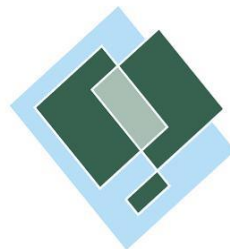




KALIUM
LAKES



Preston
Consulting

CARNEGIE POTASH PROJECT

NATIVE VEGETATION CLEARING PERMIT APPLICATION

SUPPORTING INFORMATION

28 MARCH 2019
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Appendix 2:	Exploration Environmental Management Plan (Kalium Lakes, 2017)
Appendix 3:	NatureMap search report of Permit Area (DBCA, 2019)
Appendix 4:	Copy of Exploration Lease extract



1 INTRODUCTION

1.1 PROJECT BACKGROUND

The Carnegie Joint Venture (CJV) between Kalium Lakes Ltd (Kalium Lakes) and BCI Minerals Ltd is working to develop the Carnegie Potash Project (Project) which aims to produce Sulphate of Potash (SOP), a high yield premium fertiliser, for both domestic and international markets. The Project is planned to be developed within the Lake Carnegie system, located approximately 220 km north-east of Wiluna (Figure 1).

The CJV completed a scoping study in June 2018, which concluded that the Project has the potential for economic and technical viability. The CJV now intends to conduct a drilling program within the Lake Carnegie system in order to further investigate the potential resources of the Project.

1.2 PURPOSE

The purpose of this Native Vegetation Clearing Permit (NVCP) application is to allow the clearing of native vegetation necessary to enable the safe access for Pre-Feasibility Study (PFS) investigations within Lake Carnegie in the Gascoyne bioregion of Western Australia (WA).

Lake Carnegie is a large saline internal drainage basin listed under the National Directory of Important Wetlands (Department of the Environment and Energy (DotEE) website, accessed March 2019) under two criteria:

1. A good example of a wetland type occurring within a biographic region of Australia; and
2. A wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail.

Due to its listing as an Important Wetland, Lake Carnegie is classified as an environmentally sensitive area (ESA) as declared by the Minister of the Environment under section 51B of the *Environmental Protection Act 1986* (WA; EP Act).

A NVCP is required under Part V Section 51E of the EP Act to allow vegetation clearing within an ESA. Up to 50 ha of native vegetation is proposed to be cleared for access tracks and exploration bore sites within the ESA for the PFS investigations.



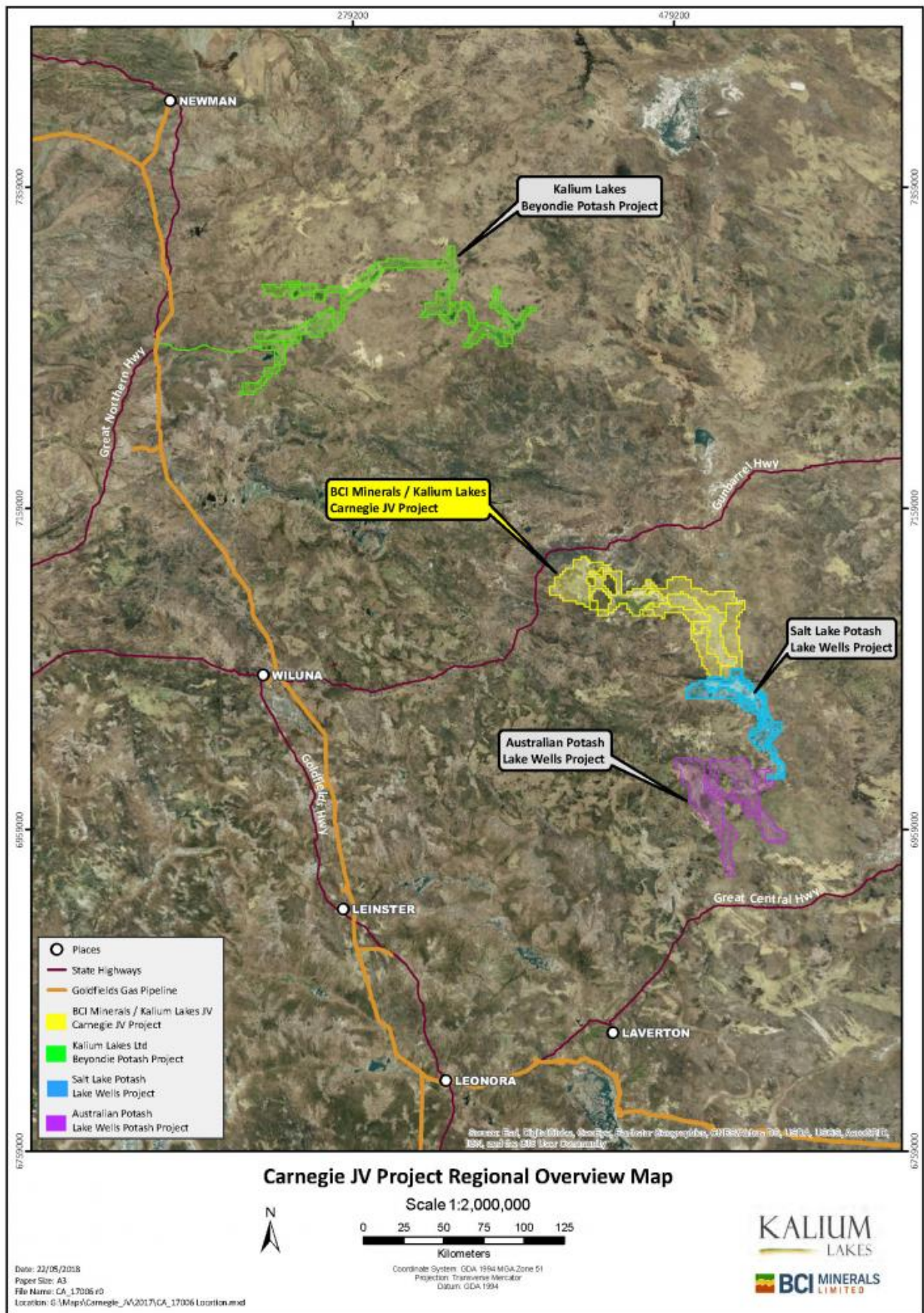


Figure 1: Regional location of the CJV.



2 PROPOSED PURPOSE PERMIT AREA

2.1 BOUNDARY

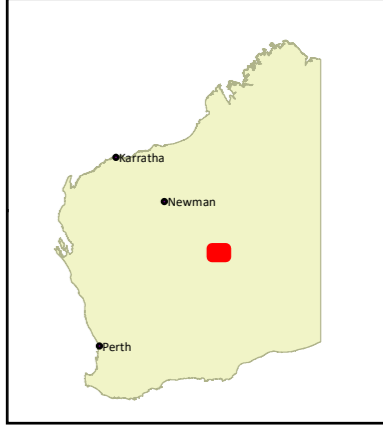
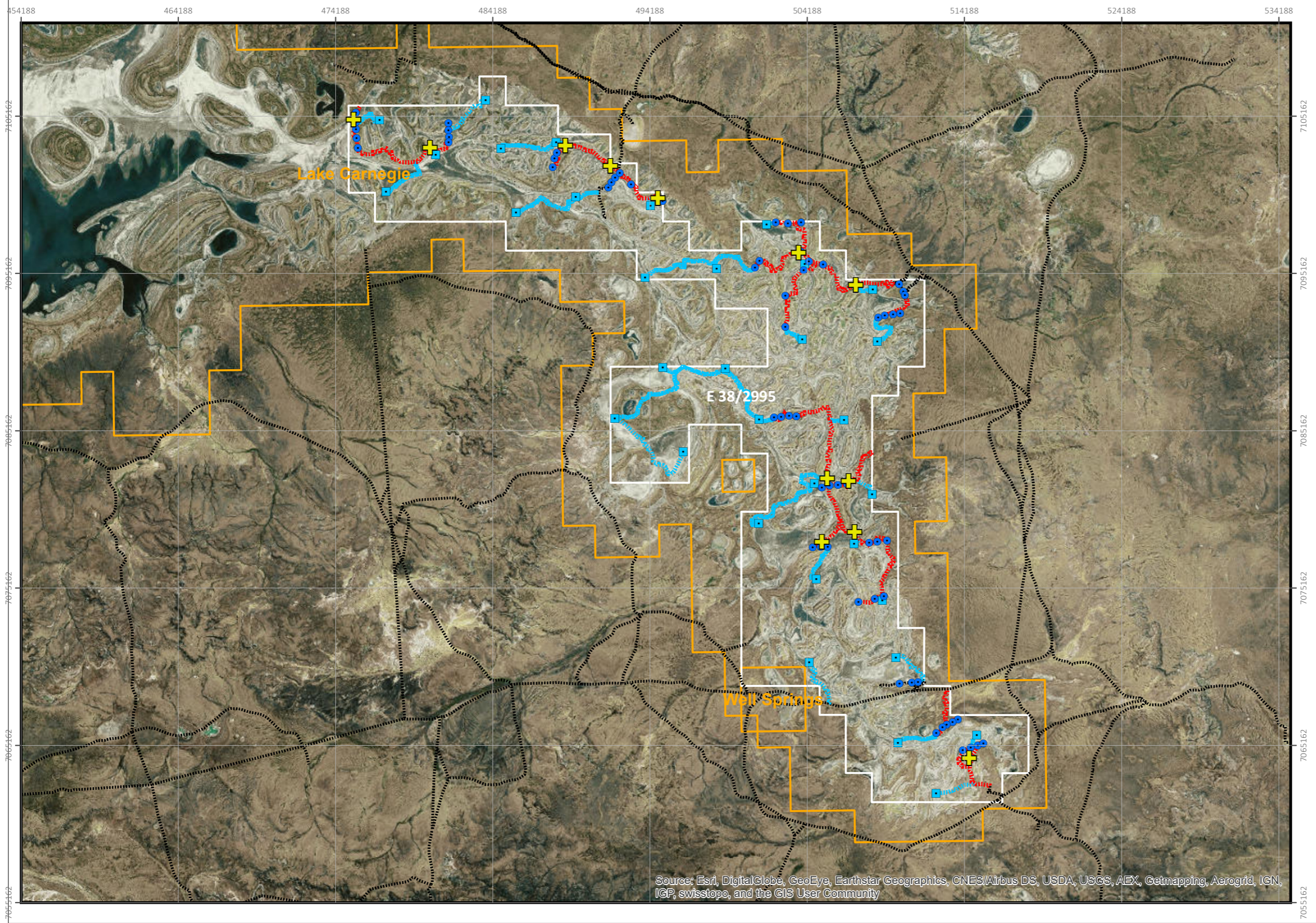
The Purpose Permit Area (Permit Area) proposed in this application is shown in Figure 2. The Permit Area includes all vegetation clearing and disturbance required for the proposed drill sites, trenches and access tracks.

2.2 TENURE AND LAND ACCESS

The CJV will be developed on tenure issued under the *Mining Act 1978*. The proposed Permit Area aligns with the boundary of Exploration Lease (E) 38/2995, held by Kalium Lakes Potash Pty Ltd, a wholly-owned subsidiary of Kalium Lakes Ltd (Figure 2). A copy of the Exploration Lease extract has been provided in Appendix 4.

E 38/2995 is currently being transferred to Carnegie Potash Pty Ltd (a joint venture company between Kalium Lakes Potash Pty Ltd and BCI Minerals Ltd). The Department of Mines, Industry Regulation and Safety (DMIRS) will be notified once this transfer is complete and the application will be amended to reflect the new ownership.

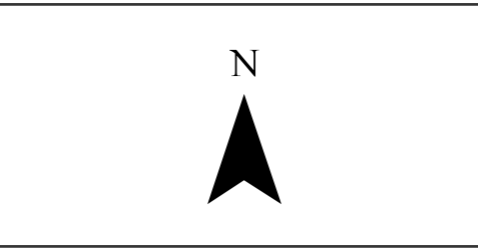




- Legend**
- + Proposed Causeway
 - Proposed Drill Holes/Bores
 - Proposed Trench
 - - - - Proposed Tracks
 - - - - Proposed Trench Access-Drive Over
 - ⋯ Existing Tracks
 - Registered Heritage Site
 - Kalium Lakes Tenements

Rev	Description	Drn	Chk	App
A	Issued for Release	DF	BH	BH

Datum: GDA94
Projection: MGA Zone 51



Client:	Kalium Lakes
Project:	Carnegie
Date:	06/02/2019

Title		
Carnegie Pre-Feasibility Study Ground Works		
Scale @ A3: 1:250,000	Drawing No: KLP_0166_REV_2	Rev: 2



Figure 2: Proposed Permit Area and associated works

3 PROPOSED ACTIVITIES

3.1 DESCRIPTION OF PROPOSED ACTIVITIES

The following sections detail the PFS investigation activities that require vegetation clearing. Access and sampling sites are predominately planned to utilise areas of bare salt pan and will only require a small footprint, minimising vegetation clearing requirements.

3.1.1 DRILL HOLES/ BORES

65 drill sampling sites are proposed to be established within the Permit Area to sample brine quality and yield from the palaeochannel aquifer. Each drill site will require a 20 m x 20 m drill pad to accommodate drilling machinery and sampling areas. Sumps will be constructed near the drill collar to contain any groundwater intersected during drilling. All sumps will have shallow slopes or include egress ramps to prevent fauna from being trapped. All of the sites are located within areas of native vegetation therefore approximately 2.6 ha of vegetation will be required to be cleared for drill sites.

Figure 3 shows an example of the layout and disturbance required for the proposed drill sites.

3.1.2 TRENCHES AND MONITORING TEST PITS

Trench and monitoring test pit sampling sites are proposed to be established in conjunction with drill sites to allow analysis of brine quality and yields from the surficial aquifer.

Thirty-three trenches and 66 monitoring test pits will be installed. The trenches will each measure approximately 20 m x 10 m and the monitoring test pits will each measure approximately 5 m x 5 m. Approximately 0.8 ha of disturbance will be required for the construction of trenches however none of this area is expected to require vegetation clearing, as it falls within areas of unvegetated salt pan.

The trenches and monitoring pits will operate in a similar way to trenches currently installed at the Beyondie SOP Project (Figure 4).

3.1.3 ACCESS TRACKS

Access tracks will be constructed to provide access between the pre-existing, local tracks to the drill and trench / test pit sites. 88 km of access tracks are required, at a width of approximately 5 m, in order to provide access for drilling trucks and site vehicles. Approximately 43.7 ha of native vegetation will be required to be cleared for these access tracks.

Vehicles may also travel between drill and trench / test pit sites using dedicated access routes on the unvegetated lake surface where safe to do so. This method has reduced the requirement for vegetation clearing. These routes are expected to cover a distance of 85 km.



3.1.4 CAUSEWAYS

Twelve causeways will need to be installed along the access tracks in order to traverse inundated or damp areas. The causeways will traverse 4 km in total and are expected to be approximately 10 m wide allowing access for safe access by the drill rigs. Approximately 4.0 ha of disturbance will be required for the construction of the causeways however none of this area is expected to require clearing as it falls within areas of unvegetated salt pan.

3.2 ESTIMATED VEGETATION DISTURBANCE REQUIREMENTS

Table 1 summarises the maximum potential native vegetation disturbance requirements for each of the proposed activities / items within the Permit Area (Figure 2).

Table 1: Estimated vegetation disturbance requirements

Activity/Item	Total disturbance (ha)	Disturbance outside vegetated areas	Vegetation clearing required (ha)
Drill Holes/ Bores	2.6	0.0	2.6
Trenches	0.8	0.8	0.0
Access tracks	47.9	4.2	43.7
Causeways	4.0	4.0	0.0
Contingency (if required)	3.7	0.0	3.7
Total Clearing	59.0	9.0	50.0

3.3 METHOD OF VEGETATION DISTURBANCE

Vegetation will generally be cleared with bulldozers or graders. Diggers and loaders may be used around drainage lines as required.

Vegetation and topsoil will typically be stripped and stored to the side of each disturbed area. Areas with thicker vegetation may need to have the vegetation pushed into piles and mulched. For the purposes of fire hazard reduction it is likely that a combination of mulching equipment and hand-held chain saws will be used to selectively clear vegetation.

3.4 REHABILITATION AND MAINTENANCE

The investigations proposed in this NVCP form the first stage of studies for the Project. Successful bores, trenches and monitoring test pits are expected to be retained during the study phase.

Rehabilitation of cleared areas will occur upon completion of the study phase, however some areas will be rehabilitated earlier if they are not required for the remainder of the study phase.

All areas of disturbed vegetation will be revegetated and rehabilitated, ultimately providing a stable landform similar to surrounding undisturbed areas that supports suitable local native flora and vegetation species. In areas where topsoil has been disturbed it will be spread back over the area and left to revegetate from in-situ and wind-blown seed. It is not expected that there will be any areas subject to compaction as all works are temporary and only required for



the duration of the investigation program. If it is found that there are areas where compaction has occurred, the area may be scarified to provide a rough seed bed.

3.5 INDICATIVE TIMELINE

Kalium Lakes proposes to commence vegetation clearing in mid-2019 with the majority of the clearing works expected to be completed by the end of 2020.



Figure 3: Example of drill site layout (picture taken from the Beyondie SOP Project)



Figure 4: Example of trench infiltration (picture taken from Beyondie SOP Project)



4 RELEVANT ENVIRONMENTAL CHARACTERISTICS

This section contains information about the environmental characteristics of the Permit Area (within the context of the region) that may be relevant to this NVCP application.

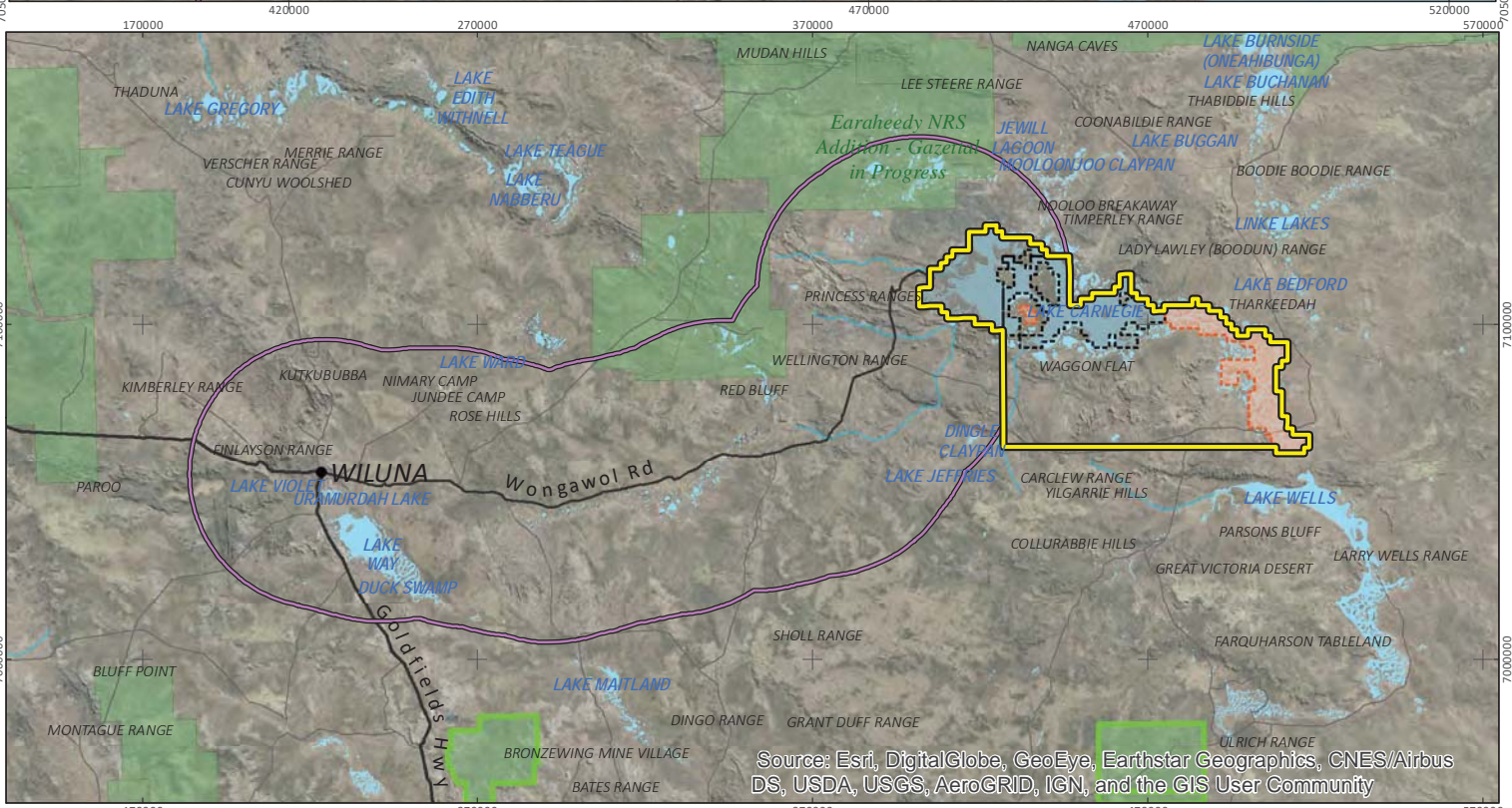
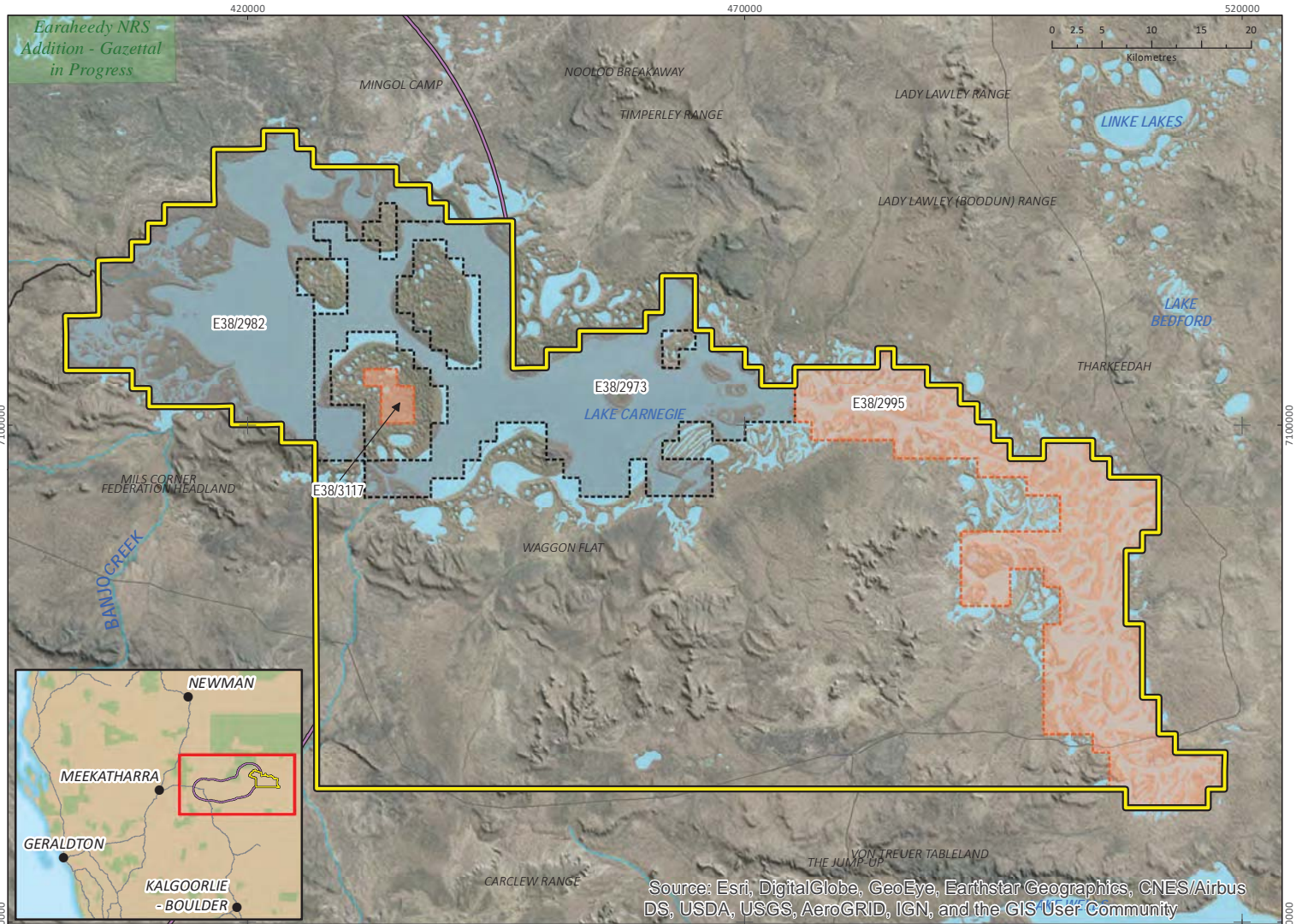
An environmental desktop review and survey was conducted by Phoenix Environmental Sciences Pty Ltd (Phoenix) in May 2017 (Phoenix, 2017; Appendix 1) in accordance with the requirements of the *Environmental Impact Assessment Guidance Framework for Environmental Factors* (Environmental Protection Authority, 2016). The search area defined in Phoenix (2017) covered a much larger area than the Permit Area (Figure 5).

The following database searches were undertaken for the study area:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool for threatened flora and ecological communities listed as matters of National Environmental Significance under the EPBC Act;
- Department of Biodiversity, Conservation and Attractions' (DBCA's) and WA Museum's NatureMap for Threatened and Priority Flora records;
- DBCA Threatened and Priority Flora Database;
- DBCA Threatened and Priority Ecological Communities Database;
- WA Museum Arachnology / Myriapodology, Crustacea and Mollusca databases; and
- Phoenix invertebrate database.

The information in this section has been derived from Phoenix (2017) in conjunction with updated NatureMap searches as required.





	Kalium Lakes Ltd Carnegie Potash Project JV	Lake study Road study Tenements within study area Live Pending	Protected areas DPAW Managed Lands and Waters Nature	Figure 1-1 Project location and study area
	Project No 1152 Date 26/05/2017 Drawn by KW Map author KC	 1:2,250,000 (at A4) GDA 1994 MGA Zone 51		

All information within this map is current as of 26/05/2017. This product is subject to COPYRIGHT and is property of Phoenix Environmental Sciences (Phoenix). While Phoenix has taken care to ensure the accuracy of this product, Phoenix make no

Figure 5: Phoenix (2017) study area in comparison to Permit Area

4.1 BIOGEOGRAPHIC REGIONS

The Permit Area is located in the Carnegie sub-region of the Gascoyne bioregion of WA. The Carnegie sub-region is characterised by rugged low Proterozoic sedimentary and granite ranges divided by broad flat valleys dominated by extensive salt lake systems. Vegetation of the salt lakes are characterised by saltbush and Samphire steppes and occurrences of low Mulga communities.

4.2 LAND SYSTEMS AND SOILS

Land system mapping is based on regional patterns in topography, soils and vegetation. The Permit Area is contained within the Carnegie system characterised by salt lakes with fringing saline alluvial plains, kopi dunes and sandy banks, supporting halophytic, shrublands and acacia tall shrublands (Pringle et al. 1994). The land systems represented within the Permit Area and surrounds are shown in Figure 6.

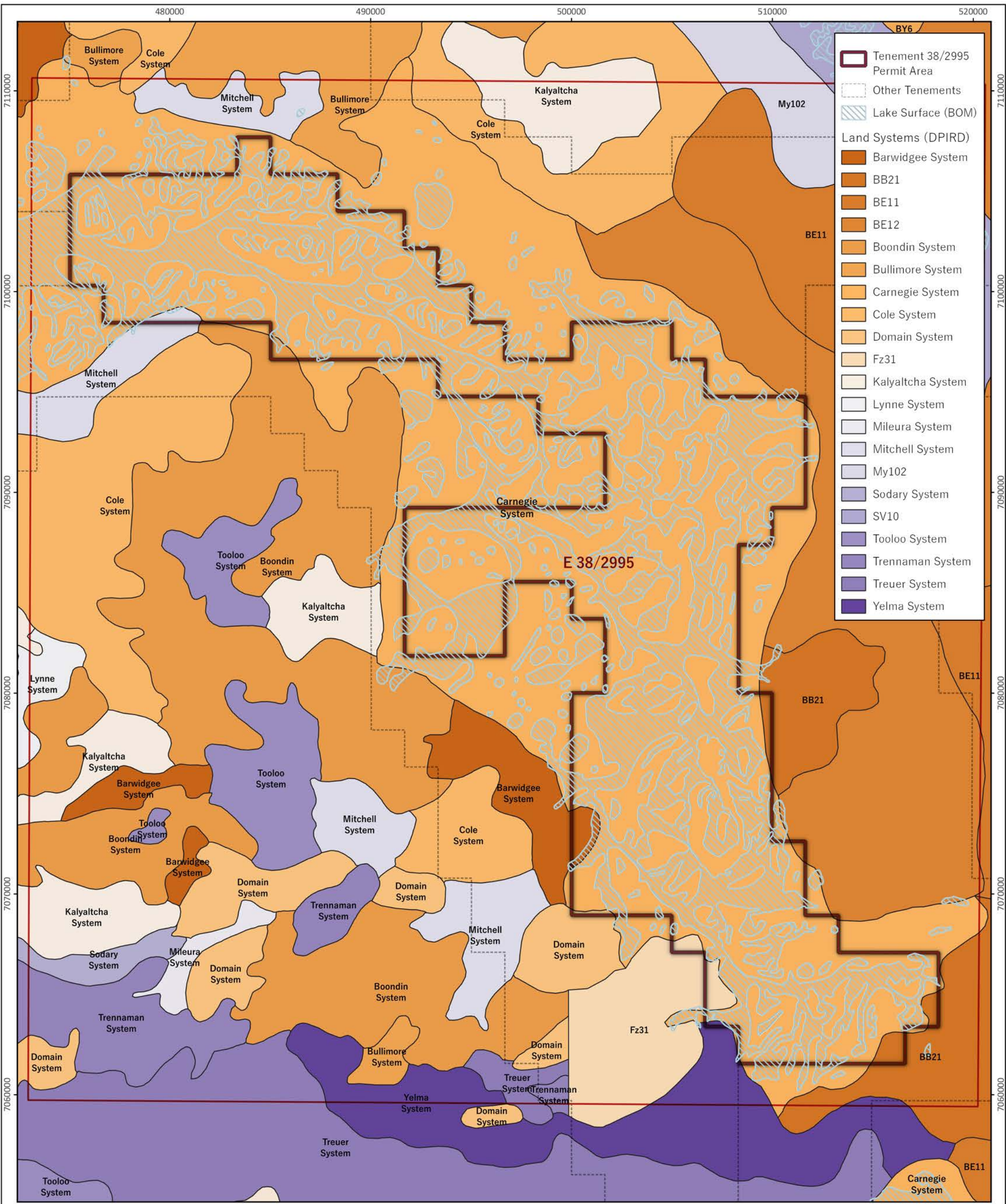
4.3 CONSERVATION RESERVES AND ENVIRONMENTALLY SENSITIVE AREAS

The Permit Area does not intersect any conservation reserves. The closest reserves to the Permit Area are:

- Lorna Glen (Mutuwa) – 44 km to the west; and
- Earaaheedy (Kurra Kurra) – 8 km to the north-west.

The Permit Area is within an ESA as declared by the Minister for the Environment under Section 51B of the EP Act for its wetland values. The boundary of this ESA in relation to the Permit Area is shown in Figure 7.





- Tenement 38/2995 Permit Area
- Other Tenements
- Lake Surface (BOM)
- Land Systems (DPIRD)**
- Barwidgee System
- BB21
- BE11
- BE12
- Boondin System
- Bullimore System
- Carnegie System
- Cole System
- Domain System
- Fz31
- Kalyaltcha System
- Lynne System
- Mileura System
- Mitchell System
- My102
- Sodary System
- SV10
- Tooloo System
- Trennaman System
- Treuer System
- Yelma System

Basemap: Open Topo Basemap

Carnegie Potash Project Land Systems

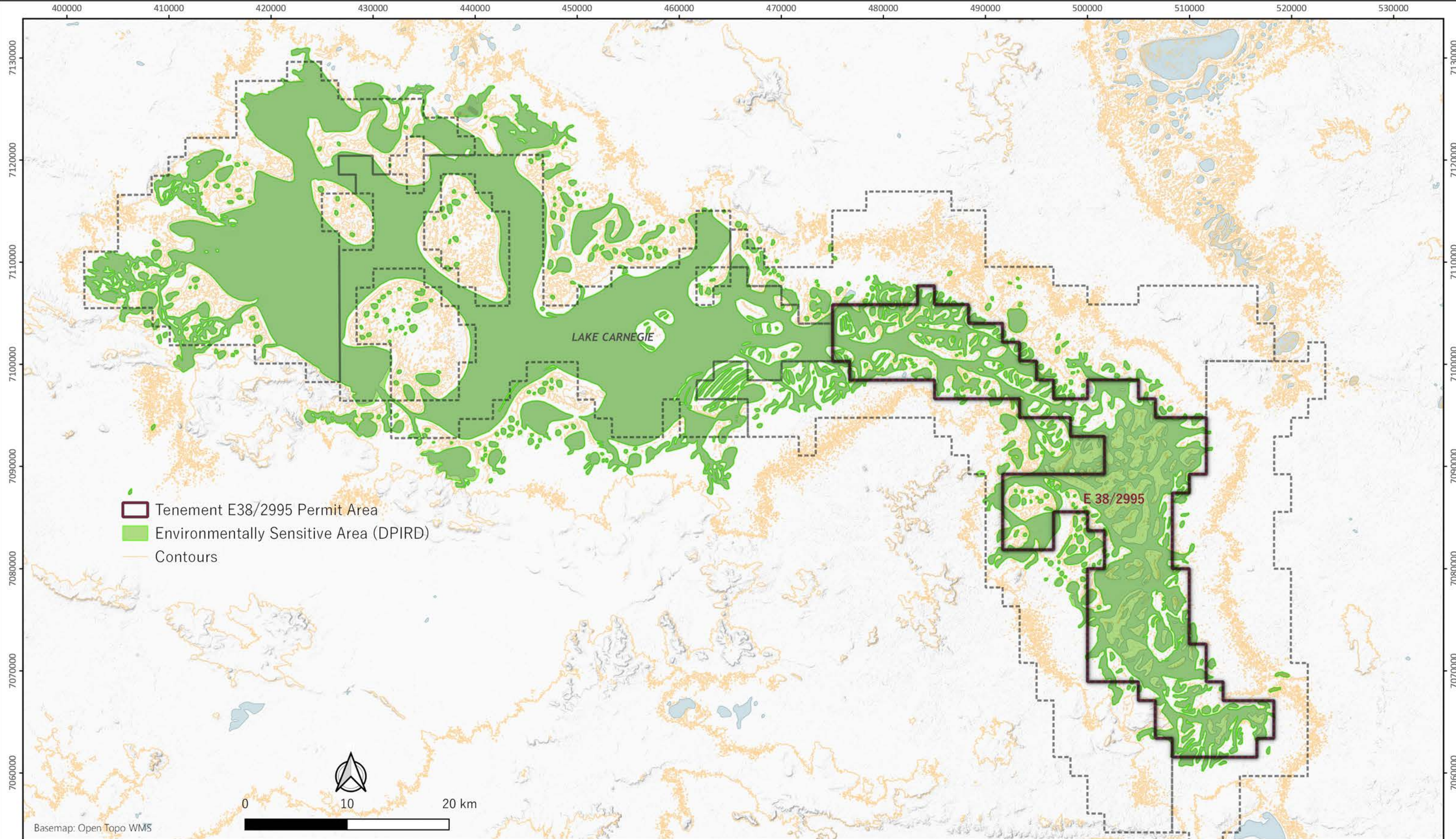
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Datum: GDA94
Projection: MGA Zone 51



Datum: GDA94
Projection: MGA51
Scale at A3: 1:172000



Figure 6: Land systems of the Permit Area and surrounds



- Tenement E38/2995 Permit Area
- Environmentally Sensitive Area (DPIRD)
- Contours



Basemap: Open Topo WMS

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Rev	Description	Drn	Chk	App

Datum: GDA94
 Projection: MGA51
 Scale at A3: 1:350000



Carnegie Potash Project
Environmentally Sensitive Areas

CA_19002 7/3/2019



Figure 7: Map indicating the ESA classification of Lake Carnegie in relation to the Permit Area.

4.4 FLORA AND VEGETATION

The information in this section has been sourced from Phoenix (2017) unless referenced otherwise.

4.4.1 SIGNIFICANT FLORA

No Threatened or Priority Flora were noted as occurring within the Permit Area during the desktop survey and none were recorded elsewhere on Lake Carnegie or within its fringing vegetation (Figure 8).

4.4.2 INTRODUCED FLORA SPECIES

Twenty-one introduced species and one weed of national significance were identified within a broad search area. A search of DBCA / WA Museum NatureMap indicated no introduced species, declared pests or Weeds of National Significance have been recorded within the Permit Area (Department of Biodiversity, Conservation and Attractions, 2019).

4.4.3 VEGETATION

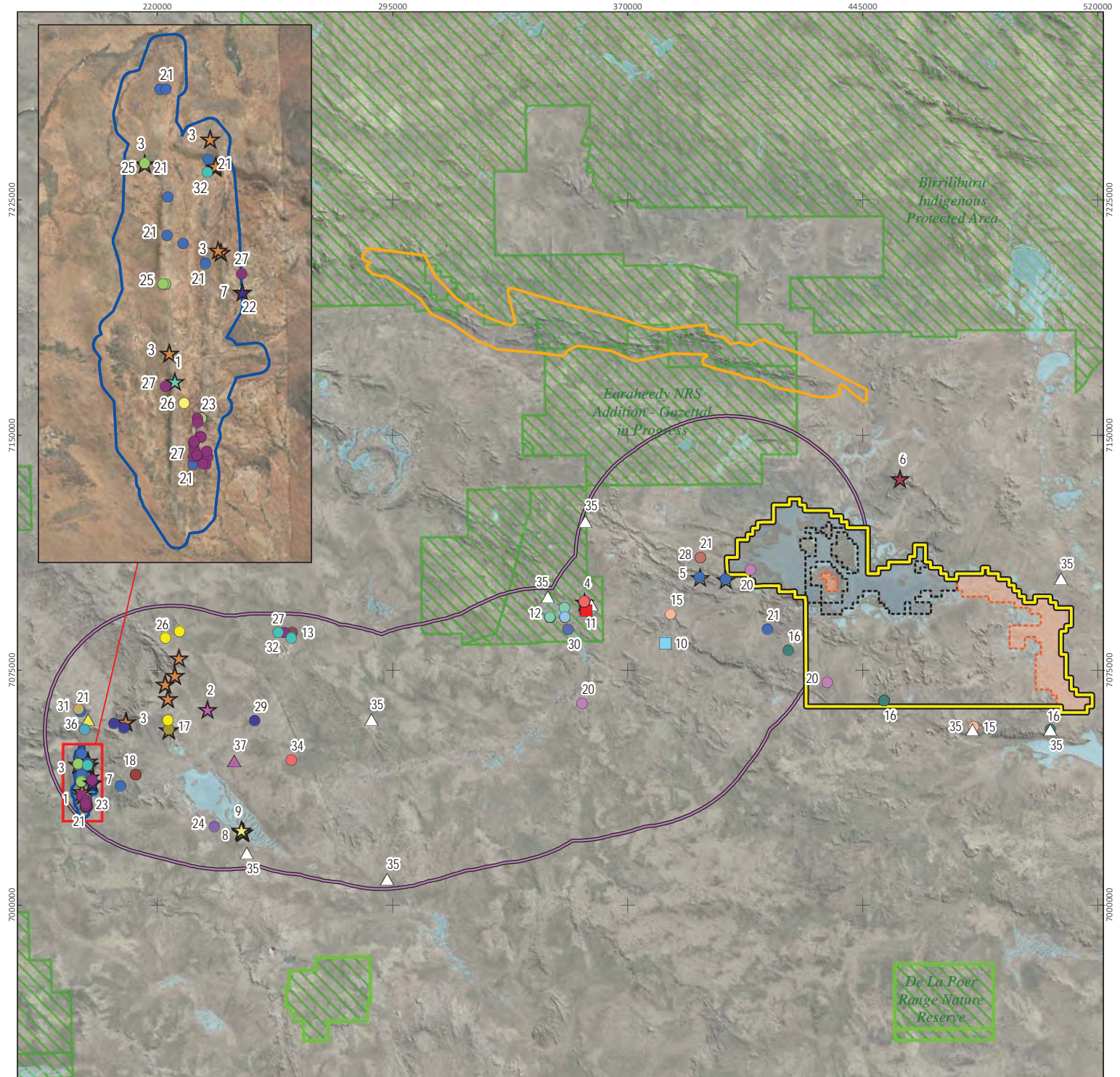
Four vegetation associations identified by broad scale mapping of the area by Shepherd (2002) occur within the Permit Area (Figure 9):

- 39: Shrublands; mulga shrub;
- 125: Bare areas; salt lakes;
- 676: Succulent steppe; samphire; and
- 1446: Succulent steppe with scrub; mulga over bluebush.

The majority of the Permit Area consists of 'vegetation association 125: Bare areas; salt lakes'.

The Directory of Important Wetlands listing for Lake Carnegie describes the lake bed as bare of vegetation; the islands and lake margins as supporting low shrubland (saltbush and samphire); and low open-woodland with a low shrubland understorey fringing the northern boundary of the lake.





DPaW conservation significant flora			
Label, Taxon (ConsStatus)			
★	1, <i>Beyeria lapidicola</i> (P1)	★	9, <i>Tecticornia</i> sp. Sunshine Lake (K.A. Shepherd et al. KS 867) (P1)
★	2, <i>Eremophila arguta</i> (P1)	□	10, <i>Eremophila jamesiorum</i> (P2)
★	3, <i>Eremophila congesta</i> (P1)	■	11, <i>Goodenia virgata</i> (P2)
★	4, <i>Eremophila daddii</i> (P1)	●	12, <i>Acacia burrowsiana</i> (P3)
★	5, <i>Eremophila regia</i> (P1)	●	13, <i>Aristida jerichoensis</i> var. <i>subspinulifera</i> (P3)
★	6, <i>Eremophila resiliens</i> (P1)	●	14, <i>Elatine macrocalyx</i> (P3)
★	7, <i>Ptilotus chrysocomus</i> (P1)	●	15, <i>Eremophila annosocaulis</i> (P3)
★	8, <i>Tecticornia</i> sp. Lake Way (P. Armstrong 05/961) (P1)	●	16, <i>Eremophila campanulata</i> (P3)
		●	17, <i>Eremophila flaccida</i> subsp. <i>attenuata</i> (P3)
		●	18, <i>Euryomyrtus inflata</i> (P3)
		●	19, <i>Goodenia lyrata</i> (P3)
		●	20, <i>Gunnopsis propinqua</i> (P3)
		●	21, <i>Homalocalyx echinulatus</i> (P3)
		●	22, <i>Maireana prosthocochaeta</i> (P3)
		●	23, <i>Olearia mucronata</i> (P3)
		●	24, <i>Paspalidium distans</i> (P3)
		●	25, <i>Prostanthera ferricola</i> (P3)
		●	26, <i>Ptilotus luteolus</i> (P3)
		●	27, <i>Sida picklesiana</i> (P3)
		●	28, <i>Sporobolus blakei</i> (P3)
		●	29, <i>Stackhousia clementii</i> (P3)
		●	30, <i>Tecticornia cymbiformis</i> (P3)
		●	31, <i>Thryptomene</i> sp. Leinster (B.J. Lepschi and L.A. Craven 4362) (P3)
		●	32, <i>Tribulus adelacanthus</i> (P3)
		●	33, <i>Vittadinia pustulata</i> (P3)
		●	34, <i>Xanthoparmelia nashii</i> (P3)
		△	35, <i>Eremophila pungens</i> (P4)
		△	36, <i>Goodenia berringbinensis</i> (P4)
		△	37, <i>Hemigenia exilis</i> (P4)



Kalium Lakes Ltd
Carnegie Potash Project JV

Project No 1152
Date 24-May-17
Drawn by KW
Map author KC

0 10 20 40 60
Kilometres

1:1,750,000 (at A4) GDA 1994 MGA Zone 51

DPaW TEC/PEC search results

- Lee Steere Range vegetation complexes (banded ironstone formation) (P1)
- Wiluna West vegetation complexes (banded ironstone formation) (P1)
- Lake study area
- Road study area

Tenements within study area

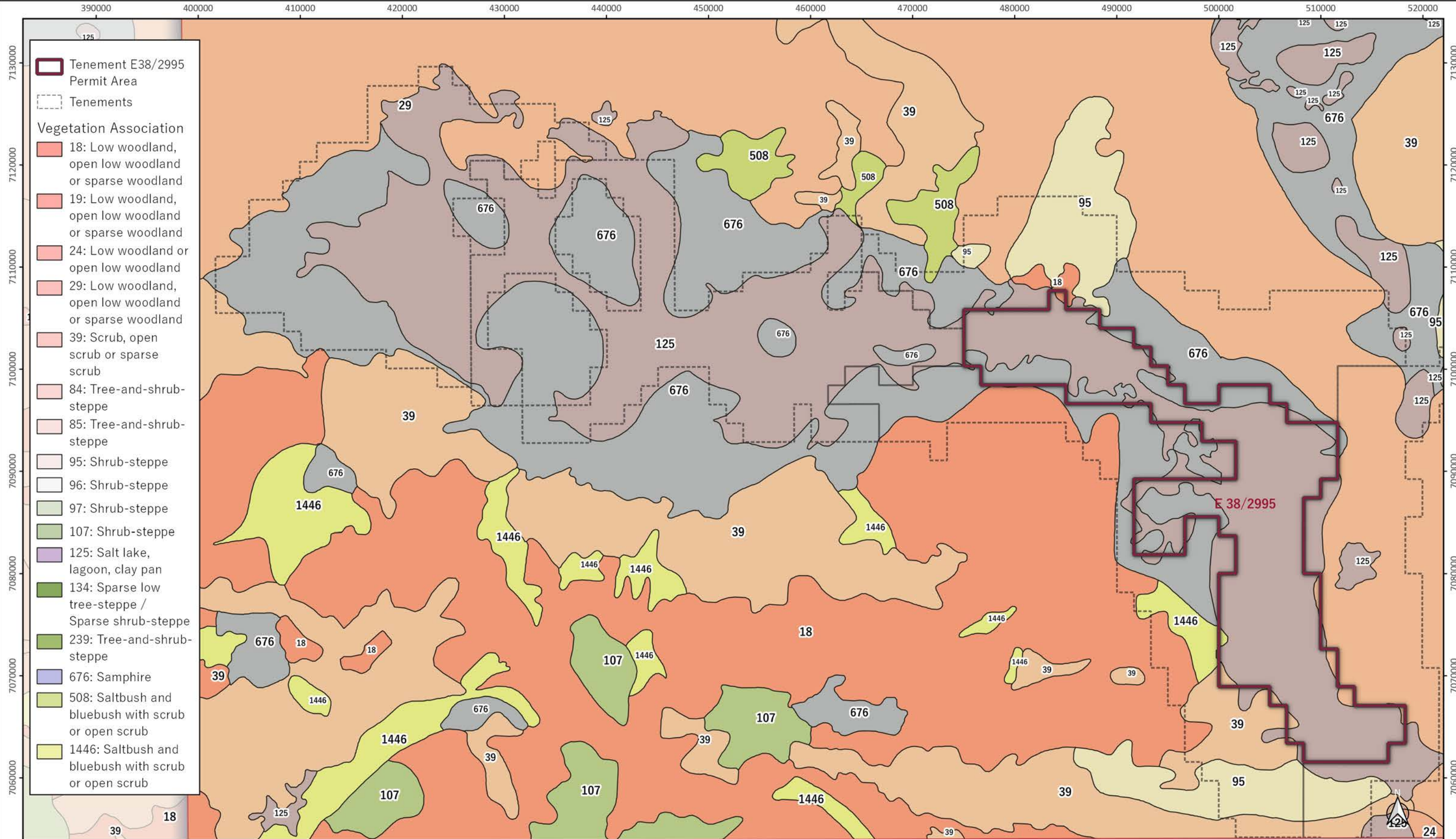
- Live tenement
- Pending tenement
- Nature Reserve
- Protected areas (CAPAD)

Figure 5-4

Desktop records of conservation significant flora and ecological communities

PHOENIX ENVIRONMENTAL SCIENCES

Figure 8: Priority Flora records in proximity to the Permit Area



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Datum: GDA94
 Projection: MGA51
 Scale at A3: 1:350000



**Carnegie Potash Project
 Vegetation Association**

CA_19003 7/3/2019



Figure 9: Vegetation associations represented within the Permit Area and local region

4.4.4 THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

No Threatened Ecological Communities were identified within the Permit Area during the desktop review (Phoenix, 2017).

Fourteen Priority Ecological Communities (PECs) were identified within the area of the desktop review, with 12 of these representing stygofaunal communities associated with confined palaeodrainage systems, also referred to as calcrete groundwater assemblages. The remaining two PECs were associated with banded iron formations; one located north of Lake Carnegie and the other west of Wiluna, both greater than 40 km from the Permit Area (Figure 8). There is no evidence from aerial photographs of any banded iron formations within the Permit Area.

4.5 FAUNA

The information in this section has been sourced from Phoenix (2017).

The search extent used by Phoenix (2017) was large in comparison to the Permit Area as it considered the whole Lake Carnegie and a potential road alignment. A 40 km buffer was applied to the lake study area and the entire road study area was assessed (which already includes a buffer). WA Museum and Phoenix database searches were conducted with a buffer of about 100 km consistent with the nominal range of short-range endemic (SRE) species (Harvey, 2002).

Records for 297 terrestrial vertebrate fauna species and subspecies were identified in the area of the desktop review. This comprised of nine frogs, 87 reptiles, 152 birds (151 native and one introduced) and 48 mammals (37 native and 11 introduced).

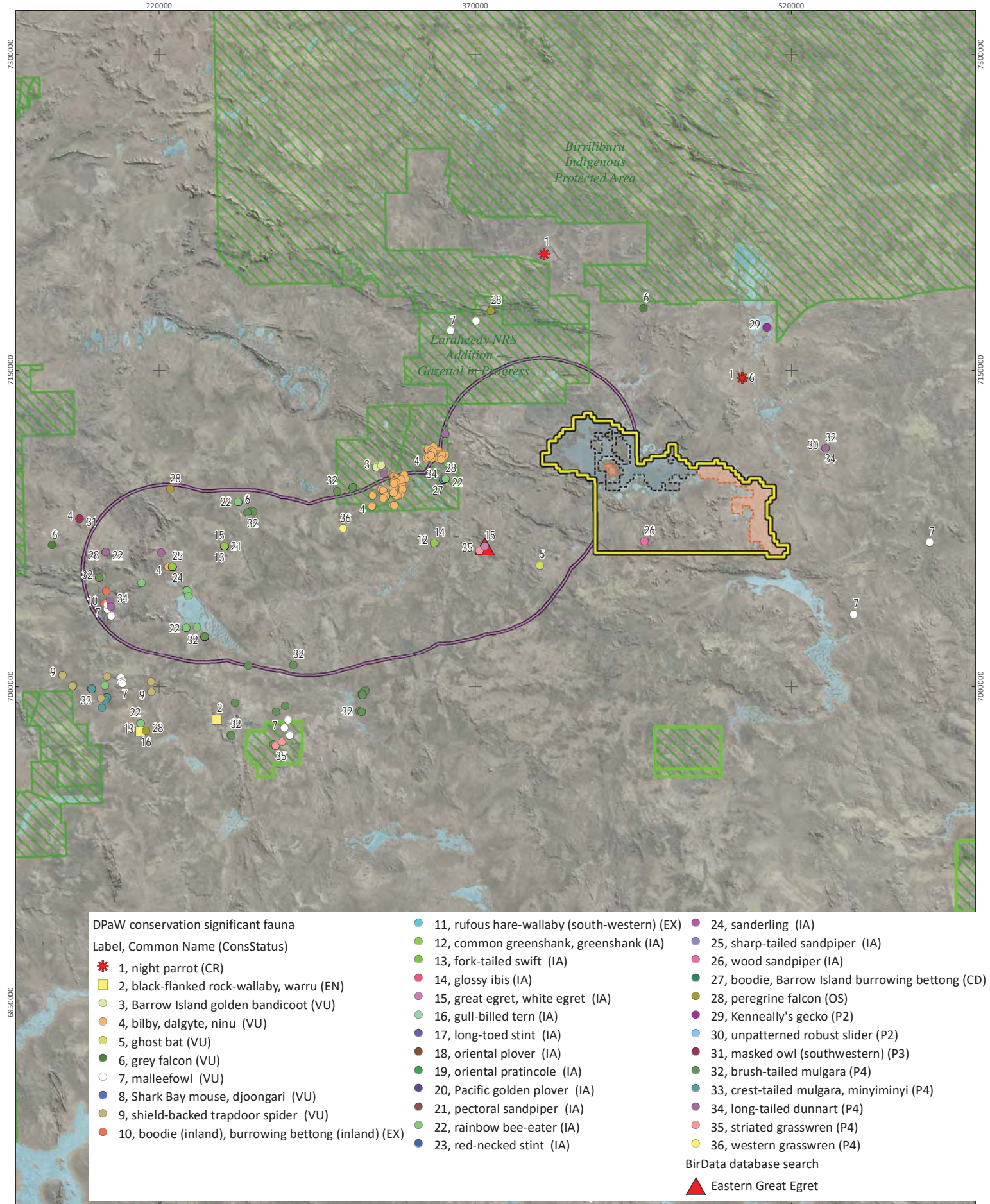
4.5.1 SIGNIFICANT FAUNA

A total of 39 species or subspecies of conservation significance were identified in the desktop review including 17 listed under the EPBC Act and/or *Wildlife Conservation Act 1950* (WC Act) as Threatened, Conservation Dependent or Specially Protected. A further 16 species are listed as 'Migratory' under the EPBC Act and WC Act and eight species are listed as Priority species by DBCA.

Figure 10 shows the location of conservation significant fauna records in proximity to the Permit Area. None of the conservation significant fauna records occur within the Permit Area.

Although not recognised as a true refugia site Lake Carnegie is documented as an important breeding site with records indicating more than 1,000 breeding pairs of Black Swans (*Cygnus atratus*) and 24 other waterbird species seeking refuge during vulnerable stages of their lifecycles and drought (Cowan, 2001).





- DPaW conservation significant fauna**
- Label, Common Name (ConsStatus)**
- ★ 1, night parrot (CR)
 - 2, black-flanked rock-wallaby, warru (EN)
 - 3, Barrow Island golden bandicoot (VU)
 - 4, bilby, dalgyte, ninu (VU)
 - 5, ghost bat (VU)
 - 6, grey falcon (VU)
 - 7, malleefowl (VU)
 - 8, Shark Bay mouse, djoongari (VU)
 - 9, shield-backed trapdoor spider (VU)
 - 10, boodie (inland), burrowing bettong (inland) (EX)
 - 11, rufous hare-wallaby (south-western) (EX)
 - 12, common greenshank, greenshank (IA)
 - 13, fork-tailed swift (IA)
 - 14, glossy ibis (IA)
 - 15, great egret, white egret (IA)
 - 16, gull-billed tern (IA)
 - 17, long-toed stint (IA)
 - 18, oriental plover (IA)
 - 19, oriental pratincole (IA)
 - 20, Pacific golden plover (IA)
 - 21, pectoral sandpiper (IA)
 - 22, rainbow bee-eater (IA)
 - 23, red-necked stint (IA)
 - 24, sanderling (IA)
 - 25, sharp-tailed sandpiper (IA)
 - 26, wood sandpiper (IA)
 - 27, boodie, Barrow Island burrowing bettong (CD)
 - 28, peregrine falcon (OS)
 - 29, Kenneally's gecko (P2)
 - 30, unpatterned robust slider (P2)
 - 31, masked owl (southwestern) (P3)
 - 32, brush-tailed mulgara (P4)
 - 33, crest-tailed mulgara, minyiminyi (P4)
 - 34, long-tailed Dunnart (P4)
 - 35, striated grasswren (P4)
 - 36, western grasswren (P4)
- BirData database search
- ▲ Eastern Great Egret



Kalium Lakes Ltd Carnegie Potash Project JV	
Project No	1152
Date	24-May-17
Drawn by	KW
Map author	KC
1:2,300,000 (at A4) GDA 1994 MGA Zone 51	

- Lake study area
- Road study area
- Tenements within study area
- Live tenement
- Pending tenement
- Nature Reserve
- Protected areas (CAPAD)

Figure 5-6

Desktop records of conservation significant vertebrate fauna

Figure 10: Conservation significant fauna records

4.5.2 SHORT-RANGE ENDEMIC FAUNA

Surveys conducted at nearby Lorna Glen identified a total of 260 potential SRE species (Langlands, 2012) however none of those were recorded within Lake Carnegie. Salt lakes are known to harbour a number of SREs particularly within riparian zones, including islands within the lake (Framenau & Hudson, 2017; Lopez-Lopez et al., 2016). Within the nearby Lake Wells a number of salt lake specialist SREs including wolf spiders, buthid scorpions and tiger beetles have been collected (Phoenix, 2017). Although none have been recorded within Lake Carnegie, Lake Wells belongs to the same paleodrainage system and its close proximity increases the likelihood of similar SRE populations within the Permit Area.

4.6 SURFACE WATER DRAINAGE

The Permit Area is within the Gascoyne region which generally exhibits an arid climate and low summer rainfall associated with regions the wet season. Surface inflow to Lake Carnegie occurs from numerous inland creeks approaching from multiple directions however ephemeral drainage results in a typically dry salt pan (Phoenix, 2017). The Permit Area is located in the south western end of the lake and consists of approximately 9.7% of the estimated 570,000 ha lake area.

4.7 CURRENT LAND USE

Pastoral leases in the region have allowed grazing on native flora for more than a century and occupy more than 65% of land use within the Gascoyne bioregion Department of Agriculture and Food (2019). Grazing over this period is likely to have resulted in some degradation of native vegetation in the region however decreases in grazing since 2001 may have moderated this to some extent (Cowan, 2001). The vast majority of land within the bioregion is otherwise Unallocated Crown Land (Cowan, 2001). The Permit Area is encompassed by the Prenti pastoral lease (3114/1066) and a large portion of Lake Carnegie is subject to Native Title holding (National Native Title Tribunal, 2013).



5 ASSESSMENT OF CLEARING AGAINST THE TEN CLEARING PRINCIPLES

The proposed vegetation disturbance has been assessed against the ten clearing principles described within *A Guide to the Assessment of Applications to Clear Native Vegetation* (Department of Environment Regulation, 2014) under Part V Division 2 of the EP Act. Table 2 assesses the CJV against these ten clearing principles.

The results of flora, vegetation and fauna surveys described in Section 3 have been used in the assessment of the ten clearing principles.



Table 2: Assessment of proposed vegetation disturbance against the ten clearing principles

Relevant information	Assessment of potential impacts	Proposed control measures	Outcome - Assessment of variance with clearing principle
1. Native vegetation should not be cleared if it comprises a high level of biological diversity			
<p>A desktop review conducted by Phoenix (2017) identified that none of the vegetation types or vegetation associations mapped within the Permit Area correspond to a known Threatened Ecological Community (TEC) or PEC under the EPBC Act or EP Act.</p> <p>Lake Carnegie is listed as an ESA due to its wetland values. The Permit Area contains four vegetation associations mapped by Shepherd et al. (2002), however the majority of vegetation clearing is to occur within the following association (Figure 9): 676 Succulent steppe; samphire. This vegetation association remains relatively uncleared and is well represented in the surrounding area.</p> <p>No Threatened or Priority flora have been recorded within the Permit Area (Phoenix, 2017).</p> <p>The habitat types present in the Permit Area appear to be well represented in the surrounding areas.</p>	<p>Lake Carnegie is listed as an ESA due to its wetland values, particularly its use by waterbirds when water is present. All disturbance proposed in this application is to occur within the ESA.</p> <p>Salt lakes can have unique vegetation and flora assemblages however they are not typically associated with high levels of biological diversity. Species are generally limited to those that are salt-tolerant or opportunistic during flood events.</p> <p>The clearing principle refers to the native vegetation to be cleared, in this case it is predominantly fringing samphire habitat, defined by a limited number of salt-tolerant samphire species.</p> <p>Based on the above, the clearing of a small proportion of a much larger fringing vegetation association around Lake Carnegie is not expected to be considered vegetation that “comprises a high level of biological diversity”.</p>	<p>Conduct works in accordance with the Kalium Lakes Exploration Environmental Management Plan (EEMP; Appendix 2) which includes the following key commitments relevant to this clearing principle:</p> <ul style="list-style-type: none"> • All employees and contractors shall be inducted to be aware of general environmental risk and responsibilities • Disturbed land shall be rehabilitated in accordance with tenement conditions • Rehabilitation activities shall be completed as soon as possible after the cessation of exploration work and shall be completed before the expiry of the licence • Use scrub rolling or slashing rather than blade machines for clearing, where practicable • Where soil compaction or erosion has occurred, restore soil structure by scarifying or ripping • All topsoil removed from the drill sites shall be appropriately stored and protected from erosion for later use in rehabilitation activities • There shall be no movement of soil or vegetation into, out of or within the exploration areas • Ensure that all planned activities are consistent with the NVCP and any other relevant approval requirements prior to commencing any exploration • All employees, contractors and equipment are not to stray from the designated access ways and drill lines • Use existing areas of disturbance including existing tracks and roads for access where available • Significant environmental incidents or hazards are to be reported by phone to Kalium Lakes management as soon as practicable • Records of investigation operations shall be kept by Kalium Lakes and a register of rehabilitation requirements and timings kept and used to ensure compliance • At the cessation of the project, Kalium Lakes shall complete a Rehabilitation Report and submit to the Department of Mines, Industry Regulation and Safety (DMIRS) • Ensure that, unless otherwise specified in the Programme of Works (PoW) or NVCP, all areas disturbed as a result of exploration activities are revegetated and rehabilitated, ultimately providing a stable landform similar to surrounding undisturbed areas that supports suitable local native flora and vegetation species 	<p>The proposed vegetation disturbance is not expected to be at variance with this principle.</p>
2. Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA			
<p>The Permit Area predominantly includes areas of bare salt lake and surrounding fringing vegetation, mapped by Shepherd et al. (2002) as “succulent steppe; samphire”. This fringing vegetation can provide habitat for a number of salt-lake specialist SRE species and potential refuge and breeding zones for birdlife.</p> <p>Lake Carnegie is a large saline internal drainage basin listed under the National DIW under two criteria (ref DotEE 1995)</p> <ol style="list-style-type: none"> 1. A good example of a wetland type occurring within a biographic region of Australia 2. A wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail. <p>Due to its listing as an Important Wetland, Lake Carnegie is classified as an ESA as declared by the Minister for the Environment under section 51B of the EP Act.</p>	<p>The fringing vegetation around Lake Carnegie as a whole could be considered to be a significant habitat for fauna indigenous to WA. A majority of the 50 ha of vegetation clearing proposed in this NVCP application is to occur within this fringing vegetation.</p> <p>Lake Carnegie covers an area of over 570,000 ha. Fringing vegetation extends around the majority of the lake as well as covering small islands within the lake. The area proposed to be cleared is expected to form a very small part of an extremely large habitat that may be considered ‘significant’ when assessed as a whole.</p>	<p>Conduct works in accordance with the Kalium Lakes EEMP (Appendix 2) which in addition to the commitments listed above, includes the following key commitments relevant to this clearing principle:</p> <ul style="list-style-type: none"> • No exploration personal shall intentionally trap or harm fauna • No pets shall be brought into the field • Ensure that all sumps and costeans incorporate egress ramps to prevent fauna from becoming trapped • Domestic waste shall be managed in such a way as to avoid attracting fauna • Domestic waste shall be stored in fauna proof containers • Personnel completing the exploration activities will be briefed on the potential occurrence, appearance and preferred habitat of the Night Parrot (<i>Pezoporus occidentalis</i>) • Sighting of the Night Parrot (<i>Pezoporus occidentalis</i>) will be reported only to DBCA as soon as practicable • Helicopter will not be flown at dawn or dusk to minimise potential risks of disturbance to the Night Parrot • The helicopter will not land on islands in the lake or in or near any thick samphire vegetation 	<p>The proposed vegetation disturbance is not expected to be at variance with this principle.</p>
3. Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora			
<p>No Threatened flora species pursuant to the EPBC Act or the WC Act have been recorded within the Permit Area (Phoenix 2017).</p>	<p>The proposed clearing will not result in the disturbance of any recorded Threatened Flora species listed under the WC Act or EPBC Act.</p>	<p>Conduct works in accordance with the Kalium Lakes EEMP (Appendix 2).</p>	<p>The proposed vegetation disturbance is not at variance with this principle.</p>



Relevant information	Assessment of potential impacts	Proposed control measures	Outcome - Assessment of variance with clearing principle
4. Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a Threatened Ecological Community			
No TECs were noted to occur within or in proximity to the Permit Area and the Permit Area does not lie within the buffer of any known TECs (Phoenix, 2017).	No impacts to TECs expected.	Conduct works in accordance with the Kalium Lakes EEMP (Appendix 2).	The proposed vegetation disturbance is not at variance with this principle.
5. Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared			
Clearing within the Permit Area is limited to minor tracks and pastoral activities. The area has been subject to grazing associated with pastoral leases. The Permit Area lies within a broad relatively undisturbed landscape.	The Permit Area and its surrounds remain relatively undisturbed. Clearing within the surrounding area is limited to access tracks and other pastoral activities.	Conduct works in accordance with the Kalium Lakes EEMP (Appendix 2).	The proposed vegetation disturbance is not at variance with this principle.
6. Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland			
<p>Lake Carnegie is a large saline internal drainage basin listed under the National Directory of Important Wetlands under two criteria:</p> <ol style="list-style-type: none"> 1. A good example of a wetland type occurring within a biographic region of Australia 2. A wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail <p>Due to its listing as an Important Wetland, Lake Carnegie is classified as an ESA as declared by the Minister for the Environment under section 51B of the EP Act.</p>	<p>The majority of the 50 ha of native vegetation to be cleared is growing in, or in association with, an environment associated with a wetland. There are several clearing characteristics that should be noted however:</p> <ul style="list-style-type: none"> • The clearing is to be conducted within narrow areas (i.e. for access tracks, causeways, drill pads), leaving large areas of surrounding vegetation • 50 ha of vegetation clearing represents an extremely small portion of the 570,000 ha extent of Lake Carnegie • The type of clearing allows relatively simple rehabilitation methods (i.e. push material to the side then back across the cleared area when complete) • The clearing will target areas that are mostly dry. While they may flood on rare occasions it is likely that most of the clearing areas will not be inundated during the investigations program • The investigation works are relatively small in scale and therefore do not require large volumes of diesel or other potentially contaminating material • Causeways are proposed to be installed over damp areas to allow free flow of surface water under the causeway if required 	<p>Conduct works in accordance with the Kalium Lakes EEMP (Appendix 2) which in addition to the commitments listed above, includes the following key commitments relevant to this clearing principle. Some commitments have been edited slightly to increase the protection of Lake Carnegie:</p> <ul style="list-style-type: none"> • Causeways are to be fitted with an appropriate number of culverts if surface water is noted to flow across the causeway alignment • Exploration areas shall be maintained in a clean and tidy condition at all times • At the completion of exploration, ensure that all grid pegs, tags, sample bags, flagging tape and any other rubbish is removed • Drill holes intersecting flowing water shall be plugged • Exploration activities shall avoid surface water drainage features where possible. The exploration programmes shall be designed to ensure that no disturbance shall occur to surface water drainage patterns • All wastes shall be collected, segregated and stored in properly constructed containers and removed to a licenced landfill facility or another disposal site in accordance with local council requirements • All holes shall be constructed and / or sealed to prevent the collapse of the surrounding surface • Shallow surveying holes shall be backfilled on completion • Drill holes shall be sealed, surveyed and marked • Material Safety Data Sheets shall be kept on site for diesel, domestic cleaning products, degreaser, engine oil and other relevant substances. Site induction shall include risk management requirements for these substances • Chemicals, hydrocarbons and containers shall be stored outside the lake boundary where they or their contents cannot enter or contaminate surface water or groundwater systems, interfere with native flora or fauna, or come into contact with livestock • All chemicals, fuels and oils shall be appropriately stored with self-bunded and double skinned containers used where practicable • Any drilling additives used shall be non-toxic and biodegradable • Spill kits shall be available for hydrocarbon and chemical spillages. They shall be regularly checked and maintained • All vehicles, earthmoving and drilling equipment shall be inspected to check that they do not leak oil, fuel or other fluids, before entering the site, and again before entering the lake boundary • Contaminated material shall be disposed of at an approved waste disposal site • A supply of appropriate spill and dust prevention and oil absorbent materials shall be maintained at all drill sites • No servicing of equipment is to be undertaken on site • All spills of dry or wet chemicals or hydrocarbons shall be cleaned up • On completion of exploration activities, all chemicals and hydrocarbons (including their containers) must be removed from site for disposal at an approved waste disposal facility • Refuelling is to be done outside of the ANCA listed area and fuel brought to site using only existing tracks. 	<p>The proposed vegetation disturbance may be at variance with this principle.</p>



Relevant information	Assessment of potential impacts	Proposed control measures	Outcome - Assessment of variance with clearing principle
7. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation			
<p>The area surrounding the Permit Area remains mostly uncleared with disturbance limited to that caused by local access activity and grazing associated with pastoral leases. The proposed Permit Area contains no records of introduced flora species however 21 introduced species and one Weed of National Significance were recorded within a broad search area around the Permit Area.</p>	<p>The proposed clearing is short in duration, will only require a small workforce and consists of narrow linear features within a broadly undisturbed landscape. There is therefore minimal potential for appreciable land degradation as a result of the clearing, especially on a scale that extends outside the work areas. Nevertheless, mitigation measures will be implemented to ensure that risks are as low as practicable.</p> <p>With the implementation of these measures the native vegetation clearing is unlikely to cause appreciable land degradation at a local or regional scale.</p>	<p>Conduct works in accordance with the Kalium Lakes EEMP (Appendix 2) which in addition to the commitments listed above, includes the following key commitments relevant to this clearing principle. Some commitments have been edited slightly to increase the protection of Lake Carnegie:</p> <ul style="list-style-type: none"> • Exploration areas shall be maintained in a clean and tidy condition at all times • All vehicles and machines shall have well-maintained exhaust systems to prevent the accumulation of combustible material against heat sources (engine exhaust pipes and mufflers). Injectors on diesel vehicles shall be in good / safe working order • In high-risk fire periods and areas all field vehicles shall be equipped with a minimum of a 9 kg pressurised fire extinguisher • Exploration vehicles shall use only diesel fuel, not petrol • Field crew shall ensure that cigarette butts are completely extinguished and disposed of appropriately • All fire-fighting equipment shall be checked for compliance by site manager before being brought onto site • Prior to entering the exploration area, all vehicles shall assemble at a designated site for weed inspection and removal of soil and plant material. The vehicles shall proceed to the work areas via designated roads • All drill water returns shall be trapped in a small sump and allowed to drain back into the ground • Ascertain if any regional disease or weed control campaign is current and follow directives from the regulators and the landholder / owner 	<p>The vegetation disturbance is not expected to be at variance with this principle.</p>
8. Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area			
<p>The Permit Area does not intersect with any listed conservation reserves.</p> <p>The Permit Area contains a portion of Lake Carnegie. Lake Carnegie is a large saline internal drainage basin listed under the National DIW under two criteria (DotEE, 1995)</p> <ol style="list-style-type: none"> 1. A good example of a wetland type occurring within a biographic region of Australia 2. A wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail <p>Due to its listing as an Important Wetland, Lake Carnegie is classified as an ESA as declared by the Minister for the Environment under section 51B of the EP Act.</p>	<p>Clearing within the ESA will be required as part of the investigations. The area proposed to be cleared is expected to form a very small part of an extremely large habitat that forms the ESA.</p> <p>The proposed clearing is not expected to impact the criteria for declaring Lake Carnegie to be an ESA due to the following reasons:</p> <ul style="list-style-type: none"> • The clearing is not permanent and short-term • The clearing is to be conducted within narrow areas (i.e. for access tracks, causeways, drill pads), leaving large areas of surrounding vegetation • 50 ha of vegetation clearing represents an extremely small portion of the 570,000 ha extent of Lake Carnegie • The type of clearing allows relatively simple rehabilitation methods (i.e. push material to the side then back across the cleared area when complete) • The investigation works are relatively small in scale and therefore do not require large volumes of diesel or other potentially contaminating material • Causeways are proposed to be installed over damp areas to allow free flow of surface water under the causeway if required 	<p>Conduct works in accordance with the Kalium Lakes EEMP (Appendix 2). Key commitments relevant to this clearing principle have been listed above.</p>	<p>The proposed vegetation disturbance may be at variance with this principle.</p>
9. Native vegetation should not be cleared if the clearing is likely to cause deterioration in the quality of surface or underground water			
<p>Surface water is rare in the Permit Area and proposed works will not be conducted during inundation to ensure safe operation.</p> <p>No significant water users (groundwater or surface water) are in close proximity to the Permit Area.</p> <p>Groundwater is hypersaline and holds little value to other users apart from a potential brine source for SOP producers.</p>	<p>Potential impacts to surface quality as a result of the clearing include sediment loss from disturbed areas and minor hydrocarbon spills, which may occur as a result of leaks from hydraulics, earthmoving equipment or vehicles.</p> <p>Given that the clearing is relatively small in scale (50 ha) and will generally occur during dry conditions, the clearing is unlikely to result in significant sediment run-off. Diesel spills would only occur during incidents as refuelling and fuel storage will occur outside the boundary of Lake Carnegie. Mitigation measures will ensure that any incidental spills will be cleaned up immediately and will not impact surface water or groundwater.</p>	<p>Conduct works in accordance with the Kalium Lakes EEMP (Appendix 2). Key commitments relevant to this clearing principle have been listed above.</p>	<p>The proposed vegetation disturbance is not expected to be at variance with this principle.</p>
10. Native vegetation should not be cleared if the clearing is likely to cause, or exacerbate, the incidence or intensity of flooding			
<p>The majority of the proposed clearing occurs within the boundary of Lake Carnegie and its fringing vegetation.</p> <p>Surface water is rare in the Permit Area and proposed works will not be conducted during inundation to ensure safe</p>	<p>Drill pads are unlikely to cause, or exacerbate, the incidence or intensity of flooding. Roads and access tracks will be developed to allow surface water to flow across it should inundation events occur.</p> <p>Inundation basins are to be excavated on the lake floor and are designed to</p>	<p>Conduct works in accordance with the Kalium Lakes EEMP (Appendix 2). Key commitments relevant to this clearing principle have been listed above.</p>	<p>The proposed native vegetation disturbance is not expected to be at variance with this principle.</p>



Relevant information	Assessment of potential impacts	Proposed control measures	Outcome - Assessment of variance with clearing principle
operation.	<p>capture groundwater that infiltrates through the basin wall. These basins will capture floodwater when present however this would only occur when the whole lake is in flood, and therefore would not cause, or exacerbate, the incidence or intensity of flooding.</p> <p>Causeways are proposed to be installed over damp areas to allow access for drill rigs and vehicles. These causeways will be fitted with an appropriate number of culverts if surface water is noted to flow across the causeway alignment. As a result the culverts would not cause, or exacerbate, the incidence or intensity of flooding.</p>		



6 SUMMARY AND CONCLUSIONS

The purpose of this NVCP application is to seek a Purpose Permit for the clearing of 50 ha of native vegetation within the Carnegie sub-region of the Gascoyne bioregion of WA. The vegetation clearing is required to enable the safe access for SOP investigations.

All vegetation disturbance detailed in the NVCP application is proposed to occur within the Permit Area shown in Figure 2.

All proposed works will be carried out in accordance with the Kalium Lakes EEMP, provided in Appendix 2.

The assessment against the ten clearing principles described within *A Guide to the Assessment of Applications to Clear Native Vegetation* (Department of Environmental Regulation, 2014) under Part V Division 2 of the EP Act was based on information derived from:

- Desktop flora and fauna surveys conducted by Phoenix (2017; Appendix 1)
- Additional NatureMap database searches conducted in February 2019.

Kalium Lakes has designed the Project to minimise potential environmental impacts associated with the vegetation clearing, including:

- Utilising existing tracks where present;
- Utilising the bare salt lake surface for access where possible to avoid having to clear access tracks through vegetated areas;
- Complying with the requirements of the EEMP;
- Minimising the scope of the disturbance for the works so that all clearing is kept to minimum required areas and completed only as required; and
- Committing to rehabilitate any cleared areas following completion of the investigations.

The proposed clearing is not expected to be at variance with eight of the ten clearing principles (Table 2), however it may be at variance with principle six and eight. Principle six states: “*native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland*”. Clearing is required within the boundaries of Lake Carnegie as the investigations are targeting the brine SOP sources that lie within the sediments of Lake Carnegie and within the underlying palaeochannel. Principle eight states: “*Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area*”. Clearing is not proposed within any conservation reserves however clearing is required within the boundaries of the Lake Carnegie ESA. This clearing may therefore be in variance to this principle if the ESA is considered to be a ‘conservation area’.

Kalium Lakes shall implement the proposed control measures listed in Table 2 to ensure that all potential impacts are minimised.



7 GLOSSARY

Term	Meaning
DBCA	Department of Biodiversity, Conservation and Attractions
DMIRS	Department of Mines, Industry Regulation and Safety
DotEE	Department of the Environment and Energy
E	Exploration Lease
EEMP	Exploration Environmental Management Plan
EP Act	<i>Environmental Protection Act 1986</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESA	Environmentally Sensitive Area
Kalium Lakes	Kalium Lakes Limited
NVCP	Native Vegetation Clearing Permit
PEC	Priority Ecological Community
Permit Area	Proposed Purpose Permit Area
PFS	Pre-Feasibility Study
Phoenix	Phoenix Environmental Sciences Pty Ltd
PoW	Programme of Works
Project	Carnegie Potash Project
SOP	Sulphate of Potash
SRE	Short-range endemic
TEC	Threatened Ecological Community
WA	Western Australia
WC Act	<i>Wildlife Conservation Act 1950</i>



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9 APPENDICES

The following appendices have been provided:

- Appendix 1:** Environmental desktop review and survey scoping for the Carnegie Project (Phoenix, 2017)
- Appendix 2:** Exploration Environmental Management Plan (Kalium Lakes, 2017)
- Appendix 3:** NatureMap search report of Permit Area (DBCA, 2019)
- Appendix 4:** Copy of Exploration Lease extract

