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GHD Pty Ltd (April 2016) Wonthaggi North East Growth Area Planning Studies – Contaminated Land Investigation, Prepared for Bass Coast Shire Council (document reference 31/33577/248148)

The PDF is one of five files generated from the entire report, for the purposes of reducing file size only, and each file does not constitute a stand-alone report.

The PDF files comprising the entire report are:

1. 248148 Rev 2_Main Report.pdf
2. 248148 Rev 2_Figures.pdf
3. 248148 Rev 2_Appendices A-C.pdf
4. 248148 Rev 2_Appendices D-F.pdf
5. 248148 Rev 2_Appendices G-J.pdf

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Appendices

Appendix A – Wetlands Assessment



A Wetlands and waterways review

The following provides a description of the wetlands and waterways relevant to the Wonthaggi North East Growth area (WNEGA) based on desktop assessment. The area falls in the Powlett River catchment, under the management of the West Gippsland CMA.

A1. Wetlands

Four current wetlands are recorded in the Victorian Biodiversity Interactive Map (Version 3.2) as located within or immediately adjacent to the WNEGA (see map appended). Wetlands 80243 and 80235 are located south of the Bass Highway are mostly within the WNEGA, and total approximately 12.3 Ha. Wetland 80234, located outside the WNEGA north of the Bass Highway, lies immediately adjacent to the western boundary of the WNEGA. Wetland 80236 is located on the Bass Highway, mostly outside the eastern boundary of the WNEGA but may extend across the boundary into the WNEGA alongside the road reserve.

Each of these four wetlands are naturally occurring, temporary freshwater swamps, that are periodically inundated. These wetlands have very low connectivity with waterways in the Powlett catchment, and the contribution from groundwater, is unknown.

The Victorian Biodiversity Atlas contains no records of aquatic or semi-aquatic fauna (eg. amphibians, reptiles, fish) from within the four wetlands. However it is not known if any surveys for aquatic species have been undertaken in these wetlands, and thus an assessment of the ecological values in these wetlands would require site surveys.

Although threatened aquatic species have not been recorded within the WNEGA, species listed in the Commonwealth EPBC Act, Victorian FFG Act, or Victorian Advisory list are recorded within 10 km of the WNEGA. These include species such as Southern Toadlet, Growling Grass Frog, Eastern Snake-necked Turtle.

A2. Waterways

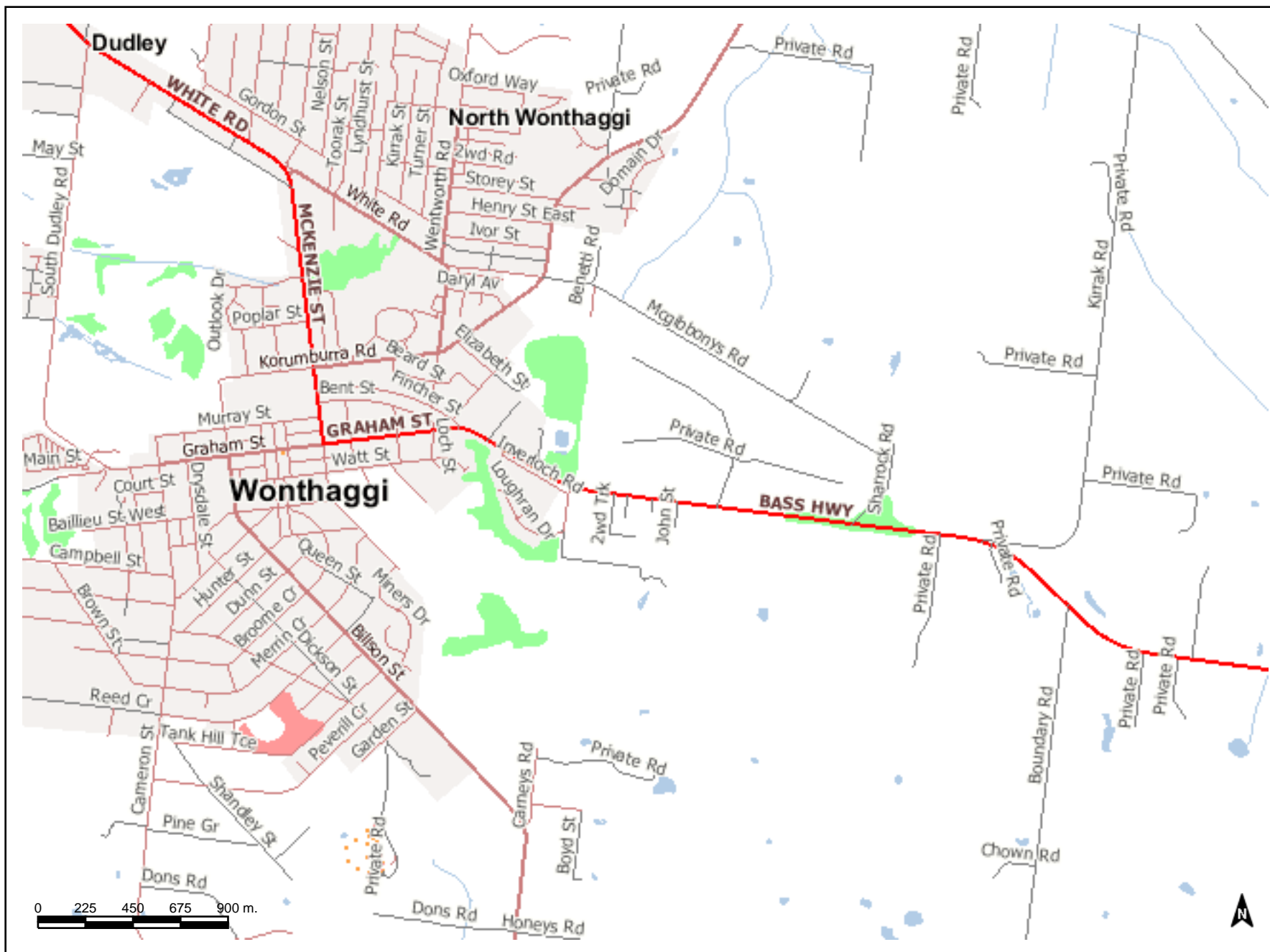
The WNEGA lies within the Powlett River catchment. An unnamed tributary of the river flows north from McGibbonys Road, across land currently used as pasture, crosses Korumburra-Wonthaggi Road north of the WNEGA and enters the Powlett River north of Wonthaggi township. Based on the catchment area of this first order stream, it is likely that this waterway is ephemeral.



Based on the Victorian Government's Biodiversity Interactive Map (3.2), there are no floodways within the WNEGA, and is outside the 1 in 100 year flood level for the Powlett River.

The Victorian Biodiversity Atlas contains no records of aquatic or semi-aquatic fauna (eg. amphibians, reptiles, fish, aquatic invertebrates) from the waterways within the WNEGA. It is not known if any surveys for aquatic species have been undertaken, and thus it is not known if these small waterways provide habitat for significant aquatic species. An assessment of the habitat suitability for significant aquatic species would require a site inspection of habitat quality, and possibly targeted surveys to improve confidence in an assessment of presence/absence.

Similarly, the Index of Stream Condition assessment has not been undertaken in these waterways. However given the high degree of land modification, and minimal riparian vegetation, it is considered unlikely that these small streams contain high value ecosystems.



- ROADS**
- Freeway
 - Highway
 - Main Road
 - Secondary Road
 - Local Road
 - 2WD (Unsealed)
 - 4WD Only
 - Walking or Cycle Track
- WATERCOURSES**
- Unnamed Drainage Lines
- CURRENT WETLANDS**
- Coastal saltmarsh
 - Forest/Woodland
 - Moss/heath
 - No emergent vegetation
 - Sedge/grass/forb
 - Shrub
 - Unknown
- WATERBODIES**
- Watercourse Area
 - Permanent Waterbody
 - Wetland Area
 - Inundation Area
- BUILT UP AREAS**

Disclaimer: This map is a snapshot generated from Victorian Government data. This material may be of assistance to you but the State of Victoria does not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for error, loss or damage which may arise from reliance upon it. All persons accessing this information should make appropriate enquiries to assess the currency of the data.

Appendix B – EPBC Protected Matter report



B EPBC Matters

Please find following a brief description of an ecological desktop assessment undertaken for the Wonthaggi North East Growth Area (WNEGA), with particular emphasis on a desktop search of the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) Protected Matters Search Tool (PMST), which predicts the presence of Matters of National Environmental Significance (MNES).

A search was undertaken using the PMST, to determine a list of MNES that may occur in the WNEGA. Standard procedure for flora and fauna assessment is to search the PMST within a 10-km buffer of the study site.

Without visiting the site, it is difficult to determine the likelihood of occurrence of identified MNES in the study site itself. An examination of aerial photography and DELWP vegetation mapping provides some information on the presence of potential habitat on-site.

B1. Biodiversity Interactive Map (DELWP)

DELWP interactive mapping¹ was utilised to determine vegetation types likely to be present in the study site. This was augmented by a search of the DELWP Native Vegetation Information Management (NVIM)² tool.

Mapping indicates that the site is relatively clear of native vegetation. There are some areas of native vegetation within the footprint provided. The largest section of native vegetation consists of **EVC 925** – Damp Sands Herb-rich Woodland/Swamp Scrub Mosaic. This is a vegetation type dominated by Manna Gums (*Eucalyptus viminalis*) with an understorey dominated by native grass, shrubs (such as Tea-tree, Paperbark or Heath) or Bracken (*Pteridium esculentum*).

The largest area of EVC 925 at the study site appears to centre on the Wonthaggi Bushland Reserve, on the western side of Carneys Rd, either side of the Bass Hwy.

Smaller areas of vegetation include an area of **EVC 924** – Grassy Woodland/Swamp Scrub mosaic. This vegetation type consists usually of a *Eucalyptus* or *Allocasuarina* woodland over a diverse ground layer of grasses and forbs. The main area of EVC 924 on the study site is to the east of Sharrock Rd and along the McGibbonys Rd road reserve.

Other than these areas of potential native vegetation, much of the area is farmland, with some light industrial and commercial properties on the south side of the Bass Highway and areas adjoining the Wonthaggi Bushland Reserve.

The significance of intact native vegetation is that, more than cleared or farmed areas, it is in intact native vegetation that listed threatened species are more likely to occur. The presence of intact vegetation on site increases the probability of the area being used as habitat by these species.

¹ <http://mapshare2.dse.vic.gov.au/MapShare2EXT/imf.jsp?site=bim> (accessed 16/12/2015)

² <http://nvim.depi.vic.gov.au/> (accessed 16/12/2015)



B1.2 Protected Matters Search Tool Results³

The results of the PMST search (attached) identify four MNES within ten kilometres of the study site:

- ▶ Wetlands of International Importance;
- ▶ Listed Threatened Ecological Communities;
- ▶ Listed Threatened Species; and
- ▶ Listed Migratory Species.

All of the MNES should be considered in any future assessment of the area, particularly in terms of construction or any clearing of the study site. A number of MNES have been addressed below. However this should not be considered a detailed assessment of the ecological values of the site.

Wetlands of International Importance

In 1982, a large portion of Western Port was designated as a wetland of international importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention). The site occupies 59,297 ha and consists of large shallow intertidal areas dissected by deeper channels, and a narrow strip of adjacent coastal land in some areas.

This wetland is considered in this assessment because it occurs within 10 km of the site and is therefore picked up by the PMST search, as described above.

There are small water courses and drainage lines in the area but they are minor and likely to be only very distantly connected to Western Port, if at all. Additionally, appropriate sediment and erosion control at the site, during any construction or works will minimise impacts on these small drainage lines and water courses.

Given the distance to the Wetland, topography and site management, works will not impact on Wetlands of National Significance.

Listed threatened ecological communities

The Natural Damp Grassland of the Victorian Coastal Plains is a type of grassland dominated by tussock grasses, typically with a sparse presence of trees and shrubs. It is generally found at elevations less than 100 metres above sea level, on heavy grey silty-loamy soils that are poorly draining, often damp and sometimes waterlogged. The ecological community is limited to southern Victoria, and has a disjunct distribution on the coastal plains. There are known occurrences in south Gippsland, the head of Western Port Bay, Philip Island, Mornington Peninsula and the Bellarine Peninsula.

The grassland generally is dominated by tussock grasses, notably *Themeda triandra* (Kangaroo Grass) on drier sites, or *Poa labillardierei* (Common Tussock-grass) on wetter sites. The range of grasses and forbs present includes species associated with damp sites.

The grasslands are known to be derived from cleared woodland or heathland, where the tree or shrub canopy has been removed but a native ground layer remains intact, so may be present at the study site in cleared areas where woodlands may historically have been present. However, clearing and cultivation of the land has modified the environment, so may have reduced the likelihood of this MNES being present.

³ <https://www.environment.gov.au/epbc/protected-matters-search-tool> (accessed 15/12/2015)



Listed Threatened Species and Migratory Species

The PMST results indicate the potential for 49 Listed Threatened Species and 43 Migratory Species to occur within a 10-km buffer of the study site. As previously stated, it is difficult to make an assessment of the likelihood of occurrence of all species until a site visit and assessment can be undertaken. However, the habitat requirements for the following species are well known.

► Eastern Dwarf Galaxias (*Galaxiella pusilla*) – listed as Vulnerable

Eastern Dwarf Galaxias is a tiny, slender freshwater fish that averages 30-40 mm in length. It has been recorded in southern Australia from the Mitchell River Basin in Gippsland to Cortina Lakes near South Australia's Coorong.

The Eastern Dwarf Galaxias has broad habitat requirements and occurs in slow flowing and still, shallow, permanent and temporary freshwater habitats such as swamps, drains and the backwaters of streams and creeks, often (but not always) containing dense aquatic macrophytes and emergent plants. Habitat can occur in superficially degraded waterways, and specific detailed habitat requirements are unknown. The species may use 'transient habitat' in the water courses and drainage lines around the study site.

Survey for eastern Dwarf Galaxias should be undertaken in January to April, should suitable habitat be available.

► Growling Grass Frog (*Litoria raniformis*) – listed as Vulnerable

The Growling Grass Frog is one of the largest frog species in Australia. The species was previously widespread across Victoria but has disappeared from most of its former range.

This species is found mostly amongst emergent vegetation (Robinson 1993), including bulrushes, reeds and sedges, in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams. The Growling Grass Frog is dependent upon permanent freshwater lagoons for breeding, preferably with complex vegetation structure.

There is a lack of available habitat at the study site, as any waterways are ephemeral and devoid of fringing vegetation, therefore reducing the likelihood of Growling Grass Frog occurrence. Ideal survey time is during the breeding season, which occurs in November-December in southern Australia. However, a site assessment would confirm the absence of suitable habitat.

► Giant Gippsland Earthworm (*Megascolides australis*) – listed as Vulnerable

The Giant Gippsland Earthworm is one of the largest earthworms in the world. It grows to 80–100+ cm long and is 2 cm in diameter.

The Giant Gippsland Earthworm is generally found in the deep blue-grey clay-like soils over cretaceous rocks in the western Strzelecki Ranges and in the alluvial soils in depositional zones to the north and south-west. Populations are usually found within close proximity to streams or drainage channels, usually within 40 m but are often restricted to within 5 to 10 m of the banks.

The Giant Gippsland Earthworm occurs in permanent pasture, with agriculture representing the major land use throughout its range. It is possible that it may occur at the study site and further site assessment may be required.

► Eastern Spider Orchid (*Caladenia orientalis*) – listed as Endangered

The Eastern Spider Orchid grows to 20 cm tall and has strongly perfumed, creamy white to pale yellowish green flowers (Backhouse & Jeanes 1995). It tends to grow in coastal heathland and heathy woodland on deep sands. It may grow in undisturbed areas on the study site, but is unlikely in the



disturbed and modified majority of the site. The species flowers in October and early November. It is best to survey for species when they are flowering, making them more conspicuous.

► **Clover Glycine (*Glycine latrobeana*) – listed as Vulnerable**

Clover Glycine grows mainly in grasslands and grassy woodlands (Walsh and Entwisle 1996). It is widespread but rare and only sporadically encountered. It may occur in the study site, but the Wonthaggi Bushland Reserve does not contain EVCs that are likely to support habitat and the other sections of the site are disturbed and cultivated open areas that make up the bulk of the study site. Flowers September and early October.

► **Maroon Leek-orchid (*Prasophyllum frenchii*) – listed as Endangered**

Maroon Leek-orchid is widespread across southern Victoria but of disjunct occurrence. It is found mostly in grasslands, heathlands and grassy woodlands on moderately rich sandy and black clay loams (Backhouse and Jeanes 1995). As with other species, it may occur in the study site, but is more likely in the Wonthaggi Bushland Reserve, rather than in the disturbed and cultivated open areas that make up the bulk of the study site. Flowers October to December.

► **Dense Leek-orchid (*Prasophyllum spicatum*) – listed as Vulnerable**

Scattered over coastal and hinterland areas of Victoria but of disjunct occurrence. Found in grasslands, heathlands and heathy woodlands on well-drained sand and clay loams (Backhouse and Jeanes 1995). It may occur in the study site, but is more likely in the Wonthaggi Bushland Reserve, rather than in the disturbed and cultivated open areas that make up the bulk of the study site. Flowers October.

► **Leafy Greenhood (*Pterostylis cucullata*) – listed as Vulnerable**

Widely distributed but disjunct, mostly occurring in small groups in coastal areas, rarely inland (Walsh and Entwisle 1994). Widespread across southern Victoria, and extending into montane areas of the Eastern Highlands and East Gippsland. Grows in closed scrublands on the landward slopes, swales and tops of coastal sand dunes. Also grows in open forests on moist slopes, on seasonally inundated inland river flats, and in other riparian habitats. On the coast it grows in deep, well-drained sandy loams while inland it favours heavier sandy loams (Backhouse & Jeanes 1995). Flowers August to October.

► **Bird Species**

The majority of threatened and migratory species are birds. There is a large variety of habitats and conditions required for bird species to utilise an area such as the study site. Despite the disturbed nature of much of the study site, the potential for habitat for birds for roosting, nesting or foraging means that a site assessment by a qualified zoologist should be undertaken. Birds use artificial as well as natural habitats and their presence cannot be confirmed or discounted without a site assessment.



B2.Recommendations / further studies

The results of this review provide *some* advance direction as to the likelihood of referral requirements under the EPBC Act being triggered. However, this is just one component of ecological projects for a project on this scale. The following approach to further ecological investigation of the site is recommended, moving forward towards design and approvals.

1. Desktop assessment – Search other databases of flora and fauna records (e.g. Victorian Biodiversity Atlas), review any available literature, determine likelihood of occurrence of species listed under *Flora and Fauna Guarantee Act 1988* and in the Victorian Advisory List of Rare or Threatened Species.
2. Preliminary site inspection – survey the area and map areas of flora and fauna values.
3. Preliminary flora and fauna report to inform design and approvals
4. Detailed flora and fauna assessment, following detailed design or planning, to determine whether there will be actual losses of vegetation, species habitat, listed threatened species.



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: 17/12/15 11:34:02

[Summary](#)

[Details](#)

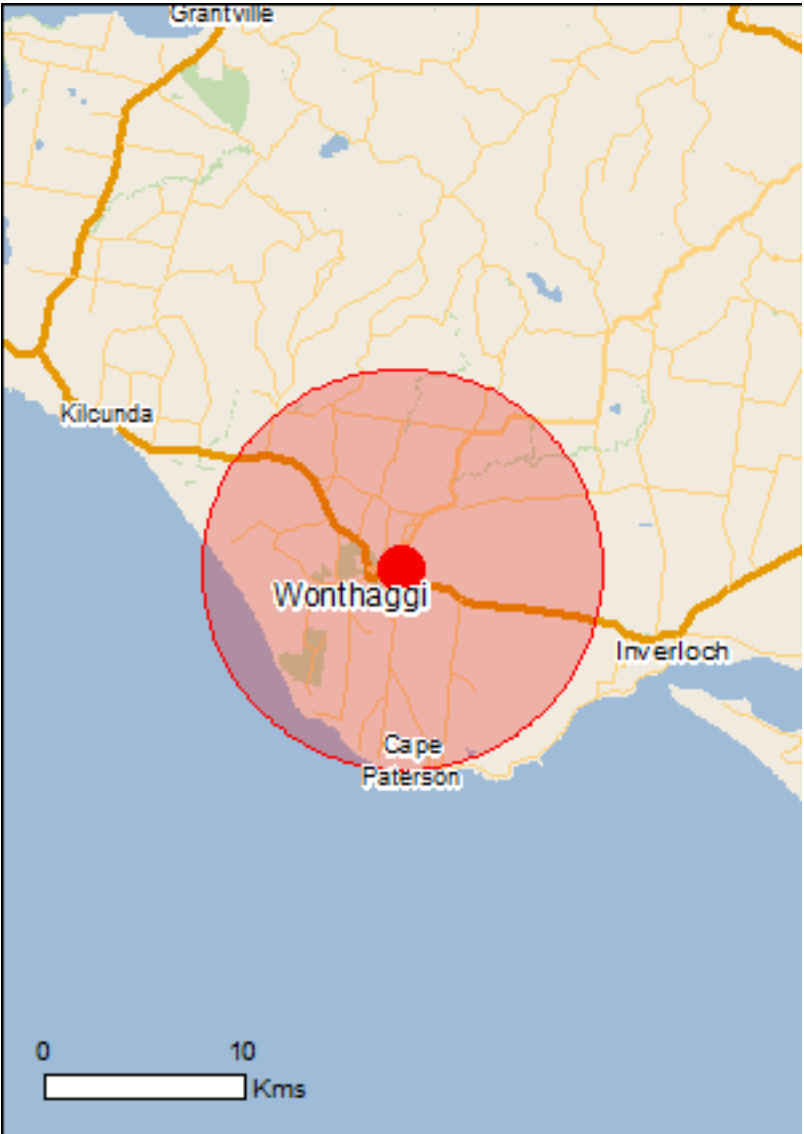
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

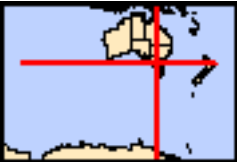
[Acknowledgements](#)



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[Coordinates](#)

Buffer: 10.0Km



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](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	49
Listed Migratory Species:	43

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>

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.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	73
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	14
Regional Forest Agreements:	None
Invasive Species:	35
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		[Resource Information]
Name		Proximity
Western port		Within 10km of Ramsar

Listed Threatened Ecological Communities	[Resource Information]
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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.

Name	Status	Type of Presence
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community likely to occur within area

Listed Threatened Species	[Resource Information]
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Name	Status	Type of Presence
Birds		

Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Diomedea epomophora epomophora Southern Royal Albatross [25996]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora sanfordi Northern Royal Albatross [82331]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans exulans Tristan Albatross [82337]	Endangered	Species or species habitat may occur within area
Diomedea exulans gibsoni Gibson's Albatross [82271]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta salvini Salvin's Albatross [82343]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat known to occur within area
Fish		
Galaxiella pusilla Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species

Name	Status	Type of Presence
Prototroctes maraena Australian Grayling [26179]	Vulnerable	habitat likely to occur within area Species or species habitat likely to occur within area
Frogs		
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat known to occur within area
Insects		
Synemon plana Golden Sun Moth [25234]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isoodon obesulus obesulus Southern Brown Bandicoot (Eastern) [68050]	Endangered	Species or species habitat known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys fumeus Konoom, Smoky Mouse [88]	Endangered	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Other		
Megascolides australis Giant Gippsland Earthworm [64420]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Caladenia orientalis Eastern Spider Orchid [83410]	Endangered	Species or species habitat known to occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area
Prasophyllum frenchii Maroon Leek-orchid, Slaty Leek-orchid, Stout Leek-orchid, French's Leek-orchid, Swamp Leek-orchid [9704]	Endangered	Species or species habitat likely to occur within area
Prasophyllum spicatum Dense Leek-orchid [55146]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		

Name	Status	Type of Presence
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Sharks		
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat known to 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
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within

Name	Threatened	Type of Presence area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[<u>Resource Information</u>]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species

Name	Threatened	Type of Presence
Catharacta skua Great Skua [59472]		habitat may occur within area Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within

Name	Threatened	Type of Presence
Myiagra cyanoleuca Satin Flycatcher [612]		area Species or species habitat known to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche chrysostoma Grey-headed Albatross [66491]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Fish		
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys mollisoni Mollison's Pipefish [66260]		Species or species habitat may occur within area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stigmatopora olivacea a pipefish [74966]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Whales and other Cetaceans		
[Resource Information]		
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within

Name	Status	Type of Presence
Balaenoptera edeni Bryde's Whale [35]	Endangered	area
Balaenoptera musculus Blue Whale [36]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]	Endangered	Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]		Species or species habitat known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]	Vulnerable	Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Bunurong	VIC
Bunurong Marine Park	VIC
Cape Patterson N.C.R	VIC
Wonthaggi G237 B.R.	VIC
Wonthaggi G238 B.R.	VIC
Wonthaggi G239 B.R.	VIC
Wonthaggi G240 B.R.	VIC
Wonthaggi G241 B.R.	VIC
Wonthaggi G242 B.R.	VIC
Wonthaggi G243 B.R.	VIC
Wonthaggi G244 B.R.	VIC
Wonthaggi G245 B.R.	VIC
Wonthaggi G246 B.R	VIC
Wonthaggi Heathlands N.C.R	VIC

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 Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		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
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
Turdus philomelos Song Thrush [597]		Species or species habitat likely to occur within area
Mammals		
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
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
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
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Carrichtera annua Ward's Weed [9511]		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
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		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

Name	Status	Type of Presence
Ulex europaeus		
Gorse, Furze [7693]		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

-38.6029 145.60876

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:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Parks and Wildlife Commission NT, Northern Territory Government](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian 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](#)
- [Forestry Corporation, 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.

Appendix C – Historical aerial photography review

C1 Historical aerial imagery review

Six sets of historical aerial photographs dating from 1950 to 2015 were reviewed for the Study Area. The photographs from 1950 to 1991 were obtained from the Department of Environment, Land, Water and Planning (DELWP), Aerial Photography Register, Victorian Records Office. Aerial Imagery for the period between 1950 and 1970 was missing from the record office at the time of this assessment. In all cases the aerial imagery available from the DELWP Aerial Photography Register was of a large scale and poor resolution, which provided limited detail to identify landscape features. Available imagery from Google Earth Pro was also reviewed for 2010 and 2015. The historical aerial photograph review is presented below in Table C1 below.

Table C1 Review of historical aerial photographs

Year	Observations
1950	<p>Study Area Observations</p> <p>The study area appears to have been largely vacant grass covered paddocks with minimal vegetation. An area of dense vegetation is visible in the south western portion of the study area incorporating the property 113 and the southern portion of Property 109.</p> <p>Buildings and structures in the southern portion of the study area appear to be limited to residential and farming properties located to the north and south of Inverloch Road in properties (48, 56,56, 66-69, 72-73 and 105).</p> <p>Centrally located in the study area, buildings and structures (also residential in appearance) are visible to the north of McGibbony's Road in the southwest corner of property 42, in property 45 and in Property 46.</p> <p>Buildings are also visible in the north of the study area on Property 6, Property 7 (north of Oates Rd), Property 34 (east of Oates Rd) and Property 39 east of Korumburra-Wonthaggi Rd. Structures in Property 5 and the western portion of Property 2 in the northeast of the study area are also visible.</p> <p>What appears to be dams were visible on Properties 1, 2, 4, 6 (3), 18, 34, 38, 40, 42 (3), 46, 111.</p> <p>An area of possible earth works approximately 320 m x 30 m is visible in the image adjacent to the northern boundary of Property 108. Disturbed ground surface is also visible in the north eastern corner of Property 8.</p> <p>Surrounding Area Observations</p> <p>The township of Wonthaggi is located to the west of the study area The Powlett River is located to the north of the study area running east-west. The areas to the south, north and east of the study area are predominantly vacant paddocks with the exception of a cluster of building (likely farming) located to the east on Inverloch Rd and a smaller cluster of buildings approximately 120 m to the north of the study area. Earthworks were also noted adjacent to the west of Property 113.</p> <p>The Wonthaggi coal mine is visible approximately 600 m to the southwest of the southern boundary of the study area (not visible in extent of Figure C1 –C6).</p> <p>A landfill (listed on the EPA Priority sites register) was identified approximately 2 km to the southwest of the study area which is visible in the 1950 imagery.</p>
1970	<p>Study Area Observations</p> <p>Dams not present in the 1950 image are visible on properties: 1, 4, 38, 40, 42 (2), property 113(3)</p> <p>A structure/ building is visible in the central portion of Property 40. Property 41 appears to have been developed into an industrial site (identified in later imagery as an electrical substation/ transformer yard). A light coloured area (possibly water or disturbed earth) is visible at the southwest boundary of Property 36 adjacent to the north side of Korumburra Road.</p> <p>Additional buildings are located on Property 42 at the southern boundary (corner of Benetti Rd Mc</p>



Year	Observations
	<p>Gibbony's Roads, in the south of Property 46, the centre of Property 49, on property 104, and 105.</p> <p>The area of suspected earthworks observed in the 1950 imagery at the north of Property 108 is also visible in the 1970 image.</p> <p>Vegetation is present in the north east corner of Property 8 (where possible earthworks were identified in the 1950 imagery).</p> <p>Vegetation present in the 1950 imagery in the northern half of Property 113 is no longer visible (the area appears to have been cleared).</p> <p>Surrounding Area Observations</p> <p>A property of industrial appearance is visible adjacent to the southwest of the Property 113.</p> <p>The Wonthaggi coal mine is visible approximately 600 m to the southwest of the southern boundary of the study area (not visible in extent of Figures C1-C6).</p>
1985	<p>Study Area Observations</p> <p>The study area appears largely unchanged from the 1970 photography.</p> <p>Disturbed ground or earthworks are again visible in the north east corner of Property 8 (present in the 1950 image but with vegetation cover in the area in 1970).</p> <p>Some additional tracks are visible traversing Properties 47, 49 and 50.</p> <p>The area of possible earthworks identified at the north of Property 108 remains visible. Vegetation clearing has occurred in the southern parts of 108 and 109.</p> <p>Surrounding Area Observations</p> <p>With the exception of minor development of land within Wonthaggi North, the majority of the surrounding area remains largely unchanged from the 1970 imagery.</p> <p>An area of possible earthworks or a body of water is visible to the north of the Property 113 west of Properties 51-58.</p>
1991	<p>Study Area Observations</p> <p>The majority of the study area has remained largely unchanged from the 1985 imagery. A new building is visible at the boundary between Property 56 and 60.</p> <p>Additional dams are visible at the western boundary of Property 108 and in Property 59. A previously identified dam in the northeast corner of Property 59 is not present in the 1991 imagery and appears to have been filled in.</p> <p>Surrounding Area Observations</p> <p>With the exception of minor development of land within Wonthaggi North, the majority of the surrounding area remains largely unchanged from the 1970 imagery.</p> <p>The area of possible earthworks observed in the 1985 imagery to the north of the Property 113 appears to now contain several large industrial/ commercial type buildings.</p>
2010	<p>Study Area Observations</p> <p>An Industrial type building is located on Properties 51, 52 and 53. A large warehouse style building is also visible in the south of Property 59. General industrial type use of land (large warehouse buildings, trucks, and storage of materials) is visible on Properties 59-68, 72-77 (to the south of Property 77 in Property 107, 84 and 112).</p> <p>Properties 9-31 have been subdivided into a low density residential configuration and Regency Drive added. With the exception of Properties 23, 24 (undeveloped) and 17 (under development) all contain residential buildings.</p> <p>The area in the north of Property 108 (identified in previous imagery as potential earthworks) is visible with an evident difference in groundcover suggestive of a depression or mounding in the ground surface or infilling.</p> <p>An area of stockpiles, possible hay bale storage or vegetation is visible in the southeast corner of Property 106.</p> <p>Industrial style buildings are visible on Properties 34, 35 and 36 with property 34 also appearing to</p>

Year	Observations
	<p>contain possible market gardens or green houses.</p> <p>Property 26 appears residential but also appears to have poly-tunnels/greenhouses.</p> <p>Cropping is visible across Property 46 and a dam is apparent. Due to image quality it is not possible to determine whether they were present in earlier imagery.</p> <p>The number of buildings on Property 49 appears to have increased.</p> <p>Surrounding Area Observations</p> <p>With the exception of minor development of land within Wonthaggi North, the majority of the surrounding area remains largely unchanged from the 1970 imagery.</p> <p>The area to the north of Property 113 appears to be an industrial estate with scrap metal and storage of various materials visible.</p> <p>The area immediately south of Property 5 was under development for what appears to be residential purposes.</p>
2015	<p>Study Area Observations</p> <p>The majority of the study area is largely unchanged from the 2010 imagery with farming the predominant land use and areas of low density residential (northwest) and light industrial (southwest).</p> <p>Soil mounds are visible in the northern half of the Property 113.</p> <p>A large area of earthworks (approximately 190 m x 200 m) is visible in the eastern half of Property 106. This was confirmed during the site inspection to be soil stockpiles</p> <p>Surrounding Area Observations</p> <p>With the exception of minor development of land within Wonthaggi North, the majority of the surrounding area remains largely unchanged from the 2010 imagery.</p>

C1.1 Historical aerial review summary

Study area observations summary

The review identified that the study area has remained in use for predominantly agricultural and stock grazing purposes land since the first available aerial imagery from 1950. Areas of residential and industrial development were also noted in the northwest and southwest of the site respectively.

An electrical substation/ transformer yard was observed on Property 41 from at least 1970 (not present in 1950). Potential market gardening was observed at Properties 26 and 34 in more recent imagery (2010).

The majority of features identified during the review consisted of residential/farm buildings and dams which were progressively developed from pre-1950 onwards. In some instances this included the development of residential and/or farm buildings. Potential infilling of dams and/or earthworks were identified on Property 2, 4, 6, 8, 17, 38, 59, 106, 108 109, 110, 113. Two buildings were also noted to have been demolished between 2010 and 2015 on Property 42.



Mounding and tracks were visible on Property 113 from 1970 onwards considered to be potentially associated with the earthworks adjacent and the mining further to the southwest. Ground disturbance was also noted on properties 8, 106 and 108.

Surrounding Area observations summary

Ongoing development of the township of Wonthaggi to the north, south and west of the study area occurred progressively from pre-1950 to 2015, eventually encroaching up to the boundary of the study area.

The Wonthaggi coal mine was identified approximately 600 m to the southwest of the study area from pre -1950 (although this area is not visible in Figures C1-C6). Earthworks were also noted adjacent to the west of Property 113 from pre-1950 with expansion of the earthworks and tracks leading onto Property 113 in the 1991 imagery. Mounding and tracks were visible on Property 113 from 1970 onwards considered to be potentially associated with the earthworks adjacent and the mining further to the southwest.

An industrial estate was observed to the southwest of the study area (north of Property 113) in more recent imagery (1985 onwards)

A landfill (listed on the EPA Priority sites register) was identified approximately 2 km to the southwest of the study area which is visible in the 1950 imagery.



LEGEND


Property Boundaries

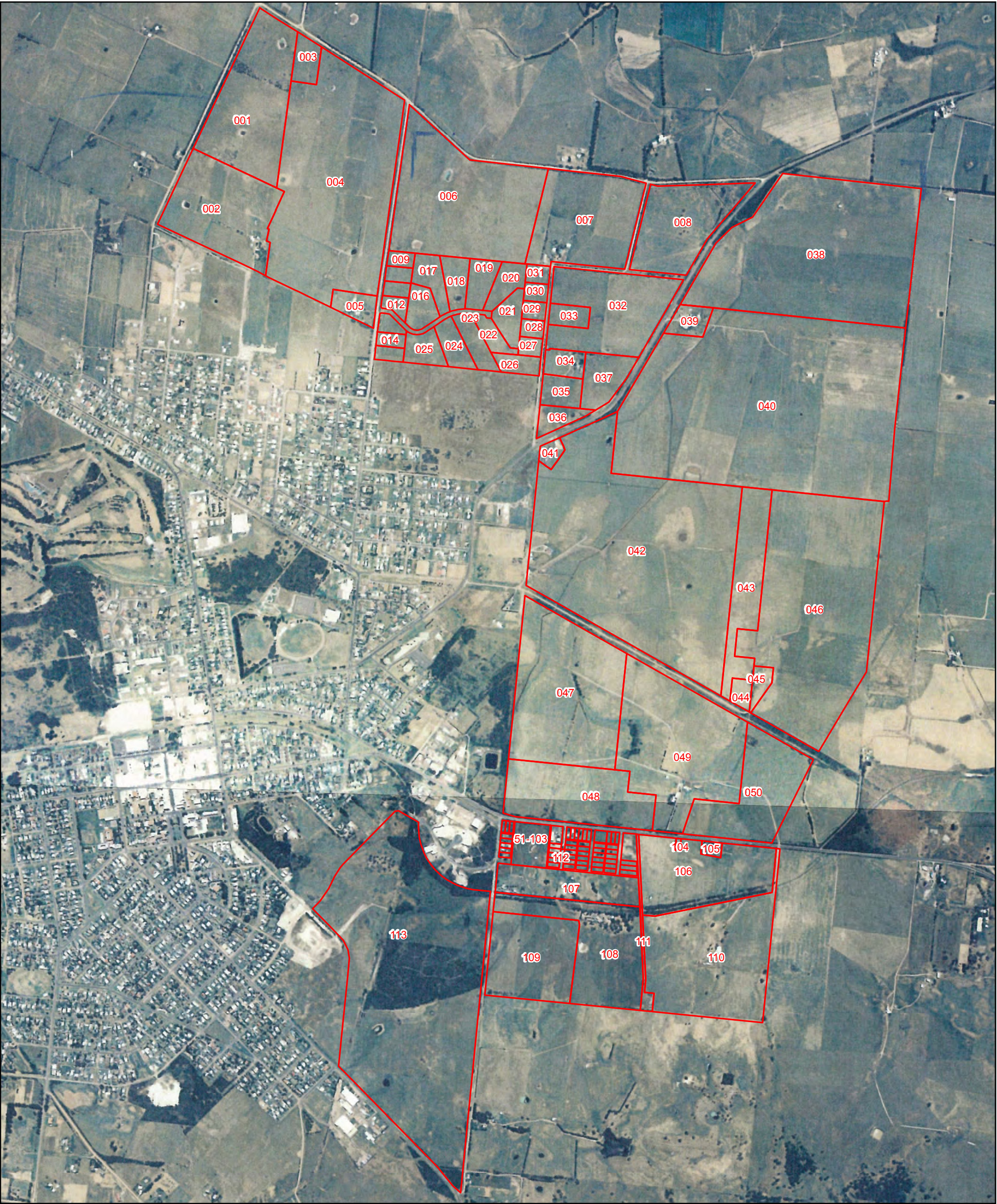


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Property Boundaries

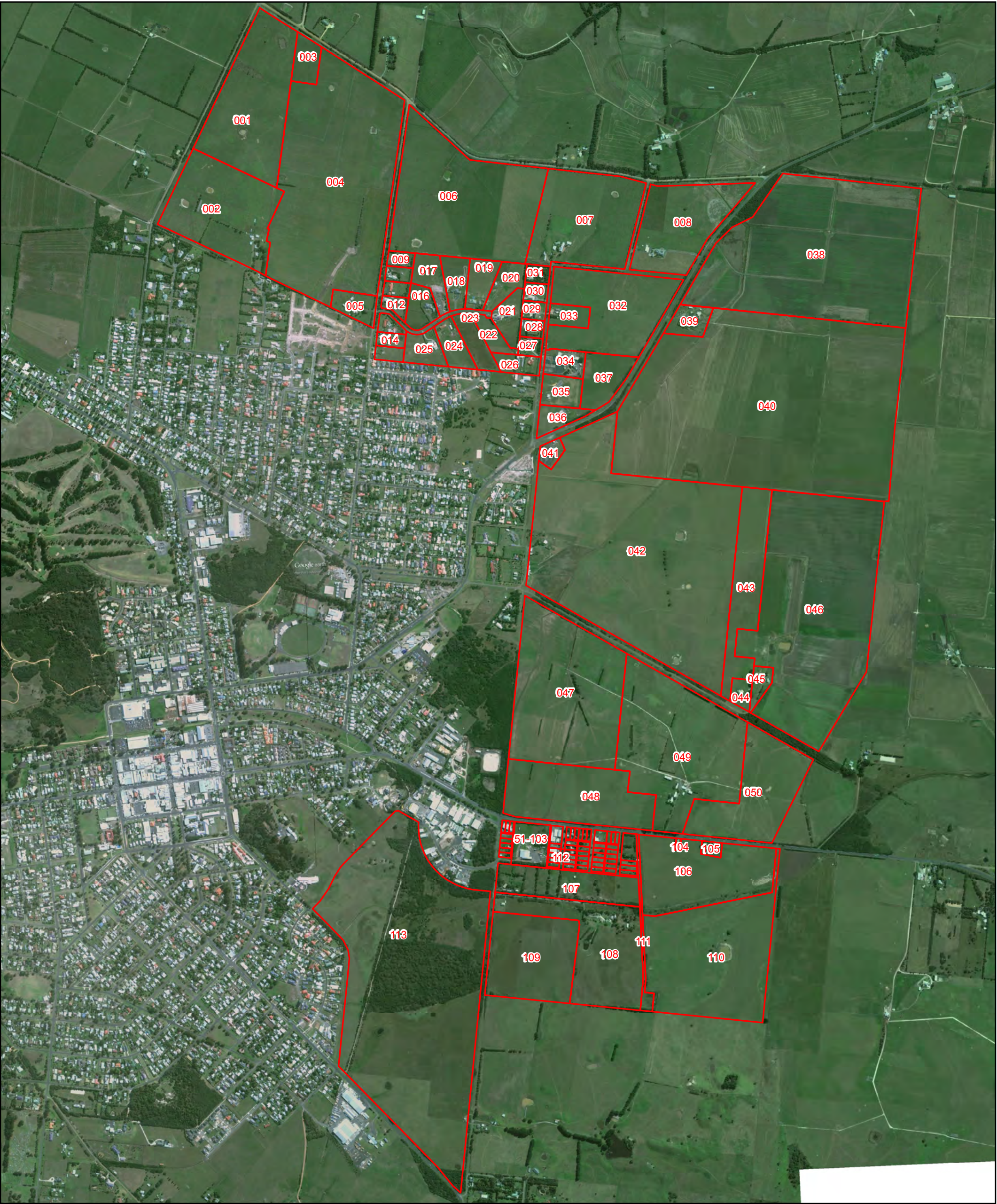


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 Property Boundaries



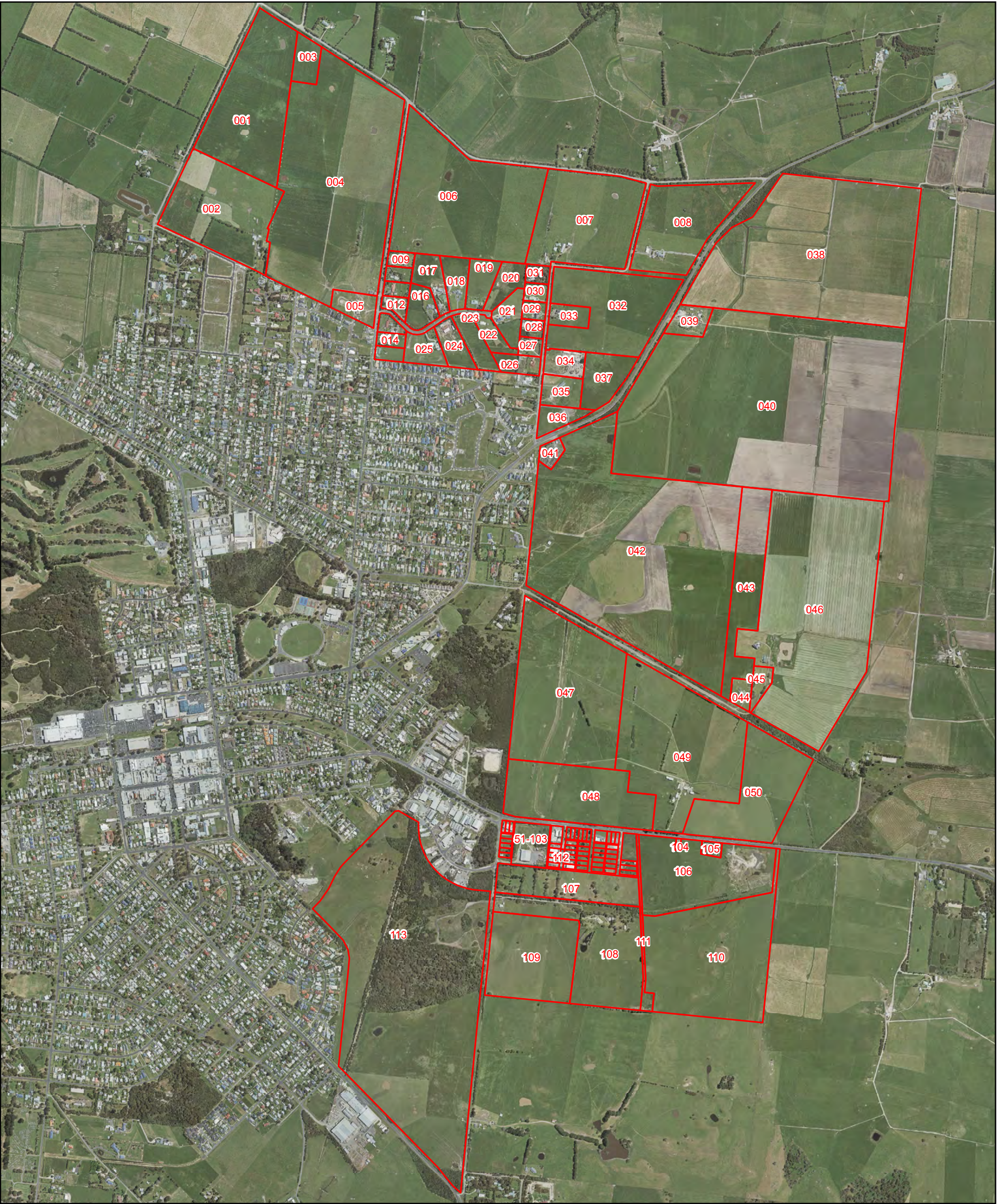
LEGEND

Property Boundaries



LEGEND

Property Boundaries



LEGEND

Property Boundaries



Aerial photography 22-25 March 2006

NOTE (30 Oates Rd) FILL HAS BEEN INTRODUCED TO SITE, AND NURSERY SHADE STRUCTURES ARE BEING ESTABLISHED. HOUSE EXISTS IN SOUTH EAST



Aerial photography 13 March 2012

NOTE (30 Oates Rd) NURSERY SHED, NURSERY SHADE STRUCTURES AND HOUSE HAVE BEEN REMOVED



Aerial photography 5 Nov 2013



Aerial photography 9 Nov 2014

NOTE (30 Oates Rd) LONG CALF SHED HAS BEEN BUILT ON NORTHERN BOUNDARY OF SITE



Aerial photography 17 Dec 2015

NOTE (30 Oates Rd) CALF SHED REMOVED, BUT CONCRETE PAD AND ORGANIC BEDDING REMAINS (NORTH OF SITE)