversity;
- rehabilitating waterways/drainage lines to create a 'living stream' through revegetation and as required fencing; and
- develop a greening strategy to increase green canopy and green spaces.

2.1.3 Fauna

The majority of the site has been cleared. As a result, fauna habitat has largely been removed. The only potentially significant fauna habitat on site is within the two areas of remnant vegetation.

Within the bush corridor, in the northern section of Lot 521, there is the potential for black cockatoo foraging, roosting and breeding habitat, , and any impacts on these habitats should be minimised,. Biodiverse Solutions supports this area being conserved as POS.

The Department of Biodiversity Conservation and Attractions have recently advised that vegetation in this bush corridor will support roosting Black Cockatoos species that are listed as threatened under the *State Wildlife Conservation Act 1950* and the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999*. Additionally, significant areas of native vegetation are located in Crown reserves to the east of the site that provide habitat for cockatoo and other threatened and non-threatened species along with landscape connectivity. The Department of Biodiversity Conservation and Attractions encourage the retention of as much of the strip of vegetation as possible on Lot 521 to support roosting habitat and landscape connectivity in the form of 'stepping stones'.

To reduce likely impacts to native fauna, the bush corridor will be retained through maintaining the strip of remnant vegetation in the north of the site and the native vegetation in the south-east corner as POS. Additionally, native vegetation species will be used in areas of POS to promote habitat for native fauna species.

2.2 Landform and soils

2.2.1 Landform

Overall, the site has a gentle to moderate gradient. Topography over the site is undulating ranging from a high point of 51m AHD in the central northern portion of the site to a low point of 22m AHD in the southern central portion of the site. There is a ridge that runs from the central northern portion of the site to the south-west corner.

2.2.2 Geology and soils

Regolith of WA (Department of Mining, 2009) mapping indicates that soils across the site are classified as sandplain, mainly

Aeolian and include some residual deposits.

A Geotechnical Investigation was conducted on the 29 August 2017 by Great Southern Geotechnics under later winter conditions. The Geotechnical Investigation is included in Appendix 9. The investigation included both soil analysis and measuring of water table. The soil testing was conducted to assess the suitability of the site for the proposed residential and light industrial development including onsite effluent disposal for the extension of the industrial area.

Soil testing showed that soils across the site comprised predominately of a silty sand topsoil, over sandy gravel (with a layer depth varying from 200 - 700mm), over sandy clay to the depth of the hole.

Permeability testing was conducted by Liquid Labs WA as part of the Geotechnical Investigation. Permeability at both borehole site TP3 and TP10 is considered to be extremely low this is consistent with the soil type (sandy clay) encountered at these locations.

Phosphorous Retention Index (PRI) results across the site varied consistent with soil type. The sandy clays found across the majority of the site were found to have a very high PRI and therefore a very high ability to fix nutrients and heavy metals. The sandy gravel found at TP1 also had an extremely high PRI, particularly for a sand, whereas the light grey sand found at TP6 had a low PRI and therefore a low ability of fixing nutrients and heavy metals.

Ten boreholes were constructed within the site to a depth of 2.3 metres and left open for a minimum of 1 hour to identify water table present. No groundwater was encountered.

2.2.3 Land capability

As set out in Appendix 9, a Land Capability Assessment of the site was conducted by Bio Diverse Solutions. The overall capability of the site supporting the Urban Development land use was rated as highly capable for Mapping Unit 1 and very highly capable for Mapping Unit 2. The overall capability of the site supporting the Light Rural Industrial is rated as highly capable for Mapping Unit 1. Mapping Unit 2 was not encountered at the location of the proposed Light Rural Industrial land use. The degree of limitations for both Urban Development and Light Rural Industry for Mapping Unit 1 and Mapping Unit 2 is low to very low.

Accordingly, the site is capable of supporting urban development and has similar soil types and hydrology to the surrounding urban areas. The soils have good foundation stability and any inconsistencies (e.g. lateritic cap rock) can be managed via design and normal construction techniques.

2.2.4 Acid Sulphate Soils

Acid Sulphate Soil (ASS) mapping indicates the site is not situated on any known ASS. There is however a section of high to moderate risk of ASS occurring within 3m of natural soil surface to the south of the site on Mercer Road.

The final fill levels and excavation requirements of the future subdivision will determine if an ASS and Dewatering Management Plan is required to be prepared prior to subdivision. If required, the management plan will be prepared to satisfy the Department of Water and Environmental Regulation and will outline the soil management measures, the groundwater and dewatering effluent monitoring measures and the contingency management measures required to minimise any environmental impacts.

2.2.5 Landscape impact

The western boundary of the site adjoins Chester Pass Road which is a tourist route connecting Albany to attractions including the Stirling Ranges and the Porongurup's. The site also forms part of the 'gateway' into Albany.

The site has mature planting adjoining the Chester Pass Road boundary which is

managed by the landowner. The mature planting, combined with the flat topography and the existing development adjoining Chester Pass Road, will ensure there will be manageable landscape impacts of new development when viewed from Chester Pass Road.

At the residential subdivision stage, a revegetation/landscape strategy will be formulated to provide a framework for the development of POS and the landscape within the public realm. The strategy will address matters including the landscape and design context, protection of remnant vegetation, rejuvenation of habitat and ecological linkages and water sensitive urban design (WSUD).

2.3 Groundwater and surface water

2.3.1 Overview

There are no significant waterways, wetlands or groundwater resources within the site or within the vicinity of the site. Accordingly, surface water or groundwater are not considered constraints to future urban development.

2.3.2 Surface water hydrology

There are no major naturally existing drainage networks or water bodies within the site. There is one minor waterway situated in the north-western section of Lot 10. This area will need to be managed sensitively in relation to stormwater planning within the site.

Hydrographic Sub-catchments (DoW, 2008) show the site to be within two surface water sub-catchments; with the northern and western portion of the site discharging to Willyung Creek to the north of the site and the central and southern portion of the site discharging to Yakamia Creek to the south of the site. Both the Willyung Creek and Yakamia Creek sub-catchments form part of the Oyster Harbour/Kalgan/King Catchment ultimately discharging to Oyster Harbour.

There are several man-made dams across the site, which are surface water fed and used for livestock drinking water.

2.3.3 Groundwater hydrology and hydrogeology

Australian Geoscience Mapping and Department of Water 250K Hydrogeological mapping places the site within the; 'Tertiary - Cainozoic - Phanerozoic (TPw) period: Plantagenet Group - siltstone, spongolite; minor sandstone, peat, and conglomerate.' The aquifer is a 'sedimentary aquifer with intergranular porosity – extensive aquifers, major groundwater resources.' (DoW, 2015).

As set out in section 2.2.2, a Geotechnical Investigation was conducted on the 29 August 2017 by Great Southern Geotechnics under late winter conditions. The investigation included measuring of water table. Ten boreholes were constructed within the site to a depth of 2.3 metres. Groundwater was not observed in any of the boreholes indicating there is no likely groundwater present beneath the site to a depth of 2.3 metres. The geotechnical investigation was undertaken in accordance with Australian Standards.

The site is not located within a Public Drinking Water Source Protection Area.

2.4 Bushfire hazard

The publicly released Bushfire Prone Area Mapping (DFES, 2017) shows that the majority of the site is located within a Bushfire Prone Area (situated within 100m of >1 ha of bushfire prone vegetation).

Bio Diverse Solutions have assessed bushfire risks and have prepared a BAL Contour Plan for the site (Appendix 9). The plan addresses *State Planning Policy 3.7 Planning in Bushfire Prone Areas* and the *Guidelines for Planning in Bushfire Prone Areas*. The plan has informed the Structure Plan and its design.

Based on the Bio Diverse Solutions assessment, the Structure Plan meets the

'Acceptable Solutions' of each Element of the bushfire mitigation measures as per the *Guidelines for Planning in Bushfire Prone Areas* (WAPC, 2017). Table 2 summarises the Bio Diverse Solutions assessment of the site and the Structure Plan against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4.

Table 2 – Assessment against Acceptable Solutions

Element	Acceptable Solution	Applicable or not Yes/No	Meets Acceptable Solution
Element 1: Location	A1.1 Development Location	Yes	Compliant - BAL 29 or less applied to lots
Element 2: Siting and Design	A2.1 Asset Protection Zone	Yes	Compliant, APZ in BAL 29 or less
Element 3: Vehicular Access	A3.1 Two Access Routes	Yes	Compliant two access to 2 destinations - Compliant
	A3.2 Public Road	Yes	Compliant with EAW
	A3.3 Cul-de-sacs	Yes	Compliant
	A3.4 Battle axes	N/A	Compliant
	A3.5 Private driveways	Yes	N/A
	A3.6 Emergency Access Ways	Yes	Compliant on parent lot
	A3.7 Fire Service Access Ways	N/A	N/A
	A3.8 Firebreaks	Yes	Complaint
Element 4: Water	A4.1 Reticulated areas	Yes	Compliant
	A4.2 Non-reticulated areas	N/A	N/A
	A4.3 Individual lots in non-reticulated areas	N/A	N/A

Based on Appendix 9, the site and the proposed subdivision/development will have acceptable bush fire risks. Future development can be designed to achieve a maximum BAL rating of BAL-29, appropriate access and egress will be provided, new lots and development will be connected to reticulated water and hydrants will be installed.

Future dwellings within the Bushfire Prone Area will be constructed to the required standard that correspond to their assessed BAL, as set out in *AS 3959-2009 Construction of Buildings in Bushfire-Prone Areas*.

A detailed Bushfire Management Plan will be required if any industry is defined as 'High Risk'. A Bushfire Management Plan and a Bushfire Emergency Evacuation Plan are required to support a future Development Application for the primary school. Additionally, a detailed Bushfire Management Plan may be required to support the staged development of the subdivision.

2.5 Heritage

There is no registered Aboriginal heritage site within the Structure Plan area as set out on the Department of Planning, Lands and Heritage inquiry system. Proponents are however required to address the Department of Planning, Lands and Heritage's *Cultural Heritage Due Diligence Guidelines* and meet the provisions of the *Aboriginal Heritage Act 1972*.

The site does not contain any structure or place of heritage significance on the *City of Albany Municipal Heritage Inventory*.

2.6 Servicing

2.6.1 Overview

The Ardess Industrial Estate is provided with standard 'hard' infrastructure with the exception of reticulated sewerage. An internal access road, which is privately owned, provides vehicular access between the estate and Chester Pass Road. A sealed emergency access way,

with an associated approved crossover, connects the internal access road with Terry Road.

2.6.2 Wastewater

There is currently no reticulated sewerage provided to the site. Given this, the expanded light industrial area will be serviced with on-site sewerage disposal consistent with the draft *Government Sewerage Policy*.

All residential lots will be connected to the reticulated sewerage system.

2.6.3 Water

Future lots will be serviced with reticulated water. There are also opportunities for development to capture rainfall into water tanks for reuse within both industrial/commercial operations and on residential lots.

2.6.4 Stormwater

The western and northern portions of the site drain towards the north, while the central and eastern sections drain to the south. Stormwater drainage will be managed through on-site reuse, detention and connection. Further details are outlined in section 3.5 and Appendix 11.

2.6.5 Telecommunications and electricity

Future lots will be serviced with underground power.

2.6.6 Vehicular Access

The site has good access to the State and regional road network. Restricted Access Vehicles (RAVs) are permitted on Chester Pass Road and to enter/leave the Ardess Industrial Estate via the private road.

2.7 Context and other land use constraints and opportunities

2.7.1 Context

The site is located approximately 5 kilometres north of the Albany central area.

The site is surrounded by a wide range of land uses including those outlined on Appendix 3. The site is surrounded by rural properties to the north, west and south and remnant vegetation (Reserve 27179) to the east. The land to the north and west is zoned 'Future Urban'. To the south-west of the site along Chester Pass Road is Albany's main light industrial area which includes a range of businesses. To the south of Mercer Road is a shopping centre and a lifestyle village.

The Ardess Industrial Estate is a well-established industrial area which contains a number of sheds used for industrial, commercial and warehouse purposes along with uses such as transportation/logistics.

An internal access road, which is privately owned, provides access to the estate. A well-established landscape buffer is provided on the estate's western boundary adjoining Chester Pass Road.

The site is bordered by significant areas of remnant vegetation on its eastern boundary (Reserve 27179) which is reserved as 'Parks and Recreation' within LPS1. The vegetated reserve contributes significantly to the character and amenity of the area.

2.7.2 Rational for Structure Plan design

Major influences of the Structure Plan design include:

- designation of the site in ALPS as 'Future Urban' and 'Industry' and local government support to expand the Ardess Industrial Estate in the draft ALPS;
- design principles in *Liveable Neighbourhoods*;
- investigations and recommendations from Biodiverse Solutions;
- advice from the local government and State Government agencies;
- retaining native vegetation including the bush corridor;
- creating an urban village in a bush setting;

- promoting employment opportunities including facilitating transport depots and logistic operations;
- the *Ardess Service Industry Estate Development Plan,* existing development in the Ardess Industrial Estate and likely future development;
- extending Range Road; and
- draft *Warrenup-Walmsley Local Structure Plan*.

The Structure Plan responds to the site's context, opportunities, constraints and the planning framework. The rationale behind the Structure Plan (Plan 1) includes to:

- address land use compatibility with adjoining/nearby uses and coordinate with surrounding development;
- provide light industrial development and employment in the western section and residential development in the central and eastern sections;
- provide a range of residential lot densities, sizes and housing which contribute to a greater choice of housing and at densities that are marketable and make efficient use of land and infrastructure;
- comply with *Guidelines for Planning in Bushfire Prone Areas*;
- have regard to topographic and other natural features along with required servicing;
- foster a sense of identity that reflects the natural character of the area and creates a sense of community;
- create an urban village in a bush setting, bordered by open spaces (bush corridor on Lot 521, Reserve 27179 and proposed POS adjoining Mercer Road);
- minimise the impact of development on sensitive environmental values;
- facilitate the safe and efficient movement of traffic and promote a connective and permeable walking and cycling network;
- provide POS that conserves native vegetation, treats stormwater along with providing opportunities for a range of recreation;
- enhance the area through the provision of a primary school and a community purpose site;
- recognise there is increasingly a move away from manufacturing operations towards transportation logistics and storage, warehousing and distribution centres. The Ardess Industrial Estate is well suited to assisting with transportation logistics with its excellent road access and as demonstrated by current development in the estate;
- provide an opportunity to create a high quality extension of Albany's urban area which maximises the views to surrounding features including Willyung Hill, Porongurup, Stirling Ranges, Mount Manypeaks, Mount Clarence, Mount Melville and the coast; and
- provide additional retail catchment to the existing Chester Pass Mall activity centre.

2.7.3 Structure Plan key proposals

The Structure Plan has been developed to guide the subdivision and development of the site. The Structure Plan proposes:

- light industrial development;
- residential development with densities ranging between R5 – R60;
- POS in three sections of the site;
- a primary school site;
- community purpose site; and
- new roads and opportunities for walking and cycling.

Light industry is shown as Precinct A and Precinct B. This relates to a separate scheme amendment request to LPS1 to facilitate the permissibility of the transport depot use in the Ardess Industrial Estate (Industrial Area IA1). The amendment proposes:

- Precinct A - the transport depot use is an 'A' use (land located within the '<200 metre' buffer'); and
- Precinct B - the transport depot use is an 'D' use (land located within the '>200 metre' buffer').

3. LAND USE AND SUBDIVISION REQUIREMENTS

3.1 Land use

3.1.1 Overview

The Structure Plan (Plan 1) provides guidance for future subdivision and development. The Structure Plan proposes additional light industrial development, low and medium density housing development, POS, a primary school site and a community purpose site. The Structure Plan outlines a range of residential densities to promote a variety of densities, lot sizes and types of housing.

Associated roads are identified including part of Range Road which connects central Albany with Oyster Harbour/Lower King and road widening for Terry Road (eastern section).

The Structure Plan summary table, in the Executive Summary, outlines key statistics and planning outcomes.

3.1.2 Suitability of proposed land uses

The site is suitable and capable of accommodating light industrial and residential development.

The western portion of the site is suitable for light industrial development to complement the existing Ardess Industrial Estate. Expanding the Ardess Industrial Estate will create considerable employment and economic activity.

The central and eastern portions of the site are suitable for residential subdivision/development consistent with ALPS. *Liveable Neighbourhoods* promotes the concept of 'walkable catchments'. The residential area is generally within 400 metres (equivalent of 5 minutes walking time) to an area of POS.

3.1.3 Integration with surrounding land use

The Structure Plan is compatible and integrated with surrounding land uses. The Structure Plan has considered the site's context, including adjoining and nearby land uses, and considered the compatibility of future development. In summary, the proposed light industry and residential uses are compatible with adjoining and nearby land uses/development given:

- the long established Ardess Industrial Estate is well-buffered to sensitive uses given it adjoins industrial and rural land. Additionally, Chester Pass Road is wide adjoining the site. This combined with the established planting provides a buffer to uses on the western side of Chester Pass Road;
- it is likely that there are greater noise and associated impacts from Chester Pass Road than from the Ardess Industrial Estate;
- the Structure Plan proposes light industry rather than general industry. Effectively managed light industry can be located adjoining residential development;
- Range Road will have a 30 metre reserve width incorporating street trees and landscaping;
- development conditions can further assist to minimise off-site impacts; and
- a requirement for industrial operators to appropriately manage their operation and control their impacts on their own property in accordance with standard practice and legal principles.

3.2 Public open space

3.2.1 Overview

The design of the POS system responds to a wide number of opportunities presented by the site, namely:

- retaining key environmental features such as remnant vegetation;
- integrating surface water management measures into POS;
- providing well-distributed and generous sized POS that provide a range of recreational opportunities;
- fostering a sense of community, place and local identity through the creation of an urban village in a bush setting, bordered by open spaces (bush

corridor on Lot 521, Reserve 27179 and POS adjoining Mercer Road); and
- providing an attractive entry frontage to Mercer Road that enhances the site's sense of place.

3.2.2 POS provision

The Structure Plan provides the following POS:

- a vegetated bush corridor containing remnant vegetation in the north-east section;
- two generous sized neighbourhood parks incorporating an incidental drainage function; and
- a community centre site located near the proposed primary school.

A schedule of POS for the Structure Plan Area is shown in Table 3.

Table 3 – POS Schedule

Land use allocations	Hectares
Total Structure Plan area	**178.3348**
Less – Unrestricted POS not included in POS contribution	10.728ha
Total – Net site area	**167.6068ha**
Deductions	
Primary school	4ha
Light industry	58.4648ha
Arterial roads:	
Range Road (30m reserve width)	2.67ha
Terry Road – eastern section (5m widening within Structure Plan area)	0.675ha
Gross subdivisible area	101.797ha
Required POS @ 10 per cent	10.1797ha
POS contribution	
May comprise: minimum 80% unrestricted POS	7.59ha
May comprise: maximum 20% restricted POS – bush corridor total area 13.41ha	2.682ha
Unrestricted POS sites	
Neighbourhood Park No. 1, central-south 3.2ha (take 0.7ha for drainage basin)	2.5ha
Neighbourhood Park No. 2, south-east 5.15ha (take 0.46ha for drainage basin)	4.69ha
Community purpose site	0.4ha
Restricted use POS	
Restricted use POS - bushland	2.682ha
POS provision	**10.272ha**

In addition to the above, there are opportunities for community use of the primary school oval under a shared access agreement with the Department of Education.

The amount of POS has been calculated to meet the minimum 10% requirement under *Liveable Neighbourhoods* and to provide for stormwater management systems. The allocation of POS will be further refined during the subdivision stage as the detail of the stormwater management system is further determined through the Urban Water Management Plan. This will result in opportunities to improve dwelling yield and planning outcomes, while continuing to balance ecological and recreational needs within the minimum 10% requirement of *Liveable Neighbourhoods*.

The Structure Plan aims to provide wide ranging recreational opportunities while contributing to the unique identity of the locality. The Structure Plan recognises that well designed POS contributes to a community's better quality of life.

The provision of POS assists to create a distinctive sense of place, conserve important natural areas, provide active and passive recreational areas and provide convenient access to residential areas. Portions of the POS are also proposed to integrate with managing stormwater.

3.2.3 Nature space

While the majority of the site has been cleared there are areas of remnant vegetation that will be retained within the POS. Retention of the native vegetation in public ownership will facilitate the effective management of the area for its conservation value.

The bush corridor contains native species or communities in a relatively natural state and hence contains biodiversity. The Department of Biodiversity Conservation and Attractions have recently advised that the vegetation in this bush corridor will support roosting Black Cockatoos species that are listed as threatened under the

State Wildlife Conservation Act 1950 and the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999*. Significant areas of native vegetation are located in Crown reserves to the east of the site that provide habitat for cockatoo and other threatened and non-threatened species and landscape connectivity. The Department of Biodiversity Conservation and Attractions encourage the retention of as much of the strip of vegetation as possible on Lot 521 to support roosting habitat and landscape connectivity in the form of 'stepping stones'.

The role of the bush corridor is significant in enhancing the area's natural assets to the benefit of the community. The bush corridor is expected to be of high value to residents. The POS will be bordered by public roads to assist with management of the POS.

Passive, conservation style POS is consistent with the desired character and lifestyle of the area. There will be opportunities for low-key recreation within the bush corridor, with details be addressed at the subdivision stage.

3.2.4 Neighbourhood parks

Two large neighbourhood parks are proposed on Lot 521 in the central-south and south-east sections. The central-south POS is 3.2 hectares and is expected to incorporate a drainage basin of around 0.7 hectare. The south-eastern POS is 5.15 hectares and is expected to incorporate a drainage basin of around 0.46 hectare.

Their location provides an opportunity to create an attractively landscaped entry statement to the area. There is an opportunity to provide attractively designed areas of POS which will be overlooked by the surrounding residential areas. The POS should be maintained to a high standard to be appealing to the community.

It is expected that the neighbourhood parks will be used for active recreation, passive recreation, nature space and unstructured active play. These sites could be developed for active recreational use such as playgrounds, exercise facilities, half-court basketball courts along with passive facilities such as picnic/barbecue areas and seating.

Drainage areas for the one in 100 year event within POS near Mercer Road have the potential to combine passive recreation and unstructured active play opportunities through WSUD. Where drainage basins remain dry for most of the year, they can be designed to enable them to be used for recreational purposes.

3.2.5 Community purpose site

A community purpose site is proposed near the primary school. While details will be addressed at the subdivision stage, including its ownership or vesting, it is envisaged the site will be around 4000m^2 in area. The community purpose site will be an asset to the area and will complement the primary school.

3.3 Residential

The Structure Plan provides R5 to R60 coded areas to facilitate a mix of densities lot sizes and housing types. Increasing population in Albany, a designated regional centre, adds to its overall viability, vitality and prosperity and the range of services that can be sustained.

Future subdivision will meet the minimum lot size and will comply with the average lot size requirements of the *Residential Design Codes* for the specified density coding.

Approximately 94.24 ha has been identified as gross residential development land.

ALPS recommends that urban residential densities of approximately R20 are to be achieved in 'Future Urban' areas. The R20 density code is the equivalent to an urban density of approximately 14 dwellings per hectare of gross urban land. It is estimated approximately 1320 residential lots will be created, based on 14 dwellings per hectare of gross urban land. Final yields will be determined at the subdivision design

stage. Over the life of the project, there is an opportunity to achieve an increased overall density, subject to market demand.

As previously outlined, it is intended to foster a sense of community, place and local identity through the creation of an urban village in a bush setting, bordered by open spaces (bush corridor on Lot 521, Reserve 27179 and POS adjoining Mercer Road). Based on land use allocation, street block pattern and associated lot orientation, the Structure Plan seeks to promote views and outlooks.

Residential development should respond to the unique character of the area and be sympathetic to existing landform. Consideration should be made to formulating Building and Landscaping Guidelines supported by restrictive covenants.

The proposed higher density near Range Road will maximise opportunities for future access to public transport.

3.4 Movement networks

3.4.1 Current situation

The site has excellent access to the National and State highway network and the regional road network. Additionally the site is highly accessible by road with convenient access to the Albany central area and the Albany urban area. This will ensure convenient vehicular access that meets safety and amenity objectives.

Vehicular access between the site and Chester Pass Road is via an existing sealed access way (private road). There are appropriate sight distances in both directions where the access way intersects with Chester Pass Road (which is four lane dual carriageway adjoining the site) which facilitates safety for road users.

The City has previously approved a crossover from the site onto Terry Road. In comparison to the main and direct access between the Ardess Industrial Estate and Chester Pass Road, the crossover to Terry Road is used only occasionally. Terry Road is not a classified Restricted Access Vehicles (RAV) route, so all RAVs are required to enter and leave the Ardess Industrial Estate via the main Ardess Industrial Estate access way. No RAV's are permitted to access or leave the Ardess Industrial Estate via Terry Road. 'As of right' vehicles are however able to use Terry Road.

Chester Pass Road is an approved road train route and it has a speed zoning of 60kph where the Ardess Industrial Estate access road intersects with Chester Pass Road. MRWA are supportive of RAVs to RAV Category 7 entering and leaving the site from the Ardess Industrial Estate access road. RAV Category 7 relates to vehicles (prime mover towing a semi-trailer and B Double or a B Double towing a dog trailer) that have a maximum length of 36.5 metres and a maximum mass of 107.5 tonnes.

Given the site adjoins Chester Pass Road, the impact of RAVs on general traffic on the Structure Plan area is minimised. RAVs will enter and leave the site in a forward gear.



Chester Pass Road looking towards Chester Pass Mall with Ardess Industrial Estate on the left

3.4.2 Proposed movement system

Various traffic impact studies have been prepared for the locality. In summary, these studies conclude that the road network and intersections have sufficient capacity to address traffic generation from the development.

The Structure Plan proposes:

- a movement network that maximises permeability and legibility. New connections provide access to surrounding areas;
- key roads on a north-south and east-west grid to promote permeability including connecting the Ardess Industrial Estate with Range Road;
- an extension of Range Road will provide an alternative north-south route to Chester Pass Road and Lower King Road/Ulster Road;
- road reserve widths of 30 metres on Range Road/Terry Road to cater for eventual four lanes, stormwater management, services and street trees;
- no direct vehicular access between lots and Terry Road/Range Road. There will be limited or no access between lots and Mercer Road with this matter to be addressed at the subdivision stage; and
- no cul-de-sacs in the general industry estate and only one cul-de-sac in the residential area (between Terry Road and the bush corridor POS, which will be provided with an emergency access way).

The Structure Plan will ensure convenient vehicular access that meets safety and amenity objectives. The Structure Plan is guided by the appropriate road types from *Liveable Neighbourhood*. Neighbourhood connector roads are proposed as the key access and egress connectors for the Structure Plan area.

The final design will be subject to detailed civil engineering design at the subdivision stage. Roads will be designed and constructed in accordance with local government requirements.

3.4.3 Key issues

In time, it is expected that the western section of Terry Road will be realigned. The existing intersection of Terry Road/Chester Pass Road is expected to be closed and the intersection relocated northwards to provide appropriate vehicular sight distances in both directions. This is being separately considered via the *Warrenup-Walmsley Local Structure Plan*.

MRWA is seeking changes to the realignment of Terry Road including connecting it with Harvey Road to create a 4 leg roundabout. MRWA advise the advantage to the design is safety. A 4 way roundabout is more effective than a 3 leg, the land to build the roundabout already resides in the Harvey Road truncations and it reduces the number of conflict points.

MRWA prefers a flow through two way arrangement for transport depots, including at the Ardess Industrial Estate, to allow for increased flow options.

Chester Pass Road will continue to act as part of the Restricted Access Vehicle (RAV) Class 7 Network until the Albany Ring Road is finalised.

Development in the light industrial area that incorporates RAVs will be advised that there is no guarantee that RAVs will be permitted to use Chester Pass Road between Menang Drive and the main roundabout (intersection with Albany Highway, North Road and Hanrahan Road) following the Albany Ring Road being completely constructed and operational to the Port of Albany. Associated development approvals may also contain conditions or advice relating to future limitations of access for RAVs.

Given there is existing light industrial development adjoining Chester Pass Road, there are no traffic noise implications from Chester Pass Road on future development on the site.

In the future, the owners of Lot 10 Chester Pass Road and the City will review whether

the private road becomes vested with the City as a public road.

3.4.4 Vehicle manoeuvring and parking

Vehicle parking and manoeuvring areas for industrial/commercial development will be contained on site and all vehicles will be able to enter and leave the site in a forward gear. Vehicular access, parking and manoeuvring areas will be constructed, drained and where necessary sealed to the satisfaction of the local government.

3.4.5 Pedestrian and cyclist movements

The site's location and the Structure Plan design provide considerable opportunities for walking and cycling. A strong pedestrian network is promoted in the Structure Plan to enable connectivity, access and recreational opportunities.

There are various opportunities to promote walking and cycling to/from the site which will be considered in more detail in future planning and design stages. Dual use paths and footpaths will be provided in the residential area in accordance with *Liveable Neighbourhoods.*

3.4.6 Public transport

The site is not currently serviced by public transport. It is expected that Range Road/Terry Road and Chester Pass Road will be identified as future public transport routes connecting the Albany central area with localities including Oyster Harbour, Lower King, Warrenup and Pendeen.

3.5 Water management

A Local Water Management Strategy (LWMS) has been prepared in support of the Structure Plan as required by *State Planning Policy 2.9 Water Resources* and Better Urban Water Management (WAPC 2008). Refer to Appendix 11.

The LWMS outlines there are opportunities to enhance water quality and quantity onsite before being discharged offsite. Accordingly, stormwater management from the site is required be effectively designed, constructed and managed to the satisfaction of the local government and Department of Water and Environmental Regulation to meet publications such as *State Planning Policy 2.9 Water Resources*, *Better Urban Water Management, Stormwater Management Manual for Western Australia*.

The LWMS details the integrated water management strategies to facilitate future urban water management planning. The LWMS will achieve integrated water management.

The LWMS sets out a number of management/design measures to be implemented to reduce the impact of the proposed development on surface water and groundwater flows, levels and quality, the function and environmental values of the site, or its interconnected areas.

Stormwater management is required to ensure there are limited off-site impacts through adopting WSUD. This recognises that water is a valuable resource. WSUD aims to reduce stormwater runoff, remove nutrients and contaminants, protect receiving environments, minimise water use, maximise water conservation, promote fit-for-purpose use and promote re-use.

In particular, the subdivision/development is required to ensure that stormwater is designed to ensure that post development run-off rates are no greater than pre-development run-off rates.

The LWMS confirms that there are no significant constraints or sensitive features which would preclude implementation of WSUD.

Based on geotechnical investigations, land capability assessed and the proposed management measures, it is not expected that any changes to groundwater flows, levels or quality will have an adverse impact on the function and environmental values of the site.

There are limited water management risks associated with development of the site.

Based on the geotechnical investigations (see section 2.2.3), there is no requirement to undertake pre-development groundwater monitoring. Overall, the soil types enable stormwater infiltration at source.

Based on geotechnical investigations (Appendix 9), it is expected that lots can support on-site reuse and/or detention.

The LWMS includes indicative locations of stormwater basins at each low point within the catchments. These basins will be fully integrated with the POS and designed and landscaped to become a significant feature of the development.

3.6 Education facilities

The estimated lot yield of 1320 residential lots and a population of approximately 3300 people will generate demand for one primary school.

Liaison with the Department of Education confirms that one primary school will be required within the Structure Plan area to service the site and a catchment extending outside of the Structure Plan area. Provision for a high school is not required.

A four hectare primary school site, rectangular in shape, is set aside for education facilities within the Structure Plan area. The school is central to the residential area and accessible to the future school catchment north of Terry Road.

The school site is bordered on four sides by roads to assist with access and parking. There will be effective circulation for traffic around the school site which will assist to reduce traffic congestion and illegal parking issues at peak school periods. This in turn will assist to reduce congestion in the local streets as traffic moves to and from the school site.

The site has minimal physical constraints, is gently sloping, is well drained and is capable of supporting school buildings.

There are opportunities for community use of the school oval under a shared access agreement with the Department of Education. If agreed, it will satisfy the requirement for an active sporting area in the northern portion of the site and provide another public recreational asset.

3.7 Activity centres and employment

The City and the WAPC (via documents such as *Liveable Neighbourhoods*) promote employment and economic growth which will be assisted by the proposed expansion of the Ardess Industrial Estate to Range Road.

The Structure Plan will have various economic benefits including supporting local employment, supporting local services and strengthening the local economy which is consistent with the planning framework. For instance, implementation of the Structure Plan will:

- provide a range of opportunities and choices for businesses, most which are expected to be small to medium sized operations;
- assist in the economic sustainability and strength of Albany and contributes to the local and regional economy. Development of the site will contribute to job creation (direct and indirect jobs) and it will assist in the growth and diversify of the City's economic base and add to the overall vitality and prosperity of Albany;
- support a growing and more diverse industrial and logistics sector which will provide an important foundation for the future economic growth of Albany;
- create employment close to where people live; and
- assist with employment self-sufficiency in the district.

Other employment generators within the Structure Plan area include the primary school and home businesses.

3.8 Infrastructure coordination, servicing and staging

3.8.1 Overview

Background servicing information is set out in section 2.6. Future subdivision and development will be appropriately serviced in accordance with local government and WAPC requirements.

The subdivision/development of the site, as advocated by the Structure Plan, will require the extension and upgrading of essential civil infrastructure. There will be a need for more detailed investigations and design to ensure there is capacity of these services for the subdivision. The capacity of existing infrastructure to service future subdivision will need to be determined prior to the issue of titles.

3.8.2 Wastewater

Biodiverse Solutions assessed the proposed expanded light industrial area being serviced with on-site effluent disposal against the draft *Government Sewerage Policy*. The assessment found that the proposed light industrial area is appropriate for on-site sewage disposal. In addition, the low permeability and high PRI of the soils in the location of the proposed industrial area will allow for slow draining assisting the process of being fixed by soil microbes.

As the light industrial area is located in a sewerage sensitive area, a secondary waste water treatment system with nutrient removal should be used. The provision of on-site sewage disposal systems including calculation of land application area will be in accordance with minimum site requirements contained in Schedule 3 of the draft *Government Sewerage Policy* (DoP, 2016) and must be approved for use in Western Australia by the Department of Health. LPS1 requirements for the current Light Industrial area require 'dry industry' and 'alternative treatment effluent disposal systems'.

Based on geotechnical investigations, on-site wastewater disposal is appropriate for future light industrial lots/development. This reflects the expected generous lot sizes, the intended land uses, the expected low wastewater generation and anticipated low volume of process water.

All residential lots will be connected to the reticulated sewerage system. To service residential lots, waste water pumping stations (WWPS) will be required. It is expected that the northern portion of the site will be serviced with a WWPS located outside the site in the northeast corner of Lot 4925 Terry Road. South of the ridge line on Lot 521, the majority of the site is expected to the serviced with a WWPS located outside the site on Mason Road within the *Yakamia-Lange Structure Plan* area. Both WWPS's eventually discharge into the WWPS on the corner of Albany Highway and Le Grande Avenue.

While the permanent WWPS and their pressure mains are ultimately funded by the Water Corporation, pre-funding of those works by developers is likely to be required to enable subdivision to proceed. These costs can be shared between developers both within and outside of the Structure Plan area.

3.8.3 Reticulated water

Proposed lots will be connected to the reticulated (scheme) water system. This will require an extension and upgrading of the water main, plus advancing the programmed enlargement of a supply main to ensure proposed lots have sufficient pressure to meet Water Corporation's licence conditions and it's Customer Charter. Hydrants will be installed based on Water Corporation guidelines.

The reticulated water supply should be complemented with rainwater capture and storage, with landowners/operators required to install rainwater tanks as a condition of development approval.

3.8.4 Power supply and telecommunications

All proposed lots will be serviced with underground power and required telecommunication infrastructure.

Electrical trenching within the site will also be used for communications cabling as well.

Existing HV power supplies are available in adjacent commercial and industrial areas and can be extended in a staged program to service the site. While no significant offsite infrastructure upgrades are anticipated, this will need to be confirmed closer to the subdivision stage.

3.8.5 Gas

Albany has an LPG reticulated gas network operated by Atco Gas. While the current system is limited and there is no network in the Walmsley locality, upgrades currently being carried out may extend the system.

The options at present are an individual household/commercial premise bottled supply or the establishment of a centralised 'bullet' for reticulated gas to each household and commercial premise.

3.8.6 Staging

A staged development will occur, with the initial stages being the expansion of the Ardess Industrial Estate to the east. The formulation of future stages will consider the location of services, demand and feasibility considerations. Residential subdivision will only be feasible and environmentally sustainable once reticulated sewerage has been established in the area.

3.9 Developer contributions arrangements

Developer contributions are to be made in accordance with the WAPC's *State Planning Policy 3.6 Development Contributions for Infrastructure* and any Local Planning Policy adopted by the local government.

A Contribution Plan is provided in Appendix 12. This sets out the key infrastructure, community facilities and land requirements to be provided by subdividers with and outside the Structure Plan area.

Some of the key infrastructure and facilities that are covered by the Contribution Plan include:

- Terry Road widening and upgrading;
- Range Road construction;
- Mercer Road/Range Road intersection;
- Mercer Road/neighbourhood connector intersections;
- primary school site; and
- POS.

Subdividers should refer to section 7.1 of Part One - Implementation section for developer contribution responsibilities.

3.10 Implementation

Implementation of the Structure Plan will be through application of the provisions of Part One - Implementation of the Structure Plan through scheme amendment, subdivision and/or development processes.

4.0 CONCLUSION

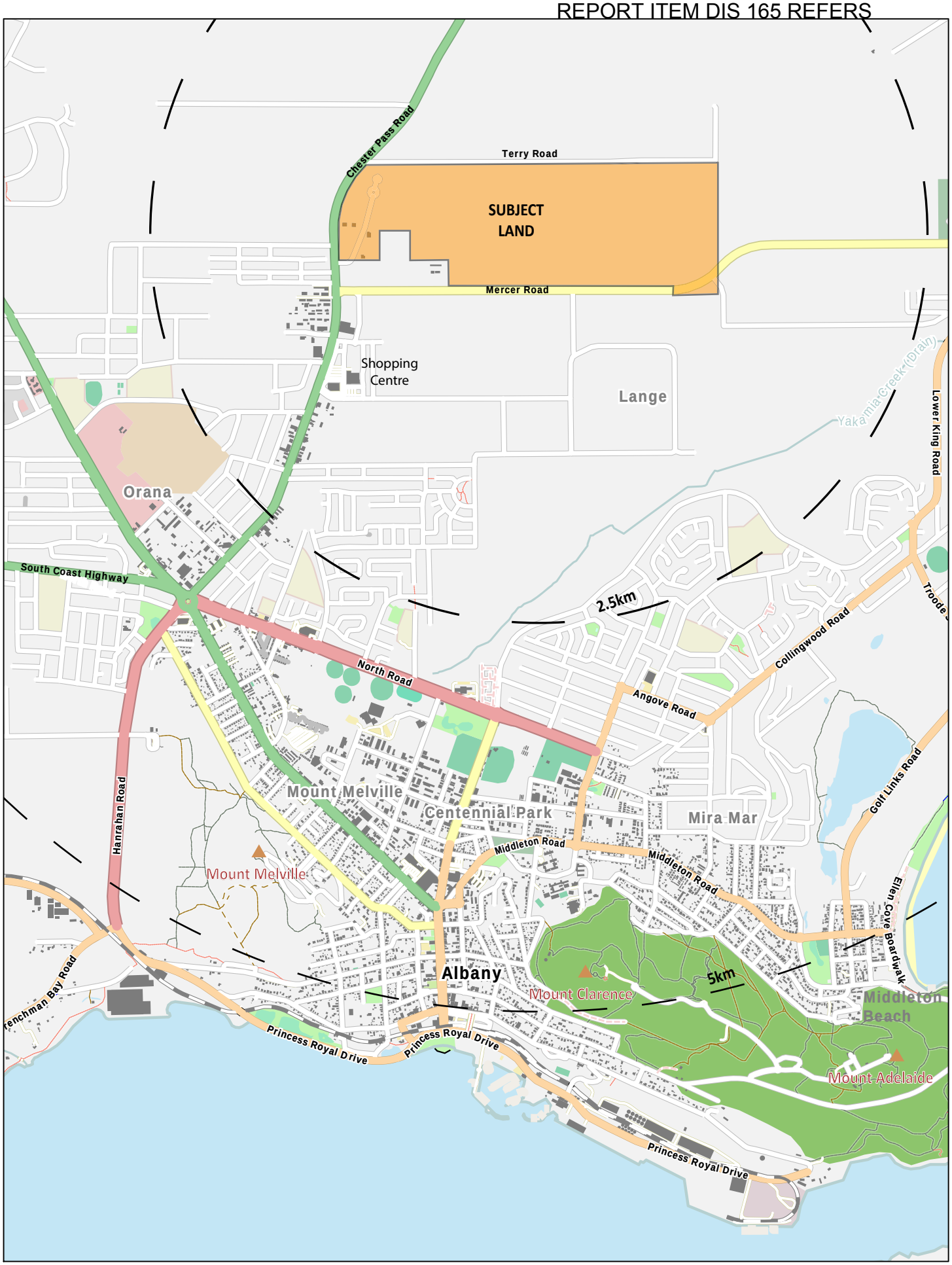
The *Ardess-Walmsley Local Structure Plan* coordinates and facilitates a strategically significant development area as identified in ALPS. Its relative proximity to the Albany central area, retail, commercial and industrial activity provides an opportunity to consolidate development which maximises access to employment and services.

The Structure Plan recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form, that creates an environmentally responsive urban development that meets the EPA, WAPC and City of Albany's environmental requirements.



View of Ardess Industrial Estate and surrounding area

APPENDIX 1



LOCATION PLAN

Lot 10 Chester Pass Road
and Lot 521 Mercer Road
Walmsley, City of Albany

SUBJECT LAND

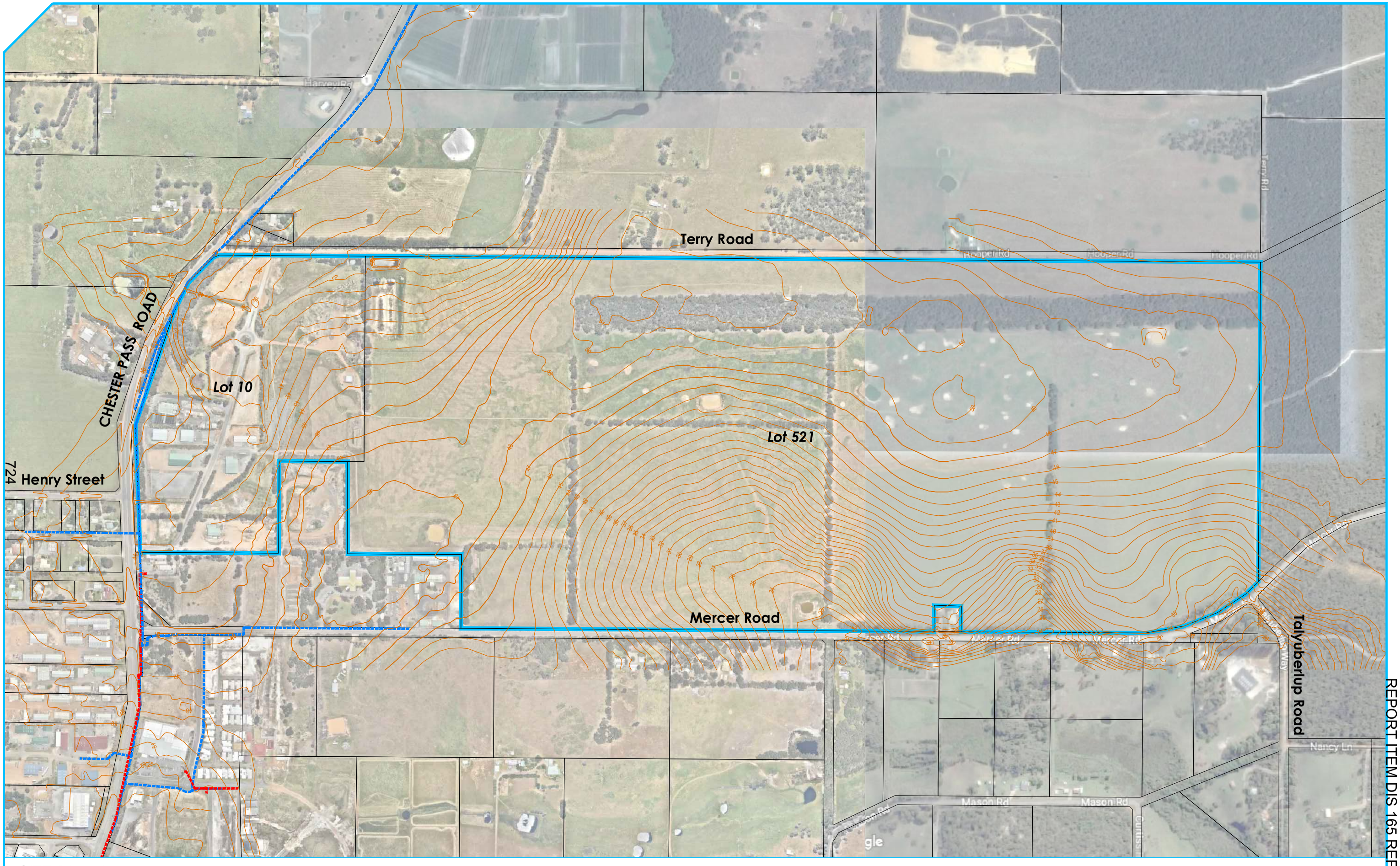
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scale 1 : 30,000 @ A4

0 2km

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APPENDIX 2



SITE PLAN
Lot 10 Chester Pass Road and Lot 521 Mercer Road Walmsley

Legend

- Structure Plan Boundary
- Existing Lot Boundary
- Contours
- Existing u/ground Water Pipe
- Existing u/ground Sewer Pipe

SCALE 1:7500
SHEET A3

0 150 300m

NORTH

REV	DESCRIPTION	YYMMDD	DRAWN	APPRVD
A	CONTEXT PLAN	170522	SJ	ST

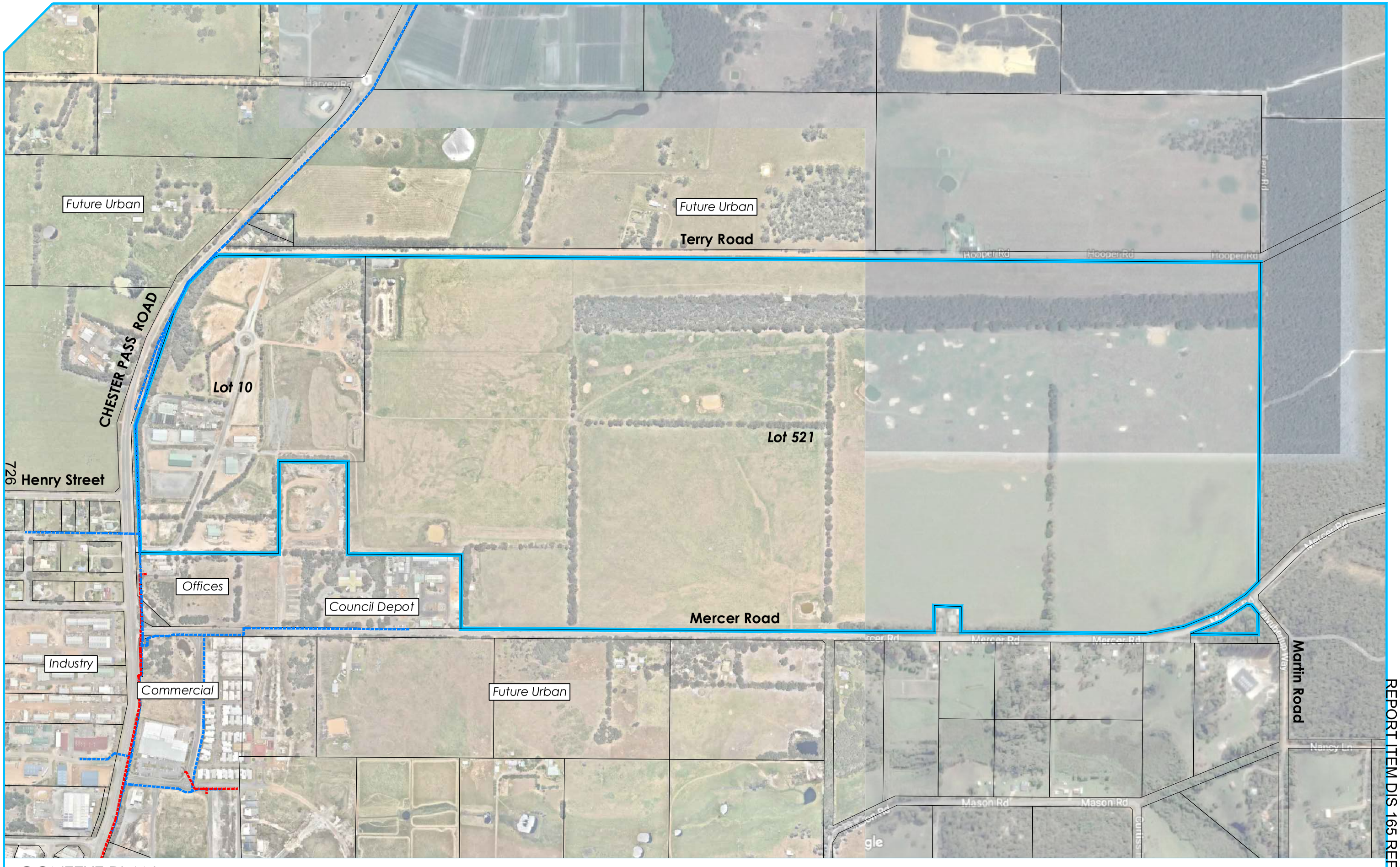
DRAWING NUMBER EP 170520 01 REV A

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REPORT ITEM DIS 165 REFERS

APPENDIX 3



CONTEXT PLAN
Lot 10 Chester Pass Road
and Lot 521 Mercer Road
Walmsley

Legend

- Structure Plan Boundary
- Existing Lot Boundary
- Existing u/ground Water Pipe
- Existing u/ground Sewer Pipe

SCALE 1:7500
SHEET A3

0 150 300m

NORTH

REV	DESCRIPTION	YYMMDD	DRAWN	APPRVD
A	CONTEXT PLAN	170522	SJ	ST

DRAWING NUMBER EP 170520 03 REV A

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APPENDIX 4

ORIGINAL: Not to be removed from the Department of Land Administration.

Application H436981

Volume 1575 Folio 458

WESTERN AUSTRALIA

VOLUME 2192 FOLIO 1

IN THE REGISTER

CERTIFICATE OF TITLE

UNDER THE " TRANSFER OF LAND ACT, 1893 " AS AMENDED

The person described in the First Schedule hereto is the registered proprietor of the undermentioned estate in the undermentioned land subject to the easements, encumbrances and notices shown in the Second Schedule hereto.

REGISTRAR OF TITLES

Dated 5th May, 2000

ESTATE AND LAND REFERRED TO

Estate in fee simple in portion of Plantagenet Location 392 and being Lot 10 on Diagram 99325, delineated on the map in the Third Schedule hereto.

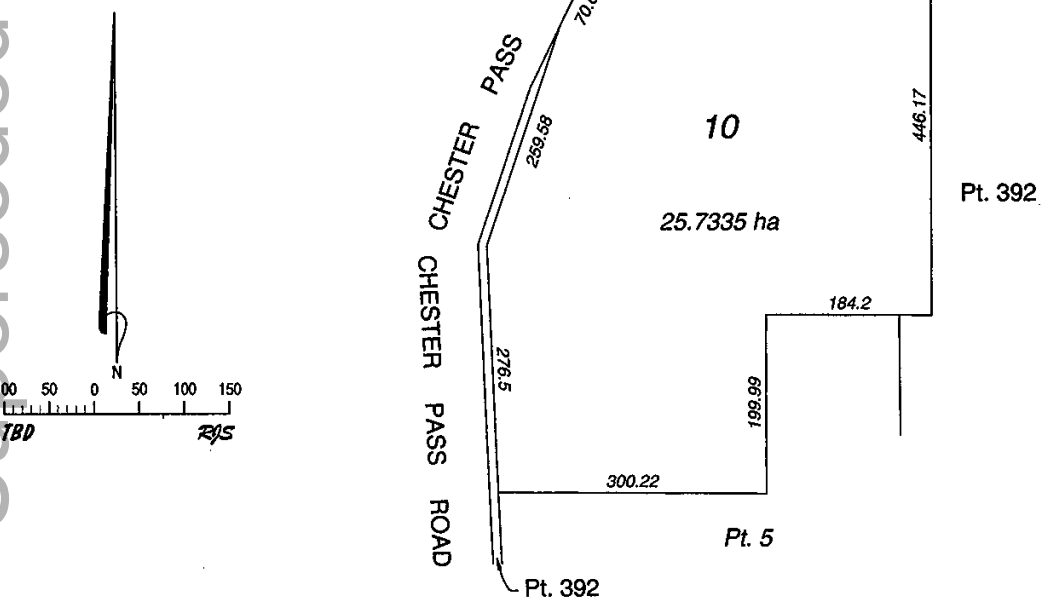
FIRST SCHEDULE (continued overleaf)

~~Ten Year Developments Pty Ltd of 51 Collie Street, Albany.~~

SECOND SCHEDULE (continued overleaf)

1. EASEMENT for Drainage purposes created on Diagram 99325 under Section 27A TP&D Act.
2. MORTGAGE H436984 to **Ten Year Developments Pty. Ltd.** of 51 Collie Street, Albany. Registered 5.5.00 at 11.19 hrs.

THIRD SCHEDULE



NOTE: Entries may be affected by subsequent endorsements.

ORIGINAL CERTIFICATE OF TITLE
Superseded - Copy for Sketch Only
LANDGATE COPY OF ORIGINAL NOT TO SCALE Wed Jan 4 09:27:39 2017 JOB 52822494
728
Landgate
www.landgate.wa.gov.au

REPORT ITEM DIS 165 REFERS

VOLUME 2192 FOLIO 1

IN THE REGISTER

FIRST SCHEDULE (continued) NOTE : ENTRIES MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS

PARTICULARS	INSTRUMENT NATURE	INSTRUMENT NUMBER	REGISTERED	TIME	SEAL & INITIAL
Ardess 1607 Pty. Ltd. of Lot 52 Lower Denmark Road, Albany.	Transfer	H436983	5.5.00	11.19	

SECOND SCHEDULE (continued)

REGISTERED or LODGED	TIME	SEAL & INITIAL	CANCELLATION NATURE	CANCELLATION NUMBER	REGISTERED or LODGED	SEAL & INITIAL

Superseded - Copy for ROM

LANDGATE COPY OF ORIGINAL NOT TO SCALE Wed Jan 4 09:27:39 2017 JOB 52822494

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WESTERN AUSTRALIA

REGISTER NUMBER	
521/DP76829	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
N/A	**N/A**

VOLUME **2822** FOLIO **563**

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 521 ON DEPOSITED PLAN 76829

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

TEN YEAR DEVELOPMENTS PTY LTD OF 51 COLLIE STREET, ALBANY

(AF M485739) REGISTERED 5/12/2013

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP76829
PREVIOUS TITLE:	2795-990
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY:	CITY OF ALBANY

NOTE 1: M485739 THIS LOT/TITLE CREATED AFTER CROWN LAND INCLUDED INTO THE FREEHOLD ESTATE WITHOUT PRODUCTION OF THE DUPLICATE CERTIFICATE OF TITLE. CURRENT DUPLICATE FOR THE WITHIN LAND IS STILL VOLUME 2795 FOLIO 990 EDITION 1

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WESTERN AUSTRALIA

REGISTER NUMBER	
10/D99325	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
2	21/7/2014

RECORD OF CERTIFICATE OF TITLE

VOLUME 2192 FOLIO 1

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 10 ON DIAGRAM 99325

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

ARDESS 1607 PTY LTD OF LOT 52 LOWER DENMARK ROAD, ALBANY
(T H436983) REGISTERED 5 MAY 2000

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1.	*L643182	CAVEAT BY ANNE WALMSLEY AS TO PORTION ONLY LODGED 2.6.2011.
2.	*L643183	CAVEAT BY GORDON WALMSLEY AS TO PORTION ONLY LODGED 2.6.2011.
3.	*L643184	CAVEAT BY PETER WALMSLEY AS TO PORTION ONLY LODGED 2.6.2011.
4.	*L643185	CAVEAT BY RHODA WALMSLEY, GEORGE WALMSLEY AS TO PORTION ONLY LODGED 2.6.2011.
5.	M685117	EASEMENT TO CITY OF ALBANY FOR DRAINAGE PURPOSES - SEE DEPOSITED PLAN 76833 REGISTERED 26.6.2014.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

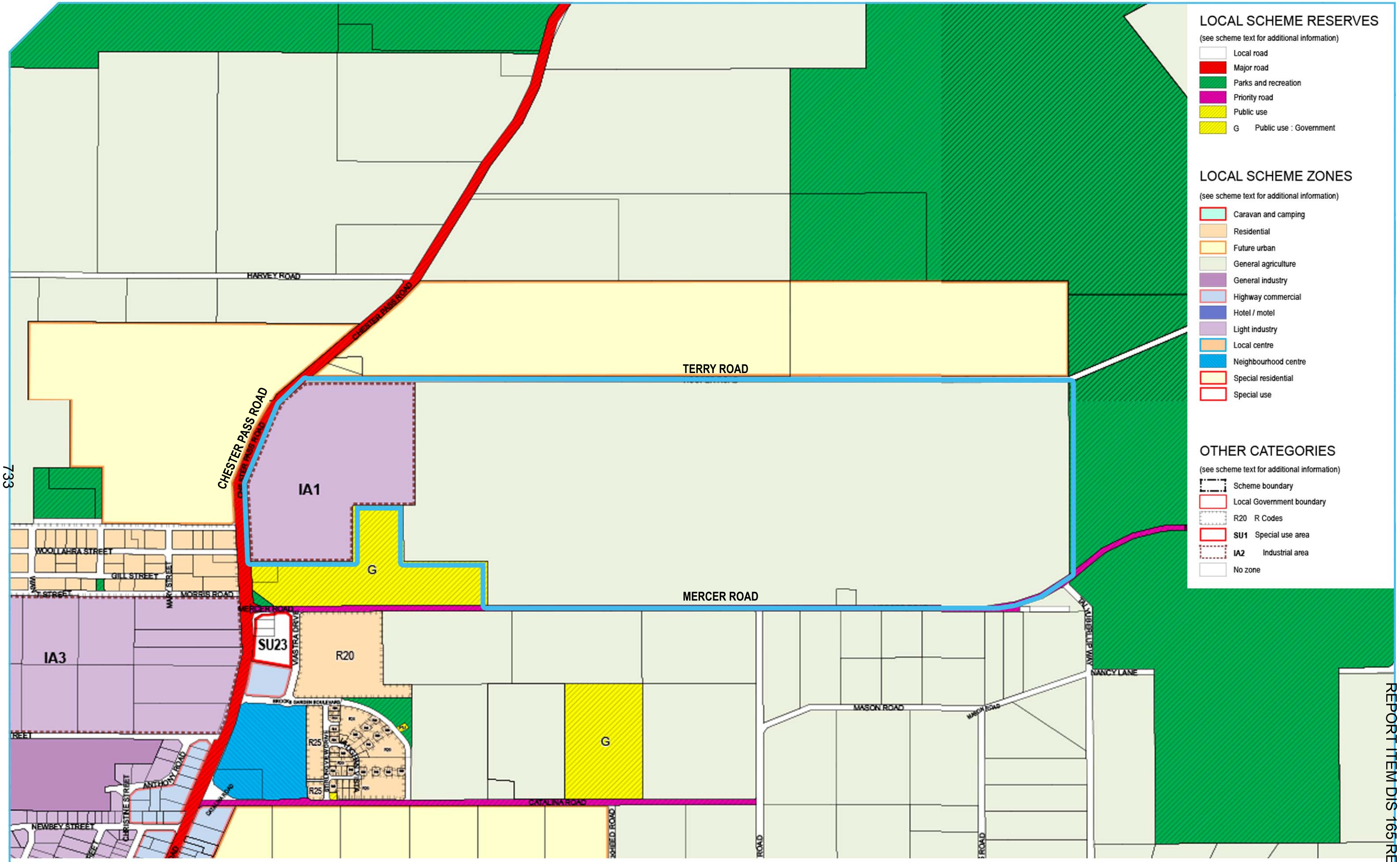
The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 2192-1 (10/D99325).
PREVIOUS TITLE: 1575-458.
PROPERTY STREET ADDRESS: 230 CHESTER PASS RD, WALMSLEY.
LOCAL GOVERNMENT AREA: CITY OF ALBANY.

NOTE 1: M498174 DEPOSITED PLAN (INTEREST ONLY) 76833 LODGED.

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APPENDIX 5



LOCAL SCHEME RESERVES

(see scheme text for additional information)

- Local road
- Major road
- Parks and recreation
- Priority road
- Public use
- G Public use : Government

LOCAL SCHEME ZONES

(see scheme text for additional information)

- Caravan and camping
- Residential
- Future urban
- General agriculture
- General industry
- Highway commercial
- Hotel / motel
- Light industry
- Local centre
- Neighbourhood centre
- Special residential
- Special use

OTHER CATEGORIES

(see scheme text for additional information)

- Scheme boundary
- Local Government boundary
- R20 R Codes
- SU1 Special use area
- IA2 Industrial area
- No zone

EXISTING ZONING PLAN
Lot 10 Chester Pass Road and Lot 521 Mercer Road Walmsley

Legend

- Structure Plan Boundary

NORTH

0 300 600 900 1,200

REV	DESCRIPTION	YYMMDD	DRAWN	APPRVD
A	EXISTING ZONING	170522	SJ	ST

DRAWING NUMBER EP 170520 04 REV A

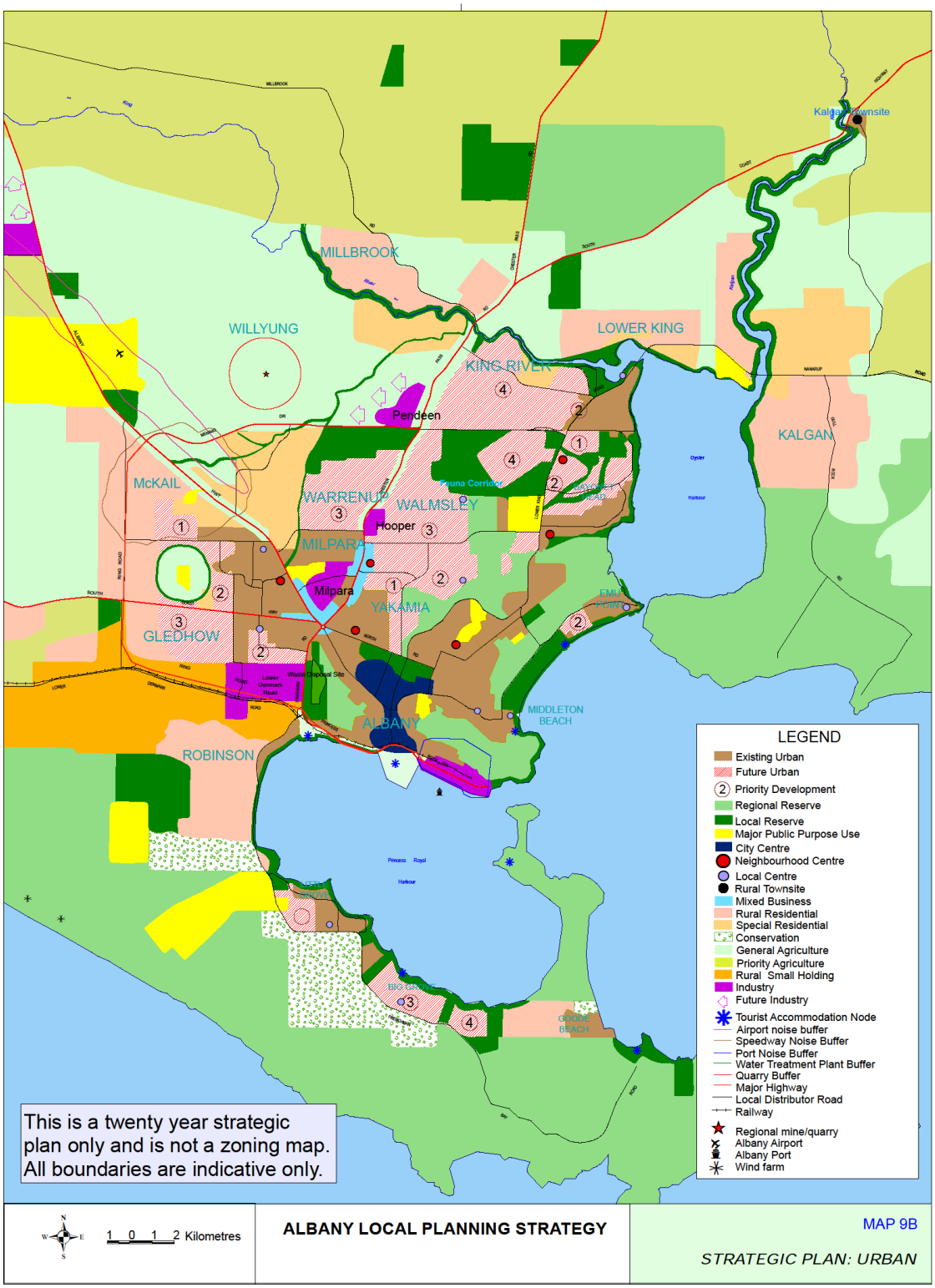
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APPENDIX 6

No.	Industrial Area	Special Conditions Applying to Industrial Area
IA1	Ardess Light Industrial Estate, Chester Pass Road and Terry Road, Walmsley	**1. Subdivision** 1.1 Subdivision of the land shall generally be in accordance with Development Guide Plan *IA1* endorsed by the CEO, with any minor variations approved by the Western Australian Planning Commission. **2. Land Use** 2.1 Notwithstanding any other requirements of the Zoning Table, the following land use restrictions shall apply - (i) All industrial uses within the zone shall comply with the definition of a 'Dry Industry' as follows: *Dry Industry means an industrial land use which can demonstrate to the satisfaction of the Local Government that the quality/quantity and volume of wastes produced from its operations can be successfully disposed of on- site without creating any adverse environmental or health effects.* 2.2 The Local Government may permit a maximum of 16 dry industries (industries which do not have significant effluent or waste disposal requirements) on the lot (average density = 1.62 hectares per industry). **3. Site and Building Requirements** 3.1 All buildings and structures are to have minimum setback as follows: (i) Internal Road: 9 metres; and (ii) Revegetation Areas: 10 metres. 3.2 The setback from the internal road can be used for landscaping, car parking or trade display. **4. Access to Ardess Industrial Estate** 4.1 Access to the estate will be via a single entry road onto Chester Pass Road. 4.2 All internal roads and crossovers will be required to be sealed to the satisfaction of the Local Government. The minimum road pavement width for the internal road(s) should be 10 metres with 2 metre shoulders to allow the passage of two passing vehicles past a further vehicle parked at the verge. Minor roads are to be constructed to at least 5 metres pavement width. **5. Stormwater Management** 5.1 The Local Government will require stormwater disposal measures to be implemented to ensure that maximum retention and infiltration occurs on site through the use of individual soakwells, retention basins or other measures as deemed necessary. Oil and grease traps are to be provided within each building site to the satisfaction of the Local Government to ensure that nutrient export off the site is kept to a minimum. **6. Effluent Disposal** 6.1 On-site effluent disposal shall utilise alternative treatment effluent disposal systems unless the applicant can provide advice to the Local Government that soil conditions are conducive to the operation of septic tanks and leach drains and will not result in unacceptable loss of nutrients to surrounding waterways, or create a risk to public health.

APPENDIX 7


Kalgan Townsite
MILLBROOK
WILLYUNG
LOWER KING
KING RIVER
Pendeen
KALGAN
McKAIL
WARRENUP
WALMSLEY
Hooper
MILPARA
Milpara
YAKAMIA
GLEDHOW
EMU POINT
MIDDLETON BEACH
ALBANY
ROBINSON
GOODE BEACH
This is a twenty year strategic plan only and is not a zoning map. All boundaries are indicative only.
LEGEND
Existing Urban
Future Urban
Priority Development
Regional Reserve
Local Reserve
Major Public Purpose Use
City Centre
Neighbourhood Centre
Local Centre
Rural Townsite
Mixed Business
Rural Residential
Special Residential
Conservation
General Agriculture
Priority Agriculture
Rural Small Holding
Industry
Future Industry
Tourist Accommodation Node
Airport noise buffer
Speedway Noise Buffer
Port Noise Buffer
Water Treatment Plant Buffer
Quarry Buffer
Major Highway
Local Distributor Road
Railway
Regional mine/quarry
Albany Airport
Albany Port
Wind farm
1 0 1 2 Kilometres
ALBANY LOCAL PLANNING STRATEGY
MAP 9B
STRATEGIC PLAN: URBAN

APPENDIX 8

ARDESS SERVICE INDUSTRY ESTATE - DEVELOPMENT PLAN

Legend

- Existing fences
- Proposed Main Roads, 10m 2 coat seal
- Proposed Access Roads, 5m 2 coat seal
- Constructed drainage lines, additonal retention basins in positions shown if needed
- Retention and swirl basins to ameliorate water flows across site.
- Strategic firebreaks / emergency access routes Gravel to 2WD all weather standard
- Revegetation Areas (further plantings around individual industries will be required)
- Potential industrial sites. Final siting to be determined by landowner and Council depending upon industry requirements. Hatch areas shown are approximately 2500m².
- Landsca Protection Zone (dimensions as shown)

Major contour interval 2.0m, minor contour interval 0.5m, heights approx. AHD., Map Datum Local - Albany Grid

0 50 100 250

TOWN PLANNING INFORMATION

To be read in conjunction with the City of Albany Town Planning Scheme No. 3

Service Industry Zone:

i) Council shall not permit an industrial use unless it can be demonstrated that by application of buffer standards in place at the time the industry can be accommodated without detrimental impact upon surrounding land uses and that the industry will perform as a "Dry Industry".

ii) The landowner will be required to demonstrate that prospective industries will be able to meet environmental guidelines in terms of risk, noise, dust, emissions or other potential nuisance and be able to be accommodated on the site without the need for a buffer distance of greater than 50m.

iii) The landowner shall be required to plant and maintain suitable revegetation areas to maintain visual amenity of the site and to assist in nutrient assimilation. Council may require additional plantings as a condition of Planning Scheme Consent or allow a variation to any revegetation plan if an area of the same or greater extent is planted elsewhere within the site to Councils satisfaction. The choice of species shall be the responsibility of the landowner but at least 50% of the trees must be capable of growing to a height of 3m within 5 years, with preference given to species endemic to the region.

iv) Applications for Planning Scheme Consent shall be required for all uses as listed in Table 1 for the Service Industry Zone and any change of use. The Application for Planning Scheme Consent shall require the submission of a completed "Application for Planning Scheme Consent", three copies of the plan showing the exact location of any buildings or displays proposed and three copies of scaled elevation plans for any buildings or displays showing colours and materials to be used.

v) Uses not specifically listed in Table 1 may be permitted if, in the opinion of Council, they will fulfil the objectives of the zone. Such uses will be regarded as "AA" uses for the purposes of public consultation and advertising. Any additional requirements for individual areas are to be listed in Schedule 6 - Service Industry zone.

Extract from Schedule VI "Special provisions relating to the Ardess Service Industry Zone"

i) Council may permit a maximum of 16 dry industries on the lot (average density = 1.625ha per industry). The area allotted to each industry will be dependant upon individual industry requirements in terms of area, internal buffers and land capability. Any requests by the landowners to increase the maximum number of industries shall be made in the manner of Scheme Policy or Scheme Amendment to be decided upon by Council and dependant upon the scale and nature of the proposed changes.

ii) All buildings and structures shall be set back a minimum of 20 metres from the internal road and 10 metres from any revegetation area. The 20m setback from the internal road can be used for landscaping, carparking or trade display in a similar manner to the standards set by provisions 5.7 to 5.9 inclusive or any alterations to these provisions by way of a Town Planning Scheme Policy or Amendment.

iii) Council may vary the setback requirements for any setback if the landowner can demonstrate that it will not adversely impact upon adjoining industries, revegetation or access for firefighting purposes and may require further screening within the reduced setback area to compensate for any percieved or actual loss of amenity.

iv) All entrance to the estate will be via a single entry onto Chester Pass Road.

v) Advertising signs for individual businesses shall not be visible from Chester Pass Road although a sign stack approved by and to the specifications of the Main Roads Department may be erected upon Chester Pass Road at the entry statement.

vi) A single entry statement may be erected at the Chester Pass Road entrance subject to advice and approval from Council and the Main Roads Department.

vii) All internal roads and crossovers will be required to be sealed to the satisfaction of Council. The minimum standard proposed is for the main internal road to have a pavement width of 10m with 2m shoulders to allow the passage of tw ssing vehicl past a further vehicle parked on the verge. Minor roads are to be constructed to at least 5m pavement width.

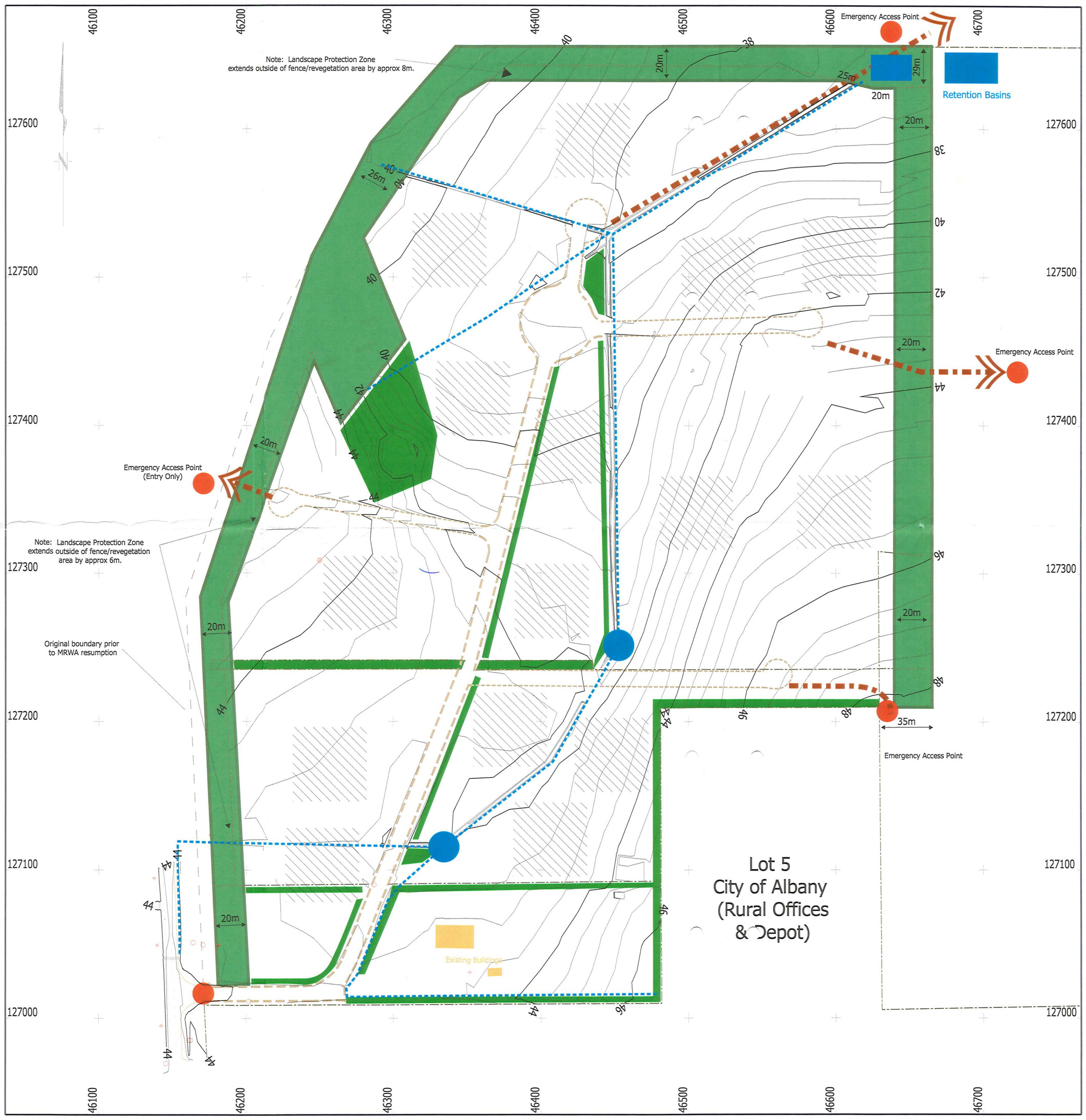
viii) Council will require stormwater disposal measures to be taken to ensure that maximum retention and infiltration occurs on site through the use of individual soakwells, retention basins or other measures as deemed necessary. Oil and grease traps are to be provided within each building site to the satisfaction of Council to ensure that nutrient export off the site is kept to a minimum.

ix) On site effluent disposal shall utilise amended soil systems unless the proponent can provide advice to Council that soil conditions are conducive to the operation of septic tanks and leach drains and will not result in unacceptable loss of nutrients to surrounding waterways, or risk to public health.

x) The landowner shall be directly responsible for the maintenance of amenity in those areas surrounding individual industries and shall take necessary means to rectify unsightly displays or unkempt land as directed by Council.

xi) Carparking bays shall be provided in accordance with relevant standards as directed by Council.

xii) The landowner shall provide a copy of these Special provisions to prospective tenants and provision shall be made to the satisfaction of Council to prove that this has occurred and that the prospective tenant has read and understood their content.



APPENDIX 9

REPORT ITEM DIS 165 REFERS

Lot 10 Chester Pass Road &
Lot 521 Mercer Road,
Walmsley WA 6330

Environmental Assessment and Land Capability Assessment Report



BIO DIVERSE SOLUTIONS

21/11/2017

Kathryn Kinnear

Bio Diverse Solutions

DOCUMENT CONTROL

Title: Environmental Assessment Report – Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley WA

Author (s): Chiquita Burges

Reviewer(s): Kathryn Kinnear & Steve Thompson

Job Number: EPP 004

Client: Ardess 1607 Pty Ltd

REVISION RECORD

Revision	Summary	Revised By	Date
Draft Id 26/09/2017	Internal QA Review	Kathryn Kinnear	26/09/2017
Draft Id 29/09/2017	Issued to client for review	K. Kinnear	29/9/2017
Draft Id 26/10/2017	Updated as per client review	B. Theyer	26/10/2017
Draft Id 13/11/2017	Issued to Client	K. Kinnear	13/11/2017
Final Id 21/11/2017	Final updates and Issued to Client	K. Kinnear	21/11/2017

The recommendations and measures contained in this assessment report are based on the requirements of the Australian Standards 3959 – Building in Bushfire Prone Areas, WAPC SPP3.7, Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017) and CSIRO's research into Bushfire behaviour. These are considered the minimum standards required to balance the protection of the proposed dwelling and occupants with the aesthetic and environmental conditions required by local, state and federal government authorities. They DO NOT guarantee that a building will not be destroyed or damaged by a bushfire. All surveys and forecasts, projections and recommendations made in this assessment report and associated with this proposed dwelling are made in good faith on the basis of the information available to the fire protection consultant at the time of assessment. The achievement of the level of implementation of fire precautions will depend amongst other things on actions of the landowner or occupiers of the land, over which the fire protection consultant has no control. Notwithstanding anything contained within, the fire consultant/s or local government authority will not, except as the law may require, be liable for any loss or other consequences (whether or not due to negligence of the fire consultant/s and the local government authority, their servants or agents) arising out of the services rendered by the fire consultant/s or local government authority.

BIO DIVERSE SOLUTIONS

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

Bio Diverse Solutions
29 Hercules Crescent
Albany WA 6330

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CONTENTS

1. EXECUTIVE SUMMARY 1
2. INTRODUCTION 3
2.1. LOCATION 3
2.2. LOCAL STRUCTURE PLAN 4
2.3. STATUTORY FRAMEWORK 4
2.4. SUITABLY QUALIFIED ENVIRONMENTAL CONSULTANTS 5
3. EXISTING ENVIRONMENT 7
3.1. EXISTING LAND USE 7
3.2. SURROUNDING LAND USES 8
3.3. CLIMATE 9
3.4. TOPOGRAPHY 9
3.5. ACID SULPHATE SOILS 9
3.6. GEOLOGY AND SOILS 10
3.7. SURFACE WATER HYDROLOGY 11
3.8. GROUNDWATER HYDROLOGY AND HYDROGEOLOGY 11
3.9. WETLANDS 12
3.10. SEWERAGE SENSITIVE AREA 12
3.11. FLORA AND VEGETATION 12
3.12. FAUNA 15
3.13. CONTAMINATED SITES 16
3.14. HERITAGE 16
3.15. BUSHFIRE THREATS 16
4. LAND CAPABILITY ASSESSMENT 20
4.1. LAND USE REQUIREMENTS 21
4.2. LAND RESOURCE SURVEY 22
4.3. LAND CAPABILITY ANALYSIS 24
5. POTENTIAL ENVIRONMENTAL IMPACTS AND MANAGEMENT MEASURES 25
5.1. ACID SULPHATE SOILS 25
5.2. WATER MANAGEMENT 25
5.3. WASTE WATER MANAGEMENT 26
5.4. FLORA AND VEGETATION 27
5.5. FAUNA 28
5.6. FIRE MANAGEMENT 28
5.7. LIGHT INDUSTRIAL AREA AND ASSOCIATED BUFFERS 29
6. MANAGEMENT COMMITMENTS AND CONCLUSIONS 30
7. REFERENCES 31

LIST OF TABLES

Table 1: Phosphorus Retention Index Results

Table 2: Land Capability Classes

Table 3: Land Qualities to fulfil Urban Development Land Use Requirements

Table 4: Land Qualities to fulfil Light Rural Industry Land Use Requirements

Table 5: Mapping Units

Table 6: Land Capability Assessment for Urban Development

Table 7: Light Rural Industry Land Capability Rating

Table 8: Assessment to On-site Effluent Disposal Lot Requirements

Table 9: Bushfire protection criteria applicable to the site

LIST OF FIGURES

Figure 1: Location Plan

Figure 2: Topography and ASS Risk Mapping

Figure 3: Borehole Locations

Figure 4: ARVS & Broad Scale Vegetation Survey Mapping

Figure 5: Bushfire Prone Area Mapping

Figure 6: Land Capability Mapping Units

APPENDICES

Appendix A: Draft Local Structure Plan (Edge Planning & Property, 2017).

Appendix B – Geotechnical Investigation (Great Southern Geotechnics, 2017)

Appendix C – Phosphorous Retention Index Test Results (CSBP Laboratory, 2017)

Appendix D - BAL Contour Plan (Bio Diverse Solutions, 2017)

1. Executive Summary

Ardess 1607 Pty Ltd commissioned Bio Diverse Solutions (Environmental Consultants) to prepare an Environmental Assessment Report (EAR) and Land Capability Assessment (LCA) to guide all future environmental management for the proposed subdivision of Lot 10 Chester Pass Road and Lot 521 Mercer Road, Albany WA.

This EAR and LCA describes the relevant environmental characteristics of the site and presents management and mitigation strategies in response to potential environmental impacts. These management and mitigation strategies aim to minimise the potential impact on the environmental values within the site.

The Local Structure Plan (LSP) has been developed to guide the subdivision and development of the Subject Site (Appendix A). The LSP for the site proposes an extension of the adjacent light industrial area, a residential zone which includes are range of residential densities, a primary school and three POS areas. The proposed light industrial area will require on-site effluent disposal, where as the residential area will be developed once reticulated sewerage has been established in the area. This EAR and LCA identifies the measures proposed to mitigate and manage the environmental features of the site, and focuses on the natural areas to be retained within the LSP.

The Subject Site was found to have no significant environmental constraints. A geotechnical investigation conducted by Great Southern Geotechnics (2017) under late winter conditions did not encounter groundwater to depth of 2.3m across the site. Soil type across the majority of the site was found to be sandy gravel over sandy clay with low permeability and high PRI. A small area in the southern central portion of the site was found to have silty sand over gravelly sand with a low PRI. There is no significant waterways, wetlands or groundwater resources within the Subject Site or within the vicinity of the Subject Site.

The vegetation across the Subject Site and surrounding areas is consistent with rural farmland, with the majority of the site and surrounds comprising of heavily grazed pasture dominated by pasture grass species. There are two areas of remnant vegetation within the Subject Site. A broad scale vegetation survey of these two areas was conducted with the strip of vegetation running parallel with the northern boundary of the site (approximately 12 ha in size) found to comprise of Low Open Jarrah/Marri/Sheoak Forest in good condition and the small area of remnant vegetation in the south-east corner comprising of mixed Eucalypt Forest in a degraded condition.

A BAL Contour Plan was prepared by Bio Diverse Solutions to identify the bushfire risks associated with the site (Appendix D) and guide the Structure Plan development. The Subject Site was assessed as having internal areas of Grassland Type G consistent with rural farmland, low fuel/non- vegetated areas (associated with the industrial area, tracks/roads and buildings) and an area of Forest Type A (being the strip of remnant vegetation in the north). External bushfire risks are mostly associated with the Forest Type A (CoA Reserve) directly to the east and south-east of the Subject Site and Forest Type A and Woodland Type B along the Mercer Road Reserve. BAL contouring across the Subject Site has allocated BAL 29 or less shall apply to any buildings within the lots. All future buildings (through subdivision designs) can achieve an APZ area associated with a BAL allocation of BAL 29, BAL 19 or BAL 12.5. A detailed Bushfire Management Plan has not been prepared for the site. The publicly released Bushfire Prone Area Mapping (DFES, 2017) shows that the majority of the Subject Site is located within a Bushfire Prone Area (situated within 100m of >1 ha of bushfire prone vegetation). Where “High risk” or “Vulnerable land uses” (Primary school), as defined by SPP 3.7 are proposed, detailed Bushfire Management Plans are to be prepared.

A Land Capability Assessment (LCA) of the site was conducted in accordance with the State Planning Commission’s (1989) Land Capability Assessment for Local Rural Strategies (note these definitions are as per this policy for the purposes of this report and not any other planning instrument/policy). The overall capability of the Subject Site supporting the Urban Development land use was rated as highly capable for Mapping Unit 1 and very highly capable for Mapping Unit 2. The overall capability of the Subject Site supporting the Light

Rural Industrial (as per WAPC, 1989) land use is rated as highly capable for Mapping Unit 1. Mapping Unit 2 was not encountered at the location of the proposed Light Rural Industrial land use. The degree of limitations for both Urban Development and Light Rural Industry for Mapping Unit 1 and Mapping Unit 2 is low to very low.

This EAR and LCA report provides details of the ASS, Water, Waste Water, Flora, Fauna and Fire Management strategies proposed to be implemented across the site as it is developed to ensure adequate protection of environmental, life, property and biodiversity assets.

The proposed LSP recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form, that creates an environmentally responsive urban development that meets the EPA and City of Albany's environmental requirements. Consequently, the environmental outcomes of the proposed LSP are considerable and include:

- Providing an improvement in groundwater and surface water quality through residential and industrial development and implementation of water sensitive urban design and best stormwater drainage management practices.
- Revegetation using native species (where currently there is very little native species and diversity) in areas of POS to promote fauna habitat and flora diversity. Landscaped urban areas to promote biodiversity using native plants.
- Maintaining areas of remnant vegetation and limiting access points through these areas to the subdivision to prevent adverse impacts particularly for transient fauna.
- The Local Structure Plan is required to meet the "Acceptable Solutions" of each Element of the bushfire mitigation measures (WAPC, 2017).
- As Light industrial land use is proposed in the west of the Structure Plan, a detailed Bushfire Management Plan will be required to guide developers if any industry is defined as "High Risk".
- A detailed Bushfire Management Plan jointly endorsed by DFES and CoA will be required for any Primary School proposed in the Structure Plan area, at the Development Application stage. A Bushfire Emergency Evacuation Plan (BEEP) will be required at Development Approval Stages.
- The proposed light industrial area is deemed appropriate for effluent disposal and meets the state's minimum requirements for on-site sewage disposal systems as outlined in the *Draft Government Sewerage Policy* (Department of Planning, 2016). Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.
- Provide vegetated buffer and / or other management techniques between industrial areas to sensitive land uses (such as residential) in accordance with the EPA's (2015) Draft Guidance Statement No. 3 *Separation Distances Between Industrial and Sensitive Land Uses.*

2. Introduction

Ardess 1607 Pty Ltd commissioned Bio Diverse Solutions (Environmental Consultants) to prepare an Environmental Assessment Report (EAR) and Land Capability Assessment (LCA) to guide all future environmental management for the proposed subdivision of Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley WA.

This EAR and LCA describes the relevant environmental characteristics of the site and presents management and mitigation strategies in response to potential environmental impacts. These management and mitigation strategies aim to minimise the potential impact on the environmental values within the site.

2.1. Location

Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley WA (herein referred to as the Subject Site) is 178ha and located approximately 6km north of the Albany CBD. The Subject Site is bound by Chester Pass Road to the west, Mercer Road to the south, Terry Road to the north and a City of Albany (CoA) reserve to the east. The location of the Subject Site is shown on Figure 1.

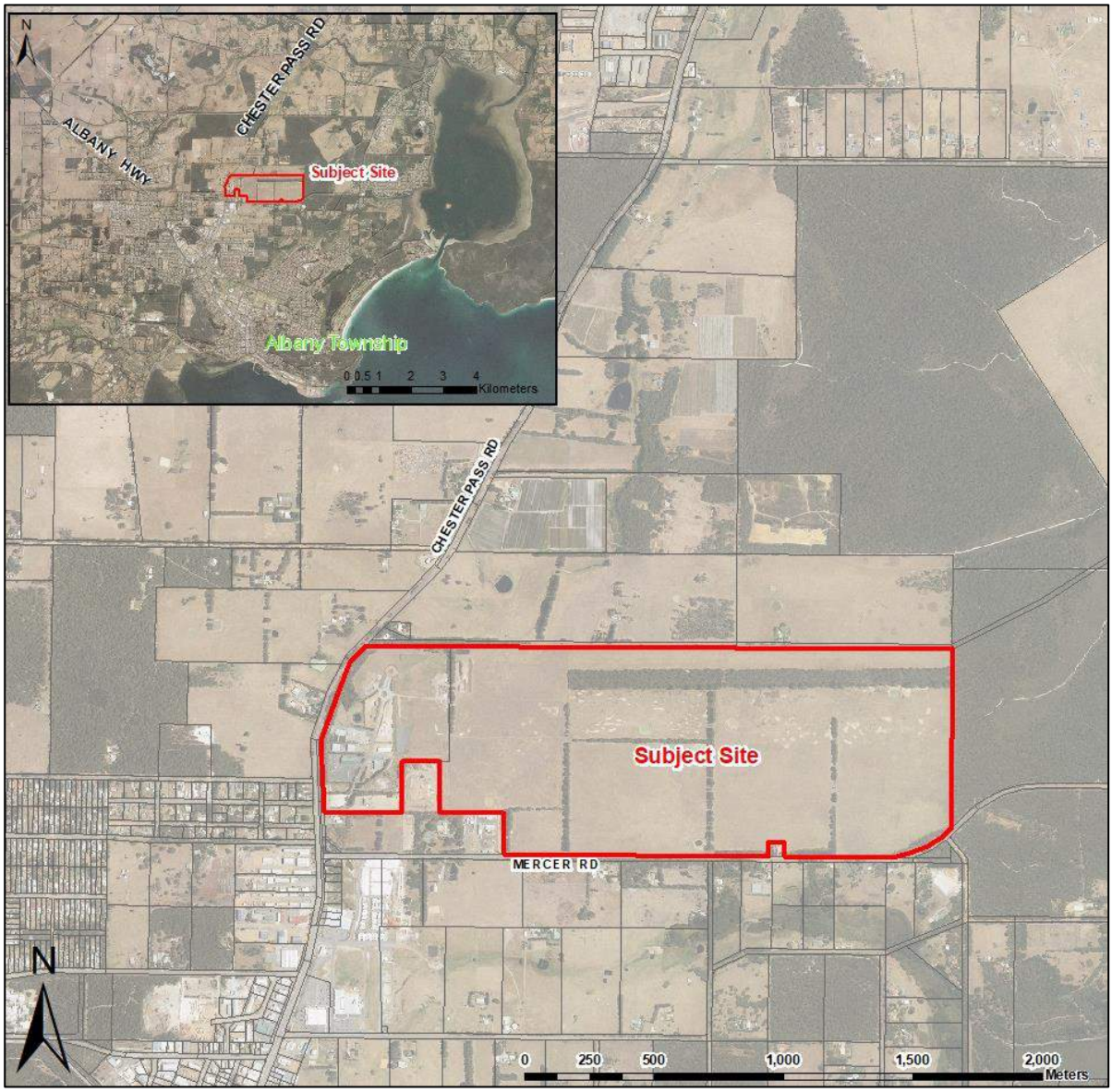


Figure 1: Location Plan

2.2. Local Structure Plan

The Local Structure Plan (LSP) has been developed to guide the subdivision and development of the Subject Site, the Draft LSP for the site has been included as Appendix A.

The proposed LSP includes the following land uses:

- Residential (R30-R60);
- Residential (R20-R30);
- Residential (R15-R25);
- Primary School Site;
- Public Open Space (POS); and
- Light Industrial.

There is no current staging plan for the LSP however the initial stage/s of the subdivision will include the extension of the existing light industrial area within the Subject Site (Ardess Industrial Estate) further to the north and east. There is currently no reticulated sewerage at the location of the Subject Site and as such the lots within the proposed Light Industrial Area will require on-site sewerage disposal and a minimum lot size of 1ha consistent with guidelines set out in the Draft Government Sewerage Policy (Gov. of WA, 2016).

Subsequent stage/s of the subdivision will include the development of the central and eastern portion of the site into a residential zone, including a Primary School and two areas of POS. Residential densities within the residential zone will range from R15 to R60. The residential zone of the subdivision will only be feasible and environmentally sustainable once reticulated sewerage has been established in the area. Therefore, there will be no on-site sewerage disposal within this area.

This EAR and LCA identifies the measures proposed to mitigate and manage the environmental features of the site, and focuses on the natural areas to be retained within the LSP.

2.3. Statutory Framework

Development within the site is required to comply with relevant environmental legislation, policy and guidelines. This document and the recommendations contained within are aligned to the following key state and Commonwealth legislation and regulations;

- *Environmental Protection Act 1986*;
- *Environmental and Protection and Biodiversity Conservation Act 1999 (EPBC Act);*
- *Environment Protection and Biodiversity Conservation Regulations 2000*;
- *Conservation and Land Management Act 1984;*
- *Conservation and Land Management Regulations 2002;*
- *Environmental Protection (Noise) Regulations 1997;*
- *State Legislation Aboriginal Heritage Act 1972;*
- *Heritage of Western Australia Act 1950;*
- *Land Administration Act 1997;*
- *Planning and Development Act 2005;*
- *Rights in Water and Irrigation Act 1914;*
- *Contaminated Sites Act 2003;*
- *Wildlife Conservation Act 1950;*
- Draft Government Sewerage Policy – Consultation Draft 2016;
- DER Acid Sulphate Soils Assessment Guidelines;
- Western Australian State Planning Policy (SPP) 3.7; and
- Guidelines for Planning in Bushfire Prone Areas 2017.

2.4. Suitably Qualified Environmental Consultants

This EAR and LCA has been prepared by suitable qualified personnel from Bio Diverse Solutions. The three qualified personnel responsible for delivery of this assessment include; Chiquita Burges (Senior Hydrologist/Environmental Consultant), Bianca Theyer (Conservation and Wildlife Biologist/Environmental Consultant) and Kathryn Kinnear (Level 2 BPAD Accredited 30794 Bushfire Consultant).

Chiquita Burges

The existing environment and general environmental management section of this report has been prepared by Chiquita Burges. Chiquita has the following Tertiary Qualifications:

- B.Sc. Natural Resource Management; and
- Graduate Certificate in Hydrogeology

Chiquita has over 8 years of experience working as a hydrologist and senior hydrologist, her experience includes preparation of local and urban water management strategies, surface water and groundwater monitoring programs and hydrogeological reports. Tasks undertaken by Chiquita include report writing, mapping, field work including installation and monitoring of groundwater bores, modelling of stormwater and groundwater and liaising with clients, sub-consultants and approving agencies. Since joining Bio Diverse Solutions in early 2017 Chiquita has diversified her skills and knowledge to include more general environmental consultancy work.

Bianca Theyer

The flora and fauna component of this assessment has been prepared by Bianca Theyer. Bianca has the following Tertiary Qualifications:

- B.Sc. Conservation and Wildlife Biology; and
- Honours Conservation Biology.

Bianca has experience in biodiversity management with direct experience including: biodiversity surveys, fauna surveys, monitoring and trapping programs (invertebrates, mammals, amphibians, and reptiles); flora surveys and vegetation assessments. Bianca has been responsible for several projects during her time at Bio Diverse Solutions, these include multiple flora (including threatened) and vegetation surveys; fauna habitat survey at Frenchman Bay, Albany; Environmental Assessment Reports for a proposed liquid waste facility, a pastured egg farm and a proposed gravel extraction project; Foreshore Management Plans for projects in South Moorlands, Bunbury and Frenchman Bay Albany; a Mosquito Management Plan for Meadowbrook Lifestyle Villages in Boyanup, and development of an Environmental Management Plan for a proposed Solar Station in Kalbarri.

Kathryn Kinnear

The bushfire assessment and management component of the assessment has been prepared by Kathryn Kinnear. Kathryn Kinnear currently has the following tertiary Qualifications:

- BAS Technology Studies & Environmental Management;
- Diploma Business Studies; and
- Graduate Diploma in Environmental Management.

Kathryn Kinnear is an accredited Level 2 Bushfire Practitioner (Accreditation No: BPAD30794) who has 10 years operational fire experience with the (formerly) DEC (1995-2005) and has the following accreditation in bushfire management:

- Incident Control Systems;
- Operations Officer;
- Prescribed Burning Operations;
- Fire and Incident Operations;
- Wildfire Suppression 1, 2 & 3;

- Structural Modules – Hydrants and hoses, Introduction to Structural Fires, and Fire extinguishers; and
- Ground Controller.

Kathryn Kinnear has also worked in environmental management for 20 years within that time she has worked on a vast range of environmental projects and has developed specialist skills in field operations, reporting and project management.

Bio Diverse Solutions are Silver Corporate Members of the Fire Protection Australia Association. Kathryn is a committee member of the WA Bushfire Working Group (FPAA) and is a suitably qualified Bushfire Practitioner to assess the bushfire risks and management strategies.

3. Existing Environment

3.1. Existing Land use

The Subject Site currently consists of multiple land uses; Lot 10 Chester Pass Road (Lot to the west) comprises of an industrial area and cleared land used to keep current and old farm machinery and sand/gravel piles. The industrial area comprises of sheds, office building, car parks, an internal road network and cleared areas for future development. Businesses within the industrial area include; Albany Freight Lines, Designer Dirt (landscaping supplies) and Ardess Nursery.

Lot 521 Mercer Road (Lot to the east) encompasses the majority of the Subject Site and comprises of predominantly cleared rural land used for grazing cattle. There are no existing dwellings on Lot 521 Mercer Road, there are two small to medium sized sheds (one used to store hay and farm machinery and the other an old shearing shed), a set of cattle yards and a strip of remnant vegetation in the north-east of the Subject Site. Land use within the Subject Site is shown on Photographs 1 to 4.



Photograph 1 – View of cleared rural land within Lot 521 Mercer Road.



Photograph 2 – View of old farm machinery within Lot 10 Chester Pass Road.



Photograph 3 – View of hay and machinery shed located in the north of Lot 521 Mercer Road.



Photograph 4 – View of internal road and roundabout within industrial area in Lot 10 Chester Pass Road.

3.2. Surrounding land uses

The Subject Site is surrounded by rural properties to the north, west and south and remnant vegetation (CoA reserve) to the east. To the south-west of the Subject Site along Chester Pass Road and adjacent to the western most section of Mercer Road is Albany's light industrial area which includes a range of businesses and a lifestyle village and on the western side of Chester Pass Road is a residential area. The surrounding areas are shown on Photographs 5 to 8.



Photograph 5 – View of Albany Business Centre along Chester Pass Road to the south-west of Subject Site.



Photograph 6 – View of rural property to the north of Subject Site.



Photograph 7 – View of City of Albany holding facilities along Mercer Road to the south of Subject Site.



Photograph 8 – View of remnant vegetation directly east of the Subject Site.

3.3. Climate

The Albany area is characterised by a Mediterranean climate with warm dry summers and cool wet winters. Rainfall data is from the nearby Bureau of Meteorology (BoM) Albany Station (Site No. 9500).

The long-term average annual rainfall is 929 mm (1877 to 2016). This average has decreased between 2000 to present, to an average annual rainfall of 879 mm, reflecting a 5% reduction compared to the long-term average, consistent with a general trend in the South West of WA. The total rainfall distribution has also altered, with a reduction of average winter monthly rainfall, but no significant reduction in average summer monthly rainfall.

The average annual pan evaporation for the Albany area is approximately 1397 mm (Luke *et al,* 1988).

3.4. Topography

Topography over the Subject Site is undulating ranging from a high point of 51m AHD in the central northern portion of the site to a low point of 22m AHD in the southern central portion of the site. There is a ridge that runs from the central northern portion of the site to the south-west corner with topography decreasing in a radial manner from the ridge. Topographic contours (1 metre contours are shown on Figure 2).

The effective slopes (measured as per AS3959-2009) for the Subject Site are flat/upslope to low ranging from 0 to 5 degrees. The effective slopes for the Subject Site and surrounding areas are shown in the BAL Contour Plan Report included as Appendix D.

3.5. Acid Sulphate Soils

Acid sulphate soils (ASS) are naturally occurring soils and sediments containing sulphide minerals, predominantly pyrite (an iron sulphide). When undisturbed below the water table, these soils are benign and not acidic (potential acid sulphate soils). However, if the soils are drained, excavated or exposed by lowering of the water table, the sulphides will react with oxygen to form sulphuric acid (EPA 2008). Acid Sulphate Soil (ASS) Risk Mapping (Figure 2) indicates the Subject Site does not sit within any known areas of ASS.

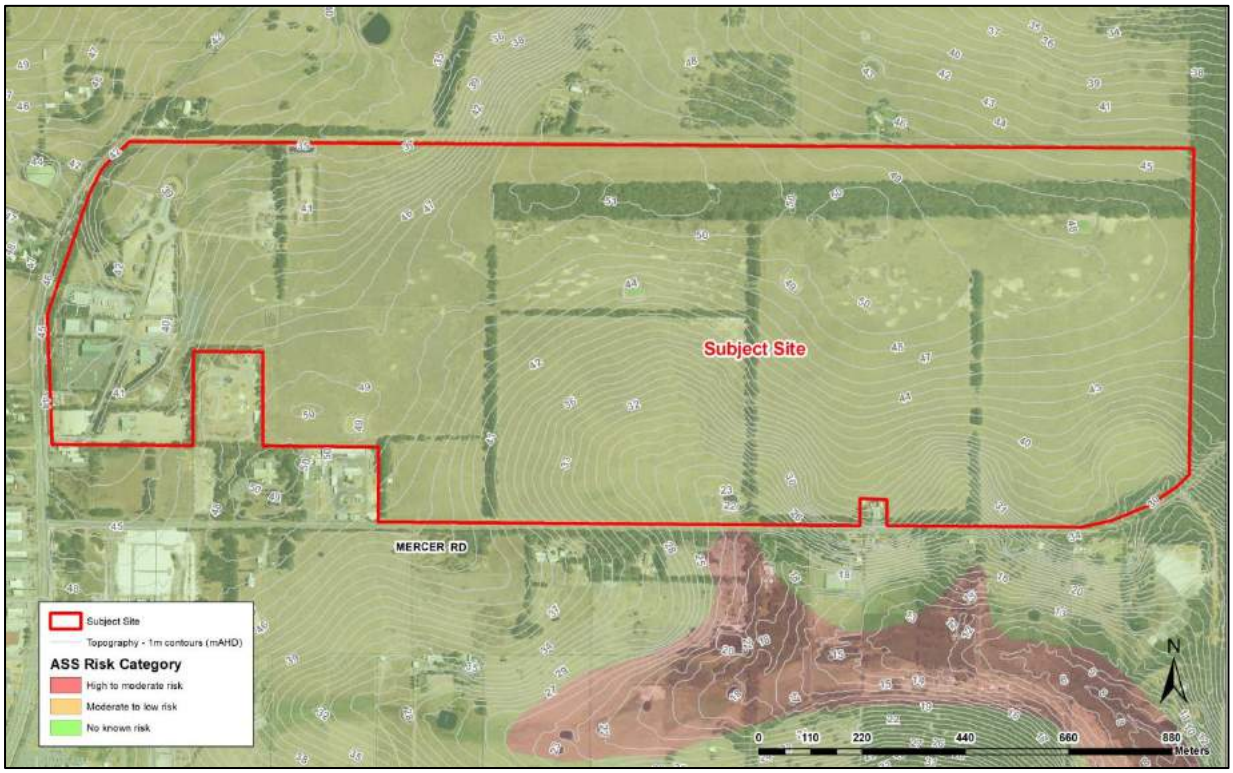


Figure 2: Topography and ASS Risk Mapping

3.6. Geology and Soils

Regolith of WA (Department of Mining, 2009) mapping indicates that soils across the Subject Site are classified as sandplain, mainly Aeolian and include some residual deposits.

A Geotechnical Investigation was conducted on the 29th of August 2017 by Great Southern Geotechnics under later winter conditions, the Geotechnical Investigation is included as Appendix B. The investigation included both soil analysis and measuring of water table. The soil testing was conducted to assess the suitability of the site for the proposed development including onsite effluent disposal for the extension of the industrial area.

Ten boreholes were constructed within the Subject Site to a depth of 2.3 metres and left open for a minimum of 1hr to identify water table present. The location of the boreholes are shown on Figure 3, lithological logs of the boreholes are shown in Appendix B.

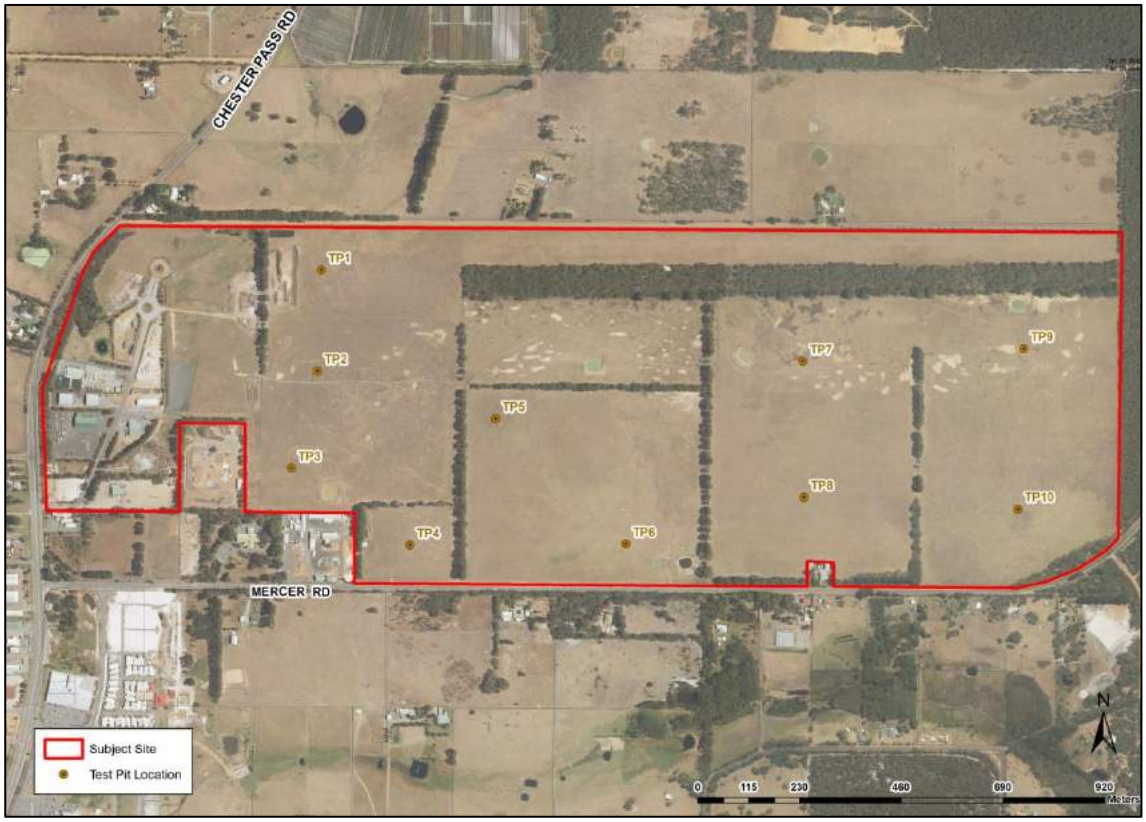


Figure 3: Borehole Locations

Soil Type

Soil testing showed that soils across the site comprised predominately of a silty sand topsoil, over sandy gravel (with a layer depth varying from 200 - 700mm), over sandy clay to the depth of the hole. This soil profile was encountered at each borehole location except TP6 and TP10. The soil profile at TP6 comprised of a silty sand topsoil, over silty sand (200 - 700mm depth), over gravelly sand (700 to 1500mm depth), over sandy gravel (1500 - 2300mm depth). The soil profile at TP10 comprised of a silty sand topsoil, over silty sand (200 - 400mm), over sandy clay (400 – 2300mm) (Great Southern Geotechnics, 2017).

Permeability

Permeability testing was conducted on TP3 (400 – 1100mm BGL) and TP10 (400 – 2300mm BGL) by Liquid Labs WA as part of the Geotechnical Investigation. TP3 recorded a permeability of 0.0035 m/day whilst TP10 recorded a permeability of 0.0015 m/day (refer to Liquid Labs WA Laboratory testing in Appendix B). Permeability at both TP3 and TP10 is considered to be extremely low this is consistent with the soil type (sandy clay) encountered at these locations.

Phosphorous Retention Index

Phosphorous retention Index (PRI) is the ability of soils to absorb nutrients and heavy metals within the soil (i.e. Soil microbe disinfecting ability). Soils with a PRI less than 1 have a very poor ability to retain nutrients and heavy metals, whilst soils with a PRI of >5 having a high ability to retain nutrients and heavy metals. PRI testing was conducted by CSBP Laboratory on soil samples from TP1, TP3, TP6 and TP10. The PRI results are shown in Table 1 and Appendix C.

Table 1: Phosphorus Retention Index Results

Borehole	Depth (mm)	Soil Type	Phosphorus Retention Index
TP1	200-900	Sand with gravel	2414.5
TP3	400-1100	Sandy clay	2387.4
TP6	200-700	Silty sand	0.8
TP10	400-2300	Sandy clay	608.0

PRI results across the site varied consistent with soil type. The sandy clays found across the majority of the site (as seen at TP3 and TP10) were found to have a very high PRI and therefore a very high ability to fix nutrients and heavy metals. The sandy gravel found at TP1 also had an extremely high PRI, particularly for a sand, whereas the light grey sand found at TP6 had a low PRI and therefore a low ability of fixing nutrients and heavy metals.

3.7. Surface Water Hydrology

There are no major naturally existing drainage networks or water bodies within the Subject Site. There is one minor waterway situated in the north-western extent of Lot 10. This area will need to be managed sensitively in relation to stormwater planning within the site. Surface water generally runs off the central and eastern portions of the site in a southerly and south-easterly direction towards Mercer Road. The western portion of the site generally drains in a north westerly direction towards Terry Road and Chester Pass Road.

Hydrographic Sub-catchments (DoW, 2008) show the Subject Site to be within two surface water sub-catchments; with the northern and western portion of the site discharging to Willyung Creek to the north of the Subject Site and the central and southern portion of the site discharging to Yakamia Creek to the south of the site. Both the Willyung Creek and Yakamia Creek sub-catchments form part of the Oyster Harbour/Kalgan/King Catchment ultimately discharging to Oyster Harbour.

There are several man-made dams across the site, which are surface water fed and used for livestock drinking water. The majority of the Subject Site drains towards a dam in the central southern portion of the site, whilst the eastern rural areas drain to a large dam located in the north-east corner of Lot 521 Mercer Road.

3.8. Groundwater Hydrology and Hydrogeology

Australian Geoscience Mapping and Department of Water 250K Hydrogeological mapping places the Subject Site within the; '*Tertiary - Cainozoic - Phanerozoic (TPw) period: Plantagenet Group - siltstone, spongolite; minor sandstone, peat, and conglomerate.'* The aquifer is a *'sedimentary aquifer with intergranular porosity – extensive aquifers, major groundwater resources.*' (DoW, 2015).

A Geotechnical Investigation was conducted on the 29th of August 2017 by Great Southern Geotechnics under late winter conditions. The investigation included both soil analysis and measuring of water table. Ten boreholes were constructed within the Subject Site to a depth of 2.3 metres, the location of the boreholes is shown on Figure 3. Groundwater was not observed in any of the boreholes indicating there is no likely groundwater present beneath the Subject Site to a depth of 2.3 metres. The Geotechnical Investigation (Great Southern Geotechnics, 2017) was undertaken in accordance with Australian Standards and has been included as Appendix B.

The subject site is not located within a Public Drinking Water Source Protection Area (DoW 2001).

3.9. Wetlands

There are no significant wetlands within or within the vicinity of the Subject Site.

3.10. Sewerage Sensitive Area

The Subject Site is located in a Sewerage Sensitive Area according to the Department of Planning's Sewerage Sensitive Area Mapping (DoP, 2017). The draft Government Sewerage Policy (2016) describes Sewerage Sensitive Areas, as areas; '*within 10 kilometres of Wilson Inlet, Torbay Inlet, Manarup Lagoon, Lake Powell, Princess Royal Harbour and Oyster Harbour'.*

3.11. Flora and Vegetation

The Subject Site lies within the Jarrah Forest IBRA bioregion. Hearn et al (2002) describes the bioregion as; '*Duricrusted plateau of Yilgarn Craton characterised by Jarrah-Marri forest on laterite gravels and, in the eastern part, by Wandoo - Marri woodlands on clayey soils. Eluvial and alluvial deposits support Agonis shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of species-rich shrublands.'*

The vegetation has been mapped on a broad scale by J.S. Beard (Shepherd et al 2002) in the 1970's, where a system was devised for state-wide mapping and vegetation classification based on geographic, geological, soil, climate structure, life form and vegetation characteristics (Sandiford and Barrett 2010). A GIS search of J.S. Beards (DEC, 2005) vegetation classification places the Subject Site within one System and Vegetation Association (Source DEC Pre-European Vegetation GIS dataset, 2005):

- **System Association Name:** Albany.
- **Vegetation Association Number:** 3.
- **Vegetation Description:** Low forest; jarrah, *Eucalyptus staeri* & *Allocasuarina fraseriana.*

The Albany Regional Vegetation Survey (ARVS) undertaken by Sandiford and Barret in 2010 identified the vegetation within the Subject Site as belonging to the Jarrah/Marri/Sheoak Laterite Forest unit. This unit is described as occurring on well drained shallow loamy/sandy soil with outcropping laterite (Sandiford and Barret, 2010). Key defining features of this vegetation type are a canopy of *Eucalyptus marginata* and *Allocasuarina fraseriana* over a relatively open and diverse understorey. The understorey is dominated by *Bossiaea linophylla, Agonis theiformis* and *Xanthosia rotundifolia. Banksia grandis* is often present within this vegetation type as a tall shrub. Common identifying species of the open sedge component of this vegetation type are *Tetraria octandra, Tetraria capillaris, Desmocladus fasciculatus* and *Anarthria prolifera* (Sandiford and Barret, 2010). Furthermore, this vegetation type has been assessed as having a modified condition (Thackway and Leslie, 2006) (equivalent to "good to very good" on the Keighrey (1994) Condition Scale) whereby the native vegetation community structure, composition and regenerative capacity is intact, but is perturbed by land use / land management practices (Thackway and Lesslie 2006). ARVS Mapping within the Subject Site and its vicinity is shown on Figure 4.

A search of publicly available databases through WA Atlas, Nature Map, and EPBC Protected Matter Search Tool indicates that no threatened, priority or declared rare flora is present on the site, or within the surrounding Nature Reserves and remnant vegetation.

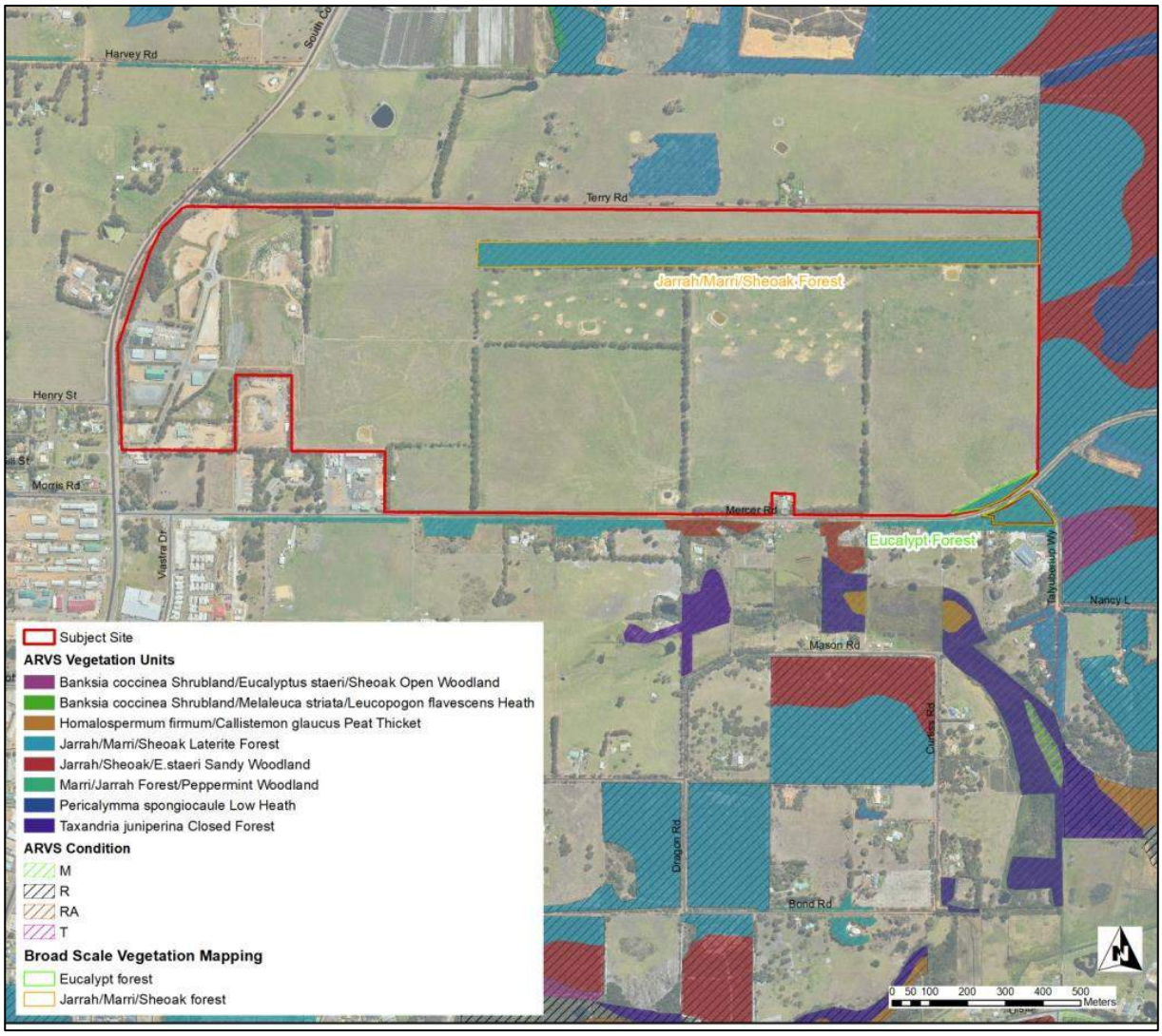


Figure 4: ARVS & Broad Scale Vegetation Survey Mapping

3.12. Vegetation Survey

The vegetation across the Subject Site and surrounding areas is consistent with rural farmland, with the majority of the site and surrounds comprising of heavily grazed pasture dominated by pasture grass species. There are two areas of remnant vegetation within the Subject Site, a strip of vegetation running parallel with the northern boundary of the site (approximately 12 ha) and a small area in the south-eastern corner of the site on either side of Mercer Road.

As part of this EAR a broad scale vegetation survey was conducted on the 29 August 2017 on the two areas of remnant vegetation. Two vegetation types were identified; the strip of vegetation in the north was identified as Jarrah/Marri Sheoak Forest and the vegetation in the south-east corner was identified as Eucalypt Forest. Broad scale Vegetation Mapping is shown on Figure 4. As per the Draft Structure Plan the internal remnant vegetation is to be retained as Public Open Space (POS).

Jarrah/Marri/Sheoak Forest

This area was previously described as being Jarrah/Marri/Sheoak Laterite Forest by Sandiford and Barrett (2010). The species identified during this survey are consistent with the ARVS vegetation type. The overstorey composition consisted of *Eucalyptus marginata, Allocasuarina fraseriana, Corymbia calophylla* and occasional patches of *Eucalyptus cornuta* and *Banksia grandis.* Midstorey species identified were *Agonis flexuosa, Bossiaea linophylla, Beaufortia decussata, Hakea amplexicaulis, Persoonia longifolia, Leucopogon verticillatus, Xanthorrhoea platyphylla, Bossiaea dentata, Hakea ruscifolia, Xanthosia rotundifolia, Tetratheca setigera, Sphaerolobium alatum (?), Hovea chorizemifolia, Hibbertia sp.,* and *Pimelea sp.* Understorey species

identified included natives such as *Chamaescilla corymbosa var. corymbosa, Dampiera sp., Lomandra sp.,* and *Conostylis sp.,* as well as weed species such as **Cirsium sp., *Olaxis sp., *Cenchrus clandestinus, and *Hypochaeris sp.* (* Denotes weed species). Based on the species composition observed during the survey this vegetation type is still consistent with ARVS.

The condition of this strip of vegetation varied throughout its extent with condition improving closer to the fenced remnant vegetation to the east. The western half of the strip was quite open, with very few midstorey species and a high proportion of sedges and grasses with areas of bare ground. This is likely due to grazing pressures from cattle. There was evidence of cattle activity throughout this area with cattle tracks, hoof prints and cow dung detected. There were areas where midstorey and understorey vegetation increased with fewer signs of disturbance present. Vegetation in this unit is considered to be in very good condition as there are obvious signs of disturbance to the vegetation structure from cattle grazing, weeds and human disturbances (Keighrey, 1994). Photographs 9 to 12 show images of Jarrah/Marri/Sheoak Forest within Subject Site.



Photograph 9 to 12 – View of Jarrah/Marri/Sheoak Forest within Subject Site

Eucalypt Forest

This area of vegetation was mapped in the ARVS as Jarrah/Marri/Sheoak Laterite Forest, however during this survey few species associated with this vegetation type were identified, there were also a high proportion of weed species were identified. The overstorey composition consists of *E. marginata*, *Eucalyptus gomphocephala, A. fraseriana, C. calophylla, Eucalyptus megacarpa, *Acacia longifolia, *Acacia dealbata, Eucalyptus sp.,* and **Pinus radiata* (* Denotes weed species). The midstorey composition was far less diverse than the northern strip of vegetation. Species identified included *Callistemon sp., Beaufortia decussata, Leucopogon verticillatus, Leucopogon sp., Pimelea sp., Hibbertia sp., Adenanthos cuneatus, Hemiandra pungens,* and *Chamelaucium ciliatum*. There were very few understorey species present, with most of the area covered with plant litter, of the groundcover/understorey species present these were weed species such as Kikuyu and *Watsonia sp*.

Vegetation condition within this area is considered to be degraded as the basic vegetation structure has been severely impacted by multiple disturbances such as aggressive weed species and clearing activities (Keighrey, 1994). Evidence of clearing was observed during this survey as several trees and larger shrubs had been cut down. Photographs 13 to 16 show images of Eucalypt Forest within Subject Site.



Photograph 13 to 16 – View of Eucalypt Forest within Subject Site.

3.13. Fauna

The majority of the site has been historically and extensively cleared and as a consequence significant fauna habitat has been removed. Opportunistic Fauna sightings were recorded during the Broad Scale Vegetation Survey on the two areas of remnant vegetation within the Subject Site.

3.13.1. Opportunistic Fauna Sightings

During the Broad Scale Vegetation Survey of the strip of remnant vegetation in the north of the Subject Site various birds were observed and heard within the Jarrah/Marri/Sheoak Forest such as Red-Capped Parrot (*Purpureicephalus spurius*), Galah (*Eolophus roseicapillus*), Willie Wagtail (*Rhipidura leucophrys*), New Holland Honeyeater (*Phylidonyris novaehollandiae*), Yellow rumped Thornbill (*Acanthiza chrysorrhoa*), Western Gerygone (*Gerygone fusca*), Rufous Whistler (*Pachycephala rufiventris*) and Magpie (*Cracticus tibicen*). A flock of 6-10 Forest Red-tailed Black Cockatoos (*Calyptorhynchus banksii naso*) were observed feeding in the adjacent remnant vegetation to the east of the Subject Site. A potential Quenda (*Isoodon obesulus fusciventer*) runnel was identified within the understorey of the Jarrah/Marri/Sheoak Forest (Photograph 17). Western Grey Kangaroos (*Macropus fuliginosus*) were also observed.



Photograph 17 – Potential Quenda Runnel within Subject Site remnant vegetation.

3.14. Contaminated Sites

A review of the DER's Contaminated Sites Database determined there are no registered contaminated sites within the Subject Site. However, prior to subdivision further investigations may be required to confirm there is no potential contamination on the site.

3.15. Heritage

A search of the Department of Aboriginal Affair's Aboriginal Heritage Inquiry System was conducted and no matches were recorded for the Subject Site or within the vicinity of the Subject Site.

A search of the Heritage Council's inHerit database and the City of Albany's Municipal Heritage Inventory (City of Albany 2000) was conducted with no matches found for the Subject Site or its surroundings.

3.16. Bushfire Risks and Bushfire Assessment

The publicly released Bushfire Prone Area Mapping (DFES, 2017) shows that the majority of the Subject Site is located within a Bushfire Prone Area (situated within 100m of >1 ha of bushfire prone vegetation). Bushfire Prone Area Mapping is shown on Figure 5.



Figure 5: Bushfire Prone Area Mapping

A BAL Contour plan has been prepared for the site by Level 2 Bushfire Practitioner K. Kinnear (BPAD 30794). The BAL Contour Plan has been included as Appendix D. All vegetation within 150m of the site boundary/ proposed development was classified in accordance with Clause 2.3 and Exclusions as per Clause 2.2.3.2 of AS 3959-2009. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified in the BAL Contour document. Each plot is representative of the Vegetation Classification to AS3959-2009 Table 2.3 and shown on the Vegetation Classification Mapping (Appendix D).

The Subject Site was assessed as having internal areas of Grassland Type G consistent with rural farmland, low fuel/non- vegetated areas (associated with the industrial area, tracks/roads and buildings) and an area of Forest Type A (being the strip of remnant vegetation in the north). External bushfire risks are mostly associated with the Forest Type A (CoA reserve) directly to the east and south-east of the Subject Site and Forest Type A and Woodland Type B along Mercer Road (Bio Diverse Solutions, Appendix D).

The Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017) outlines bushfire protection criteria which subdivision and development proposals are assessed for compliance. The bushfire protection criteria

(Appendix 4, WAPC, 2017) are performance based criteria utilised to assess bushfire risk management measures and they outline four elements, being:

- Element 1: Location
- Element 2: Siting and Design of Development;
- Element 3: Vehicle Access; and
- Element 4: Water.

(WAPC, 2017)

The Local Structure Plan is required to meet the "Acceptable Solutions" of each Element of the bushfire mitigation measures (WAPC, 2017). The proposal will be assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4.

Acceptable Solution A1- Location

It is recommended to guide the development of the LSP that the minimum separation apply to achieve BAL 29 or less on the future dwellings (as shown on the BAL Contour Plan):

- 21-27m Forest Type A;
- 14-17m Woodland Type B;
- 13-15m Scrub Type D; and
- 8-9m Grassland Type G.

This will ensure that Acceptable Solution 1 is achieved by setbacks to BAL 29 applied through the design and layout of the road reserves and (if required) building setbacks.

Acceptable Solution A2 – Siting and design

All buildings within the Structure plan shall have an Asset Protection Zone (APZ) area associated with BAL 29 or less. Setbacks for dwellings associated with the BAL Contours can be applied through the road design from external and internal bushfire risks. Future landscaped areas (internal shall below fuel in nature and maintained areas. The internal POS area in the north shall remain as native vegetation and the internal road design will ensure BAL 29 or less prevails over the proposed dwellings.

Any future plantings in POS areas (excepting the northern POS) are to be to a APZ standard as per WAPC requirements. The developer will be responsible for implementing revegetation standards as per APZ standards. New lot owners are to conform to any planting on their lot for revegetation, screening or windbreaks to APZ standards.

Staged construction is to ensure that separation distances to residential areas are maintained, as a guide 100m from any residential building should be maintained as low fuel areas (i.e. maintained by the Developer) to ensure that BAL does not apply from current land management practises to the proposed residential areas.

Acceptable Solution A3 – Vehicular Access

The internal road layout should ensure that every lot has the ability to exit the Structure Plan in two separate directions to a minimum of two destinations. Cul-de-sacs and battle axes are not recommended. The minimum technical requirements for public roads are shown in Table 9.

Table 9: Vehicular Access Technical Requirements (WAPC, 2017)

Technical requirements	Public Road
Minimum trafficable surface (m)	*6
Horizontal clearance (m)	6
Vertical clearance (m)	4.5
Maximum grades	1 in 10
Minimum weight capacity (t)	15
Maximum crossfall	1 in 33
Curves minimum inner radius (m)	8.5
Maximum Length	N/A

Fire Service Access and Emergency Access Way will be along the internal road network and will not be required separately. Staged development should include road network construction to ensure that no one-way or dead-end streets occur. Firebreaks are to be maintained on the parent lot according to CoA Fire Management Notice (annually updated). Compliance to these issues will ensure the Acceptable Solution A3 (1-8) can be achieved.

Acceptable Solution A4 – Water Supply

The development will be provided with reticulated scheme water in accordance with the specifications of the relevant water supply authority (Water Corporation WA (WCWA)) and DFES requirements. This will be detailed in the detailed engineering drawings and be subject to approval from WCWA and DFES at subdivision condition stages, meeting the Acceptable Solution. Fire hydrant (street) outlets are required, these must be installed to WCWA standards installed in accordance with the *Water Corporation's No 63 Water Reticulation Standard* and are to be identified by standard pole and/or road markings and installed by the Developer.

The Structure Plan is deemed compliant to this Acceptable Solution 4.1.

Overall Fire Management for the site

BAL contouring across the Subject Site has allocated BAL 29 or less to apply to any buildings and can be guided by the Structure Plan design. Setbacks from bushfire risks is to be maintained through road reserves and building setbacks. The inherent bushfire risks for the site is the internal strip of vegetation in the north and the remnant vegetation contained in CoA reserve to the east. Minimum setbacks to achieve BAL 29 in these areas is 21m (northern strip of remnant vegetation) and 27m (eastern CoA reserve). All future buildings can achieve an APZ area associated with a BAL allocation of BAL 29, BAL 19 or BAL 12.5.

Vehicle access standards can be achieved through the Structure Plan design. The minimum technical requirements for Public Roads is to meet Table 9. No Battle axes are proposed and FSA will be along the public road network. One Cul-de-sac is proposed near the intersection of Range and Terry Road, as the CoA seek to minimise new intersections to Range Road and the eastern extents of Terry Road. Where the cul-de-sac is present, an EAW is shown connecting to Range Road ensuring compliance to Element A3.3 of Acceptable Solution A3. Reticulated water will be provided water in accordance with the specifications of the relevant water supply authority WCWA and DFES requirements, meeting A4.1.

A detailed Bushfire Management Plan will be required if any industry is defined as "High Risk" or to support a future Development Application for the Primary School. Additionally, a detailed Bushfire Management Plan may be required to support the staged development of the subdivision.

High Risk Land use and Vulnerable Land Uses

The LSP contemplates potential "High Risk" land use (light industry) and "Vulnerable Land Use" as per the definitions of SPP 3.7. As defined by the Guidelines for Planning in Bushfire Prone areas Vers1.2 (2017):

"High-risk land uses may include, but are not limited to: service stations, landfill sites, bulk storage of hazardous materials, fuel depots and certain heavy industries as well as military bases, power generating land uses, saw-mills, highways and railways, among other uses meeting the definition.

Proposals for non-residential, high-risk land uses in bushfire prone areas are to comply with policy measure 6.6 which requires a Bushfire Management Plan jointly endorsed by the local government and the Department of Fire and Emergency Services. This may include establishing an appropriate Asset Protection Zone or Hazard Separation Zone, and should be supported by a risk management plan that addresses bushfire risk management measures for any flammable on-site hazards."

As Light industrial land use is proposed in the west of the Structure Plan, a detailed Bushfire Management Plan will be required to guide developers if any industry is defined as "High risk".

Policy measure 6.6 of SPP 3.7 applies to vulnerable land uses, and refers specifically to subdivision and development applications. However, if a scheme amendment or structure plan identifies a site for a vulnerable land use, then the policy requirements should be addressed. Typically, vulnerable land uses are those where persons may be less able to respond in a bushfire emergency. A detailed Bushfire Management Plan jointly endorsed by DFES and CoA will be required for any Primary School proposed in the Structure Plan area at the Development Application stage. A Bushfire Emergency Evacuation Plan (BEEP) will be required at Development Approval Stages.

4. Land Capability Assessment

Land capability is the ability of the land to sustain a specified land use without resulting in significant onsite or offsite degradation or damage to land resources. The Land Capability Assessment of the Subject Site is completed in accordance with the State Planning Commission's (1989) Land Capability Assessment for Local Rural Strategies. The assessment is a three-stage process and includes:

Stage 1 – Land Use Requirements

- Specify and define the proposed land use;
- Determine the specific land use requirements of that use;
- List the relevant land qualities to fulfil the land use requirements; and
- List the relevant land characteristics which determine each land quality.

Stage 2 – Land Resource Survey

- Divide the study area into mapping units which have a measurable difference in the land characteristics listed above and may be expected to influence the land quality attributes and land capabilities.

Stage 3 – Land Capability Analysis

- For each mapping unit rate each individual land quality; and
- For each mapping unit determine its overall capability to sustain the land use by comparing its land quality ratings in the capability rating table.

The WAPC (1989) utilises a five-class system of assessing Land Capability, these five classes rate the degree of physical limitations associated with land use and management needed for these. The land capability classes are shown in Table 2.

Table 2: Land Capability Classes

Capability Class	Degree of Limitation	General Description
I	Very low	Areas with a very high capability for the proposed activity or use. Very few physical limitations to the specified use are present or else they are easily overcome. Risk of land degradation under the proposed use is negligible.
II	Low	Areas with a high capability for the proposed activity or use. Some physical limitations to the use do occur affecting either its productive use or the hazard of land degradation. These limitations can however, be overcome through careful planning.
III	Moderate	Areas with a fair capability for the proposed activity or use. Moderate physical limitations to the land use do occur which will significantly affect its productive use or result in moderate risk of land degradation unless careful planning and conservation measures are undertaken.
IV	High	Areas with a low capability for the proposed activity or use. There is a high degree of physical limitations which are either not easily overcome by standard development techniques or which result in a high risk of land degradation without extensive conservation requirements.
V	Very High	Areas with a very poor capability for the proposed activity or use and the severity of physical imitations is such that its use is usually prohibitive in terms of either development costs or the associated risk of land degradation.

4.1. Land Use Requirements

There are two land uses proposed for the Subject Site as defined by the State Planning Commission (1989) Urban Development and Light Rural Industry (note these definitions are as per this policy for the purposes of this report and not any other planning instrument/policy). The location of the two proposed land uses is shown on the LSP in Appendix A, with "Urban Development" shown as "Residential" and "Light Rural Industry" shown as "Light Industry".

4.1.1. Urban Development

The WAPC Land Capability Assessment for Rural Strategies Guideline defines Urban Development areas as follows;

'Urban use consists of mostly residential development, but includes the use of land for extensive building complexes (such as shopping centres and offices). Urban development is an intensive form of land use which requires a high level of servicing and site disturbance.

Services include sealed and kerbed roads and carparks, storm water drainage and underground services (including reticulated water, gas and telephone connections) to cater for single housing allotments in the order of 500-700m^2 but also up to 2000 m^2.

The Water Authority's Country Sewerage Policy indicates that deep sewerage should be provided where it is already provided within the town, or where soil, land and environmental factors specifically indicate it should be provided. Deep sewerage may not need to be provided if there are no environmental or public health problems arising from the operation of on-site septic tanks.'

The WAPC Land Capability Assessment for Rural Strategies Guideline identifies land use requirements for Urban Development areas as follows;

- Availability of extensive flat to gently sloping areas (preferably 0-2% but up to 8%);
- Deep well drained soils which are easy to excavate and provide a stable foundation for building;
- Disposal of liquid effluent via a treatment plant or from onsite septic tanks should not result in pollution of surface water bodies or groundwater resources;
- Urban stormwater is often highly polluted (high in BOD, nutrients, heavy metals and hydrocarbons) and may need to be treated to prevent point source pollution at the disposal site; and
- Urban development results in increased stormwater runoff which may raise the level of the unconfined water table or result in soil instability where steep slopes occur. The land should therefore not be subject to slumping/ landslips, water logging or water erosion.

Table 3 outlines the land qualities to fulfil the Urban Development land use requirements. The land characteristics for each land quality are shown in the guideline document (WAPC 1989).

Table 3: Land Qualities to fulfil Urban Development Land Use Requirements

Land Qualities	**Rating**				
Ease of excavation, x	Very high	High	Moderate	Low	Very Low
Foundation stability, b	Very high	High	Moderate	Low	Very Low
Water logging hazard, i	Low		Moderate	High	Very high
Water erosion hazard, e	Low		Moderate	High	Very high
Soil salinity, y	Very Low	Low	Moderate	High	
Soil absorption ability, a	High	Moderate	Low	Very Low	
Wind erosion hazard, w			Low	Moderate	High-Very high
Bushfire hazard, z	Very Low	Low	Moderate	High	Very high
Wave erosion hazard, u					High – Very high
Flood hazard, f	Very low				High -Very high
Water pollution hazard, s			Low	Moderate	High
Water availability, g	High			Moderate	Low
Overall capability rating	**I**	**II**	**III**	**IV**	**V**

4.1.2. Light Rural Industry

The WAPC Land Capability Assessment for Rural Strategies Guideline defines Light Rural Industry areas as follows;

'This land use comprises mixed industrial uses (such as light industry, agriculture support industries) often with showroom/warehouse developments along major roads on the periphery of towns. These industries are generally controllable. The activities are mostly undertaken in warehouses or factories, while the external area, being used for traffic circulation, storage and display purposes, is generally cleared of all vegetation and compacted or sealed. Lot sizes may vary considerably but are often about 2000 m^2. These areas may be deep sewered (especially if the town is sewered) but this is generally not a requirement. A reticulated water supply is provided to each lot.'

The WAPC Land Capability Assessment for Rural Strategies Guideline identifies land use requirements for Light Rural Industrial areas as follows:

- Availability of extensive flat to gently sloping areas (0 - 8%);
- Deep to moderately deep well drained soils which are easy to excavate and provide a stable foundation for building. Moderately well drained soils with a slight susceptibility to waterlogging may be tolerated;
- The land should not be susceptible to flooding; and
- Disposal of septic effluent or other waste waters should not result in water pollution.

Table 4 outlines the land qualities to fulfil the Light Rural Industry land use requirements. The land characteristics for each land quality are shown in the guideline document (WAPC 1989).

Table 4: Land Qualities to fulfil Light Rural Industry Land Use Requirements

Land Qualities	**Rating**				
Ease of excavation, x	Very high-high		Moderate	Low	Very Low
Foundation stability, b	Very high-high		Moderate	Low	Very Low
Water logging hazard, i	Low	Moderate	High	Very High	
Water erosion hazard, e	Low	Moderate	High	Very High	
Soil absorption ability, a	High	Moderate	Low	Very Low	
Flood hazard, f	Nil		High		Very high
Water pollution hazard,s	Very low	Low	Moderate	High	
Water availability, g	High		Moderate		Low
Overall capability rating	**I**	**II**	**III**	**IV**	**V**

4.2. Land Resource Survey

The land characteristics have been analysed to determine mapping units at the Subject Site for assessing land capability. The mapping units were determined using the following land characteristics:

- Soils, including: soil type, texture, depth, PRI and permeability;
- Slope;
- Depth to groundwater;
- Land use; and
- Vegetation type.

The two distinguishable Mapping Units are defined in Table 5.

Table 5: Mapping Units

Map Unit	Characteristics within the Subject Site
Map Unit 1	Silty sand topsoil over sandy gravel over sandy clay or silty sand topsoil over sandy clay. Soils have low permeability. Soils have high PRI. Groundwater > 2.3m BGL. Slope <0 to 5%. Predominately cleared land with pasture grasses. Rural land use.
Map Unit 2	Silty sand topsoil over gravelly sand over sandy gravel. Soils have low PRI. Groundwater > 2.3m BGL. Slope <0 to 5%. Predominately cleared land with pasture grasses. Rural land use.

The mapping units for the Subject Site are shown on Figure 6.

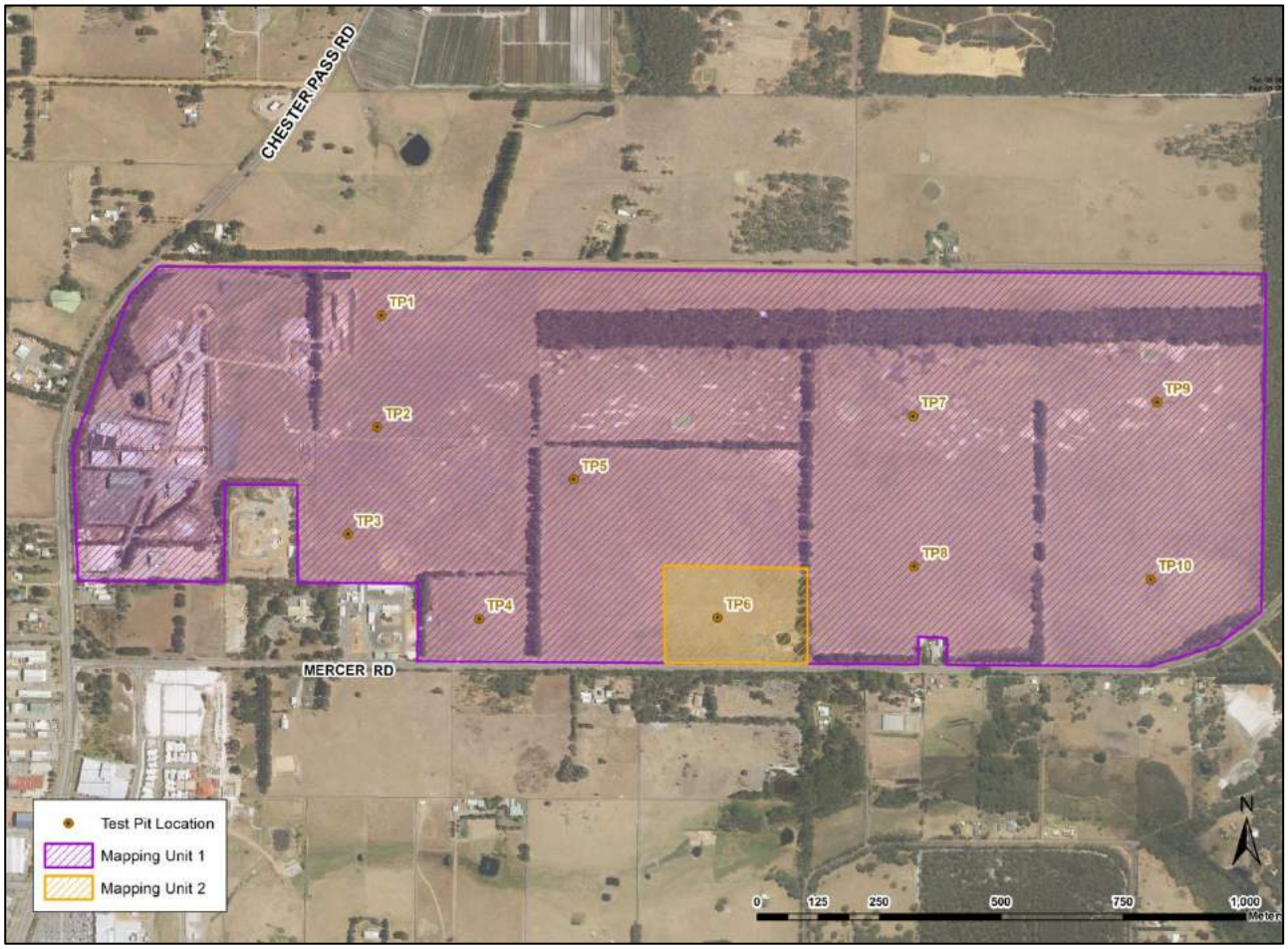


Figure 6: Land Capability Mapping Units

4.3. Land Capability Analysis

4.3.1. Urban Development

The land capability assessment for the Urban Development portion of the Subject Site is presented in Table 6. Two mapping units (Mapping Unit 1 and 2) are present in the location of the proposed Urban Development.

Table 6: Land Capability Assessment for Urban Development

Land Qualities	Mapping Unit 1	Mapping Unit 2
Ease of excavation, x	High	Very high
Foundation stability, b	High	Very high
Water logging hazard, i	Moderate	Low
Water erosion hazard, e	Low	Low
Soil salinity, y	Very Low	Very Low
Soil absorption ability, a	Moderate	Very Low
Wind erosion hazard, w	Low	Low
Bushfire hazard, z	Moderate	Moderate
Wave erosion hazard, u	Nil	Nil
Flood hazard, f	Nil	Nil
Water pollution hazard, s	Low	Moderate
Water availability, g	High (scheme water)	High (scheme water)
Overall capability rating	**II**	**IV**

The overall capability of the Subject Site supporting the Urban Development land use is rated as highly capable for Mapping Unit 1 and low capability for Mapping Unit 2 (refer to Table 2 for full description of capability rating).

4.3.2. Light Rural Industry

The land capability assessment for the Light Rural Industry portion of the Subject Site is presented in Table 7. Only Mapping Unit 1 is present in the location of the proposed Light Rural Industrial area.

Table 7: Light Rural Industry Land Capability Rating

Land Qualities	Mapping Unit 1
Ease of excavation, x	High
Foundation stability, b	High
Water logging hazard, i	Moderate
Water erosion hazard, e	Low
Soil absorption ability, a	Moderate
Flood hazard, f	Nil
Water pollution hazard, s	Low
Water availability, g	High (scheme water)
Overall capability rating	**II**

The overall capability of the Subject Site supporting the Light Rural Industry land use is rated as highly capable (refer to Table 2 for full description of capability rating).

5. Potential Environmental Impacts and Management Measures

5.1. Acid Sulphate Soils

Acid Sulphate Soils (ASS) are stable when left undisturbed, but when they are exposed to air, during excavation or dewatering, this can set off a reaction resulting in acidity (sulfuric acid) being produced. The potential impacts relate to the potential for oxidation of excavated or in situ ASS generating acidic conditions, and possibly releasing metals into groundwater or surface water catchments. ASS mapping indicates the Subject Site is not situated on any known Acid Sulphate Soils (Figure 2). There is however a section of high to moderate risk of ASS occurring within 3m of natural soil surface to the south of the Subject Site on Mercer Road.

The final fill levels and excavation requirements of the proposed subdivision will determine if an ASS and Dewatering Management Plan (ASSDMP) is required to be prepared prior to subdivision. If required, the ASSDMP will be prepared to satisfy the DER and will outline the soil management measures, the groundwater and dewatering effluent monitoring measures and the contingency management measures required to minimise any environmental impacts.

5.2. Water Management

Findings outlined in Sections 3.7 and 3.8 indicate there are limited water management risks associated with development of the Subject Land. Based on the investigations, there is no requirement to undertake pre-development groundwater monitoring. Overall, the soil types enable stormwater infiltration at source.

The water management objectives are to maintain the quantity of surface water and groundwater so that existing and potential environmental values are protected and to ensure that the quality of water emissions (surface and ground) do not adversely affect environmental values or the health, welfare and amenity of people and land uses, and meets statutory requirements and acceptable standards.

A number of management/design measures will be implemented to reduce the impact of the proposed development on surface water and groundwater flows, levels and quality, the function and environmental values of the site, or its interconnected areas. Management measures relevant to construction and the development will be identified in a Local Water Management Strategy (LWMS).

The LWMS details the integrated water management strategies to facilitate future urban water management planning. The LWMS will achieve integrated water management through the following design objectives:

- Effectively manage the risk to human life, property damage and environmental degradation from water contamination, flooding and waterlogging.
- Maintain and if possible improve water quality (surface and groundwater) within the development in relation to pre-development water quality.
- Reduce potable water consumption within both public and private spaces using practical and cost-effective measures.
- Promote infiltration of surface water on site to minimise the risk of further water quality degradation in the Catchment.
- Implement best management practices in regards to stormwater management.
- Incorporate where possible, low maintenance, cost-effective landscaping and stormwater treatment systems.

The LWMS will incorporate the following structural Best Management Practices (BMPs) to address water quantity and quality for the LSP:

- A conceptual drainage strategy demonstrating that the land is capable of retaining the 100 ARI event, while providing an indicative location of stormwater detention.

- Structural and non-structural controls will be used to improve stormwater quality, as compared to a development that does not actively manage stormwater.
- Rainfall from the 1 year 1-hour ARI (Annual Recurrence Interval) events will be retained and infiltrated as close to the source as possible.
- All residential lots will confine run-off from roofs and paving within the property boundary.
- Large rainfall events (10 ARI to 100 ARI) will be conveyed and retained through a network of roads, drainage reserves and POS within each catchment.
- It is anticipated that there will be no impacts from stormwater run-off to downstream ecosystems.

It is expected that development of the site will have a positive impact on groundwater and stormwater quality through BMPs and the treatment of stormwater prior to infiltration. Based on the site assessment and the management measures proposed, it is not expected that any changes to groundwater flows, levels or quality will have an adverse impact on the function and environmental values of the site.

5.3. Waste Water Management

The Subject Site is situated in a Sewerage Sensitive Area that does not have access to deep or reticulated sewerage. It is proposed the initial stage/s of the subdivision will involve the extension of the Light Industrial Area (similar to the existing Industrial Area) and on-site effluent disposal will be required for this area. All residential subdivision will be connected to reticulated sewerage.

The draft Government Sewerage Policy (DoP, 2016) outlines that on-site effluent disposal may be considered for non-residential subdivision that:

a) Are remote from existing or proposed sewerage schemes and the proposed development cannot be connected to reticulated sewerage;

b) Utilise secondary treatment systems with nutrient removal if in a sewage sensitive area or a public drinking water source area; and

c) Where the proponent has demonstrated, to the satisfaction of the Western Australian Planning Commission on the advice of the Department of Health and the Department of Water that there is sufficient capacity to treat and dispose of sewage and contain associated buffers on-site. Consideration will be given to the maximum hydraulic load that can be contained within the lot and the potential impacts on waterways and wetlands.

The minimum lot size for non-residential lots is determined on a case-by-case basis. Residential lots with on-site effluent disposal in sewerage sensitive areas must be at least 1 hectare in size (DoP, 2016).

The proposed industrial area as shown on the LSP was assessed against the requirements for lots with on-site effluent disposal as outlined in the draft Government Sewerage Policy (DoP, 2016). The requirements and assessment to each requirement is shown in Table 8.

Table 8: Assessment to On-site Effluent Disposal Lot Requirements

Lot Requirement (DoP, 2016)	Assessment to Requirement
Adequate separation from groundwater – the discharge point of the on-site sewage disposal system should be at least 1.2 to 1.5 metres, depending on soil type, in sewage sensitive areas.	Groundwater was not encountered to 2.3 metres depth (Great Southern Geotechnics, 2017).
An on-site sewage disposal system should not be located within 30 metres of a private bore used for household/drinking water purposes.	There are no private bores registered within the Subject Site or with in the vicinity of the proposed Industrial Area (DoW Water Register, 2017).

Table 8 continued over page.

Lot Requirement (DoP, 2016)	Assessment to Requirement
An on-site sewage disposal system should not be located within 100 metres of a waterway.	No waterways located within the Subject Site or within 100m of the proposed Industrial Area (Site inspection conducted 29/8/2017)
An on-site sewage disposal system should not be located within 100m of a significant wetland.	No significant wetlands located within the Subject Site or within the vicinity of proposed Industrial Area (DEC and CoA 2017 database search)
An on-site sewage disposal system should not be located within 100 metres of a surface or subsurface drainage system that discharges directly into a downstream waterway or waterbody.	No surface or subsurface drainage systems located within the Subject Site or within 100m of the proposed Industrial Area (Site inspection conducted 29/8/2017 and DoW database search)
An on-site sewage disposal system should not be located within any area subject to inundation and/or flooding in a 10 per cent Annual Exceedance Probability (AEP) rainfall event.	Given the relatively higher topography in the area and gradual slopes of the land inundation in the location of the proposed Industrial area is unlikely.

The assessment found that the proposed light industrial area is appropriate for effluent disposal and meets the stated minimum requirements for on-site sewage disposal systems as outlined in the *Draft Government Sewerage Policy* (Department of Planning, 2016). In addition, the low permeability and high PRI of the soils in the location of the proposed industrial area will allow for slow draining assisting the process of being fixed by soil microbes.

As the industrial area is in a sewerage sensitive area a secondary waste water treatment system with nutrient removal should be used. The provision of on-site sewage disposal systems including calculation of land application area shall be in accordance with minimum site requirements contained in Schedule 3 of the draft Government Sewerage Policy (DoP, 2016) and must be approved for use in Western Australia by the Department of Health. The Local Planning Scheme requirements for the current Light Industrial area require 'dry industry' and 'alternative treatment effluent disposal systems'.

Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant to Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.

5.4. Flora and Vegetation

The aim of the flora and vegetation management strategy is to maintain the abundance, diversity, geographic distribution and productivity of flora at the species and ecosystem levels through the avoidance or management of adverse impacts and through improvement in knowledge.

The site's historical use for agriculture and grazing has degraded the vegetation on site and reduced the native vegetation cover to a strip of remnant vegetation in the north of the site and a small area in the south-east corner of the site. Consequently, it is anticipated that the proposed development would have very little impact on native vegetation. All efforts should be made to conserve existing native vegetation. There is support however to clear, as required, replanted vegetation which is Bluegums given they are generally unsuitable in an urban area.

The following management measures have been developed and incorporated into the LSP to reduce the likelihood of impacts to vegetation and flora. These measures have been developed with the aim of retaining the key existing biological values of the site:

- Remnant vegetation will be retained within the vegetation strip in the north of the Subject Site and in the south-east corner of the site (inclusion within POS will provide the most effective way of managing the conservation values of the native vegetation).
- Access crossings within the vegetation strip will be limited to facilitate retention and natural regeneration of vegetation.
- Use of native vegetation species in areas of POS and revegetation areas to maintain local biodiversity.

5.5. Fauna

The aim of the fauna management strategy is to maintain the abundance, diversity, geographic distribution and productivity of native fauna at the species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

As the majority of the site has been historically cleared and as a result, fauna habitat has largely been removed. The only potentially significant fauna habitat on site is within the two areas of remnant vegetation.

The following management measures have been developed and incorporated into the LSP to reduce the likelihood of impacts to native fauna:

- Regional fauna corridor will be retained through maintaining the strip of remnant vegetation in the north of the Subject Site and the vegetation in the south-east corner.
- Use of native vegetation species in areas of POS to promote habitat for native fauna species.

5.6. Fire Management

The Local Structure Plan is required to meet the “Acceptable Solutions” of each Element of the bushfire mitigation measures (WAPC, 2017). The proposal has been assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4, as per the Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017).

The Subject Site was assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4. Please refer to the summary table below.

Table 9: Bushfire protection criteria applicable to the site

Element	Acceptable Solution	Applicable or not Yes/No	Meets Acceptable Solution
Element 1 – Location	A1.1 Development Location	Yes	Compliant BAL 29 or less applied to lots
Element 2 – Siting and Design	A2.1 Asset Protection Zone	Yes	Compliant, APZ in BAL 29 or less N/A
Element 3 – Vehicular Access	A3.1 Two Access Routes A3.2 Public Road A3.3 Cul-de-sacs A3.4 Battle axes A3.5 Private driveways A3.6 Emergency Access Ways A3.7 Fire Service Access Ways A3.8 Firebreaks	Yes Yes Yes N/A Yes Yes N/A Yes	Compliant two access to 2 destinations Compliant Compliant with EAW N/A Compliant Compliant N/A Compliant on parent lot
Element 4 – Water	A4.1 Reticulated areas A4.2 Non-reticulated areas A4.3 Individual lots in non-reticulated areas	Yes N/A N/A	Compliant N/A N/A

5.7. Light Industrial Area and Associated Buffers

The EPA Draft Guidance Statement No. 3 *Separation Distances Between Industrial and Sensitive Land Uses* (EPA, 2015) provides generic separation distances from particular industries to sensitive land uses. Sensitive land uses are land uses applied to places where people live or regularly spend time and which are therefore sensitive to emissions from industry.

The EPA's hierarchy for the management of emissions is:

- Avoid or minimise the creation and discharge of emissions through design and operation of the facility;
- Ensure environmental impacts from emissions are acceptable and meet the relevant regulations and health criteria at the boundary of the site; and
- Implement separation distances to ensure that any residual emissions and unintended emissions do not impact adversely on sensitive land uses.

The generic separation distances are based on the consideration of typical emissions that may affect the amenity of nearby sensitive land uses. These include:

- Gaseous and particulate emissions;
- Noise;
- Dust; and
- Odour.

The only 'Sensitive Land Use' within the vicinity of the proposed Light Industrial area is the proposed Residential area. According to the EPA (2015) the general minimum vegetated setback of 200m is required to private residences, however the *Guidance Number 3 Separation Distances between Industrial and Sensitive Land Uses* - Appendix 1 (EPA, 2015) must be consulted for the industry types proposed within the development area and their associated separation to distance to sensitive land use prior to development.

6. Management Commitments and Conclusions

The proposed LSP recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form, that creates an environmentally responsive urban development that meets the EPA and City of Albany's environmental requirements. Consequently, the environmental outcomes of the proposed LSP are considerable and include:

- Providing an improvement in groundwater and surface water quality through residential and industrial development and implementation of water sensitive urban design and best stormwater drainage management practices.
- Revegetation using native species (where currently there is very little native species and diversity) in areas of POS to promote fauna habitat and flora diversity. Landscaped urban areas to promote biodiversity using native plants.
- Maintaining areas of remnant vegetation and limiting access points through these areas to the subdivision to prevent adverse impacts particularly for transient fauna.
- The Local Structure Plan is required to meet the "Acceptable Solutions" of each Element of the bushfire mitigation measures (WAPC, 2017).
- As Light industrial land use is proposed in the west of the Structure Plan, a detailed Bushfire Management Plan will be required to guide developers if any industry is defined as "High Risk".
- A detailed Bushfire Management Plan jointly endorsed by DFES and CoA will be required for any Primary School proposed in the Structure Plan area at the Development Application stage. A Bushfire Emergency Evacuation Plan (BEEP) will be required at Development Approval Stages.
- The proposed light industrial area is deemed appropriate for effluent disposal and meets the state's minimum requirements for on-site sewage disposal systems as outlined in the *Draft Government Sewerage Policy* (Department of Planning, 2016). Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.
- Provide vegetated buffer and/or other management techniques between industrial areas to sensitive land uses (such as residential) in accordance with the EPA's (2015) Guidance Statement No. 3 *Separation Distances Between Industrial and Sensitive Land Uses.*

7. References

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Appendices

Appendix A – Draft Local Structure Plan (Edge Planning & Property, 2017)

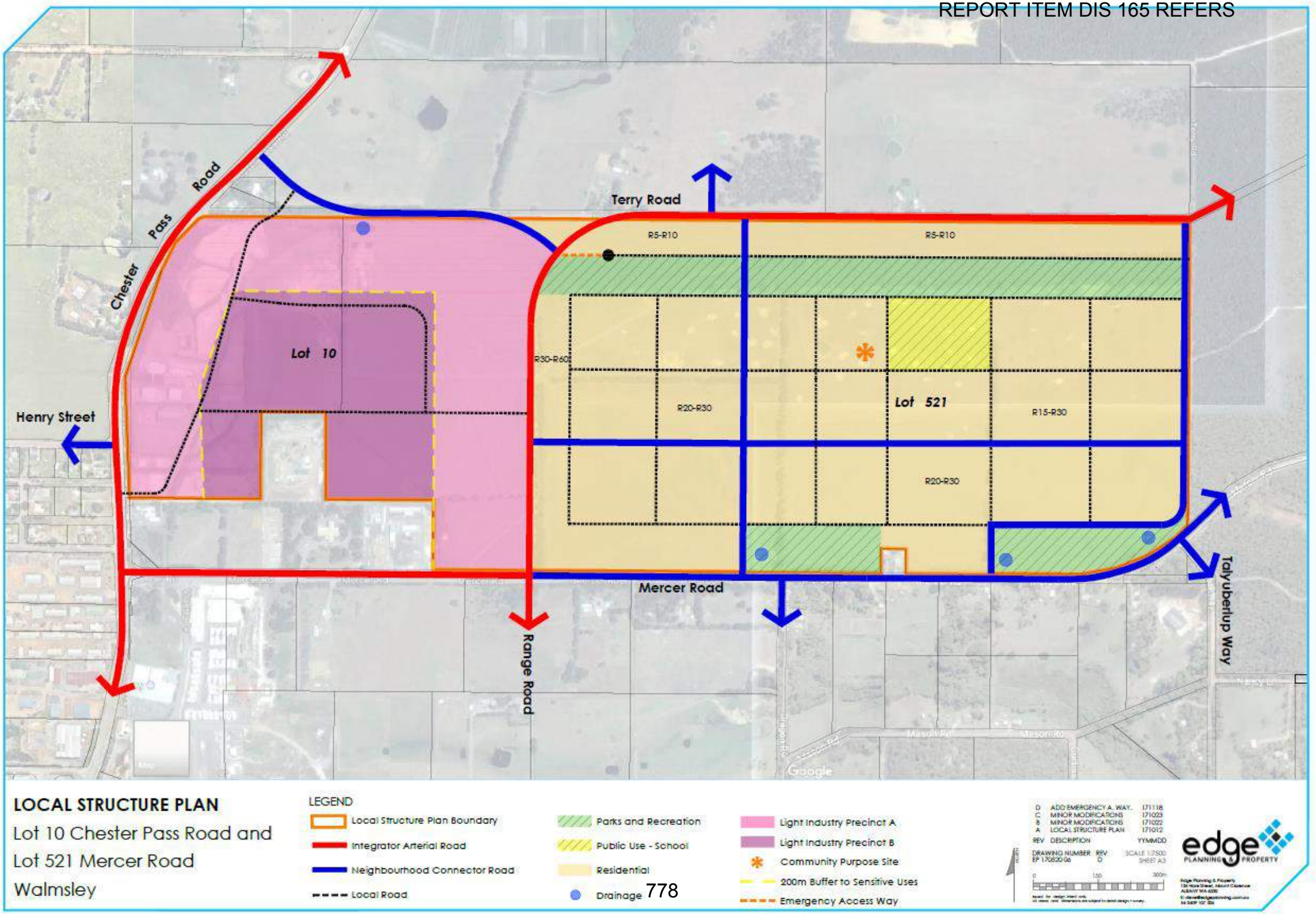
Appendix B – Geotechnical Investigation (Great Southern Geotechnics, 2017)

Appendix C – Phosphorous Retention Index Test Results (CSBP Laboratory, 2017)

Appendix D – BAL Contour Plan (Bio Diverse Solutions, 2017)

Appendix A

Draft Local Structure Plan (Edge Planning & Property, 2017)



LOCAL STRUCTURE PLAN

Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

LEGEND

- Local Structure Plan Boundary
- Integrator Arterial Road
- Neighbourhood Connector Road
- Local Road
- Parks and Recreation
- Public Use - School
- Residential
- Drainage
- Light Industry Precinct A
- Light Industry Precinct B
- Community Purpose Site
- 200m Buffer to Sensitive Uses
- Emergency Access Way

REV	DESCRIPTION	YYMMDD
D	ADD EMERGENCY A. WAY.	171116
C	MINOR MODIFICATIONS	171025
B	MINOR MODIFICATIONS	171022
A	LOCAL STRUCTURE PLAN	171012

DRAWING NUMBER EP 17062006 REV D SCALE 1:7500 SHEET A3

edge PLANNING & PROPERTY

Appendix B

Geotechnical Investigation (Great Southern Geotechnics, 2017)

VERSION 1

Report No 104/1

SEPTEMBER 17, 2017

GEOTECHNICAL INVESTIGATION

BIO DIVERSE SOLUTIONS

LOT 10 CHESTER PASS RD & LOT 521 MERCER RD, MILPARA WA 6330

PRESENTED BY: M.COFFEY

GREAT SOUTHERN GEOTECHNICS
5A 209 CHESTER PASS RD, ALBANY WA

1.0 INTRODUCTION

As authorised by Kathryn Kinnear of Bio Diverse Solutions, a site investigation for the proposed development of Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA 6330 was preformed on the 29th of August, 2017.

2.0 GENERAL

This purpose of the investigation was to determine the following:

- Surface site conditions
- Subsurface soil profiles & characteristics
- Depth of ground water tables .

3.0 SITE INVESTIGATION

The site is approximately 5.0kms North of the Albany CBD and is located on the Northern side of Mercer Road spanning over 2kms West to East.

Established trees border the fence lines of grassy paddocks and natural bushland can be found adjacent to the eastern boundary.

Site conditions and Test pit locations were recorded and are shown in Appendix 2

The field investigation consisted of ten test pits excavated on-site to depths of up to 2.3m using a Kubota KX41-3V Mini Excavator with a 300mm wide Hydraulic open flight auger attachment.

All soil layers encountered were visually assessed and classified on-site

The subsurface soil profiles are shown on the Test pit logs located in Appendix 1

IMPORTANT NOTE: We have endeavoured to locate the test pits so that they are representative of the subsurface materials across the site. However, soil conditions may change dramatically over short distances and our investigations may not locate all soil variations across the site.

This report and associated documentation was undertaken for the specific purpose described in the report and shall not be relied on for other purposes. This report was prepared solely for the use by Bio Diverse Solutions and any reliance assumed by other parties on this report shall be at such parties own risk.

COLOURS

BLACK - BROWN (bk)	BLUE (bl)	ORANGE (or)
BROWN (br)	BLUE - GREEN (bl/gr)	RED (rd)
GREY - BROWN (gy/br)	GREEN (gr)	RED - BROWN (rd/br)
GREY (gy)	YELLOW (yl)	PINK (pk)
BLUE - GREY (bl/gy)	YELLOW - BROWN (yl/br)	PURPLE (pr)

MOISTURE CONDITION OF SOIL

TERM	DESCRIPTION
Dry	Cohesive soils; hard and friable or powdery, well dry of plastic limit. Granular soils; cohesionless and free-running.
Moist	Soil feels cool, darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.
Wet	Soil feels cool, darkened in colour. Cohesive soils usually weakened and free water forms on hands when handling. Granular soils tend to cohere and free water forms on hands when handling.

PARTICLE SHAPES

ANGULAR	SUB-ANGULAR	SUB-ROUNDED	ROUNDED



PARTICLE SIZES

BOULDERS	COBBLES	COARSE GRAVEL	MEDIUM GRAVEL	FINE GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	SILT	CLAY
>200mm	63-200mm	20-63mm	6-20mm	2.36-6mm	0.6-2.36mm	0.2-0.6mm	0.075-0.2mm	0.002-0.075mm	<0.002mm

GRAIN SIZE

SOIL TYPE (ABBREV.)	CLAY (CL)	SILT (SI)	← SAND (SA) →		← GRAVEL (GR) →			COBBLES (CO)
SIZE	< 2µm	2-75µm	Fine 0.075-0.2mm	Medium 0.2-0.6mm	Coarse 0.6-2.36mm	Fine 2.36-6mm	Medium 6-20mm	Coarse 20-63mm	63-200mm
SHAPE & TEXTURE	Shiny	Dull	← angular or subangular or subrounded or rounded →						
FIELD GUIDE	Not visible under 10x	Visible under 10x	Visible by eye	Visible at < 1m	Visible at < 3m	Visible at < 5m	Road gravel	Rail ballast	Beaching

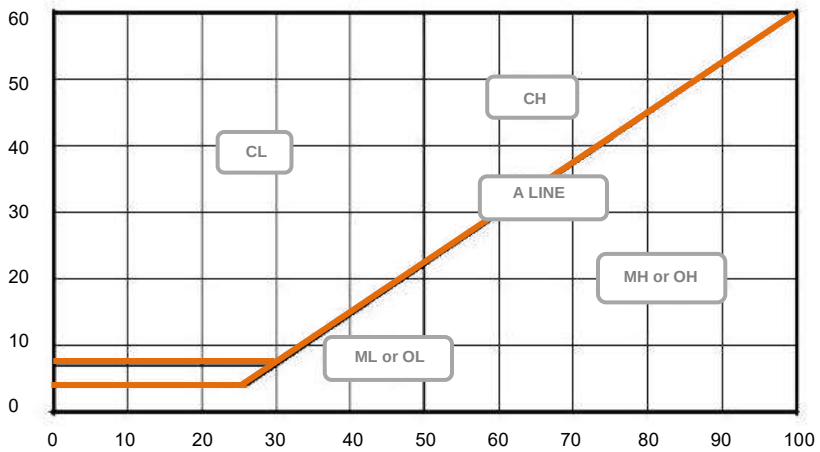
CLASSIFICATION CHART

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60mm and basing fractions on estimated mass)				GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS More than 50% of material less than 63 mm is larger than 0.075 mm	GRAVELS More than 50% of coarse fraction is larger than 2.36mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	GP	Poorly Graded gravels and gravel-sand mixtures, little or no fines, uniform gravels
		GRAVELS WITH FINES (Appreciable amount of fines)	Dirty' materials with excess of non-plastic fines, zero to medium dry strength	GM	Silty gravels, gravel-sand-silt mixtures
			'Dirty' materials with excess of plastic fines, medium to high dry strength	GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction is smaller than 2.36mm	CLEAN SANDS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	SW	Well graded sands, gravelly sands, little or no fines
			Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength '	SP	Poorly graded sands and gravelly sands; little or no fines, uniform sands
		SANDS WITH FINES (Appreciable amount of fines)	Dirty' materials with excess of non-plastic fines, zero to medium dry strength	SM	Silty sands, sand-silt mixtures
			'Dirty' materials with excess of plastic fines, medium to high dry strength	SC	Clayey sands, sand-clay mixtures

FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm	IDENTIFICATION PROCEDURES ON FRACTIONS <0.2mm					
		DRY STRENGTH	DILATANCY	TOUGHNESS		
	SILTS AND CLAYS Liquid limit less than 50	None to low	Quick to slow	None	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with low plasticity. Silts of low to medium Liquid Limit.
		Medium to high	None to very slow	Medium	CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
		Low to medium	Slow	Low	OL	Organic silts and organic silt-clays of low to medium plasticity.
	SILTS AND CLAYS Liquid limit greater than 50	Low to medium	Slow to none	Low to medium	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, silts of high Liquid Limit.
		High to very high	None	High	CH	Inorganic clays of high plasticity.
		Medium to high	None to very slow	Low to medium	OH	Organic clays of high plasticity
HIGHLY ORGANIC SOILS	Readily identified by colour, odour, spongy feel and frequently by fibrous texture				Pt	Peat and other highly organic soils

PLASTICITY CHART

For laboratory classification of fine grained soils



PLASTICITY

DESCRIPTIVE TERM	OF LOW PLASTICITY	OF MEDIUM PLASTICITY	OF HIGH PLASTICITY
Range Of Liquid Limit (%)	≤ 35	> 35 ≤ 50	> 50

DESCRIPTION OF ORGANIC OR ARTIFICIAL MATERIALS

PREFERRED TERMS	SECONDARY DESCRIPTION
Organic Matter	Fibrous Peat/ Charcoal/ Wood Fragments/ Roots (greater than approximately 2mm diameter)/ Root Fibres (less than approximately 2mm diameter)
Waste Fill	Domestic Refuse/ Oil/ Bitumen/ Brickbats/ Concrete Rubble/ Fibrous Plaster/ Wood Pieces/ Wood Shavings/ Sawdust/ Iron Filings/ Drums/ Steel Bars/ Steel Scrap/ Bottles/ Broken Glass/ Leather

CONSISTENCY - Cohesive soils

TERM	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD
Symbol	VS	S	F	St	VSt	H
Undrained Shear Strength (kPa)	< 12	12 - 25	25 - 50	50 - 100	100 - 200	> 200
SPT (N) Blowcount	0 - 2	2 - 4	4 - 8	8 - 15	15 - 30	> 30
Field Guide	Exudes between the fingers when squeezed	Can be moulded by light finger pressure	Can be moulded by strong finger pressure	Cannot be moulded by fingers. Can be indented by thumb nail	Can be indented by thumb nail	Can be indented with difficulty with thumb nail

CONSISTENCY - Non-cohesive soils

TERM	VERY LOOSE	LOOSE	MEDIUM DENSE	DENSE	VERY DENSE	COMPACT
Symbol	VL	L	MD	D	VD	CO
SPT (N) Blowcount	0 - 4	4 - 10	10 - 30	30 - 50	50 - 100	> 50/150 mm
Density Index (%)	< 15	15 - 35	35 - 65	65 - 85	85 - 95	> 95
Field Guide	Ravels	Shovels easily	Shovelling very difficult	Pick required	Pick difficult	Cannot be picked

MINOR COMPONENTS

TERM	TRACE	WITH
% Minor Component Field Guide	Coarse grained soils: < 5% Fine grained soils: <15% Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary components	Coarse grained soils: 5 - 12% Fine grained soils: 15 - 30% Presence easily detectable by feel or eye, soil properties little different to general properties of primary component

GEOLOGICAL ORIGIN

	TYPE	DETAILS
TRANSPORTED SOILS	Aeolian Soils	Deposited by wind
	Alluvial Soils	Deposited by streams and rivers
	Colluvial Soils	Deposited on slopes
	Lacustrine Soils	Deposited by lakes
	Marine Soils	Deposited in ocean, bays, beaches and estuaries
FILL MATERIALS	Soil Fill	Describe soil type, UCS symbol and add 'FILL'
	Rock Fill	Rock type, degree of weathering, and word 'FILL'.
	Domestic Fill	Percent soil or rock, whether pretrucible or not.
	Industrial Fill	Percent soil, whether contaminated, particle size & type of waste product, i.e. brick, concrete, metal

STRENGTH OF ROCK MATERIAL

TERM	SYMBOL	IS(50)	(MPA)	FIELD GUIDE TO STRENGTH
Extremely Low	EL	≤0.03		Easily remoulded by hand to a material with soil properties.
Very Low	VL	>0.03	≤0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxle sample by hand. Pieces up to 3 cm thick can be broken by finger pressure.
Low	L	>0.1	≤0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	M	>0.3	≤1.0	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
High	H	>1	≤3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High	VH	>3	≤10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High	EH	>10		Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

ROCK MATERIAL WEATHERING CLASSIFICATION

TERM	SYMBOL	DEFINITION
Residual Soil	RS	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported
Extremely Weathered Rock	XW	Rock is weathered to such an extent that it has 'soil' properties, i.e. it either disintegrates or can be remoulded, in water.
Distinctly Weathered Rock	DW	Rock strength usually changed by weathering. Rock may be highly discoloured, usually be ironstaining. Porosity may be increased by leaching or may be decreased due to deposition of weathering products in pores.
Slightly Weathered Rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh Rock	FR	Rock shows no sign of decomposition or staining.

Appendix 1

Test Pit Logs

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REFERS

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS

Report No. **104/1** | Job No. **104** | Sheet 1 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP1** Sample No. **17G288**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 580601 6128901
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 900	700	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M	D-VD				
		Fine to medium grained sand.						
900 - 2300	1400	**Sandy CLAY:** Low to medium plasticity**,** Light brown/orange. Fine to medium grained sand.	M	S / F				

Comments:

Pit Terminated at:	✓ or ×	(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REFERS

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS	Report No. **104/1**	Job No. **104**	Sheet 2 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP2** Sample No. **17G289**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 580560 6128698
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 100	100	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
100 - 300	200	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	W	L				
		Fine to medium grained sand.						
300 - 700	400	**Sandy CLAY:** Low to medium plasticity**,** Light brown/orange. Fine to medium grained sand.	M	S				
700 - 2300	1600	**Sandy CLAY:** Low to medium plasticity, Grey mottled orange/red. Fine to medium grained sand.	M	S-F				

Comments:

Pit Terminated at: ✓ or ×		(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REFERS

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS	Report No. **104/1**	Job No. **104**	Sheet 3 of 10

Client:	Bio Diverse Solutions	Operator/Contractor:	GSG
Project:	Proposed Light Industrial Area	Equipment type:	Kubota KX41-3V
Project No.	n/a	Excavation Method :	300mm Auger
Location:	Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA	Position:	50 H 580597 6128498
Test Pit No.:	**TP3** Sample No. **17G290**	Elevation:	

Date Commenced:	29.08.2017	Logged By	M.Coffey	Excavation Dimensions:
Date Completed:	29.08.2017	Checked By:	M.Coffey	Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 -150	150	**(Topsoil) SAND with silt:** Dark grey/brown, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
150 - 400	250	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M-W	D-MD				
		Medium to coarse grained sub-angular to angular sand.						
400 - 1100	700	**Sandy CLAY:** Low to medium plasticity, Brown/orange. Fine to medium grained sand.	M	S-F				✓
1100 - 2300	1200	**Sandy CLAY:** Low to medium plasticity, Red mottled grey/brown. Fine to medium grained sand.	M	S-F				

Comments:

Pit Terminated at: ✓ or ×		(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS

Report No. **104/1** | Job No. **104** | Sheet 4 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP4** Sample No. **17G291**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 580829 6128337
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 550	350	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M-W	D-VD				
		Cobbles up to 100mm. Fine to medium grained sand.						
550 - 900	350	**Sandy CLAY:** Low to medium plasticity, Light brown mottled red/orange.	M	S-F				
		Fine to medium grained sand.						
900 - 2300	1400	**Sandy CLAY:** Low to medium plasticity, Grey mottled red/brown. Fine to medium grained sand.	M	F				

Comments:

Pit Terminated at: ✓ or ×		(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS

Report No. **104/1** | Job No. **104** | Sheet 5 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP5** Sample No. **17G292**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 580977 6128666
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey/brown, fine to medium grained. Roots & root fibres.	M	L		1200mm below existing ground level		
200 - 500	300	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M-W	MD				
		Fine to medium grained sand.						
500 - 1000	500	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M	VD				
		Cobbles & Boulders up to 200mm. Fine to medium grained sand.						
1000 - 1200	200	**Sandy CLAY:** Low to medium plasticity**,** Light brown/orange. Fine to medium grained sand.	M	F				
1200 - 2300	1100	**Sandy CLAY:** Low to medium plasticity, Red mottled grey. Fine to medium grained sand.	M	F				

Comments:

Water table measured 1200mm below existing ground level 3hrs 55mins after achieving full depth of test pit.

Water noted seeping into test pit at 500mm below surface level.

Pit Terminated at:	✓ or ×	(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REFERS

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS	Report No. 104/1	Job No. 104	Sheet 6 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP6** Sample No. **17G293**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 581324 6128351
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey/brown, fine to medium grained. Roots & root fibres.	M	L		1700mm below existing ground level		
200 - 400	200	**SAND with silt:** Grey, fine to medium grained.	M	L				
400 - 700	300	**SAND with silt:** Light grey, fine to medium grained.	M	L				
700 - 1500	800	**Gravelly SAND with silt:** Brown, fine to medium grained.	M	MD				
		Fine to medium grained, sub-rounded to sub-angular gravel.						
1500 - 2300	800	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M	MD				
		Fine to medium grained sand.						

Comments:
Water table measured 1700mm below existing ground level 1hr 55mins after achieving full depth of test pit.

Pit Terminated at:	✓ or ×	(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS

Report No. **104/1** | Job No. **104** | Sheet 7 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP7** Sample No. **17G294**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 581693 6128729
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		900mm below existing ground level		
200 - 800	600	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M-W	L-MD				
		Cobbles & boulders up to 200mm. Fine to medium grained sand.						
800 - 1200	400	**Sandy CLAY:** Low to medium plasticity, Brown/orange. Fine to medium grained sand.	M	S-F				
1200 - 2300	1100	**Sandy CLAY:** Low to medium plasticity, Red mottled grey. Fine to medium grained sand.	M	F				

Comments:

Water table measured 900mm below existing ground level 3hrs 55mins after achieving full depth of test pit.

Water noted seeping into test pit at 700mm below surface level.

Pit Terminated at:	✓ or ×	(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

▼ Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

Materials Consistency/Strength		Rock	Cementation
Cohesive	Non-Cohesive		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REFERS

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS	Report No. 104/1	Job No. 104	Sheet 8 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP8** Sample No. **17G295**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 581720 6128505
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 800	600	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M	D-VD				
		Fine to medium grained sand.						
800 - 1000	200	**Sandy CLAY with gravel:** Low to medium plasticity**,** Light brown mottled red/orange.	M	F				
		Fine to medium grained sand. Fine to medium grained, angular to sub-angular gravel.						
1000 - 1900	900	**Sandy CLAY:** Low to medium plasticity, Red mottled light brown/orange.	M	F-VSt				
		Fine to medium grained sand. (VSt between depth 1700mm to 1900mm)						
1900 - 2300	400	**Sandy CLAY:** Low plasticity, orange mottled red/cream. Fine to medium grained sand.	M	S-F				

Comments:

Pit Terminated at: ✓ or ×		(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REFERS

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS	Report No. 104/1	Job No. 104	Sheet 9 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP9** Sample No. **17G296**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 582184 6128769
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 800	600	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	M	MD				
800 - 1100	300	**Sandy CLAY:** Low to medium plasticity, brown/orange. Fine to medium grained sand.	M	S-F				
1100 - 2300	1200	**Sandy CLAY:** Low to medium plasticity, Red mottled grey. Fine to medium grained sand.	M	F				

Comments:

Pit Terminated at:	✓ or ×	(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REFERS

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS	Report No. 104/1	Job No. 104	Sheet 10 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP10** Sample No. **17G297**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 582184 6128441
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 400	200	**SAND with silt:** Grey/brown, fine to coarse grained sub-rounded to sub-angular.	M	L-MD				
		(Contains some cobbles up to 150mm)						
400 - 2300	1900	**Sandy CLAY:** Low to medium plasticity, Light brown/orange. Fine to medium grained sand.	M	L				✓
		(Contains pockets of yellow/cream fine to medium grained sand).						

Comments:

Pit Terminated at: ✓ or ×		(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	Non-Cohesive		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

Appendix 2

Site Map & Test Pit Locations

The fieldwork was carried out on the 29th of August 2017 and comprised the following:
Ten test pits were excavated using a Kubota KX41-3V Mini Excavator with a 300mm wide Auger attachment to achieve depths of up to 2.3m to visually assess subsurface conditions and monitor any ground water present. Approximate Test Pit locations are shown on **Figure 2.**



Figure 1 - Site Location



Figure 2 - Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA 6330



Test Pit No. 1 Excavation



Test Pit No. 1 Spoil

Job No: 104 **Test Pit No:** **TP1**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 2 Excavation



Test Pit No. 2 Spoil

Job No: 104 **Test Pit No:** **TP2**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 3 Excavation



Test Pit No. 3 Spoil

Job No: 104 **Test Pit No:** **TP3**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 4 Excavation



Test Pit No. 4 Spoil

Great Southern GEOTECHNICS

Job No: 104 **Test Pit No:** **TP4**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 5 Excavation



Test Pit No. 5 Spoil

Job No: 104 **Test Pit No:** **TP5**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 6 Excavation



Test Pit No. 6 Spoil

Job No: 104 **Test Pit No:** **TP6**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 7 Excavation



Test Pit No. 7 Spoil

Job No: 104 **Test Pit No:** **TP7**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 8 Excavation



Test Pit No. 8 Spoil

Job No: 104 **Test Pit No:** **TP8**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 9 Excavation



Test Pit No. 9 Spoil

Job No: 104 **Test Pit No:** **TP9**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 10 Excavation



Test Pit No. 10 Spoil

Job No: 104 **Test Pit No:** **TP10**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA

Appendix 3

Test Results

GREAT SOUTHERN GEOTECHNICS

5a 209 Chester Pass Road, Milpara WA 6330
Mobile: 0407 903 297 Email: Info@gsgeotechnics.com

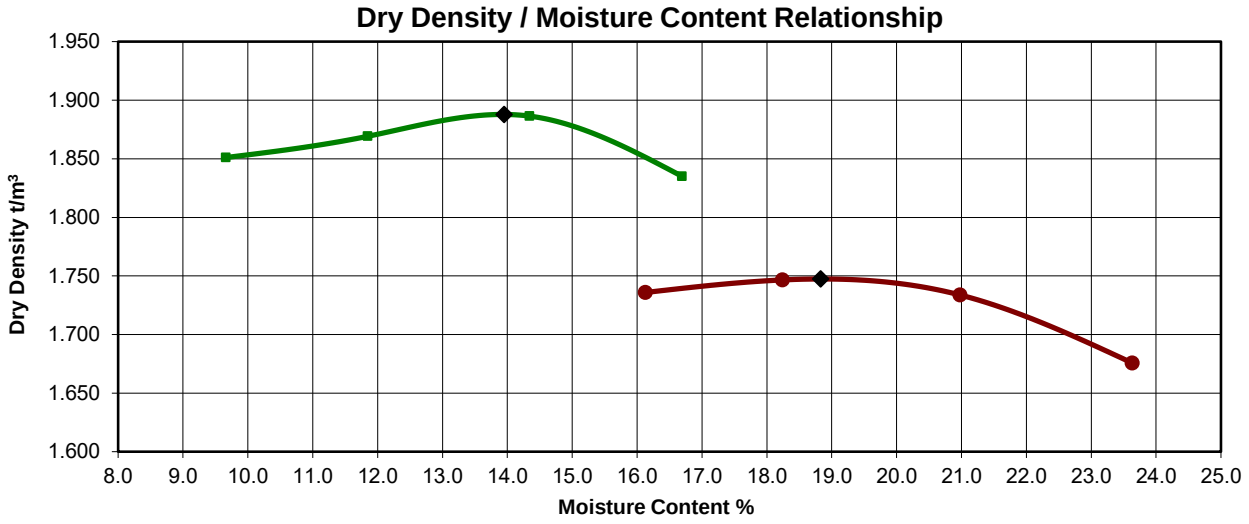
REPORT ITEM DIS 165 REFERS

Dry Density / Moisture Content Relationship Test Report — Sheet 1 of 1

Report No. 104/1 **Job No.** 104

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Road: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA 6330
Section N/A

Sample No.	Sample Location	Field Description
17G298	Test Pit 3	Sandy CLAY
17G299	Test Pit 10	Sandy CLAY



Sample Number		17G298 ●	17G299 ●	●
Depth		400mm - 1100mm	400mm to 2300mm	
Stabiliser Used				
Stabiliser Added %				
Curing Period	Water (Days)	Field	Field	
	Stabiliser (Hrs)			
Moisture Content Method used		AS 1289.2.1.1	AS 1289.2.1.1	
Sampling Method		AS 1289.1.2.1 Proc 6.5	AS 1289.1.2.1 Proc 6.5	
Date Sampled		29.08.2017	29.08.2017	
Date Received		29.08.2017	29.08.2017	
Date Tested		02.09.2017	02.09.2017	
Test Method		AS 1289.5.2.1	AS 1289.5.2.1	
Maximum Dry Density t/m^3		**1.75**	**1.89**	
Optimum Moisture Content %		**19.0**	**14.0**	
Adjusted Maximum Dry Density t/m3				
Adjusted Optimum Moisture Content %				
Percentage Retained %	37.5 mm	**0**	**0**	
Percentage Retained %	19.0 mm	**0**	**0**	

NATA WORLD RECOGNISED ACCREDITATION

Comments: N/a

Distribution: Laboratory File / Kathryn Kinnear

Approved Signatory:

Name: M.Coffey
Function: Laboratory Manager
Date: 17.09.2017

LIQUIDLABSWA
CONSTRUCTION MATERIALS TESTING LABORATORY
UNIT 4, 96 BRIGG ST, WELSHPOOL, WA 6106 LIQUIDLABSWA.COM.AU

Falling Head Permeability Report		**Test Method: AS 1289.6.7.2**	
Client:	Bio Diverse Solutions	**Ticket No:**	S812
Project:	Lot 10 Chester Pass Rd & Lot 521 Mercer Road	**Report No:**	LLS17/2133 _2
Location:	Milpara, WA 6339	**Sample No:**	LLS17/2133
Sample ID:	TP3 400-1100mm (17G298)	**Issue Date:**	14-September-2017

Sampling Procedure: Tested as Received

Laboratory Moisture Ratio (%)	100.5
Laboratory Density Ratio (%)	95.0
Compactive Effort	Modified
Surcharge (kPa)	3
% Retained on 19mm Sieve	0
Coefficient of Permeability (m / sec)	4.1×10^{-8}

Client Address: 5a 209 Chester Pass Road, Albany WA 6330

Comments: MMDD and OMC Values supplied by Great Southern Geotechnics

NATA WORLD RECOGNISED ACCREDITATION

Accredited for Compliance with ISO/IEC 17025 - Testing
Accreditation No. 19872

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Approved Signature:
Name: Matt van Herk
Function: Laboratory Manager
Date: 14-September-2017

LIQUIDLABSWA
CONSTRUCTION MATERIALS TESTING LABORATORY
UNIT 4, 96 BRIGG ST, WELSHPOOL, WA 6106 LIQUIDLABSWA.COM.AU

Falling Head Permeability Report		**Test Method: AS 1289.6.7.2**	
Client:	Bio Diverse Solutions	**Ticket No:**	S812
Project:	Lot 10 Chester Pass Rd & Lot 521 Mercer Road	**Report No:**	LLS17/2134 _2
Location:	Milpara, WA 6339	**Sample No:**	LLS17/2134
Sample ID:	TP10 400-2300mm (17G299)	**Issue Date:**	14-September-2017

Sampling Procedure: Tested as Received

Laboratory Moisture Ratio (%)	98.5
Laboratory Density Ratio (%)	95.0
Compactive Effort	Modified
Surcharge (kPa)	3
% Retained on 19mm Sieve	0
Coefficient of Permeability (m / sec)	$1.8 \times 10^{(-8)}$

Client Address: 5a 209 Chester Pass Road, Albany WA 6330

Comments: MMDD and OMC Values supplied by Great Southern Geotechnics

NATA WORLD RECOGNISED ACCREDITATION

Accredited for Compliance with ISO/IEC 17025 - Testing
Accreditation No. 19872

This document may not be reproduced unless in full.

Approved Signature:
Name: Matt van Herk
Function: Laboratory Manager
Date: 14-September-2017

Appendix C

Phosphorous Retention Index Test Results (CSBP Laboratory, 2017)

Customer Bio Diverse Solutions
Job Chiquita Burgers
Date Rec'd 1/09/2017

Lab Number	Name	Code	Customer	Depth	Phosphorus Retention Index
2ZS17085	Test Pit 3	01/09/17	Bio Diverse Solutions	40-110	2387.4
2ZS17086	Test Pit 6	01/09/17	Bio Diverse Solutions	20-70	0.8
2ZS17087	Test Pit 10	01/09/17	Bio Diverse Solutions	40-230	608.0
2ZS17088	Test Pit 1	01/09/17	Bio Diverse Solutions	20-90	2414.5

Appendix D

BAL Contour Plan (Bio Diverse Solutions, 2017)

AS 3959 Bushfire Attack Level (BAL) Contour Plan Report

Site Details			
Address:	Lot 10 Chester Pass Road and Lot 521 Mercer Road		
Suburb:	Walmsley	**State:**	W.A.
Local Government Area:	City of Albany		
Description of Building Works:	N/A		
Stage of WAPC Planning	Structure Plan		

BAL Contour Plan Details			
Report / Job Number:	EPP 004	**Report Version:**	Final
Assessment Date:	29/8/2017	**Report Date:**	25/10/2017
Practitioner	Kathryn Kinnear	**Accreditation No.**	BPAD 30794



BIO DIVERSE SOLUTIONS

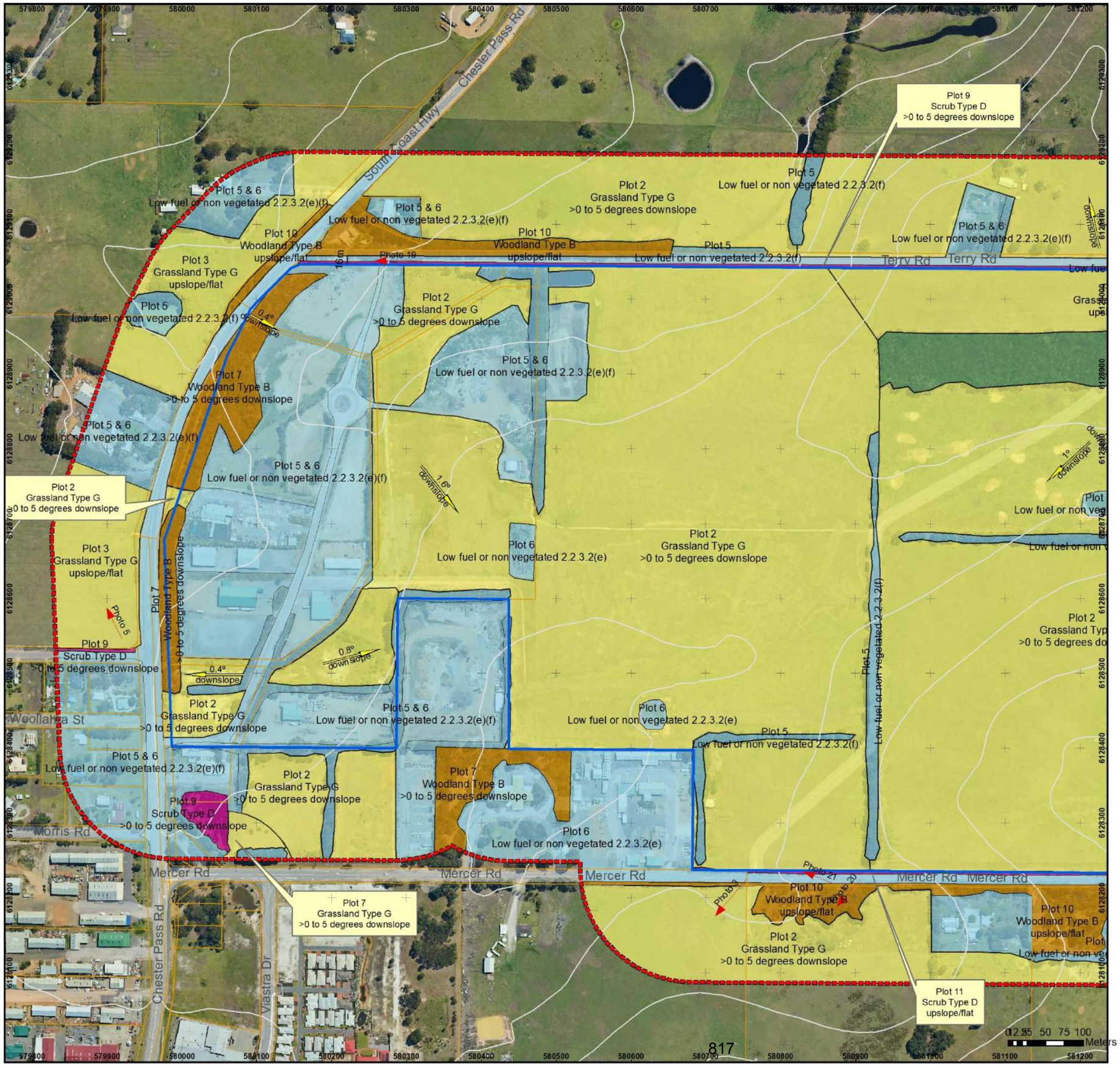
BPAD Bushfire Planning & Design Accredited Practitioner Level 2

This BAL Plan was prepared by:
Kathryn Kinnear, Bio Diverse Solutions
Accreditation No: BPAD30794
Jurisdiction: Level 2 - WA

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

BIO DIVERSE SOLUTIONS

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Albany, WA 6330
Australia
Tel: 08 9842 1575
Fax: 08 9842 1575



817



Overview Map Scale 1:100,000

Legend

- Subject Site
- 150m Assessment Boundary
- Cadastre
- 5m Contours
- Slope Degrees
- Separation Distance
- Photo ID

Site Vegetation

- Forest Type A
- Grassland Type G
- Low fuel or non vegetated 2.2.3.2
- Scrub Type D
- Woodland Type B

Scale
1:5,000 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2017
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Edge Planning & Property
Steve Thompson
Lot 10 Chesterpass Road
Ardess Warrenup, WA 6330

Figure 1.1. Vegetation Classes

BAL Assessor	QA Check	Drawn by
KK	KK	SA
STATUS	**FILE**	**DATE**
FINAL	EPP004	28/09/2017

This BAL Plan was prepared by:
Kathryn Kinnear, Bio Diverse Solutions
Accreditation No: BPAD30794
Jurisdiction: Level 2 - WA

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

BIO DIVERSE SOLUTIONS

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Albany, WA 6330
Australia
Tel: 08 9842 1575
Fax: 08 9842 1575



Overview Map Scale 1:100,000

Legend

- Subject Site
- 150m Assessment Boundary
- Cadastre
- 5m Contours
- Slope Degrees
- Separation Distance
- Photo ID

Site Vegetation

- Forest Type A
- Grassland Type G
- Low fuel or non vegetated 2.2.3.2
- Scrub Type D
- Woodland Type B

Scale
1:5,000 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2017
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

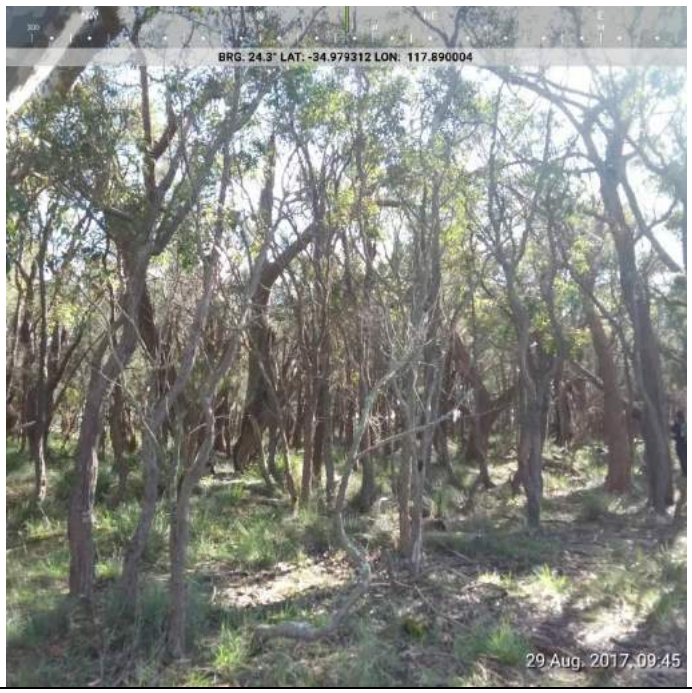
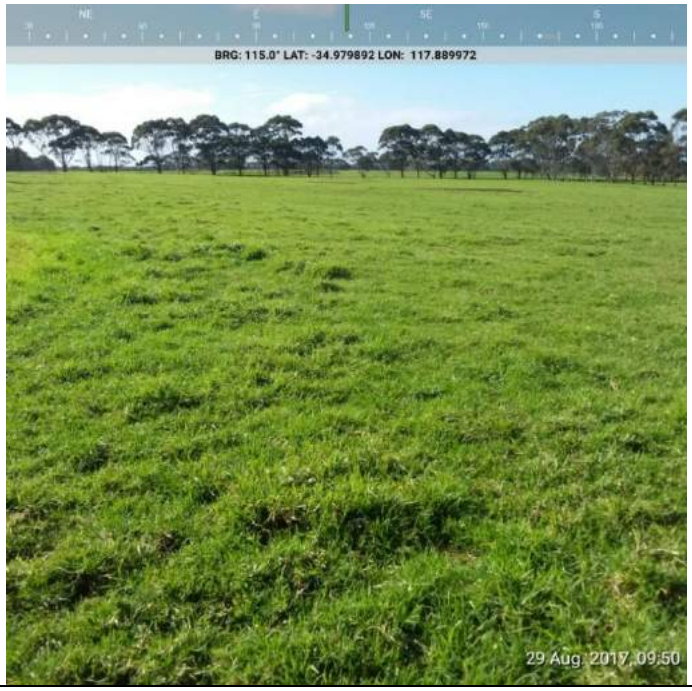
CLIENT Edge Planning & Property
Steve Thompson
Lot 10 Chesterpass Road & Lot 521 Mercer Road
Ardess Warrenup, WA 6330

Figure 1.2. Vegetation Classes

BAL Assessor	*QA Check*	*Drawn by*
KK	**KK**	**SA**
STATUS	*FILE*	*DATE*
FINAL	**EPP004**	**28/09/2017**

SECTION 1 - Vegetation Classification

All vegetation within 150m of the site / proposed development was classified in accordance with Clause 2.2.3 of AS 3959-2009. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified below.

Plot	**1**	**Classification or Exclusion Clause**	**Forest Type A**
			**Location:** internal to the site in proposed POS in the north east of the structure Plan. **Separation distance:** 0m. **Dominant species & description:** Jarrah, Marri, *Casuarina, Leucopogon, Acacia* and grasses. Presents in some areas as low amount of multilayering (borderline Woodland Type B), however once grazing ceases could re-grow to Forest Type A. **Average vegetation height:** 8m. **Vegetation Coverage:** >30-70%. **Available fuel loading:** 25-35t/ha. **Effective slope:** Flat.
Photo Id 1: View of Forest Type A internal to the site. View from south to north.			
Plot	**2**	**Classification or Exclusion Clause**	**Grassland Type G**
			**Location:** Internal to the site in grazed paddocks. Southern areas, north east and western paddocks. **Separation distance:** 0m. **Dominant species & description:** Kikuyu, ryegrasses, clovers and Capeweed. **Average vegetation height:** 120mm. **Vegetation Coverage:** <10% trees. **Available fuel loading:** 4.5t/ha. **Effective slope:** Downslope >0-5 degrees.
Photo Id 2: View to the east of internal Grasslands Type G. Grazed by cattle.			

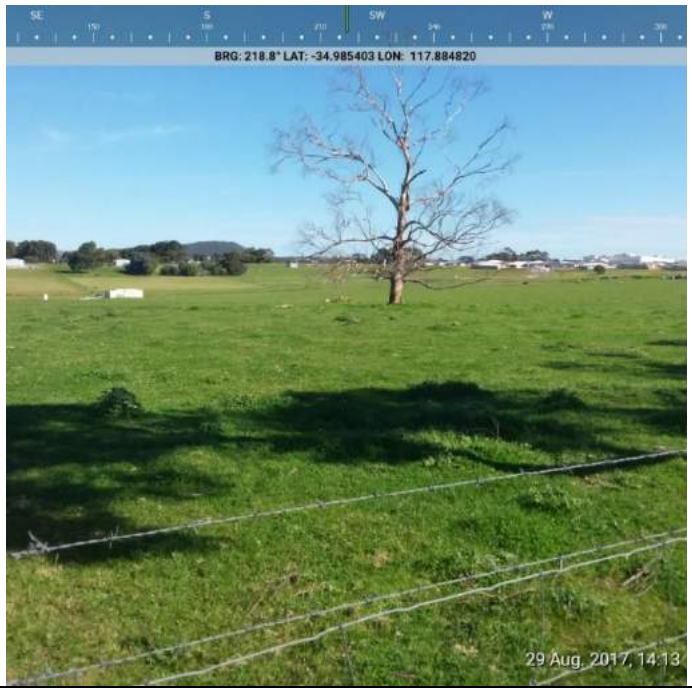
Plot	2	Classification or Exclusion Clause	Grassland Type G
			**Location:** Located to the north and south of the subject site (north of Terry Road) and south of Mercer Road in grazed paddocks. **Separation distance:** 0m (north east boundary) and between 15-20m (established road reserves separation). **Dominant species & description:** Kikuyu, ryegrasses, clovers and capeweed. **Average vegetation height:** 120mm. **Vegetation Coverage:** <10% trees. **Available fuel loading:** 4.5t/ha. **Effective slope:** Downslope >0-5 degrees.

Photo Id 3: View to the south west (south of Mercer Road) of grasslands Type G. Grazed by cattle.

Plot	3	Classification or Exclusion Clause	Grassland Type G
			**Location:** Located in the north of the subject site in grazed paddocks. **Separation distance:** 0m. **Dominant species & description:** Kikuyu, ryegrasses, clovers and Capeweed. **Average vegetation height:** 120mm. **Vegetation Coverage:** 120mm. **Available fuel loading**: 4.5t/ha. **Effective slope:** Flat to upslope.

Photo Id 4: View internal of the subject site to the north of grazed paddocks.

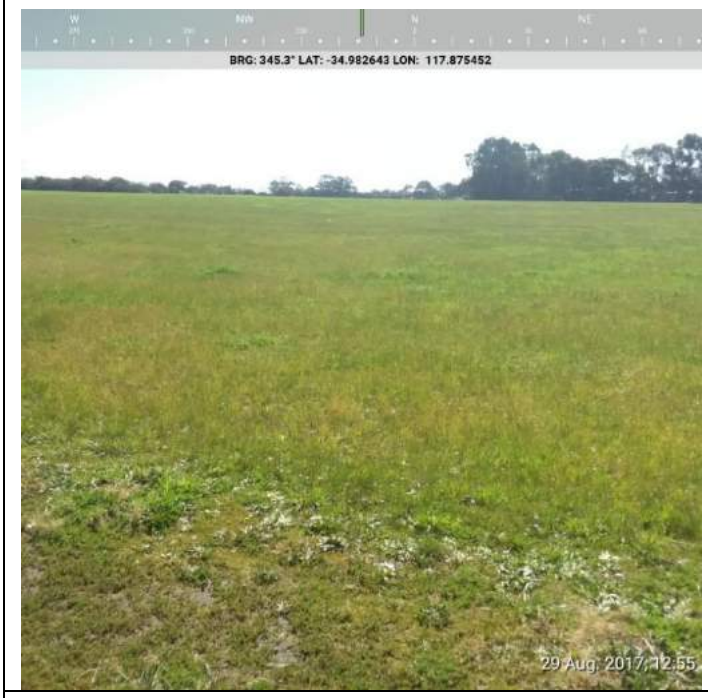
Plot	3	Classification or Exclusion Clause	Grassland Type G
			**Location:** Located adjacent to the subject site to the west in adjacent grazed paddocks **Separation distance:** 20m (Chester Pass Road Reserve). **Dominant species & description:** Kikuyu, ryegrasses, clovers and Capeweed. **Average vegetation height:** 120mm. **Vegetation Coverage:** 120mm. **Available fuel loading**: 4.5t/ha. **Effective slope:** Flat to upslope.

Photo Id 5: View of adjacent paddocks to the west of Chester Pass Road, view to the north, northwest.

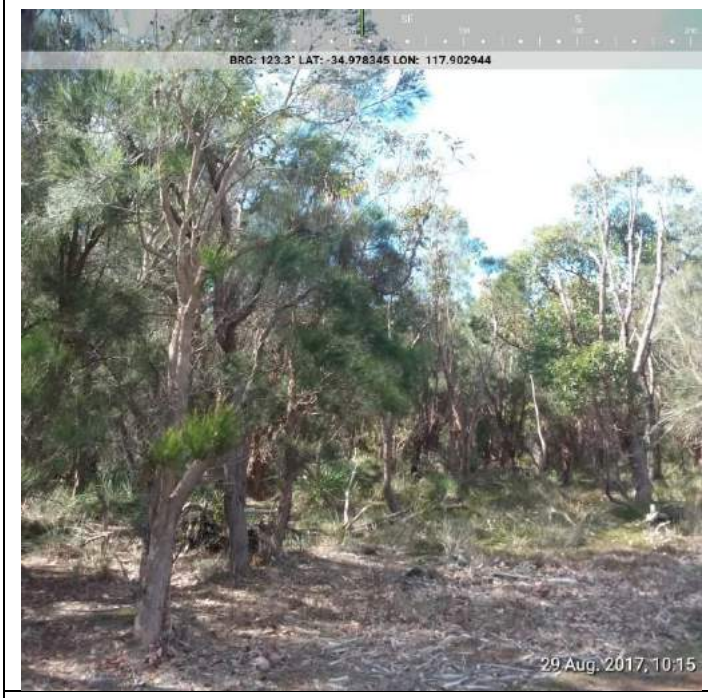
Plot	4	Classification or Exclusion Clause	Forest Type A
			**Location:** To the east of the subject site in City of Albany Reserve. **Separation distance:** 4-6m (firebreak, traversable) **Dominant species & description:** Jarrah, *Acacia, Melaleuca, Banksia*, Tea Tree, sedges and grasstrees. Multilayered vegetation structure. **Average vegetation height:** 6-10m. **Vegetation Coverage:** >30-70%. **Available fuel loading:** 12 35t/ha. **Effective slope:** Downslope >0-5 degrees.

Photo Id 6: View to east-south east of Forest Type A in adjacent City of Albany Reserve.

Plot	4	Classification or Exclusion Clause	Forest Type A
			**Location:** To the south east in adjacent private property, south of Mercer Road. **Separation distance:** 20m (<Mercer Road reserve). **Dominant species & description:** Jarrah, *Acacia, Melaleuca, Banksia*, Tea Tree, sedges and grasstrees. Multilayered vegetation structure. **Average vegetation height:** 6-10m. **Vegetation Coverage:** >30-70%. **Available fuel loading:** 12 35t/ha. **Effective slope:** Downslope >0-5 degrees.

Photo Id 7: View to east-south east of Forest Type A in adjacent property south of Mercer Road.

Plot	4	Classification or Exclusion Clause	Forest Type A
			**Location:** To the south in adjacent private property, south of Mercer Road and Mercer Road reserve. **Separation distance:** 15-20m (<Mercer Road reserve). **Dominant species & description:** Jarrah, *Acacia, Melaleuca, Banksia,* Tea Tree, sedges and grasstrees. Multilayered vegetation structure. **Average vegetation height:** 6-10m. **Vegetation Coverage:** >30-70%. **Available fuel loading:** 12 35t/ha. **Effective slope:** Downslope >0-5 degrees.

Photo Id 8: View to south west of Forest Type A in road reserve and in private property south of Mercer Road.

Plot	5	Classification or Exclusion Clause	Exclusion 2.2.3.2 (f)
			**Location:** Lawns, managed gardens, windbreaks and other low-threat vegetation. As per exclusion clause 2.2.3.2 (f) of AS3959-2009. Located internal and external to the site. **Separation distance:** NA. **Dominant species & description:** Mixed Eucalypts planted windbreaks. Single rows. **Average vegetation height:** 16m. **Vegetation Coverage:** NA. **Available fuel loading:** <2t/ha. **Effective slope:** NA.

Photo Id 9: View to south east of planted windbreak internal (south) central of the site.

Plot	5	Classification or Exclusion Clause	Exclusion 2.2.3.2 (f)
			**Location:** Lawns, managed gardens, windbreaks and other low-threat vegetation. As per exclusion clause 2.2.3.2 (f) of AS3959-2009. Located internal and external to the site. **Separation distance:** NA. **Dominant species & description:** Mixed Eucalypts planted windbreaks. Single rows. **Average vegetation height:** 16m. **Vegetation Coverage:** NA. **Available fuel loading:** <2t/ha. **Effective slope:** NA.

Photo Id 10: View to east of planted windbreak to the north of the site (external).

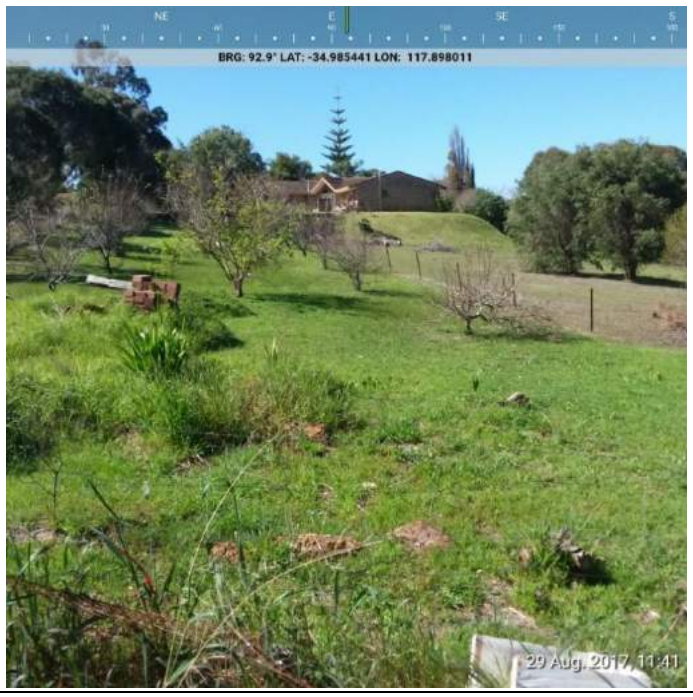
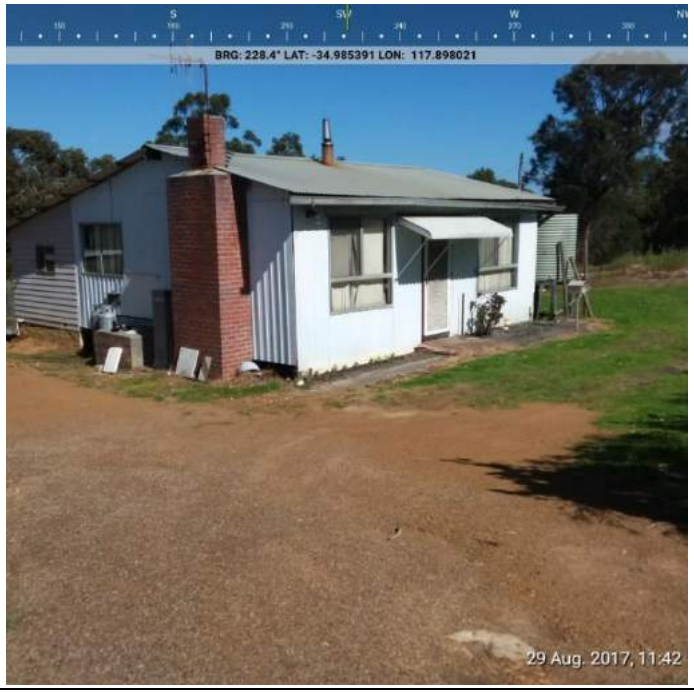
Plot	5	Classification or Exclusion Clause	Exclusion 2.2.3.2 (f)
			**Location:** Lawns and managed gardens associated with APZ areas, windbreaks and other low-threat vegetation. As per exclusion clause 2.2.3.2 (f) of AS3959-2009. Located internal and external to the site. **Separation distance:** NA. **Dominant species & description:** Mixed Eucalypts planted windbreaks. Single rows. **Average vegetation height:** 16m. **Vegetation Coverage:** NA. **Available fuel loading:** <2t/ha. **Effective slope:** NA.

Photo Id 11: View to the east of low fuel orchard and mowed managed lawns (background).

Plot	6	Classification or Exclusion Clause	Exclusion 2.2.3.2 (e)
			**Location:** Roads, driveways, buildings, mineral earth, dams and other non-vegetated areas. As per AS3959-2009 exclusion clause 2.2.3.2 (e). **Separation distance:** NA. **Dominant species & description:** NA. **Average vegetation height:** NA. **Vegetation Coverage:** NA. **Available fuel loading:** NA. **Effective slope:** NA.

Photo Id 12: View of dam internal to the site (south central). View from north to south.

Plot	6	Classification or Exclusion Clause	Exclusion 2.2.3.2 (e)
			**Location:** Roads, driveways, buildings, mineral earth, dams and other non-vegetated areas. As per AS3959-2009 exclusion clause 2.2.3.2 (e). **Separation distance:** NA. **Dominant species & description:** NA. **Average vegetation height:** NA. **Vegetation Coverage:** NA. **Available fuel loading:** NA. **Effective slope:** NA.
Photo Id 13: View of Talybenup Road (South of Mercer Road). View from north to south.			

Plot	6	Classification or Exclusion Clause	Exclusion 2.2.3.2 (e)
			**Location:** Roads, driveways, buildings, mineral earth, dams and other non-vegetated areas. As per AS3959 exclusion clause 2.2.3.2 (e). **Separation distance:** NA. **Dominant species & description:** NA. **Average vegetation height:** NA. **Vegetation Coverage:** NA. **Available fuel loading:** NA. **Effective slope:** NA.
Photo Id 14: View of building located south along Mercer Road. View from north east to south west.			

Plot	7	Classification or Exclusion Clause	Woodland Type B
			**Location:** Located internal to the site in the south east. **Separation distance:**0m **Dominant species & description:** Mixed planted eucalypts in south east area of site (internal). **Average vegetation height:** 18m. **Vegetation Coverage:** 10-30%. **Available fuel loading:** 15-25% **Effective slope:** Downslope >0-5 degrees.
Photo Id 15: View of planted eucalypt trees south east of the subject site.			

Plot	7	Classification or Exclusion Clause	Woodland Type B
			**Location:** Located external to the site (north) in adjacent private properties. **Separation distance:** 33.5m. **Dominant species & description:** Jarrah and Marri open woodland, not multilayered. **Average vegetation height:** 18m. **Vegetation Coverage:** 10-30%. **Available fuel loading:** 15-25% **Effective slope:** Downslope >0-5 degrees.
Photo Id 16: View of to the north from Terry Road to plot of Woodland in paddocks to the north.			

Plot	8	Classification or Exclusion Clause	Forest Type A
			**Location:** to the east in CoA managed reserve. **Separation distance:** 4-6m along trafficable firebreak. **Dominant species & description:** Jarrah, *Acacia, Melaleuca, Banksia*, Tea Tree, sedges and Grasstrees. **Average vegetation height:** 8m. **Vegetation Coverage:** >30-70%. **Available fuel loading:** 25-35t/ha. **Effective slope:** Upslope.

Photo Id 17: View of Forest Type A to the east in CoA Managed Reserve.

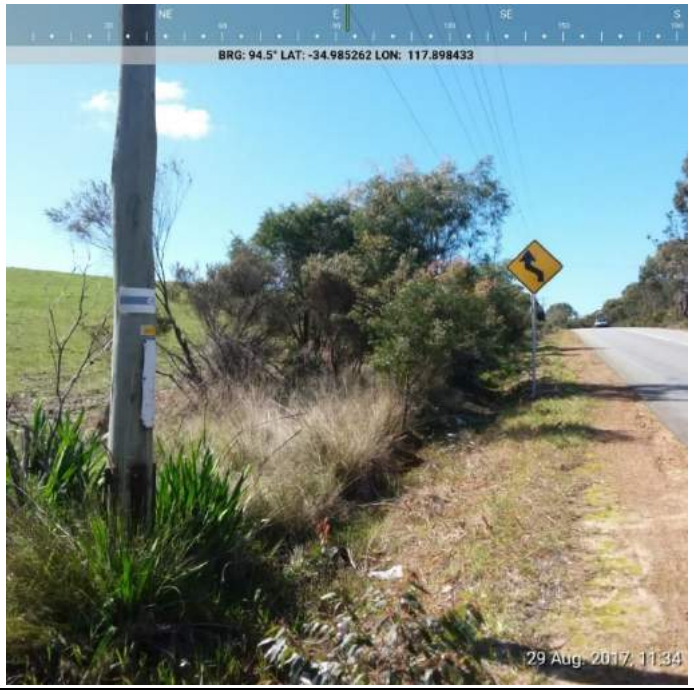
Plot	9	Classification or Exclusion Clause	Scrub Type D
			**Location:** Along public road reserves under western powerlines where vegetation is trimmed to 3-4m. **Separation distance:** 0-15m depending on road reserve and side of road. **Dominant species & description:** *Casuarina*, Teatree, trimmed Eucalypts and Peppermints. Note: Vegetation trimmed under powerline. **Average vegetation height:** 3m. **Vegetation Coverage:** >30%. **Available fuel loading:** 25t/ha. **Effective slope:** Downslope >0-5 degrees.

Photo Id 18: View along northern edge of Mercer Road Reserve. Trimmed vegetation under powerline.

Plot	9	Classification or Exclusion Clause	Scrub Type D



Location: Along public road reserves under western powerlines where vegetation is trimmed to 3-4m.

Separation distance: 0-15m depending on road reserve and side of road.

Dominant species & description: *Casuarina*, Teatree, trimmed Eucalypts and Peppermints.

Note: Vegetation trimmed under powerline.

Average vegetation height: 3m.

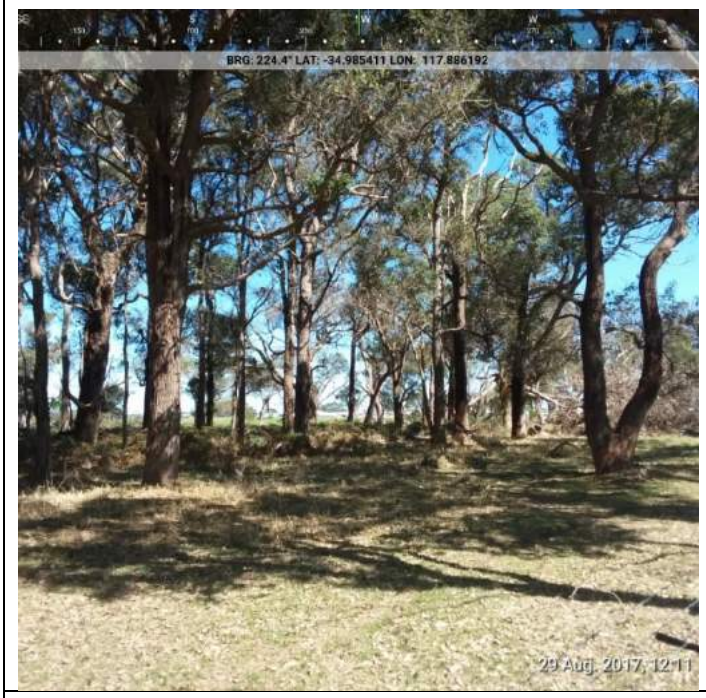
Vegetation Coverage: >30%.

Available fuel loading: 25t/ha.

Effective slope: Downslope >0-5 degrees.

Photo Id 19: View along northern edge of Terry Road Reserve. Trimmed vegetation under powerline (note tall trees in background associated with different plot).

Plot	10	Classification or Exclusion Clause	Woodland Type B



Location: Located in private properties to the south and north west of the subject site.

Separation distance: 20m.

Dominant species & description: Jarrah, Marri, Peppermints and *Casuarina* low open Woodlands, fuel reduced through grazing. Not multilayered.

Average vegetation height: 10m.

Vegetation Coverage: 10-30%.

Available fuel loading: 15-25t/ha.

Effective slope: Upslope.

Photo Id 20: View of to the south west off Mercer road into adjacent property to the south. Eucalypt trees grazed by stock.

Plot	11	Classification or Exclusion Clause	Scrub Type D
			**Location:** Along public road reserves under western powerlines where vegetation is trimmed to 3-4m. **Separation distance:** 0m. **Dominant species & description:** *Casuarina* trimmed under the powerline, not exceeding 3m. Note: Vegetation trimmed under powerline **Average vegetation height:** 3m. **Vegetation Coverage:** >30%. **Available fuel loading:** 25t/ha. **Effective slope:** Upslope.
Photo Id 21: View of trimmed casuarina trees along Mercer Road.			

COMMENTS ON VEGETATION CALCULATIONS:

- Distances from vegetation were made based on surface fuels to edge of lot (subject site) boundary;
- Effective slopes were measured in the field using a Nikon Forestry Pro and represented on the respective plots;
- Method 1 (AS3959-2009) Simplified procedure was used for vegetation classification and BAL Assessment process;
- All vegetation was classified within the subject site and within 150m of the lot boundaries to AS3959 Table 2.3; and
- The perimeter of the vegetation was measured using field GPS and notations on field GIS maps.

COMMENTS ON BAL CALCUALTIONS

- Method 1 (AS3959-2009) Simplified procedure was used for the BAL Assessment process;
- The BAL Contour Plan was prepared by an Accredited Level 2 Bushfire Planning Practitioner (BPAD30794); and
- The BAL Contour Map has been prepared in accordance with Department of Planning (WAPC) Guidelines for Planning in Bushfire Prone areas Vers 1.2 August 2017
- Assessment based on draft Local Structure Plan as supplied by Edge Planning & Property dated 23/10/2017.
- Subject site is located in a Bushfire Prone Area, See Appendix 2 (Slip, 2016 & 2017).
- APZ areas will be maintained in a Low Fuel state as per AS3959-2009 Exc Clause 2.2.3.2 (f). Grasses <100mm in height and forest areas fuel reduced to <2T/ha. Refer to Appendix 3.
- Buildings are to be placed in BAL 12.5, BAL 19 and BAL 29 zones.

This BAL Plan was prepared by:
Kathryn Kinnear, Bio Diverse Solutions
Accreditation No: BPAD30794
Jurisdiction: Level 2 - WA

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

BIO DIVERSE SOLUTIONS

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Albany, WA 6330
Australia
Tel: 08 9842 1575
Fax: 08 9842 1575



Overview Map Scale 1:100,000

Legend

- Subject Site
- 150m Assessment Boundary
- Cadastre
- 5m Contours
- BAL29 Separation Distance

BAL Contours

- BAL-FZ
- BAL-40
- BAL-29
- BAL-19
- BAL-12.5
- BAL-LOW

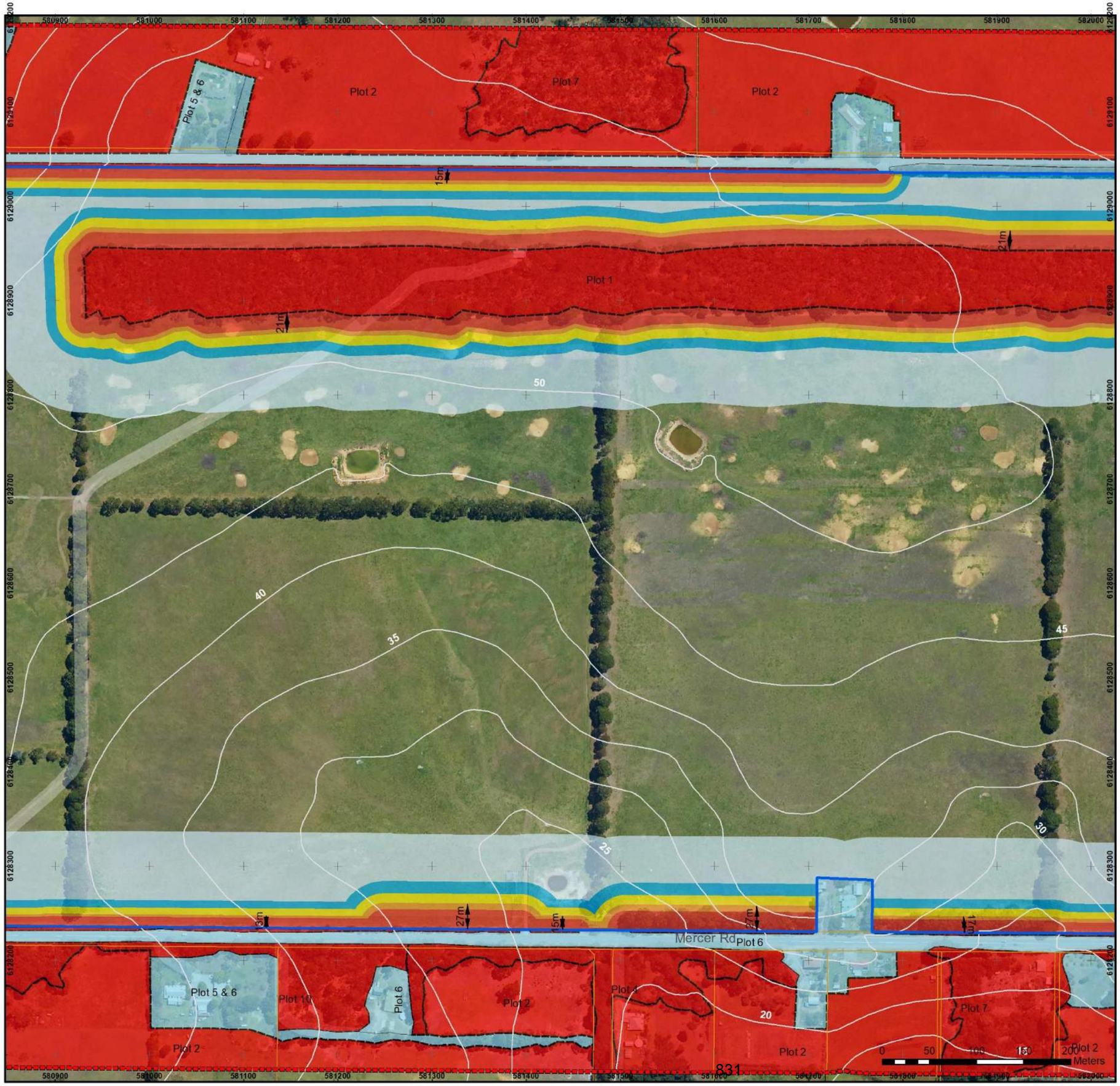
Scale
1:4,000 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2017
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT Edge Planning & Property
Steve Thompson
Lot 10 Chesterpass Road & Lot 521 Mercer Road
Ardess Warrenup, WA 6330

Figure 2.1. BAL Contour Plan

BAL Assessor	*QA Check*	*Drawn by*
KK	KK	SA
STATUS	*FILE*	*DATE*
FINAL	EPP004	28/09/2017



This BAL Plan was prepared by:
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Accreditation No: BPAD30794
Jurisdiction: Level 2 - WA

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Overview Map Scale 1:100,000

Legend

- Subject Site
- 150m Assessment Boundary
- Cadastre
- 5m Contours
- BAL29 Separation Distance

BAL Contours

- BAL-FZ
- BAL-40
- BAL-29
- BAL-19
- BAL-12.5
- BAL-LOW

Scale
1:4,000 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2017
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

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Edge Planning & Property
Steve Thompson
Lot 10 Chesterpass Road & Lot 521 Mercer Road
Ardess Warrenup, WA 6330

Figure 2.2. BAL Contour Plan

BAL Assessor	QA Check	Drawn by
KK	KK	SA
STATUS	**FILE**	**DATE**
FINAL	EPP004	28/09/2017

This BAL Plan was prepared by:
Kathryn Kinnear, Bio Diverse Solutions
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BIO DIVERSE SOLUTIONS

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Albany, WA 6330
Australia
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Fax: 08 9842 1575



Overview Map Scale 1:100,000

Legend

- Subject Site
- 150m Assessment Boundary
- Cadastre
- 5m Contours
- BAL29 Separation Distance

BAL Contours

- BAL-FZ
- BAL-40
- BAL-29
- BAL-19
- BAL-12.5
- BAL-LOW

Scale
1:4,000 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2017
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

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Edge Planning & Property
Steve Thompson
Lot 10 Chesterpass Road & Lot 521 Mercer Road
Ardess Warrenup, WA 6330

Figure 2.3. BAL Contour Plan

BAL Assessor	*QA Check*	*Drawn by*
KK	**KK**	**SA**
STATUS	*FILE*	*DATE*
FINAL	**EPP004**	**28/09/2017**

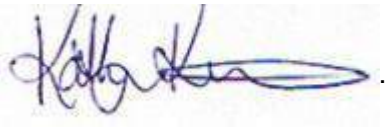
SECTION 3: DISCLAIMER

The recommendations and measures contained in this assessment report are based on the requirements of the Australian Standards 3959-2009 – Building in Bushfire Prone Areas, WAPC State Planning Policy 3.7 (WAPC, 2015), WAPC Guidelines for Planning in Bushfire Prone Areas (WAPC, 2015), and CSIRO's research into Bushfire behaviour. These are considered the minimum standards required to balance the protection of the proposed dwelling and occupants with the aesthetic and environmental conditions required by local, state and federal government authorities. They DO NOT guarantee that a building will not be destroyed or damaged by a bushfire. All surveys and forecasts, projections and recommendations made in this assessment report and associated with this proposed dwelling are made in good faith on the basis of the information available to the fire protection consultant at the time of assessment. The achievement of the level of implementation of fire precautions will depend amongst other things on actions of the landowner or occupiers of the land, over which the fire protection consultant has no control. Notwithstanding anything contained within, the fire consultant/s or local government authority will not, except as the law may require, be liable for any loss or other consequences (whether or not due to negligence of the fire consultant/s and the local government authority, their servants or agents) arising out of the services rendered by the fire consultant/s or local government authority.

AS3959-2009 disclaimer: It should be borne in mind that the measures contained within this Standard (AS3959-2009) cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the unpredictable nature and behavior of fire and extreme weather condition.
(AS3959, 2009)
Building to AS39590-2009 is a standard primarily concerned with improving the ability of buildings in designated bushfire prone areas to better withstand attack from bushfire thus giving a measure of protection to the building occupants (until the fire front passes) as well as to the building itself.

SECTION 5: Certification

I hereby certify that I have undertaken the assessment of the above site and determined the Bushfire Attack Level stated above in accordance with the requirements of AS 3959-2009 (Incorporating Amendment Nos 1, 2 and 3) and the Guidelines for Planning in Bushfire Prone Areas Ver 1.2 (WAPC, 2017).

SIGNED, ASSESSOR:  ..... DATE: 28/9/2017

Kathryn Kinnear, Bio Diverse Solutions
Accredited Level 1 BAL Assessor
Accredited Level 2 Bushfire Practitioner (Accreditation No: BPAD30794)

BIO DIVERSE SOLUTIONS

BPAD Bushfire Planning & Design Accredited Practitioner Level 1

References

Western Australian Planning Commission (WAPC) (2015) Guidelines for Planning in Bushfire Prone Areas. Western Australian Planning Commission and Department of Planning WA, Government of Western Australia.

Western Australian Planning Commission (WAPC) (2017) State Planning Policy 3.2 Planning in Bushfire Prone Areas Vers 1.2. Department of Planning WA and Western Australian Planning Commission.

State Land Information Portal (SLIP) (2016, 2017) map of Bushfire Prone Areas. Office of Bushfire Risk management (OBRM) data retrieved from:
https://maps.slip.wa.gov.au/landgate/bushfireprone/

APPENDIX 10

PRINTED : Fri Oct 13 16:31:13 2000

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836

Drawn : AH

Date : 13/10/2000

File Ref: 99176/2000_115_F4A

Oyster Harbour

King George Sound

Princess Royal Harbour

Middleton Beach

ALBANY TOWNSITE

CUTHBERT TOWNSITE

Proposed King River Trail

Kalgan River Circuit Trail

Proposed Mt. Melville Circuit Trail

Proposed Middleton Beach Dual Use Path Extension

Frenchman Bay Dual Use Path

Proposed Yakamia Creek Trail

ALBANY HIGHWAY

CHESTER PASS ROAD

MERCER ROAD

MERCER ROAD EXTENSION

PROPOSED RING ROAD

SOUTH COAST HIGHWAY

LOWER DENMARK ROAD

NANARUP ROAD

YAKAMIA CREEK ROAD

MIDDLETON ROAD

PRINCESS ROYAL DRIVE

FRENCHMAN BAY ROAD

HANRAHAN ROAD

LOWER KING ROAD

GULL ROCK ROAD

SEVEN MILE CREEK

FIVE MILE CREEK

WILKUNG CREEK

1 0 1

Kilometres

Scale 1 : 60,000

LEGEND

GREENWAYS

CONSERVATION

- Ecological Corridor (Vegetated)

UTILITARIAN

- Existing or Potential Corridor requiring Revegetation/ Landscaping

RECREATION

- Existing Trail
- Proposed Trail
- Remnant Vegetation
- Reserve
- Wetland
- Waterway
- Prominent Ridge Line
- Cadastral Boundary

Note: Where Greenways go through a reserve the entire reserve functions as a Greenway.

Source : City of Albany, 2000; DOLA, 2000

ATA Environmental

environmental scientists

ALBANY GREENWAYS

GREENWAYS IN ALBANY TOWNSITE

FIGURE 3A

REPORT ITEM DIS 165 REFERS

APPENDIX 11

Local Water Management Strategy
Supporting the Ardess-Walmsley Local Structure Plan

Prepared by Edge Planning & Property for Ardess 1607 Pty Ltd and Ten Year Developments Pty Ltd

www.edgeplanning.com.au

January 2018

Executive Summary

This Local Water Management Strategy (LWMS) has been prepared to support the *Ardess-Walmsley Local Structure Plan* and the associated Scheme Amendment No. 26 to the *City of Albany Local Planning Scheme No. 1* (LPS1). The Structure Plan provides a planning framework to Lot 10 Chester Pass Road, Walmsley and Lot 521 Mercer Road, Walmsley (the 'site') to facilitate proposed residential, light industrial, education/community and public open space (POS) uses. Amendment 26 proposes a planning rule change to permit transport depots in the Ardess Industrial Estate (Lot 10 Chester Pass Road). The Structure Plan site is shown in Attachment 1.

This LWMS is intended to:

- inform the planning and design process;
- provide an overview of water resources on the site; and
- present a recommended approach for total water cycle management with an emphasis placed on water sensitive urban design (WSUD) which is appropriate for the site's context, the site's characteristics, risk, available and expected servicing and the downstream environment.

The development is considered a low risk to water resources given the site's location, environmental characteristics, proposed servicing and the approach to development. The LWMS concludes that the site is capable of supporting residential and light industry subdivision/development and is able to achieve appropriate water management outcomes. An Urban Water Management Plan (UWMP) is required to support residential subdivision, however not UWMP is required to support light industrial subdivision. There will however be a requirement for engineering drawings and specifications to be submitted for the light industrial subdivision and approved by the City which are generally consistent with the LWMS which adopt WSUD.

Key strategies and initiatives proposed for the subdivision/development are summarised below:

Water sustainability initiatives

- Provision of awareness raising material on water saving measures and benefits for new residents and business occupants including Waterwise and nutrient wise gardens.
- Conservation of potable water through utilising water-efficient fixtures and fittings and encouraging water wise practices by households.
- Encouraging all new dwellings, larger outbuildings and light industrial operations to be provided with a rainwater tank.
- Promoting greywater for non-edible garden irrigation.
- Connecting all lots to the reticulated water supply.
- Capturing stormwater and reusing it to irrigate POS.

Stormwater management

Managing stormwater for the site includes both structural and non-structural measures. These include:

- adopting WSUD which maintain the existing water balance, promotes retention, at source infiltration and treatment of stormwater before it is discharged to receiving water bodies;
- post development flows to be as close as possible to the pre-development flow;
- treating stormwater on lots for storm events up to the 1 in 1 year, 1 hour average recurrence interval (ARI) event including through rainwater tanks and soakwells;
- treating stormwater in road reserves at or near to the source for the 1 in 5 year ARI event through swales;
- creating detention basins to intercept and store flows from major storm events;
- leaving the seasonal watercourse undeveloped and not obstructed;
- accommodating major storm events in road reserves and POS;
- ensuring that buildings are setback from the seasonal watercourse, with buildings raised above the natural ground level and where possible above roads;
- integrating stormwater treatment into the landscape;

- creating a 'living stream' adjoining the seasonal watercourse on the site;
- providing suitable conditions for urban development (dwellings and light industry);
- adopting a Waterwise and nutrient wise approach to gardens;
- undertaking sediment and litter control and construction management; and
- providing educational material to prospective purchasers of lots and to builders.

Groundwater management

- Residential development to be connected to reticulated sewerage.
- Suitably designed and located on-site effluent disposal systems for light industrial development.
- Adopting a treatment train approach to runoff and infiltration through the use of WSUD.
- Promoting nutrient wise gardens and minimising the use of fertilisers.

Contents

Section No.	Heading	Page No.
	Executive Summary	**2**
1	**Introduction**	**6**
1.1	Purpose	6
1.2	Total water cycle management – principles and objectives	6
1.3	Planning framework	7
1.4	Previous studies	7
2	**Proposed Development**	**7**
2.1	Ardess-Walmsley Local Structure Plan	7
2.2	Scheme Amendment No. 26	7
3	**Design Criteria**	**7**
3.1	Overview	7
3.2	Water conservation	8
3.3	Water quantity management	8
3.4	Water quality management	8
3.5	Commitment to best management practice	8
4	**Existing Environment**	**9**
4.1	Study area	9
4.2	Climate	9
4.3	Landform and topography	9
4.4	Aboriginal heritage sites	9
4.5	Environmental assets	9
4.6	Surface water and drainage	11
4.7	Geology and soils	11
4.8	Groundwater	12
4.9	Existing infrastructure and constraints to design	12
4.10	Existing environment conclusions	13
5	**Water Sustainability Initiatives**	**13**
5.1	Overview	13
5.2	Drinking water	14
5.3	Fit-for-purpose use	14
5.4	Water balance modelling	16
5.5	Waterwise landscaping and irrigation	17
5.6	Water source recommendations	18
6	**Stormwater Management Strategy**	**18**
6.1	Overview	18
6.2	Surface water quantity management	18
6.3	Surface water quality management	20
6.4	Impact on water dependent ecosystems	20
6.5	Non-structural controls	21
6.6	Stormwater management strategy conclusions	21
7	**Groundwater Management Strategy**	**21**
7.1	Overview	21
7.2	Groundwater levels	21
7.3	Groundwater quality management	21
7.4	Impact on water dependent ecosystems	22
7.5	Implications for fill	22
8	**Monitoring and Additional Investigations**	**22**
8.1	Overview	22
8.2	Monitoring	22
9	**Implementation**	**23**
9.1	Developer commitments	23
9.2	Roles and responsibilities for implementation	23

9.3	Review of LWMS	23
10	**Conclusions**	**23**
11	**References**	**24**
	Attachments	
1	Site Plan	
2	Location Plan	
3	Environmental and Land Capability Assessment	
4	Ardess-Walmsley Local Structure Plan	
5	Context Plan	
6	Context Water Information	
7	Location and Catchments	
8	Local Water Management Strategy	

1. INTRODUCTION

1.1 Purpose

For the site shown in Attachments 1 and 2, this LWMS is intended to:

- inform the planning and design process;
- provide an overview of water resources on the site; and
- present a recommended approach for total water cycle management with an emphasis placed on water sensitive urban design (WSUD) which is appropriate for the site's context, the site's characteristics, risk, available and expected servicing and the downstream environment.

The objective of this LMWS is to achieve water management outcomes which are consistent with State and local requirements.

1.2 Total water cycle management – principles and objectives

State Planning Policy 2.9 Water Resources outlines the key principles of integrated water cycle management as:

- consideration of all water resources, including wastewater, in water planning;
- integration of water and land use planning;
- the sustainable and equitable use of all water sources, having consideration of the needs of all water users, including the community, industry and the environment;
- integration of human water use and natural water processes; and
- a whole of catchment integration of natural resource use and management.

Total water cycle management 'recognises that water supply, stormwater and sewage services are interrelated components of catchment systems and therefore must be dealt with using a holistic water management approach that reflects the principles of ecological sustainability' (Department of Water: 2007).

WSUD objectives set out in *State Planning Policy 2.9 Water Resources* are to:

- manage a water regime;
- maintain and, where possible, enhance water quality;
- encourage water conservation;
- enhance water-related environmental values; and
- enhance water-related recreational and cultural values.

The objectives for managing stormwater as stated in the *Stormwater Manual for Western Australia* (Department of Water: 2007) are:

- Water Quality: to maintain or improve the surface and groundwater quality within the development areas relative to predevelopment conditions.
- Water Quantity: to maintain the total water cycle balance within the development areas relative to the predevelopment conditions.
- Water Conservation: to maximise the reuse of stormwater.
- Ecosystem Health: to retain natural drainage systems and protect ecosystem health.
- Economic Viability: to implement stormwater management systems that are economically viable in the long term.
- Public Health: to minimise the public risk, including risk from injury or loss of life, to the community.
- Protection of Property: to protect the built environment from flooding and waterlogging.
- Social Values: to ensure that social, aesthetic and cultural values are recognised and maintained when managing stormwater.
- Development: to ensure the delivery of best practice stormwater management through planning and development of high quality developed areas in accordance with sustainability and precautionary principles.

1.3 Planning framework

There are a number of State, regional and local documents that set the framework for land and water planning including *State Planning Policy 2 Environment and Natural Resources Policy* (2003), *State Planning Policy 2.9 Water Resources (2006), State Water Plan* (2007), *Better Urban Water Management* (2008), *Stormwater Management Manual for Western Australia* (2007), *Liveable Neighbourhoods* (2007), *Great Southern Water Strategy* (2014) and LPS1. Further details are set out in the Structure Plan report. The LWMS has been prepared to address the objectives outlined in the planning framework.

Of particular significance to the site is LPS1 where the site is zoned 'Light Industry' and 'General Agriculture' The *Albany Local Planning Strategy* allocates Lot 521 Mercer Road as 'Future Urban'.

1.4 Previous studies

No district water management strategy has been prepared for the area. A LWMS was prepared for the adjoining *Warrenup-Walmsley Local Structure Plan*.

In support of the LWMS, Bio Diverse Solutions prepared an Environmental Assessment Report and Land Capability Assessment to guide future environmental management for the Structure Plan and future subdivision/development of the site (see Attachment 3).

2. PROPOSED DEVELOPMENT

2.1 Ardess-Walmsley Local Structure Plan

A Structure Plan has been prepared (see Attachment 4) to provide a framework for the site and to guide the subdivision and development. The Structure Plan proposes an extension of the Ardess Industrial Estate, a residential area which includes a range of residential densities, a primary school and three POS areas. The proposed light industrial area will require on-site effluent disposal, where-as the residential area will be developed once reticulated sewerage has been established in the area.

The Structure Plan responds to the site's context, opportunities and constraints and the planning framework. The rationale behind the Structure Plan includes to take account of site characteristics, soil types, conserve the site's remnant native vegetation, and to provide lots that are capable and suitable of accommodating residential and light industrial development.

The development will be staged. The first stage is expected to be adjoining the existing Ardess Industrial Estate to reduce upfront servicing costs. The timing, location and configuration of lot releases will consider demand, feasibility and the location and capacity of services.

The Structure Plan provides context to Amendment 26.

2.2 Scheme Amendment No. 26

Scheme Amendment No. 26 proposes a planning rule change to permit transport depots in the Ardess Industrial Estate (Lot 10 Chester Pass Road).

3. DESIGN CRITERIA

3.1 Overview

The LWMS set outs the approach to managing and conserving the total water cycle for this development and to integrate water and land use planning. The design criteria adopted for this LWMS is based on the design objectives outlined in *Better Urban Water Management* (2008). The design criteria are set out under the headings of water conservation, water quantity management, water quality management, and commitment to best management practice. Strategies to address the design criteria are set out later in this report.

The LWMS is used to provide information on the potential impact of development on water resources. The LWMS will consider the management of stormwater for the development for different ARI events.

3.2 Water conservation

The LWMS considers water resources related to the site and the development and seeks to achieve the sustainable management of all aspects of the water cycle. This includes minimising potable water in and outside the home/businesses and using reticulated potable water as efficiently as possible. The principles are:

- minimising total water use to address *State Water Plan* targets; and
- substituting drinking quality water with fit-for-purpose water for non-drinking water uses.

3.3 Water quantity management

The principle is that post development stormwater discharge volumes and peak flows are to be maintained relative to the existing conditions. This will be achieved through:

- ecological protection - the post development discharge volume and peak flow rates will be maintained relative to pre-development conditions on the site for the 1 in 1 year ARI event;
- flood management - manage the catchment run-off for up to the 1 in 100 year ARI event in the development area to pre-development peak flows; and
- protect infrastructure and assets from inundation and flooding – residential and light industry subdivision/development can increase impervious areas without appropriate management, and development can result in increased volumes and flows of surface runoff. This in-turn has the potential to contribute to localised flooding and inundation. The location of development, detailed engineering design and the construction of buildings are to suitably address localised flooding and inundation.

3.4 Water quality management

The principles are to:

- maintain surface and groundwater quality at pre-development levels through adopting WSUD; and
- restore environmental assets where possible and practical.

3.5 Commitment to best management practice

The planning framework sets out a requirement to address WSUD and strive towards best management practice. There are opportunities ranging from a structure plan scale to an individual lot scale along with structural and non-structural strategies. A combination of strategies is required to achieve required outcomes. Additionally, best management practice strategies will vary based on matters including site characteristics and the development proposal. Adopting WSUD and best management practice strategies will reduce risks of localised flooding on development and infrastructure while maximising the potential for stormwater to be treated as a resource.

The principles are:

- implement controls at or near the source to prevent pollutants entering the system and/or treat stormwater;
- installing in-transit measures to treat stormwater and mitigate pollutants that have entered the conveyance system; and
- implement 'end-of-system' controls to treat stormwater, addressing any remaining pollutants prior to discharging to receiving environments.

4. EXISTING ENVIRONMENT

4.1 Study area

The Structure Plan area is located approximately 5 kilometres north of the Albany central area in the locality of Walmsley (see Attachment 2). The site is generally bordered by Chester Pass Road, Terry Road, Reserve 27179 and Mercer Road. Attachment 5 shows the context plan.

The site (see Attachment 1) is 178.3348 hectares in area. Lot 10 Chester Pass Road is 25.7335 hectares in area and Lot 521 is 152.6013 hectares in area.

The site consists of multiple land uses. Lot 10 Chester Pass Road comprises the Ardess Industrial Estate and cleared land used to keep current and old farm machinery and sand/gravel piles. The industrial area comprises of sheds, office buildings, car parks, an internal road network and cleared areas for future development. Businesses within the industrial area include Albany Freight Lines, Designer Dirt (landscaping supplies) and Ardess Nursery. The Ardess Industrial Estate is subject to various leases.

Lot 521 Mercer Road encompasses the majority of the site and comprises predominantly cleared rural land used for grazing cattle. There are no dwellings on Lot 521 Mercer Road. There are two small to medium sized sheds (one used to store hay and farm machinery and the other an old shearing shed), a set of cattle yards and a strip of remnant vegetation in the northern part of Lot 521.

4.2 Climate

The Albany area is characterised by a Mediterranean climate with warm dry summers and cool wet winters. Rainfall data is from the nearby Bureau of Meteorology (BoM) Albany Station (Site No. 9500).

The long-term average annual rainfall is 929 mm (1877 to 2016). This average has decreased between 2000 to present, to an average annual rainfall of 879 mm, reflecting a 5% reduction compared to the long-term average, consistent with a general trend in the South West of WA. The total rainfall distribution has also altered, with a reduction of average winter monthly rainfall, but no significant reduction in average summer monthly rainfall.

Based on the climatic characteristics of the district, climate is not considered to be a limiting factor to development.

4.3 Landform and topography

Overall, the site has a gentle to moderate gradient. Topography over the site is undulating ranging from a high point of 51m AHD in the central northern portion of the site to a low point of 22m AHD in the southern central portion of the site. There is a ridge that runs from the central northern portion of the site to the south-west corner.

4.4 Aboriginal heritage sites

The Department of Planning, Lands and Heritage's database has no known sites of Aboriginal cultural significance on the site. While noting this, land developers have an obligation under the *Aboriginal Heritage Act 1972* to protect places and objects in Western Australia that are important to Aboriginal people because of the connections to their culture.

4.5 Environmental assets

A) Overview

To inform the LWMS, an environmental assessment was carried out by Biodiverse Solutions (Attachment 3).

It is expected the development will have a limited environmental impact given the site is generally cleared, remnant native vegetation will be conserved, residential lots will be connected to reticulated sewerage, light industrial subdivision will 1 hectare and above with effluent disposal systems to be appropriately designed and located, and stormwater will be appropriately managed. There are also opportunities for revegetation including enhancing the seasonal watercourse on the site.

B) Vegetation and flora

There are two areas of remnant vegetation within the site. A broad scale vegetation survey of these two areas was conducted by Bio Diverse Solutions on 29 August 2017 (see Attachment 3). The strip of vegetation running parallel with the northern boundary of the site (approximately 13 hectares in size) comprises Low Open Jarrah/Marri/Sheoak Forest in good condition. The small area of remnant vegetation in the south-east corner comprises mixed Eucalypt Forest in a degraded condition.

A search of publicly available databases through WA Atlas, Nature Map, and EPBC Protected Matter Search Tool indicates that no threatened, priority or declared rare flora is present on the site, or within the surrounding Nature Reserves and remnant vegetation. There are no Ramsar listed sites, Wetlands of National Importance or Declared Rare or Priority species of vegetation. Nevertheless, the remaining native vegetation has value and it is proposed to retain these areas.

There are opportunities to connect the bush corridor on Lot 521 Mercer Road to the north and west. This includes planting native vegetation on the western section of Terry Road adjoining the site and opportunities through the adjoining *Warrenup-Walmsley Local Structure Plan* to provide revegetation in drainage lines, as part of POS and within relevant road reserves.

Bio Diverse Solutions advise 'all efforts should be made to conserve existing native vegetation. There is support however to clear, as required, replanted vegetation which is Blue gums given they are generally unsuitable in an urban area.'

The following management measures are proposed to reduce the likelihood of impacts to vegetation and flora and to retain the key existing biological values of the site:

- remnant vegetation will be retained within the vegetation strip in the north-east of the site and in the south-east corner of the site. Inclusion of the native vegetation within POS will provide the most effective way of managing the conservation values of the native vegetation;
- access crossings within the vegetation strip will be limited to facilitate retention and natural regeneration of vegetation and to prevent adverse impacts particularly for transient fauna;
- there will be revegetation using native species, where currently there is very little native species and diversity, in the two southern areas of POS along with other areas to promote fauna habitat, flora diversity and biodiversity;
- rehabilitating waterways/drainage lines to create a 'living stream' through revegetation and as required fencing; and
- develop a greening strategy to increase green canopy and green spaces.

C) Fauna and habitat

The majority of the site has been cleared. As a result, fauna habitat has largely been removed. The only potentially significant fauna habitat on site is within the two areas of remnant vegetation.

Within the bush corridor, in the northern section of Lot 521, there is the potential for black cockatoo foraging, roosting and breeding habitat, and any impacts on these habitats should be minimised.

The Department of Biodiversity Conservation and Attractions have recently advised that vegetation in this bush corridor will support roosting Black Cockatoos species that are listed as threatened under the *State Wildlife Conservation Act 1950* and the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999*. Additionally, significant areas of native vegetation are located in Crown reserves to the east of the site that provide habitat for cockatoo and other threatened and non-threatened species along with landscape connectivity. The Department of Biodiversity Conservation and Attractions encourage the retention of as much of the strip of vegetation as possible on Lot 521 to support roosting habitat and landscape connectivity in the form of 'stepping stones'.

To reduce likely impacts to native fauna, the bush corridor will be retained through maintaining the strip of remnant vegetation in the north of the site and the native vegetation in the south-east corner as POS. Additionally, native vegetation species will be used in areas of POS to promote habitat for native fauna species.

D) Wetlands and lakes

There are no protected wetlands or Environmental Protection Policy Lakes within the site.

E) Acid sulphate soils

Acid Sulphate Soil (ASS) mapping indicates the site is not situated on any known ASS. There is however a section of high to moderate risk of ASS occurring within 3m of natural soil surface to the south of the site on Mercer Road.

There is a low risk of acid sulphate soils on the site. This is confirmed by the geotechnical investigation undertaken by Great Southern Geotechnics who conclude that the risk of exposing or disturbing potential acid sulfate soil is negligible given soil types.

The final fill levels and excavation requirements of the future subdivision will determine if an ASS and Dewatering Management Plan is required to be prepared prior to subdivision. If required, the management plan will be prepared to satisfy the Department of Water and Environmental Regulation (DWER) and will outline the soil management measures, the groundwater and dewatering effluent monitoring measures and the contingency management measures required to minimise any environmental impacts.

F) Contamination

A search of the DWER's Contaminated Sites Database was conducted to determine locations of any known or suspected contaminated sites in the vicinity of the site. The search revealed that no known or suspected contaminated sites occur within the site.

G) Sedimentation and erosion

There is limited evidence of erosion on the site.

4.6 Surface water and drainage

There are no major naturally existing drainage networks or water bodies within the site. There is one minor seasonal watercourse situated in the north-western section of the site. This area will need to be managed sensitively in relation to stormwater planning within the site.

Hydrographic Sub-catchments (DoW, 2008) show the site to be within two surface water sub-catchments; with the northern and western portion of the site discharging to Willyung Creek to the north of the site and the central and southern portion of the site discharging to Yakamia Creek to the south of the site (see Attachment 7). Both the Willyung Creek and Yakamia Creek sub-catchments form part of the Oyster Harbour/Kalgan/King Catchment ultimately discharging to Oyster Harbour. These catchments are not proclaimed surface water areas.

There are several man-made dams across the site, which are surface water fed and used for livestock drinking water.

4.7 Geology and soils

Regolith of WA (Department of Mining, 2009) mapping indicates that soils across the site are classified as sandplain, mainly Aeolian and include some residual deposits.

A Geotechnical Investigation was conducted on the 29 August 2017 by Great Southern Geotechnics under later winter conditions. The Geotechnical Investigation is included in Attachment 3. The investigation included both soil analysis and measuring of water table. The soil testing was conducted to assess the

suitability of the site for the proposed residential and light industrial development including onsite effluent disposal for the extension of the industrial area.

Soil testing showed that soils across the site comprised predominately of a silty sand topsoil, over sandy gravel (with a layer depth varying from 200 - 700mm), over sandy clay to the depth of the hole.

Permeability testing was conducted by Liquid Labs WA as part of the Geotechnical Investigation. Permeability at both borehole site TP3 and TP10 is considered to be extremely low this is consistent with the soil type (sandy clay) encountered at these locations.

Phosphorous Retention Index (PRI) results across the site varied consistent with soil type. The sandy clays found across the majority of the site were found to have a very high PRI and therefore a very high ability to fix nutrients and heavy metals. The sandy gravel found at TP1 also had an extremely high PRI, particularly for a sand, whereas the light grey sand found at TP6 had a low PRI and therefore a low ability of fixing nutrients and heavy metals.

Ten boreholes were constructed within the site to a depth of 2.3 metres and left open for a minimum of 1 hour to identify water table present. No groundwater was encountered.

As set out in Attachment 3, a Land Capability Assessment of the site was conducted by Bio Diverse Solutions. The overall capability of the site supporting the Urban Development land use was rated as highly capable for Mapping Unit 1 and very highly capable for Mapping Unit 2. The overall capability of the site supporting the Light Rural Industrial is rated as highly capable for Mapping Unit 1. Mapping Unit 2 was not encountered at the location of the proposed Light Rural Industrial land use. The degree of limitations for both Urban Development and Light Rural Industry for Mapping Unit 1 and Mapping Unit 2 is low to very low.

Accordingly, the site is capable of supporting urban development and has similar soil types and hydrology to the surrounding urban areas. The soils have good foundation stability and any inconsistencies (e.g. lateritic cap rock) can be managed via design and normal construction techniques.

4.8 Groundwater

Australian Geoscience Mapping and Department of Water 250K Hydrogeological mapping places the site within the; 'Tertiary - Cainozoic - Phanerozoic (TPw) period: Plantagenet Group - siltstone, spongolite; minor sandstone, peat, and conglomerate.' The aquifer is a 'sedimentary aquifer with intergranular porosity – extensive aquifers, major groundwater resources.' (DoW, 2015).

As set out in section 4.7, a Geotechnical Investigation was conducted on the 29 August 2017 by Great Southern Geotechnics under late winter conditions. The investigation included measuring of water table. Ten boreholes were constructed within the site to a depth of 2.3 metres. Groundwater was not observed in any of the boreholes indicating there is no likely groundwater present beneath the site to a depth of 2.3 metres. The geotechnical investigation was undertaken in accordance with Australian Standards.

The site is not located within a Public Drinking Water Source Protection Area. The site is within an unproclaimed groundwater area under the *Rights in Water and Irrigation Act 1914*.

4.9 Existing infrastructure and constraints to design

A) Servicing overview

The subdivision/development of the site as advocated by the Structure Plan will require the extension and upgrading of essential civil infrastructure including reticulated water and reticulated sewerage to residential development. There is a need for more detailed investigations and design to ensure there is capacity of these services for the subdivision/development. The capacity of infrastructure to service future subdivision will need to be determined prior to the issue of titles.

B) Wastewater disposal

The site is located in a Sewerage Sensitive Area as set out in in the draft *Government Sewerage Policy*.

Residential development will be serviced with reticulated sewerage. Existing and future light industrial the subdivision/development will be serviced by on-site effluent disposal, with a minimum lot size of 1 hectare. The geotechnical assessment (Attachment 3) confirms site capability for onsite effluent disposal. There is a need for the development to comply with the draft *Government Sewerage Policy*. Any on-site wastewater disposal system is required to be located and designed to the satisfaction of the Department of Health and the City. This is given statutory backing through LPS1.

C) Water supply

Lot 10 Chester Pass Road is connected to the reticulated (scheme) water network.

Proposed residential and light industrial lots will be connected to the reticulated water system.

At the subdivision stage, the developer's consulting engineer will approach the Water Corporation for information about system capacity and constraints. Proposed lots are required to have sufficient pressure to meet Water Corporation's licence conditions and it's Customer Charter.

In addition to the reticulated water scheme, there are opportunities for additional water supply provision such as future landowner's installing rainwater tanks. The use of rainwater tanks is supported and this will complement the reticulated water supply.

D) Fire hydrants

Fire hydrants will be installed on the site at the subdivision stage.

E) Stormwater

Current drainage conditions are limited to the Ardess Industrial Estate which include open drains. It is proposed that stormwater drainage will be managed through on-site reuse, detention and treatment in accordance with WSUD principles which are outlined in section 6.

4.10 Existing environment conclusions

As outlined in section 4, the site has minimal environmental assets and is considered suitable and capable of accommodating residential and light industry subdivision/development. Key considerations, as part of future detailed design, include:

- conserving remnant native vegetation;
- effectively managing stormwater using WSUD;
- there is a need to extend services including reticulated water; and
- enhancing the seasonal watercourse in the north-west section of the site.

5. WATER SUSTAINABILITY INITIATIVES

5.1 Overview

It is desirable to reduce water demand in general and scheme water demand in particular for the development where possible and practical. The *State Water Plan (2007)* has set a target to reduce annual household use of scheme water in Perth to less than 100 kilolitres (kL) per person (page 61), while *Better Urban Water Management* has a target of not more than 40-60 kL per person per year for scheme water. These targets have been adopted for the development.

The *Perth Residential Water Use Study 2008/09* (Water Corporation: 2010) found that the average Perth household (2.4 people) water use was 255kL per annum.

The target water usage per household for use inside and outside dwellings is to 240kL per annum. The domestic irrigation demand could be reduced further if landscaping was redesigned and if the amount of lawn is minimised.

A range of water savings can be made by adopting Waterwise practices as part of future development as outlined below.

The main water use initiatives rely on individual landholders. The best way is not to mandate the water saving devices but rather to encourage prospective purchasers on water sustainability opportunities.

5.2 Drinking water

Reticulated water will be supplied to all lots. The reticulated water scheme will be operated by Water Corporation. Accordingly, scheme water will be from existing water sources which will provide the development with a potable water supply.

Water efficiency is part of Water Corporation's 'business as usual' approach and is enabled through the use of technology and by changing behaviour to use less water. The Western Australian Government has introduced a range of measures to ensure that new houses built in Western Australia meet minimum standards for energy and water efficiency. The 5 Star Plus building standards, introduced in September 2007, are based around two new building codes, the *Energy Use in Houses Code* and the *Water Use in Houses Code* and help to improve the energy and water efficiency of new homes. The *Water Use in Houses Code* requires:

- all tap fittings must be a minimum 4 stars Water Efficiency Labelling and Standards scheme (WELS) rated;
- all showerheads must be a minimum 3 stars WELS rated; and
- all sanitary flushing systems must be a minimum 4 stars WELS rated dual flush.

These ratings should be reviewed as more efficient appliances become available.

5.3 Fit-for purpose use

A) Rainwater

While noting the development will be connected with scheme water, rainwater tanks will be encouraged to be installed on all lots with water available for internal and external use. It is highlighted that the installation of rainwater tanks is the responsibility of the land owner.

Rainwater tanks provide a range of benefits including reducing use of the reticulated water supply and managing stormwater across the site (by detaining or retaining roof runoff). Captured rainwater can be used to supply in-house requirements and/or used outdoors including on gardens.

Landowners and business operators will be encouraged to install rainwater tanks to reduce the amount of water consumption from the water mains. Additionally, owners will be encouraged to install fittings to ensure the captured rainwater can service indoor and/or outdoor purposes. For instance, the installation of a 3,000 litre rainwater tank could potentially capture approximately 29kL per annum for each household's usage.

Water quality from rainwater tanks is generally considered to be of a high standard if regular maintenance is undertaken. This includes the installation of first flush diverters, prevention of access to any vermin or disease vectors, filters to minimise the entry of large particles and leaves, regular de-sludging to avoid a build-up of sediments at the base of the tank and regular inspection and maintenance of gutters and downpipes.

With appropriate maintenance, it is considered that the water quality from rainwater tanks should be of a sufficient standard to be used for non-potable in-house use without further treatment. With further treatment, and subject to City approval, rainwater is expected to be suitable for potable use.

B) Groundwater

Groundwater abstraction is generally the easiest and usually most cost effective method of providing an alternative to scheme water for irrigation in domestic gardens.

Groundwater is predominantly used externally for non-potable purposes. The use of groundwater presents a small risk in terms of water quality. With respect to irrigation, the presence of significant iron concentrations,

hardness, alkalinity or nutrients can impact upon the receiving vegetation and soils and/or contribute to scaling or scour of irrigation pipework.

It is generally acknowledged that the consumption of groundwater by individual households owning a private bore is greater than for those households irrigating from scheme water. Accordingly, it is considered that encouraging private bore use on the site would not lead to achievement of the water conservation objectives. However, if available and cost effective, it will reduce the use of scheme water.

Subject to availability and water quality, the use of groundwater for private lot irrigation will be the decision of the landowner. There is no requirement for DWER to licence groundwater on the site.

C) Stormwater

There are various options to utilise stormwater as a resource which include promoting rainwater tanks for each dwelling, larger outbuildings and business premises and directing stormwater from roads and driveways into detention basins for re-use.

D) Domestic greywater

At the household or business scale, treated greywater is suitable for garden irrigation or infiltration in accordance with the *Code of Practice for the Reuse of Greywater in Western Australia*. Greywater can generally only be stored for up to 24 hours after which time there are significant impacts to water quality and subsequent risks to public health.

Households choosing to install a greywater system for garden irrigation or appropriate non-potable indoor use will be responsible for adhering to the *Code of Practice for Greywater Reuse in Western Australia* along with associated costs for operation and maintenance of the greywater system.

If greywater is used for domestic garden use, the supply may be greater than the demand during the winter months. Alternative uses or disposal to the sewerage network may have to be made during the winter months. However, during the summer months greywater could provide approximately 60% of the supply for domestic irrigation (Loh and Coghlan: 2003).

E) Wastewater

As outlined in section 4.9, residential subdivision/development will be serviced with reticulated sewerage, while light industrial subdivision will be serviced through appropriate on-site effluent disposal systems. It is not expected that treated wastewater will be reused on this site other than for irrigating open space.

The draft *Government Sewerage Policy* outlines that on-site effluent disposal may be considered for non-residential subdivision that:

> a) Are remote from existing or proposed sewerage schemes and the proposed development cannot be connected to reticulated sewerage;
>
> b) Utilise secondary treatment systems with nutrient removal if in a sewage sensitive area or a public drinking water source area; and
>
> c) Where the proponent has demonstrated, to the satisfaction of the Western Australian Planning Commission on the advice of the Department of Health and the Department of Water that there is sufficient capacity to treat and dispose of sewage and contain associated buffers on-site. Consideration will be given to the maximum hydraulic load that can be contained within the lot and the potential impacts on waterways and wetlands.

The minimum lot size for non-residential lots is determined on a case-by-case basis.

The proposed industrial area was assessed by Biodiverse Solutions against the requirements for lots with on-site effluent disposal as outlined in the draft Government Sewerage Policy (DoP, 2016). The requirements and assessment to each requirement is shown below.

Lot Requirement (DoP, 2016)	Assessment to Requirement
Adequate separation from groundwater – the discharge point of the on-site sewage disposal system should be at least 1.2 to 1.5 metres, depending on soil type, in sewage sensitive areas.	Groundwater was not encountered to 2.3 metres depth (Great Southern Geotechnics, 2017).
An on-site sewage disposal system should not be located within 30 metres of a private bore used for household/drinking water purposes.	There are no private bores registered within the Site or with in the vicinity of the proposed Industrial Area (DoW Water Register, 2017).
Lot Requirement (DoP, 2016)	Assessment to Requirement
An on-site sewage disposal system should not be located within 100 metres of a waterway.	No waterways located within the Site or within 100m of the proposed Industrial Area (Site inspection conducted 29/8/2017)
An on-site sewage disposal system should not be located within 100m of a significant wetland.	No significant wetlands located within the Site or within the vicinity of proposed Industrial Area (DEC and CoA 2017 database search)
An on-site sewage disposal system should not be located within 100 metres of a surface or subsurface drainage system that discharges directly into a downstream waterway or waterbody.	No surface or subsurface drainage systems located within the Site or within 100m of the proposed Industrial Area (Site inspection conducted 29/8/2017 and DoW database search)
An on-site sewage disposal system should not be located within any area subject to inundation and/or flooding in a 10 per cent Annual Exceedance Probability (AEP) rainfall event.	Given the relatively higher topography in the area and gradual slopes of the land inundation in the location of the proposed Industrial area is unlikely.

The assessment by Biodiverse Solutions concluded that the proposed light industrial area is appropriate for effluent disposal and meets the stated minimum requirements for on-site sewage disposal systems as outlined in the draft *Government Sewerage Policy*. In addition, the low permeability and high PRI of the soils in the location of the proposed industrial area will allow for slow draining assisting the process of being fixed by soil microbes.

As the industrial area is in a sewerage sensitive area, a secondary waste water treatment system with nutrient removal should be used. The provision of on-site sewage disposal systems including calculation of land application area shall be in accordance with minimum site requirements contained in Schedule 3 of the draft *Government Sewerage Policy* and must be approved for use in Western Australia by the Department of Health. LPS1 requirements for the current Light Industrial area require 'dry industry' and 'alternative treatment effluent disposal systems'.

Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant to Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.

5.4 Water balance modelling

The adoption of the initiatives set out in the LWMS have the potential to significantly reduce water demands. Key opportunities include the use of rainwater tanks; all dwellings having Waterwise fittings, infiltrated runoff through soakwells on each lot and grassed or vegetated swales as part of future roads.

5.5 Waterwise landscaping and irrigation

As outlined above, there are opportunities for domestic gardens and industrial/commercial landscaping to be irrigated by non-scheme water (including rainwater tanks, groundwater and greywater).

Waterwise gardens

The water savings from planning and implementing Waterwise gardens and implementing other outdoor Waterwise techniques can be in the order of 50kL per household per annum. This includes reducing the amount of lawn and planting water wise species which are generally endemic to the region or appropriate water-wise exotic plant species.

To achieve the necessary target of 240kL per household per annum, an achievable target of 84kL (approximately 35%) per annum has been allocated to gardens and other outside usages. The installation of a rainwater tank can be used to supplement for the use of mains potable water for usage on garden and other outdoor requirements.

Public open space

The Structure Plan proposes considerable POS. In particularly, the Structure Plan provides the following POS:

- a vegetated bush corridor containing remnant vegetation in the north-east section;
- two generous sized neighbourhood parks incorporating an incidental drainage function; and
- a community centre site located near the proposed primary school.

The design of the POS system responds to a wide number of opportunities presented by the site, namely:

- retaining key environmental features such as remnant vegetation;
- integrating surface water management measures into POS;
- providing well-distributed and generous sized POS that provide a range of recreational opportunities;
- fostering a sense of community, place and local identity through the creation of an urban village in a bush setting, bordered by open spaces (bush corridor on Lot 521, Reserve 27179 and POS adjoining Mercer Road); and
- providing an attractive entry frontage to Mercer Road that enhances the site's sense of place.

Two large neighbourhood parks are proposed on Lot 521 in the central-south and south-east sections. The central-south POS is 3.2 hectares and is expected to incorporate a drainage basin of around 0.7 hectare. The south-eastern POS is 5.15 hectares and is expected to incorporate a drainage basin of around 0.46 hectare.

The POS location provides an opportunity to create an attractively landscaped entry statement to the area. There is an opportunity to provide attractively designed areas of POS which will be overlooked by the surrounding residential areas. The POS should be maintained to a high standard to be appealing to the community.

It is expected that the neighbourhood parks will be used for active recreation, passive recreation, nature space and unstructured active play. These sites could be developed for active recreational use such as playgrounds, exercise facilities, half-court basketball courts along with passive facilities such as picnic/barbecue areas and seating.

Drainage areas for the one in 100 year event within POS near Mercer Road have the potential to combine passive recreation and unstructured active play opportunities through WSUD. Where drainage basins remain dry for most of the year, they can be designed to enable them to be used for recreational purposes.

There are opportunities to captured stormwater from the detention basins to irrigate the POS.

5.6 Water source recommendations

A key component of achieving water sustainability measures is adopting an educational approach. To assist in achieving this, the developer will provide relevant information to prospective purchasers and builders regarding the range of measures and household products that can be utilised to harvest rainwater and reduce scheme water use. This includes providing information on the following:

- promoting rainwater tanks for each dwelling, larger outbuildings and industrial premises for external and/or internal use;
- promoting Waterwise gardens including relevant Water Corporation's publications;
- promoting the use of Waterwise practices including water efficient fixtures and fittings (e.g. taps, showerheads, toilets); and
- maximising on-site retention of stormwater and associated re-use.

6. STORMWATER MANAGEMENT STRATEGY

6.1 Overview

The stormwater management strategy for the site is to maintain pre-development flows while maintaining and/or improving water quality. The stormwater system is required to adequately manage small, minor and major storm events.

In order to meet the design criteria, it is necessary to use a combination of appropriate stormwater management strategies that are suitable for the development and site characteristics. They include structural and non-structural measures. Structural measures include those undertaken on a lot, street and estate scale. Non-structural measures include educational material and interpretive signage.

Key components of managing stormwater for the development are shown on the Strategy Plan (Attachment 8). The strategies and initiatives are intended to meet the principles and objectives (section 1.2) and the design criteria (section 3).

Stormwater infrastructure will be designed to ensure stormwater discharges and volumes do not exceed pre-development levels for the 1 in 1 ARI year, 1 in 5 ARI year and the 1 in 100 year ARI storm events in relation to volume and rate.

Development of the site will increase the amount of impervious surfaces through dwellings, outbuildings, light industry, driveways and roads. The total hard surface for the subdivision/development will vary depending on land use and lot size. There should be space on each lot for appropriate stormwater attenuation/detention. The degree of attenuation required to address the design criteria will be addressed during the detailed civil engineering phase of the project.

6.2 Surface water quantity management

A) Stormwater retention/detention on each lot

Stormwater for the 1 in 1 year, 1 hour ARI event will be retained on each lot predominantly through rainwater tanks and soakwells, possibly other than for medium density development e.g. R60. Excess stormwater from major rainfall events will flow onto the ground for infiltration over a broad area. This can be readily accommodated given the soil types which are overall suitable for infiltration.

B) Stormwater retention/detention in road reserves

Roads will be sealed, designed and constructed in accordance with City requirements which are expected to be the *Local Government Guidelines for Subdivision Development* and *Austroads Design Guidelines*. Detailed design will accommodate topography, drainage and possible erosion requirements etc.

The design of the road drainage is expected to include:

- stormwater from roads will be through overland flow, via shallow open channels (swales) where possible rather than via pipes. The swales will collect and slowly channel stormwater (to act as

detention areas) towards the discharge point. There will be culverts as required including at crossovers;
- swales on at least one side of the road especially if the detailed road design has one way cross-fall;
- likely detention features to slow run-off and minimise erosion in portions of the site;
- possible concrete covered sumps to collect stormwater and sediment where required; and
- various shallow vegetated detention basins in low points.

Erosion risk from the development is expected to be low given the gentle to moderate slopes, soil types and mitigation measures to reduce run-off volumes and reduce flow rates.

C) 1 in 1 year, 1 hour ARI event

The intent of managing the 1 in 1 year, 1 hour ARI storm event is source control. In particular, to capture or prevent runoff from constructed impervious surfaces and to manage water quality. Adopting WSUD will result in stormwater harvesting (including rainwater tanks), detaining and slowing down peak flows that especially address the 'first flush' run-off.

Stormwater from minor storm events up to the 1 in 1 year, 1 hour ARI event will be retained as close to source as possible. The strategy is to:

- require that lots retain the 1 in 1 year, 1 hour ARI event with water then re-used (through rainwater tanks) or slowly recharged into the groundwater (including soakwells and rain gardens);
- encourage future lot owners to direct run-off from their dwelling, large outbuilding or industrial premise into rainwater tanks to reduce stormwater runoff. The City will apply appropriate development conditions to address stormwater management for the 1 in 1 year, 1 hour ARI event at the Development Application and/or Building Permit stages; and
- ensure that road reserves retain the 1 in 1 year, 1 hour ARI event as close to source as possible through grassed or vegetated swales.

D) 1 in 5 year ARI event

The intent of managing the 1 in 5 year ARI storm event is runoff control. In particular, it is to retain, detain and convey stormwater, to manage water quantity for serviceability and to prevent erosion. The strategy is to:

- require that soakage devices such as soakwells are provided with an overflow outlet for major storm events;
- provide open swales within road reserves which are designed to collect, treat (through the planting of nutrient stripping vegetation to promote bioretention or the filtration of stormwater) and slowly channel stormwater towards the discharge point;
- require the swales to be sized to adequately store up to the 1 in 5 year ARI event with a controlled outflow to match pre-development flow rates; and
- consider directing stormwater to the existing dam or future dams for on-site use as part of the detailed design.

E) 1 in 100 year ARI event

The intent of managing the 1 in 100 year ARI storm event is the safe conveyance and discharge of stormwater and to protect buildings and lots from flooding.

There is a minor seasonal watercourse in the north-west section. The site is not within an identified flood risk area. While noting this, the strategy is to:

- ensure that the watercourse is left undeveloped and unobstructed to not compromise upstream surface-water flows;
- maintain existing or provide alternative overland flow paths and drainage discharge points in order to preserve predevelopment conditions. Flows are to be conveyed along roads, road verges/swales, drainage lines and the floodway (seasonal watercourse);
- provide appropriate building setbacks from drainage lines;
- require that roads are designed to cater for the surface overflow for major storms;

- require that buildings should be at least 0.3 metre above the ground level and where possible above the road level to address the potential for localised flooding from roads; and
- require that swale profiles and culvert sizes for lot crossovers and intersections are designed to mitigate the flows and protect lots from flood levels in road reserves.

6.3 Surface water quality management

The impacts from the proposed development are expected to have minimal impact on water quality. Correspondingly, there are a number of ways in which surface water quality can be maintained or enhanced. The strategy is to:

- accommodate the 1 in 1 year ARI event which will treat around 99% of annual run-off volume which helps to protect ecological values;
- improve water quality via soil and vegetation filtration;
- adopt a treatment train to stormwater including in road reserves through the use of WSUD including vegetated roadside swales, detention basins and as required sediment traps and gross pollutant traps. This will assist to remove and treat sediments, phosphorous, nitrogen, suspended solids and other contaminants;
- implement controls at or near the source to prevent pollutants entering the system and/or treat stormwater;
- install in-transit measures to treat stormwater and mitigating pollutants that have entered the conveyance system. Appropriate native or possibly suitable non-native plant species that have fibrous roots to filter nutrients will be planted as required within the swales. The plants will be constructed according to the latest *FAWB Adoption Guidelines for Filter Media in Biofiltration Systems* and the *Stormwater Management Manual for WA* design guidelines in consultation and to the satisfaction of the City;
- implement 'end-of-system' controls to treat stormwater, addressing any remaining pollutants prior to discharging to receiving environments. This could include that surface run off from roads is directed to shallow vegetated detention basins prior to emptying to the seasonal watercourse;
- encourage all lot purchasers to practice Waterwise and nutrient wise practices including minimising the area of lawn established or possible alternatives to lawn;
- undertaken appropriate sediment and erosion control during construction;
- provide a suitable buffer between development and the watercourse;
- restore/revegetate the seasonal watercourse on the site to create a 'living stream' which will enhance the watercourse's ecological functions; and
- undertake additional revegetation and replanting in other parts of the site.

Water quality treatment systems and WSUD structures should be designed in accordance with the *Stormwater Management Manual for Western Australia* (Department of Water: 2007) and *Australian runoff quality: a guide to water sensitive urban design* (Engineers Australia: 2007).

6.4 Impact on water dependent ecosystems

The main water dependent ecological systems influenced by the development are groundwater and the watercourse. Stormwater and groundwater will be managed so that post development receiving hydrological regimes are comparable to pre-development. Accordingly, there should be minimal impact on water-dependent ecosystems.

There are a number of ways in which water quality can be maintained or enhanced. The strategy is to:

- undertake those measures set out in section 6.3;
- require that all lots have an appropriately designed and located on-site effluent disposal system;
- encourage appropriate fertiliser use including minimising where possible, not exceeding application rates, using low water soluble fertiliser, only fertilising when symptoms of nutrient deficiency occur and applying at the appropriate time of the year (spring or early autumn); and
- encourage appropriate weed management, spot spraying and general maintenance on the site.

6.5 Non-structural controls

A number of non-structural controls have been set out in this LWMS which include promoting education and undertaking Waterwise practices. Further non-structural controls are set out in the *Stormwater Management Manual of WA* (2007).

6.6 Stormwater management strategy conclusions

The proposed development has minimal limitations for effectively managing stormwater given the proposed lot sizes, the generous provision of POS and there are appropriate soil conditions for stormwater infiltration.

Environmentally sensitive stormwater management at the site is considered feasible by assisting recharge into the soils. Physical enhancement of the ground profile, by way of swales will contain runoff, facilitating sediment control and recharge to groundwater at the road side. Treatment of overflow stormwater resulting from major storm events that cannot otherwise recharge to groundwater can be addressed by contouring and planting detention basins prior to discharge into the seasonal water course.

The approach to managing stormwater includes:

- accommodating small, minor and major storm events;
- detention and gradual conveyance of stormwater rather than instantaneous rapid conveyance;
- on-site infiltration/groundwater recharge;
- localised stormwater harvesting; and
- promoting replanting to enhance water quality.

7. GROUNDWATER MANAGEMENT STRATEGY

7.1 Overview

As outlined in Attachment 3, it was determined there would be minimal impact on groundwater from the development given the depth of groundwater.

Biodiverse Solutions advise 'there are limited water management risks associated with development of the Subject Land. Based on the investigations, there is no requirement to undertake pre- development groundwater monitoring. Overall, the soil types enable stormwater infiltration at source.'

Biodiverse Solutions advise:

> 'It is expected that development of the site will have a positive impact on groundwater and stormwater quality through BMPs and the treatment of stormwater prior to infiltration. Based on the site assessment and the management measures proposed, it is not expected that any changes to groundwater flows, levels or quality will have an adverse impact on the function and environmental values of the site.'

As set out in section 4.8, impacts on groundwater will be further minimised with dwellings being raised at least 0.3 metre above the natural ground level.

7.2 Groundwater levels

As set out in Attachment 3 and section 4.8, no test pit encountered groundwater.

It is expected that post-development groundwater levels will be similar to pre-development levels. The site's soil types will assist infiltration and groundwater recharge close to the source.

7.3 Groundwater quality management

The environmental values of groundwater within and surrounding the site are required to be retained given groundwater is an important environmental asset. Implementation of WSUD is expected to result in maintaining or where possible improving groundwater quality. An example is the planting of fibrous rooted plants incorporated into the base of the roadside bioretention swales in portions of the site. This will provide

treatment of surface water runoff collected within the drainage network prior to infiltration into the groundwater. These products bind nutrients and other contaminants that are mobile.

Where fill is installed, it may be associated with a sub soil drainage system in order to maintain ground water levels at, or close to, that which currently exists. Subsoil drains should have 'open' outlets.

7.4 Impact on water dependent ecosystems

Overall, the development is expected to have minimal impacts on groundwater quantity and quality and according there are expected to be limited impacts on water dependent ecosystems. The recommended management practices will maximise the quality of the infiltration. This includes encouraging new residents to install nutrient wise gardens and to minimise the amount of lawn.

7.5 Implications for fill

There will be filling on various residential lots which will be addressed at the subdivision stage. Considerations include:

- ensuring there is sufficient clearance to the highest groundwater levels;
- filling for house pads will be required on some lots to increase heights above the adjacent road and/or ground level. In particular, it is recommended that all buildings are raised by 0.3 metre above the ground level; and
- where required, clean sand fill will be imported to the site to provide an appropriate clearance from subsoil drains.

8. MONITORING AND ADDITIONAL INVESTIGATIONS

8.1 Overview

An UWMP should be prepared to support residential subdivision.

Based on the development's site characteristics, the proposed generous lot sizes (1 hectare minimum) and the low level of risk of impacting water resources, it is considered unnecessary to prepare an UWMP for the light industrial subdivision. Engineering design drawings submitted to the City for approval at the subdivision stage and building plans submitted to the City at the Building Permit stage provide appropriate opportunities to implement the LWMS.

While noting the above, there are various matters to be addressed in progressing from conceptual designs and strategies to detailed civil engineering designs. Amongst matters, the detailed civil engineering design will address road, swale and detention basin design. Matters to address include:

- plans to be generally consistent with the LWMS including its objectives and design criteria including adopting WSUD principles;
- demonstration of compliance with regulatory requirements, including required licences and approvals, *Building Code of Australia* and *Plumbing Code of Australia*;
- ensuring that the construction and development works suitably address sediment and erosion control; and
- operational and maintenance responsibilities and liabilities.

The consulting engineer will incorporate any conditions and changed circumstances into the subdivision design and provide the detailed design drawings of the road network and drainage. At that time, detailed calculations will be made to confirm and design the drainage system including flow rates and attenuation.

There will be a need for a site classification report to determine in more detail soil conditions at the Building Permit stage.

8.2 Monitoring

No pre-development or post-development groundwater monitoring is required for the development due to the groundwater depth, soil types and the expected minimal impact of the development on groundwater.

While noting this, there is a need for routine inspection of WSUD elements by the developer, or developer's appointed consulting engineer/project manager, for a minimum of 12 months after the completion of works or for an agreed upon time between the developer and the City.

There is a need for cost effective methods to evaluate the adequacies of the operation and performance of WSUD elements. It will be assumed that if the WSUD elements operate in accordance to the designs then they are delivering the desired key management objectives. The WSUD elements should only require minimal routine maintenance and these are generally of a landscape maintenance nature, with the most common maintenance being the removal of debris and siltation.

9. IMPLEMENTATION

9.1 Developer commitments

Implementation will only occur at the construction stage following the full engineering calculations for the roads and stormwater management.

The developer, or the developer's appointed consulting engineer/project manager, is committed to the following:

- designing and constructing a reticulated water supply services for all lots;
- residential subdivision being connected to the reticulated sewerage system;
- designing and constructing the stormwater management system based on WSUD principles;
- providing lot owners and builders with information regarding Waterwise practices inside and outside the dwelling including promoting rainwater tanks, Waterwise appliances, Waterwise gardens, and providing information on appropriate fertiliser application;
- sediment and erosion control during construction;
- creating POS as outlined on the Structure Plan;
- creating a 'living stream' for the seasonal watercourse in the north-west of the site; and
- maintaining the stormwater system for a minimum period of 12 months from practical completion, or as agreed with the City, and ensuring that any remedial works as necessary for the upkeep of the system are undertaken.

Developer commitments would in part be set out in the conditions of subdivision.

9.2 Roles and responsibilities for implementation

The developer is responsible for the actions outlined in the LWMS until either handover to the City or until sale of the lots. Following handover, the City is then responsible for ensuring the stormwater system is maintained.

Landowners are responsible for various matters within and outside their home including the provision of stormwater tanks and adopting Waterwise and nutrient wise gardens.

9.3 Review of LWMS

There will be a need to review the LWMS given the anticipated long timeframe to implement the Structure Plan.

10. CONCLUSIONS

The development is considered a low risk to water resources given the site's location, environmental characteristics, proposed lot sizes and proposed servicing. Groundwater and surface water are not considered constraints to future development.

The LWMS concludes that the site is capable of supporting residential and light industrial subdivision/development and is able to achieve appropriate water management outcomes. Further, it is considered that an UWMP is required to support residential subdivision, however no UWMP is required to support light industrial subdivision. There will however be a requirement for engineering drawings and specifications to be submitted and approved by the City for the light industrial subdivision which are generally consistent with the LWMS and which adopt WSUD.

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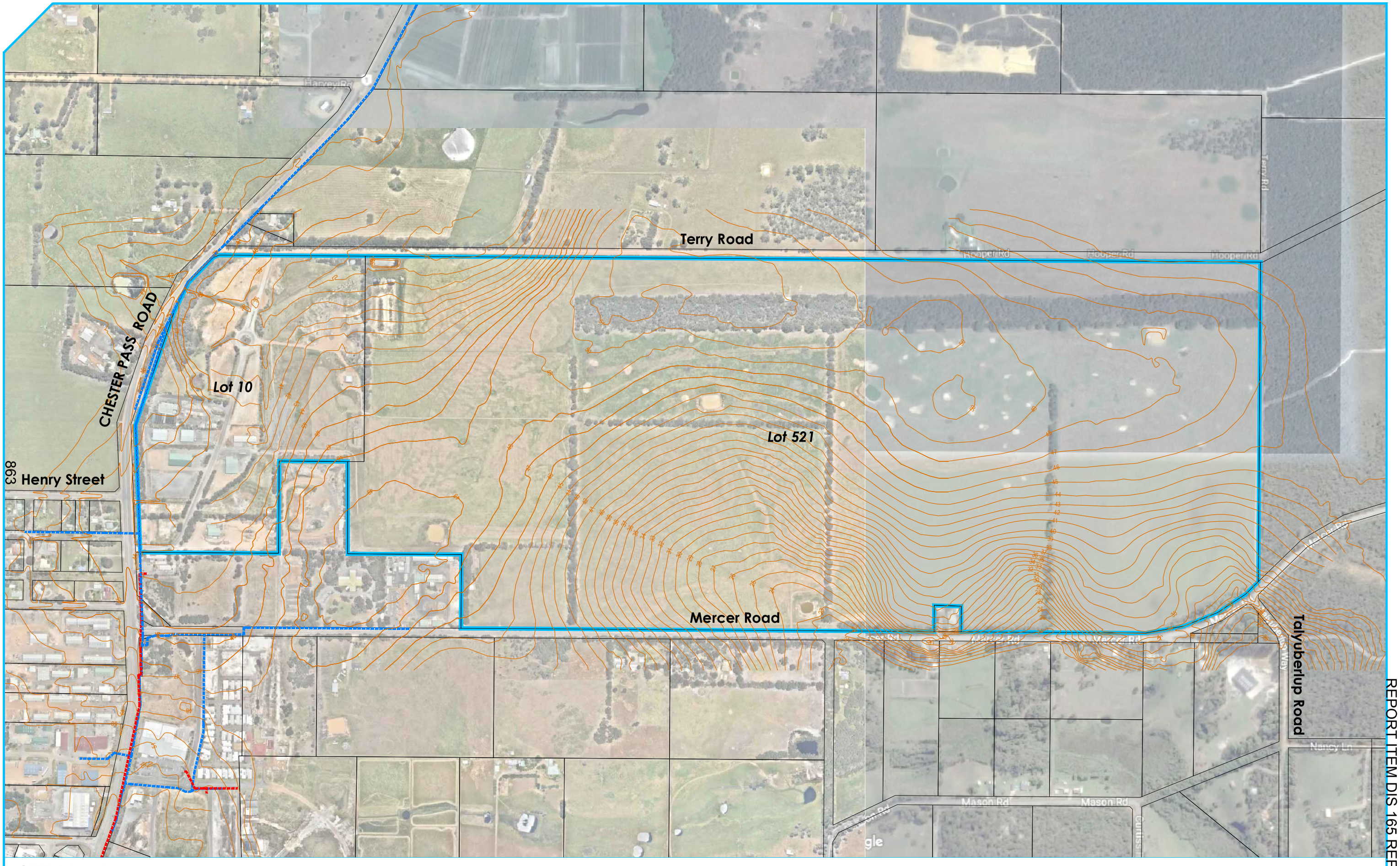
Western Australian Planning Commission, 2008, *Better Urban Water Management*

Western Australian Planning Commission, 2007, *Liveable Neighbourhoods*

Western Australian Planning Commission, 2003, *State Planning Policy 2 Environment and Natural Resources Policy*

Western Australian Planning Commission, 2006, *State Planning Policy 2.9 Water Resources*

ATTACHMENT 1



SITE PLAN
Lot 10 Chester Pass Road and Lot 521 Mercer Road Walmsley

Legend

- Structure Plan Boundary
- Existing Lot Boundary
- Contours
- Existing u/ground Water Pipe
- Existing u/ground Sewer Pipe

SCALE 1:7500
SHEET A3

0 150 300m

NORTH

REV	DESCRIPTION	YYMMDD	DRAWN	APPRVD
A	CONTEXT PLAN	170522	SJ	ST

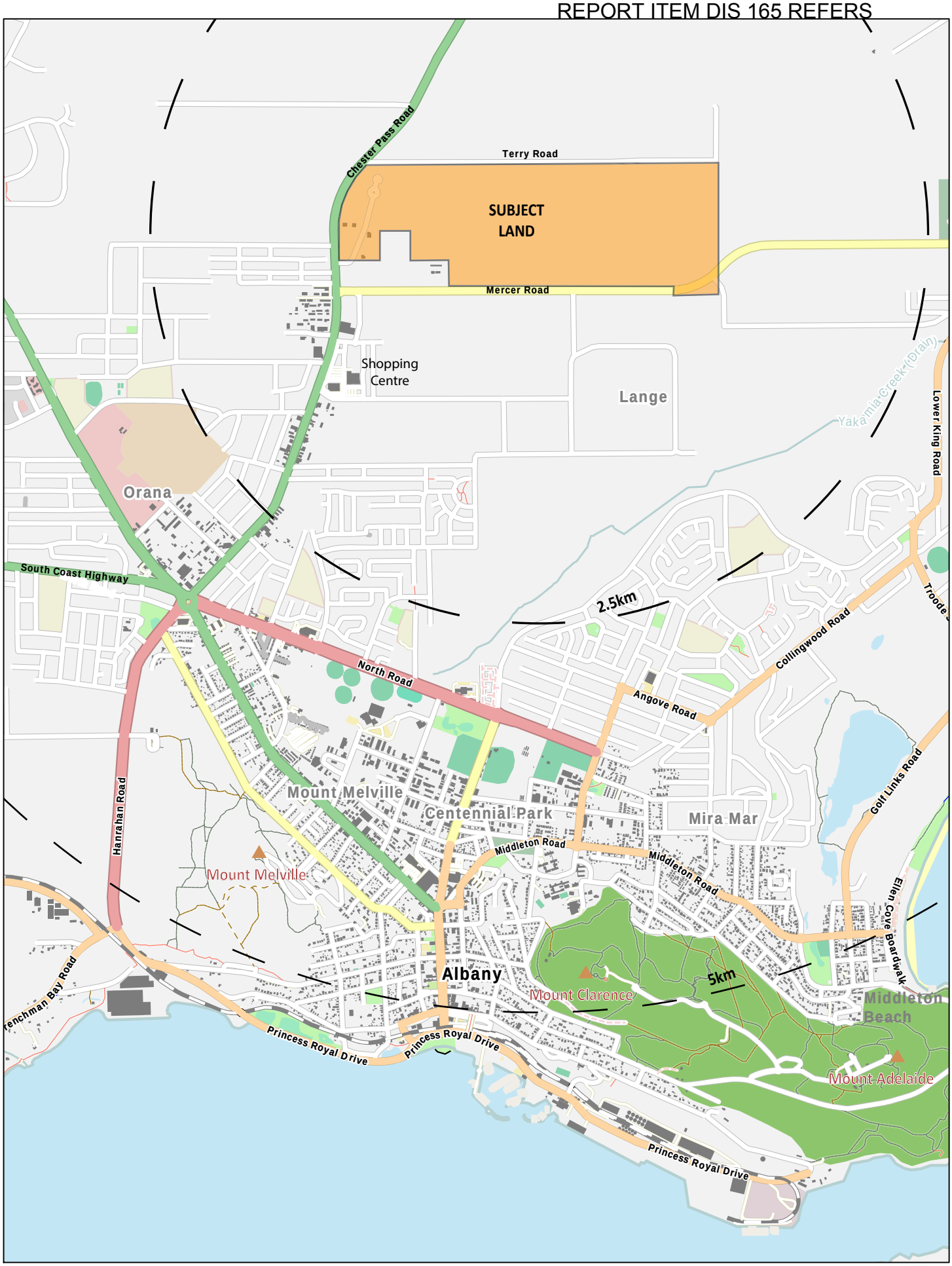
DRAWING NUMBER EP 170520 01 REV A

Issued for design intent only. All areas and dimensions are subject to detail design + survey.

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REPORT ITEM DIS 165 REFERS

ATTACHMENT 2



LOCATION PLAN

Lot 10 Chester Pass Road
and Lot 521 Mercer Road
Walmsley, City of Albany

SUBJECT LAND

N

scale 1 : 30,000 @ A4

0 2km

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ATTACHMENT 3

Lot 10 Chester Pass Road &
Lot 521 Mercer Road,
Walmsley WA 6330

Environmental Assessment and Land Capability Assessment Report



BIO DIVERSE SOLUTIONS

21/11/2017

Kathryn Kinnear

Bio Diverse Solutions

DOCUMENT CONTROL

Title: Environmental Assessment Report – Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley WA

Author (s): Chiquita Burges

Reviewer(s): Kathryn Kinnear & Steve Thompson

Job Number: EPP 004

Client: Ardess 1607 Pty Ltd

REVISION RECORD

Revision	Summary	Revised By	Date
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Draft Id 26/10/2017	Updated as per client review	B. Theyer	26/10/2017
Draft Id 13/11/2017	Issued to Client	K. Kinnear	13/11/2017
Final Id 21/11/2017	Final updates and Issued to Client	K. Kinnear	21/11/2017

The recommendations and measures contained in this assessment report are based on the requirements of the Australian Standards 3959 – Building in Bushfire Prone Areas, WAPC SPP3.7, Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017) and CSIRO's research into Bushfire behaviour. These are considered the minimum standards required to balance the protection of the proposed dwelling and occupants with the aesthetic and environmental conditions required by local, state and federal government authorities. They DO NOT guarantee that a building will not be destroyed or damaged by a bushfire. All surveys and forecasts, projections and recommendations made in this assessment report and associated with this proposed dwelling are made in good faith on the basis of the information available to the fire protection consultant at the time of assessment. The achievement of the level of implementation of fire precautions will depend amongst other things on actions of the landowner or occupiers of the land, over which the fire protection consultant has no control. Notwithstanding anything contained within, the fire consultant/s or local government authority will not, except as the law may require, be liable for any loss or other consequences (whether or not due to negligence of the fire consultant/s and the local government authority, their servants or agents) arising out of the services rendered by the fire consultant/s or local government authority.

BIO DIVERSE SOLUTIONS

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

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CONTENTS

1. EXECUTIVE SUMMARY 1
2. INTRODUCTION 3
2.1. LOCATION 3
2.2. LOCAL STRUCTURE PLAN 4
2.3. STATUTORY FRAMEWORK 4
2.4. SUITABLY QUALIFIED ENVIRONMENTAL CONSULTANTS 5
3. EXISTING ENVIRONMENT 7
3.1. EXISTING LAND USE 7
3.2. SURROUNDING LAND USES 8
3.3. CLIMATE 9
3.4. TOPOGRAPHY 9
3.5. ACID SULPHATE SOILS 9
3.6. GEOLOGY AND SOILS 10
3.7. SURFACE WATER HYDROLOGY 11
3.8. GROUNDWATER HYDROLOGY AND HYDROGEOLOGY 11
3.9. WETLANDS 12
3.10. SEWERAGE SENSITIVE AREA 12
3.11. FLORA AND VEGETATION 12
3.12. FAUNA 15
3.13. CONTAMINATED SITES 16
3.14. HERITAGE 16
3.15. BUSHFIRE THREATS 16
4. LAND CAPABILITY ASSESSMENT 20
4.1. LAND USE REQUIREMENTS 21
4.2. LAND RESOURCE SURVEY 22
4.3. LAND CAPABILITY ANALYSIS 24
5. POTENTIAL ENVIRONMENTAL IMPACTS AND MANAGEMENT MEASURES 25
5.1. ACID SULPHATE SOILS 25
5.2. WATER MANAGEMENT 25
5.3. WASTE WATER MANAGEMENT 26
5.4. FLORA AND VEGETATION 27
5.5. FAUNA 28
5.6. FIRE MANAGEMENT 28
5.7. LIGHT INDUSTRIAL AREA AND ASSOCIATED BUFFERS 29
6. MANAGEMENT COMMITMENTS AND CONCLUSIONS 30
7. REFERENCES 31

LIST OF TABLES

Table 1: Phosphorus Retention Index Results

Table 2: Land Capability Classes

Table 3: Land Qualities to fulfil Urban Development Land Use Requirements

Table 4: Land Qualities to fulfil Light Rural Industry Land Use Requirements

Table 5: Mapping Units

Table 6: Land Capability Assessment for Urban Development

Table 7: Light Rural Industry Land Capability Rating

Table 8: Assessment to On-site Effluent Disposal Lot Requirements

Table 9: Bushfire protection criteria applicable to the site

LIST OF FIGURES

Figure 1: Location Plan

Figure 2: Topography and ASS Risk Mapping

Figure 3: Borehole Locations

Figure 4: ARVS & Broad Scale Vegetation Survey Mapping

Figure 5: Bushfire Prone Area Mapping

Figure 6: Land Capability Mapping Units

APPENDICES

Appendix A: Draft Local Structure Plan (Edge Planning & Property, 2017).

Appendix B – Geotechnical Investigation (Great Southern Geotechnics, 2017)

Appendix C – Phosphorous Retention Index Test Results (CSBP Laboratory, 2017)

Appendix D - BAL Contour Plan (Bio Diverse Solutions, 2017)

1. Executive Summary

Ardess 1607 Pty Ltd commissioned Bio Diverse Solutions (Environmental Consultants) to prepare an Environmental Assessment Report (EAR) and Land Capability Assessment (LCA) to guide all future environmental management for the proposed subdivision of Lot 10 Chester Pass Road and Lot 521 Mercer Road, Albany WA.

This EAR and LCA describes the relevant environmental characteristics of the site and presents management and mitigation strategies in response to potential environmental impacts. These management and mitigation strategies aim to minimise the potential impact on the environmental values within the site.

The Local Structure Plan (LSP) has been developed to guide the subdivision and development of the Subject Site (Appendix A). The LSP for the site proposes an extension of the adjacent light industrial area, a residential zone which includes are range of residential densities, a primary school and three POS areas. The proposed light industrial area will require on-site effluent disposal, where as the residential area will be developed once reticulated sewerage has been established in the area. This EAR and LCA identifies the measures proposed to mitigate and manage the environmental features of the site, and focuses on the natural areas to be retained within the LSP.

The Subject Site was found to have no significant environmental constraints. A geotechnical investigation conducted by Great Southern Geotechnics (2017) under late winter conditions did not encounter groundwater to depth of 2.3m across the site. Soil type across the majority of the site was found to be sandy gravel over sandy clay with low permeability and high PRI. A small area in the southern central portion of the site was found to have silty sand over gravelly sand with a low PRI. There is no significant waterways, wetlands or groundwater resources within the Subject Site or within the vicinity of the Subject Site.

The vegetation across the Subject Site and surrounding areas is consistent with rural farmland, with the majority of the site and surrounds comprising of heavily grazed pasture dominated by pasture grass species. There are two areas of remnant vegetation within the Subject Site. A broad scale vegetation survey of these two areas was conducted with the strip of vegetation running parallel with the northern boundary of the site (approximately 12 ha in size) found to comprise of Low Open Jarrah/Marri/Sheoak Forest in good condition and the small area of remnant vegetation in the south-east corner comprising of mixed Eucalypt Forest in a degraded condition.

A BAL Contour Plan was prepared by Bio Diverse Solutions to identify the bushfire risks associated with the site (Appendix D) and guide the Structure Plan development. The Subject Site was assessed as having internal areas of Grassland Type G consistent with rural farmland, low fuel/non- vegetated areas (associated with the industrial area, tracks/roads and buildings) and an area of Forest Type A (being the strip of remnant vegetation in the north). External bushfire risks are mostly associated with the Forest Type A (CoA Reserve) directly to the east and south-east of the Subject Site and Forest Type A and Woodland Type B along the Mercer Road Reserve. BAL contouring across the Subject Site has allocated BAL 29 or less shall apply to any buildings within the lots. All future buildings (through subdivision designs) can achieve an APZ area associated with a BAL allocation of BAL 29, BAL 19 or BAL 12.5. A detailed Bushfire Management Plan has not been prepared for the site. The publicly released Bushfire Prone Area Mapping (DFES, 2017) shows that the majority of the Subject Site is located within a Bushfire Prone Area (situated within 100m of >1 ha of bushfire prone vegetation). Where “High risk” or “Vulnerable land uses” (Primary school), as defined by SPP 3.7 are proposed, detailed Bushfire Management Plans are to be prepared.

A Land Capability Assessment (LCA) of the site was conducted in accordance with the State Planning Commission’s (1989) Land Capability Assessment for Local Rural Strategies (note these definitions are as per this policy for the purposes of this report and not any other planning instrument/policy). The overall capability of the Subject Site supporting the Urban Development land use was rated as highly capable for Mapping Unit 1 and very highly capable for Mapping Unit 2. The overall capability of the Subject Site supporting the Light

Rural Industrial (as per WAPC, 1989) land use is rated as highly capable for Mapping Unit 1. Mapping Unit 2 was not encountered at the location of the proposed Light Rural Industrial land use. The degree of limitations for both Urban Development and Light Rural Industry for Mapping Unit 1 and Mapping Unit 2 is low to very low.

This EAR and LCA report provides details of the ASS, Water, Waste Water, Flora, Fauna and Fire Management strategies proposed to be implemented across the site as it is developed to ensure adequate protection of environmental, life, property and biodiversity assets.

The proposed LSP recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form, that creates an environmentally responsive urban development that meets the EPA and City of Albany's environmental requirements. Consequently, the environmental outcomes of the proposed LSP are considerable and include:

- Providing an improvement in groundwater and surface water quality through residential and industrial development and implementation of water sensitive urban design and best stormwater drainage management practices.
- Revegetation using native species (where currently there is very little native species and diversity) in areas of POS to promote fauna habitat and flora diversity. Landscaped urban areas to promote biodiversity using native plants.
- Maintaining areas of remnant vegetation and limiting access points through these areas to the subdivision to prevent adverse impacts particularly for transient fauna.
- The Local Structure Plan is required to meet the "Acceptable Solutions" of each Element of the bushfire mitigation measures (WAPC, 2017).
- As Light industrial land use is proposed in the west of the Structure Plan, a detailed Bushfire Management Plan will be required to guide developers if any industry is defined as "High Risk".
- A detailed Bushfire Management Plan jointly endorsed by DFES and CoA will be required for any Primary School proposed in the Structure Plan area, at the Development Application stage. A Bushfire Emergency Evacuation Plan (BEEP) will be required at Development Approval Stages.
- The proposed light industrial area is deemed appropriate for effluent disposal and meets the state's minimum requirements for on-site sewage disposal systems as outlined in the *Draft Government Sewerage Policy* (Department of Planning, 2016). Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.
- Provide vegetated buffer and / or other management techniques between industrial areas to sensitive land uses (such as residential) in accordance with the EPA's (2015) Draft Guidance Statement No. 3 *Separation Distances Between Industrial and Sensitive Land Uses.*

2. Introduction

Ardess 1607 Pty Ltd commissioned Bio Diverse Solutions (Environmental Consultants) to prepare an Environmental Assessment Report (EAR) and Land Capability Assessment (LCA) to guide all future environmental management for the proposed subdivision of Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley WA.

This EAR and LCA describes the relevant environmental characteristics of the site and presents management and mitigation strategies in response to potential environmental impacts. These management and mitigation strategies aim to minimise the potential impact on the environmental values within the site.

2.1. Location

Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley WA (herein referred to as the Subject Site) is 178ha and located approximately 6km north of the Albany CBD. The Subject Site is bound by Chester Pass Road to the west, Mercer Road to the south, Terry Road to the north and a City of Albany (CoA) reserve to the east. The location of the Subject Site is shown on Figure 1.

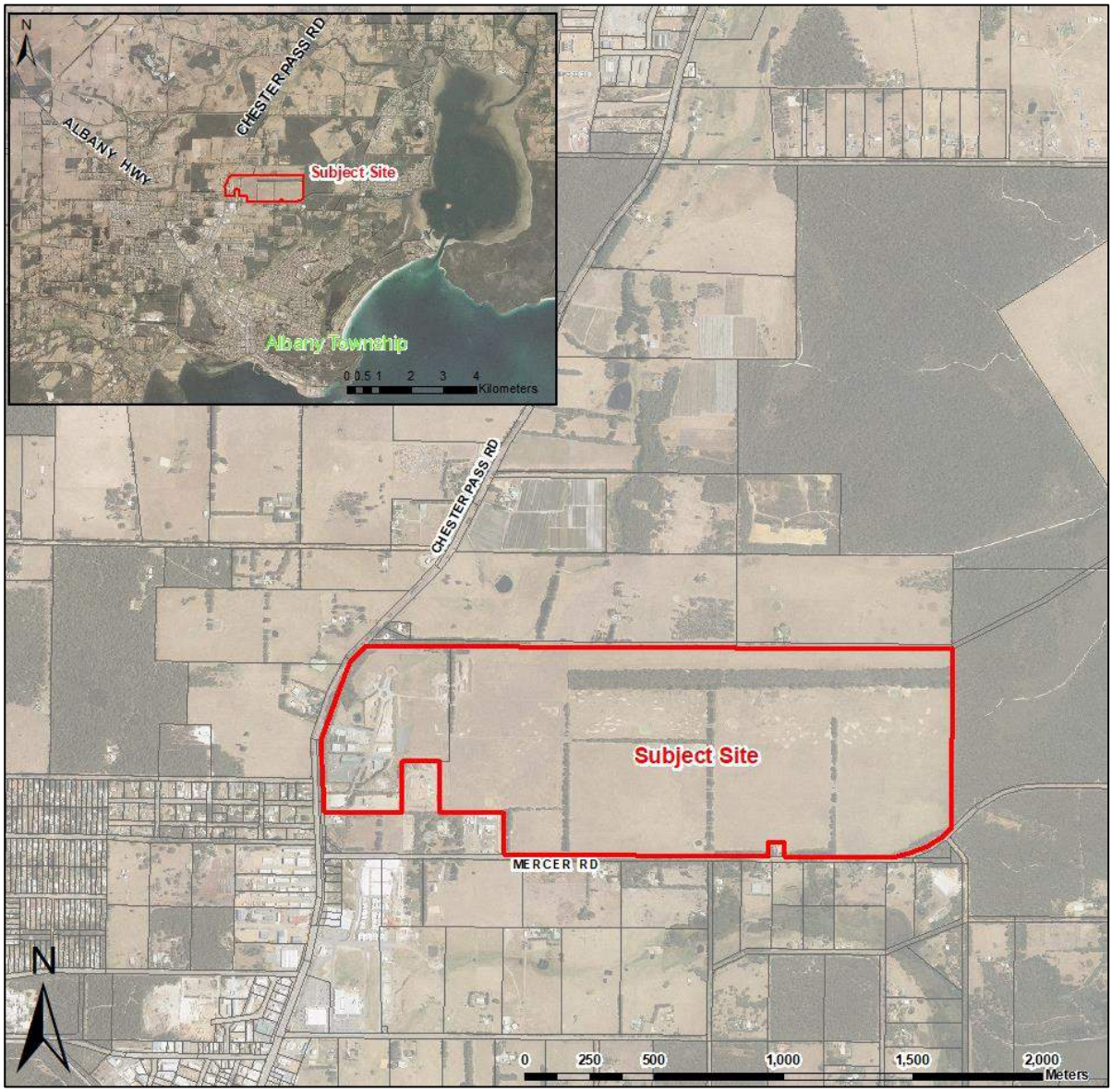


Figure 1: Location Plan

2.2. Local Structure Plan

The Local Structure Plan (LSP) has been developed to guide the subdivision and development of the Subject Site, the Draft LSP for the site has been included as Appendix A.

The proposed LSP includes the following land uses:

- Residential (R30-R60);
- Residential (R20-R30);
- Residential (R15-R25);
- Primary School Site;
- Public Open Space (POS); and
- Light Industrial.

There is no current staging plan for the LSP however the initial stage/s of the subdivision will include the extension of the existing light industrial area within the Subject Site (Ardess Industrial Estate) further to the north and east. There is currently no reticulated sewerage at the location of the Subject Site and as such the lots within the proposed Light Industrial Area will require on-site sewerage disposal and a minimum lot size of 1ha consistent with guidelines set out in the Draft Government Sewerage Policy (Gov. of WA, 2016).

Subsequent stage/s of the subdivision will include the development of the central and eastern portion of the site into a residential zone, including a Primary School and two areas of POS. Residential densities within the residential zone will range from R15 to R60. The residential zone of the subdivision will only be feasible and environmentally sustainable once reticulated sewerage has been established in the area. Therefore, there will be no on-site sewerage disposal within this area.

This EAR and LCA identifies the measures proposed to mitigate and manage the environmental features of the site, and focuses on the natural areas to be retained within the LSP.

2.3. Statutory Framework

Development within the site is required to comply with relevant environmental legislation, policy and guidelines. This document and the recommendations contained within are aligned to the following key state and Commonwealth legislation and regulations;

- *Environmental Protection Act 1986*;
- *Environmental and Protection and Biodiversity Conservation Act 1999 (EPBC Act);*
- *Environment Protection and Biodiversity Conservation Regulations 2000*;
- *Conservation and Land Management Act 1984;*
- *Conservation and Land Management Regulations 2002;*
- *Environmental Protection (Noise) Regulations 1997;*
- *State Legislation Aboriginal Heritage Act 1972;*
- *Heritage of Western Australia Act 1950;*
- *Land Administration Act 1997;*
- *Planning and Development Act 2005;*
- *Rights in Water and Irrigation Act 1914;*
- *Contaminated Sites Act 2003;*
- *Wildlife Conservation Act 1950;*
- Draft Government Sewerage Policy – Consultation Draft 2016;
- DER Acid Sulphate Soils Assessment Guidelines;
- Western Australian State Planning Policy (SPP) 3.7; and
- Guidelines for Planning in Bushfire Prone Areas 2017.

2.4. Suitably Qualified Environmental Consultants

This EAR and LCA has been prepared by suitable qualified personnel from Bio Diverse Solutions. The three qualified personnel responsible for delivery of this assessment include; Chiquita Burges (Senior Hydrologist/Environmental Consultant), Bianca Theyer (Conservation and Wildlife Biologist/Environmental Consultant) and Kathryn Kinnear (Level 2 BPAD Accredited 30794 Bushfire Consultant).

Chiquita Burges

The existing environment and general environmental management section of this report has been prepared by Chiquita Burges. Chiquita has the following Tertiary Qualifications:

- B.Sc. Natural Resource Management; and
- Graduate Certificate in Hydrogeology

Chiquita has over 8 years of experience working as a hydrologist and senior hydrologist, her experience includes preparation of local and urban water management strategies, surface water and groundwater monitoring programs and hydrogeological reports. Tasks undertaken by Chiquita include report writing, mapping, field work including installation and monitoring of groundwater bores, modelling of stormwater and groundwater and liaising with clients, sub-consultants and approving agencies. Since joining Bio Diverse Solutions in early 2017 Chiquita has diversified her skills and knowledge to include more general environmental consultancy work.

Bianca Theyer

The flora and fauna component of this assessment has been prepared by Bianca Theyer. Bianca has the following Tertiary Qualifications:

- B.Sc. Conservation and Wildlife Biology; and
- Honours Conservation Biology.

Bianca has experience in biodiversity management with direct experience including: biodiversity surveys, fauna surveys, monitoring and trapping programs (invertebrates, mammals, amphibians, and reptiles); flora surveys and vegetation assessments. Bianca has been responsible for several projects during her time at Bio Diverse Solutions, these include multiple flora (including threatened) and vegetation surveys; fauna habitat survey at Frenchman Bay, Albany; Environmental Assessment Reports for a proposed liquid waste facility, a pastured egg farm and a proposed gravel extraction project; Foreshore Management Plans for projects in South Moorlands, Bunbury and Frenchman Bay Albany; a Mosquito Management Plan for Meadowbrook Lifestyle Villages in Boyanup, and development of an Environmental Management Plan for a proposed Solar Station in Kalbarri.

Kathryn Kinnear

The bushfire assessment and management component of the assessment has been prepared by Kathryn Kinnear. Kathryn Kinnear currently has the following tertiary Qualifications:

- BAS Technology Studies & Environmental Management;
- Diploma Business Studies; and
- Graduate Diploma in Environmental Management.

Kathryn Kinnear is an accredited Level 2 Bushfire Practitioner (Accreditation No: BPAD30794) who has 10 years operational fire experience with the (formerly) DEC (1995-2005) and has the following accreditation in bushfire management:

- Incident Control Systems;
- Operations Officer;
- Prescribed Burning Operations;
- Fire and Incident Operations;
- Wildfire Suppression 1, 2 & 3;

- Structural Modules – Hydrants and hoses, Introduction to Structural Fires, and Fire extinguishers; and
- Ground Controller.

Kathryn Kinnear has also worked in environmental management for 20 years within that time she has worked on a vast range of environmental projects and has developed specialist skills in field operations, reporting and project management.

Bio Diverse Solutions are Silver Corporate Members of the Fire Protection Australia Association. Kathryn is a committee member of the WA Bushfire Working Group (FPAA) and is a suitably qualified Bushfire Practitioner to assess the bushfire risks and management strategies.

3. Existing Environment

3.1. Existing Land use

The Subject Site currently consists of multiple land uses; Lot 10 Chester Pass Road (Lot to the west) comprises of an industrial area and cleared land used to keep current and old farm machinery and sand/gravel piles. The industrial area comprises of sheds, office building, car parks, an internal road network and cleared areas for future development. Businesses within the industrial area include; Albany Freight Lines, Designer Dirt (landscaping supplies) and Ardess Nursery.

Lot 521 Mercer Road (Lot to the east) encompasses the majority of the Subject Site and comprises of predominantly cleared rural land used for grazing cattle. There are no existing dwellings on Lot 521 Mercer Road, there are two small to medium sized sheds (one used to store hay and farm machinery and the other an old shearing shed), a set of cattle yards and a strip of remnant vegetation in the north-east of the Subject Site. Land use within the Subject Site is shown on Photographs 1 to 4.



Photograph 1 – View of cleared rural land within Lot 521 Mercer Road.



Photograph 2 – View of old farm machinery within Lot 10 Chester Pass Road.



Photograph 3 – View of hay and machinery shed located in the north of Lot 521 Mercer Road.



Photograph 4 – View of internal road and roundabout within industrial area in Lot 10 Chester Pass Road.

3.2. Surrounding land uses

The Subject Site is surrounded by rural properties to the north, west and south and remnant vegetation (CoA reserve) to the east. To the south-west of the Subject Site along Chester Pass Road and adjacent to the western most section of Mercer Road is Albany's light industrial area which includes a range of businesses and a lifestyle village and on the western side of Chester Pass Road is a residential area. The surrounding areas are shown on Photographs 5 to 8.



Photograph 5 – View of Albany Business Centre along Chester Pass Road to the south-west of Subject Site.



Photograph 6 – View of rural property to the north of Subject Site.



Photograph 7 – View of City of Albany holding facilities along Mercer Road to the south of Subject Site.



Photograph 8 – View of remnant vegetation directly east of the Subject Site.

3.3. Climate

The Albany area is characterised by a Mediterranean climate with warm dry summers and cool wet winters. Rainfall data is from the nearby Bureau of Meteorology (BoM) Albany Station (Site No. 9500).

The long-term average annual rainfall is 929 mm (1877 to 2016). This average has decreased between 2000 to present, to an average annual rainfall of 879 mm, reflecting a 5% reduction compared to the long-term average, consistent with a general trend in the South West of WA. The total rainfall distribution has also altered, with a reduction of average winter monthly rainfall, but no significant reduction in average summer monthly rainfall.

The average annual pan evaporation for the Albany area is approximately 1397 mm (Luke *et al,* 1988).

3.4. Topography

Topography over the Subject Site is undulating ranging from a high point of 51m AHD in the central northern portion of the site to a low point of 22m AHD in the southern central portion of the site. There is a ridge that runs from the central northern portion of the site to the south-west corner with topography decreasing in a radial manner from the ridge. Topographic contours (1 metre contours are shown on Figure 2).

The effective slopes (measured as per AS3959-2009) for the Subject Site are flat/upslope to low ranging from 0 to 5 degrees. The effective slopes for the Subject Site and surrounding areas are shown in the BAL Contour Plan Report included as Appendix D.

3.5. Acid Sulphate Soils

Acid sulphate soils (ASS) are naturally occurring soils and sediments containing sulphide minerals, predominantly pyrite (an iron sulphide). When undisturbed below the water table, these soils are benign and not acidic (potential acid sulphate soils). However, if the soils are drained, excavated or exposed by lowering of the water table, the sulphides will react with oxygen to form sulphuric acid (EPA 2008). Acid Sulphate Soil (ASS) Risk Mapping (Figure 2) indicates the Subject Site does not sit within any known areas of ASS.

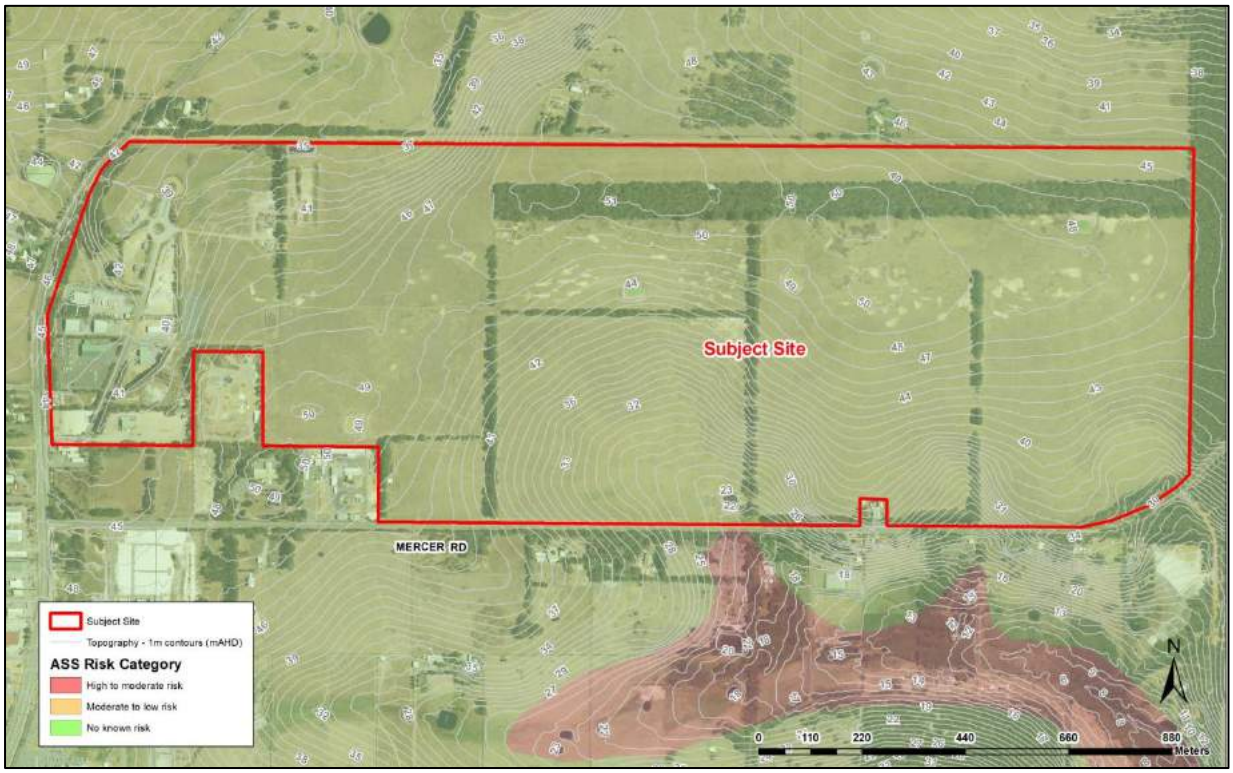


Figure 2: Topography and ASS Risk Mapping

3.6. Geology and Soils

Regolith of WA (Department of Mining, 2009) mapping indicates that soils across the Subject Site are classified as sandplain, mainly Aeolian and include some residual deposits.

A Geotechnical Investigation was conducted on the 29th of August 2017 by Great Southern Geotechnics under later winter conditions, the Geotechnical Investigation is included as Appendix B. The investigation included both soil analysis and measuring of water table. The soil testing was conducted to assess the suitability of the site for the proposed development including onsite effluent disposal for the extension of the industrial area.

Ten boreholes were constructed within the Subject Site to a depth of 2.3 metres and left open for a minimum of 1hr to identify water table present. The location of the boreholes are shown on Figure 3, lithological logs of the boreholes are shown in Appendix B.

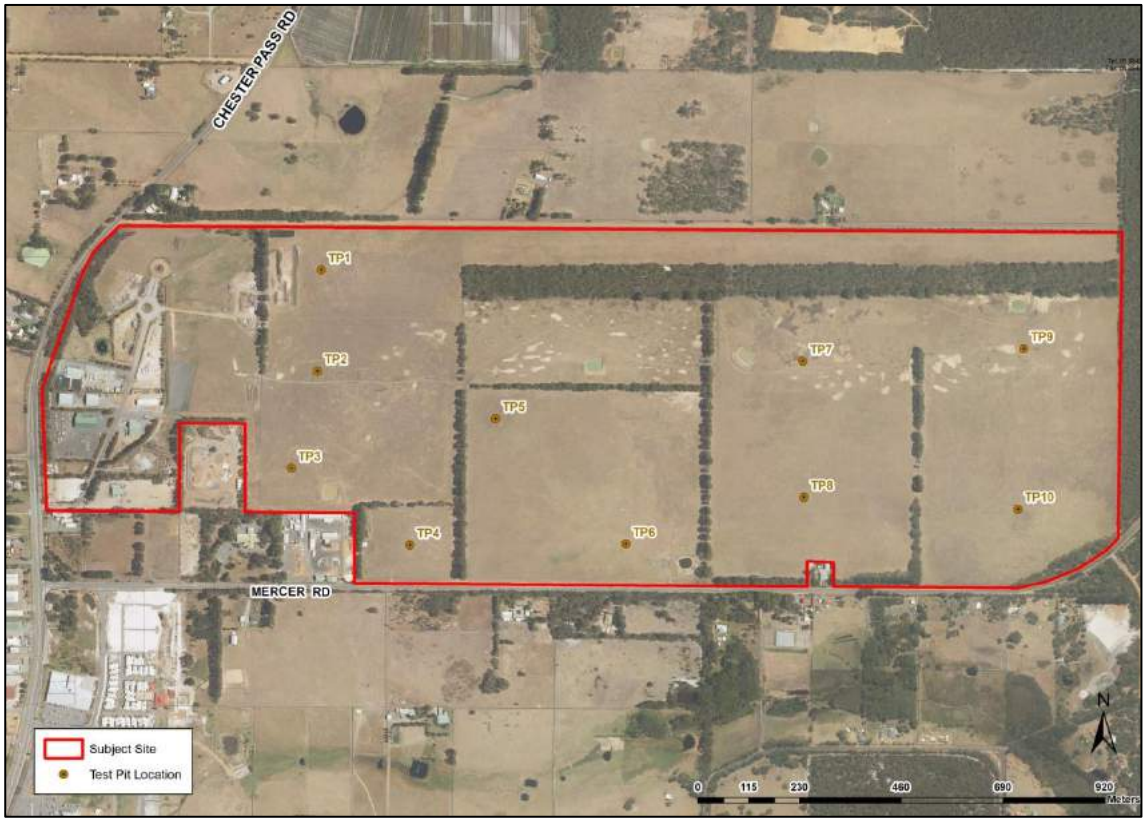


Figure 3: Borehole Locations

Soil Type

Soil testing showed that soils across the site comprised predominately of a silty sand topsoil, over sandy gravel (with a layer depth varying from 200 - 700mm), over sandy clay to the depth of the hole. This soil profile was encountered at each borehole location except TP6 and TP10. The soil profile at TP6 comprised of a silty sand topsoil, over silty sand (200 - 700mm depth), over gravelly sand (700 to 1500mm depth), over sandy gravel (1500 - 2300mm depth). The soil profile at TP10 comprised of a silty sand topsoil, over silty sand (200 - 400mm), over sandy clay (400 – 2300mm) (Great Southern Geotechnics, 2017).

Permeability

Permeability testing was conducted on TP3 (400 – 1100mm BGL) and TP10 (400 – 2300mm BGL) by Liquid Labs WA as part of the Geotechnical Investigation. TP3 recorded a permeability of 0.0035 m/day whilst TP10 recorded a permeability of 0.0015 m/day (refer to Liquid Labs WA Laboratory testing in Appendix B). Permeability at both TP3 and TP10 is considered to be extremely low this is consistent with the soil type (sandy clay) encountered at these locations.

Phosphorous Retention Index

Phosphorous retention Index (PRI) is the ability of soils to absorb nutrients and heavy metals within the soil (i.e. Soil microbe disinfecting ability). Soils with a PRI less than 1 have a very poor ability to retain nutrients and heavy metals, whilst soils with a PRI of >5 having a high ability to retain nutrients and heavy metals. PRI testing was conducted by CSBP Laboratory on soil samples from TP1, TP3, TP6 and TP10. The PRI results are shown in Table 1 and Appendix C.

Table 1: Phosphorus Retention Index Results

Borehole	Depth (mm)	Soil Type	Phosphorus Retention Index
TP1	200-900	Sand with gravel	2414.5
TP3	400-1100	Sandy clay	2387.4
TP6	200-700	Silty sand	0.8
TP10	400-2300	Sandy clay	608.0

PRI results across the site varied consistent with soil type. The sandy clays found across the majority of the site (as seen at TP3 and TP10) were found to have a very high PRI and therefore a very high ability to fix nutrients and heavy metals. The sandy gravel found at TP1 also had an extremely high PRI, particularly for a sand, whereas the light grey sand found at TP6 had a low PRI and therefore a low ability of fixing nutrients and heavy metals.

3.7. Surface Water Hydrology

There are no major naturally existing drainage networks or water bodies within the Subject Site. There is one minor waterway situated in the north-western extent of Lot 10. This area will need to be managed sensitively in relation to stormwater planning within the site. Surface water generally runs off the central and eastern portions of the site in a southerly and south-easterly direction towards Mercer Road. The western portion of the site generally drains in a north westerly direction towards Terry Road and Chester Pass Road.

Hydrographic Sub-catchments (DoW, 2008) show the Subject Site to be within two surface water sub-catchments; with the northern and western portion of the site discharging to Willyung Creek to the north of the Subject Site and the central and southern portion of the site discharging to Yakamia Creek to the south of the site. Both the Willyung Creek and Yakamia Creek sub-catchments form part of the Oyster Harbour/Kalgan/King Catchment ultimately discharging to Oyster Harbour.

There are several man-made dams across the site, which are surface water fed and used for livestock drinking water. The majority of the Subject Site drains towards a dam in the central southern portion of the site, whilst the eastern rural areas drain to a large dam located in the north-east corner of Lot 521 Mercer Road.

3.8. Groundwater Hydrology and Hydrogeology

Australian Geoscience Mapping and Department of Water 250K Hydrogeological mapping places the Subject Site within the; '*Tertiary - Cainozoic - Phanerozoic (TPw) period: Plantagenet Group - siltstone, spongolite; minor sandstone, peat, and conglomerate.'* The aquifer is a *'sedimentary aquifer with intergranular porosity – extensive aquifers, major groundwater resources.*' (DoW, 2015).

A Geotechnical Investigation was conducted on the 29th of August 2017 by Great Southern Geotechnics under late winter conditions. The investigation included both soil analysis and measuring of water table. Ten boreholes were constructed within the Subject Site to a depth of 2.3 metres, the location of the boreholes is shown on Figure 3. Groundwater was not observed in any of the boreholes indicating there is no likely groundwater present beneath the Subject Site to a depth of 2.3 metres. The Geotechnical Investigation (Great Southern Geotechnics, 2017) was undertaken in accordance with Australian Standards and has been included as Appendix B.

The subject site is not located within a Public Drinking Water Source Protection Area (DoW 2001).

3.9. Wetlands

There are no significant wetlands within or within the vicinity of the Subject Site.

3.10. Sewerage Sensitive Area

The Subject Site is located in a Sewerage Sensitive Area according to the Department of Planning's Sewerage Sensitive Area Mapping (DoP, 2017). The draft Government Sewerage Policy (2016) describes Sewerage Sensitive Areas, as areas; '*within 10 kilometres of Wilson Inlet, Torbay Inlet, Manarup Lagoon, Lake Powell, Princess Royal Harbour and Oyster Harbour'.*

3.11. Flora and Vegetation

The Subject Site lies within the Jarrah Forest IBRA bioregion. Hearn et al (2002) describes the bioregion as; '*Duricrusted plateau of Yilgarn Craton characterised by Jarrah-Marri forest on laterite gravels and, in the eastern part, by Wandoo - Marri woodlands on clayey soils. Eluvial and alluvial deposits support Agonis shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of species-rich shrublands.'*

The vegetation has been mapped on a broad scale by J.S. Beard (Shepherd et al 2002) in the 1970's, where a system was devised for state-wide mapping and vegetation classification based on geographic, geological, soil, climate structure, life form and vegetation characteristics (Sandiford and Barrett 2010). A GIS search of J.S. Beards (DEC, 2005) vegetation classification places the Subject Site within one System and Vegetation Association (Source DEC Pre-European Vegetation GIS dataset, 2005):

- **System Association Name:** Albany.
- **Vegetation Association Number:** 3.
- **Vegetation Description:** Low forest; jarrah, *Eucalyptus staeri* & *Allocasuarina fraseriana.*

The Albany Regional Vegetation Survey (ARVS) undertaken by Sandiford and Barret in 2010 identified the vegetation within the Subject Site as belonging to the Jarrah/Marri/Sheoak Laterite Forest unit. This unit is described as occurring on well drained shallow loamy/sandy soil with outcropping laterite (Sandiford and Barret, 2010). Key defining features of this vegetation type are a canopy of *Eucalyptus marginata* and *Allocasuarina fraseriana* over a relatively open and diverse understorey. The understorey is dominated by *Bossiaea linophylla, Agonis theiformis* and *Xanthosia rotundifolia. Banksia grandis* is often present within this vegetation type as a tall shrub. Common identifying species of the open sedge component of this vegetation type are *Tetraria octandra, Tetraria capillaris, Desmocladus fasciculatus* and *Anarthria prolifera* (Sandiford and Barret, 2010). Furthermore, this vegetation type has been assessed as having a modified condition (Thackway and Leslie, 2006) (equivalent to "good to very good" on the Keighrey (1994) Condition Scale) whereby the native vegetation community structure, composition and regenerative capacity is intact, but is perturbed by land use / land management practices (Thackway and Lesslie 2006). ARVS Mapping within the Subject Site and its vicinity is shown on Figure 4.

A search of publicly available databases through WA Atlas, Nature Map, and EPBC Protected Matter Search Tool indicates that no threatened, priority or declared rare flora is present on the site, or within the surrounding Nature Reserves and remnant vegetation.

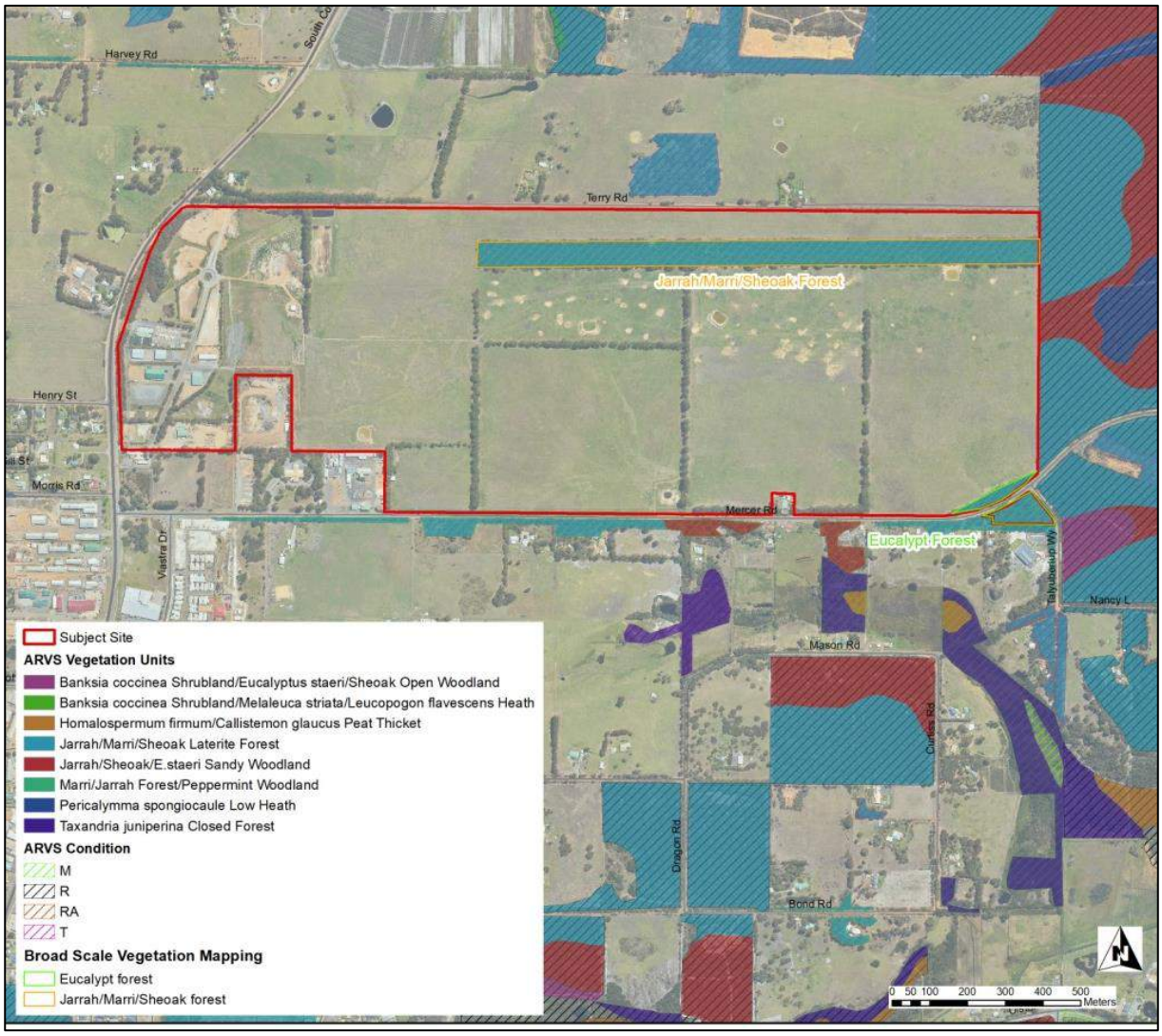


Figure 4: ARVS & Broad Scale Vegetation Survey Mapping

3.12. Vegetation Survey

The vegetation across the Subject Site and surrounding areas is consistent with rural farmland, with the majority of the site and surrounds comprising of heavily grazed pasture dominated by pasture grass species. There are two areas of remnant vegetation within the Subject Site, a strip of vegetation running parallel with the northern boundary of the site (approximately 12 ha) and a small area in the south-eastern corner of the site on either side of Mercer Road.

As part of this EAR a broad scale vegetation survey was conducted on the 29 August 2017 on the two areas of remnant vegetation. Two vegetation types were identified; the strip of vegetation in the north was identified as Jarrah/Marri Sheoak Forest and the vegetation in the south-east corner was identified as Eucalypt Forest. Broad scale Vegetation Mapping is shown on Figure 4. As per the Draft Structure Plan the internal remnant vegetation is to be retained as Public Open Space (POS).

Jarrah/Marri/Sheoak Forest

This area was previously described as being Jarrah/Marri/Sheoak Laterite Forest by Sandiford and Barrett (2010). The species identified during this survey are consistent with the ARVS vegetation type. The overstorey composition consisted of *Eucalyptus marginata, Allocasuarina fraseriana, Corymbia calophylla* and occasional patches of *Eucalyptus cornuta* and *Banksia grandis.* Midstorey species identified were *Agonis flexuosa, Bossiaea linophylla, Beaufortia decussata, Hakea amplexicaulis, Persoonia longifolia, Leucopogon verticillatus, Xanthorrhoea platyphylla, Bossiaea dentata, Hakea ruscifolia, Xanthosia rotundifolia, Tetratheca setigera, Sphaerolobium alatum (?), Hovea chorizemifolia, Hibbertia sp.,* and *Pimelea sp.* Understorey species

identified included natives such as *Chamaescilla corymbosa var. corymbosa, Dampiera sp., Lomandra sp.,* and *Conostylis sp.,* as well as weed species such as **Cirsium sp., *Olaxis sp., *Cenchrus clandestinus, and *Hypochaeris sp.* (* Denotes weed species). Based on the species composition observed during the survey this vegetation type is still consistent with ARVS.

The condition of this strip of vegetation varied throughout its extent with condition improving closer to the fenced remnant vegetation to the east. The western half of the strip was quite open, with very few midstorey species and a high proportion of sedges and grasses with areas of bare ground. This is likely due to grazing pressures from cattle. There was evidence of cattle activity throughout this area with cattle tracks, hoof prints and cow dung detected. There were areas where midstorey and understorey vegetation increased with fewer signs of disturbance present. Vegetation in this unit is considered to be in very good condition as there are obvious signs of disturbance to the vegetation structure from cattle grazing, weeds and human disturbances (Keighrey, 1994). Photographs 9 to 12 show images of Jarrah/Marri/Sheoak Forest within Subject Site.



Photograph 9 to 12 – View of Jarrah/Marri/Sheoak Forest within Subject Site

Eucalypt Forest

This area of vegetation was mapped in the ARVS as Jarrah/Marri/Sheoak Laterite Forest, however during this survey few species associated with this vegetation type were identified, there were also a high proportion of weed species were identified. The overstorey composition consists of *E. marginata*, *Eucalyptus gomphocephala, A. fraseriana, C. calophylla, Eucalyptus megacarpa, *Acacia longifolia, *Acacia dealbata, Eucalyptus sp.,* and **Pinus radiata* (* Denotes weed species). The midstorey composition was far less diverse than the northern strip of vegetation. Species identified included *Callistemon sp., Beaufortia decussata, Leucopogon verticillatus, Leucopogon sp., Pimelea sp., Hibbertia sp., Adenanthos cuneatus, Hemiandra pungens,* and *Chamelaucium ciliatum*. There were very few understorey species present, with most of the area covered with plant litter, of the groundcover/understorey species present these were weed species such as Kikuyu and *Watsonia sp*.

Vegetation condition within this area is considered to be degraded as the basic vegetation structure has been severely impacted by multiple disturbances such as aggressive weed species and clearing activities (Keighrey, 1994). Evidence of clearing was observed during this survey as several trees and larger shrubs had been cut down. Photographs 13 to 16 show images of Eucalypt Forest within Subject Site.



Photograph 13 to 16 – View of Eucalypt Forest within Subject Site.

3.13. Fauna

The majority of the site has been historically and extensively cleared and as a consequence significant fauna habitat has been removed. Opportunistic Fauna sightings were recorded during the Broad Scale Vegetation Survey on the two areas of remnant vegetation within the Subject Site.

3.13.1. Opportunistic Fauna Sightings

During the Broad Scale Vegetation Survey of the strip of remnant vegetation in the north of the Subject Site various birds were observed and heard within the Jarrah/Marri/Sheoak Forest such as Red-Capped Parrot (*Purpureicephalus spurius*), Galah (*Eolophus roseicapillus*), Willie Wagtail (*Rhipidura leucophrys*), New Holland Honeyeater (*Phylidonyris novaehollandiae*), Yellow rumped Thornbill (*Acanthiza chrysorrhoa*), Western Gerygone (*Gerygone fusca*), Rufous Whistler (*Pachycephala rufiventris*) and Magpie (*Cracticus tibicen*). A flock of 6-10 Forest Red-tailed Black Cockatoos (*Calyptorhynchus banksii naso*) were observed feeding in the adjacent remnant vegetation to the east of the Subject Site. A potential Quenda (*Isoodon obesulus fusciventer*) runnel was identified within the understorey of the Jarrah/Marri/Sheoak Forest (Photograph 17). Western Grey Kangaroos (*Macropus fuliginosus*) were also observed.



Photograph 17 – Potential Quenda Runnel within Subject Site remnant vegetation.

3.14. Contaminated Sites

A review of the DER's Contaminated Sites Database determined there are no registered contaminated sites within the Subject Site. However, prior to subdivision further investigations may be required to confirm there is no potential contamination on the site.

3.15. Heritage

A search of the Department of Aboriginal Affair's Aboriginal Heritage Inquiry System was conducted and no matches were recorded for the Subject Site or within the vicinity of the Subject Site.

A search of the Heritage Council's inHerit database and the City of Albany's Municipal Heritage Inventory (City of Albany 2000) was conducted with no matches found for the Subject Site or its surroundings.

3.16. Bushfire Risks and Bushfire Assessment

The publicly released Bushfire Prone Area Mapping (DFES, 2017) shows that the majority of the Subject Site is located within a Bushfire Prone Area (situated within 100m of >1 ha of bushfire prone vegetation). Bushfire Prone Area Mapping is shown on Figure 5.



Figure 5: Bushfire Prone Area Mapping

A BAL Contour plan has been prepared for the site by Level 2 Bushfire Practitioner K. Kinnear (BPAD 30794). The BAL Contour Plan has been included as Appendix D. All vegetation within 150m of the site boundary/ proposed development was classified in accordance with Clause 2.3 and Exclusions as per Clause 2.2.3.2 of AS 3959-2009. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified in the BAL Contour document. Each plot is representative of the Vegetation Classification to AS3959-2009 Table 2.3 and shown on the Vegetation Classification Mapping (Appendix D).

The Subject Site was assessed as having internal areas of Grassland Type G consistent with rural farmland, low fuel/non- vegetated areas (associated with the industrial area, tracks/roads and buildings) and an area of Forest Type A (being the strip of remnant vegetation in the north). External bushfire risks are mostly associated with the Forest Type A (CoA reserve) directly to the east and south-east of the Subject Site and Forest Type A and Woodland Type B along Mercer Road (Bio Diverse Solutions, Appendix D).

The Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017) outlines bushfire protection criteria which subdivision and development proposals are assessed for compliance. The bushfire protection criteria

(Appendix 4, WAPC, 2017) are performance based criteria utilised to assess bushfire risk management measures and they outline four elements, being:

- Element 1: Location
- Element 2: Siting and Design of Development;
- Element 3: Vehicle Access; and
- Element 4: Water.

(WAPC, 2017)

The Local Structure Plan is required to meet the "Acceptable Solutions" of each Element of the bushfire mitigation measures (WAPC, 2017). The proposal will be assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4.

Acceptable Solution A1- Location

It is recommended to guide the development of the LSP that the minimum separation apply to achieve BAL 29 or less on the future dwellings (as shown on the BAL Contour Plan):

- 21-27m Forest Type A;
- 14-17m Woodland Type B;
- 13-15m Scrub Type D; and
- 8-9m Grassland Type G.

This will ensure that Acceptable Solution 1 is achieved by setbacks to BAL 29 applied through the design and layout of the road reserves and (if required) building setbacks.

Acceptable Solution A2 – Siting and design

All buildings within the Structure plan shall have an Asset Protection Zone (APZ) area associated with BAL 29 or less. Setbacks for dwellings associated with the BAL Contours can be applied through the road design from external and internal bushfire risks. Future landscaped areas (internal shall below fuel in nature and maintained areas. The internal POS area in the north shall remain as native vegetation and the internal road design will ensure BAL 29 or less prevails over the proposed dwellings.

Any future plantings in POS areas (excepting the northern POS) are to be to a APZ standard as per WAPC requirements. The developer will be responsible for implementing revegetation standards as per APZ standards. New lot owners are to conform to any planting on their lot for revegetation, screening or windbreaks to APZ standards.

Staged construction is to ensure that separation distances to residential areas are maintained, as a guide 100m from any residential building should be maintained as low fuel areas (i.e. maintained by the Developer) to ensure that BAL does not apply from current land management practises to the proposed residential areas.

Acceptable Solution A3 – Vehicular Access

The internal road layout should ensure that every lot has the ability to exit the Structure Plan in two separate directions to a minimum of two destinations. Cul-de-sacs and battle axes are not recommended. The minimum technical requirements for public roads are shown in Table 9.

Table 9: Vehicular Access Technical Requirements (WAPC, 2017)

Technical requirements	Public Road
Minimum trafficable surface (m)	*6
Horizontal clearance (m)	6
Vertical clearance (m)	4.5
Maximum grades	1 in 10
Minimum weight capacity (t)	15
Maximum crossfall	1 in 33
Curves minimum inner radius (m)	8.5
Maximum Length	N/A

Fire Service Access and Emergency Access Way will be along the internal road network and will not be required separately. Staged development should include road network construction to ensure that no one-way or dead-end streets occur. Firebreaks are to be maintained on the parent lot according to CoA Fire Management Notice (annually updated). Compliance to these issues will ensure the Acceptable Solution A3 (1-8) can be achieved.

Acceptable Solution A4 – Water Supply

The development will be provided with reticulated scheme water in accordance with the specifications of the relevant water supply authority (Water Corporation WA (WCWA)) and DFES requirements. This will be detailed in the detailed engineering drawings and be subject to approval from WCWA and DFES at subdivision condition stages, meeting the Acceptable Solution. Fire hydrant (street) outlets are required, these must be installed to WCWA standards installed in accordance with the *Water Corporation's No 63 Water Reticulation Standard* and are to be identified by standard pole and/or road markings and installed by the Developer.

The Structure Plan is deemed compliant to this Acceptable Solution 4.1.

Overall Fire Management for the site

BAL contouring across the Subject Site has allocated BAL 29 or less to apply to any buildings and can be guided by the Structure Plan design. Setbacks from bushfire risks is to be maintained through road reserves and building setbacks. The inherent bushfire risks for the site is the internal strip of vegetation in the north and the remnant vegetation contained in CoA reserve to the east. Minimum setbacks to achieve BAL 29 in these areas is 21m (northern strip of remnant vegetation) and 27m (eastern CoA reserve). All future buildings can achieve an APZ area associated with a BAL allocation of BAL 29, BAL 19 or BAL 12.5.

Vehicle access standards can be achieved through the Structure Plan design. The minimum technical requirements for Public Roads is to meet Table 9. No Battle axes are proposed and FSA will be along the public road network. One Cul-de-sac is proposed near the intersection of Range and Terry Road, as the CoA seek to minimise new intersections to Range Road and the eastern extents of Terry Road. Where the cul-de-sac is present, an EAW is shown connecting to Range Road ensuring compliance to Element A3.3 of Acceptable Solution A3. Reticulated water will be provided water in accordance with the specifications of the relevant water supply authority WCWA and DFES requirements, meeting A4.1.

A detailed Bushfire Management Plan will be required if any industry is defined as "High Risk" or to support a future Development Application for the Primary School. Additionally, a detailed Bushfire Management Plan may be required to support the staged development of the subdivision.

High Risk Land use and Vulnerable Land Uses

The LSP contemplates potential "High Risk" land use (light industry) and "Vulnerable Land Use" as per the definitions of SPP 3.7. As defined by the Guidelines for Planning in Bushfire Prone areas Vers1.2 (2017):

"High-risk land uses may include, but are not limited to: service stations, landfill sites, bulk storage of hazardous materials, fuel depots and certain heavy industries as well as military bases, power generating land uses, saw-mills, highways and railways, among other uses meeting the definition.

Proposals for non-residential, high-risk land uses in bushfire prone areas are to comply with policy measure 6.6 which requires a Bushfire Management Plan jointly endorsed by the local government and the Department of Fire and Emergency Services. This may include establishing an appropriate Asset Protection Zone or Hazard Separation Zone, and should be supported by a risk management plan that addresses bushfire risk management measures for any flammable on-site hazards."

As Light industrial land use is proposed in the west of the Structure Plan, a detailed Bushfire Management Plan will be required to guide developers if any industry is defined as "High risk".

Policy measure 6.6 of SPP 3.7 applies to vulnerable land uses, and refers specifically to subdivision and development applications. However, if a scheme amendment or structure plan identifies a site for a vulnerable land use, then the policy requirements should be addressed. Typically, vulnerable land uses are those where persons may be less able to respond in a bushfire emergency. A detailed Bushfire Management Plan jointly endorsed by DFES and CoA will be required for any Primary School proposed in the Structure Plan area at the Development Application stage. A Bushfire Emergency Evacuation Plan (BEEP) will be required at Development Approval Stages.

4. Land Capability Assessment

Land capability is the ability of the land to sustain a specified land use without resulting in significant onsite or offsite degradation or damage to land resources. The Land Capability Assessment of the Subject Site is completed in accordance with the State Planning Commission's (1989) Land Capability Assessment for Local Rural Strategies. The assessment is a three-stage process and includes:

Stage 1 – Land Use Requirements

- Specify and define the proposed land use;
- Determine the specific land use requirements of that use;
- List the relevant land qualities to fulfil the land use requirements; and
- List the relevant land characteristics which determine each land quality.

Stage 2 – Land Resource Survey

- Divide the study area into mapping units which have a measurable difference in the land characteristics listed above and may be expected to influence the land quality attributes and land capabilities.

Stage 3 – Land Capability Analysis

- For each mapping unit rate each individual land quality; and
- For each mapping unit determine its overall capability to sustain the land use by comparing its land quality ratings in the capability rating table.

The WAPC (1989) utilises a five-class system of assessing Land Capability, these five classes rate the degree of physical limitations associated with land use and management needed for these. The land capability classes are shown in Table 2.

Table 2: Land Capability Classes

Capability Class	Degree of Limitation	General Description
I	Very low	Areas with a very high capability for the proposed activity or use. Very few physical limitations to the specified use are present or else they are easily overcome. Risk of land degradation under the proposed use is negligible.
II	Low	Areas with a high capability for the proposed activity or use. Some physical limitations to the use do occur affecting either its productive use or the hazard of land degradation. These limitations can however, be overcome through careful planning.
III	Moderate	Areas with a fair capability for the proposed activity or use. Moderate physical limitations to the land use do occur which will significantly affect its productive use or result in moderate risk of land degradation unless careful planning and conservation measures are undertaken.
IV	High	Areas with a low capability for the proposed activity or use. There is a high degree of physical limitations which are either not easily overcome by standard development techniques or which result in a high risk of land degradation without extensive conservation requirements.
V	Very High	Areas with a very poor capability for the proposed activity or use and the severity of physical imitations is such that its use is usually prohibitive in terms of either development costs or the associated risk of land degradation.

4.1. Land Use Requirements

There are two land uses proposed for the Subject Site as defined by the State Planning Commission (1989) Urban Development and Light Rural Industry (note these definitions are as per this policy for the purposes of this report and not any other planning instrument/policy). The location of the two proposed land uses is shown on the LSP in Appendix A, with "Urban Development" shown as "Residential" and "Light Rural Industry" shown as "Light Industry".

4.1.1. Urban Development

The WAPC Land Capability Assessment for Rural Strategies Guideline defines Urban Development areas as follows;

'Urban use consists of mostly residential development, but includes the use of land for extensive building complexes (such as shopping centres and offices). Urban development is an intensive form of land use which requires a high level of servicing and site disturbance.

Services include sealed and kerbed roads and carparks, storm water drainage and underground services (including reticulated water, gas and telephone connections) to cater for single housing allotments in the order of 500-700m^2 but also up to 2000 m^2.

The Water Authority's Country Sewerage Policy indicates that deep sewerage should be provided where it is already provided within the town, or where soil, land and environmental factors specifically indicate it should be provided. Deep sewerage may not need to be provided if there are no environmental or public health problems arising from the operation of on-site septic tanks.'

The WAPC Land Capability Assessment for Rural Strategies Guideline identifies land use requirements for Urban Development areas as follows;

- Availability of extensive flat to gently sloping areas (preferably 0-2% but up to 8%);
- Deep well drained soils which are easy to excavate and provide a stable foundation for building;
- Disposal of liquid effluent via a treatment plant or from onsite septic tanks should not result in pollution of surface water bodies or groundwater resources;
- Urban stormwater is often highly polluted (high in BOD, nutrients, heavy metals and hydrocarbons) and may need to be treated to prevent point source pollution at the disposal site; and
- Urban development results in increased stormwater runoff which may raise the level of the unconfined water table or result in soil instability where steep slopes occur. The land should therefore not be subject to slumping/ landslips, water logging or water erosion.

Table 3 outlines the land qualities to fulfil the Urban Development land use requirements. The land characteristics for each land quality are shown in the guideline document (WAPC 1989).

Table 3: Land Qualities to fulfil Urban Development Land Use Requirements

Land Qualities	**Rating**				
Ease of excavation, x	Very high	High	Moderate	Low	Very Low
Foundation stability, b	Very high	High	Moderate	Low	Very Low
Water logging hazard, i	Low		Moderate	High	Very high
Water erosion hazard, e	Low		Moderate	High	Very high
Soil salinity, y	Very Low	Low	Moderate	High	
Soil absorption ability, a	High	Moderate	Low	Very Low	
Wind erosion hazard, w			Low	Moderate	High-Very high
Bushfire hazard, z	Very Low	Low	Moderate	High	Very high
Wave erosion hazard, u					High – Very high
Flood hazard, f	Very low				High -Very high
Water pollution hazard, s			Low	Moderate	High
Water availability, g	High			Moderate	Low
Overall capability rating	**I**	**II**	**III**	**IV**	**V**

4.1.2. Light Rural Industry

The WAPC Land Capability Assessment for Rural Strategies Guideline defines Light Rural Industry areas as follows;

'This land use comprises mixed industrial uses (such as light industry, agriculture support industries) often with showroom/warehouse developments along major roads on the periphery of towns. These industries are generally controllable. The activities are mostly undertaken in warehouses or factories, while the external area, being used for traffic circulation, storage and display purposes, is generally cleared of all vegetation and compacted or sealed. Lot sizes may vary considerably but are often about 2000 m^2. These areas may be deep sewered (especially if the town is sewered) but this is generally not a requirement. A reticulated water supply is provided to each lot.'

The WAPC Land Capability Assessment for Rural Strategies Guideline identifies land use requirements for Light Rural Industrial areas as follows:

- Availability of extensive flat to gently sloping areas (0 - 8%);
- Deep to moderately deep well drained soils which are easy to excavate and provide a stable foundation for building. Moderately well drained soils with a slight susceptibility to waterlogging may be tolerated;
- The land should not be susceptible to flooding; and
- Disposal of septic effluent or other waste waters should not result in water pollution.

Table 4 outlines the land qualities to fulfil the Light Rural Industry land use requirements. The land characteristics for each land quality are shown in the guideline document (WAPC 1989).

Table 4: Land Qualities to fulfil Light Rural Industry Land Use Requirements

Land Qualities	**Rating**				
Ease of excavation, x	Very high-high		Moderate	Low	Very Low
Foundation stability, b	Very high-high		Moderate	Low	Very Low
Water logging hazard, i	Low	Moderate	High	Very High	
Water erosion hazard, e	Low	Moderate	High	Very High	
Soil absorption ability, a	High	Moderate	Low	Very Low	
Flood hazard, f	Nil		High		Very high
Water pollution hazard,s	Very low	Low	Moderate	High	
Water availability, g	High		Moderate		Low
Overall capability rating	**I**	**II**	**III**	**IV**	**V**

4.2. Land Resource Survey

The land characteristics have been analysed to determine mapping units at the Subject Site for assessing land capability. The mapping units were determined using the following land characteristics:

- Soils, including: soil type, texture, depth, PRI and permeability;
- Slope;
- Depth to groundwater;
- Land use; and
- Vegetation type.

The two distinguishable Mapping Units are defined in Table 5.

Table 5: Mapping Units

Map Unit	Characteristics within the Subject Site
Map Unit 1	Silty sand topsoil over sandy gravel over sandy clay or silty sand topsoil over sandy clay. Soils have low permeability. Soils have high PRI. Groundwater > 2.3m BGL. Slope <0 to 5%. Predominately cleared land with pasture grasses. Rural land use.
Map Unit 2	Silty sand topsoil over gravelly sand over sandy gravel. Soils have low PRI. Groundwater > 2.3m BGL. Slope <0 to 5%. Predominately cleared land with pasture grasses. Rural land use.

The mapping units for the Subject Site are shown on Figure 6.

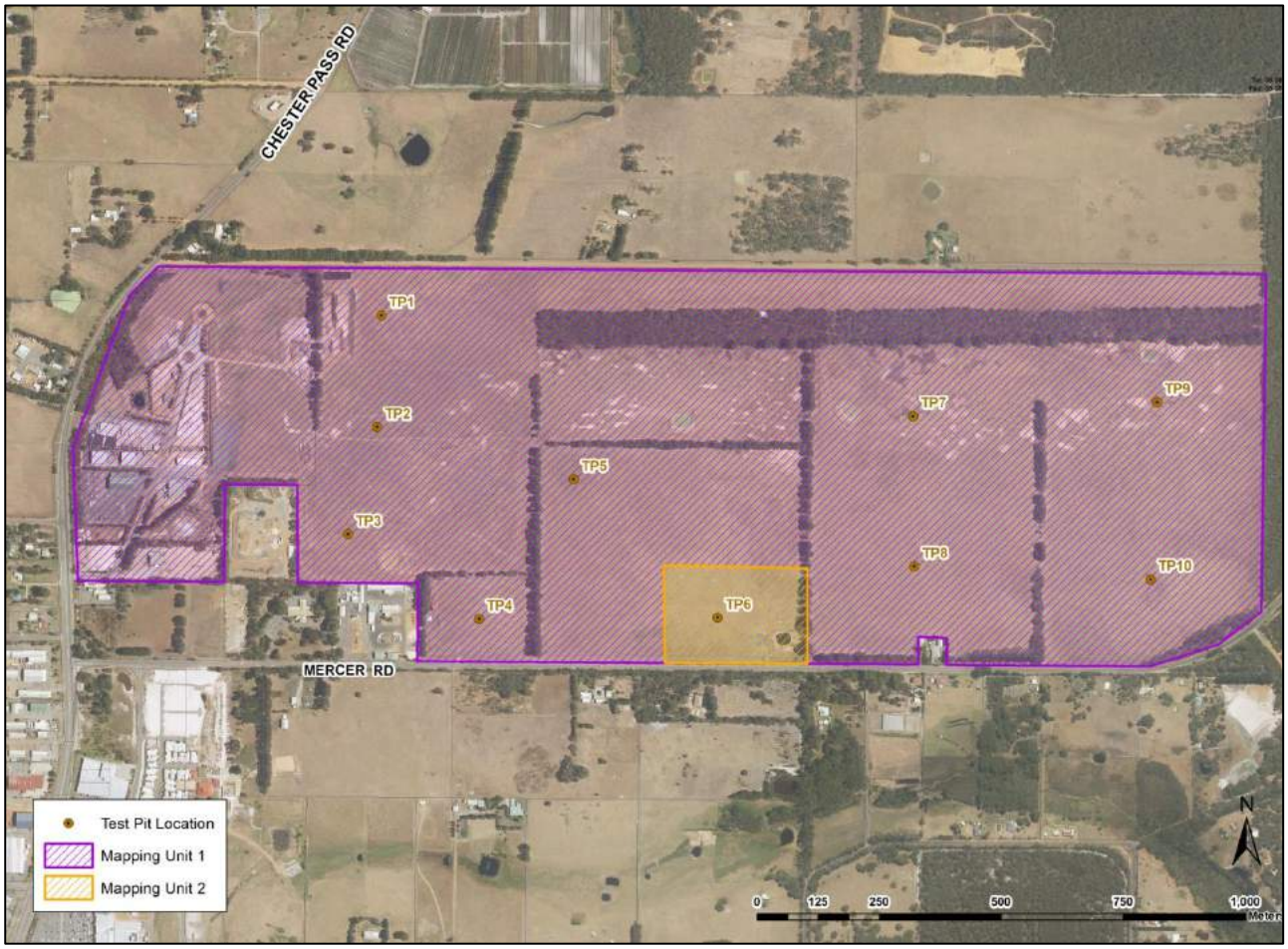


Figure 6: Land Capability Mapping Units

4.3. Land Capability Analysis

4.3.1. Urban Development

The land capability assessment for the Urban Development portion of the Subject Site is presented in Table 6. Two mapping units (Mapping Unit 1 and 2) are present in the location of the proposed Urban Development.

Table 6: Land Capability Assessment for Urban Development

Land Qualities	Mapping Unit 1	Mapping Unit 2
Ease of excavation, x	High	Very high
Foundation stability, b	High	Very high
Water logging hazard, i	Moderate	Low
Water erosion hazard, e	Low	Low
Soil salinity, y	Very Low	Very Low
Soil absorption ability, a	Moderate	Very Low
Wind erosion hazard, w	Low	Low
Bushfire hazard, z	Moderate	Moderate
Wave erosion hazard, u	Nil	Nil
Flood hazard, f	Nil	Nil
Water pollution hazard, s	Low	Moderate
Water availability, g	High (scheme water)	High (scheme water)
Overall capability rating	**II**	**IV**

The overall capability of the Subject Site supporting the Urban Development land use is rated as highly capable for Mapping Unit 1 and low capability for Mapping Unit 2 (refer to Table 2 for full description of capability rating).

4.3.2. Light Rural Industry

The land capability assessment for the Light Rural Industry portion of the Subject Site is presented in Table 7. Only Mapping Unit 1 is present in the location of the proposed Light Rural Industrial area.

Table 7: Light Rural Industry Land Capability Rating

Land Qualities	Mapping Unit 1
Ease of excavation, x	High
Foundation stability, b	High
Water logging hazard, i	Moderate
Water erosion hazard, e	Low
Soil absorption ability, a	Moderate
Flood hazard, f	Nil
Water pollution hazard, s	Low
Water availability, g	High (scheme water)
Overall capability rating	**II**

The overall capability of the Subject Site supporting the Light Rural Industry land use is rated as highly capable (refer to Table 2 for full description of capability rating).

5. Potential Environmental Impacts and Management Measures

5.1. Acid Sulphate Soils

Acid Sulphate Soils (ASS) are stable when left undisturbed, but when they are exposed to air, during excavation or dewatering, this can set off a reaction resulting in acidity (sulfuric acid) being produced. The potential impacts relate to the potential for oxidation of excavated or in situ ASS generating acidic conditions, and possibly releasing metals into groundwater or surface water catchments. ASS mapping indicates the Subject Site is not situated on any known Acid Sulphate Soils (Figure 2). There is however a section of high to moderate risk of ASS occurring within 3m of natural soil surface to the south of the Subject Site on Mercer Road.

The final fill levels and excavation requirements of the proposed subdivision will determine if an ASS and Dewatering Management Plan (ASSDMP) is required to be prepared prior to subdivision. If required, the ASSDMP will be prepared to satisfy the DER and will outline the soil management measures, the groundwater and dewatering effluent monitoring measures and the contingency management measures required to minimise any environmental impacts.

5.2. Water Management

Findings outlined in Sections 3.7 and 3.8 indicate there are limited water management risks associated with development of the Subject Land. Based on the investigations, there is no requirement to undertake pre-development groundwater monitoring. Overall, the soil types enable stormwater infiltration at source.

The water management objectives are to maintain the quantity of surface water and groundwater so that existing and potential environmental values are protected and to ensure that the quality of water emissions (surface and ground) do not adversely affect environmental values or the health, welfare and amenity of people and land uses, and meets statutory requirements and acceptable standards.

A number of management/design measures will be implemented to reduce the impact of the proposed development on surface water and groundwater flows, levels and quality, the function and environmental values of the site, or its interconnected areas. Management measures relevant to construction and the development will be identified in a Local Water Management Strategy (LWMS).

The LWMS details the integrated water management strategies to facilitate future urban water management planning. The LWMS will achieve integrated water management through the following design objectives:

- Effectively manage the risk to human life, property damage and environmental degradation from water contamination, flooding and waterlogging.
- Maintain and if possible improve water quality (surface and groundwater) within the development in relation to pre-development water quality.
- Reduce potable water consumption within both public and private spaces using practical and cost-effective measures.
- Promote infiltration of surface water on site to minimise the risk of further water quality degradation in the Catchment.
- Implement best management practices in regards to stormwater management.
- Incorporate where possible, low maintenance, cost-effective landscaping and stormwater treatment systems.

The LWMS will incorporate the following structural Best Management Practices (BMPs) to address water quantity and quality for the LSP:

- A conceptual drainage strategy demonstrating that the land is capable of retaining the 100 ARI event, while providing an indicative location of stormwater detention.

- Structural and non-structural controls will be used to improve stormwater quality, as compared to a development that does not actively manage stormwater.
- Rainfall from the 1 year 1-hour ARI (Annual Recurrence Interval) events will be retained and infiltrated as close to the source as possible.
- All residential lots will confine run-off from roofs and paving within the property boundary.
- Large rainfall events (10 ARI to 100 ARI) will be conveyed and retained through a network of roads, drainage reserves and POS within each catchment.
- It is anticipated that there will be no impacts from stormwater run-off to downstream ecosystems.

It is expected that development of the site will have a positive impact on groundwater and stormwater quality through BMPs and the treatment of stormwater prior to infiltration. Based on the site assessment and the management measures proposed, it is not expected that any changes to groundwater flows, levels or quality will have an adverse impact on the function and environmental values of the site.

5.3. Waste Water Management

The Subject Site is situated in a Sewerage Sensitive Area that does not have access to deep or reticulated sewerage. It is proposed the initial stage/s of the subdivision will involve the extension of the Light Industrial Area (similar to the existing Industrial Area) and on-site effluent disposal will be required for this area. All residential subdivision will be connected to reticulated sewerage.

The draft Government Sewerage Policy (DoP, 2016) outlines that on-site effluent disposal may be considered for non-residential subdivision that:

a) Are remote from existing or proposed sewerage schemes and the proposed development cannot be connected to reticulated sewerage;

b) Utilise secondary treatment systems with nutrient removal if in a sewage sensitive area or a public drinking water source area; and

c) Where the proponent has demonstrated, to the satisfaction of the Western Australian Planning Commission on the advice of the Department of Health and the Department of Water that there is sufficient capacity to treat and dispose of sewage and contain associated buffers on-site. Consideration will be given to the maximum hydraulic load that can be contained within the lot and the potential impacts on waterways and wetlands.

The minimum lot size for non-residential lots is determined on a case-by-case basis. Residential lots with on-site effluent disposal in sewerage sensitive areas must be at least 1 hectare in size (DoP, 2016).

The proposed industrial area as shown on the LSP was assessed against the requirements for lots with on-site effluent disposal as outlined in the draft Government Sewerage Policy (DoP, 2016). The requirements and assessment to each requirement is shown in Table 8.

Table 8: Assessment to On-site Effluent Disposal Lot Requirements

Lot Requirement (DoP, 2016)	Assessment to Requirement
Adequate separation from groundwater – the discharge point of the on-site sewage disposal system should be at least 1.2 to 1.5 metres, depending on soil type, in sewage sensitive areas.	Groundwater was not encountered to 2.3 metres depth (Great Southern Geotechnics, 2017).
An on-site sewage disposal system should not be located within 30 metres of a private bore used for household/drinking water purposes.	There are no private bores registered within the Subject Site or with in the vicinity of the proposed Industrial Area (DoW Water Register, 2017).

Table 8 continued over page.

Lot Requirement (DoP, 2016)	Assessment to Requirement
An on-site sewage disposal system should not be located within 100 metres of a waterway.	No waterways located within the Subject Site or within 100m of the proposed Industrial Area (Site inspection conducted 29/8/2017)
An on-site sewage disposal system should not be located within 100m of a significant wetland.	No significant wetlands located within the Subject Site or within the vicinity of proposed Industrial Area (DEC and CoA 2017 database search)
An on-site sewage disposal system should not be located within 100 metres of a surface or subsurface drainage system that discharges directly into a downstream waterway or waterbody.	No surface or subsurface drainage systems located within the Subject Site or within 100m of the proposed Industrial Area (Site inspection conducted 29/8/2017 and DoW database search)
An on-site sewage disposal system should not be located within any area subject to inundation and/or flooding in a 10 per cent Annual Exceedance Probability (AEP) rainfall event.	Given the relatively higher topography in the area and gradual slopes of the land inundation in the location of the proposed Industrial area is unlikely.

The assessment found that the proposed light industrial area is appropriate for effluent disposal and meets the stated minimum requirements for on-site sewage disposal systems as outlined in the *Draft Government Sewerage Policy* (Department of Planning, 2016). In addition, the low permeability and high PRI of the soils in the location of the proposed industrial area will allow for slow draining assisting the process of being fixed by soil microbes.

As the industrial area is in a sewerage sensitive area a secondary waste water treatment system with nutrient removal should be used. The provision of on-site sewage disposal systems including calculation of land application area shall be in accordance with minimum site requirements contained in Schedule 3 of the draft Government Sewerage Policy (DoP, 2016) and must be approved for use in Western Australia by the Department of Health. The Local Planning Scheme requirements for the current Light Industrial area require 'dry industry' and 'alternative treatment effluent disposal systems'.

Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant to Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.

5.4. Flora and Vegetation

The aim of the flora and vegetation management strategy is to maintain the abundance, diversity, geographic distribution and productivity of flora at the species and ecosystem levels through the avoidance or management of adverse impacts and through improvement in knowledge.

The site's historical use for agriculture and grazing has degraded the vegetation on site and reduced the native vegetation cover to a strip of remnant vegetation in the north of the site and a small area in the south-east corner of the site. Consequently, it is anticipated that the proposed development would have very little impact on native vegetation. All efforts should be made to conserve existing native vegetation. There is support however to clear, as required, replanted vegetation which is Bluegums given they are generally unsuitable in an urban area.

The following management measures have been developed and incorporated into the LSP to reduce the likelihood of impacts to vegetation and flora. These measures have been developed with the aim of retaining the key existing biological values of the site:

- Remnant vegetation will be retained within the vegetation strip in the north of the Subject Site and in the south-east corner of the site (inclusion within POS will provide the most effective way of managing the conservation values of the native vegetation).
- Access crossings within the vegetation strip will be limited to facilitate retention and natural regeneration of vegetation.
- Use of native vegetation species in areas of POS and revegetation areas to maintain local biodiversity.

5.5. Fauna

The aim of the fauna management strategy is to maintain the abundance, diversity, geographic distribution and productivity of native fauna at the species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

As the majority of the site has been historically cleared and as a result, fauna habitat has largely been removed. The only potentially significant fauna habitat on site is within the two areas of remnant vegetation.

The following management measures have been developed and incorporated into the LSP to reduce the likelihood of impacts to native fauna:

- Regional fauna corridor will be retained through maintaining the strip of remnant vegetation in the north of the Subject Site and the vegetation in the south-east corner.
- Use of native vegetation species in areas of POS to promote habitat for native fauna species.

5.6. Fire Management

The Local Structure Plan is required to meet the “Acceptable Solutions” of each Element of the bushfire mitigation measures (WAPC, 2017). The proposal has been assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4, as per the Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017).

The Subject Site was assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4. Please refer to the summary table below.

Table 9: Bushfire protection criteria applicable to the site

Element	Acceptable Solution	Applicable or not Yes/No	Meets Acceptable Solution
Element 1 – Location	A1.1 Development Location	Yes	Compliant BAL 29 or less applied to lots
Element 2 – Siting and Design	A2.1 Asset Protection Zone	Yes	Compliant, APZ in BAL 29 or less N/A
Element 3 – Vehicular Access	A3.1 Two Access Routes A3.2 Public Road A3.3 Cul-de-sacs A3.4 Battle axes A3.5 Private driveways A3.6 Emergency Access Ways A3.7 Fire Service Access Ways A3.8 Firebreaks	Yes Yes Yes N/A Yes Yes N/A Yes	Compliant two access to 2 destinations Compliant Compliant with EAW N/A Compliant Compliant N/A Compliant on parent lot
Element 4 – Water	A4.1 Reticulated areas A4.2 Non-reticulated areas A4.3 Individual lots in non-reticulated areas	Yes N/A N/A	Compliant N/A N/A

5.7. Light Industrial Area and Associated Buffers

The EPA Draft Guidance Statement No. 3 *Separation Distances Between Industrial and Sensitive Land Uses* (EPA, 2015) provides generic separation distances from particular industries to sensitive land uses. Sensitive land uses are land uses applied to places where people live or regularly spend time and which are therefore sensitive to emissions from industry.

The EPA's hierarchy for the management of emissions is:

- Avoid or minimise the creation and discharge of emissions through design and operation of the facility;
- Ensure environmental impacts from emissions are acceptable and meet the relevant regulations and health criteria at the boundary of the site; and
- Implement separation distances to ensure that any residual emissions and unintended emissions do not impact adversely on sensitive land uses.

The generic separation distances are based on the consideration of typical emissions that may affect the amenity of nearby sensitive land uses. These include:

- Gaseous and particulate emissions;
- Noise;
- Dust; and
- Odour.

The only 'Sensitive Land Use' within the vicinity of the proposed Light Industrial area is the proposed Residential area. According to the EPA (2015) the general minimum vegetated setback of 200m is required to private residences, however the *Guidance Number 3 Separation Distances between Industrial and Sensitive Land Uses* - Appendix 1 (EPA, 2015) must be consulted for the industry types proposed within the development area and their associated separation to distance to sensitive land use prior to development.

6. Management Commitments and Conclusions

The proposed LSP recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form, that creates an environmentally responsive urban development that meets the EPA and City of Albany's environmental requirements. Consequently, the environmental outcomes of the proposed LSP are considerable and include:

- Providing an improvement in groundwater and surface water quality through residential and industrial development and implementation of water sensitive urban design and best stormwater drainage management practices.
- Revegetation using native species (where currently there is very little native species and diversity) in areas of POS to promote fauna habitat and flora diversity. Landscaped urban areas to promote biodiversity using native plants.
- Maintaining areas of remnant vegetation and limiting access points through these areas to the subdivision to prevent adverse impacts particularly for transient fauna.
- The Local Structure Plan is required to meet the "Acceptable Solutions" of each Element of the bushfire mitigation measures (WAPC, 2017).
- As Light industrial land use is proposed in the west of the Structure Plan, a detailed Bushfire Management Plan will be required to guide developers if any industry is defined as "High Risk".
- A detailed Bushfire Management Plan jointly endorsed by DFES and CoA will be required for any Primary School proposed in the Structure Plan area at the Development Application stage. A Bushfire Emergency Evacuation Plan (BEEP) will be required at Development Approval Stages.
- The proposed light industrial area is deemed appropriate for effluent disposal and meets the state's minimum requirements for on-site sewage disposal systems as outlined in the *Draft Government Sewerage Policy* (Department of Planning, 2016). Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.
- Provide vegetated buffer and/or other management techniques between industrial areas to sensitive land uses (such as residential) in accordance with the EPA's (2015) Guidance Statement No. 3 *Separation Distances Between Industrial and Sensitive Land Uses.*

7. References

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Appendices

Appendix A – Draft Local Structure Plan (Edge Planning & Property, 2017)

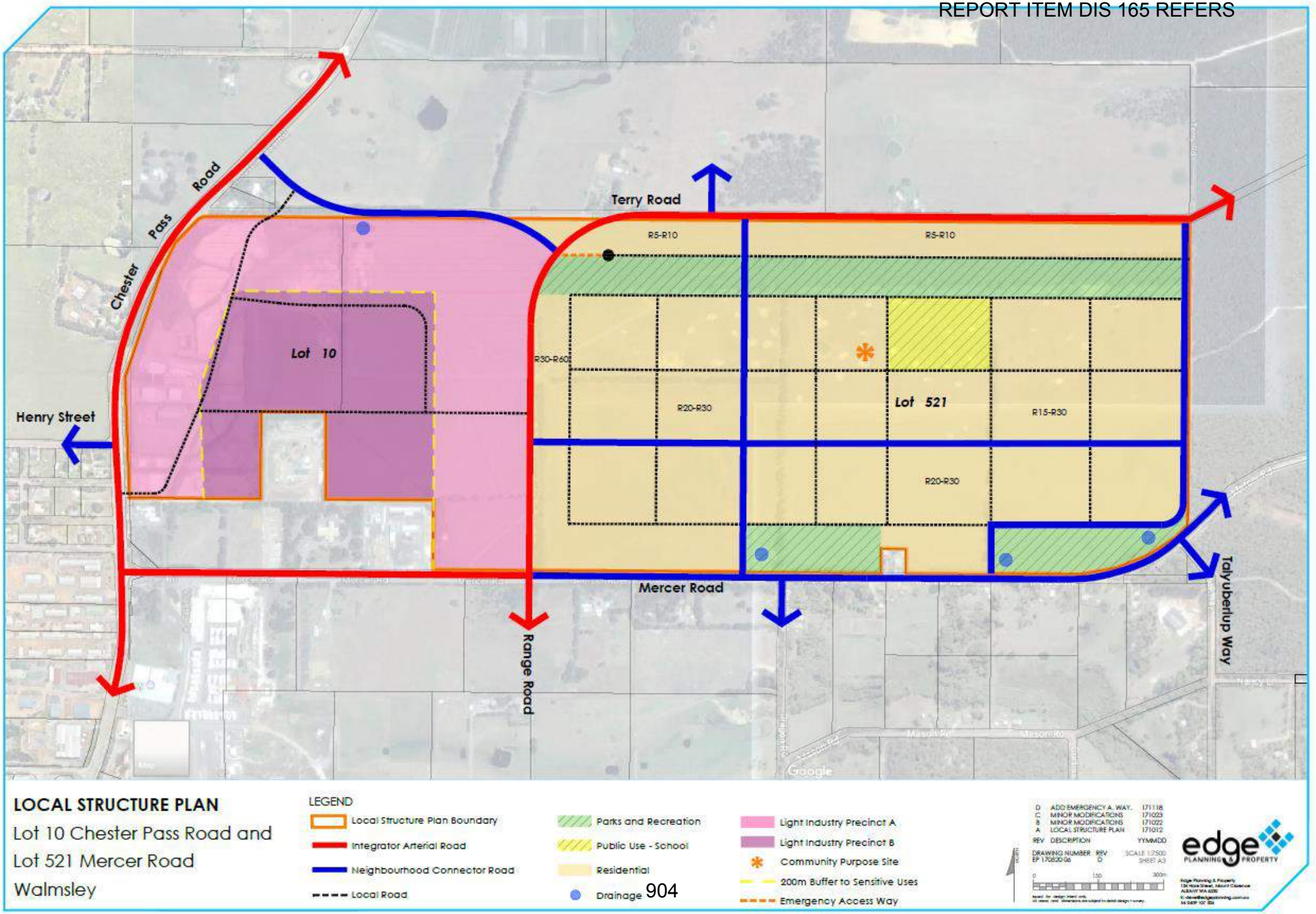
Appendix B – Geotechnical Investigation (Great Southern Geotechnics, 2017)

Appendix C – Phosphorous Retention Index Test Results (CSBP Laboratory, 2017)

Appendix D – BAL Contour Plan (Bio Diverse Solutions, 2017)

Appendix A

Draft Local Structure Plan (Edge Planning & Property, 2017)



LOCAL STRUCTURE PLAN

Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

LEGEND

- Local Structure Plan Boundary
- Integrator Arterial Road
- Neighbourhood Connector Road
- Local Road
- Parks and Recreation
- Public Use - School
- Residential
- Drainage
- Light Industry Precinct A
- Light Industry Precinct B
- Community Purpose Site
- 200m Buffer to Sensitive Uses
- Emergency Access Way

REV	DESCRIPTION	YYMMDD
D	ADD EMERGENCY A. WAY.	171116
C	MINOR MODIFICATIONS	171025
B	MINOR MODIFICATIONS	171022
A	LOCAL STRUCTURE PLAN	171012

DRAWING NUMBER EP 17062006 REV D SCALE 1:7500 SHEET A3

edge PLANNING & PROPERTY

Appendix B

Geotechnical Investigation (Great Southern Geotechnics, 2017)

VERSION 1

Report No 104/1

SEPTEMBER 17, 2017

Great Southern GEOTECHNICS

GEOTECHNICAL INVESTIGATION

BIO DIVERSE SOLUTIONS

LOT 10 CHESTER PASS RD & LOT 521 MERCER RD, MILPARA WA 6330

PRESENTED BY: M.COFFEY

GREAT SOUTHERN GEOTECHNICS
5A 209 CHESTER PASS RD, ALBANY WA

1.0 INTRODUCTION

As authorised by Kathryn Kinnear of Bio Diverse Solutions, a site investigation for the proposed development of Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA 6330 was preformed on the 29th of August, 2017.

2.0 GENERAL

This purpose of the investigation was to determine the following:

- Surface site conditions
- Subsurface soil profiles & characteristics
- Depth of ground water tables .

3.0 SITE INVESTIGATION

The site is approximately 5.0kms North of the Albany CBD and is located on the Northern side of Mercer Road spanning over 2kms West to East.

Established trees border the fence lines of grassy paddocks and natural bushland can be found adjacent to the eastern boundary.

Site conditions and Test pit locations were recorded and are shown in Appendix 2

The field investigation consisted of ten test pits excavated on-site to depths of up to 2.3m using a Kubota KX41-3V Mini Excavator with a 300mm wide Hydraulic open flight auger attachment.

All soil layers encountered were visually assessed and classified on-site

The subsurface soil profiles are shown on the Test pit logs located in Appendix 1

IMPORTANT NOTE: We have endeavoured to locate the test pits so that they are representative of the subsurface materials across the site. However, soil conditions may change dramatically over short distances and our investigations may not locate all soil variations across the site.

This report and associated documentation was undertaken for the specific purpose described in the report and shall not be relied on for other purposes. This report was prepared solely for the use by Bio Diverse Solutions and any reliance assumed by other parties on this report shall be at such parties own risk.

COLOURS

BLACK - BROWN (bk)	BLUE (bl)	ORANGE (or)
BROWN (br)	BLUE - GREEN (bl/gr)	RED (rd)
GREY - BROWN (gy/br)	GREEN (gr)	RED - BROWN (rd/br)
GREY (gy)	YELLOW (yl)	PINK (pk)
BLUE - GREY (bl/gy)	YELLOW - BROWN (yl/br)	PURPLE (pr)

MOISTURE CONDITION OF SOIL

TERM	DESCRIPTION
Dry	Cohesive soils; hard and friable or powdery, well dry of plastic limit. Granular soils; cohesionless and free-running.
Moist	Soil feels cool, darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.
Wet	Soil feels cool, darkened in colour. Cohesive soils usually weakened and free water forms on hands when handling. Granular soils tend to cohere and free water forms on hands when handling.

PARTICLE SHAPES

ANGULAR | SUB-ANGULAR | SUB-ROUNDED | ROUNDED



PARTICLE SIZES

BOULDERS	COBBLES	COARSE GRAVEL	MEDIUM GRAVEL	FINE GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	SILT	CLAY
>200mm	63-200mm	20-63mm	6-20mm	2.36-6mm	0.6-2.36mm	0.2-0.6mm	0.075-0.2mm	0.002-0.075mm	<0.002mm

GRAIN SIZE

SOIL TYPE (ABBREV.)	CLAY (CL)	SILT (SI)	← SAND (SA) →		← GRAVEL (GR) →			COBBLES (CO)
SIZE	< 2µm	2-75µm	Fine 0.075-0.2mm	Medium 0.2-0.6mm	Coarse 0.6-2.36mm	Fine 2.36-6mm	Medium 6-20mm	Coarse 20-63mm	63-200mm
SHAPE & TEXTURE	Shiny	Dull	← angular or subangular or subrounded or rounded →						
FIELD GUIDE	Not visible under 10x	Visible under 10x	Visible by eye	Visible at < 1m	Visible at < 3m	Visible at < 5m	Road gravel	Rail ballast	Beaching

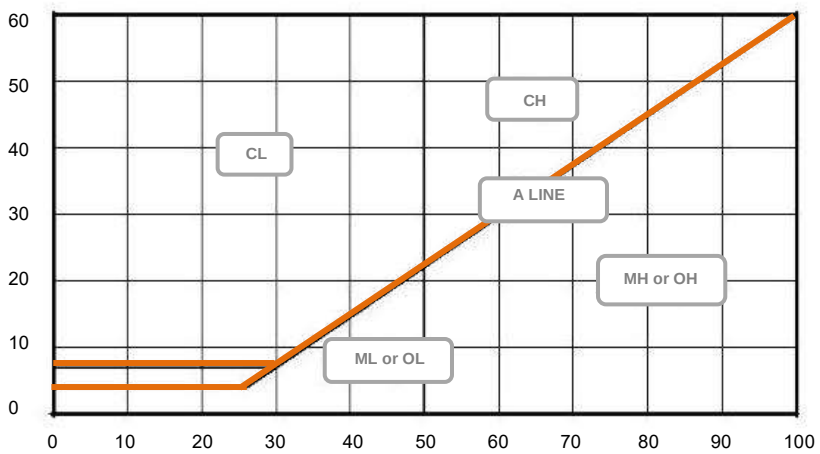
CLASSIFICATION CHART

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60mm and basing fractions on estimated mass)				GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS More than 50% of material less than 63 mm is larger than 0.075 mm	GRAVELS More than 50% of coarse fraction is larger than 2.36mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	GP	Poorly Graded gravels and gravel-sand mixtures, little or no fines, uniform gravels
		GRAVELS WITH FINES (Appreciable amount of fines)	Dirty' materials with excess of non-plastic fines, zero to medium dry strength	GM	Silty gravels, gravel-sand-silt mixtures
			'Dirty' materials with excess of plastic fines, medium to high dry strength	GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction is smaller than 2.36mm	CLEAN SANDS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	SW	Well graded sands, gravelly sands, little or no fines
			Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength '	SP	Poorly graded sands and gravelly sands; little or no fines, uniform sands
		SANDS WITH FINES (Appreciable amount of fines)	Dirty' materials with excess of non-plastic fines, zero to medium dry strength	SM	Silty sands, sand-silt mixtures
			'Dirty' materials with excess of plastic fines, medium to high dry strength	SC	Clayey sands, sand-clay mixtures

FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm	IDENTIFICATION PROCEDURES ON FRACTIONS <0.2mm					
		DRY STRENGTH	DILATANCY	TOUGHNESS		
	SILTS AND CLAYS Liquid limit less than 50	None to low	Quick to slow	None	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with low plasticity. Silts of low to medium Liquid Limit.
		Medium to high	None to very slow	Medium	CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
		Low to medium	Slow	Low	OL	Organic silts and organic silt-clays of low to medium plasticity.
	SILTS AND CLAYS Liquid limit greater than 50	Low to medium	Slow to none	Low to medium	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, silts of high Liquid Limit.
		High to very high	None	High	CH	Inorganic clays of high plasticity.
		Medium to high	None to very slow	Low to medium	OH	Organic clays of high plasticity
HIGHLY ORGANIC SOILS	Readily identified by colour, odour, spongy feel and frequently by fibrous texture				Pt	Peat and other highly organic soils

PLASTICITY CHART

For laboratory classification of fine grained soils



PLASTICITY

DESCRIPTIVE TERM	OF LOW PLASTICITY	OF MEDIUM PLASTICITY	OF HIGH PLASTICITY
Range Of Liquid Limit (%)	≤ 35	> 35 ≤ 50	> 50

DESCRIPTION OF ORGANIC OR ARTIFICIAL MATERIALS

PREFERRED TERMS	SECONDARY DESCRIPTION
Organic Matter	Fibrous Peat/ Charcoal/ Wood Fragments/ Roots (greater than approximately 2mm diameter)/ Root Fibres (less than approximately 2mm diameter)
Waste Fill	Domestic Refuse/ Oil/ Bitumen/ Brickbats/ Concrete Rubble/ Fibrous Plaster/ Wood Pieces/ Wood Shavings/ Sawdust/ Iron Filings/ Drums/ Steel Bars/ Steel Scrap/ Bottles/ Broken Glass/ Leather

CONSISTENCY - Cohesive soils

TERM	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD
Symbol	VS	S	F	St	VSt	H
Undrained Shear Strength (kPa)	< 12	12 - 25	25 - 50	50 - 100	100 - 200	> 200
SPT (N) Blowcount	0 - 2	2 - 4	4 - 8	8 - 15	15 - 30	> 30
Field Guide	Exudes between the fingers when squeezed	Can be moulded by light finger pressure	Can be moulded by strong finger pressure	Cannot be moulded by fingers. Can be indented by thumb nail	Can be indented by thumb nail	Can be indented with difficulty with thumb nail

CONSISTENCY - Non-cohesive soils

TERM	VERY LOOSE	LOOSE	MEDIUM DENSE	DENSE	VERY DENSE	COMPACT
Symbol	VL	L	MD	D	VD	CO
SPT (N) Blowcount	0 - 4	4 - 10	10 - 30	30 - 50	50 - 100	> 50/150 mm
Density Index (%)	< 15	15 - 35	35 - 65	65 - 85	85 - 95	> 95
Field Guide	Ravels	Shovels easily	Shovelling very difficult	Pick required	Pick difficult	Cannot be picked

MINOR COMPONENTS

TERM	TRACE	WITH
% Minor Component Field Guide	Coarse grained soils: < 5% Fine grained soils: <15% Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary components	Coarse grained soils: 5 - 12% Fine grained soils: 15 - 30% Presence easily detectable by feel or eye, soil properties little different to general properties of primary component

GEOLOGICAL ORIGIN

	TYPE	DETAILS
TRANSPORTED SOILS	Aeolian Soils	Deposited by wind
	Alluvial Soils	Deposited by streams and rivers
	Colluvial Soils	Deposited on slopes
	Lacustrine Soils	Deposited by lakes
	Marine Soils	Deposited in ocean, bays, beaches and estuaries
FILL MATERIALS	Soil Fill	Describe soil type, UCS symbol and add 'FILL'
	Rock Fill	Rock type, degree of weathering, and word 'FILL'.
	Domestic Fill	Percent soil or rock, whether pretrucible or not.
	Industrial Fill	Percent soil, whether contaminated, particle size & type of waste product, i.e. brick, concrete, metal

STRENGTH OF ROCK MATERIAL

TERM	SYMBOL	IS(50)	(MPA)	FIELD GUIDE TO STRENGTH
Extremely Low	EL	≤0.03		Easily remoulded by hand to a material with soil properties.
Very Low	VL	>0.03	≤0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxle sample by hand. Pieces up to 3 cm thick can be broken by finger pressure.
Low	L	>0.1	≤0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	M	>0.3	≤1.0	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
High	H	>1	≤3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High	VH	>3	≤10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High	EH	>10		Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

ROCK MATERIAL WEATHERING CLASSIFICATION

TERM	SYMBOL	DEFINITION
Residual Soil	RS	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported
Extremely Weathered Rock	XW	Rock is weathered to such an extent that it has 'soil' properties, i.e. it either disintegrates or can be remoulded, in water.
Distinctly Weathered Rock	DW	Rock strength usually changed by weathering. Rock may be highly discoloured, usually be ironstaining. Porosity may be increased by leaching or may be decreased due to deposition of weathering products in pores.
Slightly Weathered Rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh Rock	FR	Rock shows no sign of decomposition or staining.

Appendix 1

Test Pit Logs

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REFERS

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS

Report No. **104/1** | Job No. **104** | Sheet 1 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP1** Sample No. **17G288**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 580601 6128901
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 900	700	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M	D-VD				
		Fine to medium grained sand.						
900 - 2300	1400	**Sandy CLAY:** Low to medium plasticity**,** Light brown/orange. Fine to medium grained sand.	M	S / F				

Comments:

Pit Terminated at:	✓ or ×	(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REFERS

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS	Report No. 104/1	Job No. 104	Sheet 2 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP2** Sample No. **17G289**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 580560 6128698
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 100	100	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
100 - 300	200	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	W	L				
		Fine to medium grained sand.						
300 - 700	400	**Sandy CLAY:** Low to medium plasticity**,** Light brown/orange. Fine to medium grained sand.	M	S				
700 - 2300	1600	**Sandy CLAY:** Low to medium plasticity, Grey mottled orange/red. Fine to medium grained sand.	M	S-F				

Comments:

Pit Terminated at: ✓ or ×		(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REFERS

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS	Report No. **104/1**	Job No. **104**	Sheet 3 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP3** Sample No. **17G290**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 580597 6128498
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 -150	150	**(Topsoil) SAND with silt:** Dark grey/brown, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
150 - 400	250	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M-W	D-MD				
		Medium to coarse grained sub-angular to angular sand.						
400 - 1100	700	**Sandy CLAY:** Low to medium plasticity, Brown/orange. Fine to medium grained sand.	M	S-F				✓
1100 - 2300	1200	**Sandy CLAY:** Low to medium plasticity, Red mottled grey/brown. Fine to medium grained sand.	M	S-F				

Comments:

Pit Terminated at: ✓ or ×		(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS

Report No. **104/1** | Job No. **104** | Sheet 4 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP4** Sample No. **17G291**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 580829 6128337
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 550	350	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M-W	D-VD				
		Cobbles up to 100mm. Fine to medium grained sand.						
550 - 900	350	**Sandy CLAY:** Low to medium plasticity, Light brown mottled red/orange.	M	S-F				
		Fine to medium grained sand.						
900 - 2300	1400	**Sandy CLAY:** Low to medium plasticity, Grey mottled red/brown. Fine to medium grained sand.	M	F				

Comments:

Pit Terminated at:	✓ or ×	(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
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Test Pit Report

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Great Southern GEOTECHNICS	Report No. 104/1	Job No. 104	Sheet 5 of 10

Client:	Bio Diverse Solutions	Operator/Contractor:	GSG
Project:	Proposed Light Industrial Area	Equipment type:	Kubota KX41-3V
Project No.	n/a	Excavation Method :	300mm Auger
Location:	Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA	Position:	50 H 580977 6128666
Test Pit No.:	**TP5** Sample No. **17G292**	Elevation:	

Date Commenced:	29.08.2017	Logged By	M.Coffey	Excavation Dimensions:	
Date Completed:	29.08.2017	Checked By:	M.Coffey	Depth 2.3 (m)	Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey/brown, fine to medium grained. Roots & root fibres.	M	L		1200mm below existing ground level		
200 - 500	300	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M-W	MD				
		Fine to medium grained sand.						
500 - 1000	500	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M	VD				
		Cobbles & Boulders up to 200mm. Fine to medium grained sand.						
1000 - 1200	200	**Sandy CLAY:** Low to medium plasticity**,** Light brown/orange. Fine to medium grained sand.	M	F				
1200 - 2300	1100	**Sandy CLAY:** Low to medium plasticity, Red mottled grey. Fine to medium grained sand.	M	F				

Comments:

Water table measured 1200mm below existing ground level 3hrs 55mins after achieving full depth of test pit.

Water noted seeping into test pit at 500mm below surface level.

Pit Terminated at:	✓ or ×	(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water

Water first Encountered

Moisture

D - Dry M - Moist W - Wet

General

N/A - Not Applicable
N/D - Not Determined

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Test Pit Report

REPORT ITEM DIS 165 REFERS

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Great Southern GEOTECHNICS	Report No. **104/1**	Job No. **104**	Sheet 6 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP6** Sample No. **17G293**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 581324 6128351
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey/brown, fine to medium grained. Roots & root fibres.	M	L		1700mm below existing ground level		
200 - 400	200	**SAND with silt:** Grey, fine to medium grained.	M	L				
400 - 700	300	**SAND with silt:** Light grey, fine to medium grained.	M	L				
700 - 1500	800	**Gravelly SAND with silt:** Brown, fine to medium grained.	M	MD				
		Fine to medium grained, sub-rounded to sub-angular gravel.						
1500 - 2300	800	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M	MD				
		Fine to medium grained sand.						

Comments:
Water table measured 1700mm below existing ground level 1hr 55mins after achieving full depth of test pit.

Pit Terminated at:	✓ or ×	(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

Email: info@gsgeotechnics.com
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Great Southern GEOTECHNICS

Report No. **104/1** | Job No. **104** | Sheet 7 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP7** Sample No. **17G294**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 581693 6128729
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		900mm below existing ground level		
200 - 800	600	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M-W	L-MD				
		Cobbles & boulders up to 200mm. Fine to medium grained sand.						
800 - 1200	400	**Sandy CLAY:** Low to medium plasticity, Brown/orange. Fine to medium grained sand.	M	S-F				
1200 - 2300	1100	**Sandy CLAY:** Low to medium plasticity, Red mottled grey. Fine to medium grained sand.	M	F				

Comments:

Water table measured 900mm below existing ground level 3hrs 55mins after achieving full depth of test pit.

Water noted seeping into test pit at 700mm below surface level.

Pit Terminated at:	✓ or ×	(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

▼ Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REFERS

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Great Southern GEOTECHNICS	Report No. 104/1	Job No. 104	Sheet 8 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP8** Sample No. **17G295**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 581720 6128505
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 800	600	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular.	M	D-VD				
		Fine to medium grained sand.						
800 - 1000	200	**Sandy CLAY with gravel:** Low to medium plasticity, Light brown mottled red/orange.	M	F				
		Fine to medium grained sand. Fine to medium grained, angular to sub-angular gravel.						
1000 - 1900	900	**Sandy CLAY:** Low to medium plasticity, Red mottled light brown/orange.	M	F-VSt				
		Fine to medium grained sand. (VSt between depth 1700mm to 1900mm)						
1900 - 2300	400	**Sandy CLAY:** Low plasticity, orange mottled red/cream. Fine to medium grained sand.	M	S-F				

Comments:

Pit Terminated at: ✓ or ×		(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REFERS

Email: info@gsgeotechnics.com
Mobile: 040 790 3297

Great Southern GEOTECHNICS	Report No. 104/1	Job No. 104	Sheet 9 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP9** Sample No. **17G296**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 582184 6128769
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 800	600	**Sandy GRAVEL:** Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	M	MD				
800 - 1100	300	**Sandy CLAY:** Low to medium plasticity, brown/orange. Fine to medium grained sand.	M	S-F				
1100 - 2300	1200	**Sandy CLAY:** Low to medium plasticity, Red mottled grey. Fine to medium grained sand.	M	F				

Comments:

Pit Terminated at: ✓ or ×		(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

5a 209 Chester Pass Rd, Albany WA 6330
ACN: 613 485 644 ABN: 77 613 485 644

Test Pit Report

REPORT ITEM DIS 165 REEFERS

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Great Southern GEOTECHNICS

Report No. **104/1** | Job No. **104** | Sheet 10 of 10

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Project No. n/a
Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA
Test Pit No.: **TP10** Sample No. **17G297**

Operator/Contractor: GSG
Equipment type: Kubota KX41-3V
Excavation Method : 300mm Auger
Position: 50 H 582184 6128441
Elevation:

Date Commenced: 29.08.2017
Date Completed: 29.08.2017

Logged By M.Coffey
Checked By: M.Coffey

Excavation Dimensions:
Depth 2.3 (m) Width 0.3 (m)

Depth Below Surface (mm)	Layer Depth (mm)	Material Description SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	**(Topsoil) SAND with silt:** Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 400	200	**SAND with silt:** Grey/brown, fine to coarse grained sub-rounded to sub-angular.	M	L-MD				
		(Contains some cobbles up to 150mm)						
400 - 2300	1900	**Sandy CLAY:** Low to medium plasticity, Light brown/orange. Fine to medium grained sand.	M	L				✓
		(Contains pockets of yellow/cream fine to medium grained sand).						

Comments:

Pit Terminated at: ✓ or ×		(mm) below ground level
Target Depth	✓	2300
Cave In		
Refusal		
Near Refusal		
Flooding		
Lack of Reach		

Materials Consistency/Strength		Rock	Cementation
Cohesive	**Non-Cohesive**		
VS - Very Soft	VL - Very Loose	EL - Extremely Low	
S - Soft	L - Loose	VL - Very Low	IN - Indurated
F - Firm	MD - Medium Dense	L - Low	PC - Poorly Cemented
St - Stiff	D - Dense	M - Medium	MC - moderately Cemented
VSt - Very Stiff	VD - Very Dense	H - High	WC - Well Cemented
H - Hard	CO - Compact	VH - Very High	
		EH - Extremely High	

Water
Water first Encountered

Moisture
D - Dry M - Moist W - Wet

General
N/A - Not Applicable
N/D - Not Determined

Appendix 2

Site Map & Test Pit Locations

The fieldwork was carried out on the 29th of August 2017 and comprised the following:
Ten test pits were excavated using a Kubota KX41-3V Mini Excavator with a 300mm wide Auger attachment to achieve depths of up to 2.3m to visually assess subsurface conditions and monitor any ground water present.
Approximate Test Pit locations are shown on **Figure 2.**



Figure 1 - Site Location



Figure 2 - Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA 6330



Test Pit No. 1 Excavation



Test Pit No. 1 Spoil

Job No: 104 **Test Pit No:** **TP1**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 2 Excavation



Test Pit No. 2 Spoil

Job No: 104 **Test Pit No:** **TP2**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 3 Excavation



Test Pit No. 3 Spoil

Job No: 104 **Test Pit No:** **TP3**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 4 Excavation



Test Pit No. 4 Spoil

Great Southern GEOTECHNICS

Job No: 104 **Test Pit No:** **TP4**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 5 Excavation



Test Pit No. 5 Spoil

Job No: 104 **Test Pit No:** **TP5**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 6 Excavation



Test Pit No. 6 Spoil

Job No: 104 **Test Pit No:** **TP6**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 7 Excavation



Test Pit No. 7 Spoil

Great Southern GEOTECHNICS

Job No: 104 **Test Pit No:** **TP7**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 8 Excavation



Test Pit No. 8 Spoil

Job No: 104 **Test Pit No:** **TP8**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 9 Excavation



Test Pit No. 9 Spoil

Job No: 104 **Test Pit No:** **TP9**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA



Test Pit No. 10 Excavation



Test Pit No. 10 Spoil

Job No: 104 **Test Pit No:** **TP10**
Client: Bio Diverse Solutions
Project: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA

Appendix 3

Test Results

GREAT SOUTHERN GEOTECHNICS

5a 209 Chester Pass Road, Milpara WA 6330
Mobile: 0407 903 297 Email: Info@gsgeotechnics.com

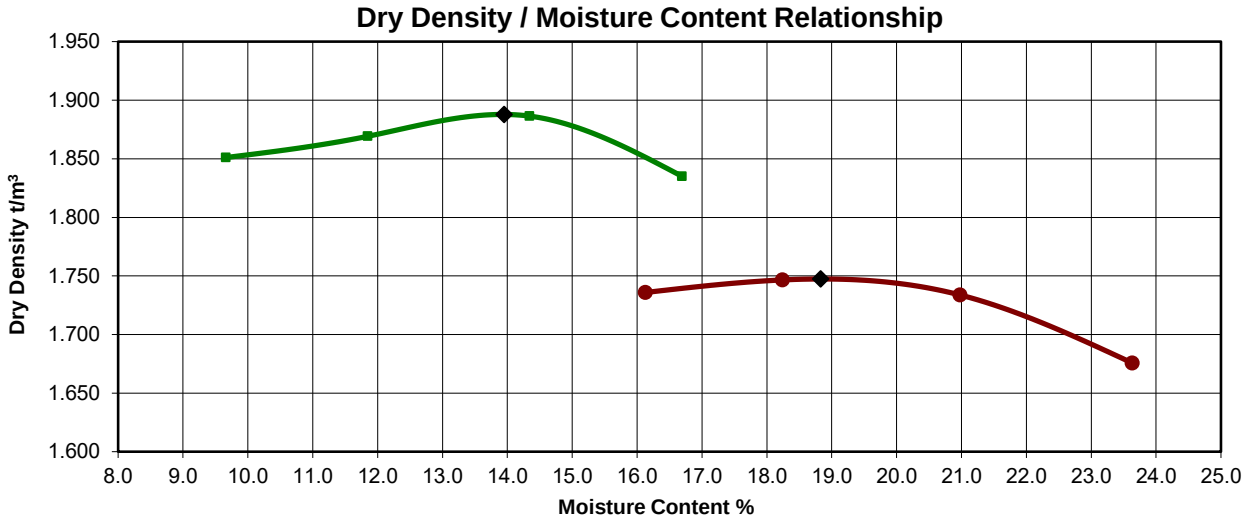
REPORT ITEM DIS 165 REFERS

Dry Density / Moisture Content Relationship Test Report — Sheet 1 of 1

Report No. 104/1 **Job No.** 104

Client: Bio Diverse Solutions
Project: Proposed Light Industrial Area
Road: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA 6330
Section N/A

Sample No.	Sample Location	Field Description
17G298	Test Pit 3	Sandy CLAY
17G299	Test Pit 10	Sandy CLAY



Sample Number		17G298	17G299	
Depth		400mm - 1100mm	400mm to 2300mm	
Stabiliser Used				
Stabiliser Added %				
Curing Period	Water (Days)	Field	Field	
	Stabiliser (Hrs)			
Moisture Content Method used		AS 1289.2.1.1	AS 1289.2.1.1	
Sampling Method		AS 1289.1.2.1 Proc 6.5	AS 1289.1.2.1 Proc 6.5	
Date Sampled		29.08.2017	29.08.2017	
Date Received		29.08.2017	29.08.2017	
Date Tested		02.09.2017	02.09.2017	
Test Method		AS 1289.5.2.1	AS 1289.5.2.1	
Maximum Dry Density t/m^3		**1.75**	**1.89**	
Optimum Moisture Content %		**19.0**	**14.0**	
Adjusted Maximum Dry Density t/m3				
Adjusted Optimum Moisture Content %				
Percentage Retained %	37.5 mm	**0**	**0**	
Percentage Retained %	19.0 mm	**0**	**0**	

NATA WORLD RECOGNISED ACCREDITATION

Comments: N/a

Distribution: Laboratory File / Kathryn Kinnear

Approved Signatory:

Name: M.Coffey
Function: Laboratory Manager
Date: 17.09.2017

LIQUIDLABSWA
CONSTRUCTION MATERIALS TESTING LABORATORY
UNIT 4, 96 BRIGG ST, WELSHPOOL, WA 6106 LIQUIDLABSWA.COM.AU

Falling Head Permeability Report		**Test Method: AS 1289.6.7.2**	
Client:	Bio Diverse Solutions	**Ticket No:**	S812
Project:	Lot 10 Chester Pass Rd & Lot 521 Mercer Road	**Report No:**	LLS17/2133 _2
Location:	Milpara, WA 6339	**Sample No:**	LLS17/2133
Sample ID:	TP3 400-1100mm (17G298)	**Issue Date:**	14-September-2017

Sampling Procedure: Tested as Received

Laboratory Moisture Ratio (%)	100.5
Laboratory Density Ratio (%)	95.0
Compactive Effort	Modified
Surcharge (kPa)	3
% Retained on 19mm Sieve	0
Coefficient of Permeability (m / sec)	$4.1 \times 10^{(-8)}$

Client Address: 5a 209 Chester Pass Road, Albany WA 6330

Comments: MMDD and OMC Values supplied by Great Southern Geotechnics

NATA WORLD RECOGNISED ACCREDITATION

Accredited for Compliance with ISO/IEC 17025 - Testing
Accreditation No. 19872

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Approved Signature:
Name: Matt van Herk
Function: Laboratory Manager
Date: 14-September-2017

LIQUIDLABSWA
CONSTRUCTION MATERIALS TESTING LABORATORY
UNIT 4, 96 BRIGG ST, WELSHPOOL, WA 6106 LIQUIDLABSWA.COM.AU

Falling Head Permeability Report		**Test Method: AS 1289.6.7.2**	
Client:	Bio Diverse Solutions	**Ticket No:**	S812
Project:	Lot 10 Chester Pass Rd & Lot 521 Mercer Road	**Report No:**	LLS17/2134 _2
Location:	Milpara, WA 6339	**Sample No:**	LLS17/2134
Sample ID:	TP10 400-2300mm (17G299)	**Issue Date:**	14-September-2017

Sampling Procedure: Tested as Received

Laboratory Moisture Ratio (%)	98.5
Laboratory Density Ratio (%)	95.0
Compactive Effort	Modified
Surcharge (kPa)	3
% Retained on 19mm Sieve	0
Coefficient of Permeability (m / sec)	1.8×10^{-8}

Client Address: 5a 209 Chester Pass Road, Albany WA 6330

Comments: MMDD and OMC Values supplied by Great Southern Geotechnics

NATA WORLD RECOGNISED ACCREDITATION

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Approved Signature:
Name: Matt van Herk
Function: Laboratory Manager
Date: 14-September-2017

Appendix C

Phosphorous Retention Index Test Results (CSBP Laboratory, 2017)

Customer Bio Diverse Solutions
Job Chiquita Burgers
Date Rec'd 1/09/2017

Lab Number	Name	Code	Customer	Depth	Phosphorus Retention Index
2ZS17085	Test Pit 3	01/09/17	Bio Diverse Solutions	40-110	2387.4
2ZS17086	Test Pit 6	01/09/17	Bio Diverse Solutions	20-70	0.8
2ZS17087	Test Pit 10	01/09/17	Bio Diverse Solutions	40-230	608.0
2ZS17088	Test Pit 1	01/09/17	Bio Diverse Solutions	20-90	2414.5

ATTACHMENT 4

Chester Pass Road

Terry Road

Henry Street

942

Lot 10

R5-R10

R5-R10

R30-R60

R20-R30

Lot 521

R15-R30

R20-R30

Mercer Road

Range Road

Talyuberlup Way

Mason Rd

Mason Rd

Google

REPORT ITEM DIS 165 REFERS

LOCAL STRUCTURE PLAN

Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

LEGEND

- Local Structure Plan Boundary
- Integrator Arterial Road
- Neighbourhood Connector Road
- Local Road
- Parks and Recreation
- Public Use - School
- Residential
- Drainage
- Light Industry Precinct A
- Light Industry Precinct B
- Community Purpose Site
- 200m Buffer to Sensitive Uses
- Emergency Access Way

REV	DESCRIPTION	YYMMDD
D	ADD EMERGENCY A. WAY.	171118
C	MINOR MODIFICATIONS	171023
B	MINOR MODIFICATIONS	171022
A	LOCAL STRUCTURE PLAN	171012

DRAWING NUMBER EP 170520 06 | REV D | SCALE 1:7500 SHEET A3

NORTH

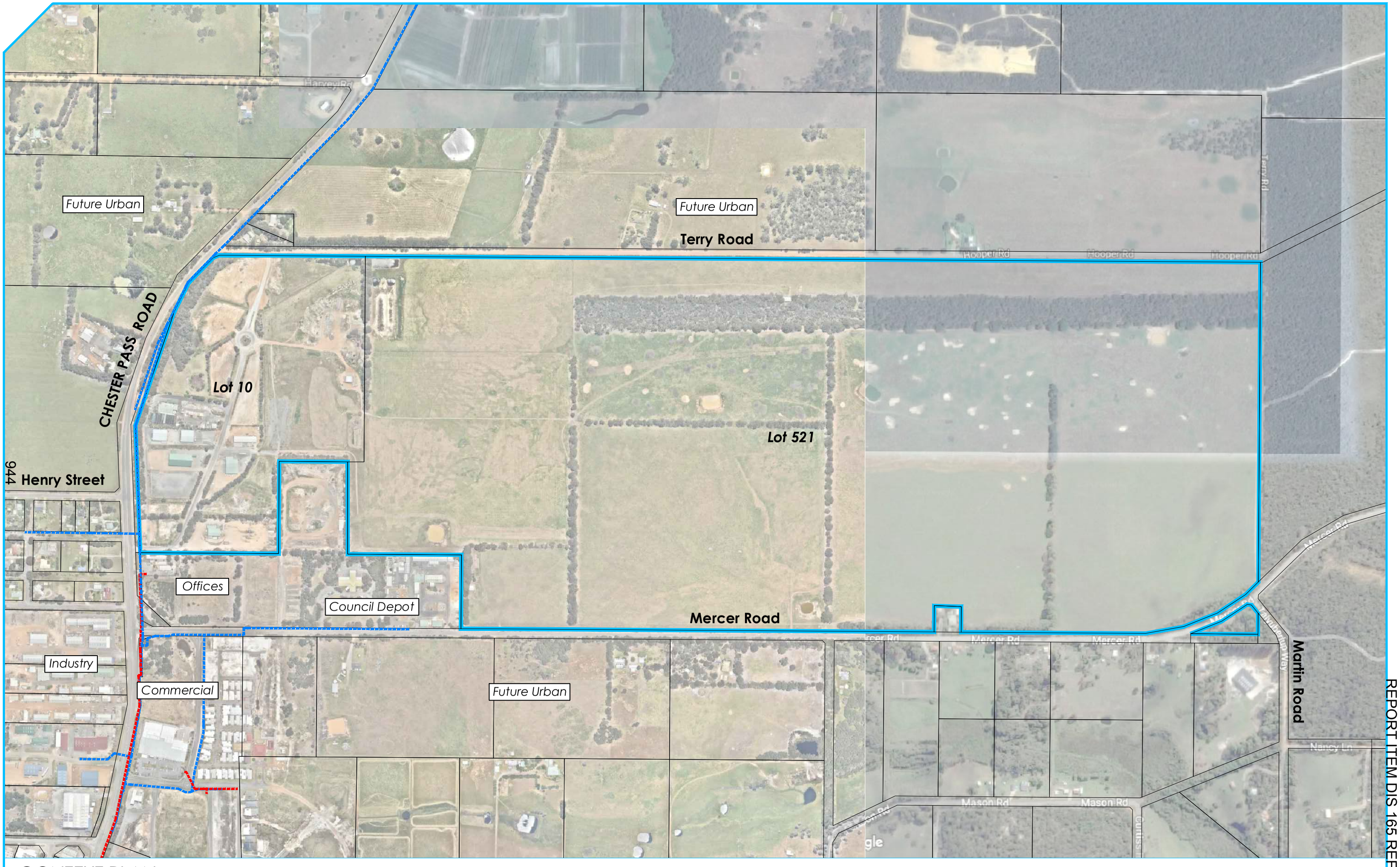
0 150 300m

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ALBANY WA 6330
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M: 0409 107 336

ATTACHMENT 5



CONTEXT PLAN
Lot 10 Chester Pass Road
and Lot 521 Mercer Road
Walmsley

Legend

- Structure Plan Boundary
- Existing Lot Boundary
- Existing u/ground Water Pipe
- Existing u/ground Sewer Pipe

SCALE 1:7500
SHEET A3

0 150 300m

NORTH

DRAWING NUMBER EP 170520 03 REV A

REV	DESCRIPTION	YYMMDD	DRAWN	APPRVD
A	CONTEXT PLAN	170522	SJ	ST

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REPORT ITEM DIS 165 REFERS

ATTACHMENT 6

Terry Road

Chester Pass Road

Lot 10

Lot 521

Henry Street

946

Mercer Road

Talyuberlup Way

REPORT ITEM DIS 165 REFERS

CONTEXT WATER INFORMATION
Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

LEGEND

- Subject Land
- Underground Water Pipe
- Seasonal Water Course / Living Stream
- Catchment Boundary
- Sub-catchment Boundary
- Moderate to High Risk Acid Sulphate Soils within 3m of Natural Soil Surface *(Department of Environmental Regulation 2015)*
- Waterlogging Risk 10-30% (Moderate - Very High Risk) *(Department of Agriculture and Food; Fisheries and Regional Development 2017)*
- Waterlogging Risk 50-70% (Moderate - Very High Risk) *(Department of Agriculture and Food; Fisheries and Regional Development 2017)*

REV	DESCRIPTION	YYMMDD
A	WATER INFORMATION	171121

NORTH

SCALE 1:7500
SHEET A3

0 150 300m

DRAWING NUMBER EP 170520 07

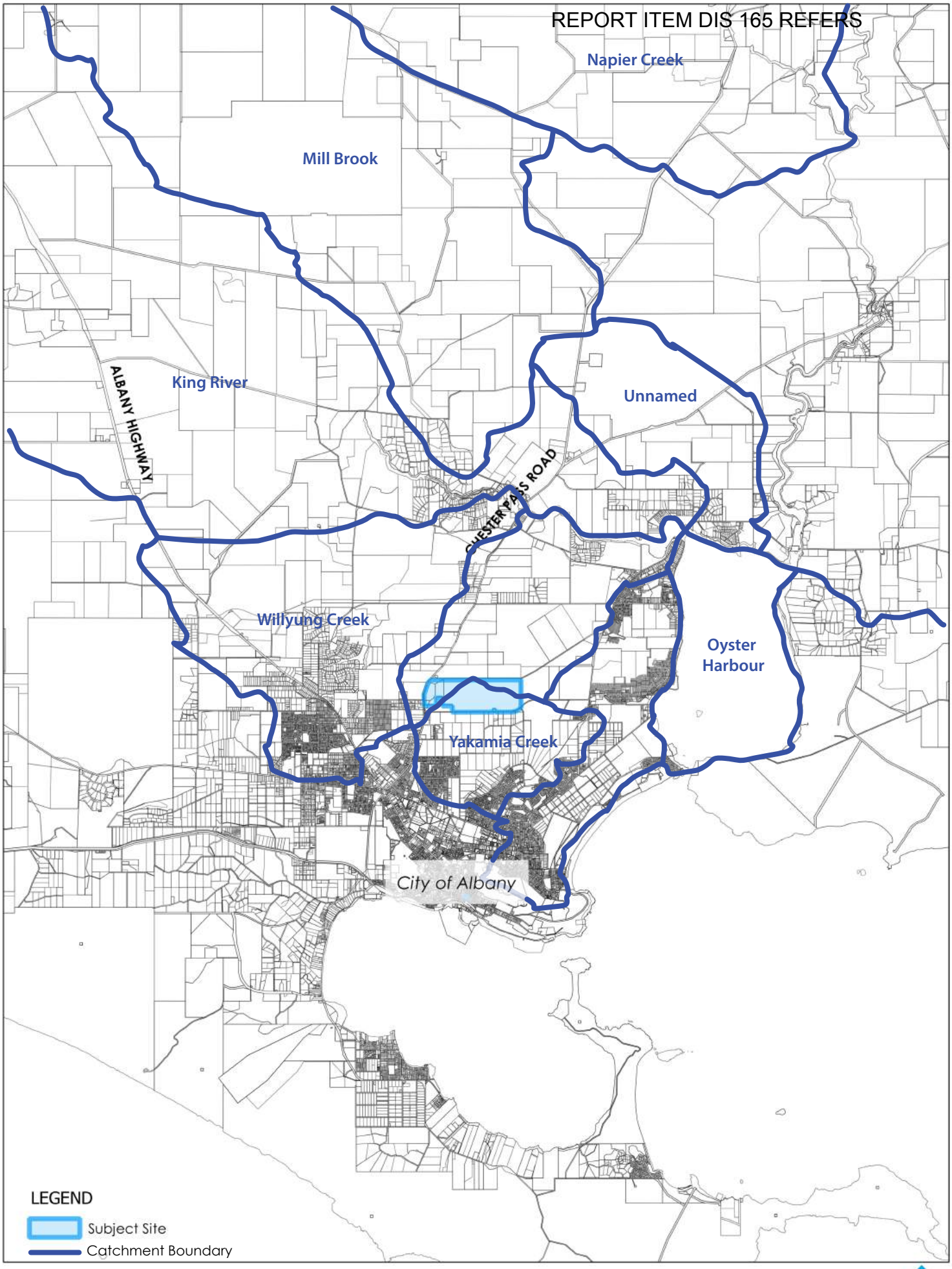
REV A

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ATTACHMENT 7



LOCATION AND CATCHMENTS

Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

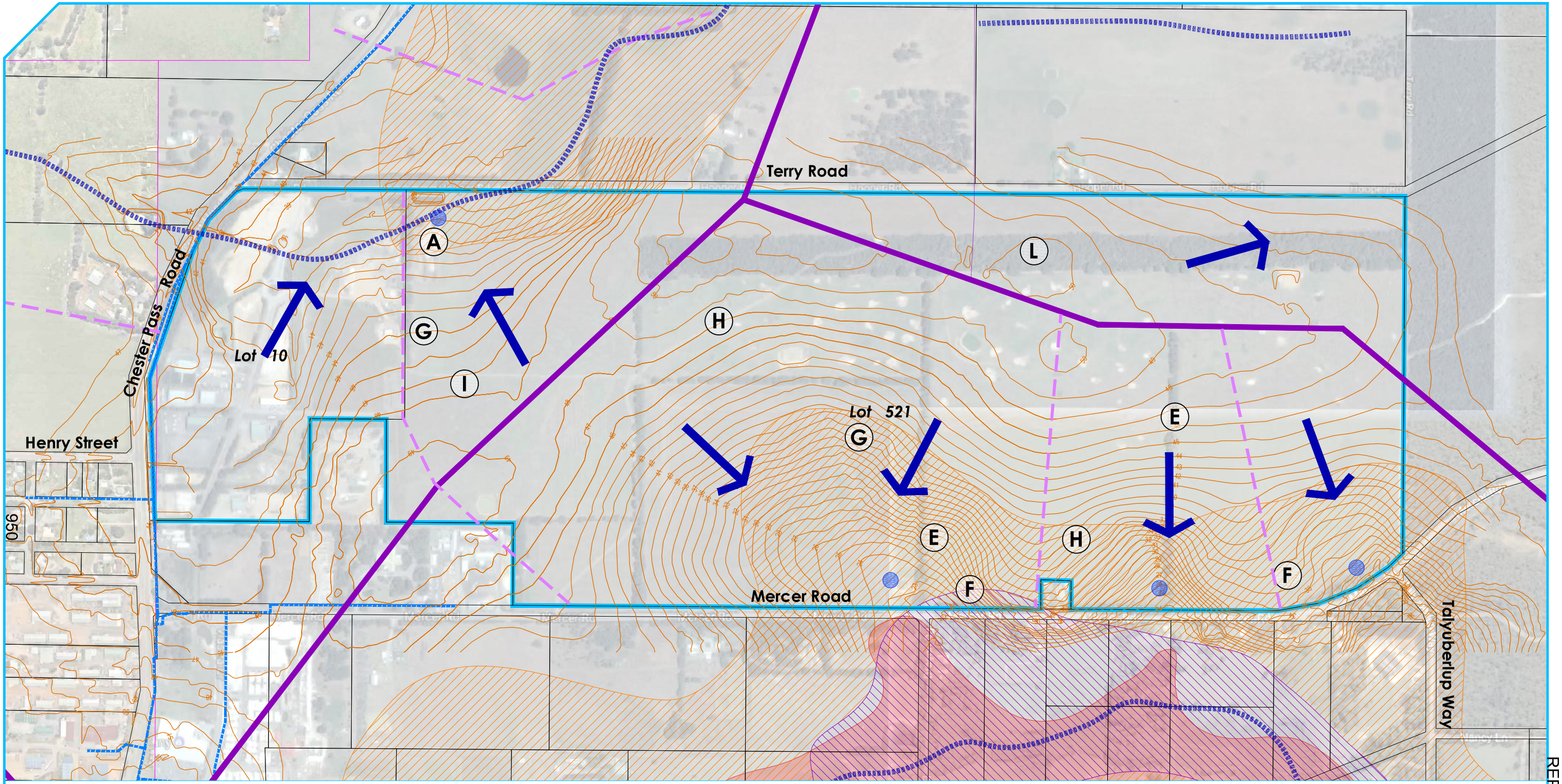
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1:150,000

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ATTACHMENT 8



(A) Undertake enhancement of the seasonal watercourse within the Structure Plan area to create a "living stream". Consider the preferred tenure and management of the seasonable watercourse at the subdivision stage.

(B) Adopt water sensitive urban design with post development flows to be as close as possible to the pre-development flow.

(C) Stormwater to be retained on lots for up to the 1 in 1 year, 1 hour ARI event. Support measures including rainwater tanks and soakwells.

(D) Stormwater run-off from roads to be designed to accommodate the 1 in 5 year ARI event through roadside bioretention swales with overflow in larger flood events directed to detention basins.

(E) Relevant roads to be designed to accommodate flood routes for a 1 in 100 ARI year event.

(F) At the detailed design stage, consider utilising stormwater for the irrigation of public open space and street trees.

(G) All lots to be connected to the reticulated water system.

(H) All residential lots to be connected to the reticulated sewerage system.

(I) Where industrial lots are 1 hectare or above, they will serviced with an approved method of effluent disposal.

(J) Buildings to be raised at least 0.3 metre above the ground level.

(K) Support an education strategy including the provision of information on Waterwise gardens and water-efficient appliances.

(L) Native vegetation to be conserved and incorporated into Public Open Space.

LEGEND

- Subject Land
- Contours
- Drainage Path
- Seasonal Water Course / Living Stream
- Indicative Detention Basin
- Catchment Boundary
- Sub-catchment Boundary
- Moderate to High Risk Acid Sulphate Soils within 3m of Natural Soil Surface *(Department of Environmental Regulation 2015)*
- Waterlogging Risk 10-30% (Moderate - Very High Risk) *(Department of Agriculture and Food; Fisheries and Regional Development 2017)*
- Waterlogging Risk 50-70% (Moderate - Very High Risk) *(Department of Agriculture and Food; Fisheries and Regional Development 2017)*

LOCAL WATER MANAGEMENT STRATEGY
Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

SCALE 1:7500
SHEET A3

NORTH 0 150 300m

REV	DESCRIPTION	YYMMDD
B	ADD F, MOD TO NOTE L	171118
A	LWMS	171006

DRAWING NUMBER EP 170520 05 REV B

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REPORT ITEM DIS 165 REFERS

APPENDIX 12

CONTRIBUTION PLAN: ARDESS-WALMSLEY LOCAL STRUCTURE PLAN

1. Background

1.1 The developer of Lot 10 Chester Pass Road, Walmsley and the developer of Lot 521 Mercer Road, Walmsley are largely responsible for subdivision works relating to their land based on Western Australian Planning Commission (WAPC) policies.

1.2 In accordance with *State Planning Policy 3.6 Development Contributions for Infrastructure* and other WAPC policies, some subdivision works (land contributions, infrastructure works and monetary contributions) adjoining the Structure Plan area and/or within Lot 521 Mercer Road are the responsibility of developers and/or landowners outside the *Ardess-Walmsley Local Structure Plan* area and/or are the responsibility of the City.

2. Contributions

2.1 The attached Contributions Plan provides the framework for key infrastructure, community facilities and land requirements (referred to as land contributions, infrastructure works and monetary contributions in SPP 3.6) to be provided by developers (also means subdividers) within the *Ardess-Walmsley Local Structure Plan* area, by developers and/or landowners outside the *Ardess-Walmsley Local Structure Plan* area and by the City.

2.2 The key contributions relate to:

i) Terry Road;
ii) Range Road;
iii) Mercer Road/Range Road intersection;
iv) Mercer Road/neighbourhood connector intersections;
v) primary school site; and
vi) public open space.

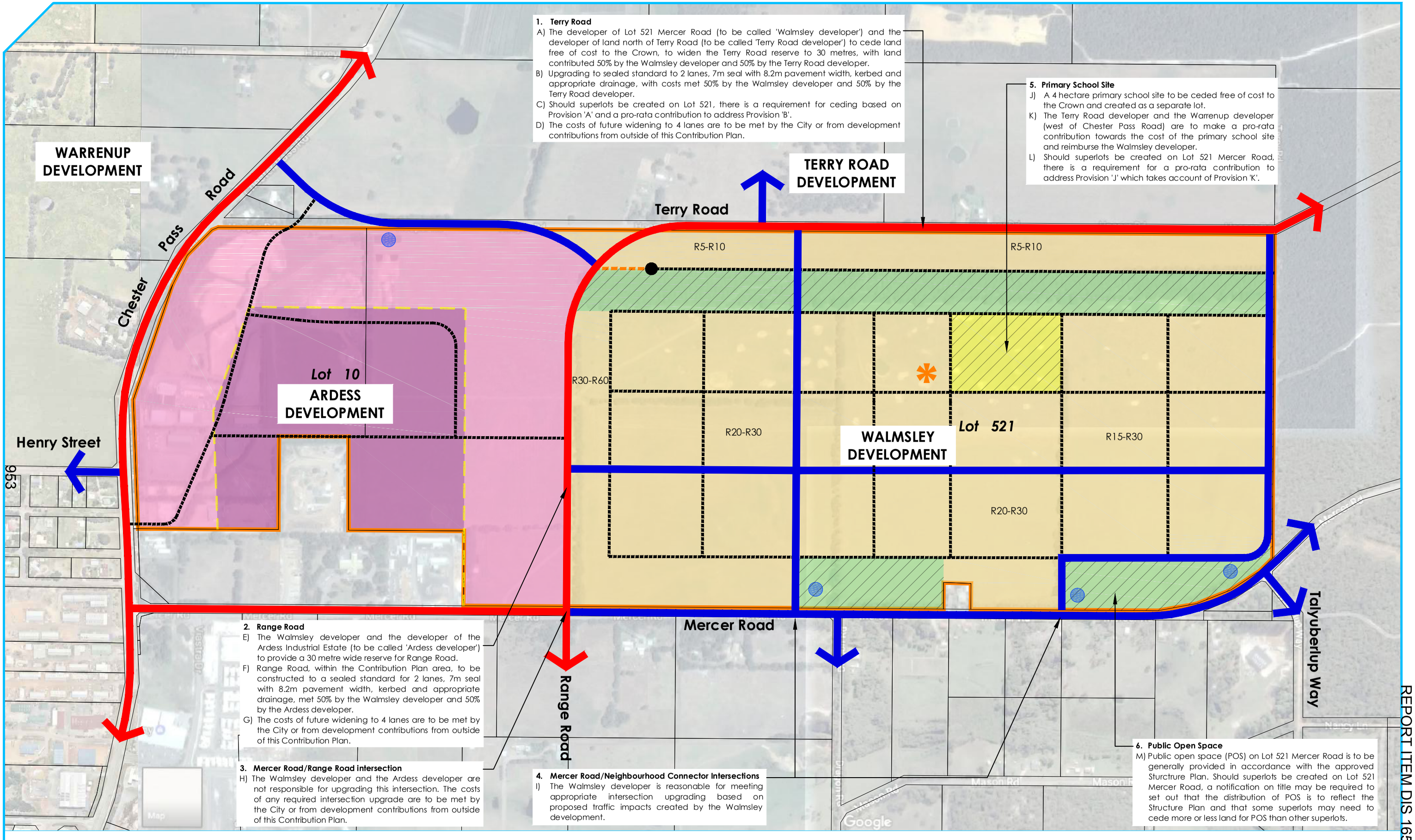
2.3 There will be separate consideration by the City regarding how it will fund the costs of future widening of Terry Road and Range Road to four (4) lanes within and adjoining the *Ardess-Walmsley Local Structure Plan* and how it will fund the Mercer Road/Range Road intersection construction/upgrading. This may require a separate Contribution Plan/s and/or Local Planning Policies relating to the full construction and implementation of extending Range Road/Terry Road between North Road, Albany and Lower King Road, Oyster Harbour.

3. Implementation

3.1 Developers should refer to section 7.1 of Part One - Implementation section of the *Ardess-Walmsley Local Structure Plan* for developer contribution responsibilities.

3.2 Implementation of the Structure Plan will be through application of the provisions of Part One - Implementation of the Structure Plan through scheme amendment, subdivision and/or development processes.

3.3 Based on section 2.3 above, the City may create separate planning guidance to facilitate funding and achieve suitable outcomes.



1. Terry Road

A) The developer of Lot 521 Mercer Road (to be called 'Walmsley developer') and the developer of land north of Terry Road (to be called 'Terry Road developer') to cede land free of cost to the Crown, to widen the Terry Road reserve to 30 metres, with land contributed 50% by the Walmsley developer and 50% by the Terry Road developer.

B) Upgrading to sealed standard to 2 lanes, 7m seal with 8.2m pavement width, kerbed and appropriate drainage, with costs met 50% by the Walmsley developer and 50% by the Terry Road developer.

C) Should superlots be created on Lot 521, there is a requirement for ceding based on Provision 'A' and a pro-rata contribution to address Provision 'B'.

D) The costs of future widening to 4 lanes are to be met by the City or from development contributions from outside of this Contribution Plan.

5. Primary School Site

J) A 4 hectare primary school site to be ceded free of cost to the Crown and created as a separate lot.

K) The Terry Road developer and the Warrenup developer (west of Chester Pass Road) are to make a pro-rata contribution towards the cost of the primary school site and reimburse the Walmsley developer.

L) Should superlots be created on Lot 521 Mercer Road, there is a requirement for a pro-rata contribution to address Provision 'J' which takes account of Provision 'K'.

2. Range Road

E) The Walmsley developer and the developer of the Ardess Industrial Estate (to be called 'Ardess developer') to provide a 30 metre wide reserve for Range Road.

F) Range Road, within the Contribution Plan area, to be constructed to a sealed standard for 2 lanes, 7m seal with 8.2m pavement width, kerbed and appropriate drainage, met 50% by the Walmsley developer and 50% by the Ardess developer.

G) The costs of future widening to 4 lanes are to be met by the City or from development contributions from outside of this Contribution Plan.

3. Mercer Road/Range Road intersection

H) The Walmsley developer and the Ardess developer are not responsible for upgrading this intersection. The costs of any required intersection upgrade are to be met by the City or from development contributions from outside of this Contribution Plan.

4. Mercer Road/Neighbourhood Connector Intersections

I) The Walmsley developer is reasonable for meeting appropriate intersection upgrading based on proposed traffic impacts created by the Walmsley development.

6. Public Open Space

M) Public open space (POS) on Lot 521 Mercer Road is to be generally provided in accordance with the approved Sturctrure Plan. Should superlots be created on Lot 521 Mercer Road, a notification on title may be required to set out that the distribution of POS is to reflect the Structure Plan and that some superlots may need to cede more or less land for POS than other superlots.

CONTRIBUTION PLAN

Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

LEGEND

- Contribution Plan Boundary
- Integrator Arterial Road
- Neighbourhood Connector Road
- Local Road
- Parks and Recreation
- Primary School
- Residential
- Drainage
- Light Industry Precinct A
- Light Industry Precinct B
- Community Purpose Site
- 200m Buffer to Sensitive Uses
- Emergency Access Way

REV	DESCRIPTION	YYMMDD
A	CONTRIBUTION PLAN	171205

DRAWING NUMBER EP 170520 06 REV A SCALE 1:7500 SHEET A3

NORTH

0 150 300m

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REPORT ITEM DIS 165 REFERS

WOOD & GRIEVE ENGINEERS

Ardess-Walmsley Local Structure Plan

Transport Impact Assessment

Prepared for:

10 Year Developments Pty Ltd

Prepared by:

David Trotter

Project No. 39605

P:\39605\PROJECT DOCUMENTATION\TRANSPORTATION ENGINEERING\TRANSPORTATION REPORTS\TR-RE-005.DOCX

Date:
19 March 2019

Level 22, 570 Bourke Street, Melbourne VIC 3000
T: (03) 8554 7000 **E:** melbourne@wge.com.au **W:** www.wge.com.au

Revision

REVISION	DATE	COMMENT	PREPARED BY	APPROVED BY
A-Dr	02/11/18	DRAFT	David Trotter	James Brownlie
A	30/11/18	FINAL	David Trotter	James Brownlie
B	19/03/19	REVISED FINAL – INCORPORATING MRWA & COUNCIL COMMENTS	David Trotter	James Brownlie



James Brownlie
For and on behalf of
Wood & Grieve Engineers

Contents

EXECUTIVE SUMMARY		1
1.	DEVELOPMENT PROPOSAL	2
1.1	Introduction	2
1.2	Structure Plan Proposal	2
1.3	Internal Road Network	5
1.4	Purpose	6
2.	EXISTING CONDITIONS	7
2.1	Subject Site	7
2.2	Road Network	8
2.3	Sustainable Transport	11
2.4	Warrenup / Walmsley Local Structure Plan	11
3.	TRAFFIC CONSIDERATIONS	13
3.1	Methodology	13
3.2	Land Use	13
3.3	Traffic Generation	14
3.4	Site Generated	15
3.5	Post Development	16
3.6	Traffic Impact	18
3.7	Internal Road Network	20
3.8	Vehicle Access	20
3.9	Traffic Noise	21
4.	RECOMMENDATIONS	22
4.1	Midblock	22
4.2	Intersection	23
5.	CONCLUSION	25
APPENDIX A – ARDESS-WALMSLEY LOCAL STRUCTURE PLAN		26
APPENDIX B – TRAFFIC VOLUMES		27
APPENDIX C - SIDRA INTERSECTION RESULTS		35
APPENDIX D – ELECTRONIC SWEPT PATH ASSESSMENT		36

Executive Summary

The following outlines a Transport Impact Assessment (TIA) of the Ardess-Walmsley Local Structure Plan (LSP). The LSP encompasses the entirety of Lot 521, however, this report considers Lot 10 Chester Pass Road and the western section of Lot 521 Mercer Road in particular. Specifically, the development of the subject site as a light industry precinct and the impact of this development, including RAV's.

The report has been prepared to build upon and assess the difference between the current LSP proposal and that contemplated within a Transport Assessment (prepared by Opus, dated April 2016) as part of the Warrenup / Walmsley LSP. As such, an assessment of both the subject site (Lot 10 Chester Pass Road and the western section of Lot 521 Mercer Road) as well as the entire LSP area have been completed to provide a comparison with the previously prepared Opus assessment.

The LSP is anticipated to generate and add 2,451 and 2,528 vehicle movements to the external road network during the respective weekday AM and PM peak hours. This represents a decrease of 631 and 659 vehicle movements during the respective weekday AM and PM peak hours than that assessed within the Opus report. There will be more RAV's than that assessed within the Opus report, however, the surrounding roads and intersections have appropriate capacity to accommodate these movements, subject to the adoption of recommendations outlined within this report.

The traffic impact of the development proposal on the Chester Pass Road / Private Access Road intersection has been assessed using SIDRA INTERSECTION and is considered appropriate, including for additional RAV's, subject to the adoption of recommendations outlined within this report. The midblock capacities of the road network within the LSP are within acceptable limits, including allowance for RAV's, subject to the recommendations provided within this and the Opus reports.

Ultimately this report recommends the following additional recommendations, over and above those already presented within the Opus assessment:

- At the bend in the Private Access Road the following mitigating measures are recommended:
  - Trees on the inner radius of the bend in the Private Access Road be removed to allow for appropriate sight lines for oncoming traffic.
  - Provide additional shoulder width at the corner to allow for two opposing RAV's to pass each other simultaneously.
- Complete further analysis to confirm the likely future intersection treatment and timing / trigger point of the upgrade of the Chester Pass Road / Terry Road intersection and Chester Pass Road / Mercer Road intersections.
- Provide a right-turn entry and exit ban (through signage) to/from the Private Access Road via Chester Pass Road. The timing and implementation of these bans are subject to the development of the entire LSP area and subsequent increase in through traffic volumes on Chester Pass Road and provision of seagull style intersection treatments at surrounding intersections.

As outlined within the proceeding assessment and subject to adoption of the above recommendations, the traffic impacts of the development of the subject site (light industry precinct), including allowance for RAV's, are considered acceptable.

1. Development Proposal

1.1 Introduction

Wood & Grieve Engineers (WGE) have been commissioned by Ten Year Developments Pty Ltd to prepare a Transport Impact Assessment (TIA) as part of the Ardess-Walmsley Local Structure Plan (LSP). The LSP encompasses the entirety of Lot 521, however, this report considers Lot 10 Chester Pass Road and the western section of Lot 521 Mercer Road. The extents of the LSP as well as the surrounding lots are illustrated within Figure 1.1. It should be noted that an additional TIA will be prepared, pre-subdivision, for the balance of Lot 521 located to the east of Range Road.

This TIA is based upon the Local Structure Plan prepared by Edge Planning & Property, Drawing Number EP 17052006, Revision E, dated 15 May 2018, which is included within Appendix A.

The following outlines an assessment of the LSP in accordance with the recommended structure outlined within the Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines: Volume 2 – Planning Schemes, Structure Plans and Activity Centre Plans (August 2016).

The scope of the report was discussed within a meeting on Thursday 16 August 2018 between WGE, City of Albany, Main Roads WA (MRWA), The Applicant and Town Planner. Specifically, this report has been prepared to build upon and assess the difference between the current LSP proposal and that contemplated within a Transport Assessment (prepared by Opus, dated April 2016) as part of the Warrenup / Walmsley LSP. This report should be read in conjunction with the Opus report.

1.2 Structure Plan Proposal

This report has due consideration to the transport findings of the Opus report and builds upon these with respect to the LSP.

As discussed previously, this LSP incorporates Lot 10 Chester Pass Road and the western section of Lot 521 Mercer Road (refer to Figure 1.1 for context). Within this area, nominated as a light industry precinct, it is understood that this area could ultimately comprise in the order of 30 industrial lots. Based on the anticipated typology of these uses and advice provided by the project team, an industrial floor area of 500sq.m per lot has been assumed.

In order to provide context Table 1.1 has been prepared to summarise the assessed land uses and sizes.

LOT	USE	SIZE		
		OPUS REPORT [1]	THIS REPORT	DIFFERENCE
6	Residential	185 dwellings	185 dwellings	-
	Commercial	12,000 sq.m	12,000 sq.m	-
271	Residential	220 dwellings	220 dwellings	-
	Commercial	11,000 sq.m	11,000 sq.m	-
4925	Residential	285 dwellings	285 dwellings	-
5498	Residential	385 dwellings	385 dwellings	-
	Commercial	7,000 sq.m	7,000 sq.m	-
	Retail	2,000 sq.m (1,000 sq.m food and 1,000 sq.m non-food)	2,000 sq.m (1,000 sq.m food and 1,000 sq.m non-food)	-
10	Industrial	40,000sq.m	6,500 sq.m [2]	- 33,500 sq.m
521	Residential	1,480 dwellings [3]	1,251 dwellings [4]	- 229 dwellings
	Primary School	430 pupils	430 pupils	-
	Industrial	-	8,500 sq.m [5]	+ 8,500 sq.m
Total	**Residential**	**2,555 dwellings**	**2,326 dwellings**	**- 229 dwellings**
	Commercial	**18,000 sq.m**	**18,000 sq.m**	**-**

	Retail	**2,000 sq.m**	**2,000 sq.m**	-
	Primary School	**430 pupils**	**430 pupils**	-
	Industrial	**40,000 sq.m**	**15,000 sq.m**	**-25,000sq.m**

Table 1.1 – Development Schedule

[1] As per Opus Transport Assessment, dated April 2016. Industrial floor area assumed to be 50% of the site area.

[2] Total site are of approximately 26.5ha. Assumed to comprise 13 of the 30 total industrial lots. Assumed industrial floor area of 500sq.m per lot.

[3] Total site of Lot 152 is 152.62ha, excluding allowance for the Primary School, this roughly equates to a provision of 9.7 dwellings / ha[1].

[4] Assumes a residential land area of 129 ha, calculated as 152ha original site size minus 33ha of industrial area. Calculated as 9.7 dwellings / ha multiplied by the residential land area of 129 ha.

[5] Industrial site area approximately 33ha. Assumed to comprise 17 of the 30 total industrial lots. Assumed industrial floor area of 500sq.m per lot.

[1] It is understood that in reality that the 9.7 dwellings / ha includes public open space (POS) and includes remnant native vegetation proposed to be retained on Lot 521. Excluding POS and conserving remnant native vegetation, the estimated residential density is likely to be closer to 14 dwellings / ha. Notwithstanding, a density of 9.7 dwellings / ha has been adopted for this analysis.

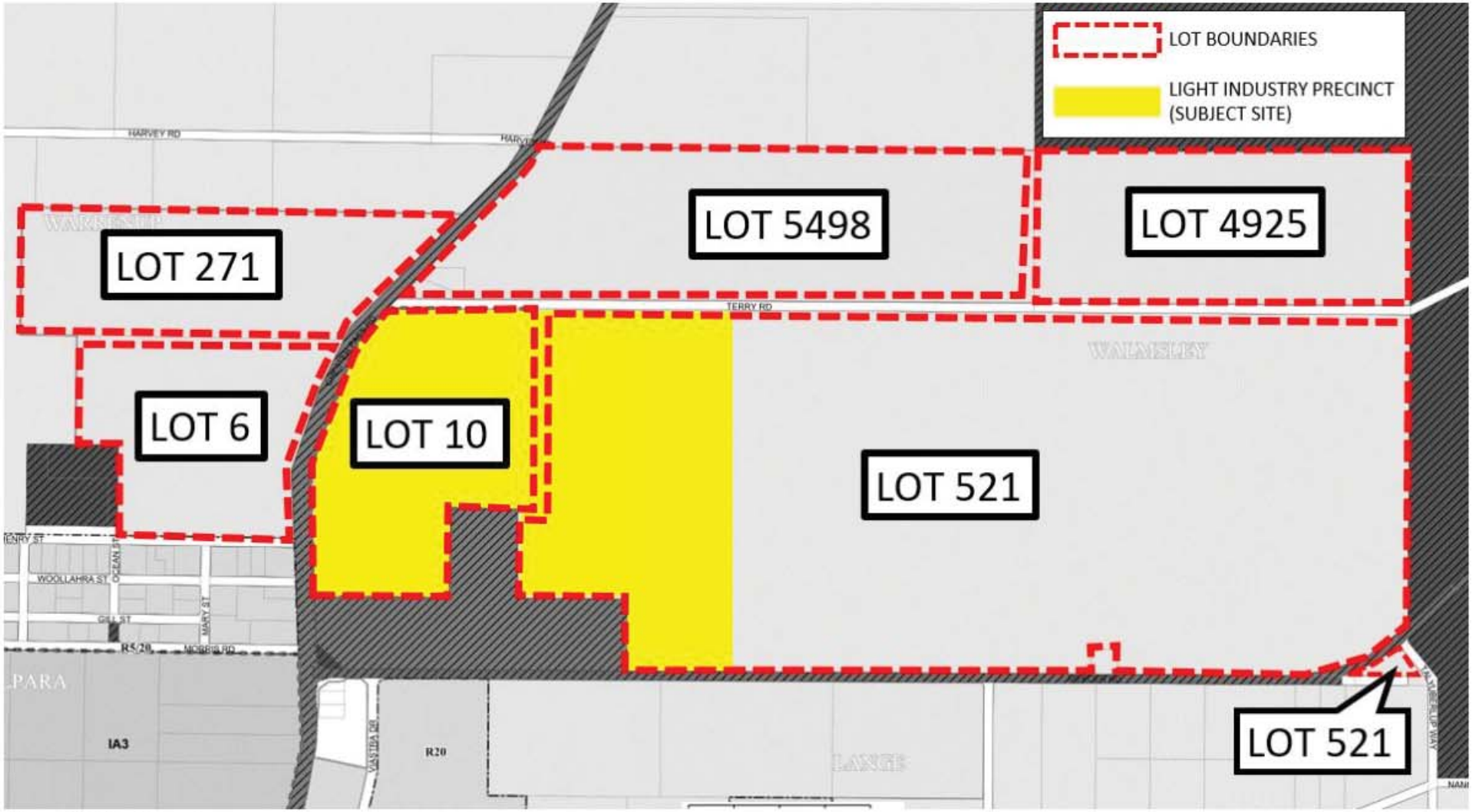


Figure 1.1: Site Context

(Source: Intra Maps – City of Albany)

1.3 Internal Road Network

The proposed internal road network is outlined within the Local Structure Plan, which is illustrated within Figure 1.2.

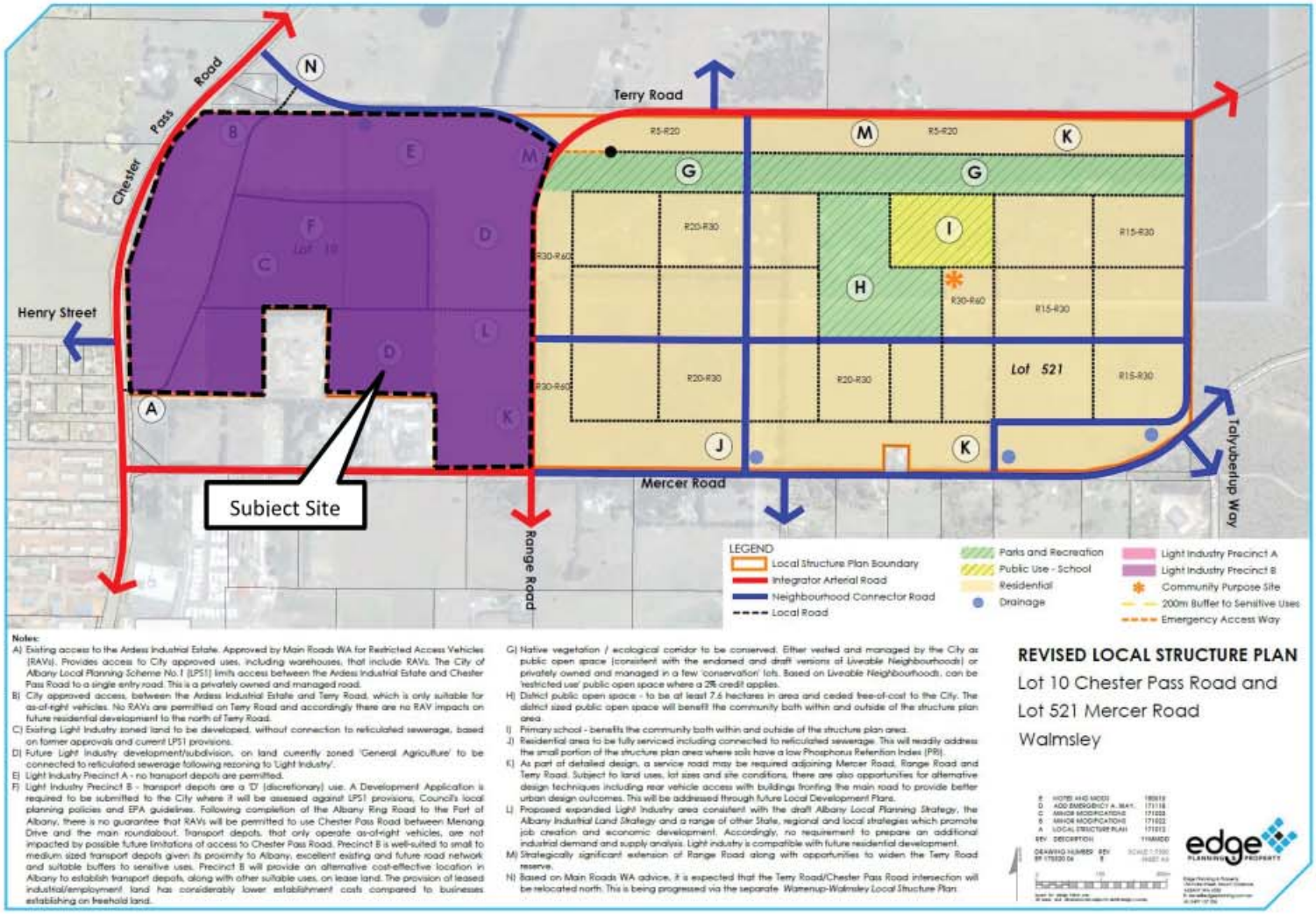


Figure 1.2: Local Structure Plan

(Source: Edge Planning & Property)

1.4 Purpose

This transport impact assessment provides an assessment of both internal and external links within the proposed LSP road network. The purpose of this assessment is to build upon the transport assessment prepared by Opus and to identify the proposed changes from the transport impacts identified within that report.

This report has been prepared in accordance with the recommended structure outlined within the 'Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines: Volume 2 – Planning Schemes, Structure Plans and Activity Centre Plans (August 2016)'. Specifically, this report focusses upon the following:

- Existing site and transport conditions
- Proposed land use types/sizes
- Internal and external road network and connections
- Anticipated traffic generation and distribution
- Traffic impact and associated recommended mitigating roadworks and treatments.

2. Existing Conditions

2.1 Subject Site

The subject site incorporates Lot 10 Chester Pass Road and the western section of Lot 521 Mercer Road and is generally bound by Chester Pass Road (west), Terry Road (north) and the City of Albany Works Depot / Mercer Road (south). The subject site is located approximately 5km north of the Albany CBD.

The LSP area (subject site) currently comprises a transport depot, industrial uses and various unoccupied land parcels. Surrounding land uses primarily comprise industrial uses to the south (fronting or in the immediate vicinity of Chester Pass Road), residential uses to the west and rural / park uses to the north and east of the site. The notable exception to this is Chester Pass Mall and the Harvey Norman tenancy, which are located south of the subject site. These retail land uses are major traffic attractors within the vicinity of the subject site.

The location of the subject site and the surrounding environs is shown in Figure 2.1 with the land zoning shown in Figure 2.2.

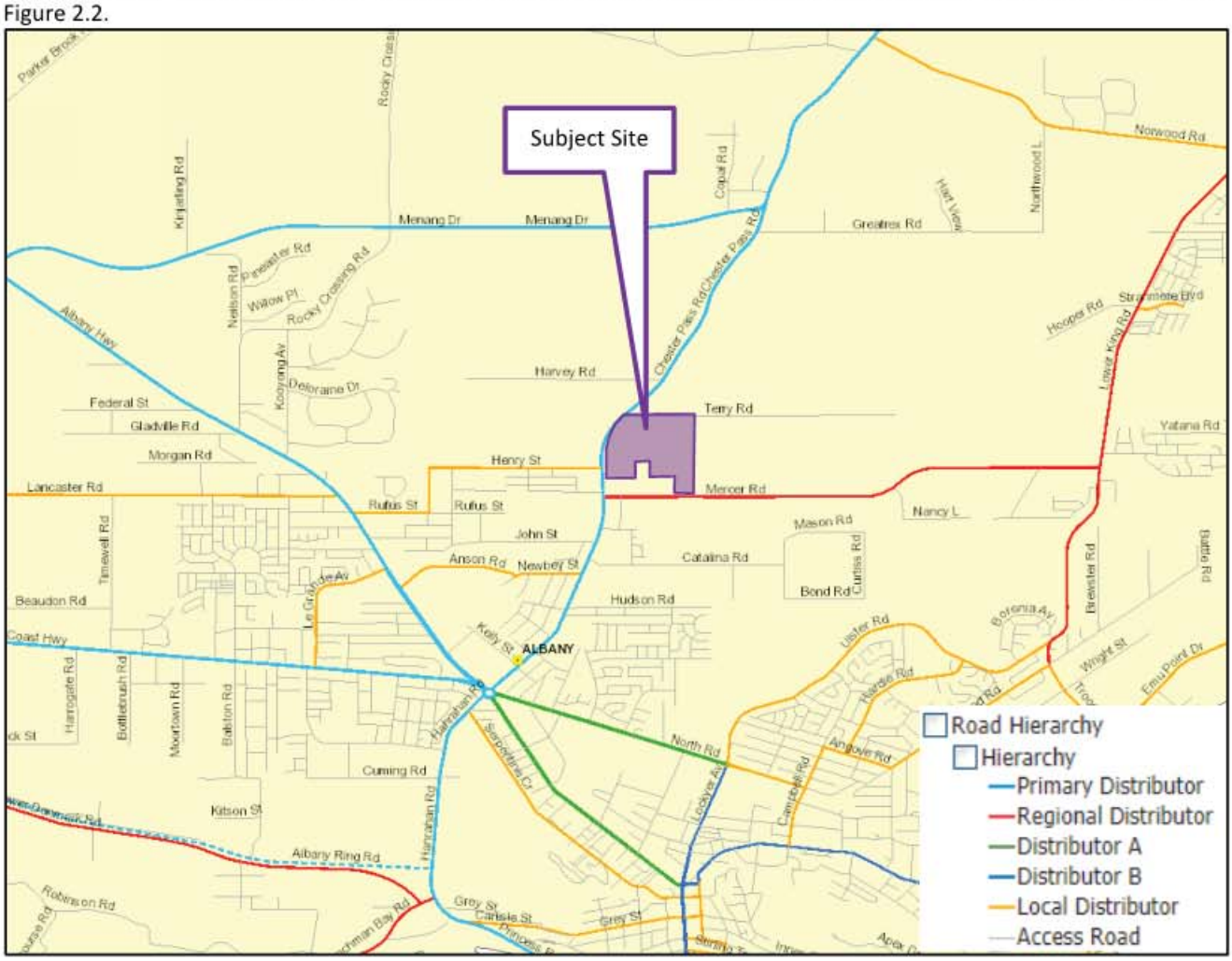


Figure 2.1: Surrounding Road Network & Environs

(Source: Main Roads WA)

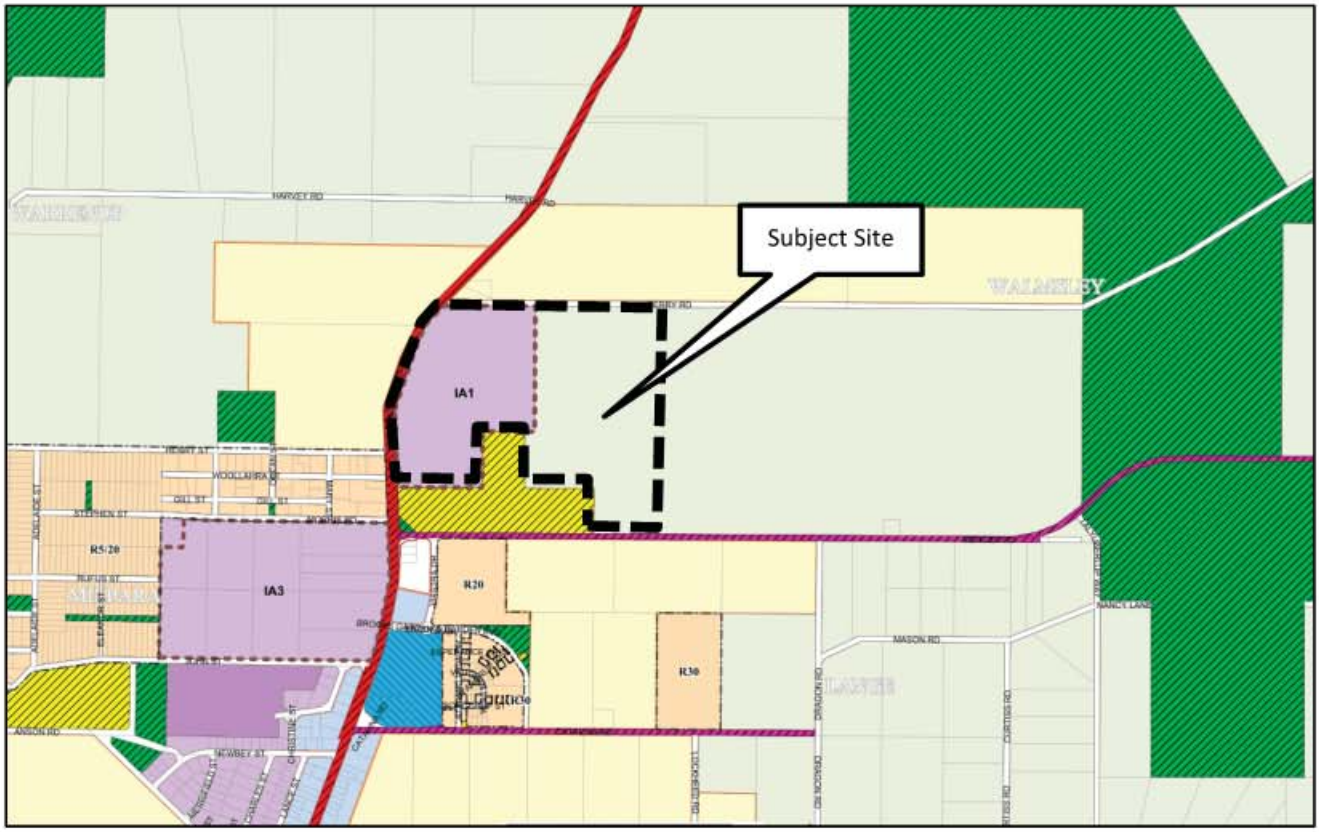


Figure 2.2: Land Zoning Map

(Source: IntraMaps)

2.2 Road Network

Chester Pass Road

Chester Pass Road functions as a primary distributor. It is generally aligned in a north-south direction and comprises two traffic lanes in each direction, separated by a painted median. The carriageway narrows to a single lane in each direction north of Henry Street.

Chester Pass Road is a permitted RAV (Restricted Access Vehicle) Network 7 route, allowing vehicles up to an including a prime mover, towing semi-trailer and b-double as well as a b-double towing a dog trailer (both up to 36.5m in length) to use the road.

Chester Pass Road carries in the order of 5,694 vehicles per day[2] and is shown within Figure 2.3.

[2] Main Roads WA Great Southern Traffic Digest 2009/10-2014/15, 2010/11 data (Location North of Mercer Road). The 2013/14 – 2018/19 Traffic Digest does not contain traffic data for this road segment, as such a 3% compound growth rate of 3% per year has been applied for 7 years to reflect anticipated 2017/18 traffic volumes.



Figure 2.3 – Chester Pass Road – Looking North

Mercer Road

Mercer Road functions as a Regional Distributor, generally aligned in an east-west direction and comprising a single traffic lane in each direction. Mercer Road provides a key road link between Chester Pass Road and Lower King Road.

Mercer Road carries in the order of 4,527 vehicles per day[3] and is shown within Figure 2.4.



Figure 2.4 – Mercer Road – Looking East

Terry Road

Terry Road functions as an Access Road and is aligned in an east-west direction. The road is unsealed and permits two-way traffic.

Terry Road carries in the order of 35 vehicles per day[4] and is shown within Figure 2.5.

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[3] Weekday average of pneumatic tube counts completed by the City of Albany from 2 October 2018 to 18 October 2018.

[4] Weekday average of pneumatic tube counts completed by the City of Albany from 19 October 2018 to 7 November 2018.



Figure 2.5 – Terry Road – Looking East

Private Access Road

A private access road is provided to the 'Ardess Estate' with a direct connection to Chester Pass Road as well as Terry Road. Based on observations it is understood that the connection to Chester Pass Road has a significantly higher utilisation than that to Terry Road.

The Private Access Road provides a single traffic lane in each direction with future RAV (Restricted Access Vehicle) Network 7 route status being sought for the road. The future RAV Network 7 status being sought would permit vehicles up to an including an Oversize Road Train to use the road, noting that RAV's are not permitted on Terry Road.

The Private Access Road carries approximately 725 vehicles per day[5] in the vicinity of Chester Pass Road and is shown within Figure 2.6. It is further noted that 5.3% of these recorded vehicles were Restricted Access Vehicles (all categories).



Figure 2.6 – Private Access Road – Looking East

[5] Weekday average of pneumatic tube counts completed by the City of Albany from 1 October 2018 to 18 October 2018.

2.3 Sustainable Transport

There is limited public transport and bicycle/walking paths within the vicinity of the site. There are shared paths surrounding the Chester Pass Mall to the south of the site and along the eastern side of Chester Pass Road. The broader sustainable transport infrastructure surrounding the subject site is shown within Figure 2.7.

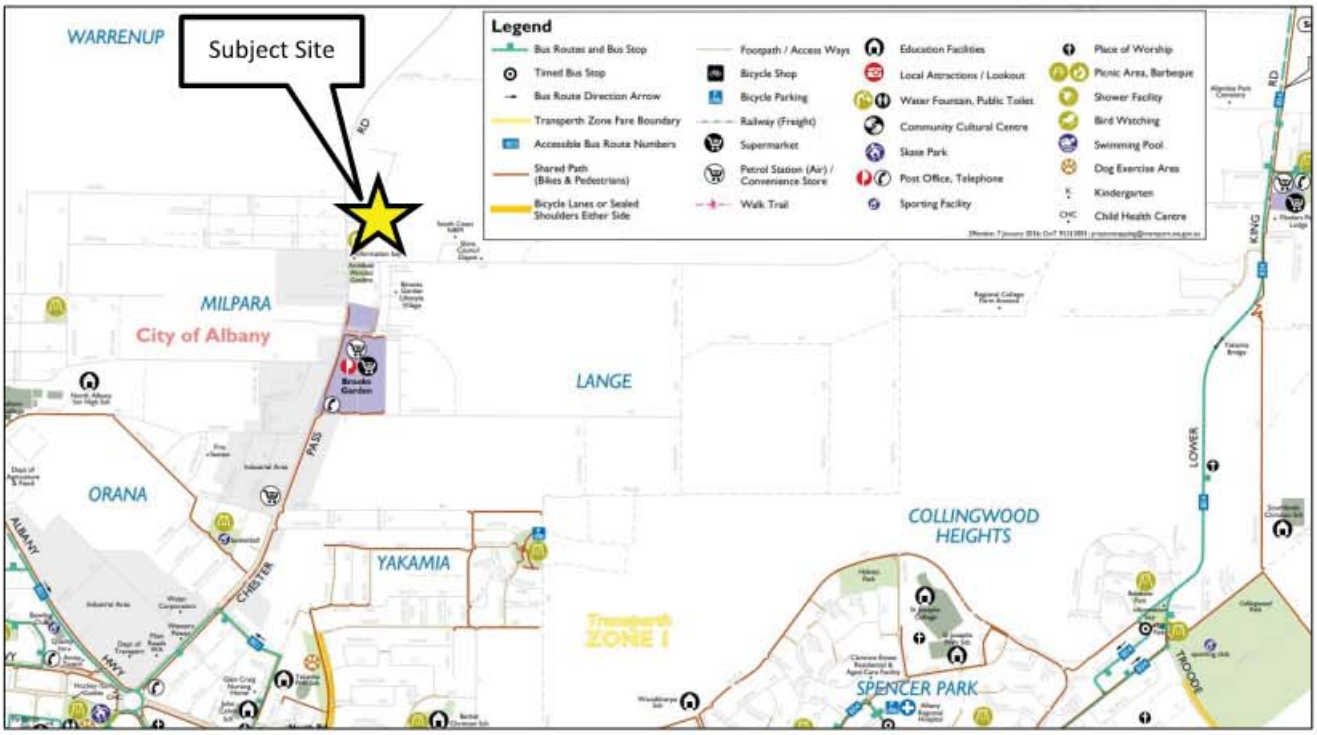


Figure 2.7 – Sustainable Transport Infrastructure

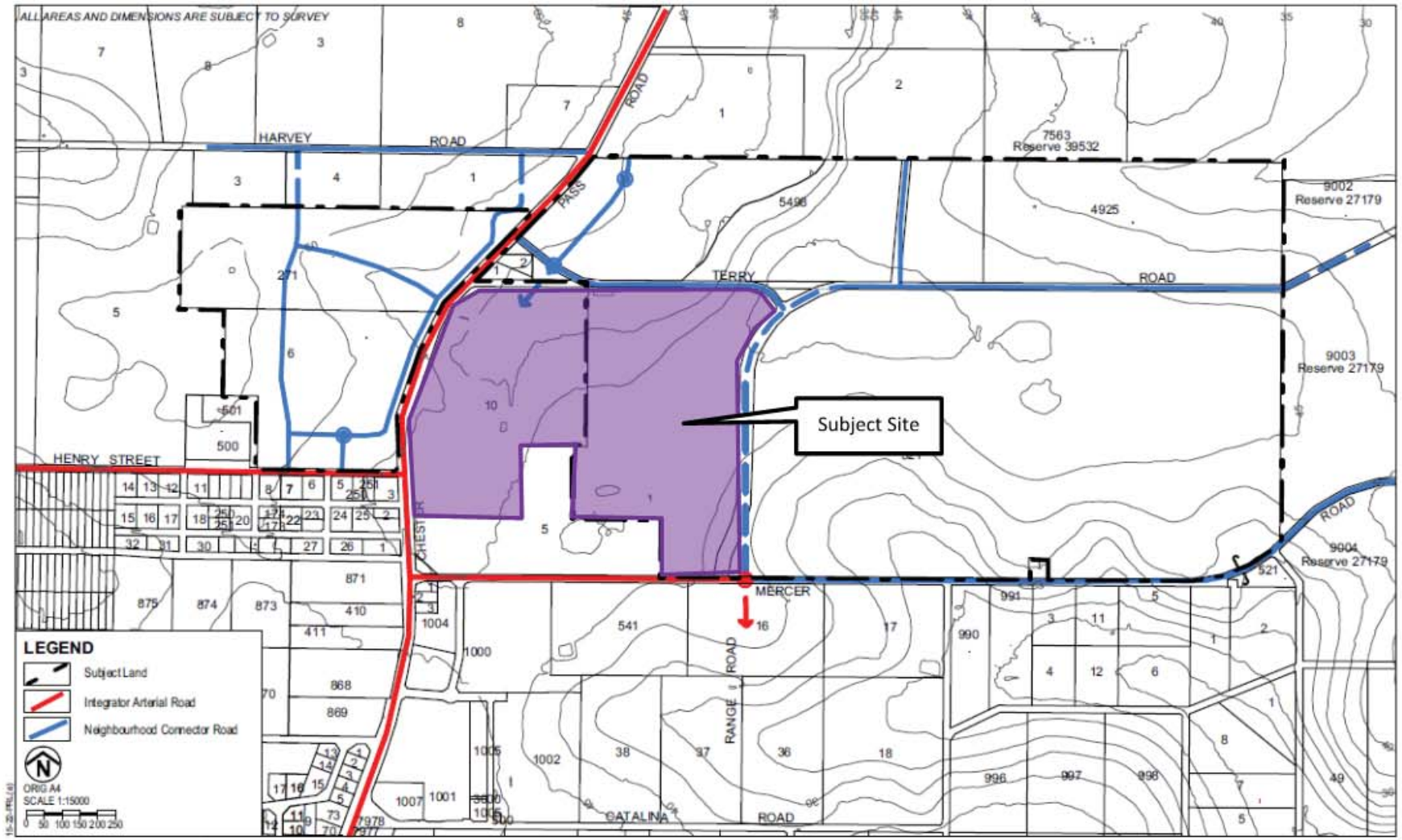
(Source: TravelSmart Map)

2.4 Warrenup / Walmsley Local Structure Plan

Ayton Baesjou Planning prepared the Warrenup / Walmsley Local Structure Plan. As discussed previously this LSP comprised a Transport Assessment, prepared by Opus, which provided the following key conclusions:

- Extension of the duplication of Chester Pass Road from Henry Street to Harvey Road;
- Provision for Chester Pass Road to be widened by 10 metres on either side.
- Retention of the Henry Street/Chester Pass Road and Chester Pass Road/Mercer Road intersections as opposed to linking Henry Street directly to Mercer Road with a four-way intersection or roundabout;
- No new points of access permitted onto Chester Pass Road with potential provision for seagull style T intersections at Henry Street and Harvey Road to allow right turning movements as well as from the realigned Terry Road intersection.
- An extension of Range Road to provide an alternative north-south route to Chester Pass Road;
- Limited access to/from Mercer Road to the east of Range Road;
- Provision of an internal service road on the western side of Chester Pass Road between Henry Street and Harvey Road to accommodate traffic serving the proposed future mixed use/commercial area;
- Provision for on and off-road cycle infrastructure within the site and opportunities to improve safety of cyclists on Chester Pass Road;
- Provision of footpaths from residential areas to school and future commercial/retail precincts, including a suitable connection across Chester Pass Road to access the Local Centre;
- Plan for provision of bus services and bus stops within the development.

Based on the Opus assessment a transport network plan was prepared which is illustrated within Figure 2.8.



AYTON BAESJOU PLANNING
59 Peels Place
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PRIMARY ROAD LAYOUT
Lots 4925 & 5498 Terry Road, Lot 521 Mercer Road
& Lots 1, 2, 6 & 271 Chester Pass Road
Warrenup/Walmsley, City of Albany

Figure 2.8 – Proposed Road Network - Warrenup / Walmsley Local Structure Plan

(Source: Figure 10 - Warrenup / Walmsley Local Structure Plan)

3. Traffic Considerations

3.1 Methodology

As described earlier within this report, this assessment builds upon the assessment already prepared by Opus as part of the Warrenup / Walmsley Local Structure Plan (LSP).

The following traffic assessment is generally based upon the assumptions and methodology outlined within the Opus report and has been prepared to provide updated traffic volumes, and hence findings, with respect to traffic considerations based on the revised land uses.

As noted within the Opus report any recommendations made may need to be revised following the development of the Yakamia/Lange Structure Plan as well as the finalisation of the Albany Transport Model by MRWA.

3.2 Land Use

The proposed land uses and their size as part of the Warrenup/Walmsley LSP along with the refinements set out in the Ardess/Walmsley LSP for Lot 10 and the western section of Lot 521 are nominated within Table 3.1.

LOT	USE	SIZE
6	Residential	185 dwellings
	Commercial	12,000 sq.m
271	Residential	220 dwellings
	Commercial	11,000 sq.m
4925	Residential	285 dwellings
5498	Residential	385 dwellings
	Commercial	7,000 sq.m
	Retail	2,000 sq.m (1,000 sq.m food and 1,000 sq.m non-food)
10	Industrial	6,500 sq.m [1]
521	Residential	1,251 dwellings [2]
	Primary School	430 pupils
	Industrial	8,500 sq.m [3]
Total	**Residential**	**2,326 dwellings**
	Commercial	**18,000 sq.m**
	Retail	**2,000 sq.m**
	Primary School	**430 pupils**
	Industrial	**15,000 sq.m**

[1] Total site area of approximately 26.5ha. Assumed to comprise 13 of the 30 total industrial lots. Assumed industrial floor area of 500sq.m per lot.
[2] Assumes a residential land area of 129 ha, calculated as 152ha original site size minus 33ha of industrial area. Calculated as 9.7 dwellings / ha multiplied by the residential land area of 129 ha[6].
[3] Industrial site area approximately 33ha. Assumed to comprise 17 of the 30 total industrial lots. Assumed industrial floor area of 500sq.m per lot.

Table 3.1 – Development Schedule

[6] It is understood that in reality that the 9.7 dwellings / ha includes public open space (POS) and includes remnant native vegetation proposed to be retained on Lot 521. Excluding POS and conserving remnant native vegetation, the estimated residential density is likely to be closer to 14 dwellings / ha. Notwithstanding, a density of 9.7 dwellings / ha has been adopted for this analysis.

3.3 Traffic Generation

Traffic generation rates are derived from the WAPC Transport Assessment guidelines for Developments: Volume 2 – Structure Plans as per the Opus report.

The Opus report assumes that 25% of traffic associated with non-residential uses is assumed to be internal to the LSP network. The Opus report separated this traffic out, however, ultimately added these volumes into calculations to provide an overtly conservative assessment.

For the purposes of this assessment a 25% reduction has been applied to non-residential traffic generation rates to allow for this internal traffic and to avoid 'double counting', that is, avoid counting internal movements within both residential and non-residential traffic generation rates).

As such, adopted traffic generation rates are nominated within Table 3.2 that include a 25% reduction for non-residential uses.

LAND USE	UNIT	AM PEAK HOUR TRIP RATE		PM PEAK HOUR TRIP RATE	
		IN	OUT	IN	OUT
Residential	Dwellings	0.15	0.45	0.38	0.23
School	Pupils	0.5	0.5	0.5	0.5
Commercial [1]	100sq.m GFA	1.2	0.3	0.3	1.2
Retail [1] [2]	100sq.m GFA	1.13	0.28	2.63	2.63
Industrial [1]	100sq.m GFA	0.6	0.15	0.15	0.6

*GFA = Gross Floor Area

[1] Traffic generation rates from the 'WAPC Transport Assessment guidelines for Developments: Volume 2 – Structure Plans' have been reduced by 25% to avoid 'double counting' as per outlined methodology.

[2] Retail includes food and non-food tenancies, with the former having a higher traffic generation rate. For the purposes of this assessment the midpoint has been selected with retail land uses within the LSP assumed to have a 50/50 split of food and non-food retail tenancies.

Table 3.2 – Traffic Generation Rates

3.3.1 Existing Conditions

WGE sourced traffic volume information for key surrounding roads from the following sources:

- **Chester Pass Road** - Main Roads WA Great Southern Traffic Digest 2009/10-2014/15, 2010/11 data (Location North of Mercer Road). A compound growth rate of 3% per year has been applied for 7 years to reflect anticipated 2017/18 traffic volumes. Assumed 8% peak-to-daily ratio and a 40/60 (AM) and 50/50 (PM) north/south directional split.
- **Mercer Road** - Weekday average of peak hour pneumatic tube counts completed by the City of Albany from 2 October 2018 to 18 October 2018. Assumed 50/50 east/west directional split.
- **Private Access Road** - Weekday average of peak hour pneumatic tube counts completed by the City of Albany from 1 October 2018 to 18 October 2018. Assumed 80/20 (AM) and 20/80 (PM) directional split.
- **Terry Road** – Weekday average of peak hour pneumatic tube counts completed by the City of Albany from 19 October 2018 to 7 November 2018. Assumed 80/20 (AM) and 20/80 (PM) directional split.

No existing traffic volume information is available for Henry Street and Harvey Road. The existing traffic volume has been assumed as zero, consistent with the Opus report. It is noted that negligible existing traffic is assumed within Harvey Road with Henry Street expected to have moderate existing traffic volumes given the number of abutting properties and surrounding road network.

Importantly it is noted that the assessment outlines within this report determines that less traffic is expected to utilise Henry Street and Harvey Road, compared with that outlined within the Opus report. As such, the absence of existing traffic data for Henry Street and Harvey Road is considered appropriate in the context of this report.

Based on these traffic counts the derived 2018 AM and PM existing peak hour traffic volumes are shown within Appendix B.

3.3.2 Base Case

The Base Case outlines a future scenario, which excludes the development proposal but includes future traffic growth in the area.

A compound growth factor of 3% has been added to the existing traffic volumes on Chester Pass Road and Mercer Road, but not the Private Access Road and Terry Road as traffic counts were completed in 2018. Traffic volumes have been factored to reflect a 2031 design year with the base case AM and PM peak hour traffic volumes shown in Appendix B. A 2031 design year was nominated within the Opus report as the development of the precinct may take 10-15 years.

3.4 Site Generated

3.4.1 Traffic Distributions

The following directional distribution distributions of traffic to/from the site have been assumed:

General

- 100% of site generated traffic, via Chester Pass Road, occurs to/from the south.
- 25% of traffic associated with non-residential uses assumed to be internal to the LSP network. For the purposes of this assessment a 25% reduction has been applied to non-residential traffic generation to allow for this internal traffic and to avoid 'double counting', that is, avoid counting internal movements which are considered within both residential and non-residential traffic generation rates.
- All traffic to/from the south via either Chester Pass Road or the Range Road extension.

Lots 6 & 271

- Chester Pass Road via Harvey Road – 50%
- Chester Pass Road via Henry Street – 50%

Lot 521

- Chester Pass Road via Mercer Road – 50%
- Range Road Extension – 50%

Lots 4925 & 5498

- Chester Pass Road via Terry Road – 50%
- Range Road Extension – 50%

Subject Site

- Chester Pass Road via Private Access Road – 65%
- Chester Pass Road via Terry Road – 10%
- Range Road Extension – 25%

3.4.2 Traffic Volumes

Site Generated

Based on the traffic generation rates outlined within Table 3.2; Table 3.3 has been prepared to show the anticipated site generated traffic volumes. These volumes are also illustrated within Appendix B.

LOCATION	LAND USE	SIZE	AM PEAK HOUR		PM PEAK HOUR	
			IN	OUT	IN	OUT
Subject Site	Industrial	15,000 sq.m	90 vph	23 vph	23 vph	90 vph
Lot 6	Residential	185 dwellings	37 vph	111 vph	93 vph	56 vph
	Commercial	12,000 sq.m	144 vph	36 vph	36 vph	144 vph
Lot 271	Residential	220 dwellings	44 vph	132 vph	110 vph	66 vph
	Commercial	11,000 sq.m	132 vph	33 vph	33 vph	132 vph
Lots 6 & 271 (Sub-Total)			357 vph	312 vph	272 vph	398 vph
Lot 521	Residential	1,251 dwellings	250 vph	751 vph	626 vph	375 vph

Lot 4925	Residential	285 dwellings	57 vph	171 vph	143 vph	86 vph
Lot 5498	Residential	385 dwellings	77 vph	231 vph	193 vph	116 vph
	Commercial	7,000 sq.m	84 vph	21 vph	21 vph	84 vph
	Retail	2,000 sq.m	23 vph	6 vph	53 vph	53 vph
Lots 4925 & 5498 (Sub-Total)			241 vph	429 vph	409 vph	338 vph
Total			**938 vph**	**1,514 vph**	**1,328 vph**	**1,200 vph**
Lot 521	Primary School [1]	430 pupils	215 vph	215 vph	215 vph	215 vph

*vph = vehicles per hour

[1] All traffic assumed to be internal to the road network.

Table 3.3 – Traffic Generation

Traffic Volume Comparison

Table 3.4 has been prepared to provide a comparison of the site generated traffic volumes on the external road network that are assessed within this and the Opus assessment.

	AM PEAK HOUR			PM PEAK HOUR		
ASSESSMENT [1]	IN	OUT	TOTAL	IN	OUT	TOTAL
WGE	938 vph	1514 vph	2,451 vph	1,328 vph	1,200 vph	2,528 vph
Opus	1,341 vph	1,741 vph	3,082 vph	1,549 vph	1,638 vph	3,187 vph
Difference	**-403 vph**	**-227 vph**	**-631 vph**	**-221 vph**	**-438 vph**	**-659 vph**

[1] Excludes all traffic associated with the Primary School.

Table 3.4 – Traffic Generation Comparison

As shown within Table 3.4 the revised LSP proposal is anticipated to generate some 631 and 659 fewer vehicle movements to the external road network than that assessed within the previously prepared Opus assessment. This reduction in anticipated traffic volumes is based upon the following:

- Reduction in the assumed floor area of the 'industrial area'.
- Reduction in the number of dwellings within Lot 521 (WGE), nominated as Lot 392 (Opus).
- WGE assessment does not include internal traffic volumes within the external traffic generation and distribution and applies a 25% reduction in non-residential traffic generation to account for this and to avoid 'double counting'. This double counting is included within the Opus assessment, with the exception of the primary school traffic, which is not included within the external analysis for either assessment.

3.5 Post Development

Post development traffic volumes have been derived by adding the site generated traffic volumes to the base case traffic volumes. The post development AM and PM peak hour traffic volumes, for both this assessment and the Opus assessment are shown within Appendix B.

Based on this, Figure 3.1 and Figure 3.2 have been prepared to provide a comparison of the volumes outlined within this report (WGE) and the Opus assessment.

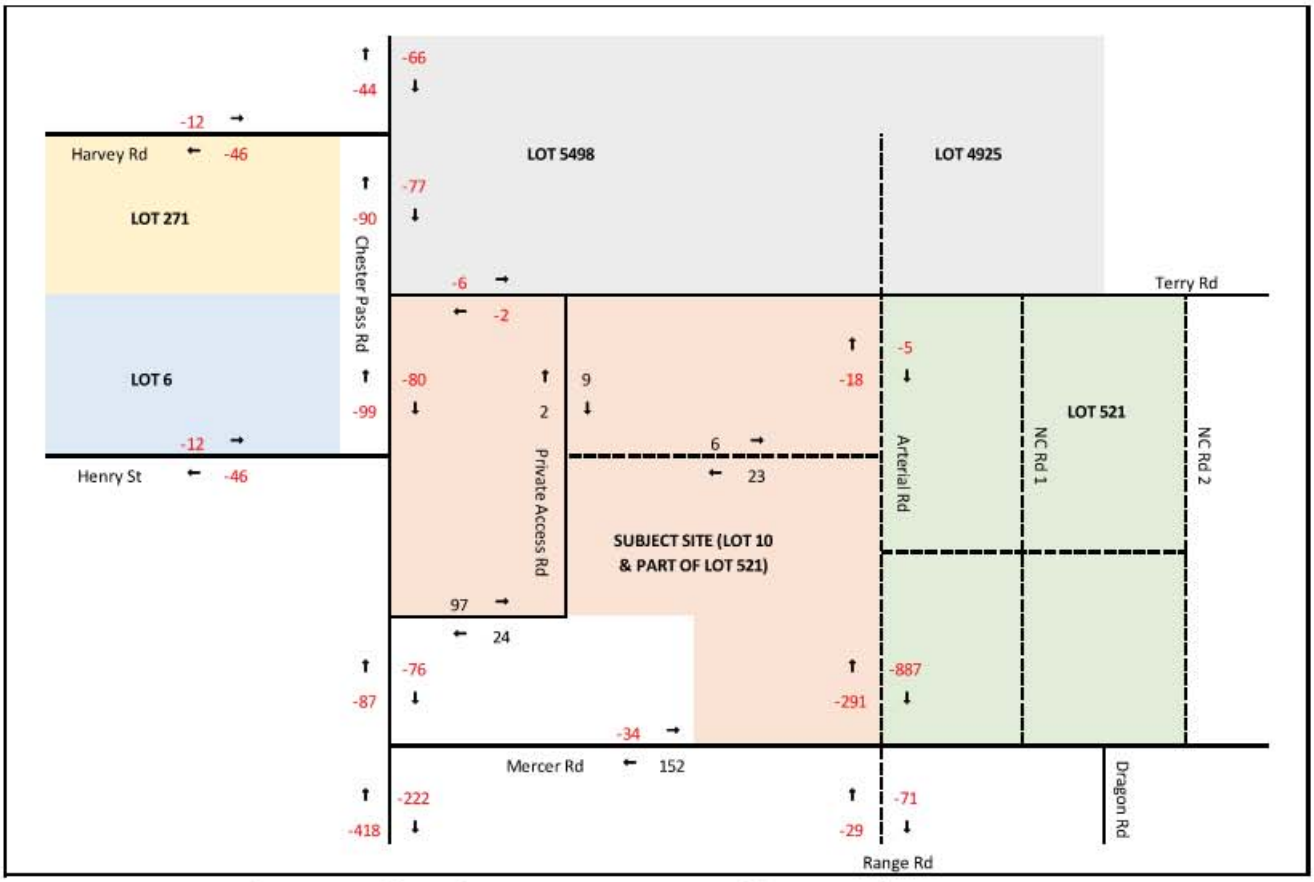


Figure 3.1 – Post Development Traffic Volumes Comparison – Weekday AM Peak Hour

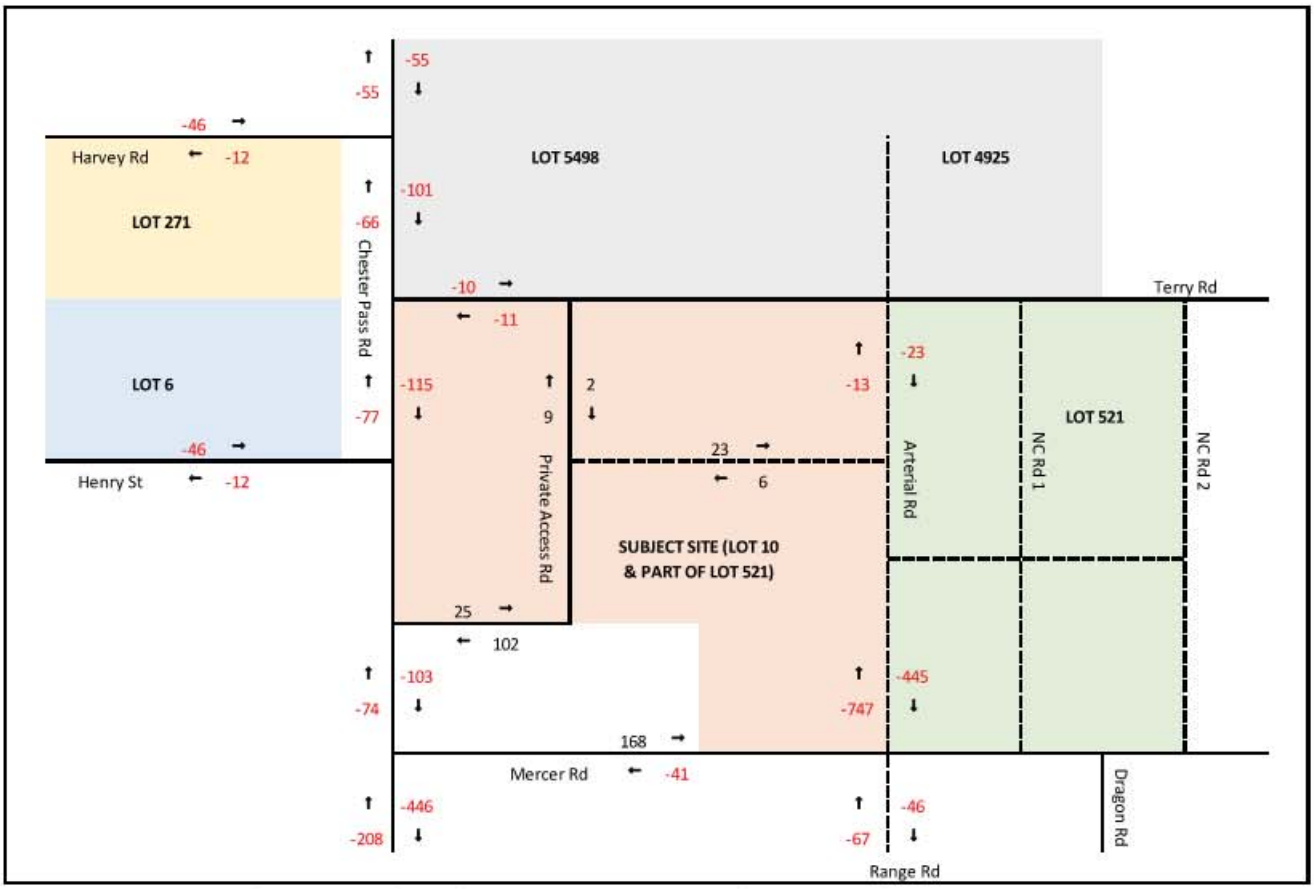


Figure 3.2 – Post Development Traffic Volumes Comparison – Weekday PM Peak Hour

As shown within Figure 3.1 and Figure 3.2 the revised land uses, as per the Ardess-Walmsley LSP, are anticipated to result in lower peak hour traffic volumes on the majority of roads than that previously assessed within the Opus report. The exception to this is Mercer Road. Notwithstanding, the primary reason for this is that existing traffic volumes for Mercer Road have been assumed (no existing traffic is assumed within Mercer Road within the Opus report).

3.6 Traffic Impact

3.6.1 Methodology

As discussed with the aforementioned meeting with relevant stakeholders on 16 August 2018 this report focusses upon the suitability of the proposed Private Access Road / Chester Pass Road intersection. As per these discussions, the following outlines an assessment of this intersection.

3.6.2 Heavy Vehicles

Based on advice provided by the Applicant it is understood that the LSP area could likely accommodate up to three transport depots / truck yards based on the characteristics and catchment of the area.

Each transport depot would have slightly different traffic volume characteristics to a 'traditional' industrial use, which has been assumed for all industrial sites for the purposes of this assessment; in accordance with the WAPC Transport Assessment guidelines for Developments: Volume 2 – Structure Plans.

Advice provided by the Applicant indicates that up to 60 restricted access vehicle (RAV) movements per day could be associated with each transport depot. This equates to 180 RAV movements per day and some 36 RAV movements within the respective AM and PM peak hours, adopting a peak to daily ratio of 20% (as per the 'RMS Guide to Traffic Generating Developments 2002' for Road Transport Facilities). Furthermore, it is understood that RAV access to the subject site would be limited to the Private Access Road with no RAV access provisions to Terry Road or the Range Road Extension. The quantum of RAV's in the context of the overall LSP traffic generation is relatively minor.

RAV's are able to pass each other within all assessed parts of the Private Access Road, with the exception of the main bend in the road. In this regard, a probability of conflict assessment has been undertaken using Austroads traffic theory of the probability of two RAV's travelling in opposing directions, meeting during a peak hour. The assessment assumes a 20/80 directional split of traffic, conflict length of 50 metres and average speed of 20 km/hr. The assessment suggests that the probability of two RAV's travelling in opposing directions meeting at least once in this section of road during a peak hour is 40.5%.

Based on this the following recommendations are made:

- An inspection of sight distances around this corner indicated that a number of palm trees, which line the inner radius of the corner, restrict sightlines. Based on this, it is strongly recommended that the trees on the inner radius of the bend in the Private Access Road be removed to allow for appropriate sight lines for oncoming traffic.
- Provide additional shoulder width at the corner to allow for two opposing RAV's to pass each other simultaneously.

3.6.3 Intersection Layout

It is understood that the Private Access Road is not currently part of the RAV Network 7, but that this network status would be sought for this road. This future road classification would permit vehicles up to and including 36.5m to access the site.

Based on this a swept path assessment of a B-Triple (36.5m in length) and a B99 design vehicle at the Private Access Road / Chester Pass Road intersection and around the existing bend within the Private Access Road has been completed and is included within Appendix C.

The swept path assessment shows that the two nominated design vehicles will be able to pass each other within the existing carriageway extents and gravel road shoulder.

3.6.4 Intersection Operation

The operation of the Private Access Road / Chester Pass Road intersection has been assessed for both base case and post development conditions utilising SIDRA INTERSECTION. SIDRA is a traffic modelling software package, which calculates intersection performance, with key performance criteria as follows:

- **Degree of Saturation (DOS)** – The ratio of traffic demand to capacity. For unsignalised intersections, an upper limit DOS of 0.90 is generally considered acceptable.
- **Average Delay (sec)** – Average delay is the average time delay for all vehicles undertaking a particular traffic movement.
- **95th Percentile Queue Length (m)** – The 95th percentile queue length is the value below which 95 per cent of all observed cycle queue lengths fall.

The SIDRA intersection results are summarised within Table 3.5 with full results presented in Appendix D.

SCENARIO	APPROACH	DOS		AVERAGE DELAY (SEC)		95TH PERCENTILE QUEUE (M)	
		BASE CASE	POST DEVELOPMENT	BASE CASE	POST DEVELOPMENT	BASE CASE	POST DEVELOPMENT
Weekday AM Peak Hour	Chester Pass Road (North)	0.09	0.35	2 sec	4 sec	3 m	22 m
	Private Access Road (East)	0.01	0.04	10 sec	16 sec	0 m	1 m
	Chester Pass Road (North)	0.11	0.25	0 sec	0 sec	0 m	0 m
Weekday PM Peak Hour	Chester Pass Road (North)	0.11	0.28	0 sec	1 sec	1 m	8 m
	Private Access Road (East)	0.05	0.16	10 sec	13 sec	1 m	5 m
	Chester Pass Road (North)	0.09	0.25	0 sec	0 sec	0 m	0 m

Table 3.5 – SIDRA INTERSECTION Results

As shown within Table 3.5 the intersection is anticipated to operate with minimal queues and delays on all approaches both for a base case and post development scenario. Indeed, the addition of the traffic associated with the LSP has a relatively modest impact upon the operation of the intersection.

Notwithstanding the above it is evident from a detailed review of the results, and consistent with the commentary in the Opus report, that vehicles may have difficulty in turning right out of any of the east-west roads into Chester Pass Road due to the anticipated through traffic volumes following full development of the LSP area.

Based on the above traffic analysis and swept path assessment the following recommendations are made:

- No mitigating roadworks are required to the physical geometry of the intersection.
- A right-turn exit ban from the Private Access Road to Chester Pass Road will likely be required following full development of the site. Any right-turn ban would best be achieved through signage, as opposed to physical design, due to the swept path requirements of entering/exiting vehicles.
- The provision of a seagull style T-intersection treatment at Henry Street, as highlighted within the Opus report, will preclude the provision of right-turn entry movements to the Private Access Road.

With respect to the above recommendations, the following key points/clarifications are noted:

- Recommendations are based upon the full development of the entire LSP area. That is, right-turn restrictions wouldn't be required immediately as they would be subject to future surrounding intersection works on Chester Pass Road and future through traffic volumes on Chester Pass Road.

- Recommendations would not change should RAV's potentially be restricted in future within Chester Pass Road due to the Albany Ring Road.

3.7 Internal Road Network

As per the Opus assessment, given the preliminary nature of the review it is considered premature to provide detailed advice on the internal road network.

Notwithstanding, and in accordance with the 'WAPC Transport Impact Assessment Guidelines: Volume 2 – Planning Schemes, Structure Plans and Activity Centre Plans (August 2016)', Table 3.6 has been prepared to identify the anticipated internal traffic generation of the LSP. As per the Opus report and previous discussions, 25% of industrial, commercial and retail, as well as 100% of the primary school traffic, is assumed to be internal to the LSP network.

LOCATION [1]	LAND USE	SIZE	AM PEAK HOUR TRIP RATE		PM PEAK HOUR TRIP RATE	
			IN	OUT	IN	OUT
Subject Site	Industrial	15,000 sq.m	30 vph	8 vph	8 vph	30 vph
Lot 6	Commercial	12,000 sq.m	48 vph	12 vph	12 vph	48 vph
Lot 271	Commercial	11,000 sq.m	44 vph	11 vph	11 vph	44 vph
Lot 521	Primary School	430 pupils	215 vph	215 vph	215 vph	215 vph
Lot 5498	Mixed-Use	Commercial 7,000 sq.m, Retail 2,000 sq.m	36 vph	9 vph	25 vph	46 vph
Total			**373 vph**	**254 vph**	**270 vph**	**383 vph**

*vph = vehicles per hour

[1] Excludes lot 4925, which only comprises residential uses.

Table 3.6 – Traffic Generation (Internal)

As shown within Table 3.6 a total of 627 and 653 vehicles per hour are anticipated to be internal to the LSP road network during the respective weekday AM and PM peak hours.

3.8 Vehicle Access

3.8.1 General

The LSP, refer to Appendix A, nominates that vehicle access to the subject site is proposed to be provided via Chester Pass Road, Terry Road and Range Road. An additional 'emergency accessway' to Mercer Road is also proposed.

As nominated within Table 3.3 the subject site is anticipated to generate up to 113 vehicles per hour during peak hours. It is important to note that this traffic generation is based upon the 'WAPC Transport Impact Assessment Guidelines: Volume 2 – Planning Schemes, Structure Plans and Activity Centre Plans (August 2016)' as well as assumptions regarding the number of industrial lots and the floor area within each. The specific development of the site, including the provision of transport depots and their operation, may result in changes to the anticipated traffic generation of the site.

In the context of the broader road network the generation of 113 vehicle movements in any peak hour, or approximately two vehicles every minute, spread across multiple access points is unlikely to preclude the provision of, nor restriction to, turning movements at either Terry Road or Range Road. This is subject to the appropriate design of intersections, including appropriate stager to nearby intersections.

As discussed previously, vehicle access to Chester Pass Road is considered appropriate, subject to the restrictions to right-turn movements as previously specified following full development of the entire LSP area.

3.8.2 Mercer Road

It is understood that there has been discussion regarding the potential provision of a road link through the site to Mercer Road as shown (in green) within Figure 3.1. This proposal, if approved and implemented, would result in the western portion of the Private Access Road becoming a public road vested with the City of Albany.

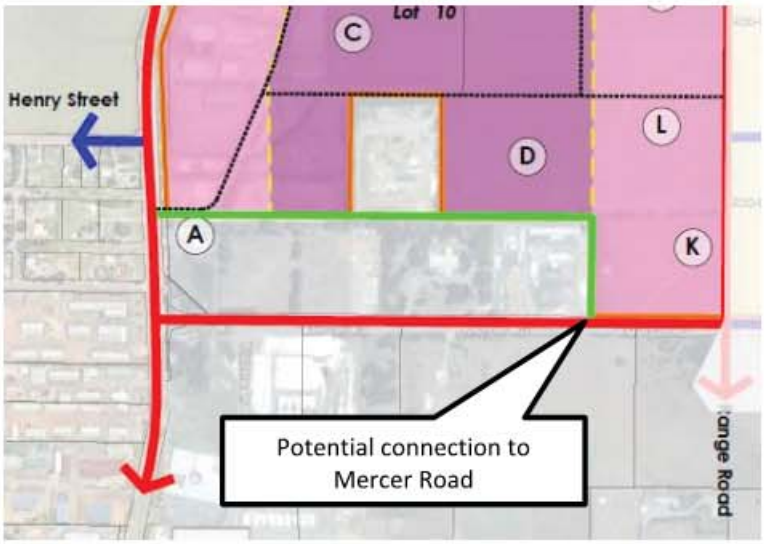


Figure 3.3 – Potential Road Connection to Mercer Road

As per the discussions of Section 3.8.1 the anticipated traffic generation of the site is unlikely to preclude vehicle access to any abutting road. The proposed road connection would be located some 100m west of the proposed Range Road Extension. This offset would allow for the provision of any right-turn lane from Mercer Road (west approach) into Range Road. As such, it is considered that there are no traffic engineering grounds that would preclude the provision of a future connection to the subject site from Mercer Road in the location specified. Notwithstanding, whilst a link may be possible it is noted that from a traffic capacity perspective this link is not required.

3.9 Traffic Noise

It is understood that there has been discussion regarding the traffic noise implications of the subject site and the implications based upon the "State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning". Traffic noise is outside the scope of traffic engineering expertise and falls within acoustic and similar disciplines. In this regard, WGE are unable to provide any specific advice with respect to this policy.

Notwithstanding, it is noted that the objectives of the policy are to:

- *"protect people from unreasonable levels of transport noise by establishing a standardised set of criteria to be used in the assessment of proposals;*
- *protect major transport corridors and freight operations from incompatible urban encroachment;*
- *encourage best-practice design and construction standards for new development proposals and new or redeveloped transport infrastructure proposals;*
- *facilitate the development and operation of an efficient freight network; and*
- *facilitate the strategic co-location of freight handling facilities."*

4. Recommendations

4.1 Midblock

The *'Austroads Guide to Traffic Management – Part 3: Traffic Studies and Analysis'* and the *'RMS Guide to Traffic Generating Developments (2002)'* provides typical mid-block capacities for urban roads. These capacities are summarised within the Opus report.

Reference is made to the post-development traffic volumes provided within Appendix B and the comparison of peak hour traffic volumes provided within Figure 3.1 and Figure 3.2. As nominated previously this comparison shows that traffic volumes on the majority of roads are proposed to decrease.

Notwithstanding the general decrease in traffic volumes as a result of the revised land uses, albeit recognising that would be an increase in RAV traffic volumes, Table 4.1 has been prepared to provide a summary of the Opus recommendations and an updated opinion based on the findings of this assessment. It is important to re-emphasise that a TIA will be prepared, pre-subdivision, for the balance of Lot 521 east of Range Road. Moreover, it is acknowledged that any future construction of the Albany Ring Road would also likely have significant implications upon traffic volumes and movements within the area.

ROAD	RECOMMENDATIONS	
	OPUS ASSESSMENT	WGE ASSESSMENT
Chester Pass Road	Duplication of Chester Pass Road between Henry Street and Harvey Road.	Agree. Notwithstanding, we note that peak hour traffic volumes in either direction on Chester Pass Road, during either peak hour, do not exceed 600 vehicles per hour (Level of Service C) between Harvey Road and Terry Road. As such, there is potential that Chester Pass Road only be duplicated to Terry Road. However, given the relatively short offset between Harvey Road and Terry Road (proposed to be re-aligned north) as well as the traffic volumes, which are approaching the LOS D threshold, the Opus recommendation is considered valid.
Range Road	Single lane in each direction. Potential to duplicate in future due to Yakamia/Lange Structure Plan development.	Agree. Traffic volumes outlined within WGE assessment are less than those assessed within the Opus assessment.
Terry Road	No recommendation	Single lane in each direction. A level of service A/B is anticipated during both the AM and PM peak hours, assuming a single lane is provided in each direction, with a maximum anticipated traffic volume of 217 vph in any direction.
Private Access Road	No recommendation	Single lane in each direction. A level of service A is anticipated during both the AM and PM peak hours with a maximum anticipated traffic volume of 102 vph in any direction. The following recommendations are made at the bend in the road: • Trees on the inner radius of the bend in the Private Access Road be removed to allow for appropriate sight lines for oncoming traffic. • Provide additional shoulder width at the corner to allow for two opposing RAV's to pass each other simultaneously.
Mercer Road	No recommendation	Single lane in each direction. A level of service C/D is anticipated during both the AM and PM

		peak hours with a maximum anticipated traffic volume of 676 vph in any direction. A level of service D indicates that there are restrictions to drivers in achieving their desired speed. Notwithstanding, the anticipated traffic volumes are at the lower end of the Level of Service D range (600-900 vph). Moreover, the Opus assumptions associated with Lot 521 assumes that 50% of traffic uses Mercer Road with 0% utilising Terry Road. In reality, and depending on the internal road network, it is expected that some traffic associated with Lot 521 will utilise Terry Road, which would likely reduce the anticipated volumes along Mercer Road. It is likely that turn lanes will be required at major road intersections (assuming retention of a single lane in each direction) given the mid-block road performance, which is at, or approaching Level of Service D. Overall recommendation to retain Mercer Road at a single lane in each direction.
General	Provide for east-west pedestrian access across Chester Pass Road the Local Centre.	Agree.
Other Considerations	None.	It is understood that there has been discussion regarding the potential provision of a road link through the site to Mercer Road. This proposal, if approved and implemented, would result in the western portion of the Private Access Road becoming a public road vested with the City of Albany. Note only.

*LoS – Level of Service

Source: Based on values as supplied in Guide to Traffic Generating Developments (RMS, 2002)

Table 4.1 – Mid-Block Recommendations

4.2 Intersection

Table 4.2 has been prepared to provide a summary of the Opus recommendations and an updated opinion based on the findings of this assessment:

INTERSECTING ROAD WITH CHESTER PASS ROAD	RECOMMENDATIONS OPUS ASSESSMENT	WGE ASSESSMENT
Harvey Road	Seagull style priority controlled T-intersection.	Agree. Assuming the majority of traffic exiting from Harvey Road will turn right onto Chester Pass Road the post development traffic volumes along Chester Pass Road will likely result in significant delays for these motorists.
Terry Road	No interim recommendation. Potential future roundabout following completion of the Albany Ring Road.	Would require further investigation, noting that Terry Road is located outside of the Ardess-Walmsley LSP. Site generated traffic volumes on Terry Road are comparable to that of Harvey Road and Henry Street. Whilst it is assumed that 100% of Terry Road traffic will travel to/from the south in reality there will be some traffic, which will travel north. As such, there may be a future need to provide a seagull intersection or roundabout treatment to allow for right-turners to safely and efficiently turn right from Terry Road into Chester Pass Road. Recommend that further analysis be completed to confirm an appropriate future intersection treatment as part of the

		Warrenup-Walmsley LSP.
Henry Road	Seagull style priority controlled T-intersection.	Agree. Assuming the majority of traffic exiting from Harvey Road will turn right onto Chester Pass Road the post development traffic volumes along Chester Pass Road will likely result in significant delays for these motorists.
Private Access Road	No recommendation.	Following full development of the internal road network and the LSP, ban right-turn exit movements through signage (either all day or during peak hours only) onto Chester Pass Road. As shown within the preceding modelling the post development traffic volumes on Chester Pass Road will make it difficult for vehicles to turn right from the Private Access Road into Chester Pass Road. Notwithstanding, continue to monitor and review the road network performance prior to implementing any ban. Prior to implementing any ban, the internal road network would need to be completed to allow for motorists travelling northbound to turn onto Chester Pass Road from either Mercer Road or Terry Road. Following the provision of a seagull style T-intersection treatment at Henry Street, as highlighted within the Opus report, right-turn entry movements to the Private Access Road will be precluded.
Mercer Road	Protected right turn lane on Chester Pass Road.	Provide an appropriate intersection treatment. The most appropriate intersection treatment, protected right turn, seagull style priority controlled, roundabout or signalised option would be subject to future traffic modelling and associated trigger point assessment. There are 618 vehicles anticipated to turn right from Chester Pass Road into Mercer Road (assuming 100% of motorists arrive/depart from the south). Mercer Road is clearly the most significant east-west road within the LSP, anticipated to carry 2-3 times the traffic of other east-west roads. As such, a roundabout or traffic signals may be required as the right-turn movement may be too significant, also having regard to anticipated southbound traffic volumes on Chester Pass Road, to operate satisfactorily without their provision. Recommend that further analysis be completed to confirm an appropriate future intersection treatment and it's trigger point.

Table 4.2 – Intersection Recommendations

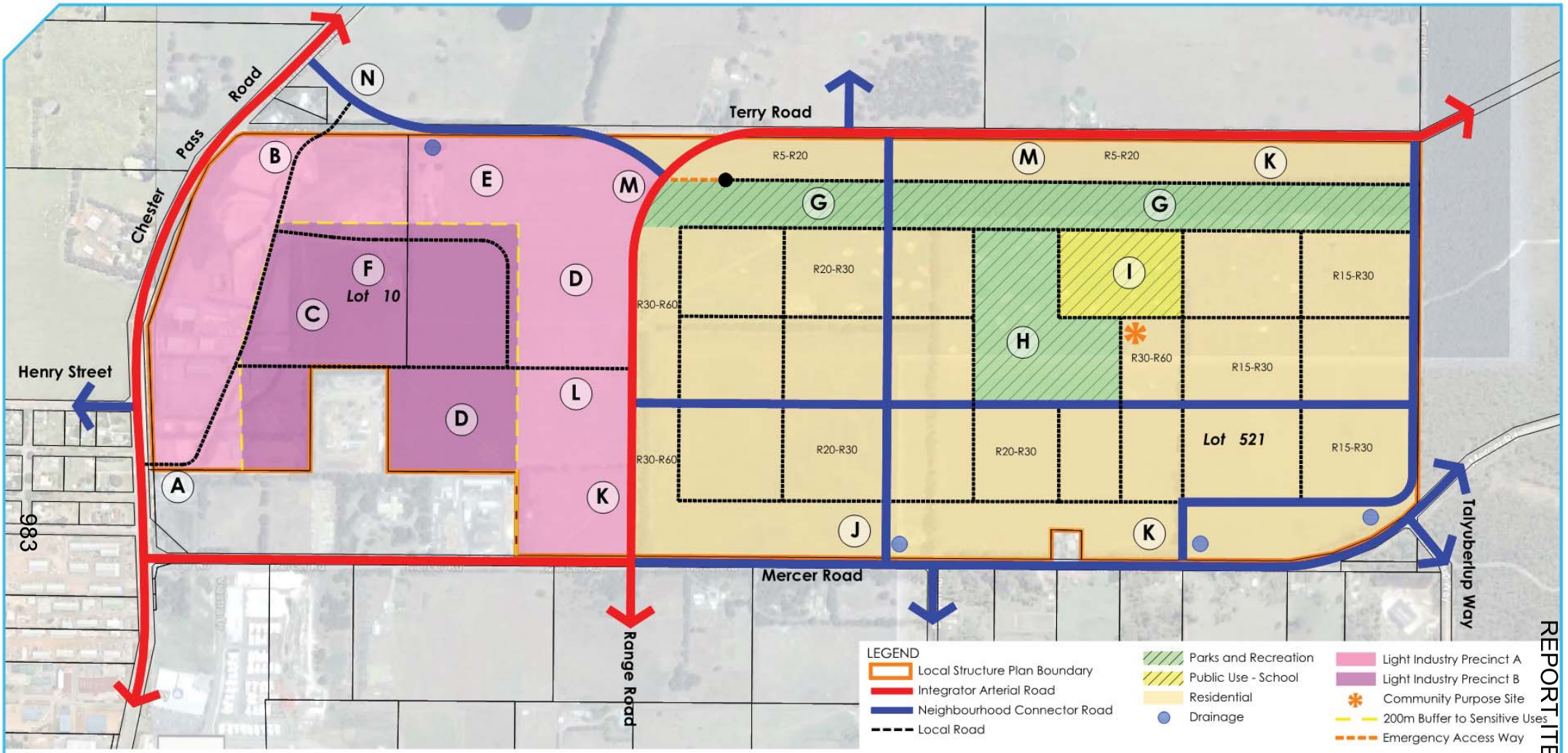
5. Conclusion

This Transport Impact Assessment report has been prepared as part of the Ardess-Walmsley Local Structure Plan and provides an updated assessment/comparison of matters considered within the Opus Transport Assessment of the Warrenup-Walmsley LSP.

Based on the discussions and analysis outlined within this report the following key conclusions are derived:

- The current LSP proposal is anticipated to generate less traffic, on the majority of roads, than that assessed and anticipated within the Opus report.
- The LSP is anticipated to generate and add 2,451 and 2,528 vehicle movements to the external road network during the respective weekday AM and PM peak hours. This represents a decrease of 631 and 659 vehicle movements during the respective weekday AM and PM peak hours than that assessed within the Opus report. There will be more RAV's than that assessed within the Opus report, however, the surrounding roads and intersections have appropriate capacity to accommodate these movements, subject to the adoption of recommendations outlined within this report.
- The traffic impact of the development proposal on the Chester Pass Road / Private Access Road intersection has been assessed using SIDRA INTERSECTION and is considered appropriate, including for additional RAV's, subject to the adoption of recommendations outlined within this report.
- The midblock capacities of the road network within the LSP are within acceptable limits, including allowance for RAV's, subject to the recommendations provided within this and the Opus reports.
- Based on the discussions and analysis outlined within report the following additional recommendations, over and above those already presented within the Opus assessment, are made:
- At the bend in the Private Access Road the following mitigating measures are recommended:
  - Trees on the inner radius of the bend in the Private Access Road be removed to allow for appropriate sight lines for oncoming traffic.
  - Provide additional shoulder width at the corner to allow for two opposing RAV's to pass each other simultaneously.
- Complete further analysis to confirm the likely future intersection treatment and timing / trigger point of the upgrade of the Chester Pass Road / Terry Road intersection and Chester Pass Road / Mercer Road intersections.
- Provide a right-turn entry and exit ban (through signage) to/from the Private Access Road via Chester Pass Road. The timing and implementation of these bans are subject to the development of the entire LSP area and subsequent increase in through traffic volumes on Chester Pass Road and provision of seagull style intersection treatments at surrounding intersections.

APPENDIX A – Ardess-Walmsley Local Structure Plan



Notes:

A) Existing access to the Ardess Industrial Estate. Approved by Main Roads WA for Restricted Access Vehicles (RAVs). Provides access to City approved uses, including warehouses, that include RAVs. The *City of Albany Local Planning Scheme No.1* (LPS1) limits access between the Ardess Industrial Estate and Chester Pass Road to a single entry road. This is a privately owned and managed road.

B) City approved access, between the Ardess Industrial Estate and Terry Road, which is only suitable for as-of-right vehicles. No RAVs are permitted on Terry Road and accordingly there are no RAV impacts on future residential development to the north of Terry Road.

C) Existing Light Industry zoned land to be developed, without connection to reticulated sewerage, based on former approvals and current LPS1 provisions.

D) Future Light Industry development/subdivision, on land currently zoned 'General Agriculture' to be connected to reticulated sewerage following rezoning to 'Light Industry'.

E) Light Industry Precinct A - no transport depots are permitted.

F) Light Industry Precinct B - transport depots are a 'D' (discretionary) use. A Development Application is required to be submitted to the City where it will be assessed against LPS1 provisions, Council's local planning policies and EPA guidelines. Following completion of the Albany Ring Road to the Port of Albany, there is no guarantee that RAVs will be permitted to use Chester Pass Road between Menang Drive and the main roundabout. Transport depots, that only operate as-of-right vehicles, are not impacted by possible future limitations of access to Chester Pass Road. Precinct B is well-suited to small to medium sized transport depots given its proximity to Albany, excellent existing and future road network and suitable buffers to sensitive uses. Precinct B will provide an alternative cost-effective location in Albany to establish transport depots, along with other suitable uses, on lease land. The provision of leased industrial/employment land has considerably lower establishment costs compared to businesses establishing on freehold land.

G) Native vegetation / ecological corridor to be conserved. Either vested and managed by the City as public open space (consistent with the endorsed and draft versions of *Liveable Neighbourhoods*) or privately owned and managed in a few 'conservation' lots. Based on *Liveable Neighbourhoods*, can be 'restricted use' public open space where a 2% credit applies.

H) District public open space - to be at least 7.6 hectares in area and ceded free-of-cost to the City. The district sized public open space will benefit the community both within and outside of the structure plan area.

I) Primary school - benefits the community both within and outside of the structure plan area.

J) Residential area to be fully serviced including connected to reticulated sewerage. This will readily address the small portion of the structure plan area where soils have a low Phosphorus Retention Index (PRI).

K) As part of detailed design, a service road may be required adjoining Mercer Road, Range Road and Terry Road. Subject to land uses, lot sizes and site conditions, there are also opportunities for alternative design techniques including rear vehicle access with buildings fronting the main road to provide better urban design outcomes. This will be addressed through future Local Development Plans.

L) Proposed expanded Light Industry area consistent with the draft *Albany Local Planning Strategy*, the *Albany Industrial Land Strategy* and a range of other State, regional and local strategies which promote job creation and economic development. Accordingly, no requirement to prepare an additional industrial demand and supply analysis. Light industry is compatible with future residential development.

M) Strategically significant extension of Range Road along with opportunities to widen the Terry Road reserve.

N) Based on Main Roads WA advice, it is expected that the Terry Road/Chester Pass Road intersection will be relocated north. This is being progressed via the separate *Warrenup-Walmsley Local Structure Plan*.

REVISED LOCAL STRUCTURE PLAN

Lot 10 Chester Pass Road and Lot 521 Mercer Road Walmsley

REV	DESCRIPTION	YYMMDD
E	NOTES AND MODS	180515
D	ADD EMERGENCY A. WAY.	171118
C	MINOR MODIFICATIONS	171023
B	MINOR MODIFICATIONS	171022
A	LOCAL STRUCTURE PLAN	171012

DRAWING NUMBER EP 170520 06 | REV E | SCALE 1:7500 SHEET A3

0 150 300m

Issued for design intent only.
All areas and dimensions are subject to detail design + survey.

edge PLANNING & PROPERTY

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ALBANY WA 6330
E: steve@edgeplanning.com.au
M: 0409 107 336

REPORT ITEM DIS 165 REFERS

APPENDIX B – Traffic Volumes

Existing Conditions

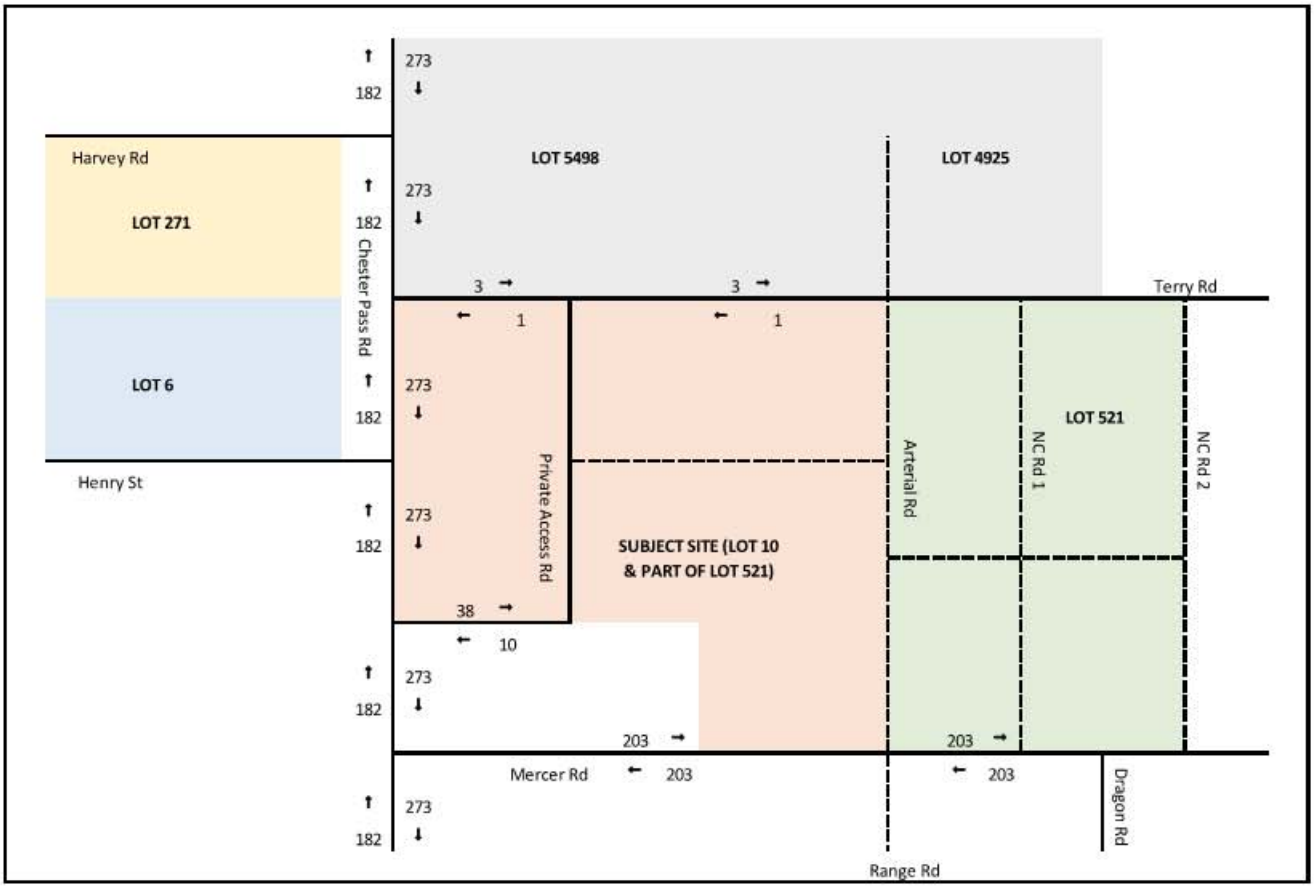


Figure B.1 – Existing Traffic Volumes - Weekday AM Peak Hour

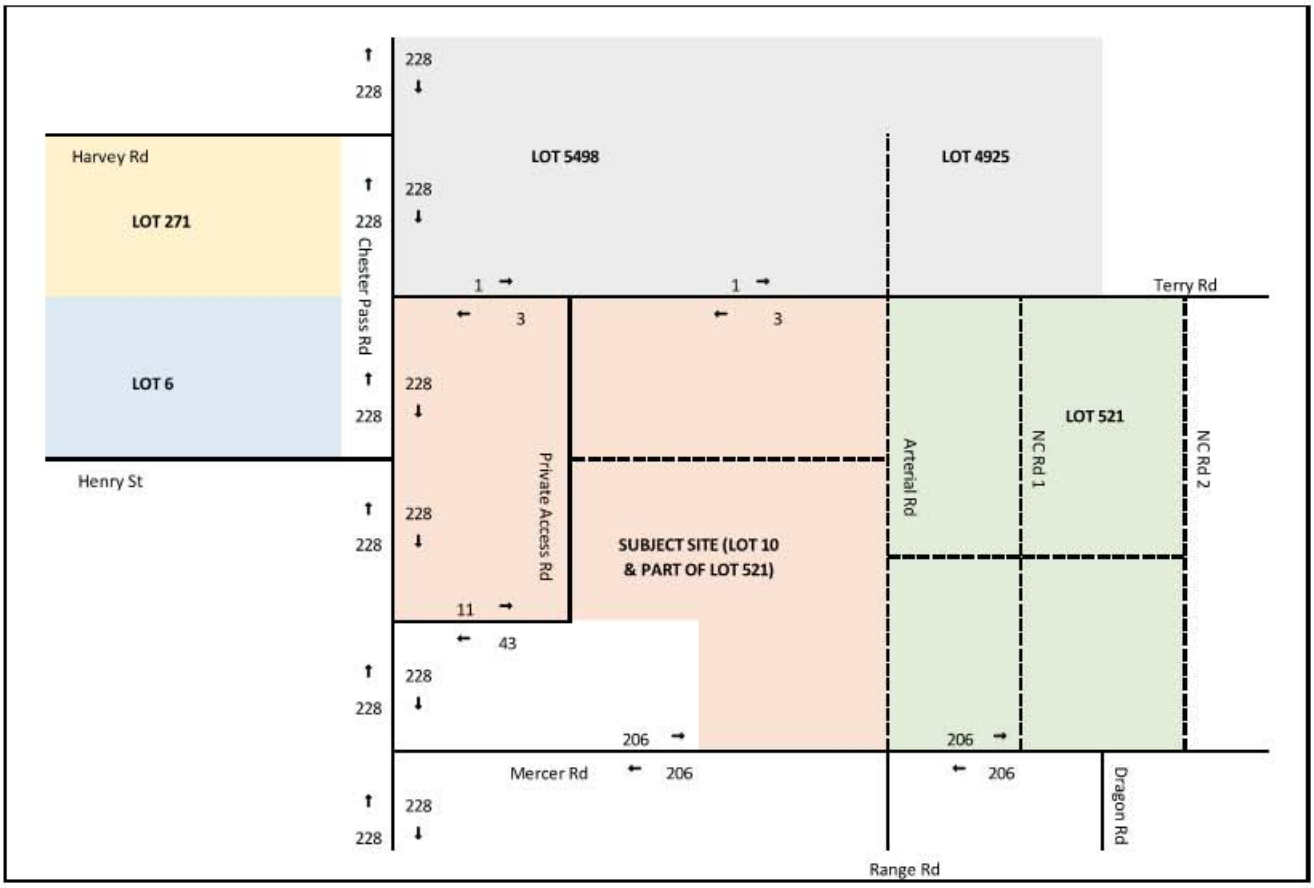


Figure B.2 – Existing Traffic Volumes - Weekday PM Peak Hour

Base Case

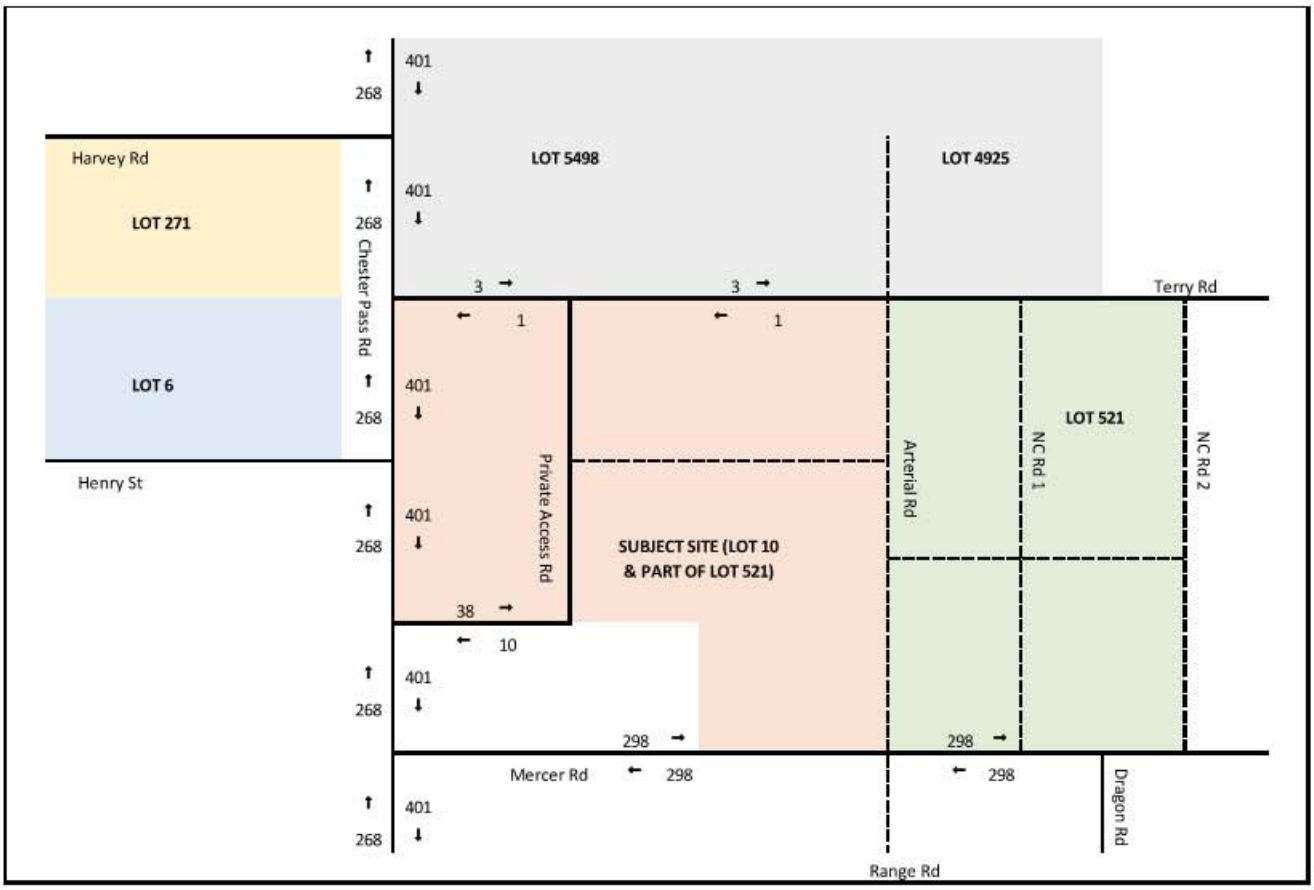


Figure B.3 – Base Case Traffic Volumes - Weekday AM Peak Hour

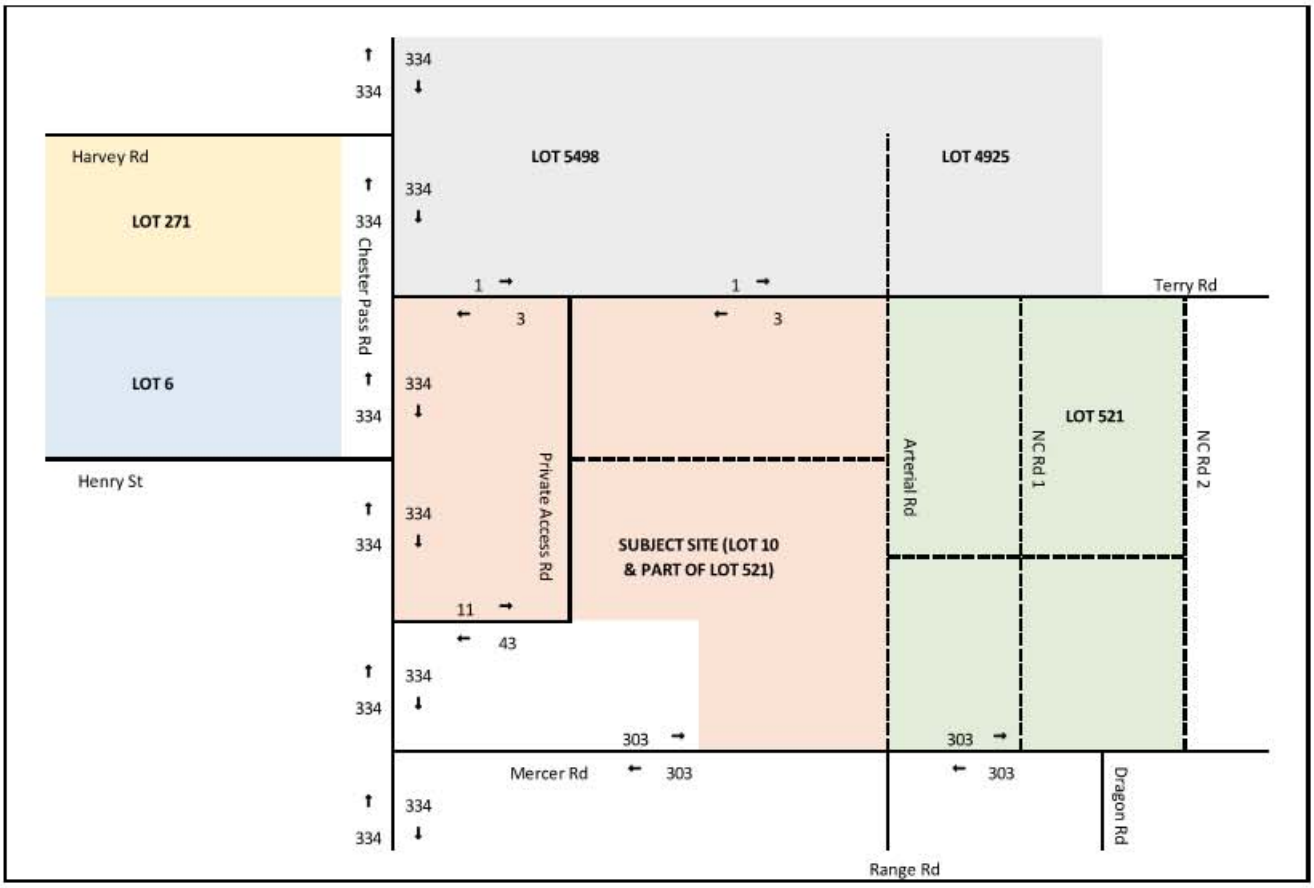


Figure B.4 – Base Case Traffic Volumes - Weekday PM Peak Hour

Site Generated

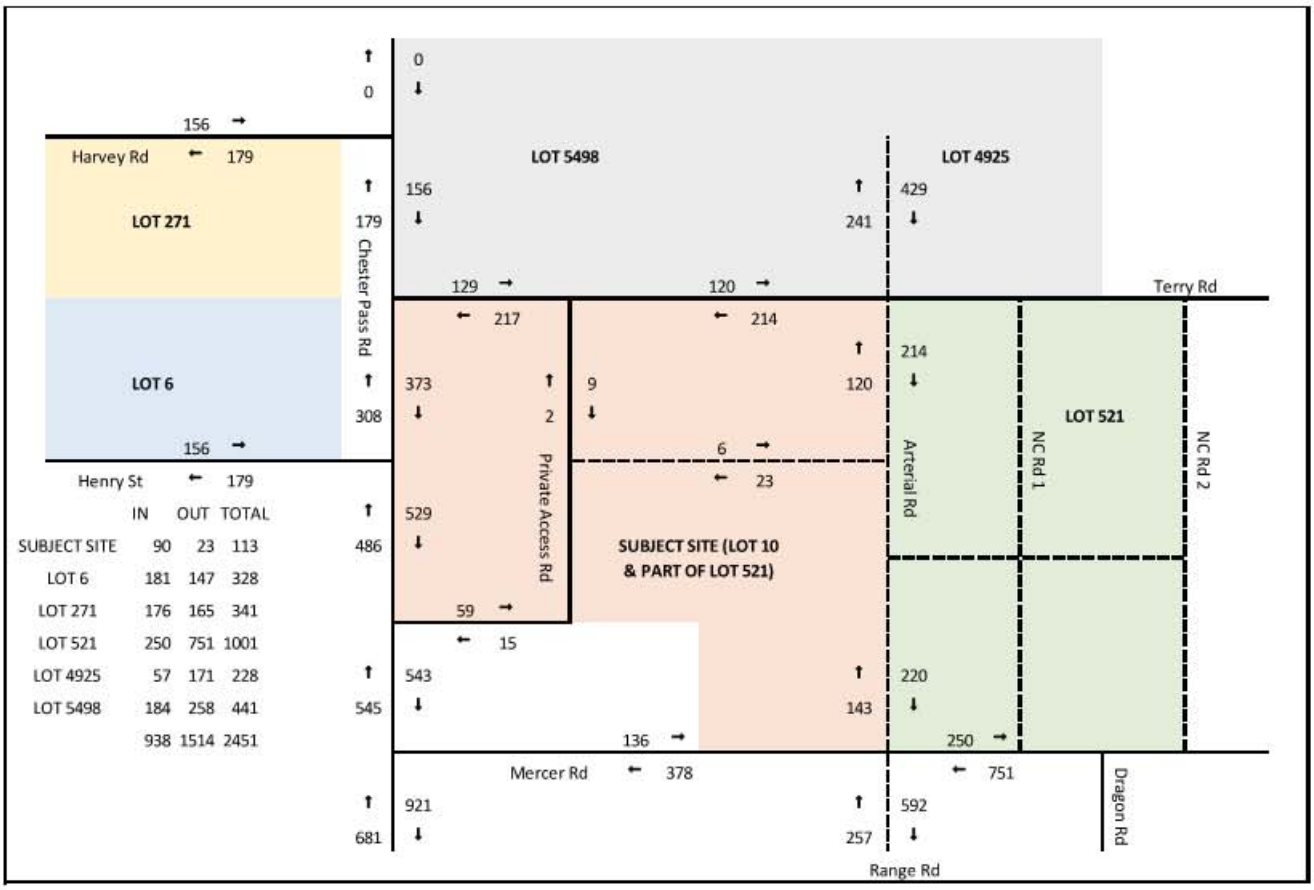


Figure B.5 – Site Generated Traffic Volumes - Weekday AM Peak Hour

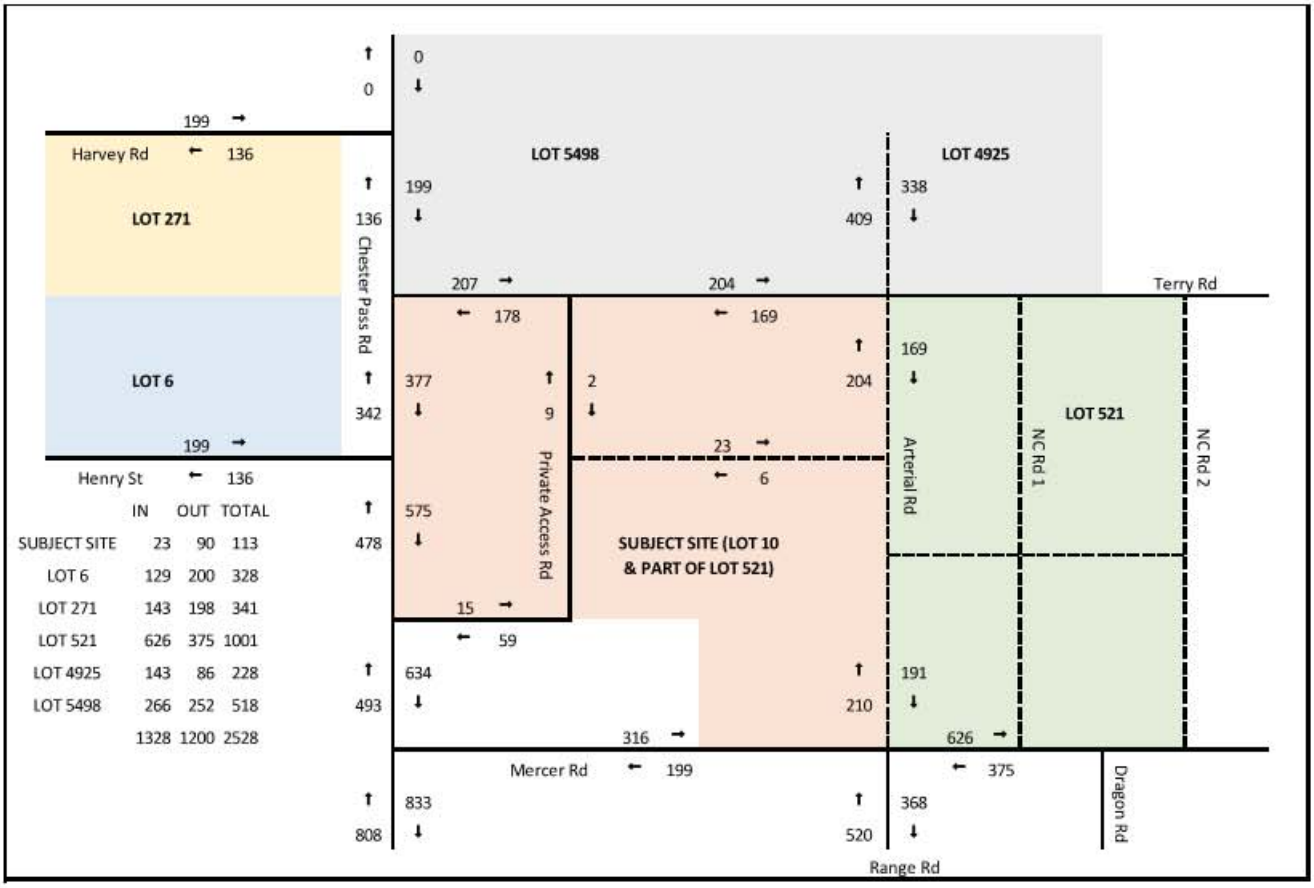


Figure B.6 – Site Generated Traffic Volumes - Weekday PM Peak Hour

Post Development (WGE)

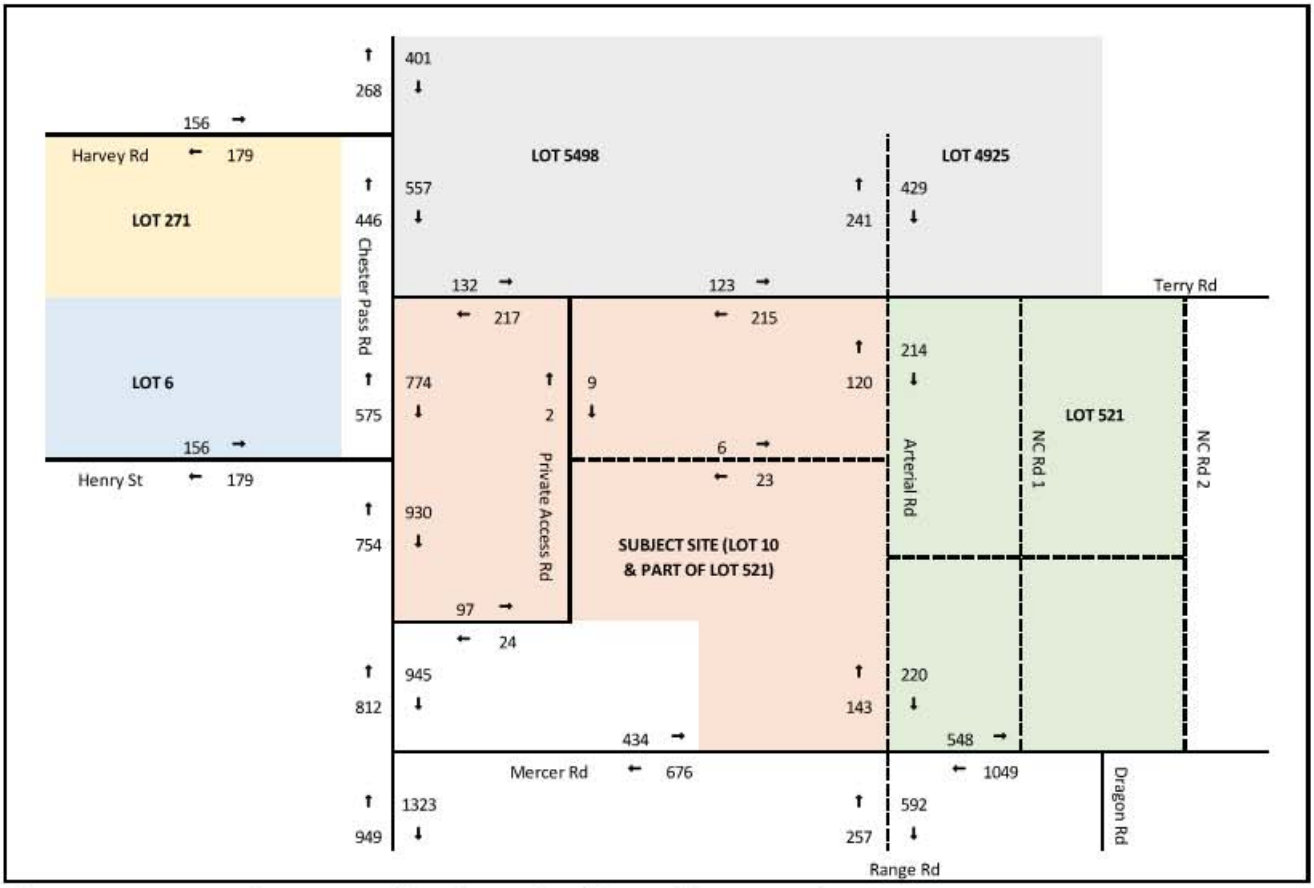


Figure B.7 – Post Development Traffic Volumes (WGE) - Weekday AM Peak Hour

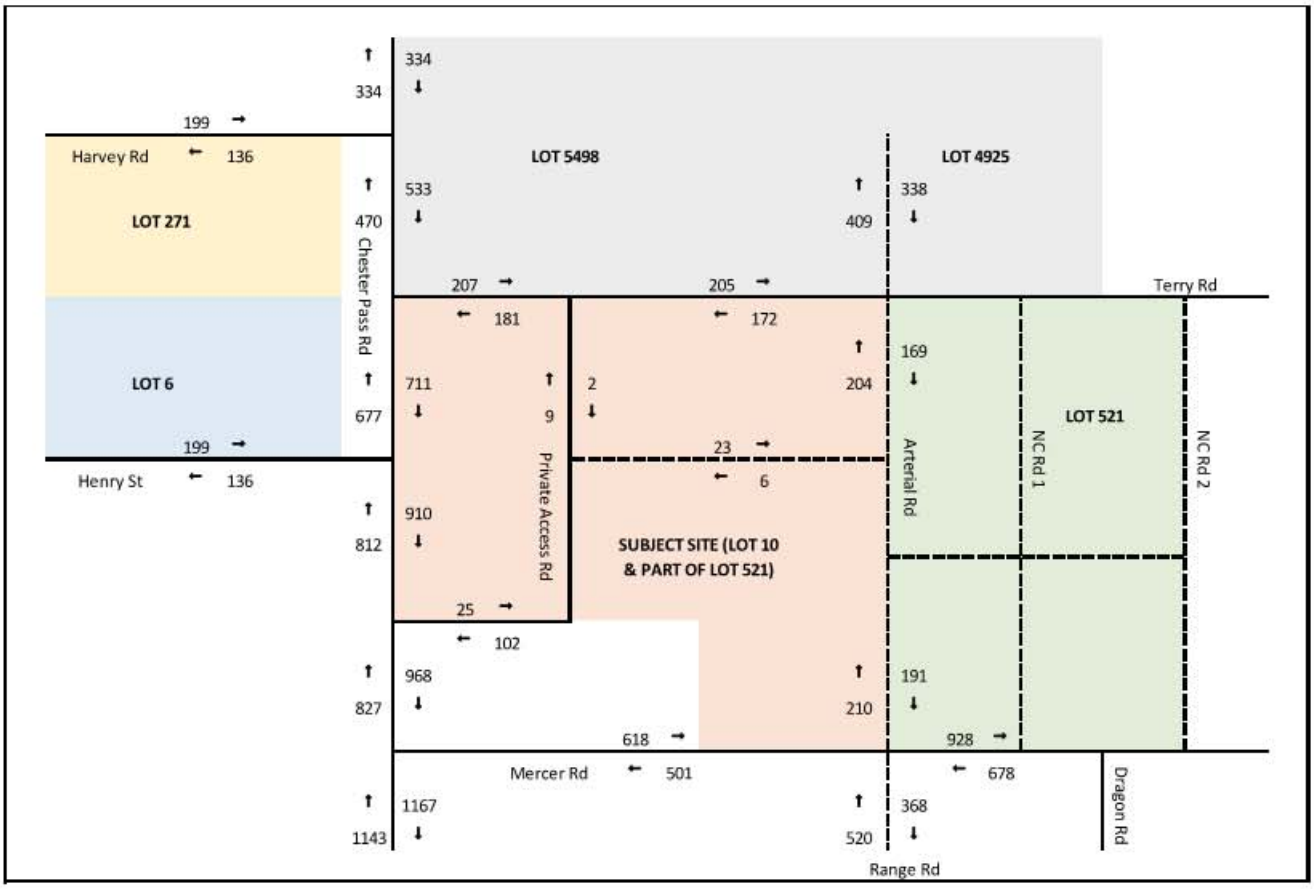


Figure B.8 – Post Development Traffic Volumes (WGE) - Weekday PM Peak Hour

Post Development (Opus)

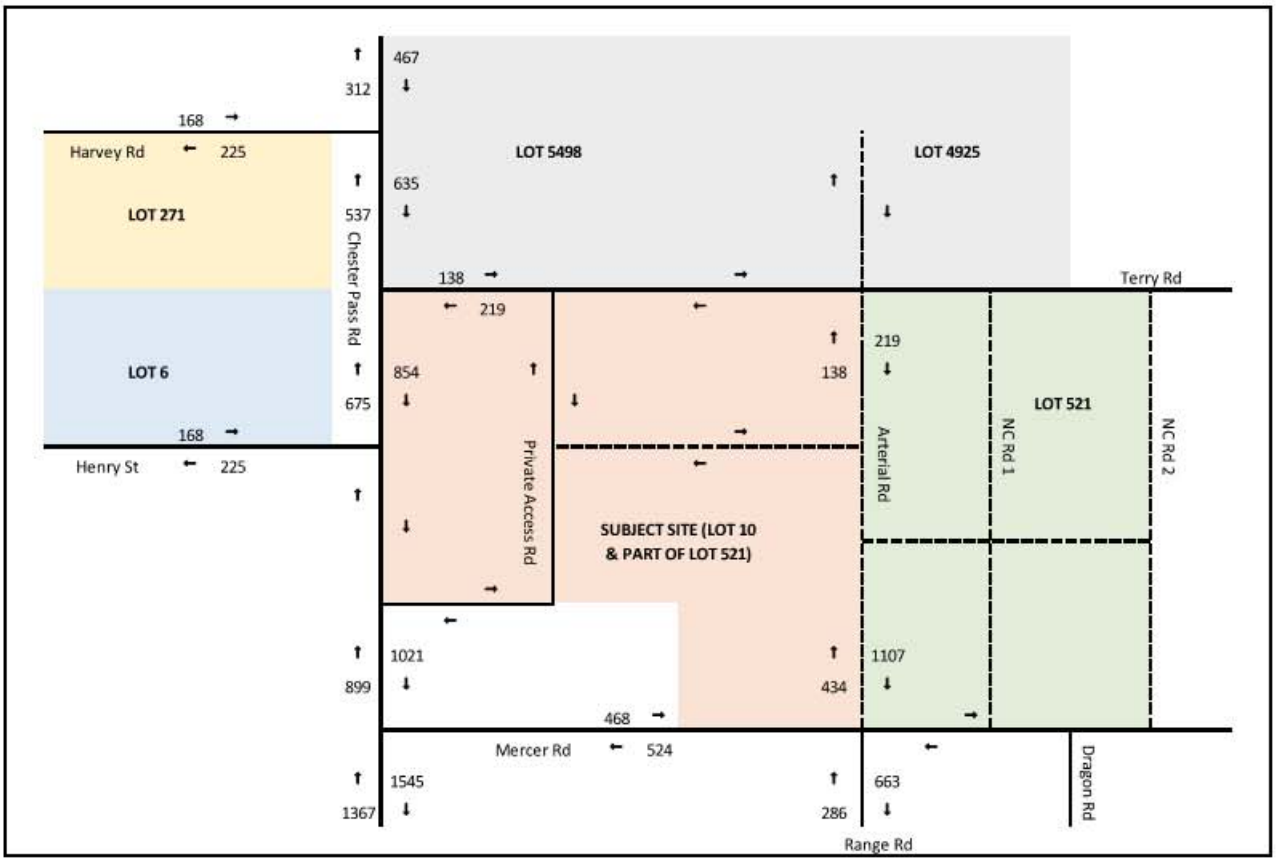


Figure B.9 – Post Development Traffic Volumes (Opus) - Weekday AM Peak Hour

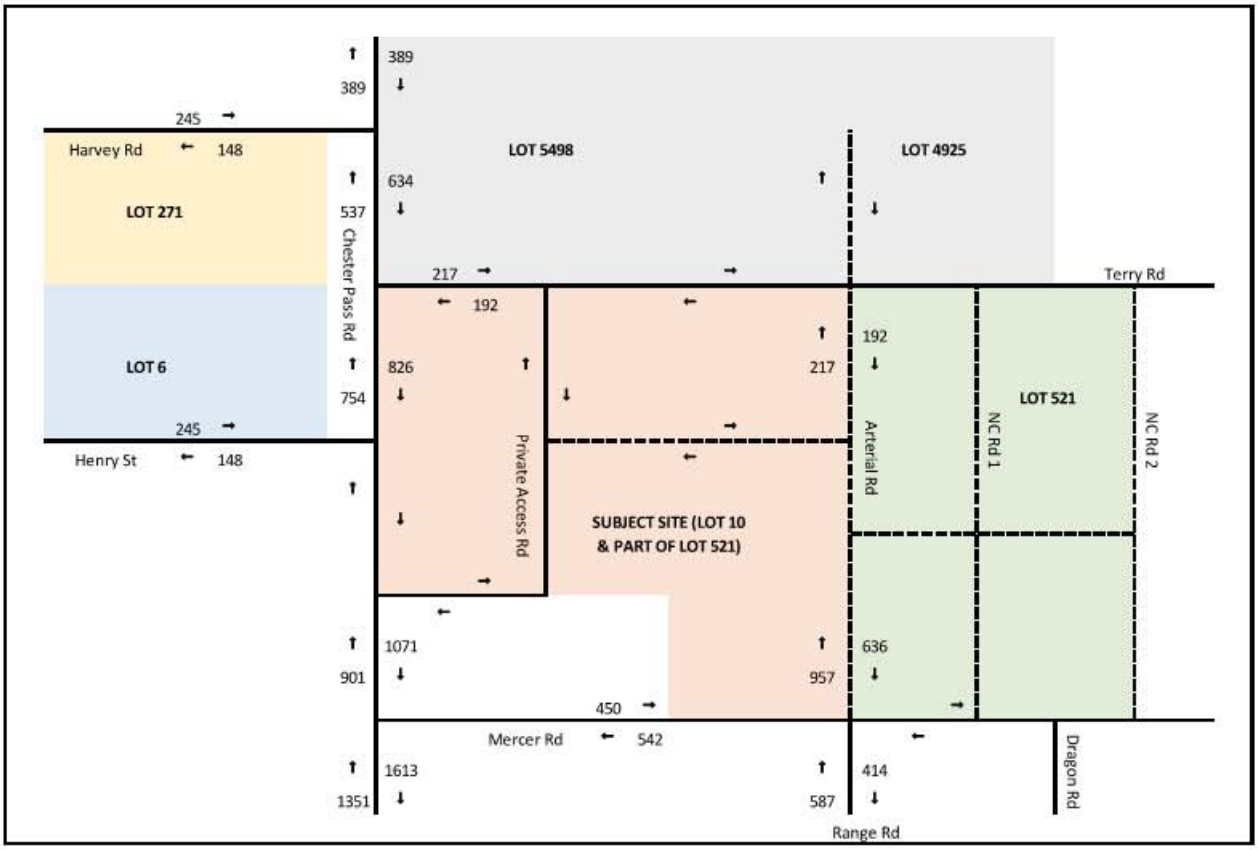


Figure B.10 – Post Development Traffic Volumes (Opus) - Weekday PM Peak Hour

APPENDIX C - SIDRA Intersection Results

LANE SUMMARY

Site: 101 [Base Case - AM Peak]

Chester Pass Road / Private Access Road
Stop (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chester Pass Road (South)													
Lane 1	138	10.0	1831	0.075	80[6]	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	130	10.0	1379	0.094	100	3.1	LOS A	0.4	3.0	Full	500	0.0	0.0
Approach	268	10.0		0.094		1.5	NA	0.4	3.0				
East: Private Access Road (East)													
Lane 1	10	10.0	905	0.011	100	9.5	LOS A	0.0	0.3	Full	500	0.0	0.0
Lane 2	1	10.0	324	0.003	100	16.8	LOS C	0.0	0.1	Short	14	0.0	NA
Approach	11	10.0		0.011		10.2	LOS B	0.0	0.3				
North: Chester Pass Road (North)													
Lane 1	201	10.0	1830	0.110	100	0.0	LOS A	0.0	0.0	Short	150	0.0	NA
Lane 2	201	10.0	1831	0.110	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	402	10.0		0.110		0.0	NA	0.0	0.0				
Intersection	681	10.0		0.110		0.8	NA	0.4	3.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

6 Lane under-utilisation due to downstream effects

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LANE SUMMARY

Site: 101 [Base Case - PM Peak]

Chester Pass Road / Private Access Road
Stop (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chester Pass Road (South)													
Lane 1	153	10.0	1831	0.083	80[6]	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	181	10.0	1729	0.105	100	0.6	LOS A	0.1	1.0	Full	500	0.0	0.0
Approach	334	10.0		0.105		0.3	NA	0.1	1.0				
East: Private Access Road (East)													
Lane 1	43	10.0	944	0.046	100	9.4	LOS A	0.2	1.2	Full	500	0.0	0.0
Lane 2	1	10.0	328	0.003	100	16.6	LOS C	0.0	0.1	Short	14	0.0	NA
Approach	44	10.0		0.046		9.5	LOS A	0.2	1.2				
North: Chester Pass Road (North)													
Lane 1	167	10.0	1830	0.091	100	0.0	LOS A	0.0	0.0	Short	150	0.0	NA
Lane 2	168	10.0	1831	0.091	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	335	10.0		0.091		0.0	NA	0.0	0.0				
Intersection	713	10.0		0.105		0.8	NA	0.2	1.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

6 Lane under-utilisation due to downstream effects

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LANE SUMMARY

Site: 101 [Post Development - AM Peak]

Chester Pass Road / Private Access Road
Stop (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chester Pass Road (South)													
Lane 1	509	10.0	1831	0.278	80[6]	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	303	10.0	869	0.349	100	10.8	LOS B	2.9	21.8	Full	500	0.0	0.0
Approach	812	10.0		0.349		4.0	NA	2.9	21.8				
East: Private Access Road (East)													
Lane 1	24	10.0	618	0.039	100	11.9	LOS B	0.1	1.0	Full	500	0.0	0.0
Lane 2	1	10.0	29	0.034	100	119.8	LOS F	0.1	0.7	Short	14	0.0	NA
Approach	25	10.0		0.039		16.2	LOS C	0.1	1.0				
North: Chester Pass Road (North)													
Lane 1	465	10.0	1831	0.254	100	0.0	LOS A	0.0	0.0	Short	150	0.0	NA
Lane 2	466	10.0	1831	0.254	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	931	10.0		0.254		0.0	NA	0.0	0.0				
Intersection	1768	10.0		0.349		2.1	NA	2.9	21.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

6 Lane under-utilisation due to downstream effects

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LANE SUMMARY

Site: 101 [Post Development - PM Peak]

Chester Pass Road / Private Access Road
Stop (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chester Pass Road (South)													
Lane 1	404	10.0	1831	0.221	80[6]	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	423	10.0	1528	0.277	100	2.7	LOS A	1.0	7.9	Full	500	0.0	0.0
Approach	827	10.0		0.277		1.4	NA	1.0	7.9				
East: Private Access Road (East)													
Lane 1	102	10.0	629	0.162	100	12.1	LOS B	0.6	4.5	Full	500	0.0	0.0
Lane 2	1	10.0	30	0.034	100	117.5	LOS F	0.1	0.7	Short	14	0.0	NA
Approach	103	10.0		0.162		13.2	LOS B	0.6	4.5				
North: Chester Pass Road (North)													
Lane 1	455	10.0	1831	0.249	100	0.0	LOS A	0.0	0.0	Short	150	0.0	NA
Lane 2	456	10.0	1831	0.249	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	911	10.0		0.249		0.0	NA	0.0	0.0				
Intersection	1841	10.0		0.277		1.4	NA	1.0	7.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

6 Lane under-utilisation due to downstream effects

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APPENDIX D – Electronic Swept Path Assessment



SWEPT PATH LEGEND

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- CLEARANCE FROM VEHICLE BODY
  - 500mm B-TRIPLE (RAV CAT 7)
  - 300mm B99

ASSUMED SPEED 5KM/H

998

REPORT ITEM DIS 165 REFERS

1:250 2.5 0 2.5 5 7.5 10 12.5 A1
1:500 A3

REV	DESCRIPTION	DRAWN	APP'D	DATE
A	PRELIMINARY ISSUE	TS	DT	07/09/18

ARCHITECT/CLIENT

PROJECT: LOT 10 CHESTER PASS ROAD/ LOT 521 MERCER ROAD, ALBANY

TITLE: SWEPT PATH ASSESSMENT TURNING IN MOVEMENTS

WOOD & GRIEVE ENGINEERS

PRELIMINARY
NOT FOR CONSTRUCTION
TRANSPORTATION

SCALE @ A1	PROJECT No	DRAWING No	REV
1:250	39605	TR-400-P01	A



SWEPT PATH LEGEND

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- CLEARANCE FROM VEHICLE BODY
  - 500mm B-TRIPLE (RAV CAT 7)
  - 300mm B99

ASSUMED SPEED 5[illegible]%

B-TRIPLE

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 17.2
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

B99

	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.9

1:250 2.5 0 2.5 5 7.5 10 12.5 A1
1:500 A3

REPORT ITEM DIS 165 REFERS

999

REV	DESCRIPTION	DRAWN	APP'D	DATE
A	PRELIMINARY ISSUE	TS	DT	07/09/18

ARCHITECT/CLIENT

PROJECT: LOT 10 CHESTER PASS ROAD/ LOT 521 MERCER ROAD, ALBANY

TITLE: SWEPT PATH ASSESSMENT TURNING OUT MOVEMENTS

WOOD & GRIEVE ENGINEERS

PRELIMINARY
NOT FOR CONSTRUCTION
TRANSPORTATION

SCALE @ A1	PROJECT No	DRAWING No	REV
1:250	39605	TR-400-P02	A

ARDESS-WALMSLEY LOCAL STRUCTURE PLAN

PART ONE - IMPLEMENTATION

1. Structure Plan area

This Structure Plan shall apply to Lot 10 Chester Pass Road, Walmsley and Lot 521 Mercer Road, Walmsley being the land contained within the inner edge of the line denoting the Structure Plan boundary on the Structure Plan map (Plan 1).

2. Structure Plan content

This Structure Plan comprises:

a) Part 1 - Implementation section - This section contains the Structure Plan map and statutory planning provisions and requirements.
b) Part 2 – Non-statutory (explanatory) section - This section to be used as a reference guide to interpret and justify the implementation of Part One.
c) Appendices – Technical reports and supporting plans and maps.

3. Interpretation and Scheme relationship

Unless otherwise specified in this part, the words and expressions used in this Structure Plan shall have the respective meanings given to them in the *City of Albany Local Planning Scheme No. 1* (the Scheme) including any amendments gazetted thereto.

The Scheme prevails over the Structure Plan in the case of any inconsistency.

4. Operation

The date the Structure Plan comes into effect is the date the Structure Plan is approved by the Western Australia Planning Commission (WAPC).

5. Vision

The Structure Plan vision is to:

a) Develop two precincts, one comprising light and general industry and the other comprising residential.
b) Provide a major employment area.
c) Separate the industrial and residential precincts by a landscaped major north/south transport route.
d) Provide a district size public open space along with an adjoining primary school central to the residential precinct.

6. Preferred character, design objectives, strategies, requirements and actions

Table 1 sets out the preferred character, design objectives, strategies, requirements and actions for the industrial precinct and the residential precinct. This establishes the longer-term direction, intended outcomes, required additional technical investigations along with requirements (standards).

Table 1 - Preferred character, design objectives, strategies, requirements and actions		
	Industrial Precinct	Residential Precinct
Preferred character	To create an industrial precinct that provides a range of land uses and employment opportunities which limit offsite impacts including noise, visual, dust and transport.	To create a primarily residential neighbourhood based on a connected grid-based local street network, that has been modified to respond to the topography and key site and amenity features.
Design Objectives	• Ensure development facing public roads is appealing and is appropriately landscaped. • Support development that minuses land use conflict with adjoining residential areas through setbacks, landscaping, noise mitigation, land use and building orientation. • Require a holistic approach to stormwater treatment that avoids localised and temporary drainage treatment where possible. • Require landscaping of streets with appropriate trees and shrubs. • Require an active built form interface with Range Road.	• Encourage residential subdivision generally at a conventional density (lot sizes of approximately 400-600m^2) with opportunities for smaller lots adjacent to public open space (POS) and school. • Promote joint POS and primary school recreation. • Promote portion of POS contribution as finance for use in developing infrastructure associated with POS areas. • Support diverse housing outcomes in key locations, such as near key roads, interfacing with POS, on prominent corners and in other appropriate locations. • Encourage a subdivision design that prioritises a connected, legible and gridded street network, with modifications that respond to site conditions, topography and amenity features. • Encourage subdivision design that incorporates discrete design elements that will result in a diverse and attractive public realm and sense of place. • Avoid cul-de-sacs. • To require landscaping of streets with canopy trees. • Require an active built form interface with intergrator arterial roads, neighbourhood connector roads and POS. • Require a holistic approach to stormwater treatment that avoids localised and temporary drainage treatment where possible.
Strategies	• Support light industry and general industry. Locate the light industry surrounding the general industry as a buffer to neighbouring sensitive uses. • Incorporate landscaped setback areas or other amelioration measures between light industry and sensitive uses. • Limit industrial activity subject to public road capacity. • Connect new industrial areas to reticulated sewerage. • Support transport depots in the General Industry area following rezoning:	• Support residential development at minimum of R20. • Promote higher density adjacent to POS and the primary school and other relevant parts of the precinct.

	○ Any transport depot or other use that can be considered, that is accessed by Restricted Access Vehicles, can be considered for Temporary Development Approval for a period that expires not later than the expected completion date of the Ring Road (to be confirmed by Main Roads); and ○ Any transport depot or other use that can be considered, that is accessed by "as of right" vehicles can be located in the Ardess Estate without time restrictions.	
Requirements	• Require a mix of lot sizes to accommodate different uses (e.g. 2000m^2 – 2ha). • Maximum total of 30 industrial lots/industrial land uses may be considered within the industrial precinct. This requirement applies due to limitations on adjoining transport infrastructure. • A revised traffic impact assessment is required setting out mitigation measures and associated treatments, should the number of vehicle movements to and from the industrial precinct exceed the current threshold detailed in the Transport Impact Assessment report (March 2019). • An Urban Water Management Plan is undertaken at the subdivision stage to provide detailed design in accordance with Department of Water and Environmental Regulation and local government requirements. • Stormwater is designed to feed into silt traps, which connect to the stormwater system and treated downstream. • Stormwater is not to be discharged from development onto Chester Pass Road or into the Chester Pass Road drainage system. • Retention and infiltration are to occur on site using individual soakwells, retention basins or other measures as deemed necessary. Oil and grease traps are to be provided within each building site to the satisfaction of the local government to ensure that nutrient export off the site is kept to a minimum. • The landscaping strip adjoining the Chester Pass Road boundary is to be retained and managed. • The living stream to be landscaped. • Intersections to be developed as generally indicated on the Structure Plan map. • Range Road to be developed as two	• An Urban Water Management Plan is undertaken at the subdivision stage to provide detailed design in accordance with Department of Water and Environmental Regulation and local government requirements. • Stormwater is designed to feed into silt traps, which connect to the stormwater system and treated downstream. • All residential lots being connected to the reticulated sewerage system. • Subject to the outcomes of the required Traffic Impact Assessment, the intersections to be developed as generally indicated on the Structure Plan map. • Range Road to be developed as two lanes with a 30m road reserve. • Consideration for pedestrian and cycling movement within subdivision design. • A minimum of 10 per cent POS provided in residential areas in accordance with WAPC policy. POS is to be provided generally in accordance with the Structure Plan map. The district POS area to be developed central to residential areas and is to incorporate portion of remnant vegetation as indicated on the Structure Plan map. The POS is to provide a range of opportunities suitable for sporting activities, nature space, playgrounds and other facilities. • Support portion of POS contribution as finance for use in developing infrastructure associated with POS areas. • Support opportunities for joint community/school recreational use of the primary school oval. • Stormwater basins in POS areas is to be developed in accordance with measures applicable to the WAPC Liveable Neighbourhoods.

	lanes with a 30m road reserve. • Road closure as per the Structure Plan map. • Subject to Main Roads Western Australia permitting Restricted Access Vehicles (RAV) on Chester Pass Road, between the Ardess Industrial Estate and Menang Drive, RAV access to and from the Ardess Industrial Estate is via the Private Access Road onto Chester Pass Road. • No RAV access onto Terry Road, Range Road or Mercer Road. • Access is permitted between the industrial precinct and Terry Road, Range Road and Mercer Road for as-of-right vehicles. • No additional crossovers to Chester Pass Road. • A right turn exit ban from the Private Access Road to Chester Pass Road required following full development of the site. Any right-turn ban would best be achieved through signage, as opposed to physical design. • Trees on the inner radius of the bend in the Private Access Road to be removed to allow for appropriate sight lines for oncoming traffic. Provide additional shoulder width at the corner to allow for two opposing RAV's to pass each other simultaneously. • Roads in the industrial precinct, including private roads, are to be developed to accommodate heavy vehicles. • The existing zoned industrial area may remain unsewered and confined to dry industries if all lots are above 1 hectare. On-site wastewater disposal shall utilise alternative treatment effluent disposal systems unless the applicant can provide advice to the local government that soil conditions are conducive to the operation of septic tanks and leach drains and will not result in unacceptable loss of nutrients to surrounding waterways, or create a risk to public health. • Additional industrial areas, currently zoned 'General Agriculture', to be connected to reticulated sewerage. A sewer pump station may be necessary. • Industrial uses are required to meet industrial buffer standards (including as relevant risk, noise, dust, emissions and other potential nuisances) and to not create detrimental impact on surrounding land uses. • All access and car parking areas are	• Revegetation using native species in areas of POS is to occur to promote fauna habitat and flora diversity. • At the time of rezoning, identify measures necessary to overcome land capability issues for southern areas adjacent to Mercer Road. • Prevent direct vehicular access between lots and Range Road, Terry Road and Mercer Road. • Suitably address an appealing street frontage to Range Road, Terry Road and Mercer Road through the design of subdivision roads and lots and the design/orientation of buildings. • The need for service roads will be addressed at the subdivision stage through more detailed assessment of a range of design considerations including land uses, topography, stormwater management, landscaping and addressing urban design and built form outcomes. • The orientation and design of buildings should be sympathetic to the existing landform.

	to be sealed to avoid dust. • No direct vehicular access is permitted between lots and Chester Pass Road and Range Road. • Suitably address an appealing street frontage to Range Road, Terry Road and Mercer Road through the design of subdivision roads and lots and the design/orientation of buildings.	
Actions	• Rezoning of the land to 'Light Industry' and 'General Industry' in accordance with the Structure Plan map. • Special conditions applicable to industrial zones are to be updated and included in Schedule 11 of the Scheme . • Notification on title and notification via development approvals that Chester Pass Road is a major heavy vehicle freight route and buildings in the vicinity may be affected by transport noise and vibration. • Should a review of heavy vehicle access along Chester Pass Road determine that negative impacts apply, restricted access regulations may be imposed, meaning the transport depot may have-to relocate or change the combination of trailers to comply. • At the time of rezoning or subdivision, the following studies may be necessary: a) Urban Water Management Plan. b) A Local Development Plan to address street frontages and design outcomes adjoining Range Road. c) Revegetation/landscaping plan.	• Rezoning of the land to 'Future Urban'. • At the time of rezoning or subdivision, the following studies may be necessary: a) Urban Water Management Plan. b) Bushfire Attack Level Contour Map. c) Traffic Impact Assessment, which includes intersection treatment locations and intersection and road upgrades/contributions. a) Local Development Plan. b) Revegetation/landscaping plan.

7. Land use and subdivision requirements

The Structure Plan map (Plan 1) outlines land use, zones and reserves applicable within the Structure Plan area.

7.1 Land Use Permissibility

Land use permissibility within the Structure Plan area shall be in accordance with the corresponding zone or reserve under the Scheme.

~~The land uses, zones and reserves designated under the Structure Plan map (Plan 1) are to plan for the co-ordination of future subdivision and development of the Structure Plan area.~~

The Structure Plan shall be given due regard by the local government when assessing development applications. Once incorporated into the Scheme, the use and development controls of the Structure Plan will have force and effect.

The Structure Plan map (Plan 1) provides designations guiding the preferred locations for future land uses and future key infrastructure including roads. The designations are indicative and will

be refined through detailed investigations and design at the time of rezoning, subdivision and/or development as appropriate.

~~Land within the Structure Plan area that is zoned 'General Agriculture' requires rezoning to 'Future Urban' via an amendment to the Scheme.~~

~~It is expected that the expanded light industrial area will be rezoned to 'Light Industry' while the land east of Range Road will be rezoned to 'Future Urban'.~~

~~5.3 Light Industry~~

~~The main access to the Ardess Industrial Estate is via a single entry road onto Chester Pass Road. Secondary access is permitted between the estate and Terry Road for as-of-right vehicles.~~

~~5.2 Residential~~

~~Plan 1 identifies residential density codes for the Structure Plan area.~~

~~A range of R-Codes will apply to residential areas shown on the Structure Plan. This will provide flexibility, allowing the final R Code to be applied closer to the time when the land will be subdivided.~~

~~On average, the Structure Plan area could accommodate approximately 14 dwellings per hectare. There are opportunities to create additional lots subject to market demand.~~

~~5.4 Public open space~~

~~A minimum of 10 per cent public open space (POS) will be provided in residential areas in accordance with WAPC policy. POS is to be provided generally in accordance with Plan 1. The POS will provide a range of opportunities suitable for sporting activities, nature space, playgrounds and other facilities.~~

~~There may also be opportunities for joint community/school recreational use of the primary school oval.~~

7.2 Subdivision

Key requirements to support or implement subdivision applications are set out in Table 1.

Subdivision of the land should address the requirements and actions outlined in Table 1 and generally be in accordance with the Structure Plan (Plan 1) approved by the WAPC with any minor variations approved by the WAPC.

~~The minimum lot size is 1 hectare in the area classified and then zoned as 'Light Industry'.~~

For land zoned 'General Agriculture', other than the creation of super lots, further subdivision will not be supported prior to rezoning to the 'Future Urban' zone.

7.3 Conditions of subdivision approval

At the time of subdivision, the following conditions may be recommended, as applicable, requiring the preparation and/or implementation of the following:

- Urban Water Management Plan.
- Bushfire Management Plan.

- A Local Development Plan ~~to address matters in section 6.2~~.
- Revegetation/landscaping plan.
- Preventing direct vehicular access between lots and Chester Pass Road, Range Road, Terry Road (section classified as an Integrator Arterial Road) and between residential lots and Mercer Road.
- Notification of titles, for lots adjoining Chester Pass Road, advising that Chester Pass Road is a major heavy vehicle freight route and buildings in the vicinity may be affected by transport noise and vibration.
- ~~All residential lots being connected to the reticulated sewerage system.~~

~~a) Notification on titles advising that reticulated sewerage is not provided to light industrial lots and setting out that uses need to be 'dry industries'.~~

8. Development requirements

8.1 General

Development will be controlled by the Scheme and will be guided by the Structure Plan (Plan 1), the *Residential Design Codes* (for residential development), any approved Local Development Plan and any relevant Local Planning Policies.

~~The proposed predominant land use within the Structure Plan area will be residential development. It is also proposed to further develop and expand the Ardess Industrial Estate as a key employment area.~~

~~6.3 Light Industrial development~~

~~Development in the area classified as 'Light Industry' will be serviced with on-site wastewater disposal. Existing and proposed industries will be 'dry-type' light industrial uses. Development is required to have low wastewater generation and low volume of process water for disposal. Development shall comply with the *State Government Sewerage Policy*.~~

~~On-site waste water disposal shall utilise alternative treatment effluent disposal systems unless the applicant can provide advice to the local government that soil conditions are conducive to the operation of septic tanks and leach drains and will not result in unacceptable loss of nutrients to surrounding waterways, or create a risk to public health.~~

~~The local government will require stormwater disposal measures to be implemented to ensure that maximum retention and infiltration occurs on site through the use of individual soakwells, retention basins or other measures as deemed necessary. Oil and grease traps are to be provided within each building site to the satisfaction of the local government to ensure that nutrient export off the site is kept to a minimum.~~

~~The landowner shall retain and manage the landscaping strip adjoining the Chester Pass Road boundary of the site.~~

~~Industrial uses are required to meet industrial buffer standards (including as relevant risk, noise, dust, emissions and other potential nuisances) and to not create detrimental impact on surrounding land uses.~~

~~Development that incorporates restricted access vehicles will be advised that there is no guarantee that restricted access vehicles will be permitted to use Chester Pass Road between Menang Drive and the main roundabout (intersection with Albany Highway, North Road and Hanrahan Road) following the Albany Ring Road being completely constructed and operational to the Port of Albany. Associated development approvals may also contain conditions or advice relating to future limitations of access for restricted access vehicles.~~

~~6.2 Residential development~~

~~The orientation and design of buildings should be sympathetic to existing landform.~~

8.2 Local Development Plans

Local Development Plans will be required to support applications for subdivision and development relating to the following:

a) Industrial and residential development adjoining Range Road to address access, car parking, built form, possible mixed uses and landscaping.
~~b) Lots located between Terry Road and the bush corridor to address access, built form, bushfire management and landscaping.~~
c) Lots adjoining Terry Road (section classified as an Integrator Arterial Road) and Mercer Road, if there is no service road, to address access, built form and landscaping.
d) Where residential lot sizes are 260m^2 or less.

9. Other requirements

9.1 Developer contributions

~~The local government will have due regard to a Contribution Plan prepared for the site and area~~.

Developer contributions are to be made in accordance with the WAPC's State Planning Policy 3.6 and any Local Planning Policy adopted by the City of Albany.

9.2 Staging

~~The Ardess Industrial Estate is long established industrial estate. It is initially proposed to expand the industrial area eastwards to the extension of Range Road.~~

The Structure Plan proposes a substantial residential precinct ~~area~~ east of Range Road. It is likely that the development will be staged over the next couple of decades. The staging will be flexible and should adapt to competing development fronts and the varying attractivity and cost of subdividing other development.

Lot 521 is zoned 'General Agriculture'. Accordingly, it will need to be rezoned prior to residential subdivision and development proceeding. The residential precinct to be rezoned to 'Future Urban'.

Schedule of Submissions and Recommended Modifications

LOCAL STRUCTURE PLAN No.10

Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley.

No.	Address	Summary of Submissions ***Note: This is a broad summary of the submissions only.*** ***A copy of the submissions in full has been provided to the Council as a separate document.***	City Recommended Modification	City Reason
Utilities				
1.	ATCO Gas Australia	<u>Gas</u> ATCO Gas Australia does not have any objection to the proposed Local Structure Plan.	<u>Note comment from ATCO Gas.</u> No modification to structure plan required.	ATCO Gas has no objection to the Structure Plan.
2.	Water Corporation	<u>Water Supply</u> The subject area is within the Albany Water Zone and currently no detailed retic level water planning exists. Subject to verification of capacity issues as further subdivision and development proceeds, the Corporation will consider allowing developers to incrementally extend water reticulation-sized mains (generally 200mm diameter or smaller) into the subdivision areas.	<u>Note comment from WC on water</u> No modification to structure plan recommended.	The subject area is within the Albany Water Zone and currently no detailed retic level water planning exists. Subject to verification of capacity issues as further subdivision and development proceeds, the Corporation will consider allowing developers to incrementally extend water reticulation-sized mains (generally 200mm diameter or smaller).
3.	Department of Planning, Lands and Heritage.	<u>Reticulated sewer – additional industrial areas</u> All of the additional land proposed by the Structure Plan for industry is to be provided with reticulated sewerage so that the zone can accommodate the whole range of lot sizes and uses, with only the inner core of the existing industrial zone being unsewered with a min 1ha lots.	<u>Uphold comments relating to sewer.</u> **1. It is recommended that the structure plan is amended with conditions ensuring that;** **a) New industrial areas are connected to reticulated sewer; and** **b) Subdivision to create lots <1ha in the existing industrial area shall connect to deep sewer.** **2. It is recommended that the structure plan is modified to note that the existing zoned industrial area may remain unsewered and confined to dry industries until such time as more dense development in the area needs to be accommodated in which case deep sewerage is required.**	The Water Corporation and the Department of Planning, Lands and Heritage commented that the subject land, including new industrial land, should connect to reticulated sewer. Deep sewer infrastructure has been developed in the locality and is available for connection.
4.		<u>Reticulated sewer – existing industrial areas</u> The existing zoned industrial area to remain unsewered and confined to dry industries until such time as more dense development in the area needs to be accommodated in which case sewerage would be needed.		
5.	Water Corporation	<u>Wastewater</u> The implementation of sewer planning relies on the area being developed in a logical and orderly manner from west to east. Leapfrogging the urban front will likely incur costs for the developers in the construction of temporary wastewater infrastructure and the extension of water reticulation mains. The ultimate servicing of most of this land relies on the construction of a major waste water pumping station.		

6.	Department of Water and Environmental Regulation (Water resource matters)	<u>Wastewater</u> The site is not located within a Sewerage Sensitive Area as defined in the draft Government Sewerage Policy (Department of Planning Lands and Heritage, 17 November 2017). Under the draft Government Sewerage Policy the acceptability for on-site sewage is considered on case-by-case basis for approved industrial development.		
7.	Ayton Baesjou (on behalf of neighbouring Lots: • 6 Chester Pass Rd • 271 Chester Pass Rd • 5498 Terry Rd	<u>Sewer</u> Excluding the area from scheme sewer will significantly increase the cost of bringing the sewer into the area. Connection to sewer will also enable the Ardess Industrial Estate to provide a wide range of lot sizes ranging from 2,000m^2 upwards.		
POS/Native Vegetation				
8.	Ayton Baesjou (on behalf of neighbouring Lots: • 6 Chester Pass Rd • 271 Chester Pass Rd • 5498 Terry Rd	<u>POS</u> The size of Lot 521 provides an opportunity to consolidate the POS requirement to create a District Open Space area to cater for future active recreation. The designation of the vegetation running east-west across the property as POS is contrary to Liveable Neighbourhoods and Council's POS Policy and will result in inadequate provision for active POS. It also represents a lost opportunity to create a district POS area which in association with a primary school could become a major attraction.	<u>Uphold comment relating to POS.</u> **3. It is recommended that the structure plan is amended to show a district area of POS central to the residential precinct.**	POS should be ceded and developed to comply with the WAPC Liveable Neighbourhoods and the City's Public Parkland Policy. POS is generally acquired to provide areas for residents to undertake sport, nature and recreation activities. It is considered inappropriate to cede POS for conservation purposes. Restricted access conservation areas are not accepted as a contribution to POS provision. Also, the allocation of POS to manage stormwater should not take away the predominant function of POS, being to provide areas for recreation. The structure plan proposes stormwater basins to attenuate the flow of water. Constructed permanent water bodies (e.g. ornamental lakes) are only permitted where designed in accordance with water sensitive urban design principles and approved in the Local Water Management Strategy and Urban Water Management Plan. Concrete-lined and/or <u>steep-sided drains</u> and retention basins or detention basins receive zero per cent credit towards public open space provision.
9.	Department of Biodiversity, Conservation and Attractions.	<u>Native Vegetation</u> The retention of native vegetation not only maintains the natural amenity for this area but also supports threatened species through retention of habitat.	<u>Note comment from DBCA on remnant vegetation.</u> **4. It is recommended that the structure plan text and map is changed to identify portion of the proposed conservation area for residential development and portion for 'POS - Nature space'.**	The advertised structure plan (2018) recommended the protection of an existing strip of native vegetation. The structure plan proposes to protect the vegetation via ceding to the Crown as Public Open Space. The structure plan has categorised the proposed POS (conservation area) as 'Restricted' POS. As an alternative to ceding vegetated areas for conservation, the proponent initially proposed in 2018 that

				vegetation could also be retained and managed through larger residential or 'conservation' lots. Native Vegetation/POS The proposed conservation area will not provide a POS function to the community and therefore should not be deemed as 'Restricted' use and should not be ceded as POS. The Western Australian Planning Commission (draft) Liveable Neighbourhoods document recommends that 'Restricted access conservation areas' should not be accepted as a contribution to POS provision. Conservation Lots City staff believe that the land should be zoned to accommodate fully serviced, small lot residential development and not conservation lots, which may, over time be compromised with clearing to gain access and for fire management.
Demand/Supply for Industrial Development				
10.	Merrifield Real Estate	Ardess Estate Ardess Estate is a popular industrial estate providing affordable and flexible accommodation to businesses in Albany. Currently the site has a mixture of small transport, logistic and warehouse uses. The current tenants have chosen to locate in Ardess Estate as leasing land significantly reduces the upfront cost of setting up a site. Growth in the estate has been substantial over the past 5 years with further development expected as all buildings are currently occupied. Further growth of the estate will add to the economic activity and job creation of the area whilst attracting new business to Albany. Light and general industry land for lease is limited, making development difficult in this sector. We support the proposed extension of the industrial area surrounding Ardess Estate to ensure a long term supply of industrial land within a reasonable proximity to other commercial areas and good accessibility to the CBD and rural land. Historically Ardess Estate has provided affordable accommodation which is essential for the growth of small to medium businesses in Albany. In the past 12 months Ardess Pty Ltd has developed a small warehouse complex which is aimed at start up and small business to allow a stepping stone into medium industrial sites. Further development of this model is planned as there is a gap in the market for 90-150sqm sheds in a price range achievable to start-up businesses.	Note comments on supply and demand characteristics for industry. **5. It is recommended that the structure plan document references that industrial demand and supply has been addressed through the draft Albany Local Planning Strategy 2018.**	The draft Albany Local Planning Strategy 2018 foreshadowed an expansion of the Ardess industrial estate to the Range Road extension and "to cater for increasing demand for 'Light Industry' zoned land". The draft strategy does not set out the requirement for a separate industrial demand and supply assessment for Ardess. Preparation of an additional industrial land demand and supply assessment is unnecessary and a costly waste of landowner resources.
11.	Department of Planning, Lands and Heritage.	Need for Industry The Structure Plan needs to justify demand for/extent of proposed industrial land shown in context of the needs of the locality and the overall Albany City needs.		
12.	Goodchild	Land Supply/Demand		

		If Ardess Industrial Estate expands, this will further stress a depressed market for industrial land.		
13.	Walmsley	Employment Opportunity Support the Ardess - Walmsley Structure Plan as proposed by Ten Year Developments for the following reasons: • It creates an opportunity for local employment and business growth. • It will provide an enhanced central location for existing and new business ventures. • It complements the existing plan Ardess has for its land. • There is minimal environmental impact with the retention of native vegetation.		
200m Buffer				
14.	Department of Planning, Lands and Heritage.	Transport depot - 200m Buffer Transport depots are considered to be inappropriate adjacent to sensitive land uses such as residential. Delete provision for transport depots to be located adjacent to residential or other sensitive land uses. Confine transport depots to a core area separated by minimum 200m buffer.	Uphold comment regarding need to separate future transport depots from future residential. **6. As per Environmental Protection Guidelines and neighbour comment, it is recommended that the structure plan is modified to restrict transport depots from locating within 200m of residential development.** **7. It is recommended that the structure plan is modified such that transport depots are not permitted within a 200m buffer to residential uses. It is recommended that the structure plan is modified to show a 'Light Industry' area adjacent to residential (200m buffer area) and a 'General Industry' area central to the industry precinct (>200m to residential). The structure plan is to allow transport depots in the general industry area and not the light industry area.**	As recommended by the Environmental Protection Authority (EPA Guidelines), it is inappropriate to locate general industrial type activities (e.g. transport depot) within 200m of residential development. A core area (area >200m setback to boundaries), may be established and defined as 'General Industry' to accommodate transport depots.
15.	Goodchild	Land Use Conflict Not good planning to increase industrial land when surrounded by residential.		
16.	Department of Planning, Lands and Heritage.	Land Uses – Light Industry Limit the outer ring of industrial uses to standard light industries via light industrial zone.		
17.	Ayton Baesjou (on behalf of neighbouring Lots: • 6 Chester Pass Rd • 271 Chester Pass Rd • 5498 Terry Rd	Buffers It is apparent that the proposal to expand the Ardess Industrial area has had little regard to the objectives and recommendations of State Planning Policies such as; • SPP 5.4 Road and Rail Noise and Freight Considerations in Land Use Planning. • Policy DC4 Industrial subdivision. • SPP4.1 Industrial Interface. • EPA Environmental Assessment Guidelines for Separation Distances between Industrial and sensitive land Uses The land owners of Lots 6 and 271 on the western side of Chester Pass Road and Lot 5498 to the north, object to the absence of buffers. Transport depots as noted in the EPA's 'Environmental Assessment Guidelines for Separation Distances between Industrial and Sensitive Land Uses', are associated with gaseous, noise, dust and odour issues and a 200 metre separation distance is recommended.		
City Land				

18.	Department of Planning, Lands and Heritage.	<u>City Land</u> The structure plan should take a precautionary view on the land use options available for Council land, in particular the need or otherwise for a 200m buffer from the northern boundary for the establishment of proposed transport depots.	<u>Note comment from DPLH regarding adjacent land owned by the City of Albany.</u> No modification to structure plan required.	The City propose to continue to operate Lot 52 as a depot site, which includes storage yard, workshop, maintenance and administration.
Industrial Lot Size				
19.	Department of Planning, Lands and Heritage.	<u>Range of industrial lot size.</u> New light industry zones need to provide for a range a lot sizes (including lots less than 1ha).	<u>Uphold comment regarding industrial lot sizes.</u> **8. It is recommended that the structure plan is modified to ensure a range of lot sizes (including lots less than 1ha).**	A variety of lot sizes will facilitate different types of industrial land use.
20.	Ayton Baesjou (on behalf of neighbouring Lots: • 6 Chester Pass Rd • 271 Chester Pass Rd • 5498 Terry Rd	<u>Brooks Garden Activity Centre - viability</u> The development of an extensive industrial area within the primary catchment area of the Brooks Garden Activity Centre will do little to support the viability of the centre. Fully serviced lots ranging from 2,000m^2 upwards will generate significantly more jobs over the long term and will be more compatible with the surrounding area. Rather than space extensive industrial development, a greater emphasis on residential development will support the Activity Centre.		
Industrial Use Permissibility and Design Controls				
21.	Department of Planning, Lands and Heritage.	<u>Controls – Light Industry</u> Modifying the Structure Plan such that where the Light Industry zone is to be adjacent to/opposite residential areas within or outside SP area (eg Range Road and northern boundary of proposed industry area) , the Structure Plan prescribes the need for controls over uses and development to avoid potential conflict between some light industry uses and adjacent uses. The structure plan could also flag amendments to Local Planning Scheme such that some uses, e.g. Service Station is changed from 'P' to 'D' use in the Light Industry zone.	<u>Uphold (in part) comment from DPLH regarding a need for land use controls.</u> **9. It is recommended that the structure plan prescribes the need for controls over industrial uses and development, to avoid potential conflict (e.g. noise, odour and visual amenity) with adjacent residential uses.**	Subject to control measures (e.g. operational times and noise walls), uses that are possible in land zoned or allocated as Light Industry may be adequately located near residential uses.
Zoning Prior to Subdivision				
22.	Department of Planning, Lands and Heritage.	<u>Zoning</u> Modifying the Structure Plan to require industrial areas to be appropriately zoned prior to subdivision	<u>Uphold comment from DPLH requiring rezoning.</u> **10. It is recommended that the structure plan includes a provision that ensures industrial and residential areas are appropriately zoned prior to subdivision.**	Compliance with planning legislation.
Transport				
23.	Department of Planning, Lands and Heritage.	<u>Service Roads</u> Prescribe and show the need for local residential service roads adjacent/parallel to Mercer Road, Range Road and Terry Road.	<u>Uphold (in-part) comment from DPLH requiring the need for service roads.</u> **11. It is recommended that the structure plan is modified to include requirements that:** **a) restrict direct access from lots to major arterial roads; and** **b) ensure buildings are orientated toward major arterial roads (visual amenity).**	It is proposed to limit crossover access to major roads, including Terry, Mercer and Range Roads. It is proposed that internal roads (neighbourhood roads) form the basis for access to major arterial roads.

24.		Crossover – Lot 10 Review needs to be undertaken to determine if a single access point to Chester Pass Road is applicable given the Structure Plan shows an additional access to the north.	Note comment from DPLH relating to standard of entry/exit **12. It is recommended that the structure plan includes the following conditions, culminating from a traffic assessment:** **a) Trees on the inner radius of the bend in the Private Access Road be removed to allow for appropriate sight lines for oncoming traffic. Provide additional shoulder width at the corner to allow for two opposing RAV's to pass each other simultaneously.** **b) Max total 30 industrial lots/industrial land uses may be considered within the industrial areas. This condition applies because of limitations on adjoining transport infrastructure. A transport assessment has determined that the maximum number of vehicles that the current intersection design (Chester Pass Rd) can handle is 180 RAV's per day.**	A traffic assessment (undertaken post advertising by Wood and Grieve) has determined that the entry/exit at Chester Pass Road is suitable for large truck movement. The traffic assessment recommends upgrading of the internal access to enable safe turning movement. The traffic assessment concluded that the intersection is capable of handling 180 RAV movements per day. Upgrading of the intersection is required when traffic movements exceed 180 RAV's per day.
25.		Leasehold with private roads versus Freehold with public roads The Structure Plan needs to make it clear that the expanded industrial area is intended to be private leasehold lots serviced by private roads, and that provision of reticulated water and sewerage, power, etc would be compatible and satisfactory to the Service Providers such as the Water Corporation under this tenure arrangement.	Note comment from DPLH on lease-holding. No modification to structure plan recommended.	The expanded industrial area is intended to be private leasehold lots serviced by private roads. The structure plan states: *In the future, the owners of Lot 10 Chester Pass Road and the City will review whether the private road becomes vested with the City as a public road.* Under a private arrangement, the Water Corporation would provide an appropriately sized service to a single lot (green title) based on availability and capacity of the water and wastewater system. Water mains are laid in gazetted roads and would not be extended to private roads. Similarly a wastewater connection would be provided to the lot boundary. The applicant can make arrangements to configure a private water supply main within their lot to service leasehold lots. This can also be done for wastewater (private plumbing) and is managed by the owners, with the Corporation being responsible to the recognised lot boundary only.
26.		Transport Depot – sunset clause Provisions in the structure plan and scheme should require approvals for transport depots to be subject to 'sunset' clause such that in the future they	Note comments transport depots and associated heavy vehicle movement on local roads,	Large restricted access vehicles (RAV's) are currently permitted to travel on the Chester Pass Road, which adjoins the subject land.

		may be relocated to locations which meet future transport objectives of MRWA and the City.	**13. It is recommended that the structure plan includes the following conditions:** **a. Any transport depot or other use that can be considered, that is accessed by RAVs can be considered for temporary Development Approval for a period that expires not later than the completion date of the Ring Road (to be confirmed by Main Roads).** **b. Any transport depot or other use that can be considered, that is accessed by "as of right" vehicles can be located in the Ardess Estate without time restrictions.**	As set out in the Traffic Impact Assessment, Chester Pass Road and associated intersections can safely accommodate traffic in an expanded Ardess Industrial Estate including RAVs (heavy haulage vehicles). The Ring Road has now been funded and will likely be completed in the next 3-5 years. It is highly likely that there will be changes to the RAV network on Chester Pass Road once the Ring Road is complete. Any transport depot or other use that is accessed by RAVs can therefore only use the Ardess Estate as an interim location for a period not exceeding 3-5 years (to be confirmed). This can be controlled by issuing temporary development approvals as provided for in the City's local planning scheme. These restrictions included in this structure plan can be reviewed at a time when there is certainty around the ultimate RAV network designation of Chester Pass Road.
27.	Ayton Baesjou (on behalf of neighbouring Lots: • 6 Chester Pass Rd • 271 Chester Pass Rd • 5498 Terry Rd	<u>Transport depot</u> A location of transport orientated uses within the proposed ring road will draw traffic into the urban core and will have a significant impact on the amenity of the Residential, Community and Commercial areas. Transport depots may be denied access along Chester Pass Road when the ring road is constructed. Therefore makes no planning sense to locate transport depots in the area. Likely create significant issues in the future.		
28.	Goodchild	<u>Future Access – Chester Pass Rd</u> With the proposed expansion of Ardess Industrial Estate more trucking companies could move into this area and continue south on Chester Pass Rd towards the main roundabout of Albany instead of heading out of town and utilising the bypass ring road- Menang Drive. There is a statement in the Environment Assessment Capability Assessment Report - "that restricted access vehicles may not be guaranteed access to Chester Pass Rd between Menang Drive and the main roundabout when Menang Drive is completed," how would the City of Albany enforce this policy in the future?		
29.	Main Roads WA	<u>Closure – Crossover – Chester Pass Rd</u> Main Roads may request the closure of the existing driveway access to Chester Pass Road after the Terry Road connection to Chester Pass Road is realigned and completed. Any change of use or upgrading of the current driveway access to Chester Pass Rd is to be approved by Main Roads. As the development grows further treatments to the existing crossover access may be required (turn pockets etc).	<u>Note comment from MRWA regarding the existing crossover to Chester Pass Road.</u> No modification to structure plan recommended.	It is intended that heavy vehicles continue to use the existing private access onto Chester Pass Road. It is intended that the Terry Road connection to Chester Pass Road is used by as-of –right vehicles and not large trucks (RAV7). A traffic assessment has determined that the entry/exit at Chester Pass Road is suitable for large truck movement. The traffic assessment recommends upgrading of the internal access to enable safe turning movement. The traffic assessment concluded that the intersection is capable of handling 180 RAV movements per day. Upgrading of the intersection is required when traffic movements exceed 180 RAV movements per day.
30.	Department of Planning, Lands and Heritage.	<u>Transport/Roads/Intersections</u> Further investigation is needed by way of preliminary engineering assessment to ensure grade of proposed road alignments and intersections would 'be appropriate for heavy vehicles (northern road connection from Chester Pass Road would provide for heavy vehicles to access Range Road).	<u>Dismiss comment from DPLH regarding engineering assessment to ensure grade of proposed road alignments and intersections would 'be appropriate for heavy vehicles.</u>	The maximum grade of a road is a function of site conditions, vehicle dynamics, road construction cost and maintenance cost. Depending on the design speed and terrain, maximum grades vary from 3% to 10% and more. The maximum length of grade, especially steep grade, is governed by the operating speed of a typical loaded truck (uphill) and the risk of brake failure (downhill). The grade of the site where the road linking from Terry Road to Range Rd is proposed equates to max 10% - a

				1m rise for a 10m length. This may be accepted as a suitable grade subject to road design and speed limits. The northern precinct proposes to accommodate residential development. It is not appropriate that large trucks commute through a residential area. The advertised draft structure plan proposed that access via the proposed northern road connection to Chester Pass Road is for as-of-right vehicles only. RAV7 vehicles not permitted.
31.	Main Roads WA	<u>Private Access Roads</u> Main Roads questions the validity of privately owned access roads within the industrial estate. It raises the question of substandard access for heavy vehicles as the roads are not included in the Restricted Access Vehicle network system.	<u>Uphold comment from MRWA regarding private road construction.</u> **1. It is recommended that a provision is included to ensure roads within the structure plan area are designed and developed to accommodate heavy vehicles.**	No comment.
32.		<u>Restrictive Covenant</u> Where not already in place, restrictive covenants to all lots sharing boundary's with the Chester Pass Rd road reserve will be applied. No further access points to Chester Pass Rd will be approved by Main Roads. This includes emergency fire access points, requirements for bushfire safety must be addressed by other means.	<u>Uphold (in part) comment from MRWA on access to Chester Pass Road.</u> **2. It is recommended that a provision is included to ensure that no additional access to Chester Pass Road may be permitted.** **3. The structure plan needs to be amended to show an emergency fire access to Chester Pass Road. This is in-line with the approved Development Guide Plan for Ardess, which supports an emergency fire access to Chester Pass Road.**	Access to the subject land is available via a crossover to Chester Pass Road and Terry Road. As part of previous planning for Ardess, extending back decades, the landowner has previously ceded land to Main Roads WA to widen the Chester Pass Road reserve.
33.		<u>Notification – Chester Pass Rd</u> All future planning must take into account that the Chester Pass Road is a major heavy vehicle freight route and buildings in the vicinity will be affected by transport noise and vibration.	<u>Uphold comment from MRWA regarding transport noise from Chester Pass Road.</u> **4. It is recommended that a provision is included to ensure landholders are aware (notification on title and notification on Development Applications) that Chester Pass Road is a major heavy vehicle freight route and buildings in the vicinity may be affected by transport noise and vibration.** **5. This notification can be removed in future if the designation changes.**	The Ardess Industrial Estate has existed alongside the heavy freight route for decades.
34.	Goodchild	<u>Competition and Development Standards</u> Object strongly to the Walmsley Local Structure Plan.	<u>Note comment relating to infrastructure development standards.</u>	No comment.

		We are developers of Pendeen General Industrial Estate, we are trying to continue the establishment of Pendeen General Industrial Land we have land (21 hectares) available and ready access to Albany's freight route, Menang Drive. We have to provide roadside kerbing, underground drainage, street lighting these things seem not to be provided by Ardess and we consider that this is not putting us on an equal footing with Ardess developers.	**6. It is recommended that provision is included with the structure plan to ensure roads are developed to an urban standard, to the satisfaction of the City.**	
35.	Ayton Baesjou (on behalf of neighbouring Lots: • 6 Chester Pass Rd • 271 Chester Pass Rd • 5498 Terry Rd	Traffic Impact Assessment A detailed traffic impact assessment, as required by State Planning Policy 5.4, has not been prepared for what purports to be a significant transport orientated development. It is likely that alternative access to Chester Pass Road will be required which will result in heavy goods vehicles being drawn through surrounding residential areas. The owner of Lot 5498 is likely to be impacted if this occurs and objects to such access as it will detrimentally impact on his residential development.	Note comment relating to restricting heavy vehicles from accessing through future residential areas to the north. No modification to structure plan recommended.	A traffic assessment (undertaken post advertising by Wood and Grieve) has determined that the entry/exit at Chester Pass Road is suitable for large truck movement. The traffic assessment recommends upgrading of the internal access to enable safe turning movement. The traffic assessment concluded that the intersection is capable of handling 180 RAV movements per day. Upgrading of the intersection is required when traffic movements exceed 180 RAV movements per day. The advertised draft structure plan proposed that the northern road connection to Chester Pass Road is for as-of-right vehicles only.
36.		Crossover Lot 10 – Chester Pass Rd The existing access to Chester Pass Road does not provide passing /slip lanes for heavy vehicles either entering or exiting the site.	Note comment relating to standard of intersection between Chester Pass Road and Lot 10. No modification to structure plan required.	A traffic assessment concluded that the intersection is capable of handling heavy truck movement. MRWA has approved the crossover as is for heavy truck movement.
37.		Terry Road The owners of Lot 4925 and 5498 Terry Road object to the designation of Terry Road as an Integrated Arterial Road, which will require a five metre road widening on either side. In discussion with MRWA, the CoA and DPLH, it was agreed that Mercer Road and Terry Road would be designated as Neighbourhood Connector Roads.	Note comment relating to standard of Terry Road. No modification to structure plan required.	Road hierarchy should reflect existing and proposed function/characteristic - in keeping with Liveable Neighbourhoods. E.g. 'Primary Distributor', Integrator Arterial', 'Neighbourhood Connector'.
Residential Density				
38.	Department of Planning, Lands and Heritage.	Min R20 Density Amend SP to show proposed R5/10 area as having proposed minimum density code of R20.	Uphold comment from DPLH requesting density change. **7. It is recommended that the structure plan is modified to show proposed R5/10 area as having a minimum density code of R20.**	It is proposed that the subject land is developed for 'urban' purposes and that development is fully serviced.
39.	Ayton Baesjou (on behalf of neighbouring Lots: • 6 Chester Pass Rd • 271 Chester Pass Rd • 5498 Terry Rd	Residential Density The proposed designation of R5-10 Residential development along the southern side of Terry Road will significantly impact on the viability of constructing Terry Road to an Arterial Road standard.		
School				

40.	Department of Education	School The proposed site location and the 4 hectares identified for the primary school site is acceptable to the Department. The estimated Lot yield is sufficient for the proposal for a primary school within the identified local structure plan.	Note comment from the DOE on a proposed school. **8. It is recommended that, reference within the structure plan, to contribution planning for the proposed school, is deleted.**	The structure plan recommends that landholders adjacent to the structure plan area contribute to the cost of the proposed primary school site. Contributions for schools are managed by the Department of Education. The structure plan does not need to calculate contributions for the proposed school.
Land Capability				
41.	Department of Water and Environmental Regulation (Water resource matters)	Land capability assessment There are inconsistencies within the document regarding the land capability assessment for urban development.	Uphold comment from DWER relating to land capability. **9. It is recommended that the structure plan is amended to identify measures necessary to overcome land capability issues for a 'Mapping Unit No.2' area (low development capability area).**	The land capability assessment identifies an area (Mapping Unit No.2) as having a low development capability ('IV'), mainly due to a 'Very Low' soil absorption ability. Regardless, the structure plan identifies the area as being suitable for development. A range of measures can be used to overcome the land capability constraint including providing clean and suitable fill at the subdivision stage. The area will be serviced with reticulated sewerage, enhanced stormwater management and there are opportunities to provide amended soils for gardens and within the road reserves. This will be suitably addressed at the subdivision stage.
Stormwater				
42.	Main Roads WA	Stormwater – Chester Pass Rd No stormwater from the development is to be discharged into the Chester Pass Rd drainage system.	Uphold comment from MRWA on stormwater. **10. Recommend including provision to ensure stormwater is not discharged from development to the Chester Pass Rd drainage system.**	Stormwater should be managed on-site to the satisfaction of the City.
43.	Department of Water and Environmental Regulation (Water resource matters)	Waterway - location The location of the waterway shown on the LWMS map is not entirely accurate. The modified waterway which enters Lot 10 from Chester Pass Road and which exits Lot 10 on Terry Drive is located further to the north of the waterway that is mapped. Based on a site visit, the waterway is contained entirely within Lot 10 and this is supported by aerial imagery where the course of the waterway is visible. Development of the waterway into a Living Stream would improve the values of the waterway including water quality discharging into the King River.	Uphold comment from DWER relating to a watercourse. **11. It is recommended that the structure plan map is amended to show a waterway within the Lot 10 and also extending north over the neighbouring Lot 5498.** **12. It is recommended that the structure plan is amended to show landscaping of the waterway.**	Landscape treatment helps to manage nutrients and generally improves the amenity of the area. The structure plan currently states the following for the living stream: *Undertake enhancement of the seasonal watercourse within the Structure Plan area to create a 'Living Stream'.* The proponent believes that landscape treatment, is only necessary within the existing drainage easement. Depending on characteristics of the land and water flooding/movement, landscape treatment may be necessary outside of the drainage easement.
		Waterway - revegetation Revegetation could be used to provide connectivity with the Living Stream to the vegetation corridor to the east on Lot 521, although realignment of the existing waterway may be required to achieve this. The department recommends that rehabilitation of the waterway occurs and that the Living Stream is included within POS.	Dismiss comment from DWER relating to connectivity with Lot 521. No modification to structure plan required.	Land to the east of the waterway is cleared of vegetation and is proposed for industrial development and not for conservation purposes.

		Local water management strategy. The document does not provide the work required to support the recommendations made in the LWMS. For instance, the LWMS does not 'prove up' the geotechnical study for stormwater design or demonstrate what needs to be done to meet the design objectives and criteria. The LWMS's stormwater management strategy should make recommendations based on appropriate measurement and modelling. The methodology of the Australian rainfall and runoff: a guide to flood estimation for hydrological and hydraulic analyses is a prerequisite to infrastructure design. No surface water modelling has been undertaken as required with preparation of a LWMS and no preliminary calculations or sketches are provided all of which are required to provide proof of concept. Drainage modelling needs to be undertaken to determine the detailed land requirements and flood ways needed to cope with storm events. The location of the surface flow paths and floodwater storage areas needs to be shown so that consultation with the department and drainage service providers can occur to establish acceptability for meeting flood protection, amenity and other requirements. The DWER would support the use of tree pits along road verges particularly as a strategy where on site infiltration is limited by slow draining soil types.	Uphold comment from DWER relating to local water management. **13. It is recommended that the structure plan is updated to show how stormwater drainage will be managed within the planned development area. In particular, the structure plan needs to demonstrate:** **a) How infiltration on site for at-source control will be achieved through bio-retention, floodways, treatment drains, public open space and should provide indicative locations for this infrastructure. Note: More basins as structural controls would be expected to be required for sub-catchment;** **b) How runoff in steep areas will be controlled to avoid erosion;** **c) A flow path in the event that land is affected by flooding (1% Annual Exceedance Probability).**	A Local Water Management Strategy (undertaken post advertising by Wood and Grieve) has been submitted showing how stormwater responds to the context of site investigations and local conditions. Measures for implementation include upstream detention basins that could accompany public open space areas.
Contributions				
44.	City of Albany	The structure plan includes a contribution plan for infrastructure treatments. The contribution plan is ambiguous and in need of simplification.	***14.*** **Recommend deleting the Contributions Plan in the structure plan (Appendix 12). Recommended that the following wording is placed in the Structure Plan provisions (Attachment 6 of Council Report Item):** ***"Developer contributions are to be made in accordance with the WAPC's State Planning Policy 3.6 and any Local Planning Policy adopted by the City of Albany."*** **Recommend replacing the wording in Section 3.9 of the LSP with the following:** ***"Developer contributions are to be made in accordance with the WAPC's State Planning Policy 3.6. Contributions may be required for:*** ***1. The ceding and development of land for a north/south link road, namely 'Range Road'.*** ***2. Road upgrading and/or intersection treatments as may be required at the subdivision stage, as***	It is expected that a Traffic Analysis required at a subdivision design stage may clarify the need for contributions and/or infrastructure development and the ratio of contribution based on costings, proportion of vehicles and expected dwellings.

			recommended by a Traffic Analysis to the satisfaction of the City of Albany. ***Note: The value of contribution for Range Road may consider:*** ***1. Value of land ceded (30m W/L?); +*** ***2. Road construction costs; divided by*** ***3. Proportion of vehicles attributed to structure plan; divided by*** ***4. Expected dwellings; =*** ***5. Cost per lot.*** ***Note: Road upgrading and/or intersection treatments may be required for Terry Road, Mercer Road and the intersection between the Range Road and Mercer Road. Cost sharing mechanisms may apply."***	

Schedule of Modifications

LOCAL STRUCTURE PLAN No.10

Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley.

1) **It is recommended that the structure plan is amended with conditions ensuring that;**
   a) **New industrial areas are connected to reticulated sewer; and**
   b) **Subdivision to create lots <1ha in the existing industrial area shall connect to deep sewer.**

2) **It is recommended that the structure plan is modified to note that the existing zoned industrial area may remain unsewered and confined to dry industries until such time as more dense development in the area needs to be accommodated in which case deep sewerage is required.**

3) **It is recommended that the structure plan is amended to show a district area of POS central to the residential precinct.**

4) **It is recommended that the structure plan text and map is changed to identify portion of the proposed conservation area for residential development and portion for 'POS - Nature space'.**

5) **It is recommended that the structure plan document references that industrial demand and supply has been addressed through the draft Albany Local Planning Strategy 2018.**

6) **As per Environmental Protection Guidelines and neighbour comment, it is recommended that the structure plan is modified to restrict transport depots from locating within 200m of residential development.**

7) **It is recommended that the structure plan is modified such that transport depots are not permitted within a 200m buffer to residential uses. It is recommended that the structure plan is modified to show a 'Light Industry' area adjacent to residential (200m buffer area) and a 'General Industry' area central to the industry precinct (>200m to residential). The structure plan is to allow transport depots in the general industry area and not the light industry area.**

8) **It is recommended that the structure plan is modified to ensure a range of lot sizes (including lots less than 1ha).**

9) **It is recommended that the structure plan prescribes the need for controls over industrial uses and development, to avoid potential conflict (e.g. noise, odour and visual amenity) with adjacent residential uses.**

10) **It is recommended that the structure plan includes a provision that ensures industrial and residential areas are appropriately zoned prior to subdivision.**

11) **It is recommended that the structure plan is modified to include requirements that:**
   a) **restrict direct access from lots to major arterial roads; and**
   b) **ensure buildings are orientated toward major arterial roads (visual amenity).**

12) **It is recommended that the structure plan includes the following conditions, culminating from a traffic assessment:**
   a) **Trees on the inner radius of the bend in the Private Access Road be removed to allow for appropriate sight lines for oncoming traffic. Provide additional shoulder width at the corner to allow for two opposing RAV's to pass each other simultaneously.**
   b) **Max total 30 industrial lots/industrial land uses may be considered within the industrial areas. This condition applies because of limitations on adjoining transport infrastructure. A transport assessment has determined that the maximum number of vehicles that the current intersection design (Chester Pass Rd) can handle is 180 RAV's per day.**

13) It is recommended that the following notification accompanies a development application for a transport depot at Lot 10 Chester Pass Road:

Should a review of heavy vehicle access along Chester Pass Road determine that negative impacts apply, restricted access regulations may be imposed, meaning the transport depot may have to relocate or change the combination of trailers to comply.

14) It is recommended that a provision is included to ensure roads within the structure plan area are designed and developed to accommodate heavy vehicles.

15) It is recommended that a provision is included to ensure that no additional access to Chester Pass Road may be permitted.

16) The structure plan needs to be amended to show an emergency fire access to Chester Pass Road. This is in-line with the approved Development Guide Plan for Ardess, which supports an emergency fire access to Chester Pass Road.

17) It is recommended that a provision is included to ensure landholders are aware (notification on title and notification on Development Applications) that Chester Pass Road is a major heavy vehicle freight route and buildings in the vicinity may be affected by transport noise and vibration.

18) It is recommended that provision is included with the structure plan to ensure roads are developed to an urban standard, to the satisfaction of the City.

19) It is recommended that the structure plan is modified to show proposed R5/10 area as having a minimum density code of R20.

20) It is recommended that, reference within the structure plan, to contribution planning for the proposed school, is deleted.

21) It is recommended that the structure plan is amended to identify measures necessary to overcome land capability issues for a 'Mapping Unit No.2' area (low development capability area).

22) Recommend including provision to ensure stormwater is not discharged from development to the Chester Pass Rd drainage system.

23) It is recommended that the structure plan map is amended to show a waterway within the Lot 10 and also extending north over the neighbouring Lot 5498.

24) It is recommended that the structure plan is amended to show landscaping of the waterway.

25) It is recommended that the structure plan is updated to show how stormwater drainage will be managed within the planned development area. In particular, the structure plan needs to demonstrate:

a) How infiltration on site for at-source control will be achieved through bio-retention, floodways, treatment drains, public open space and should provide indicative locations for this infrastructure. Note: More basins as structural controls would be expected to be required for sub-catchment;
b) How runoff in steep areas will be controlled to avoid erosion;
c) A flow path in the event that land is affected by flooding (1% Annual Exceedance Probability).

***26)* Recommend deleting the Contributions Plan in the structure plan (Appendix 12). Recommend deleting the Contributions Plan in the structure plan (Appendix 12). Recommended that the following wording is placed in the Structure Plan provisions (Attachment 6 of Council Report Item):**

"Developer contributions are to be made in accordance with the WAPC's State Planning Policy 3.6 and any Local Planning Policy adopted by the City of Albany."

Recommend replacing the wording in Section 3.9 of the LSP with the following:

"Developer contributions are to be made in accordance with the WAPC's State Planning Policy 3.6. Contributions may be required for:

1. ***The ceding and development of land for a north/south link road, namely 'Range Road'.***
2. ***Road upgrading and/or intersection treatments as may be required at the subdivision stage, as recommended by a Traffic Analysis to the satisfaction of the City of Albany.***

Note: The value of contribution for Range Road may consider:

1. ***Value of land ceded (30m W/L?); +***
2. ***Road construction costs; divided by***
3. ***Proportion of vehicles attributed to structure plan; divided by***
4. ***Expected dwellings; =***
5. ***Cost per lot.***

Note: Road upgrading and/or intersection treatments may be required for Terry Road, Mercer Road and the intersection between the Range Road and Mercer Road. Cost sharing mechanisms may apply."

27) Recommend including the following conditions in the structure plan:

a) **Any transport depot or other use that can be considered, that is accessed by Restricted Access Vehicles, can be considered for Temporary Development Approval for a period that expires not later than the expected completion date of the Ring Road (to be confirmed by Main Roads); and**
b) **Any transport depot or other use that can be considered, that is accessed by "as of right" vehicles can be located in the Ardess Estate without time restrictions.**

28) Recommend that the Local Structure Plan is updated as per Attachment 2 of the Council Report Item.

29) Recommend that Part 1 – Implementation (provisions) are updated as per Attachment 6 of the Council Report Item.

Community Strategic Priorities and links to Intelligent Community Forum Indicators

Self-assessment score		Community Priority	1 Broadband Connectivity 71	2 Knowledge Workforce 47	3 Innovation 16	4 Digital Equality 48	5 Sustainability 43	6 Advocacy 56
Leadership	1.1.1	Implement systems and controls that ensure the prudent use of rates and ensure value for money in all aspects of Council operations.			1			
	1.1.2	Provide informed and transparent decision making that is consistent with our strategic direction, meets our legal obligations, reflect the level of associated risk and are adequately explained to community.			2			
	1.2.1	Provide positive leadership that delivers community outcomes and gains a reputation for doing what is good for Albany and the surrounding region.	2	1	2	1	1	1
	1.2.2	Develop contemporary service delivery and staff development programs to ensure a professional and resilient workforce which is continually improving.		1				
	1.3.1	Develop structures and processes that engage the community and engender community confidence, and trust that their input is valued and used to inform decisions and priorities.			1	1		
	1.3.2	Improve community engagement processes and platforms to provide our community with a variety of opportunities to be involved and to contribute to decisions		1				
Smart Prosperous & Growing	2.1.1	Work with business and other stakeholders to attract investment; diversify the economy; create jobs and support small business growth.	2	1	1			1
	2.1.2	Advocate for innovation and technology platforms that provide opportunities for Albany businesses and individuals to access jobs and markets throughout Australia and around the world.	2		1			1
	2.2.1	Partner with learning networks, schools and training providers to deliver education and training programs that support families and encourage a culture of lifelong learning.		1	2			1
	2.2.2	Promote Albany and the surrounding region as an ideal location to hold conferences and training events.						1
	2.3.1	Encourage, support and deliver significant events that promote our region and have a positive economic and social benefit.		1	2			1
	2.3.2	Promote the “Amazing South Coast” region as a sought after and iconic tourism destination to increase the number of people visiting and the duration they stay.						1
Clean, Green & Sustainable	3.1.1	Deliver effective practices that reduce risk to property, infrastructure and the natural environment and improve community awareness and resilience.			2			
	3.1.2	Sustainably protect and enhance our iconic coastline, reserves flora and fauna by delivering projects and programs that reflect the importance of our coastline and natural reserves.			2		1	
	3.2.1	Deliver environmentally & financial sustainable long term planning for infrastructure via a forward capital works program that meets the needs of our community.					2	
	3.2.2	Design, construct and maintain infrastructure cost effectively in a manner that maximises it’s life, capacity and function.					1	
	3.3.1	Integrate and promote effective sustainability through resource conservation, management and education to continuously improve environmental outcomes.		2	2		1	
	3.3.2	Deliver a sustainable and progressive approach to waste management including collaboration with neighbouring local governments.					1	
Community Health & Participation	4.1.1	Facilitate and promote arts and cultural activities for all ages by providing a variety of arts and cultural activities that attract local and visiting patrons.			1			
	4.1.2	Promote and develop an authentic sense of community by developing programs and providing services that make people feel welcome, involved and connected to each other.	2		2	2		
	4.2.1	Deliver activities and programs that engage with the wider community and engender community spirit.			2	1		
	4.2.2	Maintain infrastructure and deliver programs that promote Albany’s unique heritage, engender civic pride and leave a lasting memory.			2			
	4.3.1	Develop a range of activities and facilities that connect people, promote a healthy community and are appropriate for all ages.	2	2	2	1		
	4.3.2	Encourage and support volunteers and community groups to grow an active volunteer base that is supported and valued.						1
A Connected and Safe Built Environment	5.1.1	Develop and implement a contemporary Local Planning Strategy that reflects our identity and supports economic growth.			2		1	
	5.1.2	Provide proactive planning and building services that support sustainable growth while reflecting our local character and heritage.					1	
	5.2.1	Improve connectedness and traffic flows via a well-designed and safe transport and pathway network that connects people and services and encourages pedestrians and cyclists.					1	
	5.2.2	Create infrastructure and connected streetscapes that are consistent and reflect our unique heritage.						
	5.3.1	Plan for and monitor community safety via effective ranger and emergency services.	2		2			2
	5.3.2	Deliver programs and advocate for specialist services that improve public health and wellbeing in line with the Public Health Act 2016 and growing community expectations.			2			1

1 There is a direct opportunity to influence IC indicator whilst meeting the community priority
2 There is a potential opportunity to influence IC indicator whilst meeting the community priority

CITY OF ALBANY

Road Cost Apportionment Schedule

Kalgan Rural Village

March 2019

This document acts as an updated addendum to the Kalgan Rural Village Structure Plan and determines how Land Developers in the area will contribute to infrastructure upgrades.

Revision

Date	Description	Revision	Author
June 2014	Original issue	Rev 0	Paul Camins – Development Engineer
April 2019	Updated costs and lot yield	Draft 1	Alan Millar – Development Engineer

Executive Summary

The intensification of residential land through subdivision will create significant demands on the existing road infrastructure.

Developers are required to contribute to the upgrade of this existing road infrastructure at:

- Hunton Road intersection with South Coast Hwy
- Wheeldon Road – traffic modifications
- Riverside Road

The contributions required are:

- a payment of $3,441.16 (incl GST) as at March 2019 (increased annually on 1 July by CPI), for each additional lot created in the Kalgan Rural Village area, for the purposes of upgrading the entry points to the Kalgan Rural Village site.
- an additional payment of $5,195.08 (incl GST) as at March 2019 (increased annually on 1 July by CPI), for each additional lot identified as impacting on Riverside Road, to equally contribute to its upgrade.

Contents

Revision 2
Executive Summary 3
Introduction 5
Proposed Development 6
Existing Roads 7
Traffic 9
Design Recommendations 11
Cost Sharing and Contributions 15
Appendix A – Marked-Up Figure 1 from KRVSP indicating Lot Yields and impact on Riverside Road .. 16
Appendix B – Lot Yield and Contribution Calculation 18
Appendix C – Traffic Calculations and Counts 20
Appendix D – Proposed Upgrade Treatments 22
Appendix E – Treatment Cost Estimates 25

Introduction

This document is an updated Road Cost Apportionment Schedule from the original issue in June 2014. Since this time, there has been a significant amount of development activity in the area, interest for further subdivision, and infrastructure works completed. As such, there is a need to revise the contribution amounts with an updated estimated lot yield plan.

In 2012, the Kalgan Rural Village Structure Plan (KRVSP) was endorsed. The intensification of residential land use will increase the population of the area and create significant demands on existing infrastructure. This was recognized as part of the Structure Plan, and various negotiations were undertaken with the City of Albany and Main Roads WA and commitments made. The outcome of these negotiations proposed road upgrades to ensure that the road network in the area is safe and will meet the expectations of the current and future land owners. The endorsed KRVSP requires that contributions be made to upgrade a number of roads within the Structure Plan area.

The amount of contribution required was not determined as part of the development of the Structure Plan and has left developers unsure of the contribution amount. The funds acquired from contributions will be set aside for the roads within the Structure Plan area.

The road upgrade cost to meet the total development shall be calculated and this will be the total cost to meet the needs of a “build-out scenario” (i.e. all lots able to be created, are created).

Proposed Development

Development Area

There are three precincts identified under the Kalgan Rural Village Structure Plan (KRVSP), with Precinct 2 and Precinct 3 identified as key areas for subdivision. Precinct 2 has been further split into 3 sub-precincts. Appendix A shows an updated Lot Yield Assessment (Ayton Baesjou, February 2019) based on existing approved subdivisions and predicated subdivisions.

The Precincts are defined in the KRVSP as:

PRECINCT 1 - HISTORIC VILLAGE CORE

The historic community node is to be protected and enhanced as a local activity centre. Infill and consolidation through the subdivision of freehold lots is supported subject to further design and assessment to address capability, fire safety, protection of water courses and vegetation, and to ensure enhancement of cultural, heritage and landscape values and the village character.

Currently, there has not been a strong interest for development within this precinct.

PRECINCT 2 - RURAL VILLAGE ACTIVITY CENTRE

Controlled expansion of the settlement south and east of the Kalgan River and Highway is supported through subdivision and development.

Precinct 2 encompasses the majority of the developable area as special residential lots. There are some lots to the north of South Coast Hwy with some development potential as a result of the Structure Plan.

PRECINCT 3 - RURAL VILLAGE NORTH

In recognition of existing lot sizes, land uses and the constraints of the highway, limited subdivision and boundary rationalisation will be considered. The traditional commercial node is to be retained and enhanced. Development proposals shall give consideration to access, trails, vegetation protection, food production and employment generation.

Whilst Precinct 3 is partially separated by the highway, the area remains a critical part to the Structure Plan, with residents utilising Hunton Road to access the Village Centre and Nanarup Road.

Lot Yields

Updated lot yields are tabulated in Appendix B. Lots within the rezoned area that have chosen not to be a part of the Structure Plan development have been assigned a nominal predicted yield.

The total and additional lots per precinct that have been used for the calculation are summarised below.

	Total Lots	Additional lots
Precinct 1	15	7
Precinct 2a	88	81
Precinct 2b	80	75
Precinct 2c	23	17
Precinct 3	34	11
Total	243	191

Existing Roads

Hunton Road

The existing road formation is a 6 metre seal with 1 metre gravel shoulders either side. This is consistent with the City of Albany levels of service standards.

The existing bridge over Chelgiup Creek was replaced and upgraded in 2018 via government funding. Hunton Road is signposted at 60 km/h north of Riverside Road, with traffic counts indicating an estimated AADT (Annual Average Daily Traffic) of 59 north of Wheeldon Road and 131 south of Riverside Road. South of Riverside Road, Hunton Road is a derestricted speed zone.

Riverside Road

Riverside Road was sealed with a single coat 14mm seal between Hunton Road to Myola Drive (first intersection) in 2017. A second 7mm coat seal is still required to create a 2-coat seal.

From the intersection of Hunton Road to Myola Drive, 280m in length, there is a wider 8.5me formation and less restrictive vegetation. Part of this section has been reshaped by the developer of lot 100 in order to make the intersection for his development safe. The end section that will service proposed section 2c has a narrower formation, with a 4 metre width and heavily vegetated and therefore unsuitable for heavy and regular traffic in its current form. Riverside Road is a derestricted speed zone with 2012 traffic counts indicating an AADT of 43.

Wheeldon Road

Wheeldon Road currently provides a through way between South Coast Highway and Hunton Road as well as a parking area for the Luke Penn walk, along the Kalgan River. The existing bridge is narrow, at 5.5 metres wide and the road either side of the bridge has a 5.8m wide seal with 1 metre gravel shoulders. This is a high bridge spanning approximately 70m. Aboriginal heritage surveys

undertaken in the area have established that future disturbance to the Kalgan River bed is not supported. Wheeldon Road is signposted at 60 km/h with 2012 traffic counts indicating an AADT of 102.

Churchlane Road

Churchlane Road currently provides a connection between South Coast Highway and Chester Pass Road. There are no other roads intersecting with Churchlane Road. The formation of the road is gravel, with a width of 7 metres and drains for all weather access. With the minimal additional development, sealing of the road would not be required. This is a derestricted speed zone with traffic counts indicating an AADT of 55.

South Coast Highway

South Coast Highway is a major heavy haulage and travel route, heading east from Albany towards Jerramungup. The section fronting the village is designated as a MRWA RAV Network 7, which allows road trains up to 36.5m long and up to 107 tonnes. The posted speed limit is 90Km/h. As a priority heavy haulage route, modification to and safety of intersections is a priority. Anticipated traffic flows from developments on Hunton Road and changes to be made to Wheeldon Road will increase the burden on the intersection of Hunton Road and South Coast Highway. The noise implications of developing lots on South Coast highway and the noise path will not change lot outputs as these properties are smaller and more heavily vegetated.

Traffic

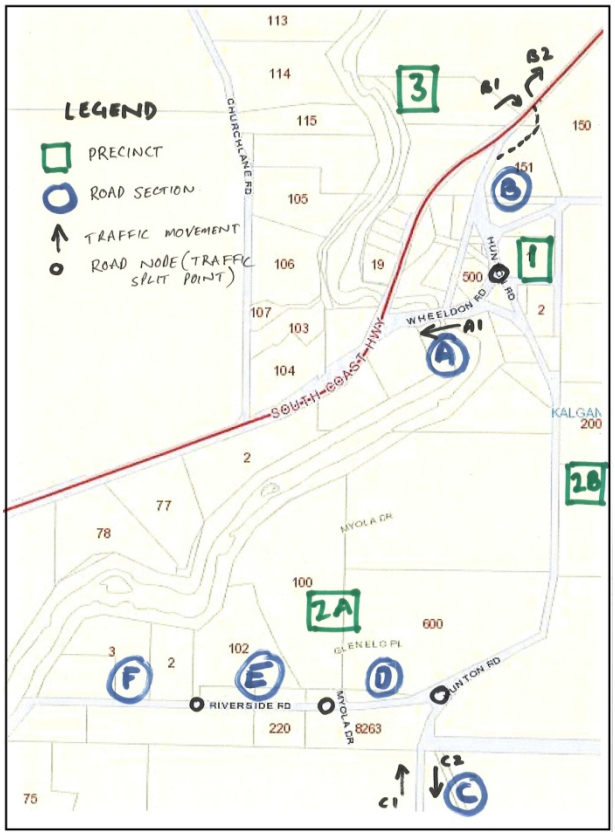
Traffic volumes

The build-out of the Rural Village project will significantly increase traffic volumes. Presently, properties are predominantly larger lifestyle hobby farm lots generating minimal traffic.

In order to calculate the additional vehicles expected as a result of development, a number of assumptions have been made.

Assumptions in additional volume calculations

- Each additional property will generate 4 return trips, or 8 vehicle movements per day for each property. This is justified by the anticipated residents being regular commuters into the Albany area for work.
- 0% organic traffic growth (only by development) for existing traffic within the Village Area (consistent with traffic counts).
- Traffic that would travel from South Coast Highway through Wheeldon Road being reallocated to Hunton Road following the realignment.
- Use of Hunton Road and/or Wheeldon Road as a through road, from South Coast Highway to Nanarup Road, will remain consistent with present usage patterns.
- 90% (80% west and 10% east) of traffic generated from development will use South Coast Highway with 10% heading south towards Nanarup Road. The primary reason for this would be that Hunton Road and Nanarup Road is the route that offers the fastest access to Flinders Park Primary School and Grammar School.
- Due to the expense of widening the Wheeldon Road Bridge, Wheeldon Road is to receive a one way and right turn restriction treatment, therefore 50% of the existing traffic will be reallocated to Hunton Road.
- 100% of traffic from the development area of Churchlane Road and the Hunton Road developments will not head north to Chester Pass Road.
- 10% of traffic from Precinct 3 will use Hunton Road, with schools being the major destination



Traffic Movement	Precinct Calculation
A1	0.8 x 0.5 x (1+2A+2B+2C) + 0.1 x 0.5 x (3)
B1	0.9 x 0.5 x (1+2A+2B+2C) + 0.1 x 0.5 x (3)
B2	0.1 x (1+2A+2B+2C)
C1 = C2	0.1 x0.5 x (1+2A+2B+2C+3)

Assumed relevant post-development traffic movements from Kalgan Rural Village

Pre-development traffic counts and post-development calculations are detailed in Appendix C. In summary, the expected additional traffic on the roads in question are summarised below.

	Existing Vehicles per Day		Projected additional vehicles	Projected reduction in vehicles	Net additional vehicles	Total	% New development	Modifications required to meet projected volume
Wheeldon Rd	102	2012	**580.4**	***51***	529.4	631.4	84%	One way treatment
Hunton Rd north of Wheeldon	59	2012	**724.4**	***-51***	775.4	834.4	93%	Intersection realignment at South Coast, Highway and bridge replacement
Hunton Rd south of Riverside	131	2010	**152.8**		152.8	283.8	54%	None
Riverside Road 0 -270	43	2012	**384**		384	427	90%	Grade, bind and seal to 6.0m 2-coat seal
Riverside Road 270 - 700	43	2012	**136**		136	179	76%	Upgraded and 2-coat seal to 5.5m
Riverside Road 700 - 1100	20	2012	**72**		72	92	78%	Widened to allowing passing opportunities. Resheet.

Design Recommendations

Hunton Road Bridge Upgrade

The bridge was upgraded on Hunton Road in 2018. As these works were government funded, these works no longer form part of the Road Cost Apportionment Schedule.

Realignment of Hunton Intersection

The intersection of Hunton Road and South Coast Highway has insufficient Approach Sight Distance (ASD), at the existing 90km/h speed limit. Main Roads WA will not support a further decrease of the speed limit in this section as the road is a Strategic Transport Route for heavy haulage.

The preferred option and that identified by Main Roads WA and proposed by the KRVSP is a realignment of the road to intersect at a safer location with the addition of an auxiliary turning lane and slip lane. The Hunton Road to South Coast Highway intersection is to be realigned 100m to the east. This will meet the warrants for the ASD and allow a perpendicular intersection layout.

Auxiliary lanes at Hunton Intersection

Without this development, the through traffic on South Coast Highway is expected to be in the order of 1,750 vehicles a day by 2031. An estimate at the Peak Hour of 13.5% (Austroads Guide 4A recommends using between 11-16% of AADT to determine this figure) means the hourly traffic is 236 vehicles.

Without the development, traffic counts (at Wheeldon Road) indicate that there are currently approximately 6 vehicles turning right from South Coast Highway in the peak hour.

As a result of development, expected daily traffic returning via the right hand turn is 775 vehicles per day. Using a 13.5% peak hour gives an estimate of traffic turning right of 106 vehicles in the peak hour. This meets Austroads and Main Roads warrants for a Right Turn Auxiliary Lane. Although there is less traffic expected to be turning left onto Hunton Road from South Coast Highway, the number of fast moving heavy vehicles on South Coast Highway justify the requirement for a left turn pocket.

It is proposed that slip lanes for both left and right turning traffic entering Hunton Road from South Coast Highway be provided. This project will require the resumption of land as well as an environmental impact assessment.

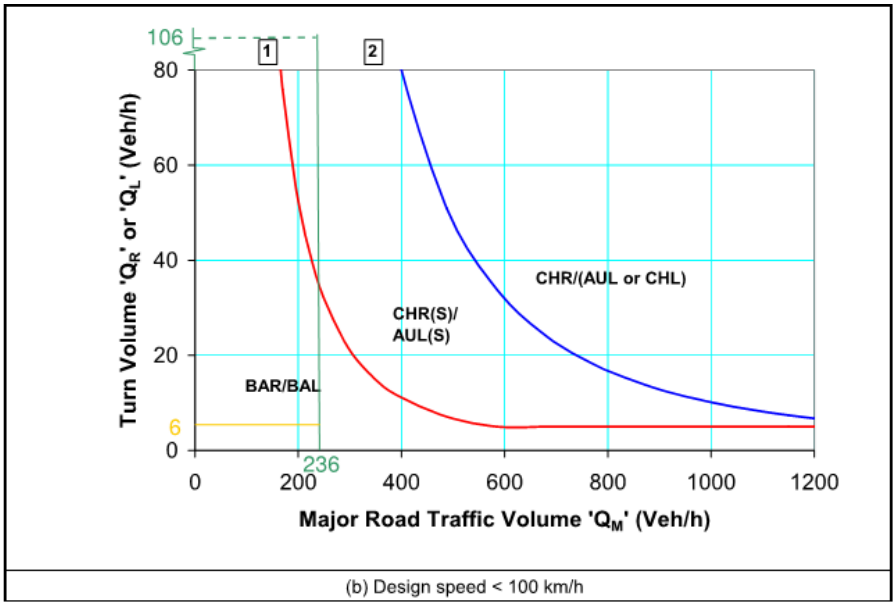


Figure 4.9: Warrants for turn treatments on the major road at unsignalised intersections[1]

In Figure 4.9 from Austroads *Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections,* Main Roads WA recommends the application of Figure 4.9, but with the AUR treatment in lieu of the CHR(S) treatment[2].

The intersection of the green lines shows the anticipated traffic from the development and the intersection of the yellow lines shows current traffic volumes. This shows a significant jump in the traffic conflicts expected at the intersection and warrants an AUR treatment. A preliminary concept design is attached as Appendix D.

The estimated costing for this work forms part of Appendix E and totals $573,501 (excl GST) excluding the bridge upgrade.

Wheeldon Road

Wheeldon Road also has a narrow bridge, over the Kalgan River. It is proposed that the intersection with South Coast Highway is restricted to left turn egress only. This is due to poor approach sight distance for right turns and the high expense in modifying the bridge on South Coast Highway. Cyclists would continue to be able to use this road from South Coast Highway and allow the owner of 6 Wheeldon Road, direct vehicular access to the Village Centre.

[1] From Austroads *Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections*

[2] The CHR(S) treatment incorporates line-marked "islands" to help channelize traffic. The AUR treatment is a rural auxiliary lane (right turn pocket) without channelization. Technical application only- cost difference negligible.



Indicative treatment to the Wheeldon Road and South Coast Highway Intersection

The estimated costing for this work forms part of Appendix E and totals $77,000 (excl GST).

Riverside Road

Riverside Road is a local road that also provides access down to the Kalgan River. It currently experiences minimal traffic of 43 vehicles per day. With development along the road, the demands will be significantly increased. The design standard requirements for Riverside Road (refer Appendix D2) have been determined and split into 3 starting from Chainage 0 at the Hunton Road intersection:

- Chainages 0 – 270: As part of the Contributions this section of road has been sealed with a single coat 14mm seal, and requires a second 7mm seal. This section has a 6.0m wide seal with 1.2m unsealed shoulders.
- Chainages 270 – 700: 179 vehicles per day are expected to use this section of road at build-out. This section is heavily vegetated and would be treated as a narrower formation road with a minimum 5.5m wide 2-coat seal. Upgrading of this section of road is expected to occur in the 2019/20 financial year.
- Chainages 700 – 1100: This section of road is estimated to only carry up to 92 vehicles per day at build-out. The road is quite narrow and heavily vegetated. In order to minimise tree removal and keep the traffic speed environment low, the expected treatment would involve upgrade works to improve sight distance and passing opportunities, but not sealing this section of road. At the time works are proposed it may be deemed prudent to seal this section of road, but it does not form part of the contribution calculations. Due to the emergency access requirement to have two access points, it is proposed that the internal subdivision road connect to Myola Drive. This may further reduce the need to seal this section road. Timing for these works will be dependent upon subdivision activity along this section of road.

The estimated costing for this work forms part of Appendix E and totals $307,129 (excl GST). The cost of all works on Riverside Road would be shared by all the developers using the road, no matter where their entry point is. It should be noted that upon revision of the costs, the cost per lot has increased from the 2014 Road Cost Apportionment Schedule, due to additional works expected along the section between Chainages 270-700. However, in order to maintain equity to future developers paying contributions for Riverside Road, the contribution for Riverside Road will remain the same as the 2014 Road Cost Apportionment Schedule with CPI included.

Environmental Impacts and Heritage Area

The road realignment occurs in both an environmentally sensitive and Aboriginal Heritage area. This will mean that an environmental impact assessment and Heritage Assessment will need to be completed prior to ground disturbance. An allowance for this has been included as part of the Contributions Plan.

Land Resumption

Land resumptions have taken place to improve the realignment of Hunton Road with South Coast Highway. The actual costs have been included in the cost estimates.

Works required directly by individual Developers

The construction costs of all internal roads currently within private lots will be borne by the developer or in some cases by agreement with adjoining developers. These will be covered by subdivision conditions.

The upgrade of Andrews Road to a sealed standard will be a subdivision condition on lots 4821 and 4904, dependent upon which is first. A cost sharing arrangement may be considered between these two landowners. Sealing of some road frontages may also be a condition on some Precinct 1 lots.

Cost Sharing and Contributions

The proposed sharing of costs is summarised in Appendix B and includes improvements to Wheeldon Road, Hunton Road and South Coast Highway intersection and Riverside Road.

The City of Albany share is based on the existing traffic with the cost associated with the additional traffic from the Kalgan Rural Village development to be paid for by the developers.

The Construction costs of the works are calculated at March 2019 and shall be increased by CPI to when the contribution is paid. The contribution payment must be paid prior to clearance of the new subdivided lots.

In summary;

- a payment of $3,441.16 (incl GST) as at March 2019, for each additional lot created in the Kalgan Rural Village area, for the purposes of upgrading the entry points to the Kalgan Rural Village site.
- an additional payment of $5,195.08 (incl GST) as at March 2019, for each additional lot identified as impacting on Riverside Road, to equally contribute to its upgrade.

Appendix A – Marked-Up Figure 1 from KRVSP indicating Lot Yields and impact on Riverside Road

Lot Yield Assessment

April 2019

FIGURE 1

PRECINCT 3
RURAL VILLAGE NORTH
In recognition of existing lot sizes, land uses and the constraints of the highway, limited subdivision and boundary rationalisation will be considered. The traditional commercial node is to be retained and enhanced. Development proposals shall give consideration to access, trails, vegetation protection, food production and employment generation.

PRECINCT 1
HISTORIC VILLAGE CORE
The historic community node is to be protected and enhanced as a local activity centre. Infill and consolidation through the subdivision of freehold lots is supported subject to further design and assessment to address capability, fire safety, protection of water courses and vegetation, and to ensure enhancement of cultural, heritage and landscape values and the village character.

PRECINCT 2 -
RURAL VILLAGE ACTIVITY CENTRE
Controlled expansion of the settlement south and east of the Kalgan River and Highway is supported through subdivision and development.

New lots impacting Riverside Road Ch 0 - 700

New lots impacting Riverside Road Ch 700 - 1110

Additional iducative lots only for yield estimates (subject to ground proving)

LEGEND

- Rural Village Zone Boundary
- Crown Land / Reserve
- Historic Village Core - Precinct 1
- Rural Village - Precinct 2
- Rural Village - Precinct 3
- Existing Vegetation
- Vegetation Corridor
- South Coast Highway
- Proposed Subdivision Road
- Indicative Subdivision
- Site of Cultural / Heritage Significance
- Proposed Multi-Use Trail / Strategeic Fire Break
- Walk Trail
- Traditional Commercial Node
- Village Centre - Existing Community Node
- Indicative Community Facilities Site
- Intersection treatment required to address traffic safety

Note:
Lot and road pattern is indicative only and may change subject to more detailed land capability on other investigations at subdivision stage.

AYTON BAESJOU PLANNING
59 Peels Place
Albany WA 6330
Ph 9842 2304 Fax 9842 8494

10-01-YIELD(c)

ORIG A3
SCALE 1:10000
0 50 100 150 200 250

Appendix B – Lot Yield and Contribution Calculation

Lot		Area	Total lots estimated	Additional Lots Created (less parent lot)			Contribution A - SCH Intersections	Contribution B - Riverside Rd Upgrade	Total Contribution for current lot
				Intersections	Riverside Rd Reseal 0 -700	Riverside Rd Reseal 700 -1150			
22	Precinct 1		2	1			$3,128	$0	**$3,128**
23	Precinct 1		2	1			$3,128	$0	**$3,128**
1	Precinct 1		2	1			$3,128	$0	**$3,128**
2	Precinct 1		2	1			$3,128	$0	**$3,128**
17	Precinct 1		2	1			$3,128	$0	**$3,128**
18	Precinct 1		2	1			$3,128	$0	**$3,128**
3	Precinct 1		2	1			$3,128	$0	**$3,128**
14	Precinct 1		1				$0	$0	**$0**
1730	*Precinct 2a*		*8*	*7*			*$21,898*	*$0*	***$21,898***
100	*Precinct 2a*		*9*	*8*	*8*		*$25,027*	*$40,524*	***$65,551***
9002	Precinct 2a		4	3	3		$9,385	$15,197	**$24,581**
10	Precinct 2a		2	1	1		$3,128	$5,066	**$8,194**
9500	Precinct 2a		36	35			$109,491	$0	**$109,491**
37	Precinct 2a		5	4			$12,513	$0	**$12,513**
601	Precinct 2a		24	23	19		$71,951	$96,245	**$168,196**
201	Precinct 2b		17	16			$50,053	$0	**$50,053**
200	Precinct 2b		9	8			$25,027	$0	**$25,027**
150	Precinct 2b		20	19			$59,438	$0	**$59,438**
151	Precinct 2b		21	20			$62,566	$0	**$62,566**
300	Precinct 2b		13	12			$37,540	$0	**$37,540**
102	*Precinct 2c*		*9*	*8*	*8*		*$25,027*	*$40,524*	***$65,551***
1491	Precinct 2c		2	1		1	$3,128	$5,066	**$8,194**
3	Precinct 2c		6	5		5	$15,642	$25,328	**$40,969**
2	Precinct 2c		4	3		3	$9,385	$15,197	**$24,581**
103	Precinct 2c		1				$0	$0	**$0**
221	Precinct 2c		1				$0	$0	**$0**
3486	*Precinct 3*		*3*	*2*			*$6,257*	*$0*	***$6,257***
105	Precinct 3		2	1			$3,128	$0	**$3,128**
106	Precinct 3		2	1			$3,128	$0	**$3,128**
151	Precinct 3		3	2			$6,257	$0	**$6,257**
150	Precinct 3		2	1			$3,128	$0	**$3,128**
77	Precinct 3		2	1			$3,128	$0	**$3,128**
4791	Precinct 3		2	1			$3,128	$0	**$3,128**
24	Precinct 3		2	1			$3,128	$0	**$3,128**
20	Precinct 3		2	1			$3,128	$0	**$3,128**
2	Precinct 3		1				$0	$0	**$0**
25	Precinct 3		1				$0	$0	**$0**
28	Precinct 3		1				$0	$0	**$0**
104	Precinct 3		1				$0	$0	**$0**
103	Precinct 3		1				$0	$0	**$0**
107	Precinct 3		1				$0	$0	**$0**
3465	Precinct 3		1				$0	$0	**$0**
14	Precinct 3		1				$0	$0	**$0**
15	Precinct 3		1				$0	$0	**$0**
19	Precinct 3		1				$0	$0	**$0**
21	Precinct 3		1				$0	$0	**$0**
29	Precinct 3		1				$0	$0	**$0**
3112	Precinct 3		1				$0	$0	**$0**
311	Precinct 3		1				$0	$0	**$0**
			240	**191**	**39**	**9**	**$597,510**	**$243,144**	**$840,654**

	Intersections	Riverside
Cost Estimate less COA contribution	**$597,509.93**	**$243,144.14**
Cost per additional lot (exc GST)	**$3,128.32**	**$5,065.50**
	$3,441.16	$5,572.05
Riverside 2014 contribution (incl GST)		$ 4,864.67
Riverside 2014 with CPI to 2018 (incl GST)		$ 5,195.08

	Total Lots	Additional lots
Precinct 1	15	7
Precinct 2a	88	81
Precinct 2b	80	75
Precinct 2c	23	17
Precinct 3	34	11
	240	191

COST SUMMARY

	Total Cost ex GST	% developers to pay	
Hunton Intersection	$573,501	93%	$532,949
Wheeldon Rd	$77,000	84%	$64,561
Riverside Rd 0-270	$58,414	90%	$52,532
Riverside Rd 270-700	$176,679	76%	$134,237
Riverside Rd 700-1150	$72,036	78%	$56,376

Appendix C – Traffic Calculations and Counts

		Add'l Lot Yields	Daily Trips		(A) Increase Wheeldon Rd (one way)	(B) Increase Hunton Rd north of Wheeldon	(C) Increase Hunton Rd south of Riverside	(D) Increase Riverside Road 0-270	(E) Increase Riverside Road 270-700	(F) Increase Riverside Road 700-1100	Increase in Precinct 3
Precinct 1		7	7x8	56	22.4	28	5.6				
Precinct 2a		81	81x8	648	259.2	324	64.8	248			
Precinct 2b		75	75x8	600	240	300	60	0			
Precinct 2c	**0-700**	8	8x8	64	25.6	32	6.4	64	64		
Precinct 2c	**700-1150**	9	9x8	72	28.8	36	7.2	72	72	72	
Precinct 3		11	11x8	88	4.4	4.4	8.8	0			88
Total		***191***		***1528***	***580.4***	***724.4***	***152.8***	***384***	***136***	***72***	***88***
Existing Traffic					102	59	131	43	43	20	N/A

	Existing Vehicles per Day		Projected additional vehicles	Projected reduction in vehicles	Net additional vehicles	Total	% New development	Modifications required to meet projected volume
Wheeldon Rd	102	2012	**580.4**	***51***	529.4	631.4	84%	One way treatment
Hunton Rd north of Wheeldon	59	2012	**724.4**	***-51***	775.4	834.4	93%	Intersection realignment at South Coast, Highway and bridge replacement
Hunton Rd south of Riverside	131	2010	**152.8**		152.8	283.8	54%	None
Riverside Road 0 -270	43	2012	**384**		384	427	90%	Grade, bind and seal to 6.0m 2-coat seal
Riverside Road 270 - 660	43	2012	**136**		136	179	76%	Upgraded and 2-coat seal to 5.5m
Riverside Road 660 - 1100	20	2012	**72**		72	92	78%	Widened to allowing passing opportunities. Resheet.

Appendix D – Proposed Upgrade Treatments

Appendix D1

~~REPORT ITEM DIS 167 REFERS~~



REV	DESCRIPTION	APPROVED	DATE

CITY OF Albany

102 NORTH ROAD, YAKAMIA WA 6330
PO BOX 484 ALBANY WA 6331
Tel: (08) 9841 9333
Fax: (08) 9841 4099
Email: cityassets@albany.wa.gov.au
Website: www.albany.wa.gov.au

PRELIMINARY

APPROVED		DESIGNED	DRAWN
AUTHORISED M.I.			
AUTHORISED E.D.W.S.	1046	THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED AS APPROVED	

PROJECT

PROPOSED ROAD REALIGNMENT FOR HUNTON ROAD , ALBANY

DRAWING NAME

PRELIMINARY LAYOUT PLAN

DRAWING No	FILE REF	JOB No	SCALE	SHEET No	REV
-	-	-	1:1000 @ A3		-

n:\works,service\infrastructure\05 future works\r_hunton road realignment\03 design\drawings\14005-prelimlnary.dwg

Appendix E – Treatment Cost Estimates

Description	Unit	Qty	Rate	$	$
ESTABLISHMENT AND TRAFFIC CONTROL					
Land Resumption (completed)	*item*	*1*	*$58,914.45*	*$58,914.45*	
Establishment on Site	item	1	$25,000.00	$25,000.00	
Survey	item	1	$5,000.00	$5,000.00	
Environmental impact assessment	item	1	$10,000.00	$10,000.00	
Traffic Control	item	1	$40,000.00	$40,000.00	
Aboriginal Heritage	item	1	$20,000.00	$20,000.00	
					$158,914.45
EARTHWORKS					
Clearing of site	m²	3000	$2.20	$6,600.00	
Strip and respread topsoil	m²	1050	$5.00	$5,250.00	
Cut to fill	m²	1940	$8.00	$15,520.00	
Import fill	LCM	5000	$16.00	$80,000.00	
Trim subgrade	m²	1692	$5.00	$8,460.00	
					$115,830.00
DRAINAGE					
Supply and lay RCP 375mmø	m	33	$175.00	$5,775.00	
Headwalls Single	ea	4	$800.00	$3,200.00	
					$8,975.00
METALCOURSES					
250mm gravel	m²	3014	$45.00	$135,630.00	
					$135,630.00
BITUMINOUS SURFACING					
2 coat seal	m²	2228	$11.00	$26,747.00	
Asphalt intersection	m²	240	$40.00	$9,600.00	
Kerb at intersection	lm	80	$50.00	$4,000.00	
Ascon	item	1	$10,000.00	$10,000.00	
QA	item	1	$5,000.00	$5,000.00	
					$55,347.00
ROAD DECOMISSIONING					
Remove materials to spoil	m²	1050	$20.00	$21,000.00	
					$21,000.00
LINEMARKING AND SIGNAGE					
Estimate	item	1	$3,000.00	$3,000.00	
					$3,000.00
				TOTAL ESTIMATE (excluding GST)	**$498,696.45**
				Survey and Superintendence	**$49,869.65**
				Contingency	**$24,934.82**
				TOTAL ESTIMATE (excluding GST)	**$573,500.92**

Item	Description	Unit	Qty	Rate	$	$
1	ESTABLISHMENT AND TRAFFIC CONTROL					
1.1	Establishment on Site	Unit	1	$5,000.00	$5,000.00	
1.2	Survey	Unit	1	$5,000.00	$5,000.00	
1.3	Traffic Control	Unit	1	$8,000.00	$8,000.00	
						$18,000.00
2	ROAD INFRASTRUCTURE					
2.1	Kerbing and island fill	Unit	1	$50,000.00	$50,000.00	
						$50,000.00
3	LINEMARKING AND SIGNAGE					
3.1	Estimate	Unit	1	$2,000.00	$2,000.00	
						$2,000.00
					TOTAL ESTIMATE (excluding GST)	**$70,000.00**
					Survey and Superintendence	**$7,000.00**
					TOTAL ESTIMATE (excluding GST)	**$77,000.00**

Description	Unit	Qty	Rate	$	$
ESTABLISHMENT AND TRAFFIC CONTROL					
Traffic Control	Unit	1	$6,000.00	$6,000.00	
					$6,000.00
BITUMINOUS SURFACING					
Works completed single 14mm coat	*item*	*1*	*$20,474.73*	*$20,474.73*	
2nd coat seal 7mm	m²	1620	$11.00	$17,820.00	
intersection extra over	item	1	$5,000.00	$5,000.00	
					$43,294.73
LINEMARKING AND SIGNAGE					
Estimate	item	1	$1,500.00	$1,500.00	
					$1,500.00
				ESTIMATE (excluding GST)	**$50,794.73**
				Survey and Superintendence	**$5,079.47**
				Contingency	**$2,539.74**
				TOTAL ESTIMATE (excluding GST)	**$58,413.94**

Description	Unit	Qty	Rate	$	$
ESTABLISHMENT AND TRAFFIC CONTROL					
Establishment on Site	Unit	1	$5,000.00	$5,000.00	
Survey	Unit	1	$5,000.00	$5,000.00	
Traffic Control	Unit	1	$6,000.00	$6,000.00	
					$16,000.00
EARTHWORKS					
Clearing of site	m²	1720	$2.20	$3,784.00	
Preparation of subgrade	m²	2795	$5.00	$13,975.00	
Cut and fill	item	1	$50,000.00	$50,000.00	
					$67,759.00
GRAVEL COURSES					
SGR extra	m²	559	$15.00	$8,385.00	
Trim	m²	2795	$5.00	$13,975.00	
					$22,360.00
BITUMINOUS SURFACING					
2 coat seal	m²	2365	$11.00	$26,015.00	
					$26,015.00
EXTEND CULVERTS	item	1	$20,000.00	$20,000.00	
					$20,000.00
LINEMARKING AND SIGNAGE					
Estimate	item	1	$1,500.00	$1,500.00	
					$1,500.00
				ESTIMATE (excluding GST)	**$153,634.00**
				Survey and Superintendence	**$15,363.40**
				Contingency	**$7,681.70**
				TOTAL ESTIMATE (excluding GST)	**$176,679.10**

Description	Unit	Qty	Rate	$	$
ESTABLISHMENT AND TRAFFIC CONTROL					
Establishment on Site	Unit	1	$5,000.00	$5,000.00	
Survey	Unit	1	$5,000.00	$5,000.00	
Traffic Control	Unit	1	$5,000.00	$5,000.00	
					$15,000.00
EARTHWORKS					
Clearing of site	m²	1200	$2.20	$2,640.00	
Preparation of subgrade	m²	2800	$5.00	$14,000.00	
					$16,640.00
GRAVEL COURSES					
Trim and overlay	m²	2800	$10.00	$28,000.00	
					$28,000.00
BITUMINOUS SURFACING					
2 coat seal	m²	0	$5.75	$0.00	
					$0.00
LINEMARKING AND SIGNAGE					
Estimate	Unit	1	$3,000.00	$3,000.00	
					$3,000.00
				ESTIMATE (excluding GST)	**$62,640.00**
				Survey and Superintendence	**$6,264.00**
				Contingency	**$3,132.00**
				TOTAL ESTIMATE (excluding GST)	**$72,036.00**

City of Albany

Policy

KALGAN RURAL VILLAGE COST APPORTIONMENT SCHEDULE POLICY 2019

CONTENTS

Objective 3
Policy Statement 3
Scope 3
Legislative and Strategic Context 3
Review Position and Date 3
Associated Documents 3

Objective

1. This Policy is intended to ensure that appropriate developer contributions are made to the upgrade of existing infrastructure at:

    • Hunton Road - intersection with South Coast Highway

    • Wheeldon Road – traffic modifications

    • Riverside Road – road upgrade (gravel to seal)

Policy Statement

2. The following developer contributions will be required:

    - A payment of $3,441.16 (incl GST) as at March 2019 (Increased Annually on 1 July by CPI), for each additional lot created in the Kalgan Rural Village area, for the purposes of upgrading the entry points to the Kalgan Rural Village site.

    - An additional payment of $5,195.08 (incl GST) as at March 2019 (Increased Annually on 1 July by CPI), for each additional lot identified as impacting on Riverside Road, to equally contribute to its upgrade.

    - This Policy has been adopted in accordance with Part 2 of *Local Planning Scheme 1.*

3. Local Government is to have due regard to the provisions of this Policy and the objectives

Scope

4. This Policy applies to the subdivision of land within the *Kalgan Rural Village Structure Plan* area.

Legislative and Strategic Context

5. The policy operates within the following framework of legislation.

    - *Planning and Development Act 2005*
    - *Planning and Development (Local Planning Schemes) Regulations 2015*
    - *City of Albany Local Planning Scheme No.1.*
    - *The Kalgan Rural Village Structure Plan*

Review Position and Date

6. This policy and procedure is to be reviewed by the document owner on or before 1 September 2020.

Associated Documents

7. *Road Cost Apportionment Schedule (March 2019)*
8. *State Planning Policy 3.6 Development Contributions for Infrastructure*

Document Approval			
Document Development Officer: Alex Bott		**Document Owner:** *Paul Camins*	
Coordinator Planning Services		Executive Director Development Services	
Document Control			
File Number - Document Type:	CM.STD.7 – Policy		
Document Reference Number:	(Created when cover sheet is created in Synergy Records Module)		
Status of Document:	**Council decision:** Draft, **Administrative decision:** Draft,		
Quality Assurance:	Chief Executive Officer, Executive Management Team.		
Distribution:	Internal Document, Public Document		
Document Revision History			
Version	**Author**	**Version Description**	**Date Completed**
0.1	Development Engineer	Initial Draft	23/05/2019

CITY OF ALBANY

REPORT

To	:	His Worship the Mayor and Councillors
From	:	Information Officer - Planning
Subject	:	Development Application Approvals – May 2019
Date	:	04 June 2019

1. The attached report shows Development Application Approvals issued under delegation by a planning officer for the month of May 2019.

2. Within this period 54 Development applications were determined, of these;

   - 49 Development applications were approved under delegated authority; and
   - 1 Development application was withdrawn.

Michelle Gray
Information Officer – Development Services

PLANNING SCHEME CONSENTS ISSUED UNDER DELEGATED AUTHORITY

Applications determined for May 2019

Application Number	Application Date	Applicant	Street Address	Locality	Description of Application	Decision	Decision Date	Assessing Officer
P2190183	9/04/2019	Serendipity (WA) Pty Ltd	Stirling Terrace	Albany	Office - Alterations	Delegate Approved	28/05/2019	Alex Bott
P2170057	6/02/2017	Harley Dykstra Pty Ltd	Alison Parade	Bayonet Head	Single House	Delegate Approved	31/05/2019	Jan van der Mescht
P2190190	16/04/2019	T Barnett	Anchorage Vista	Bayonet Head	Family Day care	Delegate Approved	13/05/2019	Jessica Anderson
P2190229	8/05/2019	NBG Mickle	Flynn Way	Bayonet Head	Single House & Outbuilding	Delegate Approved	9/05/2019	Lezia Sandon
P2190245	17/05/2019	Koster's Outdoor Pty Ltd	Ballindean Avenue	Bayonet Head	Single House - Patio	Delegate Approved	22/05/2019	Lezia Sandon
P2190253	24/05/2019	Turps Steel Fabrications	Lound Street	Bayonet Head	Single House - Outbuilding Addition	Delegate Approved	30/05/2019	Lezia Sandon
P2190269	29/05/2019	Koster's Outdoor Pty Ltd	Elizabeth Street	Bayonet Head	Single House - Outbuilding	Delegate Approved	30/05/2019	Alex Bott
P2190140	12/03/2019	Ryde Building Company Pty Ltd	Eclipse Drive	Collingwood Heights	Development - Earthworks in excess of 600mm and Retaining	Delegate Approved	27/05/2019	Jessica Anderson
P2190202	23/04/2019	Stuart Jamieson C/- City of Albany	Albany Highway	Drome	Office	Delegate Approved	1/05/2019	Alex Bott
P2190260	24/05/2019	Powerhouse Architectural Drafting	Bedwell Street	Emu Point	Single House - Additions	Delegate Approved	29/05/2019	Lezia Sandon
P2190248	21/05/2019	TG Burgess	George Street	Gledhow	Approval of Existing Development (Above Ground Swimming Pool)	Delegate Approved	23/05/2019	Lezia Sandon
P2190221	6/05/2019	YD Henderson	La Perouse Road	Goode Beach	Single House	Delegate Approved	23/05/2019	Jessica Anderson
P2190206	26/04/2019	AL Scott	Walford Road	Kalgan	Development - Outbuilding & Watertank	Delegate Approved	9/05/2019	Jessica Anderson
P2190224	6/05/2019	WG Blakeney	Walford Road	Kalgan	Single House - Retaining Wall	Delegate Approved	8/05/2019	Lezia Sandon
P2190226	7/05/2019	MCB Construction Pty Ltd	Churchland Road	Kalgan	Agriculture - Extensive (Outbuilding)	Delegate Approved	14/05/2019	Lezia Sandon
P2190249	21/05/2019	WA Country Builders	Walford Road	Kalgan	Single House	Delegate Approved	28/05/2019	Lezia Sandon
P2190240	16/05/2019	RJ Tweddle	Hart View	King River	Single House - Outbuilding Extensions	Delegate Approved	17/05/2019	Lezia Sandon

Application Number	Application Date	Applicant	Street Address	Locality	Description of Application	Decision	Decision Date	Assessing Officer
P2190191	17/04/2019	AJ West	Shelley Beach Road	Kronkup	Development - Outbuilding x 2	Delegate Approved	15/05/2019	Jessica Anderson
P2190222	6/05/2019	RJ Harrison	Harbour Esplanade	Little Grove	Single House - Boundary Fence	Delegate Approved	9/05/2019	Jessica Anderson
P2190184	10/04/2019	New Horizon Homes (WA) Pty Ltd	Hillview Rise	Lower King	Ancillary Accommodation	Delegate Approved	1/05/2019	Jessica Anderson
P2190209	30/04/2019	DM Williams	Daniels Close	Lower King	Single House - Outbuilding & Carport	Delegate Approved	16/05/2019	Jessica Anderson
P2190247	20/05/2019	LC Grinham	Rutherford Street	Lower King	Single House - Retaining Walls and Lean to	Delegate Approved	23/05/2019	Lezia Sandon
P2190230	8/05/2019	A & KL Langridge	Piggot Martin Road	Lowlands	Agriculture - Extensive (Outbuilding)	Delegate Approved	14/05/2019	Lezia Sandon
P2190213	1/05/2019	Matson Fabrications	Berrima Road	Marbelup	Single House - Additions	Delegate Approved	7/05/2019	Lezia Sandon
P2190216	2/05/2019	WA Country Builders	Ajana Drive	Marbelup	Single House	Delegate Approved	3/05/2019	Alex Bott
P2190217	3/05/2019	Kbuilt Construction Pty Ltd	Ajana Drive	Marbelup	Single House	Delegate Approved	8/05/2019	Alex Bott
P2190200	18/04/2019	Ryde Building Company Pty Ltd	Celestial Drive	McKail	Single House & Retaining Wall	Delegate Approved	6/05/2019	Jessica Anderson
P2190211	30/04/2019	Matson Fabrications	Albany Highway	McKail	Single House - Addition	Delegate Approved	13/05/2019	Jessica Anderson
P2190212	1/05/2019	Matson Fabrications	McNeal Loop	McKail	Single House - Additions	Delegate Approved	7/05/2019	Jessica Anderson
P2190266	28/05/2019	Koster's Outdoor Pty Ltd	Gladville Road	McKail	Single House - Outbuilding	Delegate Approved	30/05/2019	Jessica Anderson
P2190152	15/03/2019	Concept Building Design And Drafting	Middleton Road	Middleton Beach	Single House - Alteration & Addition	Delegate Approved	29/05/2019	Alex Bott
P2190199	18/04/2019	Koster's Outdoor Pty Ltd	Warburton Street	Middleton Beach	Single House - Additions - Patio	Delegate Approved	2/05/2019	Jessica Anderson
P2190227	7/05/2019	Dr Tindal	Hereford Way	Milpara	Single House - Additions	Delegate Approved	20/05/2019	Jessica Anderson
P2190265	27/05/2019	Koster's Outdoor Pty Ltd	Hereford Way	Milpara	Single House - Outbuilding	Delegate Approved	31/05/2019	Lezia Sandon
P2190108	28/02/2019	GJ Hunter	Shorts Place	Mira Mar	Single House - Retaining Wall	Delegate Approved	2/05/2019	Taylor Gunn
P2190204	24/04/2019	Powerhouse Architectural Drafting	Beauchamp Street	Mira Mar	Single House - Additions	Delegate Approved	13/05/2019	Alex Bott

Application Number	Application Date	Applicant	Street Address	Locality	Description of Application	Decision	Decision Date	Assessing Officer
P2190205	24/04/2019	Powerhouse Architectural Drafting	Beresford Street	Mira Mar	Single House - Additions	Delegate Approved	6/05/2019	Jessica Anderson
P2190223	6/05/2019	All Style Sheds - Great Southern	Lake Seppings Drive	Mira Mar	Single House - Additions Patio	Delegate Approved	7/05/2019	Lezia Sandon
P2170243	19/05/2017	Carl Beck	Marine Drive	Mount Clarence	Reserve Development - Trails Network	Delegate Approved	28/05/2019	Jessica Anderson
P2190228	8/05/2019	City of Albany	Marine Drive	Mount Clarence	Sign Shelter	Delegate Approved	28/05/2019	Jessica Anderson
P2190197	18/04/2019	S King	Carlisle Street	Mount Melville	Approval of Existing Development - Single House (Deck)	Delegate Approved	1/05/2019	Jessica Anderson
P2190180	5/04/2019	Dustin Coombe	Monroe Court	Robinson	Single House - Outbuilding	Delegate Approved	23/05/2019	Jessica Anderson
P2190219	3/05/2019	Holmes Architects	Home Road	Robinson	Single House	Delegate Approved	24/05/2019	Alex Bott
P2190232	8/05/2019	First Australian Farmland Pty Ltd	Drawbin Road	South Stirling	Agriculture-Extensive -Farm Storage Shed	Delegate Approved	15/05/2019	Lezia Sandon
P2190174	1/04/2019	Parry and Whyte Architects	Wansbrough Street	Spencer Park	MSWA Supported Accommodation and Service Hub	Delegate Approved	1/05/2019	Alex Bott
P2190193	17/04/2019	N Sims	Angove Road	Spencer Park	Consulting Rooms - Change of Use (Physiotherapy)	Delegate Approved	1/05/2019	Jessica Anderson
P2190214	1/05/2019	Christopher Frank Boetel	Premier Circle	Spencer Park	Application for Development Approval - Patio 34 Premier Circle Spencer Park	Withdrawn	3/05/2019	Jessica Anderson
P2190234	9/05/2019	PH & CK Gligorevic	North Road	Spencer Park	Approval of Existing Development - Single House - Carport	Delegate Approved	21/05/2019	Jessica Anderson
P2190207	26/04/2019	EL Myers	Randell Crescent	Warrenup	Single House - Addition	Delegate Approved	6/05/2019	Lezia Sandon
P2190210	30/04/2019	Koster's Outdoor Pty Ltd	Deloraine Drive	Warrenup	Single House - Outbuilding	Delegate Approved	1/05/2019	Alex Bott
P2190233	8/05/2019	AJ West	Deloraine Drive	Warrenup	Single House - Outbuilding	Delegate Approved	10/05/2019	Lezia Sandon
P2190237	14/05/2019	Perrella Building & Fabrications	Pinaster Road	Willyung	Single House - Outbuilding - Additions	Delegate Approved	20/05/2019	Lezia Sandon
P2190225	7/05/2019	Matson Fabrications	Minerva Street	Yakamia	Single House - Additions	Delegate Approved	9/05/2019	Lezia Sandon
P2190026	21/01/2019	KR & N Watkins	Lower Denmark Road	Youngs Siding	Animal Establishment - Dog Breeding	Delegate Approved	8/05/2019	Taylor Gunn

City of Albany

Building Report

To	:	His Worship the Mayor and Councillors
From	:	Zoe Sewell - Development Services
Subject	:	Building Activity – May 2019
Date	:	5 June 2019

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1. In May 2019, one hundred and Sixteen (116) building permits were issued for building activity worth $26,949,357.00. This included five (5) demolition permits and five (5) sign permits.

2. It's brought to Council's attention that these figures included the following building permits;
   #162948 – Six Residential Units, Office, Retaining & Decking, Conversion of Exist Building to Restaurant: Estimated Value $2,200,000.00; and
   #163301 - New Hotel and Restaurant/Bar: Estimated Value $18,920,000.00.

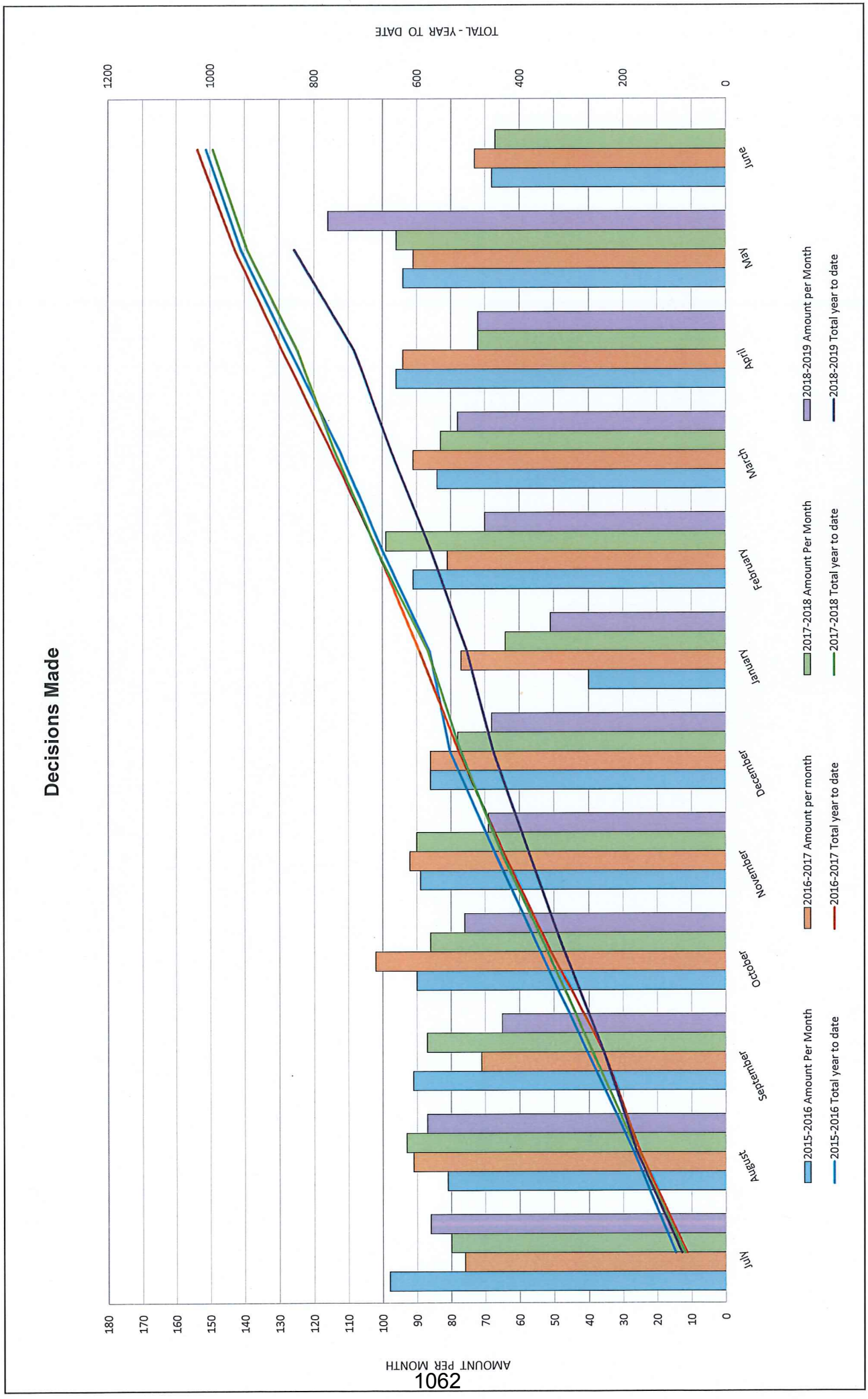
3. The three (3) attached graphs compare the current activity with the past three (3) fiscal years. The first one compares the amount of decisions made, the second one compares the value of activity, and the third one compares the number of dwellings and units.

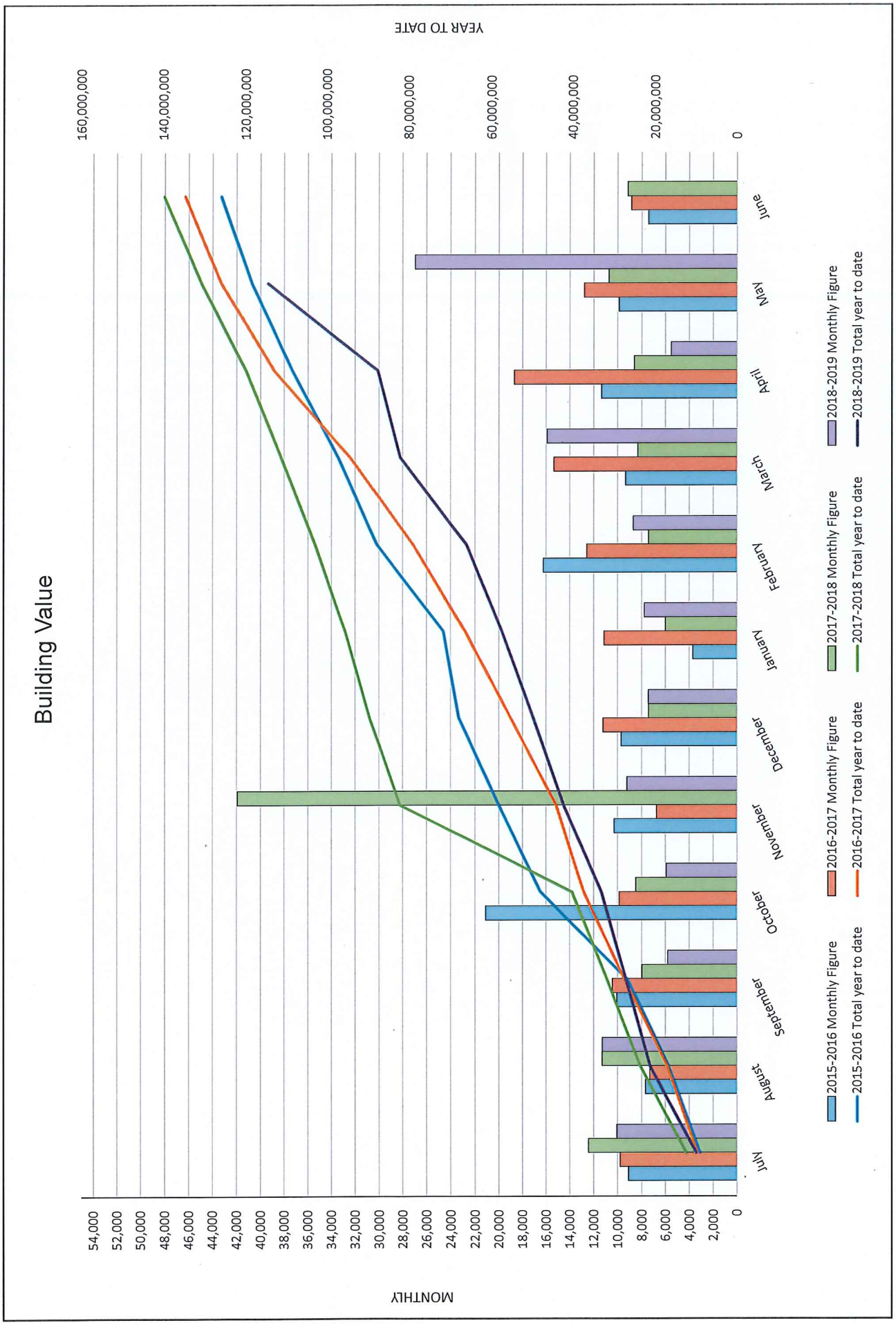
4. A breakdown of building activity into various categories is provided in the Building Construction Statistics form.

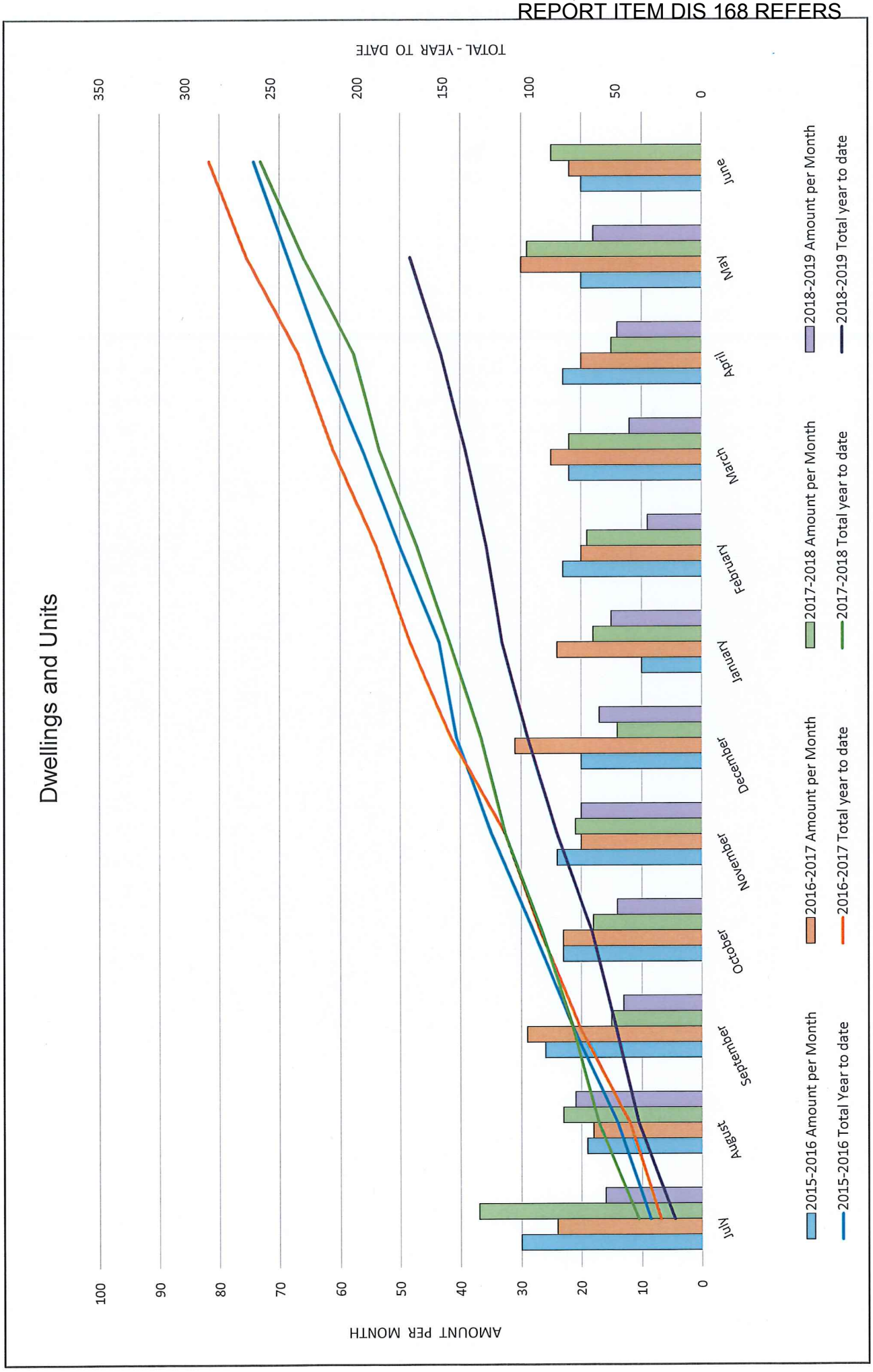
5. Attached are the details of the permits issued for May, the eleventh month of activity in the City of Albany for the financial year 2018/2019.

Yours faithfully

Zoe Sewell
Development Services


Decisions Made
TOTAL - YEAR TO DATE
AMOUNT PER MONTH
1200
1000
800
600
400
200
0
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
July
August
September
October
November
December
January
February
March
April
May
June
2015-2016 Amount Per Month
2015-2016 Total year to date
2016-2017 Amount per month
2016-2017 Total year to date
2017-2018 Amount Per Month
2017-2018 Total year to date
2018-2019 Amount per Month
2018-2019 Total year to date


Building Value
MONTHLY
YEAR TO DATE
54,000
52,000
50,000
48,000
46,000
44,000
42,000
40,000
38,000
36,000
34,000
32,000
30,000
28,000
26,000
24,000
22,000
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
160,000,000
140,000,000
120,000,000
100,000,000
80,000,000
60,000,000
40,000,000
20,000,000
0
July
August
September
October
November
December
January
February
March
April
May
June
2015-2016 Monthly Figure
2015-2016 Total year to date
2016-2017 Monthly Figure
2016-2017 Total year to date
2017-2018 Monthly Figure
2017-2018 Total year to date
2018-2019 Monthly Figure
2018-2019 Total year to date


Dwellings and Units
AMOUNT PER MONTH
TOTAL - YEAR TO DATE
0
10
20
30
40
50
60
70
80
90
100
0
50
100
150
200
250
300
350
July
August
September
October
November
December
January
February
March
April
May
June
2015-2016 Amount per Month
2015-2016 Total Year to date
2016-2017 Amount per Month
2016-2017 Total year to date
2017-2018 Amount per Month
2017-2018 Total year to date
2018-2019 Amount per Month
2018-2019 Total year to date

2018-2019	SINGLE DWELLING		GROUP DWELLING		Total	DOMESTIC/ OUTBUILDINGS		ADDITIONS/ DWELLINGS		HOTEL/ MOTEL		NEW COMMERCIAL		ADDITIONS/ COMMERCIAL		OTHER		TOTAL $ VALUE
	No	$ Value	No	$ Value		No	$ Value	No	$ Value	No	$ Value	No	$ Value	No	$ Value	No	$ Value	
JULY	15	4,914,962	1	70,000	16	25	378,091	15	337,400	0	0	2	2,985,240	11	1,081,784	13	287,568	10,055,045
AUGUST	20	5,778,908	1	172,175	21	22	507,268	23	1,277,795	0	0	1	2,977,700	3	430,368	9	123,345	11,267,559
SEPTEMBER	10	3,322,153	3	727,136	13	15	556,716	17	322,425	0	0	2	85,500	1	4,000	11	778,907	5,796,737
OCTOBER	13	4,008,661	1	80,000	14	20	501,004	22	490,261	0	0	0	0	3	738,000	9	104,996	5,922,922
NOVEMBER	19	7,290,500	1	501,553	20	17	330,345	14	482,320	0	0	0	0	1	483,395	4	135,867	9,223,980
DECEMBER	16	4,420,085	1	74,982	17	11	315,559	23	2,194,155	0	0	0	0	4	336,482	7	100,647	7,441,910
JANUARY	14	4,663,662	1	250,000	15	11	317,677	13	662,217	0	0	0	0	3	1,360,500	7	530,700	7,784,756
FEBRUARY	9	3,712,519	0	0	9	23	445,557	19	631,557	0	0	1	115,000	6	3,619,859	11	176,836	8,701,328
MARCH	11	3,214,089	1	72,000	12	12	286,777	28	1,115,519	0	0	2	450,000	4	382,555	13	10,388,143	15,909,083
APRIL	10	3,409,455	4	414,896	14	12	302,525	25	794,882	0	0	1	100,000	0	0	16	498,047	5,519,805
MAY	12	3,092,911	6	2,200,000	18	13	225,776	56	1,354,034	1	18,920,000	2	293,000	3	657,000	18	206,636	26,949,357
JUNE																		
DATE	**149**	**47,827,905**	**20**	**4,562,742**	**169**	**181**	**4,167,295**	**255**	**9,662,565**	**1**	**18,920,000**	**11**	**7,006,440**	**39**	**9,093,943**	**118**	**13,331,692**	**114,572,482**

REPORT ITEM DIS 168 REFERS

BUILDING, SIGN & DEMOLITION LICENCES ISSUED UNDER DELEGATED AUTHORITY

Applications determined for May 2019

Application Number	Builder	Description of Application	Street #	Property Description	Street Address	Suburb
163331	OCCUPANCY PERMIT	OCCUPANCY PERMIT - REPLACE EXISTING TIMBER ROOF WITH METAL DECK ROOF REPLACE	N/A	N/A	RAILWAY RESERVE	ALBANY
163289	JASON SIGNMAKERS	SIGN - CERTIFIED	62	1521	PROUDLOVE PARADE	ALBANY
163333	IRONMONGER BUILDING COMPANY	ADDITION OF STUDY TO EXISTING DWELLING - UNCERTIFIED	19	17	EARL STREET	ALBANY
163339	OWNER BUILDER	SIGN X 1 - SIGN LICENCE	270-284	4	YORK STREET	ALBANY
163341	OCCUPANCY PERMIT	OCCUPANCY PERMIT - WAVE ENERGY RESEARCH CENTER - ALTERATIONS/ADDITIONS TO EXISTING BUILDING - CERTIFIED	45-55	512	PROUDLOVE PARADE	ALBANY
163342	PEACEFUL BAY BUILDING SERVICE	ALTERATION - DISABLED TOILET - CERTIFIED	15-21	3	ABERDEEN STREET	ALBANY
163346	BUILDING APPROVAL CERTIFICATE	BUILDING APPROVAL CERTIFICATE - PARTIAL CONSTRUCTION OF VERANDAH	86-94	17	STIRLING TERRACE	ALBANY
163347	J WEARING	VERANDAH - CERTIFIED	86-94	17	STIRLING TERRACE	ALBANY
163357	KOSTER'S OUTDOOR PTY LTD	PATIO X 3 - UNCERTIFIED	16-18	12	VIEW STREET	ALBANY
163361	J GOMM	SHOP FRONT AWNING MAINTENANCE - UNCERTIFIED	258-260	8	YORK STREET	ALBANY
163364	RYDE BUILDING COMPANY PTY LTD	PART CHANGE OF CLASSIFICATION TO EXISTING BUILDING FROM CLASS TO CLASS	112-140	S27, S28, 123, 9, 76, 75	STIRLING TERRACE	ALBANY
163378	J WALTERS	SCAFFOLDING - BUILDING REPAIRS	168-180	100 66	STIRLING TERRACE	ALBANY
162948	GREAT SOUTHERN ENDEAVOUR PROJECTS PTY LTD	6 X RESIDENTIAL UNITS OFFICE RETAINING & DECKING CONVERSION OF EXIST BUILDING	1	20	DUKE STREET	ALBANY
163301	PINDAN CONSTRUCTIONS PTY LTD	NEW HOTEL AND RESTAURANT/BAR - CERTIFIED	3	3	TOLL PLACE	ALBANY
163410	J GOMM	UNDERPINNING TO DWELLING - UNCERTIFIED	74	105	VANCOUVER STREET	ALBANY
163424	J KNEZEVICH	OFFICE -TENANCY FITOUT / ALTERATIONS - CERTIFIED	112-140	S27 S28 123 9 76 75	STIRLING TERRACE	ALBANY
163310	OWNER BUILDER	SHED - UNCERTIFIED	5	132	GEELONG PARADE	BAYONET HEAD
163319	MR ROOFING WA	RE-ROOF DWELLING - UNCERTIFIED	82	613	ALLWOOD PARADE	BAYONET HEAD
163375	PULS PATIOS	CARPORT - UNCERTIFIED	72	26	ALISON PARADE	BAYONET HEAD

Application Number	Builder	Description of Application	Street #	Property Description	Street Address	Suburb
163385	C TWEDDLE	AMENDMENT TO ORIGINAL BUILDING PERMIT 161635 - CHANGE OF ROOF COLOUR WINDOW LOCATION & ADD STOREROOM - UNCERTIFIED	18	578	THE OUTLOOK	BAYONET HEAD
163405	TERJESEN CONSTRUCTION PTY LTD	COMPLETION OF BUILDING WORKS FOR NEW DWELLING APPROVED UNDER BUILDING PERMIT 161963 - CERTIFIED	36	75	ALLWOOD PARADE	BAYONET HEAD
163418	KOSTER'S OUTDOOR PTY LTD	PATIO - UNCERTIFIED	18	113	BALLINDEAN AVENUE	BAYONET HEAD
163317	SCHLAGER GROUP PTY LTD	ALBANY PLAZA AMENITIES UPGRADE - CERTIFIED	42-88	105, 104	ALBANY HIGHWAY	CENTENNIAL PARK
163344	R TROTT	CHANGE OF CLASSIFICATION - CLASS 6 SHOP TO CLASS 5 OFFICE - NEW FIT OUT - GM	131-135	120	LOCKYER AVENUE	CENTENNIAL PARK
163349	HACER PTY LTD trading as SMITH CONSTRUCT	TELSTRA SHOP INTERNAL FIT OUT - CERTIFIED	78-82	94	LOCKYER AVENUE	CENTENNIAL PARK
163368	I STAVELY	PATIO TO EXISTING PARK HOME - UNCERTIFIED	33	734	BARKER ROAD	CENTENNIAL PARK
163386	CITY OF ALBANY	WATER TANK - CERTIFIED	57-61	501	WELLINGTON STREET	CENTENNIAL PARK
163400	P.M.A DEMO PTY LTD	SHED - DEMOLITION	104-120	43	STEAD ROAD	CENTENNIAL PARK
163425	HALIFAX CRANE HIRE PTY LTD	WAREHOUSE LEAN TO AND ANCILLARY OFFICE - CERTIFIED	35	113	HERCULES CRESCENT	CENTENNIAL PARK
163389	AD CONTRACTORS PTY LTD	DEMOLITION - REMOVAL OF REDUNDANT PUMP STATION	LOT 7110	7110	LOWER KING ROAD	COLLINGWOOD HEIGHTS
163332	BUILDING APPROVAL CERTIFICATE	RETAINING WALL AND WATER TANK - BUILDING APPROVAL CERTIFICATE	101	16	PRESCOTTVALE ROAD	CUTHBERT
163390	ALBANY CONSTRUCTION & MAINTENANCE	SHED - UNCERTIFIED	61	142	HARROGATE ROAD	GLEDHOW
163401	P.M.A DEMO PTY LTD	DWELLING ROOF - DEMOLITION	29	8	BALSTON ROAD	GLEDHOW
163417	BUILDING APPROVAL CERTIFICATE	ABOVE GROUND SWIMMING POOL AND POOL SAFETY FENCE - BUILDING APPROVAL	25	110	GEORGE STREET	GLEDHOW
163337	OWNER BUILDER	BATHROOM/LAUNDRY ALTERATIONS - TO DWELLING UNCERTIFIED	2	21	ST GEORGES CRESCENT	GOODE BEACH
163387	RYDE BUILDING COMPANY PTY LTD	DWELLING ADDITIONS (GAMES ROOM) - CERTIFIED	11	57	KARRAKATTA ROAD	GOODE BEACH
163306	D LEEFLANG	RE-ROOF - ASBESTOS TO COLOURBOND TO EXISTING DWELLING - UNCERTIFIED	41839	4 3	SOUTH COAST HIGHWAY	GREEN RANGE
163305	OWNER BUILDER	UNIVERSALLY ACCESSIBLE TOILET - UNCERTIFIED	133	771	MOUNT BOYLE ROAD	KALGAN
163330	RYDE BUILDING COMPANY PTY LTD	NEW DWELLING AND RAINWATER TANK - UNCERTIFIED	26	208	LESUEUR VIEW	KALGAN

Application Number	Builder	Description of Application	Street #	Property Description	Street Address	Suburb
163362	OWNER BUILDER	SHED - UNCERTIFIED	LOT 153	153	WALFORD ROAD	KALGAN
163371	R GALLIMORE	FARM SHED - UNCERTIFIED	LOT 50, 4752	50, 4752	MEAD ROAD	KALGAN
163376	BLUEWATER TANKS	WATER TANK - UNCERTIFIED	LOT 153	153	WALFORD ROAD	KALGAN
163369	OWNER BUILDER	WINERY SHED & WATER TANK X 2 - CERTIFIED	133	771	MOUNT BOYLE ROAD	KALGAN
163391	OWNER BUILDER	REPLACEMENT OF RETAINING WALL - UNCERTIFIED	126	155	WALFORD ROAD	KALGAN
163327	OWNER BUILDER	RELOCATION OF EXISTING TRANSPORTABLE CHALET TO NEW SITE ON PROPERTY TWO	45724	111	SOUTH COAST HIGHWAY	KALGAN
163392	NORTH 2 SOUTH EXECUTIVE HOMES PTY LTD	RETAINING WALL & SITE WORKS - UNCERTIFIED	LOT 28	28	COOMBES ROAD	KRONKUP
163409	A WEST	MACHINERY SHED - UNCERTIFIED	LOT 35	35	SHELLEY BEACH ROAD	KRONKUP
163355	N WALLIS	ALTERATIONS & ADDITIONS TO EXISTING SHED - CERTIFIED	116	4	CHESTER PASS ROAD	LANGE
163334	OWNER BUILDER	AMENDMENT TO BP #163011 - REVISED ENGINEERING FOR RETAINING WALL - UNCERTIFIED	3	205	BLACKSWAN COURT	LITTLE GROVE
163366	RYDE BUILDING COMPANY PTY LTD	NEW DWELLING - UNCERTIFIED	36	104	GROVE STREET WEST	LITTLE GROVE
163412	J BOCCAMAZZO	RE-ROOF - ASBESTOS TO TIN - UNCERTIFIED	7	1	STUBBS ROAD	LITTLE GROVE
163419	LA ROSA CONSTRUCTIONS WA PTY LTD	ALTERATION TO INTERNAL WALLS TO EXISTING DWELLING - UNCERTIFIED	3	350	WILSON STREET	LITTLE GROVE
163303	D LEEFLANG	ALFRESCO - UNCERTIFIED	637	10	LOWER KING ROAD	LOWER KING
163335	HOME GROUP WA GREAT SOUTHERN PTY LTD	NEW DWELLING - UNCERTIFIED	LOT 47	47	RIVERVALE CHASE	LOWER KING
163402	OWNER BUILDER	PATIO AND CARPORT X 2 - UNCERTIFIED	469	7	LOWER KING ROAD	LOWER KING
163312	K WORT & K EVANS	ADMENDMENT TO BUILDING PERMIT 163195 - HOUSE LOCATION MOVED - UNCERTIFIED	Lot 3725	3725	THOMPSON ROAD	LOWLANDS
163299	WA COUNTRY BUILDERS PTY LTD	NEW DWELLING - UNCERTIFIED	LOT 530	530	BERRIMA ROAD	MARBELUP
163360	MATSON FABRICATIONS	PATIO - UNCERTIFIED	LOT 536	536	BERRIMA ROAD	MARBELUP
163403	KBUILT CONSTRUCTION PTY LTD	NEW DWELLING SHED AND 3 X WATER TANKS	LOT 550	550	AJANA DRIVE	MARBELUP
163329	MATSON FABRICATIONS	PATIO - UNCERTIFIED	6	335	SATELLITE CLOSE	MCKAIL

Application Number	Builder	Description of Application	Street #	Property Description	Street Address	Suburb
163336	OWNER BUILDER	SHED - UNCERTIFIED	44	355	COMET CORNER	MCKAIL
163345	OWNER BUILDER	SEACONTAINER - UNCERTIFIED	50	31	FEDERAL STREET	MCKAIL
163350	WA COUNTRY BUILDERS PTY LTD	NEW DWELLING - UNCERTIFIED	25	227	CELESTIAL DRIVE	MCKAIL
163365	MATSON FABRICATIONS	PATIO - UNCERTIFIED	28	377	MCNEAL LOOP	MCKAIL
163379	RYDE BUILDING COMPANY PTY LTD	NEW DWELLING - UNCERTIFIED	21	229	CELESTIAL DRIVE	MCKAIL
163383	B HOOK	PATIO - UNCERTIFIED	108	4	BEAUDON ROAD	MCKAIL
163377	WAUTERS ENTERPRISES PTY LTD	DEMOLITION OF BRICK BUILDING AND PORTICO OVER FUEL PUMPS ATTACHED TO EXISTING SHOP	557	66, 67, 37	ALBANY HIGHWAY	MCKAIL
163394	BUILDING APPROVAL CERTIFICATE	BUILDING APPROVAL CERTIFICATE - SHED & PATIO - CERTIFIED	23	726	KITCHER PARADE	MCKAIL
163407	MATSON FABRICATIONS	PATIO - UNCERTIFIED	633	16	ALBANY HIGHWAY	MCKAIL
163351	KOSTER'S OUTDOOR PTY LTD	PATIO - UNCERTIFIED	6	41	WARBURTON STREET	MIDDLETON BEACH
163354	KEEDAK HOLDINGS PTY LTD	ADDITIONS & ALTERATIONS TO EXISTING DWELLING - UNCERTIFIED	42B	1	HARE STREET	MIDDLETON BEACH
163396	MATSON FABRICATIONS	PATIO - UNCERTIFIED	73	82	ADELAIDE CRESCENT	MIDDLETON BEACH
163325	OWNER BUILDER	ALFRESCO EXTENSION - UNCERTIFIED	36	111	HEREFORD WAY	MILPARA
163338	KOSTERS STEEL CONSTRUCTION PTY LTD	ADDITIONS TO EXISTING SHOP - CERTIFIED	139	500	CHESTER PASS ROAD	MILPARA
163367	EYERITE SIGNS	PYLON SIGN x 1 - UNCERTIFIED	115	75	CHESTER PASS ROAD	MILPARA
163411	OWNER BUILDER	PERGOLA - UNCERTIFIED	35	133	HEREFORD WAY	MILPARA
163427	OWNER BUILDER	WATER TANKS X 2	71-79	32	GILL STREET	MILPARA
163324	SIGNOFF PTY LTD	SIGN - UNCERTIFIED	29	319	COCKBURN ROAD	MIRA MAR
163328	RISING SIGNS	SIGN X 2 - UNCERTIFIED	Unit 6/20	6	CAMPBELL ROAD	MIRA MAR
163158	WITHDRAWN	NEW DWELLING - UNCERTIFIED	13	4	MIRAMAR ROAD	MIRA MAR
163353	OWNER BUILDER	CARPORT - UNCERTIFIED	7	35	TAYLOR STREET	MIRA MAR

Application Number	Builder	Description of Application	Street #	Property Description	Street Address	Suburb
163373	S WESTERN	PATIO - UNCERTIFIED	37	216	LAKE SEPPINGS DRIVE	MIRA MAR
163384	T & W BRADE	ADDITION GAMES ROOM DECK AND CARPORT - UNCERTIFIED	22	3	BERESFORD STREET	MIRA MAR
163399	OCCUPANCY PERMIT	MEDICAL CENTRE DAY HOSPITAL - OCCUPANCY PERMIT	6	252	LUBICH WAY	MIRA MAR
163315	P FREER	VERANDAH & DECK - UNCERTIFIED	5	2	ROBERT STREET	MOUNT CLARENCE
163256	OWNER BUILDER	RETAINING WALLS - UNCERTIFIED	217	20	MIDDLETON ROAD	MOUNT CLARENCE
163356	OWNER BUILDER	AMENDMENT TO BUILDING PERMIT 163124 - RETAINING WALL - UNCERTIFIED	3	703	SUFFOLK STREET	MOUNT CLARENCE
163138	PLUNKETT HOMES (1903) PTY LTD	NEW DWELLING - UNCERTIFIED	3	10	ASHWELL STREET	MOUNT MELVILLE
163415	BUILDING APPROVAL CERTIFICATE	PART DECK - CERTIFIED	3	577	CARLISLE STREET	MOUNT MELVILLE
163322	R FRANCESCHI	AWNING/PATIO - UNCERTIFIED	367	116	ALBANY HIGHWAY	ORANA
163406	P SHEPHERD	PATIO - UNCERTIFIED	7B	2	VALENCIA CLOSE	ORANA
163318	MR ROOFING WA	RE-ROOF DWELLING - UNCERTIFIED	86	22	BRUNSWICK ROAD	PORT ALBANY
163382	BUILDING APPROVAL CERTIFICATE	BUILDING APPROVAL CERTIFICATE - DWELLING LEAN TO & WC OUTBUILDING	1557	3	REDMOND WEST ROAD	REDMOND WEST
163321	KOSTER'S OUTDOOR PTY LTD	NEW DWELLING - UNCERTIFIED	95	203	ALLMORE DRIVE	ROBINSON
163359	WREN (WA) PTY LTD	AMENDMENT TO BUILDING PERMIT 163235 - ANCILLARY ACCOMMADATION MOVED 8M WEST - UNCERTIFIED	105	135	FRENCHMAN BAY ROAD	ROBINSON
163370	MCB CONSTRUCTION PTY LTD	HORSE STABLES - UNCERTIFIED	75	43	ELPHINSTONE ROAD	ROBINSON
163380	R TROTT	NEW DWELLING SHED X 2 SEA CONTAINER & WATER TANK - UNCERTIFIED	LOT 210	210	TROTTER GROVE	ROBINSON
163252	AUSSIE SHEDS ALBANY	SHED - UNCERTIFIED	94	26	HARDIE ROAD	SPENCER PARK
163316	T GOODALL	GARAGE - UNCERTIFIED	48	30	HARDIE ROAD	SPENCER PARK
163323	CORAL COAST HOMES (WA) PTY LTD	SHED - UNCERTIFIED	23	4	ANGOVE ROAD	SPENCER PARK
163358	OWNER BUILDER	PATIO - UNCERTIFIED	34	36	PREMIER CIRCLE	SPENCER PARK
163429	BUILDING APPROVAL CERTIFICATE	INTERNAL ALTERATIONS AND ATTACHED STRUCTURES - BUILDING APPROVAL	36	65	NORTH ROAD	SPENCER PARK

Application Number	Builder	Description of Application	Street #	Property Description	Street Address	Suburb
163307	OWNER BUILDER	SHED - UNCERTIFIED	18	249	OWEN COURT	WARRENUP
163343	B HOOK	AMENDMENT TO BUILDING PERMIT 163343 - LOT BOUNDARY INCREASED - UNCERTIFIED	159	320	DELORAINE DRIVE	WARRENUP
163352	A WEST	PATIO - UNCERTIFIED	57	232	WARRENUP PLACE	WARRENUP
163381	KOSTER'S OUTDOOR PTY LTD	SHED - UNCERTIFIED	9	196	DELORAINE DRIVE	WARRENUP
163348	OWNER BUILDER	PATIO - UNCERTIFIED	52	422	KELTY VIEW	WILLYUNG
163308	PLUNKETT HOMES (1903) PTY LTD	NEW DWELLING - UNCERTIFIED	26	236	RIVERWOOD ROAD	WILLYUNG
163395	POCOCK BUILDING COMPANY PTY LTD	ALTERATIONS AND ADDITIONS TO EXISTING WORKSHOP - CERTIFIED	75	6	COPAL ROAD	WILLYUNG
163326	MATSON FABRICATIONS	PATIO & DECK - UNCERTIFIED	36	91	MARCONI ROAD	YAKAMIA
163372	TURPS STEEL FABRICATIONS	PATIO - UNCERTIFIED	1	800, 70, 9	ULSTER ROAD	YAKAMIA
163374	MATSON FABRICATIONS	PATIO - UNCERTIFIED	16	44	MINERVA STREET	YAKAMIA
163388	KOSTER'S OUTDOOR PTY LTD	BIKE SHELTER - CERTIFIED	102	4743	NORTH ROAD	YAKAMIA
163397	LOVEGROVE ELECTRICAL	INSTALLATION OF SOLAR ROOF PANELS - CERTIFIED	204	296	NORTH ROAD	YAKAMIA
163408	DOWNRITE DEMOLITION	DEMOLITION OF HOUSE AND ATTACHED BUILDINGS - UNCERTIFIED	29-33	13	ULSTER ROAD	YAKAMIA