

ATTACHMENTS

Planning and Development Committee Meeting

08 October 2014

5.30pm

City of Albany Council Chambers

PLANNING AND DEVELOPMENT COMMITTEE
ATTACHMENTS –08/10/2014
** REFER DISCLAIMER **

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Planning & Development Services

City of Albany
Policy

Kalgan Rural Village Developer Contribution Policy

KALGAN RURAL VILLAGE DEVELOPER CONTRIBUTION POLICY

Policy Statement

1. This Policy has been adopted in accordance with Part 2 of *Local Planning Scheme 1*.
2. Local Government is to have due regard to the provisions of this Policy and the objectives which the Policy is designed to achieve before making its determination.

Objective

3. 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

Scope

4. This Policy applies to the subdivision of land within the *Kalgan Rural Village Structure Plan* area.

Strategic Context

5. This Policy relates directly to the following elements of the *Community Strategic Plan “Albany 2023”*:
 - *To maintain and renew City assets in a sustainable manner; and*
 - *To advocate, plan and build friendly and connected communities.*

Legislative Context

6. *Local Planning Scheme No. 1, Part 2 – Policy Planning Framework*, clause 2.2 *Local Planning Policies* states that:

“The Local Government may prepare a Local Planning Policy in respect of any matter related to the planning and development of the Scheme area so as to apply:

- (a) Generally or for a particular class or classes of matters;*
- (b) Throughout, or in one or more parts of the Scheme area and may amend, add to, or rescind a Local Planning Policy so prepared.”*

Policy Provisions

7. The following developer contributions will be required:
 - A payment of \$8,269.83 (incl GST) as at June 2014 (Increased Annually on 1 July by Perth 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 \$4,864.67 (incl GST) as at June 2014 (Increased Annually on 1 July by Perth CPI), for each additional lot identified as impacting on Riverside Road, to equally contribute to its upgrade.
8. A complete overview of necessary upgrades and attendant cost calculations are provided in Appendix 1 – *Kalgan Rural Village Road Contributions Plan*.

Review Position and Date

9. N/A

Associated Documents

- 10. *Appendix 1 – Kalgan Rural Village Road Contributions Plan (June 2014)*
- 11. *Local Planning Scheme 1 (LPS1)*
- 12. *State Planning Policy 3.6 Development Contributions for Infrastructure*

Version Control

Document Approval			
Document Development Officer: Craig McMurtrie		Document Owner: Dale Putland	
Kalgan Rural Village Developer Contribution Policy			
Document Control			
File Number - Document Type:	CM.STD.7 – Policy		
Synergy Reference Number:	(Created when cover sheet is created in Synergy Records Module)		
Meta Data: Key Search Terms	Kalgan Rural Village Developer Contribution Policy		
Status of Document:	Draft		
Document file details:	N:\Devel.Service\Development\		
Quality Assurance:	Chief Executive Officer, Executive Management Team		
Distribution:	Internal Document, Public Document		
Document Revision History			
Version	Author	Version Description	Date Completed
Draft v0.01	Planning Officer	Initial Draft	09/09/2014

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CITY OF ALBANY

Road Contributions Plan

Kalgan Rural Village

June 2014



This Document acts as an Addendum to the Kalgan Rural Village Structure Plan and determines how Land Developers in the area will contribute to infrastructure upgrades.

Executive Summary

The intensification of residential land use will increase the population of the area and creating significant demands on existing infrastructure.

Developers are required to contribute to the upgrade of this existing infrastructure at:

- Hunton Road intersection with South Coast Hwy
- Wheeldon Road – traffic modifications
- Riverside Road

The contributions required are:

- a payment of \$8,269.83 (incl GST) as at June 2014 (increased annually on 1 July by Perth 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 \$4,864.67 (incl GST) as at June 2014 (increased annually on 1 July by Perth CPI), for each additional lot identified as impacting on Riverside Road, to equally contribute to its upgrade.

For Distribution

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For Distribution

Introduction

In 2012, the Kalgan Rural Village Structure Plan was endorsed. The intensification of residential land use will increase the population of the area and create significant demands on existing infrastructure. This was recognised 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 Kalgan Rural Village Structure Plan (KRVSP) requires that contributions be made to upgrade a number of roads within the Structure Plan area.

There is a need to investigate current usage patterns and determine future usage patterns based on proposed development in 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). Road upgrading may be paid for 'in kind' by the provision of works rather than as a contribution where appropriate and only by agreement with the City of Albany or Main Roads as applicable.

Proposed Development

Development Area

There are three precincts identified under the Kalgan Rural Village Structure Plan, 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 a marked up copy of Figure 1 from KRVSP)

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.

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 Highway 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.

Lot Yields

Expected 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	17	10
Precinct 2a	60	56
Precinct 2b	42	37
Precinct 2c	22	16
Precinct 3	18	11
	159	130

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 is 5.3m wide. This bridge's deficiencies will be exacerbated with additional traffic volume. Hunton Road is signposted at 60 km/h north of Riverside Road, with recent 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 is an unsealed road. From the intersection of Hunton Road to the first intersection, 280m in length, there is a wider 8.5 metre 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

Accident History

Between 2006 and 2012, at the intersection of Hunton Road and South Coast Highway there was a single reported collision between a car and motorcycle, where the motorcyclist was hospitalised. This is the only recorded accident in the Kalgan Rural Village study area in this time period.

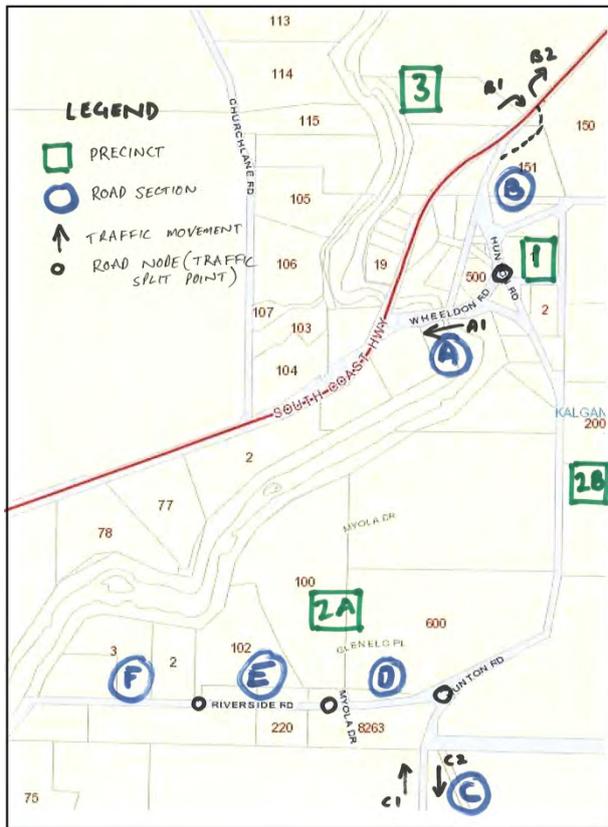
Traffic volumes

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	$0.8 \times 0.5 \times (1+2A+2B+2C) + 0.1 \times 0.5 \times (3)$
B1	$0.9 \times 0.5 \times (1+2A+2B+2C) + 0.1 \times 0.5 \times (3)$
B2	$0.1 \times (1+2A+2B+2C)$
C1 = C2	$0.1 \times 0.5 \times (1+2A+2B+2C+3)$

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
Wheelodon Road	102	2012	385	51	334	436	77%	One way treatment
Hunton Road north of Wheelodon	59	2012	480	-51	531	590	90%	Intersection realignment at South Coast, Highway and bridge replacement

	Existing Vehicles per Day		Projected additional vehicles	Projected reduction in vehicles	Net additional vehicles	Total	% New development	Modifications required to meet projected volume
Hunton Road south of Riverside	131	2010	104		104	235	44%	None
Riverside Road Ch 0 - 270	43	2012	320		320	363	88%	Grade, bind and seal to 6.0m 2-coat seal
Riverside Road Ch 270 - 700	43	2012	128		128	171	75%	Upgraded and 2-coat seal to 5.5m
Riverside Road Ch 700 - 1150	20	2012	56		56	76	74%	Widened to allowing passing opportunities. Resheet.

Design Recommendations

Hunton Road Bridge Upgrade

Main Roads undertook a waterways study to determine an economic replacement for the bridge on Hunton Road. The proposed design is to be based on the BGE report *RN 685*, which recommended a box culvert crossing of two 2400x2400mm culverts with fill to match the current road levels. These bridge replacement works will also widen the bridge to carry the additional two-way traffic and will be designed in the 2013/14 financial year.

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 530 vehicles per day. Using a 13.5% peak hour gives an estimate of traffic turning right of 71 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.

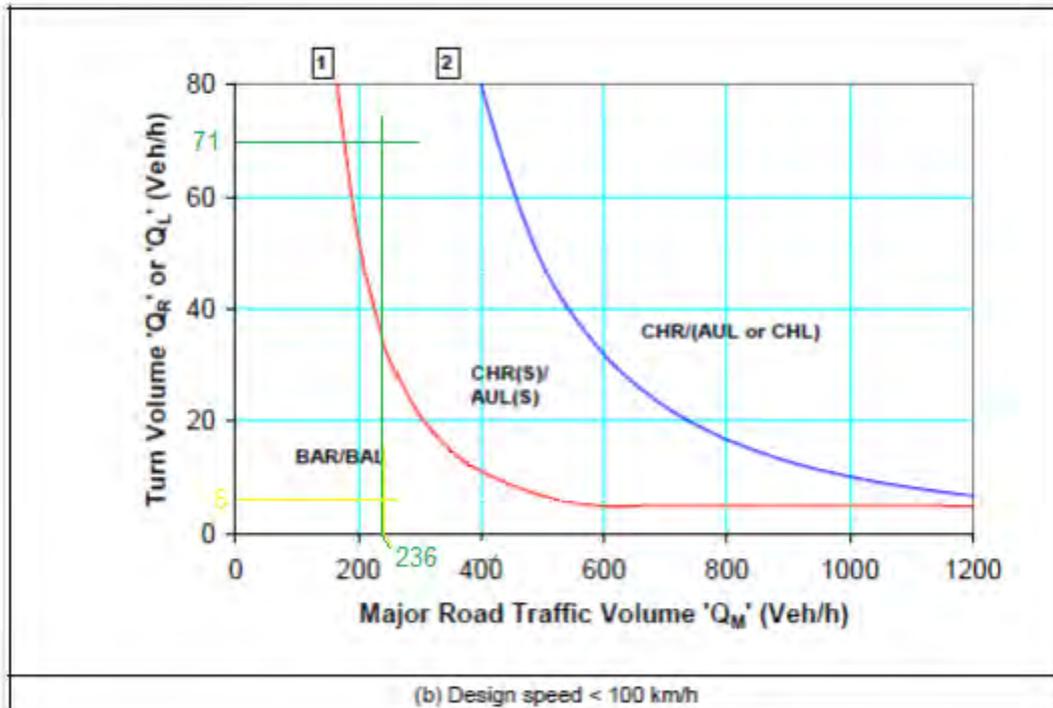


Figure 4.9: Warrants for turn treatments on the major road at unsignalised intersections¹

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) treatment².

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 \$1,020,311 (exc GST) including 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 channelise traffic. The AUR treatment is a rural auxiliary lane (right turn pocket) without channelisation. 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 (exc 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: The road is predominantly cleared and can easily meet sealing requirements to service the 363 vehicles per day. This section requires a 6.0m wide 2-coat seal with 1.2m unsealed shoulders.
- Chainages 270 – 660: 171 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. Considerations relating to local area traffic management could be made where there is a large tree narrowing the seal for a small section without necessarily removing the tree.
- Chainages 660 – 1100: This section of road is estimated to only carry 76 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.

The estimated costing for this work forms part of Appendix E and totals \$227,003 (exc 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.

Environmental Impacts and Heritage Area

The proposed bridge works and road realignment occur in areas of 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.

Land Resumption

The realignment and improvement of the Hunton Road and South Coast Highway intersection would require some land resumption. An estimated land resumption of 3163m² is expected to be required for the Hunton Road realignment. An additional 1000m² is being allowed for to accommodate passing lanes on South Coast Highway.

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.

For Distribution

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 June 2014 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.

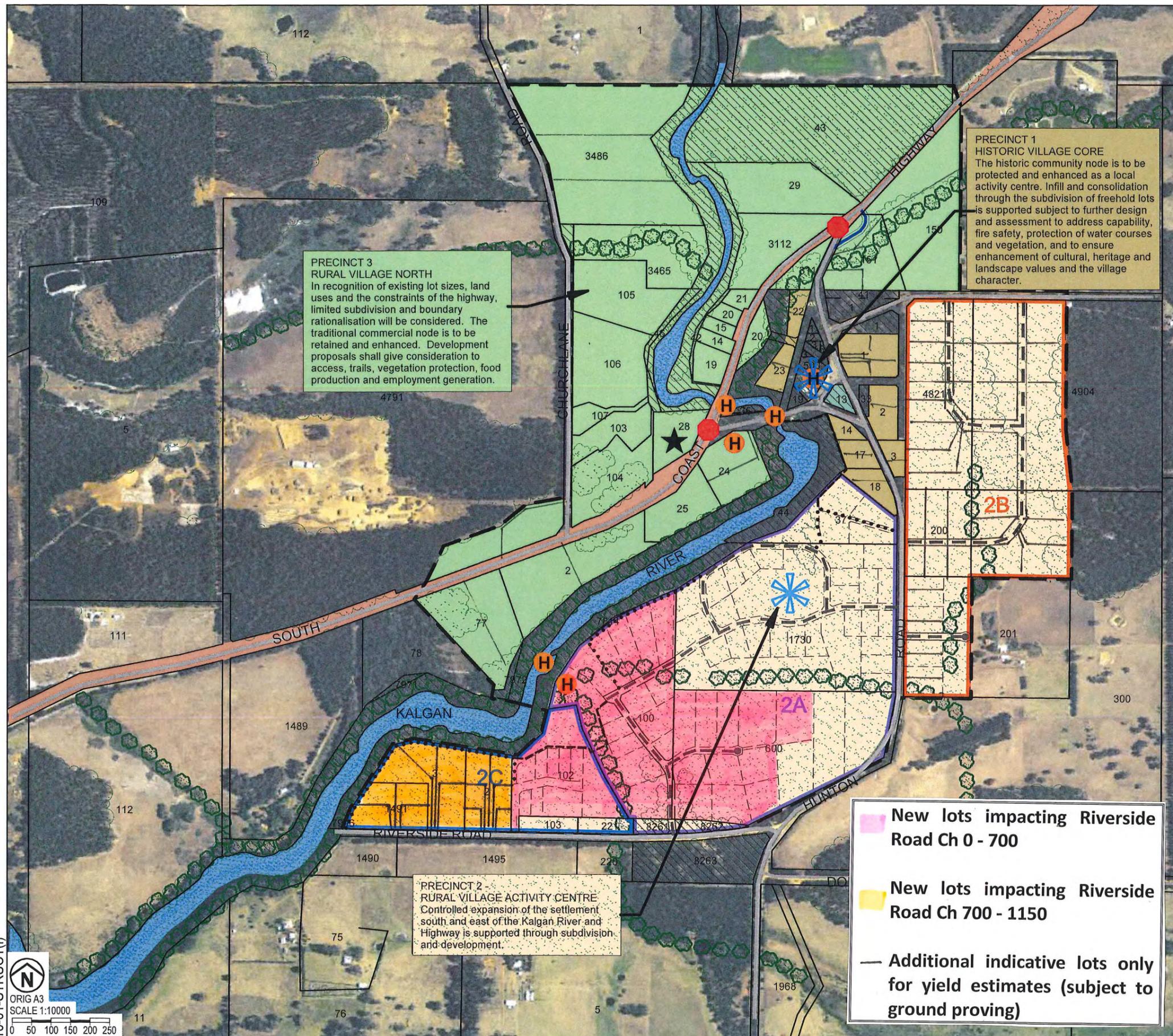
In summary;

- a payment of \$8,269.83 (incl GST) as at June 2014, 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 \$4,864.67 (incl GST) as at June 2014, 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

For Distribution

**KALGAN RURAL VILLAGE
 STRUCTURE PLAN**
 Kalgan, City of Albany
 (Refer item 2.6 21 June 2011)



As endorsed by the SPC 28 February 2012

**AYTON BAESJOU
 PLANNING**
 11 Duke Street
 Albany WA 6330
 Ph 9842 2304 Fax 9842 8494

Appendix B – Lot Yield and Contribution Calculation

For Distribution

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		\$7,518	\$0	\$7,518	
23	Precinct 1		2	1		\$7,518	\$0	\$7,518	
1	Precinct 1		4	3		\$22,554	\$0	\$22,554	
2	Precinct 1		2	1		\$7,518	\$0	\$7,518	
17	Precinct 1		2	1		\$7,518	\$0	\$7,518	
18	Precinct 1		3	2		\$15,036	\$0	\$15,036	
3	Precinct 1		2	1		\$7,518	\$0	\$7,518	
1491	Precinct 2c	22,373	3	2		\$15,036	\$8,845	\$23,881	
3	Precinct 2c	33,616	4	3	3	\$22,554	\$13,267	\$35,821	
2	Precinct 2c	24,283	3	2	2	\$15,036	\$8,845	\$23,881	
103	Precinct 2c	6,113	1			\$0	\$0	\$0	
102	Precinct 2c	55,338	10	9	9	\$67,662	\$39,802	\$107,464	
221	Precinct 2c	5,714	1			\$0	\$0	\$0	
100	Precinct 2a	120,111	14	13	13	\$97,734	\$57,492	\$155,226	
600	Precinct 2a	156,890	14	13	11	\$97,734	\$48,647	\$146,381	
1730	Precinct 2a	202,689	27	26		\$195,469	\$0	\$195,469	
37	Precinct 2a	35,554	5	4		\$30,072	\$0	\$30,072	
200	Precinct 2b	38,079	6	5		\$37,590	\$0	\$37,590	
4821 (Part only)	Precinct 2b	83,117	10	9		\$67,662	\$0	\$67,662	
4904 (Part only)	Precinct 2b	127,293	10	9		\$67,662	\$0	\$67,662	
201 (Part only)	Precinct 2b	53,369	8	7		\$52,626	\$0	\$52,626	
300 (Part only)	Precinct 2b		8	7		\$52,626	\$0	\$52,626	
105	Precinct 3		2	1		\$7,518	\$0	\$7,518	
106	Precinct 3		2	1		\$7,518	\$0	\$7,518	
151	Precinct 3	28,744	3	2		\$15,036	\$0	\$15,036	
150	Precinct 3	67,659	2	1		\$7,518	\$0	\$7,518	
3486	Precinct 3	127,724	3	2		\$15,036	\$0	\$15,036	
77	Precinct 3	43,213	2	1		\$7,518	\$0	\$7,518	
4791 (part only)	Precinct 3		2	2		\$15,036	\$0	\$15,036	
24	Precinct 3	22,867	2	1		\$7,518	\$0	\$7,518	
			159	130	33	7	\$977,344	\$176,897	\$1,154,241

	Intersections	Riverside
Cost Estimate less COA contribution	\$977,343.57	\$176,897.00
Cost per additional lot (exc GST)	\$7,518.03	\$4,422.43
	\$8,269.83	\$4,864.67

	Total Lots	Additional lots
Precinct 1	17	10
Precinct 2a	60	56
Precinct 2b	42	37
Precinct 2c	22	16
Precinct 3	18	11
	159	130

Lot yield as per KRVSF
Lot yield estimated only

COST SUMMARY

	Total Cost ex GST	% developers to pay	
Hunton Intersection	\$1,020,311	90%	\$918,349
Wheeldon Rd	\$77,000	77%	\$58,994
Riverside Rd 0-270	\$58,788	88%	\$51,824
Riverside Rd 270-660	\$96,179	75%	\$71,994
Riverside Rd 700-1150	\$72,036	74%	\$53,079

Appendix C – Traffic Calculations and Counts

For Distribution

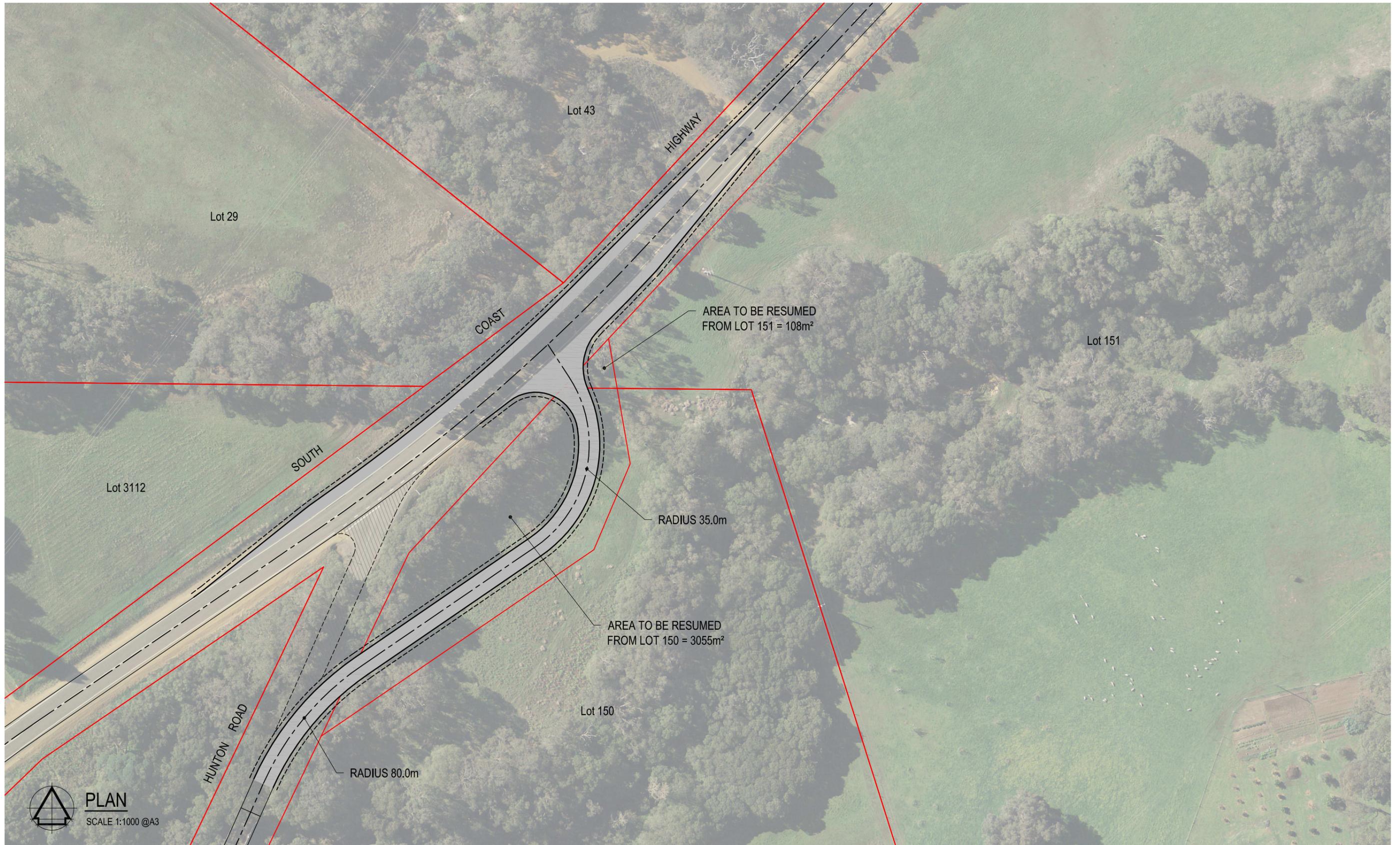
	Add'l Lot Yields	Daily Trips		(A) Increase Wheeldon Rd (one way)	(B) Increase Hunton Rd north of Wheeldon	(C) Increase Hunton Rd south of Riverside	(D) Increase Riverside Road 0-270	(E) Increase Riverside Road 270-700	(F) Increase Riverside Road 700-1100	Increase in Precinct 3
Precinct 1	10	10x8	80	32	40	8				
Precinct 2a	56	56x8	448	179.2	224	44.8	192			
Precinct 2b	37	37x8	296	118.4	148	29.6	0			
Precinct 2c	9	9x8	72	28.8	36	7.2	72	72		
Precinct 2c	7	7x8	56	22.4	28	5.6	56	56	56	
Precinct 3	11	11x8	88	4.4	4.4	8.8	0			88
Total	130		1040	385.2	480.4	104	320	128	56	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	385.2	51	334.2	436.2	77%	One way treatment
Hunton Rd north of Wheeldon	59	2012	480.4	-51	531.4	590.4	90%	Intersection realignment at South Coast, Highway and bridge replacement
Hunton Rd south of Riverside	131	2010	104		104	235	44%	None
Riverside Road 0 -270	43	2012	320		320	363	88%	Grade, bind and seal to 6.0m 2-coat seal
Riverside Road 270 -	43	2012	128		128	171	75%	Upgraded and 2-coat seal to 5.5m
Riverside Road 700 - 1150	20	2012	56		56	76	74%	Widened to allowing passing opportunities. Resheet.

Appendix D – Proposed Upgrade Treatments

For Distribution



REV	DESCRIPTION	APPROVED	DATE



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.	25	

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED AS APPROVED

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		-



This map has been produced by the City of Albany using data from a range of agencies. The City bears no responsibility for the accuracy of this information and accepts no responsibility for its use by other parties

Tuesday, 1 April 2014

1:3000



Appendix E – Treatment Cost Estimates

For Distribution

	area seal	area form
Hunton with LT pocket	1440	1940
Passing bulge	788	1074
	2228	3014

Item	Description	Unit	Qty	Rate	\$	\$
1	ESTABLISHMENT AND TRAFFIC CONTROL					
1.1	Land Resumption incl admin	SM	3163	\$15.00	\$47,445.00	
1.2	Establishment on Site	item	1	\$25,000.00	\$25,000.00	
1.3	Survey	item	1	\$5,000.00	\$5,000.00	
1.4	Environmental impact assessment	item	1	\$10,000.00	\$10,000.00	
1.5	Traffic Control	item	1	\$40,000.00	\$40,000.00	
1.6	Aboriginal Heritage	item	1	\$20,000.00	\$20,000.00	
						\$147,445.00
2	EARTHWORKS					
2.1	Clearing of site	m ²	3000	\$2.20	\$6,600.00	
2.2	Strip and respread topsoil	m ²	1050	\$5.00	\$5,250.00	
2.3	Cut to fill	m ²	1940	\$8.00	\$15,520.00	
2.4	Import fill	LCM	5000	\$16.00	\$80,000.00	
2.5	Trim subgrade	m ²	1692	\$5.00	\$8,460.00	
						\$115,830.00
3	DRAINAGE					
3.1	Supply and lay RCP 375mmø	m	33	\$175.00	\$5,775.00	
3.3	Headwalls Single	ea	4	\$800.00	\$3,200.00	
3.4	Bridge works	item	1	\$400,000.00	\$400,000.00	
						\$408,975.00
4	METALCOURSES					
4.1	250mm gravel	m ²	3014	\$45.00	\$135,630.00	
						\$135,630.00
5	BITUMINOUS SURFACING					
5.1	2 coat seal	m ²	2228	\$11.00	\$26,747.00	
5.2	Asphalt intersection	m ²	240	\$40.00	\$9,600.00	
5.3	Kerb at intersection	lm	80	\$50.00	\$4,000.00	
5.4	Ascon	item	1	\$10,000.00	\$10,000.00	
5.5	QA	item	1	\$5,000.00	\$5,000.00	
						\$55,347.00
6	Road decommissioning					
6.1	Remove materials to spoil	m ²	1050	\$20.00	\$21,000.00	
						\$21,000.00
7	LINEMARKING AND SIGNAGE					
7.1	Estimate	item	1	\$3,000.00	\$3,000.00	
						\$3,000.00
TOTAL ESTIMATE (excluding GST)						\$887,227.00
Survey and Superintendence						\$88,722.70
Contingency						\$44,361.35
TOTAL ESTIMATE (excluding GST)						\$1,020,311.05

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

	Length	width seal	width Clearing	width cleared v	width form	area seal	area form	area clearing	area to clear
Riverside	270	6	12	12	8	1620	2160	3240	0

Item	Description	Unit	Qty	Rate	\$	\$
1	ESTABLISHMENT AND TRAFFIC CONTROL					
1.2	Establishment on Site	Unit	1	\$5,000.00	\$5,000.00	
1.3	Survey	Unit	1	\$5,000.00	\$5,000.00	
1.4	Traffic Control	Unit	1	\$6,000.00	\$6,000.00	
						\$16,000.00
2	EARTHWORKS					
2.1	Clearing of site	m ²	0	\$2.20	\$0.00	
						\$0.00
4	GRAVEL COURSES					
4.1	Trim & bind	m ²	2160	\$5.00	\$10,800.00	
						\$10,800.00
5	BITUMINOUS SURFACING					
5.1	2 coat seal	m ²	1620	\$11.00	\$17,820.00	
	intersection extra over	item	1	\$5,000.00	\$5,000.00	
						\$22,820.00
7	LINEMARKING AND SIGNAGE					
7.1	Estimate	item	1	\$1,500.00	\$1,500.00	
						\$1,500.00
ESTIMATE (excluding GST)						\$51,120.00
Survey and Superintendence						\$5,112.00
Contingency						\$2,556.00
TOTAL ESTIMATE (excluding GST)						\$58,788.00

	Length	width seal	width Clearing	width cleared v	width form	area seal	area form	area clearing	area to clear
Riverside	430	5.5	10	6	6.5	2365	2795	4300	1720

Item	Description	Unit	Qty	Rate	\$	\$
1	ESTABLISHMENT AND TRAFFIC CONTROL					
1.2	Establishment on Site	Unit	1	\$5,000.00	\$5,000.00	
1.3	Survey	Unit	1	\$5,000.00	\$5,000.00	
1.4	Traffic Control	Unit	1	\$6,000.00	\$6,000.00	\$16,000.00
2	EARTHWORKS					
2.1	Clearing of site	m ²	1720	\$2.20	\$3,784.00	
2.3	Preparation of subgrade	m ²	2795	\$5.00	\$13,975.00	\$17,759.00
4	GRAVEL COURSES					
	SGR extra	m ²	559	\$15.00	\$8,385.00	
4.1	Trim	m ²	2795	\$5.00	\$13,975.00	\$22,360.00
5	BITUMINOUS SURFACING					
5.1	2 coat seal	m ²	2365	\$11.00	\$26,015.00	\$26,015.00
7	LINEMARKING AND SIGNAGE					
7.1	Estimate	item	1	\$1,500.00	\$1,500.00	\$1,500.00
ESTIMATE (excluding GST)						\$83,634.00
Survey and Superintendence						\$8,363.40
Contingency						\$4,181.70
TOTAL ESTIMATE (excluding GST)						\$96,179.10

	Length	width seal	width Clearing	width cleared v	width form	area seal	area form	area clearing	area to clear
Riverside	400	0	8	5	7	0	2800	3200	1200

Item	Description	Unit	Qty	Rate	\$	\$
1	ESTABLISHMENT AND TRAFFIC CONTROL					
1.2	Establishment on Site	Unit	1	\$5,000.00	\$5,000.00	
1.3	Survey	Unit	1	\$5,000.00	\$5,000.00	
1.4	Traffic Control	Unit	1	\$5,000.00	\$5,000.00	
						\$15,000.00
2	EARTHWORKS					
2.1	Clearing of site	m ²	1200	\$2.20	\$2,640.00	
2.3	Preparation of subgrade	m ²	2800	\$5.00	\$14,000.00	
						\$16,640.00
4	GRAVEL COURSES					
4.1	Trim and overlay	m ²	2800	\$10.00	\$28,000.00	
						\$28,000.00
5	BITUMINOUS SURFACING					
5.1	2 coat seal	m ²	0	\$5.75	\$0.00	
						\$0.00
7	LINEMARKING AND SIGNAGE					
7.1	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

Subject land



No.	Name/Address of Submitter	Summary of Submission	Officer Comment
1	Telstra – Forecasting/Area Planning – South Western Access Network & Technology Locked Bag 2525 PERTH WA 6001	No objections. A network extension will be required for any development within the area concerned.	Nil.
2	Department of Agriculture and Food 444 Albany Highway ALBANY WA 6330	<p>The Department of Agriculture and Food, WA (DAFWA) received a request in December 2011 to provide some preliminary advice to the landowner addressing Lot 124, Marbelup, west of Albany. At the point in time, the owner was considering a rezoning application and subdivision proposal. In response DAFWA provided written and verbal discussion to the landowner addressing a number of issues related to the draft proposal, which included matters linked to the negative impacts from adjacent land users (i.e. the small rural residential holdings to the west) of the owner's Race Horse adjustment activity. The text response provided to the land owner (dated December 2011) is noted in the referral documentation.</p> <p>DAFWA received a request in early August from the Department of Planning (Albany Office) to provide comment on the proposed rezoning of Lots 124 and 125, South Coast Highway, Marbelup. Prior to that request, DAFWA had not received any referral notification from the City of Albany requesting comment. The points below are the comments provided to the Department of Planning.</p> <ol style="list-style-type: none"> 1. Under the Lower Great Southern Region Strategy, the land is classed as Priority Agricultural Land (PAL), which infers superior quality for agricultural (horticulture) production. However, PAL can also represent land that is prime for any intensive agricultural pursuit, which could include high value livestock grazing – such as race horse agistment and 	The comments received from DAFWA are consistent with the current designation of the subject lots in the Albany Local Planning Strategy (ALPS) as 'Priority Agriculture'.

No.	Name/Address of Submitter	Summary of Submission	Officer Comment
		<p>stud breeding. PAL mapping has been compiled from regional scale data through the interpretation of soil unit qualities – it does not include any water resource information. It is acknowledged that improved detail can often be gained from accompanying paddock scale assessments.</p> <p>2. Attached in previous email correspondence is an extract from a draft map illustrating High Quality Ag Land (HQAL) for the subject area (<i>Officer's note: refer Appendix 2</i>). This draft mapping was prepared in an attempt to revise or refine the identification of PAL in the region. While there are some challenges with the methodology, the information is still valid for identifying land for a “diversity of intensive agricultural pursuits” – the pale green representing >60% of Priority 2 agricultural land. It for this reason, together with the comments submitted in previous correspondence with the land owner as to why DAFWA cannot support the proposal.</p> <p>3. Additional comments</p> <ul style="list-style-type: none"> • It is a perversion of the planning system, to change the Agricultural Land classification status from Priority to General, based on a land consultancy report compiled on behalf of the proponent seeking to rezone / subdivide the land. • The proponents have supplied a detailed land use capability assessment report prepared by a reputable land assessor which states that the overall analysis of the agricultural capability for Lot 124 and 125 (Table 5. Site - Specific Capability Analysis, p25) is generally of fair capability or average quality for grazing activities (i.e. Class 3 capability); and about half of the land is of 'fair or better' (Class 2) capability for 	<p>REPORT ITEM PD054 REFERS</p>

No.	Name/Address of Submitter	Summary of Submission	Officer Comment
		<p>perennial horticultural activity. While this is based on a semi-detailed paddock scale assessment, it does not wholly contradict the regional scale PAL identification. The land at present (or at least in the recent past) provided high quality grazing and stud agistment for Race Horses which require a combination of (a) access to consistently available high quality water and (b) good and stable soils to achieve excellent pasture condition and production. Given the nature and requirements of the past land use, the capability statement suggesting 'average grazing quality' doesn't align.</p> <ul style="list-style-type: none"> • DAFWA does not dispute the soil mapping provided by Land Assessment Pty Ltd (page 17). DAFWA supports detailed (paddock-scale) soil and landscape assessment in lieu of the regional scale mapping and associated interpretation. DAFWA acknowledges that the western portion of Lot 125 (mapped as Unit U1) is likely to have a lower capability than the surrounding units due to the shallow nature of the soil. If developing an intensive land use with supporting infrastructure, generally the poorer quality soils (where conditions for the development are not limiting) are used for that infrastructure. Soil unit U1 is ideal for sheds, silos, feedlots or housing infrastructure. • DAFWA acknowledges that that irrespective of the quality of the land, there are likely to be challenging issues for intensive agriculture on Lot 124 and 125 - because of the 'sandwiched' location of the property (described as a 'discrete-cell' in the application documentation). Some of the challenges are discussed in the report (i.e. plastic bags, animal distress, and thievery, etc) - 	<p>REPORT ITEM PD054 REFERS</p>

No.	Name/Address of Submitter	Summary of Submission	Officer Comment
		<p>these issues of course can occur in any location or demographic. However, while described as a 'discrete cell' this property presents a "unique situation" for the Albany area, in that it has the combination of consistently available and good quality water in association with generally good quality soils. This is a rare / shrinking resource in the Albany area. Properties with this combination represent land with a "high flexibility for a diverse range of intensive agricultural options." Under the current DAFWA methodology supporting the identification of High Quality Agricultural Land, Lots 124 and 125 would most likely be classed as High Quality Agricultural Land (http://archive.agric.wa.gov.au/PC_95674.html)</p> <ul style="list-style-type: none"> • The comments provided by DAFWA are based on our position statement for agricultural land use planning, through which we are guided by the State Planning Policy 2.5 (2012) and the associated Rural Planning Guidelines (2013). • DAFWA does not support the proposed rezoning and subdivision application. 	REPORT ITEM PD054 REFERS
3	Department of Health PO Box 8172 PERTH BUSINESS CENTRE WA 6849	The proponents are advised that approval is required for any on-site waste water treatment process. In particular the amendment should reflect this regulatory requirement and reference DOH publications as appropriate.	Should the LSAR be supported, late winter site testing to determine land capability for effluent disposal would be required to accompany any formal scheme amendment proposal. The proposal should also reference any DoH publications as may be appropriate.
4	Department of Water – South Coast Region PO Box 525 ALBANY WA 6331	The subject site is located in the Torbay Catchment, with the water draining from this property entering Lake Powell and Torbay Inlet. The DoW has invested considerable resources into this catchment to restore water quality over many years through the implementation of the Watershed Torbay Catchment Restoration Plan. The DoW would not wish to see a negative impact on water quality as an	Should the LSAR be supported, the DoW's concerns should be addressed in any formal scheme amendment proposal. Staff would support the DoW's position that waterlogged areas should be identified as development exclusion zones, restrictions placed on the keeping of stock on some lots, and the fencing and revegetation of waterways. Where possible, this should extend to the minor waterways on Lot 124. It is

No.	Name/Address of Submitter	Summary of Submission	Officer Comment
		<p>outcome of this development. The identification of waterlogged areas as development exclusion zones, restriction on keeping of stock on some lots and the fencing and revegetation of waterways will assist with minimising the impact of water quality.</p> <p>Lot 124 appears to have several minor waterways on the property, as well as the more significant Five Mile Creek. The DoW would recommend the restoration of these waterways, with fencing and revegetation as required. While the Five Mile Creek is contained within a drainage reserve, there may still be opportunities to enhance the ecological values of the waterway with some restoration works to be included, without interfering with the access and maintenance requirements of Water Corporation.</p>	<p>REPORT ITEM PD054 REFERS</p> <p>also recommended that consideration is given to enhancing the ecological values of Five Mile Creek with some restoration works, provided that this does not interfere with the access and maintenance requirements of the Water Corporation.</p>
5	<p>Main Roads WA Great Southern Region PO Box 503 ALBANY WA 6331</p>	<p>The proposed rezoning would be acceptable to Main Roads subject to the following conditions being imposed:</p> <ol style="list-style-type: none"> 1. Only one access from the South Coast Highway would be permitted to the development. The developer shall gain the approval of the location of the access point from Main Roads. 2. The developer shall construct a dedicated left turn pocket to accommodate left-in turn movements from the South Coast Highway into the development at the approved access location. 3. The developer shall construct a dedicated right turn pocket to accommodate right-in turn movements from the South Coast Highway into the development at the approved access location. 4. The developer shall design the approved entry treatments to the satisfaction of Main Roads. 5. Due to the current sight distance restrictions on the 	<p>Should the LSAR be supported, Staff would recommend that Main Roads WA's conditions are addressed in any formal scheme amendment proposal.</p>

No.	Name/Address of Submitter	Summary of Submission	Officer Comment
		<p>road geometry of the South Coast Highway, access to the development would not be considered to the east of the existing drainage easement.</p> <p>6. The developer shall be responsible for all costs involved in the design and construction of the approved access intersection treatment. This includes any land, signing, road markings, relocation of services and Main Roads costs involved in reviewing design and construction drawings and any site inspections required.</p> <p>7. There shall be no discharge of storm water from the development onto the South Coast Highway road reserve.</p> <p>8. The developer shall place a restrictive covenant on the deposited plans for lots adjacent to the South Coast Highway stating no vehicle access shall be permitted to or from the South Coast Highway Road Reserve.</p> <p>Additional Advice to Developer</p> <p>1. Main Roads currently have unfunded future planned roadworks adjacent to Lots 124 and 125 South Coast Highway. These roadworks will require up to 10m of land acquisition from Lots 124 and 125. This requirement should be considered on any planned development.</p> <p>Main Roads will provide more specific advice to any proposed development after any approved Scheme Amendment by the City of Albany.</p>	<p>REPORT ITEM PD054 REFERS</p>

No.	Name/Address of Submitter	Summary of Submission	Officer Comment
6	Department of Planning PO Box 1108 ALBANY WA 6331	<p>The proposed SAR for Lots 124 and 125 South Coast Highway, Albany is to rezone the land from General Agriculture to Rural Residential. In providing feedback on the current scheme amendment request, the following statutory and strategic planning documents are of importance.</p> <p>The land is identified as agricultural land of state and regional significance according to <i>the Lower Great Southern Strategy (LGSS map - 2007)</i> i.e. Priority Agricultural Land (PAL) and is to be retained for agricultural uses. The change of zoning is therefore not supported.</p> <p>The land is currently within the Priority Agriculture designation in the <i>Albany Local Planning Strategy (ALPS - 2010)</i>. During the preparation of ALPS, the <i>City of Albany Rural Planning Issues Review (Landvision, 2002)</i> concluded there was an oversupply of Rural Residential lots. The finding was that land zoned Rural Residential for speculative reasons can impact on agricultural land values. The change of zoning to Rural Residential is therefore, not supported.</p> <p>In the recently gazetted <i>Albany Local Planning Scheme (Albany LPS1 - 2014)</i> the land is zoned General Agriculture with objectives to prevent land uses and development within the zone that may adversely impact on the continued use of the land for agricultural and rural purposes. The <i>Albany LPS1</i> clearly does not anticipate the land being used for rural residential purposes.</p> <p>The <i>State Planning Policy 2.5 Land Use Planning in Rural Areas</i> states in <i>5.1 Protection of Rural Land</i>, that land use changes from rural to all other uses are required to be planned for in a planning strategy or scheme; and priority agricultural land is to be retained for that purpose. The subject land has not been identified for a change of</p>	<p>REPORT ITEM PD054 REFERS</p> <p>The comments received from the DoP are consistent with the current designation of the subject lots in the ALPS as 'Priority Agriculture'. However, should the LSAR be supported, any formal scheme amendment request must be accompanied by a detailed hydrological study to determine the Q100 extent across the site; an acid sulphate soil assessment to determine its suitability for house construction; and identification of an environmental buffer around the existing gravel extraction area, which would remain in place until such time as this activity has been discontinued.</p>

No.	Name/Address of Submitter	Summary of Submission	Officer Comment
		<p data-bbox="539 124 640 156">zoning.</p> <p data-bbox="539 196 1308 360">None of the above documents support the rezoning of the subject land as proposed in the SAR. In addition to the statutory and strategic planning framework there are a number of attributes of the land which are of concern in the current context:</p> <ul style="list-style-type: none"> <li data-bbox="539 400 1308 667">a) The land capability report included in the report indicates that "most of the land is of generally fair capability or average quality for grazing activities" and "about half of the land is of 'fair or better' capability for perennial horticultural activity." The Department of Agriculture and Food WA does not support the proposal as the land is identified as PAL and of sufficient size for intensive agricultural production. <li data-bbox="539 707 1308 935">b) Two-thirds of the subject land is subject to flooding and contains the "drain" which redirects Five Mile Creek and empties into the Torbay catchment. A detailed hydrological study would therefore be required to determine the Q100 extent across the site prior to any contemplation of a change of use of the land. <li data-bbox="539 975 1308 1074">c) This land is also in an area of moderate to low acid sulphate soil which contributes to its unsuitability for housing development. <li data-bbox="539 1114 1308 1174">d) Direct access onto the highway is unfavourable; and there is limited access/egress to the proposed site. <li data-bbox="539 1214 1308 1378">e) The drier part of the subject land has a Rural Resources Protection license over it for gravel extraction and abuts a reserve with a gravel extraction designation. This is unsuitable for close proximity to dwellings. 	<p data-bbox="1621 65 2051 97">REPORT ITEM PD054 REFERS</p>

No.	Name/Address Submitter	of Summary of Submission	Officer Comment REPORT ITEM PD054 REFERS
		<p>In conclusion, appropriate planning is based on the implementation of strategic and statutory policies and documents. The key issue in this SAR is that the area is being prepared for intensification of land use over land not identified for future rural residential growth. The proposal is not in accordance with LGSS, ALPS, Albany LPS1 or SPP 2.5 and on this basis, it is not supported.</p> <p>Should the City of Albany still wish to consider the proposal, then it is recommended that the subject land is investigated further, when the ALPS is reviewed.</p>	

CITY OF ALBANY

SCHEME AMENDMENT REQUEST

LOTS 124 & 125 SOUTH COAST HIGHWAY, MARBELUP

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ATTACHMENT A - AGRICULTURAL LAND EVALUATION – LAND ASSESSMENT PTY LTD

FEBRUARY 2014

1. INTRODUCTION

Lots 124 & 125 South Coast Highway are located 10km from the Albany Central Area, accessed by Albany and South Coast Highways. They are located immediately west of the George Street recreation reserves and are surrounded by existing and developing Rural Residential Areas.

The purpose of this Scheme Amendment Request is to flag the landowners' intention to seek rezoning of the land under Local Planning Scheme No. 1 from General Agriculture to Rural Residential (Special Rural). This is to then provide for the future subdivision of the land and the creation of a variety of lifestyle and rural pursuits in accord with the amenity and qualities of the land and its context within an established rural residential/special rural development area.



Location Plan

2. BACKGROUND

2.1 Existing Land use

Lot 124 is 25.6ha in area. It is mostly cleared established pasture and currently is used as a thoroughbred stables having established yards, pens, water points, blue gum shelter belts and other similar improvements.

Lot 125 is 82.9ha in area and is also is mostly cleared pasture. Landuse is predominantly grazing with developed fencing and water points while the flats also support hay production on a seasonal basis. The land has also supported gravel and sand extraction. These activities have been long discontinued with all areas being recontoured and topsoiled to now support established pasture.

2.2 Existing Zoning

Both lots are zoned Rural under Town Planning Scheme No. 3. It is Council's intention to have the land zoned General Agriculture under new Local Planning Scheme No. 1.

2.3 Albany Local Planning Strategy

The ALPS shows that the land is sandwiched between a local recreation reserve system, a number of Rural Residential areas and the highway. Regardless of this non rural landuse context, the land itself is shown a Priority Agriculture.

2.4 Preliminary Liaison

Following on from the Albany Local Planning Strategy identifying the land as Priority Agriculture and following discussion with Council and Dept of Agriculture & Food officers, a detailed agricultural site assessment was completed. This outlined that a Priority Agriculture classification could not be sustained on the land and that in lieu of the otherwise most appropriate rural residential type class, the General Agriculture zone would suit.

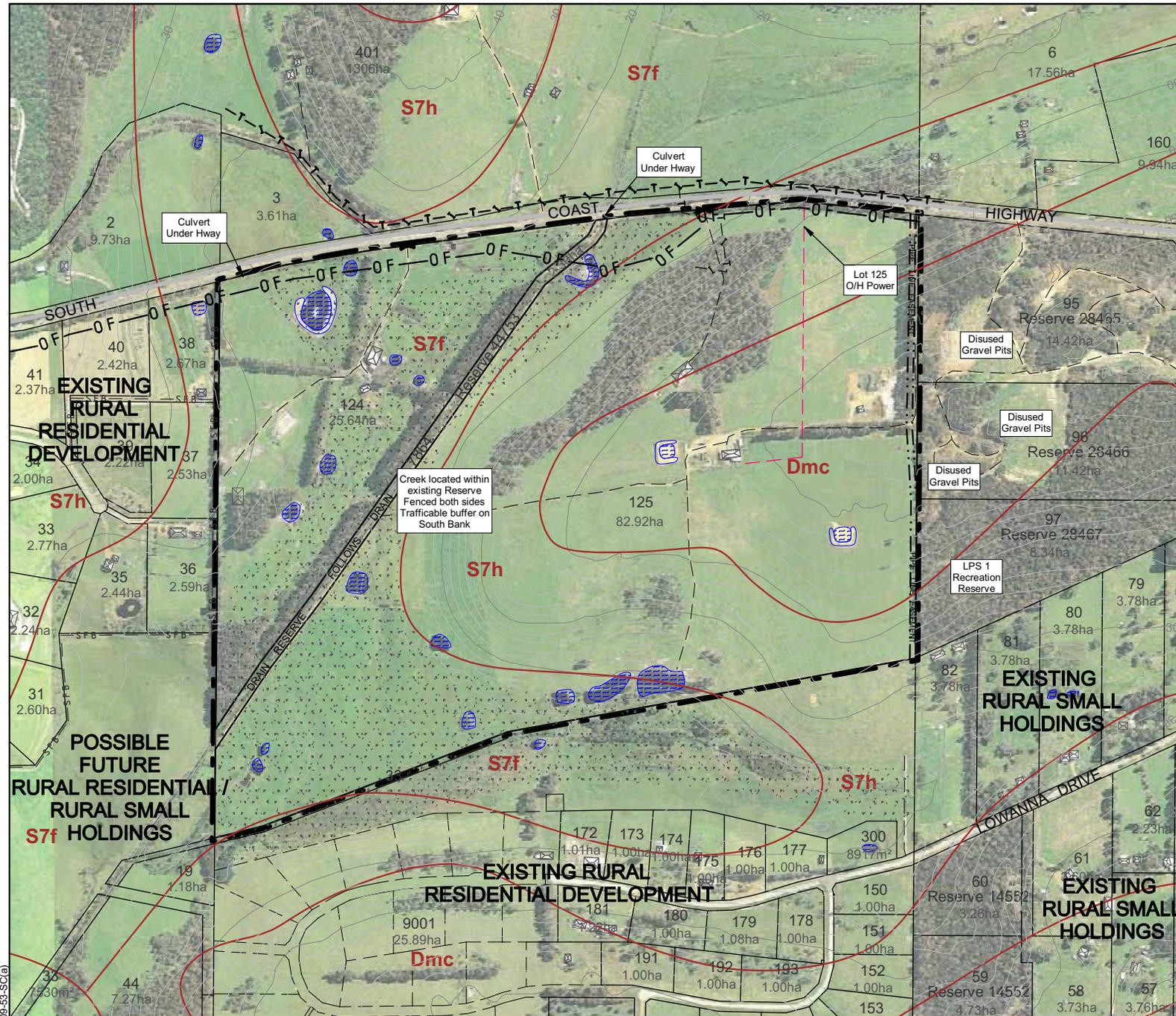
As a result of this study council resolved to under LPS No. 1, to depict the land in the General Agriculture zone. In considering this action, the following points were acknowledged:

- The General Agriculture zone is the best interim zone for the land in the period prior to a Rural Residential type rezoning proposal being carried.
- That Rural Residential type development is the accepted future for the land but that this needs to come about following specific site assessment through the rezoning/LPS Amendment process.

This submission follows this background and seeks support to commence the rezoning to Rural Residential and at the same time correct the Albany Local Planning Strategy classification accordingly.

SITE CHARACTERISTICS

Lots 124 & 125
South Coast Highway
Marbelup, City of Albany



LEGEND

- Subject Land
 - Tree Cover Including Paddock Trees & Shelterbelts
 - Buildings
 - Dams / Soaks
 - Existing Main Road
 - Overhead Power Lines
 - Tracks
 - Strategic Fire Break
 - Lower Laying Land potentially unsuitable for Rural Residential dwellings & effluent disposal. Will be subject to winter site assessment.
 - Dmc** Generally Gravelly Duplex Soils on broad crests
 - S7h** Generally Deep Leached Sands on slopes
 - S7f** Generally Humus Podzols or Yellow Duplex Soils on lower slopes and valley floors
- ORIG A4
 SCALE 1:10,000
 0 50 100 150 200 250

09-53-SC(a)

3. ALBANY LOCAL PLANNING STRATEGY

As the rezoning of the land to a rural residential type classification has been supported and as the Albany Local Planning Strategy is already superseded by the more up to date proposals of Local Planning Scheme No. 1, ALPS needs to be updated to at least accord with the Scheme.

In this instance, it is recommended the ALPS classification be transferred from Priority Agriculture to Rural Residential.

3.1 ALPS Modification Issues

From a locational perspective, the land sets itself apart from ongoing sustainable long term agricultural use by being within close proximity to the services and facilities provided by the Albany urban area and by being surrounded by small lot Rural Residential estates (to the west and south), a recreation reserve and rural small holdings to the east and a major road reserve (South Coast Highway) to the north.

As a result, Lots 124 and 125 are a discrete cell of rural zoned land within an area of established Rural Residential and non Rural development all with strong links and good proximity to the urban area.

On the back of these site and locational qualities, which ostensibly contradict the Albany Local Planning Strategy (ALPS) Priority Agriculture classification, it was necessary to clarify the status of the land vis Priority Agriculture via an agricultural land evaluation.

This has been completed (Attachment A) and demonstrates that the Priority Agriculture classification has been incorrectly applied to the land by ALPS. The assessment also finds that the objective of protecting land suitable for Priority Agriculture is not compromised by classifying the land for alternative uses/development, and that a more suitable classification for Lots 124 and 125 would be Rural Residential in nature.

In summary:

- The broad scale agricultural qualities do not support Department of Agriculture and Food criteria for Priority Agriculture.
- The detailed site assessment identifies that the land does not accommodate the qualities to support the proposed Priority Agriculture zone.
- The Lots are small and in a contained cell surrounded by non agricultural uses including Rural Small Holdings, Conservation Reserves, Rural Residential lots and the highway.
- The qualities of the land coupled with the small areas available for possible Priority Agricultural use and the high environmental management required by poor site qualities and location in the sensitive Five Mile Creek catchment mitigate against the most intensive agricultural uses promoted by the Priority Agriculture zoning.
- Existing and future Priority Agriculture uses are seriously constrained by surrounding Rural Residential and Rural Small Holdings development to the point that many uses are unviable. For example, surrounding residences on smaller lots make the use of gas gun bird control unacceptable, create conflict over the use of agricultural machinery (noise and dust), create conflict over site management (manure management and odour, and herbicide/pesticide use).
- Risk to high value crops, machinery, plant, equipment and stock. From a rural perspective, the high local population density generally increases risks to the above factors due to impacts including theft, absentee landowners, and poor/careless management of rural residential lots.
- Indeed, the neighbouring rural residential estates are having a serious and negative impact on the thoroughbred racehorse adjustment activity on Lot 124. Race horses have been attacked by wandering domestic dogs and there has been an incident where plastic rubbish blown from adjoining rural residential land has been eaten by a racehorse and resulted in the need for veterinary intervention.
- The land does not appear to be in an area of “local agricultural significance”. The Agricultural Assessment addresses the unsuitability of the broad scale mapping used to identify these areas.

- The proposal for the land to be zoned Priority Agriculture runs counter to a number of Policy measures from the Rural Land Use 'Statement of Planning Policy' including that Priority Agriculture zones should be located where on and off side impacts are minimised and where Agricultural Impact Statements support such a zoning.

In this instance, with the land being surrounded by Rural Residential lots and dwellings, there is a high and undesirable probability that each activity will negatively impact the other neighbouring activities. In general, the intensive agricultural uses promoted by the Priority Agriculture zone are not conducive to a quiet rural retreat lifestyle.

In addition, the Agricultural Assessment clearly does not support the imposition of the Priority Agricultural zone or classification but outlines, along with the planning assessment, that a mix of managed rural residential and rural small holdings development is the appropriate response.

3.2 Proposed Response

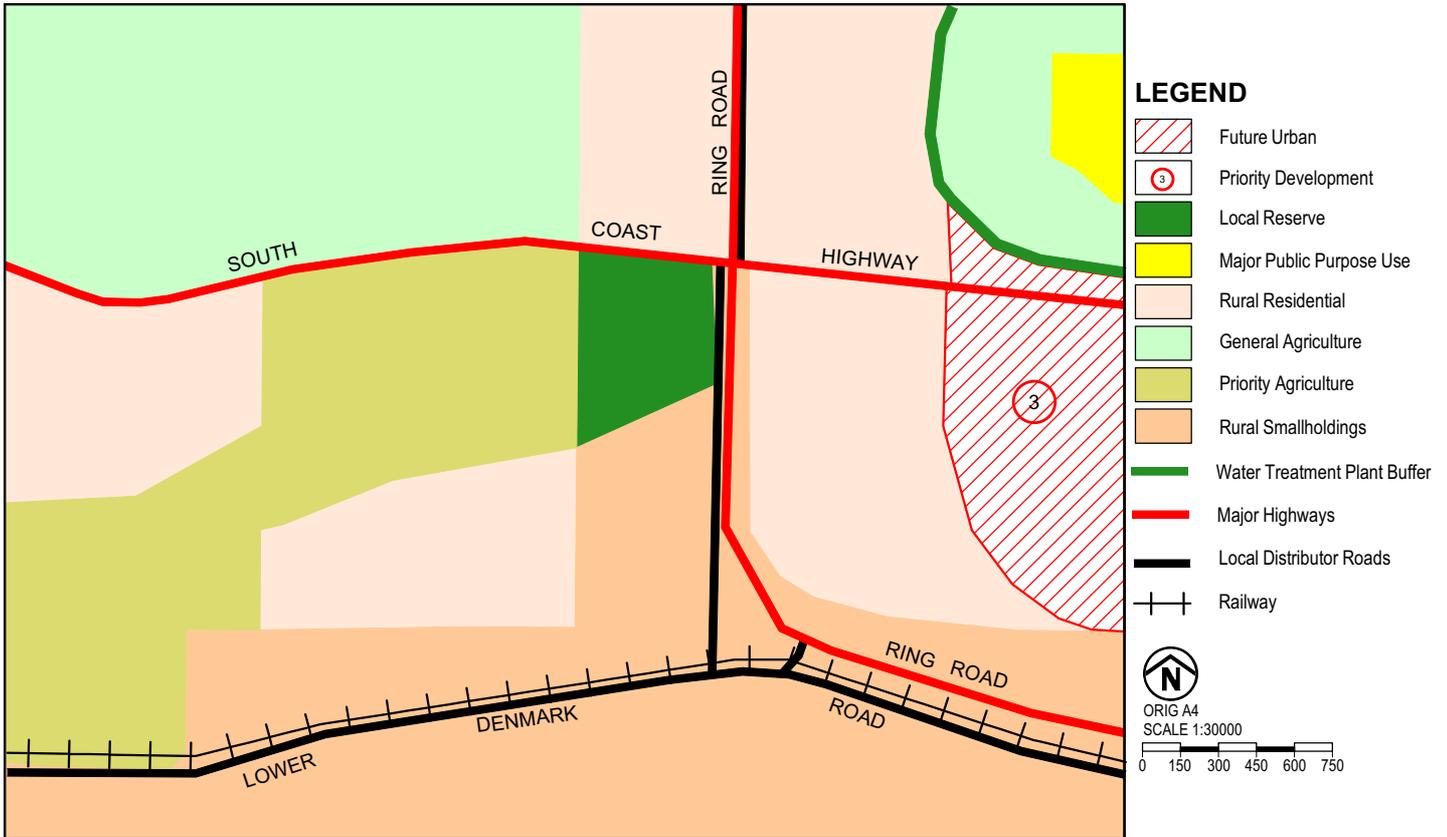
As the Priority Agriculture classification is clearly not appropriate to cover existing land uses or in the future to cover suitable future land use and development options nor meet the LPS No. 1 General Agriculture zoning, ALPS needs to be modified.

Given that the background landowner planning, preliminary agency liaison, Council consideration of Local Planning Scheme No. 1, as well as the Agricultural Assessment have all concluded that a Rural Residential zoning would suit the land and allow for a mix of landuse and lot sizes commensurate with land qualities and the principles of efficient landuse, this report is submitted for consideration and support.

Maps showing the modification follow for reference purposes.

CITY OF ALBANY LOCAL PLANNING STRATEGY

Existing Strategy Classification

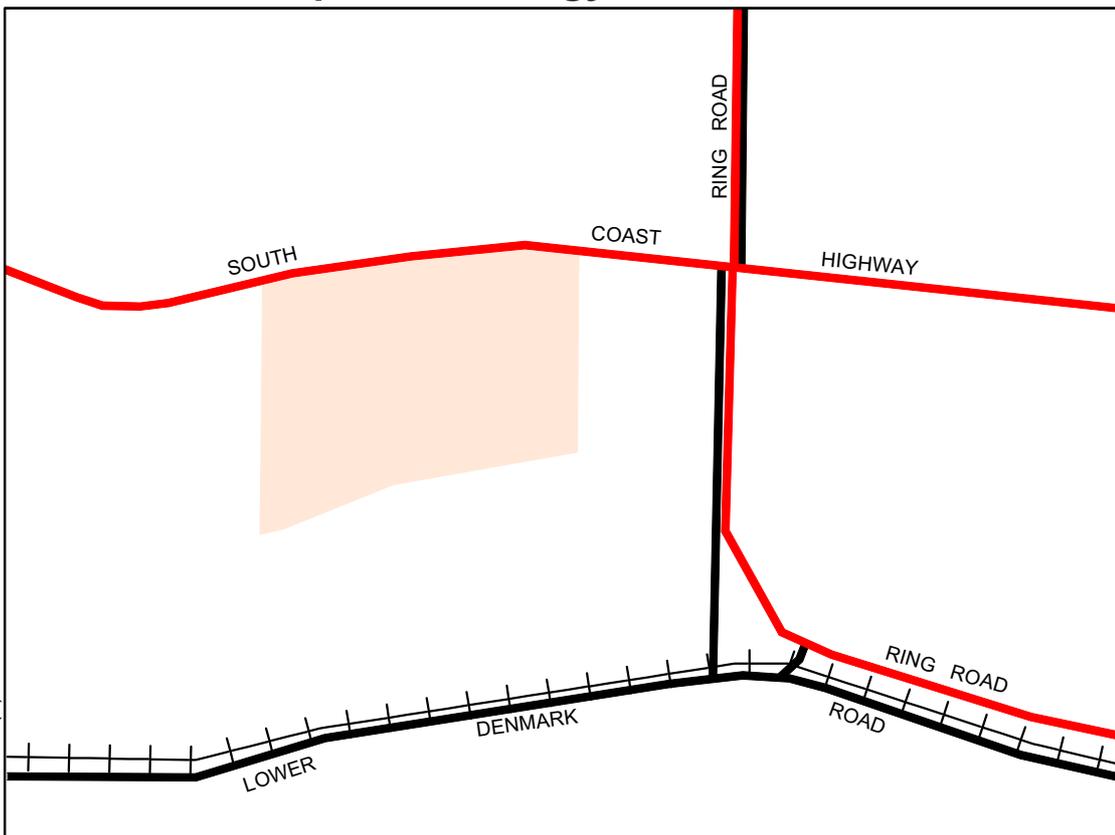


LEGEND

- Future Urban
- Priority Development
- Local Reserve
- Major Public Purpose Use
- Rural Residential
- General Agriculture
- Priority Agriculture
- Rural Smallholdings
- Water Treatment Plant Buffer
- Major Highways
- Local Distributor Roads
- Railway

ORIG A4
SCALE 1:30000
0 150 300 450 600 750

Proposed Strategy Classification



09-53-ALPS(a)

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4. LAND QUALITIES

In brief and subject to winter site assessment (scheduled for later in 2014), the following comments and observations are made:

- Three landform/soil types are broadly represented across the site. These have been verified by the agricultural assessment and correlate with Council's own landform - soil unit tables.
- Upslope – Dmc – gravelly duplex soils on broad crests. Elevated land with a generally high capability for rural residential subdivision & development.
- Midslope – S7h – deep leached sands on slopes. Mid slopes with high to moderate capability for rural residential subdivision & development.
- Lower Slopes – S7f – yellow duplex soils or humus podzols on lower slopes and valley floors. Lowest land with generally low capability for rural residential subdivision & development. Potentially more suited to rural pursuit development most likely with capable and suitable building envelopes identified on the plan.
- Lower land is well developed with soaks and dams for stock water/hobby farm purposes.
- The land is predominantly cleared with isolated paddock trees and planted shelter belts. Lot 125 also has an area of tree cover of approx 4ha retained for stock shelter purposes in area on its mid northern slopes. The edges of this are parkland cleared and effectively act as hazard separation areas while more central portions appear more densely vegetated. The small pocket of apparent tree cover to the south of Lot 125 is in a very poor condition accommodating poor quality or dead standing timber over pasture.
- Lower land is flat; midslopes are gentle maxing out at 12% but are generally well less than 10%. Upslope areas are flat or very gently sloping at 5% or less.
- Five mile Creek bisects the lots. This is covered by an established drain reserve. This reserve is well fenced on both sides and accommodates a slashed and trafficable bank adjacent to Lot 125 which is suitable for maintenance activities.

- Access is made via South Coast Highway. Both lots have a primary access point at the approximately the mid point of each lot. Initial review shows the access from Lot 124 has good intersection sight distances while that for Lot 125 may need relocation to the west. This issue will require further consideration in the plan development phase.
- Lot 125 has a secondary access point at its eastern end adjacent to the George Street Recreation Reserves. This however appears constrained and should possible only serve as a future emergency access point.
- Lot 125 accommodates a 10m wide pipeline easement following and parallel to its eastern boundary. Unless dissolved, this easement will need to be protected from physical development.
- The adjoining George Street recreation reserves are heavily vegetated in the east and south. Western areas (adjoining the subject land) have a history of extensive (and apparently continuing) gravel extraction and now accommodate bare areas, open vegetation and a network of access tracks. Pending the final design of the Albany Ring Road – South Coast Hwy intersection, significant portions of these reserves may be required for road purposes.
- It is understood the City is seeking management orders from the State Government for the reserves here that it does not already manage.

5. OPPORTUNITIES AND CONSTRAINTS

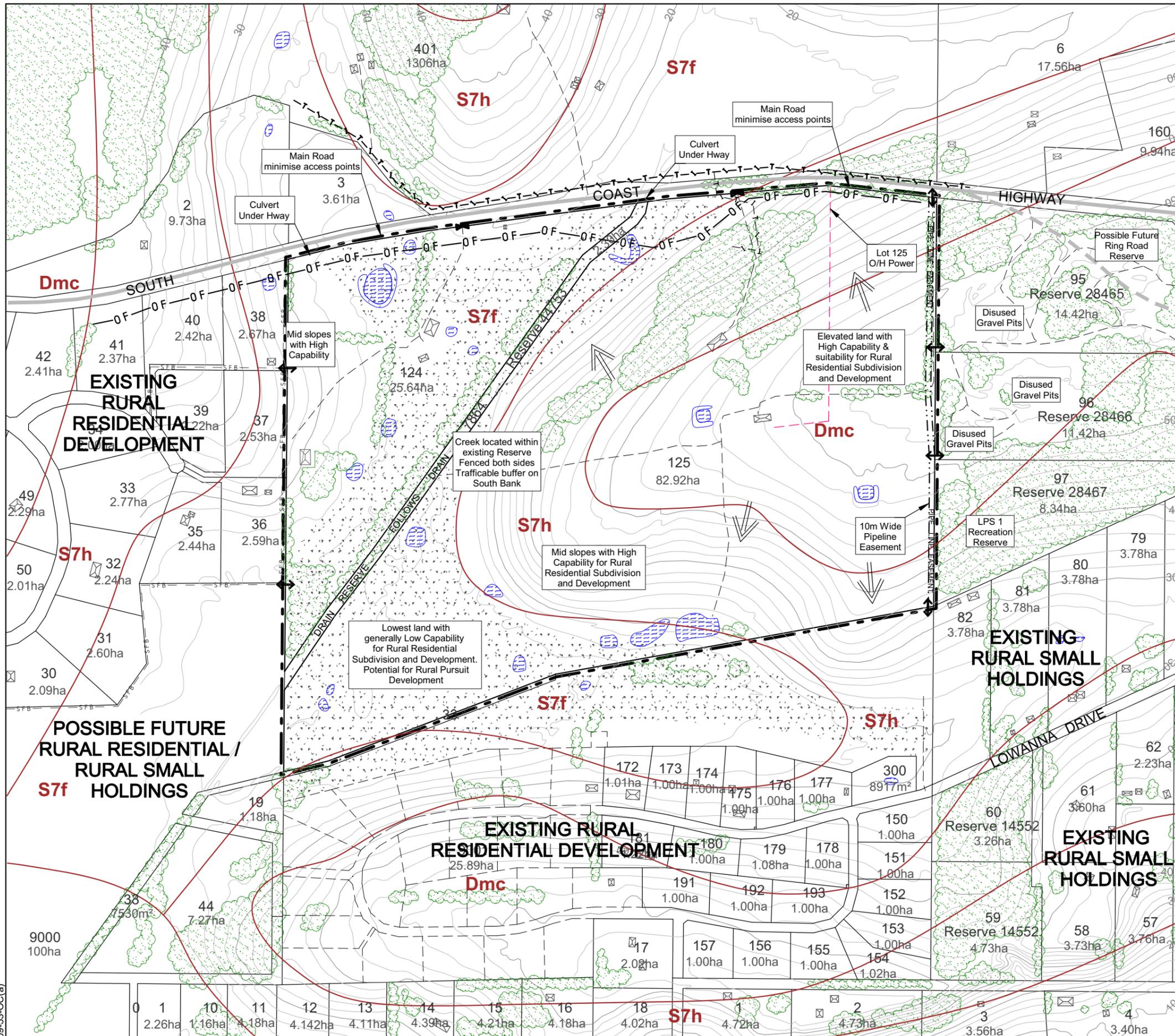
The following plan graphically summarises the opportunities, constraints and issues relevant to Lots 124 & 125.

OPPORTUNITIES AND CONSTRAINTS

Lots 124 & 125

South Coast Highway

Marbelup, City of Albany



LEGEND

- Subject Land
- Tree Cover
Including Paddock Trees & Shelterbelts
- Buildings
- Dams / Soaks
- Existing Main Road
- Road Realignment (Indicative)
- Tracks
- Strategic Fire Break
- Strategic Fire Break Link Opportunities
- Views
- Lower Laying Land potentially unsuitable for Rural Residential dwellings & effluent disposal. Will be subject to winter site assessment.
- Dmc** Generally Gravelly Duplex Soils on broad crests
- S7h** Generally Deep Leached Sands on slopes
- S7f** Generally Humus Podzols or Yellow Duplex Soils on lower slopes and valley floors

ORIG A3
SCALE 1:7500

6. PROPOSED REZONING

It is proposed to move the land to the Rural Residential zone. This zoning permits the application of a guide plan and in addition to the general scheme clauses; management provisions which will apply to the land controlling subdivision, development and ongoing landuse/land management.

To support the rezoning the following issues will need to be discussed and incorporated into the Subdivision Guide Plan and management provisions as necessary.

- A range of lot sizes say, from smaller traditional rural retreats on the higher and more capable and to larger rural pursuit type lots on the lower land (with capable and suitable building envelopes provided and identified). There are a range of activities that may be suitable on the larger rural pursuit type lots. These uses may include Animal Establishment (animal rehab/holding, small scale stables), Home Business/Occupation/Office, Cottage Industry and Rural Pursuit (definitions per Local Planning Scheme No. 1).
- Retention of the drain reserve to accommodate Five Mile Creek. As this reserve is already well fenced and accommodates a widened bank area for maintenance purposes, at the time of detailed survey, any additional fenced areas could be included within the reserve. Any future dams, soaks and/or bores will be subject to Scheme requirements notably cl 5.5.13.2.7.
- Acceptable crossovers to South Coast Highway with acceptable sight distances.
- Provision of and emergency access link to adjacent subdivision as well as potentially across the creek and drain reserve and on to the highway.
- Fire management planning including hazard separation and building protection areas and the like.
- Acceptable house sites and identified building envelopes in specific areas. Identified in response to the upcoming winter site assessment.
- Protection of the easement on Lot 125.

- Management provisions satisfactory to guide and manage ongoing residential based uses on the traditional special rural type lots (possibly including home occupation etc) and sufficient to manage landuse and development on the proposed larger rural pursuit based lots (rural pursuits and possibly home business, see also point above).
- Subdivision provisions to cover adequate lot services including road provision, electrical power, potable water, emergency water, onsite effluent disposal and the like.

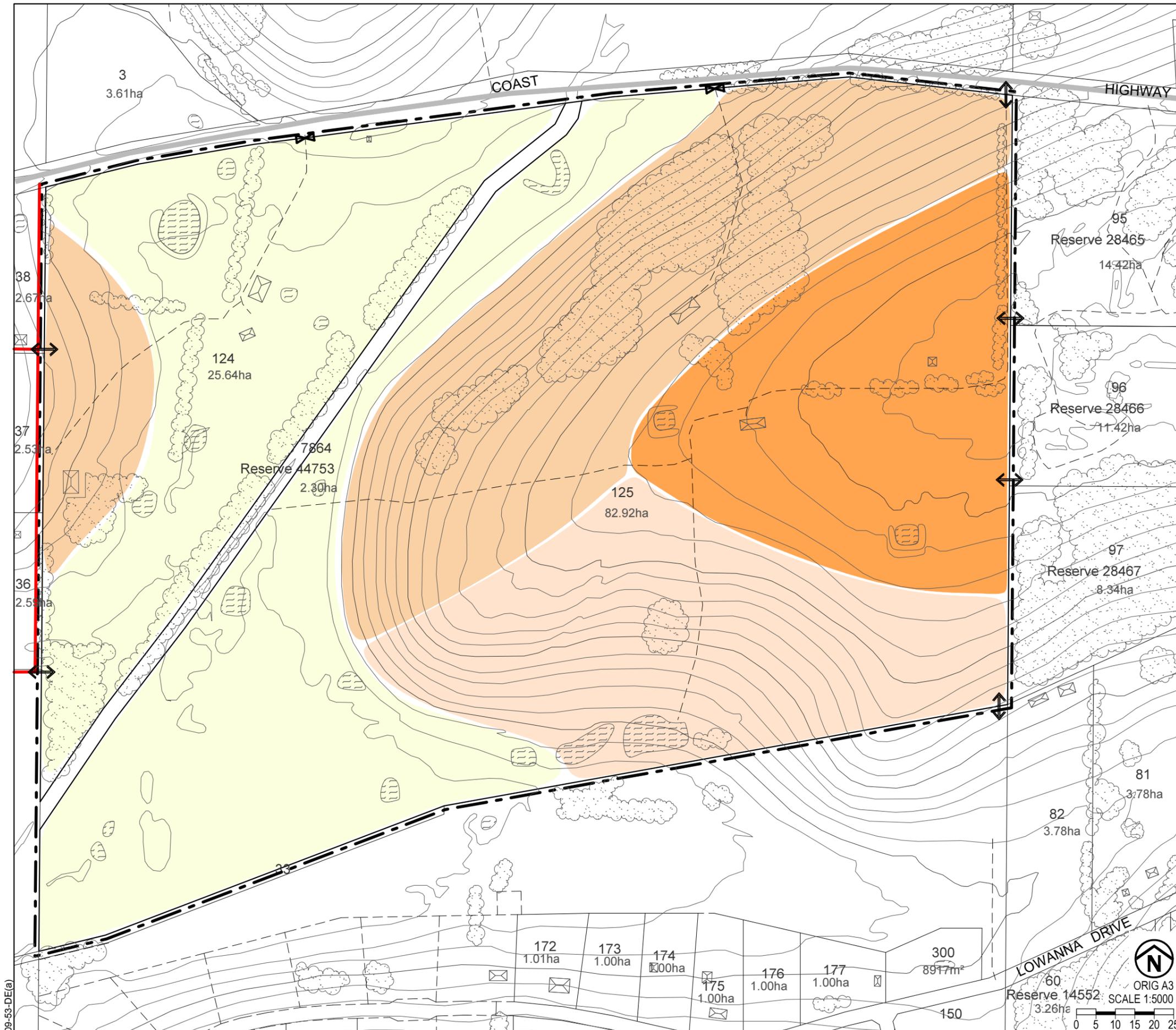
A plan showing the Subdivision Guide Plan notional design elements follows. The tenets of this plan will be used along with the winter site assessment and input from the planning process to frame the subdivision guide plan for further review and then inclusion within the rezoning documentation.

NOTIONAL DESIGN ELEMENTS

Lots 124 & 125

South Coast Hwy

Marbelup, City of Albany



LEGEND

- Subject Land
- Existing Vegetation
- Existing Buildings
- Existing Dams / Soaks
- Existing Tracks
- Primary Access Opportunities
- Existing Strategic Fire Break
- Strategic Fire Break Link Opportunities

- A** Potential traditional smaller rural residential lots on elevated flat land. Layout to make use of potential strategic fire break links to the east and north and provide low fuel/fire setbacks to the moderate risks on the adjoining reserves.
- B** Potential traditional rural residential retreat lots on the slopes. Lots to make the most of the northern aspect and amenity provided by areas of tree cover and the rural hinterland views. Fire setbacks to be considered. All lot access to be off an internal road network with no direct lot access off the Highway.
- C** Potential traditional rural residential retreat lots on gentle southern and southwestern slopes. Lots to make the most of the excellent views available from part of this area. Layout to make use of potential strategic fire break links available in the south east and provide low fuel/fire setbacks to moderate risks on the adjoining reserve. Opportunity for lots with high amenity/utility accommodating the developed lakes and dams in the south.
- D** Potential larger rural residential lots suitable for rural pursuits on the lower flat land. House sites may need to be identified on appropriate and suitable land with rural pursuits running down slope to the flats. Abundant water available in established dams to provide for hobby scale rural pursuit activity. Appropriate setbacks to be provided to the creek and drain reserve along with the opportunity to use one or both of the possible strategic fire break links available to the rural residential lots to the west. All lot access to be off an internal road network with no direct lot access off the Highway.

7. PRELIMINARY CONCEPT PLAN

From this background, a preliminary Concept Plan has been prepared and is included overleaf.

This plan shows how the opportunities, constraints and notional design elements may be addressed in a layout for the land.

Amongst other issues, the plan shows:

- Large setbacks to the highway and eastern boundary (pipeline easement).
- A logical and efficient road network. While highway access is minimised intersection sight distances will need to be verified. The road network is supported by strategic firebreaks for emergency access links within and outside of the site.
- Smaller Rural Residential lots are located on the higher and mid slopes on the more capable land.
- Larger Rural Residential/ rural pursuit lots are located on the lower slopes with capable building envelopes identified above the summer pasture areas.
- Bulldogging envelopes are identified where site issues require; ie, to provide fire safety setbacks, site capability, vegetation retention. For lots without identified building envelopes, conventional road and boundary setbacks can apply.
- Retention of the southern man made lakes as lot features.
- Retention and verification of the fenced drain reserve.
- Retention of the north western tree cover on Lot 125 so as to significantly screen the road from the development and vica versa.
- A conservative yield based on Rural Residential Lots ranging from 1ha to ~10ha.

Following on from the above points, it needs to be emphasised that this plan is preliminary in nature. The layout and other details that are to be shown on the Subdivision Guide Plan will be further informed by winter site assessment, downstream planning and servicing review as well as the noted design elements, opportunities and constraints.

CONCEPT PLAN

Lots 124 & 125

South Coast Highway

Marbelup, City of Albany



LEGEND

-  Subject Land
-  Existing Lot Boundaries
-  Proposed Lot Boundaries
-  Tree Cover
Including Paddock Trees & Shelterbelts
-  Buildings
-  Dams / Soaks
-  Failed Dam
To be filled / made good
-  Existing Main Road
-  Indicative Building Envelope
-  Lots Potentially Suitable
for Rural Pursuit
-  Strategic Fire Break
-  Pipeline Easement



ORIG A3
SCALE 1:5000



Note

Notional Layout for discussion purposes only. Subject to winter site assessment & downstream planning.

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8. CONCLUSION

This Scheme Amendment Request demonstrates that the rezoning of the land is in accord proper and orderly planning and has been foreshadowed by previous specific council consideration as a part of the Local Planning Scheme process.

In addition to this, the Scheme Amendment Request provides the background and issues to be addressed by the rezoning documentation and includes requirements for the future Subdivision Guide Plan and Management Provisions.

As a result of this background, the landowners respectfully request Council invite the preparation and lodgement of rezoning documentation for further consideration.

ATTACHMENT A

AGRICULTURAL LAND EVALUATION

LOTS 124 & 125
SOUTH COAST HIGHWAY MARBELUP
CITY OF ALBANY

**AGRICULTURAL LAND EVALUATION
LOTS 124 & 125 SOUTH COAST HIGHWAY
CITY OF ALBANY**

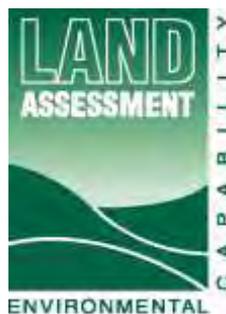
prepared for

Ayton Baesjou Planning

on behalf of

Mr B Fuller and Mr E Bale

by



LAND ASSESSMENT PTY LTD
5/27 York Street, SUBIACO WA 6008

Tel: (08) 9388 2427
Report No. 1118

February 2012

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ATTACHMENTS

- A** Priority Agriculture Land Advice - Department of Agriculture and Food
- B** Site location figure, results summary and representative photographs

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1.0 BACKGROUND

This report has been commissioned by planning consultants Ayton Baesjou on behalf of the landholders of adjoining Lots 124 and 125 on the southern side of the South Coast Highway approximately 8 km west-north-west of the Albany central business area (Figure 1).

The purpose of the report is to provide a site-specific assessment of the agricultural capability of the land in view of the land's current designation as 'Priority Agriculture' within the City of Albany Local Planning Strategy (CoA 2010), and the landholder's intention to pursue options for subdivision and development of the land for rural small holdings or 'Special Rural' lots.

The 108.5 ha area of land, is zoned 'Rural' and is located in the Marbelup locality between the existing Gledhow rural residential area* to the east (although with an intervening reserve) and existing Special Rural zoned areas to the immediate west and south (Figure 2).

Lot 124 is currently used for the agistment of racehorses (15 – 50 varying seasonally), and small areas of blue gum plantings. Adjacent Lot 125 is used for a mix of cattle grazing and an extractive industry business (gravel and sand). Neither of these properties is considered likely to be an economically independent farming enterprise.

Ayton Baesjou have had a preliminary discussion with the City of Albany and concluded that the land's existing designation as "Priority Agriculture' is an impediment to progressing any development potential that might otherwise arise from its location relative to existing Special Rural zones. Ayton Baesjou subsequently sought clarification from the Department of Agriculture and Food (DAFWA) on how 'Priority Agricultural Land' (PAL) is determined and on the suitability of its retention over the subject land given its locational context.

In its response (Attachment A) DAFWA advised that its input to the identification of 'Priority Agricultural Land' within the planning system is based on regional scale mapping of land capability and soil qualities without consideration of location, lot size, water availability or existing land use. DAFWA provided such input to the Lower Great Southern Region Strategy (WAPC 2007) in order to identify the best quality agricultural land worthy of protection through planning system as "Agricultural Land of State and Regional Significance".

* Part of the Gledhow area is designated 'future urban' within the Albany Local Planning Strategy.

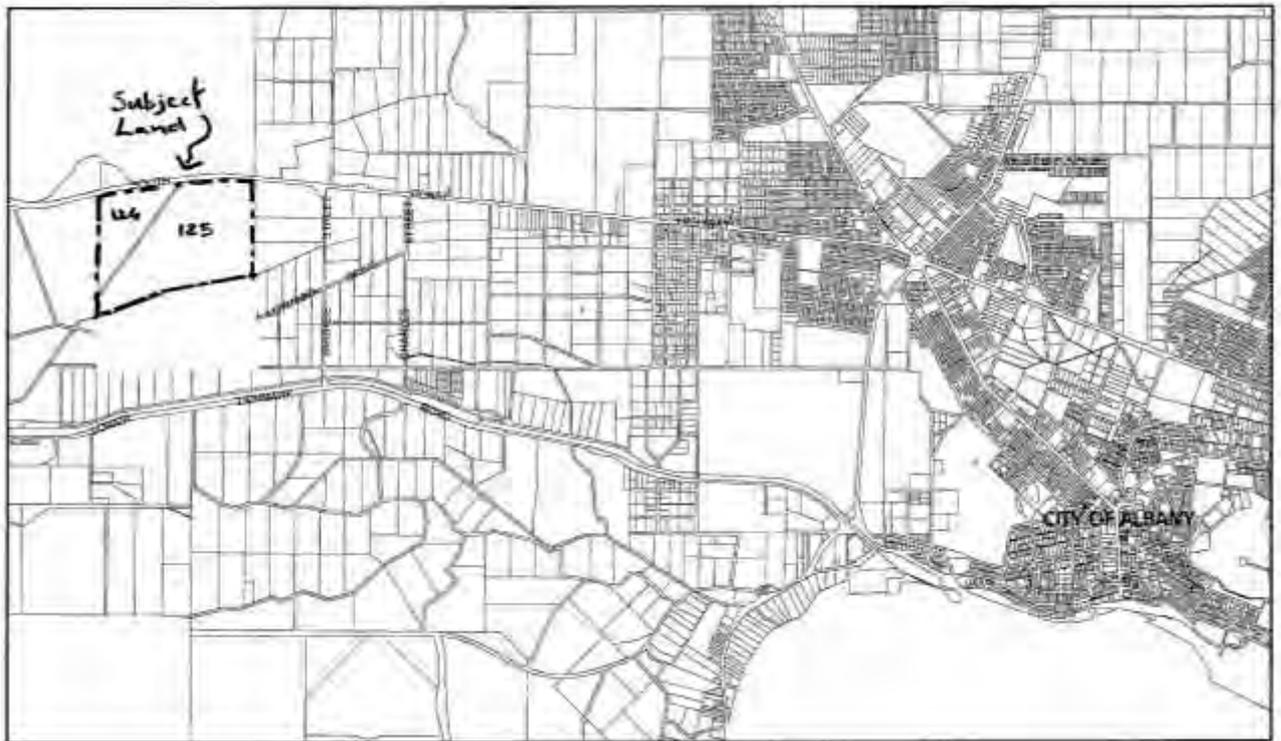


Figure 1. Location Plan.



Figure 2. Zoning within Town Planning Scheme.

Under SPP 2.5 additional areas considered to be of ‘local significance’ on the basis of factors other than just soil qualities can also be identified by local councils as ‘Priority Agricultural Land’ within a Local Planning Strategy.

DAFWA’s focus in land use planning matters is on preserving large agricultural lots to facilitate continued access and investment in more intensive food production. In view of the broad scale of the information on which the Department’s assessment of the best quality agricultural land is based, the response to Ayton Baesjou also advised;

“For proposals addressing property level planning, the Department of Agriculture and Food always recommends that the proponent seeks to have an independent land evaluation report compiled discussing the capability of the land area”.

This report has been initiated in response to that recommendation.

2.0 PLANNING CONSIDERATIONS

2.1 Priority Agriculture Land (PAL)

Since 2002, Statement of Planning Policy, SPP 11 (subsequently renamed SPP 2.5 and currently under revision) has required Local Authorities to identify agricultural areas of State or regional significance within Local Planning Strategies and to subsequently zone them as “Priority Agriculture” unless occurring within an existing Rural-Residential or Rural Small-holdings development.

The Albany Local Planning Strategy (ALPS) identifies two agricultural classifications: *Priority Agricultural* and *General Agricultural*. Priority Agricultural Land is described in the ALPS as;

...areas of State, regional and local significance and must be retained and protected as a finite resource. These areas should be avoided for settlements because they contain land suitable for traditional agricultural activities plus irrigated annual and perennial horticulture and other irrigated crops and pasture.

Figure 3 shows areas identified as Priority Agriculture in the vicinity of Albany. They include all portions of the subject land, Lots 124 and 125 off South Coast Highway. The ALPS generally discourages subdivision within Priority Agriculture areas and the City of Albany’s Rural and Environment Policy (Agricultural Protection and Subdivision) requires all non-agricultural land use proposals to be assessed in terms of their potential impact on or conflict with existing agricultural land uses and management practices. In relation to any subdivision for intensive agricultural purposes the policy requires that Council be satisfied that the subsequent development suitably responds to land degradation risks, can satisfy relevant “Codes of Practice” and that a Nutrient and Irrigation management Plan has been agreed to.

2.2 How has Priority Agriculture Land been determined?

There has been a significant and on-going involvement of the Department of Agriculture and Food (DAFWA) in the process of determining Priority Agriculture Land to assist land use planning in Western Australia.

FIGURE 3: PRIORITY AGRICULTURE DESIGNATED AREAS NEAR ALBANY



Source: Adapted from Map 5B Albany Local Planning Strategy (City of Albany 2010).

To date, Priority Agricultural Land (PAL) mapping produced by DAFWA has been primarily based on just identifying areas of high capability for irrigated horticultural activity. A new, and more sophisticated approach (High Quality Agricultural Land /HQAL mapping) is however currently being developed by DAFWA to better identify agricultural areas of State significance. In the context of land use planning decisions in the Lower Great Southern DAFWA have advised however that until the HQAL mapping approach is suitably developed and tested, the land capability-based PAL mapping as published within the Lower Great Southern Strategy (WAPC 2007) should be deferred to as it represents the currently best available approximation of 'agricultural areas of State or regional significance'.

As a component of the local planning strategy process, SPP No 2.5 also enables each local government authority to consider agricultural areas of local significance in addition to those defined by DAFWA as being of State or regional significance.

2.3 Agricultural Areas of State or Regional Significance

The Lower Great Southern Strategy (LGSS) was prepared by the Western Australian Planning Commission in 2007 with the purpose of guiding regional land use and infrastructure planning and development, especially on matters of regional significance.

Among other things, the LGSS addressed the identification and protection of land of State and regional agricultural significance, and stated the expectation that the objectives of the strategy will be realised through local level planning. This was proposed to occur through a reflection of the areas of agricultural significance within Local Planning Strategies, and their subsequent rezoning as 'Priority Agriculture' with associated restrictions on subdivision and non-agricultural land use activity.

The Lower Great Southern Strategy identified agricultural land of State or regional significance as shown here in Figure 4 overleaf. Lots 124 and 125 Great Southern Highway are shown as predominantly, although not totally, encompassed within an area of Priority Agricultural Land.

FIGURE 4: AGRICULTURAL LAND OF STATE AND REGIONAL SIGNIFICANCE

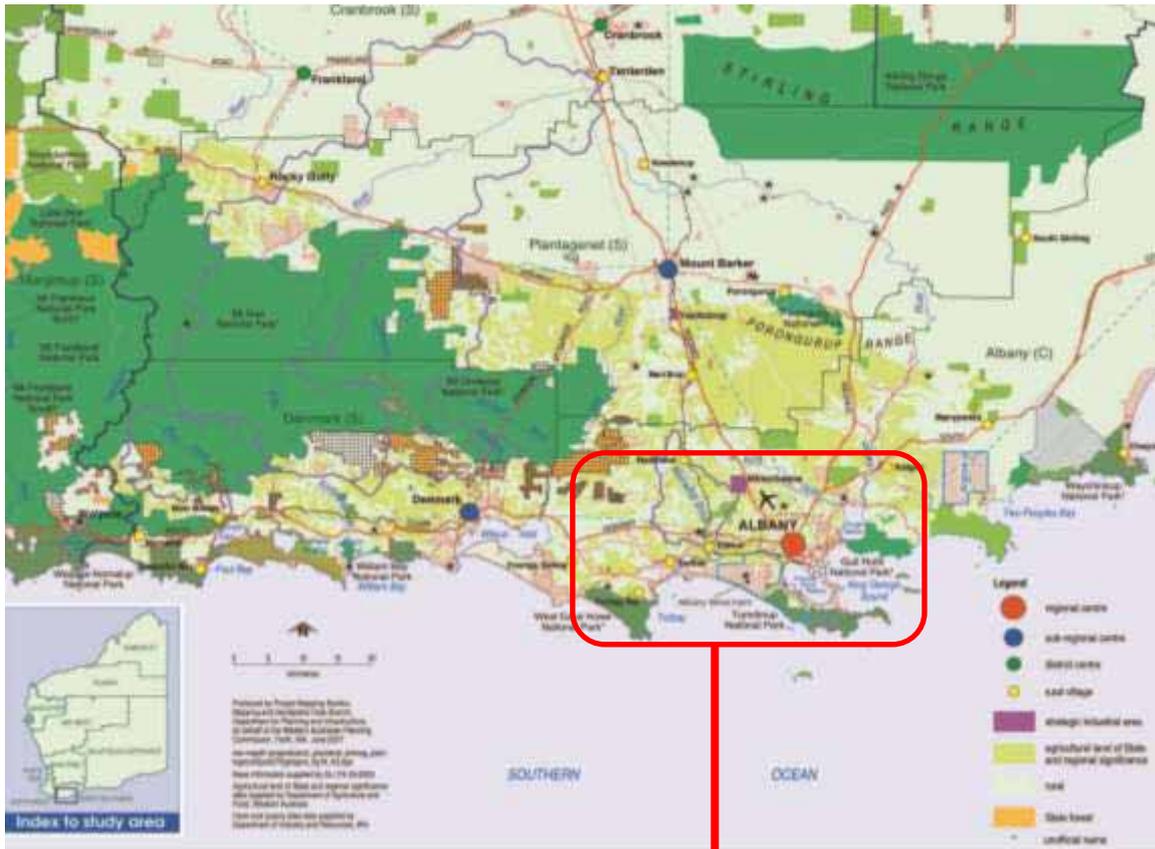


Figure 4a – regional scale

agricultural land of State and regional significance



Lots 124 & 125

Also see inset overleaf

Figure 4b – local authority scale

*Source: Adapted from Figures 10 & 19 of Lower Great Southern Strategy (WAPC 2007)

FIGURE 4: AGRICULTURAL LAND OF STATE AND REGIONAL SIGNIFICANCE* - continued



Figure 4c – detailed locality scale

*Source: Adapted from mapping provided by DAFWA to WAPC courtesy Mr Tim Overheu.

Comparison of the subject land as shown in Figure 4c above with the same area in Figure 3 suggests that the regional scale interpretation of significant agricultural land has simply been ‘rounded off’ to practical cadastral boundaries as part of preparing the Albany Local Planning Strategy (City of Albany 2010). This is because the LPS does not identify any criteria used to define additional areas of local significance.

The criteria used to determine “Priority Agriculture’ areas within the Lower Great Southern Strategy (and then reflected in the Albany Local Planning Strategy) are outlined within the footnote on Page 41 of the LGSS document. This states it is based on interpretation of the broad-scale land resource mapping undertaken by CSIRO in 1988 (Churchward et al 1988) with identification of areas of high land capability (70 per cent plus*) for annual and perennial horticulture in areas receiving more than 700 mm annual average rainfall. However an overview of the existing available land resource / land capability information for the subject land that is presented in the following Section 3 contradicts this, and reinforces the need for an independent land evaluation report discussing the capability of the land area.

* Due to the inevitable variability of landform and soil conditions within any broad-scale mapping unit, DAFWA utilise the concept of ‘proportional capability classes’. For example, instead of assigning a single specific (high, moderate or low) capability rating to a particular map unit, a proportional assessment is used to more conservatively express the capability as a range (e.g. 50-70%) of the total area of that map unit expected to contain land of a certain capability rating.

3.0 NATURE OF THE LAND

3.1 Catchment Management Perspective

The subject land forms part of the Torbay Catchment area (Figure 5) encompassing the drainage systems leading into Torbay Inlet and Lake Powell. Both of these wetlands are particularly nutrient enriched (Water and Rivers Commission 2004). The catchment area is the subject of a restoration plan termed 'Watershed Torbay' (Department of Water 2006) that has been developed through a partnership approach linking community interest with government, industry and research organisations and provides a strategic framework for improving the condition of the wetlands and agricultural land through measures including land use planning.

The wetlands of the Torbay catchment consist of a small associated set of water bodies influenced by both riverine and coastal processes. In order to control flooding and facilitate horticultural development within low lying areas, the natural drainage systems and waterways that contribute to the wetlands have been significantly altered by drainage schemes. The Torbay Inlet drainage system is now part of the Albany Drainage District; one of six districts established and legislated for agricultural land drainage and flood control in WA.

The subject land occurs within the Five Mile Creek sub-catchment area (Figure 5) and lots 124 and 125 are separated by an excavated drain forming part of that creek system. Five Mile Creek is a relatively small tributary which, in combination with Marbellup Brook and Seven Mile Brook, previously discharged into a much more extensive Lake Powell. Today, drains from the Five Mile Creek sub-catchment and the Cuthbert horticultural area (south of the Albany - Torbay Road) discharge via Grasmere drain into Lake Powell.

Nutrient enrichment and associated algal blooms in both Torbay Inlet and Lake Powell are considered to be due to a range of factors including leaching of nutrients from sandy profile soils in areas used for extensive agriculture (grazing), discharge of nutrients from intensive industries (including waste water treatment plants, dairies,

piggeries and annual horticulture), leaching from residential septic systems, and release of accumulated nutrients from lakebed sediments.

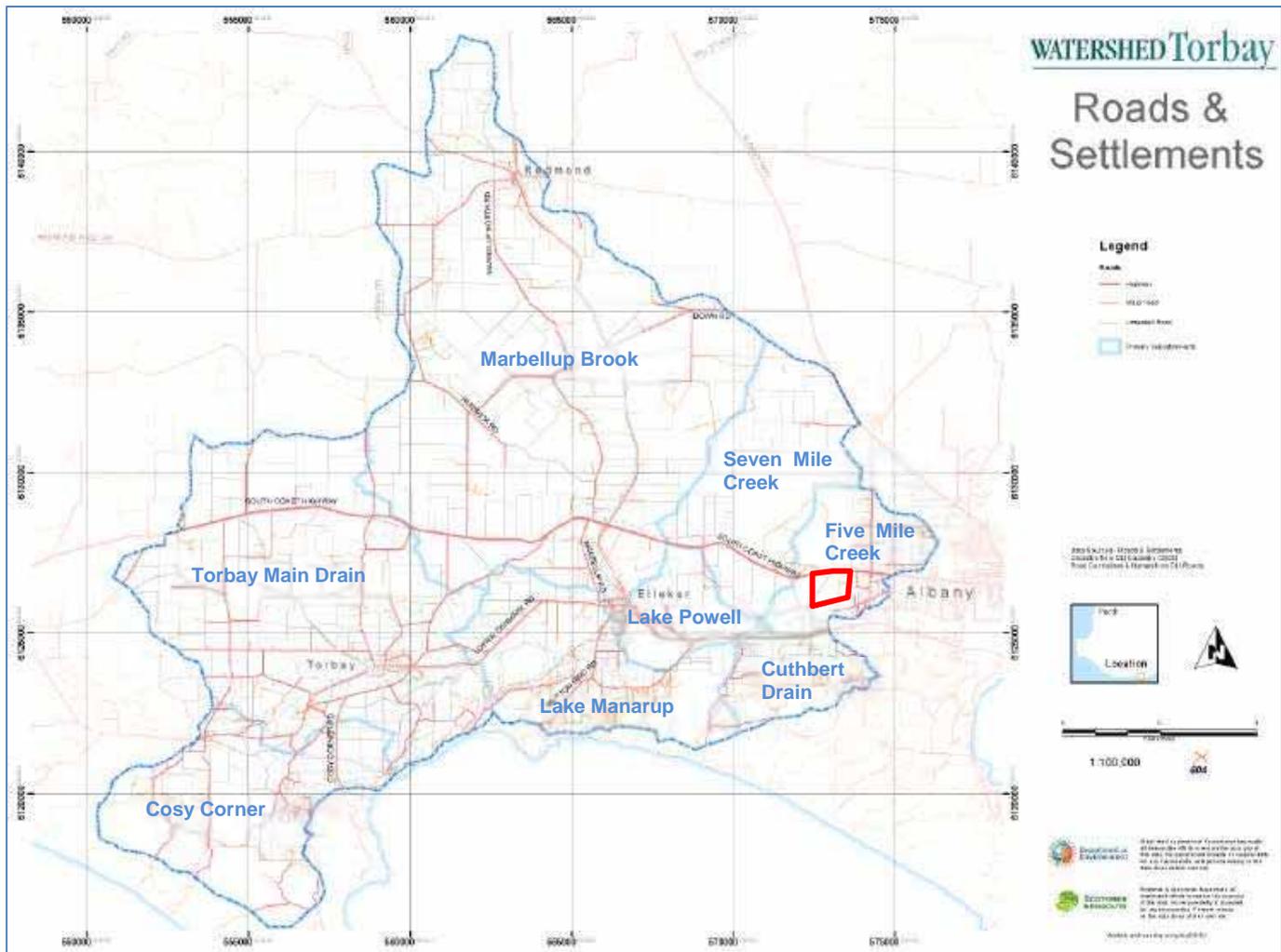


Figure 5. Location within Torbay Catchment and Sub-catchment Areas

Five Mile creek contributes an estimated 50% of the total phosphorus load to Lake Powell, with most of this being in soluble form (DoW 2006). In keeping with the land use planning recommendations contained within 'Watershed Torbay' it is likely that site-specific land capability assessment will be required to address the risk of any new development contributing to environmental degradation within the catchment, and that approval for any intensive agricultural development would require preparation and approval of a Nutrient and Irrigation Management Plan.

3.2 Landforms, Soils and Agricultural Capability

3.2.1 Broad-scale mapping and land capability assessment

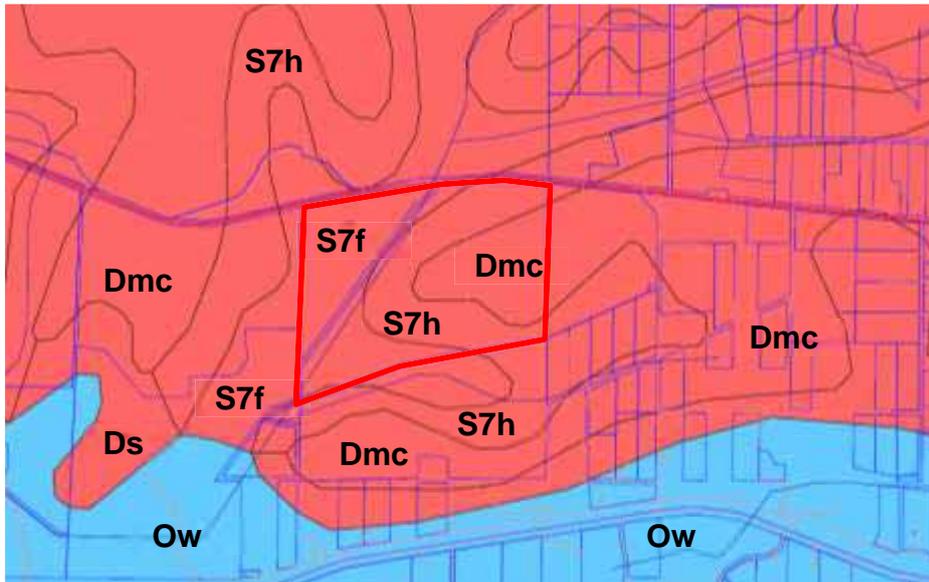
The Department of Agriculture and Food's land capability interpretations for the Albany area are based on soil / landscape mapping produced by CSIRO (Churchward et al 1988) at a publication scale of 1:100,000. Figure 6 depicts the relevant enlarged portion of that broad-scale mapping with the subject land highlighted.

It shows an upland eastern portion of the subject land as broad crest with mainly gravel soils, and the remainder as part of a broad minor valley (S7 - less than 30 m relief) with sideslopes (S7h) containing sands and deep sandy duplex soils leading to a valley floor (S7f) with predominantly wet and semi wet soils within the western and southern portions.

Comparison of Figure 6 overleaf, with earlier Figure 4c, shows that broad-scale CSIRO mapping units S7h and S7f were determined to be areas of State or Regional Significance for agriculture, whilst areas of mapping unit Dmc were excluded.

The Department's agricultural land use capability interpretations for the map units in Figure 6 are then shown in Figures 7a-d and summarised in Table 1. Due to the inevitable degree of variability of landform and soil conditions within any broad-scale mapping unit, the Department's assessments of agricultural land use capability utilise the concept of 'proportional capability classes'. As an example, instead of assigning a single specific (high, moderate or low) capability rating to all areas of a particular map unit, a proportional assessment is used to more conservatively express the capability as a range (e.g. 50-70%) of the total area of that map unit expected to contain land of a certain capability rating.

FIGURE 6. SOIL LANDSCAPE MAPPING



Source: Shared Land Information Platform (SLIP) <http://spatial.agric.wa.gov.au/slip> based on original mapping from *Landforms and Soils of the South Coast and Hinterland, Western Australia: Northcliffe to Manypeaks*. (Churchward et al 1988).

KING SYSTEM (242 Kg) – (shown brown)

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

Broad convex crests of sandy and lateritic spurs and ridges on deeply weathered siltstone in the southern edge of the Albany Sandplain. Duplex sandy gravels, Grey deep sandy duplexes, Pale deep sands and Shallow gravels.

S7h Minor Valleys S7 slope Phase

Sideslopes of minor valleys on colluvium sedimentary rocks in the southern edge of the Albany Sandplain. Pale deep sands and Grey deep sandy duplexes.

S7f Minor Valleys S7 floor Phase

Footslopes and swampy valley floors of minor valleys on colluvial and alluvial deposits over weathered sedimentary rocks in the southern edge of the Albany Sandplain. Wet and Semi-wet soils, Pale deep sands and Grey deep sandy duplexes.

TORBAY SYSTEM (242 Tb) – (shown blue)

Ow – Owingup phase *Plains with swamps, lunettes and dunes. Yellow solonetzic soils, organic loams and diatomaceous earth; wattle-paperbark thickets, Teatree heath and reeds. Podzols on dunes; banksia-sheoak woodland.*

TABLE 1. BROAD-SCALE LAND CAPABILITY RATINGS

Map Unit (within King system)	Perennial Horticulture (including vines)	Annual Horticulture	Grazing	Cropping
DMc Dempster – crest phase	B1	B1	B2	B1
S7h Minor valley - slope phase	B1	B1	B2	B2
S7f Minor valley - floor phase	C1	B2	C2	C2

Ratings 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.

Source for Table 1 and Figures 6a-d: Shared Land Information Platform (SLIP)
<http://spatial.agric.wa.gov.au/slip> based on interpretations by DAFWA (land unit database)
 accessed 11 January 2012.

Based on the table above, and Figures 7a-d overleaf, it is clear that none of the map units within the subject land (Lots 124 and 125) represent category A1 where the percentage of high capability land for horticulture is greater than 70% (the criteria reported to be used for PAL in the LGSS as shown in Figure 4). Furthermore, none of the map units within the subject land represent category A2 where the percentage of high capability land is between 50 and 70% for any of the assessed agricultural activities.

Without containing category A1 or A2 land (where there is a reasonable percentage of high capability land for agricultural activity) the designation of Priority Agricultural Land over any portion of the subject land is questionable.

FIGURE 7. BROAD-SCALE AGRICULTURAL CAPABILITY ASSESSMENTS

Legend (**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.*)

-  A1 >70% of Land has high capability
-  A2 50-70% of Land has high capability
-  B1 >70% of Land has moderate to high capability
-  B2 50-70% of Land has moderate to high capability
-  C1 50-70% of Land has low capability
-  C2 >70% of Land has low capability

FIGURE 7a. LAND CAPABILITY FOR PERENNIAL HORTICULTURE*

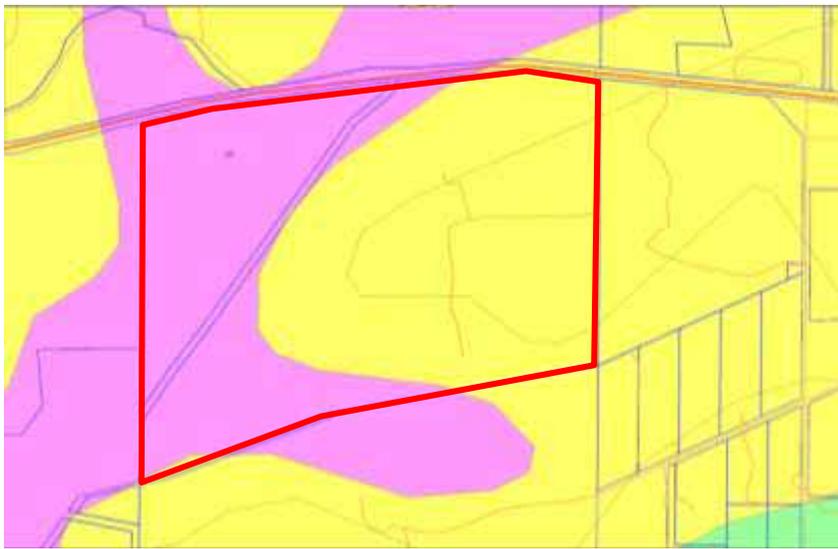
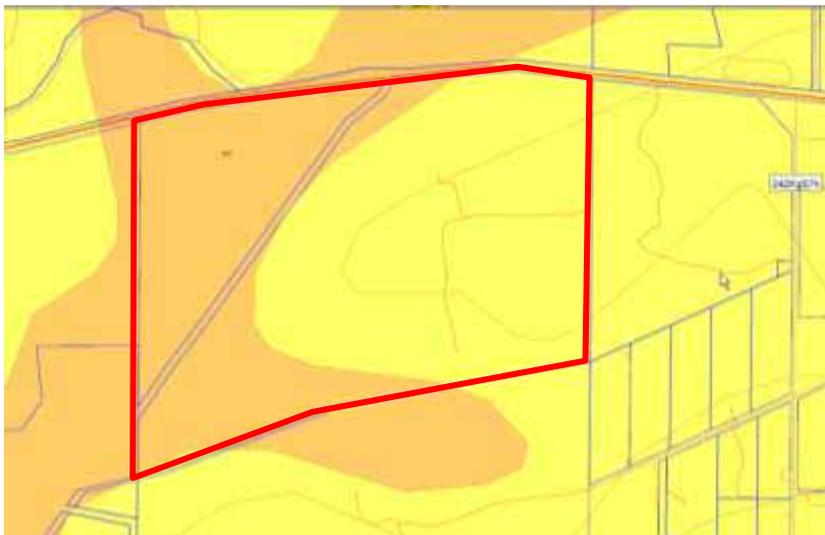


FIGURE 7b. LAND CAPABILITY FOR ANNUAL HORTICULTURE*



Continued Overleaf

FIGURE 7. BROAD-SCALE AGRICULTURAL CAPABILITY ASSESSMENTS - continued

Legend

-  A1 >70% of Land has high capability
-  A2 50-70% of Land has high capability
-  B1 >70% of Land has moderate to high capability
-  B2 50-70% of Land has moderate to high capability
-  C1 50-70% of Land has low capability
-  C2 >70% of Land has low capability

FIGURE 7c. LAND CAPABILITY FOR GRAZING

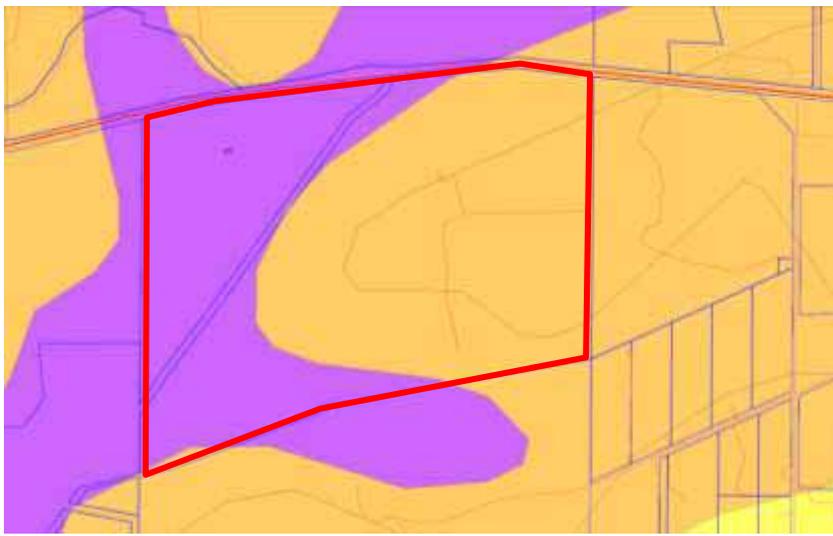
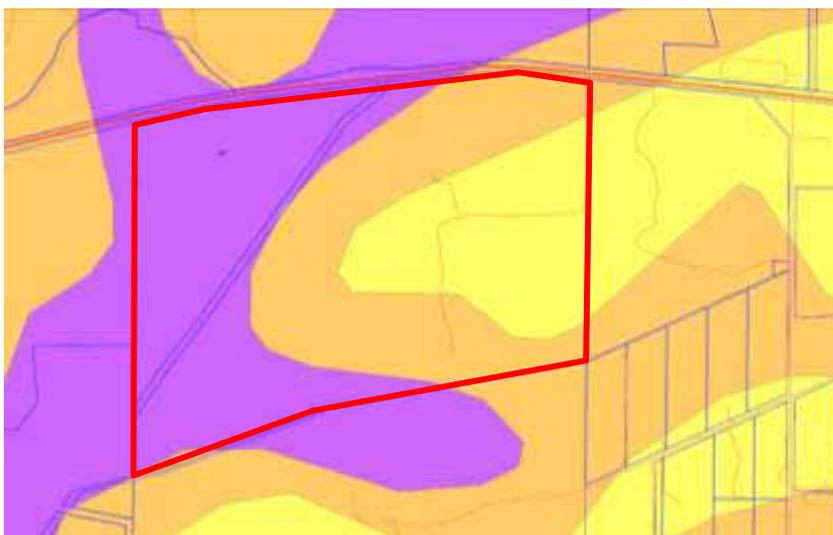


FIGURE 7d. LAND CAPABILITY FOR CROPPING



NOTE: See Footnote to Table 1 for source of information.

3.2.2 More-detailed land unit mapping

Given the broad scale of soil landscape mapping in Figure 6, 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 'property-specific' land capability assessment.

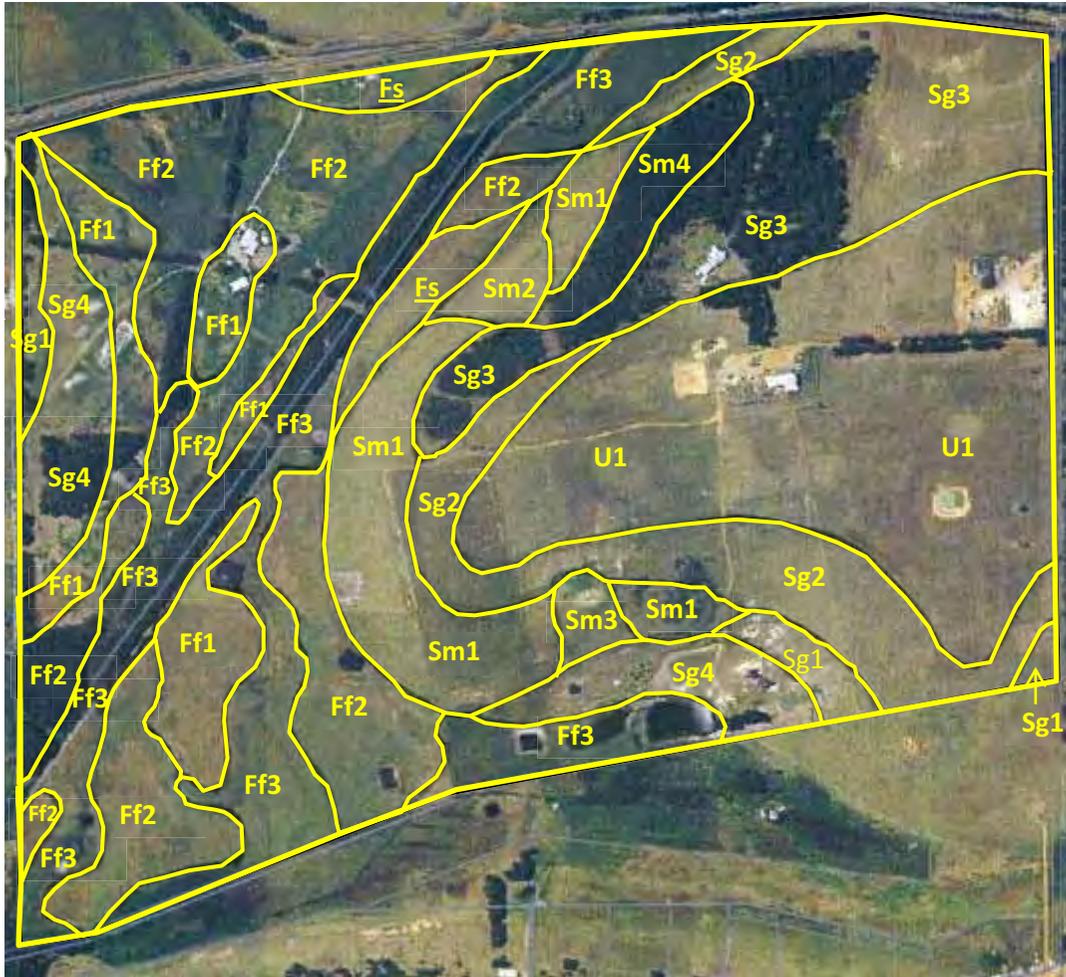
Soil and landform conditions were examined through aerial photo interpretation and subsequent field survey work was undertaken during the 19th – 21st of December 2011. Soils were examined at twenty three 'soil auger observation sites' where soils were described and classified in accordance with the Department of Agriculture and Food's WA Soil Group nomenclature (Schoknecht 2002) and slope gradients at these sites measured using a hand-held inclinometer. Other informal surface soil and topographic observations were made from vehicular transects.

The resulting more-detailed mapping of land units within the subject land is shown in Figure 8, with a description of each land unit (soil-landform type) provided in Table 2. Table 3 then provides an assessment of land degradation hazards for each of the land units.

Further appreciation of the nature of the land and the location of sites can be gained by reference to material within Attachment B. This contains a site location figure, site results summary, and representative photographs of land units. Further details on soil classifications can be obtained by reference to the WA Department of Agriculture and Food's Soils Group publication by Schoknecht (2002).

The field survey revealed soil and landform conditions within the property to be generally consistent with the range and variations described by the earlier, broad-scale CSIRO mapping. However the more detailed mapping delineates these variations and established a dominance of sandy duplex soils (with gravel) on valley sideslopes and a lesser component of pale deep sands in these areas compared to that described by CSIRO. Furthermore, soils within much of the upland area (U1) have been truncated through gravel extraction, although these areas have been successfully re-established to pasture.

ABBREVIATED LEGEND



Upland terrain

U1 Shallow gravels (< 15 cm) over laterite pan.

Valley Slopes

- Sm Moderate gradients (10-15%) and;
- Sm1 grey deep sandy duplex soil with gravel.
 - Sm2 pale deep sands.
 - Sm3 grey sand with humic hard pan.
 - Sm4 shallow gravels.

Sg Gentle gradients (5 -10%) and;

- Sg1 grey deep sandy duplex soil with gravel.
- Sg2 grey shallow sandy duplex soil with gravel.
- Sg3 shallow gravel / shallow sand over gravel.
- Sg4 pale deep sands.

Valley Floor

- Fs Foothslopes with pale deep sand.
- Ff Flat, winter-wet terrain with < 2% gradient and;
- Ff1 imperfect - poorly drained semi wet soils.
 - Ff2 poorly drained wet soils.
 - Ff3 very poorly drained depressions and drainage pathways with variable wet soils.

FIGURE 8. LAND UNIT MAPPING

Scale approx 1: 9200 ↑ N

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TABLE 2. LAND UNIT DESCRIPTIONS

Upland terrain of broad crests and upper slopes with less than 5% gradient. (U) – equivalent to DMc; Dempster crest phase.	
U1	Moderately well drained shallow gravels (< 15 cm) over laterite pan. Many areas subject to previous gravel extraction activity (now rehabilitated).
Slopes of valley associated with Five Mile Brook (S) - equivalent to S7h; Minor valley – slope phase.	
Sm	Slopes with moderate gradients (10-15%) and; Sm1 well drained, grey deep sandy duplex soil with gravel. Sm2 rapidly drained, pale deep sands. Sm3 imperfectly drained, grey sand with humic hard pan. Sm4 well drained, shallow gravels (mainly remnant vegetation)
Sg	Slopes with gentle gradients (5 -10%) and; Sg1 well drained, grey deep sandy duplex soil with gravel. Sg2 moderately well drained, grey shallow sandy duplex soil with gravel. Sg3 moderately well drained, shallow gravel or shallow sand over gravel (including disturbed / rehabilitated areas). Sg4 rapidly drained, pale deep sands.
Floor of valley associated with Five Mile Brook (F) - equivalent to S7f; Minor valley – floor phase.	
Fs	Footslopes with very gentle gradients (2-5%) and moderately well drained, pale deep sand and > 80 cm to watertable.
Ff	Flat, winter-wet terrain with less than 2 % gradient and; Ff1 imperfect to poorly drained flats with sands or humic sands and > 50 cm to watertable (semi wet soils). Ff2 poorly drained flats with humic sands and < 50 cm to watertable (wet soils). Ff3 very poorly drained swampy depressions and drainage pathways with variable wet soils (humic sands or loams) and < 20 cm to watertable.

TABLE 3. ASSESSMENT OF LAND DEGRADATION HAZARDS FOR LAND UNITS

Soil Group	Land Units (Table 2)	Salinity risk	Waterlogging /inundation risk	Susceptibility to water erosion**	Susceptibility to wind erosion *	Susceptibility to subsurface (10-20 cm) acidification	Susceptibility to water repellence	Susceptibility to topsoil structure decline	Susceptibility to subsurface compaction (10-30 cm)	Susceptibility to phosphorus export
Deep Sands	Sg4 (gentle slopes)	Nil	Nil	Moderate	High	High	High	Low	Low to Moderate	High
	Sm2 (mod slope)	Nil	Nil	High	High	High	High	Low	Low to Moderate	High
	Fs (footslope)	Low	Low-Moderate	Low-Moderate	Moderate	High	High	Low	Low to Moderate	High
Sand over Clay (Deep sandy duplex with gravel)	Sg1 (gentle slopes)	Low	Moderate	Moderate	High	High	High	Low	Moderate	Moderate
	Sm1 (mod slope)	Low	Low	High	High	High	High	Low	Moderate	Moderate
Shallow Sand over Clay (Shallow sandy duplex with gravel)	Sg2	Low	Low	Moderate	High	High	Moderate	Low	Moderate	Moderate
Gravels	U1 (uplands)	Nil	Low	Low	Low	Moderate	Moderate	Low	Low	Low
	Sg3	Low	Low	Moderate	Low	Moderate	Moderate	Low	Low	Low

TABLE 3. ASSESSMENT OF LAND DEGRADATION HAZARDS FOR LAND UNITS

Soil Group	Land Units (Table 2)	Salinity risk	Waterlogging /inundation risk	Susceptibility to water erosion**	Susceptibility to wind erosion *	Susceptibility to subsurface (10-20 cm) acidification	Susceptibility to water repellence	Susceptibility to topsoil structure decline	Susceptibility to subsurface compaction (10-30 cm)	Susceptibility to phosphorus export
Semi wet Soils	(gentle slopes) Sm4 (mod slope)	Nil	Low	Moderate to High	Low	Moderate	Moderate	Low	Low	Low
	Sm3 (mod slope seepage area)	Low to Moderate	High	High	Nil	Not assessed	Nil	Not assessed	Not assessed	High
	Ff1 (Winter wet flats)	Low to Moderate	High	Moderate	Nil	Not assessed	Nil	Not assessed	Not assessed	Very High
	Ff2 (Winter wet flats)	Low to Moderate	Very High	Moderate to High	Nil	Not assessed	Nil	Not assessed	Not assessed	Very High
Wet soil	Ff3 (Drainage pathway)	Low to Moderate	Very High	High	Nil	Not assessed	Nil	Not assessed	Not assessed	Very High
* Erosion risk if land surface is depleted of vegetative cover		** As above, plus consideration of local flood risk								

3.2.3 More-detailed Land Capability Assessment

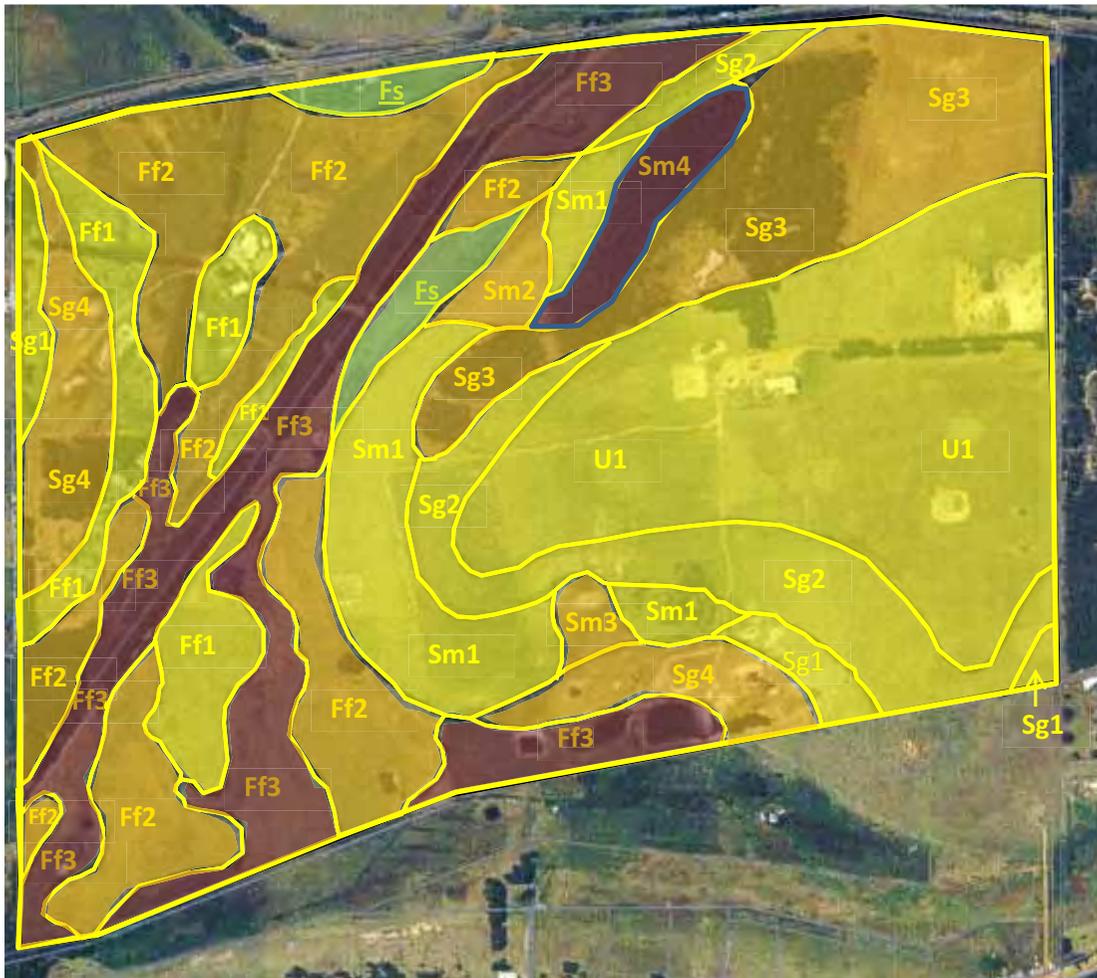
'Land capability' is a term used to express the ability of land to support a proposed use with minimal risk of degradation to its soil and water resources*. A general methodology for land capability assessment has been developed by the Department of Agriculture (Wells and King 1989, and more recently by van Gool et al 2005) and forms the basis for the land use evaluations in both this report and the earlier DAFWA work shown in Figures 7a-d. Notwithstanding the results of the earlier DAFWA broad-scale assessments being expressed in terms of proportional capability classes, the methodology remains the same.

At a specific property level, the more-detailed land unit mapping in Figure 8 allows the capability assessment to be more definitively expressed in terms of a five class rating system from 'very high' capability (class one) to 'very low' capability (class five). Land of high capability is considered to have few inherent physical land use limitations and minimal associated risk of land degradation. At the other extreme, very low capability land is severely constrained by the inherent soil or landform conditions and there is an associated high risk of land or water degradation. As a result, the need for land management inputs increases proportionally from 'very high' through to 'very low' capability land.

Given the size of the existing landholding (both lots less than 100 ha) and its position within the Torbay catchment, the capability assessments provided here are for 'grazing' and 'perennial horticulture'. **The results are illustrated in Figures 9 and 10 and Tables 4 and 5.**

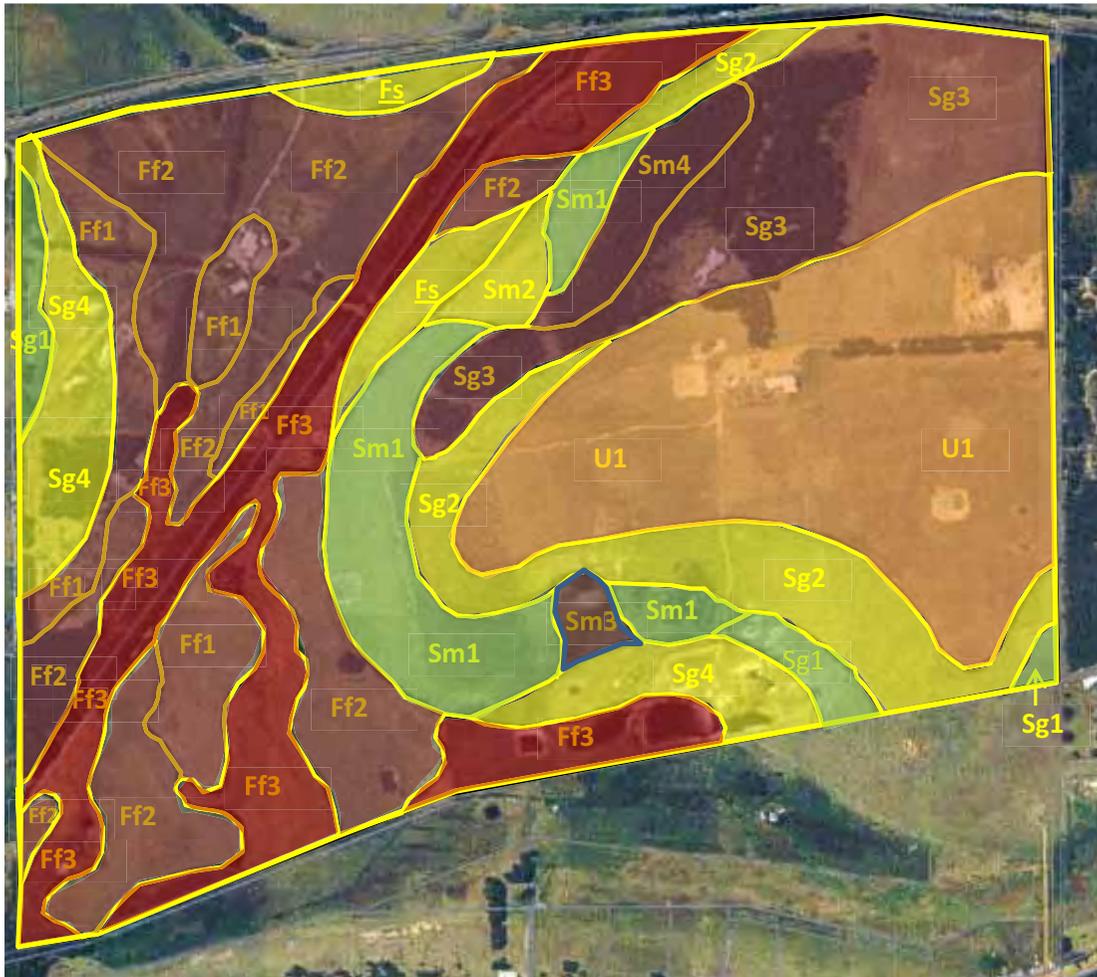
Dryland cropping has not been assessed, being restricted to much larger properties due to economies of scale. Annual horticulture (e.g. vegetable growing) is also not directly assessed because prospects for its establishment on a commercial scale are likely to be extinguished by the potential for land use conflict with existing nearby rural-residential land uses, and the risk of further contributions to nutrient loads within the Five Mile Creek sub-catchment.

* Capability assessment focuses on soil and landform conditions and does not directly consider water availability, conservation value of any remaining vegetation, and required set-backs from water bodies.



Capability Rating	
	High
	Fair
	Fair – Low
	Low
	Very Low

FIGURE 9. LAND CAPABILITY FOR GRAZING Scale approx 1: 9200 N ↑
 © Land Assessment Pty Ltd



	Fair – High
	Fair
	Fair – Low
	Low
	Very Low

FIGURE 10. LAND CAPABILITY FOR PERENNIAL HORTICULTURE Scale approx 1: 9200 N ↑
 © Land Assessment Pty Ltd

TABLE 4. SITE-SPECIFIC LAND CAPABILITY RATINGS

Land Unit	Percent of total area	Capability for Grazing	Capability for Perennial Horticulture	Comment
U1	21.1	Fair	Fair - Low	Various portions have been gravel stripped, although successfully rehabilitated. Limited rooting depth.
Sm1	7.4	Fair	Fair - High	Slopes prone to water erosion if depleted of vegetative cover.
Sm2	1.0	Fair - Low	Fair	Slopes prone to wind and water erosion if depleted of vegetative cover. Sands have poor ability to retain nutrients and moisture.
Sm3	0.7	Fair - Low	Low	Localised area susceptible to hillside seepage and waterlogging.
Sm4	2.1	Low	Low	All under remnant vegetation. Limited rooting depth.
Sg1	2.3	Fair	Fair - High	Localised areas adjacent to property boundaries.
Sg2	8.5	Fair	Fair	Possible susceptibility to waterlogging in wet years due shallow depth to clay
Sg3	11.1	Fair - Low	Low	Approx 50 % under remnant vegetation and much of remainder has been gravel stripped then rehabilitated. Hence limited rooting depth.
Sg4	6.0	Fair - Low	Fair	Sandy lower slopes prone to wind erosion if depleted of vegetative cover. Sands have poor ability to retain nutrients and moisture.
Fs	2.4	High	Fair	Lesser gradient and closer to watertable than Sg4. Sands have poor ability to retain nutrients and moisture.
Ff1	6.8	Fair	Low	Winter-wet flats susceptible to waterlogging but marginally higher than Ff2. Provide good seasonal (summer) pasture for grazing livestock. Horticultural activity requires drainage and sandy subsoils present a high risk of nutrient export to Five Mile Creek and downstream waterbodies.
Ff2	18.2	Fair - Low	Low	Winter-wet flats – more susceptible to waterlogging than Ff1 but marginally higher than Ff3. As above re pastures and horticulture.
Ff3	12.4	Low	Very Low	Winter-wet drainage pathways with local flood risk. Stock access contributes nutrients (excrement) and sediment (through erosion) to drainage system.

TABLE 5. SITE –SPECIFIC CAPABILITY ANALYSIS

CAPABILITY CLASS	Percentage* of Subject Land with Capability Rating for -	
	GRAZING	PERENNIAL HORTICULTURE
High	2.4	
Fair - High		9.7
Total % generally 'Good'	2.4 % (2.6 ha)	9.7 % (10.5 ha)
Fair	46.1	17.9
Fair - Low	37.0	21.1
Total % generally 'Fair'	83.1 % (90.2 ha)	39 % (42.3 ha)
Low	14.5	38.9
Very Low		12.4
Total % generally 'Poor'	14.5 % (15.7 ha)	51.3 % (55.7 ha)

* **Note** - Results do not take into account the extent of remnant vegetation, areas of land affected by buildings, dams or infrastructure, and setback requirements from boundaries or Five Mile Creek.

Table 5 presents an overall analysis of the agricultural capability of combined lots 124 and 125. It indicates that most of the land is of generally fair capability or average quality for grazing activities, and that about half the total land is of 'fair or better' capability for perennial horticultural activity.

3.2.4 Water Resources

A water resource assessment is beyond the scope of this report. However, as shown on the site location figure within Attachment B, there is a significant number of small dams (including groundwater soaks) on each of the two existing properties sufficient to provide for watering of livestock.

Lots 124 and 125 are separated by the man-made drain associated with Five Mile Creek and a number of small feeder drains occur within adjacent agricultural land, particularly on Lot 124. A foreshore survey conducted for the Five Mile Creek subcatchment (Water and Rivers Commission 2000) provides management and rehabilitation advice to landholders in the interest of improving water quality.

4.0 CONCLUSIONS

A review here of the Department of Agriculture and Food's broad-scale soil-landscape mapping and capability assessment information shows that no portion of Lots 124 and 125 meet the criteria (i.e. > 70 % of high capability for horticulture) described as being used within the Lower Great Southern Region Strategy (WAPC 2007) to determine 'Agricultural land of state or regional significance'.

Notwithstanding this, an independent site-specific land evaluation study has been conducted as recommended by the Department. This evaluation shows that whilst most of the land is of generally fair capability or average quality for grazing activities it has lesser capability for horticulture.

Despite access through soakage dams to significant water within the lower-lying winter-wet flats, the potential for horticulture here is limited by the risk of waterlogging and the associated need for further drainage into Five Mile Creek – and downstream waterbodies such as Lake Powell.

Given the poor condition of Lake Powell, and the existing significant contribution of nutrients from the Five Mile Creek catchment (DoW 2006), it is considered unlikely that commercial-scale horticultural activity (annual or perennial) would be encouraged or permitted within these winter-wet flats where the grey sandy subsoils already predispose the land to a high risk of further nutrient export.

With less than 10 % of the land being of high capability for either grazing or horticulture, Lots 124 and 125 do not meet the criteria described as being used within the Lower Great Southern Region Strategy (WAPC 2007) to determine 'agricultural land of state or regional significance'. Therefore, and in the absence of any reasoning for 'local significance' within the Albany Local Planning Strategy, the identification of Lots 124 and 125 as 'Priority Agriculture Land' can not be justified by land capability considerations.

In view of the above, and the location relative to existing non-agricultural land uses, Lots 124 and 125 appear to be of no particular strategic agricultural significance to warrant their exclusion from planning consideration for rezoning for rural small holdings or rural-residential purposes.

5.0 REFERENCES

Churchward H. M., McArthur W.M., Sewell P.L., and Bartle G. A. (1988) *Landforms and Soils of the South Coast and Hinterland, Western Australia: Northcliffe to Manypeaks*. CSIRO Division of Water Resources Divisional Report 88/1. April 1988.

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Western Australian Planning Commission (2007) *Lower Great Southern Strategy*

Western Australian Planning Commission (2011) *Land Use Planning in Rural Areas State Planning Policy 2.5 Draft for Public Comment*.

ATTACHMENT A

Priority Agriculture Land Advice Department of Agriculture and Food

Bert Quayle

From: Overheu, Tim [tim.overheu@agric.wa.gov.au]
Sent: Friday, 16 September 2011 3:39 PM
To: Bert Quayle
Subject: RE: City of Albany ALPS - Priority Agriculture
Attachments: Local Rurall Policy.docx; GeorgeSt.jpg

Hi Bert,

Some points below for your consideration:

- The identification of Priority Agricultural Land was undertaken for the Lower Great Southern Region Strategy (published 2007). The terminology used for identified best quality agricultural land worthy of protection was "Agricultural Land of State and Regional Significance".
- The identification of areas of state, regional and local significance under SPP2.5 is based on regional scale land capability assessments as well as other (often locally determined) factors including the existing agricultural activities on the land and the importance of that agricultural activity to the economic development and employment of an area. The identified and mapping of the land was based soil quality attributes alone, irrespective of location, lot size, water availability, existing land use, etc.
- The purpose is to guide strategic planning and policies. The information is not necessarily at a scale suitable for making statutory planning decisions. For proposals addressing property level planning, the Department of Agriculture and Food always recommends that the proponent seeks to have an independent land evaluation report compiled discussing the capability of the land area.
- In addition to the prepared maps illustrating Agricultural Land of State and Regional Significance, Local Government in the Lower Great Southern Region were invited to 'further' identify and map their Agricultural Land of "Local" Significance (which in come cases extended the area of Agricultural Land of State and Regional Significance). The two products were merged, classified and "Priority Agricultural Land" and for the City of Albany, the merged product is what you see represented in ALPS.
- DAFWA no longer supports the inclusion of minimum lots sizes for Priority and General Agricultural Zones as set out in the current SPP2.5; and DAFWA does not consider that intensification of agriculture and emerging uses justify subdivision and
- DAFWA has a focus on preserving large agricultural lots zoned rural and/ or classed as Priority Agricultural Land. Intensification of food production will require continued access to suitably large lots and water supplies to enable investment into agriculture. DAFWA also supports the planning and implementation of buffers zones and/or specific separation distances to minimise conflict between agricultural and incompatible land uses.
- The Department of Agriculture and Food does not routinely comment on individual subdivision applications. In providing the feedback in various situations, DAFWA sets out general principles to guide decision making, where proposed rural subdivision adjoins priority agricultural land.

For your interest, I've attached an image from the same area, illustrating the Agricultural Land of State and Regional Significance. You will observe that our mapping doesn't follow cadastral boundaries.

I am probably the best point of contact for these agricultural land use planning matters in the Southern Agricultural Region.

Regards,

Tim Overheu

Research Scientist, Soils & Land Use Planning
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T: + 61 8 9892 8533
F: + 61 8 9841 2707
M: + 61 429 889 324
W: www.agric.wa.gov.au

From: Bert Quayle [mailto:bert@aytonbaesjou.com.au]
Sent: Friday, 16 September 2011 10:21 AM
To: Overheu, Tim
Subject: City of Albany ALPS - Priority Agriculture

Hello Tim,

Delma has given me your contact and I am hoping you may be able to assist or steer us in the right direction.

Nick Ayton of this office has had some preliminary discussions with Graeme Bride of the City of Albany RE the future of some land south of South Coast Highway and west of George Street.
A couple of plans are attached showing the area.

While the land is sandwiched between the existing Gledhow rural residential area (future residential and special rural in ALPS) and the existing special rural Albany Green Estate the Albany Local Planning Strategy shows it as Priority Agriculture. Unfortunately none of the background to ALPS explains to us or council officers exactly why this classification applied to this particular area given its locational context and other qualities.

As a result both Nick and the city officers are after some feedback on the suitability of retaining that priority agriculture classification or whether alternatives such as rural small holdings for instance, could be investigated.

Can you advise or let us know who we should approach. If you want to catch up or have a meeting to discuss (or need additional background), please advise either Nick or myself.

Thanks

Bert Quayle

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P L A N N I N G

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ATTACHMENT B

Site location figure, results summary and representative photographs

SITE LOCATION FIGURE



SITE RESULTS SUMMARY

Site No*	Easting	Northing	Broadscale mapping	Site Drainage status	Landform	WA Soil Group	Land unit
1	50573581	6126492	DMc	Moderately well	Broad crest – upper slope; 1 – 3%	Shallow gravel (20 cm; likely clay beneath laterite layer)	U1
2	50573492	6126207	S7h	Moderately well	Gentle slope 7%	Grey shallow sandy duplex soil with gravel (hardpan at 15 cm).	Sg2
3	50573336	6126225	S7h	Well	Gentle slope 8%	Grey deep sandy duplex soil (with gravel pan at 40 cm)	Sg1
4	50573099	6126133	S7h	Imperfect	Moderate slope 14%	Grey sand with weak humic hard pan at 55cm.	Sm3
5	50572884	6126275	S7h	Well	Moderate slope 16%	Grey deep sandy duplex soil (with gravel.at 25 cm).	Sm1
6	50572707	6126315	S7f	Poor	Valley flat < 2%	Wet soil (humic grey sand with watertable at 50 cm).	Ff2
7	50572601	6126178	S7f	Imperfect to poor	Valley flat < 2%	Semi wet soil (humic sand with watertable at 100 cm).	Ff1
8	50572838	6126249	S7h	Well	Moderate slope 12%	Grey deep sandy duplex soil (with gravel at 25 cm)	Sm1
9	50572656	6126743	S7f	Poor	Valley flat < 2%	Wet soil (peaty sand with watertable at 35 cm).	Ff2
10	50572491	6126681	S7f	Well-Rapid	Gentle slope 4-5%	Pale deep sand	Sg4
11	50572452	6126558	S7f	Well	Gentle slope 8% (eroded in placers)	Grey deep sandy duplex soil (with gravel.at 40 cm.)	Sg1
12	50572664	6126533	S7f	Imperfect to poor	Valley flat < 2%	Semi wet soil (pale deep sand but with watertable at 60 cm).	Ff1
13	50572643	6126445	S7f	Poor	Valley flat < 2%	Wet soils (humic sand to loamy sand with < 45 cm to watertable).	Ff2
14	50572485	6126318	S7f	Well-Rapid	Gentle slope 4-5%	Pale deep sand	Sg4
15	50572546	6126295	S7f	Poor	Valley flat < 2%	Wet soil (humic sand with < 50 cm to watertable).	Ff2

Site No*	Easting	Northing	Broadscale mapping	Site Drainage status	Landform	WA Soil Group	Land unit
16	50572771	6126848	S7f	Moderately well	Footslope (3-4%)	Pale deep sand (with watertable at 85cm)	Fs
17	50572750	6126540	S7f	Imperfect to poor	Valley flat < 2%	Semi wet soil (humic loamy sand to sand with watertable at 55 cm).	Ff1
18	50573050	6126663	S7h	Rapid	Moderate slope (14% upslope, 18% downslope)	Pale deep sand (eroded in places and overlying gravel at 85cm)	Sm2
19	50572978	6126684	S7h	Moderately well	Footslope or sandy terrace (2 %).	Pale deep sand but with watertable at 90 cm).	Fs
20	50573182	6126867	S7f	Very poor	Swampy depression or broad drainage pathway.	Wet soil (peaty or humic loam to loamy sands with < 10 cm to watertable).	Ff3
21	50573190	6126820	S7h	Moderately well	Gentle slope 10% (rehabilitated gravel skimmed area)	Grey shallow sand over gravel pan at 35cm	Sg3
22	50573566	6126812	DMc	Moderately well	Gentle slope 10% with few to common surface stone (rehabilitated gravel skimmed area)	Shallow gravel	Sg3
23			S7h	Moderately well	Gentle slope 8% (roadside cutting just outside property).	Grey shallow sandy duplex soil with gravel hardpan then underlying clay.	Sg2

LOT 125



1 Gravel storage facility within upland unit U1



3. Land unit U1 – dam west of sheds in central upland area



2. Land unit U1 - central eastern portion of property



4. Land unit Sm1 – near site 8



5. Land unit Sm2 –site 18.



7. Land unit Sm4 – remnant vegetation on shallow gravels



6. Land unit Sm3 –seepage area within moderate slope – site 4



8. Land unit Sg1 site 3 foreground; then Sg4, and valley floor (Ff) beyond.



9. Land unit Sg2 – site 2.



11. Land unit Sg3 – near site 23



10. Land unit Sg2 Roadside cutting site 23 with gravel hardpan over clay subsoil



12. Land unit Sg3 - rehabilitated gravel stripped area



13. Land unit Fs – site 19.



15. Land unit Ff3 – site 20



14. Land units near site 6 **Ff1** left (imperfect – poor drained) and **Ff2** right (poor).



16. Land unit Ff3 – recently excavated area with poorly nutrient retentive sandy soil.

LOT 124



1 View towards sheds and stables from highway.



3. Land unit Fs – footslopes near highway at site 16.



2. Land unit Sg4 – gentle sandy slopes east of site 11



4. Land unit Ff1 – near site 12; slightly better drained portion of valley floor



5. Land unit Ff1(right) & FF2 (left) separated by feeder drain; view to site 17



7. Land unit Ff2 – view south east from highway at NW corner of Lot 124



6. Land unit Ff2–view south west from site 16



8. Land unit Ff2 - dam near site 9.



9. Land unit Ff3 – near site 15; lowest portion of valley floor / drainage pathway.



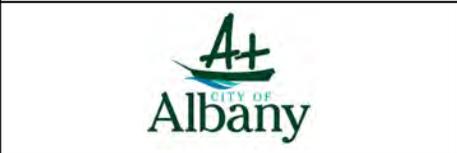
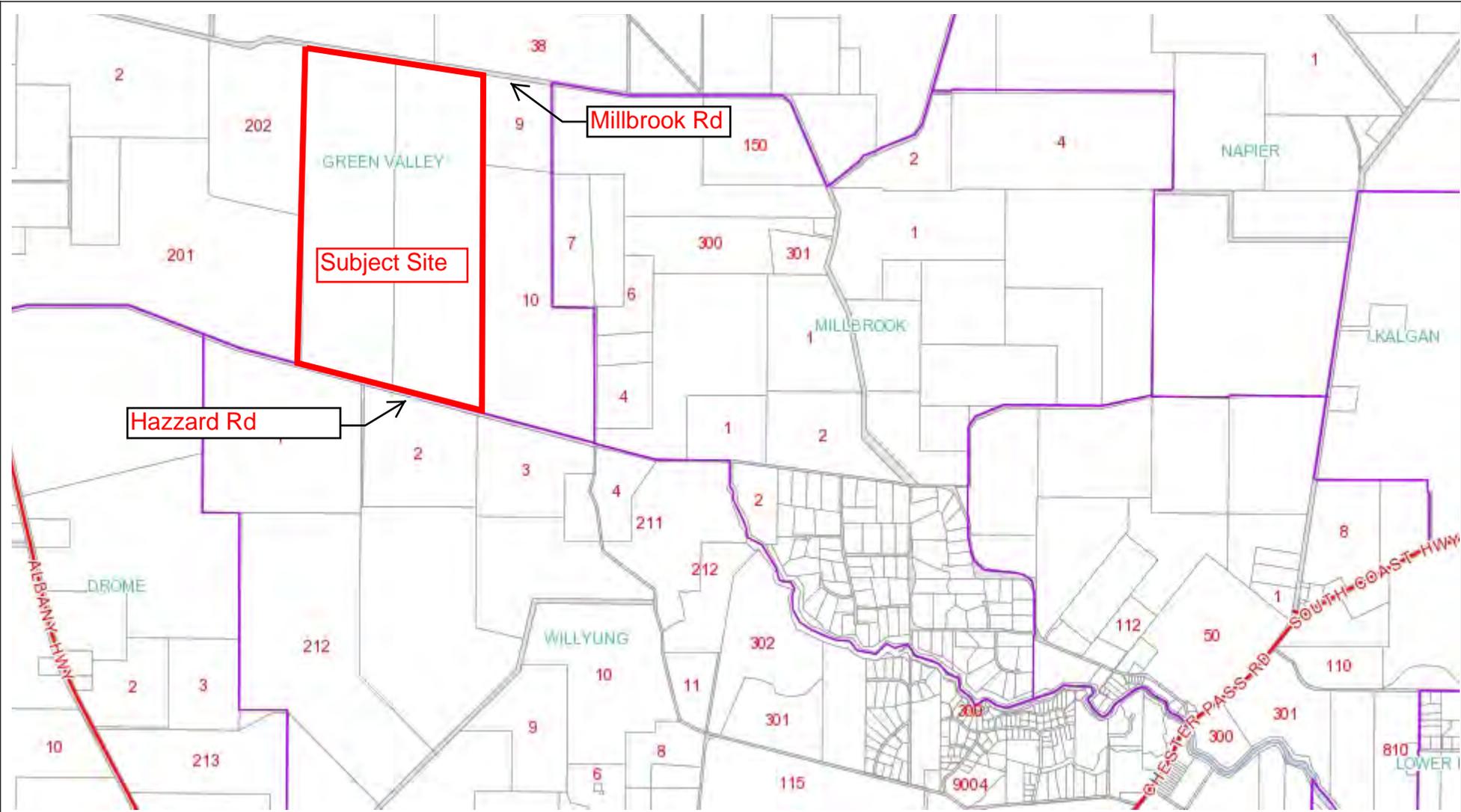
11. Portion of Five Mile Creek drain east of site 13 with fringing weed Taylorina



10. Land unit Ff3 – part of blue gum plantings within low portion of valley floor



12. Feeder drain traversing unit FF2 between sites 12 and 17.

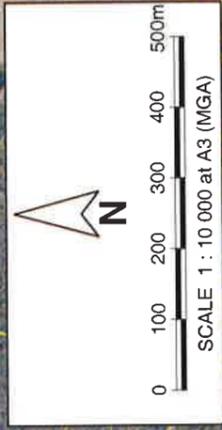
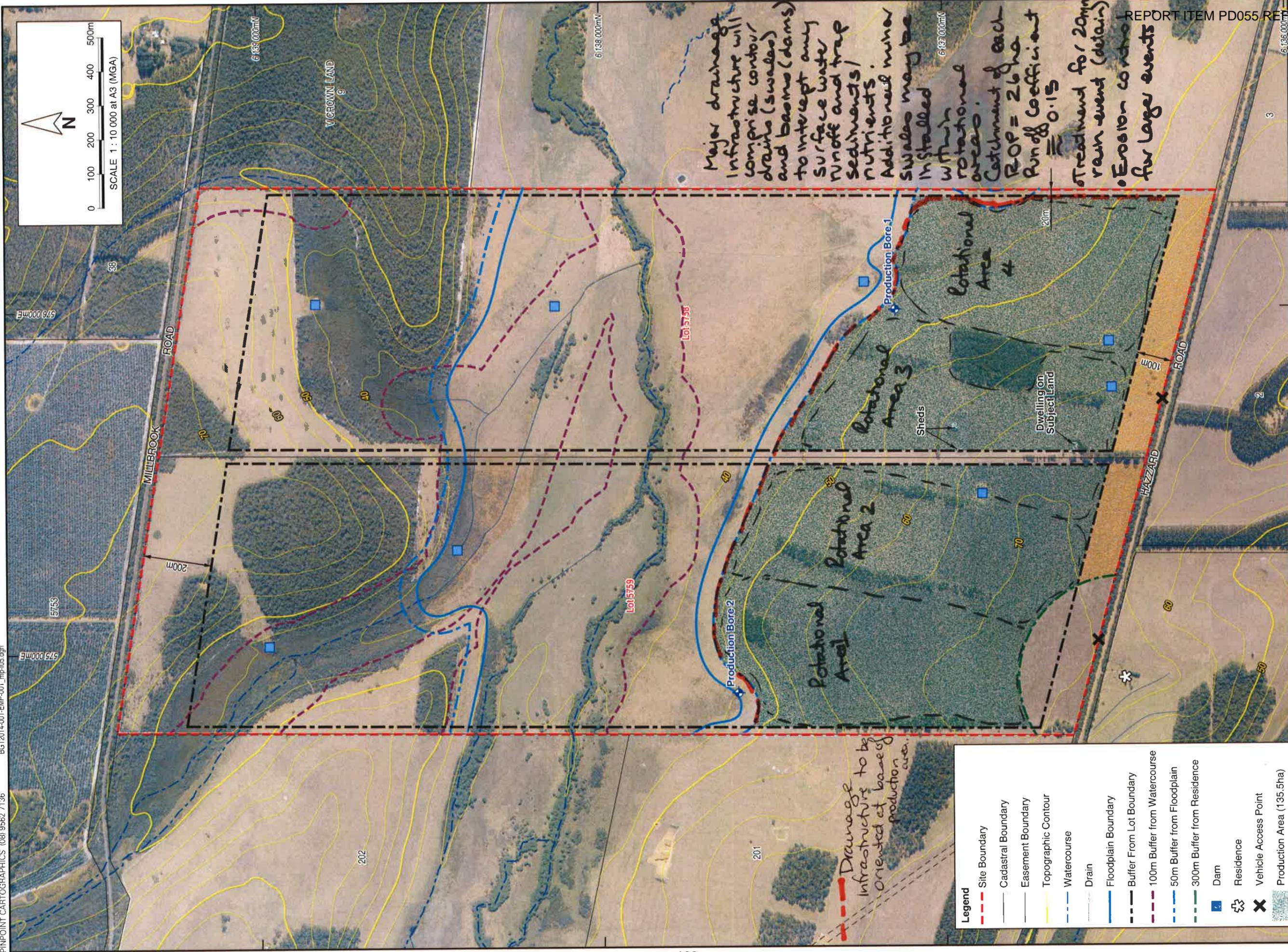


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Thursday, 25 September 2014

1:50000





Major drainage infrastructure will comprise contour drains (swales) and basins (dams) to intercept any surface water runoff and trap sediments/nutrients. Additional minor swales may be installed within rotational areas. Catchment of each ROP = 26ha Runoff coefficient = 0.15
 Treatment for 20mm rain event (detail)
 Erosion control for large events

Drainage to be oriented at base of production area.

Legend	
	Site Boundary
	Cadastral Boundary
	Easement Boundary
	Topographic Contour
	Watercourse
	Drain
	Floodplain Boundary
	Buffer From Lot Boundary
	100m Buffer from Watercourse
	50m Buffer from Floodplain
	300m Buffer from Residence
	Dam
	Residence
	Vehicle Access Point
	Production Area (135.5ha)
	Storage of Straw, Silos for Pig Feed



Drawn: M. Price Date: 28 Jul 2014

Benmore Grazing Trust
 ROTATIONAL OUTDOOR PIGGERY - BREEDING
 LOTS 5758 AND 5789 HAZZARD ROAD, GREEN VALLEY

PROPOSAL, BUFFERS AND MANAGEMENT

Figure 5



**BENMORE GRAZING TRUST
ENVIRONMENTAL MANAGEMENT PLAN
OUTDOOR ROTATIONAL PIGGERY
LOTS 5758 & 5759,
GREEN VALLEY
CITY OF ALBANY**

Prepared For:	Benmore Grazing Trust 3 Manly Crescent COLLINGWOOD HEIGHTS WA 6330
Report Number:	AA2014/013
Report Version:	Version 2
Report Date:	28 July 2014

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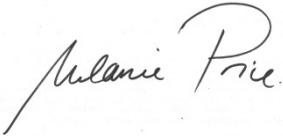
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Document No: AA2014/013
 Report No: Version 2

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DISTRIBUTION

Report File Name	Report Status	Date	Distribution	Format
BGT-2014-001_EMP_001_mp_V1.docx	Version 1	18 July 2014	Benmore Grazing Trust	PDF
BGT-2014-001_EMP_001_mp_V2.docx	Version 2	28 July 2014	Benmore Grazing Trust City of Albany	PDF

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LIST OF ABBREVIATIONS

AHD	Australian Height Datum
APIQ [✓] ™	Australian Pork Industry Quality Assurance Program
APL	Australian Pork Limited
AWWG	Animal Welfare Working Group
BOM	Bureau of Meteorology
BSE	Bovine Spongiform Encephalitis
DER	Department of Environment Regulation (previously Department of Environment and Conservation)
DAFWA	Department of Agriculture and Food, Western Australia
DOH	Department of Health, Western Australia
EHO	Environmental Health Officer
EMP	Environmental Management Plan
EPA	Environmental Protection Authority
LPS	Local Planning Scheme
PIMC	Primary Industries Ministerial Council
ROP	Rotational Outdoor Piggery
RSPCA	Royal Society for the Prevention of Cruelty to Animals

EXECUTIVE SUMMARY

This document has been prepared by Aurora Environmental for Benmore Grazing Trust and outlines an environmental management plan (EMP) for the operation of a proposed breeder rotational outdoor piggery (ROP) at Lots 5758 and 5789 Hazzard Road, Green Valley in the City of Albany. The piggery will breed pigs which will be grown for Plantagenet Pork.

The EMP has been prepared in response to requirements outlined in the City of Albany Local Planning Scheme (LPS) No 1 and other relevant legislation, policies and standards. The following matters are considered:

- Planning and policy framework for the establishment of piggeries generally and outdoor rotational operations specifically;
- Land capability, buffers and sensitive receptors; and
- Process and environmental management of the proposed operation.

Details relating to this assessment are summarised in Table 1 and explained in the document text.

TABLE 1: SUMMARY TABLE

ITEM	APPLICATION	COMMENT
Property Details:	Lots 5758 and 5789 Hazzard Road, Green Valley in the City of Albany. Lot 5758 – 229.80 hectares (ha); Lot 5759 – 229.75ha. Total 459.55ha	The subject land is owned/under contract by Benmore Grazing Trust. Land uses on the property currently include pasture and cropping.
Piggery Type:	Free range breeder piggery based on a rotational operation.	
Density of Pigs	Model Code of Practice for the Welfare of Animals – Pigs – 20 – 25 dry sows/ha; RSPCA Approved Farming Scheme Standards for Pigs – 30 adult pigs/ha	Benmore Grazing Trust proposed to have 24 boars and sows per hectare which is within the range recommended by the Model Code and RSPCA standards.
Total number of pigs:	Up to 600 sows and 35 boars and 400 piglets (at any one time).	Output of approximately 10,800 weaners per year.
Rotation	This EMP identifies 4 areas which are suitable for ROPs based on environmental criteria.	Areas have been calculated on 24 sows and boars per hectare. Each rotation unit is at least 26ha to accommodate up to 600 sows and 35 boars in each unit. Each rotation area will be used for two years and rested for at least two years.
Transport of pigs and traffic	- Maiden pigs (gilts) are brought in from another piggery on a single day each month. - Weaner piglets are transported one day a week, directly to an off-site grower facility where they are	- Gilts are transported in a semi trailer. - Piglets (as weaners) are transported using a small rigid truck.

ITEM	APPLICATION	COMMENT
	<p>raised to an adequate size prior to being sent to an abattoir for processing.</p> <p>- Feed is brought onto the property once every three weeks.</p>	<p>- Feed is delivered by a B-double (consisting of a prime mover towing two semi-trailers).</p>
<p>Buffers requirements as outlined by APL in Tucker and O'Keefe (2013)</p>	<p>Buffers required:</p> <ul style="list-style-type: none"> - Public road carrying > 50 vehicles per day – 100m. - Public road carrying < 50 vehicles per day – 200m - Town - 750m - Rural residential area - 500m - Rural dwelling – 250m - Property boundary – 20m 	<p>The proposed ROP meets these buffer requirements.</p> <p>Hazzard Road carries approximately 25 vehicles per day (Planning and Engineering Support, City of Albany, pers comm.)</p> <p>The closest dwelling external to the subject land is 100m from the south west property boundary and 300m from the closest proposed ROP.</p>
Design and Management of Outdoor Free Range Areas for Pigs (APL, 2011)		
Site selection factors:	Recommendation	
<p>Annual rainfall less than 750mm</p>	<p>940mm per annum (1880 – 2013). However, there has been a 6-8% decline since 1975 (to approximately 865mm) (Gunby, 2014) and 13.2% decline when comparing 2000 – 2006 rainfall data with the long term average (816mm; Gunby, 2014).</p>	<p>The ROP does not meet this site selection requirement. However the operation can be managed adequately for this rainfall level.</p>
<p>Mean maximum January temperature less than 28°C</p>	<p>23.2°C in February</p>	<p>The ROPs meet this site selection requirement.</p>
<p>Mean minimum July temperature exceeding 3°C</p>	<p>8.4°C in July</p>	<p>The ROPs meet this site selection requirement.</p>
<p>ROP to provide room for 24 sows and boars per ha (which is less dense than RSPCA standards which are based on 30 adult pigs per ha)</p>	<p>600 sows and 35 boars will be provided with a minimum of 26ha area per ROP compartment.</p>	<p>The ROPs meet this site selection requirement.</p>
<p>Buffer of 800m between piggery and major water supply storage</p>	<p>There are no major water supply storage areas within 800m of the subject land.</p>	<p>Proposed ROPs meet this site selection requirement.</p>
<p>Buffer of 100m between piggery and a defined water course</p>	<p>ROPs are set back at least 100m from water courses.</p>	<p>Proposed ROPs meet this site selection requirement.</p>

ITEM	APPLICATION	COMMENT
<p>Buffer of 100m to a public road carrying less than 50 vehicles per day.</p> <p>Buffer of 200m to a public road carrying more than 50 vehicles per day.</p>	<p>Hazzard Road carries less than 50 vehicles per day (Planning and Engineering Support, City of Albany pers comm.). The buffer to this road from proposed ROPs is 100m.</p> <p>Marbellup Road carries more than 50 vehicles per day. A buffer for proposed ROPs allows for a 200m setback.</p>	<p>ROPs will be sited to meet this site selection requirement.</p>
<p>Buffer of 750m to a town site.</p>	<p>The nearest townsite is King River which is 6km to the east.</p>	<p>Proposed ROPs meet this site selection requirement.</p>
<p>Buffer of 500m to a rural residential area.</p>	<p>There are no rural residential areas within 500m. The closest rural residential development is 2.2km to the south east in Willyung.</p>	<p>Proposed ROPs meet this site selection requirement.</p>
<p>Buffer of 250m to external rural dwelling</p>	<p>The nearest dwelling external to the operation is on Lot 1 Hazzard Road and is 100m south of Lot 5759 and 300m from the nearest proposed ROP.</p>	<p>Proposed ROPs meet this site selection requirement.</p>
<p>Buffer of 20m from a property boundary</p>	<p>All existing and proposed ROPs are at least 20m from the property boundary.</p>	<p>Proposed ROPs meet this site selection requirement.</p>
<p>Soils: Well drained soils with sufficient clay to retain nutrients</p>	<p>The ROP sites comprise sandy soils with a gravel and clay content.</p>	<p>The ROPs meet this site selection requirement.</p>
<p>Slopes: Gently sloping land</p>	<p>The site is gently sloping to allow for drainage but not so steep that erosion is likely to occur.</p>	<p>The ROPs meet this site selection requirement.</p>

1. INTRODUCTION

1.1 BACKGROUND

Mr Perry Cusack and Ms Kaylene Parker plan to establish a breeder ROP at Lots 5758 and 5759 Hazzard Road at the locality of Green Valley in the City of Albany ('subject land'; Figure 1).

The subject land is zoned 'Priority Agriculture' under the City of Albany LPS No. 1. Piggeries are defined as 'Animal Husbandry - Intensive' under the City of Albany Local Planning Scheme (LPS) No. 1, which is a discretionary ('D') use when the City of Albany grants planning approval (Table 2). The City of Albany requires applicants to demonstrate that the land use complies with the relevant standards and requirements and may be subject to conditions imposed by the Council in granting planning consent (Table 1). This EMP outlines how the operation will be managed to ensure that unacceptable impacts will not occur.

TABLE 2: PLANNING CONTEXT

<p>City of Albany LPS No. 1 – Zoning of Subject Land</p>	<p>Priority Agriculture Zone</p> <p>Definition:</p> <p>(a) Agricultural land resources that are considered to be of local, State and/or regional significance;</p> <p>(b) Provide for a diversity of sustainable intensive and extensive agriculture activities or rural industries that do not impact upon agricultural activities and protect those land uses from incompatible developments;</p> <p>(c) Manage in a sustainable manner the soil and water resources available in the zone;</p> <p>(d) 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; and</p> <p>(e) Provide for value-adding opportunities to agricultural and rural products on-site.</p>
<p>Land use definition- Albany LPS No. 1: Animal Husbandry - Intensive</p>	<p>Animal Husbandry – Intensive means premises used for keeping, rearing or fattening of pigs, poultry (for either egg or meat production), rabbits (for either meat or fur production) and other livestock in feedlots.</p>
<p>Requirements for Animal Husbandry - Intensive</p>	<p>Animal Husbandry – Intensive is a discretionary ('D') use and requires planning approval from the City of Albany.</p> <p>Albany LPS No. 1 states that applications need to consider and document:</p> <ul style="list-style-type: none"> • Land capability; • Site management; • Buffer separation for sensitive land uses; • Environmental and nutrient management in line

	with State Planning Policy 11 <i>Agriculture and Rural Land Use Planning</i> and Department of Water (2010) <i>Water Quality Protection Note 33</i> .
City of Albany LPS No. 1 – Surrounding Areas	Rural within 1km

1.2 APPLICANT DETAILS

Details relating to the subject land are summarised in Table 3.

TABLE 3: APPLICATION DETAILS

APPLICANT DETAILS	INFORMATION
Owner details	Benmore Grazing Company Contact: Perry Cusack and Kaylene Parker Mobile: 0427429790 Email: cusack.co@bigpond.com Postal Address: 3 Manly Crescent, Collingwood Heights WA 6330
Land details	Freehold; Lots 5758 and 5759 Hazzard Road, Green Valley in the City of Albany
Land area	Lot 5758 – 229.80ha; Lot 5759 – 229.75ha - Total 459.55

1.3 SCOPE OF WORKS

This document considers the existing environment of the subject land and requirements for ROPs according to national standards and environmental guidelines, state policies and Codes of Practice. Information gathered during desktop and field surveys in relation to the subject land is considered in relation to potential impacts of the ROP and this EMP outlines management strategies to ensure sustainable operation of the piggery.

Preparation of this document has included:

- A desktop review of existing information;
- Site inspection;
- Soil assessment and testing;
- Consideration of applicable standards, guidelines and policies;
- Liaison with the City of Albany; and
- Liaison with nearby landowners.

2. POLICIES AND PLANNING FRAMEWORK

The following standards, guidelines and policies apply to the operation and management of the ROP.

2.1 National Guidelines

2.1.1 National Environmental Guidelines for Rotational Outdoor Piggeries

The National Environmental Guidelines for Rotational Outdoor Piggeries (Tucker and O’Keefe, 2013) provides guidance with respect to the siting, buffers and operation of piggeries which are free range and operated on a rotational basis. This document provides a useful guide in the form of a planning principles checklist that is applicable to this development. The structure of this EMP is based on the National Environmental Guidelines for Piggeries Planning Principles. A copy of the Planning Principles checklist is included in Appendix A.

2.1.2 APIQ[✓]™ Standards Manual for Rotational Outdoor Piggeries

Australian Pork Limited has worked with key stakeholders to develop a Standards Manual for Rotational Piggeries (V3.2.3, 2012), referred to as the Australian Pork Industry Quality Assurance Program (APIQ[✓]™). The program aims to put into place documented procedures and methodologies to carry out key tasks to ensure that high quality pig products can be produced consistently and impacts on the environment and surrounding amenity are sustainably managed. A number of sections of the APIQ[✓]™ are relevant to the preparation of this EMP, and are included in Appendix A.

2.1.3 Fact Sheet, Design and Management of Outdoor Free Range Areas for Pigs

Australian Pork Limited (July 2011) has produced a fact sheet that summarises the desired site selection characteristics, buffer distances and nutrient management actions specifically for outdoor free range piggeries. This fact sheet provides a reference for the assessment of the suitability of the site for the development of a free range piggery, and independent verification of the proposed management practices. A copy of the fact sheet is included in Appendix B.

2.1.4 Model Code of Practice for the Welfare of Animals – Pigs (Revised)

The *Model Code of Practice for the Welfare of Animals – Pigs (Revised)* was prepared by the Animal Welfare Working Group (AWWG) within the Primary Industries Ministerial Council (PIMC) committee system in 2007. The document guides the care and management of pigs so that the basic needs of food, water, space, socialisation, accommodation/shelter and health care are of an adequate standard.

2.1.5 RSPCA – Approved Farming Scheme – Pigs

The RSPCA (2011) has developed standards for pig producers that ensure a high level of welfare for farmed pigs. Pig producers can apply to participate in the RSPCA Approved Farming Scheme and participation is granted if the farming system meets the RSPCA’s standards. Farmers on approved farms are allowed to label their produce with the RSPCA logo so that consumers can be assured that the pigs are kept according to the RSPCA’s welfare standards. These standards are higher than those recommended by the *Model Code of Practice for the Welfare of Animals: Pigs*. The standards are based on providing an adequate diet and water; freedom from discomfort, pain, injury or disease; ability to express normal behaviour and reduction of fear or distress. While these standards are not

mandatory, systems which are eligible for approval under the RSPCA Approved Farming System demonstrates that pigs are raised and handled to the highest standard.

2.2 Western Australia

2.2.1 Environmental Protection Act 1986

ROPs do not constitute a prescribed activity under the *Environmental Protection Act 1986* and therefore do not require a works approval or licence from the Department of Environment Regulation (DER).

2.2.2 Environmental Protection Authority Guidelines

The Western Australian Environmental Protection Authority (EPA) has prepared *Guidance for the Assessment of Environmental Factors – Separation Distances between Industrial and Sensitive Land Uses No. 3* (EPA 2005). The Guidance Statement is intended to provide advice on generic separation distances between specific industry and sensitive land uses to avoid or minimise the potential for land use conflict. The distances outlined are not intended to be absolute separation distances, rather they are a default distance for the purposes of:

- identifying the need for specific separation distance or buffer definition studies; and
- providing general guidance on separation distances in the absence of site specific technical studies.

The separation distances in EPA *Guidance Statement 3* (EPA, 2005) are intended to be used as a tool, supplemented by other appropriate techniques, to assist in the assessment of:

- new individual industries, infrastructure and estates, in the vicinity of existing/proposed sensitive land uses; and
- new individual sensitive land uses or estates, in the vicinity of existing/proposed industry and infrastructure.

The separation distances are also intended to provide assistance to strategic planning studies and processes.

Guidance Statement 3 (EPA 2005) states that extensive piggery (premises on which pigs are fed, watered and housed in outside paddocks or enclosures) may need a 1000m buffer to sensitive land uses (Table 4). Land uses considered by the guidelines to be potentially sensitive to emissions from industry and infrastructure include residential developments (not single rural dwellings), hospitals, hotels, motels, hostels, caravan parks, schools, nursing homes, child care facilities, shopping centres, playgrounds, and some public buildings. Some commercial, institutional and industrial land uses which require high levels of amenity or are sensitive to particular emissions may also be considered “sensitive land uses”. Examples include some retail outlets, offices and training centres, and some types of storage and manufacturing facilities.

The EPA Guidance statement refers to Department of Agriculture and Food (DAFWA) *Guidelines for New and Existing Piggeries* (Latto *et al.* 2000; Table 2 Page 10) which state that a buffer to isolated rural dwellings should be 300m.

There are no sensitive land uses within 1km of the proposed ROP. There is a single rural dwelling that will be 300m from the nearest ROP unit.

The national *Environmental Guidelines for Rotational Outdoor Piggeries* (Tucker and O’Keefe 2013) are based on extensive research and experience and have been adopted in New South Wales, Victoria and Queensland. Additional research has been done by the University of Queensland in support of the ROP Guidelines (Banhazi 2013) for noise, dust and odour. These guidelines, based on specific ROP research, have been chosen for indicative separation distances.

TABLE 4: EPA GUIDANCE STATEMENT NO. 3 FOR EXTENSIVE PIGGERIES

Industry	Description	DER Licence or Works Approval Required?	Key Government Agency for Advice	Code of Practice	Impacts	Buffer Distance to defined sensitive land uses
Piggery - Extensive	Premises on which pigs are fed, watered and housed in outside paddocks or enclosures	Not required	DAFWA, Department of Water, Local Government Authority	DAFWA Guidelines (Latto <i>et al.</i> 2000)	Dust and odour	1000m (Guidance defers to DAFWA buffer for isolated rural dwellings of 300m)

2.2.3 Statement of Planning Policy No 2.5 – Agricultural and Rural Land Use Planning

The objectives of this policy are to protect rural land from incompatible land uses by making land use decisions to support existing and future primary production and protection of priority agricultural land, particularly for the production of food. The policy supports regional development of rural enterprises, seeks to protect and improve environmental and landscape assets and minimise land use conflicts. The policy guides the preparation of planning schemes and other planning decisions.

2.2.4 Department of Agriculture and Food Western Australia – ‘Sensitive Sites’

Sensitive Sites Western Australia (WA) is a DAFWA service designed to help identify the location of sensitive agricultural production systems within the agricultural region of WA. This service aims to assist growers in preparing risk assessment and risk mitigation plans for their ongoing production activities and help protect sensitive agricultural production systems. There are no DAFWA listed ‘sensitive sites’ within 1km of proposed ROPs (DAFWA, 2014). The nearest site is Phillip Brook Winery on Redmond Hay River Road (5km west of the subject land) (DAFWA, 2014).

2.3 Local Government Authority

2.3.1 City of Albany – Local Planning Scheme No. 1

The City of Albany Local Planning Scheme (LPs) No. 1 defines extensive piggeries as a ‘Animal Husbandry - Intensive’. This type of land use is discretionary in ‘Priority Agriculture’ zones and subject to planning scheme consent by the City of Albany, subject to meeting the requirements of environmental guidelines and other applicable standards. Development for such a purpose requires approval by Council to ensure that siting, operations and management objectives can be met.

Council considers each application based on its merits and likely impacts to ensure that relevant factors are taken into consideration.

2.4 Other Policies

2.4.1 Plantagenet Pork Environmental Policy

Plantagenet Pork and the Benmore Grazing Trust are committed to protecting the environment by reducing environmental risks of operations. Therefore, the operators and owners voluntarily commit to the following:

1. Sustainable development – integrate environmental management into planning and decision making processes, to ensure sustainability and minimal impact on the environment.
2. Pollution prevention – Conduct operations in a manner that prevents pollution, conserves resources and proactively addresses past environmental contamination (where this is applicable).
3. Legal compliance – Ensure that operations comply with applicable environmental guidelines, regulations and requirements.
4. Employee involvement – Ensure environmentally responsible stewardship by employees through recycling, conserving resources, reducing waste and eliminating environmental risks in business operations.
5. Continual improvement – Regularly measure performance and practice continual improvement.
6. Training – Staff will be adequately trained in environmental management.

2.5 Additional Research

Research has been undertaken by the University of Queensland and National Centre for Engineering in Agriculture (Banhazi 2013) to determine the levels of odour dust and noise emitted from typical free range piggeries. The research project included the measurement of temperature, relative humidity, odour emission, dust concentrations and noise levels on representative free-range piggeries (including breeding ROP, breeding and grow out ROP and low density breeding ROP with 1,250m² per pig) in three different states (New South Wales, Victoria and Queensland).

Results indicate that odour emission rates measured on free-range pig farms were generally low and not affected by farm differences. While there was a significant difference demonstrated in dust concentrations between different farms, essentially on all farms very low dust concentrations were measured. Most peak dust concentrations were associated with tractor/machinery movements rather than pig activity. The results of this study also demonstrated that very low levels of noise were detected on all farms (study mean of 37 dB) and free-range piggeries on average are quieter places than traditional piggery sheds. Very few vocalisations by pigs were observed during farm visits. It was concluded that free-range piggeries would not be a major source of noise, odour and dust pollution.

3. SITE DESCRIPTION

3.1 LOCATION AND CURRENT LAND USE

The subject land comprises Lots 5758 and 5759 Hazzard Road and is situated in the locality of Green Valley, approximately 13.5km north-west of the Albany central business district in the City of Albany (Figure 1). The subject land is zoned 'Priority Agriculture' under the City of Albany LPS No 1 (Figure 2) and is currently used for cropping and grazing. Lot 5758 comprises 229.80ha and Lot 5759 comprises 229.75ha. The total area of the subject land is 459.55ha. Photographs of the subject land are included in Appendix C.

The southern boundary of the subject land is bordered by Hazzard Road, the northern boundary by Millbrook Road. The eastern and western boundaries are adjacent to private properties (Figures 3 and 4). Surrounding land to the west, north and east is zoned 'Priority Agriculture' and land to the south is zoned 'General Agriculture' (Figure 2) and is used for purposes including grazing, cropping, viticulture, commercial industries and blue gum plantations. The closest non-rural zoned land is 1.1km to the south west and is zoned for Water Corporation Waste Water Treatment Odour Buffer Special Control Area (Figure 2). Other zones include 'General Industry' 2.7km to the south west, 'Rural Residential' 2.2km to the south east and 'Special Use 6' 2.7km to the east. 'Special Use 6' area is at Lot 301 (Pt. Location 5756) Millbrook Road, Millbrook and the zone allows for holiday accommodation, a restaurant and private recreation.

There is an area of unallocated Crown land to the north east of the subject land. The closest Crown reserve is Millbrook Nature Reserve (Reserve 18739) which is 1.3km to the north.

One of the criteria for establishment of an outdoor pork production system is the availability of a sufficient area of land to operate a sustainable rotational system. The subject land provides a large area of land with sufficient buffers to accommodate the outdoor piggery system. A 120ha area has been identified as suitable as a ROP (Figure 5).

3.2 SURROUNDING LAND USES AND SENSITIVE RECEPTORS

The Albany Hinterland farming district extends around the Albany, Redmond and King River town sites. The main farming practices in the area have traditionally been sheep/cattle farming, cereal cropping and blue gum plantations. However, other farming enterprises have also been established, including intensive horticulture, specialty livestock (e.g. goats and alpacas), vineyards and tourism ventures. Land uses immediately adjacent to the subject land include livestock grazing, cropping and blue gum plantations.

In order to minimise the impact of a ROP on surrounding land users, Australian Pork Limited (Tucker and O'Keefe, 2013) have produced national buffer guidelines. Table 5 summarises the level of compliance with the buffer recommendations for the proposed development.

TABLE 5: BUFFER COMPLIANCE

DESIGN AND MANAGEMENT OF OUTDOOR FREE RANGE AREAS FOR PIGS (APL, 2011)		
SITE SELECTION FACTORS:	RECOMMENDATION	
Buffer of 800m between piggery and major water supply storage	There are no major water supply storage areas within 800m of the subject land.	Proposed ROPs meet this site selection requirement.
Buffer of 100m between piggery and a defined water course	ROP units are set back at least 100m from the King River and its flood plain.	Proposed ROP meets this site selection requirement.
Buffer of 100m to a public road carrying less than 50 vehicles per day. Buffer of 200m to a public road carrying more than 50 vehicles per day.	Hazzard Road carries less than 50 vehicles per day (Planning and Engineering Support, City of Albany pers comm.). The buffer to this road from proposed ROPs is 100m. Marbellup Road carries more than 50 vehicles per day. A buffer for proposed ROPs allows for a 200m setback.	Proposed ROP meets this site selection requirement.
Buffer of 750m to a town site.	King River townsite is 6km to the south east Redmond townsite is 11.5km to the west.	Proposed ROP meet this site selection requirement.
Buffer of 500m to a rural residential area.	There are no rural residential areas within 500m. The closest type of rural residential development is 2.2km to the south east in Millbrook.	Proposed ROP meet this site selection requirement.
Buffer of 250m to external rural dwelling	The nearest dwelling external to the subject land is 100m south on Lot 1 Hazzard Road and 300m from the nearest proposed ROP unit.	Proposed ROP meets this site selection requirement.
Buffer of 20m from a property boundary	All existing and proposed ROPs are at least 20m from the property boundaries.	Proposed ROP meets this site selection requirement.

There are 5 rural dwellings/sheds and/or sensitive receptors located within 1km of the proposed ROP as shown in Figure 3. The closest residence/sensitive receptor to any of the proposed ROP units is approximately 100m from the southern boundary of Lot 5759 (300m from the closest ROP unit) at Lot 1 Hazzard Road. The next closest dwelling is 660m east of the property boundary and 680m from the nearest proposed ROP at Lot 10 Hazzard Road. Both distances exceed the 250m buffer recommended for isolated rural dwellings.

3.3 CLIMATE

Albany, located on the south coast of Western Australia (WA), has a Mediterranean climate characterised by generally warm summers and cool, wet winters. The average annual temperature and rainfall information for the Albany airport (approximately 3km south of the subject land) is presented in Plate 1, below (BOM, 2014).

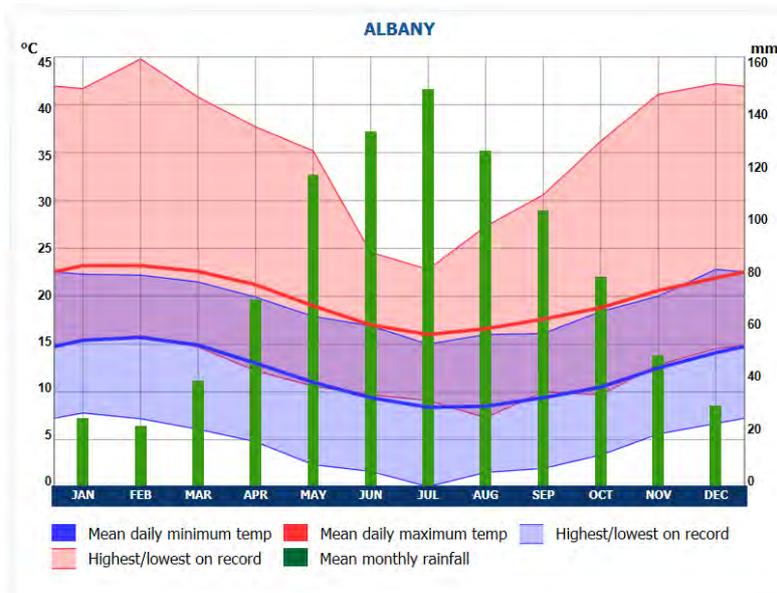
Albany has a significant number of cool cloudy days with drizzle or showers. As summarised by the Bureau of Meteorology (BOM, 2014):

The Southern Ocean is a major factor influencing Albany’s climate. The Southern Ocean imparts a moderating influence on Albany through sea breezes in the warmer months and through the effects of a relatively mild and moist air mass at any time of the year. Seasonal variations are mainly due to the north-south movement of sub-tropical ridge. An easterly broad scale flow prevails in summer when the ridge is south of the State. However, the movement of high pressure cells from west to east along this ridge brings a commonly repeated pattern of wind changes to South Coast locations.

Albany’s south coast aspect means that the progression of winds from east through north, west, south and returning to east over periods of several days to a week or more during summer can bring a large variation in weather from fine and mild, to hot with thundery showers, to cool and cloudy with drizzle. When the ridge moves north in the cooler months, the moisture-laden westerly winds south of the ridge deliver much of Albany’s annual rainfall. Atmospheric disturbances embedded in the westerly winds are common in the winter months with the potential for several cold fronts passing through southwest WA in a week.

The climate in the region is conducive to the establishment of a ROP as extremes of heat and cold are generally not experienced.

PLATE 1: ALBANY ANNUAL AVERAGE TEMPERATURES AND RAINFALL



Source: BOM (2014) <http://www.weatherzone.com.au/climate/station.jsp?lt=site&lc=9500>

3.3.1 Rainfall

The closest rainfall measurement station to the subject land is Albany Airport which is 3km to the south (Bureau of Meteorology (BOM) site number 009999; Plate 1). Albany's long-term median annual rainfall is approximately 940 mm although there can be considerable variation in the total rainfall from year to year (BOM, 2014). On average, approximately 43% of the annual rainfall occurs in winter between June and August. Although cold fronts are responsible for much of the recorded rainfall total, a moist onshore flow can occur in any season and bring showers or drizzle. Albany records rainfall on 175 days annually. July is the wettest month, with a long-term average of over 148mm. The driest month is January with a mean of 22.8mm. Like other parts of south-west WA, winter rainfall has decreased in the region during the latter half of the twentieth century, which is thought to be due to natural variability and climate change. There has been a 6-8% decline since 1975 (to approximately 865mm) (Gunby, 2014) and 13.2% decline when comparing 2000 – 2006 rainfall data with the long term average (816mm; Gunby, 2014).

Ideal rainfall for a ROP is considered to be 750mm per year or less. However, site conditions and management plays a more important part in overall conditions (e.g. adequate soil drainage). Rainfall levels in the area are conducive for minimising dust as consistent rain will prevent the ROPs from becoming too dry.

3.3.2 Temperature

The closest temperature measurement station to the subject land is Albany Airport which is 3km south of the subject land (BOM site number 009999; Plate 1). Average maximum temperatures peak in January and February in Albany, with monthly means of 23.2°C although considerably hotter temperatures (above 35°C) can occur when hot, dry northerly winds blow from inland. Overnight average minima peak in February at 15.7°C. Winter daily maximum temperatures drop to around 8.4°C in July (Plate 1). Temperatures in the area are conducive to the establishment of a ROP as extremes are generally not experienced or do not occur for extended periods of time.

Site selection for outdoor pork production systems (Australian Pork Limited, 2011) identifies that a mean maximum January temperature of less than 28°C and a mean minimum July temperature exceeding 3°C is desirable. The subject land meets these climate requirements with a mean maximum January temperature of 23.2°C and a mean minimum July temperature of 8.4°C.

3.3.3 Prevailing Winds

Wind speed and direction can be significant factors in the dispersal and transmission of odours from intensive rural industries. However, odours are usually associated with intensive operations such as indoor shedded piggeries and poultry farms. Experience has shown that the extensive nature of ROPs are not likely to cause odour issues, especially when adequate buffers to sensitive environments are in place. Research supporting this has been carried out by the University of Southern Queensland and National Centre for Engineering in Agriculture (Banhazi 2013; Section 2.5). In the unlikely event that the ROP activities do generate odours, an analysis of wind speed and direction factors has been undertaken as follows.

The nearest weather station to the subject land that records wind direction and speed data is the Albany Airport, which is 3km to the south of the subject land (BOM, 2008).

The Albany Airport experiences a varied wind climate with a bias toward an easterly wind component in summer and a westerly component in winter. On average, the windiest part of the day during

winter is the morning and in summer is the afternoon. Spring and summer afternoon sea breezes are regularly experienced from directions from the southwest through to the east. However, sea breezes from the south-east or east are most common. Summer sea breezes are frequently quite fresh and sometimes reach 25 knots (46 km/h) or more. Late autumn, winter and early spring see regular north-westerly morning winds due to a combination of the sub-tropical ridge being located to the north, with a high centre over the continent, and a land-breeze effect. Cold fronts with winter westerly winds regularly occur during this period and may bring strong to gale force winds.

The wind data for different times of the day, based on the Albany Airport weather information from the Western Australia Bureau of Meteorology, is described below (Table 6) and shown in Appendix D.

TABLE 6: PREVAILING WIND DIRECTIONS DURING DAYTIME FOR THE ALBANY AIRPORT

SEASON	PREVAILING WIND		DETAILS
	9am (% of time)	3pm (% of time)	
Summer (January)	Easterly (24%)	South-easterly (31%)	<p>In Summer mornings, calm conditions occur 6% of the time and the wind blows in an easterly direction 24% of the time (2% at 1-10km/h, 7% at 10-20km/h). Wind blows from the south east 13% of the time (2% at 1-10km/h, 4.5% at 10-20 km/h). Southerly winds blow 12% of the time (2% at 0-10km/h and 6.3% at 10-20km/h). South westerly winds blow 14% of the time (3% at 1-10km/h and 5% at 10-20km/h).</p> <p>The most prevalent wind in the afternoon (blowing 31% of the time) is from the south east (3% at 10-20km/h and 17% at 20-30km/h). Winds from the south occur 22% of the time (7.5% at 10-20km/h and 11% at 20-30km/h). South west winds occur 22% of the time (3% of 10-20km/h and 12.5% of 20-30km/h). There are rarely calm conditions at this time of the day in Summer.</p>
Autumn (April)	North-westerly (20%)	South-westerly (15%) to South-easterly (19%)	<p>In Autumn, mornings are calm for 17% of the time. Wind is most prevalent from the north west at 20% of the time (5% at 0-10km/h and 8% at 10-20km/h). Winds from the south west (4.5%), south (5%) and south east (4%) are relatively infrequent.</p> <p>Autumn afternoons have 4% time calm, with the most prevalent wind direction being south easterly 19% (2% at 0-10km/h and 7.5% at 10-20km/hr). Winds from the south occur 15% of the time (2% at 0-10km/h and 9% at 10-20km/h).</p>
Winter (July)	North-westerly	Westerly (27%) to North-	<p>Winter mornings are calm for 13% of the time. The most prevalent wind is from the north west</p>

SEASON	PREVAILING WIND		DETAILS
	9am (% of time)	3pm (% of time)	
	(37%)	westerly (24%)	for 37% and north for 23% of the time. Winds from the south west (6%), south (2.5%) and south east (1%) occur relatively infrequently. Winter afternoons have calm conditions 5% of the time with predominant winds coming from a westerly (27%) and north westerly (24%) direction. Winds from the south west occur 18% (2% 0-10km/h and 3% 10-20km/h). Winds from the south (5%) and south east (3%) occur infrequently.
Spring (October)	Westerly (22%)	South-west (25%), West (18%) to South-easterly (15%)	Spring mornings are calm for 8% of the time. The most prevalent winds are from the west (22%). Winds from the south west occur 12% of the time (1.5% 0-10km/h and 4% 10-20km/h). Winds from the south and south east occur less commonly (7%). Spring afternoons are calm 1% of the time. The most prevalent winds are from the south west 22% of the time (0.9% at 0-10km/h and 9% at 10-20km/h). Winds from the west and the south occur 18% of the time (2% at 0-10km/h and 10% at 10-20km/h). Winds from the south east occur 15.5% of the time (1% at 0-10km/h and 4% at 10-20km/h).

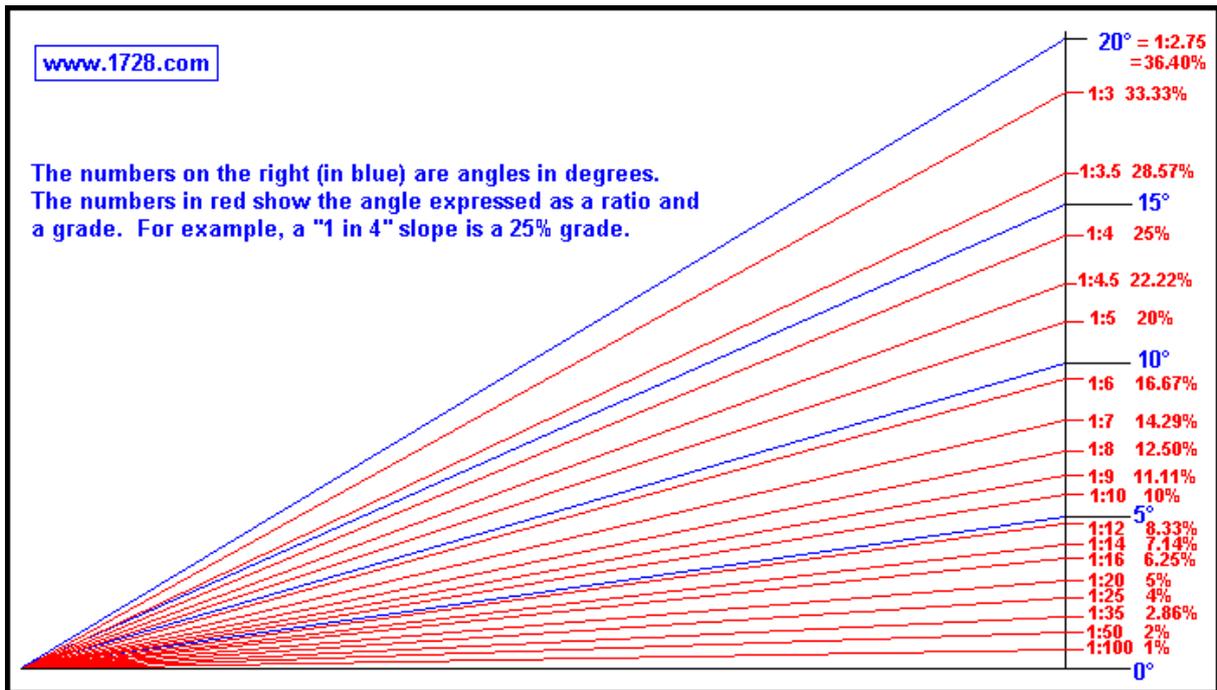
Bureau of Meteorology, 2008. Percentages based on the number of days that wind direction was recorded over the total number of observation days at the Albany Bureau of Meteorology Station between 1965 and 2004.

Should odours be generated by the ROP, they would be unlikely to impact surrounding residences due to the appropriate buffer distances that are in place at the site, and also as winds from the south east, south and south west sectors are typically strong, blowing more than 20km/h. High velocity winds would have the effect of dissipating any odours through mixing within the air stream. Light winds from the south-west, south and south-east, which would have a greater capacity to transport odours offsite, occur less than 5 % of the time in autumn and spring and less than 10 % of the time in summer. As a result, there is a low risk of odour from the ROP impacting on surrounding residences.

3.4 TOPOGRAPHY AND SLOPES

Environmental Guidelines for Rotational Outdoor Piggeries (Tucker and O’Keefe, 2013) state that optimal slopes for ROP compartments is between 2 - 6% (1 in 50 to 1 in 16 and 1.1° to 3.4°; Plate 2). These slopes assist in optimising drainage without promoting erosion. Ideal slopes depend on soil type, land use, vegetative cover, rainfall intensity, agronomic practices and soil conservation methods.

PLATE 2: SLOPES



Source: 1728 (2013)

The subject land comprises a gently undulating plateau adjacent to a valley which contains the King River. The land slopes from Hazzard Road where the height is 70m Australian Height Datum (AHD) down to the north (40m AHD) where the King River flows through a central valley. From the King River, the land slopes up to the north, to a maximum height of 70m AHD adjacent to Millbrook Road. A broad valley runs from west to east through the middle of the property with the lowest point at 35m AHD adjacent to the western boundary.

The proposed ROP units will be located on elevated and relatively flat portions of the property with maximum slopes as shown in Table 7.

TABLE 7: MAXIMUM SLOPE OF EXISTING AND PROPOSED ROP COMPARTMENTS

ROP COMPARTMENT	RATIO OF RISE TO RUN	ANGLE (DEGREES)	GRADE (%)
Area 1	1:30	1.9°	3.3%
Area 2	1:34	1.7°	2.9%
Area 3	1:35	1.6°	2.9%
Area 4	1:36	1.5°	2.7%

As shown in Table 7, the slopes for all the ROP units meet the recommended environmental guidelines (Tucker and O’Keefe, 2013) of a grade between 2% to 6%.

In order to reduce the risk of erosion from pig production areas, interceptor and rollover drains with detention basins will be positioned along the downstream sides of all active pig areas. Where possible, these area will also incorporate a vegetated filter strip (kikuyu and/or trees). This will ensure that any surface flow is slowed and sediment is captured before potentially leaving the dedicated ROP unit areas. Temporary structures such as silt traps may also be used, when erosion is noted from site inspections.

3.5 GEOLOGY, LANDFORM AND SOILS

Geology, landform and soil types found on the subject land are listed in Table 8 and shown in Figure 4. Of the five major soil types which occur on the subject land, the soil units which are associated with the ROP compartments comprises:

- 242KgDMc - which is part of the Dempster Crest Phase and comprises sands and laterite on elongate crests; and
- 242KgV8h – which is a Major Valley 8h Phase and comprises broad, shallow, gently sloping valleys and alcoves. Deep sands and gravelly sands on slopes.

TABLE 8: SOIL UNITS, LANDFORM AND GEOLOGY ASSOCIATED WITH ROP

SOIL UNIT	SUMMARY DESCRIPTION	LANDFORM	GEOLOGY	SOIL	LOCATION AND SUITABILITY
242KgDMc - Dempster crest Phase	Sands and laterite on elongate crests; Typical vegetation: Jarrah-Albany Blackbutt-Marri forest.	Broad convex crests of sandy and lateritic spurs and ridges.	deeply weathered siltstone	Duplex sandy gravels, Grey deep sandy duplexes, Pale deep sands and Shallow gravels.	Occurs where ROP compartments are proposed.
252kgV8h - Major Valleys 8h Phase	Broad, shallow, gently sloping valleys and alcoves. Deep sands and gravelly sands on slopes; Typical vegetation: Jarrah-Sheoak low forest. Humus podzols on floors; Typical vegetation: Kangaroo Grass sedgeland, Paperbark woodland.				Occurs where ROP compartments are proposed.
242KgS7h - Minor Valleys S7 slope Phase	Broad valleys in sedimentary rocks; 30 m relief; smooth slopes. Deep sands and iron podzols on slopes; Typical vegetation: Albany Blackbutt-jarrah-sheoak woodland.	Sideslopes of minor valleys.	colluvium sedimentary rocks.	Pale deep and Grey deep sandy duplexes.	Occurs in the northern portion of Lot 7589 and is not associated with ROP.

	Podzols and yellow duplex soils on floors; paperbark woodland, teatree heath.				
242KgS7f - Minor Valleys S7 floor Phase	Footslopes and swampy valley floors of minor valleys		colluvial and alluvial deposits over weathered sedimentary rocks	Wet and Semi-wet soils, Pale deep sands and Grey deep sandy duplexes	Occurs in the northern portion of Lot 7589 and is not associated with ROP.
242KgV8t - Major Valleys 8 terrace Phase	Terraces				Associated with the King River and its flood plain. Downhill of the ROP.

Source: Department of Agriculture and Food (2013); Green Skills, 2008; Geological Survey of Western Australia, 1984; Churchward *et al.* (1988).

3.5.1 Soil Profile

General soil profiles were determined by Aurora Environmental personnel through excavation of trenches on site (Figure 4; 1 July 2014). Soil logs are included in Appendix E. The general profile for each soil type is:

242KgDMc - Dempster Crest Phase (Sample Site BGT- T1)

- 0 – 15cm BGL: Grey sand with organic matter and root zone; pea gravel;
- 215 – 35cm BGL: Grey sand with lateritic gravel;
- 35 – 110cm BGL: Transition to gravelly sand (light brown to orange) with laterite gravel rocks and boulders; and
- 110 - 160cm BGL: Transition to clayey sand with gravel.

252kgV8h - Major Valleys 8h Phase (Sample Site BGT – T2)

- 0 – 15cm BGL: Grey sand fine grained with organic matter and root zone;
- 15 – 160cm BGL: Light brown fine grained sand with lateritic gravel, rocks and boulders; and
- 1.6 – 190cm BGL: Transitioning to poorly consolidated siltstone with refusal at 160cm.

242KgV8t - Major Valleys 8 terrace Phase (Sample Site BGT – T3)

- 0 – 40cm BGL: Grey to dark grey fine sand with pea gravel, organic matter and root zone. ;
- 40 – 50cm BGL: Light grey sand with lateritic gravel. Refusal at 50cm due to cemented lateritic pavement.
- Auguring indicated that beneath lateritic pavement, there was white clayey sand to 310cm BGL.

3.5.2 Soil Testing

Soil testing has been undertaken by the landowners on Lot 5759 (May 2014) for the parameters shown in Table 9 at locations illustrated in Figure 4. Results are also included in Appendix F. Soil samples comprised composite collected from top 10cm of profile. It should be noted that the subject land has a history of low fertiliser and liming application. This is reflected in the relatively high acidity (pH) and low phosphorus, potassium (K) and sulfur (S).

TABLE 9: SOIL SAMPLING RESULTS

Parameter	Site 1:West	Site 1: East	Site 1: North	Site 2	Site 3	Flats
pH (1:5 soil CaCl ₂)	3.7	3.9	3.8	3.6	4.4	4.2
pH (1:5 soil/water)	4.8	5.0	4.7	4.5	5.7	5.2
pH levels are low and a program of liming is proposed to be implemented to bring the pH as close as possible to the optimum level of around 5.5. This will benefit the cropping phase performance.						
Electrical conductivity (EC) (1:5) dS/m	0.039	0.041	0.048	0.368	0.049	0.177
The EC samples indicate that the property does not have high salt levels						
Organic Carbon (W&B) %	2.86	2.75	3.54	4.89	3.12	4.05
Organic carbon levels are good, indicating that the soil structure is likely to be good and plant nutrient uptake is likely to be facilitated.						
Total Nitrogen (based on NO ₃ – N and NH ₄ -N)	Soil nitrogen levels are ‘High’ which indicates that there is sufficient N (e.g. from clovers and livestock manure) to support crops and pasture.					
Nitrate Nitrogen NO ₃ -N	12.2	12.2	15.0	3.1	9.3	2.1
Ammonia Nitrogen NH ₄ -N	13.3	8.7	13.2	22.0	4.4	33.6
Phosphorus – P (Colwell) mg/kg	12 Low	22 Low	21 Low	10 Low	13 Low	38 Low
Phosphorus levels are currently low (too low to support cropping and pasture for commercial purposes)						
Phosphorus Buffering Index PBI+CoIP	14 Low	34 Low	25 Low	3 Low	8 Low	114 High
PBI within 10cm of ground surface indicates a low ability to sorb phosphorus (except for ‘Flats’ which has a high ability. Subsurface testing is discussed in Section 3.5.3.						
Potassium – K mg/kg	50 Low	95 Marginal	58 Low	107 Marginal	154 Sufficient	93 Marginal
Sulfur – S mg/kg	4 Low	4 Low	4 Low	13 Sufficient	3 Low	21 High

Source: CSBP Laboratories. Interpretation based on suitability for cropping and pasture production.

3.5.3 Phosphorus Buffering Index (PBI)

Phosphorus Buffering Index (PBI) provides an indication of the ability of the soil to sorb phosphorus. Levels above 100 (DoW 2008), generally indicate a high ability to sorb phosphorus that has been applied to the soil. PBI results are described in Table 9 for topsoil (10cm BGL) and Table 10 for subsoil. Subsoil samples comprised a composite soil sample from 10 – 60cm BGL(1 July 2014; See

Appendix G). Soil in the top 10cm of the soil profile of the site has an inherently low ability to sorb phosphorus. The subsoil tests for PBI indicate that phosphorus sorbing ability increases at depth (20 to 60cm) due to the inherent nature of clayey sand to sorb phosphorus. The sorbing ability of the soils will also increase with liming and a build-up of organic matter.

PBI testing will also be undertaken as part of the APIQ[✓]™ accreditation system as described in Sections 2.1.2 and 5.11.

TABLE 10: PBI RESULTS – SUBSOIL

SITE (FIGURE 4)	PBI VALUE
BGT/T1 10-60CM	73.2
BGT/T2 10-60CM	47.6
BGT/T3 10-60CM	198.9
BGT/4 20-25CM	19.1
BGT/5 20-25CM	477.2

See Appendix G for laboratory report.

3.5.4 Permeability

Soil permeability is a measure of the rate at which water flows through a soil profile and is important in determining land capability as it provides an indication of whether rain and other water will infiltrate readily into the soil, or if it will potentially cause ponding and/or surface runoff.

Infiltration tests were undertaken at two test holes excavated at the site to determine the general permeability of the soil types where the ROP is proposed to be located (Figure 4). A CL26100 well permeameter which is designed to meet the requirements set out in AS/NZS 1547:2012 (Standards Australia, 2012) was used for the investigation. This method is a constant head test, whereby water that infiltrates an unlined test hole is replenished at the same rate from a reservoir, keeping the level of water in the hole constant (i.e. constant head). Field records are taken to measure the loss of water from the reservoir over time, which are then used to calculate the coefficient of permeability (K_{SAT}) for the particular soil profile. The 0.5m deep test holes were created using a hand auger at each location. The permeability calculations, based on field measurements are detailed in Appendix H. The K_{SAT} results and interpreted soil categories are summarised in Table 11.

TABLE 11: CALCULATED K_{SAT} VALUES AND DRAINAGE CLASSIFICATION

LOCATION	K_{SAT} (M/DAY)	SOIL CATEGORY*	SOIL TYPE	SOIL TEXTURE/UNIT	PERMEABILITY
BGT-01	0.68	3	Weakly structured or massive	Loams (with gravel)	Low permeability
BGT-02	1.35	3	Weakly structured or massive	Loams (with gravel)	Low permeability

* Soil Category as per AS 1547:2012.

Based on infiltration testing results, calculated K_{SAT} values range from 0.68m/day to 1.35m/day which equates to 'low permeability'. Based on field observations and permeability, the soils at the site fall into category 3, a loam with low permeability (Standards Australia, 2012). This permeability rating is

considered to be adequate for the ROP as it is high enough to allow adequate drainage to prevent ponding of water on the surface.

3.6 SURFACE AND GROUNDWATER

The subject land is located within the catchment of Oyster Harbour which is 12km to the south east. Oyster Harbour is an estuarine system with significant environmental, social and economic value to the region. The upper reaches of Phillips Brook and Twelve Mile Brook join to form the King River which flows through the property and is associated with a flood plain (Figure 4).

Environmental Guidelines for Rotational Outdoor Piggeries (Tucker and O'Keefe, 2013) recommends that ROPs are located at least 100m from a defined water course. ROP areas have been set back a minimum of 100m from the defined water course (Figure 5). In addition, ROP units will be set back at least 50m from the floodplain (Figure 5).

The subject land contains 4 dams that are associated with ROP units (Figure 4). These dams will be used to store and supply water for the piggery operation (drinking water and water for wallows). Supplementary water will be sourced from two bores (Figures 4 and 5) and pumped to dams or dedicated tanks for distribution to the ROP units.

Groundwater in the Albany area has been characterised by Geological Survey of Western Australia (Smith 1997) and the subject land is described as follows:

- Aquifer characteristics: Sedimentary aquifer with intergranular porosity – extensive aquifers, major groundwater resources.
- Hydrology: Plantagenet Group- siltstones, spongolite, minor sandstone, peat and conglomerate; minor to major aquifers; fresh to saline.
- The water table contour is generally at 40mAHD for the subject land (which coincides with the floodplain area). Site investigations indicate that a vertical separation of at least 3m to groundwater (and most likely significantly more than this) will be achievable above the 45mAHD contour.

Aurora Environmental installed two piezometers on site at BGT02 and BGT03 (Figure 4). Both piezometers were drilled to 3.1m BGL.

- BGT02 was installed at approximately 58mAHD and remained dry when tested on 17 July 2014.
- BGT03 was installed at approximately 40mAHD and experienced a standing water level of 0.5m BGL on 17 July 2014 (approximately 39.5mAHD). The groundwater level is consistent with regional records (Smith 1997).

The groundwater levels in the production bores on the subject land were measured on 17 July 2014:

- Bore on Lot 5758 (Solar Bore; Figure 4): Groundwater at 6.7m BGL. Approximate elevation of bore is 45mAHD so groundwater is at approximately 38.3mAHD.
- Bore on Lot 5759 (Figure 4): Groundwater at 0.46m BGL. Approximate elevation of bore is 40mAHD so groundwater is at approximately 38.5mAHD.

It is considered that if ROP units are kept above the 45mAHD contour and other drainage management is implemented as described in Section 5.5, that impacts on groundwater and water courses can be adequately managed.

The subject land is not in a surface or groundwater protection area and licenses are not required for the use of water for stock purposes.

3.7 WETLANDS

The King River and its associated floodplain is part of the King River Wetland Suite and comprises a dispersed and fragmented floodplain system (Department of Water; DoW 2007; Frodsham 2008; Landgate 2014). The wetland system comprises relatively fresh water (including groundwater) due to relatively high rainfall in the catchment (Frodsham 2008). Historic agricultural use has resulted in clearing of much of the system for grazing and cropping.

There are no RAMSAR Sites (i.e. areas covered by the Convention on Wetlands of International Importance) within 5km of the subject land (Landgate, 2014).

3.8 VEGETATION

Most of the southern portion of the subject land, where the ROP is proposed, has historically been cleared of native vegetation for the establishment of agricultural pursuits. Pockets of native vegetation have been retained as shown in Figure 4.

Historical mapping for vegetation in the Albany and Mount Barker region (Beard 1979) describes upland vegetation associated with the property as a eucalypt and sheoak low forest with *Eucalyptus marginata* (jarrah) and *E. staeri* (Albany blackbutt). The flood plain, although mostly cleared would originally have contained sedges, reeds and heath shrubs. Remaining vegetation associated with the ROP is in a degraded condition due to long term grazing of livestock and weed invasion.

No native vegetation is proposed to be cleared for the establishment of the ROP. It is considered unlikely that vegetation on or off the property will be impacted by the ROP.

4. DESCRIPTION OF PROPOSED OPERATION

4.1 ROTATIONAL OUTDOOR PIGGERY - BREEDING

Benmore Grazing Trust proposes to operate a free range piggery which breeds pigs using a rotational outdoor system. ROPs are set up so pigs can be raised outdoors with shelter from the elements. The operation consists of outdoor paddocks which allow for rooting and foraging areas and huts with bedding for shelter. The huts allow the pigs to shelter from environmental extremes and provide protection for piglets when they are very young. Shelters or sheds with verandas or small pens are not considered free range as they do not comply with the standards set by *National Environmental Guidelines for Piggeries* (Tucker and O'Keefe 2013).

Free range systems such as this provide enough space for the land to assimilate nutrients which are generated through pig manure, as long as suitable soil types and slopes are chosen, stocking rates are consistent with recommendations and rotations move on a two year basis (Tucker and O'Keefe 2013). Also, outdoor operations reduce the level of odour build up (in comparison to shed based piggeries).

4.1.1 Rotation

There is approximately 135.5ha of land that meets all the buffer and physical environment criteria (Figure 4). This area will allow for more than four rotations to be established on the subject land (Figure 4). Rotating the ROP units will be undertaken on a minimum two year cycle, to allow pasture and/or crops to regenerate, assimilate nutrients and reduce the risk of land degradation and disease.

4.1.2 Fencing and Water Supply

Pigs are contained and protected from predators such as foxes by providing shelters and using secure fencing and electrification, where necessary (Plate 3). Other pest control methods are also used to reduce risk (e.g. from foxes).

Water for drinking and wallows will be provided from two bores located on the subject land and will be held in dams and tanks. A six hundred sow and 35 boar operation is estimated to use 10 – 11m³ of water a day in winter and 20 to 30m³ in summer. Water is provided to the pens via pipe work that sits on the surface of the ground at the perimeter fence, which allows it to be moved between rotations for cropping and pasture. Wallows provided in each pen during summer and autumn will help to prevent sunburn and control pests (Plate 4).

PLATE 3: INTERNAL ELECTRIC FENCING AND WATER SUPPLY PIPE



PLATE 4: WALLOW



Note: This photo illustrates an example setup and is not the style of farrowing shelter which will be used for this proposal.

4.1.3 Density of Pigs

Densities of pigs are guided by the Code of Practice for Animal Welfare – Pigs (AWWG, 2007) and the RSPCA Approved Farming Scheme Standards for Pigs (RSPCA, 2010) and are outlined in Table 12. Operations at the proposed ROP will have a maximum stocking rate of 24 sows and boars per hectare

which complies with the RSPCA limit. Through all phases of the pig cycle, the stocking rate will be compliant or at a lower density than relevant guidelines.

TABLE 12: ROTATIONAL OUTDOOR PIGGERY DENSITIES

AGE/ SEX	SPACE ALLOWANCE – CODE OF PRACTICE	SPACE ALLOWANCE – RSPCA
Dry sows	20 – 25 sows per ha	-
Lactating sows with piglets	9 – 14 sows per ha	-
Sows kept in groups	300 – 400 m ² per sow (25 - 33 sows per ha)	-
Boars, lactating sows and gestating gilts/sows	-	30 adult pigs per ha

Source: Code of Practice (AWWG, 2007); RSPCA Approved Farming Scheme Standards for Pigs (RSPCA, 2011).

4.1.4 Rotational Outdoor Piggery Units

Each ROP unit comprises four elements, including:

1. Training pens where boars and gilts are introduced to an electric fence system where the fence is reinforced with ring lock.
2. Mating and artificial insemination area (Plate 5).
3. Gestational radial area (Plate 6).
4. Farrowing radial area (Plate 7).

Radial pens are designed to make it as easy as possible to move pigs between different areas. A single lane extends from the middle of the radial system to allow pigs to be handled at a central point. The flow of pigs through the ROP is shown in Plate 8. Each ROP unit comprises approximately 26ha to allow for required densities and associated access ways.

PLATE 5: MATING / ARTIFICIAL INSEMINATION AREA



PLATE 6: GESTATION RADIAL



PLATE 7: FARROWING RADIAL



PLATE 8: FLOW CHART FOR PIG MOVEMENT IN ROP



4.2 INFRASTRUCTURE AND OTHER FEATURES

Infrastructure and other features associated with the operation of the ROP includes:

- Silo/s for food storage;
- Site office; and
- Storage area for straw for bedding.

These structures and materials will be placed close to Hazzard Road for ease of access (Figure 4).

4.3 OPERATIONS

The processes and operations for pig breeding, rearing and transport will be in line with the Model Code of Practice for the Welfare of Animals – Pigs (Revised) (AWWG, 2007) and RSPCA Approved Farming Scheme Standards for Pigs (RSPCA, 2011). Plantagenet Pork has an operation manual that guides day to day activities and the cycles of pig management.

- Feed for the pigs will be transported to the site every three weeks using a B double truck. Food for the pigs comprises pellets which will be stored in silos. Feed is blown into the pens from the perimeter to ensure it is distributed widely to allow the pigs to forage, reduce competition and assist in the even distribution of nutrients.
- Straw will be grown on the subject land or imported periodically. Straw will be kept at a single location per ROP unit (Figure 4) to reduce fire risk. Straw is used for bedding in communal and farrowing shelters.
- Gilts will be brought onto the property every month in a semi-trailer. Sows which are surplus to requirements will be transported from site periodically.
- Weaners are transported from the site weekly using a small rigid truck.
- Shelters (communal and farrowing) are moved periodically within the ROP unit paddock to allow for straw bedding to be dispersed.
- Fuel will be stored in the main farm outbuilding area, separate to pig operations.

4.4 BIOSECURITY

Australian agriculture is free from many of the more devastating diseases that exist in other countries around the world. The introduction of exotic diseases and those that already occur in Australia could have a large impact on the livestock industry, including pig production. Adequate biosecurity is required on a pig farm to maintain sanitation, disease control and vermin management and is integral to the health of the pigs and quality of the product. This means that access to the ROP needs to be limited to authorised personnel with a high standard of hygiene at all times.

The Benmore Grazing Trust will ensure that effective contingency plans are in place and that staff are adequately trained to respond to disease risk and other emergency situations. The Australian Veterinary Emergency Plan (AUSVETPLAN; Animal Health Australia, 2001) is a coordinated national response for the control and eradication of high impact animal diseases. In addition, APL and

affiliated operators are party to the Animal Health Australia Cost Sharing Deed of Agreement on Emergency Animal Disease Response (EADR; Animal Health Australia, 2001).

The Benmore Grazing Trust will implement the following:

- Signage to inform visitors they cannot enter the ROP area without permission as per Plate 9.
- Visiting vehicles will not be permitted to drive over alleyways used to walk pigs from pen to pen. Visiting vehicles, including trucks that visit other pig properties are only allowed access to a quarantined area.
- Visitors must not have come into contact with pigs in the 24 hours prior to visiting the ROP. This includes contact with pigs at agricultural shows, farm stays, transport vehicles, abattoirs and pig processing. Exemptions may apply if the pig contact is within the Plantagenet Pork production group and visitation is approved by the Livestock Manger or the consultant veterinarian;
- Visitors must not be experiencing any cold or flu like symptoms;
- Visitors must not have been on an aircraft in the preceding 72 hours;
- Visitors must sign the visitors book and provide relevant details;
- Visitors must wear the protective clothing and footwear provided; and
- Visitors must not feed food scraps to the pigs.

PLATE 9: SIGNAGE AT ENTRY TO ROP



There is a ban on feeding restricted animal material to ruminants to reduce the risk of introduction of Bovine Spongiform Encephalitis (BSE). Pig bedding may contain restricted animal material including tissue and feed. The Pest and Disease Information Service at DAFWA has advised that ruminants can be grazed on pig bedding in the following circumstances:

- Where litter has been incorporated into the soil or spread thinly; and
- Regrowth of pasture has occurred; and

- Bedding and manure has been assimilated for at least three weeks.

4.5 ACCIDENTS AND EMERGENCY RESPONSE

Emergency responses in the pig industry sector are guided by AUSVETPLAN Enterprise Manual – Pig Industry (Primary Industries Ministerial Council, 2011). AUSVETPLAN is a series of technical response plans that describe the proposed Australian approach to an emergency animal disease incident. The documents provide guidance based on recent analysis of risks, linking policy, strategies, implementation, coordination and emergency management plans.

Mass pig deaths due to factors such as abnormal heat stress or disease rarely occur. However, a plan is required for disposal of the pigs should mass deaths occur and management of the issue should the cause be an infectious disease. When disease is the cause of death, the farm owner will obtain a veterinary report and immediately contact the Emergency Disease Watch Hotline (1800 675 888), City of Albany Environmental Health Officers (EHO), Department of Agriculture and Food (DAFWA) and Department of Health (DOH), where applicable. These agencies will provide guidance to the landowner on disease control and hygiene, transport and disposal of diseased/ dead pigs.

Where there are not mass deaths and disease is not the cause, burial of the pigs on the property will be undertaken as described in Section 5.4.2.

Harsh chemicals such as disinfectants will not be used in this piggery operation. However, as for any farming operation, any person storing, handling or transporting dangerous goods (including agricultural chemicals) is required to report spills and other dangerous events to a dangerous goods officer within the Department of Industry and Resources as soon as practicable. Where an agricultural chemical spill is likely to cause pollution or environmental harm, the occupier of the land on which the discharge occurred is required to inform the Department of Environment Regulation.

4.6 FIRE RISK MANAGEMENT

Each ROP unit will have a 4m firebreak around its boundary. A fast attack unit will be kept on site to respond to a fire on the property, should the situation arise. Fire risk within each ROP area will be minimised by storing flammable material such as straw bedding in a single section of the operational area.

The subject land is in the King River Bush Fire Service District.

4.7 PUBLIC RELATIONS AND TRAINING

The landowners and Plantagenet Pork wish to promote good relations with neighbours and the general public to reduce the risk of complaints based on lack of adequate information of farm operations or fears based on misconceptions. All complaints received directly will be recorded in a log book and dealt with in a professional and sensitive manner.

A piggery manager is primarily responsible for the operation of the ROP, including transport of pig to, from and within with property, unloading and loading, feeding and general management and maintenance. Staff will be adequately trained in best practice methodology for management of the ROP.

5. ROTATIONAL OUTDOOR PIGGERY – PROPOSED MANAGEMENT

Free range piggeries, when adequately located and managed, present few management issues (see Banhazi 2013). The management considerations for any piggery is odour, dust, noise, waste, fly breeding, nutrient export and visual management. The extent of possible impacts is closely related to the size, density of pigs, management and type of operation being carried out. Generally, the more intensive the operation, the more risk there is of generating impacts on-site and off-site. This ROP will operate within the recommended density of pigs on a site which has suitable characteristics to support sustained operation.

5.1 ODOUR

ROPs need to meet the minimum separation distances set out in the *Environmental Guidelines for Rotational Outdoor Piggeries* (Tucker and O’Keefe 2013) to minimise the risk of odour nuisance. The ROP compartments in this EMP meet the separation distances outlined. ROPs pose a low risk of causing a substantial off-site odour impact, provided they are designed and managed according to sustainable nutrient loading rate criteria (Tucker and O’Keefe 2013). Measures that assist in keeping odour to acceptable levels include:

- Keeping pig densities at recommended levels;
- Ensuring that there is adequate infiltration of water and drainage of pens;
- The existing screens of native vegetation will assist in creating turbulent airflow, which will help to disperse any odour generated on the site.

Research by University of Southern Queensland and National Centre for Engineering in Agriculture (Banhazi 2013) indicates that risk associated with ROPs from odour is low.

5.2 DUST

Dust from ROP operations can be generated from traffic movements, dry conditions when pens have dry soil exposed or from associated farm operations such as feeding. The proposed setbacks from roads and property boundaries, plus existing shelter belts will ensure that impact from dust is minimal. Dust generation will be minimised though:

- Placement of pens in suitable soil types (i.e. loamy soils with clay and laterite elements);
- Vehicle movements on access roads to be restricted to moderate speeds.

Research by University of Southern Queensland and National Centre for Engineering in Agriculture (Banhazi 2013) indicates that risk associated with ROPs from dust is low.

5.3 NOISE

A low level of noise will be generated by the pigs and use of associated equipment. Noise risk in ROPs is generally not an issue, due to setbacks and the fact that the low density of pigs reduces noise related to competition for food and aggression. Noise associated with loading and unloading the pigs will be limited to daylight hours. It is also considered that noise impacts are unlikely to be a problem given the distances to sensitive receptors (e.g. rural residences), the nearest of which will be 300m to

the south of ROP Area 1. Noise generated will be of a volume generally associated with farming activities in a rural area.

Research by University of Southern Queensland and National Centre for Engineering in Agriculture (Banhazi 2013) indicates that risk associated with ROPs from noise is low.

5.4 WASTE MANAGEMENT

The ROP will generate waste products including pig manure mixed with straw bedding. The nutrients present in these materials including nitrogen (N), phosphorus (P) and potassium (K) will need to be managed to reduce the risk of export from the property. Design and management factors which will be applied to this ROP (in accordance with *Environmental Guidelines for Rotational Outdoor Piggeries*; Tucker and O'Keefe 2013) include:

- **Nutrient budgeting:** While N, P and K accumulate in soils of ROPs, the nutrient accumulation rate is generally not high unless an area has been stocked continuously for more than two years (APL 2011). Consequently, rotations will be planned so that pigs are not continuously stocked on an area for longer than two years. Following the pig stocking phase, crops for hay (or similar) will be grown to utilise accumulated N, P and K.
- **Facilitating even spreading of manure nutrients:** In ROPs, manure and consequently nutrients, are not spread evenly across the paddocks. This increases the risk of nutrient overloading a specific site, leaching and/or runoff. Moving pig shelters and feeding facilities regularly during the stocked phase will help spread nutrients more evenly. Shelters are moved between each litters of piglets, and periodically (2 to 3 months) within the sow/bore rotations. In addition, feed is blown into the enclosures and spread over a relatively large area, and in a variety of locations. These practices assist in evenly distributing the nutrients within the pig area. Manure and bedding will also be spread out after shelters are moved to facilitate more even spreading of nutrients.
- **Minimising uncontrolled movement of nutrients from ROP paddocks:** This will be achieved through regular spelling from pig production, with a plant growth and harvest phase to remove the nutrients added through the stocked phase and provision of a physical and/or vegetative barrier around the piggery perimeter. Each pig area will be rested for a minimum of two years before reuse. In addition, should surface water start to cause erosion, silt trapping fences will be located along the downstream side of the ROP unit to intercept runoff. This will slow the rate of runoff flow, and capture any sediment that may be transported from the pig areas. Runoff from ROPs will also be diverted from water supply dams to reduce the risk of contamination.
- **Providing and maintaining wallows:** Surface soils (top 10cm) associated with the subject land have a low nutrient holding capacity, but sub soil (e.g. 10cm to 60cm below ground level) has an ability to bind phosphorus and prevent excessive nutrient leaching. Due to moderate permeability the soils are suitable for the installation of wallows. Wallows will be monitored and locations changed to prevent excessive contamination of a single site. Wallows will be remediated at the end of each rotation by ripping, refilling and levelling.
- **Monitoring and surveillance:** Routine environmental monitoring of soil and surveillance of drainage lines will be undertaken after the cropping phase of the rotation. Soil sampling will be undertaken in accordance with the APIQ[✓]™ guidelines, include samples collected prior to the pig phase commencing on a site, and then again prior to reusing and area for use as an ROP. This

is undertaken to ensure that the nutrient levels have returning to satisfactory levels prior to reusing an area as an ROP.

5.4.1 Nutrient Management

The management of nutrients during and following the pig phase is an important part of the operation of the facility. Nutrients resulting from manure and straw bedding are applied to the soil. Table 13 provides estimates of the total nutrients applied from a range of pig classes.

TABLE 13: PREDICTED NUTRIENT OUTPUT BY CLASS OF PIG AND BEDDING MATERIAL (KG/ HEAD/ YEAR)

PIG CLASS	TOTAL SOLIDS	VOLATILE SOLIDS	ASH	NITROGEN	PHOSPHORUS	POTASSIUM
Gilt	197	162	35	12.0	4.6	4.0
Boar	186	151	35	15.0	5.3	3.8
Gestating sow	186	151	35	13.9	5.2	3.7
Lactating sow	310	215	95	27.1	8.8	9.8
Sucker	11.2	11.0	0.2	2.3	0.4	0.1
Sow and litter	422	325	97	50.0	13.0	11.0
Weaner pigs	54	47	7	3.9	1.1	1.1
Grower pigs	108	90	18	9.2	3.0	2.4
Finisher pigs	181	149	32	15.8	5.1	4.1
Wheat straw	89	-	-	0.58	0.41	0.51

Source: *Environmental Guidelines for Rotational Outdoor Piggeries* (Tucker and O’Keefe 2013). Shaded cells indicate pig classes present at the proposed facility.

Based on the average stocking rate for the ROP of 24 sows/boars per hectare over the site, Table 14 presents the total annual nutrient loading to the soil. Due to the nature of nitrogen in fresh pig manure, a significant portion will be lost through ammonia volatilisation and nitrous oxide emissions (estimated at 30%). It should also be noted that not all nitrogen, phosphorus and potassium are in the form that is readily available for uptake by plants. This is a result of manure having a slow release effect which will continually release bioavailable nutrients over a longer timeframe than synthetic fertilisers.

TABLE 14: TOTAL ANNUAL NUTRIENT APPLICATION TO SOIL (KG/ YEAR/ HA)

NUTRIENT SOURCE	TOTAL SOLIDS	VOLATILE SOLIDS	ASH	NITROGEN	PHOSPHORUS	POTASSIUM
Gestating Sow	4464 kg/ year/ ha	3624 kg/ year/ ha	840 kg/ year/ ha	233* kg/ year/ ha	124.8 kg/ year/ ha	88.8 kg/ year/ ha

Note: *Includes loss of nitrogen to atmosphere. Based on 24 adult pigs per hectare.

Following the pig phase, the land will be used for cropping. The net result of cropping is the removal of nutrients from the soil, and the export of these offsite. Typical data for the area suggests the nutrient removal rates provided in Table 15 would be applicable for the subject land.

TABLE 15: TYPICAL NUTRIENT REMOVAL THROUGH CROPPING (KG /YEAR)

	AVERAGE YIELD	NITROGEN		PHOSPHORUS		POTASSIUM	
	tonnes/ ha/ year	kg/tonne / year	kg/ha / year	kg/tonne/ year	kg/ha/ year	kg/tonne / year	kg/ha/ year
Hay	6	20	120	2	12	25	150
Wheat	3.5	23	80.5	3	10.5	4	14
Barley	3.5	20	70	2.9	10.15	4.4	15.4
Canola	1.8	40	72	6.5	11.7	9.2	16.6

*Source: Summit Fertilizer Nutrient Removal Tables. Note: Cropping takes place for a minimum of two years.

Both the National Environmental Guidelines for Piggeries (Tucker and O’Keefe, 2013) and the APIQ[✓]™ guidelines have a heavy emphasis on the sustainable management of nutrients at the site. In addition, the Australian Pork Fact Sheet states the accumulation of nitrogen, phosphorus and potassium in free range piggeries is unlikely to be high unless an area is stocked for more than two years. As the stocking rate is a lower stocking density than the maximum allowable, it is unlikely that nutrient accumulation would occur at a level that will negatively impact on the surrounding environment. To ensure this does not occur, Benmore Grazing Trust is committed to undertaking the APIQ[✓]™ soil monitoring to ensure that nutrient levels have returned to acceptable levels prior to reusing an area for ROP operation. This data will be collected and sent to the APIQ[✓]™ for approval to maintain accreditation. As such, a number of management measures and on site testing will ensure that nutrients are appropriately managed on site to maximise reuse and minimise potential impacts on the environment. The production area has room for over 4 rotations of 26ha each (123.2h; Figure 5).

5.4.2 Disposal of Dead Pigs

A mortality rate of 5% of adult pigs per year is generally accepted in breeder facilities. Up to 15% of piglets may also be lost, usually when they are small and accidentally crushed by the sow. This means that approximately 32 adult pigs and 540 piglets could be expected to die per year.

It is proposed to dispose of dead pigs via burial in a purpose dug trench. The burial trenches will be designed, constructed and maintained in accordance with the National Environmental Guidelines for Piggeries (Tucker, 2010). Lime will be added and the trench will be immediately backfilled. A site will be selected to ensure that there is at least 100m horizontal separation from the floodplain boundary, which means that a minimum 5m depth to groundwater will be achievable. This separation distance and the other measures proposed will minimise the risk of groundwater contamination.

It should be noted that mass pig deaths will be dealt with as outlined in Section 4.5.

5.5 DRAINAGE AND WATER MANAGEMENT

Management of drainage on the subject land will contribute to the overall management of nutrients from the free range operation. Nutrients from bedding and manure will need to be assimilated into the subject land and drainage managed to prevent discharge. Discussions with Krish Seewraj at DoW have led to the following approach:

- Management of first flush rainfall (20mm rainfall event) based on rural land use and treatment of all types of pollutants (Table 16) through capture and retention of surface water; and
- Management of water generated during larger rainfall events to reduce erosion (Plate 10).

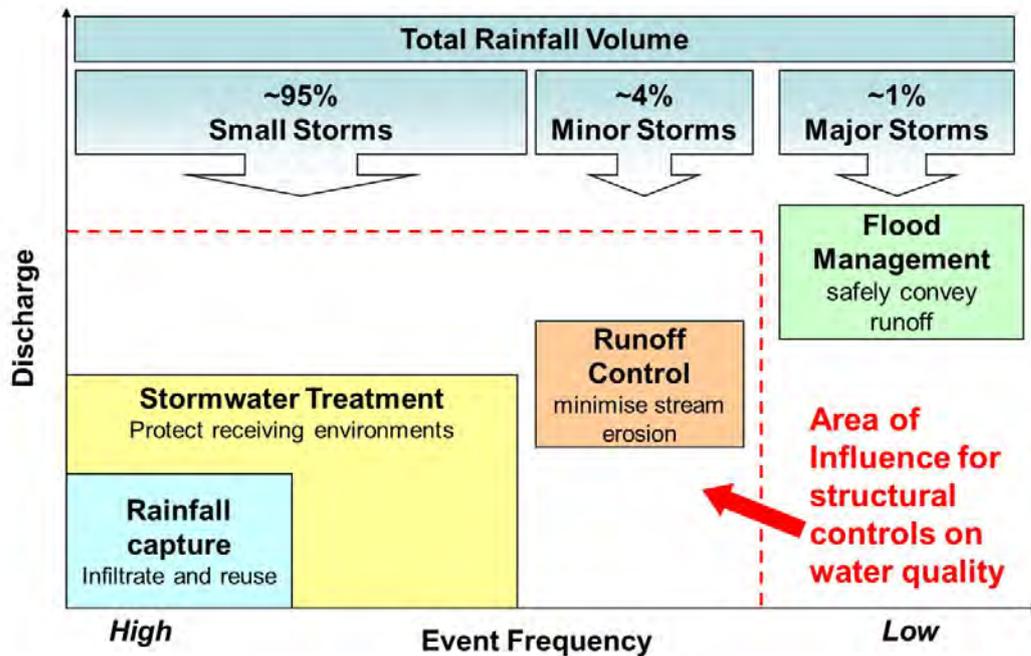
TABLE 16: DESIGN CRITERIA FOR FIRST FLUSH CONTAINMENT SYSTEMS

Pollutants	Catchment surface	Examples of industries	Rainfall level to be contained
Substances easily mobilised, such as soluble materials, fine dusts and silts	Impervious: concrete, cement, bitumen	Concrete batching plants	10 mm
Substances that are more difficult to mobilise, such as oil, grease and other non-volatile hydrocarbons	Impervious: concrete, cement, bitumen	Petrochemical plants, motor vehicle courtyards, chemical manufacturers, hot mix bitumen emulsion plants, roadways	15 mm
All types of pollutant	Pervious surfaces (including natural ground surface) that are not as easily cleansed of deposited pollutants	Market gardens, nurseries	20 mm

Source: Department of Environment and Heritage, New South Wales (2011)

Plate 10 illustrates that the management of small storms by structures such as swales and basins is desirable to ensure that approximately 95% of stormwater volume is treated and retained. Larger events need to manage runoff to minimise erosion and safely convey stormwater.

PLATE 10: RAINFALL EVENT FREQUENCY AND MANAGEMENT RESPONSES



Adapted from British Columbia Ministry of Water, Land and Air Protection, 2002

The Rural Industries Research and Development Corporation have prepared a publication, *Managing Litter Reuse for Minimal Nutrient Run-off to Surface Water* (Devereux 2012) to guide the management of nutrient rich litter when applied to farms as a fertiliser and soil conditioner. While applying to poultry litter, this guideline also applies to pig manure and bedding. This operation will manage surface water run-off in line with the guidance publication by incorporating the following features:

- At the downhill side of each rotational unit, roll over drains or swales will be constructed to capture and direct surface water to associated basins (sizing to cater for first flush 20mm rainfall event – one year 30 minutes).
- Rain fall events larger than 20mm (larger than one year 30 minute ARI event; Appendix I) will be managed to prevent erosion and facilitate safe conveyance. Stormwater in these events will be directed to existing dams as nutrients in large events will be diluted. Current dams have the capacity to catch and store large storm events.
- Each drain system will also incorporate a vegetated filter strip (e.g. kikuyu).

5.6 FLY BREEDING

Fly breeding is not considered to be a risk in this operation as manure and bedding will be spread over paddocks and not stock piled or composted and is therefore unlikely to attract flies.

5.7 WEED AND PEST MANAGEMENT

As for any agricultural enterprise, monitoring for weeds and pests is an important priority for ROP management. Lot 5759 has a history of double-gee invasion. Spread of this weed will be reduced by

ensuring that service vehicles remain on designated driveways to minimise picking up and spreading the seeds. General monitoring and treatment of weeds will be undertaken seasonally.

Free range operations are at risk of attracting rodents and predators such as foxes. Good management of pig paddocks and feeding helps to minimise pests. Strategic baiting may be used if pests are identified. This landowner will trial the use of maramba dogs to protect livestock on the property.

5.8 VISUAL

The visual impacts of ROPs can be minimised through the sensitive placement of infrastructure, setbacks from prominent areas and planting of screening vegetation. In the instance of this proposal, ROP Units will be located at least 100m north of Hazzard Road and only a small portion is visible due to the land sloping down to the north (Plate 10). Views from Millbrook Road to the south are distant (1.8km at the closest point to ROP) and shielded by native vegetation.

PLATE 12: VIEW OF ROP AREA 1 FROM HAZZARD ROAD



5.9 TRANSPORT AND ACCESS

The ROP will rely on vehicle movements to bring pig feed, deliver breeder pigs and transport weaners. The subject land is serviced by Hazzard Road and Albany Highway. Hazzard Road is a well formed gravel road and is suitable for rural traffic. Albany Highway is bitumised and a major arterial route. Access into the property is via a dedicated drive way.

Transport impacts will be minimised by:

- Ensuring that loads are appropriately sized, secured and coordinated to reduce movements;

- Keeping traffic speed on access road low (30kmh); and
- Not moving pigs during the night.

5.10 CHEMICALS AND FUELS

ROPs use fewer chemicals than many other farming enterprises (e.g. no disinfectants). However, from time to time the use of pesticides, vaccines and other pharmaceutical products may be required. These materials will be stored in farm sheds on the subject land according to manufacturer instructions and legislative requirements (where applicable). This applies to any rural activity where chemicals are required. All pesticides will be stored, applied, transported and disposed of in accordance with the *Health (Pesticides) Regulations 1956*. Medications such as vaccines will be stored in a refrigerator solely for that purpose.

5.11 MONITORING AND EVALUATION

The Australian Pork Industry Quality Assurance Program (APIQ[✓][™]) is an on-farm quality assurance program designed by the pork growing industry in consultation with producers, key customers and government. APIQ[✓][™] enables pig producers to demonstrate that their on-farm practices reflect good agricultural practices for management, food safety, animal welfare, biosecurity and traceability. Part of the APIQ[✓][™] program involves soil testing for nutrients, firstly to determine baseline nutrient levels and prior to reuse of rotational areas to ensure that nutrient levels continue to be managed sustainably. Soil testing must be undertaken as part of the accreditation process as described in Appendix A.

6. SUMMARY AND COMMITMENTS

Suppliers of pigs are required to meet exacting standards to ensure that the end product meets processor and market expectations. This ROP will meet the standards set by the RSPCA Approved Farming Scheme (RSPCA, 2011) and the Model Code of Practice for the Welfare of Animals – Pigs (Revised) (AWWG, 2007).

Examination of environmental factors, guidelines and policy requirements indicates that the proposed ROP can be managed to meet desired objectives for its operations without impacting on the surrounding environment or the health or amenity of surrounding property owners and the wider public.

The following commitments are made by the landowner in support of this EMP (Table 17).

TABLE 17: LANDOWNER COMMITMENTS

	COMMITMENT	TIMING/RESPONSIBILITY
1	ROPs will only be established within the boundaries shown on Figure 4.	Landowner.
2	The ROP areas identified will be used for two years each and rested for at least two years prior to reuse (and pending results of nutrient testing).	Two years use, at least two years rest (cropping), landowner.
3	Density of adult pigs (bores and sows) to be 24 pigs per ha or less.	Landowner.
4	Surface water flow from the ROP paddocks will be monitored and prevented through the installation of interceptor drains and basins or temporary structures such as silt trapping fences.	Landowner.
5	Apply <i>Environmental Guidelines for Rotational Outdoor Piggeries</i> (Tucker and O’Keefe 2013), Model Code of Practice for the Welfare of Animals – Pigs (revised) (AWWG, 2007) and RSPCA Approved Farming Scheme Standards for Pigs (RSPCA, 2011) to operations of the ROP.	Landowner.
6	After use, each ROP production unit will be planted to a suitable harvestable crop (e.g. oaten hay) for at least two seasons to utilise nutrients.	Minimum two years, landowner.
7	Testing for nutrient levels prior to re-use of ROP area for pigs according to APIQ [✓] ™ accreditation requirements.	Landowner.
8	Biosecurity measures will be in compliance with <i>the Australian Pork Industry Biosecurity Program</i> (APL, 2003) and AUSVETPLAN (Animal Health Australia, 2011).	Landowner.

	COMMITMENT	TIMING/RESPONSIBILITY
9	Pigs which die on the property will be buried. This does not apply where mass deaths or disease occurs.	Landowner – immediately following pig deaths.
10	Vehicle speed on access road will be limited to 30km/hour.	Landowner and suppliers.
11	Install sign at entry to ROP compartments with information regarding biosecurity.	Landowner.
12	Operations such as delivering and removal of pigs from the property will be undertaken during daylight hours.	Landowner.
15	Any complaints will initially be dealt with by the landowner, with advice from the City of Albany Environmental Health and/or Planning Officer, where necessary.	Landowner and City of Albany.

7 REFERENCES

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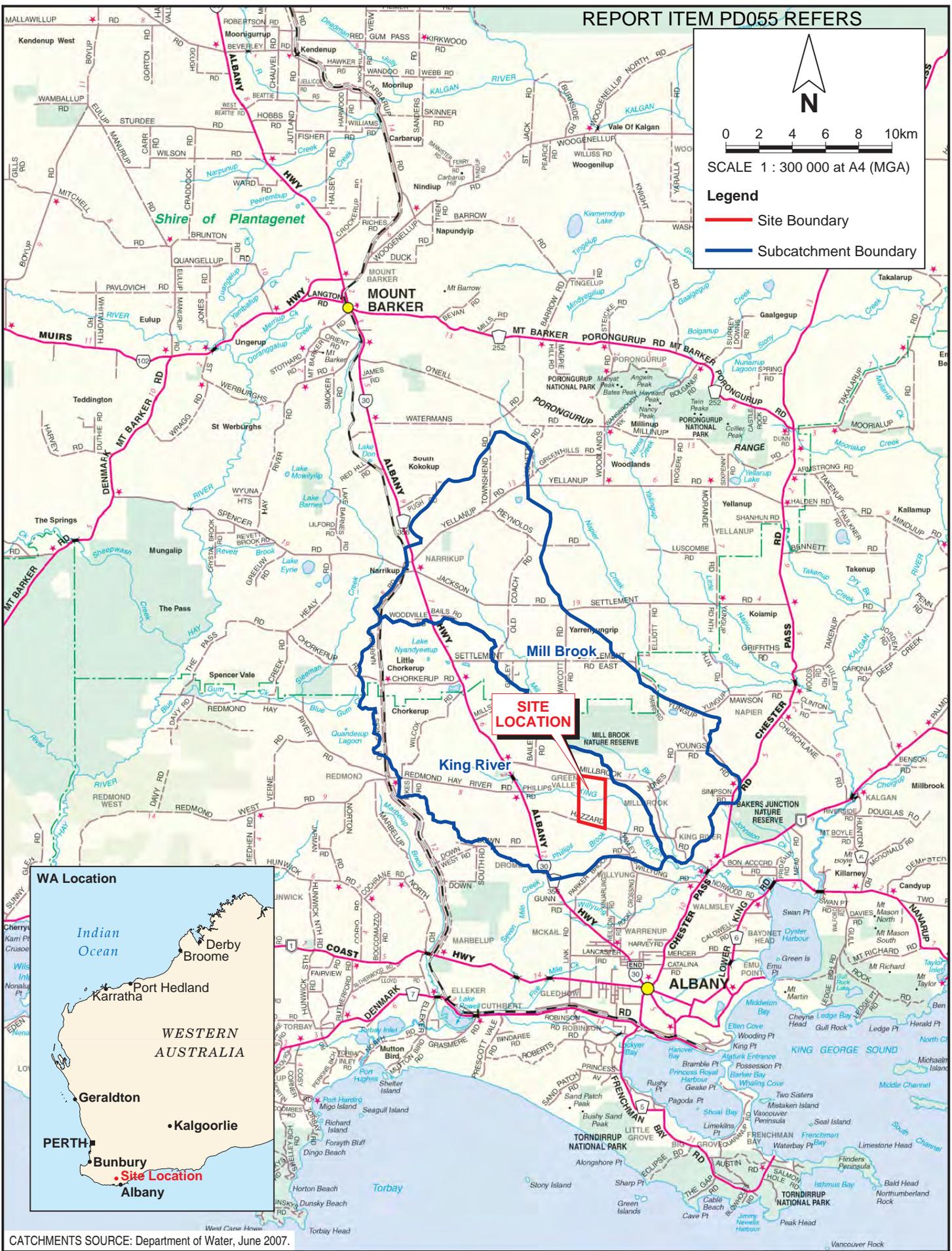
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FIGURES



0 2 4 6 8 10km

SCALE 1 : 300 000 at A4 (MGA)

Legend

- Site Boundary
- Subcatchment Boundary



CATCHMENTS SOURCE: Department of Water, June 2007.



Benmore Grazing Trust
 ROTATIONAL OUTDOOR PIGGERY - BREEDING
 LOTS 5758 AND 5789 HAZZARD ROAD, GREEN VALLEY

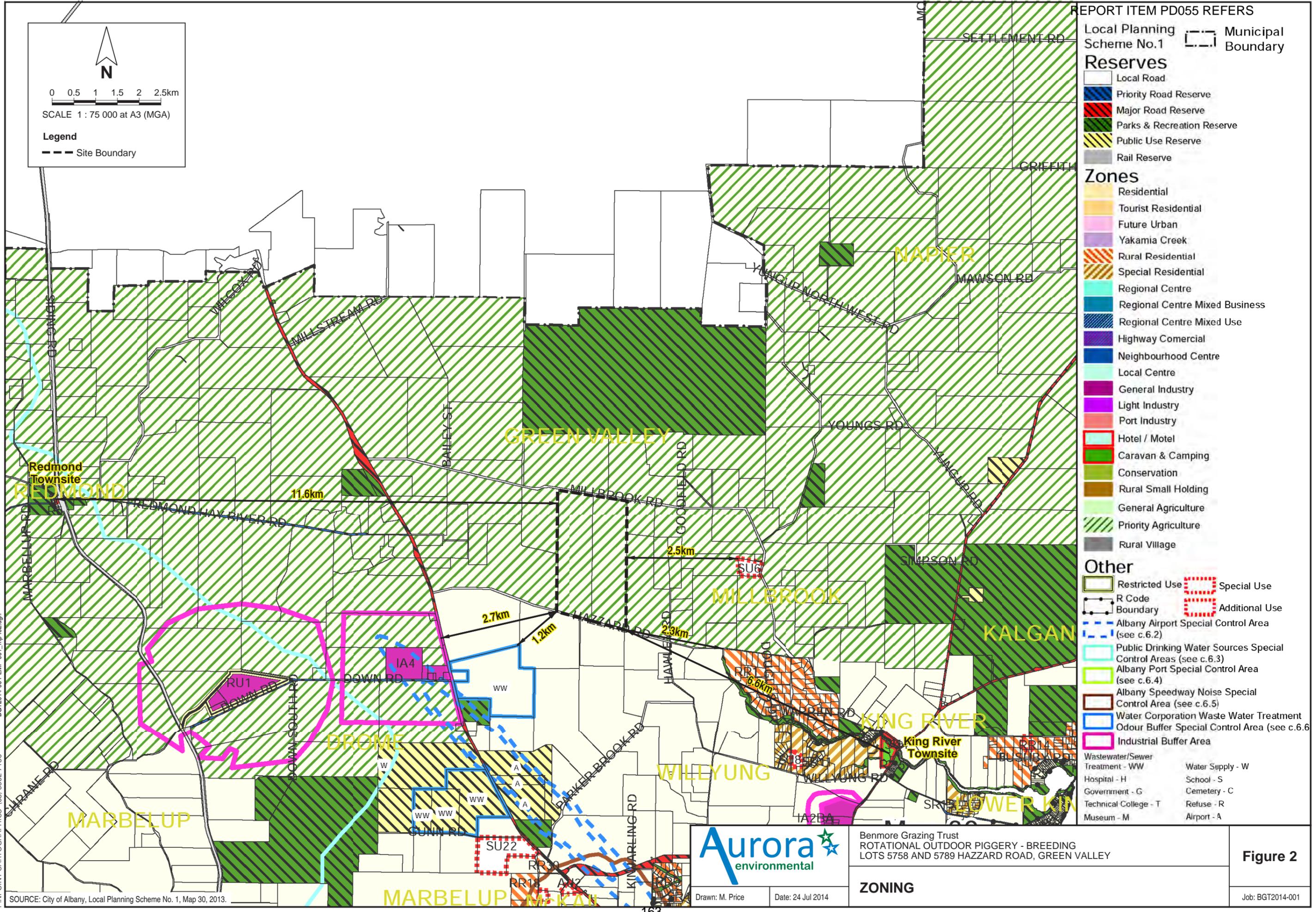
Figure 1

Drawn: M. Price Date: 24 Jul 2014

REGIONAL LOCATION

Job: BGT2014-001

PINPOINT CARTOGRAPHICS (08) 9562 7136



REPORT ITEM PD055 REFERS

Local Planning Scheme No.1 Municipal Boundary

Reserves

- Local Road
- Priority Road Reserve
- Major Road Reserve
- Parks & Recreation Reserve
- Public Use Reserve
- Rail Reserve

Zones

- Residential
- Tourist Residential
- Future Urban
- Yakamia Creek
- Rural Residential
- Special Residential
- Regional Centre
- Regional Centre Mixed Business
- Regional Centre Mixed Use
- Highway Commercial
- Neighbourhood Centre
- Local Centre
- General Industry
- Light Industry
- Port Industry
- Hotel / Motel
- Caravan & Camping
- Conservation
- Rural Small Holding
- General Agriculture
- Priority Agriculture
- Rural Village

Other

- Restricted Use
- R Code
- Boundary
- Albany Airport Special Control Area (see c.6.2)
- Public Drinking Water Sources Special Control Areas (see c.6.3)
- Albany Port Special Control Area (see c.6.4)
- Albany Speedway Noise Special Control Area (see c.6.5)
- Water Corporation Waste Water Treatment Odour Buffer Special Control Area (see c.6.6)
- Industrial Buffer Area
- Special Use
- Additional Use

Wastewater/Sewer Treatment - WW	Water Supply - W
Hospital - H	School - S
Government - G	Cemetery - C
Technical College - T	Refuse - R
Museum - M	Airport - A

Aurora environmental

Benmore Grazing Trust
 ROTATIONAL OUTDOOR PIGGERY - BREEDING
 LOTS 5758 AND 5789 HAZZARD ROAD, GREEN VALLEY

ZONING

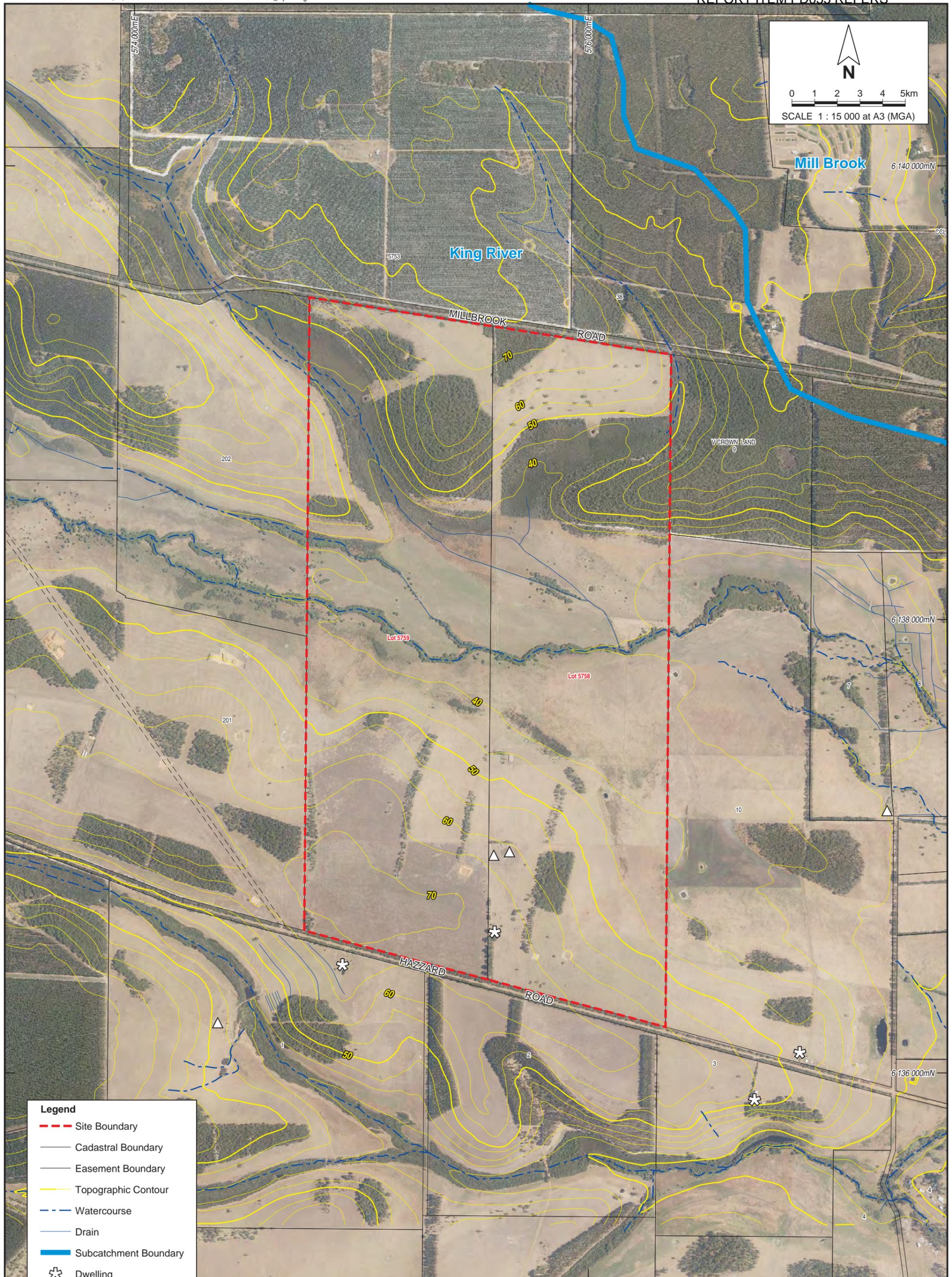
Drawn: M. Price Date: 24 Jul 2014

Figure 2

Job: BGT2014-001

BGT2014-001-EMP-001_mpf-02.dgn
 PINPOINT CARTOGRAPHICS (08) 9562 7136

SOURCE: City of Albany, Local Planning Scheme No. 1, Map 30, 2013.



N

0 1 2 3 4 5km

SCALE 1 : 15 000 at A3 (MGA)

Legend

- - - Site Boundary
- Cadastral Boundary
- Easement Boundary
- Topographic Contour
- - - Watercourse
- Drain
- Subcatchment Boundary
- * Dwelling
- △ Shed



Benmore Grazing Trust
 ROTATIONAL OUTDOOR PIGGERY - BREEDING
 LOTS 5758 AND 5789 HAZZARD ROAD, GREEN VALLEY

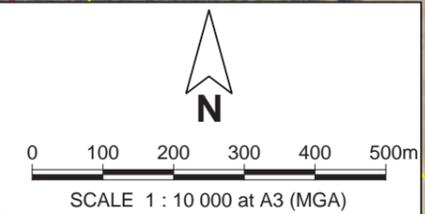
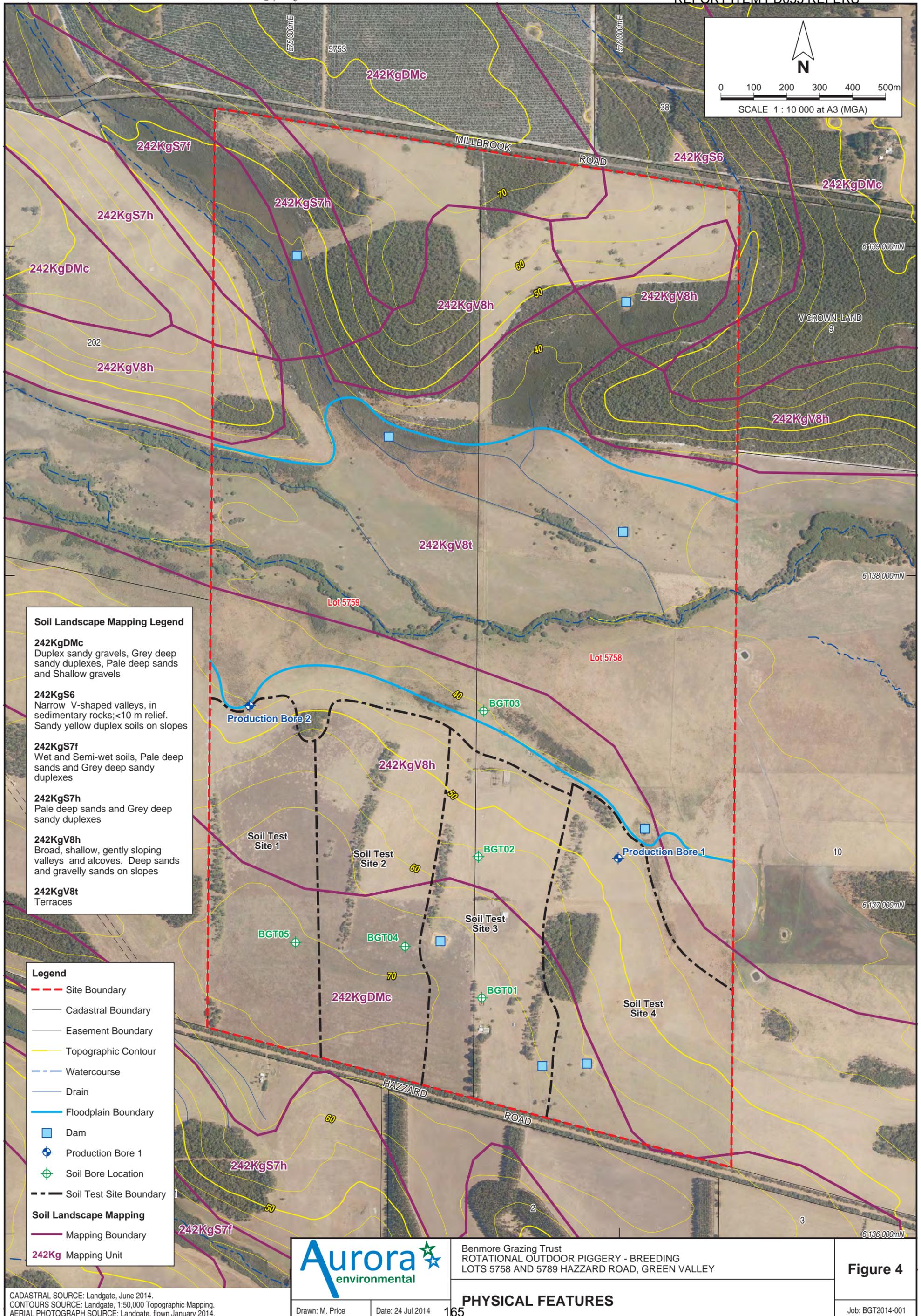
Figure 3

Drawn: M. Price Date: 24 Jul 2014

SITE LOCATION SHOWING SUBJECT LAND

Job: BGT2014-001

CADASTRAL SOURCE: Landgate, June 2014.
 CATCHMENTS SOURCE: Department of Water, June 2007.
 CONTOURS SOURCE: Landgate, 1:50,000 Topographic Mapping.
 AERIAL PHOTOGRAPH SOURCE: Landgate, flown January 2014.



Soil Landscape Mapping Legend

242KgDMc
Duplex sandy gravels, Grey deep sandy duplexes, Pale deep sands and Shallow gravels

242KgS6
Narrow V-shaped valleys, in sedimentary rocks; <10 m relief. Sandy yellow duplex soils on slopes

242KgS7f
Wet and Semi-wet soils, Pale deep sands and Grey deep sandy duplexes

242KgS7h
Pale deep sands and Grey deep sandy duplexes

242KgV8h
Broad, shallow, gently sloping valleys and alcoves. Deep sands and gravelly sands on slopes

242KgV8t
Terraces

Legend

- - - Site Boundary
- Cadastral Boundary
- Easement Boundary
- Topographic Contour
- - - Watercourse
- Drain
- Floodplain Boundary
- Dam
- ⊕ Production Bore 1
- ⊕ Soil Bore Location
- - - Soil Test Site Boundary

Soil Landscape Mapping

- Mapping Boundary
- 242Kg Mapping Unit

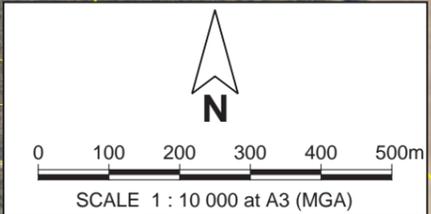
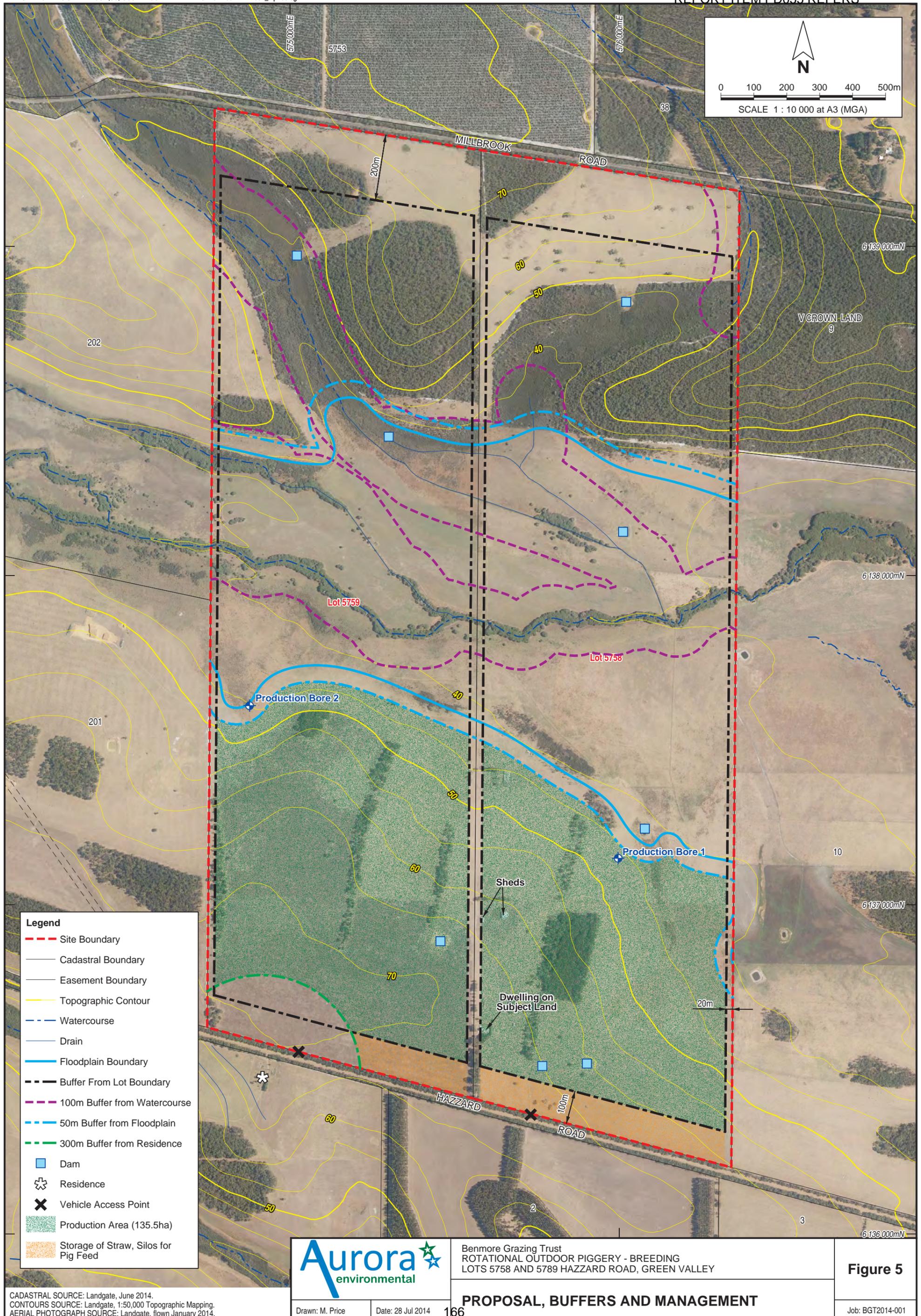


Benmore Grazing Trust
ROTATIONAL OUTDOOR PIGGERY - BREEDING
LOTS 5758 AND 5789 HAZZARD ROAD, GREEN VALLEY

Figure 4

CADASTRAL SOURCE: Landgate, June 2014.
CONTOURS SOURCE: Landgate, 1:50,000 Topographic Mapping.
AERIAL PHOTOGRAPH SOURCE: Landgate, flown January 2014.

PHYSICAL FEATURES



- Legend**
- - - Site Boundary
 - Cadastral Boundary
 - Easement Boundary
 - Topographic Contour
 - Watercourse
 - Drain
 - Floodplain Boundary
 - Buffer From Lot Boundary
 - 100m Buffer from Watercourse
 - 50m Buffer from Floodplain
 - 300m Buffer from Residence
 - Dam
 - ✱ Residence
 - ✕ Vehicle Access Point
 - Production Area (135.5ha)
 - Storage of Straw, Silos for Pig Feed



Benmore Grazing Trust
 ROTATIONAL OUTDOOR PIGGERY - BREEDING
 LOTS 5758 AND 5789 HAZZARD ROAD, GREEN VALLEY

Figure 5

CADASTRAL SOURCE: Landgate, June 2014.
 CONTOURS SOURCE: Landgate, 1:50,000 Topographic Mapping.
 AERIAL PHOTOGRAPH SOURCE: Landgate, flown January 2014.

Drawn: M. Price Date: 28 Jul 2014

PROPOSAL, BUFFERS AND MANAGEMENT

Job: BGT2014-001

APPENDIX A

Planning Principles Checklist and APIQv[®] Standards

2 Planning Principles

The following planning principles can apply to new developments, expansions or changes in material use at piggeries. The first step in planning involves the identification of any land use or zoning issues from local government, and the state government agencies responsible for piggery licensing and approval, water licensing, soil conservation and vegetation clearing. Consultation with the relevant agencies, ideally through a pre-lodgement, on-site meeting, helps to determine if the site is suitable, and the major issues to be addressed in an application. These issues are listed below in a checklist.

The next step is to gather and compile the information. As the National Guidelines provide recommended siting, design and management information, they can be used to assemble the supporting information for a piggery development application. Submission of application forms and supporting information, advertising the development and formal assessment, will follow. For large or complex applications, professional assistance may be necessary.

ISSUES	CHECK
Applicant details	
Site description (including plans) and assessment	
Real property description	
- Land tenure	
- Land area	
- Cadastral plan	
Land zoning, and zoning of the surrounding land	
Climatic data	
- Median annual rainfall	
- Average monthly rainfall	
- Rainfall intensity data (1-in-20-year design storm, 1-in-20-year 24-hour storm)	
- Average monthly evaporation	
- Monthly maximum and minimum temperatures	
- Wind speed and direction	
Soil description for the piggery complex site (including analysis of basic physical properties) and reuse areas (including analysis of basic chemical and physical properties)	
Description of groundwater resources and geology of the site	
- Details of any bores on the subject property	

PLANNING PRINCIPLES (continued)

ISSUES	CHECK
- Analysis of the chemical properties of groundwater for use in piggery	
- Details of any licenses held	
Description of surface water resources on the property or in the vicinity of property	
- Analysis of the chemical properties of surface waters for use in piggery.	
- Details of any licenses held	
Description of the current vegetation of the site and the extent of any proposed clearing	
Identification of any items, sites or places that may have cultural heritage significance	
Description of the proposed piggery operation	
Total pig or standard pig unit (SPU) numbers	
- herd composition	
- numbers and weights of incoming and outgoing stock	
- sources of stock	
Description of housing and layout plans	
Water requirements for drinking, cooling, cleaning and shandying with effluent, and water sources and quality	
Bedding requirements and bedding sources	
Feed requirements, sources and storage areas	
Staff numbers	
Hygiene practices	
Prediction of manure production and mass balance estimate of the nutrient content of solid and liquid by-products	
Design of effluent collection, pre-treatment and treatment system, including plans	
Sizing and proposed management of the reuse areas, including location, area, method, frequency and general management of spreading/irrigation activities	
Description of carcass management or disposal, including plan for mass mortalities	
Calculation of traffic numbers and consideration of access and road safety. There is also a need to negotiate with state or territory and local governments regarding road upgrading and maintenance responsibilities	

PLANNING PRINCIPLES (continued)

ISSUES	CHECK
Environmental impact assessment	
Community amenity impacts - particularly odour, dust, noise, traffic Calculate separation distances to sensitive receptors	
Surface water impacts – quality and availability for other potential users	
Groundwater impacts – quality and availability for other potential users	
Vegetation impacts – effects of clearing on rare and threatened species and communities	
Impacts on items, sites or places of cultural heritage significance	
Impacts to soils of reuse areas	
Summary of design and management features to minimise adverse environmental impacts	
Proposed environmental monitoring and reporting	
Environmental Management Plan (EMP) - An EMP focuses on the general management of the whole farm, taking into account the environment and associated risks. It should document design features and management practices; identify risks and mitigation strategies; include ongoing monitoring to ensure impacts are minimised; and processes for continual review and improvement	
Plans including:	
<i>Topographic plan</i> - showing watercourses and drainage lines; flood lines, protected land; and location of nearby residences	
<i>Recent aerial photograph</i>	
<i>Farm plan</i> – showing current land uses; proposed piggery complex location; proposed carcass composting or burial site; proposed reuse areas; on-farm roads; location of on-farm bores; and location of any soil conservation or drainage works	
<i>Piggery complex layout plan</i> - including location of by-products treatment and storage facilities	
<i>Effluent treatment ponds plan</i> - (if applicable)	
<i>Separation and buffer distances plan</i> - showing location of piggery complex (including feed storage; and by-products storage and treatment facilities) and reuse areas; and distances to sensitive land uses e.g. houses and towns, as well as buffers around sensitive natural resources	

1.2 Free Range Production Requirements

Standard	The piggery production system complies with the APIQ✓ [®] definition and standards for 'Free Range' (FR).
Performance indicators:	
<p>A. Weaners and growers and the sows from which they were bred have access to paddocks at all times for their entire life.</p> <p>Where pigs are confined temporarily for vaccinations, mating or under veterinary advice, systems are in place which support the need for confinement.</p>	
<p>B. Shelter is available to provide protection from the elements at all times.</p> <p>Steps are taken to minimise the risks to pigs from predators.</p> <p>All pigs are able to move freely in and out of shelter provided.</p> <p>Bedding is provided in the shelters.</p>	
<p>C. Suitable paddocks with rooting and/or foraging areas are available to pigs at all times.</p> <p>Wallows are provided where state regulations and the season permits.</p>	
<p>D. Shelter provided for weaners and growers meets the space allowance standards of the <i>Model Code</i>, 3rd edition, 2007, Appendix 3, Table 5.</p>	
<p>E. Shelter for dry sows in groups, lactating sows with piglets and boars meet the space allowance in the <i>Model Code</i>, 3rd edition, 2007, Appendix 3, Table 8.</p>	

1.2.1 Soil Monitoring Standard

Standard	<p>Sampling and analysis of soils is either:</p> <ul style="list-style-type: none"> - Done in accordance with the conditions of a licence, approval or consent that requires specific soil monitoring but at least every two years; OR - Done before pigs move onto that land if the pig phase is expected to exceed 24 months in length; AND - At the end of any 24 month period in which pigs are stocked on an area for any length of time and at the end of each subsequent 24 months that includes a pig phase; AND - Samples are collected from the expected nutrient-rich area of each block of paddocks.
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Performance indicators:

A. Soil sampling produces a set of samples that is representative of the expected nutrient-rich area of each block of paddocks¹ by:

- drilling at least ten holes from dispersed locations between the shelter/s and the feeding and watering points from a block of paddocks; **AND**
- bulking the samples of soils collected from common depths to produce a single composite sample for each depth from all blocks of paddocks sampled (i.e. a bulked top soil, subsoil and profile sample).

B. Soil sampling occurs

- before the commencement of each pig phase that is expected to exceed 24 months in length; **AND**
- at the end of any 24 month period in which pigs are stocked on an area for any length of time; **AND**
- at the end of any subsequent 24 month period that includes a pig phase.

C. Soil sampling depths and analysis parameters are either in accordance with the conditions of a planning or development consent, approval, permit or licence; **OR**

if not stipulated, in accordance with the following:

Soil test parameter	Depth
pH	0-0.1 m 0.3-0.6 m OR bottom 0.3 m of soil profile OR 0.3 m to base of root zone
Electrical conductivity	0-0.1 m 0.3-0.6 m OR bottom 0.3 m of soil profile OR 0.3 m to base of root zone
Nitrate-nitrogen	0-0.1 m 0.3-0.6 m OR bottom 0.3 m of soil profile OR 0.3 m to base of root zone
Available phosphorus	0-0.1 m 0.3-0.6 m OR bottom 0.3 m of soil profile OR 0.3 m to base of root zone
Phosphorus buffer capacity or phosphorus sorption index	0-0.6 m OR 0 m to base of soil profile OR 0 m to base of root zone
Potassium	0-0.1 m 0.3-0.6 m OR bottom 0.3 m of soil profile OR 0.3 m to base of root zone
Organic carbon	0-0.1 m
Exchangeable cations and CEC	0-0.1 m 0.3-0.6 m OR bottom 0.3 m of soil profile OR 0.3 m to base of root zone

¹ A block of paddocks is defined as a group of adjacent paddocks used simultaneously to run pigs. For piggeries that operate with a radial paddock system, one radial would constitute a block of paddocks. Similarly, if a piggery uses eight adjacent rectangular paddocks at a time this would constitute a block of paddocks.

1.2.2 Nutrient Management Standard

Standard	<p>If the pig phase is expected to last for 24 months or longer, the results of soil testing show that soil nutrients are at suitable levels before the pigs move onto a land area; AND</p> <p>The results of soil testing undertaken at the end of any 24 month period that includes a pig phase show that soil nutrients are at suitable levels for the area to be used for ongoing or subsequent pig phases.</p>
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Performance indicators²:

A. Before the commencement of a pig phase expected to exceed 24 months in length, the results of soil testing show that:

- the soil properties are below the trigger values suggested as indicators of sustainability in section 17.5.4 of the *APL National Environmental Guidelines for Piggeries, Second Edition (Revised)* Published in 2011; **OR**
- the soil properties are similar to; i.e. no more than 30% greater³ than those of a representative background plot⁴; **OR**
- the soil properties are satisfactory to the licensing authority or an independent soil scientist or agronomist⁵.

B. The results of soil testing undertaken on areas that have included a pig phase over any part of any 24 month period show that:

- the soil properties are below the trigger values suggested as indicators of sustainability in section 17.5.4 of the *APL National Environmental Guidelines for Piggeries, Second Edition (Revised)* Published in 2011; **OR**
- the soil properties are similar to; i.e. no more than 30% greater³ than those of a representative background plot; **OR**
- the soil properties are satisfactory to the licensing authority or an independent soil scientist or agronomist.

² A Nutrient Management Plan (NMP) is not specifically included as a Performance Indicator. However, it is valuable to develop and implement a NMP to ensure the soil nutrient properties required by the Performance Indicators can be achieved.

³ APIQ[®] FR and OB Standards Guide for Producers and Auditors.

⁴ A representative background plot is an area of land that has a similar soil type and is physically close to the land being monitored, that is sampled and analysed at the same time, to provide a basis for comparison when interpreting soil test results. It should not have been used for outdoor pig production, irrigated with effluent or spread with manure, or recently had fertiliser applied. It is recognised that it is not always easy to find a suitable background plot. The location of the representative background plot should be carefully noted as samples should be collected from the same location each time.

⁵ It is the farm's responsibility to ensure that their business complies with the permit/licensing arrangements required by their state authority/local council.

1.2.3 Promoting Even Nutrient Distribution Standard

Standard	Facilities and practices are actively managed to promote dispersal of manure nutrients over the paddock area.
Performance indicators:	
A. For breeder paddocks:	
<ul style="list-style-type: none"> - readily movable structures that could include shelters, shade, feeding points, waterers, wallows and spray or drip cooling facilities are moved within the paddock at least every six months to promote more even manure deposition over the land; OR - feed is always delivered right along the length of a paddock perimeter fence line or dispersed over a significant part of the paddock area and feeding areas are well separated from shelters; OR - when the length of the pig phase is less than six months, readily movable structures that could include either shelters, shade, feeding points, waterers, wallows and spray or drip cooling facilities are located in different positions before the return of pigs to the area. 	
B. For grower paddocks:	
<ul style="list-style-type: none"> - readily movable structures that could include shelters, shade, feeding points, waterers, wallows and spray or drip cooling facilities are moved within the paddocks at least every three months to promote more even manure deposition over the land; OR - feed is always delivered right along the length of a paddock perimeter fence line or dispersed over a significant part of the paddock area and feeding areas are well separated from shelters or these feeding areas are moved to a new location at least every three months; OR - before the return of pigs to the area and when the length of the pig phase is less than three months, readily movable structures that could include shelters, shade, feeding points, waterers, wallows and spray or drip cooling facilities are moved to different positions within the paddock. 	
C. If significant quantities of spent bedding are produced from shelters, this material is:	
<ul style="list-style-type: none"> - dispersed over land within the pig paddocks that is not within the expected nutrition rich areas that are bounded by the shelters, shade, feeding points, waterers, wallows and spray or drip coolers; OR - removed from the pig paddocks for spreading on other parts of the farm or for reuse off-farm. 	

1.2.4 Land and Water Protection Standard

Standard	Land and water are protected by minimising soil erosion throughout both the pig and the crop, forage or pasture phases of the rotation; by rehabilitating the site after the pig phase; by using water protection measures; and by properly constructing and managing wallows.
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Performance indicators:

A. Land is managed to minimise soil erosion by:

- selecting sites with a flat to gentle slope; **AND**
- maintaining sufficient groundcover⁶ over paddocks as much as practical throughout both the pig and the crop, forage or pasture phases to minimise erosion; **AND / OR**
- installing and maintaining properly designed shelter belts and / or filter strips and / or contour banks in blocks of paddocks.

B. Each block of paddocks is examined:

- on completion of the pig phase; **OR**
- where the pig phase exceeds 24 months in length the paddocks are examined at least every 24 months; **AND**
- any soil erosion or structural issues that need addressing are identified; **AND**
- a plan to address these is developed and implemented within three months of the completion of the examination.

C. Where significant soil compaction has resulted from the pig phase, the site is remediated by:

- only cultivating the soil when the moisture content is between wilting point and field capacity; **AND / OR**
- growing pasture ley crops (ungrazed); **AND / OR**
- deep ripping the soil (if this is a suitable measure for the soil type); **AND / OR**
- applying gypsum to the soil (if this is a suitable measure for the soil type).

D. Removal of nutrients in stormwater runoff is minimised by:

- maintaining groundcover over paddocks throughout both the pig and the crop, forage or pasture phases; **AND / OR**
- maintaining a continuous resilient vegetative buffer strip ideally consisting of a runner developing, non-clump forming grass species at least 10 m wide immediately downslope of the entire paddock area/s; **OR**
- installing terminal ponds sized and located to catch the first 12 mm of runoff from the piggery paddocks and other land within the same local catchment area.

E. Sites selected for wallows have loam to clay soils or the base of the wallow is lined with compacted clay.

⁶ Groundcover is any material on or near the soil surface that provides protection for the soil against the erosive action of rainfall runoff or wind. It may include plant material (alive or dead), spent bedding and other cover materials providing these will not be carried away in rainfall runoff or blown away by the wind. Since attached plant material is more effective than dead plant material or other light matter lying on the soil surface it is recommended that it make up the majority of the groundcover.

F. Wallows are remediated when they are replaced and if needed within three months of completion of the pig phase by:

- deep ripping the soil; **AND / OR**
- applying gypsum to the soil (if these are suitable measures for the soil type); **AND**
- filling with soil; **AND**
- levelling to match the slope of the immediately surrounding land.

G. A forage crop or pasture is given time to establish before the commencement of a pig phase.

NOTE: Only producers who meet the full set of APIQ✓[®] FR Standards will be APIQ✓[®] FR certified. Those producers who meet Standards 1.2A to 1.2E and are able to demonstrate that they are in the process of addressing Standards 1.2.1 to 1.2.4, will be certified as Conditional APIQ✓[®] FR. A producer with Conditional APIQ✓[®] FR certification has until close of business (COB) 30 April 2014 to comply with all APIQ✓[®] FR Standards at which time APIQ✓[®] Certification Policy 9 (CP9), Producer APIQ✓[®] Certification Status and non compliance to APIQ✓[®] Standards, comes into effect.

1.3 Outdoor Bred Production Requirements

Standard	The piggery production system complies with the APIQ [✓] ® definition and standards for 'Outdoor Bred' production. Production is carried-out according to accepted Good Agricultural Practices (GAP) for the production of Outdoor Bred pigs.
-----------------	--

Performance indicators:

Sows and piglets are managed as per Free Range Standards until weaning (see 1.2 B – E)

A. The piglets up until weaning and the sows from which they are bred have access to paddocks at all times.

Where pigs are confined temporarily for vaccinations, mating or under veterinary advice systems are in place which support the need for confinement.

B. At weaning piglets are transferred to deep litter housing, intensive indoor housing, or feedlot outdoor pens for growing and/or finishing.

Note: Additional standards for outdoor bred piggeries are being developed and will be available once approved.

APPENDIX B

Site Selection Characteristics, APL (2011)

July 2011

FACT SHEET

DESIGN AND MANAGEMENT OF OUTDOOR FREE RANGE AREAS FOR PIGS

Free Range (FR) pig production is often promoted on the basis of improved animal welfare and environmental performance compared to conventional pork production. However, if not managed well, outdoor production systems pose different and sometimes higher risks than indoor (conventional / deep litter) piggeries such as nutrient overloading and subsequent losses, soil structure issues (e.g. compaction), vegetation degradation and soil erosion.

Site selection factors important in applying good agricultural practices outdoor free range areas include:

- Finding a site with an annual rainfall of less than 750 mm, a mean maximum January temperature of less than 28°C and a mean minimum July temperature exceeding 3°C;
- Providing sufficient land for a sustainable system to operate;
- Protecting surface waters by providing a buffer at least:
 - i. 800 m wide between the piggery and a major water supply storage, and
 - ii. 100 m wide between the piggery and a defined watercourse;
- Protecting sensitive land uses such as by providing separation distances between the FR piggery and sensitive land use of at least:
 - i. 200 m to a public road carrying >50 vehicles per day, and
 - ii. 100 m to a public road carrying <50 vehicles per day, and
 - iii. 750 m to a town, and
 - iv. 500 m to a rural residential area, and
 - v. 250 m to a rural dwelling, and
 - vi. 20 m to a property boundary;
- Selecting a site with soils that are well drained but which contain sufficient clay to retain nutrients in the root zone. Sites with light soils are subject to wind erosion (and nutrient removal) when groundcover is denuded. Sites with heavy soils may be difficult to traffic during wet weather; and
- Selecting a site with gently sloping land to minimise the likelihood of local flooding.

Design and management factors important in applying good agricultural practices within outdoor free range areas include:

- Nutrient budgeting. While N, P and K accumulate in soils of FR piggeries, the nutrient accumulation rate is generally not high unless an area has been stocked continuously for more than two years. Consequently, rotations should be planned such that pigs are not continuously stocked on an area for longer than two years. Following the pig stocking phase, crops should be grown to utilise accumulated N, P and K.
- Encouraging even spreading of manure nutrients. A major challenge of FR systems is that manure, and consequently nutrients, is not spread evenly across the paddock. This increases the risk of nutrient overloading, leaching and/or runoff. Moving pig housing and feeding facilities regularly during the stocked phase will help spread nutrients more evenly.
- Adopting strategies to minimise uncontrolled movement of nutrients from FR piggery paddocks. These including regular spelling from pig production, with a plant growth and harvest phase to remove the nutrients added through the stocked phase and provision of a physical barrier and / or a good hardy vegetative cover around the piggery perimeter.
- Providing wallows on soils that allow for minimal nutrient leaching (alternatively clay can be added to the wallows to reduce the leaching rate through the base). Wallows need to be frequently emptied and cleaned to avoid heavy contamination. Wallows should be remediated by ripping; applying gypsum as needed; and proper refilling and levelling.
- Undertaking routine environmental monitoring, particularly soil monitoring during the cropping phase of the rotation.

Disclaimer: The opinions, advice and information contained in this publication have not been provided at the request of any person but are offered by Australian Pork Limited solely for informational purposes. While the information contained on this publication has been formulated in good faith, it should not be relied on as a substitute for professional advice. Australian Pork Limited does not accept liability in respect of any action taken by any person in reliance on the content of this publication.

APPENDIX C

Photos of Subject Land



View of Flood Plain Area (Degraded Condition)



View of Flood Plain from Rotational Outdoor Piggery Area



View of Rotational Outdoor Piggery Area



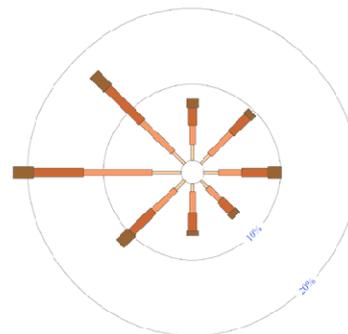
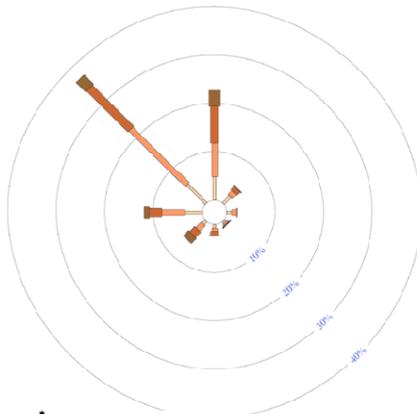
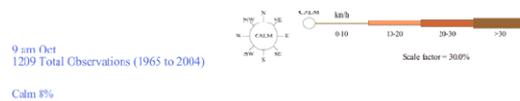
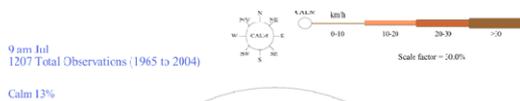
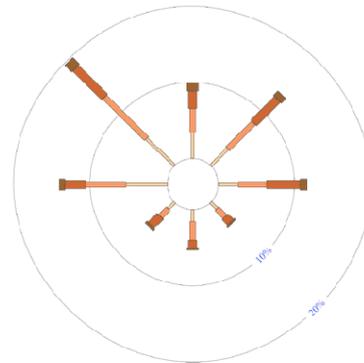
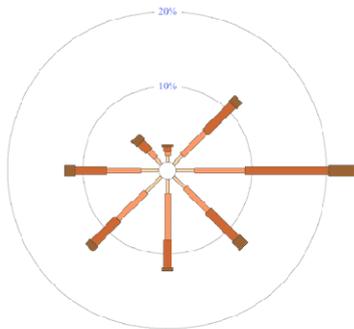
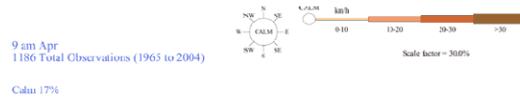
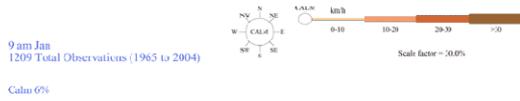
Native Vegetation Windbreaks are in a degraded condition due to historical grazing

APPENDIX D

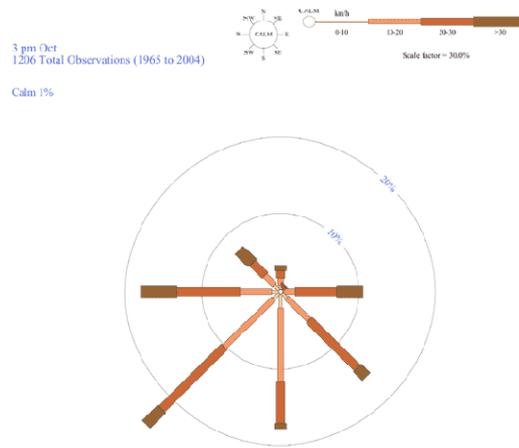
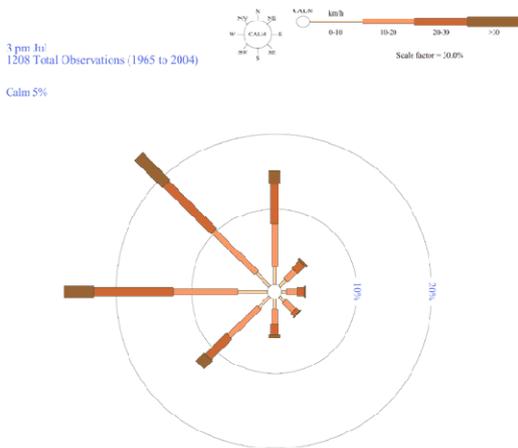
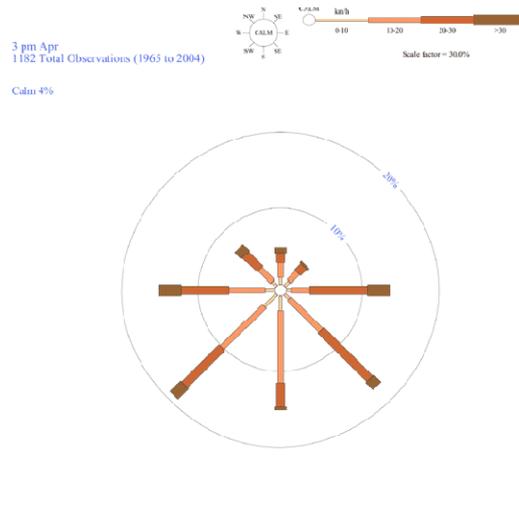
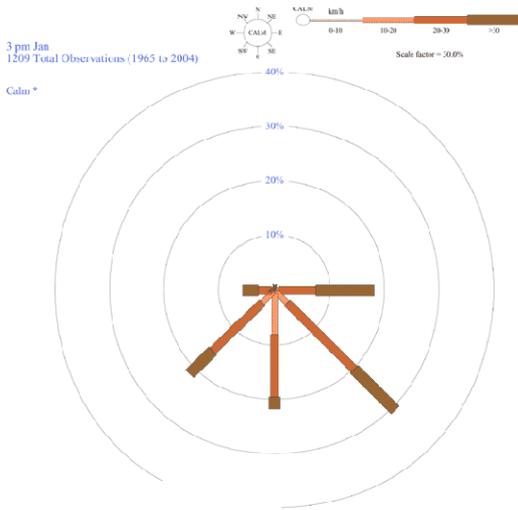
Albany Wind Roses – Bureau of Meteorology

Appendix D: Albany Wind Roses

Wind Roses for Albany Airport at 9am



Wind Roses for Albany Airport at 3pm



APPENDIX E

Soil Profile



Bore Log

BORE HOLE No: BGT T1,

Green Valley ROP

Project:	BGT-2014-001	Client:	Benmore Grazing Trust
Location:	Lot 5759 Hazzard Rd	Job No:	

Elevation:	~ 68 m, AHD	Logged By:	MP
Coordinates:	N: 6136724 E: 50575578	Date Logged:	1/7/14 8:15am
Drill Method:	Bobcat w/ excavator	Checked By:	
Driller:	Baker Trenching	Initial Water Level: (m)	N/A
		Static Water Level (m)	N/A

Geological Unit	Depth (m)	Well Construction	Samples/Measurements	Graphic Log	Unified Soil Classification	Description (Trace <10%; Little 10%-20%; Some 20%-30%)
	0 - 15cm					grey sand - root zone & organic matter - fine grained, some silt with pea gravel
	35cm					grey sand { Transition to gravelly sand (light brown/orange) Area of consolidated laterite gravel / rocks / boulders.
	1.1					Transition to clay / with gravel.
						Soil profile dry.
						refusal
	2					Permeability measured BGT Ø1



Auger -
Bore hole to 3.0m - dry
No 187 piezo installed.



Bore Log

BORE HOLE No: BGT - T2 - P2

Project:	Green Valley ROP	Client:	Benmore Grazing Trust
Location:	lot 5759 Hazzard Rd	Job No:	BGT-2014-001

Elevation:	~58 m	m, AHD	Logged By:	MP
Coordinates:	N:	E:	Date Logged:	1/7/14
Drill Method:	Bobcat w/ excavator/ auger		Checked By:	
Driller:	Barker trenching		Initial Water Level: (m)	N/A
			Static Water Level (m)	N/A

Geological Unit	Depth (m)	Well Construction	Samples/Measurements	Graphic Log	Unified Soil Classification	Description (Trace <10%; Little 10%-20%; Some 20%-30%)
	0 ↓ 15					grey sand fine grained - some silt organic matter, root zone. light brown fine grain sand - some silt ↓ Gravelly sand with laterite some gravel / staining laterite gravel / rocks / boulders. interspersed in profile. Transition to more orange brown soil w/ gravel Soil profile dry. siltstone / semi consolidated at depth.
	2					To 1.9m Auger — to 3.1m BGL No GW detected to 3m Piezometer installed

Permeability measured BGT 0/2
108

BGT/P2



Bore Log

BORE HOLE NO: BGT-T3-P3

Project:	Green Valley ROP	Client:	Benmore Grazing Trust
Location:	Lot 5759 Hazzard Rd	Job No:	BGT-2014-001

Elevation:	~ 42 m, AHD	Logged By:	MP
Coordinates:	N: 34.901307 E: 117.827348	Date Logged:	1/7/14
Drill Method:	Bobcat w/ excavator & auger	Checked By:	
Driller:	Barber Trenching	Initial Water Level: (m)	Static Water Level (m)

Geological Unit	Depth (m)	Well Construction	Samples/Measurements	Graphic Log	Unified Soil Classification	Description (Trace <10%; Little 10%-20%; Some 20%-30%)
	0					grey to dark grey organic matter, root zone
	0.5					light grey sand
	0.5	excavator refusal @ 40cm				Soil profile moist
	1.0					latite horizon - solid sheet - Refusal (Tried two trenches but same result) 10m apart
	1.5					Clayey sand (little clay)
	2.0					some gravel
	2.5					grading to white clayey sand (some clay)
						Orange staining
						Auger - to 3.1m BGL
						Piezometer installed BGT-P3

Permeability not measured.

TOC 858 189 Above GL

GW present (need to come back w/ dipper)

APPENDIX F

Soil Sampling Results – Top 10cm

A/WEST, B/EAST, C/NORTH, A/B/C, E/C/Y, and E/SE

TRADING NAME: BENMORE GRAZING TRUST

FARM: NUlogic Default

INTERPRETED ON: 15 May 2014

ACCREDITED ADVISOR: Brad Fisher

PHONE: +61-8-9892-2004

MOBILE: +61-4-2744-6357

EMAIL: brad.fisher@csbp.com.au

SAMPLE TYPE: Soil

CROP / PASTURE: Subterranean Clover

INTERPRETIVE CRITERIA: SUB CLOVER - WA

ACCREDITATION:



Interpretation Results by Sample Site

Paddock:	A/ WESTB/ (0.0 ha)	B/EAST (0.0 ha)	C/ NORTH (0.0 ha)	A/B/C (0.0 ha)	E/C/Y (0.0 ha)	E/SE (0.0 ha)
Site:	1 (- ha)	1 (- ha)	1 (- ha)	3 (- ha)	2 (- ha)	FLATS (- ha)
Lab Number:	ZQS14013	ZQS14014	ZQS14015	ZQS14016	ZQS14017	ZQS14018
Sample Depth:	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm

pH [1:5 soil/CaCl2] {4B1}	3.7 <<	3.9 <<	3.8 <<	3.6 <<	4.4 <<	4.2 <<
pH [1:5 soil/water] {4A1}	4.8	5.0	4.7	4.5	5.7	5.2
EC [1:5] (dS/m) {3A1}	0.039 ok	0.041 ok	0.048 ok	0.368 ok	0.049 ok	0.177 ok
Organic C [W&B] (%) {6A1}	2.86 ok	2.75 ok	3.54 ok	4.89 ok	3.12 ok	4.05 ok
Nitrogen	high	high	high	high	high	high
NO3-N [KCl] (mg/kg) {7C1c}	12.2	12.2	15.0	3.1	9.3	2.1
NH4-N [KCl] (mg/kg) {7C1a}	13.3	8.7	13.2	22.0	4.4	33.6
P [Colwell] (mg/kg) {9B1}	12 low	22 low	21 low	10 low	13 low	38 low
PBI+CoIP {9I2a}	14 <<	34 <	25 <	3 <<	8 <<	114 >
K [Colwell] (mg/kg) {18A1}	50 low	95 marginal	58 low	107 marginal	154 sufficient	93 marginal
S [KCl-40] (mg/kg) {10D1}	4 low	4 low	4 low	13 sufficient	3 low	21 high



NOTE: Only low, marginal and excess values have been shaded here.

Interpretation Results by Nutrient

Key
 low marginal sufficient high excess

Nitrogen

- 1
- 1
- 1
- 3
- 2
- FLATS



pH CaCl2

- 1
- 1
- 1
- 3
- 2
- FLATS

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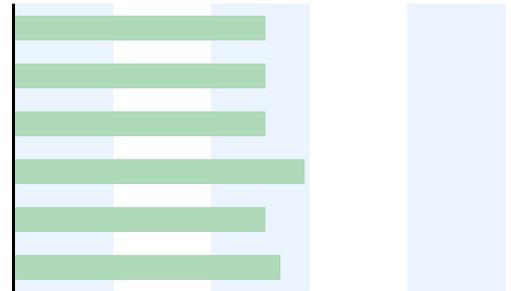
Phosphorus

- 1
- 1
- 1
- 3
- 2
- FLATS



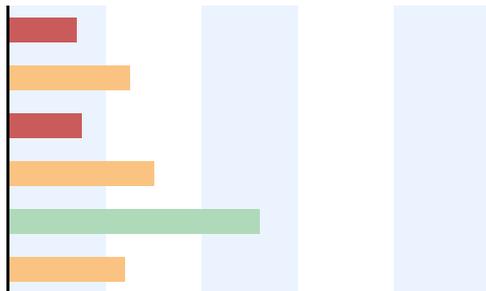
EC

- 1
- 1
- 1
- 3
- 2
- FLATS



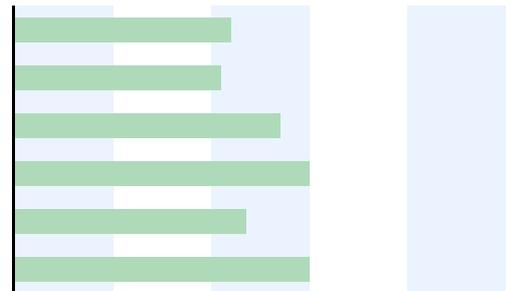
Potassium

- 1
- 1
- 1
- 3
- 2
- FLATS



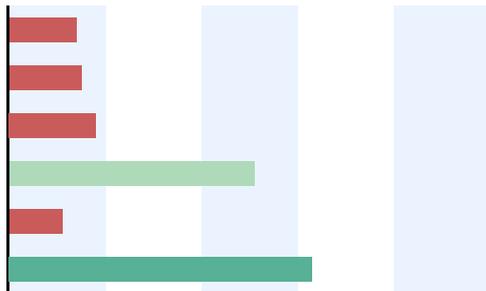
Organic Carbon

- 1
- 1
- 1
- 3
- 2
- FLATS



Sulphur

- 1
- 1
- 1
- 3
- 2
- FLATS



PBI

- 1
- 1
- 1
- 3
- 2
- FLATS



Comments

pH: Levels all very low, requiring long term liming program to correct. Ideal pH level is around 5.5 (CaCl) for optimum growing environment and nutrient availability. Suggest robust rates of lime be applied in January with a following application 2-3 years thereafter.

Phosphorus: Soil levels all in the low category. Applied phosphorus will be essential to achieve target production levels. Suggested inputs in line with district production averages and to also maintain soil statuses.

Phosphorus Buffering Index: Low to marginal PBI levels present. This is a measure of the soils ability to hold phosphorus (low levels means phosphorus is leachable). CSBP's sustained release phosphorus based products should be used in these situations.

Potassium: Potassium levels low at sites A and C, while B, D and F are all marginal. Potash has been recommended in autumn fertiliser as a result.

Sulfur: Low sulfur levels present, however this will be overcome for this season with the amount of sulfur supplied in Super SR 4:1.

Product Recommendations

Paddock:	A/ WESTB/ (0.0 ha)	B/EAST (0.0 ha)	C/ NORTH (0.0 ha)	A/B/C (0.0 ha)	E/C/Y (0.0 ha)	E/SE (0.0 ha)
Site:	1 (- ha)	1 (- ha)	1 (- ha)	3 (- ha)	2 (- ha)	FLATS (- ha)
Super SR 4:1 (kg/ha)	220	220	220	220	220	220
Topdress - May	-	-	-	-	-	-
Lime (kg/ha)	3000	3000	3000	3000	3000	3000
Topdress - January	-	-	-	-	-	-

IMPORTANT NOTE

This report provides an evaluation of the samples provided by the customer and recommendations are based on these samples. The report is a guide only, as accuracy of the analysis and recommendations relies on the customer providing representative and uncontaminated samples obtained in accordance with CSBP's guidelines. Further, as crop and pasture performance depend on extensive factors beyond CSBP's control, CSBP makes no representation and gives no guarantee of improved crop or pasture performance on application of the recommendations. CSBP is not liable for any injury, loss or claim arising out of or related to the customer's and/or customer's adviser's interpretation and application of such recommendations.

APPENDIX G

Phosphorus Buffering Index Results- Subsoil

86486
Aurora Environmental (Albany)

Lab No	4RS14134	4RS14135	4RS14136	4RS14137	4RS14138	
Name	BGT/T1	BGT/T2	BGT/T3	BGT4	BGT5	
Code	BGT-1014-001	BGT-1014-001	BGT-1014-001	BGT-1014-001	BGT-1014-001	
Customer	Benmore Grazing Trust					
Depth	0-10	0-10	0-10	0-10	0-10	
Phosphorus Colwell	mg/Kg	4	7	9	14	16
Potassium Colwell	mg/Kg	34	23	39	38	60
PBI		73.2	47.6	198.9	19.1	477.2

APPENDIX H

Permeability Results



Job No.: BGT-2014-001
 Green Valley
 Rotational
 Outdoor
 Site: Piggery Zone: 50
 Location ID: BGT01 Northing: 6167729
 Operator: MP Easting: 562563
 Date: 1/07/2014 Slope: Gentle slope

Vegetation: pasture
 Soil structure: 0-0.3m BGL Grey sand (fine) with some silt and gravel
0.3 to 1.6m BGL Areas of consolidated laterite, gravelly sands grading to light brown/orange

Average time to fall 10cm: 260.87 sec

Depth of water in hole: 23 cm
 Diameter of test hole: 8 cm
 Depth to impermeable layer: 0 cm

Diameter of water reservoir: 6 cm
 Diameter of air inlet tube: 0.8 cm

The method of calculation is taken from AS 1547:2012 On-site Domestic Wastewater Management

$$K_{sat} = \frac{4.4Q \left[0.5 \sinh^{-1} \left(\frac{H}{2r} \right) - \sqrt{\left\{ \left(\frac{r}{H^2} \right) + 0.25 \right\} + \frac{r}{H}} \right]}{2\pi H^2}$$

where

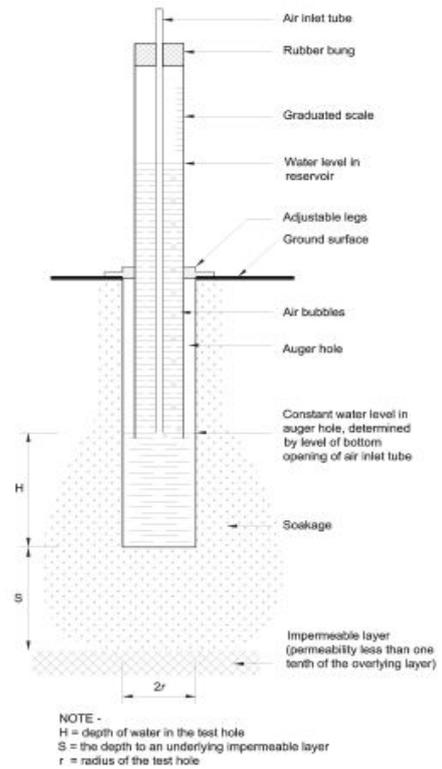
- K_{sat} = saturated hydraulic conductivity of the soil in cm/min
- 4.4 = correction factor for a systematic under-estimate of soil permeability in the mathematical derivation of the equation
- Q = rate of loss of water from the reservoir in cm³/min
- H = depth of water in the test hole in cm
- r = radius of the test hole in cm

Rate of water loss

$Q = 0.0011$ L/sec
 $Q = 63.9$ cm³/min

Saturated hydraulic conductivity

$K_{sat} = 0.05$ cm/min
 $K_{sat} = 0.68$ m/day
 $K_{sat} = 7.83E-06$ m/sec



K_{sat} in m/s	Inferred Soil Type
1×10^0	Clean gravels
High Permeability	
1×10^2	Clean sands, sand gravel mixes
Medium Permeability	
1×10^4	Very fine sands, silts and silty sands
Low Permeability	
1×10^6	Clay silts (greater than 20% clay)
Very Low Permeability	
1×10^8	
Practically Impermeable	
1×10^{10}	
1×10^{11}	
1×10^{12}	



Job No.: BGT-2014-001
 Green Valley
 Rotational
 Outdoor
 Site: Piggery Zone: 50
 Location ID: BGT02 Northing: 6137145
 Operator: MP Easting: 57557187
 Date: 1/07/2014 Slope: Gentle slope

Vegetation: pasture
 Soil structure: 0-0.15m BGL Grey sand (fine) with silt and gravel
 0.15 to 1.9m BGL Areas of consolidated laterite, gravelly sands grading to light brown/orange

Average time to fall 10cm: sec

Depth of water in hole: cm
 Diameter of test hole: cm
 Depth to impermeable layer: cm

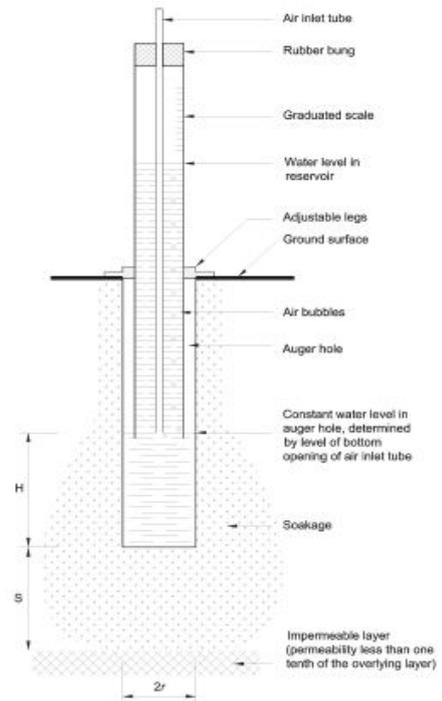
Diameter of water reservoir: cm
 Diameter of air inlet tube: cm

The method of calculation is taken from AS 1547:2012 On-site Domestic Wastewater Management

$$K_{sat} = \frac{4.4Q \left[0.5 \sinh^{-1} \left(\frac{H}{2r} \right) - \sqrt{\left\{ \left(\frac{r}{H^2} \right) + 0.25 \right\} + \frac{r}{H}} \right]}{2\pi H^2}$$

where

- K_{sat} = saturated hydraulic conductivity of the soil in cm/min
- 4.4 = correction factor for a systematic under-estimate of soil permeability in the mathematical derivation of the equation
- Q = rate of loss of water from the reservoir in cm³/min
- H = depth of water in the test hole in cm
- r = radius of the test hole in cm



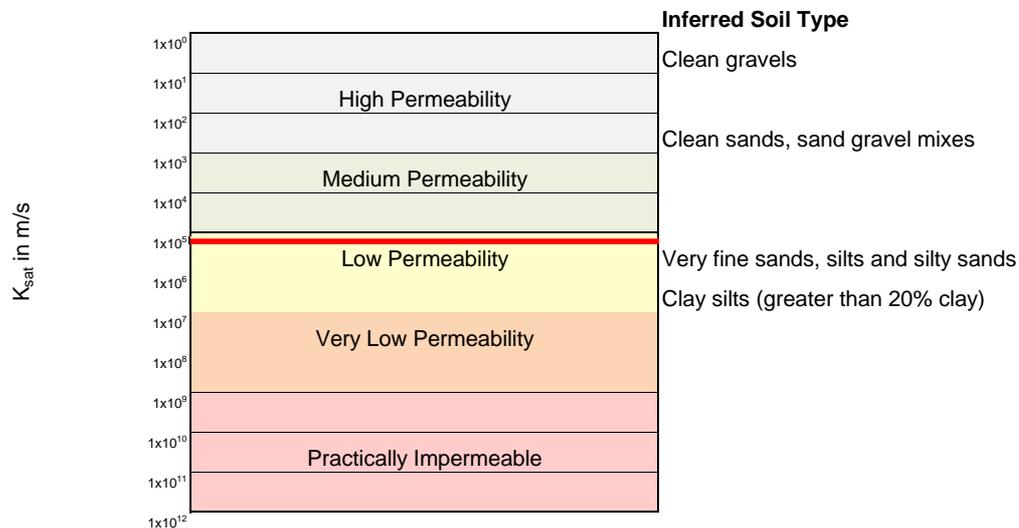
NOTE -
 H = depth of water in the test hole
 S = the depth to an underlying impermeable layer
 r = radius of the test hole

Rate of water loss

Q= 0.0036 L/sec
 Q= 215.2 cm³/min

Saturated hydraulic conductivity

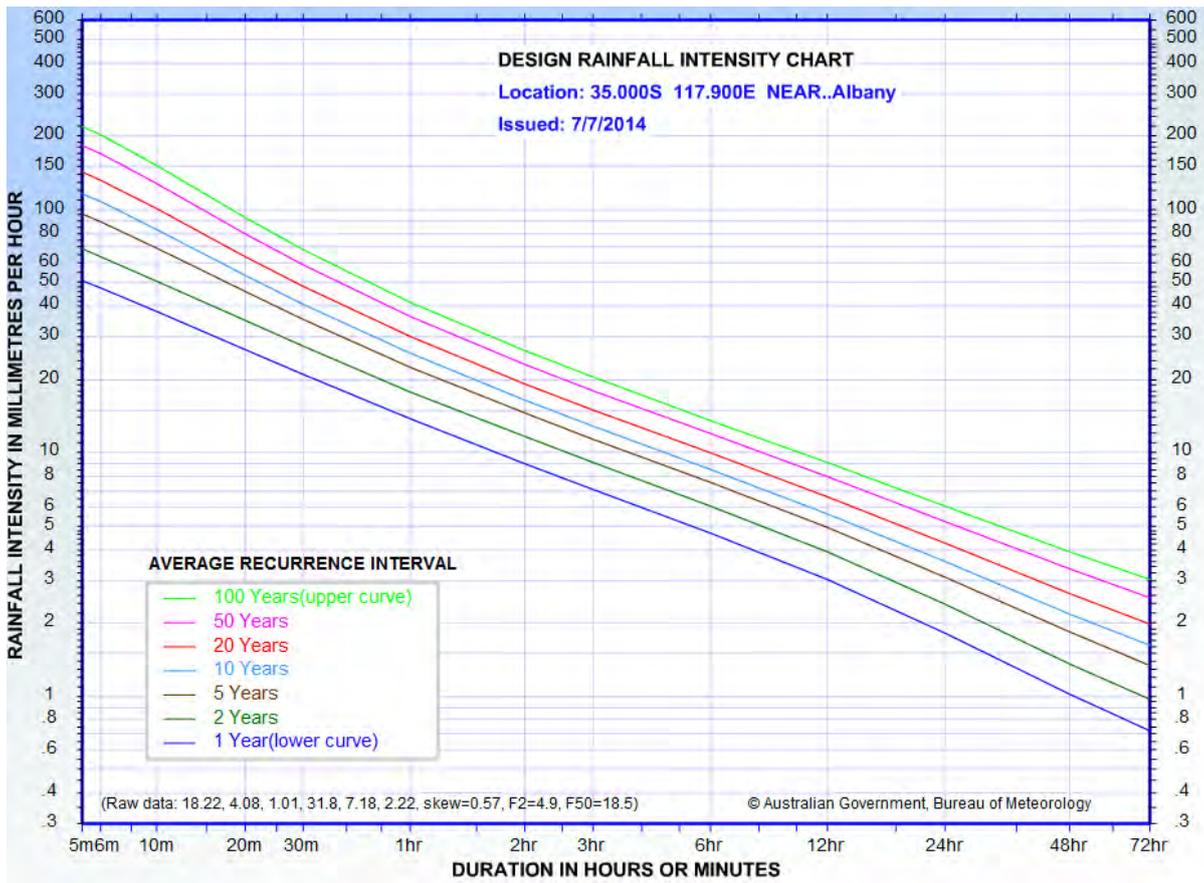
K_{sat} = 0.09 cm/min
 K_{sat} = 1.35 m/day
 K_{sat} = 1.57E-05 m/sec



APPENDIX I

Design Rainfall Intensity Chart and Intensity Frequency Duration Table – Albany

Design Rainfall Intensity Chart and Intensity Frequency Duration Table – Albany



Intensity-Frequency-Duration Table

Location: 35.000S 117.900E NEAR.. Albany Issued: 7/7/2014

Rainfall intensity in mm/h for various durations and Average Recurrence Interval

Average Recurrence Interval

Duration	1 YEAR	2 YEARS	5 YEARS	10 YEARS	20 YEARS	50 YEARS	100 YEARS
5Mins	51.2	69.0	95.9	116	143	183	219
6Mins	47.6	64.0	89.1	108	132	170	203
10Mins	38.1	50.8	69.4	82.8	101	128	152
20Mins	26.6	35.0	46.0	53.6	64.1	79.5	92.6
30Mins	21.0	27.5	35.4	40.8	48.4	59.3	68.4
1Hr	13.8	17.8	22.5	25.7	30.1	36.4	41.6
2Hrs	9.03	11.7	14.6	16.5	19.2	23.1	26.3
3Hrs	7.09	9.14	11.4	12.9	15.0	18.0	20.5
6Hrs	4.69	6.05	7.56	8.56	10.0	12.0	13.6
12Hrs	3.02	3.92	4.94	5.63	6.60	7.99	9.13
24Hrs	1.82	2.39	3.09	3.58	4.26	5.23	6.04
48Hrs	1.02	1.36	1.84	2.18	2.64	3.34	3.92
72Hrs	.722	.972	1.34	1.62	1.98	2.54	3.02

(Raw data: 18.22, 4.08, 1.01, 31.8, 7.18, 2.22, skew=0.57, F2=4.9, F50=18.5)

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Sources:

<http://www.bom.gov.au/water/designRainfalls/rainfallEvents/why100years.shtml>

<http://www.bom.gov.au/hydro/has/cdirswebx/cdirswebx.shtml>

DESIGN AND MANAGEMENT OF OUTDOOR FREE RANGE AREAS FOR PIGS (APL, 2011)		
SITE SELECTION FACTORS:	RECOMMENDATION	
Buffer of 800m between piggery and major water supply storage	There are no major water supply storage areas within 800m of the subject land.	Proposed ROPs meet this site selection requirement.
Buffer of 100m between piggery and a defined water course	ROP units are set back at least 100m from the King River and its flood plain.	Proposed ROP meets this site selection requirement.
Buffer of 100m to a public road carrying less than 50 vehicles per day. Buffer of 200m to a public road carrying more than 50 vehicles per day.	Hazzard Road carries less than 50 vehicles per day (Planning and Engineering Support, City of Albany pers comm.). The buffer to this road from proposed ROPs is 100m. Marbellup Road carries more than 50 vehicles per day. A buffer for proposed ROPs allows for a 200m setback.	Proposed ROP meets this site selection requirement.
Buffer of 750m to a town site.	King River townsite is 6km to the south east Redmond townsite is 11.5km to the west.	Proposed ROP meet this site selection requirement.
Buffer of 500m to a rural residential area.	There are no rural residential areas within 500m. The closest type of rural residential development is 2.2km to the south east in Millbrook.	Proposed ROP meet this site selection requirement.
Buffer of 250m to external rural dwelling	The nearest dwelling external to the subject land is 100m south on Lot 1 Hazzard Road and 300m from the nearest proposed ROP unit.	Proposed ROP meets this site selection requirement.
Buffer of 20m from a property boundary	All existing and proposed ROPs are at least 20m from the property boundaries.	Proposed ROP meets this site selection requirement.

CITY OF ALBANY

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1	Adjoining owner	<p>Have the following objections are</p> <p>The proposed piggery 20 metres from their boundary.</p> <p>Air Pollution Obviously this is the most important aspect for us and probably more relevant than most neighbours is the impact of the smell and this for us is major grounds for our objection.</p> <p>Air pollution (or odour) is one of the most lodged complaints in regards piggeries to local councils.</p> <p>Our residence would be 500 metres from the eastern boundary from the closest proposed piggery and we are in the path of the easterlies and south easterlies which blow in the summer in Albany,</p>	<p>The production area proposed is more than 350m from Lot 202 Millbrook Road. The proposal meets all applicable requirements to reduce environmental and health risks as reported in Aurora Environmental (2014).</p> <p>In the case of Rotational Outdoor Piggeries (ROPs), research indicates that there are only low concentrations of emissions relating to odour, dust and noise (University of Southern Queensland and National Centre for Engineering in Agriculture, 2013; Attachment 2) so it is considered that this proposal will not cause air pollution, odour or dust. The National Guidelines for ROPs (Tucker and O’Keefe, 2013) have been based on research and experience in this industry.</p> <p>The existing built structure on Lot 202 Millbrook Road is 1.6km from the proposed ROP production area. The closest that a dwelling on this lot could realistically be built is 830m due to the</p>	<p>Odour The application has also been assessed and meets the setback requirements set by the EGROP 2013 (Tucker and O’Keefe, 2013).a summary of how it meets the setbacks is as per the attached table extracted from the EMP.</p> <p>Odour from the proposed piggery is therefore not likely to have a detrimental impact on the adjoining lots or affect the rural residential area as long as the piggery is managed appropriately in accordance with the relevant guidelines.</p> <p>A condition requiring the piggery to be managed appropriately in accordance with the guidelines and APIQ accreditation is recommended to deal with these</p>

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		<p>therefore blowing the smell of the piggery to our residence for 5- 6 months of the year. Noise pollution is something you can escape from mostly knowing it has an end time. Air pollution, smell or odour is not something you can escape from. It is also noted that the proponents do not live on the property, so factors that are relevant to us and the wider community may not affect the proponents.</p> <p>Flies</p> <p>Much work has been carried out in recent months to control flies in the greater region, with the release of dung beetles. An intensive piggery will bring more flies with no details listed to control flies.</p> <p>Visual Pollution</p> <p>The proposed huts are to be made of zinalume. Our views are to the south, south east, in the immediate direction of the first stage of the piggery. We believe most properties are not allowed to build with zinc that is reflective due to the effect on neighbours. Surely this would be no different to building sheds, etc it is in direct view and of a reflective nature. Can this be changed to a non- reflective material.</p>	<p>presence of the King River flood plain. These distances provide a more than adequate buffer for dispersal of odour when considered in light of National Environmental Guidelines for ROPs (Tucker and O’Keefe, 2013). The proponents do intend to live on the property.</p> <p>Fly levels will be minimised through good farming practice, including thinly spreading litter on rotational and cropping areas and use of bait stations.</p> <p>The breeder ROP facility will be viewed from a distance (e.g. at least 830m from any dwelling on Lot 202) which will reduce the impact of the farrowing huts. The roof of each hut is only 2.4m x 2.4m in size and will be viewed obliquely from any surrounding properties. The sides of the shelters will be brown (timber). The City of Albany building codes do</p>	<p>concerns.</p> <p>Flies</p> <p>Concerns are noted. Appropriate management of the piggery in accordance with the guidelines should deal with concerns about flies.</p> <p>Visual Impact</p> <p>Concerns are noted the visual impact can be addressed through conditions that will require the proponents to construct all shelters out of non reflective materials or paint the roofs of these structures in non reflective colours.</p>

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		<p>Residency The proposed piggery is just (as stated on the report) 2.2 km from the Willyung residential rural subdivision. The Millbrook area is the currently progressing lifestyle subdivisions and population growth. Having a large 600 sow piggery just 2.2 km which will be less with urban sprawl will leave the Council open to many complaints.</p> <p>Surely it is best to ensure that a 600 sow intensive piggery is located further from residential rural areas than this.</p> <p>Nutrient Runoff It is above the recommended rainfall for outdoor free range piggeries. Total rainfall has an affect but also large rainfall episodes probably have a greater impact on the waterways due to surface runoff.</p>	<p>not include controls for colour of rural structures. The proponents are considering the cost implications of using colourbond for the larger shelters. They have committed to painting the roofs of the farrowing huts.</p> <p>The ROP meets National Environmental Guidelines and EPA State Buffer Guidelines for distance to a rural residential subdivision.</p> <p>The proposed ROP is situated in an area zoned for 'Priority Agriculture', so it is the agricultural land uses that need to be protected from residential encroachment.</p> <p>Rainfall is a relatively minor consideration in terms of key criteria for a ROP. The soil types in the production area will be able to cope with additional rainfall due to gravel and sand content. More importantly,</p>	<p>The application meets the setback requirements set by the EGROP 2013 (Tucker and O'Keefe, 2013).a summary of how it meets the setbacks is as per the attached table extracted from the EMP.</p> <p>Nutrient Runoff This matter can however be addressed by the construction of appropriately located and designed interceptor drains as recommended by the Department of Water and also by reducing the stocking rate</p>

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		<p>The proposed piggery is outside of the guidelines for the annual rainfall area of 750mm. Albany's current average rainfall from their report is 940mm. This is more than 25% above the recommendations for rainfall area for intensive free range piggeries.</p> <p>Not only is hugely above the annual rainfall they have not covered the rainfall incidence in Albany, that being the daily or rainfall period that can cause washing or runoff.</p> <p>Also due to the area being sand over clay the amount of rainfall for the profile to be wet and cause underground runoff will occur for long and extended periods of time. Philips Brook is a freshwater creek which is only created by natural runoff. If this is contaminated it will also contaminate all the downstream water.</p> <p>Piggeries are registered as having a large phosphorus output. Too much phosphorous is what promotes the growth of algae which chokes the sea grasses and what the Oyster Harbour Catchment Group have been trying to address with farmers over recent years on the effect to the Oyster Harbour.</p>	<p>management structures will be in place to capture water run-off and ensure that it is treated to remove nutrients prior to discharge to the King River and its floodplain (in line with National Guidelines for 'Managing Litter Re-Use for Minimal Nutrient Run-off to Surface Water' (Rural Industries Research and Development Corporation, 2012). The Department of Water suggests that drainage structures detain first flush rainfall for nutrient management (i.e. 20mm rainfall events) with management of erosion for larger events.</p> <p>These treatments, and the inherent capacity of the soils to buffer for nutrient management, the use of rotations and cropping will ensure that nutrients, including phosphorus will be adequately managed.</p>	<p>from 24 boars and sows per hectare to 20 per Hectare as recommended by the Department of Agriculture and Food.</p> <ol style="list-style-type: none"> 1. A further condition requiring the planting of appropriately located vegetated filter strips will assist with nutrient stripping and further protect waterways. 2. A requirement to locate all ROP areas above the 45m AHO contour, in order to achieve sufficient groundwater separation is also recommended.

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		<p>The proposed piggery only has a set-back of 50 metres from the floodplains of the Philips Brook.</p> <p>Rare Flora We were advised by the selling agent and the previous owners of our property and other adjoining farmland the Johnson brothers that Millbrook Road end of Lot 5758 was not cleared by the previous owners because there was rare flora found in the bush. Aerial photographs clearly show this as natural bush.</p> <p>We have recently travelled past the Kojonup free range piggery, and the odour was very evident on the day we travelled past.</p>	<p>No guidelines have been provided for setback from flood plains. The setback of 50m is in addition to the required setback from the King River of 100m (Tucker and O'Keefe, 2013).</p> <p>No vegetation will be removed for the establishment of the ROP.</p> <p>We are unable to comment on the operations or management of this piggery. However we do note that the only piggery in Kojonup (to our knowledge) is located on Lot 10 Crappella Road, Boscabel (800m east of Albany Highway). It is a shedded piggery, not a free range or rotational piggery. The 10,000 grower pigs in this operation are raised in large grower shelters with effluent dealt with via ponds. The operation is a prescribed premise and subject to a</p>	

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		<p>At Beaufort River there are the remains of a small piggery which has not been operating for more than 15 years.</p> <p>The smell still lingers.</p> <p>Suggest that Councillors visit the Great Southern Piggery and see if there is an odour that would offend them if they lived 350 metres from a piggery (the distance to the closest resident).</p> <p>Our personal opinion is now is the time for the Council to take action. No once the piggery is established and they have to deal with complaints of odour and flies.</p>	<p>licence under the Environmental Protection Act 1986. The Shire of Kojonup state that the piggery has operated without complaint relating to noise, odour and dust. This piggery cannot be compared to the proposed ROP as it operates very differently.</p> <p>We are unable to comment on the operations or management of this piggery, but suggest that this was also a shedded piggery and cannot be compared to the proposed operation.</p> <p>The proponents would be happy to organise visits for Councillors 1) to the proposed production area on the Benmore Grazing Trust property, 2) an operational free range breeder ROP run by Plantagenet Pork. Great Southern Piggery is a breeder piggery with 4000 sows and is not run by Plantagenet Pork.</p> <p>The City of Albany invites comments on proposals from Agencies such as Department of Water, Department of Environment Regulation etc. This</p>	

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		<p>The proposal is currently only 2.2 km from the Willung rural/residential lifestyle area, which is where Council have been supporting rural/lifestyle subdivisions. Now is the time for Council to give due consideration in rejecting this application.</p> <p>We have received this application with two weeks to formalise a reply. We believe this proposal should be brought to the attention of the wider community with a comment period.</p> <p>A small advertisement in the Albany Advertiser with lot numbers really does not notify residents of Albany of the full details or the proposal. We feel the proposal should be assessed by the relevant authorities including those covering waterways and flora.</p> <p>We believe a major factor is that the proposal is outside of the recommendation of annual rainfall by more than 25%. This surely has to be addressed as it may have major implications for the rivers and waterways</p>	<p>allows for input on various aspects of potential development impacts.</p> <p>2.2km satisfies buffer recommendations outlined in National Environmental Guidelines for ROPs (Tucker and O’Keefe, 2013) and Environmental Protection Authority buffer guidelines (EPA, 2005).</p> <p>Addressed above.</p>	

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		of Albany.		
2	Department of Water PO Box 525 ALBANY WA 6331	<p>The proposed free range piggery is located adjacent to the King River, a significant tributary to Oyster Harbour.</p> <p>The nominated buffers, to the King River and the floodplain boundary should be sufficient to mitigate the risk of nutrients being exported from the site. However, it is essential that any run-off from the rotational outdoor piggery (ROP) be contained on the site, and not be allowed to drain to the King River. Given that the rainfall in the locality significantly exceeds the site selection recommendation prepared by Australian Pork Limited, the issue of water management is not sufficiently addressed through the environmental management plan (EMP).</p> <p>The EMP should identify the location of cut-off drains and basins to manage the water on the site.</p> <p>The ROP areas need to be better defined as the site does have some constraints. The EMP identifies that high groundwater levels are an issue closer to the King River (BGT03) and recommends that the ROPs should be located above the 45m AHO contour, in order to achieve sufficient groundwater separation.</p> <p>The DoW would recommend that the proponents resubmit a plan of the site</p>	<p>The floodplain is currently in a degraded condition and contain very few areas of native vegetation. Kikuyu grass dominates the area. The proponents have fenced much of the riparian zone to exclude cattle and sheep. They also manage use of the floodplain by sheep and cattle by removing stock in winter months.</p> <p>Figure 1 has been created to conceptually indicate the extent of the ROPs (4 units in all). Figure 1 also indicates that the main drainage infrastructure will be constructed at the base of each ROP. Figure 2 shows the conceptual treatments, including contour drains (swales) and dams (basins) to detain 20mm rainfall events, trap sediments and prevent nutrient discharge to the floodplain</p>	Noted and agreed appropriate conditions will be placed on

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		showing the defined boundary of each ROP with regard to topography and surface water drainage.	and King River. Please note, that if the capacity of the contour drains is adequate, basins may not be required. For larger rainfall events, erosion control will be incorporated into the dams/basins in the form of spillways that have been stabilised with grass, geotextile or similar material. Rollover drains will also be incorporated into the rotational areas to catch water and reduce the risk of erosion.	
	Department of Agriculture and Food WA 444 Albany Highway, Albany Western Australia 6330	<p>The DAFWA encourages new industry development in the region and presents the following comments for your general information and consideration:</p> <ul style="list-style-type: none"> • It should be noted that there is still potential for land use conflict to occur with adjacent rural properties from odour. It may be appropriate for the landowner to consider vegetation screening around the rotational grow out areas. Consideration also should be given to manure management either by composting onsite or possibly by muck-spreading. • Outdoor / Extensive piggeries have the potential to contribute high nutrient loads. The soil analysis presented in the report indicates that the soil buffering capacity 		Noted conditions will be placed on the approval as recommended

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		<p>appears low to marginal for holding nutrients (P and N). It is therefore likely that nutrients could be lost from the soil through leaching and surface run-off causing potential impact downstream. It is therefore recommended that diversion drains are implemented to catch and divert surface run-off from the proposed rotational areas with suitable disposal points away from existing drainage.</p> <ul style="list-style-type: none"> • The supporting documentation prepared by Aurora aligns with the Australian Pork Limited - National Environmental Guidelines for Rotational Outdoor Piggeries (2013). This published document is an excellent and comprehensive compilation and the Department encourages the proponent to follow the guidelines for the proposed piggery expansion and ongoing management. • The stocking rate discussed in the proposal states 24 Boars or Sows per hectare. The Department recommends a stocking density (i.e. standard pig units per hectare) not exceeding 20 Boars or Sows per hectare and 50 weaners per hectare, based on soil type, rainfall, anticipated pasture cover for the Albany area. 		

References:

Aurora Environmental (2014) Benmore Grazing Trust - Environmental Management Plan – Outdoor Rotational Piggery – Breeder Facility – Lots 5758 and 5759, Green Valley, City of Albany. Report AA2014/013 Version 2. 28 July 2014. Albany, Western Australia.

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EPA, Environmental Protection Authority (2005) Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986). Separation Distances between Industrial and Sensitive Land Uses. Guidance No. 3. Perth, Western Australia.

Latto, A., Noonan J.D., Taylor, R.J. (2000) Environmental Guidelines for New and Existing Piggeries. Bulletin 4416. Agriculture Western Australia, Department of Environmental Protection, Water and Rivers Commission, West Australian Pork Producers' Association, Department of Health.

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