

# URE15096.01\_flora\_3km

Created By Daniel Panickar on 11/05/2015

Kingdom Plantae  
Current Names Only Yes  
Core Datasets Only Yes  
Method 'By Circle'  
Centre 115°49' 27" E,32°23' 07" S  
Buffer 3km  
Group By Family

Family	Species	Records
Apiaceae	3	5
Araliaceae	3	5
Asparagaceae	3	3
Asteraceae	6	9
Campanulaceae	4	5
Casuarinaceae	1	1
Celastraceae	1	1
Centrolepidaceae	2	3
Colchicaceae	1	1
Commelinaceae	1	1
Crassulaceae	3	4
Cyperaceae	16	23
Dennstaedtiaceae	1	2
Dilleniaceae	1	1
Droseraceae	3	3
Ericaceae	4	6
Euphorbiaceae	1	2
Fabaceae	12	23
Geraniaceae	1	1
Goodeniaceae	3	4
Haemodoraceae	3	5
Haloragaceae	1	2
Hemerocallidaceae	1	1
Juncaceae	1	3
Lamiaceae	1	2
Lauraceae	1	2
Loganiaceae	1	1
Menyanthaceae	2	2
Myrtaceae	10	12
Orchidaceae	5	6
Orobanchaceae	1	1
Poaceae	8	8
Polygalaceae	1	1
Proteaceae	3	3
Ranunculaceae	1	2
Restionaceae	7	15
Rubiaceae	1	2
Scrophulariaceae	2	2
Selaginellaceae	1	1
Stylidiaceae	5	6
Thymelaeaceae	2	2
<b>TOTAL</b>	<b>128</b>	<b>182</b>

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Apiaceae</b>				
1.	15446 <i>Eryngium pinnatifidum</i> subsp. <i>pinnatifidum</i>			
2.	6222 <i>Homalosciadium homalocarpum</i>			
3.	6289 <i>Xanthosia huegelii</i>			
<b>Araliaceae</b>				
4.	6229 <i>Hydrocotyle diantha</i>			
5.	19041 <i>Trachymene coerulea</i> subsp. <i>coerulea</i>			
6.	6280 <i>Trachymene pilosa</i> (Native Parsnip)			
<b>Asparagaceae</b>				
7.	1231 <i>Lomandra maritima</i>			
8.	14542 <i>Lomandra micrantha</i> subsp. <i>micrantha</i>			
9.	1318 <i>Thysanotus arbuscula</i>			
<b>Asteraceae</b>				
10.	7945 <i>Cotula coronopifolia</i> (Waterbuttons)	Y		
11.	8092 <i>Ixiolaena viscosa</i> (Sticky Ixiolaena)			

	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
12.	8175	<i>Podolepis gracilis</i> (Slender Podolepis)			
13.	8182	<i>Podotheca angustifolia</i> (Sticky Longheads)			
14.	8224	<i>Siloxerus filifolius</i>			
15.	8230	<i>Sonchus asper</i> (Rough Sowthistle)	Y		
<b>Campanulaceae</b>					
16.	9289	<i>Lobelia anceps</i> (Angled Lobelia)			
17.	7408	<i>Lobelia tenuior</i> (Slender Lobelia)			
18.	37440	<i>Monopsis debilis</i> var. <i>depressa</i>	Y		
19.	7389	<i>Wahlenbergia preissii</i>			
<b>Casuarinaceae</b>					
20.	1742	<i>Casuarina obesa</i> (Swamp Sheoak, Kuli)			
<b>Celastraceae</b>					
21.	4733	<i>Stackhousia monogyna</i>			
<b>Centrolepidaceae</b>					
22.	1117	<i>Aphelia cyperoides</i>			
23.	1121	<i>Centrolepis aristata</i> (Pointed Centrolepis)			
<b>Colchicaceae</b>					
24.	1383	<i>Burchardia bairdiae</i>			
<b>Commelinaceae</b>					
25.	1162	<i>Cartonema philydroides</i>			
<b>Crassulaceae</b>					
26.	3137	<i>Crassula colorata</i> (Dense Stonecrop)			
27.	3140	<i>Crassula glomerata</i>	Y		
28.	15706	<i>Crassula natans</i> var. <i>minus</i>	Y		
<b>Cyperaceae</b>					
29.	741	<i>Baumea articulata</i> (Jointed Rush)			
30.	749	<i>Bolboschoenus caldwellii</i> (Marsh Club-rush)			
31.	763	<i>Chorizandra enodis</i> (Black Bristlerush)			
32.	768	<i>Cyathochaeta avenacea</i>			
33.	783	<i>Cyperus congestus</i> (Dense Flat-sedge)	Y		
34.	20200	<i>Isolepis cernua</i> var. <i>setiformis</i>			
35.	917	<i>Isolepis marginata</i> (Coarse Club-rush)			
36.	921	<i>Isolepis producta</i>			
37.	932	<i>Lepidosperma effusum</i> (Spreading Sword-sedge)			
38.	940	<i>Lepidosperma pubisquamum</i>			
39.	945	<i>Lepidosperma squamatum</i>			
40.	955	<i>Mesomelaena pseudostygia</i>			
41.	980	<i>Schoenus capillifolius</i>		P3	
42.	986	<i>Schoenus efoliatus</i>			
43.	1018	<i>Schoenus subfascicularis</i>			
44.	1036	<i>Tetraria octandra</i>			
<b>Dennstaedtiaceae</b>					
45.	13758	<i>Histiopteris incisa</i>			
<b>Dilleniaceae</b>					
46.	5172	<i>Hibbertia stellaris</i> (Orange Stars)			
<b>Droseraceae</b>					
47.	3106	<i>Drosera macrantha</i> (Bridal Rainbow)			
48.	3114	<i>Drosera nitidula</i> (Shining Sundew)			
49.	3131	<i>Drosera stolonifera</i> (Leafy Sundew)			
<b>Ericaceae</b>					
50.	6323	<i>Astroloma ciliatum</i> (Candle Cranberry)			
51.	30142	<i>Brachyloma preissii</i> subsp. <i>obtusifolium</i>			
52.	30136	<i>Brachyloma preissii</i> subsp. <i>preissii</i>			
53.	6349	<i>Conostephium preissii</i>			
<b>Euphorbiaceae</b>					
54.	4582	<i>Adriana quadripartita</i> (Bitter Bush)			
<b>Fabaceae</b>					
55.	3557	<i>Acacia stenoptera</i> (Narrow Winged Wattle)			
56.	3688	<i>Aotus gracillima</i>			
57.	3845	<i>Daviesia triflora</i>			
58.	3863	<i>Dillwynia dillwynioides</i>		P3	
59.	3880	<i>Eutaxia virgata</i>			
60.	20473	<i>Gastrolobium ebracteolatum</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
61.	10909 <i>Gompholobium confertum</i>			
62.	3992 <i>Isotropis cuneifolia</i> (Granny Bonnets)			
63.	8564 <i>Lotus subbiflorus</i>	Y		
64.	4113 <i>Ornithopus compressus</i> (Yellow Serradella)	Y		
65.	4292 <i>Trifolium campestre</i> (Hop Clover)	Y		
66.	4295 <i>Trifolium dubium</i> (Suckling Clover)	Y		
<b>Geraniaceae</b>				
67.	4341 <i>Geranium solanderi</i> (Native Geranium)			
<b>Goodeniaceae</b>				
68.	7484 <i>Dampiera trigona</i> (Angled-stem Dampiera)			
69.	7538 <i>Goodenia pulchella</i>			
70.	7603 <i>Scaevola canescens</i> (Grey Scaevola)			
<b>Haemodoraceae</b>				
71.	11826 <i>Conostylis aculeata</i> subsp. <i>aculeata</i>			
72.	1472 <i>Haemodorum simplex</i>			
73.	1478 <i>Phlebocarya ciliata</i>			
<b>Haloragaceae</b>				
74.	34676 <i>Meionectes brownii</i> (Swamp Raspwort)			
<b>Hemerocallidaceae</b>				
75.	1276 <i>Caesia micrantha</i> (Pale Grass Lily)			
<b>Juncaceae</b>				
76.	1188 <i>Juncus pallidus</i> (Pale Rush)			
<b>Lamiaceae</b>				
77.	6886 <i>Mentha x piperita</i>	Y		Y
<b>Lauraceae</b>				
78.	11799 <i>Cassytha racemosa</i> forma <i>racemosa</i>			
<b>Loganiaceae</b>				
79.	16177 <i>Phyllangium paradoxum</i>			
<b>Menyanthaceae</b>				
80.	36160 <i>Liparophyllum capitatum</i>			
81.	36179 <i>Liparophyllum violifolium</i>			
<b>Myrtaceae</b>				
82.	20283 <i>Astartea scoparia</i>			
83.	5439 <i>Calytrix angulata</i> (Yellow Starflower)			
84.	13547 <i>Eucalyptus marginata</i> subsp. <i>marginata</i> (Jarrah)			
85.	20808 <i>Eucalyptus petiolaris</i>	Y		
86.	13273 <i>Melaleuca incana</i> subsp. <i>incana</i>			
87.	5926 <i>Melaleuca lateritia</i> (Robin Redbreast Bush)			
88.	5952 <i>Melaleuca preissiana</i> (Moonah)			
89.	6006 <i>Pericalymma ellipticum</i> (Swamp Teatree)			
90.	6033 <i>Scholtzia involucrata</i> (Spiked Scholtzia)			
91.	20135 <i>Taxandria linearifolia</i>			
<b>Orchidaceae</b>				
92.	15330 <i>Caladenia arenicola</i>			
93.	15419 <i>Microtis media</i> subsp. <i>media</i>			
94.	1660 <i>Microtis orbicularis</i> (Dark Mignonette Orchid)			
95.	1670 <i>Prasophyllum drummondii</i> (Swamp Leek Orchid)			
96.	1708 <i>Thelymitra fuscolutea</i> (Chestnut Sun Orchid)			
<b>Orobanchaceae</b>				
97.	15037 <i>Bartsia trixago</i>	Y		
<b>Poaceae</b>				
98.	202 <i>Anthoxanthum odoratum</i> (Sweet Vernal Grass)	Y		
99.	17234 <i>Austrostipa compressa</i>			
100.	17240 <i>Austrostipa flavescens</i>			
101.	299 <i>Deyeuxia quadrisetata</i> (Reed Bentgrass)			
102.	476 <i>Lolium perenne</i> (Perennial Ryegrass)	Y		
103.	11073 <i>Lolium x hybridum</i>	Y		
104.	635 <i>Sporobolus virginicus</i> (Marine Couch)			
105.	33101 <i>Vulpia myuros</i> forma <i>myuros</i>	Y		
<b>Polygalaceae</b>				
106.	4564 <i>Comesperma virgatum</i> (Milkwort)			
<b>Proteaceae</b>				

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
107.	1834 <i>Banksia menziesii</i> (Firewood Banksia)			
108.	2197 <i>Hakea prostrata</i> (Harsh Hakea)			
109.	2329 <i>Synaphea spinulosa</i>			
<b>Ranunculaceae</b>				
110.	2938 <i>Ranunculus trilobus</i> (Buttercup)	Y		
<b>Restionaceae</b>				
111.	17691 <i>Desmocladius fasciculatus</i>			
112.	16595 <i>Desmocladius flexuosus</i>			
113.	17838 <i>Dielsia stenostachya</i>			
114.	17841 <i>Hypolaena pubescens</i>			
115.	1085 <i>Lepyrodia glauca</i>			
116.	17679 <i>Meeboldina coangustata</i>			
117.	17694 <i>Meeboldina scariosa</i>			
<b>Rubiaceae</b>				
118.	7348 <i>Opercularia hispidula</i> (Hispid Stinkweed)			
<b>Scrophulariaceae</b>				
119.	7054 <i>Dischisma arenarium</i>	Y		
120.	7055 <i>Dischisma capitatum</i> (Woolly-headed Dischisma)	Y		
<b>Selaginellaceae</b>				
121.	6 <i>Selaginella gracillima</i> (Tiny Clubmoss)			
<b>Stylidiaceae</b>				
122.	7677 <i>Levenhookia stipitata</i> (Common Stylewort)			
123.	7712 <i>Stylidium despectum</i> (Dwarf Triggerplant)			
124.	7717 <i>Stylidium divaricatum</i> (Daddy-long-legs)			
125.	7756 <i>Stylidium longitubum</i> (Jumping Jacks)		P3	
126.	7774 <i>Stylidium piliferum</i> (Common Butterfly Triggerplant)			
<b>Thymelaeaceae</b>				
127.	5252 <i>Pimelea lanata</i>			
128.	18117 <i>Pimelea rosea</i> subsp. <i>rosea</i>			

**Conservation Codes**

T - Rare or likely to become extinct  
 X - Presumed extinct  
 IA - Protected under international agreement  
 S - Other specially protected fauna  
 1 - Priority 1  
 2 - Priority 2  
 3 - Priority 3  
 4 - Priority 4  
 5 - Priority 5

<sup>1</sup> For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.



# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 11/05/15 13:12:47

[Summary](#)

[Details](#)

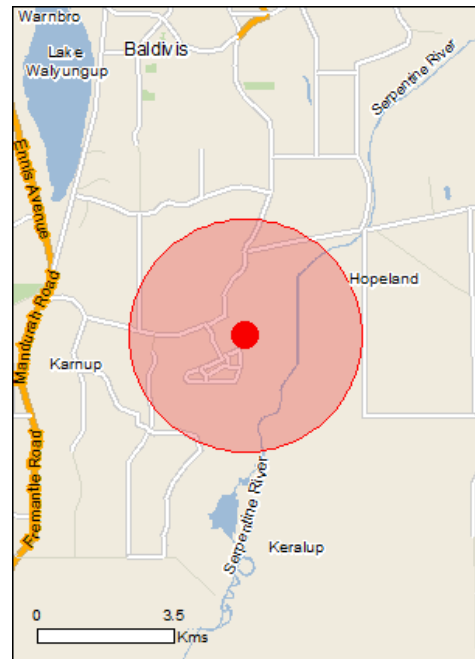
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

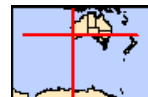
[Acknowledgements](#)



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[Coordinates](#)

Buffer: 3.0Km



# Summary

## Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	2
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	None
<a href="#">Listed Threatened Species:</a>	20
<a href="#">Listed Migratory Species:</a>	7

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage/index.html>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

<a href="#">Commonwealth Land:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	8
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Commonwealth Reserves Marine:</a>	None

## Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

<a href="#">State and Territory Reserves:</a>	None
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	33
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[ Resource Information ]
Name	Proximity
<a href="#">Becher point wetlands</a>	Within 10km of Ramsar
<a href="#">Peel-yalgorup system</a>	Upstream from Ramsar

Listed Threatened Species	[ Resource Information ]	
Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Botaurus poiciloptilus</a> Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
<a href="#">Calyptorhynchus banksii naso</a> Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat may occur within area
<a href="#">Calyptorhynchus baudinii</a> Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Calyptorhynchus latirostris</a> Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
<b>Mammals</b>		
<a href="#">Bettongia penicillata ogilbyi</a> Woylie [66844]	Endangered	Species or species habitat may occur within area
<a href="#">Dasyurus geoffroi</a> Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Pseudocheirus occidentalis</a> Western Ringtail Possum, Ngwayir [25911]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Setonix brachyurus</a> Quokka [229]	Vulnerable	Species or species habitat may occur within area
<b>Plants</b>		
<a href="#">Andersonia gracilis</a> Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
<a href="#">Caladenia huegelii</a> King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
<a href="#">Centrolepis caespitosa</a> [6393]	Endangered	Species or species habitat likely to occur within area
<a href="#">Darwinia foetida</a> Muchea Bell [83190]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Diuris micrantha</a> Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Diuris purdiei</a> Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area
<a href="#">Drakaea elastica</a> Glossy-leafed Hammer-orchid, Praying Virgin [16753]	Endangered	Species or species habitat likely to occur within area
<a href="#">Drakaea micrantha</a> Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Lepidosperma rostratum</a> Beaked Lepidosperma [14152]	Endangered	Species or species habitat likely to occur within area
<a href="#">Synaphea stenoloba</a> Dwellingup Synaphea [66311]	Endangered	Species or species habitat may occur within area

#### Listed Migratory Species [ [Resource Information](#) ]

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Pandion cristatus</a> Eastern Osprey [82411]		Species or species habitat likely to occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area



## Other Matters Protected by the EPBC Act

### Listed Marine Species [ [Resource Information](#) ]

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
<b>Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat likely to occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
<a href="#">Thinornis rubricollis</a> Hooded Plover [59510]		Species or species habitat may occur within area

## Extra Information

### Invasive Species [ [Resource Information](#) ]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
<b>Birds</b>		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species

Name	Status	Type of Presence
Carduelis carduelis European Goldfinch [403]		habitat likely to occur within area  Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
<b>Mammals</b>		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
<b>Plants</b>		

Name	Status	Type of Presence
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
<b>Reptiles</b>		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

# Coordinates

-32.39 115.82286

# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [Department of Environment, Climate Change and Water, New South Wales](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment and Natural Resources, South Australia](#)
- [Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [Environmental and Resource Management, Queensland](#)
- [Department of Environment and Conservation, Western Australia](#)
- [Department of the Environment, Climate Change, Energy and Water](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Museum Victoria](#)
- [Australian Museum](#)
- [SA Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Atherton and Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence](#)
- [State Forests of NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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**Appendix 4**  
**Conservation significant flora and**  
**ecological community definitions**





### ***Conservation Codes for Western Australia (Western Australian Herbarium 1998-)***

Under the *Wildlife Conservation Act* (1950), the Minister for the Environment may declare species of flora to be protected if they are considered to be in danger of extinction, rare or otherwise in need of special protection. Schedules 1 and 2 deal with those that are threatened and those that are presumed extinct, respectively.

#### **T: Threatened Flora (Declared Rare Flora – Extant)**

Species which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such (Schedule 1 under the *Wildlife Conservation Act 1950*).

Threatened Flora (Schedule 1) are further ranked by the Department according to their level of threat using IUCN Red List Criteria:

- CR: Critically Endangered – considered to be facing an extremely high risk of extinction in the wild
- EN: Endangered – considered to be facing a very high risk of extinction in the wild
- VU: Vulnerable – considered to be facing a high risk of extinction in the wild
- X: Presumed Extinct Flora (Declared Rare Flora – Extinct).

Species that have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such (Schedule 2 under the *Wildlife Conservation Act 1950*).

#### ***Priority Flora***

Species that have not yet been adequately surveyed to be listed under Schedule 1 or 2 are added to the Priority Flora List under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna. Species that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Conservation Dependent species are placed in Priority 5.

#### **Priority One: Poorly-known Species**

Species that are known from one or a few collections or sight records (generally less than 5), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.

#### **Priority Two: Poorly-known Species**

Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.

### **Priority Three: Poorly-known Species**

Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.

### **Priority Four: Rare, Near Threatened and other species in need of monitoring**

1. Rare: Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.
2. Near Threatened: Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
3. Species that have been removed from the list of threatened species during the past 5 years for reasons other than taxonomy.

### **Priority 5: Conservation Dependent Species**

Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within 5 years.

## ***Definition of Threatened Ecological Communities (DEC 2010)***

### **Presumed Totally Destroyed (PD)**

An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies:

- records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or
- all occurrences recorded within the last 50 years have since been destroyed.

### **Critically Endangered (CR)**

An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria:

1. The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply:
  - (a) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years)
  - (b) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated.
2. Current distribution is limited, and one or more of the following apply:
  - (a) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years)
  - (b) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes
  - (c) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.
3. The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).

### **Endangered (EN)**

An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria:

1. The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply:
  - (a) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years)
  - (b) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.

2. Current distribution is limited, and one or more of the following apply"
  - (a) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years)
  - (b) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes
  - (c) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.
3. The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

**Vulnerable (VU)**

An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria:

1. The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.
2. The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.
3. The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

## ***Definition of Priority Ecological Communities (DEC 2010)***

### **Priority One: Poorly-known ecological communities**

Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

### **Priority Two: Poorly-known ecological communities**

Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

### **Priority Three: Poorly known ecological communities**

- communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation
- communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat
- communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

### **Priority Four**

Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. These include:

1. Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.
2. Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
3. Ecological communities that have been removed from the list of threatened communities during the past five years.

### **Priority Five: Conservation Dependent ecological communities**

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.



**Appendix 5**  
**Vascular plant taxa recorded within the**  
**Survey area**





Family	Species
Aizoaceae	<i>Carpobrotus edulis</i>
Anarthriaceae	<i>Lyginia barbata</i>
Asteraceae	<i>Conyza sumatrensis</i>
	<i>Hypochaeris glabra</i>
	<i>Lagenophora huegelii</i>
	<i>Olearia axillaris</i>
Casuarinaceae	<i>Allocasuarina fraseriana</i>
Colchicaceae	<i>Burchardia congesta</i>
Cyperaceae	<i>Ficinia nodosa</i>
	<i>Lepidosperma pubisquamum</i>
	<i>Tetraria octandra</i>
Dasyogonaceae	<i>Dasyogon bromeliifolius</i>
Dilleniaceae	<i>Hibbertia hypericoides</i>
Ericaceae	<i>Brachyloma preissii</i>
	<i>Conostephium pendulum</i>
Fabaceae	<i>Acacia pulchella</i> var. <i>glaberrima</i>
	<i>Acacia saligna</i>
	<i>Acacia stenoptera</i>
	<i>Daviesia triflora</i>
	<i>Gompholobium tomentosum</i>
	<i>Jacksonia furcellata</i>
	<i>Jacksonia sternbergiana</i>
	<i>Kennedia prostrata</i>
Goodeniaceae	<i>Dampiera linearis</i>
	<i>Lechenaultia biloba</i>
Haemodoraceae	<i>Conostylis aculeata</i> subsp. <i>aculeata</i>
	<i>Phlebocarya ciliata</i>
Iridaceae	<i>Patersonia occidentalis</i>
Lamiaceae	<i>Hemiandra pungens</i>
Myrtaceae	<i>Corymbia calophylla</i>
	<i>Eucalyptus marginata</i>
	<i>Eucalyptus rudis</i>
	<i>Eucalyptus</i> sp. (planted)
	<i>Kunzea glabrescens</i>
	<i>Regelia ciliata</i>
Poaceae	<i>Briza maxima</i>
	<i>Eragrostis curvula</i>
	<i>Lagurus ovatus</i>
	<i>Poaceae</i> sp.
Proteaceae	<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>
	<i>Banksia attenuata</i>
	<i>Banksia menziesii</i>
	<i>Banksia sessilis</i>
	<i>Xylomelum occidentale</i>
Restionaceae	<i>Desmocladus flexuosus</i>
Stylidiaceae	<i>Stylidium</i> sp.
Zamiaceae	<i>Macrozamia fraseri</i>

To: Stephen Elliot

Date: 16 October 2015

Company: Urban Resources

Project No: URE15096.01

Fax/email: stephen@urbanresources.com.au

Inquiries: D Panickar

## Karnup Sand Mining Project Targeted Threatened orchid survey

### *Background*

Urban Resources Pty Ltd (Urban Resources) engaged Strategen Environmental (Strategen) to undertake a targeted orchid survey for the Threatened (Declared Rare Flora – Extant) orchid species *Caladenia huegelii*, *Drakaea elastica* and *Drakaea micrantha* within their proposed mining expansion area for the Karnup Sand Mining Project (the site). The site is located approximately 48 km south of Perth, Western Australia in the City of Rockingham. Areas of potential habitat for the orchid species were identified within the site during a flora and vegetation survey undertaken by Strategen in May 2015 and are displayed in Figure 1 and Figure 2. Habitat for *Drakaea elastica* within the site was confined to wetland areas which will not be impacted by mining. As such, no formal survey for the species was undertaken.

### *Species Information*

*Caladenia huegelii* is a tall orchid with a flowering stem between 50 cm to 1 m high with a single, hairy leaf up to 40 cm long (Brown *et al.* 1998). The species produces between one to three flowers per plant and can be distinguished from other *Caladenia* species by its large green-cream coloured lip and curved maroon tip (Brown *et al.* 1998). Habitat for the orchid occurs in areas of mixed jarrah-banksia woodland with scattered sheoak and marri over dense shrubs (DEC 2008). The species tends to favour areas of dense undergrowth in deep grey-white sand usually associated with the Bassendean sand-dune system. However, rare plants have been known to extend into the Spearwood system which is characterised by calcareous yellow sands (DEC 2008).

*Drakaea elastica* is a slender orchid with a flowering stem to 30 cm high, and a distinctive bright green, smooth, glossy, heart-shaped leaf, 1 to 2 cm in diameter (Brown *et al.* 1998). Habitat for the orchid occurs on bare patches of sand within dense vegetation in low-lying areas alongside winter-wet swamps, typically in banksia woodland or spearwood (*Kunzea glabrescens*) thicket vegetation (DEC 2009). DotE (2015) identifies the prime survey time for *D. elastica* as during May - August when the species' distinctive leaf is clearly visible.

*Drakaea micrantha* is a perennial, tuberous orchid with a diminutive flower between 1.2 cm-2.5 cm long (Brown *et al.* 1998). Habitat for the orchid occurs on bare patches of sand on firebreaks and in disturbed sites where competition from other plants has been removed. Prime survey time for this species is when the flower is visible (i.e. September to October).

### *Methods*

Initial identification of potentially suitable habitat for *C. huegelii* and *D. micrantha* was undertaken during a site visit on 1 May 2015. The targeted survey for *C. huegelii* and *D. micrantha* was undertaken at the site on 21-22 September 2015, by two Strategen personnel as outlined in Table 1.

An initial reconnaissance of the site was undertaken to verify the exact location and estimated boundaries of potentially suitable habitat, based on vegetation type and structure. Potentially suitable habitat for *C. huegelii* across the site was either categorised as 'highly suitable habitat (Banksia-Jarraah woodland)' or 'unlikely habitat (regenerating shrubland)'. Other areas within the site did not contain suitable habitat for *C. huegelii* as these areas were either cleared, under rehabilitation or contained unsuitable vegetation types/composition, and were not surveyed for this reason. Potentially suitable habitat for *D. micrantha* across the site was either categorised as 'highly suitable habitat (Banksia-Jarraah woodland)', 'highly suitable habitat (cleared areas)', or 'unlikely habitat (regenerating shrubland)'. Other areas within the site did not contain suitable habitat for *D. micrantha* as these areas were either under rehabilitation or contained unsuitable vegetation types/composition, and were not surveyed for this reason.

Following this identification of habitat, consultation with Andrew Brown of the Department of Parks and Wildlife (Parks and Wildlife) was undertaken to determine the appropriate time to undertake a targeted survey for *C. huegelii* and *D. micrantha* and identify the appropriate methodology given the site's variable condition. A targeted transect survey in accordance with methodologies specified in *Draft survey guidelines for Australia's Threatened Orchids* (DotE 2013) was then undertaken in areas mapped as 'highly suitable habitat' and 'unlikely habitat' to search for presence of *C. huegelii* and *D. micrantha* between 21-22 September 2015 (refer to Figure 1 and Figure 2).

Areas identified as 'unlikely habitat' were surveyed via transects approximately 20-30 m apart. Given the sparse vegetation, visibility to a distance 40 m was excellent and it was not deemed necessary to walk any closer than this (Plate 1, Plate 2, Appendix 1).

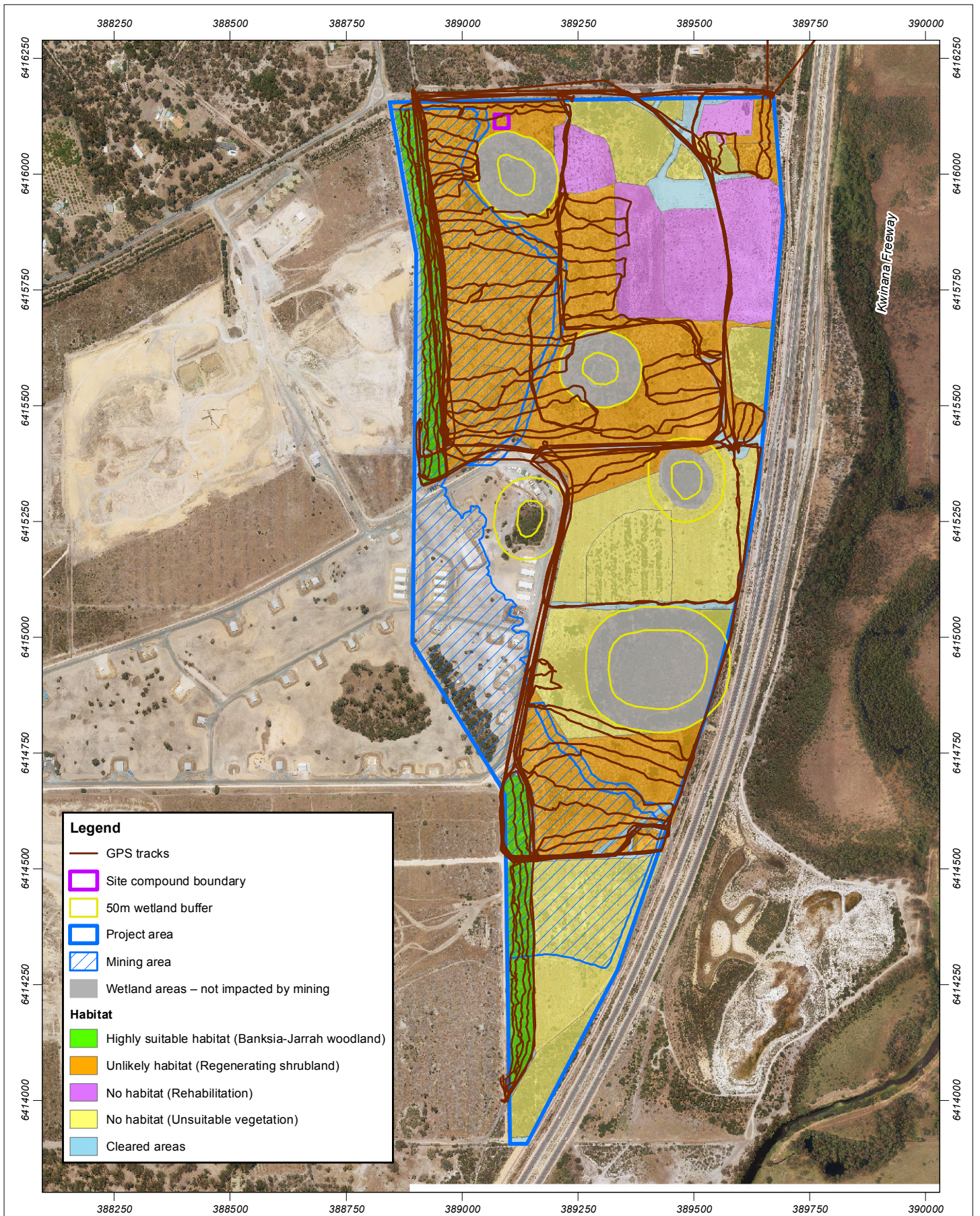
Areas mapped as 'highly suitable habitat' contained relatively dense vegetation and were surveyed via transects approximately 10 m apart (Plate 3, Appendix 1). This more intense survey methodology ensured habitat identified as most suitable to support *C. huegelii* and *D. micrantha* was surveyed in detail. Cleared areas (i.e. tracks) considered to be highly suitable habitat for *D. micrantha* were traversed on foot to look for occurrences of the species on both sides of the cleared areas.

Areas mapped as unsuitable habitat were not surveyed (Plate 4, Plate 5, Plate 6, Appendix 1).

Table 1: Survey personnel

Personnel	Title	Scientific licence number
Mr. Daniel Panickar	Experienced ecologist	SL011499
Miss. Sarah Isbister	Graduate environmental scientist	N/A





**Figure 1: Caladenia huegelii survey**

Scale 1:11,000 at A4

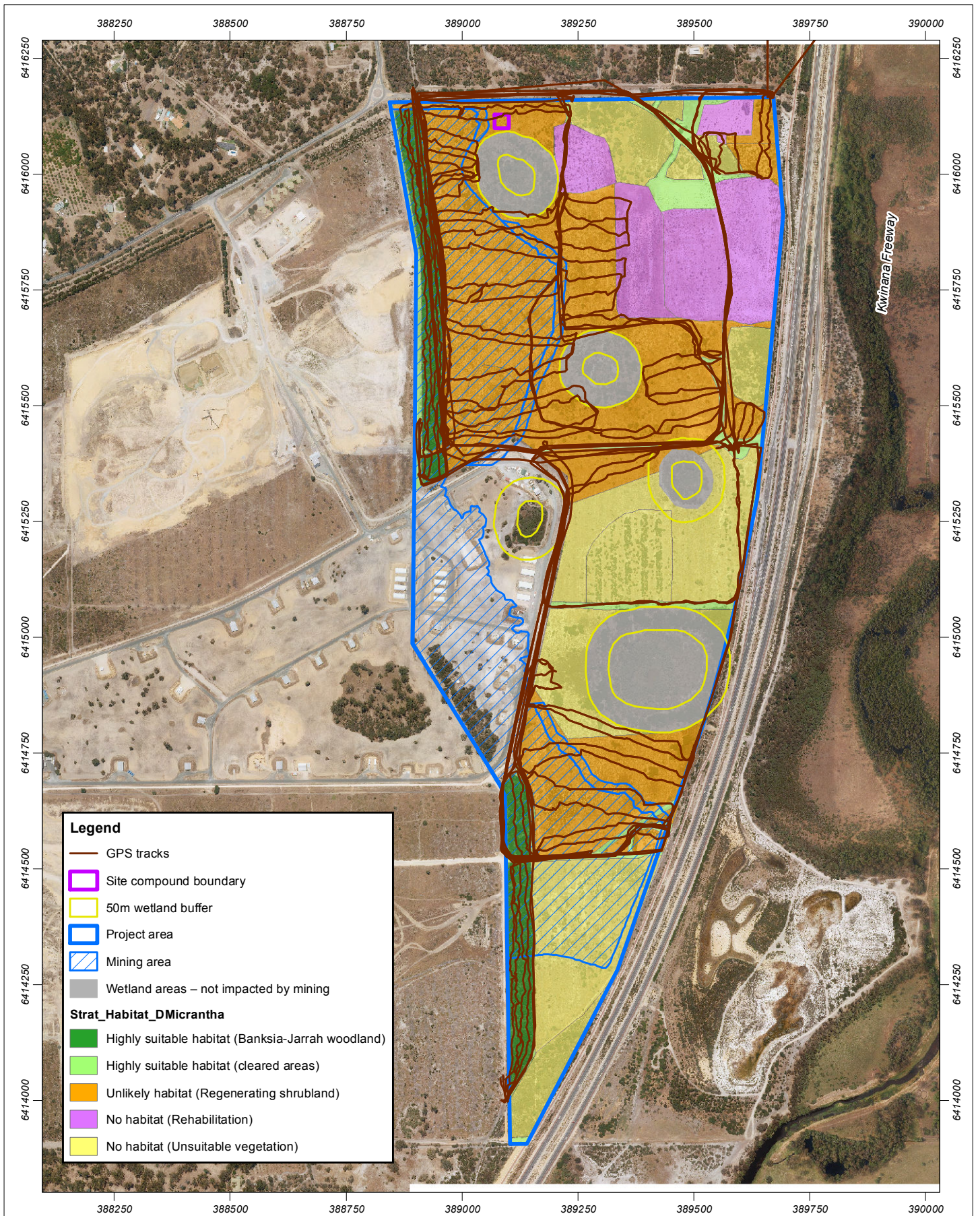


Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 1/10/2015  
 Author: JCrute  
 Source: Aerial image: Landgate, flown 11/2014.



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**Figure 2: *Drakaea micrantha* survey**

Scale 1:11,000 at A4



Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 16/10/2015  
 Author: JCrute  
 Source: Aerial image: Landgate, flown 11/2014.



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## ***Results and Conclusion***

An initial reconnaissance of the site enabled the boundaries of potentially suitable habitat and unsuitable habitat for *C. huegelii* and *D. micrantha*, to be estimated. Approximately 6.89 ha of 'highly suitable habitat' and 40.77 ha of 'unlikely habitat' for *C. huegelii* was identified within the site. Approximately 12.76 ha of 'highly suitable habitat' and 40.77 ha of 'unlikely habitat' for *D. micrantha* was identified within the site

Vegetation considered to be 'highly suitable habitat' for both *C. huegelii* and *D. micrantha* is best described as Jarrah-banksia woodland, with a relatively low-moderate level of weed invasion and degradation in the understorey. Additionally, cleared areas were also considered to be 'highly suitable habitat' for *D. micrantha*. Given the higher likelihood of these habitat types to support the two Threatened orchid species; the Jarrah-banksia woodland vegetation type was thoroughly surveyed via transects at a maximum distance of 10 m apart and cleared areas were thoroughly traversed to identify potential occurrences of *D. micrantha* within and on the periphery of these areas.

'Unlikely habitat' was identified in areas of the site which are experiencing natural regeneration following the cessation of historical pine plantation activities. Vegetation in these areas is best described as regenerating shrubland, with a very open structure and a relatively high level of weed invasion and degradation in the understorey. Even though it was considered unlikely that *C. huegelii* or *D. micrantha* would be found in vegetation identified as 'unlikely habitat', a visual assessment via transects was still undertaken as it was inferred that these areas were historically Jarrah-banksia woodland, which is a known suitable habitat type for both species. Surveying these areas has ensured a high level of certainty to the findings of the survey.

Remaining areas within the site were comprised of either rehabilitated or highly degraded vegetation (refer to Plate 4-Plate 6). Rehabilitated areas were comprised of planted local species over a limestone dominant base, while highly degraded vegetation contained large weed infestations and thus and these areas were considered highly unsuitable habitat for *C. huegelii* or *D. micrantha*.

No individuals of *C. huegelii* or *D. micrantha* were recorded within the site. *C. huegelii* and *D. micrantha* typically flower in September and October (Hoffman and Brown 2011); thus given the survey was undertaken on 21-22 September 2015 and no individuals were identified, it is considered that these species do not occur within the site.

### ***References***

- Brown A, Thomson-Dans C & Marchant N 1998, *Western Australia's Threatened Flora*, Department of Conservation and Land Management, Perth.
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- Department of the Environment (DotE) 2013, *Draft survey guidelines for Australia's Threatened Orchids – Guidelines for detecting orchids listed as Threatened under the Environment Protection and Biodiversity Conservation Act 1999*, Australian Government, Canberra.
- Hoffman N & Brown A 2011, *Orchids of South-West Australia*, University of Western Australia, Perth.

**Appendix 1**  
**Site photographs**







Plate 1: Unlikely habitat



Plate 2: Unlikely habitat





Plate 3: Highly suitable habitat



Plate 4: Unsuitable habitat





Plate 5: Unsuitable habitat



Plate 6: Unsuitable habitat (rehabilitation)



# Karnup Sand Mining Project

## Mining Proposal Karnup Sand Mine (M70/1262)

Prepared for  
Urban Resources Pty Ltd  
by Strategen

June 2015



**STRATEGEN**  
environmental consultants



# **Karnup Sand Mining Project**

## **Mining Proposal Karnup Sand Mine (M70/1262)**

Strategen is a trading name of  
Strategen Environmental Consultants Pty Ltd  
Level 2, 322 Hay Street Subiaco WA  
ACN: 056 190 419

June 2015

## ***Limitations***

### **Scope of services**

This report ("the report") has been prepared by Strategen Environmental Consulting Pty Ltd (Strategen) in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Strategen. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

### **Reliance on data**

In preparing the report, Strategen has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, Strategen has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Strategen has also not attempted to determine whether any material matter has been omitted from the data. Strategen will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Strategen. The making of any assumption does not imply that Strategen has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. Strategen disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

### **Environmental conclusions**

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

## **Client: Urban Resources Pty Ltd**

Report Version	Revision No.	Purpose	Strategen author/reviewer	Submitted to Client	
				Form	Date
Draft Report	A	For client review	D White, P Brand, A Welker, E Congear / D Newsome	Electronic	3 June 2015
Final Draft Report	B	For client review	C Ellis, E Congear / D Newsome	Electronic	19 June 2015
Final Report	0	For submission	C Ellis, E Congear / D Newsome	Electronic	30 June 2015

Filename: URE15096\_01 R002 Rev 0 - 30 June 2015



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Appendix 2	Mine Closure Plan
Appendix 3	Authorisation from tenement holders

## Mining Proposal checklist

Qu. No.	Mining Project checklist	Y/N/NA	Page No.	Comments
Public availability				
1	Are you aware that the mining Project is publically available?	Y	-	
2	Is there any information in this mining Project that should not be publically available?	N	-	
3	If "No" to Q2, do you have any problems with the information contained in this mining Project being publically available?	N	-	
4	If "Yes" to Q2, has confidential information been submitted in a separate document/section?	NA	-	
5	Has the mining Project been endorsed? See last page checklist	Y	-	
Mining proposals details				
6	Have you included the tenement number (s), site name, Project overview and date in the title page?	Y	Title Page	
7	Who authored the mining Project?	-	-	Refer to Document control table
8	State who to contact enquiries about the mining Project?	Y	1	
9	How many copies were submitted to DMP?	-	-	Hard copies = 1 Electronic = 1
10	Is this Mining proposal to support lease application?	Y	-	
11	Has a geological resource statement been included?	N	-	
12	Will more than 10 million tonnes of ore and waste be extracted per year? State total tonnage:	N	-	
13	Will more than 2 million tonnes of ore be processed each year? State total throughput	N	-	
14	Is the mining Project located on pre-1899 Crown Grant lands? (not subject to the Mining Act)	N	-	
15	Is the Project located on reserve land? If "yes" state reserve types in the space below.	N	-	
16	Will the mining Project occur within or affect a declared occupied town site?	N	-	
17	Is the mining Project within 2km of the coastline or a Private Conservation Reserve?	N	-	
18	Is the mining Project wholly or partially within a World Heritage Property, Biosphere Reserve, Heritage Site or Soil Reference Site?	N	-	
Tenement details				
19	Are all mining operations within granted or applied for tenement boundaries?	Y	-	
20	Are you the tenement holder of all tenements?	N	-	Eclipse Resources holds M70/1262. Holcim holds Miscellaneous Licence L70/160
21	If "No" at 20, do you have written authorisation from the tenement holder(s) to undertake the Mining Project activities?	Y	-	Appendix 3
22	If "Yes" at 21 do you written authorisation from the tenement holder(s) to undertake the Mining Project activities?	Y	-	
23	Have you checked for compliance against tenement conditions?	Y	-	

Qu. No.	Mining Project checklist	Y/N/NA	Page No.	Comments
Location and site layout plans				
24	Have you included location plans showing tenement boundaries and mining operations?	Y	2	
25	Have you included locations plans showing all mining operations and infrastructure in relation to tenement boundaries?	Y	2	
26	Have you included Area of Disturbance Tables for all tenements impacts by mining operations?	Y	33	
Environmental Protection Act				
27	Does the Mining Project require referral under part four of the MOU? If "Yes" describe why in space below:	N	-	
28	Has EPA set a level of assessment? If yes state:	N	-	
29	Is a clearing permit required? If "No" then explain in space below	Y	36	A Native Vegetation Clearing Permit Application will be submitted subsequent to this Mining Proposal
30	If "Yes" at Q29 then has a permit been applied for?	N		
31	Is a works approval required by the DEC?	N	-	
32	Has a works approval been submitted to the DEC?	N	-	
33	Stakeholder Consultation – Have the following stakeholders been consulted? (use N/A if not relevant)	-	47	
	Shire	Y	47	
	Pastoralist	NA	47	
	DEC	Y	47	
	Main roads	N	47	
	Others – Australian Rail and Track Eastern Goldfields Land and Sea Council	N	47	
Environmental Assessment and Management				
34	Is the mining Project wholly or partially within DEC managed areas?	N	-	
35	If "Yes" at Q34 has DEC been consulted?	NA	-	
36	Is the mining Project wholly or partially within a red book area or a bush forever site?	N	-	
37	Will the mining Project impact upon a water resource area, water reserve, declared or proposed catchment, groundwater protection area, significant lake or wetland?	N	-	
38	Is a water or dewatering licence required?	N	-	
39	If "Yes" at Q38 then has the licence(s) been applied for?	NA	-	
40	Does the mining Project include a new tailings storage or changes to existing tailings storage?	N	-	
41	Has an AMD assessment been undertaken?	N	-	
42	Have flora and fauna checks been undertaken?	Y	39	
43	Are any rare species present?	Y	39	
44	Has a preliminary closure plan been included?	Y	-	Included in Appendix 2.

I hereby certify that to the best of my knowledge the above checklist accurately reflects the information contained within this Mining Proposal.

Name: STEPHEN ELLIOTT Position: Director

Signed:  Date: 30/6/15



## Summary and commitments

The Karnup Sand Mining Project (the Project), proposed by Urban Resources Pty Ltd (Urban Resources), entails sand extraction within Mining Tenement M70/1262, located 48 km south of Perth. Urban Resources propose to mine sand from approximately 41.96 ha of the Project area to extract approximately 1 553 800 m<sup>3</sup> of sand. The site will be mined down to 4.2 – 4.5 m AHD, 1.2 m above the assessment groundwater level (AGL). Mining Tenement M70/1262 is currently held by Eclipse Resources Pty Ltd (Eclipse) and is being leased by Urban Resources to undertake sand mining activities.

Sand mining is proposed to commence in Q4 2015, following granting of the necessary environmental approvals (Mining Proposal, Mine Closure Plan and Native Vegetation Clearing Permit). Sand mining operations broadly include removal of vegetation and overburden material, removal of sand resource and re-contouring of the profile to retain final levels of 4.2 – 4.5 m AHD. Sand material will be transported out of M70/1262 via a haulage route onto Stakehill Road for distribution to various recipients throughout the Perth metropolitan area.

Urban Resources has consulted with key stakeholders including the City of Rockingham and LandCorp, who will take eventual ownership of the land for urban development and regional sporting facilities.

Key environmental factors of the Project include flora and vegetation, fauna and surface water. Land clearing is considered to be the key aspect of the Project. Proponent commitments to manage key environmental factors are summarised in Table 1.

Table 1: Summary of environmental management and commitments

Factor	Proponent commitment
Land clearing	Clearing will be in accordance with the approved footprint. 50 m buffers will be maintained to wetlands. Vehicles will be restricted to designated haul roads and access tracks. Areas will be cleared of tree stumps in stages, as they help stabilise the soil.
Flora and fauna	Clearing will be in accordance with the approved footprint. 50 m buffers will be maintained to geomorphic wetlands. Vehicles will be restricted to designated haul roads and access tracks. Areas will be cleared of tree stumps in stages, as they help stabilise the soil.
Weeds and dieback	Vehicles will be restricted to designated haul roads and access tracks.
Surface water	A buffer zone of 50 m will be maintained between mining operations and naturally vegetated geomorphic wetlands. Staged clearing and retention of tree stumps as long as possible prior to mining to assist with soil stabilisation and reduce surface water flow velocities. Stockpiles of erodible material will be located away from limestone hardstand areas to minimise sediment transport in runoff.
Groundwater	Excavation depth is limited to 1.2 m above assessment groundwater level (AGL). Hydrocarbons and oily wastes (e.g. fuels, greases, de-greaser, emulsified oils and oily waste water) are to be managed using the following practices: <ul style="list-style-type: none"> <li>• minimal generation of waste and associated contaminants</li> <li>• appropriate storage and handling procedures</li> <li>• segregation of hydrocarbon waste from stormwater and other water</li> <li>• clean-up procedures for spills.</li> </ul>
Acid sulfate soils	Excavation will not intersect the water table. A buffer zone of 50 m will be maintained between mining operations and naturally vegetated geomorphic wetlands.
Topsoil and overburden	Overburden and oversize material stockpiles will be used to backfill and rehabilitate the excavations at mine closure and are thus temporary. Stockpiling cleared vegetation for reuse in future rehabilitation. Stripping topsoil and overburden prior to construction earthworks and managing these materials for closure.

Factor	Proponent commitment
Noise	<p>Stockpiles/bunding will be located to provide substantial noise suppression between the nearest dwellings.</p> <p>Operations will occur between 0600–1800 Monday–Saturday to minimise the likelihood of noise nuisance.</p> <p>All mobile equipment will be maintained, with efficient mufflers and noise shielding.</p> <p>Mobile equipment without audible reversing alarms will be used if possible.</p>
Dust	<p>Dust suppression measures, such as water sprays/carts, will be implemented as necessary, in the event that high levels of dust are observed.</p> <p>Dust will be visually monitored daily during operations and construction to ensure control measures are effective.</p> <p>Areas will be progressively cleared and progressively rehabilitated to limit the area of bare earth at any one time.</p> <p>Access roads will be constructed of crushed limestone.</p> <p>Activities with high dust-causing potential, such as stripping, will not be carried out in sensitive areas during adverse wind conditions.</p> <p>Material drop heights between loaders and trucks and trucks to stockpiles will kept to the minimum practical height.</p> <p>Any complaints will be investigated immediately.</p>
Visual amenity	<p>Stockpiles/bunding will be located to provide substantial noise suppression between the nearest dwellings.</p>
Heritage	<p>Site inductions will brief personnel on:</p> <ul style="list-style-type: none"> <li>• the potential for unidentified buried archaeological material to occur</li> <li>• Urban Resources obligations under the <i>Aboriginal Heritage Act 1972</i></li> <li>• the response procedures in the event that unidentified buried material is found during sand extraction. This includes ceasing work and reporting to the Mine Manager.</li> </ul>
Waste	<p>Waste will be contained on site and be removed by an appropriately licensed waste contractor.</p>
Hydrocarbon management	<p>Purchase, storage and transport of fuel will comply with <i>Poisons Act 1964</i>, <i>Poisons Regulations 1965</i>, <i>Mines Safety and Inspection Act 1994</i>, <i>Mines Safety and Inspection Regulations 1995</i>, <i>Dangerous Goods Safety Act 2004</i>, <i>Dangerous Goods (Storage) Regulations 2007</i> and <i>Dangerous Goods (Road Transport) Amendment Regulations 1988</i>.</p> <p>All Hydrocarbon spills will be cleaned up and contaminated soil disposed offsite at a licensed landfill, in the event that hydrocarbon spills occur.</p>
Closure and handover	<p>All buildings and infrastructure will be removed.</p> <p>Any hard stand surfaces will be removed and used to backfill the pit.</p> <p>Overburden will be used as backfill.</p> <p>Area will be seeded and vegetated according to the agreed prescriptions.</p>



## 1. Background information

Urban Resources Pty Ltd (the Proponent) proposes to develop the Karnup Sand Mining Project (the Project) within Mining Tenement M70/1262. Mining Tenement M70/1262 is currently held by Eclipse Resources Pty Ltd (Eclipse); however, Urban Resources propose to mine within the tenement as part of a sub-lease arrangement.

The Project entails the mining of sand within Mining Tenement M70/1262 located within the locality of Karnup, 48 km south of the Perth Central Business District (CBD), Western Australia (Figure 1).

### 1.1 Ownership

The Project is located within (pending) tenement M70/1262, including the proposed haul road which is located within Miscellaneous Tenement L70/160 held by Holcim Australia Pty Ltd (Holcim).

The location of M70/1262 in relation to the neighbouring tenements held by Holcim is provided in Figure 2. Ownership details for M70/1262 are presented in Table 2.

Table 2: Tenement Ownership details

Mining Tenement	Ownership
M70/1262	Eclipse Resources Pty Ltd (100%)

The proponent for the proposal is Urban Resources. The key contact for this Project is:

Contact	Stephen Elliot
Title	Manager
Company	Urban Resources
Address	4/127 Melville Parade, Como Western Australia 6152
Postal address	PO Box 739, Como Western Australia 6152
Office Phone	08 9368 1299
Email	stephen@urbanresources.com.au

### 1.2 Project objectives

The objective of the Project is to construct and operate the Karnup Sand Mine for sand extraction to supply various customers predominately in the construction industry. Sand will be transported via a haul road located within M70/1262 prior to transport to customers via Stakehill Road.

The Project will result in disturbance of 41.96 hectares (ha), comprising 41.87 ha for the mining area, including the haul road; to facilitate access to the sand resource and topsoil, overburden and vegetative stockpiles, and 0.09 ha for the site compound. A total of 30.83 ha of vegetation will be cleared to facilitate the Project. An estimated total of 1 553 800 m<sup>3</sup> of sand will be mined over a 5 year mining life, with proposed completion by 2020. If material requires screening, a Works Approval will be applied for under Part V of the *Environmental Protection Act 1986* (EP Act) and screening will be undertaken in accordance with the Works Approval.

Construction is expected to commence in Q4 2015, following granting of the necessary approvals.

### 1.3 Location and site layout plans

The Project is located approximately 48 km south of the Perth CBD and is bound by Stakehill Road to the north, Kwinana Freeway to the east, Mining Tenements M70/1046 (Holcim) and M70/1241 (Holcim) to the west and Amarillo Drive to the south (Figure 1 and Figure 2). The Project area is defined as the portion of M70/1262 that is west of the Kwinana Freeway boundary, as outlined by Figure 1, and will include the mining area, haul road, site compound and undisturbed land. The Project area is located within the City of Rockingham and the nearest residence is approximately 200 m to the north.

The proposed mining area is adjacent to the western Project area boundary.

A haul road will traverse the Project area from the active mining areas to Stakehill Road during Stage 1. Following the completion of Stage 1, Holcim will construct a haul road within Miscellaneous Licence tenement L70/160 for use by both Holcim and Urban Resources staff and customers. Urban Resources will extend the haul road at an undefined time in the future to access and transport sand from Stages 2 and 3.

The site compound area will be comprised of limestone hardstand and include the following infrastructure:

- site office and administration
- generator and storage
- refuelling pad and equipment storage / workshop
- visitor and staff parking.

The Project area comprises predominately regrowth vegetation and six small wetlands. The Project area was cleared and planted with pine trees between 1965 and 1974 before the pine trees were cleared after 2004. Wetlands located within the Project area are ephemeral sumplands (i.e. only seasonally inundated) and include both Resource Enhancement and Conservation Category wetlands as determined by Department of Environment Regulation (DER) (Strategen 2010). A minimum 50 m buffer will be maintained around the wetlands during mining activities (Figure 3). The southern-most wetland is not located within the vicinity of the proposed mining operations, therefore has not been included in Figure 3.

#### 1.3.1 Land use

The Project area is comprised of regrowth vegetation and six wetlands. The Project area is covered entirely by Mining Tenement M70/1262 and is currently zoned 'Parks and Recreation' under the Metropolitan Region Scheme. Rural and special rural land uses exist in the immediate area surrounding the Project area with more intensive residential housing located approximately 3 km north and 5 km west of the Project area.

### 1.4 History

Historically, the purpose for this land was to form a buffer zone around the Department of Mines and Petroleum's (DMP's) Explosives Reserve Facility. The native vegetation in the Project area was originally cleared and planted as a pine plantation between 1965 and 1974 and the pine plantation was established across the Project area by 1985 (Golder Associates 2006). Several small wetlands currently present within the Project area were not originally cleared or planted with pine trees. Logging of the pine plantation within the Project area commenced in 2004 and a strip of remnant vegetation currently exists along the majority of the western Project area boundary.

Southern Gateway Alliance, the contractors who constructed the Kwinana Freeway extension, constructed and operated an asphalt processing plant in the northwest part the Project area to supply asphalt for the highway construction (Eclipse Resources 2009). The asphalt plant has been decommissioned and removed the Project area following the completion of the highway construction.

In recent years the urban fringe has steadily expanded and the urban front is now approximately 3 km to the north and 5 km to the west.

## 1.5 Existing facilities

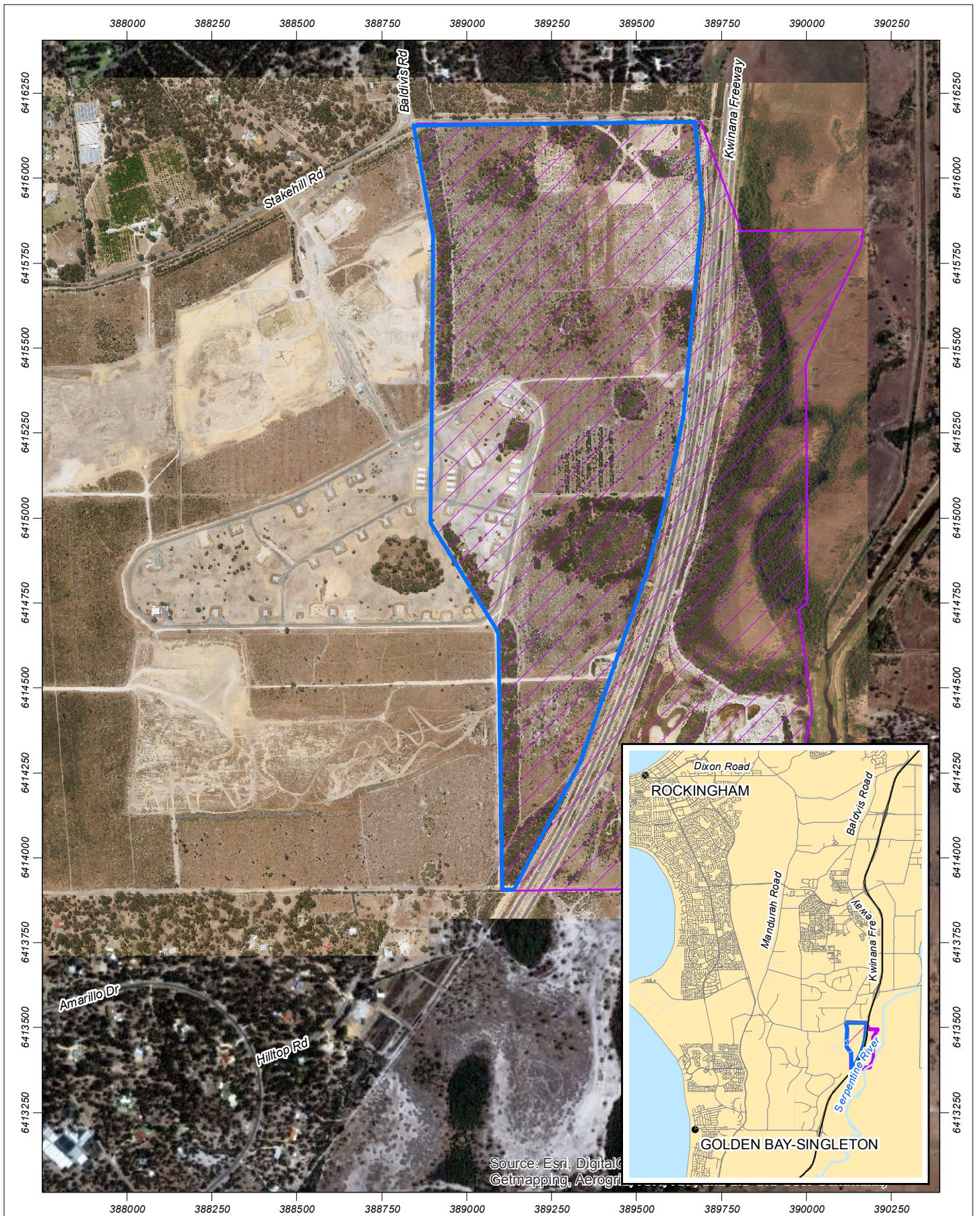
M70/1262 is dissected by the Kwinana Freeway and the highway forms the eastern Project area boundary.

The central portion of the Project area also contains part of the DMP's Explosive Reserve Facility adjacent to the western Project area boundary. A portion (15 ha) of the Explosive Reserve Facility is contained within M70/1262 and the balance is located to the west of the Project area within M70/1046 (Holcim) and M70/1241 (Holcim). The Explosives Facility will be relocated at the end of 2016 to the McLarty Site within the Myalup State Forest, Shire of Waroona and Shire of Harvey. Sand mining will be undertaken within the Explosives Reserve Facility area once it is decommissioned and removed.

The surrounding land use is a combination of low density rural residential housing, market gardens and special rural lots that include activities such as horse agistment.

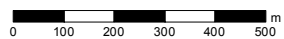
A pedestrian underpass was also constructed under the Kwinana Freeway approximately 50 m south of the northern Project area boundary (Eclipse Resources 2009).





**Figure 1: Regional location of the Project**

Scale 1:15,000 at A4



Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 12/06/2015  
 Author: JCrute

Source: Aerial image: Landgate, flown 11/2014. Aerial image background: ESRI approx. 2010.

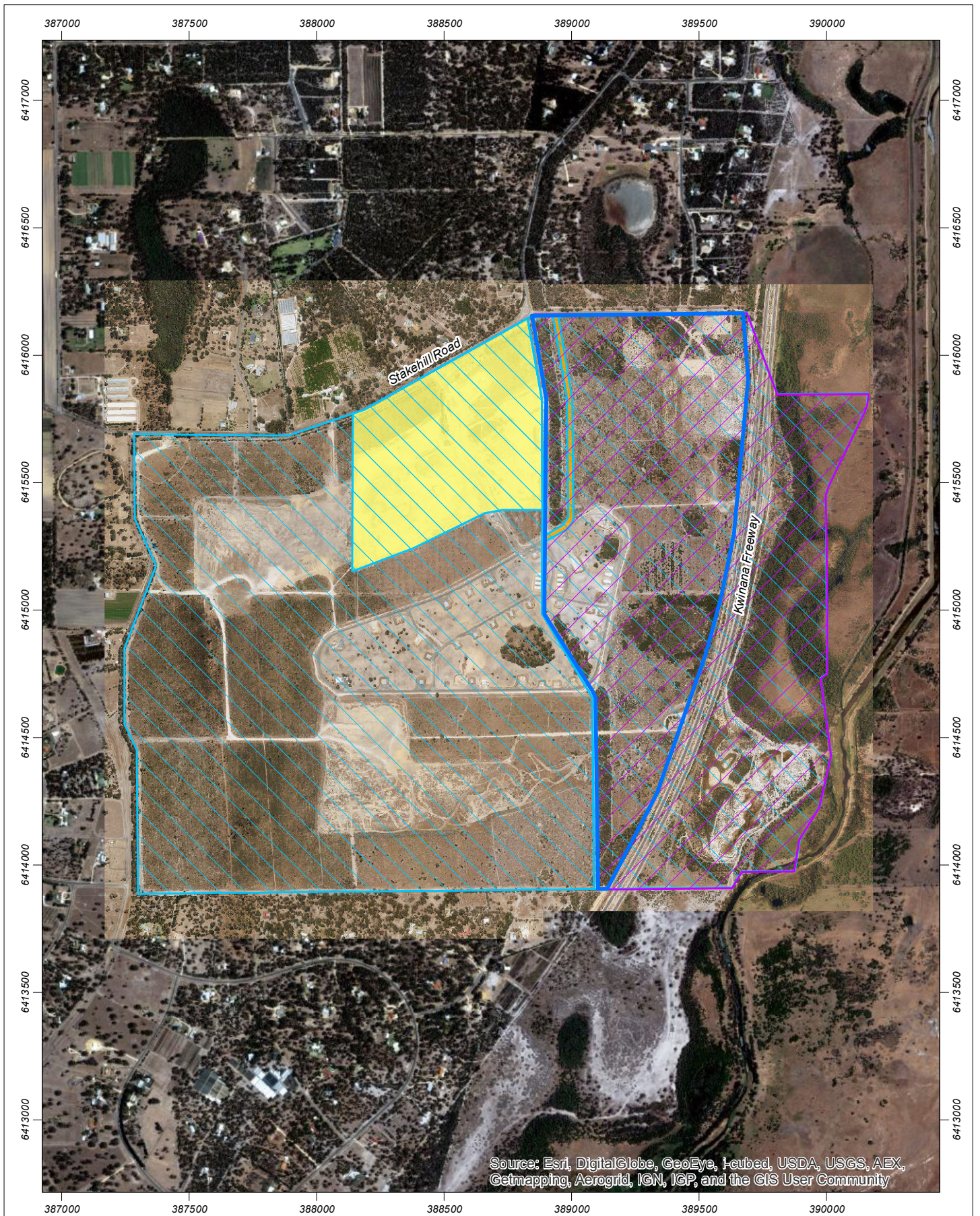
**Legend**

- Project area
- Tenement M70/1262



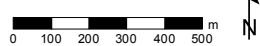
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**Figure 2: Location of M70/1262 in relation to neighbouring tenements**

Scale 1:20,000 at A4



Coordinate System: GDA 1994 MGA Zone 50

Note that positional errors may occur in some areas

Date: 12/06/2015

Author: JCrute

Source: Aerial image: Landgate, flown 11/2014. Background aerial image: ESRI online, approx. 2010. Tenement: DMP 2014.

**Legend**

Project area

**Tenements**

M70/1262

M70/1241

L 70/160

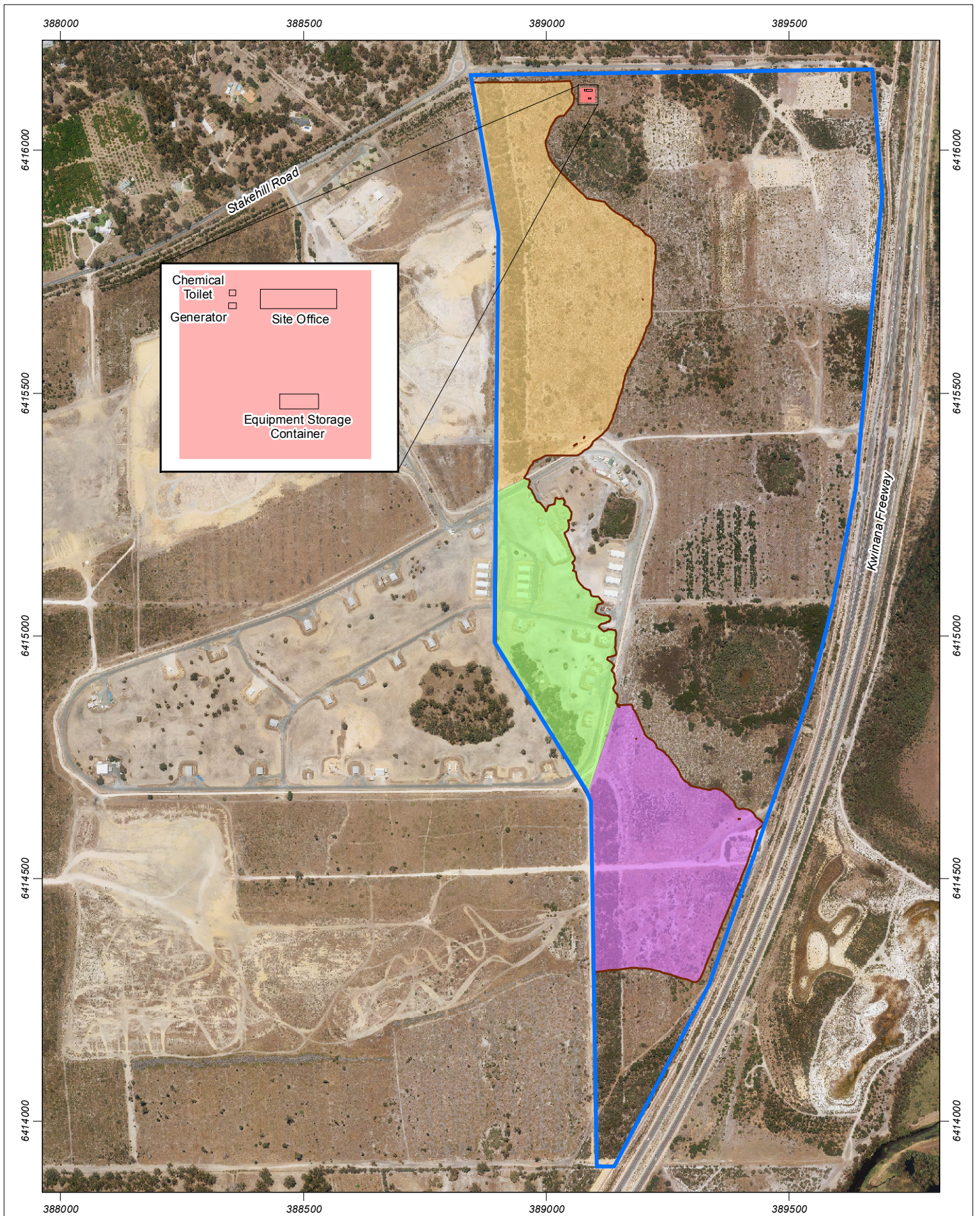
M 70/1046



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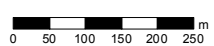
info@strategen.com.au  
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**Figure 3: Conceptual Karnup sand mining plan**

Scale 1:10,500 at A4



Coordinate System: GDA 1994 MGA Zone 50  
 Note that positional errors may occur in some areas  
 Date: 17/06/2015

Author: JCrute

Source: Aerial image: Landgate, flown 11/2014. Background aerial image: ESRI online, approx. 2010. Tenement: DMP 2014.

Path: Q:\Consult\2015\URE\URE15096.01\ArcMap\_documents\I002\RevB\URE15096\_01\_R002\_RevB\_F003.mxd

**Legend**

- Site compound boundary
- Project area
- Mine area

**Mining stages**

- Stage 1
- Stage 2
- Stage 3

