



6 October 2020

Scott McKenzie
A/Director External Services
Shire of Esperance
Windich Street
Esperance WA 6450

Our ref: 12531105-88879-19
Your ref:

Dear Scott

Shire of Esperance - New Landfill Site Selection Study Development of Shortlist of Potentially Suitable Sites - Confidential

1 Introduction

GHD has been engaged by the Shire of Esperance (the Shire) to undertake a site selection study to identify a site(s) suitable to accommodate a new modern waste management facility.

1.1 Background

The Shire currently has an active and licensed waste facility at Wylie Bay (Wylie Bay Waste Management Facility). The landfill at Wylie Bay is nearing its final design capacity with an estimate of around two more years of remaining airspace. Further to this, the site licence is currently set to expire in August 2025 with landfilling operations to cease by 31 December 2022. GHD understands that the Shire is yet to discuss options with the Department of Water and Environmental Regulation (DWER) with regards to expanding/ extending the lifespan of the landfilling operation at the Wylie Bay facility further than 2022.

As a result of this, the Shire has been working on developing a new landfill site. In March 2020, Council resolved to undertake a new search for a site north of Speddingup Road East/ West and within the Shire of Esperance boundary. GHD was appointed by the Shire in late May 2020, to facilitate this new landfill site search.

In consultation with the Shire of Esperance and the Esperance Council, GHD prepared and presented the proposed site selection criteria for the new landfill site in a report entitled: *Shire of Esperance, New Landfill Site Study; Determination of Appropriate Site Selection Criteria, GHD, 2 July 2020.*

2 Overview of the Site Selection Process

The steps required to determine available sites that meet the desired criteria are outlined below. The process is an iterative and consultative one and ultimately derives a Multi Criteria Analysis (MCA) score for each potentially suitable land parcel to inform the Shire of Esperance as to which sites may be most suitable, subject to detailed technical and commercial evaluation.

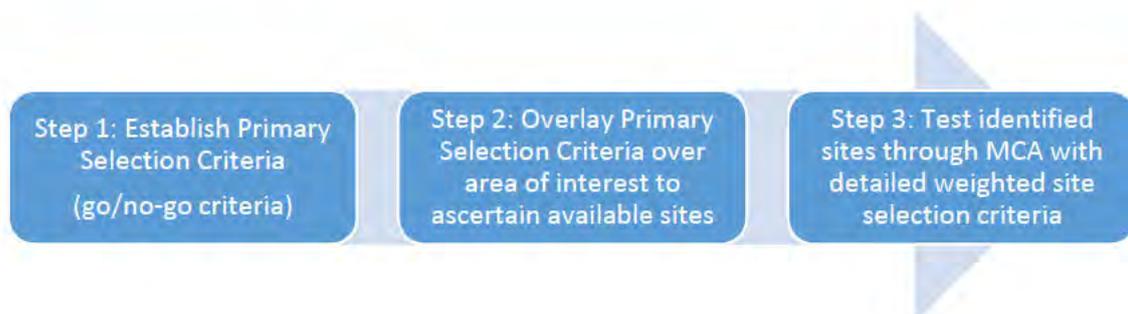


Diagram 1 Overview of the site selection process

3 Purpose of letter

The purpose of this letter is to present the endorsed primary selection criteria (STEP 1) and to present the findings from STEP 2 of the site selection process. STEP 2 has involved the primary selection criteria being geospatially overlaid onto the search area of interest to identify potentially available land parcels to be further considered, in more detail, within the overall site selection process (STEP 3).

GHD notes that this report contains land owner information that may be of a confidential nature and therefore considers that the Shire and Council treat this report as confidential unless specifically agreed otherwise.

4 Primary selection criteria

The selection criteria, including the proposed primary (go/nogo) selection criteria (STEP 1), as applied to the search area of interest, are presented within Table 1.

Table 1 Primary selection criteria (go/no-go aspects)

Criteria Category	Criteria	Requirement
Area of interest	Southern extent	Speddingup Road
	Northern extent	Within the Esperance Shire boundary
	Western extent	Speddingup Road West (western extent of road)
	Eastern extent	Speddingup Road East (eastern extent of road)
Land tenure and ownership	Tenure	Freehold and Crown land
Logistical and economics	Size	Minimum of 100 ha
Operational and engineering	Structural instability ¹	Minimum of 100m from fault lines

Criteria Category	Criteria	Requirement
Environmental/planning	National Parks	Outside of National Parks
	Wetlands	Outside of RAMSAR wetlands (including Lake Warden)
	Planning	Not in town sites or urban setting
	Proximity to airports	Minimum of 8 km from an airport
	Flooding	Avoid flood prone areas as mapped
	Proximity to wetlands/ surface water bodies	Minimum of 250 m
	Vegetation cover ²	Previously cleared including degraded farmland and existing brownfield sites (old mine etc). Remnant vegetation to be avoided
	Threatened or priority flora, fauna or ecological communities	No threatened or priority flora, fauna or ecological communities on site
Drinking water protection areas	Outside of drinking water catchment areas, groundwater recharge areas and proclaimed water management areas	
Social/community	Distance from residents (rural setting)	Minimum of 500 m from a resident (in a rural setting)
	Aboriginal and European heritage values	No registered Aboriginal or European Heritage sites

Table notes:

1. Due to a number of fault lines within the area of interest, it was agreed with the Shire that this information should be included within the short-listing stage of the process
2. Where a land parcel was assessed and found to have remnant vegetation but also found to have sufficient continuous cleared area to meet the minimum required land area, it was considered suitable for further consideration in the selection process

GHD has now progressed to STEP 2 of the landfill site selection process, as shown in Diagram 1, which involves the application of the primary selection criteria (Table 1) onto the defined area of interest.

5 Methodology for the geospatial mapping

GHD prepared a geographic information system (GIS) model with the relevant data layers (representing the derived primary selection criteria) applied to the defined area of interest. The data layers applied to the model and their source/ reference, included the following:

- Cadastre (LGATE-217, 2020) – Land parcel boundaries
- National Parks (DBCA-011, 2020) – National parks defined under acts which are applicable to DBCA
- RAMSAR Wetlands (DBCA-010, 2017)
- Townsites (LGATE-248, 2020) – Urban centres/land approved by the Minister for Lands, under the Land Administration Act 1997
- Water Observations from Space (Digital Earth Australia, 2020) - Data showing where water has been seen in Australia from 1987 to the present as an indication of topographical lows and flooding risk
- Wetlands and Surface Water Bodies (DWER and Geoscience Australia)
- Remnant Vegetation (DPIRD-005, 2020)
- Fault lines (DMIRS-015, 2018)
- Threatened or priority flora, fauna or ecological communities (DBCA, 2020)
- Public Drinking Water Source Areas (DWER-033, 2020) - Surface water catchments and groundwater areas that provide drinking water to cities, towns and communities. PDWSAs are proclaimed under the Metropolitan Water Supply, Sewerage, and Drainage Act 1909 or the Country Areas Water Supply Act 1947
- Aboriginal Heritage Places (DPLH-001, 2020)
- Heritage Council WA - State Register (DPLH-006, 2020)

Minimum setbacks and other considerations were manually applied to the model including:

- Minimum size (100 ha)
- Minimum setback from airports (8 km)
- Minimum set back from wetlands and surface water bodies (250 m)
- Minimum set back from fault lines (100 m)
- Minimum setback from a residents in a rural setting (500 m)

5.1 Refinement of the area of interest

Due to the large size of the search area and the already large distance from the Esperance Townsite, GHD considered it important to factor in basic logistical aspects with regards to the site locality at this stage of the selection process to support decision making. To capture the key logistical considerations in the model, GHD opted to apply a maximum northern extent and an east/west maximum distance from the Coolgardie- Esperance Hwy to the search area including:

- 50 km northern extent of the search boundary from Speddingup Rd
- 10 km east and west of the major highway (Coolgardie- Esperance Hwy)

5.2 Wetland catchment areas

With two wetlands of international significance (RAMSAR wetlands) located within the Esperance region, Lake Gore and Lake Warden, the proposed new landfill site should be located outside of the associated catchments to these systems (with an associated 250 m buffer). Even though this criteria is not set within the primary selection criteria (Table 1), it is a significant environmental consideration that will be weighted heavily through supplementary selection decision making processes (i.e. multi criteria analysis stage). As a result, GHD considers that avoidance of the wetland catchment areas can and should be applied to the selection decision making at this stage of the process and these layers have therefore been added to the GIS model.

The source of data used for the wetland catchment boundaries includes the following:

- **Lake Warden Recovery Catchment;** DPAW, 2014
- **Lake Gore Catchment;** given the irregularity and perceived conservatism within publicly available external data sets, in consultation with the Shire, GHD has derived a catchment boundary using the methodology outlined in Attachment A. The derived catchment boundary prepared and applied, has been independently reviewed and verified by Mr John Simons, Senior Research Scientist at the Department of Primary Industries and Regional Development (DPIRD) Esperance branch. Mr Simons' review comments (provided over email to the Shire) are presented within Attachment A.

6 Key findings from the geospatial mapping

The overall model output, showing all applied layers/ criteria and highlighting suitable land parcels that meet the primary selection criteria, is provided in Figure 1, with sub-areas presented in Figures 2, 3a, 3b and 4, Attachment B.

Individually mapped site selection criteria are provided within Figures 5 – 14, Attachment C, as outlined in Table 2.

Table 2 Individual map outputs (Figure index)

Figure #	Layer/ Criteria	Figure #	Layer/ Criteria
5	Managed land	11	Remnant vegetation
6	Wetlands	12	DBCA records (threatened and priority flora, fauna and communities)
7	Planning	13	Drinking water protection areas
8	Proximity to airports	14	Heritage sites
9	Flood risk/ Topographical lows	15	Fault lines plus 100m buffer
10	Surface water bodies plus 250 m buffer		

6.1 Suitable land parcels

As a result of the geospatial modelling of the primary selection criteria, GHD has identified a total of **158 land parcels** that meet the go/nogo criteria for the entire area of interest. The details of the potentially suitable land parcels are presented in Attachment D.

6.1.1 Logan Road Site

GHD has been requested to specifically test a site at Lot 39 Logan Road, Grass Patch, in addition to other preferred sites to be evaluated through the site selection process.

As a result of the geospatial modelling of the primary selection criteria, the site of interest at 39 Logan Rd was shown to have a block of remnant vegetation and is shown to intersect a fault line (buffer extent) in the south-western corner. As a result, this site has not been directly considered within the 158 suitable land parcels outlined in Attachment D. However, on further assessment of the land parcel in terms of its layout and where the remnant vegetation and fault line set backs are intersected, there still appears to be a large section in the east of the land parcel (approximately 200 ha) that complies with all criteria put forward to date, and therefore it is appropriate to consider this site further.

6.2 Further refinement of suitable land parcels

As previously discussed in sections 5.1 and 5.2, due to the large number of land parcels that initially meet the primary selection criteria (158), GHD has introduced two additional criteria that further refine the list of suitable land parcels. The application of additional selection criteria, that are considered to be heavily weighted factors within the MCA process, provides an opportunity for the Shire to justify further refinement of the list to a more manageable size moving forward. As mentioned in Section 5, the two layers added include:

- Wetland Catchment areas (including Lake Warden Recovery Catchment and Lake Gore Catchment)
- Logistical considerations:
 - 50 km northern extent of the search boundary from Speddingup Rd
 - 10 km east and west of the major highway (Coolgardie - Esperance Hwy)

To capture the logistical considerations above, the total search area was separated into three sub-areas (1, 2 and 3). Sub-area 1 is preferred due to its proximity to Esperance town site and the major highway. Through the application of these additional layers, the site selection process indicates that there are:

- **47** potentially **suitable land parcels** located within Sub-area 1 (Table A, Appendix D)
- **21** potentially **suitable land parcels** located within Sub-area 2 (east/ west) (Table B, Appendix D)
- **86** potentially **suitable land parcels** located within Sub-area 3 (Table C, Appendix D)

The land tenure, locality and ownership details of the potentially suitable land parcels located within each sub-area area are presented in Tables A-C, Appendix D.

6.2.1 Logan Road Site

GHD has been requested to specifically test a site at Lot 39 Logan Road, Grass Patch, in addition to other preferred sites to be evaluated through the site selection process. As mentioned in section 6.1.1,

the eastern portion of the land parcel (approximately 200 ha) is considered to meet all criteria put forward to date. To this end, the site is also considered to be within sub-area 1 and is not located within the wetland catchment areas mapped. As a result, GHD recommends that Lot 39 Logan Road should be considered within the MCA process (STEP 3) moving forward with the project.

7 Recommendations

GHD considers that the 47 land parcels presented in Table A, Appendix D in addition to the site at Lot 39 Logan Road, comply with all the primary section criteria (Table 1), are located within Sub-area 1 and outside of wetland catchment areas. As such, these 48 identified sites present a suitable short-list of sites to commence more detailed assessment of their availability and suitability.

Due to the large number of sites identified through the process, it is not considered practicable to undertake an MCA exercise on all 48 potential land parcels. To this end, GHD recommends that the Shire seek to consult with the land owners identified to communicate the process being undertaken and ascertain their willingness to be considered further in the assessment. Through this approach, it is expected that the list of available sites to continue within the evaluation process will be refined to a more manageable size. Further, this approach ensures that the process is conducted in an open and transparent manner.

GHD recognises that the site selection process to this point has been heavily reliant on publicly available information and desktop evaluation only. Early consultation with the current owners of prospective land parcels, may provide for better site access to undertake more in-depth landfill suitability assessments, including detailed site inspections. This will ultimately inform the MCA process to be undertaken to formally assess and rank the potential suitability of each site for the desired purpose.

Failing significant interest from land owners within Sub-area 1, the Shire may decide to look at land owners in Sub-area 2 or 3 to further assess the potentially suitable land parcels from these areas (within the broader 154 land parcels identified).

Please consider this report with regards to the limitations outlined in Attachment E.

Sincerely
GHD



Jon Cramer
Senior Environmental Scientist
+61 8 98405102



Martin Gravett
Technical Director – Waste Management
+61 8 6222 8723

Attachments:

- A) Lake Gore catchment boundary derivation
- B) Model outputs provided within Figures 1, 2, 3a, 3b and 4
- C) Individually mapped site selection criteria as provided within Figures 5 – 15
- D) Details of the potentially suitable land parcels
- E) Report limitations



Attachment A

Methodology for deriving the Lake Gore Catchment Boundary

GHD Derived Lake Gore Catchment Boundary – methodology and outcome

Data collection and review

The following sources of topographic and hydrologic data was reviewed and compared for the catchment:

- Hydrographic subcatchments (DWER, 2016)
- Australian Hydrological Geospatial Fabric (Geoscience Australia, 2019)
- Assessment of Acidic Saline Groundwater Hazard in the Western Australian Wheatbelt: Yarra Yarra, Blackwood and South Coast (Degens, Brad & Shand, P. (2010))
- SRTM-derived 1 Second Digital Elevation Models Version 1.0. Record 1. (Gallant, J., Wilson, N., Dowling, T., Read, A., Inskeep, C. 2011. Geoscience Australia, Canberra.
<http://pid.geoscience.gov.au/dataset/ga/72759>)

The study area is a combination of dendritic and endorheic drainage systems, whereby the dendritic drainage discharges towards the ocean, and the endorheic drainage systems drain internally to shallow depressions where runoff infiltrates and evaporates. These features, combined with low relief topography, results in a catchment boundary that varies depending on the magnitude of the rainfall event and antecedent soil and water storage conditions. There is no one true catchment boundary.

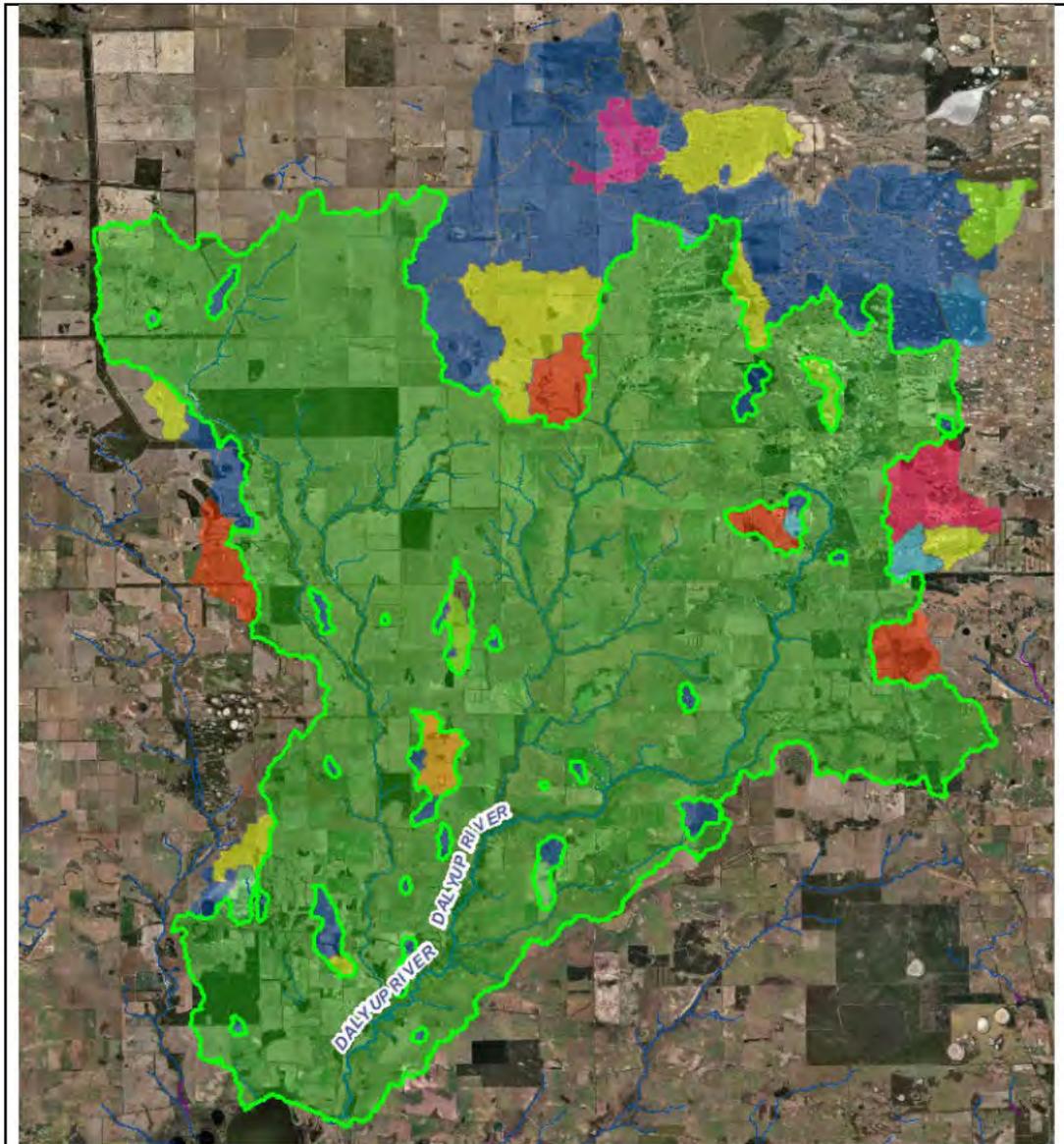
Assumptions

GHD have derived a catchment boundary using SRTM derived topographic data. The derivation methodology assumes a major storm event where all the small storages such as farm dams and other natural depressions are overtopped, and discharge into the dendritic drainage system. In a typical rainfall event, these storages will not overtop and the catchment area will therefore be smaller. It must be noted that the derivation is heavily dependent on the quality of the topographic data, which has a lower accuracy and spatial resolution compared to survey data, but is the best available.

There are a number of endoreic basins located adjacent to or within the GHD derived catchment. Analysis was undertaken to determine the rainfall required for these basins to overtop and drain into the GHD derived catchment. To estimate this, the topography of these basins was analysed and a storage volume calculated for overtopping to commence. Runoff volumes were also estimated based on the catchment area draining to these storages, and streamflow monitoring data of the Dalyup River and the Dalyup River West. Adopting a runoff rate of 5-10% of rainfall, the rainfall depths required for these basins to overtop and contribute to the GHD derived catchment are presented in Plate 1, demonstrating that significant rainfall depths are required to include these sub catchments in the GHD derived catchment.

Derived Catchment Boundary

The derived catchment is presented in Figures 1 and 2 (below). The GHD derived catchment area, in comparison, is 58% larger than the Geoscience Australia catchment but 74% smaller than the DWER catchment (refer to Plate 2 below). This layer has been used within the site selection process in preference to the DWER supplied layer.



Excess Spill-Generating Rainfall
(mm)

- 7.709875 - 50.000000
- 50.000001 - 100.000000
- 100.000001 - 150.000000
- 150.000001 - 200.000000
- 200.000001 - 250.000000
- 250.000001 - 300.000000
- 300.000001 - 350.000000
- 350.000001 - 400.000000
- 400.000001 - 450.000000
- 450.000001 - 7545.621111

Plate 1 GHD derived catchment (Green)

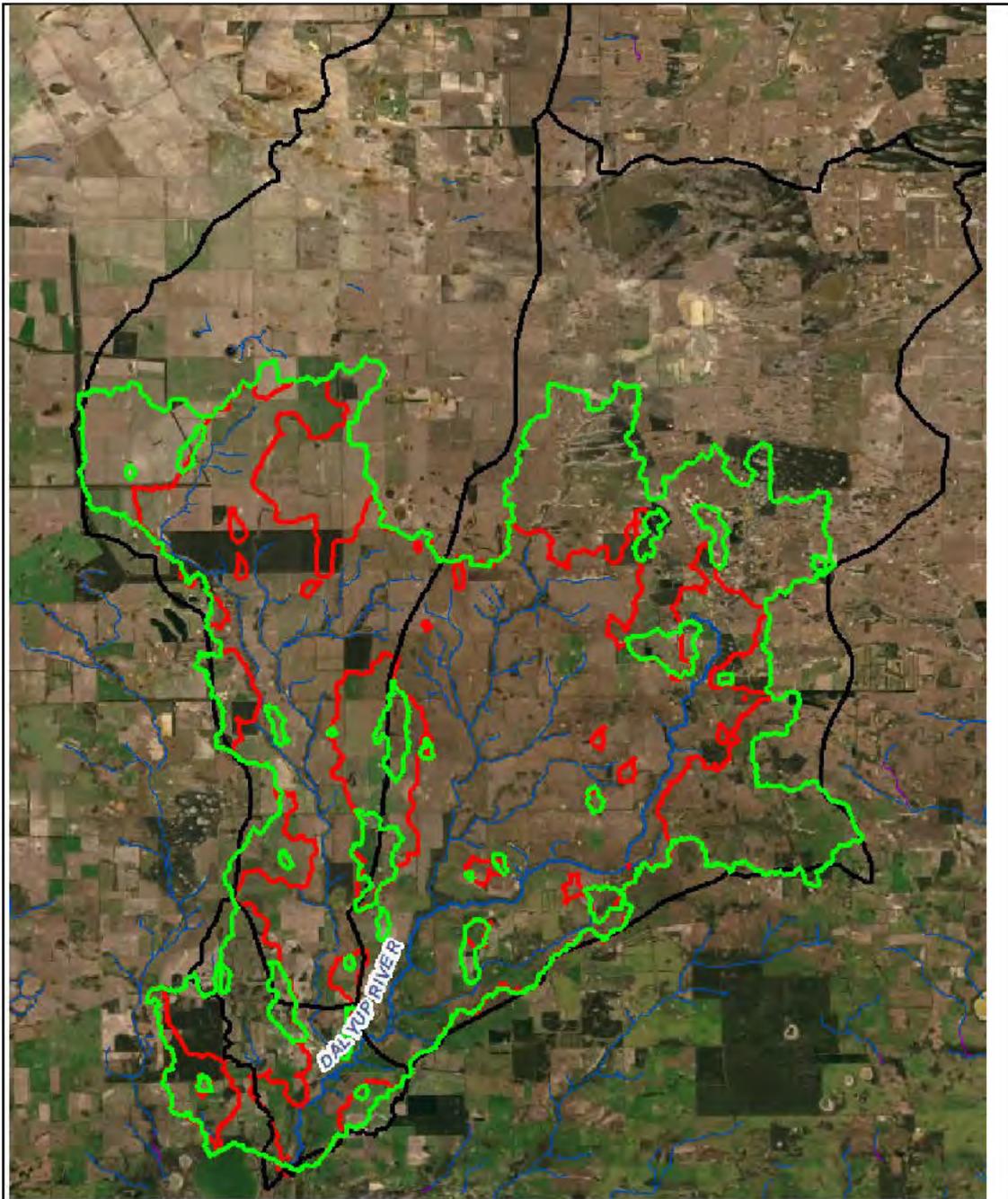


Plate 2 GHD derived catchment boundary for Lake Gore (green), compared with Geoscience Australia (red) and DWER (black)

**GHD Derived Lake Gore Catchment Boundary – independent review comments
(Mr John Simons 5 October 2020)**

From: John Simons <john.simons@dpird.wa.gov.au>
Sent: Monday, 5 October 2020 7:47 AM
To: Scott McKenzie <scott.mckenzie@esperance.wa.gov.au>
Cc: 'Jon Cramer' <Jon.Cramer@ghd.com>; Shane Burge <Shane.Burge@esperance.wa.gov.au>
Subject: RE: [EXT] - FW: New Landfill Search - GHD Consultants

Hi Scott,

Reviewed the the GHD report on the week end and the GHD derived surface water catchment boundary for Lake Gore is similar to the catchment boundary we determined in 1997 and published in Resource Management Technical Report No.165 'Catchments of the Esperance Region of Western Australia', (Gee and Simons). It is also consistent with the Lake Gore catchment boundaries in the 'Dalyup and West River Action Plan 2002' (WRC) and the 'Assessment of Acid Saline Groundwater Hazard in the Western Australian Wheatbelt, Yarra Yarra, Balckwood and South Coast' (CSIRO 2010). It also corresponds fairly well with the national catchment boundaries developed by Geoscience Australia for the Bureau of Meteorology and the water information program, which is the most recent catchment delineation program across Australia. In summary the GHD derived surface water catchment boundary for Lake Gore is reasonable and adequately accounts for the land area contributing surface flows to the drainage system (Dalyup River) that flows into Lake Gore.

Regards

John

John Simons | Senior Research Scientist – Water Science Agriculture
Resource Management and Assessment Sustainability and Biosecurity
Department of Primary Industries and Regional Development Melinjinup
Road (PMB 50), Esperance WA 6450
t +61 (0)8 9083 1128 | m +61 (0)477 704 822 | w
dpird.wa.gov.au

From: Scott McKenzie [<mailto:scott.mckenzie@esperance.wa.gov.au>]
Sent: Wednesday, 30 September 2020 3:58 PM
To: John Simons
Cc: Jon Cramer; Shane Burge
Subject: FW: [EXT] - FW: New Landfill Search - GHD Consultants

HiJohn,

Please find below a link to the amended report that reflects your comments surrounding the Lake Gore Catchment boundary and some further work undertaken by GHD in defining a new boundary. Can you please download and review?

Can you please provide some written comment on your thoughts surrounding the amended report? Does this correctly take into account the catchment boundaries in your view? Does the amended report reflect your comments when you met with Jon Cramer on Friday 11th September 2020?

If you can provide some comment back to the Shire by Tuesday, 6th October it would be appreciated. We intend to add your comments as an appendix to the rear of the report.

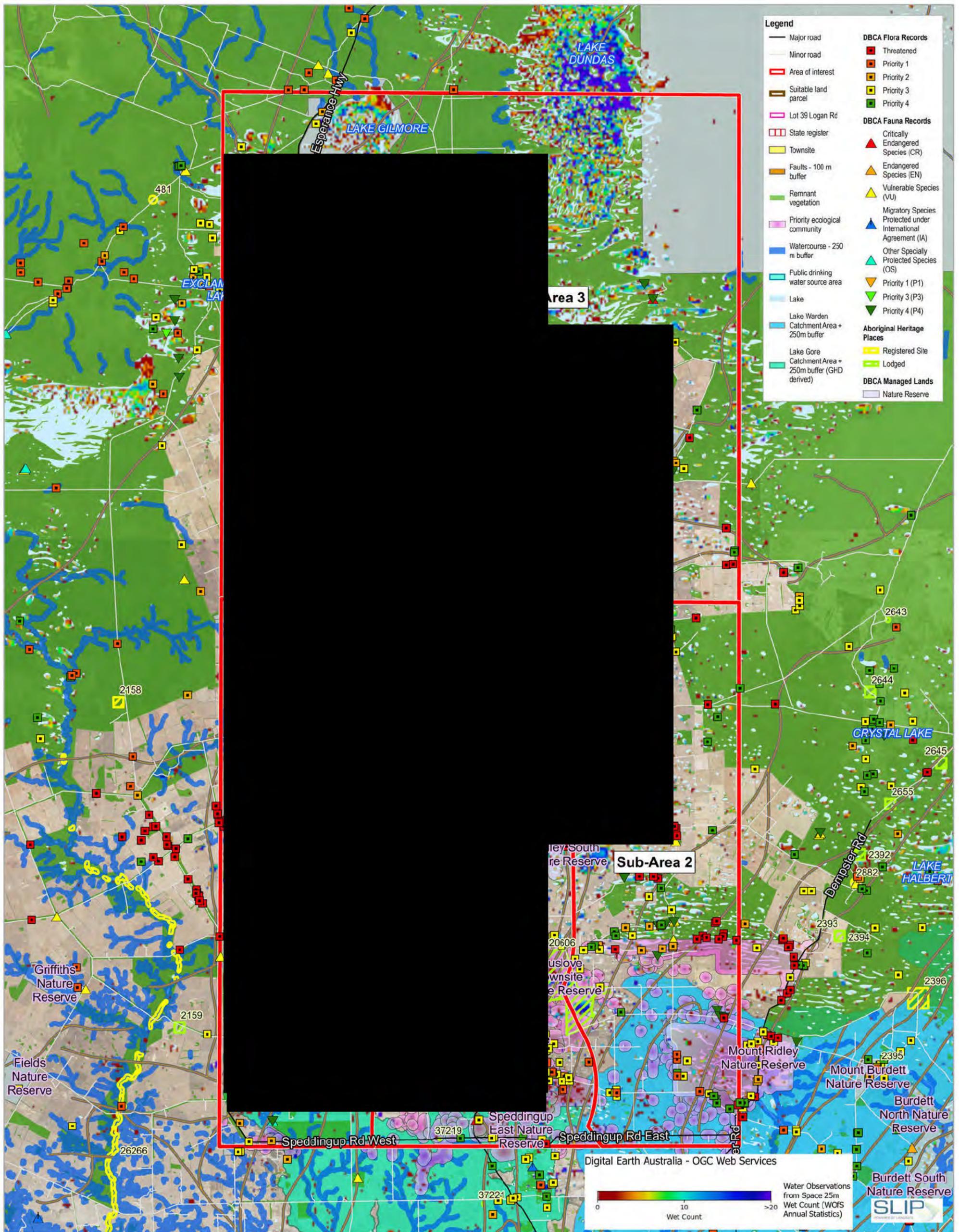
Thanks for your time and thoughts.

Scott McKenzie JP B.Bus
Acting Director External Services
Shire of Esperance
Ph: 9071 0647
Mob: 0428 000 683
Fx: 9071 0600
PO Box 507, Windich Street, Esperance WA 6450

www.esperance.wa.gov.au

Attachment B

Model outputs provided within Figures 1, 2, 3a, 3b and 4



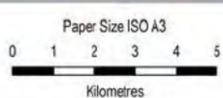
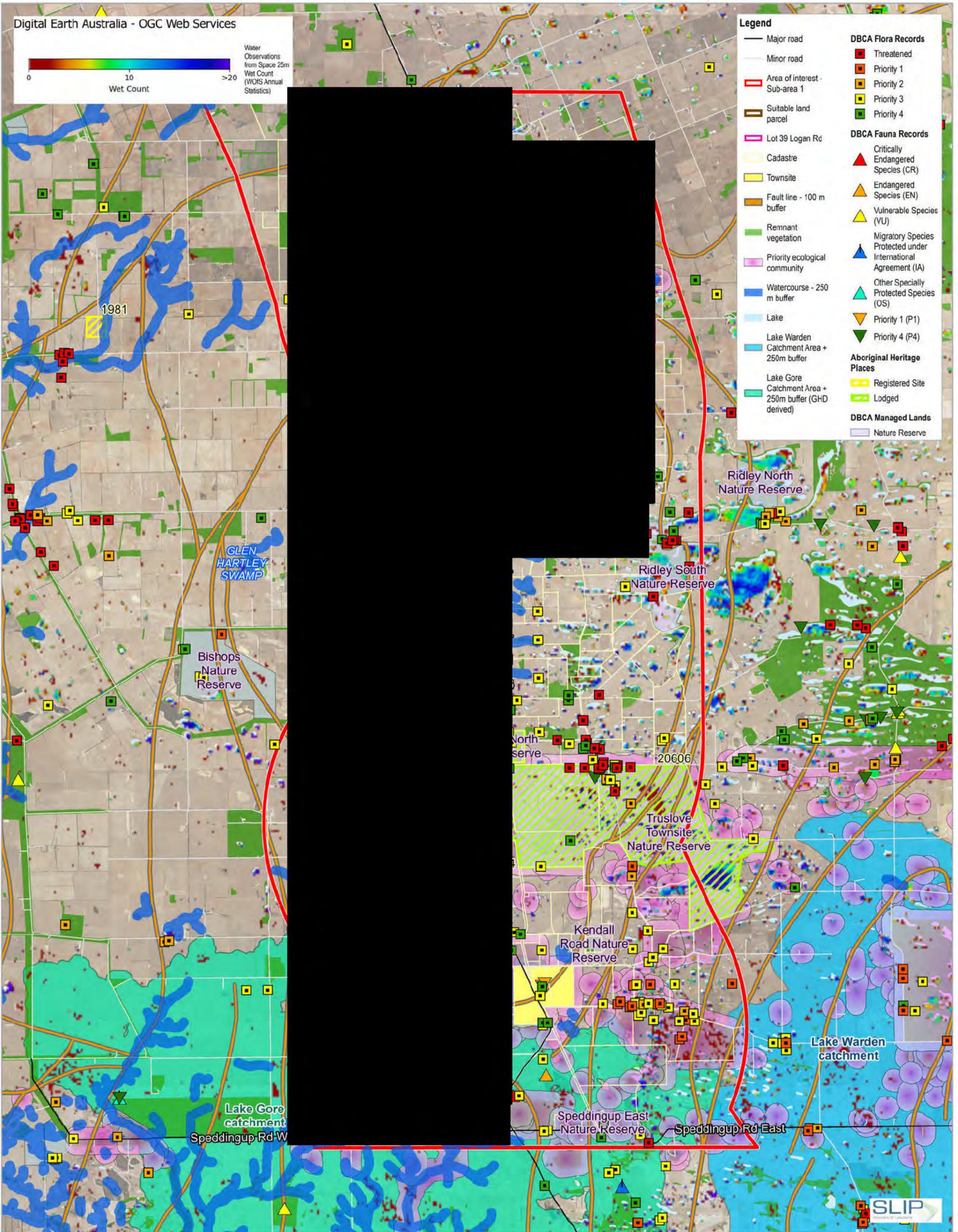
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 Kilometres
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 51



Shire of Esperance
 Landfill Site Selection Study
 Suitable Land Parcels

Project No. 61-12531105
 Revision No. 0
 Date 25 Sep 2020

FIGURE 1



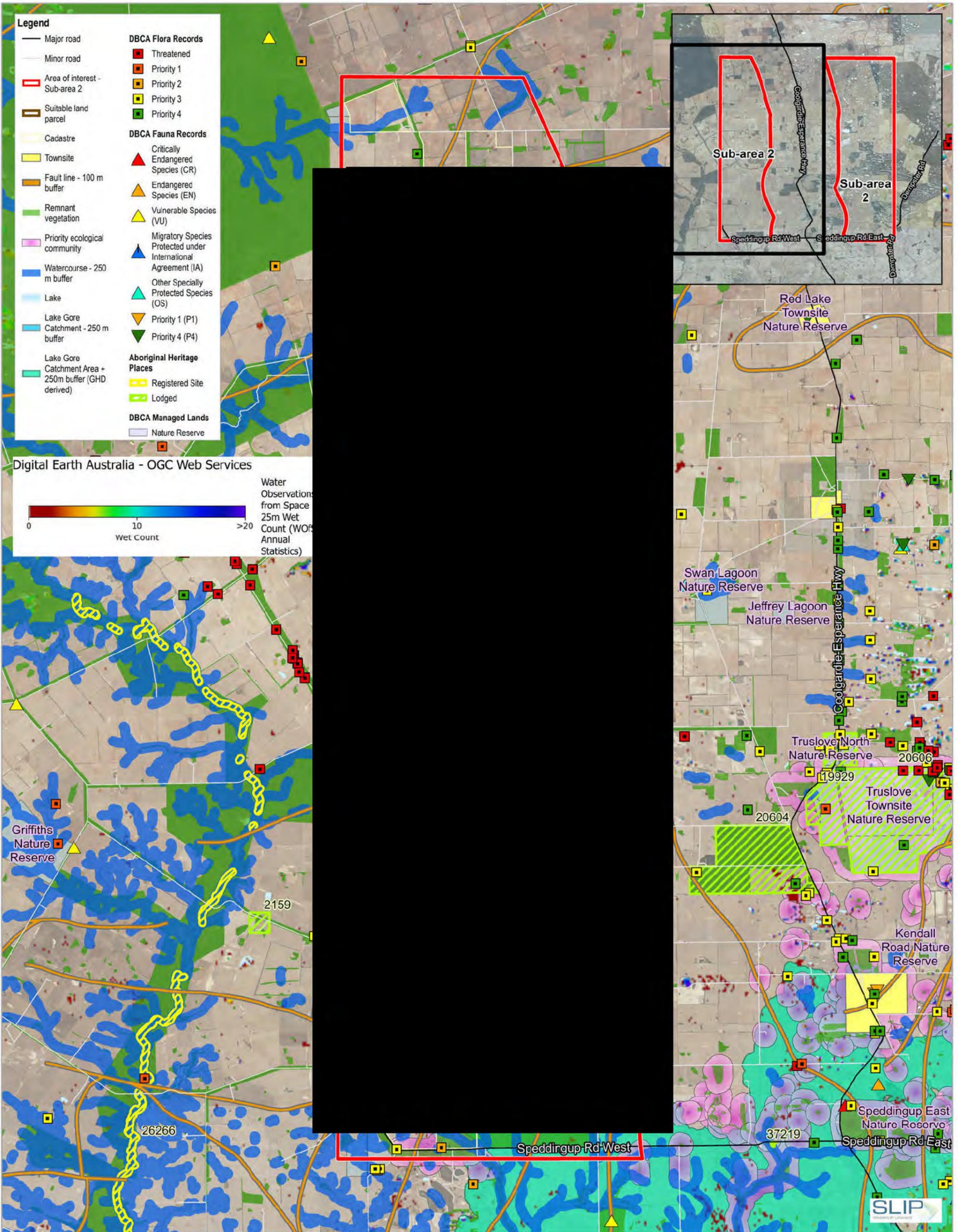
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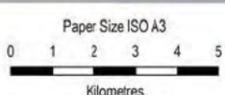
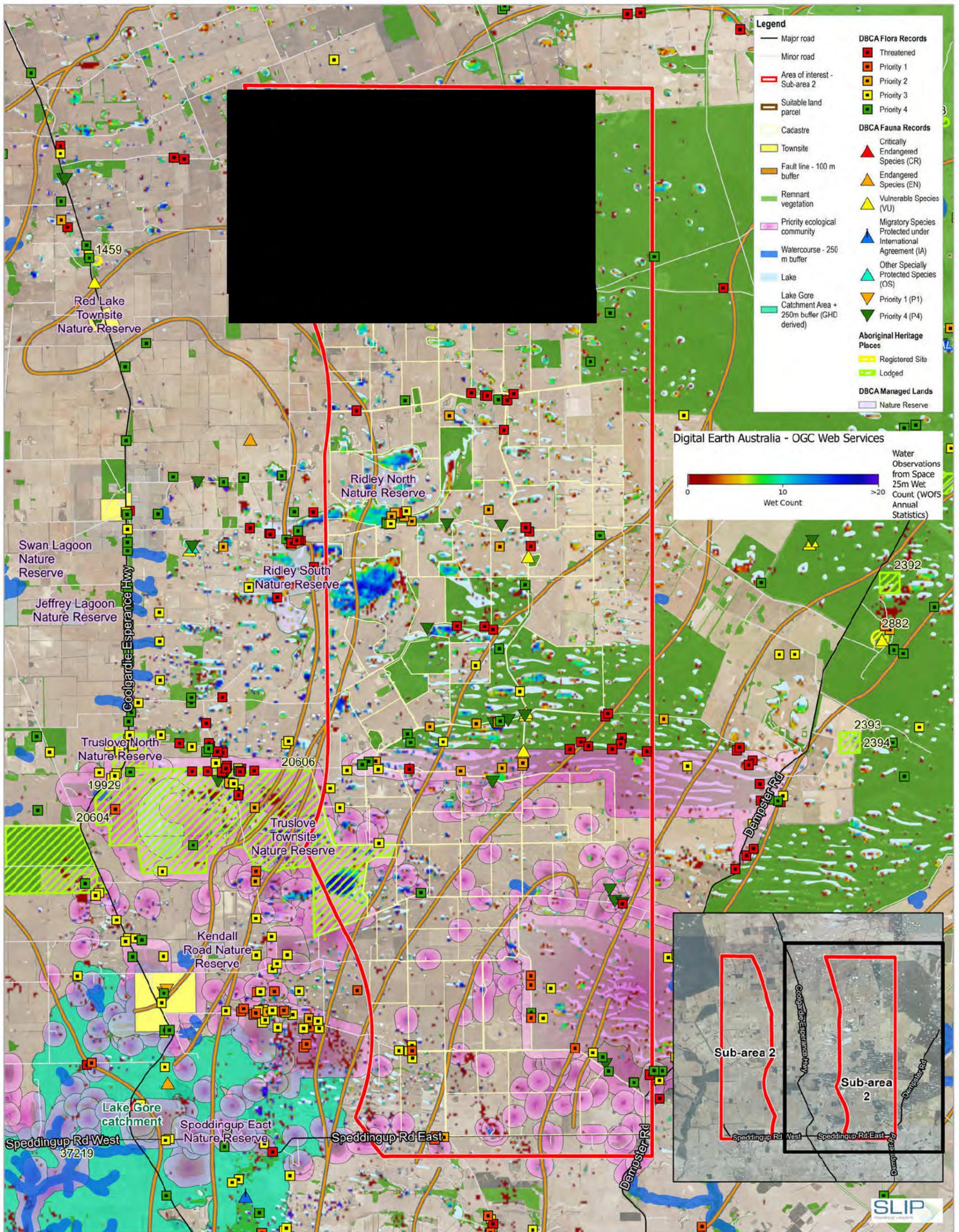
Shire of Esperance
Landfill Site Selection Study

Project No. 61-12531105
Revision No. 0
Date 25 Sep 2020

Suitable Land Parcels
Sub-Area 1

FIGURE 2





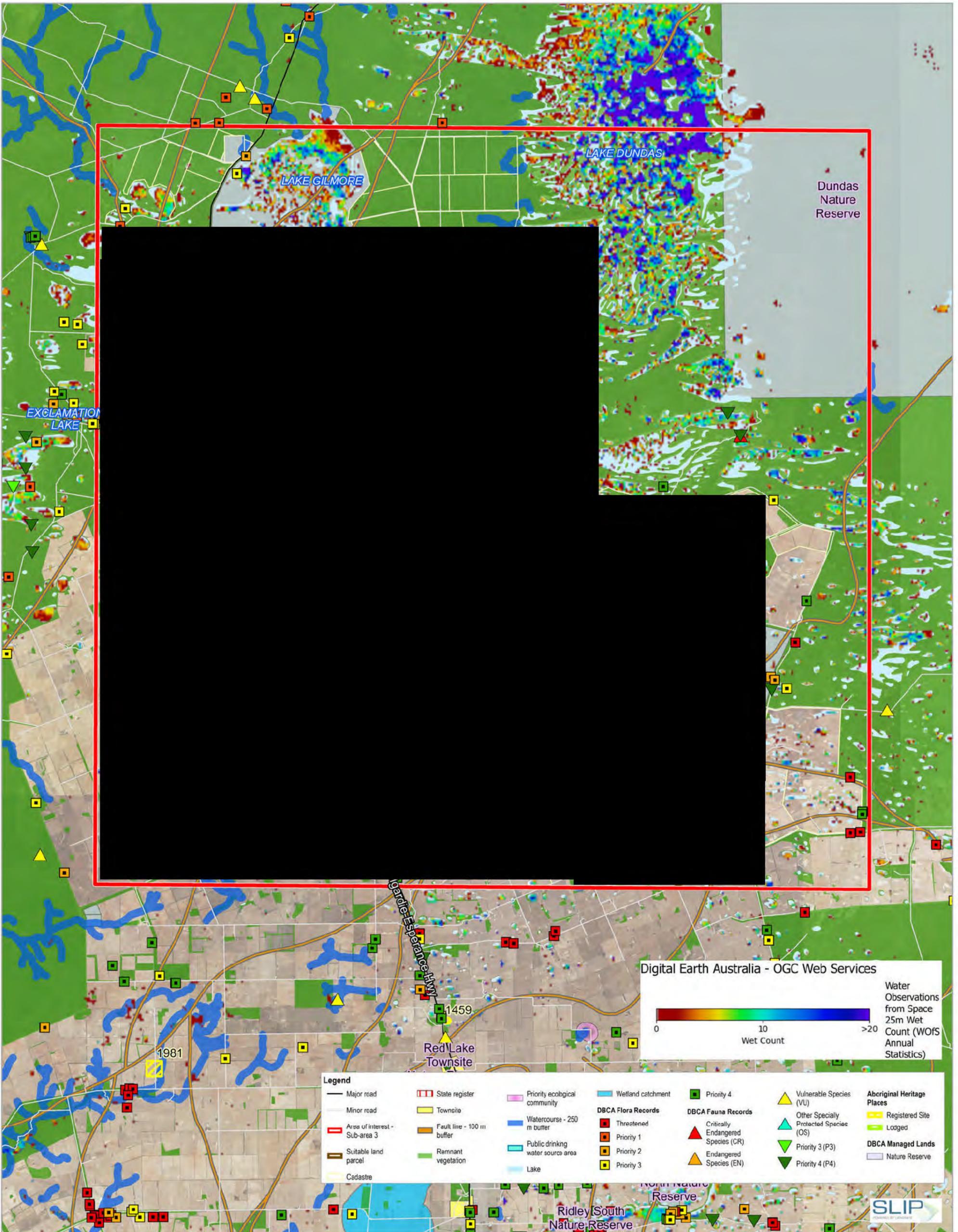
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Landfill Site Selection Study

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Revision No. 0
Date 25 Sep 2020

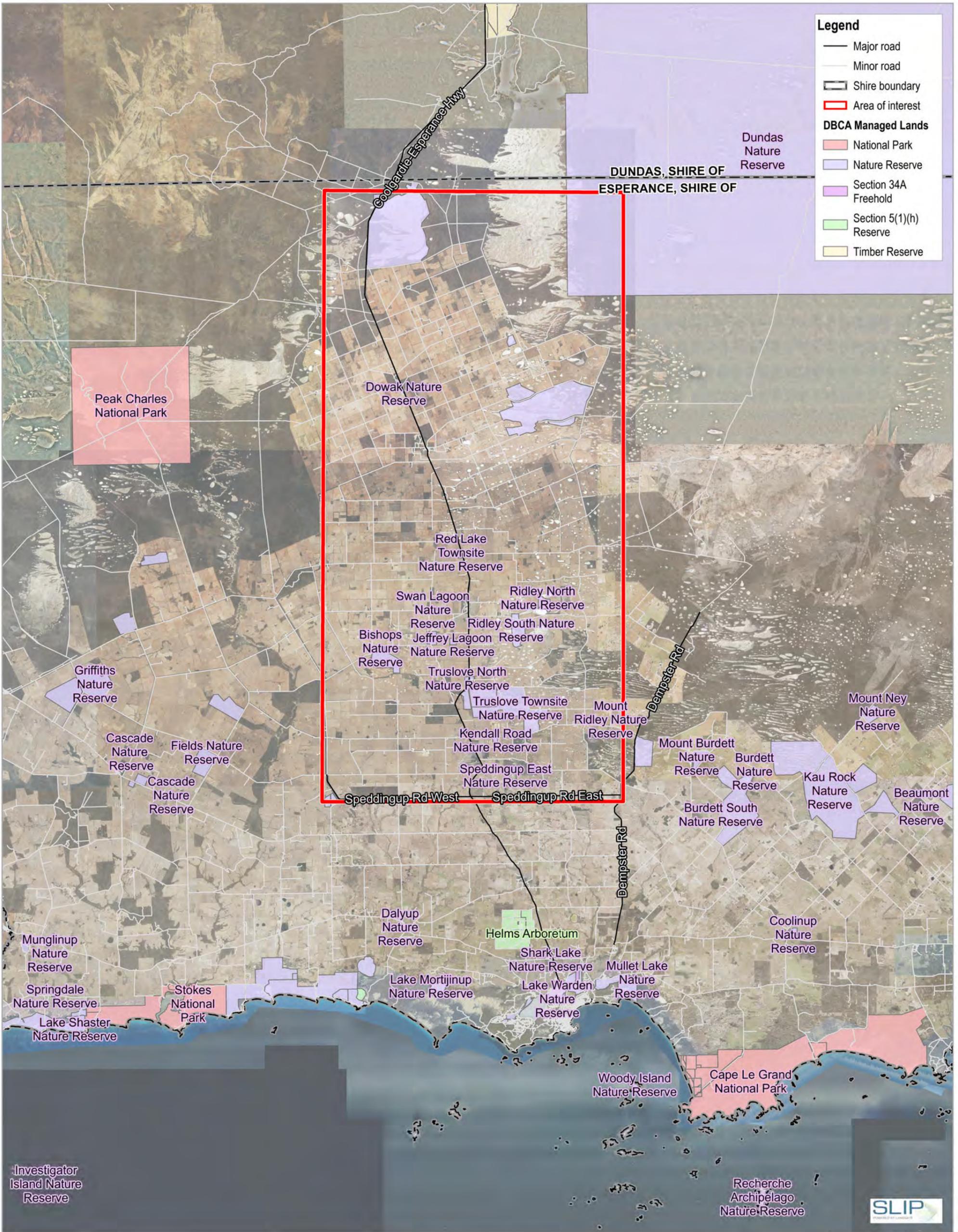
Suitable Land Parcels
Sub-Area 2

FIGURE 3b



Attachment C

Individually mapped site selection criteria as provided within Figures 5 – 15



Legend

- Major road
- Minor road
- ▭ Shire boundary
- ▭ Area of interest

DBCA Managed Lands

- ▭ National Park
- ▭ Nature Reserve
- ▭ Section 34A Freehold
- ▭ Section 5(1)(h) Reserve
- ▭ Timber Reserve

Paper Size ISO A3

Kilometres

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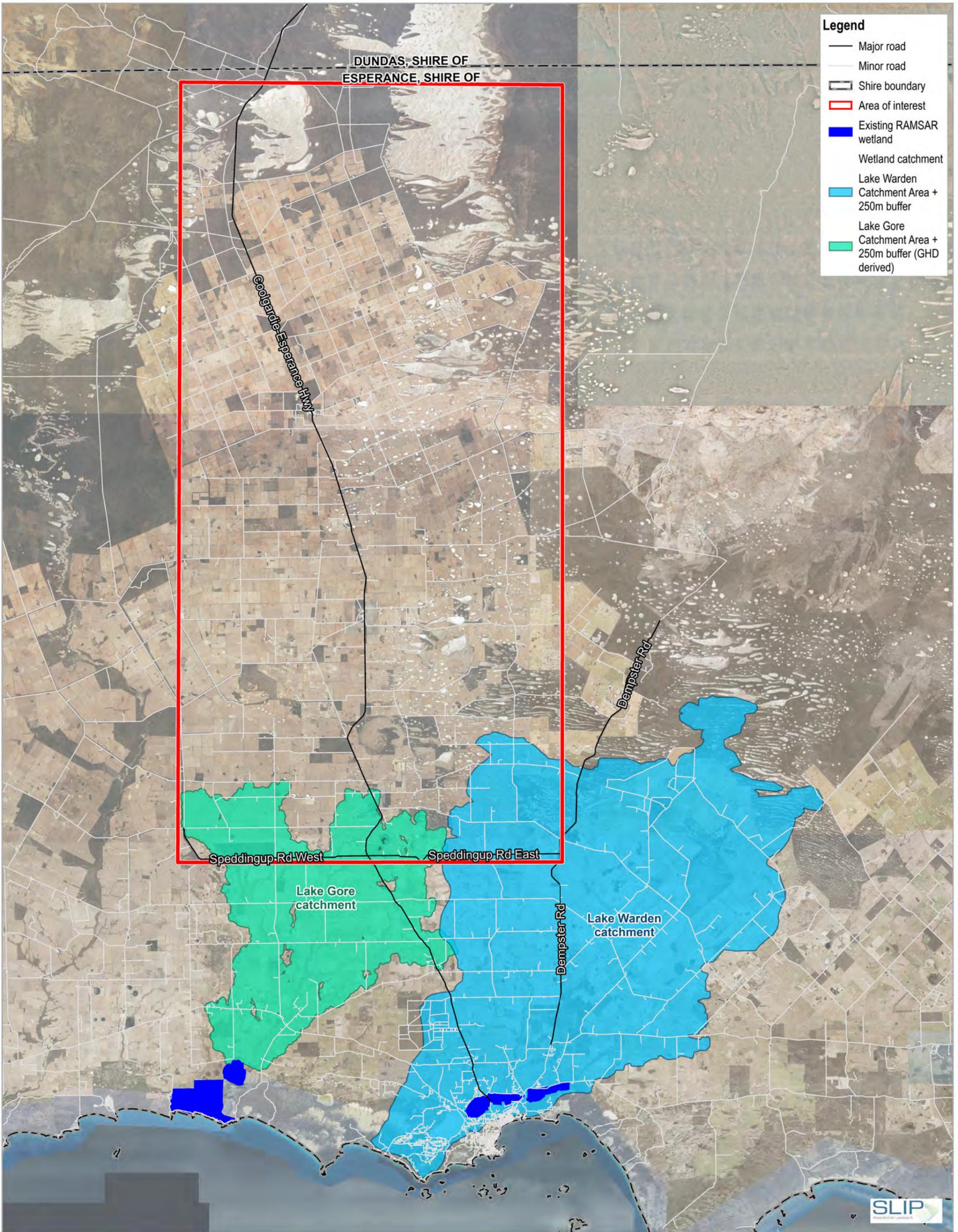


Shire of Esperance
Landfill Site Selection Study

Managed Lands

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Revision No. 0
Date 25 Sep 2020

FIGURE 5



Legend

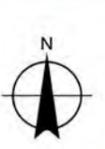
- Major road
- Minor road
- ▭ Shire boundary
- ▭ Area of interest
- Existing RAMSAR wetland
- Wetland catchment
- Lake Warden
- Catchment Area + 250m buffer
- Lake Gore
- Catchment Area + 250m buffer (GHD derived)

Paper Size ISO A3

0 5 10 15

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

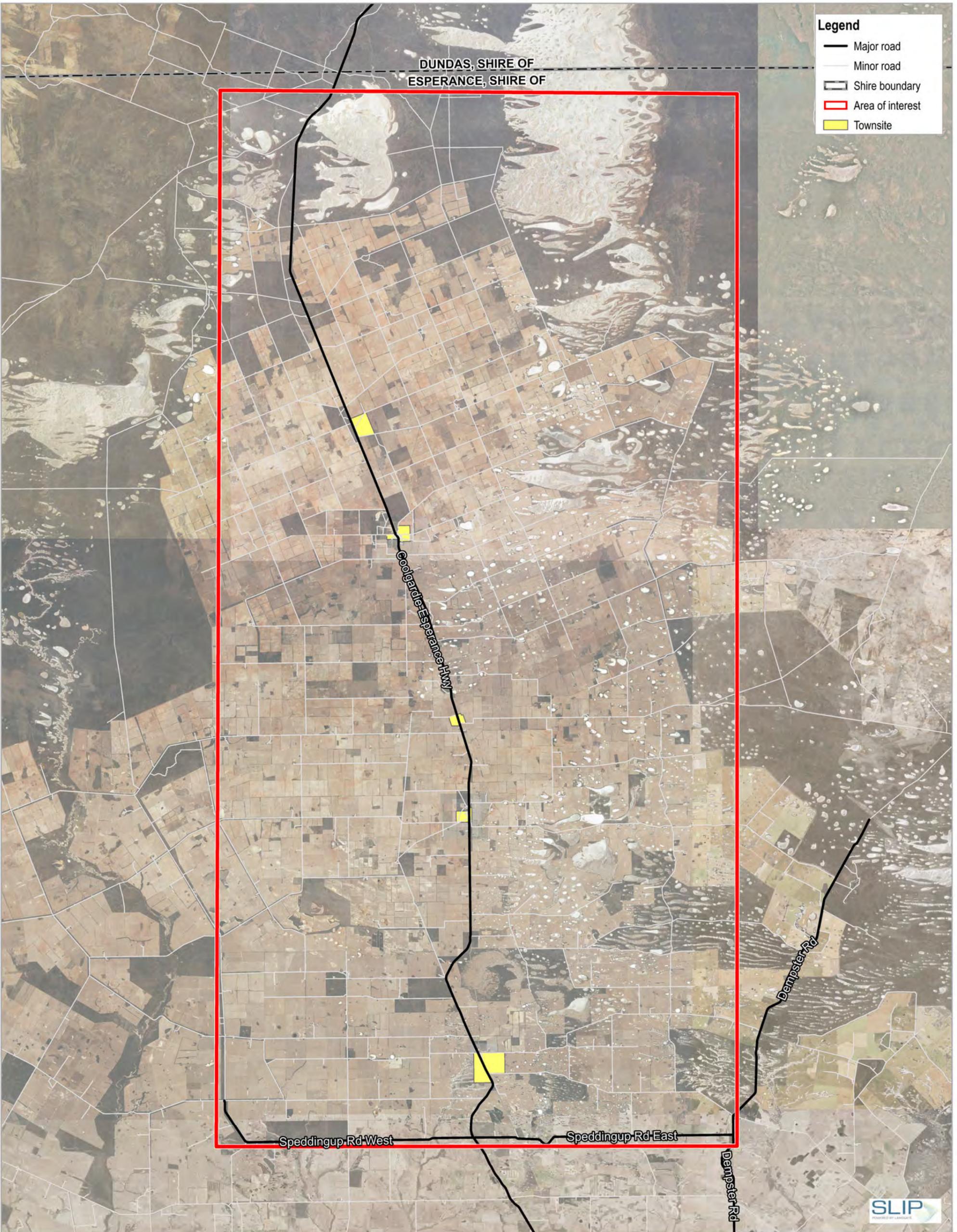


Shire of Esperance
Landfill Site Selection Study

Wetland Catchment Areas

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Revision No. 0
Date 25 Sep 2020

FIGURE 6



Legend

- Major road
- Minor road
- ▭ Shire boundary
- ▭ Area of interest
- ▭ Township

DUNDAS, SHIRE OF
ESPERANCE, SHIRE OF

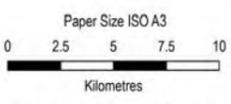
Coolgardie-Esperance hwy

Speddingup Rd West

Speddingup Rd East

Dempster Rd

Dempster Rd



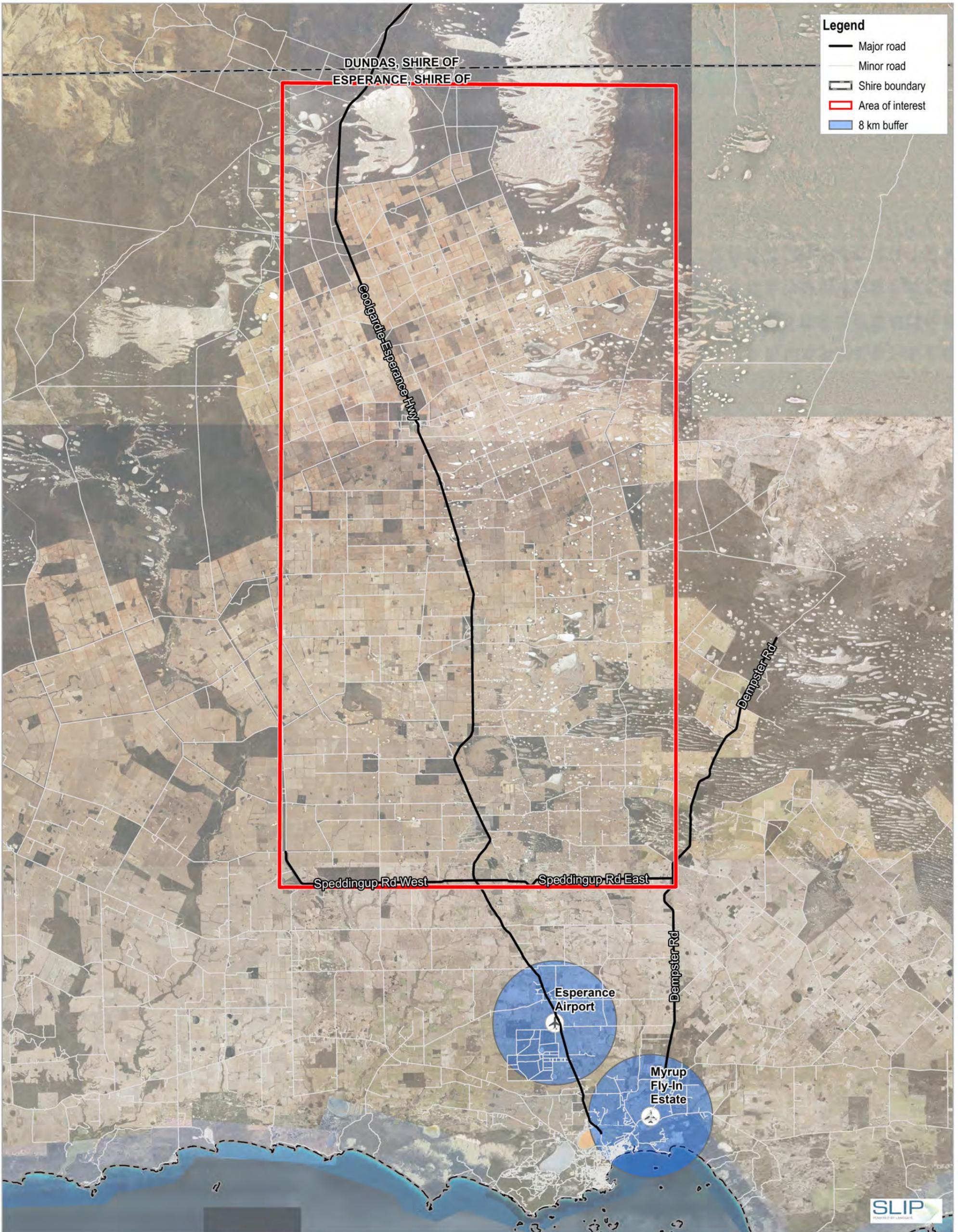
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Shire of Esperance
Landfill Site Selection Study

Planning

Project No. 61-12531105
Revision No. 0
Date 25 Sep 2020

FIGURE 7



Legend

- Major road
- Minor road
- ▭ Shire boundary
- ▭ Area of interest
- 8 km buffer

DUNDAS, SHIRE OF
 ESPERANCE, SHIRE OF

Coolgardie-Esperance Hwy

Dempster Rd

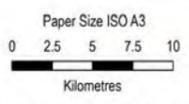
Speddingup Rd West

Speddingup Rd East

Dempster Rd

Esperance Airport

Myrup Fly-In Estate



Map Projection: Transverse Mercator
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 Grid: GDA 1994 MGA Zone 51

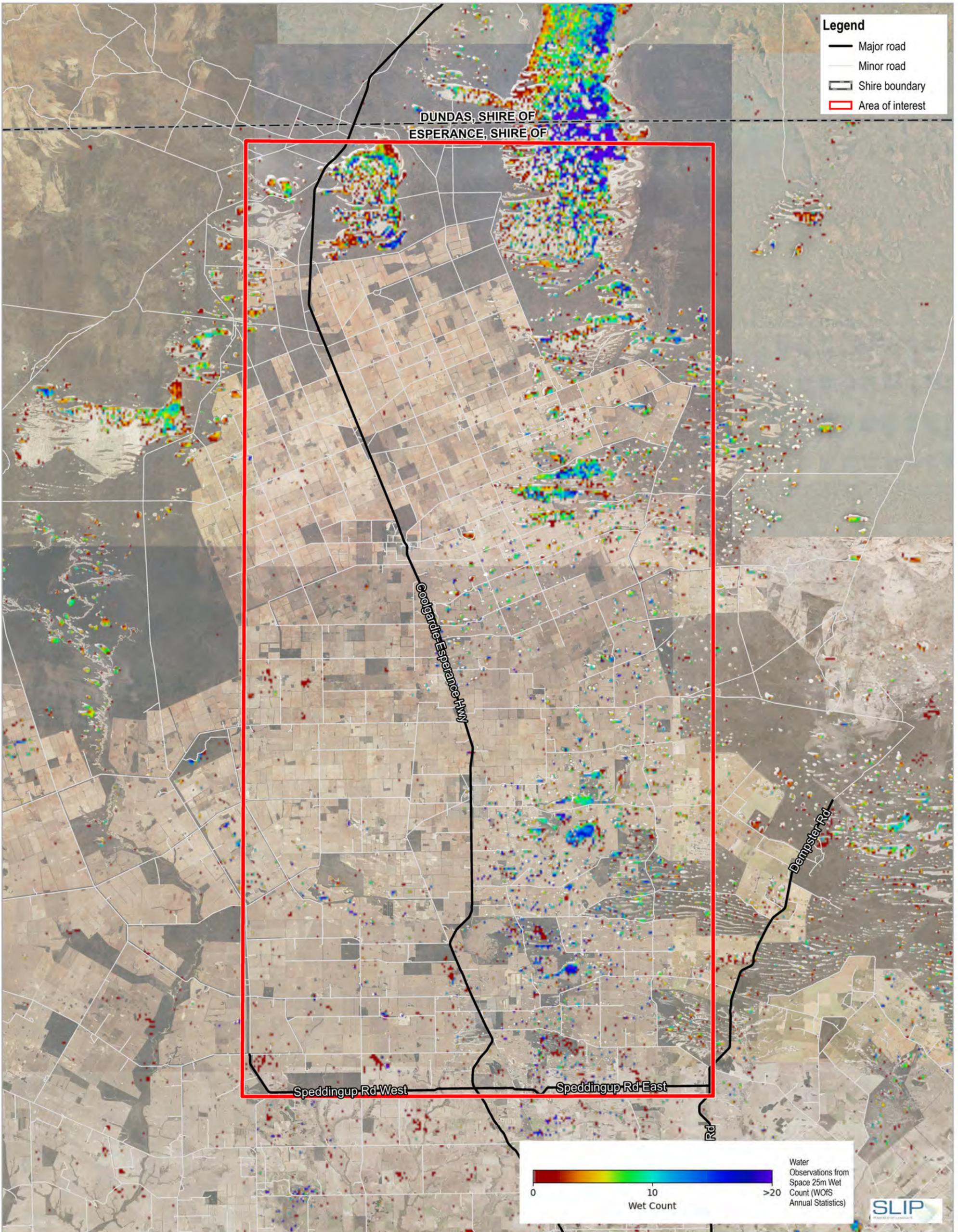


Shire of Esperance
 Landfill Site Selection Study

Proximity to Airports

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 Date 25 Sep 2020

FIGURE 8



Paper Size ISO A3
0 2.5 5 7.5 10
Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

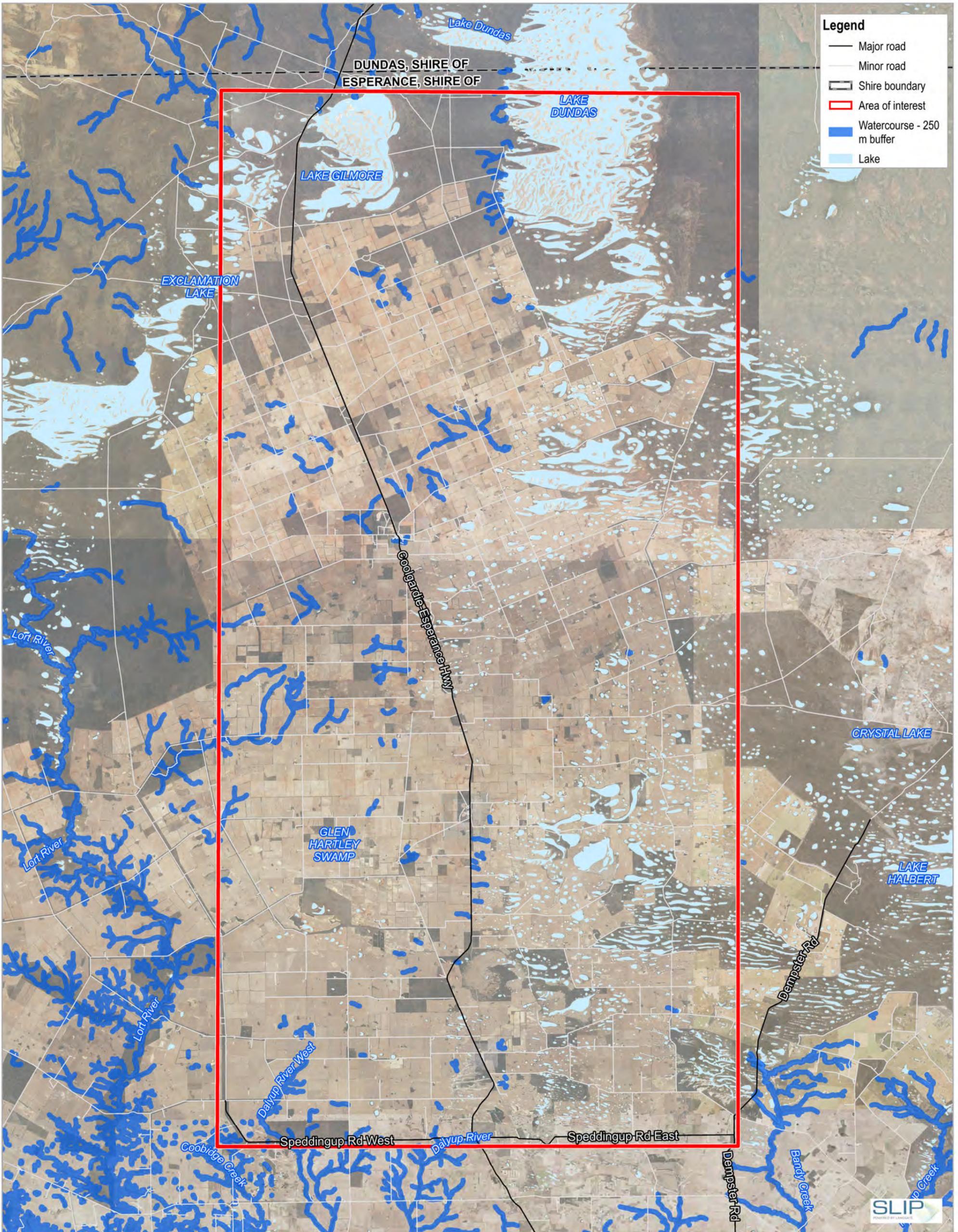


Shire of Esperance
Landfill Site Selection Study

Flooding

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Revision No. 0
Date 25 Sep 2020

FIGURE 9



Legend

- Major road
- Minor road
- ▭ Shire boundary
- ▭ Area of interest
- Watercourse - 250 m buffer
- Lake

Paper Size ISO A3

0 2.5 5 7.5 10

Kilometres

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 51

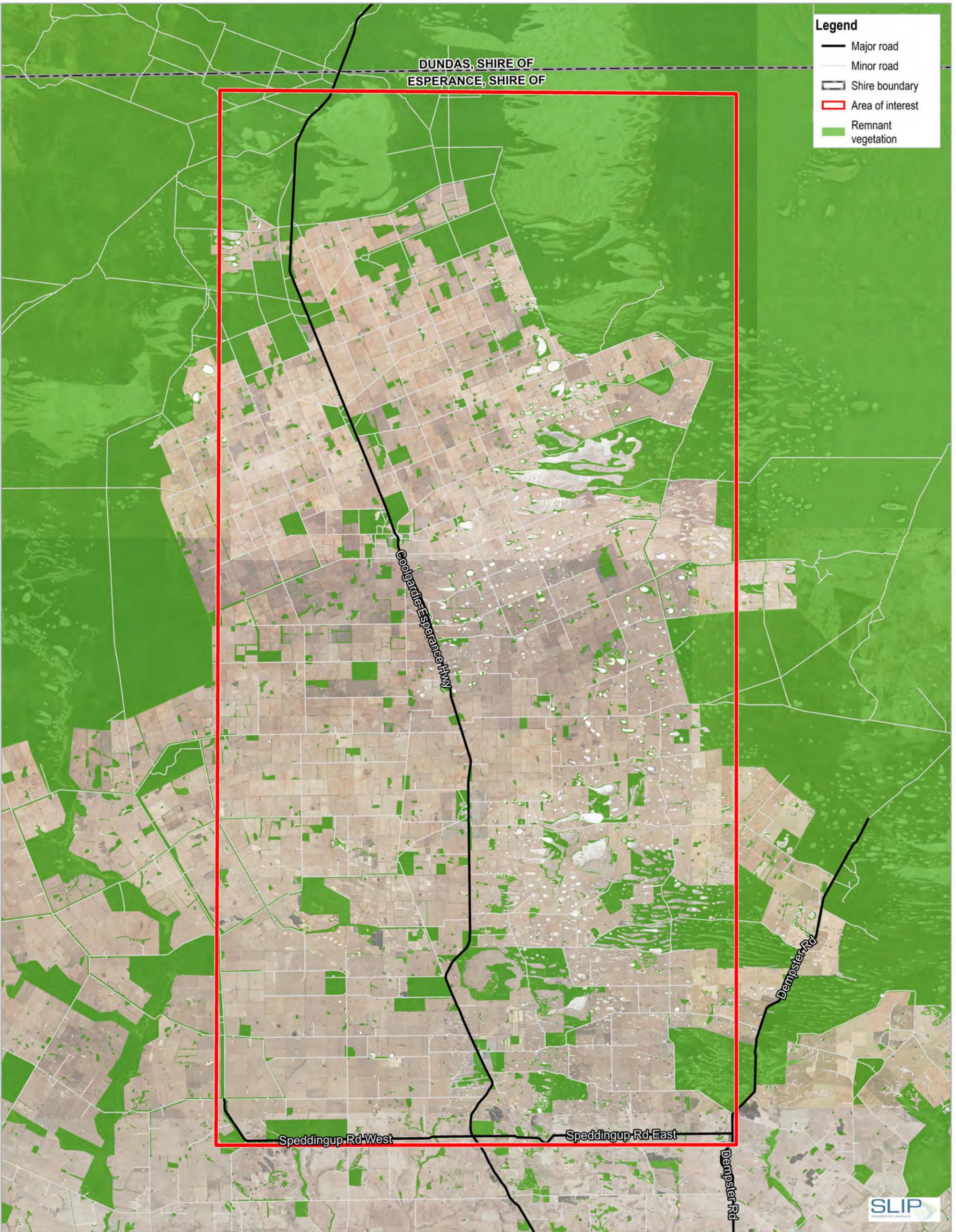


Shire of Esperance
 Landfill Site Selection Study

Surface Water Bodies

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 Revision No. 0
 Date 25 Sep 2020

FIGURE 10



Legend

- Major road
- Minor road
- ▭ Shire boundary
- ▭ Area of interest
- Remnant vegetation

DUNDAS, SHIRE OF
ESPERANCE, SHIRE OF

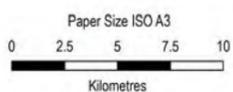
Coolgardie-Esperance hwy

Speddingup Rd West

Speddingup Rd East

Dempster Rd

Dempster Rd



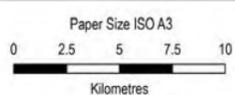
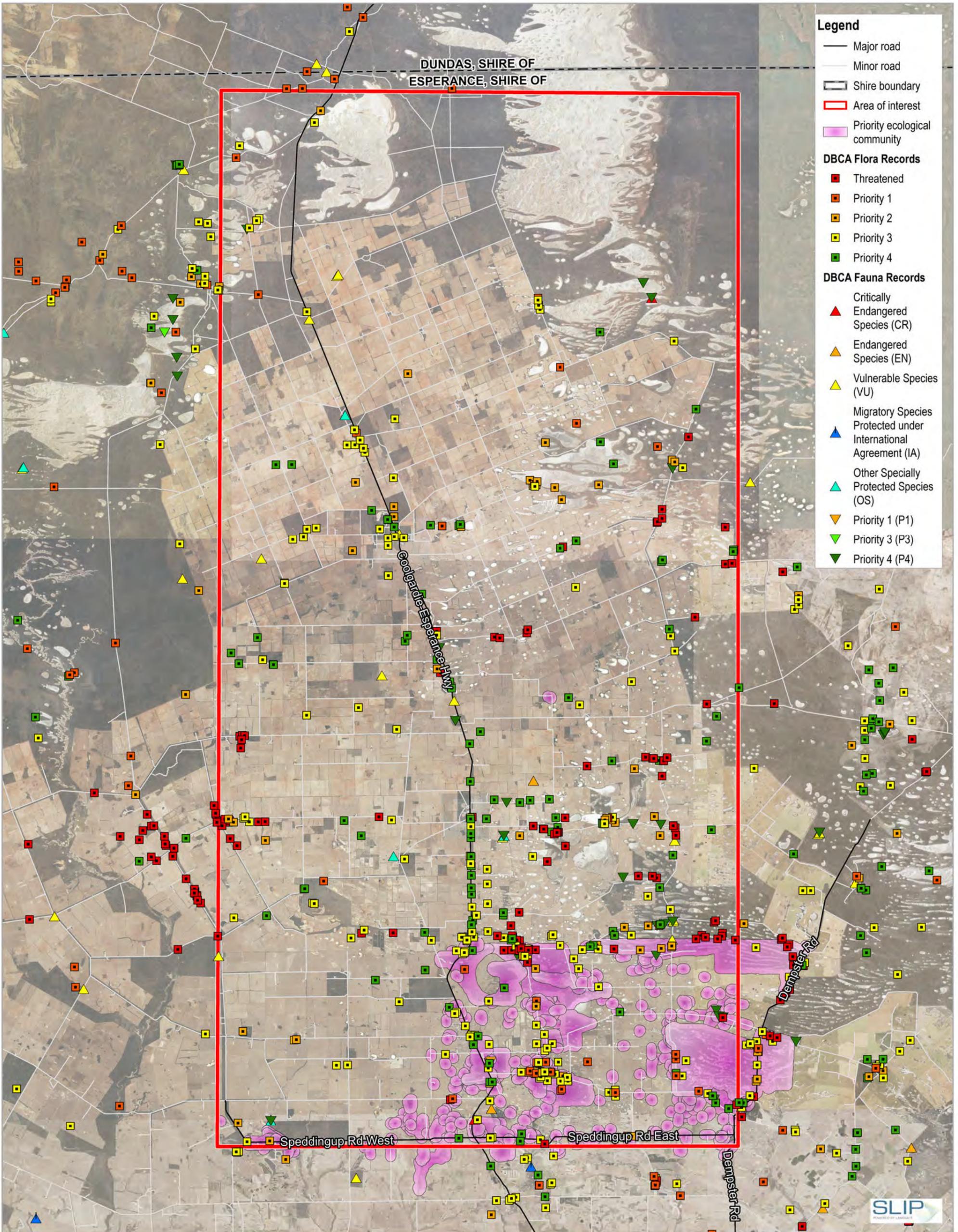
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

Shire of Esperance
Landfill Site Selection Study

Project No. 61-12531105
Revision No. 0
Date 25 Sep 2020

Remnant Vegetation

FIGURE 11



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

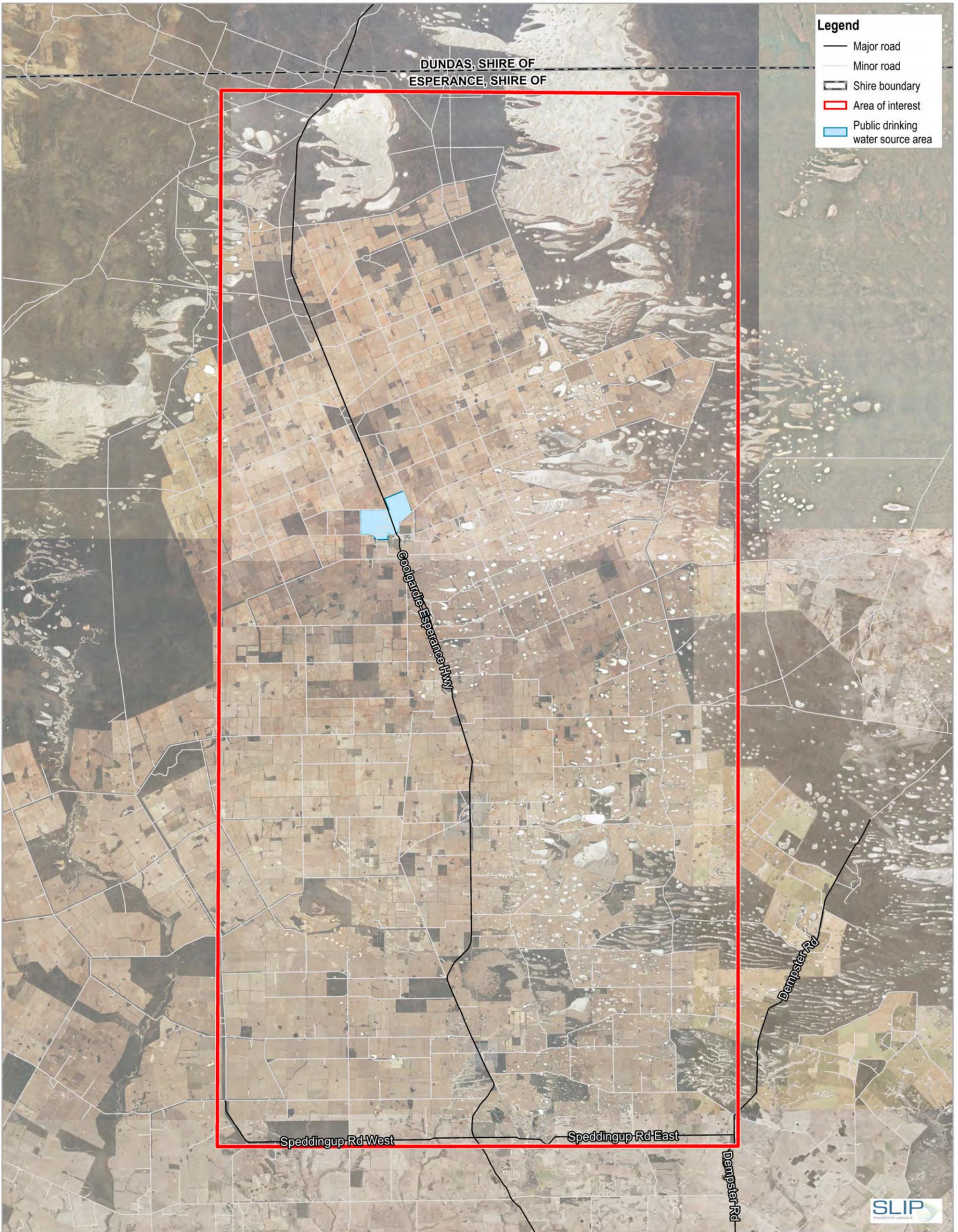


Shire of Esperance
Landfill Site Selection Study

DBCFA Records

Project No. 61-12531105
Revision No. 0
Date 25 Sep 2020

FIGURE 12



Legend

- Major road
- Minor road
- ▭ Shire boundary
- ▭ Area of interest
- ▭ Public drinking water source area

DUNDAS, SHIRE OF
 ESPERANCE, SHIRE OF

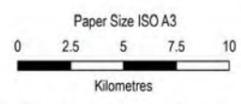
Speddingup Rd West

Speddingup Rd East

Coolgardie Esperance Hwy

Dempster Rd

Dempster Rd



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 51

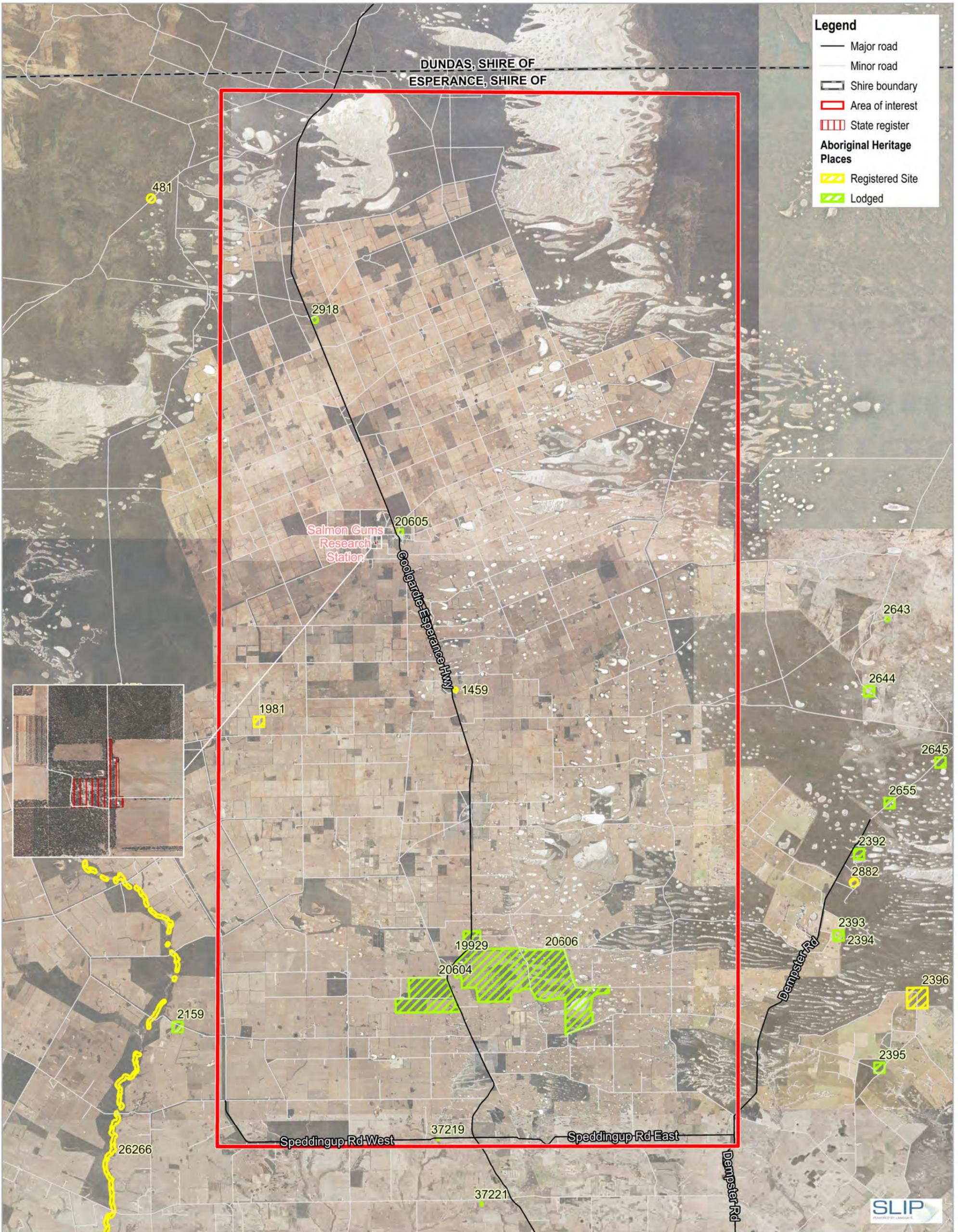


Shire of Esperance
 Landfill Site Selection Study

Drinking Water Protection Areas

Project No. 61-12531105
 Revision No. 0
 Date 25 Sep 2020

FIGURE 13



Legend

- Major road
- Minor road
- ▭ Shire boundary
- ▭ Area of interest
- ▭ State register

Aboriginal Heritage Places

- ▭ Registered Site
- ▭ Lodged

DUNDAS, SHIRE OF
ESPERANCE, SHIRE OF

Salmon Gums
Research
Station

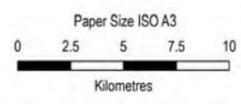
Coolgardie-Esperance Hwy

Dempster Rd

Speddingup Rd West

Speddingup Rd East

Dempster Rd



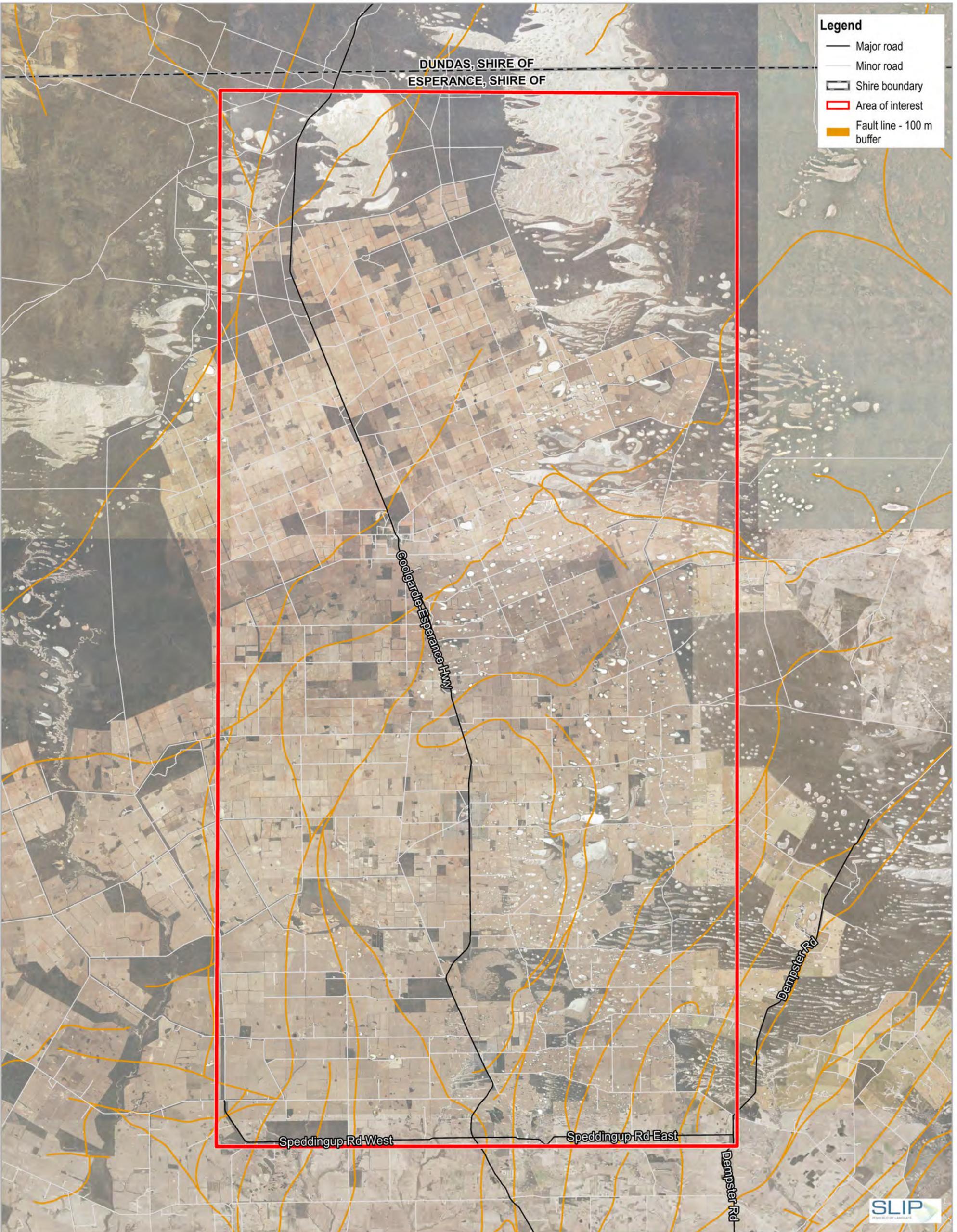
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

Shire of Esperance
Landfill Site Selection Study

Aboriginal and European
Heritage Values

Project No. 61-12531105
Revision No. 0
Date 25 Sep 2020

FIGURE 14



Legend

- Major road
- Minor road
- ▭ Shire boundary
- ▭ Area of interest
- ▭ Fault line - 100 m buffer

DUNDAS, SHIRE OF
 ESPERANCE, SHIRE OF

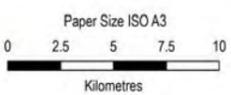
Coolgardie Esperance hwy

Speddingup Rd West

Speddingup Rd East

Dempster Rd

Dempster Rd



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 51

Shire of Esperance
 Landfill Site Selection Study

Project No. 61-12531105
 Revision No. 0
 Date 25 Sep 2020

Fault Lines

FIGURE 15

Attachment D

Details of the potentially suitable land parcels (separated by sub-area of interest)

Table A: Sub-area 1: Potentially Suitable Land Parcels (refer to Figure 2)

Parcel #	Land Type	Lot Number	Crown Survey	Survey	LGA	Address	Locality	Title Type	Proprietor	Area (ha)	Wetland Catchment
1	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		413.01	None
2	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		143.67	None
3	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		259.12	None
4	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		399.14	None
5	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		578.93	None
6	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		340.25	None
7	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		340.07	None
8	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		213.44	None
9	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		500.97	None
10	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		200.46	None
11	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		278.66	None
12	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		419.42	None
13	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		277.04	None
14	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		143.16	None
15	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		202.56	None
16	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		137.63	None
17	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		137.69	None
18	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		422.25	None
19	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		246.73	None
20	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		242.82	None
21	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		130.79	None
22	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		411.50	None
23	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		315.91	None
24	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		404.69	None
25	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		230.93	None
26	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		411.38	None
27	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		279.14	None
28	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		125.67	None
29	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		351.40	None
30	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		207.07	None
31	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		173.39	None
32	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		141.79	None
33	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		407.18	None
34	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		180.41	None
35	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		180.33	None
36	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		409.93	None
37	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		405.17	None
38	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		114.27	None
39	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		112.47	None
40	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		401.48	None
41	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		344.35	None
42	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		202.45	None
43	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		233.46	None
44	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		278.68	None
45	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		121.49	None
46	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		364.26	None
47	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		112.39	None

Table B: Sub-area 2: Potentially Suitable Land Parcels (refer to Figure 3a and 3b)

Parcel #	Land Type	Lot Number	Crown Survey	Survey	LGA	Address	Locality	Title Type	Proprietor	Area (ha)	Wetland Catchment
1	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		339.82	None
2	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		409.65	None
3	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		404.78	Lake Gore
4	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		404.52	None
5	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		381.84	Lake Gore
6	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		404.87	None
7	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		405.35	None
8	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		485.49	None
9	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		404.68	None
10	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		409.16	None
11	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		405.07	None
12	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		485.39	None
13	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		1200.14	None
14	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		404.51	None
15	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		389.01	None
16	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		405.07	None
17	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		377.99	None
18	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		365.04	None
19	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		365.43	None
20	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		409.05	None
21	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		129.51	None
22	FHOLD				ESPERANCE			Certificate of title for regular Freehold Land		409.06	Lake Gore
23	FHOLD				ESPERANCE			Certificate of title for regular Freehold Land		582.72	None
24	FHOLD				ESPERANCE			Certificate of title for regular Freehold Land		592.48	None
25	CROWN				ESPERANCE			Certificate of title for regular Freehold Land		1315.49	Lake Gore

Table C: Sub-area 3: Potentially Suitable Land Parcels (refer to Figure 4)

Parcel #	Land Type	Lot Number	Crown Survey	Survey	LGA	Title Type	Address	Locality	Proprietor	Area (ha)	Wetland Catchment
1	CROWN					Certificate of title for regular Freehold Land				404.8114	None
2	CROWN					Certificate of title for regular Freehold Land				388.6406	None
3	CROWN					Certificate of title for regular Freehold Land				404.7553	None
4	CROWN					Certificate of title for regular Freehold Land				404.5389	None
5	CROWN					Certificate of title for regular Freehold Land				384.4555	None
6	CROWN					Certificate of title for regular Freehold Land				404.7794	None
7	CROWN					Certificate of title for regular Freehold Land				404.6103	None
8	CROWN					Certificate of title for regular Freehold Land				404.8025	None
9	CROWN					Certificate of title for regular Freehold Land				404.6408	None
10	CROWN					Certificate of title for regular Freehold Land				404.5982	None
11	CROWN					Certificate of title for regular Freehold Land				127.3541	None
12	CROWN					Certificate of title for regular Freehold Land				404.9882	None
13	CROWN					Certificate of title for regular Freehold Land				404.5849	None
14	CROWN					Certificate of title for regular Freehold Land				514.6766	None
15	CROWN					Certificate of title for regular Freehold Land				213.1656	None
16	CROWN					Certificate of title for regular Freehold Land				386.4683	None
17	CROWN					Certificate of title for regular Freehold Land				195.191	None
18	CROWN					Certificate of title for regular Freehold Land				453.6965	None
19	CROWN					Certificate of title for regular Freehold Land				448.9999	None
20	CROWN					Certificate of title for regular Freehold Land				437.9464	None
21	CROWN					Certificate of title for regular Freehold Land				442.7439	None
22	CROWN					Certificate of title for regular Freehold Land				404.6584	None
23	CROWN					Certificate of title for regular Freehold Land				404.5718	None
24	CROWN					Certificate of title for regular Freehold Land				404.9008	None
25	CROWN					Certificate of title for regular Freehold Land				404.1909	None
26	CROWN					Certificate of title for regular Freehold Land				404.5592	None
27	CROWN					Certificate of title for regular Freehold Land				400.0302	None
28	CROWN					Certificate of title for regular Freehold Land				387.0585	None
29	CROWN					Certificate of title for regular Freehold Land				402.7977	None
30	CROWN					Certificate of title for regular Freehold Land				244.1876	None
31	CROWN					Certificate of title for regular Freehold Land				338.3265	None
32	CROWN					Certificate of title for regular Freehold Land				404.8037	None
33	CROWN					Certificate of title for regular Freehold Land				374.8934	None
34	CROWN					Certificate of title for regular Freehold Land				405.048	None
35	CROWN					Certificate of title for regular Freehold Land				404.626	None
36	CROWN					Certificate of title for regular Freehold Land				388.4418	None
37	CROWN					Certificate of title for regular Freehold Land				338.6541	None
38	CROWN					Certificate of title for regular Freehold Land				403.6929	None
39	CROWN					Certificate of title for regular Freehold Land				404.673	None
40	CROWN					Certificate of title for regular Freehold Land				403.549	None
41	CROWN					Certificate of title for regular Freehold Land				217.1013	None
42	CROWN					Certificate of title for regular Freehold Land				404.8074	None
43	CROWN					Certificate of title for regular Freehold Land				277.3993	None
44	CROWN					Certificate of title for regular Freehold Land				122.8155	None
45	CROWN					Certificate of title for regular Freehold Land				240.2881	None
46	CROWN					Certificate of title for regular Freehold Land				158.1492	None
47	CROWN					Certificate of title for regular Freehold Land				281.81	None
48	CROWN					Certificate of title for regular Freehold Land				325.3725	None
49	CROWN					Certificate of title for regular Freehold Land				325.2812	None
50	CROWN					Certificate of title for regular Freehold Land				280.8122	None
51	CROWN					Certificate of title for regular Freehold Land				450.367	None
52	CROWN					Certificate of title for regular Freehold Land				161.8895	None
53	CROWN					Certificate of title for regular Freehold Land				280.7403	None

Table C: Sub-area 3: Potentially Suitable Land Parcels (refer to Figure 4)

54	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	440.7181	None
55	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	452.4366	None
56	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	458.1026	None
57	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	284.2917	None
58	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	459.268	None
59	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	427.839	None
60	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	740.8532	None
61	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	130.1051	None
62	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	143.4473	None
63	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	392.1653	None
64	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	340.1654	None
65	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	263.3562	None
66	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	106.7872	None
67	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	410.6011	None
68	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	410.82	None
69	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	401.6507	None
70	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	240.8223	None
71	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	417.6005	None
72	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	442.5373	None
73	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	455.5979	None
74	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	442.3017	None
75	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	442.5423	None
76	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	452.8026	None
77	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	398.254	None
78	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	442.6266	None
79	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	442.4751	None
80	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	452.6526	None
81	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	452.3089	None
82	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	495.5942	None
83	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	414.1305	None
84	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	433.4615	None
85	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	323.6556	None
86	CROWN	ESPERANCE	Certificate of title for regular Freehold Land	368.4067	None

Attachment E

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Limitations

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