

Appendix I – Agricultural Land Capability Assessment (Mar. 2019)

**AGRICULTURAL LAND CAPABILITY
ASSESSMENT**
**Lot 5780, 54 Down Road South, Drome,
City of Albany**

Prepared for

CITY OF ALBANY

by

Land Assessment Pty Ltd



LA Report No 1902
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1.0 BACKGROUND

In cooperation with the Great Southern Motorplex Group Inc. (GSMG) and the Department of Local Government, Sport and Cultural Industries (DLGSCI), the City of Albany is currently supporting the development of a proposed multi-use Albany Motorsport Park (AMP) near the Mirambeena timber processing precinct on Down Road. The subject land, Lot 5780 Down Road South, is 192.34 ha in area and located approximately 20 km to the north-west of the Albany CBD (Figure 1).

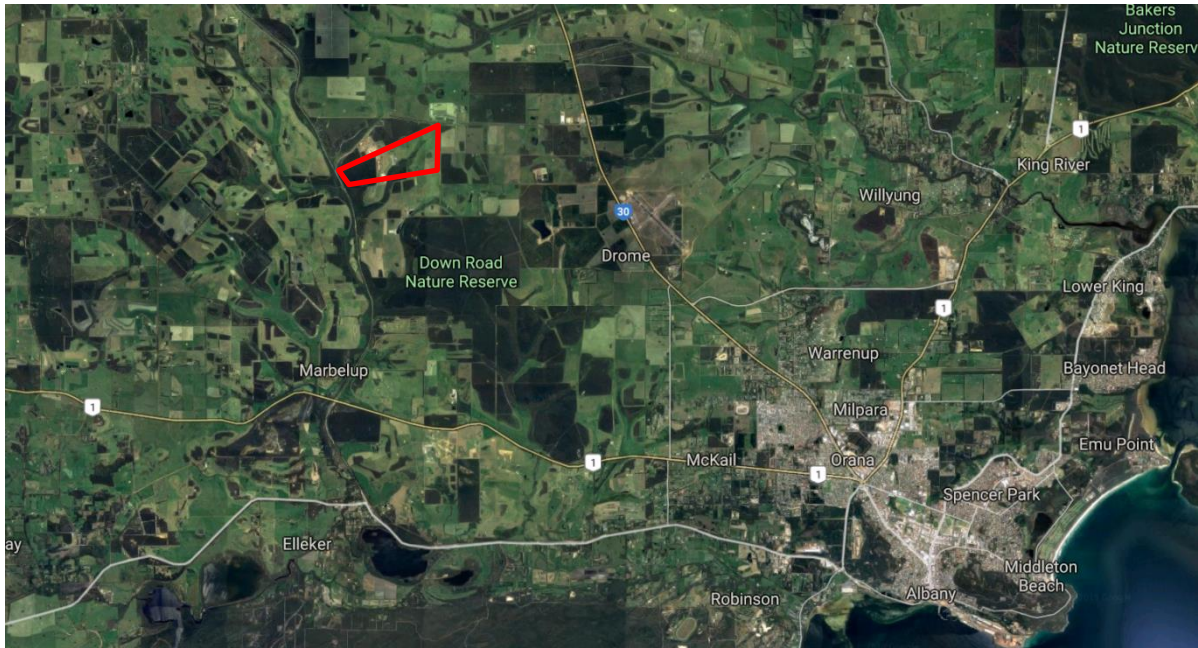


Figure 1: LOCATION PLAN

The City of Albany has completed a technical site feasibility assessment for the Albany Motorsport Park (GHD, 2018) that identified a number of matters requiring further investigation. These matters included the fact that under Local Planning Scheme No 1 (LPS 1) the subject land is currently zoned 'Priority Agriculture' and a motorsport park would not be a permissible use under that zoning category.

In accordance with State Planning Policy (SPP) 2.5 'Rural Planning', a 'Priority Agriculture' zone identifies land considered to be of local, State and /or regional significance for agricultural production. The objectives for the Priority Agriculture zone within LPS1 include; *Prevent land uses and development within the zone that may adversely impact on the continued use of the zone for a diversity of agricultural purposes.*

In light of the above, a Scheme Amendment is to be prepared in order to rezone the land to "Special Use" and facilitate the proposed AMP development.

Associated with the Scheme Amendment process, the City of Albany engaged Land Assessment Pty Ltd to prepare an Agricultural Land Capability Assessment (ALCA) for the subject land in accordance with the requirements of the Department of Primary Industries and Regional Development (DPIRD) and van Gool *et al.* (2005). The latter reference is a document outlining the Department's current methodology for determining land capability.

This consultant has had discussions with DPIRD (Mr Timothy Overheu) in relation to the identification of 'Priority Agricultural Land' within the planning system, and its requirements for an Agricultural Land Capability Assessment for the subject land.

As part of its input to the Lower Great Southern Strategy (WAPC 2016) DPIRD identified Priority Agricultural Land 'PAL' based on an interpretation of its regional scale mapping of soil-landscapes and their capability to support agricultural land uses. The PAL interpretations are irrespective of considerations of location, lot size, water availability or existing land use. The result is depicted within the relevant portion of the regional map of Priority Agricultural Land (Figure 2).

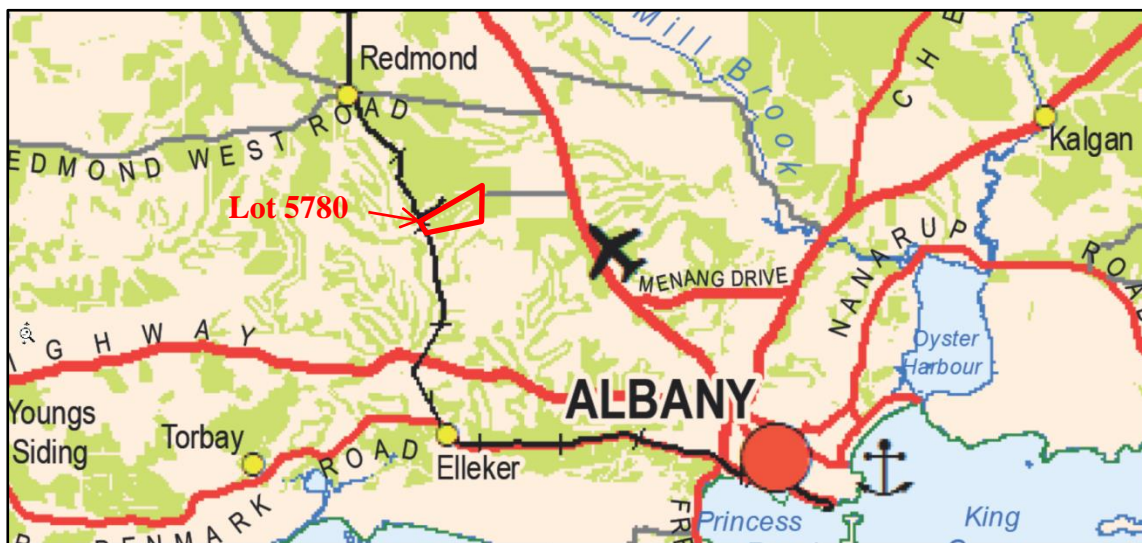


Figure 2: PRIORITY AGRICULTURAL LAND (of State or Regional Significance)

Source: Lower Great Southern Strategy (WAPC 2016) – enlargement of its Figure 3.

In accordance with SPP 2.5, regionally defined areas of priority agricultural land should be rationalised to cadastral boundaries and, where appropriate, reflected as a 'Priority Agriculture' zone within Local Planning Schemes. Additional areas considered to be of 'local agricultural significance' based on factors other than just soil qualities can also be identified. Restrictions on subdivision and non-agricultural land use activity within the 'Priority Agriculture' zone can then be administered through the Scheme.

The City of Albany’s Local Planning Scheme (LPS 1) shows 74.5 5% of this local government area is designated agricultural land, with approximately 26% (83,855 ha) zoned ‘Priority Agriculture’ and the remaining 74% (237,540 ha) zoned ‘General Agriculture’ (Figure 3).

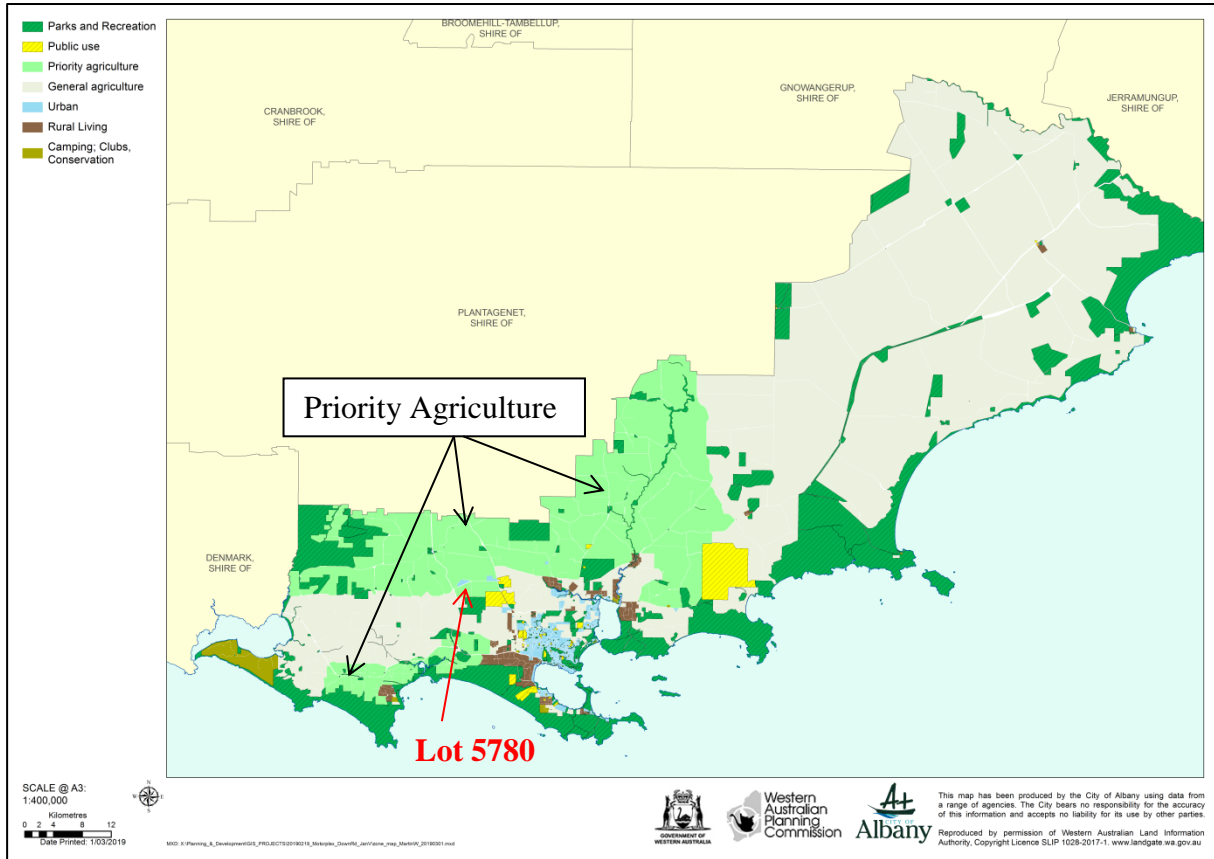


Figure 3: LOCAL PLANNING SCHEME (OVERVIEW)

Figures 3 and 4 (overleaf) show Lot 5780 occurs at the southern edge of the most extensive portion of the City of Albany’s Priority Agriculture Land, which extends inland and towards Mount Barker within the adjoining Shire of Plantagenet.

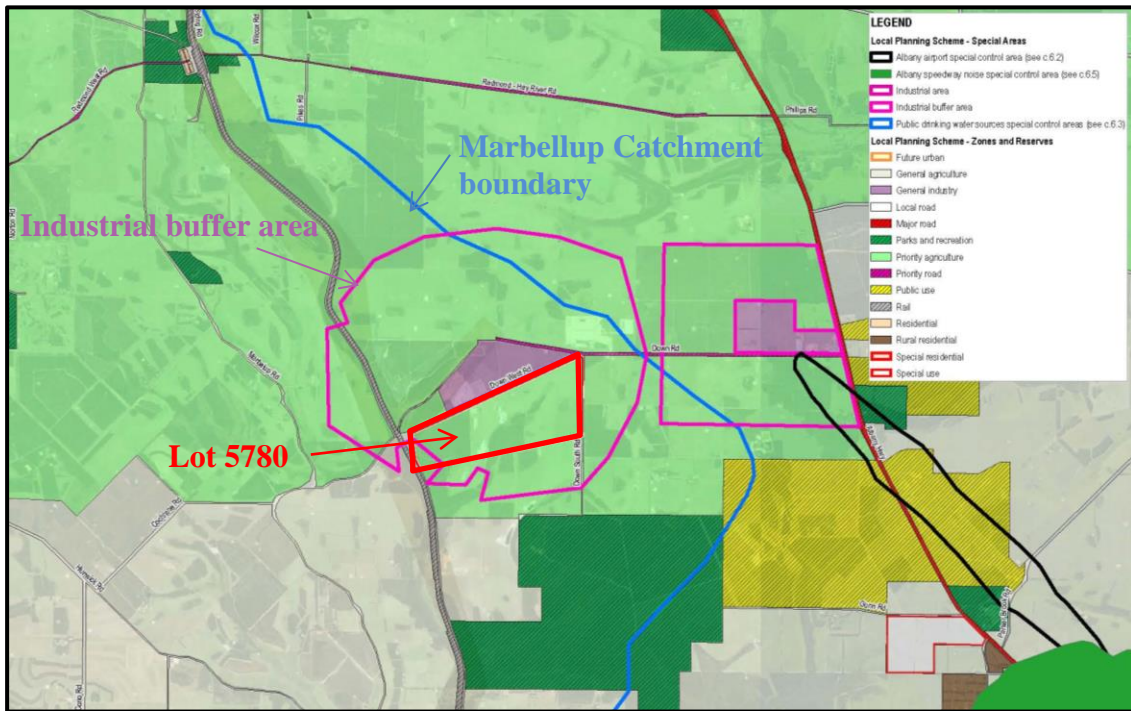


Figure 4: LOCAL PLANNING SCHEME – (DETAIL)

Source: City of Albany - Albany Motorsport Park Site Feasibility Study (GHD 2018)

The focus of the Department of Primary Industries and Regional Development (DPIRD) in relation to land use planning matters is on preserving large agricultural lots to facilitate continued access and investment in more intensive food production (T Overheu pers comm).

Given the broad scale of the soil-landscape mapping on which the DPIRD assessment of the best quality agricultural land is based (see Figure 2), the Department generally recommends that proponents of specific developments have an independent land evaluation report compiled discussing the capability of the subject land.

Furthermore, in relation to Lot 5780, and as part of a pre-fieldwork discussion between this consultant and Mr Timothy Overheu of DPIRD, it was concluded that the Agricultural Land Capability Assessment should particularly address the uniqueness' or otherwise' of the subject land within the context of the City's supply of land zoned 'Priority Agriculture'.

2.0 NATURE OF THE LAND

2.1 Current Use and Surroundings

The central to eastern portion of Lot 5780 extends over approximately 140 ha and is currently leased to a local farmer, Mr L Black. This land is predominantly used for cattle grazing although some sand extraction activity has occurred in areas which are now subject to varying stages of rehabilitation. A small (1.6 ha) portion of Lot 5780 is leased to Plantation Energy Australia Pty Ltd for the purpose of maintaining a drainage detention basin.

The western portion of the property, covering an additional 52 ha is bordered by the Avon-Albany railway line reserve and remains under remnant native vegetation. A further 22 ha of remnant vegetation occurs within the currently leased 140 ha central to eastern portion. Outside of the areas of remnant vegetation, and subject to seasonal conditions, the remaining 118 ha of cleared land with established pasture supports up to 80 cattle (breeders) and receives about 200 kg of potash super each year (pers comm L Black). There are no areas of cropping within Lot 5780.

In common with Lot 5780, land to the south and east is also zoned 'Priority Agriculture' and used for livestock grazing, but with some cropping in the more extensive flatter terrain.

The Down Road Timber Processing Precinct, occurring directly north of Lot 5780, is zoned for general industrial purposes and includes a tree plantation and processing facilities of the Albany Plantation Forest Company and the Albany Plantation Export Company. To the east of the Timber Processing Precinct, and directly north of the intersection of Down Road and Down South Road, the CBH Mirambeena grain storage facility occurs within land zoned 'Priority Agriculture'.

2.2 Landforms and Soils

2.2.1 Broad-scale mapping

DPIRD's agricultural capability interpretations for the Albany area are based on soil - landscape mapping initially surveyed by CSIRO (Churchward et al 1988) at a publication scale of 1:100,000.

Figure 5 overleaf depicts the relevant enlarged portion of that mapping with map units then described in Table 1.

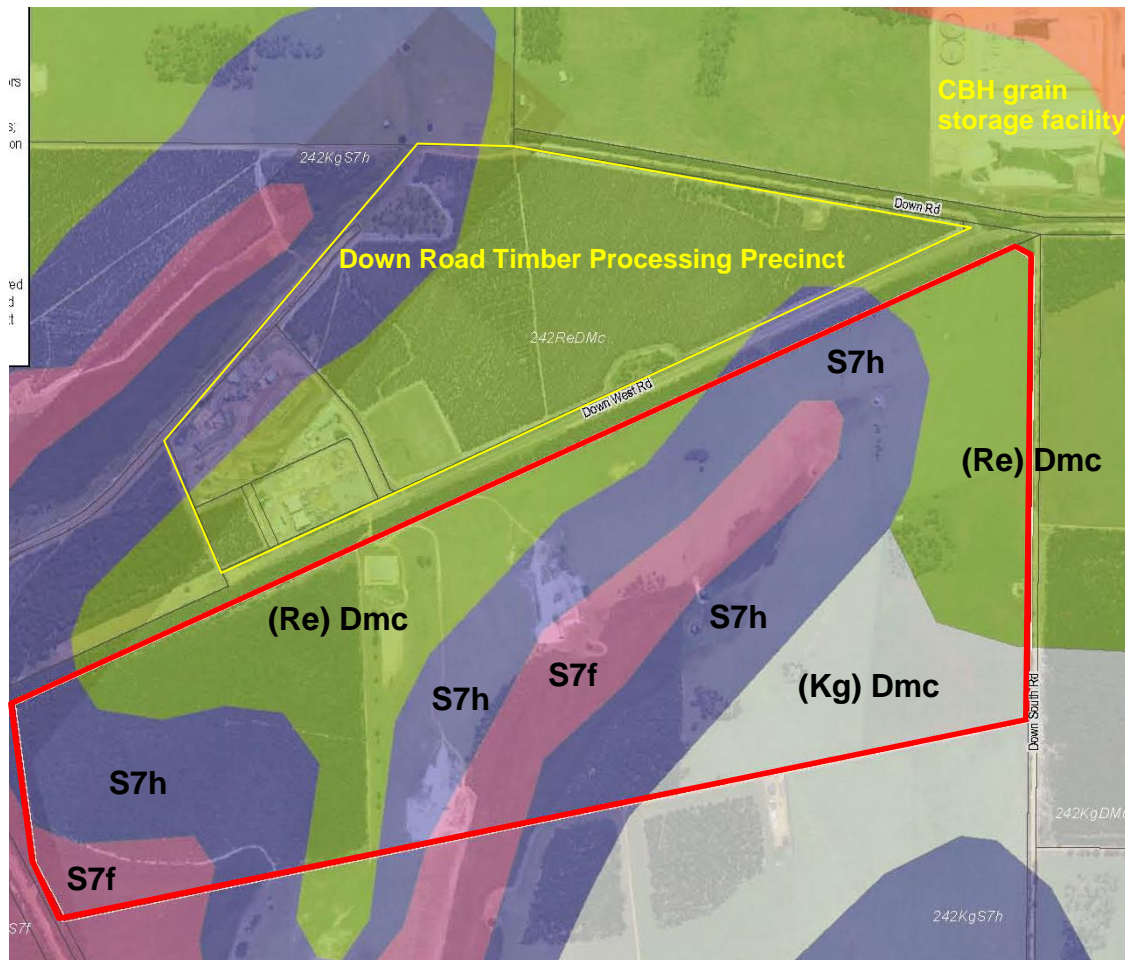


Figure 5: SOIL-LANDSCAPE MAPPING

Source: Adapted from *City of Albany – Albany Motorsport Park Site Feasibility Study* (GHD 2018) and based on original mapping from *Landforms and Soils of the South Coast and Hinterland, Western Australia*. (Churchward et al 1988) as depicted within Shared Land Information Platform (SLIP) <http://spatial.agric.wa.gov.au/slip>

Figure 5 shows the subject land encompasses the upper portion of a shallowly incised, minor valley (S7) occurring between flat to very gently inclined upland lateritic terrain (Dmc).

The Dempster crest, map unit has mainly gravelly duplex soils, and occurs as part of either the Redmond (Re) or King (Kg) soil-landscape systems.

The minor valley (S7), which is also part of the King soil-landscape system, has component sideslopes (S7h) with pale sands and deep sandy duplex soils, leading to a valley floor (S7f) with predominantly wet and semi wet soils.

Table 1: BROAD-SCALE MAPPING UNITS

REDMOND SYSTEM (242Re)	
<i>Undulating plateau with scattered depressions, in the east of the Albany Sandplain Zone. Sandy gravel, pale deep sand, non-saline wet soils and grey sandy duplex. Marri-jarrah forest, swamp yate-paperbark-sheoak woodland and heath.</i>	
DMc	Dempster crest phase* (61.7 ha or 32 % of Lot 5780) Sands and laterite on elongate crests; Duplex sandy gravels, Grey deep sandy duplexes, Pale deep sands and Shallow gravels.
KING SYSTEM (242 Kg)	
<i>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.</i>	
DMc	Dempster crest phase* (23.8 ha or 12 % of Lot 5780) Sands and laterite on elongate crests; Duplex sandy gravels, Grey deep sandy duplexes, Pale deep sands and Shallow gravels.
S7h	Minor Valleys S7 slope phase (78.6 ha or 41 % of Lot 5780) Sideslopes of minor valleys in sedimentary rocks; Pale deep sands and Grey deep sandy duplexes.
S7f	Minor Valleys S7 floor phase (28.1 ha or 15 % of Lot 5780) Foothills and swampy valley floors of minor valleys in sedimentary rocks; Wet and Semi-wet soils, Pale deep sands and Grey deep sandy duplexes.

* In relation to the Dempster crest (DMc) map unit occurrence in both the Redmond and King systems, there is no significant difference in the component soils and their agricultural capability. The Redmond and King land systems generally differ only in the degree of landscape dissection, however within an intergrade area such as around Lot 5780, the landform is consistent over both occurrences of map unit DMc.

The broad-scale map units encompassed within Lot 5780 occur widely throughout the rural areas of the City of Albany. Data analysis by the City's GIS technical staff show the upland lateritic areas, Dempster crest DMc map unit, occupy 20,624 ha or 24.6 % of the City's Priority Agriculture zone, and a further 13,362 ha or 5.6 % of the General Agriculture zone. Likewise, the sideslopes of the minor valley, S7h map unit, are well represented and occur within 7,606 ha (9 %) of the Priority Agriculture zone and a further 4,408 ha (2 %) of the General Agriculture zone.

2.2.2 More-detailed land unit mapping

Given the broad scale of soil-landscape mapping in Figure 5, some 'on-ground' variation can be expected in soil and landform conditions. More detailed mapping, or 'ground truthing' of the conditions described in the earlier mapping was therefore undertaken as a basis for the 'property-specific' assessment of agricultural capability for Lot 5780.

Soil and landform conditions were examined through aerial photo interpretation and field survey work conducted on 21 February. Soils were examined at twenty five 'soil auger observation sites' and classified in accordance with the WA Soil Group nomenclature (Schoknecht and Pathan 2013).

Attachment A contains a site location figure, site results summary, and representative photographs of land units. Additional soils data, included in Attachment B, was provided by interpretation and classification of bore log records associated with the installation of shallow groundwater monitoring bores (Biodiverse Solutions 2018).

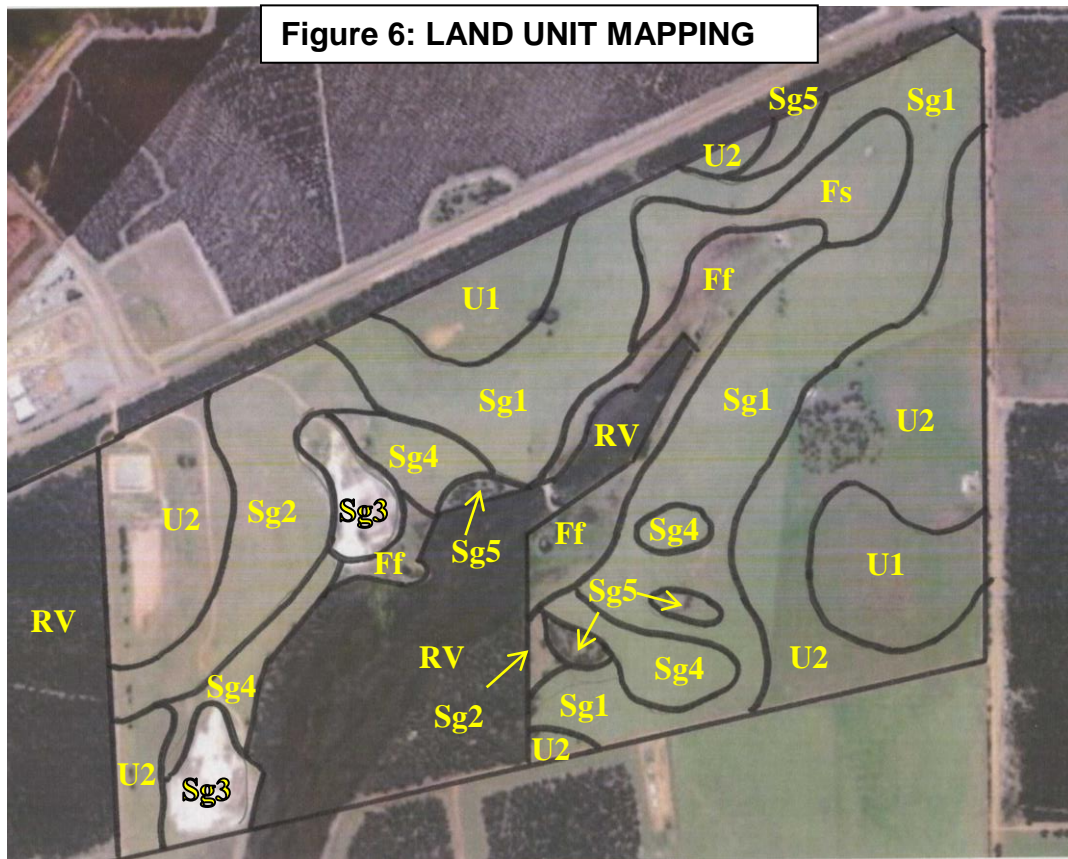
The resulting mapping of land units within the subject land is shown overleaf in Figure 6, with descriptions of each land unit (soil-landform type) provided in subsequent Tables 2 and 3.

2.3 **Vegetation**

The original native vegetation is a Marri-jarrah forest, swamp yate-paperbark-sheoak woodland and heath within areas of the Redmond soil-landscape system, and a Jarrah-marri-sheoak woodland and mallee-heath within areas of the King soil-landscape system.

The western portion of the property, covering approximately 52 ha remains under remnant vegetation and a further 22 ha occurs within the currently leased 140 ha central to eastern portion. Much of the latter 22 ha vegetated area is associated with the lower portions of the minor valley (unit S7f in Figure 5) and is a Conservation Class wetland (cited in GHD 2018).

The presence of a Conservation Class wetland, coupled with location of Lot 5780 within the Marbellup Brook Catchment (a public drinking water source area – see Section 2.4) suggest that approval for any further clearing of vegetation to facilitate agriculture would be unlikely.



Note: Image above excludes the far western portion of the property which remains under remnant vegetation and has not been mapped into land units.

Table 2: ABBREVIATED LEGEND AND AREAS

Land Unit	Simplified Description (see also Table 3 overleaf)	Area (ha)	Approx % of mapped	% of Lot
Upland lateritic terrain				
U1	Duplex sandy gravels	11	8	6
U2	Sandy duplex soils (with gravel) and shallow gravel	32	23	17
Side-slopes of valley				
Sg1	Sandy duplex soil or pale shallow sand; gravel at > 30 cm.	34	24	18
Sg2	Sandy duplex soil or pale shallow sand; gravel at < 30 cm.	10	7	5
Sg3	Disturbed areas; shallow sandy duplex or pale shallow sand	6	4	3
Sg4	Pale deep sands	8	6	4
Sg5	Shallow gravel and surface laterite	3	2	2
Floor of valley				
Fs	Pale deep sands	6	4	3
Ff	Semi-wet soils	8	6	4
3RV	Remnant Vegetation			
	- within mapped area	22	16	11
	- within remaining unmapped western portion	52	-	27
TOTAL		192	100	100

TABLE 3. LAND UNIT DESCRIPTIONS

Upland lateritic terrain of broad crests and adjacent slopes with less than 5% gradient. (U) – equivalent to DMc; Dempster crest phase.	
U1	Moderately well drained duplex sandy gravels (with brown gravelly loamy sand to sandy loam topsoil).
U2	Moderately well to well drained grey deep sandy duplex soils (with gravel above clay layer) and less commonly shallow gravel or gravelly pale deep sands; minor surface laterite.
Side-slopes of concave valley associated with the un-named tributary of Marbelup Brook (S) - equivalent to S7h; Minor valley – slope phase.	
Sg	Slopes with predominantly gentle gradients (5 -10%) and;
Sg1	well drained, grey deep sandy duplex soil (with gravel) or pale shallow sand (over gravel). Gravel layer at more than 30 cm depth.
Sg2	moderately well drained, grey deep sandy duplex soil (with gravel) or pale shallow sand (over gravel). Gravel layer at less than 30 cm).
Sg3	moderately well drained, grey shallow sandy duplex soil or pale shallow sand (over gravel) within disturbed / rehabilitated areas).
Sg4	rapidly drained, pale deep sands.
Sg5	well drained shallow gravel and scattered areas of surface laterite.
Floor of valley associated with the un-named tributary of Marbelup Brook (F) - equivalent to S7f; Minor valley – floor phase.	
Fs	Footslopes with very gentle gradients (1 – 3 %) and well drained, pale deep sand.
Ff	Flat terrain within valley headwater area or margins of lower-lying remnant vegetation encompassing the tributary stream, with imperfect to poorly drained semi wet soils (sands or humic sands).
Remnant Vegetation (RV) – occurring within the wettest portions of the valley floor and also uncleared portions of upland terrain and valley side-slopes within the western portion of Lot 5780 Downs Road – soils not mapped or assessed for agricultural capability as part of this study.	

2.4 Water Resources

2.4.1 Water for Agricultural Activity On-site

The site location figure within Attachment A shows the location of a number of small dams or soaks within Lot 5780. Most of these are associated with the un-named watercourse traversing the property, and are used for stock watering apart from the dam closest to Down West Road within the area leased to Plantation Energy Australia Pty Ltd for the purpose of maintaining a drainage detention basin.

Whilst sufficient to support the watering of up to 80 head of cattle, the existing dams within Lot 5780 are of insufficient size to provide a potential source of water for the irrigation of horticultural crops. Furthermore GHD (2018) report that groundwater salinity in the local area is in the range of 500 – 1000 mg/L which is considered to be marginal for productive uses.

2.4.2 Catchment Perspective

The central to eastern portion of Lot 5780 encompasses an un-named watercourse, a tributary of Marbellup Brook which ultimately drains to Lake Powell and forms part of the wider Torbay Inlet Catchment. Both the Lake Powell and Torbay Inlet wetlands are nutrient enriched due to a range of factors including the leaching of nutrients from pale sands in areas of the catchment used for extensive agriculture (grazing). These wetlands are the subject of a restoration plan termed '*Watershed Torbay*' (Department of Water 2006).

As shown in Figure 4, Lot 5780 is also located within a Priority 2 (P2) public drinking water sources special control area within the Marbellup Brook Catchment Area (DoPLH, 2014). This public drinking water source area (PDWSA) is not currently used but has been identified as a potential future water source option in the *Great Southern Regional Water Supply Strategy 2014* (DoW, 2014).

In the context of the agricultural capability of Lot 5780, the *Marbellup Brook Catchment Area Drinking Water Source Protection Plan* (DoW, 2007) notes that low density grazing already covers a large portion of the catchment and there are several existing horticulture enterprises. The Plan recommends that any future expansion or intensification of horticultural operations be assessed by the Department of Water and is unlikely to be supported unless it can be demonstrated that the risk to water quality is reduced. Accordingly, in relation to water protection objectives, within the P2 areas perennial forms of horticulture (such as orchards and vineyards) are designated 'Compatible with conditions' and annual forms of horticulture (such as market gardens) are designated 'Incompatible'.

3.0 AGRICULTURAL CAPABILITY

3.1 Overview-Agriculture within Albany

The City of Albany's Draft Local Planning Strategy (CoA 2019) reports;

- The Great Southern is the second largest food producing region in the State with the main commodities being grain and livestock, although horticulture and viticulture are emerging as significant contributors.
- Within the City of Albany agriculture is the third largest industry when measured in value added terms. Approximately 55% of the total value of agricultural production is derived from either broad acre crops or horticulture with the remaining 45% being derived from livestock or livestock products.
- Under LPS1 all farm related land uses are permissible or discretionary in both the 'General Agriculture' and 'Priority Agriculture' zones.
- With its relatively cooler temperate climate, the Albany hinterland area is considered to have strong potential for agricultural expansion.
- The Department of Primary Industries and Regional Development have undertaken an investigation into potential locations for horticulture development in the Lower Great Southern, with priority areas for irrigated agriculture precincts within or near the City of Albany being identified at Manypeaks, and Redmond/Narrikup (i.e. not affecting the subject land).

3.2 Capability Assessment Methodology and Determining PAL

'Land capability' is a term used to express the ability of land to support a proposed use with minimal risk of degradation to its soil and water resources. A general methodology for capability assessment has been developed by the (now) Department of Primary Industries and Regional Development (Wells and King 1989, and more recently by van Gool et al 2005) and forms the basis for the land use evaluations in both this report and the earlier DPIRD input to the *Lower Great Southern Strategy* (WAPC 2016).

Specific land use rating tables are used to compare soil and landform qualities of relatively homogeneous mapped areas (mapping units) against the optimal desired requirements of that form of land use. Using data from the best available soil-landscape or land unit mapping, factors considered in the rating tables include rooting depth, soil water storage and drainage, and risks associated with nutrient export, erosion and waterlogging. Based on the 'degree of fit', mapping units are assigned a capability class ranging from 'very high' capability (class one) to 'very low' capability (class five).







The capability classes are described in Table 4. At a specific property level, land unit mapping (such as that shown in Figure 6) delineates sufficiently homogeneous areas to allow the assessment to be expressed in terms of the simple five class system.

Table 4: LAND CAPABILITY CLASSES

Capability class	General description
1 Very high	Very few physical limitations present and easily overcome. Risk of land degradation is negligible.
2 High	Minor physical limitations affecting either productive land use and/or risk of degradation. Limitations overcome by careful planning.
3 Fair	Moderate physical limitations significantly affecting productive land use and/or risk of degradation. Careful planning and conservation measures required.
4 Low	High degree of physical limitation not easily overcome by standard development techniques and/or resulting in high risk of degradation. Extensive conservation measures required.
5 Very low	Severe limitations. Use is usually prohibitive in terms of development costs or the associated risk of degradation.

The simple five class system works well for expressing land capability when the field survey work is intensive and detailed land units can be mapped. However, there is inevitably a greater degree of variability of landform and soil conditions within broad-scale soil-landscape mapping units such as those used for the Department’s inputs to the *Lower Great Southern Strategy* (WAPC 2016). For agricultural capability assessments based on broad-scale mapping, the concept of ‘proportional capability codes’ is used (Table 5).

Table 5: PROPORTIONAL CAPABILITY CODES

Category A land: Generally high capability	
 A1	>70% of the area has high capability (is Class 1 or 2)
 A2	50-70% of the area has high capability (is Class 1 or 2)
Category B land: Generally fair or moderate capability	
 B1	>70% of the area has moderate to high capability (is Class 1, 2 or 3)
 B2	50-70% of the area has moderate to high capability (is Class 1, 2 or 3)
Category C land: Generally low capability	
 C1	50-70% of the area has low capability (is Class 4 or 5)
 C2	>70% of the area has low capability (is Class 4 or 5)

Instead of assigning a single specific (high, moderate or low) capability rating to all areas of a particular broad-scale map unit, the proportional capability codes are used

to more conservatively express the capability as a range (e.g. 50-70%) of the total area expected to contain land of a certain capability rating.

For priority agricultural land (PAL), DPIRD identified areas of agricultural land considered to be of ‘State and Regional’ significance as part of its input to the Lower Great Southern Strategy (WAPC 2016). These areas extend into Lot 5780 as shown in Figure 2 where they correspond to the broad-scale soil-landscape mapping units (Re) DMc and (Kg) S7h.

Based on consideration of other locally determined factors, these areas of PAL have been extended to include agricultural land considered to be of ‘Local’ significance and are reflected as the ‘Priority Agriculture’ zone within the Local Planning Scheme (DoPLH, 2014).

3.3 Broad-scale Assessment

DPIRD’s agricultural land use capability interpretations for the broad-scale map units shown earlier in Figure 5 are summarised in Table 6.

Table 6: BROAD-SCALE AGRICULTURAL CAPABILITY ASSESSMENT

Soil-Landscape Map Unit	Area within Lot 5780	Perennial Horticulture	Annual Horticulture	Grazing	Dryland Cropping
DMc Dempster – crest phase*	85.6 ha (44.5 %)	B1	B1	B2	B2
S7h Minor valley - slope phase	78.6 ha (40.9%)	A2	B1	B1	B1
S7f Minor valley - floor phase	28.1 ha (14.6 %)	C1	B2	B2	C1

* Capability codes are the same for occurrence of DMc within both Kg and Re systems

Codes

A1 = >70% of land has high capability; A2 = 50-70% high capability;
 B1 = >70% moderate to high capability; B2 = 50-70% moderate to high capability;
 C1 = 50-70% low capability; and C2 = >70% low capability land.

Source for Table 6 and Figures 7a and 7b- Shared Land Information Platform (SLIP) <http://spatial.agric.wa.gov.au/slip> based on interpretations by DPIRD (land unit database) current from 12 March 2018.

Figures 7a and 7b illustrate the agricultural capability for two of these agricultural land uses, grazing and perennial horticulture. Dryland cropping and annual horticulture are not considered further in this report for the cleared portions of Lot 5780. This is because cropping is restricted to much larger areas due to economies of scale, and annual horticulture (e.g. vegetable growing) is not permitted within the proclaimed Marbellup Brook Public Drinking Water Supply Area (refer section 2.4.2).

FIGURE 7. BROAD-SCALE AGRICULTURAL CAPABILITY ASSESSMENTS



FIGURE 7a. LAND CAPABILITY FOR GRAZING

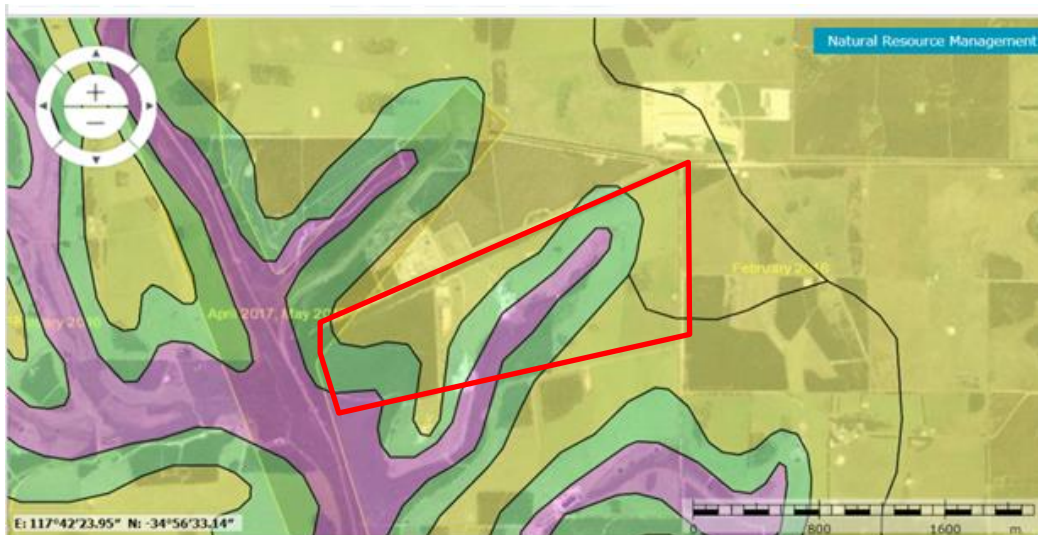


FIGURE 7b. LAND CAPABILITY FOR PERENNIAL HORTICULTURE*

(***Note** Horticultural capability ratings are based on consideration of landform and soil factors only. Availability of water supply for irrigation needs to be considered separately. DPIRD also provide a generally more favourable assessment for viticulture, which is a form of perennial horticulture).

3.4 Site-Specific Assessment

This consultant's agricultural land use capability interpretations for the more detailed land unit mapping shown earlier in Figure 6, and based on site-specific data (Attachment A), are summarised in Table 7.

TABLE 7. SITE-SPECIFIC AGRICULTURAL CAPABILITY RATINGS

Land Unit	Area in Lot 5780	Grazing	Perennial Horticulture	Comments
U1	11 ha (6 %)	Fair - High	Fair	Relatively good nutrient retention ability within topsoil and generally not subject to erosion, but limited rooting depth and possible susceptibility to waterlogging where lateritic layer and underlying clay are more competent.
U2	32 ha (17 %)	Fair	Fair	More variable than U1 and grey sandy topsoils generally less retentive of nutrients.
Sg1	34 ha (18 %)	Fair	Fair - High	Minor areas subject to gully erosion. Grey sandy topsoils generally low ability to retain moisture and nutrients. Better rooting depth and less susceptible to waterlogging than upland areas.
Sg2	10 ha (5 %)	Fair	Fair	Similar to Sg1 but lesser rooting depth.
Sg3	6 ha (3 %)	Low	Low	Most of these areas have been subject to sand extraction and limited land rehabilitation. Limited rooting depth and sandy topsoils have low ability to retain moisture and nutrients.
Sg4	8 ha (4 %)	Fair	Fair	Minor areas subject to gully erosion and potential wind erosion if depleted of vegetative cover. Sands have good rooting depth, and are not susceptible to waterlogging but a poor ability to retain nutrients and moisture.
Sg5	3 ha (2 %)	Low	Low	Limited rooting depth and difficult for cultivation. Scattered tree cover over parts.
Fs	6 ha (3 %)	Fair	Fair - High	Lesser gradient and closer to watertable than Sg4. Sands have poor ability to retain nutrients and moisture.
Ff	8 ha (4 %)	Fair - High	Low	Winter-wet flats are susceptible to subsoil waterlogging but provide good seasonal (summer) pasture for grazing livestock. Horticultural activity likely to require drainage and sandy subsoils present a high risk of nutrient export to the nearby tributary of Marbelup Brook.
RV	74 ha (38 %)	Not Assessed	Not Assessed	Encompasses areas within valley floor as well as side-slopes and upland terrain, but unlikely to obtain approval for land clearing and therefore not relevant in terms of agricultural potential or capability.

Figures 8a and 8b illustrate the agricultural capability for grazing and perennial horticulture based on the site-specific land unit mapping.

Figure 8: SITE-SPECIFIC AGRICULTURAL CAPABILITY ASSESSMENTS

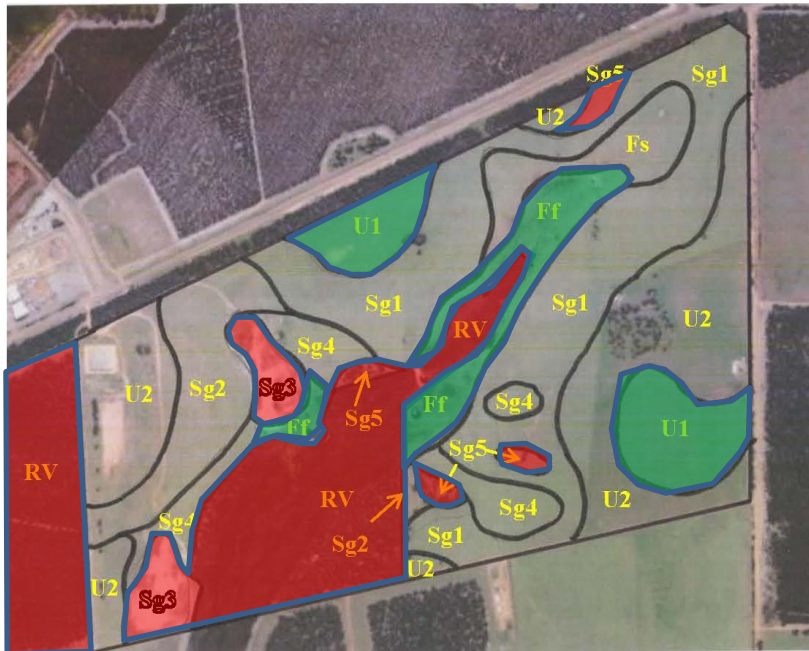


Figure 8a: LAND CAPABILITY FOR GRAZING



Figure 8b: LAND CAPABILITY FOR PERENNIAL HORTICULTURE*

Red = Low capability **Green** = Fair to High capability **Remainder** = Fair capability

(***Note** Horticultural capability ratings are based on consideration of landform and soil factors only. Availability of water supply for irrigation needs to be considered separately. Water resource information (section 2.4) indicates conditions for a suitable water supply to support commercial scale irrigation are unfavourable).

3.5 Comparison of Broad-scale and Site-specific Assessments

In order to consider the relative uniqueness or otherwise of Lot 5780 in terms of its agricultural capability, Table 8 presents a comparison of the assessment based on the site-specific land unit mapping, with that based on the broad-scale soil-landscape mapping which extends over all rural areas of the City of Albany.

To provide a common base for comparison, the assessment results from both studies (Tables 6 and 7) have been simplified into three code categories, A, B and C.

- Category A land (grouping A1 and A2 proportional capability codes from Table 5) represents land of generally ‘high’ capability, and includes the ‘fair to high’ rating in Table 7 from the site-specific study.
- Category B land (grouping B1 and B2 proportional capability codes from Table 5) represents land of generally ‘fair or moderate’ capability, and includes the ‘fair’ rating in Table 7 from the site-specific study.
- Category C land (grouping C1 and C2 proportional capability codes from Table 5) represents land of generally ‘low’ capability, and includes the ‘low’ and ‘not assessed’ ratings in Table 7 from the site-specific study.

TABLE 8: AGRICULTURAL CAPABILITY COMPARISON (Broad-scale vs Site-Specific)

CAPABILITY CODE GROUP	AGRICULTURAL CAPABILITY RATING* for;			
	GRAZING		PERENNIAL HORTICULTURE	
	Broad-scale Assessment	Site-specific Assessment	Broad-scale Assessment	Site-specific Assessment
Category A land: Generally high capability	Nil	10 % (19.2 ha)	40.9 % (78.6 ha)	21 % (40.4 ha)
Category B land: Generally fair or moderate capability	100 % (192.3 ha)	47 % (90.4 ha)	44.5 % (85.6 ha)	32 % (61.5 ha)
Category C land: Generally low capability	Nil	43 % (82.7ha)	14.6 % (28.1 ha)	47 % (90.4 ha)

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

It should be noted that for the site-specific study, areas of remnant vegetation (RV) were designated as 'not assessed' in terms of their agricultural capability. This is because regardless of the underlying soil and landform conditions, regulatory approval for clearing it is highly unlikely to be granted and hence these areas are effectively not capable of being used for agricultural production.

For the capability assessment based on the broad-scale soil-landscape mapping, areas of remnant vegetation were not separated out (see Figures 7a and 7b). This is because for the purpose of a broad-scale comparison of Lot 5780 with all other areas of the 'Priority Agriculture' zone within the City of Albany it is not practical to take vegetation cover into consideration.

In relation to Grazing

The earlier agricultural capability assessment based on broad-scale mapping indicates all of the land is of Category B 'fair' capability for grazing.

The site-specific study shows however that while the total property contains about 10 % Category A 'high' capability land for this form of agriculture, the remainder is comprised of roughly equal portions of land with Category B 'fair' or Category C 'low' capability, with the latter being significantly constrained for grazing, primarily due to remnant vegetation

In relation to Perennial Horticulture

The earlier agricultural capability assessment based on broad-scale mapping indicates about 40% of Lot 5780 is Category A 'high' capability and about 45 % is Category B 'fair' capability land for perennial horticulture.

Setting aside the question of a water supply for irrigation, the site-specific study shows Lot 5780 contains a lesser amount, about 20 %, of Category A 'high' capability land and roughly 30 % Category B 'fair' capability land for this form of intensive agriculture. The remaining roughly 50% of Lot 5780 is Category C 'low' capability land and is significantly constrained for horticulture (including viticulture). This is not only due to the extent of remnant vegetation but also the poor ability of grey sandy soils within lower parts of the landscape to retain nutrients against losses to drainage (and hence ultimately into Marbellup Brook).

4.0 CONCLUSIONS

In accordance with State Planning Policy 2.5, the Priority Agriculture zoning extending over Lot 5780 designates land considered to be of State, regional or local significance for food production purposes due to its comparative advantage in terms of soils, climate, water (rain or irrigation) and access to services.

Following on from DPIRD's recommendation for an independent site-specific agricultural capability evaluation of Lot 5780 in the context of its proposed rezoning to "Special Use" to facilitate the proposed Albany Motorsport Park, the following points address the uniqueness (or otherwise) of the land;

- The soil and landform conditions within Lot 5780 are generally consistent with the range and variations described by the earlier, broad-scale CSIRO mapping, apart from a greater proportion of pale sands on the valley sideslopes.
- Within the existing cleared portions of the property the capability of the land to support grazing is predominantly 'fair' and consistent with the earlier assessment by DPIRD based on its broad-scale soil-landscape mapping.
- Within the existing cleared portions of the property the capability of the land to support perennial horticulture (including viticulture) is a mix of 'fair', 'fair - high' and some 'low' capability land. Whilst generally consistent with the earlier assessment by DPIRD there is a greater percentage of low capability due to the poor ability of pale sands within lower parts of the landscape to retain nutrients against losses to drainage.
- The extent of remnant vegetation (approximately 38 % of Lot 5780) is a significant constraint to the agricultural capability of the total property.
- As shown in Figures 3 and 4, Lot 5780 occurs near the southern edge of the most extensive portion of Priority Agriculture zoned land, and is within an industrial buffer zone. It is also within a public drinking water supply area (Marbellup Catchment PWDSA) where there are land use restrictions on horticultural activity.
- The City's Draft Local Planning Strategy (CoA 2019?) indicates the intent for Priority Agriculture land is to protect better quality rural land for potential agricultural diversification, particularly for intensive agriculture where a suitable supply of water is available. GHD (2018) report however that groundwater salinity in the local area is in the range of 500 – 1000 mg/L which is considered to be marginal for productive uses.

- Lot 5780 is 192.4 ha in area and this represents just 0.23 % of the total Priority Agriculture zoned land within the City of Albany.
- The lateritic uplands and minor valley sideslopes (DMc and S7h broad-scale map units) encompassed within Lot 5780 occur widely throughout the rural areas of the City of Albany and together cover 28,229 ha (or 33.7 %) of its Priority Agriculture zone.

In terms of the nature of its soils and landforms, and hence its agricultural capability, Lot 5780 is therefore not unique, and its potential removal from the City's Priority Agriculture zone is considered to have no significant effect on the agricultural land protection objectives under State Planning Policy 2.5 (WAPC 2016) or the City of Albany's Local Planning Scheme (DoPLH 2014).

5.0 REFERENCES

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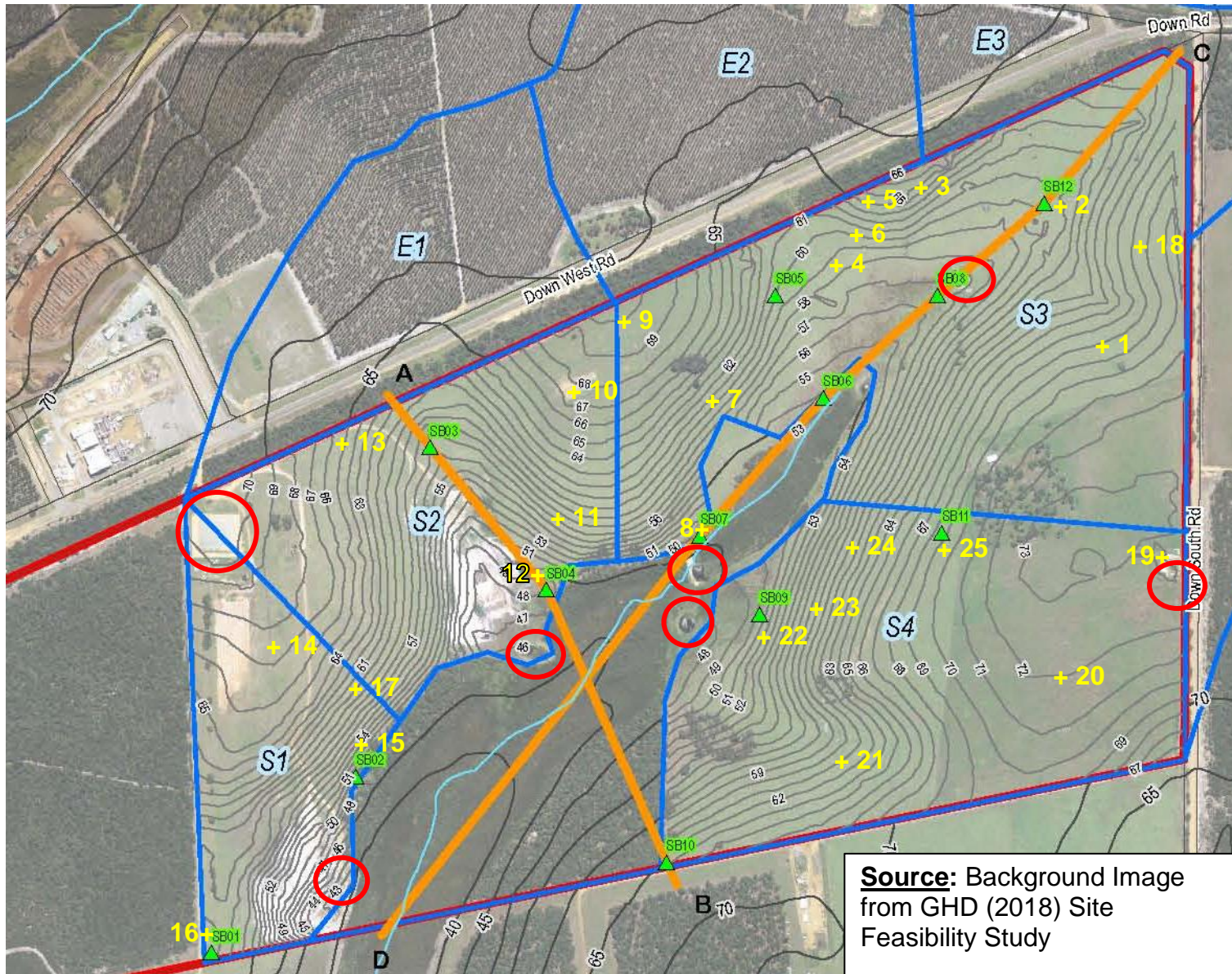
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Western Australian Planning Commission (2016) *Rural Planning State Planning Policy 2.5*

ATTACHMENT A

Site location figure, results summary and representative photographs

SITE LOCATION FIGURE



-  **Dam or Soak**
-  **Internal Catchment Boundary**
(See GHD 2018 Site Feasibility Study)
-  **Cross section**
(See GHD 2018 Site Feasibility Study)
-  **+ 20 Land Assessment Site** (This Study)
-  **+ SB10 BioDiverse Solutions Site** (See GHD 2018 Site Feasibility Study)

Source: Background Image from GHD (2018) Site Feasibility Study

SITE RESULTS SUMMARY

LA Site	BDS Site	Broadscale mapping	Site Drainage status	Landform	WA Soil Group*	Land unit
1		ReDMc	Well	Gentle mid slope 5 - 7%	Grey deep sandy duplex (with gravel above texture contrast/ clay layer) OR Pale shallow sand (over lateritic gravel at 50 cm).	Sg1
2	SB12	KgS7h	Well	Very gently sloping drainage headwater 2%	Pale deep sand (over lateritic gravel at 180 cm)	Fs
3		ReDMc	Well	Upper slope 8 - 10 %	Shallow (brown) gravel and scattered areas of Bare rock	Sg5
4		KgS7h	Well - Rapid	Gentle lower slope 3 %	Pale deep sand	Fs
5		KgS7h	Well	Gentle crest 0 - 4 %	Shallow (brown) gravel and scattered areas of Bare rock	U2
6		KgS7h	Well	Gentle mid slope 8%	Pale shallow sand (over lateritic gravel at 65-90 cm).	Sg1
7		KgS7h	Well	Gentle mid slope 9%	Grey deep sandy duplex (with gravel above texture contrast/ clay layer) OR Pale shallow sand (over lateritic gravel at 45 cm).	Sg1
8	SB7	KgS7f	Imperfect to poor	Margin of drainage area	Semi wet soil (pale deep sand with watertable at 64 cm – Feb 27 2018 - refer Attachment C).	Ff
9		ReDMc	Moderately well	Crest 0 - 2 % gradient	Duplex sandy gravel (brownish loamy sand to sandy loam gravelly topsoil above laterite at 20 cm and then clay at greater depth).	U1
10		ReDMc	Moderately well	Upper slope 4-5%	Duplex sandy gravel (as above, with laterite at 40 cm)*.	U1
11		KgS7h	Well - Rapid	Gentle mid slope 5%	Pale deep sand	Sg4
12	SB4	KgS7f	Imperfect	Lower slope 2 - 3%, Margin of drainage area	Semi wet soil (pale deep sand - no watertable within 2 m but slightly moist beyond 1 m – Feb 27 2018- refer Attachment C).	Ff
13		ReDMc	Moderately well	Gentle mid to upper slope 6%	Grey deep sandy duplex (with gravel above texture contrast / clay layer) OR Pale shallow sand (over lateritic gravel at 25cm).	Sg2
14		ReDMc	Moderately well	Broad crest 0 - 2 %	Grey deep sandy duplex (with lateritic gravel at 18 cm above clay at greater depth).	U2
15	SB2	KgS7h	Well - Rapid	Gentle to mod slope 10% at edge of valley.	Pale deep sand - no watertable within 2m – Feb 27 2018 - refer Attachment C	Sg4
16	SB1	ReDMc	Moderately well	Gently undulating crest 0 - 3 %.	Gravelly pale deep sand (gravel layer at 30 cm, over laterite then more gravel until clay at 150 cm - refer Attachment C).	U2
17		KgS7h	Moderately well	Gentle mid slope 7%	Grey deep sandy duplex (with gravel above texture contrast / clay layer) OR Pale shallow sand (over lateritic gravel at 15cm).	Sg2
18		ReDMc	Well	Very gentle upper slope 2% gradient.	Shallow (brown) gravel	U2

LA Site	BDS Site	Broadscale mapping	Site Drainage status	Landform	WA Soil Group*	Land unit
19		ReDMc	Moderately well	Broad crest 0 - 2 %.	Grey deep sandy duplex (with lateritic gravel layer at 20 cm above clay at greater depth).	U2
20		KgDMc	Moderately well	Broad crest 0 - 2 %.	Duplex sandy gravel (as for sites 9 and 10 above, with laterite at 20 cm).	U1
21		KgDMc	Well - Rapid	Gentle mid slope 4 - 5%	Pale deep sand	Sg4
22	SB9	KgS7h	Well	Gentle lower slope 4 - 5% at edge of valley floor	Semi wet soil OR Pale shallow sand (over lateritic gravel at 70 cm). Watertable at 66 cm – Feb 27 2018 -. refer Attachment C)	Sg1/Ff
23		KgS7h	Well - Rapid	Gentle mid slope 10%	Pale deep sand	Sg4
24		KgS7h/DMc	Well	Gentle mid slope 10%	Grey deep sandy duplex (with gravel above texture contrast/ clay layer) OR Pale shallow sand (over lateritic gravel at 40 cm).	Sg1
25	SB11	KgDMc	Moderately well	Gentle upper slope 3%	Grey deep sandy duplex (with lateritic gravel at 30 cm above clay at greater depth - refer Attachment C).	U2
	SB3	ReDMc		Gentle lower slope at edge of valley	Deep sandy gravel (light brown to brown) - refer Attachment C	Sg2
	SB5	KgS7h		Gentle midslope	Gravelly pale deep sand (gravel layer at 70 cm, then sand below). - refer Attachment C	Sg1
	SB6	KgS7f		Edge of valley floor	Semi wet soil (grey deep sand) with watertable at 87 cm – Feb 27 2018 - refer Attachment C.	Ff
	SB8	KgS7f/S7h		Valley floor headwater area	Grey sand (Semi wet?) moist, although no watertable within 2 m - Feb 27 2018 - refer Attachment C).	Ff
	SB9	KgS7h		Gentle lower slope	Semi wet soil (grey deep sand with gravel at 60 cm then laterite and watertable at 66 cm – Feb 27 2018 -refer Attachment C).	Ff
	SB10	KgDMc		Very gentle upper slope 2%	Shallow (brown) gravel (over laterite and then cemented siltstone / sandstone)- refer Attachment C.	U2

* WA Soil Groups as per Schoknecht and Pathan (2013). Depth of hand auger borings at Land Assessment (LA) sites within the property was often restricted by a lateritic gravel or stone layer, however roadside exposures along Down Road show the gravel / laterite layer (with a sandy or sandy loam matrix) is approximately 30 cm thick and occurs over clay. Soils initially identified as Pale shallow sand (over lateritic gravel) were therefore generally classified as deep grey sandy duplexes unless field test bore logs from the installation of shallow bores (Biodiverse Solutions – BDS sites SB1 – SB12 – refer Attachment C) provided data indicating different (non-clayey) soil conditions below the gravel / laterite layer.

LOT 5780



1 Overview of property, looking westwards from near site 1.



3. Land unit U1 – looking northwards from site 20.



2. Overview of property, looking south east from near site 17.



4. Land unit U2 – looking northwards from near site 14



5. Land unit Sg1 – view east from near site 1.



7. Land unit Sg3 – view south-east from between sites 13 and 17.



6. Land unit Sg2 – view east from near site 7.



8. Land unit Sg3. - view east over terrain between sites 15 and 16.



9. Land unit Sg4 – site 21.



11. Land unit Sg5 – west of site 21



10. Land unit Sg4 – near site 21



12. Land unit Fs – near site 2 and SB12



13. Land unit Ff – near sites 22 and SB9.



15. Dam within Land unit U2 – site 19



14. Land unit Ff – near sites 8 and SB7.



16. Exposed soil profile – edge of dam at site 19 showing subsoil clay beneath laterite boulder layer within upland terrain land unit U2.



17. Exposed soil profile – roadside cutting along Down Road showing subsoil clay below gravel / laterite layer within upland terrain (U) land units.



19. Pale deep sands – within land units Sg4 and Fs.



18. Grey deep sandy duplex soil (with gravel layer above clay) OR Pale shallow sand over gravel – typical of much of valley sideslope areas.



20. Dam / soakage area - within land unit Ff near site 8.

ATTACHMENT B

Field Test Bore Logs

Source: Biodiverse Solutions – Appendix D of Albany
Motorsport Park Site Feasibility Study (GHD 2018).

Soil Profile Sampling



Location: Lot 5780 Down Road

Date tested: 27/02/2018

Sampled by: Kathryn Kinnear

Weather: Windy, cool 21 degrees Overcast

<u>Location</u>	<u>Site description</u>	<u>Depth of profile (mm)</u>	<u>Soil Description</u>
SB1	South west corner Open Paddock	0-150 150-300 300-500 500-1200 1200-1500 1500-2000	Dark grey sandy top soil, veg matter. Grey silty sand. Orange, light brown sandy gravel pebbles 10-30mm. Laterite rock . Light brown pebbles 10-30mm, orange sandy silty gravel. Light brown sandy clay, slightly moist. No WT.
SB02	Paddock near creek west side Jarrah/Cas/Marri Forrest adjacent	0-50 50-200 200-800 800-1200 1200-1500 1500-2000 2000-2500	Dark grey sandy top soil, veg matter. Grey sandy silt. Light grey sandy silt, slightly moist. Cream sandy silt, slightly moist Laterite rock. Moist light brown orange sandy silt gravel, pebbles 10-30mm, minor clay. Light grey silty sand. No WT.
SB03	Open paddock North in minor Drainage swale	0-50 50-500 500-1000 1000-1200 1200-1600 1600-1800 1800-2000	Light brown slightly moist silty sand top soil, veg matter. Light brown silty gravel, pebbles 5-10mm. Brown silty gravel pebbles 20-30mm. Dark brown gravelly silt pebbles 20-30mm. Grey silty sand. Light grey moist silty sand. Light brown/orange silty sand, gravel pebbles 10-30mm. No WT.
SB04	Paddock near Creek in Depression area.	0-50 50-200 700-900 900-1300 1300-1500 1500-1800 1800-2000	Dark brown peaty organic matter. Dark grey silty sand slightly moist. Light grey silty sand moist. Laterite rock, moist dark brown gravelly silt (coffee rock) mottled orange. Light brown silty clay wet. Light grey moist clay. White clay not wet. No WT.
SB05	North paddock Area	0-50 50-200 200-700 700-900 900-1500 1500-1800 1800-1900 1900-2000	Slightly moist dark brown peaty sandy silt top soil, veg matter. Dry dark grey silty sand. Dry light grey silty sand. Dry gravelly silty sand orange pebbles. Dry cream quartz gravelly silty sand pebbles 30-50mm. Pink/orange silty sand gravel, cemented compacted gavel pebbles 10-30mm. Moist dark clayey sand. Dry compacted silty gravel orange/pink. No WT.

<u>Location</u>	<u>Site description</u>	<u>Depth of profile (mm)</u>	<u>Soil Description</u>
SB06	Near creek North side In reed beds	0-100 100-400 400-700 700-1800 1800-2000	Dark brown peaty organic matter moist. Dark grey silty sand moist. Grey silty sand moist. Light grey silty sand wet (smell). Wet brown silty sand (smell) WT 870mm BGL
SB07	Near creek Crossing North side	0-200 200-400 400-600 600-1800 1800-2000	Dark brown/black peaty moist. Black/dark grey peaty sand moist. Dark grey silty sand moist. Light brown silty sand smell. Cream wet silty sand smell. WT 640mm BGL
SB08	Mid creek near dam	0-50 50-200 200-500 500-900 900-1200 1200-1400 1400-1800 1800-2000	Slightly moist dark brown peaty silt, veg matter. Dark brown sandy peaty silt moist. Dark grey silty sand moist. Grey slightly moist silty sand. Dark brown cemented silt, coffee rock. Dark grey moist to wet silty sand. Grey silty sand wet. Dark brown silt minor pebbles 10mm. No WT.
SB09	South side of creek	0-50 50-200 200-600 600-700 700-1100 1100-1300 1300-2000	Dark brown peaty organic matter moist. Dark grey silty sand. Grey silty sand. Light brown gravelly silt. Laterite rock. Wet silt pebbles 30-40mm. White moist clayey silt. WT 660mm BGL
SB010	South boundary east of bush line in paddock	0-50 50-300 300-500 500-1200 1200-2000	Brown silty sand organic matter dry. Brown silty sand gravels 40-50mm, boulders 200mm Laterite, dry. Brown/orange silty sandy gravel cemented Laterite. Light brown/orange cemented silt. White mottles sandstone dry. Light brown/orange cemented silt. White mottles sandstone dry. No WT.
SB011	Mid paddock, top of hill eastern side of site	0-50 50-300 300-400 400-1200 1200-1800 1800-2000	Dark brown silty sand dry. Grey silty sand dry. Light brown silty gravel pebble 30-50mm. Light brown cemented silt Laterite. Light brown, mottles pink * white clay dry. Orange mottled red dry clay. No WT.
SB012		0-400 400-1000 1000-1500 1500-1800 1800-2000	Grey sandy silt organic matter dry. Light grey silty sand. Cream silty sand slightly moist. Dark brown sandy silt, slightly moist gravel minor pebbles. Light brown silty clayey slightly moist boulder Laterite gravels 40mm. No WT.

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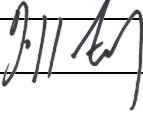
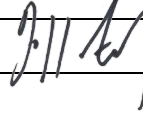
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