ST LEONARDS

BOTANICAL & FAUNA HABITAT SURVEY

For ABx4 PTY LTD

7th May 2015

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1.0 INTRODUCTION:

ABx4 Pty Ltd, a wholly owned subsidiary of Australian Bauxite Ltd is undertaking an exploratory program over the freehold property owned by Mr Steven Thurley which is located near St Leonards on the outskirts of Launceston and within EL18/2014 .

The exploration program targets a number of localised sites across the property. The program will involve shallow drill holes at each site which will not require the clearing and/or leveling of drill pad sites and so is expected to have a minimal impact on the ground surface and adjacent vegetation.

A botanical and fauna habitat survey is required as part of the MRT licence conditions to determine any likely impacts on threatened species, threatened species habitat, threatened vegetation communities or other natural values.

1.1 Objectives: The objectives of this survey were to;

- Undertake a desktop survey to confirm the known biological records and the natural values present in the exploration target areas and within 5,000 metres of the location.
- Undertake a field survey of the exploration target areas to observe and record the natural values present including the vegetation types and plant communities, the flora and in particular any threatened species and potential habitat for species of threatened fauna.
- Determine the possible impacts of the proposed exploration program on the natural values present and make recommendations on how those impacts can be minimised.

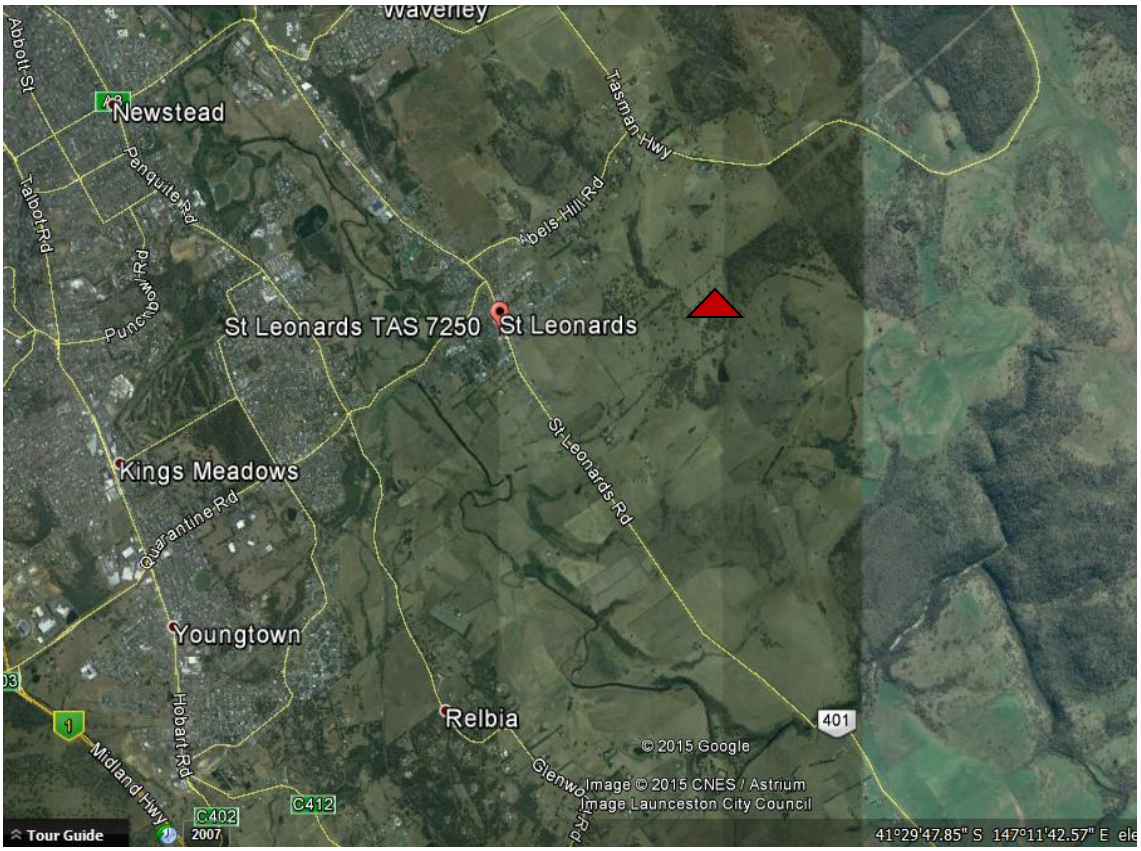
1.2 Location of Study Area:

MAP REF: Tasmap 1:25,000, Sheet No. 5040, Prospect

BIOREGION: Northern Midlands

GRID REF: 518850E – 5410600N

(All Grid References MGA Zone 55 GDA94)



MAP 1. Location of Survey area near St Leonards on the north-eastern outskirts of Launceston

1.3 Site Description:

All target areas are located on a freehold property owned by Mr Steven Thurley which is located off Kings Lane, near St Leonards on the north-eastern outskirts of Launceston. The property is located within the rolling countryside between the Tasman Highway, Abels Hill Road and Blessington Road. The North Esk River is located about 3 kilometres to the south-east and south-west of the study area reference point.

The area consists of undulating hills with a geology consisting of dolerite, laterite and some sandy deposits. The property has been cleared for agriculture in the past although remnant trees remain in paddocks, and with remnant patches of trees and indigenous vegetation particularly on hilltops and gullies. A number of arable paddocks are utilized for cropping.

Some patches of remnant vegetation, including the understorey remain, including an area of 40ha which is managed for the conservation of natural values.

There are a number of small creeks on the property, which includes a farm dam on the main creek-line, and each ultimately flow into the North Esk River. Numerous springs and soakage lines are also present on parts of the property.

MAP 1: Google earth image detailing the location of the target areas on the property. Survey area reference point: Red triangle.

2.0 DESKTOP SURVEY OF NATURAL VALUES:

The DPIPWE database "The Natural Values Atlas" was accessed for the known biological records of the locality. Records of threatened species of flora and fauna known to occur within a 5,000 metre radius of the location were also accessed. Data sourced included the vegetation types and plant communities, the occurrence of any threatened vegetation communities, the recorded locations of any threatened species of plants and threatened fauna known or expected to occur in the vicinity. Occurrences of environmental weeds and reserve status of land in the area were also sourced.
REFERENCE POINT for the locality: 518850E – 5410600N

2.1 Desktop Survey Results:

VEGETATION COMMUNITIES:
The following vegetation communities are mapped under the TASVEG mapping program as occurring within 1,500 metres of the study area reference point.

VEGETATION COMMUNITY	TasVeg Code / Map colour	EXTENT IN STUDY AREA
Eucalyptus amygdalina Inland Forest & Woodland on Cainozoic Deposits	DAZ / bright green with diagonal lines. A threatened vegetation community.	Two small patches on hill tops
Eucalyptus amygdalina Forest & Woodland on Dolerite	DAD / Bright green with horizontal lines	In the east of the study area and near Site 3.
Eucalyptus viminalis Grassy Forest & Woodland	DVG / Blue-green	The main remnant vegetation through the centre of the study area and around the agricultural land.
Bursaria - Acacia Woodland and Scrub	NBA / Olive green with "z"	Single patch in the north-east quadrat of the study area.
Lowland *Poa labillardierei* Grassland	GPL / bright yellow with diagonal lines	Two small patches to the north and north-west of centre.
Lowland Grassland Complex	GCL / Yellow with vertical lines	One linear patch extending east from the centre.
Agricultural Land	FAG / cream	Widespread in the study area.
Weed Infestation	FWU / White with zigzag lines	One patch at the south-east periphery of the study area.

TABLE 1: Vegetation Communities and extent within the study area as per TASVEG mapping program.

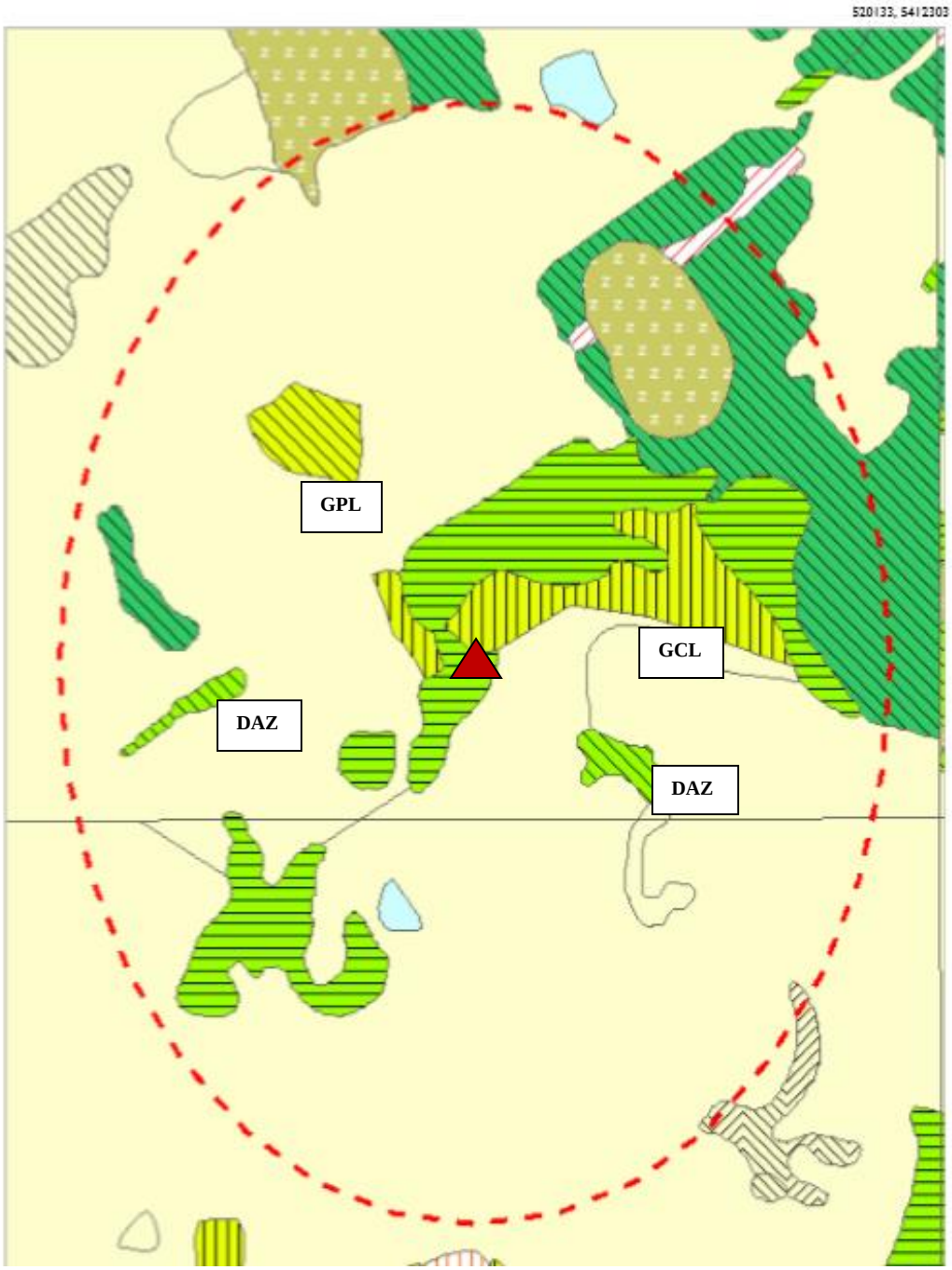


FIGURE 1: Vegetation communities as per TasVeg mapping program within 1,500 metres of reference point: GRID REF: 5188500E – 5410600N.
DAZ: *Eucalyptus amygdalina* Inland Forest on Cainozoic Deposits is a threatened vegetation community under the Tasmanian *Nature Conservation Act 2002*.
GCL: Lowland Grassland Complex and GPL: Lowland *Poa labillardierei* Grassland. Both are listed as threatened vegetation communities under the Commonwealth *EPBC Act 1999*.

VEGETATION CODES:


DAZ ……...*Eucalyptus amygdalina* Inland Forest & Woodland on Cainozoic Deposits,


DAD ……*Eucalyptus amygdalina* Forest & Woodland on Dolerite


DVG …….. *Eucalyptus viminalis* Grassy Forest & Woodland


NBA ..... *Bursaria - Acacia* Woodland and Scrub


GCL ..... Lowland Grassland Complex


GPL …….. Lowland *Poa labillardierei* Grassland


FAG ..... Agricultural Land

VEGETATION COMMUNITIES:

DAZ *Eucalyptus amygdalina* Inland Forest and Woodland on Cainozoic Deposits is a community usually dominated by the Black Peppermint *Eucalyptus amygdalina* although other species such as *Eucalyptus viminalis, E. pauciflora* or occasionally *E. ovata* may be present and can sometime form the dominant canopy species. Dry sclerophyll shrubs, often low or prostrate species, Bracken *Pteridium esculentum* or grasses and graminoids with forb species can dominate the ground stratum depending on the soil fertility and depth and the drainage conditions, as well as the additional historical factors of firing and land use. There can be a high diversity of species in the ground layer vegetation although many of the remnants are now degraded.

This community is strongly associated with lateritic sediments in the northern Midlands and its main area of distribution is in the northern Midlands with outlying localities include the Fingal Valley, West Tamar, Bridgenorth and Westbury, between Cranbrook and Swansea on the east coast and in the Cressy – Blackwood Creek area.

The community was much more extensive in the northern Midlands at the time of white settlement however much of it has been cleared for agriculture. Large areas on the less fertile soils in the northern Midlands areas were cleared in the 1960's following the introduction and widespread use of superphosphate.

The community is of high conservation value and is listed as a threatened native vegetation community under the Tasmanian *Nature Conservation Act 2002.*

DAD *Eucalyptus amygdalina* Forest and Woodland on Dolerite is more widespread than the former community and is often located on rocky sites in low rainfall areas. The community typically is dominated by uneven aged Black Peppermint less than 25metres in height and with a variable understorey ranging from grassy to shrubby. The two Eucalypt communities DAZ and DAD often occur side by side and each has a similar structure with the dominant trees and a similar composition of species in the ground stratum. It is principally the underlying geology which separates them.
DVG *Eucalyptus viminalis* Grassy Forest & Woodland is found throughout the drier parts of the state but is particularly prevalent through the Midlands and the lower slopes of the Eastern Tiers although it has been subject to clearance for agriculture through the Midlands. The community typically has a grassy understorey which can be relatively species rich in grasses and herbs in some locations. Old-growth formations of this community which contain trees with hollows are considered to be of high conservation value as potential fauna habitat.
NBA *Bursaria* - *Acacia* Woodland and Scrub. This community often establishes on dry hills and slopes following the clearing and/or decline of Eucalypt forest or after other disturbances such as ploughing. It is therefore often marginal to grazing land in the drier parts of the state such as the Midlands.
GPL Lowland *Poa labillardierei* Grassland. Many areas which were originally this community have been ploughed and converted to improved pasture dominated by exotic pasture grasses or for cropping, particularly on river flats with alluvial soils.
GCL Lowland Grassland Complex. This grassland community generally consists of natural or disturbance induced grassland which is dominated by Wallaby Grasses, Spear Grasses and/or Kangaroo Grass although Tussock Grasses can also be present. The main areas of occurrence are the Midlands, the Derwent valley, the east coast and the south-east.

Lowland grassland communities are of high conservation value where they are in good condition but are becoming increasingly rare due to conversion to improved pasture and increased cultivation of crops such as canola and poppies. Lowland grasslands including GPL and GCL are considered to be threatened vegetation communities under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*

THREATENED VEGETATION COMMUNITIES:
One natural vegetation communitiy mapped within the study area is listed as threatened under the Tasmanian *Nature Conservation Act 2002.*

- *Eucalyptus amygdalina* Inland Forest & Woodland on Cainozoic Deposits (DAZ) is listed as a vulnerable community under the Act as it has been subject to extensive clearing and fragmentation throughout the northern midlands and in particular since the 1960's. Two localised patches are mapped on the property.

Two lowland grassland communities are listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*

- Lowland *Poa labillardierei* Grassland (GPL) One localised patch to the north-west of the reference point and a smaller patch to its immediate south.
- Lowland Grassland Complex (GCL) A good sized patch within the covenanted area.

All three communities are mapped as occurring in the study area and within 1,500 metres of the reference point. Their locations are detailed in Figure 1.on page 7.

VEGETATION COMMUNITIES OF CONSERVATION SIGNIFICANCE

- Although the community *Eucalyptus amygdalina* Forest and Woodland on Dolerite is relatively widespread it mainly occurs on freehold land and is considered to be under-reserved in the state and particularly so in its old-growth condition.

THREATENED FLORA:

Two species of threatened flora listed under the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* are recorded on the "Natural Values Atlas" database as occurring within 2,000 metres of the study area reference point.

No species of threatened flora is recorded on the database from within 1,000 metres of the study area reference point.

- *Arthropodium strictum* Chocolate Lily, this species was listed as being rare in Tasmania, however with increased knowledge from recent surveys it is now considered to be more widespread than previously recorded. It has therefore been de-listed as a threatened species under the Tasmanian Act, although it is still regarded as being an uncommon plant as it is restricted to particular vegetation communities.
- *Velleia paradoxa* the Spur Velleia is listed as a vulnerable species in Tasmania. There is one record on the database dated from 1965. This rosetted herb is restricted to dry grassland habitats in the midlands, such as around Campbelltown and Tunbridge and this occurrence would be considered an outlier.

There are nine additional species of threatened flora recorded on the NVA from between 2,000 and 3,000 metres of the study area reference point, however six of those species have not been recorded in the location since the late 1800's. There is also a further record of the Spur Velleia.

- *Cryptandra amara* the Pretty Pearl Flower was last recorded in 1898. Endangered under the Tasmanian Act.
- *Cynoglossum australe,* the Coast Hounds-tongue was last recorded in 1880. Rare in Tasmania.
- *Euphrasia scabra,* the Yellow Eyebright was last recorded in 1879. Endangered under the Tasmanian Act.
- *Hovea tasmanica* the Rockfield Hovea was last recorded in 1892. Rare in Tasmania.
- *Prostanthera rotundifolia* the Roundleaf Mintbush record is dated 1880. Listed as vulnerable in Tasmania.
- *Teucrium corymbosum* the Forest Germander was last recorded in 1880. Rare in Tasmania.
- *Pimelea curviflora,* Curved Riceflower. 6 records, the most recent dated 1951. Rare in Tasmania.
- *Poa mollis,* Soft Tussock Grass. 6 records mainly dated 2009. Rare in Tasmania and usually restricted to dolerite geology.
- *Velleia paradoxa,* Spur Velleia. One early record from 1880. Vulnerable in Tasmania.

NOTE: There are a number of reasons why a species of plant may not have been recorded in a particular locality for over 100 years. The plant may now be locally extinct, particularly if it was a localised occurrence of the species originally and therefore it would have been susceptible to

changes in land use such as clearing, and/or grazing by sheep. These locations were also recorded in the days well before the accuracy of GPS technology from which we benefit today. These locations are therefore approximate and the degree of accuracy may exceed 5km.
This aspect is demonstrated by a number of the plant species detailed above having more recent records from between 3,000 and 5,000 metres of the study area reference point and these are discussed further in the following paragraph and noted with an asterisk.

There are a further 20 species of threatened flora recorded on the NVA data base from between 3,000 and 5,000 metres of the study area reference point.
There are also further records of 6 of the threatened species previously discussed.

- *Alternanthera denticulata* Lesser Joyweed. Endangered in Tasmania. Two records dated 2009 and 2010.
- *Aphelia gracilis,* Slender Fanwort. Rare in Tasmania. One record dated 2009.
- *Aphelia pumilio,* Dwarf Fanwort. Rare in Tasmania. Three records from 2009. Grows in grasslands and grassy woodlands.
- *Asperula subsimplex,* Water Woodruff. Rare in Tasmania. One record from 2000. A herb of damp environments.
- *Bulbochoenus caldwellii,* Sea Club-sedge. Rare in Tasmania. Two records from 2000. A plant of shorelines of saline and brackish waterways.
- *Brunonia australis,* Blue Pincushion. Rare in Tasmania. 17 records, the earliest being 1842 and the most recent 2000. Found in grasslands and grassy woodlands north of Epping Forest.
- *Caesia calliantha,* Blue Grass-lily. Rare in Tasmania. 6 records dated 1844, 1984, 1992 and 2010. Grows in grassy forests and woodlands.
- *Caladenia patersonii,* Patersons Spider-orchid. Vulnerable in Tasmania. Two records dated 1938 and 1991.
- *Carex longibractiata,* Drooping Sedge. Rare in Tasmania. Three records from 1995.
- *Epacris exerta,* South Esk Heath. This heath is listed as being endangered under the Tasmanian Act and its listing as being endangered under the Commonwealth Act is pending. It is a riparian species which occurs along the North Esk River as well as the South Esk.
- *Gynatrix pulchella,* Fragrant Hempbush. Rare in Tasmania. Two records dated 1994 and 2006. A small tree of riparian habitats.
- *Haloragis heterophylla,* Variable Raspwort. Rare in Tasmania. One 2005 record. A plant of damp grassy places, which is easily overlooked.
- *Hypoxis vaginata* Sheathing Yellow-star. Rare in Tasmania. 30 records all dated 2010. A plant of damp grasslands.
- *Lepidium pseudotasmanicum,* Shade Peppercress. Rare in Tasmania. One 1992 record.
- *Persicaria decipiens,* Slender Water-pepper. Vulnerable in Tasmania. One 2010 record. A plant of damp swampy places, such as soakage areas and drainage lines.
- *Pterostylis ziegerleri* Grassland Greenhood Listed as being vulnerable in Tasmania and also vulnerable nationally.
- *Senecio campylocarpus,* Bulging Fireweed. Rare in Tasmania. two records from 2010.
- *Senecio squarrosa,* Leafy Fireweed. Rare in Tasmania. One early record from 1865.

- *Siloxerus multiflorus,* Small Wrinkewort. Rare in Tasmania. 18 records all dated 2009. A tiny annual daisy of grasslands, grassy woodlands, often favouring rock plates.
- *Vittadinia gracilis* Woolly New Holland Daisy, rare in Tasmania. One early record dated 1842. A small perennial grassland daisy with mauve flowers.
- **Cryptandra amara,* Pretty Pearl Flower. One record from 1972. It is an endangered species in Tasmania. A small heathy shrub of grassy woodlands.
- **Cynoglossum australe,* Australian Hounds-tongue. Rare in Tasmania. 5 records dated 2011. A hairy leafed perennial with forget-me-not like flowers, usually in grasslands and grassy woodlands on dolerite.
- *Pimelea curviflora,* Curved Riceflower. Rare in Tasmania. two further records dated 2006. Usually an understorey shrub in dry forests.
- *Poa mollis,* Soft Tussock Grass. Rare in Tasmania. 10 records all dated 2009. This grass is usually found on dolerite outcrops and occurs on the hills around both Esk rivers.
- **Prostanthera rotundifolia,* Round-leaf Mintbush. Vulnerable in Tasmania. 10 records from 2009. This is a riparian species in Tasmania and it mainly restricted to the banks of the North and South Esk Rivers.
- **Teucrium corymbosum,* Forest Germander. Rare in Tasmania. Two records, both dated 2006.
- **Velleia paradoxa.* Spur Velleia. Vulnerable in Tasmania. One further early record dated 1865. A perennial plant of dry grasslands, mainly in the Campbelltown and Tunbridge area.

THREATENED FAUNA:

One species of threatened fauna listed under the above Acts is recorded on the database as occurring within 1,000 metres of the study area reference point.

- Australian Grayling *Prototroctes mareana* is a native fish which is considered to be vulnerable in the state and nationally and usually occurs in the lower and middle reaches of coastal rivers and streams, moving between salt and fresh waters. The damming of rivers and streams has had an impact on this species. The species is listed as being vulnerable both in Tasmania and nationally. There is one record dated 1976 and appears to be recorded from either the dam on the main creek within the property or from within the creek during a period of sufficient water flow.

Two species have been recorded from within 2,000 metres of the study area reference points.

- The Tasmanian Devil *Sarcophilus harrisii* The species is now listed as being endangered under both State and Commonwealth Acts due to the severe decline of the species as a result of the disease DFT with the disease front now extending into western Tasmania. Individual animals can roam over quite large territories and can cover up to 20km in a night.

  There is a single early sight record on the database dated 1905.
- Eastern-barred Bandicoot *Parameles gunnii* is quite widespread in Tasmania but is listed as being vulnerable under the Commonwealth Act as it is a threatened species on mainland Australia. Its preferred habitat includes woodlands, open forest with grassy understorey, and grasslands including agricultural land. There is a single recent but unverified record of a carcass on the database dated from 2015.

There are a further three species of threatened fauna recorded from between 2,000 and 3,000 metres as well as additional records of the Devil.

- Azure Kingfisher *Alcedo azurea* subsp *diemensis.* The Tasmanian subspecies of this kingfisher is endangered and is listed both in the state and nationally. It is restricted to riparian habitats and is found mainly on the rivers and streams of the north-west and west of the state. This bird has been impacted by the clearing of streamside vegetation, by the damming of rivers and streams and from the over-fishing of Whitebait which is an important food source during the kingfisher's breeding season. There is a single early record dated 1910, most likely from the North Esk River.
- The Tasmanian subspecies of Wedge-tailed Eagle *Aquila audax* subsp *fleayi.* The bird is listed as being endangered under both State and Commonwealth Acts and requires large trees within tracts (>10ha) of old-growth forest for nesting. The birds are extremely sensitive to disturbance during the nesting season. Nests are traditional, with some having been used for at least 50 years. More than one nest can be present within a pair's territory but only one is used in any one year.
  There is one sighting record on the NVA from 2012.
  There is no record of a nest tree within 3,000 metres of the reference point, however the property owner Mr Steven Thurley reported an established and active nest on an adjacent property to the north-east of the location. Possibly at about a distance of 2km.
- Spotted-tailed Quoll, *Dasyurus maculatus* subsp *maculatus* is listed as a rare species under the Tasmanian Act and vulnerable under the Commonwealth Act. It inhabits a range of forest types and will hunt and forage on farmland and pasture, travelling up to 20km at night. The animal will shelter in dens located in rocks, logs or thick vegetation.
  There is one 1978 record on the database.
- Tasmanian Devil *Sarcophilus harrisii.* There are a further three records on the data base, one undated and the others dated 2003 and 2007.

The following nine species of threatened fauna are recorded on the NVA within a radius of 3,000 to 5,000 metres of the reference point.

- Wedge-tailed Eagle *Aquila audax* subsp *fleayi.* There are two nest trees recorded adjacent to Distillery Creek a little over 3km to the north of the reference point.
  Nest ID No. 1152. Recorded in 2003.
  Nest ID No. 1365. Recorded in 2005. There is no additional information on the database in regard to more recent usage or productivity of either nest.
- Australasian Bittern *Botaurus poiciloptilus.* The Bittern is a secretive bird of reed beds and swamps and is rarely observed but is likely to be present along parts of the North Esk River. There are three records on the database, two from 2000 and one from 2010.
- Tasmanian Devil. *Sarcophilus harrisii.* There are four further records dated 1973, 2003, 2007 and 2010.
- Thylacine *Thylacinus cynocephalus.* Although considered to be extinct and being listed as such, there is a 1972 record detailed on the database.
- Eastern-barred Bandicoot *Parameles gunnii.* Two further records dated 1974 and 1978.
- Australian Grayling *Prototroctes mareana.* One further record from 1976.
- Glossy Grass Skink *Pseudemoia rawlinsonii.* This skink is known from only a few sites in Tasmania, mostly around Launceston, and in dense rushy or grassy vegetation usually

close to water. It is considered to be rare in Tasmania but may warrant uplisting to being vulnerable or endangered. There is one record dated 1988.

- Green and Gold Frog *Litoria raniformis* occurs in deep pools, lagoons, ponds and dams with aquatic vegetation, mainly in the north of the state. This frog is listed as being vulnerable in Tasmania and nationally. This frog has declined significantly over recent years. Two records, one undated and the other from 1990.
- Ouse River Caddis Fly *Oxyethira mienica.* One record dated 2001. This small insect is listed as being rare in Tasmania and was previously known from just two locations, one at Great Lake and the other in a small creek off the Scotts Peak Road in the south-west..

The following eight threatened species could occur in the locality based on habitat mapping and the known geographical range of each.

- White-bellied Sea-eagle *Halieetus leucogaster* is listed as being vulnerable under the Tasmanian Act. It inhabits the coast and larger inland water bodies and will also follow the larger rivers. It usually nests in heavily branched trees adjacent to river banks or lakesides, but will also nest on rock ledges on cliff-tops in coastal environments.
- White (Grey) Goshawk *Accipiter novaehollandiae* is listed as an endangered species under the Tasmanian Act. This species favours mature wet forests, especially along rivers and streams and often nests in mature or old-growth Blackwood trees *Acacia melanoxylon*.
  Its preferred habitat has been greatly reduced by previous land clearing and by clear-fell forestry activities across Tasmania.
- The Tasmanian subspecies of the Masked Owl *Tyoto novaehollandiae* subsp *castinops* is listed as being endangered in Tasmania and considered to be vulnerable under the Commonwealth Act. This bird requires large tree hollows for nesting, usually in White Gums and prefers mature forest as habitat. Its habitat has also been greatly reduced by previous land clearing and by clear-fell forestry practices.
- The Tussock Skink *Pseudemoia pagenstecheri* is a grassland species which is considered to be vulnerable in Tasmania. It inhabits some types of native tussock grasslands.
- The Swan Galaxia *Galaxias fontanus* is a small native fish considered to be endangered in Tasmania and nationally, and is found only within the catchments of the South Esk and North Esk Rivers. The species is endemic to Tasmania.
- The Green and Gold Frog *Litoria raniformis* is considered to be vulnerable in Tasmania and Nationally and has declined markedly over recent years. It is found mainly in the north and north-east of the state.
- Tussock Skink *Pseudomoia pagenstecheri* Requires a grassy or grassy woodland habitat with perennial tussocks for shelter. It is listed as being vulnerable in Tasmania.
- Striped Marsh Frog *Limnodynastes peroni* can occur in near coastal lagoons, marshes swamp, ponds and dams with abundant marginal vegetation mainly in the far north-west of the state. The species is listed as being vulnerable under both Acts.
- Cataract Gorge Snail *Pasamaditta jungermanniae.* This aquatic snail is restricted to the catchments of the South and North Esk Rivers and is listed as being vulnerable in Tasmania.
- Green-lined Ground-beetle The Green-lined Ground Beetle *Catadromus lacordairei* is listed as being vulnerable in Tasmania. It has been recorded from very few locations in

Tasmania but mainly in the north and central Midlands. It has been recorded within open grassy woodland vegetation usually associated with wetlands and at low elevations.

ENVIROMENTAL WEEDS:
The following environmental weeds are recorded on the NVA within 3,000 metres of the location:
Boneseed, *Chrysanthemoides monilifera*
Californian Thistle, *Cirsium arvense*
Blackberry, *Rubus fruticosus*
Crack Willow, *Salix xfragilis*
Ragwort, *Senecio jacobaea*
Gorse, *Ulex europaeus,*

RESERVED LAND:

Although no reserved land is mapped on the NVA within 3,000 metres of the location, the landowner Mr Steven Thurley advises that a 40ha block within the property is covered by a covenant and management agreement for conservation purposes.

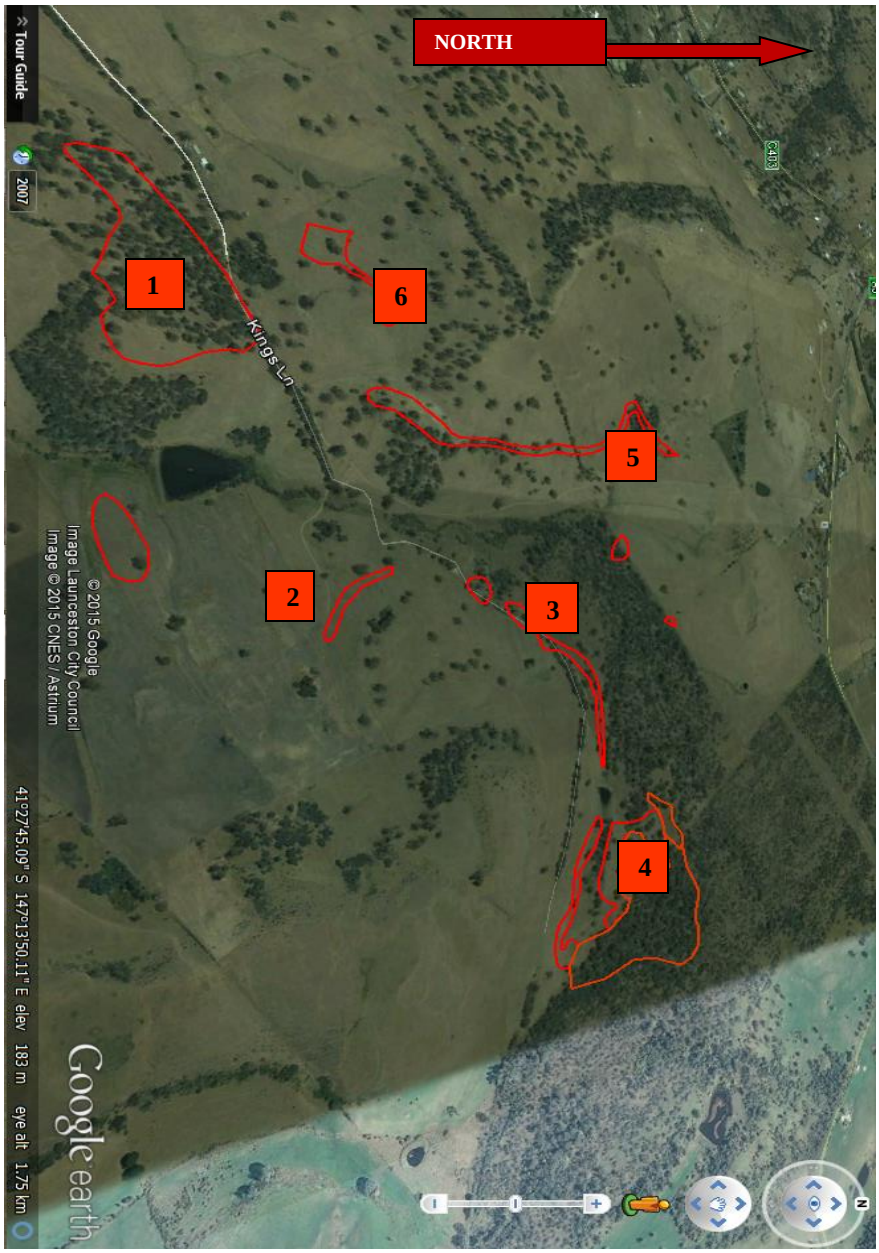
MAP No.2. <u>Approximate</u> outline of the 40ha block within the property subject to a covenant and management agreement with Mr Thurley for conservation purposes.
Survey Area reference point: Red triangle

3.0 FIELD SURVEY:

The field survey was undertaken on Tuesday 3rd March 2015.

Methodology: The target areas as detailed on the following Map No.2 were surveyed on foot. Vascular plant species, including threatened species and environmental weeds were recorded, evidence of the presence of threatened fauna and of any potential habitat was observed, vegetation communities were also observed and cross-referenced with the TASVEG map sourced from the Natural Values Atlas database.

Limitations: This survey was conducted in early autumn when many species have finished flowering, particularly ground layer flora within grasslands. No botanical survey can guarantee that all flora will be observed and recorded in a single survey in one year due to seasonal and annual variation in abundance and the possible absence of flowers and fertile material for identification. Ephemeral species which may have been present includes species of orchids, lilies, herbs, grasses and other graminoids. However all significant species known to occur in the study areas and their environs have been considered in this report.



MAP No.2. Google earth image of the property with survey areas detailed.

3.1 Field Survey Results:

SURVEY AREA No.1: (Scramble Track) GRID REF: 518385E – 5409850N.
The first site surveyed was located on a dolerite hilltop to the immediate south of Kings Lane.
The remnant vegetation on the hill was predominantly mature and semi-mature trees of Black Peppermint *Eucalyptus amygdalina* with occasional trees of White Gum *Eucalyptus viminalis*, occasional understorey trees of Silver Wattle *Acacia dealbata* and Black Wattle *Acacia mearnsii* and a grassy groundlayer which included patches of native grasses such as *Poa labillardierei* and *Dichelachne crinita.*
As it was quite late in the season following a relatively dry summer there were few herbaceous plants evident particularly around the dolerite rock-plates on parts of the hill top.
If intensive exploration was to be undertaken in this location an in-season survey of the ground layer flora would be necessary, particularly in the vicinity of rock plates.

PHOTO No. 1... Survey Area No.1. *Eucalyptus amygdalina* Grassy Forest on Dolerite.

PHOTO No.2 .... Survey Area No.1. with an area of rock plate in the foreground, native grasses in the ground layer and Prickly Box *Bursaria spinosa* the understorey shrub in the background..

SURVEY AREA No. 2: GRID REF: 518880E – 5409930N.

The target area is was an isolated lateritic outcrop on the mid to lower slopes of an arable paddock and the only indigenous plants evident were Kangaroo Apple *Solanum lacineatum* and the Tree Violet *Melicytus dentatus* and weeds such as Mallow.

The hill above and to the east of this target location consisted of a sandy deposit with a grassy ground layer of Tussock Grass *Poa labillardierei* and a low canopy of scrubby Silver Wattle *Acacia dealbata.* Lowland *Poa labillardierei* Grassland is a listed threatened community under the Commonwealth *EPBC Act 1999.* The Tree Violet *Melicytus dentatus* was also common on this sandy hill. This patch of vegetation is outlined but not detailed on the TASVEG map Figure 1. on page 7.

No specific threatened fauna habitat was observed however a number of the remnant Eucalypts possessed hollows although none of those observed were considered large enough for the Masked Owl. A wombat burrow was observed at this location however it did not appear to have been used recently.

Small numbers of the following environmental weeds were observed in this location, including gorse, hawthorn and briar rose.

At the northern end of this Poa grassland is a mapped patch of the threatened vegetation community *Eucalyptus amygdalina* Inland Forest on Cainozoic deposits, however it is in serious decline and in a relatively poor condition with no real understorey, REF Photo No.5.

PHOTO No.3 ..... Sandy hill-top above and to the east of Target Area No.2. with Silver Wattle *Acacia dealbata* and a grassy ground layer of predominantly *Poa labillardierei.*

PHOTO No.4 ... Sandy hill-top above and to the east of Target Area 2. with *Poa labillardierei* Grassland and the shrubby Tree Violet *Melicytus dentatus.*

PHOTO No.5 .... The area of mapped *Eucalyptus amygdalina* Inland Forest on Cainozoic Deposits in serious decline with dead trees and a lack of anunderstorey.

SURVEY AREA No. 3: GRID REF: Covenanted Area 519145E- 5410900N.

Target area No 3. is located within the 40ha block which is covered by a covenant and management agreement for conservation purposes. The area includes significant patches of remnant native grassland including Kangaroo Grass *Themeda triandra* and with adjoining open forest and woodland of Black Peppermint *Eucalyptus amygdalina* which also has a predominantly grassy ground layer. White Gum *Eucalyptus viminalis* was also present. Outcrops of dolerite, a minor creek-line in a shallow gully and a small number of springs and soaks are also present in this area. The area has been set aside by these means due to its high conservation values. The approximate outline of this block is detailed in Map No 2 on page 15.

Lowland grassland communities including Kangaroo Grass are listed as threatened vegetation communities under the Commonwealth *EPBC Act 1999.*

No threatened species of flora was observed however it was late in the season and herbaceous species may not have been evident at the time. The area will require a follow-up survey during the spring and early summer if intensive exploration is to be undertaken.

Non-threatened flora of interest which were observed included *Exocarpus cupressiformis, Astroloma humifusum, Lobelia anceps, Bursaria spinosa, Banksia marginata* and *Allocasuarina littoralis.*The environmental weeds observed were fairly localised but those observed included gorse, and the aquatic grass *Glyceria maxima* which was colonising soakage areas.

No specific threatened fauna habitat was observed however there was high potential habitat values across the block, including tree hollows, fallen logs and debris and healthy and intact ground layer vegetation.

Non-threatened fauna which were observed within the covenant area included the Mountain Dragon *Rankinia diemensis*, and the Jewel Spider *Austracantha minax,* (syn.*Gasteracantha minax*) as well as two birds, the Striated Pardalote *Pardalotus striatus* and the Noisy Miner *Manorina melancephala.*

PHOTO No.6.... Target Area No.3. within the conservation block. Lowland Grassland Complex vegetation community and outcrops of dolerite.

PHOTO No.7 ..... Target Site 3 within the covenant area. *Eucalyptus amygdalina* Grassy Forest on Dolerite.

PHOTO No.8. Target Site 3. within the covenant area. *Themeda triandra* Grassland community.

SURVEY AREA No.4: GRID REF: 519600E – 5410800N. (Deposit No.1) and the newly acquired adjoining property.

Survey 4 was located on a mainly gently sloping site within and at the eastern end of the area covered by the conservation covenant and management agreement where it adjoins the neighbouring property. This property has been recently acquired by Mr Thurley and the area surveyed was extended onto this property.

The vegetation communities within the covenant area was similar to area 3, mainly *Eucalyptus amygdalina* Grassy Forest and Woodland on Dolerite, and with patches of native grassland vegetation. This forested vegetation extended onto the adjoining property although White Gum *Eucalyptus viminalis* became more predominant with distance from the boundary to become *Eucalyptus viminalis* Grassy Forest and Woodland. The grassy ground layer within the adjoining property was in excellent condition both as potential fauna habitat and for herbaceous species of flora including orchids which may emerge in late spring and summer. Plenty of fallen logs and other branch debris is also important fauna shelter and habitat. A number of habitat trees with hollows were observed and there is a high probability of significant hollows being present within the adjacent *Eucalyptus viminalis* Forest, this species typically producing more hollows at maturity than other species of Eucalypts. Both burrows and scats of Wombats were observed in this survey area.

Just two environmental weeds were observed in this survey area, Spear Thistle *Cirsium vulgare* and Sweet Vernal Grass *Anthoxanthum odoratum* which is common in rough pastures.

This area will also warrant further and more detailed in-season survey should more intensive exploration be proposed.

PHOTO No.9..... Target Area No.4.. *Eucalyptus amygdalina* Open Grassy Forest on Dolerite. Ground layer of native grasses and *Lomandra longifolia,* and understorey including Silver Wattle *Acacia dealbata* and Native Cherry *Exocarpus cupressiformis.*

PHOTO No.10.... Target Area No.4.... *Eucalyptus amygdalina* Open Forest on Dolerite with a healthy groundlayer of native grasses and fallen debris as potential fauna habitat.

PHOTO No.11.... Target Area No.4. A shallow gully extends westwards along the southern boundary of the covenant area with a small dam part way down. Most of the exposed bauxite deposit extends along the side of the gully in this location.

SURVEY AREA No. 5: (Deposit No.3) Gully 518430E - 5410915N

This target area extends along a length of escarpment where the rolling hills drop relatively sharply to the main creek-line which extends through the property. It includes two short side gullies which flow into the main creek. The gullies retain some remnant vegetation and there are also a number of mature Eucalypts, mainly *Eucalyptus viminalis* which have been retained along the actual escarpment.

Aside from the remnant trees and the gully vegetation the surrounding area is rough pasture consisting of both native and exotic grasses.

No significant fauna habitat was observed within the gullies although there is potential for hollows to be present in the mature Eucalypts and these would present habitat opportunities for numerous species of fauna.

A number of weed species were present in the gullies, including blackberry hawthorn and spear thistle. Large patches of Hawthorn was observed along the main creek-line near this target area.

PHOTO No.12.... Target Area No.5. Remnant vegetation within the gully.

PHOTO No.13..... Target Area No.5. Remnant mature trees, mainly *Eucalyptus viminalis* extend along the edge of the escarpment.

PHOTO No.14..... Target Area No.5. The main creek-line on the property extends through this valley. Photo taken from within Target area 5.

SURVEY AREA No.6. Is the site of an old quarry and it had no significant vegetation.

THREATENED VEGETATION COMMUNITIES: The two mapped patches of *Eucalyptus amygdalina* Inland Forest on Cainozoic deposits were in decline and in poor condition. This community is listed as threatened under the Tasmanian *Nature Conservation Act 2002.*
Good and healthy area of lowland grassland vegetation, particularly *Themeda trianda* (Kangaroo Grass) grassland were present within the covenant area, Target areas 3 and 4. Patches of *Poa labillardierei* Lowland Grassland was observed near Target Area 2.
Lowland Grassland communities are listed as threatened under the Commonwealth *EPBC Act 1999.*

THREATENED FLORA: No species of flora listed under the Tasmanian *Threatened Species Protection Act 1995* or the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* were observed during the survey.
None of threatened species of flora recorded on the Natural Values Atlas database from within 5,000 metres of the property was observed during the field survey. There would be a relatively high probability that an in-season follow-up survey would find one or more threatened species of flora, particularly within the covenant area and on the adjoining property.

THREATENED FAUNA: No species of threatened fauna was observed during the survey.
The Tasmanian Devil and the Eastern-barred Bandicoot have both been recorded on the NVA database in the past from within 3,000 metres of the property however no evidence of the presence of either species was observed.

THREATENED FAUNA HABITAT:
No specific threatened fauna habitat was observed during the field survey however the presence of wombat burrows and scats in the vicinity of sites 2 and 4 would support the location as being likely and favourable habitat for Tasmanian Devils, as devils do utilise wombat burrows as den sites.
There were numerous mature and old-growth trees present across the property which have high potential for hollows which would provide potential fauna habitat including some threatened species. None of the mature trees observed presented potential nest trees for Wedge-tailed Eagles. No mature tree however will be directly impacted by the proposed drilling program so there will be no threat to any such potential habitat.
Logs and other fallen debris was present within the covenant area and on the adjoining property which can also provide habitat for fauna.
No potential threatened fauna habitat was present in the vicinity of target sites 5 and 6 except for potential hollows in the mature Eucalypts.

NON-THREATENED FAUNA OF CONSERVATION SIGNIFICANCE:
Wombat burrows were observed on the sandy hill above Target Area No.2, and also on the adjoining property, part of survey area No.4. Wombat scats were also observed along the property boundary within Survey Area No.4.
A Mountain Dragon was observed in Survey Area No.3. within the area of conservation covenant, along with Jewel Spiders both of which are restricted to the north and east of the state.

ENVIRONMENTAL WEEDS:
The only significant weed infestation observed on the property was a large patch of Hawthorn along the main creek-line. This is however outside of any of the exploration target areas.
Blackberry, Hawthorn, Spear Thistle, the aquatic grass *Glyceria maxima*, Gorse, Sweet Vernal Grass, Mallow and Briar Rose were observed occasionally. Gorse, Hawthorn, Blackberry and *Glyceria maxima* being the weeds with most potential to cause management issues.

PHYTOPHTHORA:
No evidence of the presence of this pathogen was observed at each of the four survey sites.

4.0 CONCLUSIONS:

There were no issues identified during the field survey which would prevent the exploration program as proposed from proceeding.
One vegetation community listed as threatened under the Tasmanian *Nature Conservation Act 2002* was observed. A small localised patch of *Eucalyptus amygdalina* Inland Forest on Cainozoic Deposits was observed near Survey Area 2, however it was in a degraded state and surrounded by cattle grazed pasture.
Lowland native grasslands are listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.* Two communities of native grasslands were observed. *Poa labillardierei* Grassland near survey area 2 and *Themeda triandra* Grassland within the defined Lowland Grassland Complex community within survey areas 3 and 4.
The vegetation community *Eucalyptus viminalis* Grassy Forest was only observed on the recently acquired neighbouring property.
There were no listed threatened flora or fauna observed during the field survey however there is potential for threatened species of herbaceous flora to be present, particularly in survey areas 1, 3 and 4 as the survey was undertaken at a time which was out of season for these plants.
Survey areas 2 and 4 included evidence of the presence of wombat scats and/or burrows. Wombat burrows are potential den habitat for Tasmanian Devils. No other specific habitat for threatened fauna was observed during the survey, however the areas covered by the conservation covenant/management agreement and the newly acquired adjoining property (survey areas 3 and 4) contain vegetation in excellent condition and both areas have high potential as habitat for fauna, including a number of threatened species.
The proposed exploration program will not impact on any permanent stream, waterhole or farm dam which may be potential habitat for aquatic or riparian species of fauna.
There are no known nest trees of Wedge-tailed Eagle on or within 2,000 metres of the property and no potential nest trees or sites were observed during the survey over the property.
Mature Eucalypts including White Gums *Eucalyptus viminalis* are relatively common across the property and these trees are potential habitat trees, particularly those with hollows. The exploration program however will not directly impact on mature trees.
Environmental weeds were not considered to be a serious issue in any of the survey areas although weed species are present and will need to be considered during field operations.

5.0 RECOMMENDATIONS:

- Survey Areas Nos.1, 3 and 4 will require in-season follow-up botanical surveys to identify the full diversity of species present and confirm the conservation value of the localised areas prior to more extensive exploration (or mining) being undertaken. Survey Areas No.2, 3 and 4 will also require more intensive fauna habitat surveys on the same basis.
  Survey Area No.1 has rock plates present which could present micro-habitats for rock-plate flora.
  Survey Area No.3 is located within the 40ha block with a conservation covenant and has important patches of remnant native grasslands and grassy woodlands with potential fauna habitat.
  Survey Area No.4 is also within the covenant area also extends onto the neighbouring property recently acquired by Mr Thurley. The area includes good patches of relatively intact grassy woodland vegetation, with potential fauna habitat.
- Ensure the adequate containment within each drill site of all silt, dust, sediment and other contaminants resulting from the drilling program to avoid impacting on adjacent soils and ground stratum vegetation.
- As a precautionary measure and in order to prevent the introduction of weeds into weed free areas all equipment and machinery should be subject to a wash-down procedure to remove any soil or mud which could contain weed seeds before entering the property.
- Any proposed drill site in the vicinity of weed infestations should be undertaken last in the drilling program.
- Accepted protocols in regard to hygiene and wash-down procedures for all machinery and equipment, including the drill rig itself should be followed, to ensure that the pathogen Phytophthora is not inadvertently introduced into disease free locations by way of extraneous soil, mud and gravel adhered to tyres, work-boots and equipment.

Philip Milner

Vegetation Consultant

APPENDIX 1:
Vegetation Communities and Species Recorded

1. ***Eucalyptus amygdalina*** **Forest & Woodland on Dolerite (TasVeg Code DAD)** Observed in survey areas 1, 3, 4 and 5.
2. ***Eucalyptus amygdalina*** **Inland Forests on Cainozoic Deposits (DAZ)** Observed near survey area 2.
3. ***Eucalyptus viminalis*** **Grassy Forest & Woodland (DVG)** Only on the recently acquired adjacent property near survey area 2.
4. ***Poa labillardierei*** **Lowland Grassland (GPL)** Observed near survey area 2.
5. **Lowland Grassland Complex as** ***Themeda triandra*** **Grassland (GCL)** Observed in and near survey area 3 and 4.

DOMINANT TREES	COMMON NAME	FREQUENCY
Eucalyptus amygdalina	Black Peppermint	common
CO-DOMINANT TREES		
Eucalyptus viminalis	White Gum	common
UNDERSTOREY TREES & LARGE SHRUBS		
Acacia dealbata	Silver Wattle	occasional
Acacia mearnsii	Black Wattle	occasional
Allocasuarina littoralis	Black Sheoak	uncommon areas 3 & 4
Allocasuarina verticillata	Drooping Sheoak	Area 4, only on adjoining property & uncommon
Banksia marginata	Silver Banksia	uncommon, area 3
Beyeria viscosa	Pinkwood	localised in area 5
Bursaria spinosa	Prickly Box	occasional
Exocarpus cupressiformis	Native Cherry	occasional areas 3, 4 & 5
Pomaderris apetala	Dogwood	localised along creek, area 3
MEDIUM SHRUBS		
Coprosma quadrifida	Native Currant	localised in area 5
Melicytus dentatus	Tree Violet	fairly common
SMALL SHRUBS		
Astroloma humifusa	Cranberry Heath	occasional
Hibbertia riparia	Erect Guineaflower	occasional
Lissanthe strigosa	Peach Heath	occasional
Solanum lacineatum	Kangaroo Apple	localised in area 2
CLIMBERS		
Cassytha melantha	Dodder-laurel	uncommon
Clematis aristata	Southern Clematis	localised in area 5

APPENDIX 1 (cont)

HERBS & HERB-LIKE PLANTS	COMMON NAME	FREQUENCY
Dichondra repens	Kidney-weed	occasional
Einadia nutans	Climbing Saltbush	localised in area 1
Euchiton sp.	A Cudweed	occasional
Lobelia anceps	Angled Lobelia	localised in area 3
Oxalis perennans	Grassland Woodsorrel	occasional
Wahlenbergia sp.	A Native Bluebell	occasional area 4
GRASSES & GRAMINOIDS		
Austrodanthonia sp.	A Wallaby grass	locally common
Cyperus lucidus	Leafy Flatsedge	localised in area 3
Dichelachne crinita	Longhair Plumegrass	occasionalin area 1 & near 2
Eleocharis acuta	Common Spikesedge	localised in area 3
Juncus sp. 1.	A Rush	localised in area 3
Juncus sp. 2	A Rush	occasional area 5
Poa labillardierei	Silver Tussock Grass	common
Poa rodwayi	Velvet Tussock Grass	occasional area 1 & near 2
Lepidosperma elatius	A Sword Sedge	occasional areas 4 & 5
Lepidosperma sp.	A Sword Sedge	occasional area 1
Lomandra longifolia	Mat-rush	occasional
Themeda triandra	Kangaroo Grass	in areas 1,2, 3 and 4
FERNS & ALLIED PLANTS		
Pteridium esculentum	Bracken	common
ENVIRONMENTAL WEEDS		
Anthoxanthum odoratum	Sweet Vernal Grass	common
Briza minor	Shivery Grass	occasional area 1
Centaurium erythraea	Centuary	common
Cirsium vulgare	Spear Thistle	occasional
Crataegus monogyna	Hawthorn	occasional near 2, common along the main creek
Glyceria maxima	Reed Sweetgrass	localised in area 3
Malva sp.	A Mallow	localised in area 2
Rosa rubiginosa	Briar Rose	localised near 2
Rubus fruticosus	Blackberry	localised in area 5
Ulex europaeus	Gorse	occasional near 2 & 3

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