

GbLA LANDSCAPE ARCHITECTS

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Hawthorn VIC 3122

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Cowies Creek

Worneenanyook

Landscape MasterPlan



Date of Issue : 28 JUNE 2024

Masterplan Status: For Approval

Revision : E

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Author : Simon Wade (GbLA Landscape Architects)

The Wadawurrung Language name, Worneenanyook, meaning foot of the hill, due to the proximity of the conservation area to the monocline, is the name that has been proposed for the creek corridor by the Wadawurrung Traditional Owners

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Acknowledgement of Country

We acknowledge the Wadawurrung People as the Traditional Owners of the lands, waterways and skies of the Northern and Western Geelong Growth Areas. We pay our respects to their Elders, past, present and emerging and acknowledge all Aboriginal and Torres Strait Islander Peoples.

Scope of Landscape Masterplan

GbLA have been engaged by the City of Greater Geelong to prepare a Landscape Masterplan for the Cowies Creek Growing Grass Frog Conservation Reserve. The Landscape Masterplan aligns with the Northern and Western Growth Areas Framework Plan – June 2024 (Framework Plan) objectives and responds to the relevant technical studies that have informed the preparation of the Creamery Road PSP (CRPSP). The Masterplan has been prepared in collaboration with the Wadawurrung Traditional Owners Aboriginal Corporation, and has also involved the engagement with the City and key specialist consultants appointed by the City and landowners within the study area.

The development of the vision and recommendations of the Landscape Masterplan has been based on an understanding of the numerous technical studies prepared to inform the development of the CRPSP, engagement with the Wadawurrung Traditional Owners Aboriginal Corporation, our own site visits to assess landscape character and site conditions.

The Landscape Masterplan is intended to provide a vision and direction for the detailed planning and design associated with the creek corridor for the next 10-15 years at which time the Landscape Masterplan may be redundant, and a new Landscape Masterplan may be required to provide further guidance for the ongoing use, development, and management of the reserve.



LEGEND

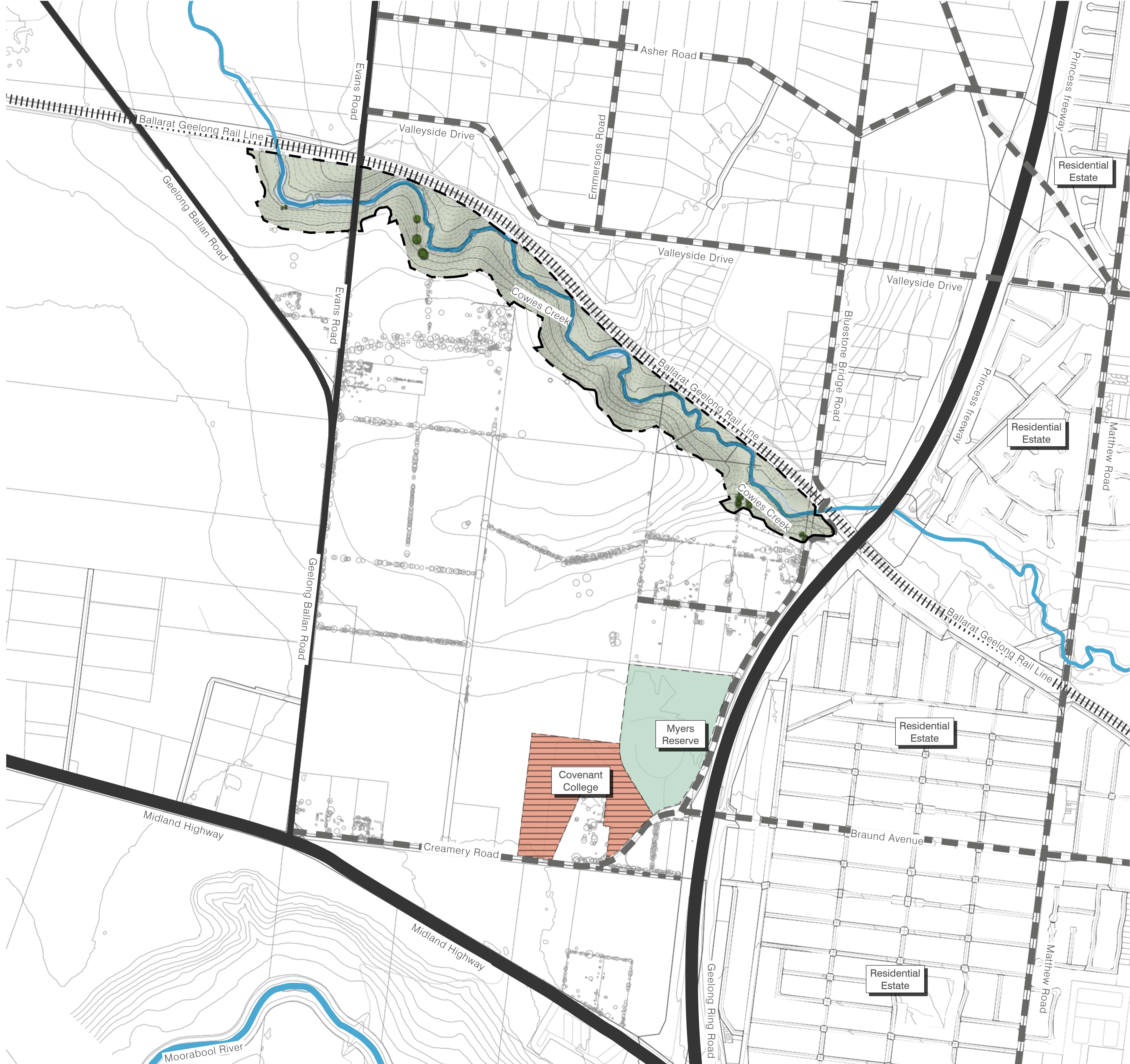
<ul style="list-style-type: none"> Creamery Road PSP Area Property Parcels 100m from Cowies Creek ● Trees to be retained * Heritage Homestead * Potential Future Railway Station Quarry Buffer Waterway Railway Corridor 	<ul style="list-style-type: none"> Conventional Residential Integrated Development Areas Mixed Use Zone IDA NAC Integrated Development Areas Activity Centre Early Years and Community Hub Existing Private School School Community Park Existing Sports (Active) Reserve Sports (Active) Reserve Drainage Corridor Indicative Drainage Asset Cowies Creek Conservation 	<ul style="list-style-type: none"> Untreated for Drainage / High Landlip Susceptibility Zone Untreated for Drainage / Moderate Landlip Susceptibility Zone * Emergency Hub (Indicative) 	<ul style="list-style-type: none"> Clever and Creative Corridor Standard (34m) - Vehicles can only turn left-in/left-out outside of a signalised location or alike. Activity Centre (20m) Variation (21.6m) Evans Road North (20m) Evans Road South (20m) 	<ul style="list-style-type: none"> Movement Network Recreational Transport Links Key Pedestrian Street Existing Road Arterial Road Connector Road Connector Road (Modified) Local Access Street (Level 1) Local Access Street (Level 2) Conservation Interface Street Bluestone Bridge Road (to be resolved through Cowies Creek Masterplan) Signalised Intersection (3 or 4 legs) Left In - Left Out P-Turn U-Turn
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Project No: 22026
Creamery Road PSP
 Cowies Creek, Geelong
 Landscape Master Plan
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Cowies Creek Study Area

Cowies Creek is located generally northwest of the Geelong CBD/Djilang and extends from a series of wetlands in its upper reaches between Anakie Road and Lights Road in Moorabool generally in a south-easterly direction for approximately 10km throughout private land holdings up to the historic bluestone viaduct at Bluestone Bridge Road. At this point, the creek begins to meander through a more urbanized context up to Thompsons Road where the creek corridor character is influenced by its' industrial context prior to entering Corio Bay/Coriayo at the Spirit of Tasmania Geelong Terminal.

This Landscape Masterplan is limited to a study area approximately 55ha in size that is generally defined by the Geelong Ballarat/Djilang Ballaarat Rail line at the historic viaduct overpass at Warners Road to the northwest which represents the northernmost point of the study area. From here the creek meanders in a south-easterly direction for approximately 2.6km towards the Geelong Ring Road where it crosses beneath Bluestone Bridge Road and then the Geelong Ballarat/Djilang Ballaarat Rail line through the historic viaduct (Cowies Creek Rail Bridge No 1). The entire northern boundary of the site is bound by the Geelong Ballarat/Djilang Ballaarat Rail line, while the southwest boundary of the site is typically defined by the proposed extent of the urban development boundary associated with the Creamery Road Precinct Structure Plan.





Cultural Significance

WADAWURRUNG COUNTRY

The Cowies Creek site forms part of the broader cultural geographical area known as Wadawurrung Country that at the time of European contact is understood to have extended from Mount Misery and Beaufort/Yarram in the north-west to the Werribee River in the northeast and to Fiery Creek and Mount Emu Creek in the west. Airey's Inlet/Mangowak defined the southernmost boundary and in the east, the Bellarine Peninsula/Ballawiyu formed the eastern extents of Wadawurrung Country (Unearthed Heritage 2021:iii).

It is likely that prior to European arrival within the area local Wadawurrung clans would have moved throughout the site and broader area taking advantage of seasonal variations to hunt and gather various animal and plant resources. At certain times of the year, larger groups are thought to have gathered at sites along Cowies Creek when resources became abundant for cultural ceremonies. The vegetation of the local area is likely to have supported habitat for kangaroos/Goim, echidna/Monngarrk, platypus/Perridak, wallabies/Go-yin, possums/Barnong, koalas/Ngaambulmum, reptiles, freshwater fish, eels/Buniya, and woodland birds (Unearthed Heritage 2021:15). As such the Cowies Creek margins has been identified as having High Archaeological Potential for the presence of archaeological deposits.

There are several registered Aboriginal sites that have been recorded and mapped within the study area that are of significance for the planning and management of the site.

A detailed assessment of Aboriginal occupation and cultural significance of the broader area has been documented in the CRPSP – Aboriginal Cultural Heritage Impact Assessment prepared by Unearthed Heritage and is a key background document necessary to guide the future development and integration of the site within the future Creamery Road precinct and the wider community.

POST-EUROPEAN LANDSCAPE

European land management and social and economic structures have dramatically impacted the social, environmental and cultural values of the site. Since European occupation, the site has primarily been utilized for productive pastoral and agricultural farming practices that have dramatically modified ecosystem functionality while also significantly diminishing Wadawurrung cultural values of the site and broader area.

Of particular significance to the study area are the Coolangatta Homestead centrally positioned to the south side of the creek corridor and the Avonlea Homestead located on the southeast of the creek, beyond the extent of the Conservation Area. Also of significance to the rejuvenation of the creek corridor are Historic Rail Bridges 1 and 2 that define both the north-western and south-eastern extents of Cowies Creek. Both rail bridges are listed on the Victorian Heritage Register and are required to be managed in accordance with the Victorian Heritage Act 2017. Currently, the Coolangatta and Avonlea Homesteads do not have any provisions under the Greater Geelong Planning Scheme for heritage protection, however, the sites are under consideration for the Heritage Overlay. Neither the Coolangatta Homestead site nor either of the historic rail bridges is within the extent of the study area of the Landscape Masterplan, however, they are all visible from within the site and within close proximity to the creek corridor and as such any recommendations of the Landscape Masterplan and future development of the site is required to acknowledge and consider these key historical assets in line with the recommendations of the CRPSP – Post-contact Heritage Assessment Final (2022).

CREEK FORM

Within the bounds of the site, Cowies Creek is generally defined as an intermittent creek channel that meanders through an undulating landform. The creek passes beneath Evans Road at the western end of the site and Bluestone Bridge Road to the far east of the site. Several informal crossings have been created along the length of the creek by landholders to gain access to the northern side of the creek which has enabled the creation of several artificial pools. The creek also has two minor drainage tributaries, one to the north of the site beneath the Geelong Ballarat/Djilang Ballarat railway and also one to the southeastern end of the site with a more defined intermittent drainage channel towards the Bluestone Bridge Road crossing.

Longitudinally the creek falls some 19m over approximately 2.6km.

HABITAT VALUES

The creek corridor has significant biodiversity values for local wildlife containing a densely vegetated riparian corridor with patches of remnant Creek line Tussock Grassland evidenced along most of the floodplain. The existing habitat quality of the creek floodplain has been identified as 'marginal' by Ecology and Heritage Partners (2021).

Cowies Creek currently supports a range of environmental values including a significant population of Growling Grass Frog (*Litoria raniformis*) listed as vulnerable under the EPBC Act 1999. Further populations of Growling Grass Frog have also been recorded in the downstream reaches of the creek, further emphasising the significance of the broader creek corridor downstream of the study area in supporting the species.

"A significant population of Growling Grass Frog was found in the Cowies Creek survey area. Some 30 Growling Grass Frogs were recorded calling within Cowies Creek (within the study area) on 6 December 2019 and five individuals were observed further north while spotlighting on 12 January 2020" (Nature Advisory April 2020).

In addition to Growling Grass Frogs, the regionally significant Eastern Long-necked Turtle (*Chelodina longicollis*) is known to inhabit the site along with a variety of other native local fauna.

Generally, water quality in the upper reach of the creek is low with high salinity and turbidity evidenced restricting access to viable habitats for a number of different species recorded within the creek corridor.

The following significant fauna species have been recorded within the Creamery Road Precinct study area (Ecology and Heritage Partners 2017):

- Swift Parrot *Lathamus discolor*
- Macquarie Perch *Macquaria australasica*
- Baillon's Crake *Porzana pusilla palustris*
- Grey Goshawk *Accipiter novaehollandiae*

- Eastern Great Egret/Moorpanyul *Ardea modesta*
- Nankeen Night Heron *Nycticorax caledonicus*
- Spotted Harrier *Circus assimilis*

The broader Creamery Road Precinct also has potential habitat for other key significant fauna species as follows:

Nationally Significant:

- Australasian Bittern *Botaurus poiciloptilus*, Plains-wanderer *Pedionomus torquatus*, Swift Parrot *Lathamus discolor*, Painted Honeyeater *Grantiella picta*, Grey-headed Flying-fox *Pteropus poliocephalus*, Striped Legless Lizard *Delma impar*, Growling Grass Frog *Litoria raniformis*, Australian Grayling *Prototroctes maraena*, Yarra Pygmy Perch *Nannoperca obscura*, Golden Sun Moth *Synemon plana*.

State Significant:

- Hardhead *Aythya australis*, Blue-billed Duck *Oxyura australis*, Whitethroated Needletail *Hirundapus caudacutus*, Eastern Great Egret *Ardea modesta*, Intermediate Egret *Ardea intermedia*, Little Egret *Egretta garzetta nigripes*, Grey Goshawk *Accipiter novaehollandiae*, Black Falcon *Falco subniger*, Lewin's Rail *Lewinia pectoralis*, Baillon's Crake *Porzana pusilla palustris*, Powerful Owl, *Ninox strenua*, Barking Owl *Ninox connivens*, Brown Treecreeper (south-eastern ssp.) *Climacteris picumnus victoriae*, Speckled Warbler *Chthonicola sagittatus*, Hooded Robin *Melanodryas cucullata*, Diamond Firetail *Stagonopleura guttata*, Common Dunnart *Sminthopsis murina*, Western Burrowing Crayfish *Engaeus merosetosus*.

Regionally Significant:

- Nankeen Night Heron *Nycticorax caledonicus hillii*, Royal Spoonbill *Platalea regia*, Spotted Harrier *Circus assimilis*, Latham's Snipe *Gallinago hardwickii*, Azure Kingfisher *Alcedo azurea*, Fat-tailed Dunnart *Sminthopsis crassicaudata*.

FLORA

Pre- European settlement, the site is known to have supported Plains Grassland and Chenopod Shrublands EVCs where predominantly vegetation grew to no more than a meter or so in height. Currently, the vegetation within the study area contains a mix of introduced pasture grasses, other exotic weed species and native species generally of low diversity and poor structure. Patches of Creeklane Grassy Woodland (EVC 68) and Plains Grasslands (EVC 132) have also been identified within the site. Tree cover is very sparse and consists of a mix of planted and native and exotic tree species.

The riparian creek corridor supports a dense composition of a variety of native sedges and rushes and is representative of a grassy and aquatic herb creek line. Ecology and Heritage Partners (2021) have specifically noted the following regarding existing vegetation within the flood plain:

"Creeping Monney-flower *Thyridia repens* is the dominant understory species, with the western extent dominated by Common Red Typha *australis*. The cover of native species formed up to 70% cover in areas fringing pooled water and reduced to 30% cover as areas of the creek became drier. Overall, weed cover was high, with the noxious Spiny Rush *Juncus acutus* being the dominant weed, with other species such as *Galenia pubescens* var. *pubescens*, Toowoomba Canary-grass *Phalaris aquatics*, Serrated Tussock and Chilean Needle-grass also common. The noxious weed and WoNS African Box-thorn *Lycium ferocissimum* were also scattered through the patch."

A large portion of the site in the upstream areas (western end) of the corridor is currently being utilised for crop production and is negatively impacting the water quality of Cowies Creek.

The following 7 significant flora species have been recorded within the study area:

- *Lachnagrostis adamsonii* (Adamson's blown-grass)
- *Pimelea spinescens* ssp. *spinescens* (Spiny Rice-flower)
- *Eucalyptus leucoxylon* ssp. *connata* (Melbourne Yellow-gum)
- *Prostanthera nivea* var. *nivea* (Snowy Mint-bush)
- *Malva preissiana* s.s. (Coast Hollyhock)
- *Geranium solanderi* var. *solanderi* s.s. (Austral Crane's-bill)
- *Rhagodia parabolica* (Fragrant Saltbush)

The following weed species have been identified within the study area:

- *Nassella neesiana* (Chilean Needle Grass)
- *Juncus acutus* (Spiny Rush)
- *Lycium ferocissimum* (African Box-thorn)
- *Cirsium vulgare* (Spear Thistle)
- *Cynara cardunculus* (Artichoke Thistle)
- *Echium plantagineum* (Patterson's Curse)
- *Nasella trichotoma* (Serrated Tussock)
- *Rosa rubiiosa* (Sweet Briar)
- *Xanthium spinosum* (Bathurst Burr)



Landscape Masterplan

Purpose

The purpose of this Masterplan is to provide an informed, consolidated approach to the design, use, function, development and management of the Cowies Creek conservation reserve. Primarily the Masterplan considers the protection and enhancement of the habitat for the Growling Grass Frog *Litoria raniformis* which is listed as Vulnerable under the EPBC Act.

The Masterplan is a key guiding document that is intended to assist with the planning and design of the broader contextual open space and pedestrian circulation and interpretation strategies in the Creamery Road Precinct as well as for the design development and detailed design of the conservation area. The Growling Grass Frog Conservation Management Plan addresses the detailed rehabilitation and management of the conservation reserve.

The Masterplan aligns with the Northern and Western Growth Areas Framework Plan – August 2020 (Framework Plan) objectives and responds to and addresses relevant technical studies, of the Draft CRPSP.

Specifically, the Landscape Masterplan provides direction with regard to the following elements of the protection and enhancement of the conservation area:

1. Overall landscape vision
2. The location and extent of the proposed conservation boundary
3. Landscape interventions to protect and enhance the habitat of the Growling Grass Frog and enhance natural values of the creek
4. Guidance associated with Wadawarrung cultural interpretation and naming conventions
5. General interface conditions with the proposed Creamery Road Urban Development Boundary
6. Pedestrian circulation
7. Plant species for revegetation and revegetation principles
8. Masterplan level cost analysis of proposed landscape interventions and local amenity provision to assist with DCP planning and development.
9. Retention and enhancement of key view shed into and along the Cowies Creek Corridor.
10. Protection of key values associated with the Coolangatta Homestead and Historic Bridges 1 and 2.
11. Address key considerations in the Draft Creamery Road PSP including relevant considerations for canopy coverage, biodiversity, heritage rail bridges and others.
12. Guidance on cultural interpretation within the conservation area.

Key Stakeholders

The principal stakeholders engaged in the preparation of the Landscape Masterplan are as follows:

- The City of Greater Geelong
- Wadawarrung Traditional Owners Aboriginal Corporation (WTOAC)
- Barwon Water
- The Department of Environment, Land, Water and Planning (DEECA)
- VicTrack
- Corangamite Catchment Management Authority (CCMA)

Consultation with stakeholders has occurred via telephone and online Teams meetings.

The WTOAC was engaged as a sub-consultant in the preparation of the Landscape Masterplan. The draft masterplan was shared with agencies nominated above and landowners in the precinct for review and feedback prior to finalisation.



Technical Studies

The Landscape Masterplan has been prepared having regard to the following documents:

Relevant Studies, Reports and Documents:

- a) Draft Creamery Road Precinct Structure Plan – City
- b) Creamery Road PSP Aboriginal Cultural Heritage Impact Assessment
- c) Northern and Western Geelong Growth Areas Framework Plan (August 2020)
- d) Existing Ecological Conditions: Northern and Western Geelong Growth Areas (July 2021)
- e) Land Capability Assessment (LCA) – Creamery Road PSP
- f) Land Capability Assessment (LCA) Addendum – Creamery Road PSP
- g) Creamery Road Development Services scheme
- h) Creamery Road Precinct Landscape and Visual Analysis Report (May 2022)
- i) Creamery Road Precinct Post Contact Heritage Report (April 2022)
- j) Creamery Road Precinct Cultural Values Assessment (February 2022)
- k) Creamery Road Precinct Arboriculture Assessment (May 2022)
- l) NWGGA Smart City Technical Report and Technical Specifications documents
- m) Creamery Road PSP Technical Transport and Access report – PMP Urbanists
- n) Creamery Road PSP – Movement and Access report – Stantec
- o) Creamery Road PSP – Matters of National Environmental Significance Assessment
- p) Creamery Road PSP – Aboriginal Cultural Heritage Impact Assessment
- q) GHD Memo (21.02.2022)
- r) Alluvium Memo (18.07.2022)
- s) Creamery Road PSP Acoustic Assessment-Rp001 01Draft (16.08.22)
- t) Interim Report – Approach to bushfire assessment & planning, Creamery Road Precinct Structure Plan (05.05.22)
- u) Creamery Road Development Services Scheme under Concept Design Report (Final) (May 2022)
- v) Biosis 2023. WGGA Cowies Creek Conservation Area Growling Grass Frog Conservation Management Plan. Report for City of Greater Geelong. Tingate. C, Trollope. S, Biosis Pty Ltd., Melbourne, Vic. Project no. 38542

Limitations of the Landscape Masterplan

On-site field assessment has been limited to the land available at the time of assessment that was able to be negotiated with existing landowners. We were not able to gain physical access to Lot 30 Avonlea Road, Bell Post Hill at the time of the assessment, however an aerial assessment of the site has been undertaken from Nearmap Imagery and from drone footage undertaken while on site.

We have not reviewed nor are we aware of the following studies that could further inform the recommendations of the Landscape Masterplan:

- Horticultural soil testing throughout the site
- Creek bed and bank stability assessment

Landscape Analysis

A general site walk of the creek corridor was carried out by GbLA and the Wadawurrung Traditional Owners Aboriginal Corporation (WTOAC) on 19 July 2022 to assess the existing landscape character, site context, and general condition of the creek and its surrounding environment.

As part of the site walk a 'Walk on Country' was also conducted by the WTOAC to provide insight into the Wadawurrung cultural connections to Country within the context of the site.

To help inform the development of the Cowies Creek Landscape Masterplan an assessment of the existing constraints and opportunities for the future rehabilitation and regeneration of the creek corridor was investigated and mapped by GbLA. The following analysis mapping interprets and illustrates the environmental and cultural mapping undertaken as part of the development of the Creamery Road PSP and this development of the Masterplan.

The key considerations from the landscape analysis that have informed the preparation of the Landscape Masterplan are as follows:

- Cultural Heritage
- Topographical conditions
- Known locations of Growling Grass Frog populations
- Landslip Analysis
- Water quality analysis
- Existing vegetation qualities and extent

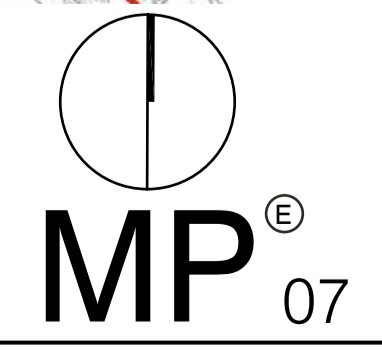
PHOTOGRAPHIC ANALYSIS



LANDSCAPE KEY

- Cowies Creek Conservation Area Extents
- Existing Minor Contours (1m intervals)
- Existing Major Contours (5m intervals)
- Q100 ARI Level
- 100m offset from centreline of Cowies Creek
- Waterway
- Existing trees
- View point location & orientation

Project No: 22026
 Creamery Road PSP
 Cowies Creek, Geelong
 Landscape Master Plan
 GbLA.COM.AU
 1 : 3000 @ A1 | 0 | 3000 | 9000
 1 : 6000 @ A3



PHOTOGRAPHIC ANALYSIS

Viewpoint 1

LOCATION: BETWEEN EVANS RD & GEELONG-BALLAN RD
LOOKING WEST

COORDINATES
Latitude: 38°04'42.0"S, -38.078320
Longitude: 144°18'22.6"E, 144.306282

DISTANCE TO CREEK: 1 M



EXISTING CONDITIONS



Productive cropping interface with Cowies Creek



Inline pool created by land owner



View looking north-east along creek line



Historic rail culvert crossing

PHOTOGRAPHIC ANALYSIS

Viewpoint 2

LOCATION: SOUTHWEST OF EVANS RD & BALLARAT GEELONG RAIL LINE
LOOKING SOUTH

COORDINATES
Latitude: 38°04'37.4"S, -38.077060
Longitude: 144°18'28.2"E, 144.307841

DISTANCE TO CREEK: 108 M



EXISTING CONDITIONS



Northern boundary interface



View north along Evans Rd with Ballarat Geelong rail line intersection



View south along Evans Rd (Cowies Creek in mid-ground)

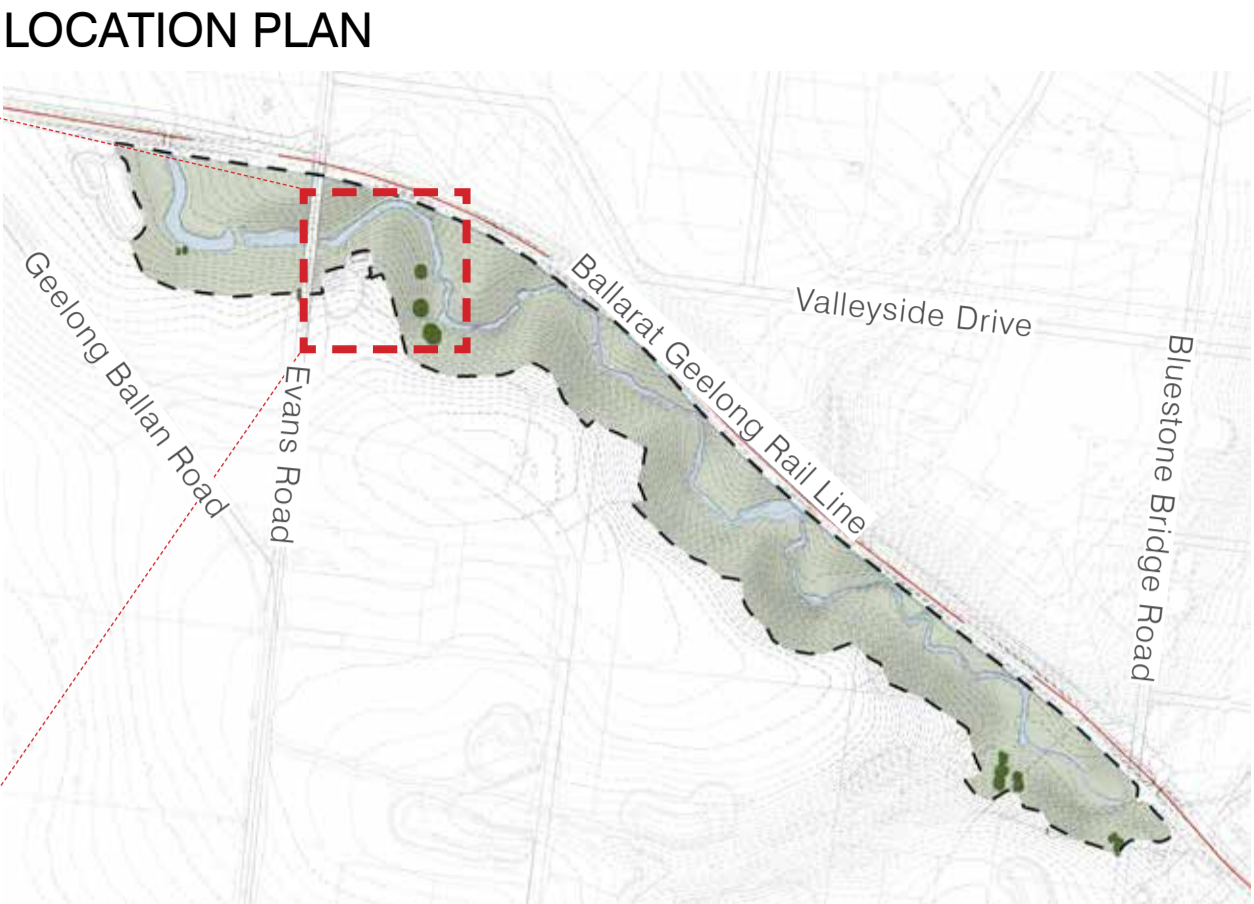
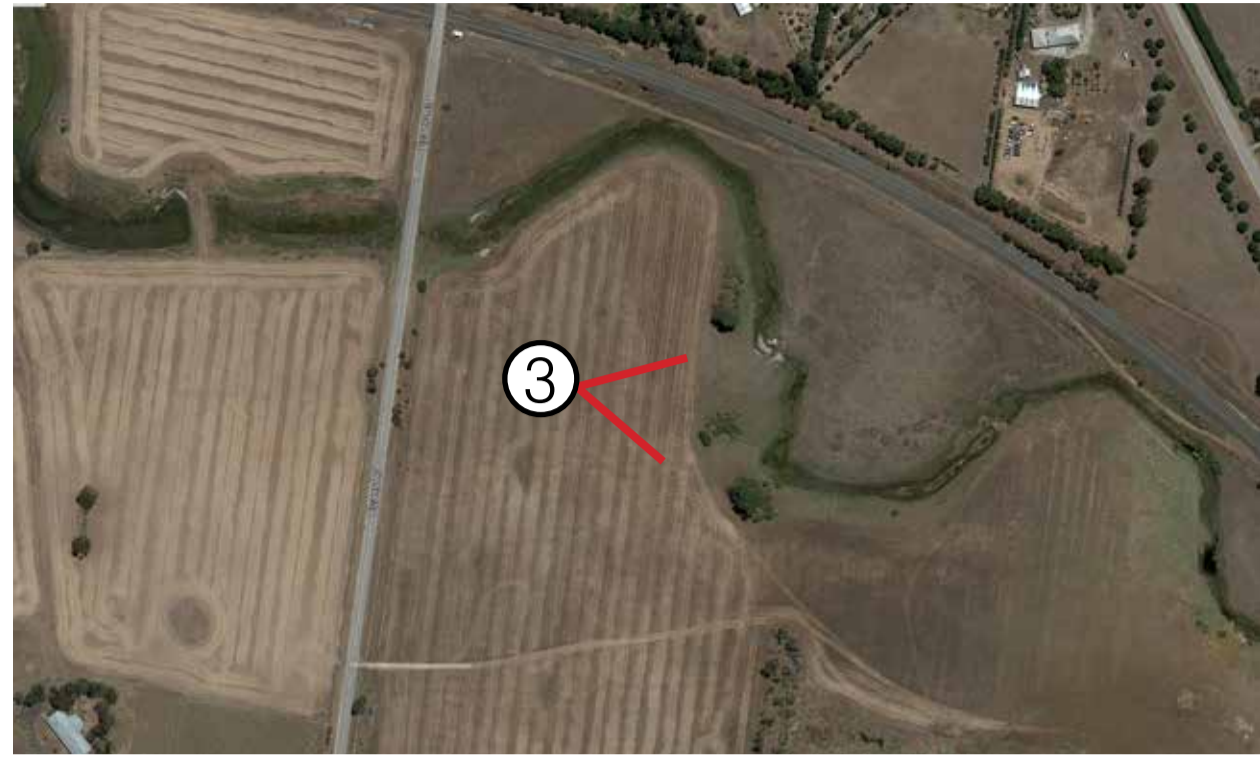
PHOTOGRAPHIC ANALYSIS

Viewpoint 3

LOCATION: NEAR ENTRANCE OF EVANS RD
LOOKING EAST

COORDINATES
Latitude: 38°04'44.4"S, -38.078999
Longitude: 144°18'33.9"E, 144.309422

DISTANCE TO CREEK: 145 M



EXISTING CONDITIONS



Existing trees in decline



Informal crossing over creek enabling artificial pooling upstream



View of culvert beneath Ballarat Geelong rail line



View west towards Evans Rd

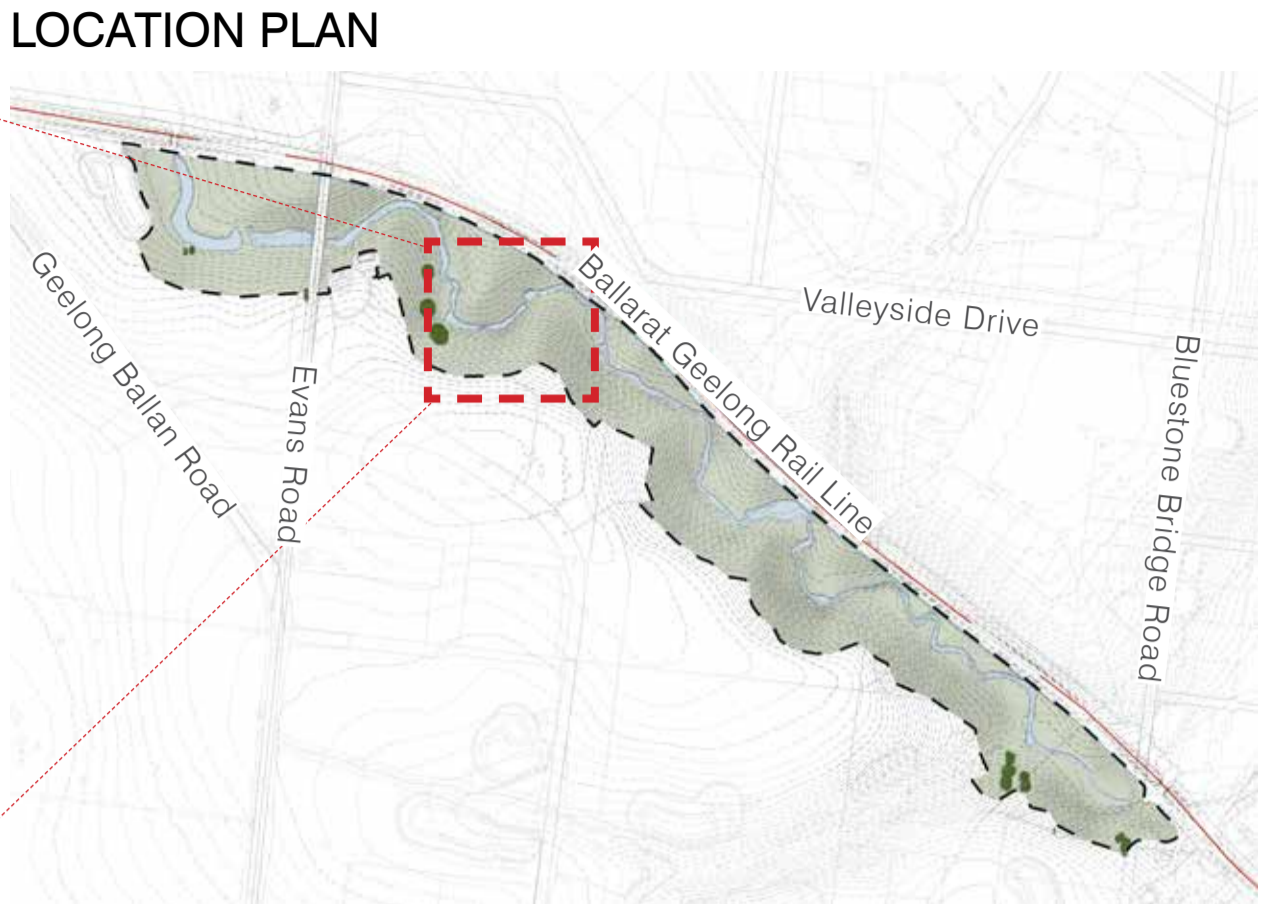
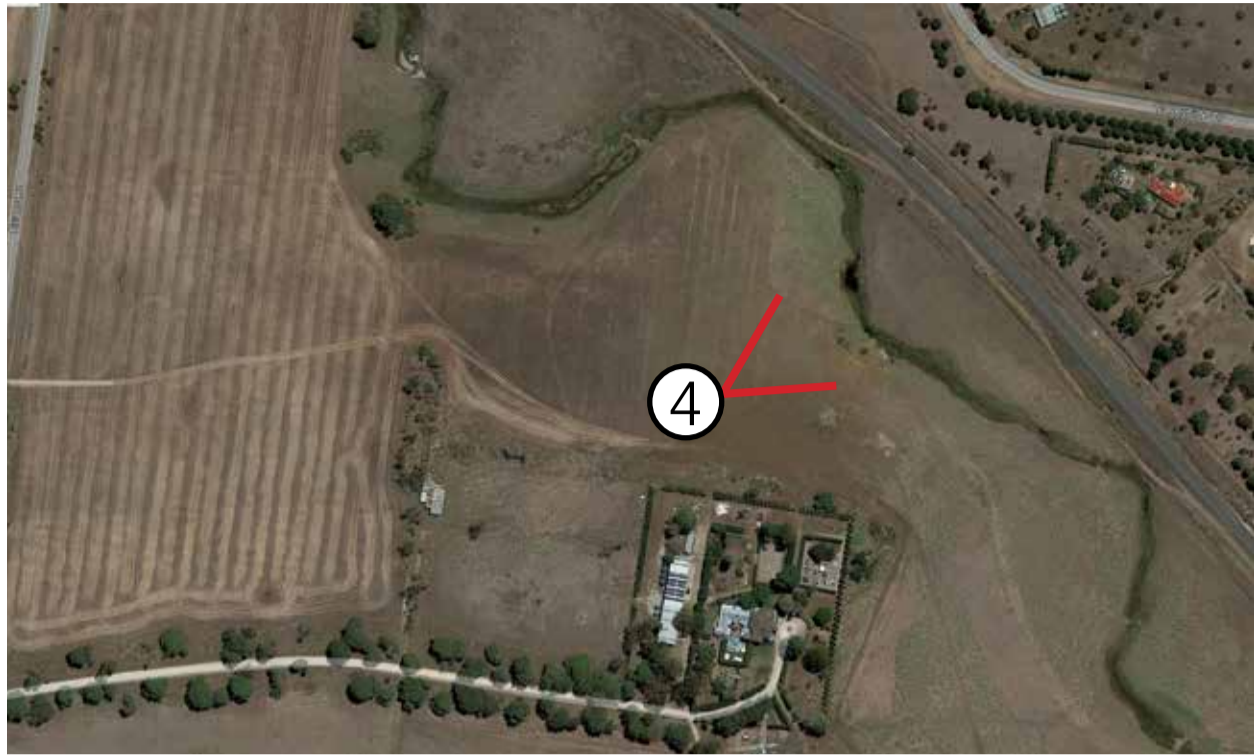
PHOTOGRAPHIC ANALYSIS

Viewpoint 4

LOCATION: NORTH OF THE COOLANGATTA HOMESTEAD
LOOKING NORTH-EAST

COORDINATES
Latitude: 38°04'52.1"S, -38.081138
Longitude: 144°18'45.7"E, 144.312700

DISTANCE TO CREEK: 180 M



EXISTING CONDITIONS



Creek bank erosion



Existing trees and fence of the Coolangatta Homestead



Dumped rubbish along creek line



Fence posts offering perching opportunities for native birds

PHOTOGRAPHIC ANALYSIS

Viewpoint 5

LOCATION: *NORTHEAST OF THE COOLANGATTA HOMESTEAD
LOOKING NORTH-EAST*

COORDINATES
 Latitude: *38°04'53.2"S, -38.081451*
 Longitude: *144°18'51.7"E, 144.314357*

DISTANCE TO CREEK: *94 M*



EXISTING CONDITIONS



View looking west



Culvert beneath the Geelong-Ballarat Rail Line



Volcanic stones scattered in the area



Dumped construction rubbish along creek line

PHOTOGRAPHIC ANALYSIS

Viewpoint 6

LOCATION: MIDDLE OF THE COWIES CREEK
CONSERVATION AREA
LOOKING SOUTH-EAST

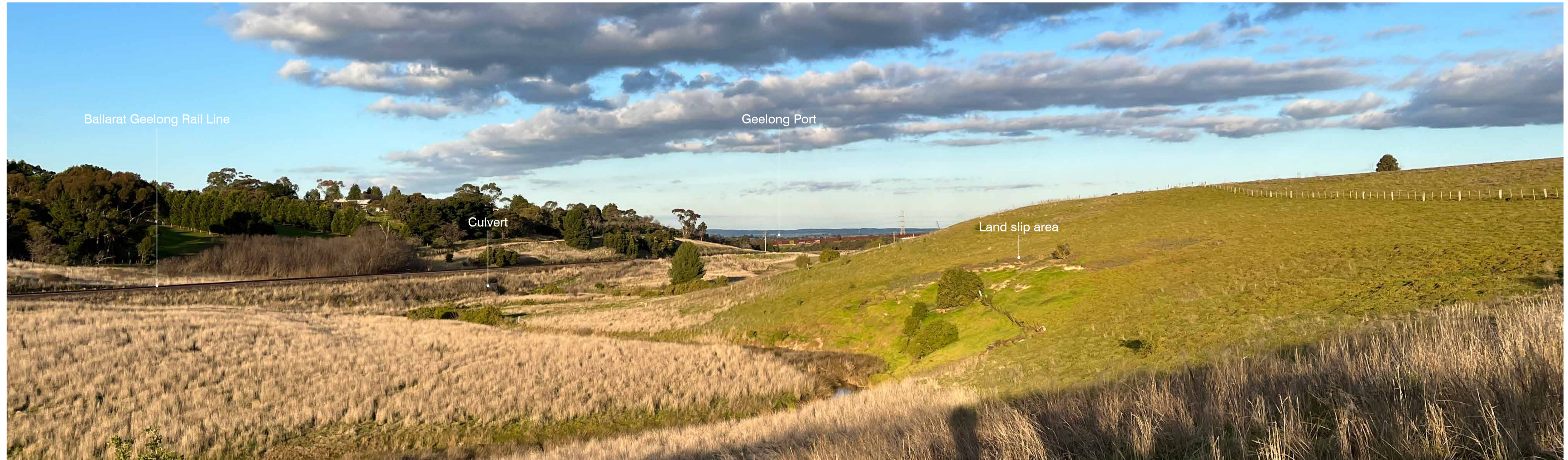
COORDINATES
Latitude: 38°05'00.0"S, -38.083343
Longitude: 144°18'58.6"E, 144.316267

DISTANCE TO CREEK: 50 M

LOCATION PLAN



EXISTING CONDITIONS



View looking towards Geelong Ring Rd



Dumped rubbish along creek line



Evidence of land slip and Box thorn thicket

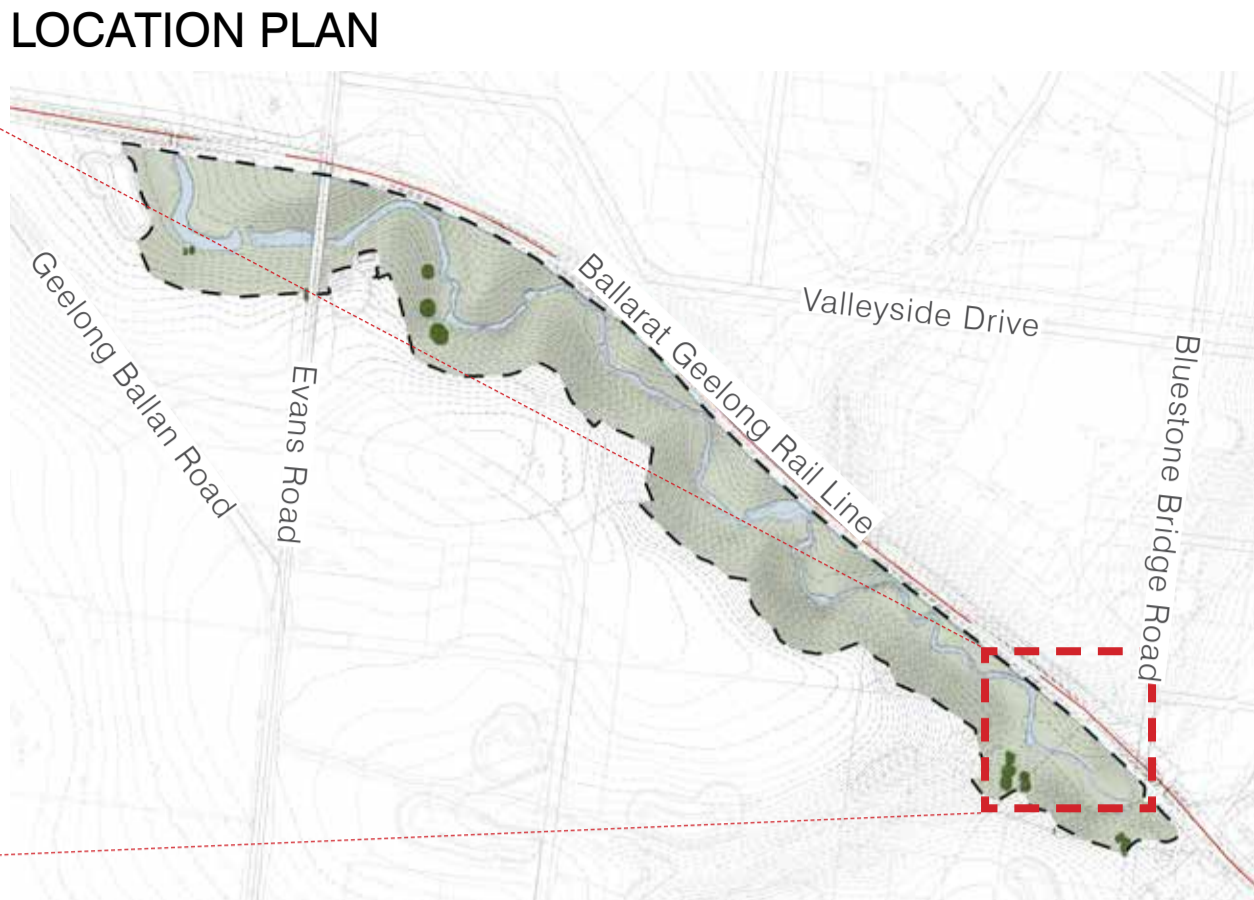
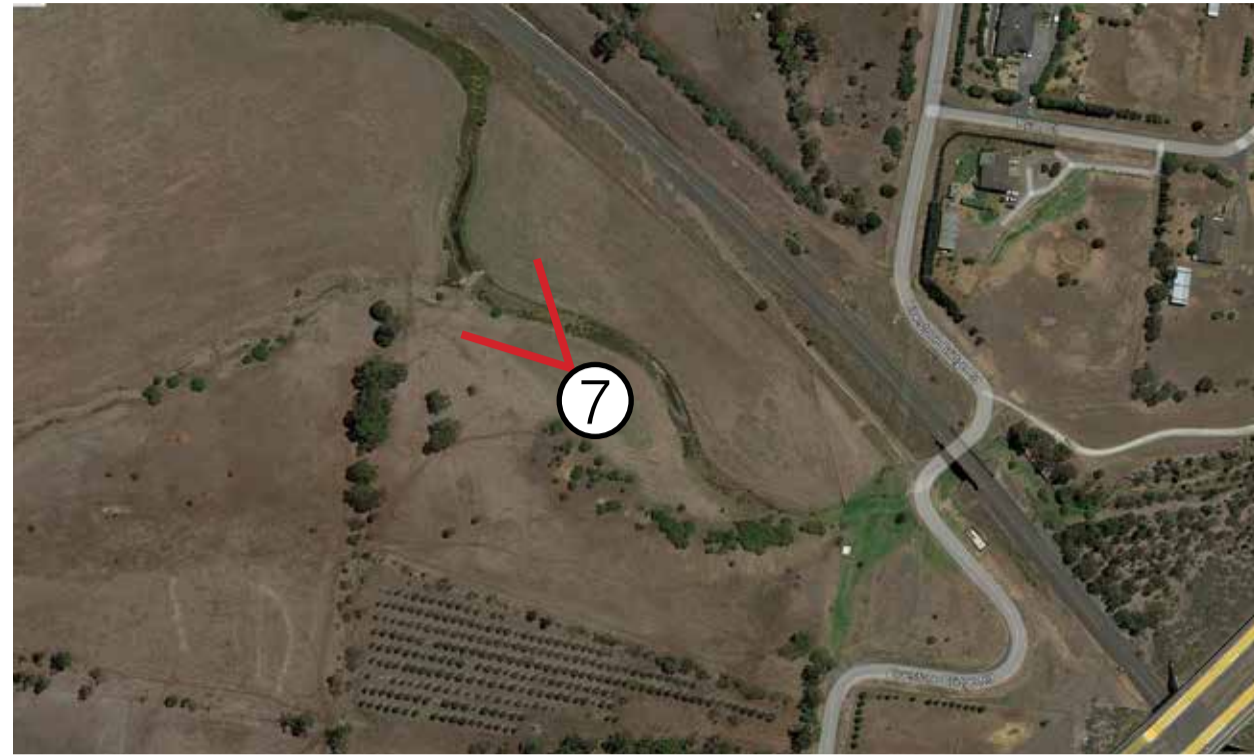
PHOTOGRAPHIC ANALYSIS

Viewpoint 7

LOCATION: NEAR WEST OF BLUESTONE BRIDGE RD
LOOKING NORTH-WEST

COORDINATES
Latitude: 38°05'15.1"S, -38.087515
Longitude: 144°19'25.8"E, 144.323831

DISTANCE TO CREEK: N/A



EXISTING CONDITIONS



Box thorn thicket



View of rail line looking east



Evidence of 4 x 4 illegal access at Bluestone Bridge Rd

SITE ANALYSIS - GEOLOGY



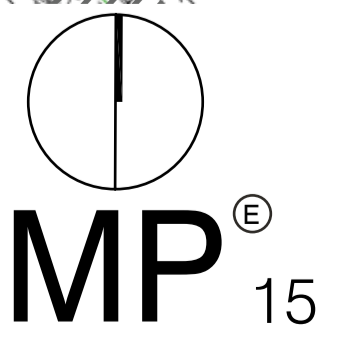
LANDSCAPE KEY

- Cowies Creek Conservation Area Extents
- Existing Minor Contours (1m intervals)
- Existing Major Contours (5m intervals)
- 100m offset from centreline of Cowies Creek
- Black Rock Sandstone
- Gellibrand Marl in Torquay
- Alluvium
- Newer Volcanic Group

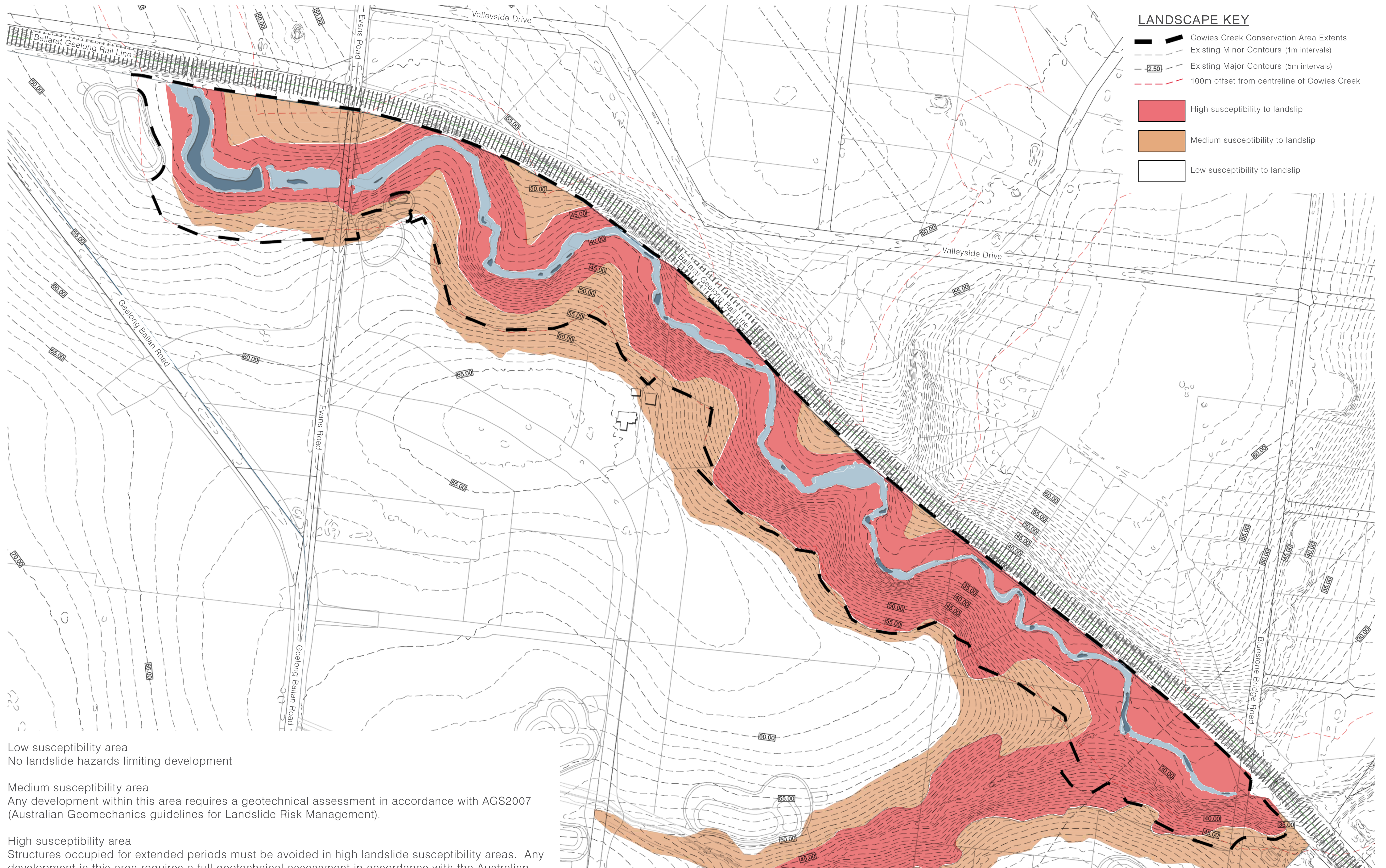
Reference :
Land Capability Assessment - Creamery Road PSP, (April 2022), Meinhart

Project No: 22026
Creamery Road PSP
Cowies Creek, Geelong
Landscape Master Plan

GbLA.COM.AU
1 : 3000 @ A1 | 0 | 3000 | 9000
1 : 6000 @ A3



SITE ANALYSIS - LANDSLIP



LANDSCAPE KEY

- Cowies Creek Conservation Area Extents
- Existing Minor Contours (1m intervals)
- Existing Major Contours (5m intervals)
- 100m offset from centreline of Cowies Creek
- High susceptibility to landslip
- Medium susceptibility to landslip
- Low susceptibility to landslip

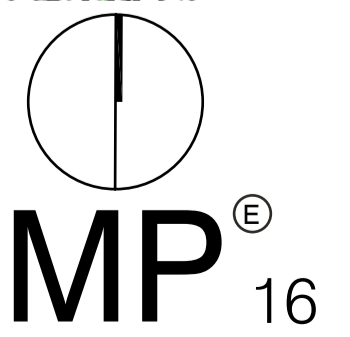
Low susceptibility area
No landslide hazards limiting development

Medium susceptibility area
Any development within this area requires a geotechnical assessment in accordance with AGS2007 (Australian Geomechanics guidelines for Landslide Risk Management).

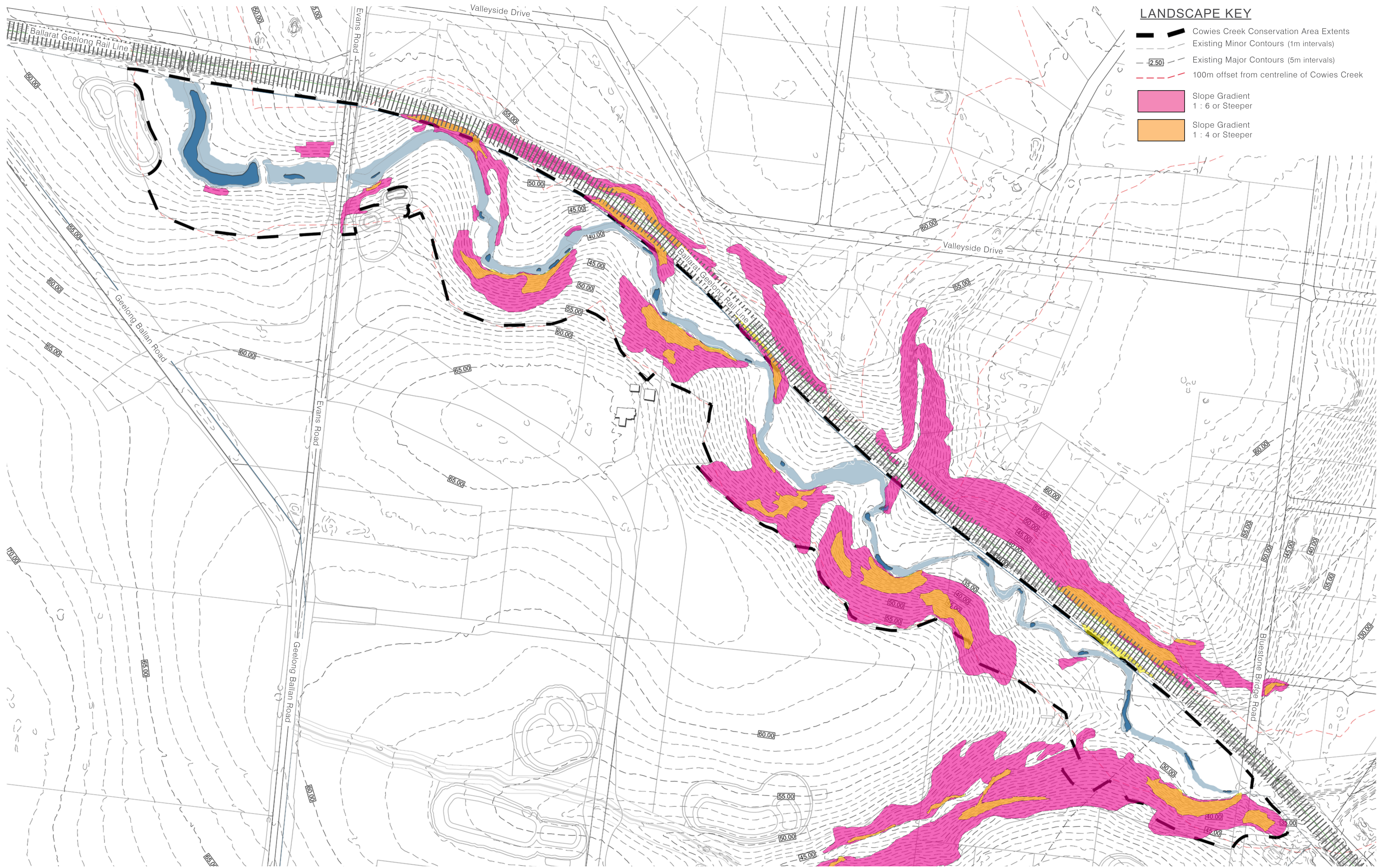
High susceptibility area
Structures occupied for extended periods must be avoided in high landslide susceptibility areas. Any development in this area requires a full geotechnical assessment in accordance with the Australian Geomechanics Guidelines for Landslide Risk Management (2007) which includes detailed subsurface investigation and risk evaluation for both individual risk and societal risk. The assessment must achieve low to very low risk levels to allow development.

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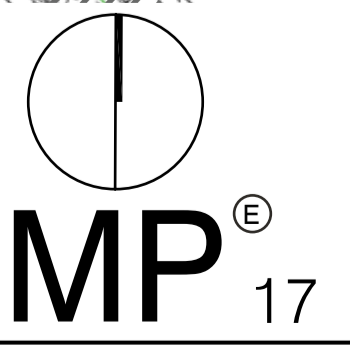


SITE ANALYSIS - SLOPE

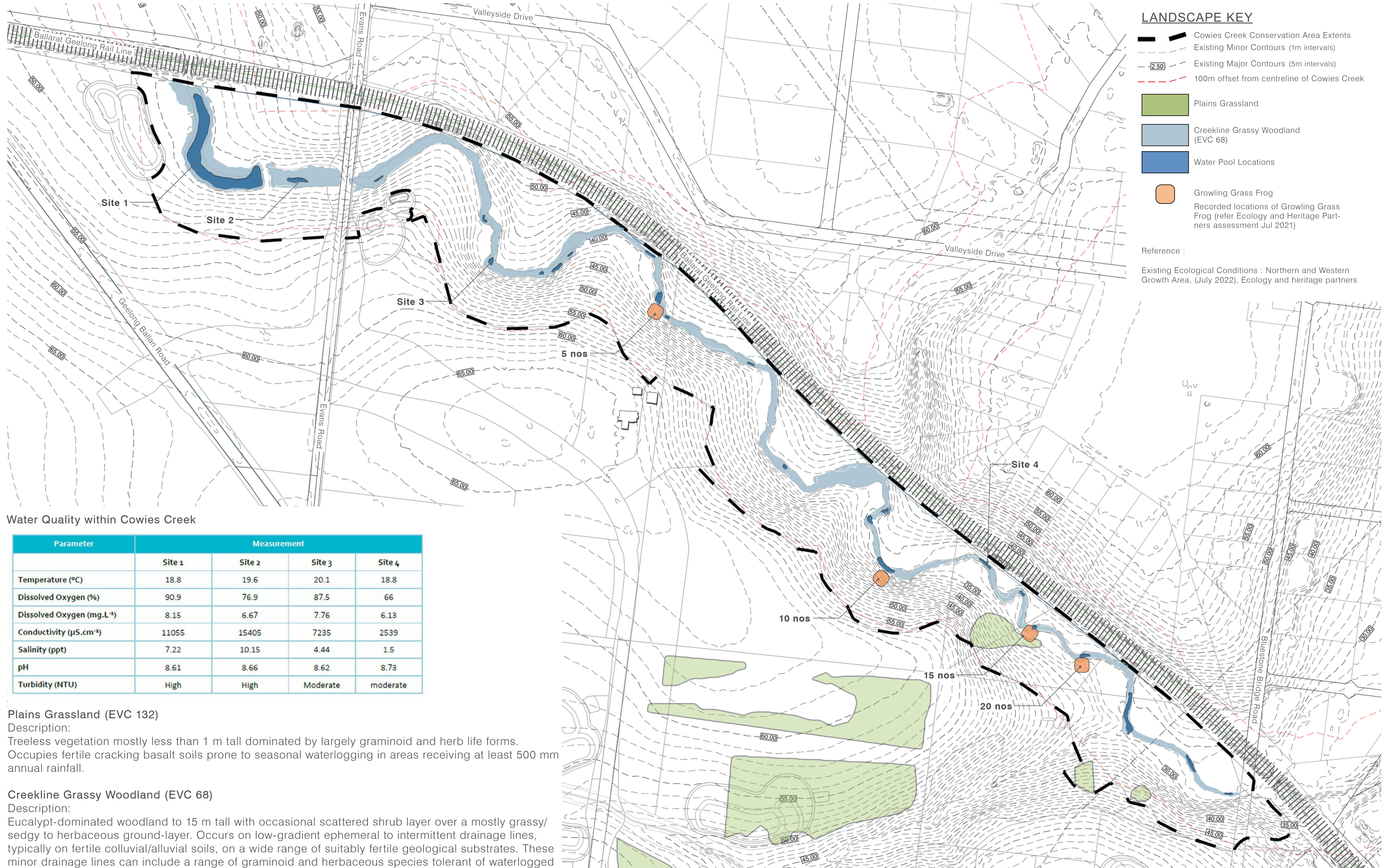


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SITE ANALYSIS - ECOLOGICAL VEGETATION CLASS, WATER QUALITY & FAUNA ASSESSMENT



LANDSCAPE KEY

- Cowies Creek Conservation Area Extents
- Existing Minor Contours (1m intervals)
- Existing Major Contours (5m intervals)
- 100m offset from centreline of Cowies Creek
- Plains Grassland
- Creekline Grassy Woodland (EVC 68)
- Water Pool Locations
- Growing Grass Frog
- Recorded locations of Growing Grass Frog (refer Ecology and Heritage Partners assessment Jul 2021)

Reference :
Existing Ecological Conditions : Northern and Western Growth Area, (July 2022), Ecology and heritage partners

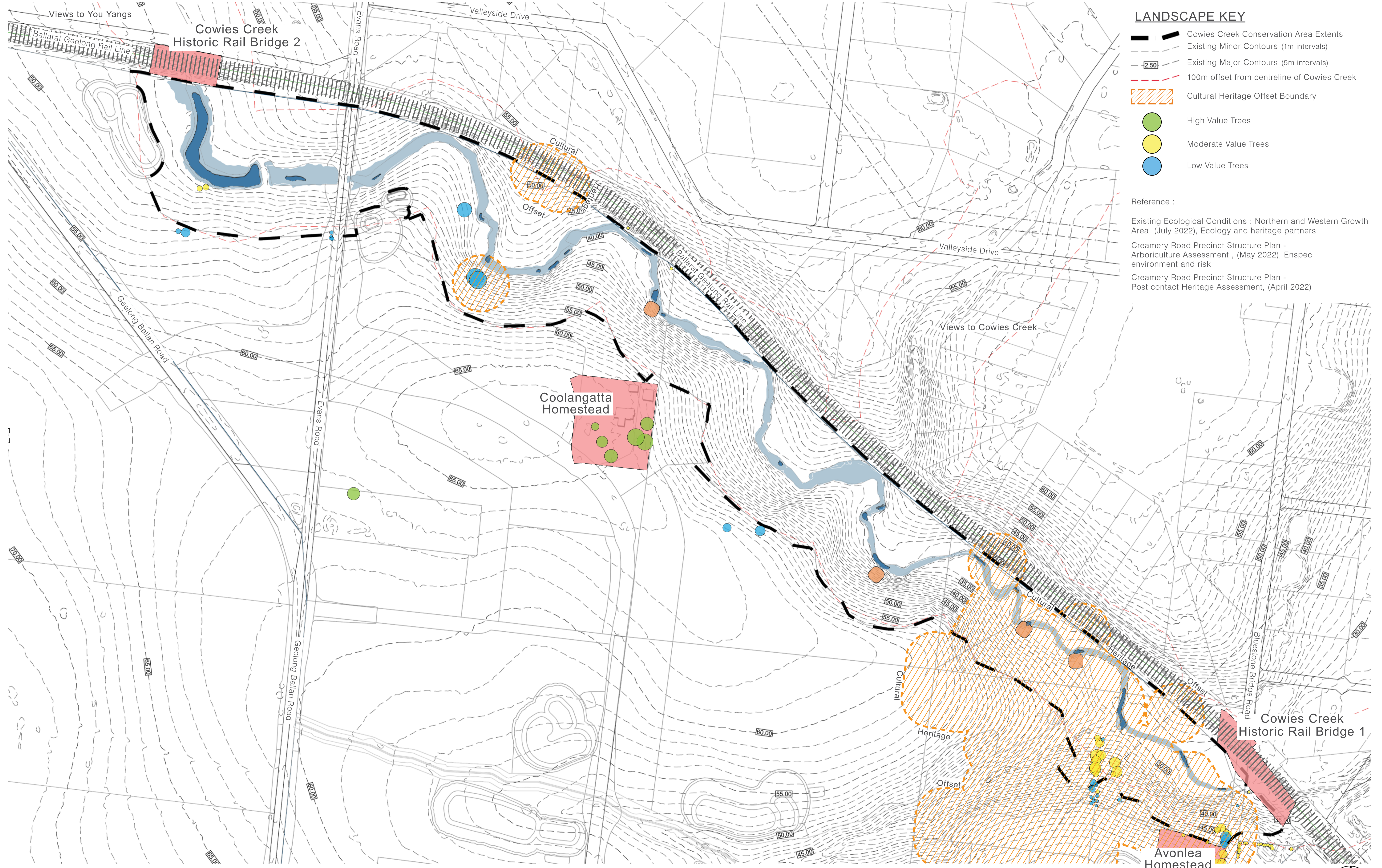
Water Quality within Cowies Creek

Parameter	Measurement			
	Site 1	Site 2	Site 3	Site 4
Temperature (°C)	18.8	19.6	20.1	18.8
Dissolved Oxygen (%)	90.9	76.9	87.5	66
Dissolved Oxygen (mg.L ⁻¹)	8.15	6.67	7.76	6.13
Conductivity (µS.cm ⁻¹)	11055	15405	7235	2539
Salinity (ppt)	7.22	10.15	4.44	1.5
pH	8.61	8.66	8.62	8.73
Turbidity (NTU)	High	High	Moderate	moderate

Plains Grassland (EVC 132)
Description:
Treeless vegetation mostly less than 1 m tall dominated by largely graminoid and herb life forms. Occupies fertile cracking basalt soils prone to seasonal waterlogging in areas receiving at least 500 mm annual rainfall.

Creekline Grassy Woodland (EVC 68)
Description:
Eucalypt-dominated woodland to 15 m tall with occasional scattered shrub layer over a mostly grassy/sedgy to herbaceous ground-layer. Occurs on low-gradient ephemeral to intermittent drainage lines, typically on fertile colluvial/alluvial soils, on a wide range of suitably fertile geological substrates. These minor drainage lines can include a range of graminoid and herbaceous species tolerant of waterlogged soils, and are presumed to have sometimes resembled a linear wetland or system of interconnected small ponds.

SITE ANALYSIS - HISTORICAL PLACES & CULTURAL HERITAGE



LANDSCAPE KEY

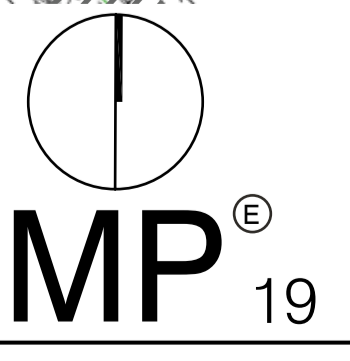
- Cowies Creek Conservation Area Extents
- Existing Minor Contours (1m intervals)
- Existing Major Contours (5m intervals)
- 100m offset from centreline of Cowies Creek
- Cultural Heritage Offset Boundary
- High Value Trees
- Moderate Value Trees
- Low Value Trees

Reference :

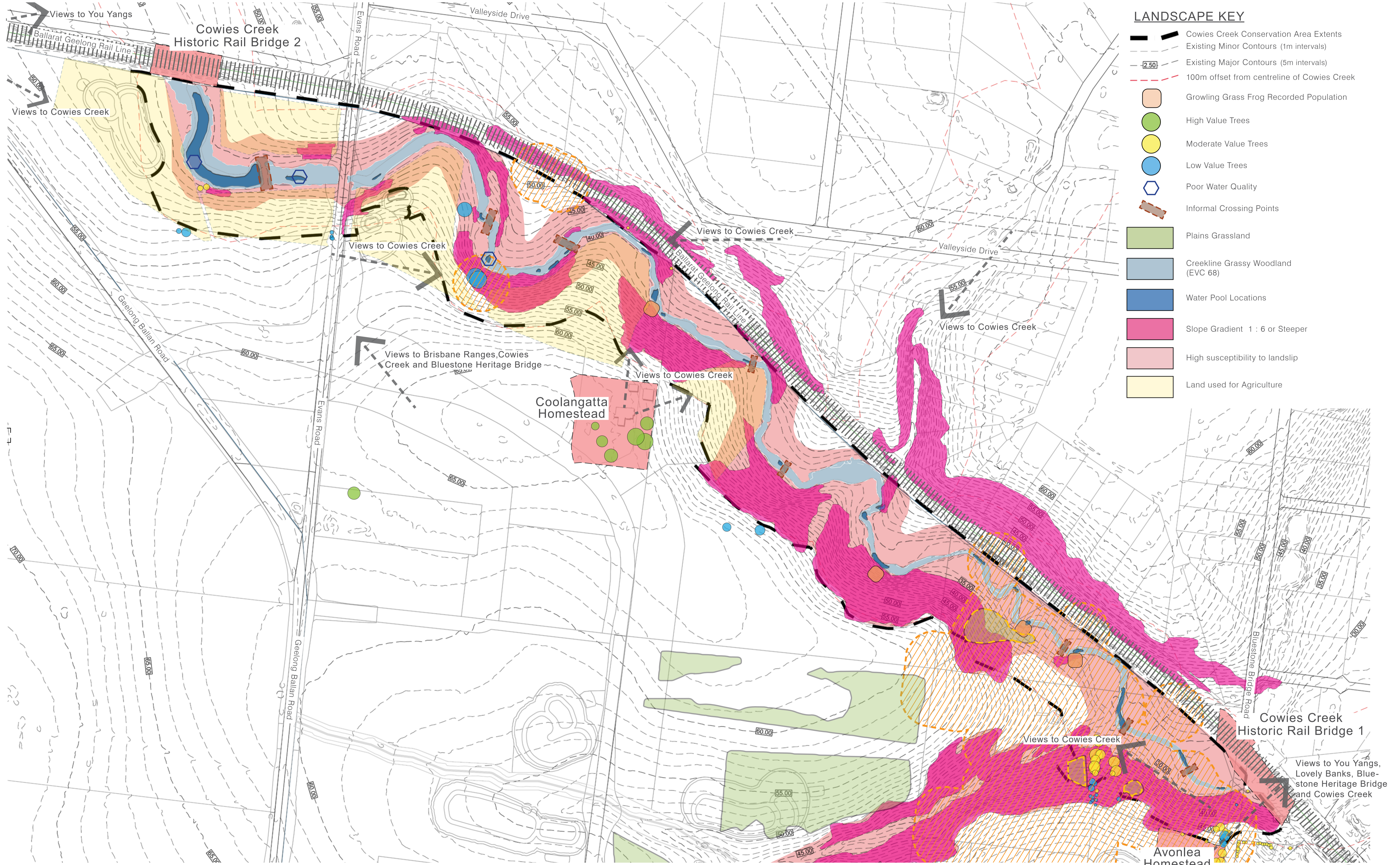
- Existing Ecological Conditions : Northern and Western Growth Area, (July 2022), Ecology and heritage partners
- Creamery Road Precinct Structure Plan - Arboriculture Assessment , (May 2022), Enspeg environment and risk
- Creamery Road Precinct Structure Plan - Post contact Heritage Assessment, (April 2022)

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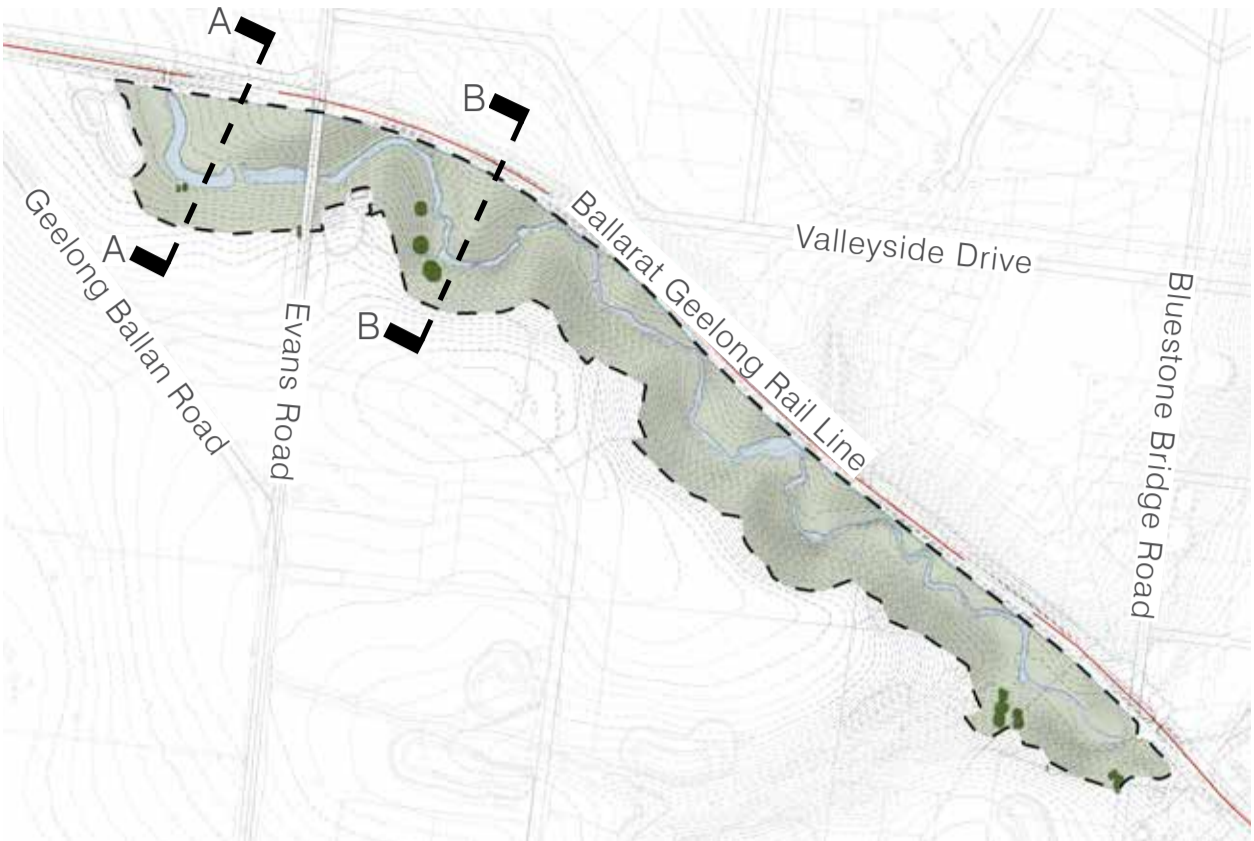
OVERALL LANDSCAPE SITE ANALYSIS



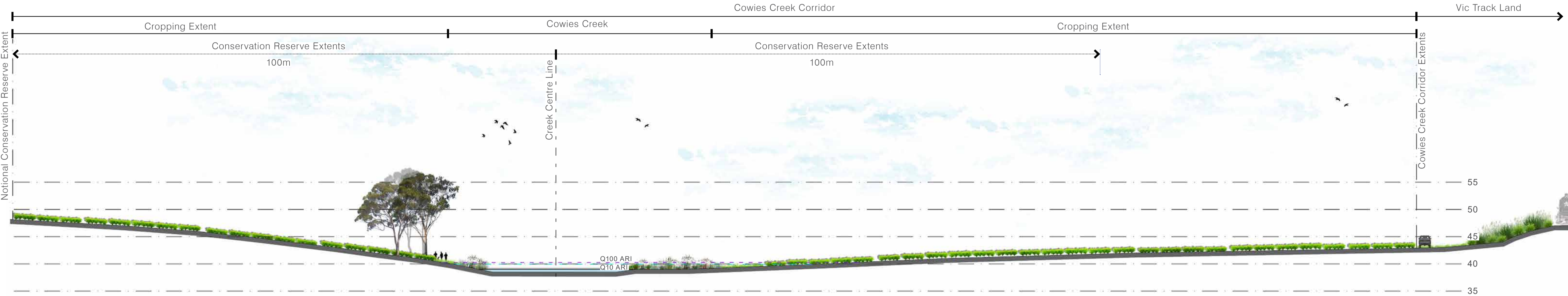
LANDSCAPE KEY

- Cowies Creek Conservation Area Extents
- Existing Minor Contours (1m intervals)
- Existing Major Contours (5m intervals)
- 100m offset from centreline of Cowies Creek
- Growing Grass Frog Recorded Population
- High Value Trees
- Moderate Value Trees
- Low Value Trees
- Poor Water Quality
- Informal Crossing Points
- Plains Grassland
- Creekline Grassy Woodland (EVC 68)
- Water Pool Locations
- Slope Gradient 1 : 6 or Steeper
- High susceptibility to landslip
- Land used for Agriculture

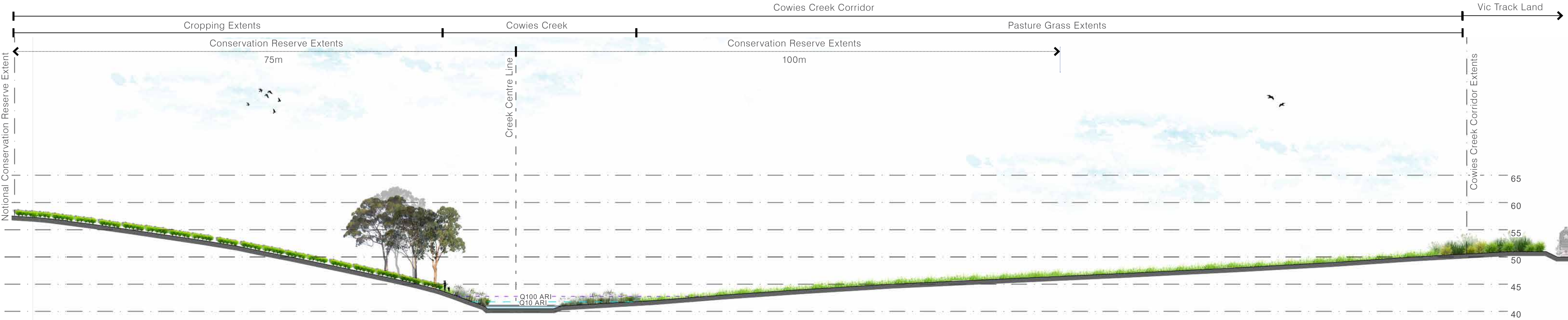
LANDSCAPE SECTIONS EXISTING CONDITIONS



CONTEXT PLAN
NTS

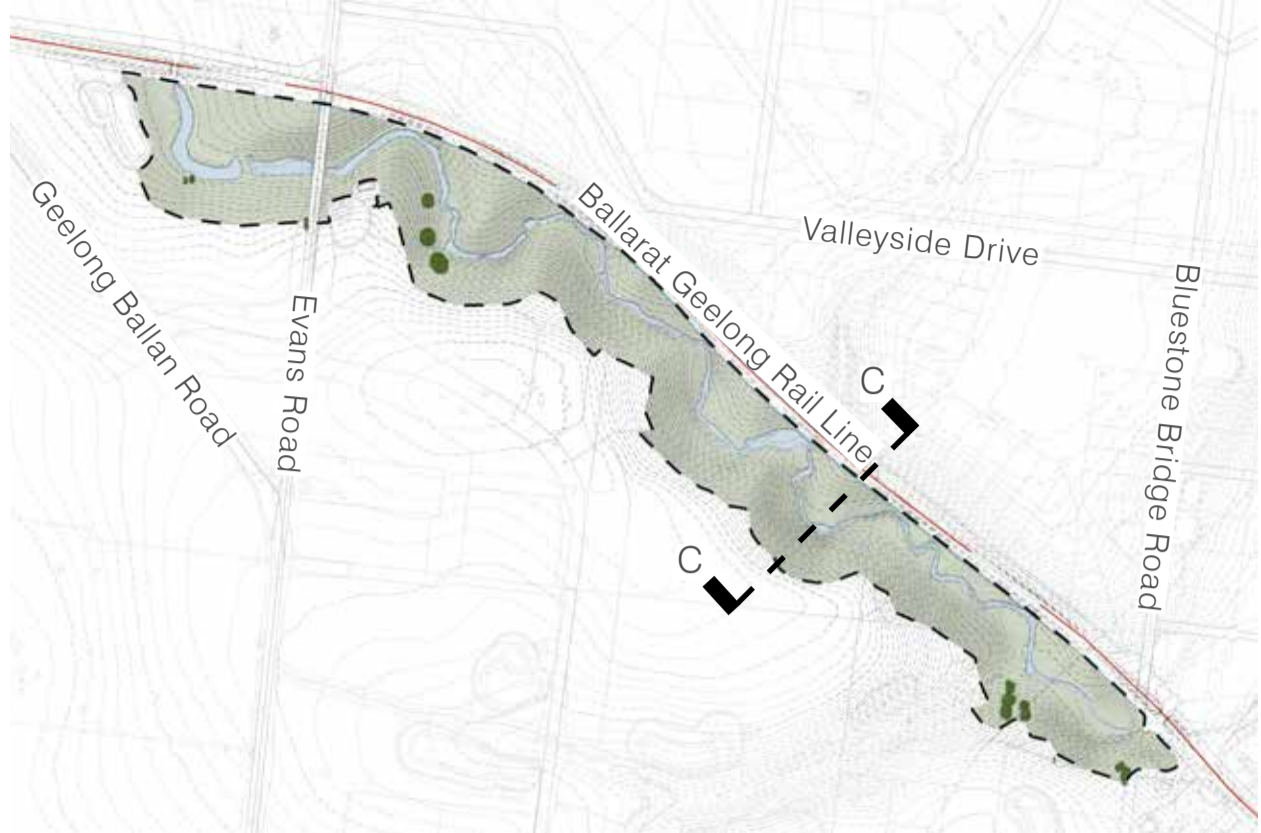


SECTION A - A
Scale 1 : 350 @ A1

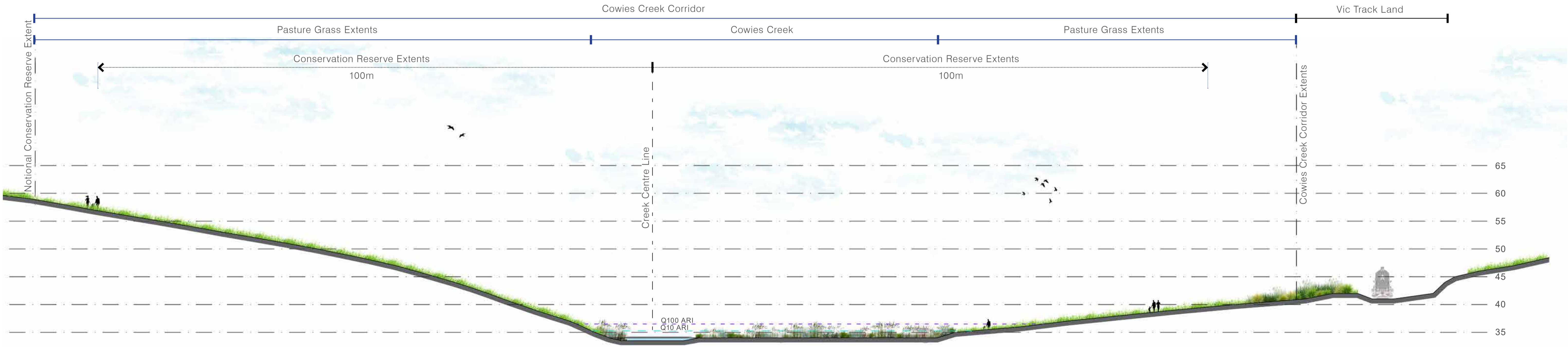


SECTION B - B
Scale 1 : 350 @ A1

LANDSCAPE SECTIONS EXISTING CONDITIONS

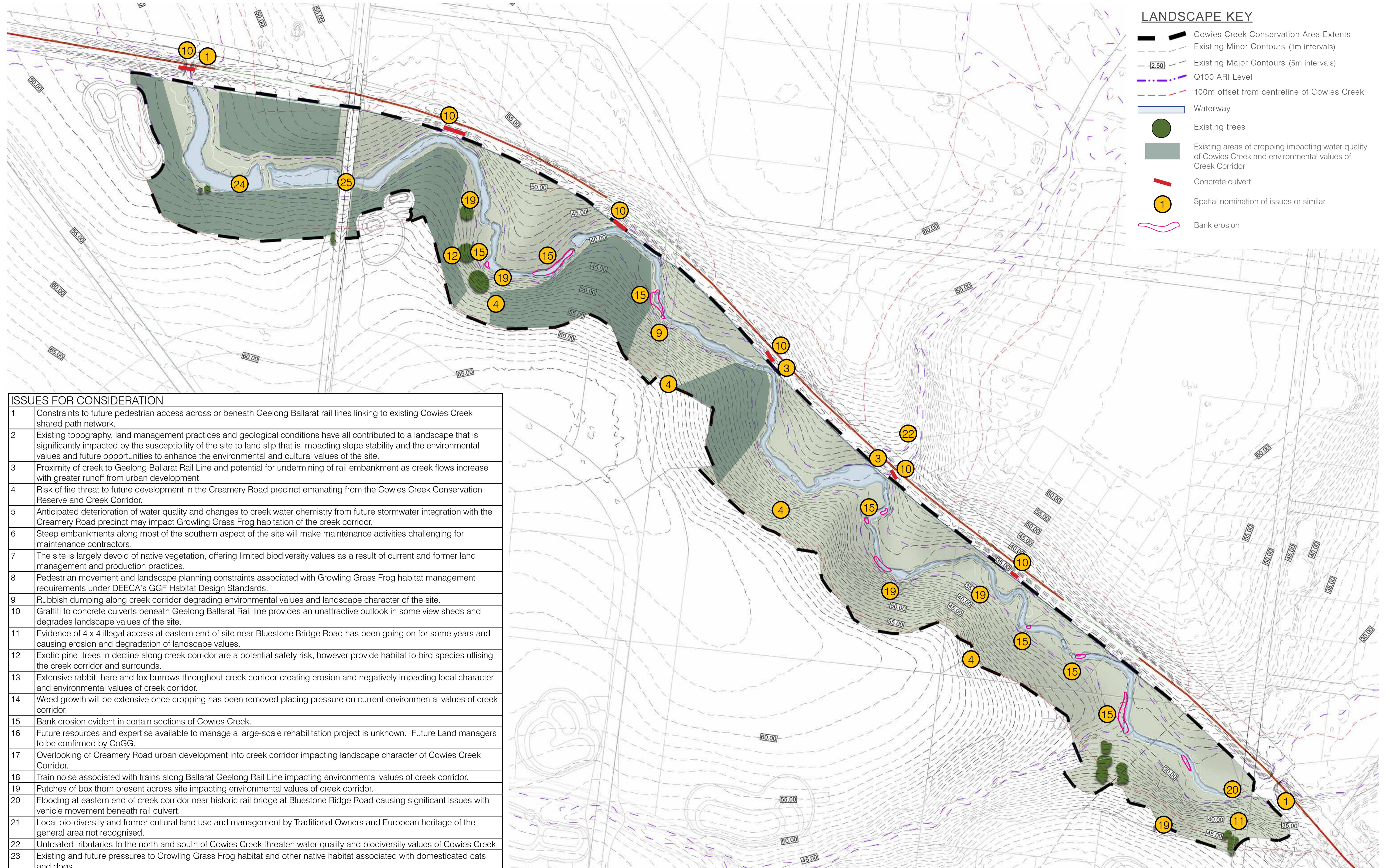


CONTEXT PLAN
NTS



SECTION C - C
Scale 1 : 350 @ A1

CONSTRAINTS PLAN

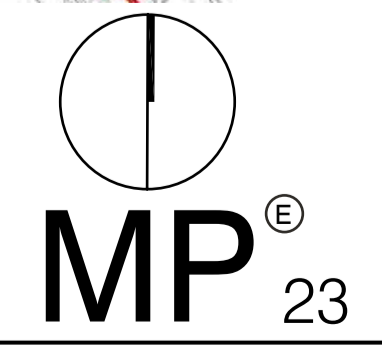


LANDSCAPE KEY

- Cowies Creek Conservation Area Extents
- Existing Minor Contours (1m intervals)
- Existing Major Contours (5m intervals)
- Q100 ARI Level
- 100m offset from centreline of Cowies Creek
- Waterway
- Existing trees
- Existing areas of cropping impacting water quality of Cowies Creek and environmental values of Creek Corridor
- Concrete culvert
- 1 Spatial nomination of issues or similar
- Bank erosion

ISSUES FOR CONSIDERATION	
1	Constraints to future pedestrian access across or beneath Geelong Ballarat rail lines linking to existing Cowies Creek shared path network.
2	Existing topography, land management practices and geological conditions have all contributed to a landscape that is significantly impacted by the susceptibility of the site to land slip that is impacting slope stability and the environmental values and future opportunities to enhance the environmental and cultural values of the site.
3	Proximity of creek to Geelong Ballarat Rail Line and potential for undermining of rail embankment as creek flows increase with greater runoff from urban development.
4	Risk of fire threat to future development in the Creamery Road precinct emanating from the Cowies Creek Conservation Reserve and Creek Corridor.
5	Anticipated deterioration of water quality and changes to creek water chemistry from future stormwater integration with the Creamery Road precinct may impact Growing Grass Frog habitation of the creek corridor.
6	Steep embankments along most of the southern aspect of the site will make maintenance activities challenging for maintenance contractors.
7	The site is largely devoid of native vegetation, offering limited biodiversity values as a result of current and former land management and production practices.
8	Pedestrian movement and landscape planning constraints associated with Growing Grass Frog habitat management requirements under DEECA's GGF Habitat Design Standards.
9	Rubbish dumping along creek corridor degrading environmental values and landscape character of the site.
10	Graffiti to concrete culverts beneath Geelong Ballarat Rail line provides an unattractive outlook in some view sheds and degrades landscape values of the site.
11	Evidence of 4 x 4 illegal access at eastern end of site near Bluestone Bridge Road has been going on for some years and causing erosion and degradation of landscape values.
12	Exotic pine trees in decline along creek corridor are a potential safety risk, however provide habitat to bird species utilising the creek corridor and surrounds.
13	Extensive rabbit, hare and fox burrows throughout creek corridor creating erosion and negatively impacting local character and environmental values of creek corridor.
14	Weed growth will be extensive once cropping has been removed placing pressure on current environmental values of creek corridor.
15	Bank erosion evident in certain sections of Cowies Creek.
16	Future resources and expertise available to manage a large-scale rehabilitation project is unknown. Future Land managers to be confirmed by CoGG.
17	Overlooking of Creamery Road urban development into creek corridor impacting landscape character of Cowies Creek Corridor.
18	Train noise associated with trains along Ballarat Geelong Rail Line impacting environmental values of creek corridor.
19	Patches of box thorn present across site impacting environmental values of creek corridor.
20	Flooding at eastern end of creek corridor near historic rail bridge at Bluestone Ridge Road causing significant issues with vehicle movement beneath rail culvert.
21	Local bio-diversity and former cultural land use and management by Traditional Owners and European heritage of the general area not recognised.
22	Untreated tributaries to the north and south of Cowies Creek threaten water quality and biodiversity values of Cowies Creek.
23	Existing and future pressures to Growing Grass Frog habitat and other native habitat associated with domesticated cats and dogs.
24	Poor water quality evidenced in upper reaches of Cowies Creek as a result of saline and turbid water restricting habitat opportunities for GGF and instream vertebrates.
25	Evans Road restricting passage of Growing Grass Frog along Cowies Creek.

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Landscape Vision Principles

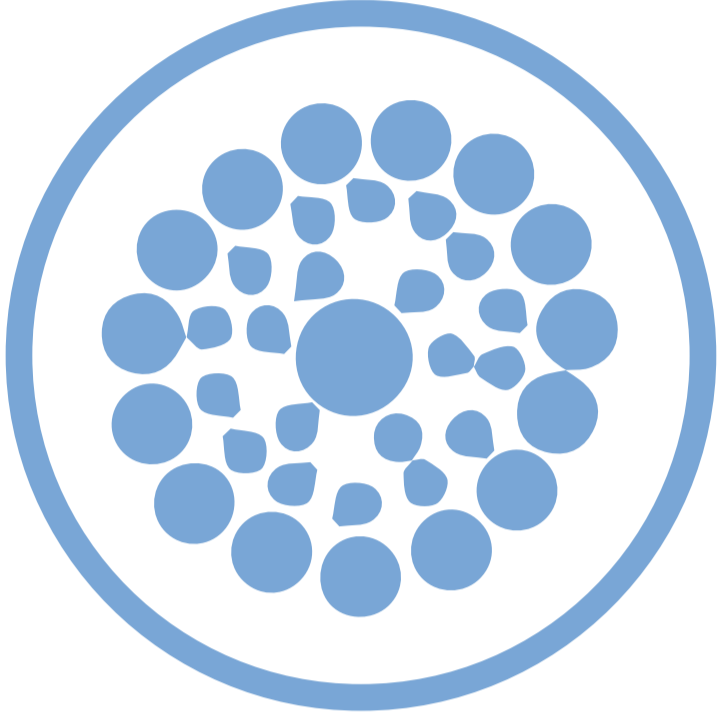
The following overarching vision statement for the Cowies Creek conservation area and creek corridor has been formulated to enable the development of the five key conservation and open space principles outlined below. The realization of each vision principle is guided by key aims and objectives that have been proposed by the Landscape Masterplan.

Cowies Creek Vision Statement:
“To protect, enhance and integrate the existing habitat and cultural values of the Cowies Creek Corridor within the context of the future Creamery Road precinct and adjoining environs”.

The following vision principles have been developed to guide the future protection, rehabilitation, management and integration of the creek corridor within a future urban development context:



1 Protect and improve the quality of habitat for the Growling Grass Frog and other associated native fauna species.



2 Identify, respect and celebrate the cultural and environmental qualities of the Cowies Creek Corridor.



3 Extend the environmental values of Cowies Creek into future Creamery Road urban development to help facilitate habitat corridors for native species.



4 Improve the quality and overall extent of existing patches of native vegetation within the Cowies Creek Corridor.



5 Provide an integrated pedestrian and cyclist network that connects within the future Creamery Road urban development precinct with the Cowies Creek conservation area and the existing Cowies Creek bike trail east of Bluestone Bridge Road.



Key Landscape Aims and Objectives

The following proposed objectives have been identified to help realize the vision of the Cowies Creek Landscape Masterplan, through the five vision principles. Proposed aims and objectives shall be coordinated with key stakeholders as necessary throughout the development of the recommendations of the Landscape Masterplan.





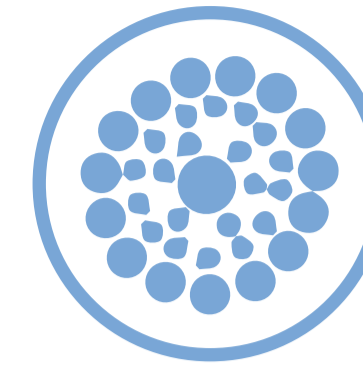
Vision Principle 1

Protect and improve the quality of habitat for the Growling Grass Frog and other associated native species.

The protection of the Growling Grass Frog and the enhancement of its habitat is a key objective of the Cowies Creek Landscape Masterplan and to this end the following aims and objectives have been prepared to help achieve this aim.

Proposed Aims and Objectives:

1. Encourage diversity and extent of native vegetation to instream, riparian and terrestrial habitats.
2. In consultation with DEECA, the CCMA, WTOAC and the City of Greater Geelong create additional inline and offline habitat pools within the Cowies Creek floodplain to enhance habitat diversity and opportunities.
3. Provide additional Growling Grass Frog habitat elements such as rocks and logs into the riparian corridor at strategic locations along the length of the Cowies Creek study area in accordance with DEECA's Growling Grass Frog Habitat Standards.
4. Remove agricultural cropping from Cowies Creek conservation area and prepare a revegetation strategy with local provenance plant species.
5. Fence off and remediate any existing landslip areas with deep-rooting perennial local provenance vegetation.
6. Investigate potential surface and subsurface drainage mitigation measures for existing landslip areas.
7. Prepare and implement a pest management strategy over time to gradually reduce and control rabbit, fox and hare populations throughout the site.
8. Consider opportunities to improve water quality from the northern tributary to Cowies Creek by establishing an ephemeral soak upstream of the existing rail culvert crossing as part of future development proposals north of the Geelong Ballarat/Djilang Ballaarat Rail Line.
9. Mitigate peak flows within Cowies Creek by retarding peak flows and maximizing stormwater infiltration into existing soil within the future Creamery's Road urban development area.
10. Locate stormwater assets such as retarding basins and sediment ponds away from key cultural and environmental assets.
11. Ensure that future stormwater management and assets do not negatively impact the hydraulic regime and water quality of Cowies Creek through an integrated best practice urban and stormwater design approach.
12. Implement a regular water quality testing regime along Cowies Creek.
13. Carry out regular monitoring and reporting of Cowies Creek Growling Grass Frog population in accordance with the GGFCMP.
14. Upgrade Evans Road crossing over Cowies Creek in accordance with DEECA's Growling Grass Frog Crossing Design Standards.



Vision Principle 2

Identify, respect and celebrate the cultural and environmental qualities of the Cowies Creek Corridor.

Proposed Aims and Objectives:

1. Maintain and enhance key view lines along the creek corridor.
2. Provide opportunities for future places of informal teaching and learning to extend and connect environmental and cultural connections with the emerging community.
3. Develop and implement an interpretive cultural design strategy to facilitate cultural heritage interpretation along the periphery of the conservation area in consultation with the WTOAC and the City of Greater Geelong.
4. Provide bio-link connections from urban development into the conservation area with the use of native tree canopies and understorey vegetation as appropriate.
5. Retain key view sheds to historic bridges.
6. Engage with the Friends of Cowies Creek and the new Creamery Road community to help facilitate ownership of protection and management of the conservation area.



Vision Principle 3

Extend the environmental values of Cowies Creek into future Creamery Road urban development to help facilitate habitat corridors for native species.

Proposed Aims and Objectives:

1. Provide bio-link connections from urban development into the conservation area with the use of native tree canopies and understorey vegetation as appropriate.
2. Make safe any dead or unhealthy trees within the conservation area and create hollows within existing trunks for habitat for native birds and other fauna.
3. Mitigate light spill and blue light intensity from the proposed development to protect the nocturnal environment of the Growling Grass Frog.
4. Provide local provenance canopy trees along the interface with the Creamery Road urban development.



Vision Principle 4

Improve the quality and overall extent of existing patches of native vegetation within the Cowies Creek Corridor.

All vegetation improvement works are required to be planned for and carried out in accordance with the GGFCMP.

Proposed Aims and Objectives

1. In consultation with the WTOAC, City of Greater Geelong, DEECA and the CFA investigate the feasibility of a cultural and environmental mosaic burning strategy to vegetation north of Cowies Creek.
2. Prepare a targeted and measurable weed management program for the conservation area to remove declared noxious weeds and reduce the overall percentage cover of weed growth. Consideration is to be given to the scalping of topsoil for direct seeding of local provenance species.
3. Stabilise existing landslip areas and mitigate the potential for future landslips to occur within the conservation area.
4. Carry out an in-stream stability assessment of the creek bed and banks to determine the risk profile for the potential of the creek to undermine the zone of influence to the VicTrack batter.
5. Carry out site management and revegetation actions as identified in the GGFCMP



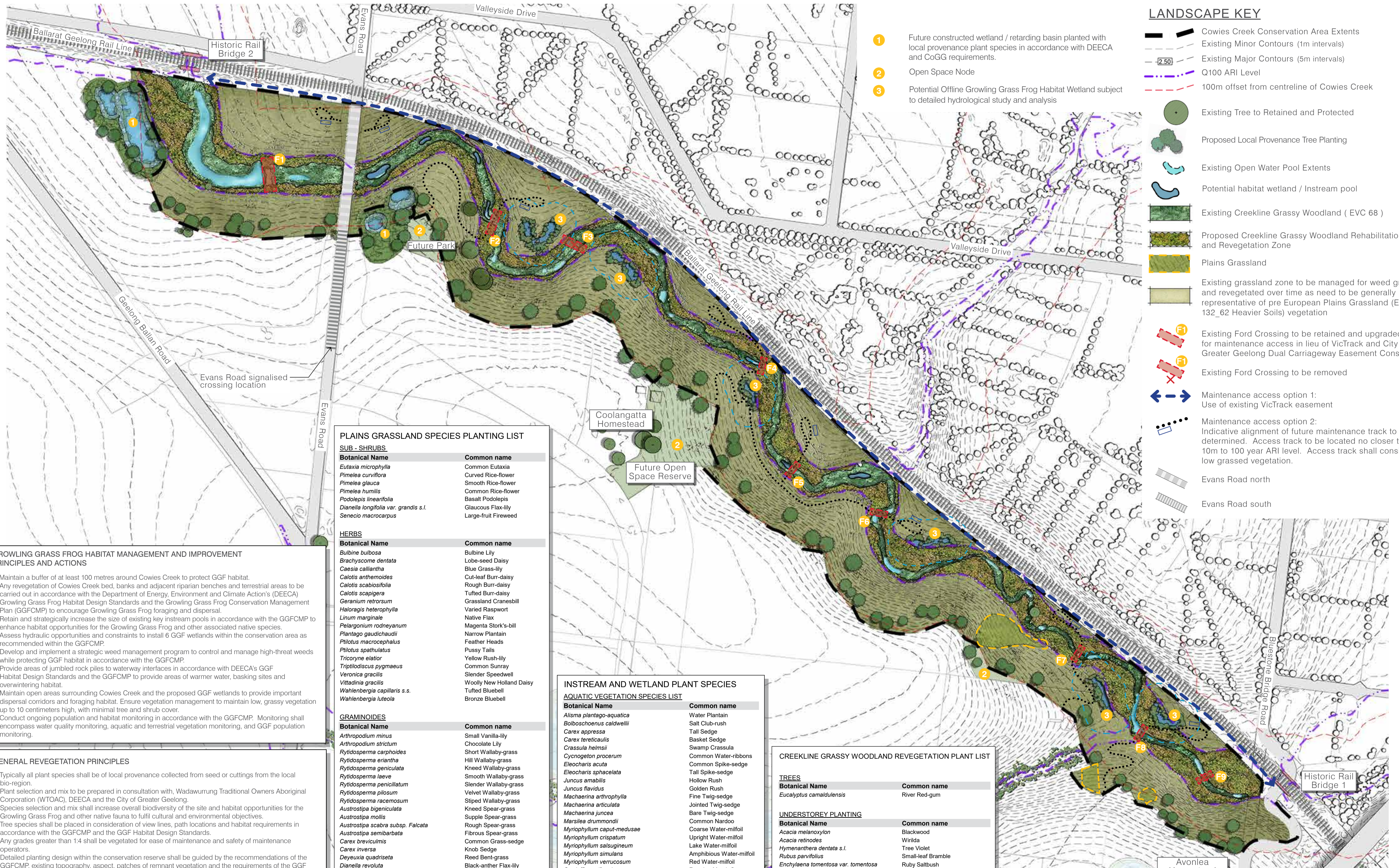
Vision Principle 5

Provide an integrated pedestrian and cyclist network that connects within the future Creamery Road urban development precinct with the Cowies Creek conservation area and the existing Cowies Creek bike trail east of Bluestone Bridge Road.

Proposed Aims and Objectives

1. Investigate opportunities to provide a pedestrian and bike link beneath the Historic Rail Viaduct within one of the existing arches at Bluestone Bridge Road in consultation with VicTrack and the City of Greater Geelong.
2. Ensure provision for a 2.5m wide shared path connecting strategic locations and viewpoints to allow public access to the conservation reserve and invite users along a cultural interpretation trail. The shared path should be sensitively designed to respect the habitat and cultural values of the conservation area.
3. Provide regular connections with the Creamery Road urban form and connections to the Clever and Creative Corridor.

OVERALL LANDSCAPE MASTERPLAN



LANDSCAPE KEY

- 1 Future constructed wetland / retarding basin planted with local provenance plant species in accordance with DEECA and CoGG requirements.
- 2 Open Space Node
- 3 Potential Offline Growing Grass Frog Habitat Wetland subject to detailed hydrological study and analysis
- Cowies Creek Conservation Area Extents
- - - Existing Minor Contours (1m intervals)
- - - Existing Major Contours (5m intervals)
- - - Q100 ARI Level
- - - 100m offset from centreline of Cowies Creek
- Existing Tree to Retained and Protected
- Proposed Local Provenance Tree Planting
- Existing Open Water Pool Extents
- Potential habitat wetland / Instream pool
- Existing Creekline Grassy Woodland (EVC 68)
- Proposed Creekline Grassy Woodland Rehabilitation and Revegetation Zone
- Plains Grassland
- Existing grassland zone to be managed for weed growth and revegetated over time as need to be generally representative of pre European Plains Grassland (EVC 132_62 Heavier Soils) vegetation
- F1 Existing Ford Crossing to be retained and upgraded for maintenance access in lieu of VicTrack and City of Greater Geelong Dual Carriageway Easement Consent
- F2 Existing Ford Crossing to be removed
- ↔ Maintenance access option 1: Use of existing VicTrack easement
- ⋯ Maintenance access option 2: Indicative alignment of future maintenance track to be determined. Access track to be located no closer than 10m to 100 year ARI level. Access track shall consist of low grassed vegetation.
- ▬ Evans Road north
- ▬ Evans Road south

PLAINS GRASSLAND SPECIES PLANTING LIST

SUB - SHRUBS	
Botanical Name	Common name
<i>Eutaxia microphylla</i>	Common Eutaxia
<i>Pimelea curviflora</i>	Curved Rice-flower
<i>Pimelea glauca</i>	Smooth Rice-flower
<i>Pimelea humilis</i>	Common Rice-flower
<i>Podolepis linearifolia</i>	Basalt Podolepis
<i>Dianella longifolia</i> var. <i>grandis</i> s.l.	Glaucous Flax-lily
<i>Senecio macrocarpus</i>	Large-fruit Fireweed

HERBS

Botanical Name	Common name
<i>Bulbine bulbosa</i>	Bulbine Lily
<i>Brachyscome dentata</i>	Lobe-seed Daisy
<i>Caesia calliantha</i>	Blue Grass-lily
<i>Calotis anthemoides</i>	Cut-leaf Burr-daisy
<i>Calotis scabiosifolia</i>	Rough Burr-daisy
<i>Calotis scapigera</i>	Tufted Burr-daisy
<i>Geranium retrorsum</i>	Grassland Cranesbill
<i>Haloragis heterophylla</i>	Varied Raspwort
<i>Linum marginale</i>	Native Flax
<i>Pelargonium rodneyanum</i>	Magenta Stork's-bill
<i>Plantago gaudichaudii</i>	Narrow Plantain
<i>Ptilotus macrocephalus</i>	Feather Heads
<i>Ptilotus spathulatus</i>	Pussy Tails
<i>Tricoryne elatior</i>	Yellow Rush-lily
<i>Triplidiscus pygmaeus</i>	Common Sunray
<i>Veronica gracilis</i>	Slender Speedwell
<i>Vittadinia gracilis</i>	Woolly New Holland Daisy
<i>Wahlenbergia capillaris</i> s.s.	Tufted Bluebell
<i>Wahlenbergia luteola</i>	Bronze Bluebell

GRAMINOIDS

Botanical Name	Common name
<i>Arthropodium minus</i>	Small Vanilla-lily
<i>Arthropodium strictum</i>	Chocolate Lily
<i>Rytidosperma carphoides</i>	Short Wallaby-grass
<i>Rytidosperma eriantha</i>	Hill Wallaby-grass
<i>Rytidosperma geniculata</i>	Knead Wallaby-grass
<i>Rytidosperma laeve</i>	Smooth Wallaby-grass
<i>Rytidosperma penicillatum</i>	Slender Wallaby-grass
<i>Rytidosperma pilosum</i>	Velvet Wallaby-grass
<i>Rytidosperma racemosum</i>	Stiped Wallaby-grass
<i>Austrostipa bigeniculata</i>	Knead Spear-grass
<i>Austrostipa mollis</i>	Supple Spear-grass
<i>Austrostipa scabra</i> subsp. <i>Falcata</i>	Rough Spear-grass
<i>Austrostipa semibarbata</i>	Fibrous Spear-grass
<i>Carex breviculmis</i>	Common Grass-sedge
<i>Carex inversa</i>	Knob Sedge
<i>Deyeuxia quadrifida</i>	Reed Bent-grass
<i>Dianella revoluta</i>	Black-anther Flax-lily
<i>Lomandra micrantha</i>	Small-flower Mat-rush
<i>Microlaena stipoides</i>	Weeping Grass
<i>Poa sieberiana</i> var. <i>sieberiana</i>	Grey Tussock-grass
<i>Schoenus apogon</i>	Common Bog-sedge

SCRAMBLERS / CLIMBERS

Botanical Name	Common name
<i>Cullen parvum</i>	Small Scurf-pea
<i>Desmodium varians</i>	Slender Tick-trefoil
<i>Glycine tabacina</i>	Variable Glycine

INSTREAM AND WETLAND PLANT SPECIES

AQUATIC VEGETATION SPECIES LIST

Botanical Name	Common name
<i>Alisma plantago-aquatica</i>	Water Plantain
<i>Bolboschoenus caldwellii</i>	Salt Club-rush
<i>Carex appressa</i>	Tail Sedge
<i>Carex tereticaulis</i>	Basket Sedge
<i>Crassula helmsii</i>	Swamp Crassula
<i>Cycnogeton procerum</i>	Common Water-ribbons
<i>Eleocharis acuta</i>	Common Spike-sedge
<i>Eleocharis sphacelata</i>	Tall Spike-sedge
<i>Juncus amabilis</i>	Hollow Rush
<i>Juncus flavidus</i>	Golden Rush
<i>Machaerina arthropylla</i>	Fine Twig-sedge
<i>Machaerina articulata</i>	Jointed Twig-sedge
<i>Machaerina juncea</i>	Bare Twig-sedge
<i>Marsilea drummondii</i>	Common Nardoo
<i>Myriophyllum caput-medusae</i>	Coarse Water-milfoil
<i>Myriophyllum crispatum</i>	Upright Water-milfoil
<i>Myriophyllum salsguinum</i>	Lake Water-milfoil
<i>Myriophyllum simulans</i>	Amphibious Water-milfoil
<i>Myriophyllum verrucosum</i>	Red Water-milfoil
<i>Ondinia reniformis</i>	Running Marsh-flower
<i>Ottelia ovalifolia</i> subsp. <i>Ovalifolia</i>	Swamp Lily
<i>Persicaria decipiens</i>	Slender Knotweed
<i>Potamogeton cheesemanii</i>	Red Pondweed
<i>Potamogeton crispus</i>	Curly Pondweed
<i>Potamogeton ochreatus</i>	Blunt Pondweed
<i>Ruppia megacarpa</i>	Large-fruit Tassel
<i>Ruppia polycarpa</i>	Many-fruit Tassel
<i>Stuckenia pinatata</i>	Fennel Pondweed
<i>Utricularia australis</i>	Yellow Bladderwort
<i>Vallisneria australis</i>	Eel Grass

CREEKLINE GRASSY WOODLAND REVEGETATION PLANT LIST

TREES

Botanical Name	Common name
<i>Eucaalyptus camaldulensis</i>	River Red-gum

UNDERSTOREY PLANTING

Botanical Name	Common name
<i>Acacia melanoxylon</i>	Blackwood
<i>Acacia retinodes</i>	Wirilda
<i>Hymenanthera dentata</i> s.l.	Tree Violet
<i>Rubus parvifolius</i>	Small-leaf Bramble
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush
<i>Oxalis perennans</i>	Grassland Wood-sorrel
<i>Azolla filiculoides</i>	Pacific Azolla
<i>Lemna dispersa</i>	Common Duckweed
<i>Austrostipa bigeniculata</i>	Knead Spear-grass
<i>Poa labillardierei</i>	Common Tussock-grass
<i>Austrodanthonia racemosa</i> var. <i>racemosa</i>	Stiped Wallaby-grass
<i>Austrodanthonia caespitosa</i>	Common Wallaby-grass
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
<i>Glycine clandestina</i>	Twining Glycine

GROWLING GRASS FROG HABITAT MANAGEMENT AND IMPROVEMENT PRINCIPLES AND ACTIONS

- Maintain a buffer of at least 100 metres around Cowies Creek to protect GGF habitat.
- Any revegetation of Cowies Creek bed, banks and adjacent riparian benches and terrestrial areas to be carried out in accordance with the Department of Energy, Environment and Climate Action's (DEECA) Growing Grass Frog Habitat Design Standards and the Growing Grass Frog Conservation Management Plan (GGFCMP) to encourage Growing Grass Frog foraging and dispersal.
- Retain and strategically increase the size of existing key instream pools in accordance with the GGFCMP to enhance habitat opportunities for the Growing Grass Frog and other associated native species.
- Assess hydraulic opportunities and constraints to install 6 GGF wetlands within the conservation area as recommended within the GGFCMP.
- Develop and implement a strategic weed management program to control and manage high-threat weeds while protecting GGF habitat in accordance with the GGFCMP.
- Provide areas of jumbled rock piles to waterway interfaces in accordance with DEECA's GGF Habitat Design Standards and the GGFCMP to provide areas of warmer water, basking sites and overwintering habitat.
- Maintain open areas surrounding Cowies Creek and the proposed GGF wetlands to provide important dispersal corridors and foraging habitat. Ensure vegetation management to maintain low, grassy vegetation up to 10 centimeters high, with minimal tree and shrub cover.
- Conduct ongoing population and habitat monitoring in accordance with the GGFCMP. Monitoring shall encompass water quality monitoring, aquatic and terrestrial vegetation monitoring, and GGF population monitoring.

GENERAL REVEGETATION PRINCIPLES

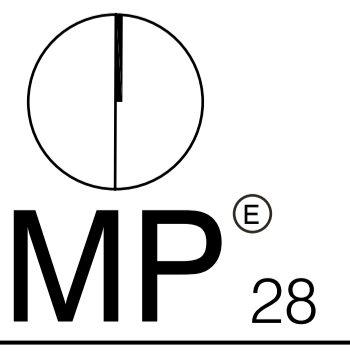
- Typically all plant species shall be of local provenance collected from seed or cuttings from the local bio-region.
- Plant selection and mix to be prepared in consultation with, Wadawurrung Traditional Owners Aboriginal Corporation (WTOAC), DEECA and the City of Greater Geelong.
- Species selection and mix shall increase overall biodiversity of the site and habitat opportunities for the Growing Grass Frog and other native fauna to fulfil cultural and environmental objectives.
- Tree species shall be placed in consideration of view lines, path locations and habitat requirements in accordance with the GGFCMP and the GGF Habitat Design Standards.
- Any grades greater than 1:4 shall be vegetated for ease of maintenance and safety of maintenance operators.
- Detailed planting design within the conservation reserve shall be guided by the recommendations of the GGFCMP, existing topography, aspect, patches of remnant vegetation and the requirements of the GGF Habitat Design Standards.
- Planting and revegetation should occur primarily outside of the key active period for the Growing Grass Frog (GGF), which is between September and April. This is to minimize disturbance during critical lifecycle periods
- Mulch shall not be used within 50m of the Cowies Creek banks
- Where sedges and tussock forming grasses are used for revegetation within 10m of Cowies Creek banks ensure that planting density does not exceed 20 per cent cover when mature in accordance with the GGFCMP and the Growing Grass Frog Habitat Design Standard.
- Tree planting to northern aspect of Cowies Creek shall be sensitively considered to prevent over shadowing of waterway areas. Tree cover within the designated Conservation Zone should not exceed 10 percent.
- Shrub cover within the designated Conservation Zone should not exceed 10%.

Project No: 22026

Creamery Road PSP
Cowies Creek, Geelong
Landscape Master Plan

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MAINTENANCE & ACCESS PLAN



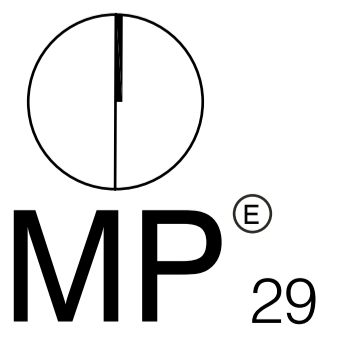
LANDSCAPE KEY

- - - Maintenance access option 1:
Use of existing VicTrack easement
- Maintenance access option 2:
Potential maintenance access route and parking pad in lieu of VicTrack and CoGG Dual Carriageway Easement
- ▭ Existing Creek Ford Crossing to be upgraded in lieu of VicTrack and City of Greater Geelong Dual Carriageway Easement Consent.

Avonlea Homestead

Project No: 22026
Creamery Road PSP
 Cowies Creek, Geelong
 Landscape Master Plan

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Landscape Masterplan Proposal Key Elements

The Growling Grass Frog Conservation Area

The Growling Grass Frog Conservation Area has been set aside for the protection and conservation of the habitat values and existing Growling Grass Frog population into perpetuity. The conservation area has generally been set by a notional boundary typically 100m on ground distance from the center alignment of the creek as determined at the time of this study. The location of the conservation boundary has been informed by discussions with the City's appointed Ecologists and discussions with the City.

The conservation boundary isn't typically identified or recognised by any constructed elements. The northern extent of the conservation reserve is currently limited by a fence designating the boundary of the Geelong Ballarat/Djilang Ballarat rail reserve. All other boundaries will in the future be defined and controlled by fencing in accordance with DEECA and the City of Greater Geelong's requirements.

The Landscape Masterplan proposes several important actions and objectives within the conservation area to meet the requirements of the GGFCMP. These key initiatives are aligned with DEECA's Growling Grass Frog Habitat Design Standards and have been proposed to protect existing populations of Growling Grass Frog and improve and expand the existing habitat opportunities of the Growling Grass Frog within Cowies Creek. The key initiatives include:

1. Creation of a conservation reserve with a boundary typically situated at least 100 metres from the centre alignment of Cowies Creek.
2. Creation of additional sections of open water within Cowies Creek through strategic removal of primarily in-stream weedy vegetation.
3. Creation of offline Growling Grass Frog Habitat Wetlands within the conservation reserve.
4. Supplementary riparian, ephemeral and aquatic planting along Cowies Creek to increase habitat diversity for the Growling Grass Frog and associated indigenous vertebrate and invertebrate species utilising the creek corridor.
5. Informed intentional placement of jumbled rock piles at specific locations providing areas of warmer water, basking sites and overwintering habitat.

Open Space and Access

The CRPSP proposes two designated open space reserves south of the conservation area, just beyond the boundary. These open spaces offer the potential to build upon the conservation area's key cultural heritage themes, further strengthening the sense of place and connection to the site and surrounding area. Theming and amenities within these spaces should be considered as part of a broader open space strategy encompassing all designated areas within the Creamery Road precinct.

While public access isn't currently proposed within the conservation reserve itself, a 2.5-meter-wide shared concrete path will be built within the road reserve, bordering the reserve. This path will include several controlled gated access points along the southern boundary for maintenance to both sides of Cowies Creek.

The path will provide pedestrian access to a series of key vistas, nodes, and rest spots along its length. Points of physical connection of the path to the proposed subdivision will be determined as part of the design process of the future subdivision.

Existing informal creek crossings built by previous landowners for maintenance access will be considered for retention and formalization to enable safe and functional crossings in lieu of an agreement with VicTrack for a shared carriageway easement on their land.

Cultural Heritage Interpretation and Integration

Wadawurrung Living Cultural Heritage Interpretation

There are numerous opportunities to integrate Wadawurrung living cultural heritage interpretation along the interface with the southern boundary of the conservation area. Such recognition and interpretation shall generally be located in areas that are not within close proximity to known Aboriginal sites. The development of interpretive themes and the integration of culturally themed landscape elements shall be developer led and explored in collaboration with the WTOAC and the City. Cultural interpretation is to occur primarily along the pedestrian trail along the interface with the conservation area. Interpretation of key cultural themes shall be explored through landscape interventions that may involve any of the following:

- Sculpture
- Text inscriptions and signage
- Patterning within the landscape
- Sound
- Integration of mobile technology to enable interactive and evolving stories.

Potential cultural themes to be explored within the conservation area and in consultation with the WTOAC are as follows:
Environmental Context

- Landforms
- Geomorphology, Soils and Geology
- Flora and Fauna
- Climate

Wadawurrung Country Context

- Wadawurrung Healthy Country Plan

Lifestyle Environment and Resources

- Plant Resources
- Animal Resources
- Hunting Techniques
- Trade and Exchange
- Travel Routes, including human and animal migration patterns

The integration of Wadawurrung place naming conventions within the creek corridor and broader Creamery Road precinct should address the following recommendations:

The Wadawurrung Language name, Worneenanyook, meaning foot of the hill (due to the proximity of the parklands to the monocline), is the name that has been proposed for the creek corridor.

The following names can be used to identify [Western landscape] 'precincts' within the body of the conservation area and should be considered in the further development of the cultural interpretation of the site:

- Headwaters of Cowies Creek (Lovely Banks Rd North of Geelong-Ballarat Line) = Karwirr
- Lovely Banks Monocline... Corner of Staceys Rd and Bacchus Marsh Rd, and runs South towards Cowies Creek (Geelong Ring Rd) = Morokpanyul
- Bell Post Hill = Morongoo (meaning Blackfellows/haccocephalom mylittae bread which grew on the Blackfellows table).

Management of Areas of Archaeological Significance

Areas of archaeological sensitivity shall be managed in accordance with the recommendations of the Creamery Road PSP – Aboriginal Heritage Impact Assessment summarised as follows:

High Sensitivity (Most Likely):

As much as possible, these areas should be retained in their current form and, where applicable, be rehabilitated to further stabilize them from erosion. Where lower impact works are proposed in these areas, these works should be designed to minimise impacts and be placed largely on top of the surface, to avoid impacting below the ground surface.

Moderate-High Sensitivity (Moderately Highly Likely):

Wherever possible, consideration should be made to retain these areas in their current form (and/or rehabilitate) and protected from development, particularly as passive open space or similar (e.g., other reserved land), or in nondevelopable portions of residential parcels (e.g., outside construction envelopes). Where lower impact works are proposed in these areas, these works should, where possible, be designed to be placed largely on top of the surface, to avoid impacting below the ground surface.

Moderate Sensitivity (Moderately Likely):

Where there is an opportunity, development impact should be minimised, where practicable. This could be through establishing passive open space (or similar, as above) or through impact mitigation design features.

Low-Moderate Sensitivity (Low – Moderately Likely):

No design or planning recommendations, though interpretive material and or Wadawurrung Language/naming should be incorporated into planning/design, in consultation with the WTOAC.

Low Sensitivity (Least Likely):

No design or planning recommendations, though interpretive material and or Wadawurrung language/naming may be incorporated into planning/design, in consultation with the WTOAC.

It is noted that some excavation works have been proposed within the creek corridor in areas of high sensitivity to further enhance habitat for the Growling Grass Frog. Such works are to be planned for and carried out in direct consultation with the WTOAC, DEECA, CCMA and the City of Greater Geelong.

Post European Settlement Heritage

Coolangatta Homestead:

A designated passive open space has been proposed immediately adjacent to the Coolangatta Homestead. The open space reserve provides significant opportunities for interpretive play theming associated with the Coolangatta Homestead.

Proposed landscaping adjacent to the boundary with the homestead shall be considered as not diluting or confusing existing heritage values of the Coolangatta Homestead.

In accordance with the recommendations of the Creamery Road PSP – Post Contact Heritage Report it is important that the northern and eastern boundaries of the property shall not be obstructed to enable the historical visual connection to the creek that was a vital part of the former farm as well as to the long view to the east out to Corio Bay.

Historic Rail Bridges 1 and 2:

Acknowledging and interpreting the cultural history of the Historic Rail Bridges 1 and 2 through European cultural conventions is an important recommendation of this report. The retention of key view sheds to the bridges and the location of the pedestrian circulation route particularly at the western end of the site provides an opportunity to integrate interpretive landscape design responses into the site.

Where any development of public amenity (eg. paths, seats, viewing platforms, sculptures, signage, and any other associated landscape infrastructure) is to occur within 20m of the registered place heritage advice is required to be sought to minimise potential impacts to the site in consultation with heritage advice and the Conservation Management Plan.

Stormwater Infrastructure

The Creamery Road Development Services Scheme will guide the development of the Creamery Road PSP to ensure the protection of the existing environmental, cultural, hydrological and geomorphological values of Cowies Creek.

Most stormwater assets from the Creamery Road Precinct have been proposed to be located within the Creamery Road NDA area apart from WLRB-08, located west of Evans Road and also SBRB9+Bio2 located immediately east of Evans Road south of Cowies Creek. The primary purpose of these stormwater assets is to remove pollutants and retard flows up to the Q100 ARI level, however, consideration in the design of the assets should also be given to maximizing the potential to provide supplementary habitat opportunities for the Growling Grass Frog in accordance with DEECA's Growling Grass Frog Habitat Design Standards subject to consent from both DEECA and the City of Greater Geelong.

The proposed planting of the periphery of these key stormwater infrastructure assets shall be in accordance with the CRPSP setback dimensions to achieve a BAL 12.5 fire rating. Grassland and wetlands periphery areas shall have a foliage cover (trees and shrubs) of less than 10%. Any shrub planting shall be no higher than 2m at maturity.

Revegetation

A detailed revegetation strategy that builds on the recommendations and concepts developed as part of the Landscape Masterplan will be required as part of the future planning for the conservation area.

The long-term revegetation of the conservation area is a significant undertaking that is required to be designed and implemented to align with Wadawurrung cultural values, the GGFCMP and the Growling Grass Frog Habitat Design Standards (Melbourne Strategic Assessment DELWP 2017a)

The revegetation of the conservation area shall be guided by the recommendations of the supporting studies and recommendations of the CRPSP as well as a weed management and detailed revegetation strategy that shall be prepared in consultation with the City, the WTOAC and other key stakeholders.

The key objective of the revegetation strategy should be to protect, expand and improve the quality of the Growling Grass Frog habitat within the conservation area. The revegetation strategy shall address the entire conservation area and adjoining open space reserve areas as may be defined in the future and shall be guided by the recommendations of the GGFCMP.

Habitat Wetlands

The GGFCMP proposes a total of six habitat wetlands located on both the northern and southern side of Cowies Creek. The habitat wetlands have been notionally indicated on Drawing MP28 of the Landscape Masterplan and are proposed to be developed in accordance with the Growling Grass Frog Habitat Design Standards: Melbourne Strategic Assessment (DELWP 2017a). The GGFCMP proposes the construction of habitat wetlands outside of the key breeding season of the GGF which is typically from September – February and prior to the construction of the residential subdivision.

The habitat wetlands have been notionally indicated beyond the Q100 ARI level to protect the wetlands during periods of flood. It is possible that the habitat wetlands could be located below the Q100 ARI level, however there would need to be flood protection in place via landscape bunding. The location and size of the wetlands shown on the Landscape Masterplan are indicative only and subject to hydraulic analysis of Cowies Creek, existing ground water conditions and detailed geo-technical investigations.

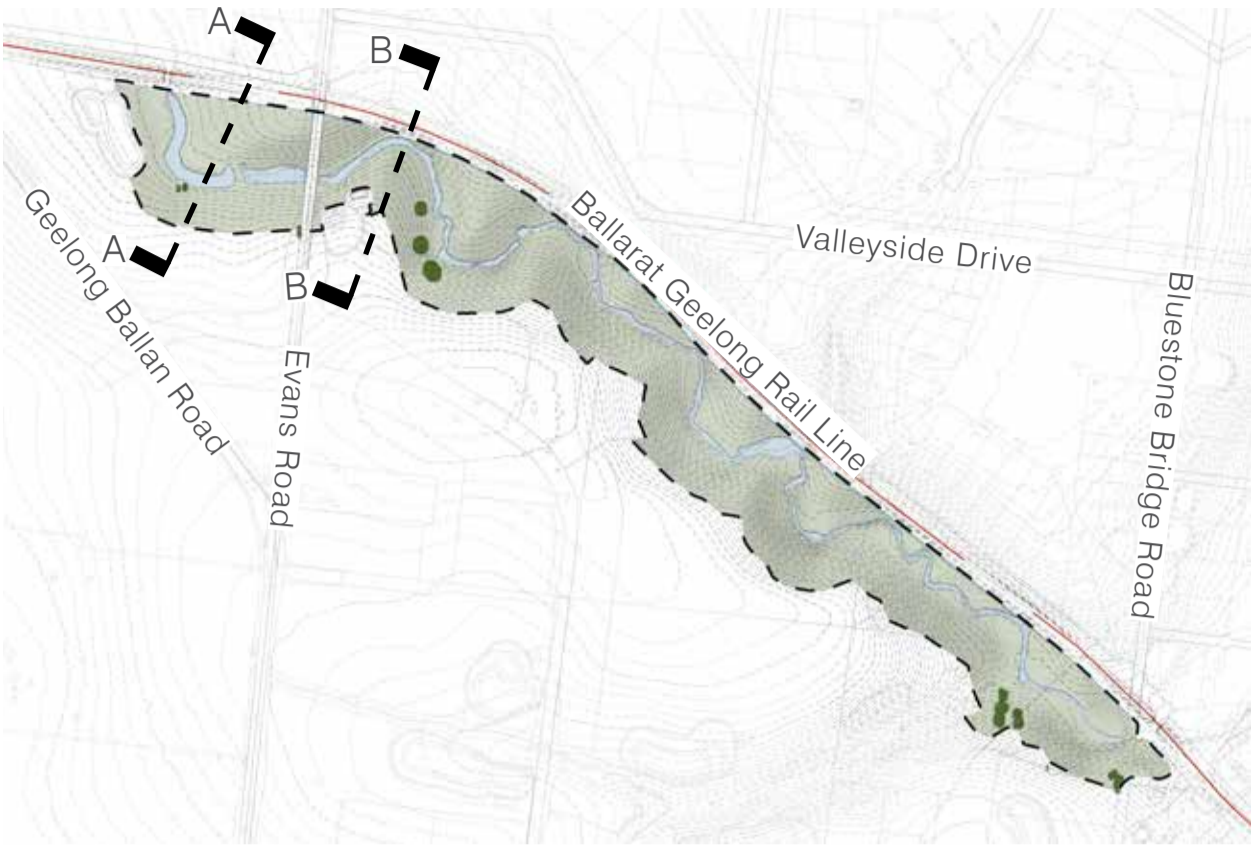
Riparian and Terrestrial Zones

The management of riparian and terrestrial vegetation zones are important to control erosion, improve water quality, expand existing patches of remnant vegetation and manage vegetation to best suit the habitat requirements of the Growling Grass Frog. All weed management and revegetation processes shall be undertaken in accordance with the recommendations of the GGFCMP, the Weed Management Plan and revegetation strategy.

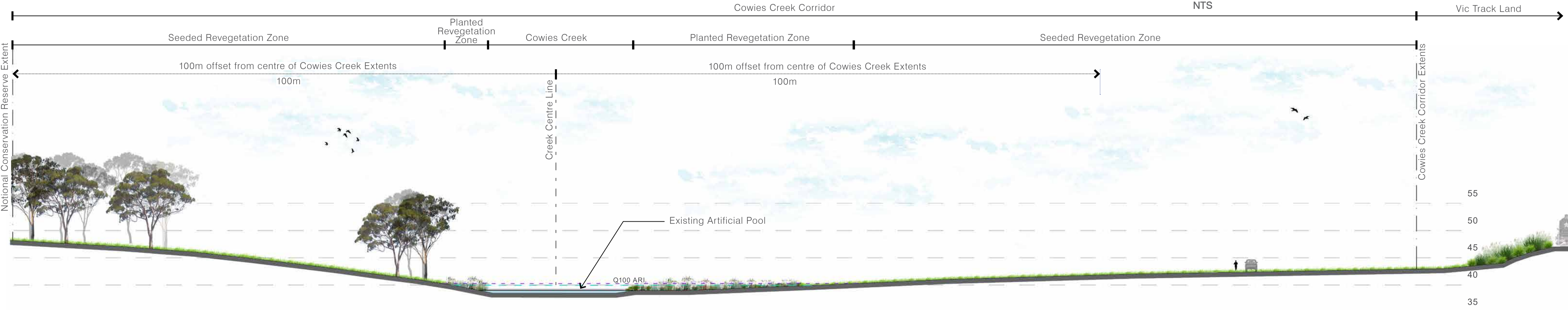
The revegetation of the conservation reserve shall be undertaken with cuttings and seed collected from local provenance species from the local bio-region.



LANDSCAPE PROPOSED SECTIONS



CONTEXT PLAN
NTS

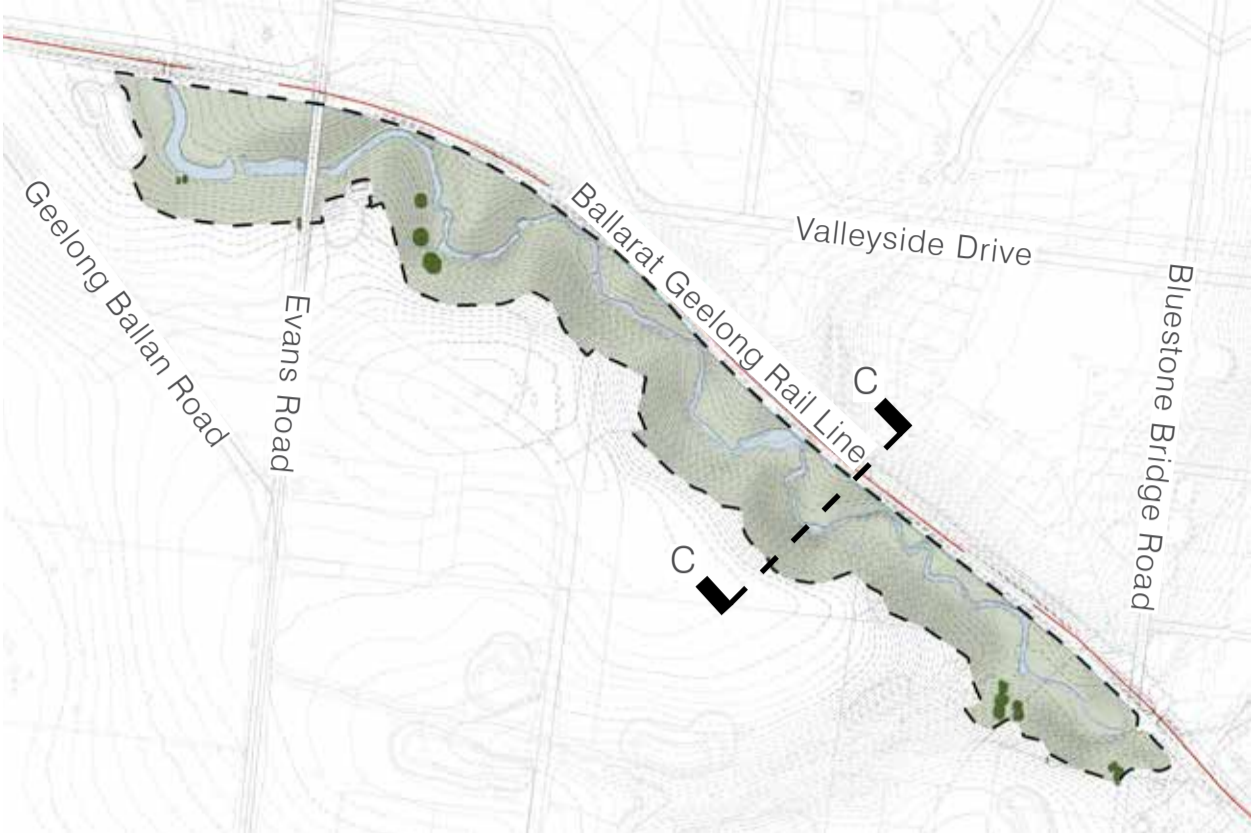


SECTION A - A
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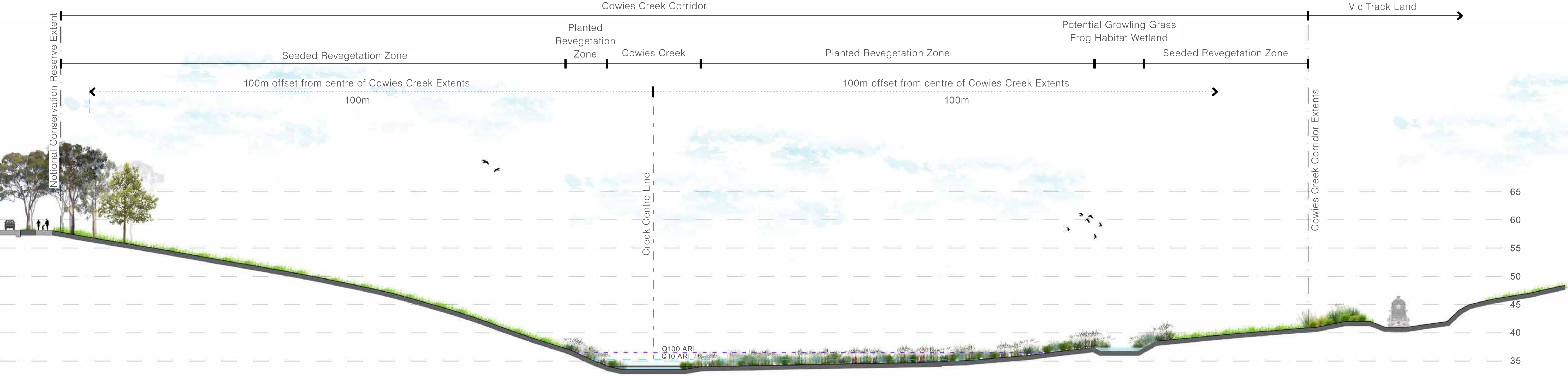


SECTION B - B
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LANDSCAPE PROPOSED SECTIONS

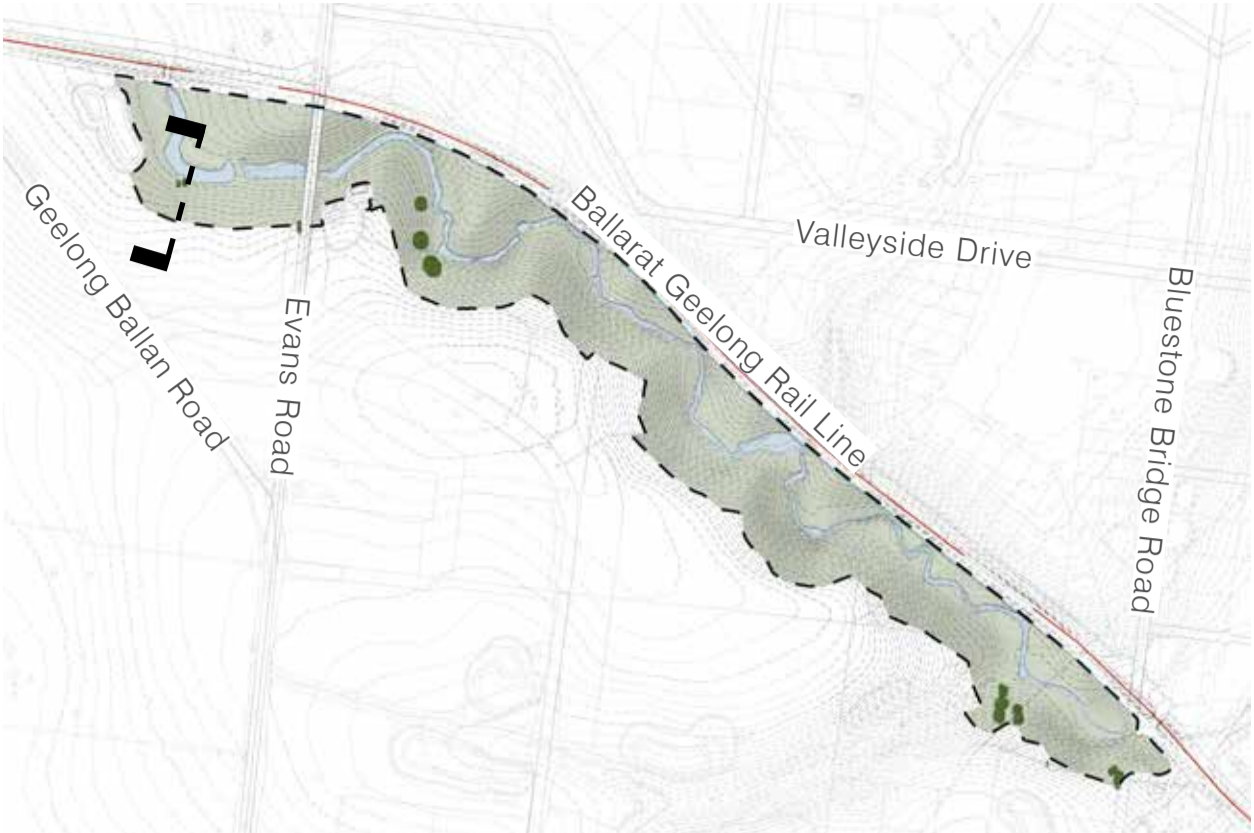


CONTEXT PLAN
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SECTION C - C
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PROPOSED SUB DIVISION INTERFACE

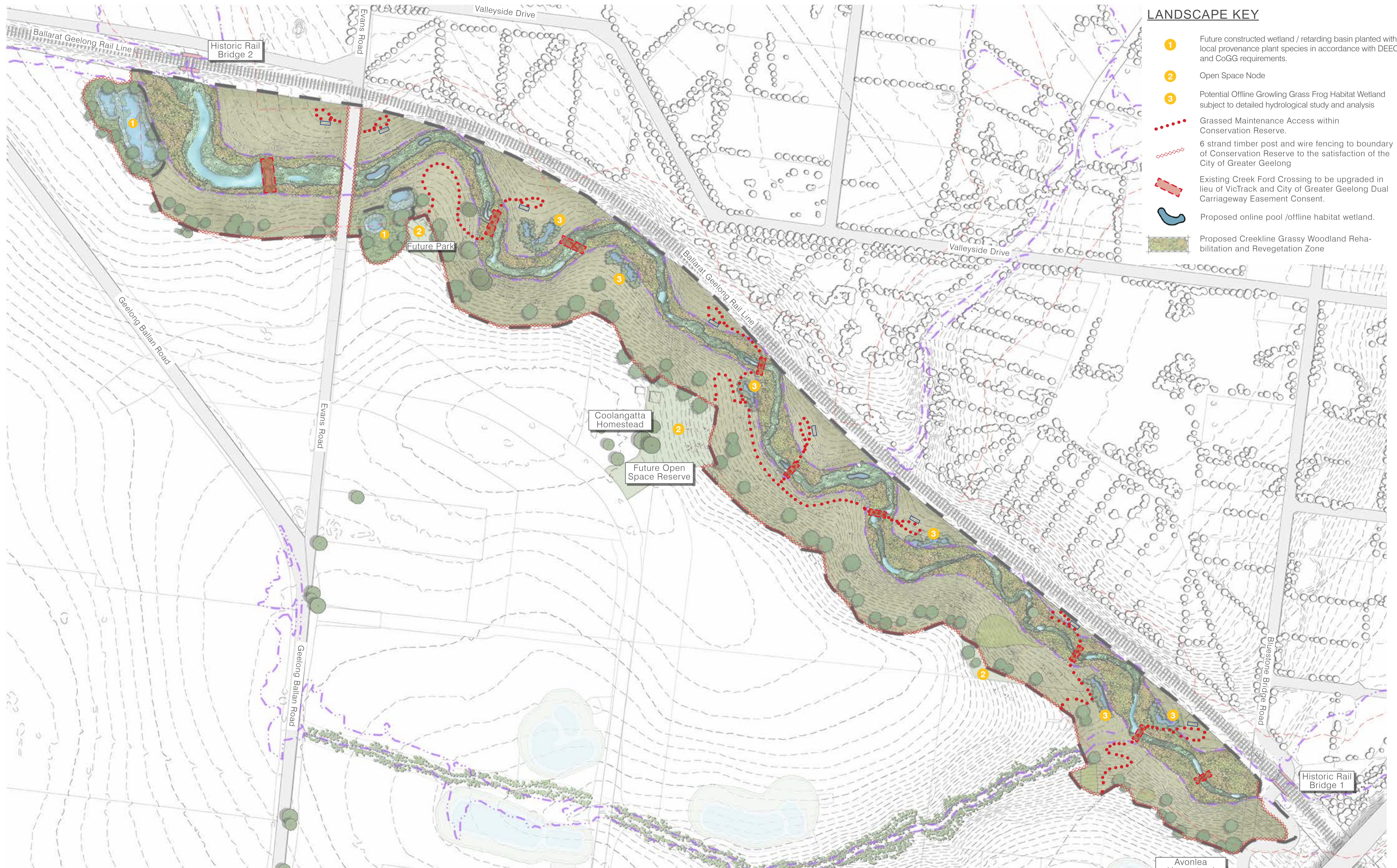


CONTEXT PLAN
NTS



INTERFACE TYPOLOGY 1
Section
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INFRASTRUCTURE AND ASSETS PLAN



LANDSCAPE KEY

- 1 Future constructed wetland / retarding basin planted with local provenance plant species in accordance with DEECA and CoGG requirements.
- 2 Open Space Node
- 3 Potential Offline Growing Grass Frog Habitat Wetland subject to detailed hydrological study and analysis
- ⋯ Grassed Maintenance Access within Conservation Reserve.
- ⋯ 6 strand timber post and wire fencing to boundary of Conservation Reserve to the satisfaction of the City of Greater Geelong
- ▬ Existing Creek Ford Crossing to be upgraded in lieu of VicTrack and City of Greater Geelong Dual Carriageway Easement Consent.
- ⋯ Proposed online pool /offline habitat wetland.
- ▬ Proposed Creekline Grassy Woodland Rehabilitation and Revegetation Zone

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