

Preliminary Assessment of the Natural Heritage Values of Birkdale Land (Previously Commonwealth Land) Old Cleveland Road East

Summary

It is a small miracle that so many unique features of scientific and both natural and human history have been preserved for so long by the Commonwealth ownership of this land. There is huge potential for a fascinating interpretive trail that would take the participant through the many different ages that are represented by the features described below in addition to the well-known historical aspects. If handled correctly, an exploration trail is likely to draw visitation from locals and tourists from near and far for many years to come. It is vital that the natural features are not damaged by the construction or use of such a trail.

This preliminary assessment focuses on the natural and physical features. Some of the standout natural features are summarised below:

1. A well-preserved river terrace that shows how rainfall has changed over geological time spans leaving traces of an earlier higher rainfall flood plain.
2. Unrecognised Regional Ecosystem species that have evolved on these old riverine deposits including the Gum-topped Box which is rarely found in the Redlands.
3. Freshwater Springs that owe their genesis to the underlying sandstone, mysteriously producing freshwater near a marine estuary.
4. An expansive marine couch (*Sporobolus virginicus*) meadow.
5. Classic examples of the transition zone between marine and terrestrial ecosystems where salt intolerant species gradually give way to salt tolerant mangrove systems.
6. Mature trees that belong to an endangered Regional Ecosystem (Scribbly Gums on basalt soils) which includes many favoured koala trees – an ideal place to spot koalas.
7. An elevated vantage point with views of Tingalpa Creek which also supports a large patch of wildflowers that have developed on the sandy soils that have broken down from the underlying sandstone formations.
8. Distinctive zones of vegetation including Melaleuca Wetland species, Blue Gums and Scribbly gums.

The most important attribute of the site is just how fragile its features are – they have only survived because the land has not been subject to urbanisation which disregards natural topography, changes levels and removes vegetation. It would be tragic if these valuable features are lost through inappropriate and thoughtless development after surviving so long under Commonwealth ownership. It is of critical importance that experts in the fields of Geology, Hydrology and Botany are commissioned to confirm these findings as well as any more discoveries that are made in a more thorough study. Expert advice regarding protection measures must also be taken as soon as possible to ensure these valuable features are retained for the benefit of future generations.

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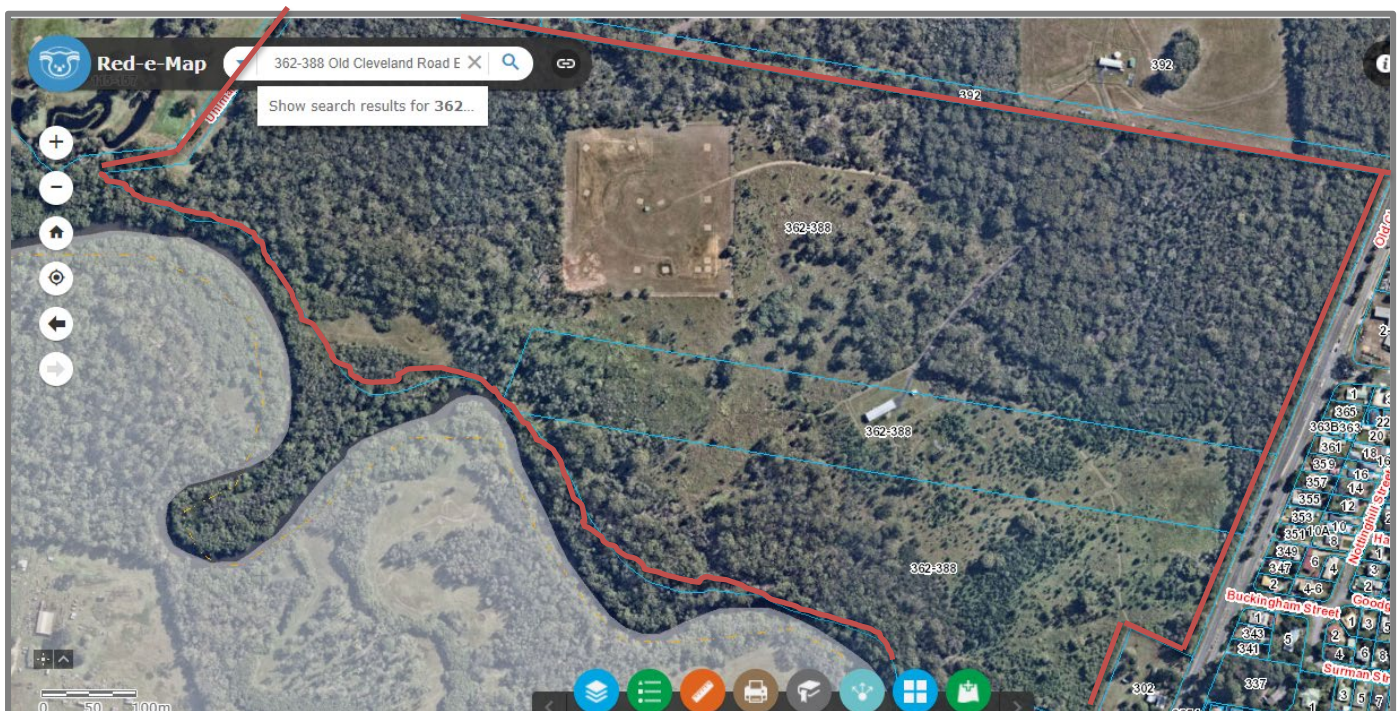
Introduction

Owing to difficulties in accessing the property these observations are based on previous field work from a visit as part of koala population assessment, desktop studies and observations from boundaries including Tingalpa Creek. The overwhelming feature is the diversity of ecosystems shown by the botany exhibited on the site owing mainly to the topography and the proximity to the marine interface. The site appears to have significant scientific values both historic and pre-historic that are rarely found owing to the obliteration of most natural values by urbanisation in other estuarine areas. The site also provides essential habitat for the vulnerable listed species, the koala and the wallum froglet.

There are also significant cultural heritage features of the site, both Indigenous and more recent historic (WWII) relics. There is no attempt in this assessment to do justice to these values which are better left to those with expertise in the area, apart from the comment that similar estuarine areas that abut higher ground are rich sources of evidence of high usage by Indigenous people.

Open Eucalypt Woodland covers most of the site as is shown by the Aerial Photograph (Figure 1). A small percentage of the site is totally cleared (noticeable as a large square in the central portion) and around another building. Previously partially cleared areas show good regeneration from the existing vegetation stock.

Figure 1. Aerial photograph of the site. Red outline shows approximate extent of area of interest. (Base map from Red-e-Map, Redland City Council.)



1. Geology

The available geological mapping is not to the fine scale that shows the true diversity of the site but the broad categories give a hint of what is to be found. The Geological Survey of Queensland Geology 1:100 000 Series (Department of Mines 1985 Reprint) shows part of the mapped Woogaroo Sub Group (sandstone, siltstone and conglomerate) running along part of the creek bank in the southern part of the site. This is a high part of the creek bank with white, sandy soils and with such soils it is unsurprisingly the site of a wild flower proliferation, mainly Native Gorse (*Daviesia ulicifolia*). Unfortunately, this area is also attractive to fishers with all the detrimental accompaniments such as rubbish, fireplaces and erosion.

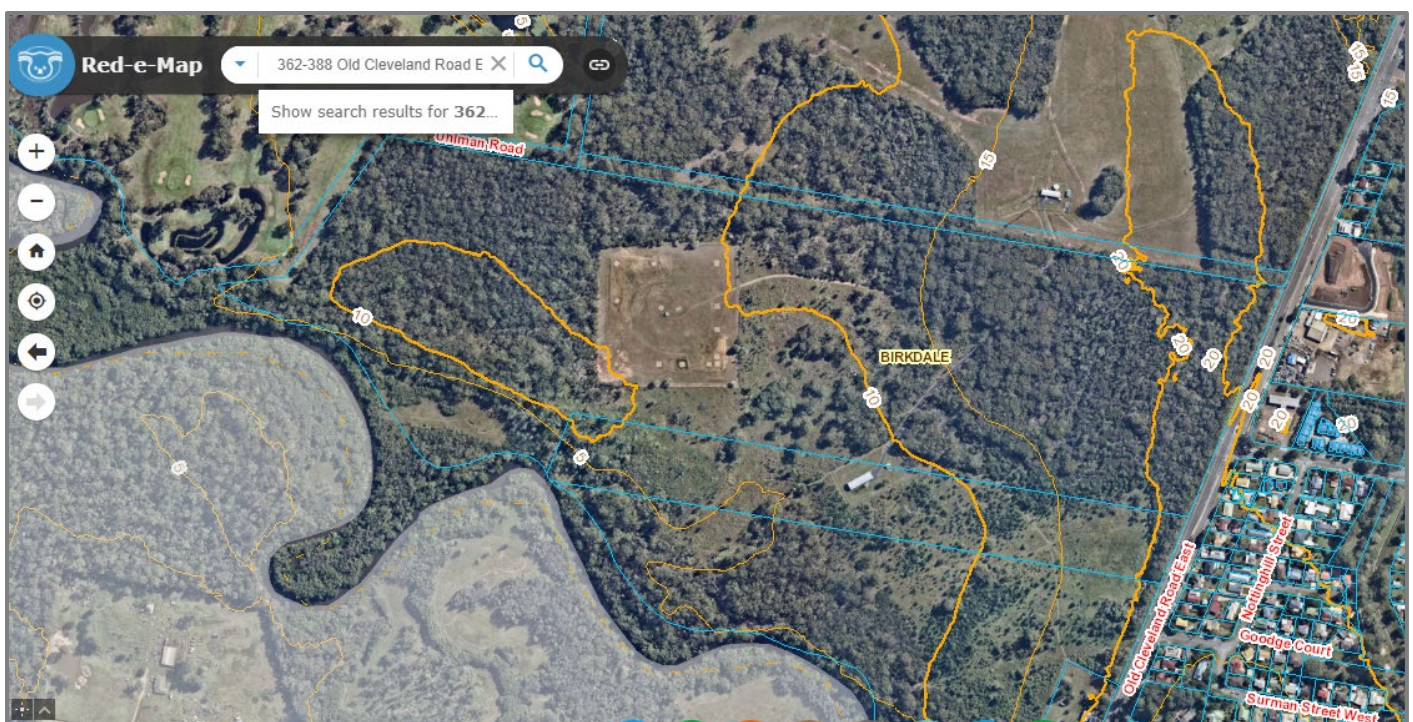
Other sections of the creek are mapped as 'estuarine deposits, mainly mud, silt sand, clay, gravel with minor peat and coral debris'. This gives rise to the mapped Regional Ecosystem 12.1.2 Estuarine wetlands (including Mangroves). Descriptions of these ecosystems will be given in the section on vegetation.

The underlying geology of the greater balance of the site is mapped as 'Mainly basalt flows' from the Lamington Group. The soils derived from this geology produce the conditions suitable for the 'Of Concern' Regional Ecosystem 12.3.11 '*Eucalyptus tereticornis* +/- *Eucalyptus siderophloia*, *Corymbia intermedia* open forest on alluvial plains usually near coast'. Lower areas that are more likely to be seasonally inundated are mapped as 12.3.6 '*Melaleuca quinquenervia* +/- *Eucalyptus tereticornis*, *Lophostemon suaveolens*, *Corymbia intermedia* open forest on coastal alluvial plains.

2. Geomorphology and Hydrology

The landforms are a product of the basic geology, soils, rainfall and the influence of Tingalpa Creek. One of the most interesting features of the site is the large flat area that rises from the marine couch meadow in the westernmost part of the site. This change in elevation of about five metres or more, according to the contours (Figure 2) forms a typical river terrace. These are formed when there is a decrease in rainfall over geological times where the old flood plain is left stranded and a new, lower plain is developed through normal erosion processes. River terraces are rare because they are usually the first place built on as they are useful, fertile flat land above flood level. This area should be protected as it is a great example of the pre-history of the site and tells a fascinating story which should be part of the Historical Experience of the land. Geography teachers would be extremely likely to encourage their students to visit the site.

Figure 2. Contours showing elevated area in the western part of the site (RCC Red-e-map)



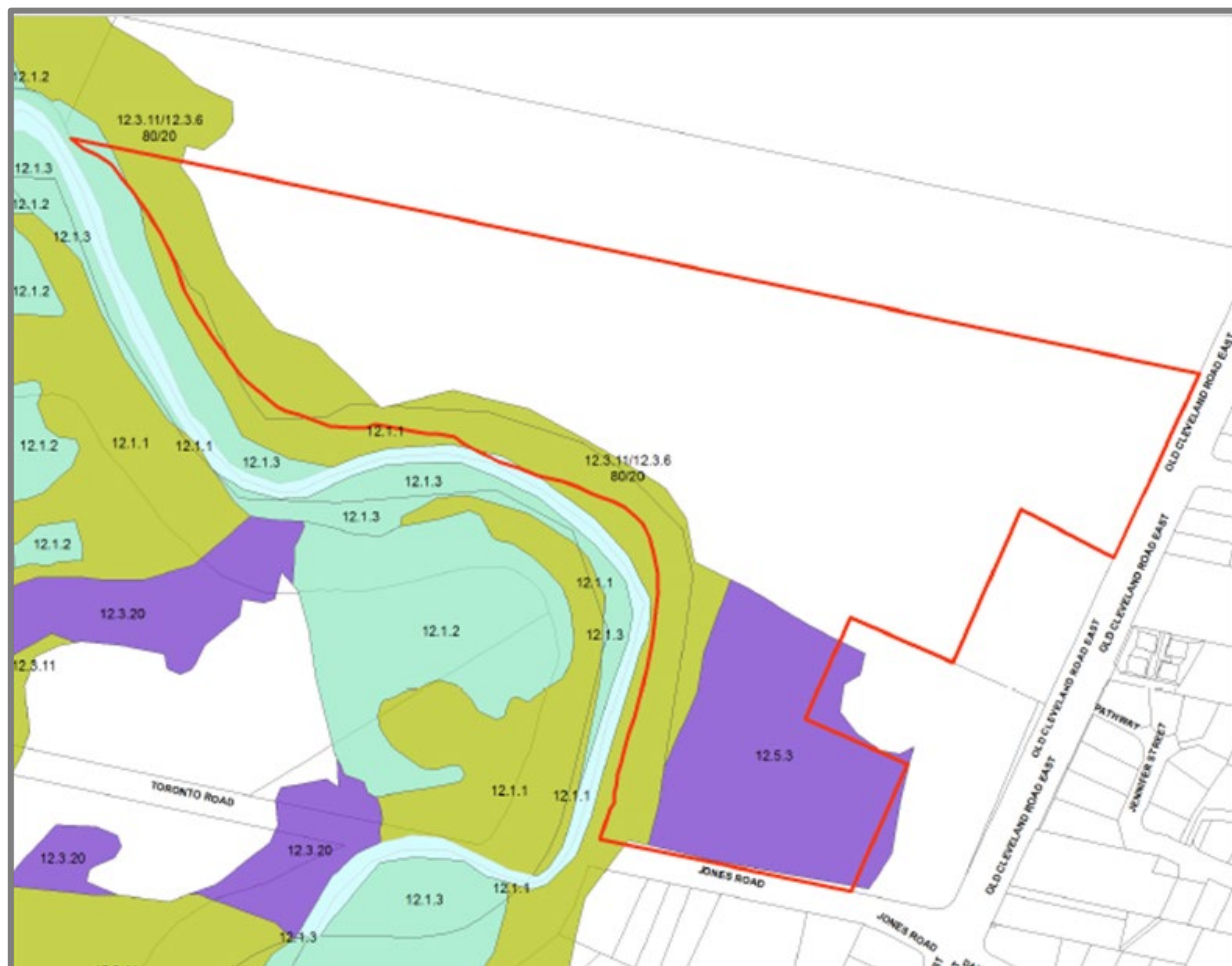
Another interesting feature of the site is the freshwater springs. Locals maintain these springs flow steadily which is consistent with the presence of an underground aquifer supplying this flow. This is not surprising given the presence of the sandstone in the geological mapping. There are many examples of how underground sandstone acts as a 'sponge' and supplies a reliable water flow, from local (Greater Glider Reserve, incidentally on the same geological type as this part of the site) to further afield (Carnarvon).

The interface between freshwater and saltwater in estuarine areas is a delicate balance that is easily upset. Human interference with the natural processes (such as changes in levels by heavy machinery, drainage of an area or overuse of freshwater resources) can all lead to catastrophic changes in the vegetation, not only near the disturbance but further away as well. Saltwater incursion can lead to whole stands of trees being lost. Once this process begins it is very difficult, if not impossible to reverse.

3. Vegetation – Regional Ecosystems

A property search of mapped Regional Ecosystems identified the following ecosystems:

Figure 3 Remnant Regional Ecosystems (DES 2020)



Biodiversity Status

- Selected Lot and Plan
- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Non-remnant vegetation, cultivated or built environment
- Plantation
- Water
- Cadastral Boundaries

12.1.1 (Of concern)

Description: *Casuarina glauca* woodland on margins of marine clay plains

12.1.3 (Least concern)

Description: Mangrove shrubland to low closed forest on marine clay plains and estuaries

It was observed that the River Mangrove tends to dominate so the following description is likely to represent the finer detailed ecosystem: **12.1.3a**

Description: *Aegiceras corniculatum* dominated low closed forest. Occurs on Quaternary estuarine deposits in the middle to upper tidal plane, in areas occasionally subject to freshwater influence.

12.3.11 (Of concern)

Description: *Eucalyptus tereticornis* +/- *Eucalyptus siderophloia*, *Corymbia intermedia* open forest on alluvial plains usually near coast

12.3.6 (No concern at present)

Melaleuca quinquenervia +/- *Eucalyptus tereticornis*, *Lophostemon suaveolens*, *Corymbia intermedia* open forest on coastal alluvial plains

(Likely to be found on the moister parts of the site.)

12.5.3 (Endangered)

Eucalyptus racemosa subsp. *racemosa* woodland with *Corymbia intermedia*, *E. siderophloia* +/- *E. tindaliae*, *E. resinifera*, *E. pilularis*, *E. microcorys*, *Angophora leiocarpa*. *Melaleuca quinquenervia* is often a prominent feature of lower slopes. Minor patches (<1ha) dominated by *Corymbia citriodora* subsp. *variegata* sometimes occur. Occurs on complex of remnant Tertiary surfaces +/- Cainozoic and Mesozoic sediments.

Vegetation communities in this regional ecosystem include:

12.5.3a: *Corymbia intermedia*, *Eucalyptus seeana* +/- *E. racemosa* subsp. *racemosa*, *Angophora leiocarpa*, *E. siderophloia*, *E. microcorys*, *C. citriodora* subsp. *variegata*, *Lophostemon suaveolens* woodland. *Melaleuca quinquenervia* is often a prominent feature of lower slopes. Occurs on complex of remnant Tertiary surfaces +/- Cainozoic and Mesozoic sediments.

All the above species were noted in an earlier visit.

Discussion

There appear to be some anomalies in the RE Mapping.

From the aerial photograph there seems to be quiet dense forest in the north-western part of the site that is not mapped. This is quite inexplicable as it seems to be just as dense as the mapped remnant. Perhaps

this was because of historical disturbance that has since ceased and is now approaching remnant status or perhaps just a mapping anomaly.

There is a substantial stand of Gum-topped Box (*Eucalyptus moluccana*) along the creek in the northern part of the site that appears to exactly match the Endangered Regional Ecosystem 12.3.3d (see description below). Every species mentioned in the description is present, including *Eucalyptus crebra* and *Corymbia citriodora* subsp. *variegata*. The latter two species are mostly found in the Mt Cotton area. This is also the area where the presumed river terrace is found which adds an interesting perspective to the RE description (highlighted below):

*12.3.3d: Eucalyptus moluccana woodland. Other frequently occurring species include Eucalyptus tereticornis, E. crebra, E. siderophloia, Corymbia citriodora subsp. variegata, Angophora leiocarpa and C. intermedia. Occurs on margins of Quaternary alluvial plains often adjacent sedimentary geologies. **May also occur on stranded Pleistocene river terraces.** Floodplain (other than floodplain wetlands).*

If this is confirmed, it appears to be the only area in the Redlands that contains this RE which adds substantially to its local significance. *Eucalyptus moluccana* (Gum-topped Box) is much sought after by koalas as a food tree.

Table 1. Preliminary Flora Species list

The table below lists just some of the species that were noted on a previous excursion to assess koala usage of the site plus those that can be readily seen from vantage points external to the site (including Tingalpa Creek) with the aid of powerful binoculars. A targeted flora survey would add greatly to the number of species.

Genus	Species	Common Name	Comments
<i>Acacia</i>	<i>disparrima</i>	Hickory wattle	
<i>Acacia</i>	<i>leiocalyx</i>	Early black wattle	
<i>Acacia</i>	<i>maidenii</i>	Maiden’s wattle	
<i>Acrostichum</i>	<i>speciosum</i>	Mangrove fern	Many examples in the understorey of the River Mangrove area
<i>Acrotriche</i>	<i>aggregata</i>	Red ground berry	
<i>Aegiceras</i>	<i>corniculatum</i>	River Mangrove	
<i>Allocasuarina</i>	<i>littoralis</i>	Black she-oak	
<i>Alphitonia</i>	<i>excelsa</i>	Red ash or soap tree	
<i>Avicennia</i>	<i>marina</i> subsp. <i>australasica</i>	Grey mangrove	
<i>Banksia</i>	<i>integrifolia</i>	Coastal banksia	
<i>Casuarina</i>	<i>glauca</i>	Swamp oak	
<i>Corymbia</i>	<i>intermedia</i>	Pink blood-wood	
<i>Corymbia</i>	<i>citriodora</i> subsp. <i>variegata</i>	Spotted gum	Koala food tree
<i>Corymbia</i>	<i>trachyphloia</i>	Brown blood-wood	
<i>Daviesia</i>	<i>ulicifolia</i>	Native gorse	Well-developed shrubs in full flower
<i>Dianella</i>	<i>brevipedunculata</i>	Blueberry lily	
<i>Dianella</i>	<i>crinoides</i>	Blue flax lily	
<i>Dodonaea</i>	<i>triquetra</i>	Forest hop bush	
<i>Einadia</i>	<i>hastata</i>	Berry saltbush	
<i>Eucalyptus</i>	<i>crebra</i>	Narrow-leafed iron bark	
<i>Eucalyptus</i>	<i>microcorys</i>	Tallow wood	Preferred koala food tree.
<i>Eucalyptus</i>	<i>moluccana</i>	Gum-topped box	Preferred koala food tree. Unusual in the Redlands

Genus	Species	Common Name	Comments
<i>Eucalyptus</i>	<i>racemosa</i>	Scribbly gum	Koala food tree
<i>Eucalyptus</i>	<i>seeana</i>	Narrow-leaved red gum	Preferred koala food tree. Restricted distribution on site
<i>Eucalyptus</i>	<i>siderophloia</i>	Grey ironbark	Koala food tree
<i>Eucalyptus</i>	<i>tereticornis</i>	Qld blue gum	Preferred koala food tree.
<i>Eustrephus</i>	<i>latifolius</i>	Wombat berry	
<i>Excoecaria</i>	<i>agallocha</i>	Milky mangrove /blind-your-eye	
<i>Ficus</i>	<i>obliqua</i>	Small-leaved fig	
<i>Fimbristylis</i>	<i>dichotoma</i>	Common fringe rush	
<i>Fimbristylis</i>	<i>ferruginea</i>	A fringe rush	
<i>Gahnia</i>	<i>aspera</i>	Large fruited sawsedge	
<i>Gmelina</i>	<i>leichhardtii</i>	White beech	
<i>Imperata</i>	<i>cylindrica</i>	Blady grass	
<i>Jacksonia</i>	<i>scoparia</i>	Dogwood	
<i>Jasminium</i>	<i>simplicifolium</i> subsp. <i>australiense</i>	Native jasmine	
<i>Juncus</i>	<i>kraussii</i>	Sea rush	
<i>Livistona</i>	<i>australis</i>	Cabbage tree palm	
<i>Lomandra</i>	<i>laxa</i>		
<i>Lophostemon</i>	<i>suaveolens</i>	Swamp box	Koala food tree
<i>Melaleuca</i>	<i>quinquenervia</i>	5-veined paperbark	Koala food tree
<i>Myoporum</i>	<i>acuminatum</i>	Coastal boobialla	
<i>Ozothamnus</i>	<i>diosmifolius</i>	Sago bush	
<i>Pandorea</i>	<i>pandorana</i>	Wonga vine	
<i>Panicum</i>	<i>effusum</i>	Hairy panic	
<i>Polymeria</i>	<i>calycina</i>	Native morning-glory	
<i>Schoenoplectus</i>	<i>litoralis</i>	Mangrove clubrush	
<i>Solanum</i>	<i>stelligerum</i>	Devil's needles	
<i>Sporobolus</i>	<i>virginicus</i>	Marine couch	
<i>Suaeda</i>	<i>australis</i>	A sea blite	
<i>Themeda</i>	<i>triandra</i>	Kangaroo grass	

4. Fauna

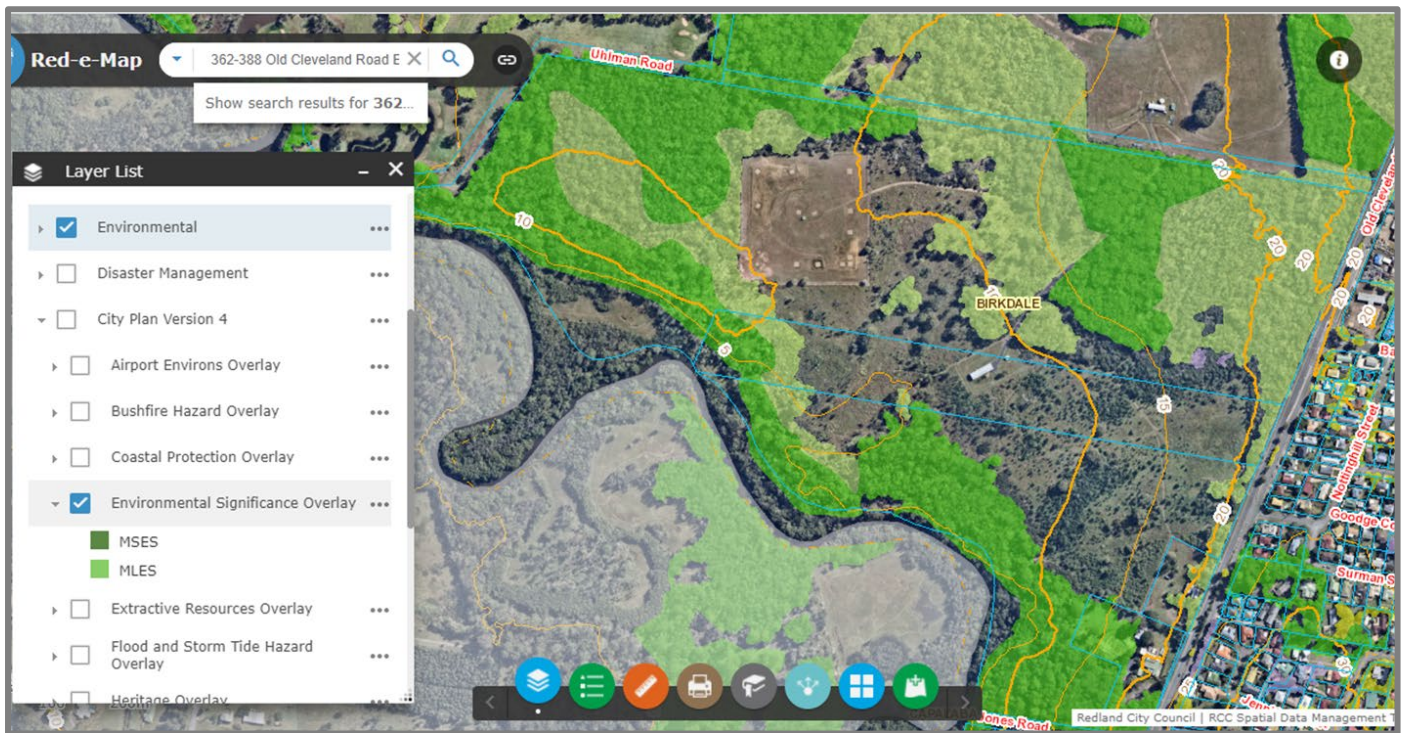
Habitat for several listed species is found in the REs identified earlier, with the koala and the wallum froglet, *Crinia tinnula* most likely to be found. It is not beyond the bounds of possibility that estuarine species such as the false water rat (*Xeromys myoides*) may be found within or close to the site. For this reason any future uses of the land must take care not to impact on the estuarine wetland areas.

Breeding habitat for the wallum froglet could be found in the springs already mentioned earlier. These are also of high importance to protect.

Koalas are well known to inhabit the site and were seen in the before mentioned survey. Given the calamitous decline in the local koala population, the protection of koala trees as well as movement paths is critically important. Koala habitat must be increased as this land over time will become an ever-increasingly vital resource to ensure the long-term viability of the koala population. Regrowth areas of the highly palatable *Eucalyptus tereticornis* and *E. moluccana* as well as the other koala trees in the 12.3.6 and 12.5.3 REs are already showing good natural regeneration in cleared areas. It is essential that these areas are protected and not used for incompatible uses, just because they appear to be cleared areas on the aerial photographs.

Some of the koala habitat area is protected under the State Koala Plan mapping but the much finer detail of the RCC mapping is a truer representation of the habitat values present (see Figure 5).

Figure 5. Redland City Council Mapped Koala Habitat (Matters of State and Local Significance – MSES and MLES)



5. Diversity of Habitats

The diversity of habitats within a relatively short distance gives the potential for interesting interpretation trails enabling visitors both local and from further afield to access points of interest such as those listed below. This could be similar to Boondall Wetlands but with the added advantage that the fauna species such as koalas and wallabies, long lost from Boondall are still easily seen here. In addition, the historical features (and potentially indigenous cultural heritage) of the site would ensure a wide range of visitors and tourists.

Points of Interest (see Figure 6):

- Endangered Regional Ecosystem 12.5.3. Large scribbly gums and many other Koala Food Trees – an ideal place to spot koalas.
- Vantage point overlooking Tingalpa Creek. Ideal place for a viewing platform. Care will need to be taken to protect the vulnerable soils in its construction. These sandy soils support an impressive wildflower meadow including the yellow-flowered Native Gorse.
- Freshwater springs. Perennial springs that provide an outlet from underground aquifer. Habitat for the endangered wallum sedge frog. Replanting of naturally occurring sedges and similar that protect the banks of these springs will protect habitat values.
- Mangrove and salt tolerant vegetation. Protected under Matters of State Environment Significance “Wetlands of High Ecological Significance” (MSES search). Good examples of River Mangrove and Mangrove Fern.

- Marine couch meadow. This is an opportunity to point out the benefits of such areas with regard to fish habitat. Possible False Water Rat habitat.
- Example of a stranded river terrace with an escarpment of at least 5 metres. Endangered Regional Ecosystem 12.3.3d species in abundance (Gum-topped box, ironbarks and spotted gums). This is the only place in the Redlands where these species are found together and in abundance.
- Melaleuca wetlands (part of RE 12.3.6) are found on the site and have immense value to the ecology of the area as explained in the Department of Environment and Science Fact Sheet: (<https://wetlandinfo.des.qld.gov.au/resources/static/pdf/resources/fact-sheets/profiles/new-profiles/29113-07-tree-swamps-web.pdf>)

Coastal and sub-coastal tree swamps play a critical role in the hydrological regime of the coastal and sub-coastal area: they provide a protective buffer against erosion; they absorb and filter water before it enters other wetland ecosystems such as mangrove swamps, estuaries and eventually the sea and off-shore reefs; they also retain flood waters and act as nutrient sinks

- Regrowth in previously cleared areas appears to be healthy and vigorous. It is extremely valuable in that it is natural regeneration of the similar mix of species found in the adjoining REs (12.5.3 and 12.3.6). Given time, it will eventually be of a form that will be indistinguishable from the existing remnant vegetation. In the meantime, such regrowth is of great educational value as the features of the species are more easily accessed in their immature form and act as an inspirational example of how to successfully encourage natural revegetation.

Figure 6. Points of interest (Base map from Red-e-Map, Redland City Council.)

