

YOULE-DEAN ROAD UPGRADE AND REALIGNMENT, BRABHAM

ENVIRONMENTAL ASSESSMENT

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ENVIRONMENTAL

CONTENTS

Contents	i
List of Attachments	iii
1 INTRODUCTION	4
1.1 Background.....	4
1.2 Purpose and Scope	4
1.3 Previous Approvals	5
2 EXISTING ENVIRONMENT	6
2.1 Land Use	6
2.1.1 Previous Land Use	6
2.1.2 Current Land Use.....	6
2.1.3 Contamination	6
2.1.4 Unexploded Ordinance.....	7
2.2 Topography	7
2.3 Geology and Soils	7
2.4 Acid Sulphate Soils	7
2.5 Hydrology	8
2.5.1 Groundwater	8
2.5.2 Surface water	8
2.6 Wetlands	8
2.7 Flora.....	9
2.8 Vegetation	9
2.8.1 Vegetation Complexes.....	9
2.8.2 Vegetation Types.....	10
2.8.3 Floristic Community Types	10
2.8.4 Vegetation Condition	10
2.9 Fauna	13
2.9.1 Habitats	13
2.9.2 Previous Surveys.....	14
2.10 Cultural Heritage	14
2.10.1 Aboriginal Heritage.....	14
2.10.2 European Heritage.....	15
3 ENVIRONMENTAL IMPACT ASSESSMENT	16

3.1	Previous and Surrounding Land Use	16
3.1.1	Site Contamination.....	16
3.1.2	Unexploded Ordinance.....	16
3.2	Acid Sulphate Soils	16
3.3	Groundwater and Surface Water	17
3.4	Wetlands	17
3.5	Flora and Vegetation.....	17
3.6	Fauna	17
3.7	Heritage	17
4	CONCLUSION	19
5	REFERENCES	20

LIST OF ATTACHMENTS

Tables

Table 1: Vegetation Condition Rating Scale

Plates

Plate 1: Historical Aerial Photography from 1953 (Landgate, 2017a)

Plate 2: Historical Aerial Photography from 1953 (Landgate, 2017a)

Plate 3: Wetlands on the site (JDA, 2008)

Plate 4: Geomorphic Wetland Mapping

Plate 5: Completely Degraded area to the north

Plate 6: Degraded vegetation in the eastern part of the site

Plate 7: Degraded vegetation in the western part of the site

Plate 8: Bulrush in the western part of the site

Figures

Figure 1: Site Boundary

Appendices

Appendix 1: Earthwork Plans for Youle-Dean Road

Appendix 2: Aboriginal Heritage Enquiry System Report

Appendix 3: Heritage Council of Western Australia Report

1 INTRODUCTION

1.1 Background

Stockland Development is proposing to upgrade and realign Youle-Dean Road to tie into the new Lord Street/ Youle-Dean Road intersection. The proposed upgrade and realignment will involve widening the road on the southern side into undeveloped land on Lot 805 and 806, abutting the current road reserve (Figure 1).

The proposed earthworks (Appendix 1) will require the clearing of native vegetation on Lot 805 which is managed by the Western Australian Planning Commission (WAPC) and Lot 806 which has been ceded into the road reserve.

1.2 Purpose and Scope

The Environmental Assessment has been commissioned by Stockland Development to:

- Undertake a desktop study of local environmental conditions;
- Assess the potential environmental impacts of the proposed upgrade and realignment to Youle-Dean Road; and
- Make recommendations (if required) to ensure the design/development of the road upgrade and realignment is developed to minimise environmental impact and to comply with environmental legislative requirements.

The Environmental Assessment includes the following:

- Description of past and present land use including:
 - Surrounding land uses;
 - Assessment of current and historical activities on the subject site and surrounding areas which have the potential to result in contamination issues at the site; and
 - Heritage features.
- Review of existing flora and fauna reports for the adjacent Lot 800, Brabham, Whiteman Edge and the Albion District Structure Plan Area;
- Physical characteristics including a description of:
 - Landform;
 - Drainage and water bodies;
 - Geological, hydrogeological and hydrological characteristics; and
 - Acid Sulphate Soil Risk Mapping.
- A site walkover to ground truth the results of the desktop study; and
- Discussion on the implications of relevant State and Commonwealth environmental policies and legislation.

1.3 Previous Approvals

The proposed infrastructure is located in the Albion District Structure Plan (DSP) area, which is included in the City of Swan Local Planning Scheme No. 17 (LPS 17) (WAPC, 2008). Scheme provisions are contained in LPS 17 regarding environmental management for the area.

The identification of environmental features to be retained in the more detailed Local Structure Plans and subsequent subdivisions was addressed in the DSP.

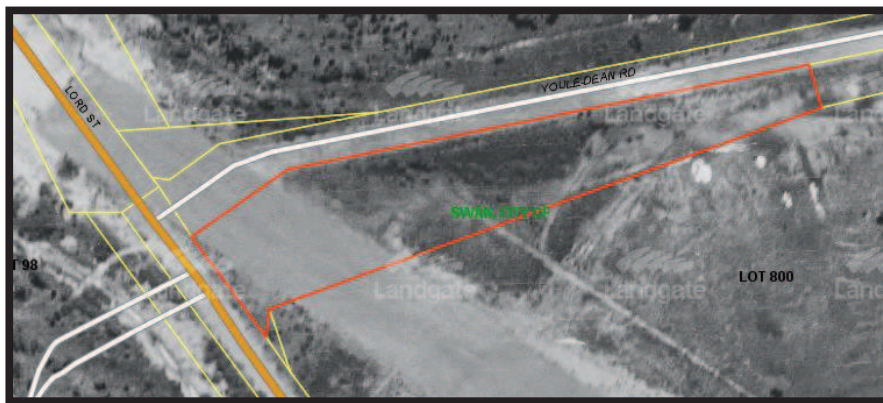
2 EXISTING ENVIRONMENT

2.1 Land Use

2.1.1 Previous Land Use

The current alignment of Youle-Dean Road was cleared prior to 1953 (Plate 1). The area of the proposed road upgrade and realignment (the site) was partly cleared prior to 1953 (Plate 1) including part of the runway of the old Caversham Airbase and later for grazing purposes.

Plate 1: Historical Aerial Photography from 1953 (Landgate, 2017a)



The 1995 aerial photograph shows that most of the site remained predominantly cleared with the growth of some native shrubs in the central area (Plate 2).

Plate 2: Historical Aerial Photography from 1995 (Landgate, 2017a)



2.1.2 Current Land Use

The site currently contains some native vegetation and a small portion of the old runway (Figure 1).

2.1.3 Contamination

The use of the adjacent Lot 800 as an airfield is considered to be potentially contaminating. Before the assessment of the proposed amendment to the LPS 17 the entire Albion DSP was listed as "Awaiting Classification" as there was not enough information provided on the site as to the location of potentially contaminated areas. The alignment of the road upgrade is at the very end of one of the

runways of the old airbase and would likely not have been subject to any contamination from the airbase operations. As a result, the area is not registered as contaminated and likely does not require any further investigation.

2.1.4 Unexploded Ordinance

The Albion DSP Environmental Review identified that Unexploded Ordinance (UXO) may potentially occur on Lot 805 and 806. The Department of Fire and Emergency Services (DFES) consider that the adjacent Lot 800 has a risk of UXO being present and will need to be contacted prior to construction. If a UXO search is required DFES will provide a Scope of Works which will outline the density and methodology required for a search of the site. The location of the proposed road works at the northwestern tip of the old airbase suggests that the potential for UXO would be very low.

2.2 Topography

The site is flat and is approximately at 22m Australian Height Datum (AHD) (Landgate, 2017). No particular landform features stand out on the site. A bund about 2m high is located on the site parallel with the southern side of the Youle-Dean Road reserve.

2.3 Geology and Soils

The site is located on the Southern River soil unit within the Bassendean Dune System (Churchward and McArthur, 1980). The Southern River soil unit consists of sandplain with low dunes and many intervening swamps; iron and humus podzols, peats, and clays.

The Department of Agriculture and Food Western Australia (DAFWA) mapped the soils on the site as Bassendean Yanga Phase (Bassendean) Phase (212Bs_Ya) which is located on poorly drained flats on alluvial deposits. The soils are semi-wet soils, yellow-brown shallow sands and grey deep sandy duplexes and are usually associated with dense *Melaleuca* scrub (DAFWA, 2017).

2.4 Acid Sulphate Soils

Acid sulphate soils (ASS) are wetland soils and unconsolidated sediments that contain iron sulphides which, when exposed to atmospheric oxygen in the presence of water, form sulphuric acid. ASS form in protected low energy environments such as barrier estuaries and coastal lakes and commonly occurs in low-lying coastal lands such as Holocene marine muds and sands. When disturbed, these soils are prone to produce sulphuric acid and mobilise iron, aluminium, manganese and other heavy metals. The release of these reaction products can be detrimental to biota, human health and built infrastructure.

The ASS Risk on the site has been mapped as being Moderate to Low (<3m from the surface), (Landgate, 2017). The Albion District Structure Plan Area was subject to a preliminary Acid Sulphate Soils (ASS) investigation by Douglas Partners in 2006. The Douglas Partners investigation provided information on the distribution and characteristics of ASS at a broad scale. Generally ASS is likely to be identified in the low lying areas and therefore investigation and management may be required once detailed design is complete, showing the areas and depth of soil disturbance.

2.5 Hydrology

2.5.1 Groundwater

The site is on the Perth Surficial Swan and Mirrabooka aquifer. The Superficial Swan overlays the Leederville aquifer which is further described as the sub area Wanneroo member under the site and consists of poorly sorted fine – to medium-grained quartz with feldspar and occasionally trace heavy minerals. This overlays the Yarragadee aquifer (DoW, 2013).

Groundwater flows from north-west to south-east across the region. The Perth Groundwater Map indicates groundwater is between 0 and 1m from the surface at 22 to 23mAHD (DoW, 2016). The site is not in an Underground Water Pollution Control Area (UWPCA) which are declared over the recharge areas of Perth's public groundwater supply schemes to protect the quality of drinking water.

A Local Water Management Strategy (LWMS) has been prepared and approved for the Albion District Structure Plan including the site (JDA, 2006).

2.5.2 Surface water

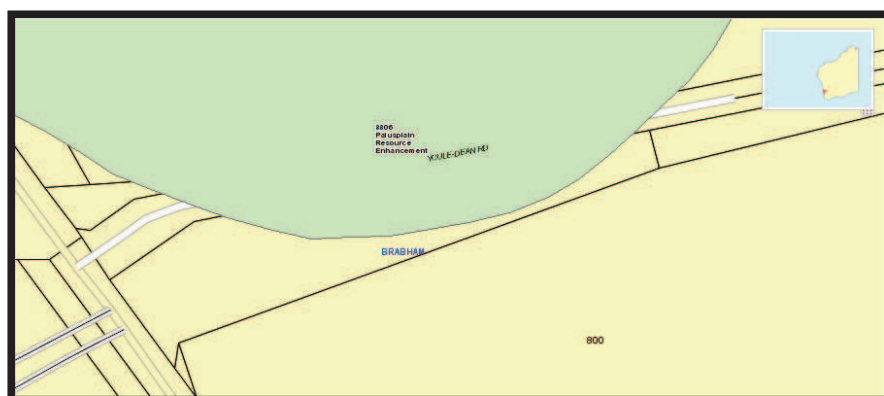
The site is within the Swan Avon/Lower Swan Catchment in the Swan Coastal Basin. According to the LWMS the surface flows to Horse Swamp (JDA, 2006). Current floodplain mapping shows the site is not within the Flood Plain or Flood Fringe of any watercourse (Landgate, 2017).

Part of the area to be cleared contains water on the surface seasonally. The site contained water in March 2017 which is likely to be due to a large rainfall event in February 2017, recorded at the Whiteman Park Station (Station Number 009263), approximately 2km from the site. The rainfall in February 2017 was 102.8mm, compared to the mean of 18.7mm (2004 to 2017).

2.6 Wetlands

One wetland is mapped on the site according to the geomorphic wetland mapping of the Department of Parks and Wildlife. Wetland UFI 8806 is a Resource Enhancement Palusplain that occurs in the central part of the site and extends to the north over the Whiteman Edge urban development site.

Plate 4: Geomorphic Wetland Mapping



The wetland was identified as wetland 91 in the DSP. The Albion DSP did not require wetland 8806 to be retained in the development of the area. However, as per the DSP *portions of Palusplain Wetlands*

77 (UFI 13396) and 91 (UFI 8806) will be retained and modified (filled or channelled) for drainage purposes (JDA, 2008).

2.7 Flora

Native vegetation occurs over most of the site, albeit in mostly degraded condition.

Several flora surveys have been conducted in the Albion DSP area including Ecologia (1999), Western Botanical (2006) and PGV Environmental (2013). The PGV Environmental Level 2 Flora and Vegetation survey was undertaken predominantly on Lot 800, however the field survey also included Lot 805 and 806 in the investigation area, although the mapping in the report did not reflect this. A total of 129 species were recorded in the PGV Environmental survey consisting of 84 native species and 45 introduced species. No Threatened (Declared Rare) Flora species have been recorded on the site in any of the flora surveys. Two priority species were recorded on Lot 800 by Western Botanical (2006):

- *Goodenia filiformis* (Priority 3); and
- *Verticordia lindleyi* subsp. *lindleyi* (Priority 4).

Kunzea sp. aff. *recurva* has also been recorded in Lot 800 and is locally significant according to the list of species in Bush Forever (Government of Western Australia, 2000).

The location of these three species was at the central and southern end of Lot 800 does not occur not in the area of the proposed road upgrade and realignment works.

A site inspection by PGV Environmental in March 2017 noted the presence of Bulrush (*Typha orientalis*) and the native species Common Joyweed (*Alternanthera nodiflora*) both of which have not previously been recorded on the site.

The site for the proposed road upgrade and realignment does not contain any Threatened, Priority or locally significant flora species.

2.8 Vegetation

2.8.1 Vegetation Complexes

The vegetation on the site is part of the Southern River Vegetation Complex. The Southern River Vegetation Complex is described as “open woodland of *Corymbia calophylla*-*Eucalyptus marginata*-*Banksia* species with fringing woodland of *Eucalyptus rudis*-*Melaleuca raphiophylla* along creek beds” (Hedde *et al.*, 1980). This general description reasonably accurately describes the vegetation on the site apart from the fact that the *Melaleuca* species occurs on the site in basin and flat-type wetlands rather than creek beds.

2.8.2 Vegetation Types

The native vegetation on Lot 805 and 806 within the proposed road works was mapped by PGV Environmental (2013) as:

Mr	<i>Melaleuca raphiophylla</i> Woodland over weeds; and
MpHa	<i>Melaleuca preissiana</i> Low Open Woodland over <i>Hypocalymma angustifolium</i> / <i>Juncus pallidus</i> Open Low Heath

The March 2017 site inspection by PGV Environmental confirmed that the Mr vegetation type extends into all of Lot 805 and 806 whereas the MpHa vegetation type does not occur in the proposed road upgrade and realignment area. As a result, all of the vegetation proposed to be cleared can be considered one vegetation type - *Melaleuca raphiophylla* Woodland over weeds.

Other native species recorded in the road upgrade and realignment area in March 2017 included scattered Flooded Gum (*Eucalyptus rudis*), *Juncus pallidus*, *Baumea juncea* and *Astartea affinis*. Common weed species throughout the site included *Lotus subbiflorus*, *Rumex crispus* and *Dittrichia graveolens*. Invasive Bulrush (*Typha orientalis*) was present in patches at the western, wetter end of the site. The Sydney Golden Wattle (*Acacia longifolia*) was a very common tall shrub at the eastern end of the site. *Acacia longifolia* is listed in the top 30 priority weeds in the Swan region (Bettink and Keighery, 2008). Several introduced River Red Gum (*Eucalyptus camaldulensis*) trees occur on the site as well as many seedlings and saplings which are thriving in the wet conditions.

2.8.3 Floristic Community Types

The vegetation survey undertaken in 2012 concluded that there were no Threatened or Priority Ecological Communities on Lot 805 or 806 (PGV Environmental, 2013).

2.8.4 Vegetation Condition

The vegetation condition over the site was assessed according to the condition rating scale used in Bush Forever by PGV Environmental (2013) (Table 1).

Table 1: Bush Forever Condition Rating Scale

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

Condition	Description
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Source: Government of Western Australia, 2000.

The northern extent of Lot 805 and 806 is Completely Degraded with the area being cleared for firebreak and a large bund adjacent to the existing Youle-Dean Road (Plate 5).

Plate 5: Completely Degraded area to the north



The March 2017 site inspection rated the vegetation as Degraded in the western part and Good in the eastern part of the proposed road upgrade and realignment area. The eastern part contained abundant Sydney Golden Wattle and other herbaceous weeds, it also contains a native understorey including stands of *Baumea juncea* that resulted in the Good rating (Plate 6).

Plate 6: Good vegetation in the eastern part of the site



The western part of the site was rated as Degraded as the understorey has been impacted by previous grazing and contains tracks and a drainage line (Plate 7).

Plate 7: Degraded vegetation in the western part of the site



The western part of the site contains stands of Bulrush (*Typha orientalis*) (Plate 8).

Plate 8: Bulrush in the western part of the site



2.9 Fauna

2.9.1 Habitats

The fauna habitat on the site is a *Melaleuca* woodland over weeds and contained open water in March 2018. Fauna habitat can be assessed using a number of factors including, the size of the habitat, the level of habitat connectivity, availability of specific resources (e.g. tree hollows) and overall vegetation quality. The habitat was assessed according to the following categories:

High quality fauna habitat – These areas closely approximate the vegetation mix and quality that would have been in the area prior to any disturbance. The habitat has connectivity with other habitats and is likely to contain the most natural vertebrate fauna assemblage.

Very good fauna habitat - These areas show minimal signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) and generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be minimally affected by disturbance.

Good fauna habitat – These areas showed signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) but generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be affected by disturbance.

Disturbed fauna habitat – These areas showed signs of significant disturbance. Many of the trees, shrubs and undergrowth are cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, contain weeds or have been damaged by vehicle or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas are likely to differ significantly from what might be expected in the area had the disturbance not occurred.

Highly degraded fauna habitat – These areas often have a significant loss of vegetation, an abundance of weeds, and a large number of vehicle tracks or are completely cleared. Limited or no fauna habitat connectivity. Faunal assemblages in these areas are likely to be significantly different to what might have been in the area pre-disturbance (Coffey Environments, 2009).

The site is considered to be Disturbed Habitat as it has been degraded and is part of disturbed vegetation that is fragmented by existing roads, runway and completely degraded areas in the adjacent Lot 800.

2.9.2 Previous Surveys

A fauna survey of the site was completed as part of the studies undertaken on the site for the Environmental Review for the Albion District Structure Plan by Bamford Consulting (2006). The assessment utilised fauna studies from the surrounding area to predict the fauna assemblage. The assemblage for the site is not expected to have changed significantly.

Predicted to occur in the Albion DSP area were:

- 14 species of amphibians;
- 58 species of birds in the vegetation on the site;
- 26 species of birds of prey and waterbirds that may visit the site;
- 8 species of native mammals; and
- 7 feral species of mammal including rats, mice, rabbits, foxes, cats, pigs and goats.

The proposed road upgrade and realignment area does not contain foraging, roosting or potential breeding habitat for Black Cockatoo species.

No conservation significant species were identified as potentially being impacted by development in of the proposed road upgrade and realignment area.

2.10 Cultural Heritage

2.10.1 Aboriginal Heritage

Martinick and Associates conducted ethnographical and archaeological surveys for the Albion District Structure Plan Area. Consultation by Martinick and Associates in 1994 was undertaken by conducting a site inspection with three separate Aboriginal groups. St Leonard's Creek and wetlands in the area were identified as having significance. This consultation did not identify any areas of cultural significance on the site.

Martinick and Associates also undertook an extensive search for artefacts during an Aboriginal Heritage Survey for the Albion District Structure Plan Area in 1997 (Martinick and Associates, 1998). The survey did not identify any sites in the proposed infrastructure sites.

A search of the Aboriginal Heritage Inquiry System indicates that no additional aboriginal heritage sites have been registered on the proposed road upgrade and realignment site (Appendix 2).

2.10.2 European Heritage

Heritage sites can be listed under the following lists/registers:

- World Heritage Sites;
- National Heritage Sites;
- Commonwealth Heritage Sites;
- Sites on the register of the National Estate;
- Sites on the Western Australian Heritage Council Register; and
- Sites listed in the City of Swan Municipal Heritage Inventory List.

There are no listed Heritage Sites or Interim Heritage Sites on the site (Landgate, 2017b; Heritage Council of Western Australia, 2016; DoE, 2016).

Caversham Airfield was assessed in March 2007 by the Heritage Council of Western Australia which concluded that the site was 'Below Threshold' to be listed on the State Register (Appendix 3).

3 ENVIRONMENTAL IMPACT ASSESSMENT

3.1 Previous and Surrounding Land Use

3.1.1 Site Contamination

A Preliminary Site Investigation for the part of the site located in the vicinity of the Caversham Airbase runway should not be required given the location of the site at the north-west tip of the old airbase.

3.1.2 Unexploded Ordinance

DFES has indicated that there is a risk of UXO occurring on the adjacent Lot 800 and a targeted assessment may be required. The assessment may extend to Lot 805 in the road upgrade and realignment area, however that is considered unlikely. If required, a Remediation Plan will need to be based on the results of the targeted search once the scope of works has been determined by DFES. In accordance with LPS 17 the Plan will ensure:

- a) *Public risk from UXO is minimised;*
- b) *All UXO is removed from the site prior to subdivision, commencement of any earthworks and endorsement of any survey documents*

The Plan may be required prior to earthworks commencing and DFES should be contacted regarding the scope of works.

3.2 Acid Sulphate Soils

Following a review of the Douglas Partners investigation, the then Department of Environment and Conservation (DEC) (now Department of Water and Environmental Regulation (DWER)) made the following recommendations:

- *“...that soil treatment should be based on the highest result expressed as total sulphidic acidity, unless the source of the titratable acidity is shown to be benign.”*
- *“...that a groundwater investigation be conducted to determine background groundwater quality prior to any earthworks commencing.”*
- *“...undertake further investigation to determine total net acidity and consider their potential offsite impacts. The suspended peroxide oxidation combined acidity and sulphate (SPOCAS) method is useful to determine the organic, sulphidic and metal-associated acidity. In addition, acid base accounting is recommended for the assessment of acid sulphate soils and predicting the lime requirement in this area.”*

City of Swan's Local Planning Scheme 17 Section 5.2.1 requires that ASS investigation and management is to be undertaken in accordance with the WAPC's Planning Bulletin 64 or its successor. In 2009 the WAPC updated Planning Bulletin 64 to refer to the WAPC Acid Sulphate Soils Planning Guidelines (WAPC, 2009) for the hierarchy of reporting required for ASS.

The WAPC *Acid Sulphate Soils Planning Guidelines* (WAPC, 2009) indicate that “*acid sulphate soils are technically manageable in the majority of cases*”. An ASS Investigation and Management Plan will be prepared in accordance with the *Acid Sulphate Soils Guideline Series: Identification and Investigation*

of *Acid Sulphate Soils and Acidic Landscapes* (DEC, 2009) and *Treatment and Management of Soils and Water in Acid Sulphate Soil Landscapes* (DEC, 2011). As ASS is manageable, the soils and geomorphology are not an impediment to the construction of the infrastructure.

3.3 Groundwater and Surface Water

Groundwater and surface water are to be managed in the context of the Local Water Management Strategy that was submitted with the Albion District Structure Plan. The management of groundwater and surface water is included in the road design and will be in accordance with the *Urban Water Management Plan Lots 15 to 17 Woollcott Avenue, Whiteman Edge Local Structure Plan IC* (RPS, 2016).

3.4 Wetlands

The proposed road upgrade and realignment impacts on a small area on the southern part of a Resource Enhancement palusplain wetland. The DSP and Albion Local Water Management Strategy acknowledge that the condition of wetlands in the Albion DSP area have been affected by past (and current) land uses.

The DSP outlined the proposed development of the Albion area, and with respect to wetlands, it identified which wetlands were proposed to be retained and those that would be developed. The DSP did not require the retention of Wetland 91 (UFI 8806), and designated the wetland to be developed with partial retention and to be used for drainage. The area of the wetland on the site is a small part of the wetland that is fragmented from the remainder by the existing Youle-Dean Road. The proposed upgrade and realignment is in accordance with the approved District Structure Plan.

3.5 Flora and Vegetation

There are no Declared rare or Priority flora species recorded on the proposed upgrade and realignment site. The vegetation is not representative of a TEC or PEC and is not an impediment to the proposed construction of the proposed road upgrade and realignment. There are numerous weed and invasive species including *Acacia longifolia* and *Typha orientalis* that are listed among the 30 priority environmental weeds for the Swan Coastal Plain (Bettink and Keighery, 2008).

No further flora and vegetation studies are required for the site.

3.6 Fauna

There are no conservation significant fauna species likely to use the site as habitat. A large number of kangaroos occur in the general area and traverse the road upgrade and realignment area to access land to the north. Management of kangaroos movement during construction works will be required such as installing fencing of the southern boundary of the site prior to construction.

3.7 Heritage

There are no Aboriginal or European Heritage sites that occur on the site and further investigations should not to be required.

Although a Management Plan is required for an LSP rather than for road construction, it is important for all contractors working on the site to be made aware of their responsibilities under the *Aboriginal Heritage Act 1972*, with regards to the discovery of Aboriginal Heritage sites through induction training. They should be educated to recognise materials that may constitute a possible Aboriginal site as per Section 5.2.4 (e) of the City of Swan's LPS 17.

If there is any possibility that an Aboriginal site has been found during construction works, the following steps should be taken:

1. All work must stop in the immediate area. The potential site should be identified in such a way that avoids any damage after works have ceased. This may include taping or temporary fencing to isolate and restrict access immediately.
2. The site supervisor is to be notified immediately.
3. The site supervisor is to notify the project manager immediately after being notified.
4. The Project Manager is to consult suitably qualified personnel to determine the appropriate course of action. This may require contacting an archaeologist.
5. If the archaeologist reports that there is no evidence that the area is of significance then this report will result in the Project Manager authorising work to recommence.
6. For isolated artefact finds, the archaeologist may recommend putting the material to one side to be recorded by an archaeologist at a later date on site.
7. If the archaeologist reports that there is evidence that the area is of significance this report will result in the Project Manager consulting with relevant authorities to determine the management of the site in accordance with all appropriate Legislation, Criterion and Guidance.
8. If skeletal material is found, the Project Manager must contact the Police and the Coroner's Office. The police treat any uncovered skeletal material as a crime scene until proven otherwise.
9. If the skeletal material is found to be of Aboriginal origin, the find will be reported to the DAA and dealt with appropriately by the DAA.
10. The archaeologist will report to the Project Manager regarding the re-commencement of works (except in the situation of the discovery of skeletal remains).
11. The Project Manager will ensure that each incident is recorded including the date of discovery, steps taken upon discovery, photographs (if possible) and the outcome.

This Cultural Heritage Protocol should be included in the Development Application.

4 CONCLUSION

The Environmental Assessment concludes that the proposed infrastructure sites have the following characteristics:

- Previous land use in the adjacent Lot 800 as an airbase may potentially require contaminated site and/or UXO investigations, although the location of the site adjacent to the very north-west corner of Lot 800 makes these investigations unlikely;
- Topography and soils should not be an impediment to construction;
- ASS investigations will be required and managed if any excavations are to occur into the natural soil;
- The site contains part of a Resource Enhancement palusplain wetland that extends further north of Youle-Dean Road. The vegetation in the wetland is mostly Degraded. The wetland is not proposed to be retained under the Albion District Structure Plan apart for some possible drainage purposes;
- The site contains native vegetation in the form of *Melaleuca raphiophylla* Scrub to Woodland. The vegetation in the western part of the site is Degraded with abundant herbaceous weeds and no understorey. The vegetation in the eastern part is in slightly better condition (Good) with some native sedges and shrubs in the understorey. The site contains an invasive weed species identified in Environmental weed census and prioritisation, Swan NRM Region, *Acacia longifolia* (Bettink and Keighery, 2008);
- The proposed road upgrade and realignment will not impact on any Conservation Significant flora species, Threatened Ecological Communities or Priority Ecological Communities;
- The proposed upgrade and realignment will not impact on any Conservation Significant fauna species or other matters of National Environmental Significance; and
- There are no heritage sites in the proposed upgrade and realignment area however ground disturbing activities may require a protocol in the event that a site is discovered.

The Environmental Assessment concludes that there are no environmental impediments to the upgrade and realignment of Youle-Dean Road. The upgrade and realignment is in accordance with the approved Albion District Structure Plan.

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(endangered) Calyptorhynchus latirostris Baudin's cockatoo (vulnerable) Calyptorhynchus
baudinii Forest red-tailed black cockatoo (vulnerable) Calyptorhynchus banksii naso.*
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APPENDIX 1

Earthwork Plans for Infrastructure

GENERAL NOTES

1. ALL LEVELS IN METRES TO AND EXISTING SURVEY BY VERTS SURVEYORS.
2. BATTERS TO EXISTING SURFACE AT 1V IN 3H TO 1V IN 3H UNLESS NOTED OTHERWISE.
3. ALL UNSUITABLE MATERIAL TO BE REMOVED BY THE CONTRACTOR TO APPROVED TIPPING SITE PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL PIES TO BE PAID BY CONTRACTOR.
4. EXTENT OF EARTHWORKS TO BE LIMITED TO THE EARTHWORKS STAGE BOUNDARY UNLESS AGREED WITH THE SUPERINTENDENT.
5. ALL CLEARED MATERIAL TO BE MULCHED AND STOCKPILED AT THE LOCATION SHOWN HIGHLIGHTED ON THIS DRAWING.
6. CONTRACTOR TO LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS ON SITE.
7. CONTRACTOR TO GRADE EVENLY BETWEEN DESIGN CONTOURS AND MATCH INTO EXISTING SURFACE AT LIMIT OF EARTHWORKS BOUNDARY WHERE APPROPRIATE.
8. EXCESS CUT FROM EARTHWORKS SHALL BE PLACED ON SITE AS DIRECTED BY THE SUPERINTENDENT.
9. WHERE LIMESTONE OR COFFEE ROCKS WITHIN 600mm OF THE FINAL FINISHED SURFACE SHALL BE REMOVED AND THE SITE IN ACCORDANCE WITH THE SPECIFICATION.
10. DESIGN LEVELS SHOWN SHALL BE ON THE FINISHED SURFACE INCLUDING TOPSOIL WHERE SPECIFIED.
11. THE CONTRACTOR SHALL LIMIT THE MOVEMENT OF EQUIPMENT AND MATERIAL TO THE MINIMUM AREA NECESSARY AND PROTECT ALL VEGETATION AND EXISTING SERVICES ON SITE.

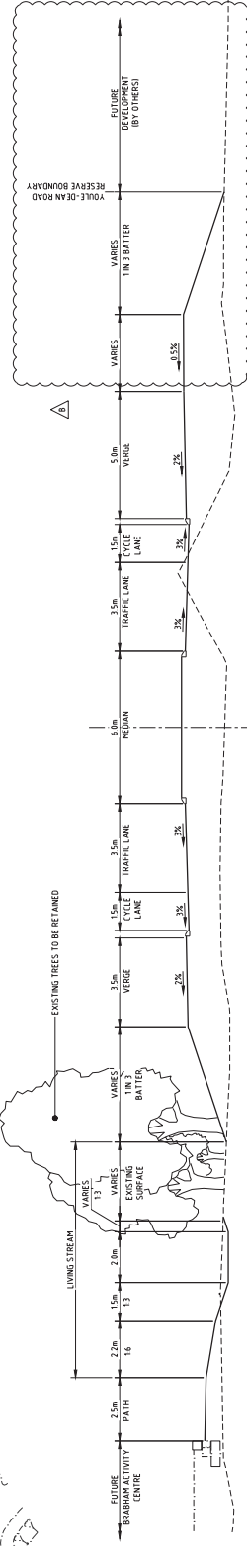
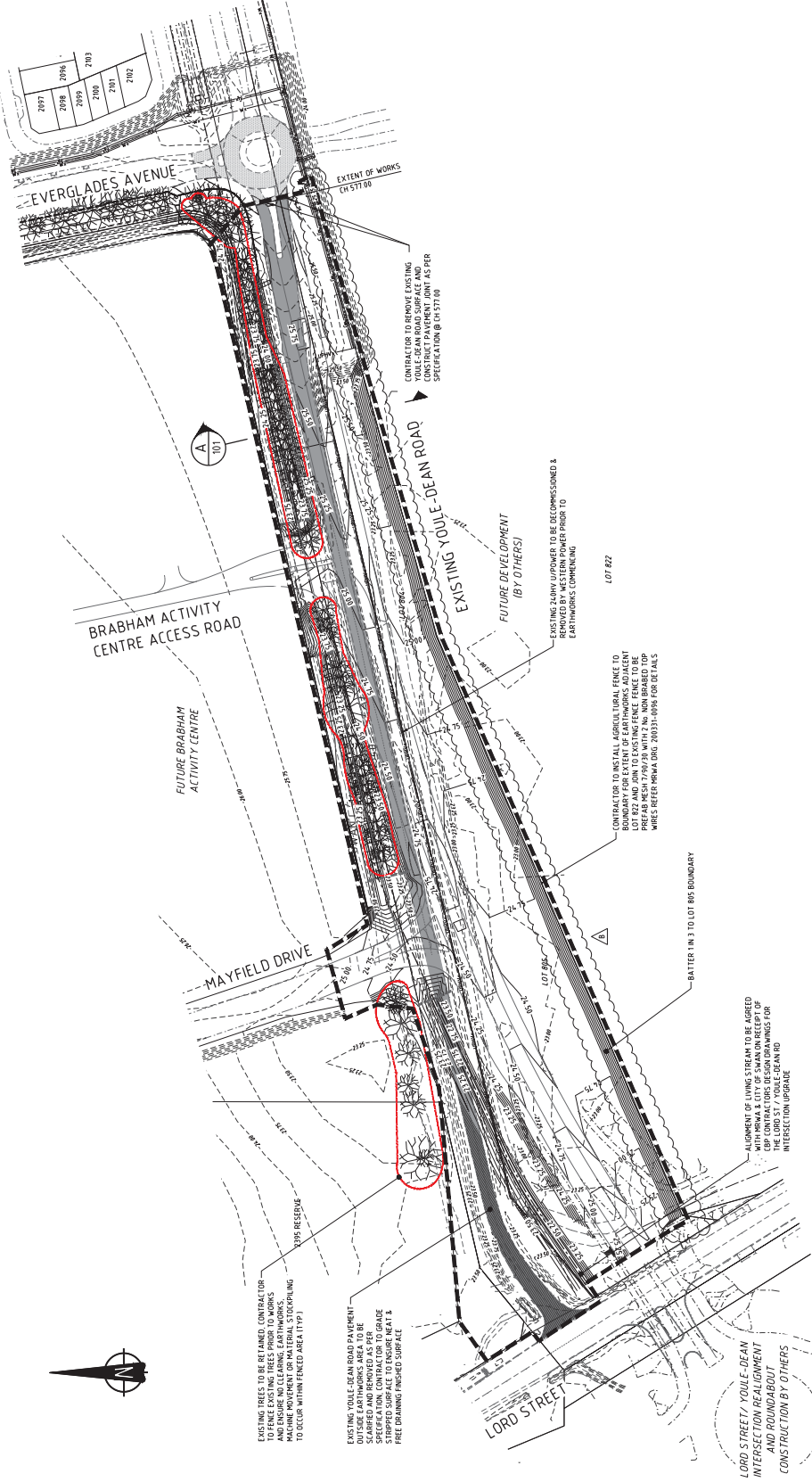
LEGEND

- EXISTING CONTOUR
- DESIGN EARTHWORKS CONTOUR (0.25m)
- EXISTING RETAINING WALL
- FUTURE RETAINING WALL
- EXTENT OF WORKS BOUNDARY
- EXISTING PAVEMENT TO BE SCABBED & REMOVED AS PER SPECIFICATION
- EXISTING PAVEMENT TO BE RETAINED
- EXISTING UNDERGROUND 240V HV POWER
- EXISTING WATER MAIN
- EXISTING TELSTRA PIT AND PIPE
- EXISTING GAS MAIN
- EXISTING TREE TO BE RETAINED
- EXTENT OF TREE PROTECTION FLAGGING

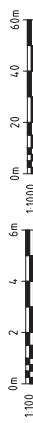




NOTICE TO CONTRACTOR

IT IS THE CONTRACTOR'S RESPONSIBILITY TO INVESTIGATE THE NATURE AND LOCATION OF ALL SERVICES WHICH MAY BE ENCOUNTERED AND TO CONSULT WITH THE RELEVANT SERVICE AUTHORITIES PRIOR TO COMMENCEMENT OF EXCAVATIONS. FAILURE TO DO SO OR TO TAKE DUE CARE SHALL NOT LIMIT THE CONTRACTOR'S LIABILITY FOR REPAIR OF ALL SERVICES DAMAGED BY HIM DURING CONSTRUCTION. WORKS THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY FOR THE PROTECTION OF ALL EXISTING SERVICES.



YOULE-DEAN ROAD - TYPICAL SECTION



PROJECT		CLIENT		CONSULTANT		DRAWING		REVISION	
WHITEHARTS EDE - YOULE-DEAN ROAD						152612		5942-YDR-100	
EARTHWORKS & CLEARING PLAN		17/01/18		152612		152612		5942-YDR-100	
APPROVED						1:1000 1:100		1:1000 1:100	
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APPENDIX 2

Aboriginal Heritage Enquiry System Report



Aboriginal Heritage Inquiry System

Aboriginal Sites Database

Search Criteria

0 Registered Aboriginal Sites in Custom search area, 402268.93mE, 6477207.23mN z50 (MGA94) : 402922.50mE, 6478321.68mN z50 (MGA94)

Disclaimer

The *Aboriginal Heritage Act 1972* preserves all Aboriginal sites in Western Australia whether or not they are registered. Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Aboriginal Affairs by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you email the details to the Department at heritageenquiries@daa.wa.gov.au and we will make every effort to rectify it as soon as possible.

South West Settlement ILUA Disclaimer

Your heritage enquiry is on land within the following Indigenous Land Use Agreement(s): Whadjuk People ILUA

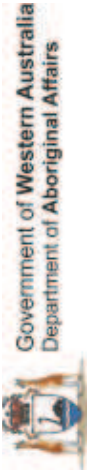
On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boorjara #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).

The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will 'impact' (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site. The Aboriginal Heritage Due Diligence Guidelines, which are referenced by the NSHA, provide guidance on how to assess the potential risk to Aboriginal heritage.

Likewise, from 8 June 2015 the Department of Mines and Petroleum (DMP) in granting Mineral, Petroleum and related Access Authority tenures within the South West Settlement ILUA areas, will place a condition on these tenures requiring a heritage agreement or a NSHA before any rights can be exercised.

If you are a State Government Department, Agency or Instrumentality, or have a heritage condition placed on your mineral or petroleum title by DMP, you should seek advice as to the requirement to use the NSHA for your proposed activity. The full ILUA documents, maps of the ILUA areas and the NSHA template can be found at <https://www.dpc.wa.gov.au/antur/Claims/Pages/SouthWestSettlement.aspx>.

Further advice can also be sought from the Department of Aboriginal Affairs (DAA) at heritageenquiries@daa.wa.gov.au.



Aboriginal Heritage Inquiry System

Aboriginal Sites Database

Copyright

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Coordinate Accuracy

Accuracy is shown as a code in brackets following the coordinates. Map coordinates (Latitude/Longitude and Easting/Northing) are based on the GDA 94 Datum. The Easting/Northing map grid can be across one or more zones. The zone is indicated for each Easting on the map, i.e. '500000mE:Z50' means Easting=500000, Zone=50.

Terminology (NB that some terminology has varied over the life of the legislation)

Place ID/Site ID: This is a unique ID assigned by the Department of Aboriginal Affairs to the place

Status:

- o **Registered Site:** The place has been assessed as meeting Section 5 of the *Aboriginal Heritage Act 1972*
- o **Other Heritage Place which includes:**
 - **Stored Data / Not a Site:** The place has been assessed as not meeting Section 5 of the *Aboriginal Heritage Act 1972*
 - **Lodged:** Information has been received in relation to the place, but an assessment has not been completed at this stage to determine if it meets Section 5 of the *Aboriginal Heritage Act 1972*

Status Reason: e.g. Exclusion - Relates to a portion of an Aboriginal site or heritage place as assessed by the Aboriginal Cultural Material Committee (ACMC). e.g. such as the land subject to a section 18 notice.

Origin Place ID: Used in conjunction with Status Reason to indicate which Registered Site this Place originates from.

Access and Restrictions:

- o **File Restricted = No:** Availability of information (other than boundary) that the Department of Aboriginal Affairs holds in relation to the place is not restricted in any way.
- o **File Restricted = Yes:** Some of the information that the Department of Aboriginal Affairs holds in relation to the place is restricted if it is considered culturally sensitive. This information will only be made available if the Department of Aboriginal Affairs receives written approval from the informants who provided the information. Download the [Request to Access Restricted Information](#) letter and form.
- o **Boundary Restricted = No:** place location is shown as accurately as the information lodged with the Registrar allows.
- o **Boundary Restricted = Yes:** To preserve confidentiality the exact location and extent of the place is not displayed on the map. However, the shaded region (generally with an area of at least 4km²) provides a general indication of where the place is located. If you are a landowner and wish to find out more about the exact location of the place, please contact DAA.
- o **Restrictions:**
 - **No Restrictions:** Anyone can view the information.
 - **Male Access Only:** Only males can view restricted information.
 - **Female Access Only:** Only females can view restricted information

Legacy ID: This is the former unique number that the former Department of Aboriginal Sites assigned to the place. This has been replaced by the Place ID / Site ID.



List of Registered Aboriginal Sites with Map

No Results



Legend

Selected Heritage Sites

- Registered Sites
Aboriginal Community Occupied
Aboriginal Community Unoccupied
Town
Search Area

Copyright for topographic base map information shall at all times remain the property of the Commonwealth of Australia, Geoscience Australia - National Mapping Division. All rights reserved.

Aerial Photos, Cadastre, Local Government Authority, Native Title boundary, Roads data copyright © Western Australian Land Information Authority trading as Landgate (2016).

Geothermal Application, Geothermal Title, Mining Tenement, Petroleum Application, Petroleum Title boundary data copyright © the State of Western Australia (DMP) (2016.6)

For further important information on using this information please see the Department of Aboriginal Affairs' Terms of Use statement at <http://www.daa.wa.gov.au/Terms-Of-Use/>

APPENDIX 3

Heritage Council of Western Australia Report

Fleet Air Arm Aerodrome (fmr)

AUTHOR Heritage Council

PLACE NUMBER 16807

LOCATION

West Swan Rd West Swan

LOCATION DETAILS

Located at Caversham Airbase, West Swan

OTHER NAME(S)

Caversham Racing Circuit, Middle Swan Aerodrome

Caversham Air Strip, Caversham Signal Station

LOCAL GOVERNMENT Swan

REGION Metropolitan

CONSTRUCTION DATE 1942 to 1943

DEMOLITION YEAR N/A

Statutory Heritage Listings

TYPE	STATUS	DATE	DOCUMENTS
(no listings)			

Other Heritage Listings and Surveys

TYPE	STATUS	DATE	GRADING/MANAGEMENT CATEGORY
RHP - Assessed-Below Threshold	Completed	23 Mar 2007	NA

Condition

Overall the evidence of the aerodrome is in fair condition, the racing circuit in fair to poor condition, and the elements of the signal station in fair to poor condition.

Associations

NAME	ASSOCIATION TYPE	DATE FROM	DATE TO
Bruce McLaren (Race Driver)	Other Association	22/11/2013	22/11/2013
A E Marshall (former land owner)	Previous Owner	22/11/2013	22/11/2013
Syd Negus (Club President)	Other Association	22/11/2013	22/11/2013
Bob Stillwell (Race Driver)	Other Association	22/11/2013	22/11/2013
Jack Brabham (Race Driver)	Other Association	22/11/2013	22/11/2013
U.S Fleet Air Arm	Other Association	22/11/2013	22/11/2013

Creation Date 14 Mar 2006

Last Update 22 Nov 2013

Viewing Status Approved

Disclaimer

This information is provided voluntarily as a public service. The information provided is made available in good faith and is derived from sources believed to be reliable and accurate. However, the information is provided solely on the basis that readers will be responsible for making their own assessment of the matters discussed herein and are advised to verify all relevant representations, statements and information.