Creamery Road Precinct Structure Plan
Arboriculture Assessment

Location: Creamery Road Precinct

Completed for: City of Greater Geelong

Date: May 12th, 2022

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1	12/10/21	12/10/21
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Related documents–

- ENSPEC - Creamery Road PSP Tree Survey data 20220512.xlsx

Related geospatial files (GDA2020 Zone 55 EPSG:7855)

- Creamery Road PSP Tree points 20220512.shp
- Creamery Road PSP Tree polygons 20211012.shp
- Creamery Road PSP SRZ 20220214.shp
- Creamery Road PSP TPZ 20220214.shp

Reference documents –

- NWGGA Creamery Road PSP Arboriculture Brief
- Existing Ecological Conditions: NWGGA July 2021 (EHP)
- Northern & Western Geelong Growth Areas Framework Plan – August 2020 (COGG)
- City of Greater Geelong Tree Management Policy v1
- City of Greater Geelong Urban Forest Strategy 2015-2025

1. EXECUTIVE SUMMARY

The purpose of this report is to identify the conservation and retention values of trees with respect to cultural, landscape and biodiversity importance within the Creamery Road Precinct. This information will be used to determine the future land use and help inform the precinct structure plan for the urban development of this first section of the West Geelong Growth Area (WGGA).

The Creamery Road PSP survey area is approximately 350 hectares bounded by the Geelong-Ballarat Railway line to the north, Geelong Ring Road to the east, Midland Highway to the south and Geelong-Ballan Road to the west.

The survey area has a low existing tree canopy cover of ~10ha (~0.3%), typical of its recent agriculture grazing and cropping heritage. The ~4500 trees that are extant in the area are typically young to mature common farm tree species in good to fair condition. Retention values for these trees are generally Moderate to Low because of the poor suitability of the species for urban development and their existing typically small to medium size.

The assessment recorded 2651 individual trees. In addition, 37 groups comprising approximately 1862 trees were recorded. These groups of trees did not meet the size threshold of 15cm trunk diameter but have been included to provide a better overview of the trees and landscape in the survey area. The groups of trees have not been included in the detailed analysis.

Major tree features of the survey area –

River Red Gums (*Eucalyptus camaldulensis*)

There are surprisingly few large, mature specimens of this species in the survey area as a result of the clearing of the watercourses. Restoration of the watercourses is a priority to improve the ecological value of the area, including the re-establishment of a self-sustaining population of *Eucalyptus camaldulensis*.

One specimen in the southwest corner of 2 Evans Road is considered likely to be a remnant, and one other in this same group is also considered quite likely to be so too. Two specimens in the southern section of 50-60 Avonlea Rd are also considered likely to be remnant, although there is some uncertainty with these specimens as to whether they were planted.

Sugar Gums (*Eucalyptus cladocalyx*)

Eucalyptus cladocalyx is a species commonly planted through western Victoria as a woodlot species. 11.7% (309) of the individual trees surveyed are *E. cladocalyx* making it one of the most common species in the area.

Tuart (*Eucalyptus gomphocephala*)

12.0% (317) specimens surveyed are *E. gomphocephala*, making it the most common species of mature trees in the area. This Western Australian species has regularly been used in some farming areas for similar functions as *E. cladocalyx* in shelterbelts and as a woodlot species for firewood, which is the case in this area. 78% of the population are rated as fair or poor structure, reflecting that many have been lopped or coppiced for firewood.

Conifer rows

There are many conifer rows in the area. Most of these are young, having only been planted in the last 20 years or more recently, although there are several old and quite decrepit rows on 100 Ballan Road.

The Coolangatta homestead driveway at 20 Evans Road has the remnants of an avenue of *Pinus pinea* (Stone Pine). While there are some good individual specimens remaining in the avenue, the loss of many trees over time and the poor condition of some of the remaining trees has significantly reduced the effect and value of the avenue; however, there would be value in restoring it as a feature entrance to the homestead garden.

The younger rows are a mix of species including *Hesperocyparis macrocarpa* (Monterey Cypress), which comprises ~10% of the total tree population; however, they are dominated by *Cupressocyparis leylandii* (Leyland Cypress), which comprises an estimated 27% of all trees in the survey area.

These two dominant conifer species by population are highly susceptible to Cypress canker and as such are expected to have a limited lifespan in the landscape.

Coolangatta homestead

The grounds of the Coolangatta homestead at 20 Evans Road are somewhat rundown but still have good examples of ornamental species that are worthy of retention as part of the grounds. It is assumed that the grounds will remain intact and can be preserved as a unit. There are many young conifers and some older ones planted as rows or windbreaks around the homestead grounds. While having limited value alone, the rows present a notable part of the landscape. Some of these have been, or are in the process of being, developed as hedges. Hedging will add to the value of the trees and the landscape.

There are three high-value ornamental specimens of note present in the grounds –

- Tree 644 *Harpephyllum caffrum* (Kaffir Plum) – large specimen of a rare species in Victoria
- Tree 646 *Araucaria bidwillii* (Bunya Bunya Pine) – a large ornamental specimen
- Tree 653 *Cupressus torulosa* – a large specimen

Group 18, the *Cryptomeria japonica* (Japanese Cedar) hedge around the pool area is also notable as a well-maintained hedge of a relatively unusual species.

Nursery and grounds at 10 Evans Road

The grounds at 10 Evans Road are unremarkable; however, there is a small but notable specimen of locally rare species *Cupressus cashmeriana* (Kashmir Cypress) within an enclosing row of *Cupressocyparis leylandii* (Leyland Cypress).

Policy context

The Northern & Western Geelong Growth Areas Framework Plan 2020 includes a strong commitment to environmental values being preserved and enhanced in the development of the survey area. This includes a commitment to enhancing biodiversity. In this context, the protection of Critical Retention value trees is essential. It is also clear from the survey data that there is a lack of diversity in the established tee population, and only 0.26% of trees are considered indigenous to the area. There is a strong requirement to improve species diversity and re-establish self-sustaining populations of indigenous species if the Framework Plan goals are to be achieved.

Council's Urban Forest Strategy 2015-2025 sets a goal of achieving 25% tree canopy cover over 30 years, becoming 'a cool green city for the future'. With the current tree canopy cover of ~10 hectares, being only 0.3% of the land surface area, there needs to be a 100-fold increase of tree canopy in the survey area if this goal is to be achieved. The Western Growth Area is not currently considered in the Strategy and needs to be incorporated as a Priority Tree Planting Area.

The identification of trees in this study will help achieve Council's Tree Management Policy goal of considering trees as early as possible in the design of the development of the area.

Given the low rate of existing tree canopy cover presented by the area, there is an excellent opportunity to plan for high tree canopy cover and density across both private and public land that will enhance both the liveability and ecological value of the area, as well as setting new benchmarks to be achieved in the future development of the broader WGGA.

ENSPEC's key recommendations –

- Where practical, retain trees of good health and structure irrespective of their Retention value
- Retain the group of *Eucalyptus camaldulensis* that includes the two trees rated as Critical for retention at 2 Evans Road in a suitably sized reserve
    - This must include protection of the entire TPZ for the Critical Retention value trees
- Retain the tree group including two *Eucalyptus camaldulensis* rated as Critical for retention at 50-60 Avonlea Road in a suitably sized reserve
    - This must include protection of the entire TPZ for the Critical Retention value trees
- Incorporate into all key documentation and approvals the requirement to comply with AS49702009 *Protection of trees on development sites* for all trees retained, including where they are on neighbouring properties
    - This will include the requirement that where encroachment of the TPZ is greater than 10%, it must be demonstrated that the development will not affect the health and viability of the tree before it is approved.
- Development within the TPZ of preserved trees, including landscaping, must protect the tree's canopy and root zone. Competing works, including the establishment of turf, should be avoided.
- Incorporate minimum tree canopy cover targets with the requisite ground space allowance into the key development documentation and planning
- In the event of trees being retained in higher density subdivisions, undertake the recommended remedial works on those trees

2. BRIEF

2.a. Background

Extract from the brief –

> The Creamery Road precinct is the first precinct proposed for development within the WGGA. Between 2016 and 2020 the City has prepared the Northern and Western Growth Areas Framework Plan (Framework Plan) to guide strategic land use and development.
>
> Amendment C395, implemented the Framework Plan into the Greater Geelong Planning Scheme, and rezoned the bulk of the precinct from Farming Zone to Urban Growth Zone. Amendment C395 was gazetted on 6 May 2021.
>
> The WGGA has an area of 3,245 hectares and is anticipated to deliver up to 22,000 new dwellings (an average of 6.8 dwellings per hectare) for a population exceeding 60,000. The landscape is characterised by Cowies Creek, and Barwon and Moorabool Rivers, views across the Barrabool Hills and Batesford Quarry, located at its centre. Numerous technical reports have been prepared at a framework planning level to inform proposed land uses within the PSP.
>
> The Creamery Road precinct is approximately 350 hectares and has the potential to develop 3,012 dwellings, providing a neighbourhood for 8,433 people. It is bounded by the Geelong-Ballarat Railway line to the north, Geelong Ring Road to the east, Midland Highway to the south and Geelong-Ballan Road to the west. The precinct is characterised by this significant transport infrastructure, Cowies Creek, and a recent history of broad acre grazing. The topography features shallow slope gradients toward Cowies Creek.
>
> The established suburb of Bell Post Hill is located to the east of the Creamery Road precinct, on the opposite side of the Geelong Ring Road.

2.b. Purpose

The purpose of the report is to identify the conservation and retention values of trees with respect to cultural, landscape and biodiversity importance within the precinct. This information will be used to determine the future land use and help inform future urban development.

2.c. Survey area

The Creamery Road precinct is approximately 350 hectares bounded by the Geelong-Ballarat Railway line to the north, Geelong Ring Road to the east, Midland Highway to the south and Geelong-Ballan Road to the west. Figure 1 is an extract of the provided plan that designates the survey area.

The existing Myers Reserve and Covenant College are excluded from the assessment. Any trees directly outside the boundaries of the school and the reserve are included in the assessment.

All trees on road reserves, railway reserve and private land within the project area have been surveyed apart from on the reserve and school that are specifically excluded.

Figure 1

2.d. Methodology

Site methodology involved a visual inspection of the trees' present health and growing environment. The influence of previous and proposed activities on the trees current and future condition was considered during the assessment.

Wherever accessible, the trunk diameter of up to 6 trunks (DBH) and basal diameter were measured using a forestry tape measure for the calculation of the Tree Protection and Structural Root Zones in accordance with AS4970-2009 *Protection of trees on development sites*. All other dimensions were visually estimated. The canopy radius from the trunk is provided for all four compass points (N, E, S, W), thereby accounting for trees with asymmetrical canopies.

Each tree was surveyed using GNSS equipment and photographed and is linked to the data record. Typical spatial precision is better than 0.2m.

2.e. Assessment dates

The assessment was conducted between September 27th and October 1st, 2021.

2.f. Arborists conducting assessment

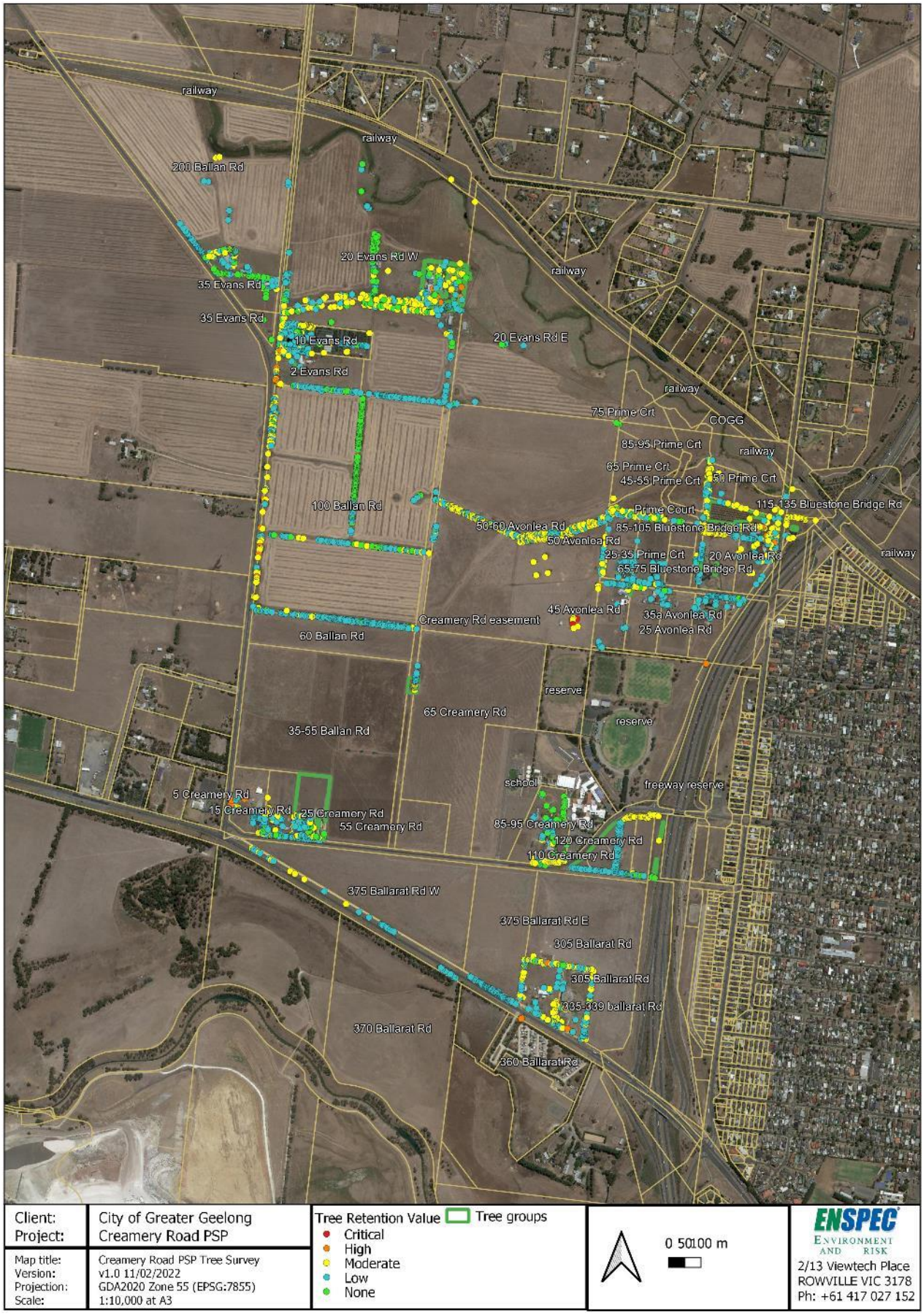
Name of Arborist	**Craig Hinton**
Qualifications	B. App. Sci. (Hort. [Env. Hort.]) Diploma of Arboriculture Diploma of Ecology Dip. App. Sci. (Hort.) Licenced Professional Registered Consulting Arborist #AL1100 Tree Risk Assessment Qualification (TRAQ) Quantified Tree Risk Assessment (QTRA) #3968 VALID Tree Risk-Benefit Validator Cert. IV Assessment and Workplace Training
Phone number	+61 428 193 626
E-mail Address	craig.hinton@enspec.com
Name of Arborist	**Stephen Daniel**
Qualifications	Diploma of Arboriculture Diploma of Ecology Dip. App. Sci. (Hort. [Arb.]) Adv. Cert. Horticulture Licenced Professional Registered Consulting Arborist #AL1778 Tree Risk Assessment Qualification (TRAQ) Quantified Tree Risk Assessment (QTRA) #4991
Name of Arborist	**Graeme Neilson**
Qualifications	Diploma of Arboriculture Tree Risk Assessment Qualification (TRAQ) Quantified Tree Risk Assessment (QTRA) #6084
Name of Arborist	**Adrian Murone**
Qualifications	Diploma of Arboriculture (currently studying) Grad Diploma in Urban Horticulture Bachelor of Arts Cert III Horticulture (Arboriculture) Tree Risk Assessment Qualification (TRAQ)
Name of Arborist	**Hayden Connelly**
Qualifications	Diploma of Arboriculture
E-mail Address	hayden.connelly@enspec.com

Supervised on-site assistance was also provided by Lisa-Jane Oldfield.

The author of this report is Craig Hinton.

3. OVERVIEW

An overview of the locations of trees (dots) and groups (polygons) surveyed is shown on the following figure. Further detail is provided on the maps in the appendices.



4. TREE INFORMATION

4.a. Tree location by address

The assessment recorded 2651 individual trees. Approximately 1862 additional trees are in 37 groups, 13 of which are young coniferous hedges around the old Coolangatta homestead at 20 Evans Rd. The groups of trees were below the size threshold of 15cm DBH for the survey but have been included to provide a better summary of the trees and landscape in the survey area. The number of trees in the larger groups are estimates only. A summary of the total trees is provided in the following table.

Street	Address	No of Trees	% of total
Avonlea Rd	5 Avonlea Rd	15	0.33%
	15-19 Avonlea Rd	44	0.97%
	20 Avonlea Rd	65	1.44%
	25 Avonlea Rd	17	0.38%
	35a Avonlea Rd	11	0.24%
	40 Avonlea Rd	36	0.80%
	45 Avonlea Rd	63	1.40%
	50 Avonlea Rd	67	1.48%
	50-60 Avonlea Rd	358	7.93%
	road reserve	6	0.13%
Ballan Rd	35-55 Ballan Rd	50	1.11%
	60 Ballan Rd	35	0.78%
	100 Ballan Rd	329	7.29%
	200 Ballan Rd	114	2.53%
	road reserve	2	0.04%
Ballarat Rd	305 Ballarat Rd	2	0.04%
	335-339 Ballarat Rd	78	1.73%
	341-345 Ballarat Rd	121	2.68%
	375 Ballarat Rd E	5	0.11%
	road reserve	91	2.02%
Bluestone Bridge Rd	65-75 Bluestone Bridge Rd	45	1.00%
	85-105 Bluestone Bridge Rd	317	7.02%
	90-140 Bluestone Bridge Rd N	1	0.02%
	90-140 Bluestone Bridge Rd S	30	0.66%
	115-135 Bluestone Bridge Rd	8	0.18%
	road reserve	6	0.13%
Creamery Rd	5 Creamery Rd	33	0.73%
	15 Creamery Rd	134	2.97%
	25 Creamery Rd	185	4.10%
	Creamery Rd easement	6	0.13%
	65 Creamery Rd	21	0.47%
	85-95 Creamery Rd	74	1.64%
	110 Creamery Rd	216	4.79%
	120 Creamery Rd	12	0.27%
	road reserve	37	0.82%
Evans Rd	2 Evans Rd	70	1.55%
	10 Evans Rd	189	4.19%
	20 Evans Rd E	16	0.35%
	20 Evans Rd W	1302	28.85%
	35 Evans Rd	21	0.47%
freeway reserve	freeway reserve	6	0.13%
railway reserve	railway reserve	57	1.26%
Prime Crt	25-35 Prime Crt	32	0.71%
	45-55 Prime Crt	1	0.02%
	50 Prime Crt	3	0.07%
	65 Prime Crt	179	3.97%
	road reserve	2	0.04%
City of Greater Gelong	COGG	1	0.02%
Grand Total		**4513**	**100.00%**

4.b. Summary tree population information

A summary of the general tree data for the surveyed population of 2651 individual trees is provided in the following section. The groups of trees are excluded from the following summary.

4.b.1 Species present

The vast majority of the surveyed trees are planted ornamental or shelterbelt species. Only five of specimens are considered to be, or likely to be, self-seeded indigenous specimens. Other specimens of locally indigenous species are considered to be planted specimens of unknown provenance.

Species	Common name	No of Trees	% of total
Acacia baileyana	Cootamundra Wattle	5	0.19%
Acacia baileyana 'Purpurea'	Purple Cootamundra Wattle	2	0.08%
Acacia fimbriata	Brisbane Golden Wattle	1	0.04%
Acacia floribunda	Gossamer Wattle	3	0.11%
Acacia longifolia	Sallow Wattle	1	0.04%
*Acacia mearnsii**	Black Wattle	1	0.04%
Acacia pendula	Weeping Myall	1	0.04%
Acacia pravissima	Ovens Wattle	1	0.04%
*Acacia pycnantha**	Golden Wattle	3	0.11%
Acacia saligna	Golden Wreath Wattle	2	0.08%
Acer negundo 'Variegatum'	Variegated Box Elder	1	0.04%
*Allocasuarina verticillata**	Drooping She-oak	9	0.34%
Alnus glutinosa	Common Alder	1	0.04%
Angophora costata	Smooth-barked Apple	1	0.04%
Araucaria bidwillii	Bunya Bunya Pine	1	0.04%
Araucaria cunninghamii	Hoop Pine	1	0.04%
Banksia integrifolia	Coast Banksia	1	0.04%
Betula papyrifera	Birch	1	0.04%
Betula pendula	Silver Birch	1	0.04%
Brachychiton populneus	Kurrajong	2	0.08%
Callistemon citrinus	Bottlebrush	1	0.04%
Callistemon salignus	Willow Bottlebrush	2	0.08%
Callistemon viminalis	Weeping Bottlebrush	6	0.23%
Callistemon viminalis cv	Weeping Bottlebrush variety	1	0.04%
Casuarina cunninghamiana	River She-oak	15	0.57%
Cedrus atlantica f. glauca	Blue Atlas Cedar	1	0.04%
Chamaecyparis lawsoniana	Lawson's Cypress	3	0.11%
Cordyline australis	Cabbage Tree	3	0.11%
Corymbia citriodora	Lemon Scented Gum	4	0.15%
Corymbia eximia	Yellow Bloodwood	1	0.04%
Corymbia ficifolia	Red Flowering Gum	1	0.04%
Corymbia maculata	Spotted Gum	19	0.72%
Cotoneaster sp.	cotoneaster	1	0.04%
Cotoneaster glaucophyllus	Large Leaf Cotoneaster	1	0.04%
Cupressocyparis leylandii	Leyland Cypress	236	8.90%
Cupressus arizonica	Arizona Smooth Bark Cypress	20	0.75%
Cupressus cashmeriana	Kashmir Cypress	1	0.04%
Cupressus lusitanica	Mexican Cypress	1	0.04%
Cupressus sempervirens	Italian Cypress	22	0.83%
Cupressus sempervirens Stricta	Pencil Pine	2	0.08%
Cupressus torulosa	Bhutan Cypress	3	0.11%
Eucalyptus astringens	Brown Mallet	29	1.09%
Eucalyptus bicostata	Victorian Blue Gum	12	0.45%
Eucalyptus botryoides	Southern Mahogany	64	2.41%
*Eucalyptus camaldulensis**	River Red Gum	130	4.90%
Eucalyptus cladocalyx	Sugar Gum	311	11.73%
Eucalyptus conferruminata	Bushy Yate	15	0.57%
Eucalyptus cornuta	Yate	4	0.15%
Eucalyptus cosmophylla	Cup Gum	4	0.15%
Eucalyptus globulus	Tasmanian Blue Gum	1	0.04%
Eucalyptus gomphocephala	Tuart	318	12.00%
Eucalyptus kitsoniana	Gippsland Mallee	1	0.04%
Eucalyptus leucoxylon	Yellow Gum	73	2.75%
Eucalyptus leucoxylon 'Rosea'	Red-flowered Yellow Gum	4	0.15%
Eucalyptus mannifera	Brittle Gum	2	0.08%
Eucalyptus megacornuta	Warty Yate	3	0.11%
*Eucalyptus melliodora**	Yellow Box	19	0.72%
*Eucalyptus microcarpa**	Grey Box	6	0.23%
Eucalyptus nicholii	Narrow-leaved Black Peppermint	2	0.08%
*Eucalyptus ovata**	Swamp Gum	1	0.04%
*Eucalyptus polyanthemos**	Red Box	30	1.13%
Eucalyptus radiata	Narrow-leafed Peppermint	20	0.75%
Eucalyptus saligna	Sydney Blue Gum	5	0.19%
Eucalyptus scoparia	Wallangara White Gum	8	0.30%
Eucalyptus sideroxylon	Red Iron Bark	18	0.68%
Eucalyptus sideroxylon 'Rosea'	Mugga	1	0.04%
Eucalyptus sp.	Gum Tree	11	0.41%
Eucalyptus spathulata	Swamp Mallet	7	0.26%
Eucalyptus stoatei	Scarlet Pear Gum	2	0.08%
Eucalyptus tereticornis	Forest Red Gum	5	0.19%
Eucalyptus tricarpa	Red Ironbark	1	0.04%
*Eucalyptus viminalis**	Manna Gum	56	2.11%
Eucalyptus viridis	Green Mallee	2	0.08%
Ficus carica	Common Fig	4	0.15%
Fraxinus angustifolia ssp. *angustifolia*	Desert Ash	15	0.57%

Species	Common name	No of Trees	% of total
Fraxinus excelsior 'Aurea'	Golden Ash	1	0.04%
Fraxinus ornus	Manna Ash	1	0.04%
Fraxinus 'Raywood'	Claret Ash	1	0.04%
Gleditsia triacanthos	Honey Locust	1	0.04%
Grevillea robusta	Silky Oak	5	0.19%
Hakea laurina	Pin Cushion Hakea	1	0.04%
Hakea sericea	Needlebush	2	0.08%
Harpephyllum caffrum	Kaffir Plum	1	0.04%
Hesperocyparis macrocarpa	Monterey Cypress	310	11.69%
Hesperocyparis macrocarpa 'Goldcrest'	Goldcrest Monterey Cypress	4	0.15%
Jacaranda mimosifolia	Jacaranda	2	0.08%
Juglans sp.	walnut	1	0.04%
Lagunaria patersonii	Norfolk Island Hibiscus	4	0.15%
Laurus nobilis	Bay Tree	1	0.04%
Ligustrum lucidum	Glossy-leaved Privet	1	0.04%
Liquidambar styraciflua	Liquidambar or Sweetgum	1	0.04%
Magnolia grandiflora	Southern Magnolia	3	0.11%
Malus sp.	Apple Tree	2	0.08%
Melaleuca armillaris	Bracelet Honey-myrtle	186	7.02%
Melaleuca bracteata	River Teatree	1	0.04%
Melaleuca lanceolata	Moonah	2	0.08%
Melaleuca linariifolia	Snow-in-Summer	7	0.26%
Melaleuca nesophila	Showy Honey Myrtle	1	0.04%
Melaleuca styphelioides	Prickly-leaved Paperbark	4	0.15%
Melia azedarach	White Cedar	1	0.04%
Morus sp.	Mulberry	1	0.04%
Olea europaea ssp. *europaea*	Common Olive	3	0.11%
Phoenix canariensis	Canary Island Date Palm	4	0.15%
Photinia glabra	Photinia	1	0.04%
Pinus canariensis	Canary Island Pine	1	0.04%
Pinus halepensis	Aleppo Pine	2	0.08%
Pinus pinaster	Maritime Pine	24	0.91%
Pinus pinea	Stone Pine	94	3.55%
Pinus radiata	Monterey Pine	203	7.66%
Pinus sp.	Pine	1	0.04%
Pistacia chinensis	Chinese Pistachio	1	0.04%
Pittosporum eugenioides	Lemonwood	1	0.04%
Pittosporum sp.	pittosporum	1	0.04%
Pittosporum tenuifolium	kohuhu or kohukohu or Black Matipo	4	0.15%
Pittosporum undulatum	Sweet Pittosporum	5	0.19%
Platanus orientalis 'Digitata'	Cut Leaved Plane	1	0.04%
Populus alba	White Poplar	1	0.04%
Populus deltoides	Eastern Cottonwood	1	0.04%
Populus nigra Italica	Lombardy Poplar	1	0.04%
Populus simonii	Simons Poplar	31	1.17%
Prunus armeniaca	Apricot	2	0.08%
Prunus cerasifera	Cherry Plum	1	0.04%
Prunus cerasifera 'Nigra'	Purple-leaf Plum	1	0.04%
Prunus dulcis	Almond	2	0.08%
Prunus sp.	Cherry species	3	0.11%
Prunus X *blireana*	Double-rose Cherry Plum	1	0.04%
Pyrus calleryana	Callery Pear	3	0.11%
Pyrus calleryana cv	Callery Pear variety	27	1.02%
Pyrus sp.	pear variety	1	0.04%
Quercus robur	English Oak	8	0.30%
Robinia pseudoacacia 'Umbraculifera'	Mop Top Robinia	4	0.15%
Salix babylonica	Weeping Willow	1	0.04%
Salix matsudana	Chinese Willow	1	0.04%
Salix matsudana 'Tortuosa'	Tortured Willow	2	0.08%
Schinus molle	Peppercorn	89	3.36%
Syagrus romanzoffiana	Cocos Palm	1	0.04%
Syzygium smithii	Lilly Pilly	1	0.04%
Tamarix parviflora	Tamarisk	1	0.04%
Thuja plicata	Western Redcedar	2	0.08%
Ulmus glabra 'Lutescens'	Golden Elm	1	0.04%
Ulmus parvifolia	Chinese Elm	2	0.08%
Yucca sp.	Yucca	1	0.04%
Zelkova serrata	Japanese Zelkova	1	0.04%
unidentified	unidentified	3	0.11%
Grand Total		**2651**	**100.00%**

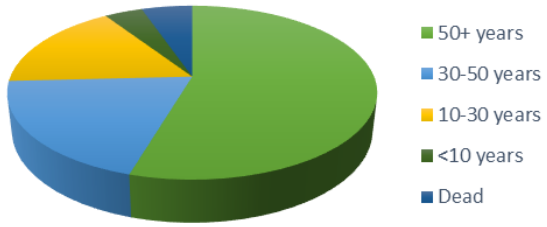
*** Potentially indigenous species**

4.b.2 Life expectancy

An estimate of the life expectancy for each tree was made based on the tree's current health, condition, and growing environment. Any significant change in these factors in the future will affect the life expectancy of the tree.

A summary of the life expectancy of the trees on the site is provided in the following table.

Life expectancy	No of Trees	% of total
50+ years	1451	54.73%
30-50 years	516	19.46%
10-30 years	436	16.45%
<10 years	105	3.96%
Dead	143	5.39%
Grand Total	**2651**	**100.00%**



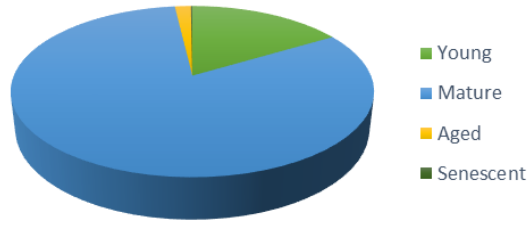
4.b.3 Life stage

The life stage of each tree was assessed and is expressed as described in the following descriptions. Life stage is based on species characteristics and the rate at which the individual tree is growing in its local environment. As such, Life Stage can be quite independent of the chronological age of the tree.

Life stage	Description
New	• Planting hardware present and under maintenance (watered) • Self-seeded sapling
Established	• Planting hardware absent/unmaintained • Not being watered • Susceptible to casual vandalism
Young	• Established • Rapid vertical growth phase • Too big to be damaged by casual vandalism
Mature	• Vertical growth slowed • Canopy spreading or stable
Aged	• Older specimen • Self-retrenchment may have started • Likely to have habitat hollows • Large dead or broken branches may be present in upper canopy
Veteran	• Very old specimen for the species in the local area • Usually has started to shed limbs with age, develop hollows • High value habitat • Generally, requires target management in well used areas • Not suitable for short-lived species e.g. most *Acacia* spp., *Hakea* spp.
Senescent	• Old tree in terminal decline • Majority of canopy is dead wood • A stag with limited canopy

A summary of the life stage of the trees on the site is provided in the following table. Some life stages are not present in the tree population.

Life stage	No of Trees	% of total
New	0	0%
Established	0	0%
Young	435	16.41%
Mature	2167	81.74%
Aged	45	1.70%
Veteran	0	0%
Senescent	4	0.15%
Grand Total	**2651**	**100.00%**



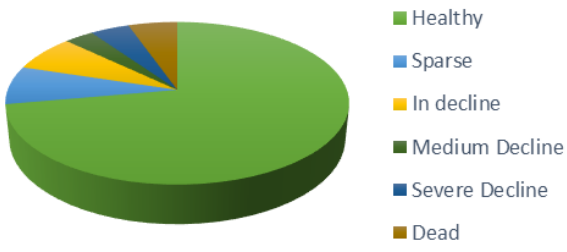
4.b.4 Health / Canopy condition

The health of the tree was assessed based on visual factors including foliage colour, canopy density, shoot extension growth, the presence of deadwood and dieback.

Healthy	• Crown full, with good density, foliage entire with good colour, minimal or no insect or disease damage. • Good growth indicators, e.g. extension growth. • No or minimal canopy dieback. • Good wound wood development.
Sparse	• Sparse indicates the tree has healthy foliage the canopy density is less than typical for a healthy specimen of the species but does not have an appreciable amount of deadwood or dieback. • Some species have more sparse canopies than others – Sparse only applies in comparison to specimens of the same species, not between different species. • A sparse canopy may indicate short-term stress or may be the start of decline; however, we use Sparse only where we consider that this is the natural crown density of the specimen or the tree will recover normal density, not for a tree entering a permanent decline.
In decline	Tree is exhibiting one or more of the following symptoms; • Tree has <25% dead wood, minor canopy dieback, some thinning of the canopy. • Foliage generally with good colour, minor or localised discolouration may be present. • Minor insect or disease damage present. • Typical indicators are reduced extension growth, leaf size and canopy density.
Medium decline	• Tree has >25% dead wood. • Canopy dieback present. • Discoloured or distorted leaves. • Extensive canopy thinning and/or excessive epicormic growth. • Significant pest or disease damage is present and/or stress symptoms that could lead or are leading to decline of tree.
Severe decline	• Tree has extensive dead wood and will not recover or cannot recover sufficiently to provide the expected benefits of a tree in its location.
Dead	• Tree is dead.

A summary of the health of the trees on the site is provided in the following table.

Health	No of Trees	% of total
Healthy	1916	72.27%
Sparse	202	7.62%
In decline	191	7.20%
Medium Decline	85	3.21%
Severe Decline	114	4.30%
Dead	143	5.39%
Grand Total	**2651**	**100.00%**



4.b.5 Structure

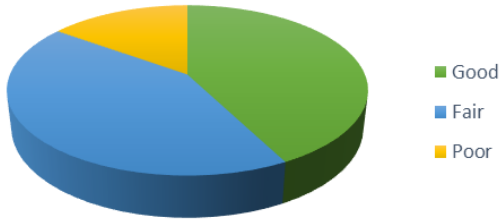
An overall assessment of the mechanical structure of the tree was made based on observable factors including tree form, branch attachment and taper, wood decay and cavities, previous pruning, and any damage the tree has suffered.

Good	• Typical structural characteristics of species that pose no significant increase in the likelihood of failure. • Typical branch attachment for the species. • Trunk and scaffold branches sound or minor damage. • Good trunk and scaffold branch taper. • No damage to structural roots and/or good buttressing present. • No obvious root pests or diseases.

Fair	• Structural factors that may increase the likelihood of a failure. • Bark missing but tree is healthy with no visible decay of the wound. • Small cavities could be present, particularly in branch sockets. • Minimal or no damage to structural roots. • Evidence of a few branch breakages that could cause damage or injury to a typical target in the vicinity.
Poor	• Structural factor(s) that increases the likelihood of a failure. • Atypical structural characteristics for the age and species such as bifurcation or included bark in scaffold limb unions. • Cavities or decay in trunk or scaffold typical of age and species that pose no significant increase in the likelihood of failure. • Girdling or damaged roots that may be problematic. • Major root damage. • Lifespan will be reduced as a result of the defect.

A summary of the structure of the trees on the site is provided in the following table.

Structure	No of Trees	% of total
Good	1123	42.36%
Fair	1130	42.63%
Poor	398	15.01%
Grand Total	**2651**	**100.00%**



5. DISCUSSION

5.a. Policy context

The area is zoned Urban Growth Zone (UGZ) and no vegetation or heritage overlays apply.

There are no trees on the National Trust Register of Significant Trees in the area.

None of the indigenous species appear on the Victorian Threatened Species Lists.

The Northern & Western Geelong Growth Areas Framework Plan 2020 (Framework Plan) states a strong commitment to environmental values being preserved and enhanced in the development of the NWGGA, including the survey area. This includes a commitment to enhancing biodiversity. In this context, the protection of Critical Retention value trees is essential. It is also clear from the survey data that there is a lack of diversity in the established tee population, and only 0.26% of trees are considered indigenous to the area. There is a strong requirement to improve species diversity and re-establish self-sustaining populations of indigenous species if the Framework Plan goals are to be achieved.

Council's Urban Forest Strategy 2015-2025 sets a goal of achieving 25% tree canopy cover over 30 years, becoming 'a cool green city for the future'. With the current tree canopy cover of ~10 hectares, being only 0.3% of the land surface area, there needs to be a 100-fold increase of tree canopy in the survey area if this goal is to be achieved. The Western Growth Area is not currently considered in the Strategy and needs to be incorporated as a Priority Tree Planting Area.

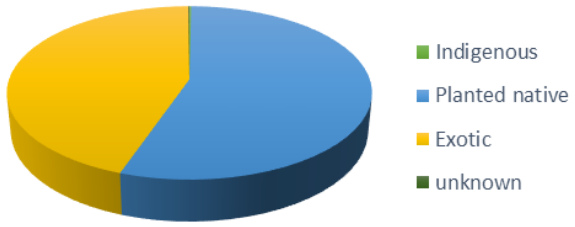
The identification of trees in this study will help achieve Council's Tree Management Policy goal of considering trees as early as possible in the design of the development of the area.

5.b. Origin

The origin of each tree or group was assessed based on species, location, age, planting situation and any other relevant factors. The most likely origin of the tree was allocated based on these factors. These are summarised in the following tables.

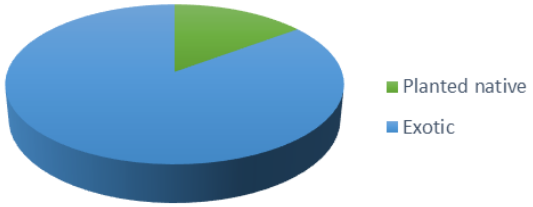
Individual trees

Origin	No of Trees	% of total
Indigenous (naturally occurring)	7	0.26%
Planted native	1461	55.11%
Exotic	1180	44.51%
Unknown/unidentified	3	0.11%
Grand Total	**2651**	**100.00%**



Groups of trees

Origin	No of Trees	% of total
Planted native	276	14.82%
Exotic	1586	85.18%
Grand Total	**1862**	**100.00%**



Some of the planted native trees are from species indigenous to the area; however, almost all of these trees have clearly been planted in mixed shelterbelt or ornamental settings, making their provenance unknown and unlikely to have been specifically sourced from locally indigenous sources. The exception may be the young specimens planted near the freeway around the corner of Creamery Road and Bluestone Bridge Road, but this is only speculative. A very small number of the planted native trees could potentially be self-sown indigenous specimens; however, the location, vegetation type and cleared nature of the surrounding landscape makes it more likely that most are actually planted, or in a few cases potentially seeded from nearby planted specimens.

5.c. Tree retention

5.c.1 Retention criteria

Each tree and group have been allocated a Retention rating based on the general descriptions provided below. These criteria have been developed based on extensive experience and successfully applied across a range of projects involving multiple stakeholders including local government, State departments and authorities.

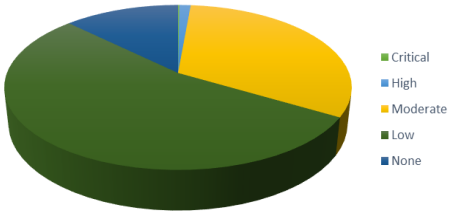
When applying a Retention rating within the same species some relativity is applied taking into account size and condition to assist in prioritising preservation. Retention ratings for each tree and group are provided in the accompanying data tables.

The Retention rating takes into account the value and suitability of the tree for the proposed environment, as well as its current condition. Some trees with lower Retention ratings may have appreciable longevity but are considered likely to add little to the landscape or are likely to cause management problems when their environment changes from low use farmland to high use urban areas. Notwithstanding, a lower Retention rating does not imply that the tree should or must be removed.

Retention Rating	Description
Critical	Protected/significant/specimen tree/patch in good condition
High	Mature/rare/indigenous/habitat/landscape specimen tree/patch in good condition
Moderate	Mid-sized tree, other landscape specimens
Low	Small / miscellaneous planted trees in good condition
None	Small, dead, poor condition or weed species

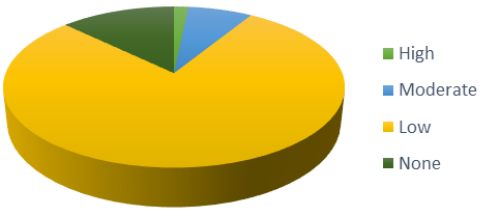
Individual trees

Retention	No of Trees	% of total
Critical	4	0.15%
High	33	1.24%
Moderate	850	32.06%
Low	1427	53.83%
None	337	12.71%
Grand Total	**2651**	**100.00%**



Groups of trees

Retention	No of Trees	% of total
High	30	1.61%
Moderate	134	7.20%
Low	1459	78.36%
None	239	12.84%
Grand Total	**1862**	**100.00%**

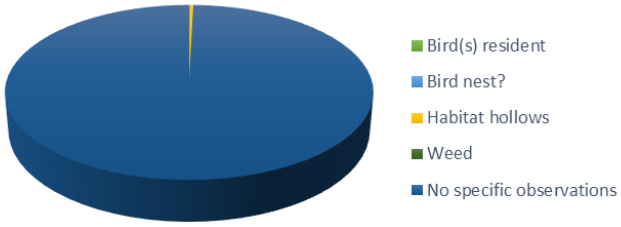


There are several factors that render few of the trees of high retention value. The species, size, condition and past management are significant factors in this assessment. In particular, the absence of remnant indigenous vegetation in the area makes the presence of high value trees far less likely.

5.c.2 Ecological values

Each tree was assessed for ecological values, primarily looking for suitable habitat hollows and signs of existing use, such as nests. A summary of this assessment is provided in the following table.

Ecology	No of Trees	% of total
Bird(s) resident	1	0.04%
Bird nest?	1	0.04%
Habitat hollows	9	0.34%
Weed	1	0.04%
No specific observations	2639	99.55%
Grand Total	**2651**	**100.00%**



Overall, while many of the native trees have some value as a food source, the majority are too young or too small to have developed hollows. Those hollows that are present are typically small and not suitable for larger mammals or birds. Trees with hollows have been classified based on the Retention criteria, with some further consideration for the hollows. Trees otherwise not suited for retention are rated higher solely based on the hollows because of the proposed urban context for the trees.

A number of the trees had European honeybee (*Apis mellifera*) hives in them. While not a native species, they provide important ecosystem services, particularly for food crops.

The weed *Lycium ferocissimum* (Boxthorn) is present in patches including around the base of some trees. While a significant weed, this species also provides valuable protective habitat for small animals and birds. *Acacia paradoxa* (Kangaroo Thorn) and *Bursaria spinosa* (Sweet Bursaria) were also noted to be present and provide the same function.

5.c.3 Cultural and landscape values

A very limited number of trees with cultural and landscape value were noted in the area.

No trees were identified as having First Nations cultural values. This is to be expected given the species and ages of trees in the project area clearly demonstrate all of the vegetation, with the possible but unlikely exception of four *Eucalyptus camaldulensis*, has been established post European settlement of the area.

There are exotic trees of note associated with the Coolangatta Homestead as noted in 5.d.5. In association with the homestead these have some heritage value.

Shelterbelts, woodlots and windbreaks associated with the farming heritage of the area are present, comprised of species commonly used of this purpose.

The Victorian Heritage Register lists a Hawthorn Hedge at 110 Creamery Road (D7721-0113) although it is noted as delisted and no hawthorn was noted on the site.

5.c.4 Trees along watercourses

The brief requires a plan for native trees with a girth greater than 1m, either standing or fallen, recorded along watercourses. No trees meeting these criteria were found.

5.d. Notes on the landscape and particular species or groups

5.d.1 River Red Gums (*Eucalyptus camaldulensis*)

Some references break up *Eucalyptus camaldulensis* into subspecies. These trees are considered to be *Eucalyptus camaldulensis* ssp. *camaldulensis.*

There are surprisingly few large, mature specimens of this species in the survey area as a result of the clearing of the watercourses. Restoration of the watercourses is a priority to improve the ecological value of the area, including the re-establishment of a self-sustaining population of *Eucalyptus camaldulensis*.

One specimen in the southwest corner of 2 Evans Road is considered likely to be a remnant, and one other in this same group is also considered quite likely to be so too. Two specimen in the southern section of 50-60 Avonlea Rd are also considered likely to be remnant, although there is some uncertainty with these specimens as to whether they were actually planted.

5.d.2 Sugar Gums (*Eucalyptus cladocalyx*)

Eucalyptus cladocalyx is a species commonly planted through western Victoria as a woodlot species. 11.7% (309) of the individual trees surveyed are *E. cladocalyx* making it one of the most common species in the area.

5.d.3 Tuart (*Eucalyptus gomphocephala*)

12.0% (317) specimens surveyed are *E. gomphocephala*, making it the most common species of mature trees in the area. This Western Australian species is less commonly planted but has regularly been used in some farming areas for similar functions as *E. cladocalyx* in shelterbelts and as a woodlot species for firewood, which is the case in this area.

5.d.4 Conifer rows

There are a large number of conifer rows in the area. Most of these are young, having only been planted in the last 20 years or more recently, although there are several old and quite decrepit rows on 100 Ballan Road.

The homestead driveway at 20 Evans Road has the remnants of an avenue of Pinus pinea (Stone Pine). While there are some good individual specimens remaining in the avenue, the loss of many trees over time and the poor condition of some of the remaining trees has significantly reduced the effect and value of the avenue.

The younger rows are a mix of species including *Hesperocyparis macrocarpa* (Monterey Cypress), which comprises ~10% of the total tree population; however, they are dominated by *Cupressocyparis leylandii* (Leyland Cypress), which comprises an estimated 27% of all trees in the survey area. *Cupressocyparis leylandii* has had a name change to x *Hesperotropsis leylandii,* however, the more commonly used name *Cupressocyparis leylandii* is used in this report and data.

These two dominant conifer species by population are highly susceptible to Cypress canker and as such are expected to have a limited lifespan in the landscape (https://agriculture.vic.gov.au/biosecurity/plant-diseases/shrub-and-tree-diseases/cypress-canker).

5.d.5 Coolangatta homestead

The grounds of the Coolangatta homestead at 20 Evans Road are somewhat rundown but still have good examples of ornamental species that are worthy of retention as part of the grounds. It is assumed that the grounds and homestead will remain intact and can be preserved as a unit. There are many young conifers and some older ones planted as rows or windbreaks around the homestead grounds. While having limited value alone, the rows present a notable part of the landscape of the grounds. Some of these have been, or are in the process of being, developed as hedges. Hedging will add to the value of the trees and the landscape.

There are three high-value ornamental specimens of particular note present in the grounds –

- Tree 644 *Harpephyllum caffrum* (Kaffir Plum) – large specimen of a rare species in Victoria
- Tree 646 *Araucaria bidwillii* (Bunya Bunya Pine) – a large specimen ornamental specimen
- Tree 653 *Cupressus torulosa* – a large specimen

Group 18, the *Cryptomeria japonica* (Japanese Cedar) hedge around the pool area is also notable as a well-maintained hedge of a relatively unusual species.

5.d.6 Nursery and grounds at 10 Evans Road

The grounds at 10 Evans Road are unremarkable; however, there is a small but notable specimen of locally uncommon species *Cupressus cashmeriana* (Kashmir Cypress) within an enclosing row of *Cupressocyparis leylandii* (Leyland Cypress).

5.e. Protection of preserved trees

Converting old farmland into new urban development presents a range of challenges when considering tree retention.

Typically, farm trees receive no maintenance over their life other than essential work to clear access. As a result, they often exhibit health and structural problems that would not typically be encountered in urban streets, parks and private lots, where they would have been rectified or the trees removed much earlier.

Further, the types of trees planted, while excellent for farm shelterbelts or woodlots, are often not suitable for areas of higher occupancy as a result of their typical structure and form, longevity or other characteristics such as the quantity of debris.

All of these factors apply in the survey area, and as a result, few of the trees are considered high value for retention. The suitability for retention of each tree is discussed in 5.c.

There are several large, old trees of high value within the grounds of the old Coolangatta homestead at 20 Evans Road. It is expected that these would be retained in association with the homestead.

The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) for each of the trees has been calculated in accordance with AS4970-2009 *Protection of trees on development sites*. The radius of the zones in metres is provided in the tree data.

- Any development documentation or planning approvals must include the requirement to comply with AS4970 for any existing trees to be retained, including where those trees may be on adjoining properties.
    - This will include the requirement that where encroachment of the TPZ is greater than 10%, it must be demonstrated that the development will not affect the health and viability of the tree before it is approved.
- Development within the TPZ of preserved trees, including landscaping, must protect the tree's canopy and root zone. Competing works, including the establishment of turf, should be avoided.

Many trees potentially to be retained are typical farm trees and as such may not be appropriate to be retained in close proximity to high-use development**Error! Reference source not found.**. As such it is recommended that any old farm trees that are retained on lots for commercial or residential development

must be provided adequate space, not less than their nominal TPZ, such that development is not unnecessarily close to the trees, thereby avoiding potential future conflict.

New tree planting and landscaping shall be planned to avoid direct root zone and canopy competition with preserved trees.

In some cases where the preserved tree is old or has structural factors of concern, landscaping can be used to isolate the tree from use of the land around it, thereby reducing potential risk. Where understorey planting is desirable to assist with isolating a tree, sympathetic planting of appropriate low shrubs, preferably indigenous species to the area, should be used.

Specimen trees should be preserved in isolation to allow for their form to be appreciated. Associated landscaping should enhance the appreciation of the tree and not obscure or compete with it.

5.f. Urban canopy cover

Given the likelihood that the already low tree canopy cover will be further diminished, it is strongly recommended that minimum tree canopy cover targets are incorporated into the key development documentation and planning. This will require adequate space to be provided for the planting and successful growth of new canopy trees within key areas of the precinct.

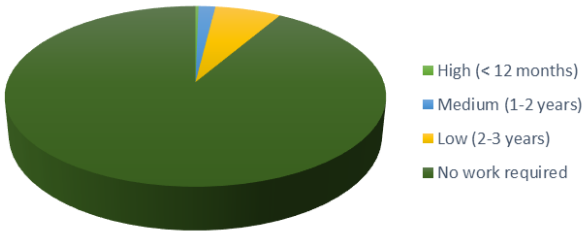
Consideration should be given to encouraging and incorporating in lot design and planning requirements that tree canopy be required on new private lots. Recent urban development has tended to allow inadequate space to achieve tree canopy goals that many councils are adopting and relying on public open space is unlikely to achieve the typical canopy cover goals that are sought. Successful establishment of future tree canopy cover requires that adequate ground space is allowed across all land tenures to allow for substantial canopy tree growth without creating undue conflict with other uses including residential development.

6. RECOMMENDATIONS & WORKS

6.a. Remedial and preventative works

Remedial or preventative work recommendations have been made for certain trees. Specific recommendations for each tree are provided in the accompanying data tables. For those trees on private property, these works are only recommended in the context that the land is subdivided and the trees are retained in a higher usage urban setting. A priority for the work is also provided.

Work Priority	No of Trees	% of total
High (< 12 months)	8	0.30%
Medium (1-2 years)	44	1.66%
Low (2-3 years)	173	6.53%
No work required	2426	91.51%
Grand Total	**2651**	**100.00%**



6.a.1 Pruning

Any pruning work must be carried out by appropriately qualified arborists working to AS4373-2007 *Pruning of amenity trees* and Minimum Industry Standard *MIS308 Tree pruning*.

6.b. Recommendation summary

A summary of the key recommendations that have arisen from the assessment and analysis is provided below.

ENSPEC's key recommendations –

- Where practical, retain trees of good health and structure irrespective of their Retention value
- Retain the group of *Eucalyptus camaldulensis* that includes the two trees rated as Critical for retention at 2 Evans Road in a suitably sized reserve
    - This must include protection of the entire TPZ for the Critical Retention value trees
- Retain the tree group including two *Eucalyptus camaldulensis* rated as Critical for retention at 50-60 Avonlea Road in a suitably sized reserve
    - This must include protection of the entire TPZ for the Critical Retention value trees
- Incorporate into all key documentation and approvals the requirement to comply with AS49702009 *Protection of trees on development sites* for all trees retained, including where they are on neighbouring properties
    - This will include the requirement that where encroachment of the TPZ is greater than 10%, it must be demonstrated that the development will not affect the health and viability of the tree before it is approved.
- Development within the TPZ of preserved trees, including landscaping, must protect the tree's canopy and root zone. Competing works, including the establishment of turf, should be avoided.
- Incorporate minimum tree canopy cover targets with the requisite ground space allowance into the key development documentation and planning
- In the event of trees being retained in higher density subdivisions, undertake the recommended remedial works on those trees

7. CONCLUSION

The Creamery Road PSP has a low tree canopy cover, typical of its recent grazing and cropping heritage. Those trees that are extant in the area are typically common farm tree species in good to fair condition. Retention values are generally Moderate to Low as a result of the species, size and condition of these trees. As a result it is expected that few of the existing trees will survive development of the area.

Given the near clean slate that is likely to be presented by the area in regard to tree canopy, there is an excellent opportunity to plan for high tree canopy cover across both private and public land that will enhance both the liveability and ecological value of the area.

8. DISCLOSURE STATEMENT

ENSPEC Pty Ltd and their employees are specialists who use their knowledge, training and education (qualifications), infield learning experiences, personal experiences research, diagnostic tools, scientific equipment to examine trees, recommend measures to enhance the beauty, health and preservation of trees, to reduce the risk of living near trees.

Trees are living organisms that can be affected by pests, diseases, and natural events outside of ENSPEC control. ENSPEC and their employees cannot detect every condition that affects a trees health, condition, and structural integrity. Conditions are often hidden within trees and below ground where humans cannot naturally see. Unless otherwise stated, ENSPEC's employee's observations have been visually made from ground level.

In the event that ENSPEC recommends retesting or inspection of trees at stated intervals, or ENSPEC recommends the installation engineering solutions, ENSPEC must inspect the engineering solution at intervals of not greater than 12 months, unless otherwise specified in writing. It is the client's responsibility to make arrangements with ENSPEC to conduct re-inspections.

Intervention treatments of trees may involve considerations beyond the scope of ENSPEC's service, such as property boundaries and ownership, disputes between neighbours, sight lines, landlord-tenant matters, and other related incidents. ENSPEC cannot take such issues into account unless complete and accurate information is given prior or at the time of the site inspection. Likewise, ENSPEC Pty Ltd cannot accept responsibility for the authorisation or non-authorisation of any recommended treatment or remedial measures undertaken.

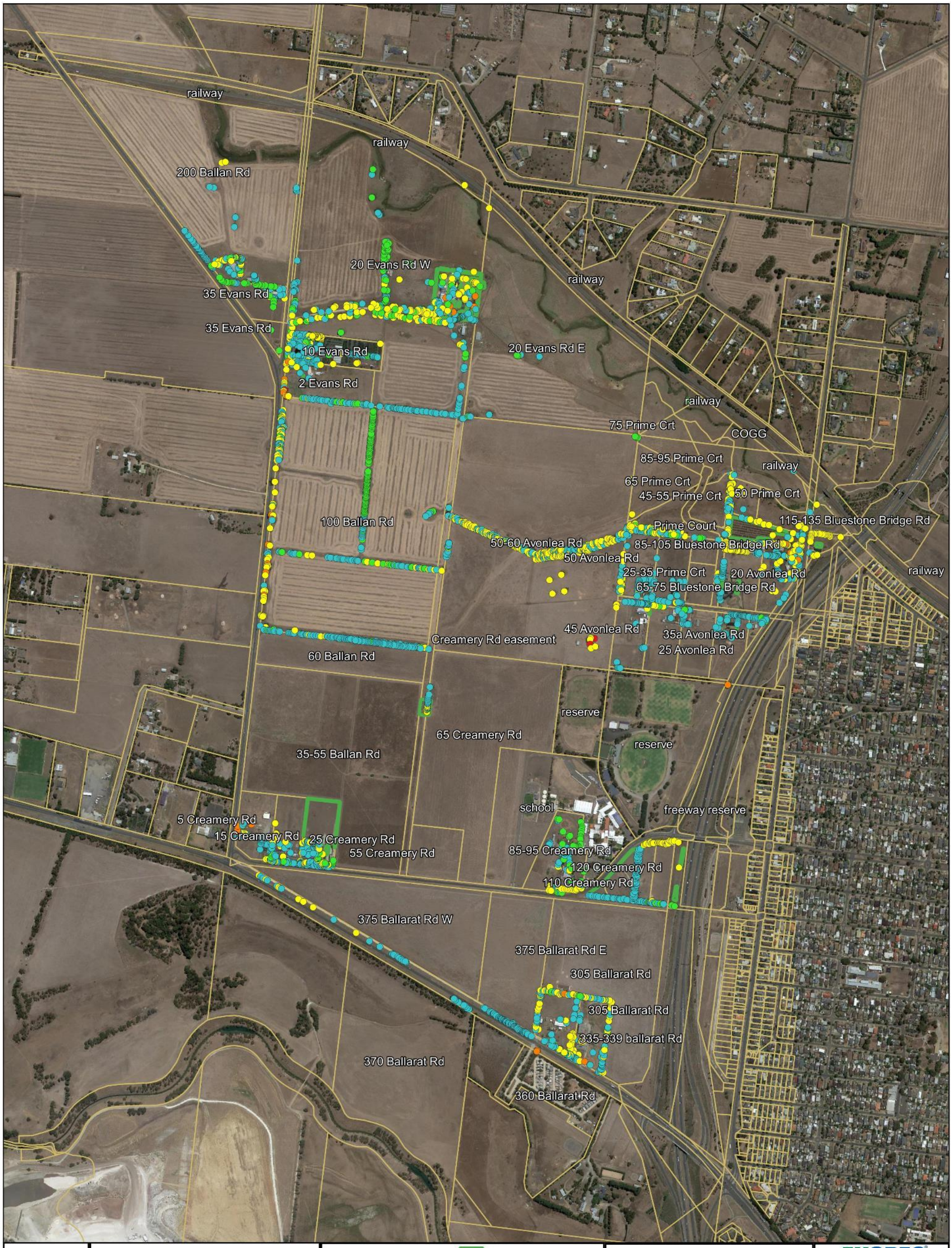
ENSPEC Pty Ltd cannot guarantee that a tree will be healthy or safe under all circumstances or for a specified period of time after our initial inspection and recommendations.

If this written report is to be used in a court of law, or any other legal situation, or by other parties ENSPEC must be advised in writing prior to the written report being presented in any form to any other party. All written reports must be read in their entirety. At no time shall part of the written assessment be referred to unless taken in full context with the whole written report.

Clients may choose to accept or disregard the recommendations of the assessment and written report.

Notwithstanding anything in the report, express or implied, the client is not entitled to recover from ENSPEC Pty Ltd, its employees, agents and/or subcontractors any damages for business interruption or loss of actual or anticipated revenue, income or profits or any consequential, special, contingent or penal damage, whatsoever, and the client releases ENSPEC Pty Ltd from any such liability. Without limitation of the foregoing, a party shall at all times be limited (to the extent permitted by law) damages in the amount paid by the Client to ENSPEC Pty Ltd for ENSPEC Pty Ltd services. The limitation applies whether the claim is based on warranty, contract, statute, tort (including negligence) or otherwise.

9. APPENDIX 1 – SURVEY OVERVIEW



10. APPENDIX 2 - TREE RETENTION PLAN, CRITICAL & HIGH VALUE TREES

Client:	City of Greater Geelong
Project:	Creamery Road PSP
Map title:	Critical & High Retention value
Version:	v1.0 11/02/2022
Projection:	GDA2020 Zone 55 (EPSG:7855)
Scale:	1:10,000 at A3

Tree Retention Value
- Critical
- High

AS4970 SRZ
- SRZ

AS4970 TPZ
- TPZ

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11. APPENDIX 3 - TREE RETENTION PLAN, MODERATE & LOW VALUE TREES