Casey Fields South and Devon Meadows

Landscape & Visual Character Assessment

Technical Report (Final - V2)
Prepared for Victorian Planning Authority

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Quality Assurance

Casey Fields South and Devon Meadows

Landscape & Visual Character Assessment

Project Number

0321-0343

Revisions

Rev	Date	Details	Prepared By	Reviewed By	Project Principal
0	3 October 2022	Incomplete Draft (VI Draft)	AvdW	MR	MR
1	23 December 2022	Final Draft (V2 Draft)	AvdW	MR	MR
2	13 February 2023	Final Issue (V2)	AvdW	MR	MR

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Glossary of Terms

Analysis

Process of breaking down landscape or visual attributes into component parts to understand how it is made or valued.

Assessment

General term for description, classification and analysis of landscape or visual attributes.

Classification

A process of sorting the landscape into different types using selected criteria, but without attaching relative values to the different kinds of landscape.

Community

A group with shared culture, traditions and activities based within a defined locality.

Community values

Commonly held perceptions and values that the community attach to environmental attributes or qualities.

Designated landscape

A landscape area formally listed by government as a park, reserve, or area with valuable natural or cultural attributes and specific management requirements.

DTM / DEM

Digital Terrain Model / Digital Elevation Model, a 3-dimensional model of the land surface (with or without trees and buildings) generated by computer from contour, survey, or remote sensing data.

Enhancement

Landscape improvement through restoration, reconstruction or mitigating action.

Impact

A positive or negative change to the landscape or the visual environment.

Landscape

A distinctive physical area as perceived by people, whose character is the result of the action and interaction of natural and / or human factors. Human perception of the land conditioned by knowledge and identity with a place.

Landscape character

A distinct, recognisable, and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.

Landscape characteristics

Elements, or combinations of elements, which make a particular contribution to distinctive character.

Landscape Character Area

Different to Landscape Types, these are single and unique areas within a particular landscape type. Each has its own individual character and identity, even though it shares the same generic characteristics with other areas of the same landscape type.

Landscape Character Type

Different to Landscape Areas, these are distinct types of landscape, relatively homogeneous in character, and generic in that wherever they occur, they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern.

Landscape elements:

Individual components which make up the landscape, such as trees and hedges.

Landscape features

Particularly prominent or eye-catching elements, like tree clumps, church towers, or wooded skylines.

Landscape quality

A judgement about the relative physical condition of an area, related to its intactness, character and visual, functional, and ecological condition.

Landscape value

The relative value or importance attached to a landscape, which expresses agreed community values because of its quality, scenic beauty, tranquillity, wildness, cultural associations, conservation, or other special value.

Mitigation

Measures to avoid, reduce or compensate for adverse landscape and visual effects.

Perception of landscape

The psychology of seeing and potentially attaching value or meaning to a landscape

Receptor

A physical landscape resource, viewer or special element that will experience an effect because of change. A place, route, viewer group or interest group which may experience an effect.

Scenic

Attractive scenery, particularly combinations of landscape features and elements which appear 'composed' similar to landscape paintings.

Scenic quality

A relative judgement, based on common community perceptions, about the visual qualities associated with a landscape type or character area.

Sense of place

A relative judgement, based on common community perceptions, about the essential character and spirit of an area.

Sensitivity

The extent to which changes in landscape and visual resources can accept change without unacceptable, adverse effects on its character.

Sensory characteristics

Perceptual characteristics or capacities that underpin a person's ability to view, comprehend and respond to the landscape.

Study area

Combination of the proposed development site and the surrounding area, typically to a radius of at least 6km. Landscape character references are likely to relate to a larger regional area.

Visual absorption capability

The capacity of the landscape to absorb change (usually development-related), without significant detriment to its landscape values (character, scenic quality, and integrity). VAC is a function of both slope and vegetation screening capacity.

Visual amenity

The value of a particular area or view in terms of what is seen.

1 Introduction

1.1 Scope of Assessment

Landscape and Visual Character Assessment is a tool designed to ensure that change and development does not undermine whatever is characteristic or valued about any particular landscape. It also considers ways of improving the character of a place.

This study provides an assessment of the landscape and visual character of the study area within its regional and local context, with the aim of setting out strategic requirements to guide future site development in terms of visual and landscape responses.

These responses will represent a unified approach to landscape planning, design, and management in the form of an overarching Landscape Framework. The intention is to inform the Precinct Structure Plan (PSP) for Casey Fields South and Devon Meadows and so preserve that which is integral to Landscape Character. In this way, a respectful transition of the precinct from rural to suburban character will be enabled.

The report will be used by the VPA as well as developers to inform development patterns, site characteristics and connections to the broader landscape setting.

1.2 Study Area

The study Area is located 50km south-east of Melbourne's CBD, and some 15km northwest of Tooradin. Overall, the study area is largely a modified agricultural landscape that will function as a part of a mixed-use growth area and as a part of the Melbourne Growth Area boundary. The site consists of two precincts separated by the South Gippsland Highway, namely:

- Casey Fields South, lying to the northeast, encompassing an area of 275ha, and bounded by Ballarto Road to the north and Clyde-Five Ways Road to the east.
- Devon Meadows, lying to the southwest, encompassing an area of 261ha, bounded by Craig Road to the west, and Browns and Facey Roads to the south. The southern edge of this precinct also lies on the southern edge of the Urban Growth Boundary.

For the purpose of this assessment the study area will be addressed at regional and local scale to understand the context of the site, and at site scale for planning purposes.

According to the Melbourne Industrial and Commercial Land Use Plan (MICLUP), the Casey Fields South Precinct lies within '*regionally significant industrial land*', and as such will provide industrial and employment land use outcomes.

The Devon Meadows Precinct is identified as '*urban – land use to be determined*'. This precinct is likely to provide primarily residential with some limited commercial opportunities to complement existing and future development that will surround the study area.

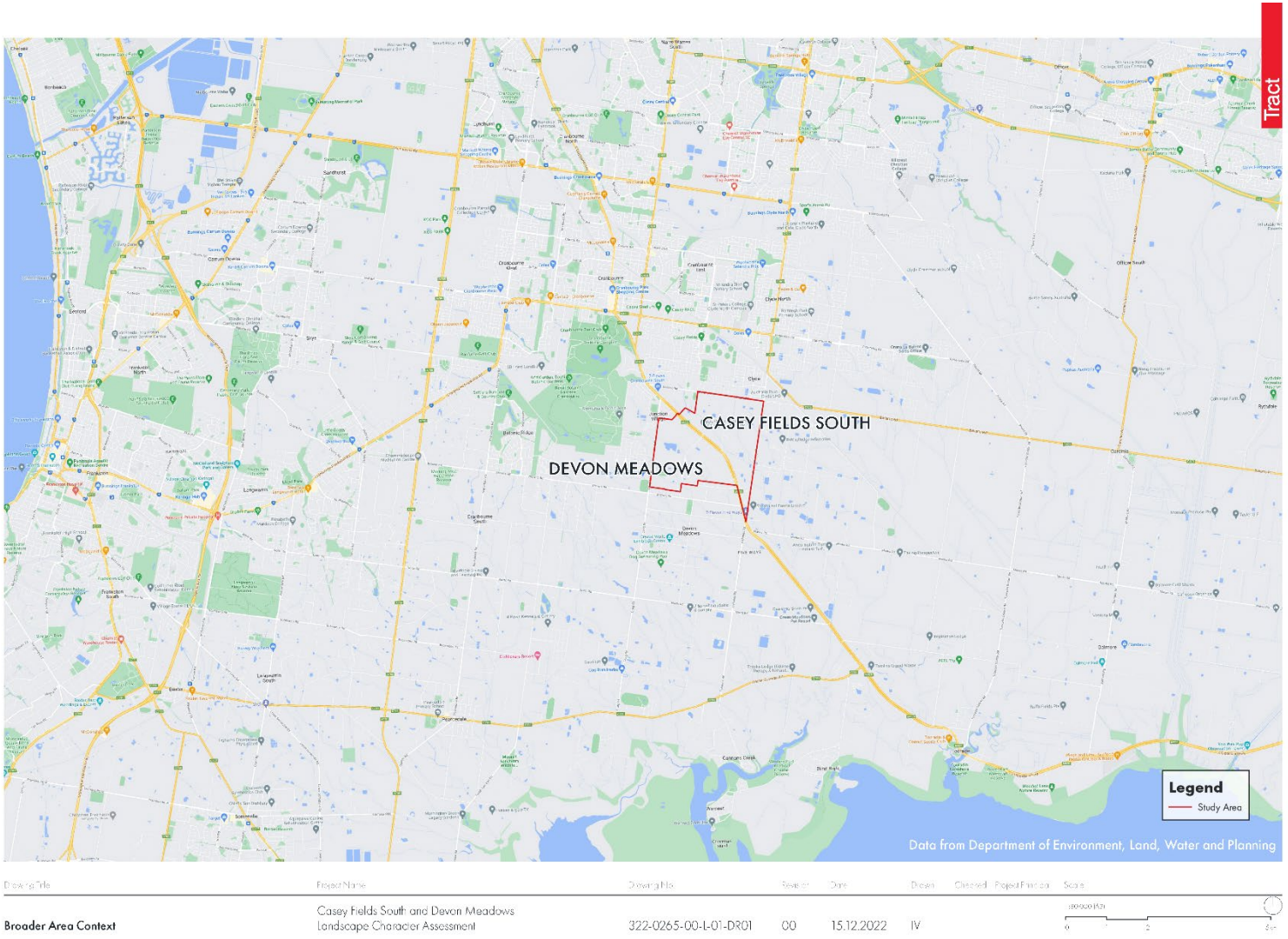
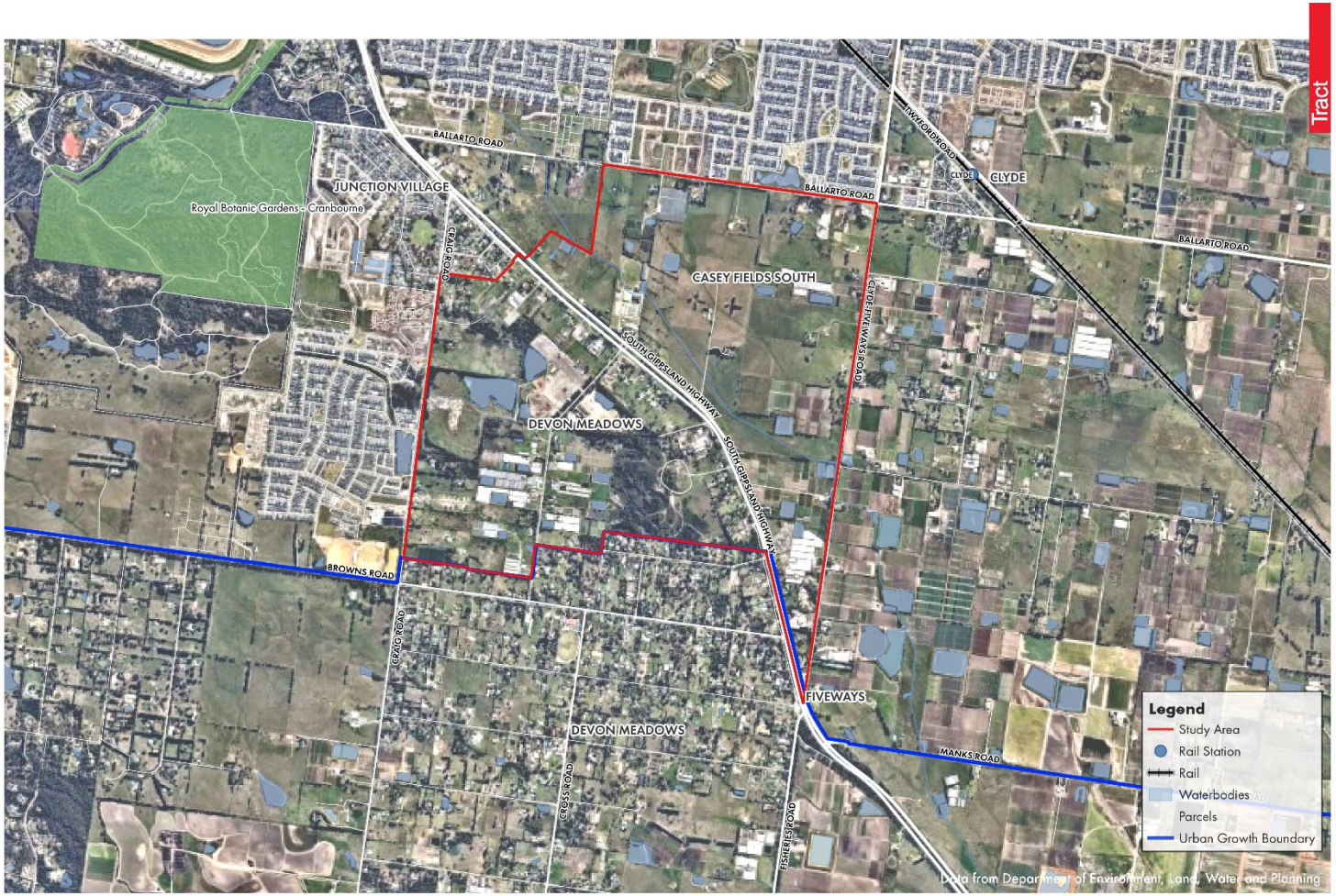


Figure 1: Broader Area Context



Drawing title	Project name	Drawing No.	Revision	Date	Drawn	Checked	Project Principal	Scale
Local Study Area	Casey Fields South and Devon Meadows Landscape Character Assessment	322-0265-00-L-01-DR01	00	15.12.2022	IV			

Figure 2: Local Study Area

1.3 Study Objectives

The classification of representative landscape character types and related scenic qualities is derived through the definition of common distinguishing characteristics.

Landscape Character Assessment addresses both the characterisation process (i.e., identifying, mapping, classifying and describing landscape character) and the process of making judgements based on landscape character to inform and support a range of decisions (The Countryside Agency and the Scottish Natural Heritage, 2002).

In this respect, the Landscape and Visual Character Assessment aims to critically guide the preparation of the Casey Fields South and Devon Meadows PSP, providing a robust landscape and visual context analysis that addresses both the immediate site and its wider landscape setting. The study will develop an overall visual and landscape response to future site development that will enable a respectful transition of the precinct from rural to a suburban character.

The objectives of this Landscape and Visual Character Assessment are to:

- Analyse key landscape and visual characteristics of the PSP area.
- Identify significant views to, from and within the precinct.
- Provide recommendations to accommodate future development, whilst maintaining a high-quality landscape and establishing a strong 'sense of place'.

1.4 Assumptions and Limitations

- The report is based on the information available and current at the time of compilation. This includes LiDAR data provided by the client (VPA), and that obtained via open sources. Refences have been noted on maps.
- It is assumed that this data is current and accurate, and as such, any findings drawn from the data is accurate to the extent that the data itself is accurate. Any embedded inaccuracies in the data set will affect the findings of this assessment accordingly.
- The assessment process aims to describe the landscape factually. However, this type of assessment also requires a series of qualitative (subjective) judgements to be made about landscape character and visual qualities. The conclusions of this assessment combine both the objective measurements and professional interpretations.
- At the time of writing this report, no Cultural Heritage Assessment had yet been completed for the study area, therefore there is no account of Aboriginal history, Aboriginal places or Aboriginal Historical References for the site or immediate study area. Despite the altered state of the landscape, the likelihood of encountering sites of Aboriginal heritage and cultural significance is not discounted.
- A search of the Victorian Heritage Database of the Heritage Council Victoria was undertaken. Two sites were identified within the study area, although not on the site itself. Although additional discoveries are not expected, the likelihood of encountering sites of or heritage significance is not discounted.
- No empirical research or specific consultation relating to community values or perceptions of landscape and visual quality has been included within this study proposal. The assessment process will therefore reference existing information sources including:
    - Perception based research findings. These deal with common ways of seeing (field of view etc) which are considered to be broadly consistent between all people, but they do not deal with place specific communities and their sensitivities.
    - The State and Local Planning Policy Framework and existing studies make specific reference to landscape character values and visual quality of the area surrounding the site. In this context, these information sources are considered to generally represent State Government, Council and broader community values relating to the landscape and visual resources of the region.
    - Any existing information from Council or the VPA relating to resident perceptions and values.

1.5 Study Team

Mark Reilly: B.Ed. (Env.Studies), M.L.Arch., AILA, RLA

Principal Landscape Architect, Tract Consultants

- Review of Findings

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- Field Assessment & Analysis
- Landscape Character and Visual Assessment
- Photography

Michael Natoli: B App Sci in Planning (Urban Design)

Senior Principal Urban Designer

- Review of Findings

Isabelle Verschueren, B Envs (Urban Design and Planning), M (Urban Design)

Senior Urban Designer, Tract Consultants

- Field Assessment and Mapping
- QGIS (Version 2.14.6)
- Photoshop (Version CS3)
- Illustrator (Version CS3)

Printed image resolution

- Printed image resolution to match photo resolution (10 megapixel)

1.6 Benchmarking

As part of the research undertaken for this study, a review of other, relevant reports was undertaken as a benchmarking exercise. Of note was a Visual Character Assessment undertaken for Devon Meadows by MDG Landscape Architects (2021). These descriptions and discussions contained in this report provided some insight into the study area and allowed for comparison with professional peer opinion.

2 Policy Context

The purpose of this section is to provide an overview of landscape or visual management planning policies that directly affect the study site and site surroundings, and that describe community values that can inform or provide an appropriate reference for the landscape and visual assessment process.

The subject site is within the municipality of Casey and therefore is subject to the Casey Planning Scheme. Statutory provisions and policy documents with implications for landscape values are summarised below.

2.1 Planning Policy Framework (PPF)

The following Clauses of the Planning Policy Framework (PPF) comprise high-level themes that are relevant state-wide:

Clause 12 (Environmental and Landscape Values)

- Planning should help to protect the health of ecological systems and the biodiversity they support (including ecosystems, habitats, species and genetic diversity) and conserve areas with identified environmental and landscape values.
- Planning should protect, restore and enhance sites and features of nature conservation, biodiversity, geological or landscape value.

Clause 12.05-2S (Landscapes)

Objective:

- To protect and enhance significant landscapes and open spaces that contribute to character, identity and sustainable environments.

Strategies:

- Ensure development does not detract from the natural qualities of significant landscape areas.
- Improve the landscape qualities, open space linkages and environmental performance in significant landscapes and open spaces, including green wedges, conservation areas and non-urban areas.
- Recognise the natural landscape for its aesthetic value and as a fully functioning system.
- Ensure important natural features are protected and enhanced.

Clause 15.01-2S (Building design)

Objective:

- To achieve building design and siting outcomes that contribute positively to the local context, enhance the public realm and support environmentally sustainable development.

Strategy:

- Ensure development is designed to protect and enhance valued landmarks, views and vistas.

2.2 Municipal Strategic Statement (MSS)

The MSS provides an overview of the current conditions of the municipality and sets out guiding policy directions. The following relevant policies are listed below:

Clause 21.01-1 (Municipal profile)

The municipal profile states that the City of Casey includes the following 'distinct geographic region' of relevance to the subject site:

- The urban growth area, which is characterised by strong building activity and rapid population growth, is located centrally in Casey extending to the east, south and west of the established urban area, and includes the developing suburbs of Botanic Ridge, Clyde (part), Clyde North, Cranbourne East, Cranbourne North, Cranbourne West, Junction Village, Lynbrook, Lyndhurst and Narre Warren South.

Clause 21.01-3 (Environmental context)

- Casey boasts a beautiful and diverse environment that is characterised by extensive areas of land with outstanding agricultural, natural landscape, cultural heritage or environmental value.
- The bushland and waterways provide recreational opportunities and are a source of inspiration, pride and cultural identity.
- The management of remnant vegetation and fauna throughout the City is important in order to achieve a net gain in the extent and quality of native vegetation, and protect and conserve biodiversity. Of particular importance is the protection and enhancement of bio link corridors that provide critical linkages for the survival of threatened species in Casey.

Clause 21.02 (Key issues and strategic vision)

The following issues are noted:

- The management of urban development and its impacts on surrounding rural areas and areas of landscape, environmental and heritage significance.
- The protection and restoration of Casey's biodiversity.
- The protection and management of areas of State, national and international significance.
- The protection and enhancement of significant rural landscapes.
- The formulation of ecologically sustainable land use and development practices.
- The protection and enhancement of local neighbourhood character.
- The retention and maintenance of heritage places for the benefit of present and future generations.

Clause 21.02-6 (Strategic framework plan)

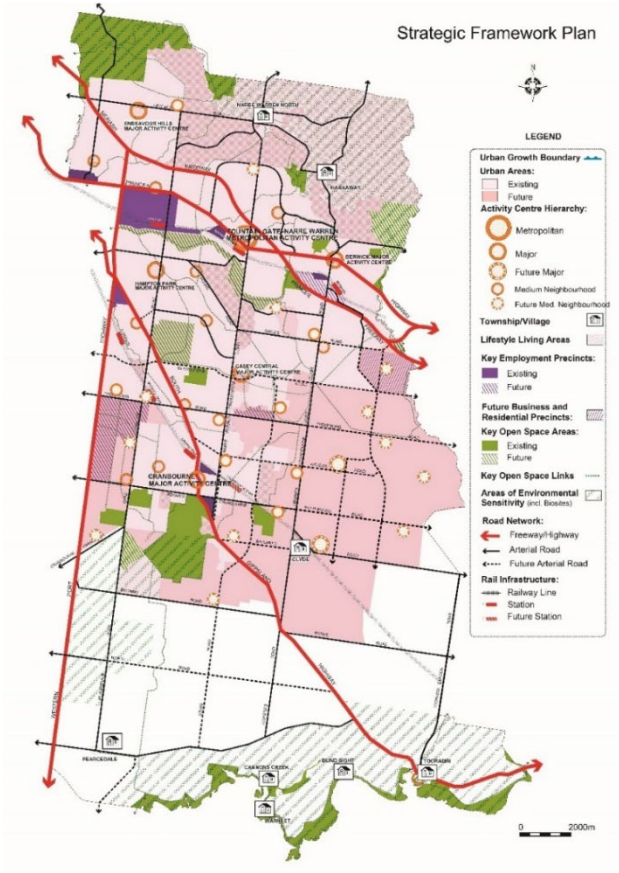


Figure 3: Strategic Framework Plan

Clause 21.03 (Settlement and housing)

Objective1: To provide a framework for urban growth and development that will support and strengthen the diverse communities in Casey.

- Strategy 1.4: Maintain key rural views.
- Strategy 1.5: Recognise and maintain areas with existing significant neighbourhood character, enhanced landscapes, views and vistas.

Clause 21.04 (Environment)

Objective 1: To protect and significantly restore Casey's biological diversity, recognising its fundamental importance in achieving a healthy environment and way of life for current and future generations.

- Strategy 1.4: Restore bushland and habitat back into the suburban and rural areas of Casey by providing for significant new planting and facilitating the natural regeneration and retention of existing vegetation, as far as practicable.
- Strategy 1.6: Maintain and enhance roadside vegetation.
- Strategy 1.7: Identify and protect identified significant landscapes, including the Casey Foothills, Western Port coast, Cardinia Creek environs and Berwick Village environs.

Clause 21.07 (Built environment)

Objective 1: To create both an image that reflects Casey as a whole and images that reflect Casey's diverse range of communities and places.

- Strategy 1.1: Protect significant natural, cultural and built heritage places from adverse impacts resulting from deterioration and inappropriate use and development.
- Strategy 1.2: Encourage the retention and maintenance of heritage places for the benefit of present and future generations.
- Strategy 1.6: Undertake neighbourhood character studies to recognise and value the intrinsic characteristics of different areas within Casey.
- Strategy 1.7: Encourage and deliver trees as the dominant suburban streetscape element.
- Strategy 1.8: Manage design and built form outcomes having regard to the strong suburban sense of place, which recognises green space and landscaped setbacks.
- Strategy 1.8: Recognise and value the intrinsic characteristics of Casey's diverse local areas.
- Strategy 1.15: Maintain and enhance the treed landscape setting of Casey's suburban areas and its non-suburban townships and villages through extensive tree planting and maintaining views and links through to open space and non-urban areas.
- Strategy 1.18: Strengthen the 'country feel' in Casey's suburban and non-suburban communities.
- Strategy 1.23: Maintain attractive views of Casey from the main road network to enhance the overall image and perception of the City.

Clause 21.13 (Casey Farm)

The subject site is located within the Local Area of Casey Farm. It is characterised by the following profile:

Casey Farm is a unique, diverse mix of quality farm land with intensive agricultural activity, large-lot rural-residential and village living, with mixed rural pursuits, as well as genuine rural activities and businesses. Much of the intensive agricultural area in the Farm has been earmarked for urban development by the State Government and this will present challenges into the future to manage the transition of this land from farms to urban uses.

The following relevant aim for the Local Area is listed '*to protect and enhance the qualities, and sense of place of the townships, villages and rural lifestyle communities of Pearcedale, Cranbourne South and Devon Meadows.*'

Specifically regarding Devon Meadows the following strategies is mentioned '*discourage any further rural-residential development in Devon Meadows,*

recognising that local infrastructure (roads and drains) cannot cope with additional development.'

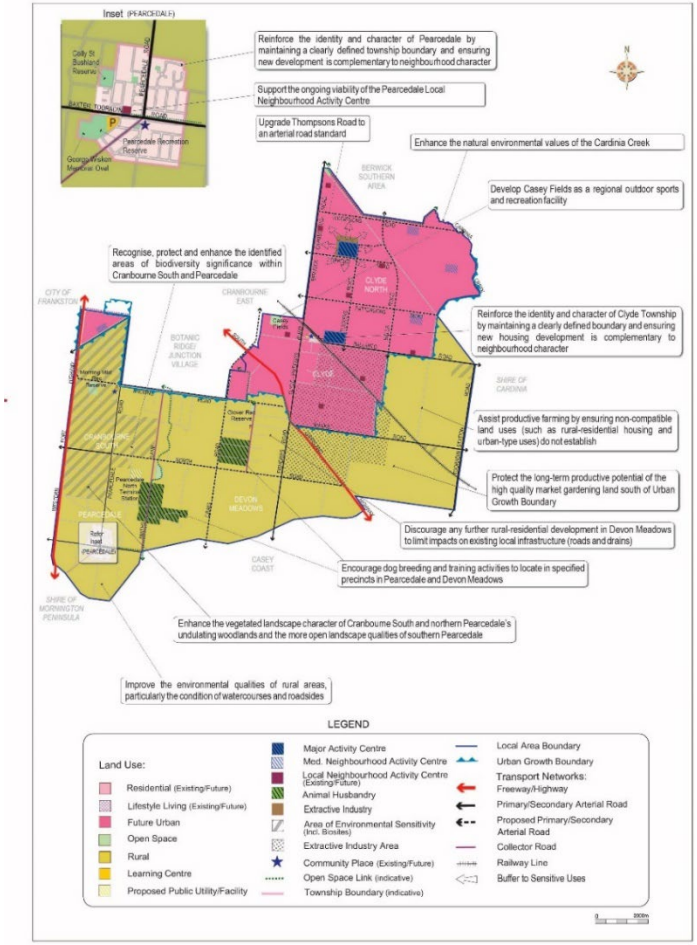


Figure 4: Casey Farm Local Area Map

2.3 Zoning

The subject site is located within several zones, primarily the Urban Growth Zone within Casey Fields South and the Farming Zone within Devon Meadows. The Urban Floodway Zone runs north-west to south-east through Casey Fields South. The South Gippsland Highway is within the Transport Zone 2.

These zones include the following relevant objectives:

Clause 37.07 (Urban Growth Zone - UGZ)

- To manage the transition of non-urban land into urban land in accordance with a precinct structure plan.
- To ensure that, before a precinct structure plan is applied, the use and development of land does not prejudice the future urban use and development of the land.

Clause 35.07 (Farming Zone - FZ)

- To encourage the retention of productive agricultural land.
- To ensure that non-agricultural uses, including dwellings, do not adversely affect the use of land for agriculture.
- To encourage the retention of employment and population to support rural communities.

Clause 37.03-1 (Urban Floodway Zone – UFZ)

- To identify waterways, major flood paths, drainage depressions and high hazard areas within urban areas which have the greatest risk and frequency of being affected by flooding.
- To ensure that any development maintains the free passage and temporary storage of floodwater, minimises flood damage and is compatible with flood hazard, local drainage conditions and the minimisation of soil erosion, sedimentation and silting.
- To protect water quality and waterways as natural resources by managing urban stormwater, protecting water supply catchment areas and managing saline

discharges to minimise the risks to the environmental quality of water and groundwater.

Planning Overlays

The site is affected by the Land Subject to Inundation Overlay (LSIO) and the Public Acquisition Overlay (PAO). To the west of the site, the Botanic Gardens are subject to the Environmental Significance, Bushfire Management and Heritage Overlays, and to the south west, a small site is affected by the Heritage Overlay. The Urban Growth areas to the west and north of the site are subject to Development Contribution Plan Overlay.

2.4 Other Policy Considerations

Summaries of additional policy considerations are included in Appendix 1. These include the following:

- Botanic Ridge Precinct Structure Plan
- City of Casey Policies including:
  - Council Plan
  - Tree Guide
  - Environment Strategy 2021-2025
  - Growth Area Heritage Places Policy
  - Roadside Vegetation Management Plan
  - Revegetation Strategy
  - Employment Land Design Guide
- State Government Policies including:
  - South-East Growth Corridor Plan
- Biodiversity Strategies including:
  - Implementation Plan for the Southern Brown Bandicoot Sub-Regional Species Strategy 2016
  - Habitat Connectivity Supplement for the Southern Brown Bandicoot 2014
- Management Plans and Guidelines:
  - Western Port Green Wedge Management Plan 2019
  - Casey's Southern Urban Rural Interface Design Guide 2020

3 Baseline Conditions

3.1 Approach

'...Exploring and understanding the landscape character of any area requires systematic investigation of the many different factors that have helped to create and influence that location. They include geology and landform, the natural attributes of soils and the vegetation associated with them, and both the historical and current influences of human land use and settlement. The inter-actions between all these factors create the character of the landscape...' (The Countryside Agency and the Scottish Natural Heritage, 2002).

As a first step, the desktop analysis of existing mapping and related information contributes to the development of an overarching view of the receiving environment and is essential in understanding how the different factors which shape the landscape come together and interact.

During the desktop analysis, various map overlays addressing the natural, manmade and cultural historic environments are assessed individually to lay foundation for the process of identifying areas of common character, which will ultimately be tested and validated in the field. These overlays should suggest clear correlations between different factors and allow areas of potentially similar character to be identified.

The purpose of detailed field work is to collect as much information on the social environment as is necessary to test and refine the character areas identified through the desktop review.

The intention is to assess aesthetic and perceptual qualities of the landscape, and so inform and support the description and delineation of Landscape Character Types and Areas.

The visual environment will be assessed in terms of both Scenic Quality and Patterns of Viewing.

3.2 Natural Environment

3.2.1 Geology, Landform and Hydrology

Geographically, the study area is located on the eastern side of Port Phillip Bay. The Mornington Peninsula lies to the southwest, Western Port Bay to the south, the plains of West Gippsland to the east and the foothills of the Dandenong Ranges to the north.

The following is a summary of the main geomorphological land systems relating to the study area, obtained from *Victorian Resources Online* (2022):

'...Plateau (Bellarine Peninsula, Cape Liptrap, Moorooduc Plains, including Mt Martha and Mt Eliza)

Most of the northern Mornington Peninsula is a weakly dissected undulating plain of low elevation, mostly less than 100 m. However on the western side there are two prominent granite hills, Mt Martha and Mt Eliza, both about 150 m high. Apart from these small areas of Palaeozoic granite, Palaeozoic sediments occur over the whole area, but Neogene sediments mostly overlie these. Often the Palaeozoic sediments are exposed by the stream incisions but elsewhere they occur above the level of the plain, e.g. east of Langwarrin and west of Balcombe. Between Somerville and Devon Meadows there are sand sheets of Late Neogene age that partly cover the underlying sediments, often the lower parts of the landscape

Apart from the soils on the sands, most of the soils on sediments are mottled yellow and brown texture contrast soils, occasionally sodic (Chromosols and Sodosols). The

sandy soils are strongly acid with bleached sandy subsoil and a hard, dark brown "B" horizon of "coffee rock" at about 0.8 m, composed of organic matter and aluminium and/or iron compounds (Podosols).

Prior to European settlement most of the area was covered with Grassy Woodland, with Lowland Forest in the southern part. The sands were covered by a Heathy Woodland. Outside the urban areas, most is cleared for grazing with areas of viticulture on the better drained soils. Vegetable and flower growing occurs on the sandy soils...

...Basaltic residuals (Phillip Island)

The southern part of the Mornington Peninsula and Phillip Island is mostly comprised of Older basalt (Palaeogene), with late Neogene alluvium in the drainage lines. The landform generally comprises low rounded crests with broadly spaced flats and depressions... The low-lying areas are generally affected by salinity, probably caused by vegetation clearing and proximity to the sea. There are few friable red gradational soils on these low residuals, most soils are mottled yellow and brown texture contrast soils, often sodic (Chromosols and Sodosols) and similarly coloured gradational soils (Dermosols). The soils of the broad drainage lines are seasonally waterlogged and comprise grey clays (Vertosols) or grey gradational soils (Dermosols, Hydrosols)...

... Coastal plains with ridges and dunefields (Brighton, Cranbourne)

The coastal plains with ridges and dunes which are typified in the Brighton, Cranbourne and Tyabb areas are formed over Neogene sediments, generally mantled by a layer of sand of variable thickness. The series of low parallel northwest trending dune ridges that lie parallel to the present coastline are believed to represent stranded Neogene dune ridges or former coastlines. The soils are either acidic sandy texture contrast soils (Chromosols) or deep, strongly acid sands with bleached subsoil and a hard, dark brown "B" horizon of "coffee rock" at about 0.8 m, composed of organic matter and aluminium and/or iron compounds (Podosols).

The present climate is humid to sub-humid, with rainfall generally well distributed over the year. The original vegetation is believed to be grassy woodland/damp sands herb-rich woodland mosaic with areas of heathy woodland/heathy herb-rich woodland mosaic. Remnants of the older vegetation on the acidic sands may be seen at the Botanical Reserve south of Cranbourne. Most of the area is now subdivided for housing or used for recreation, mainly golf courses. Earlier the area was renowned for its market gardens. The former sand quarries that supplied Melbourne with sand are located within this area and now serve as landfill sites....

...Alluvial plains (Nar Nar Goon, Caldermeade, Bass River Basin)

Alluvial plains developed in the lower reaches of the Dandenong, Cardinia and Tynong Creeks and the Bunyip, Lang Lang and Bass Rivers. The drainage eventually flowed into swamps and lagoons,.. Since the drainage of the swamps, drains now confine the flows of all these rivers and streams.

The original vegetation on the plains was mostly comprised of swamp scrub, but some areas would have been swampy grasslands and grasslands, some of which may have become invaded by swamp scrub immediately after the displacement of the Koori population. The present climate is humid to sub-humid with rainfall generally well distributed throughout the year. The grazing of dairy cattle has been an important industry in the past, but have mainly been replaced by beef cattle. Most of the alluvial plains have texture contrast soils (mostly Kurosols) but there are areas of grey clays (Vertosols)....'

Regionally, the topography slopes from the north west to the south east, with a network of largely parallel drainage corridors following the slope in a south easterly direction. The regional watershed, which runs from the northeast to the south west passes through the Royal Botanic Gardens Cranbourne, some 3km north west of the site.

The South Gippsland Highway bisects the site, running from the north west to the south east, and divides the site into two precincts that are somewhat different topographically. The Devon Meadows Precinct in the south west is gently undulating with a few distinct high points, while the Casey Fields South Precinct in the north east appears less so, and is both flatter (i.e. less undulating) and lower overall in elevation.

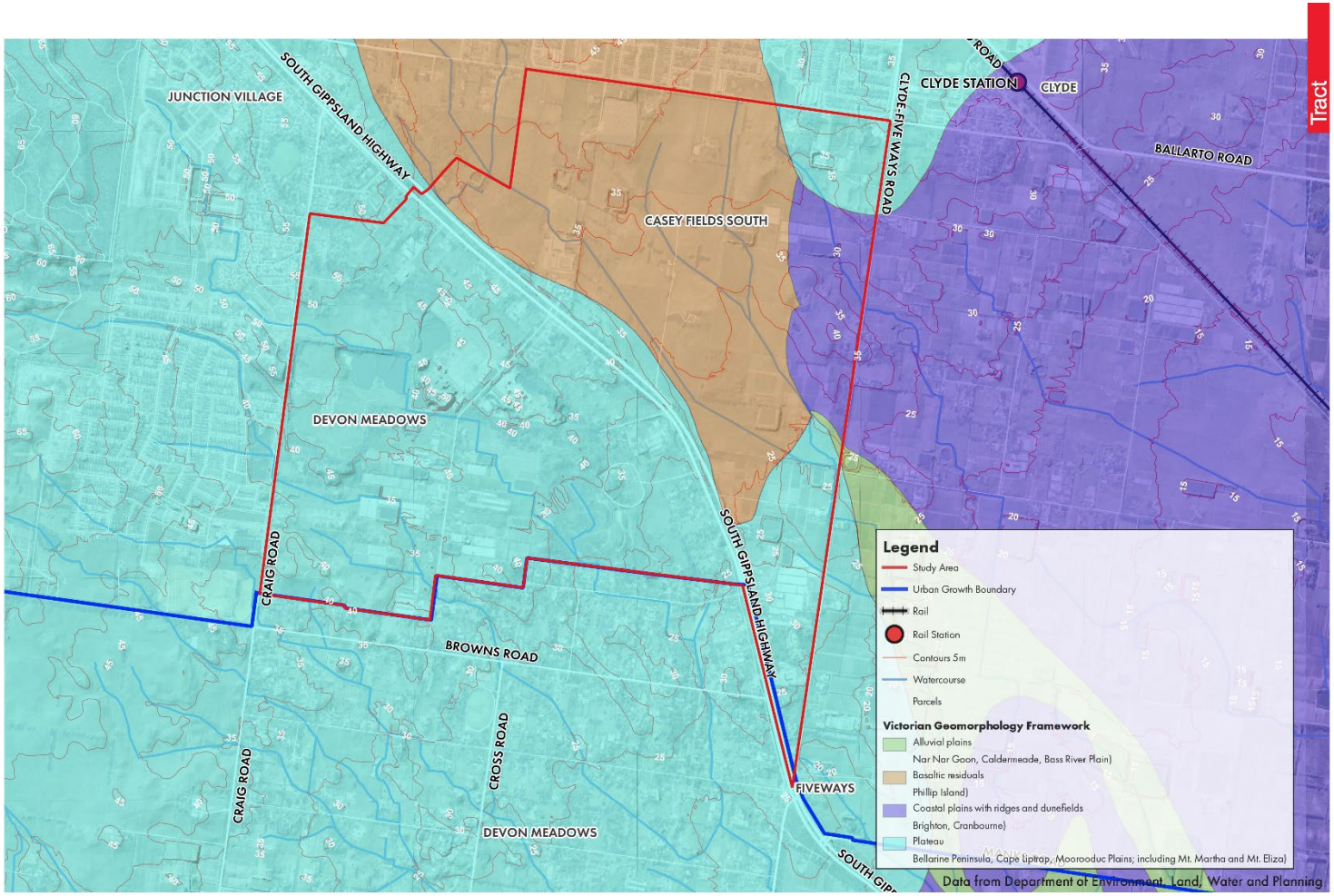
Similarly, the main geological and geomorphological units of the study area are separated roughly along the South Gippsland Highway:

- The Devon Meadows Precinct in the south west is classified as a Plateau, and is underlain by Inland dune deposits (Qd1) and Murrindindi supergroup (Sm) in the far southwestern corner.
- The Casey Fields South Precinct in the north east is classified mostly as Basaltic residuals with Coastal plains with ridges and dunefields in the east and Plateau in the north and south. The underlying geology is primarily Red bluff sandstone (Nbr) with a finger of Alluvium and colluvium (Qb) in the south.

The topography of the site is modified on a local scale. Historic agricultural practices have left many drainage corridors with diverted flows, canals and numerous off stream dams. In the central part of the Devon Meadows Precinct, quarrying activities have resulted in deep excavations and spoil heaps. The quarry excavations are flooded and isolated from the natural drainage systems traversing the site.

Overall, slopes within the study area are predominantly flat (<5%), with moderate slopes (5%-10%) arranged mostly longitudinally, following the fall of the land to the south east. Steep to very steep slopes are uncommon, and tend to be associated mostly with land modifications (i.e. dams, road verges and the quarry). Some naturally occurring steep sections are noted around natural high points in the south, north west, south west and east of the site.

The slope assessment also illustrates the finer grain of the undulating landform with small, localised high points in the Devon Meadows Precinct in the south west, as opposed to the Casey Fields South Precinct in the north east, which is clearly less varied, with larger higher lying areas in the east and north. Residual mounding from the construction of the South Gippsland Highway is noticeable along the highway, especially its northern edge.



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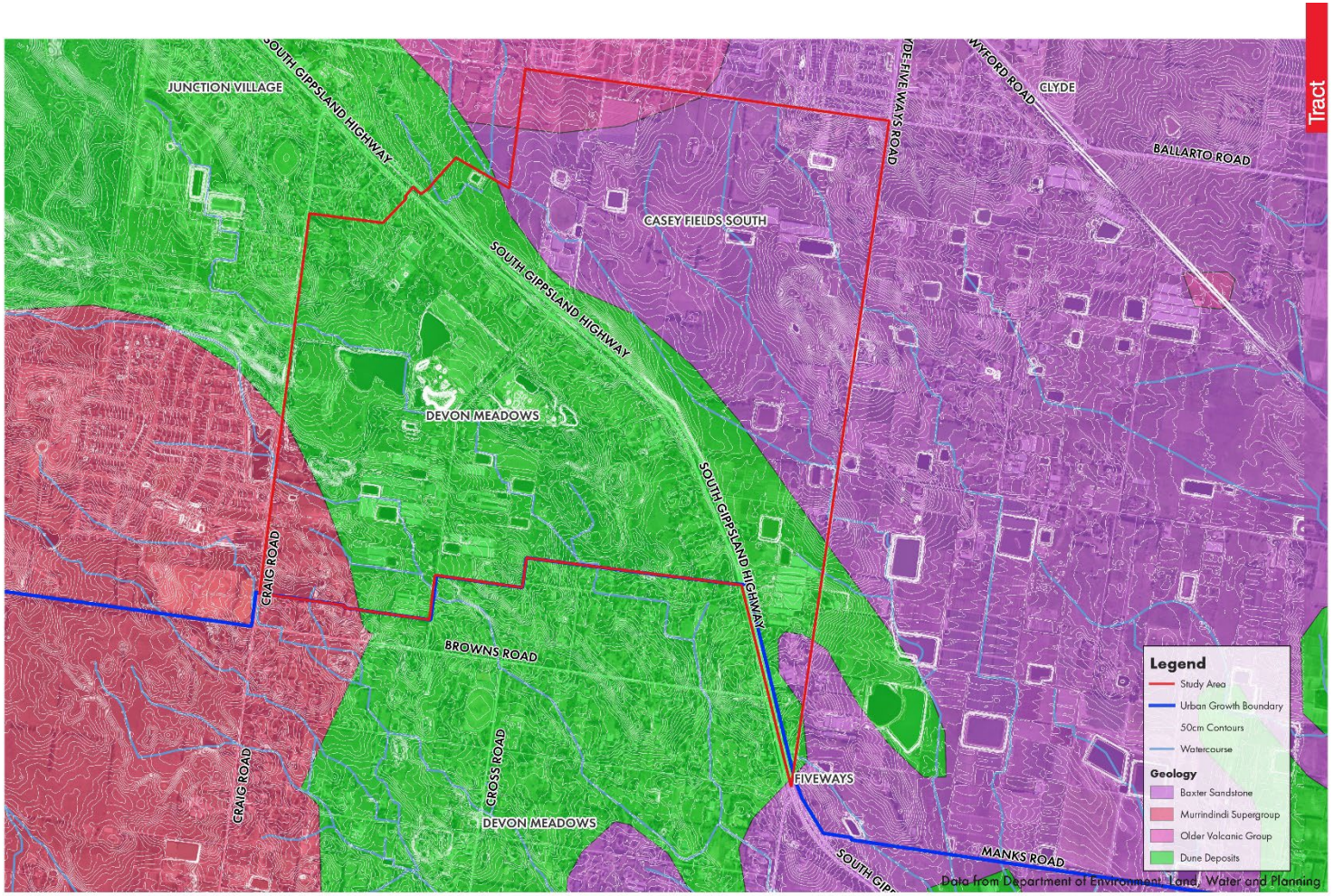
Geomorphology	Casey Fields South and Devon Meadows Landscape Character Assessment	322-0265-00-L-01-DR01	00	15.12.2022	V			

Figure 5: Geomorphology



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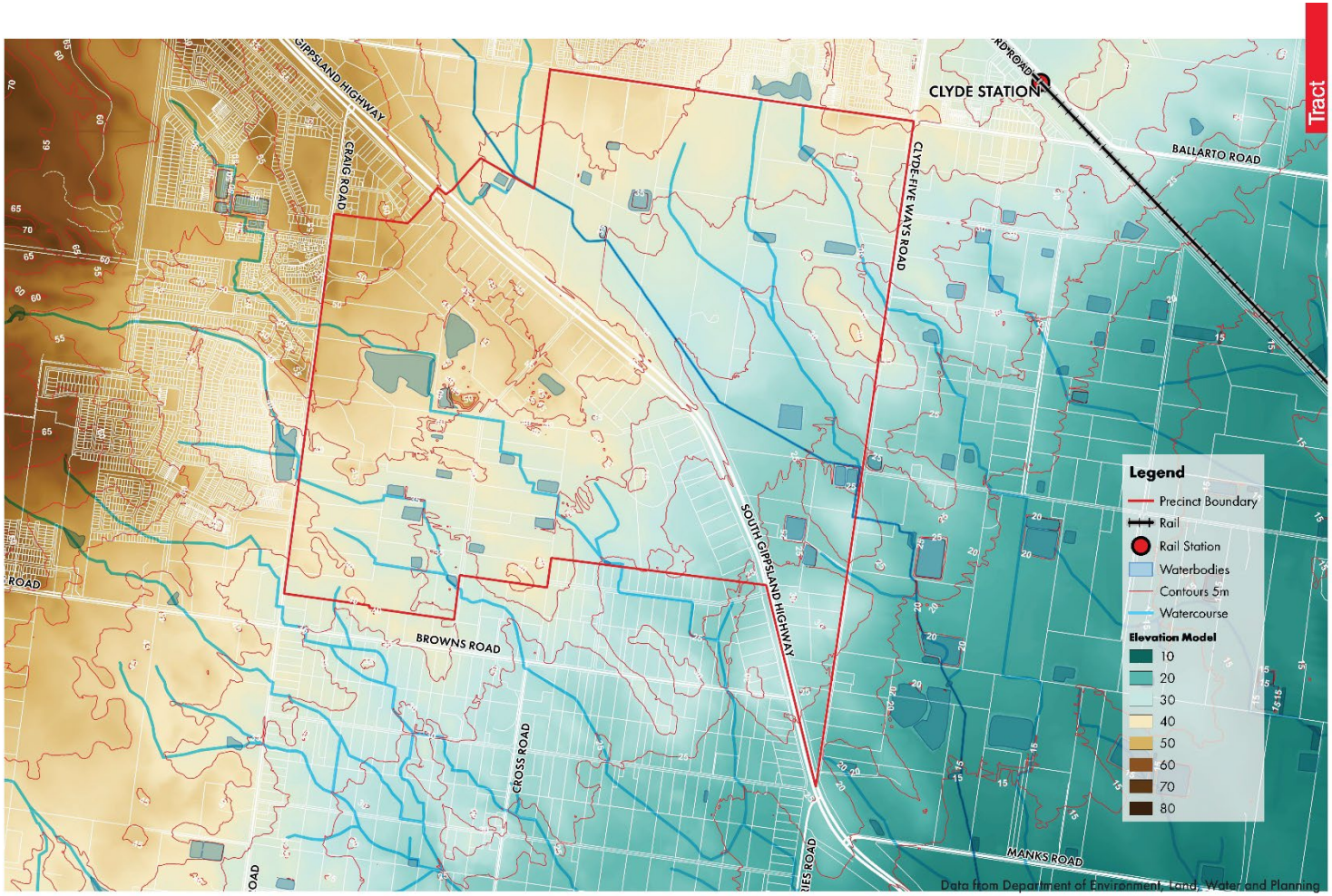
Geology	Casey Fields South and Devon Meadows Landscape Character Assessment	322-0265-00-L-01-DR01	00	15.12.2022	IV			1:15000 (A3)

Figure 6: Geology



Drawing Title	Project Name	Drawing No.	Revision	Date	Drawn	Checked	Project Principal	Scale
Landform and Hydrology	Casey Fields South and Devon Meadows Landscape Character Assessment	322-0265-00-L-01-DR01	00	15.12.2022	IV			

Figure 7: Landform and Hydrology

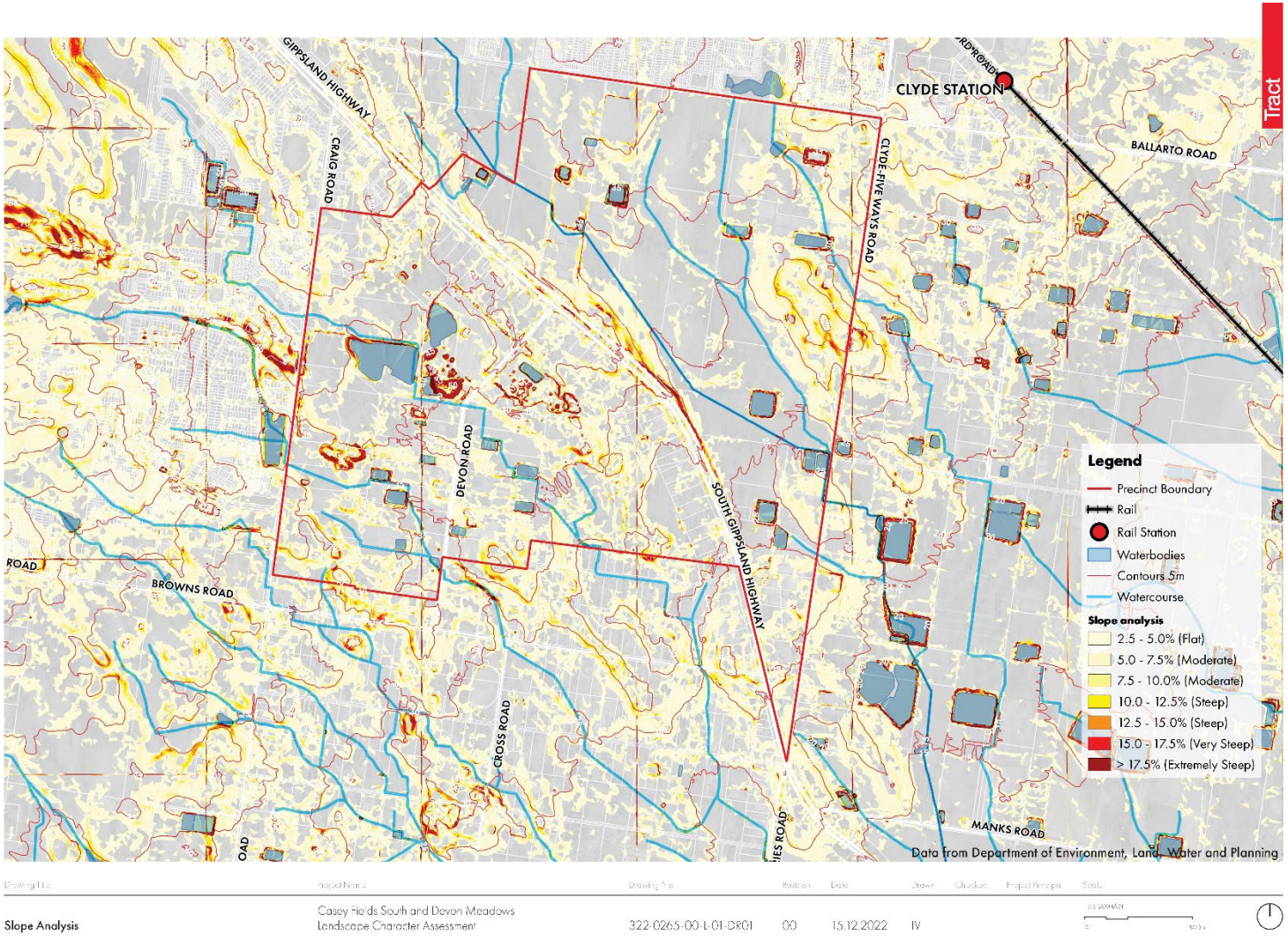


Figure 8: Slope Analysis

3.2.2 Vegetation

The study area falls within the *Gippsland Plain Bioregion*. The site is characterised by the following Ecological Vegetation Classes (EVC's). The Bioregional Conservation Status (BCS) is also noted. Source: *Naturekit 2.0 online* (2022).

'...EVC 48 – Heathy Woodland

Spans a variety of geologies but is generally associated with nutrient-poor soils including deep uniform sands (aeolian or outwash) and Tertiary sand/clay which has been altered to form quartzite gravel. Eucalypt-dominated low woodland to 10 m tall lacking a secondary tree layer and generally supporting a diverse array of narrow or ericoid-leaved shrubs except where frequent fire has reduced this to a dense cover of bracken. Geophytes and annuals can be quite common but the ground cover is normally fairly sparse....

...EVC 83 – Swampy Riparian Woodland

Woodland to 15 m tall generally occupying low energy streams of the foothills and plains. The lower strata are variously locally dominated by a range of large and medium shrub species on the stream levees in combination with large tussock grasses and sedges in the ground layer....

...EVC 175 – Grassy Woodland

A variable open eucalypt woodland to 15 m tall or occasionally Sheoak woodland to 10 m tall over a diverse ground layer of grasses and herbs. The shrub component is usually sparse. It occurs on sites with moderate fertility on gentle slopes or undulating hills on a range of geologies....

...EVC 897 -Plains Grassland / Plains Grassy Woodland Mosaic...

A description of the EVC was not available in the referenced data.

Within the Gippsland Plain Bioregion, one EVC (*EVC 48 – Heathy Woodland*) has a BCS of Depleted, which reflects its limited geographical occurrence, and two EVC's are considered Endangered (*EVC 83 – Swampy Riparian Woodland* and *EVC 175 – Grassy Woodland*). The BCS of EVC 897 - *Plains Grassland / Plains Grassy Woodland Mosaic* is unknown as it is not available in the referenced data.

The EVC zones are arranged in a generally north west – south east direction, with the South Gippsland Highway again corresponding with the natural transition from *Plains Grassland / Plains Grassy Woodland Mosiac* in the north east to the dominant *Heathy Woodland* in the south west. In the far south west of the site, a small area of *Grass Woodland* is present, and a zone of *Swampy Riparian Woodland* follows the original alignment of Wylies Creek, flowing from north west to south east.

The above descriptions relate to the benchmark condition of each EVC in its pristine state, which is not a reflection of the current state of vegetation on the subject site or the study area in general. The native vegetation of the landscape is significantly altered because of historic clearing for agriculture and development, and only remnants of the original EVC's are left. In addition, farming practices have resulted in distinct patterns of new planting over the years.

The existing vegetation cover of the landscape consists of large open grass areas interspersed with scattered mixed groupings, tree stands and areas of solid canopy. Some of these vegetation coverings are native while others are dominated by exotic evergreen and deciduous species.

The Casey Fields South Precinct in the north east is predominantly grassland with mixed shrub and tree canopy generally occurring around developments and homesteads. Linear groupings occur along paddock fences, roads and around dams as hedgerows., while more organic arrangements sparse and limited in extent. The latter occur mainly in the far south of the precinct and to the north west. Vegetation is generally a mix of native and exotic species including fruit trees and weed species.

The Devon Meadows Precinct in the south west is more diverse. Limited vegetation cover exists in the central, southern and south western part of the precinct, where intense horticulture and quarrying has resulted in mass clearing. Adjacent to the horticulture plots, grassed paddocks contain scatterings of native and exotic species including fruit trees and weed species.

The eastern and north eastern parts of the Devon Meadows Precinct is more vegetated, with cleared rural plots containing scattered native and exotic trees. These are predominantly native (Eucalypts) with some Pines and Cypress. Linear arrangements as hedgerows and more organic groupings occur around buildings and homesteads.

In the west and north west of the Devon Meadows Precinct, large open grassed areas are interspersed with significant, dense stands of native vegetation with areas of solid canopy cover. There are also scattered native and exotic species, including mature pines and cypresses in non-continuous rows.

A substantial area of predominantly native vegetation of occurs in the south of the precinct. This area consists of discontinuous large and medium sized canopy trees and dense understorey. Dense, continuous stands of native vegetation extend to the northwest to encircle the quarry and line both sides of the northern portion of Devon Road.

The highway and other roads are generally lined with hedgerows containing both native and exotic species, more so in the south western Devon Meadows Precinct than in the north eastern Casey Fields South Precinct.

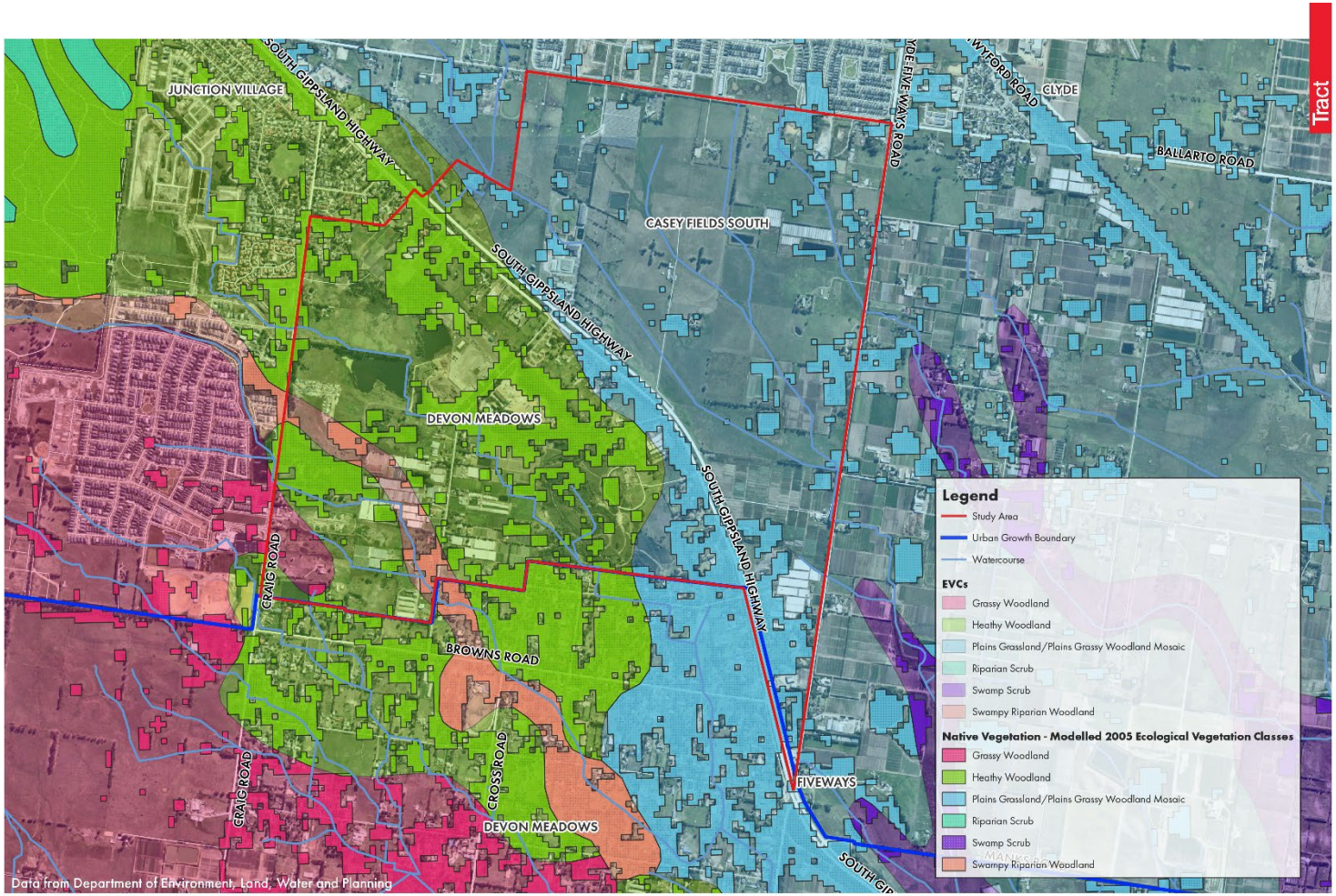
Large to very large tree specimens are present across the Devon Meadows Precinct, especially along the highway interface. Large trees are less common on the Casey Fields South Precinct.

3.2.3 Threatened Species Habitats

The Western Port Green Wedge, which lies directly to the south of the study area is home to nationally significant native species including the threatened Southern Brown Bandicoot, Swamp Skink, Common Long-necked Turtle and Growling Grass Frog (City of Casey, 2019).

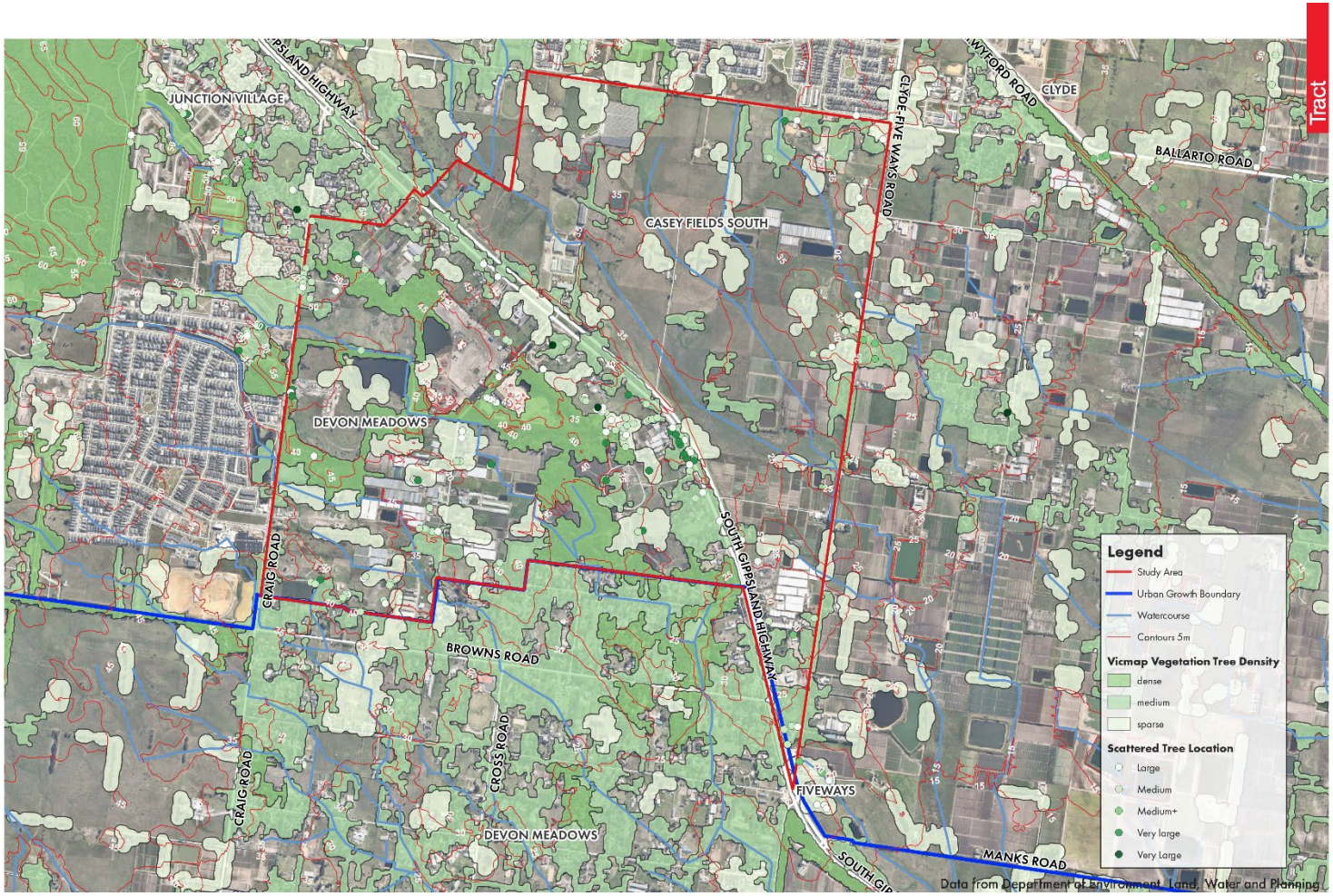
These habitats exist on a regional scale, and do not end at the boundary of the Green Wedge, but extend northwards across the Urban Growth Boundary. Potential habitats for both the Southern Brown Bandicoot and the Growling Grass Frog exist on and beyond the site within a zone extending from the Botanical Gardens Cranbourne in the west, across the full extent of both precincts, to the north east, east and south west beyond.

Potential Growling Grass Frog habitats occur mostly in the north eastern Casey Fields South Precinct along drainage lines, while potential Southern Brown Bandicoot habitats occur mainly in the south western Devon Meadows Precinct, within zones of remnant natural vegetation.



Drawing Title	Project Name	Drawing No.	Revision	Date	Drawn	Checked	Project Principal	Scale
Ecological Vegetation Classes	Casey Fields South and Devon Meadows Landscape Character Assessment	322-0265-00-L-01-DR01	00	15.12.2022	IV			

Figure 9: Ecological Vegetation Classes



Drawing Title	Project Name	Drawing No.	Revision	Date	Drawn	Checked	Project Director	Scale
Vegetation Cover	Casey Fields South and Devon Meadows Landscape Character Assessment	322-0265-00-L-01-DR01	00	15.12.2022	IV			

Figure 10: Vegetation Cover

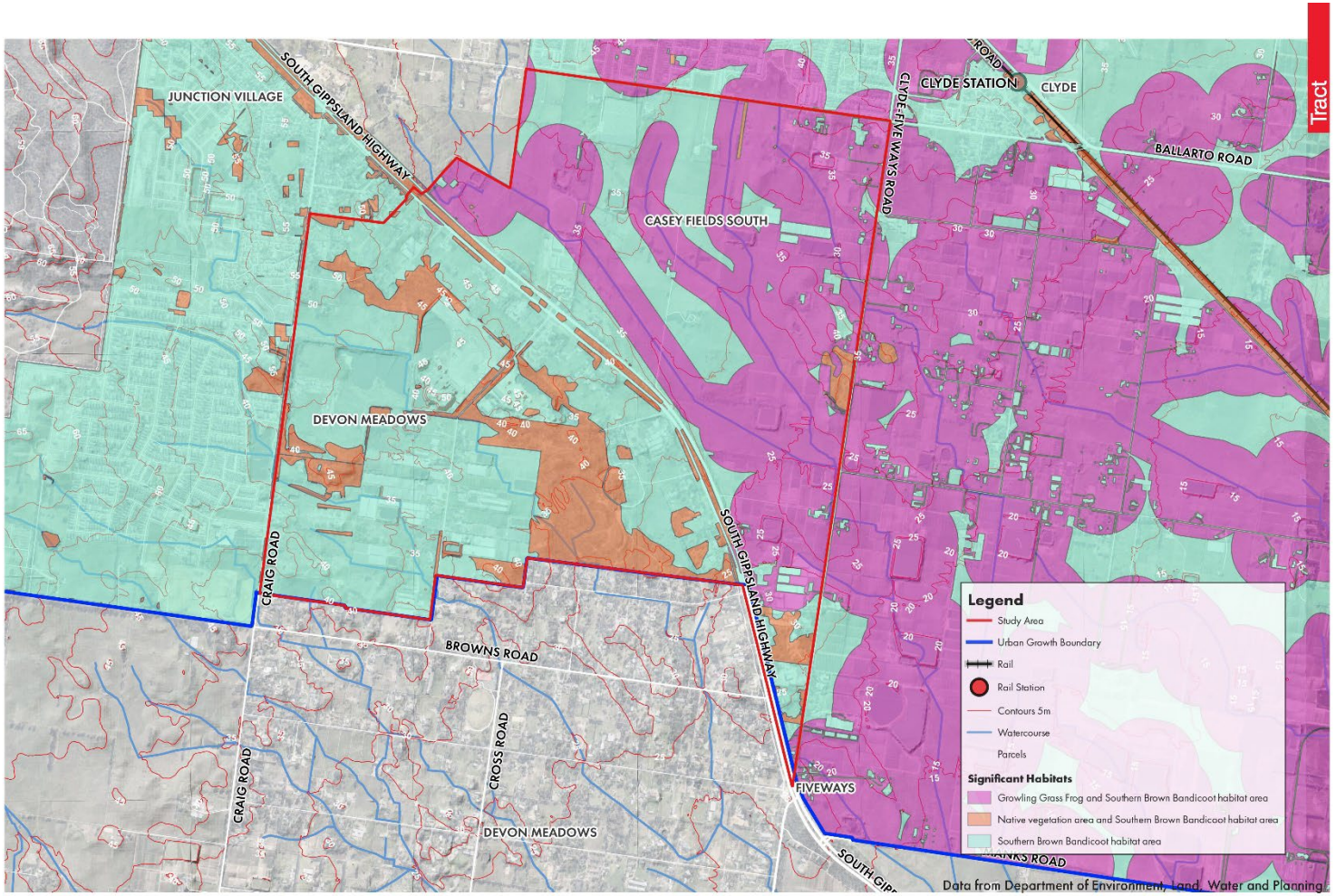


Figure 11: Threatened Species Habitats

3.3 Man Made Environment

3.3.1 Land Use, Zoning and Settlement

Regionally, the site lies on the southern edge of the Urban Growth Boundary, where it interfaces with the Western Port Green Wedge. This implies that the site will ultimately represent an important transition from the natural and agricultural land use of the Green Wedge to the urban nature of the growth area. It is also an important link between the natural habitats of the Green Wedge and those of the Royal Botanic Gardens Cranbourne, located less than a kilometre to the west of the site.

In terms of land use, the South Gippsland Highway bisects the site into 2 separate and distinct precincts, with limited connectivity between the two.

The Casey Fields South Precincts in the north east is currently zoned for urban growth, with an Urban Flood Zone traversing the site from the north west to the south east. Land use consists almost entirely of rural plots, substantially larger than those of the Devon Meadows precinct. Exceptions are the Lighthouse Christian College in the centre of the site and the small retail nodes in the far north west and south east.

Beyond the boundary of the site to the north, the extension of Cranbourne East through the subdivision of land into denser residential development is underway, with much already approved and completed. A retail node is noted to the north east at Clyde.

The Devon Meadows Precinct in the south west is currently zoned as farming, but actual land use includes intensive horticulture and quarrying activity, mostly in the central part, and rural plots in the north, east and south west. These plots are smaller, with a finer grain of development compared to the Casey Fields South Precinct, especially along the southern side of the highway. There are also areas of undeveloped bushland in varying stated of intactness.

To the south, the green wedge zoning will preserve the current agricultural land use, while the urban growth zoning to the immediate west of the site supports the subdivision of land into denser residential development. Much of this is already underway (at Botanic Ridge) or approved (Damon Creek). Of note is the existing Junction village node to the north west of the site.

3.3.2 Planning Overlays and Buffers

To the west of the site, the Botanic Gardens are subject to the Environmental Significance, Bushfire Management and Heritage Overlays, and to the south west of the site, a small site is affected by the Heritage Overlay. The Urban Growth areas to the west and north of the site are subject to Development Contribution Plan Overlay.

The site itself is affected by the Public Acquisition Overlay (which reserves land for the management of public assets) and the Land Subject to Inundation Overlay, which is necessary for flood management within the catchment.

In addition, a Watercourse Buffer is applicable to drainage lines, the purpose of which is waterway management, and specifically achieving a balance between river health, biodiversity, recreation and visual amenity. This buffer includes a setback zone of 50m on either side of all drainage line on the site.

3.3.3 Traffic and Transport

The most significant traffic route within the study area is the East Gippsland Highway, which bisects the site into two separate precincts. This is a dual carriageway which is separated by a vegetated median of varying width. It carries commuter, freight and tourist traffic from the south east towards the city of Melbourne. It is a busy route.

Clyde-Five Ways Road on the eastern boundary of the site is a well used arterial route. Craig Road on the Western Boundary of the site is also a well used arterial, serving only the region south of the highway at present. A northern extension of this road is indicated in the Casey Planning Scheme: Casey Farm Local Area Map.

Ballarto Road on the northern boundary of the site was under construction at the time of this assessment, so little traffic was noted, however, the Casey Planning Scheme (Casey Farm Local Area Map) has this route classified as an existing arterial serving the region to the east.

Browns Road in the south and Devon Road linking the highway to Browns Road through the heart of the Devon Meadows Precinct are local roads, as are Seymore and Facey Roads which give access to the rural plots south of the site. Facey Road also forms the southern boundary of the site.

3.3.4 Tourism and Recreation

Although not a scenic drive in its own right, the South Gippsland Highway is a pleasant enough drive, carrying tourists from Melbourne to Tooradin and Western Port Bay, South Gippsland and Phillip Island, all of which are popular tourist destinations.

A number of regional recreation attractions lie in close proximity to the site, including the Royal Botanic Gardens Cranbourne less than 1km to the west, the Cranbourne Racecourse and Training Complex some 2km to the north west and the Casey Fields Reserve and recreation precinct less than 1km to the north.

3.3.5 Cultural Heritage

At the time of writing, the Bunurong Land Council Aboriginal Corporation were the appointed Registered Aboriginal Party (RAP) for the region that encompasses the study area.

Areas of cultural heritage sensitivity are defined under the Aboriginal Heritage Regulations 2018, and include registered Aboriginal cultural heritage places and land form types that are generally regarded as more likely to contain Aboriginal cultural heritage. In this respect, almost the entire Devon Meadows Precinct is designated as an *'area of cultural heritage sensitivity'*. This zone is classified as a *Plateau* and is underlain by identified *Inland dune deposits* (Qd1).

In addition to the above zone, individual sites are noted in the far north east of the site, along the western boundary and along the South Gippsland Highway (unspecified).

At the time of writing this report, no Cultural Heritage Assessment had yet been completed for the study area, therefore there is no account of Aboriginal history, Aboriginal places or Aboriginal Historical References for the site or immediate study area. In spite of the altered state of the landscape, the likelihood of encountering sites of Aboriginal heritage and cultural significance is not discounted.

A search of the Victorian Heritage Database of the Heritage Council Victoria did not yield any results for the site, although the following sites to the south and south east of the Devon Meadows Precinct respectively were listed:

- Melenia Park at 71 Craig Road, Devon Meadows – local historic and aesthetic significance to the City of Casey.
- Glenburnie at 30-32 Worthing Road, Devon Meadows – cottage, creamery and shed (National Trust).

3.3.6 Land Use History

Historically, the area to the east and south east was occupied by the Koo Wee Rup and Dalmore Swamps. These swamps created a natural barrier between Melbourne and Western Gippsland. The following extract from the Western Port Green Wedge Management Plan (City of Casey, 2019) provides an overview of the land use history within the green wedge area, which lies to the immediate south of the study area.

'...Permanent European settlement of the area now known as the Western Port Green Wedge occurred progressively from the 1830's, ending the traditional lifestyle of its Aboriginal peoples. They lost access to traditional lands and waterways, hunting grounds were reduced and traditional food sources disappeared. Hunger, conflict, and the introduction of new diseases, to which the Aboriginal People had no immunity, led to a rapid decline of their population and the loss of their lands.

The relationship between the natural environment in the Western Port area and human activity changed from one of harmony to one of seemingly constant struggle as Europeans sought to change the land to fit their purposes by removing vegetation, draining it and opening it up for agricultural production and passage through to eastern Gippsland.

Typical early uses included fishing, grazing and farming. However, farming was hindered by the dense vegetation, the threat of flooding and the extensive swamps.

Settlements such as Tooradin were established to provide for the provision of essential services and supplies. From its earliest days Tooradin has had a strong fishing and tourism focus and it once marketed itself as a "sportsman's paradise".

In the 1870's the Lands Department decided to clear and to drain the Koo Wee Rup and Dalmore Swamps so that the district, containing rich peaty soils, could be farmed.

These drainage schemes also affected land located in what became the City of Casey, particularly in the Tooradin area...

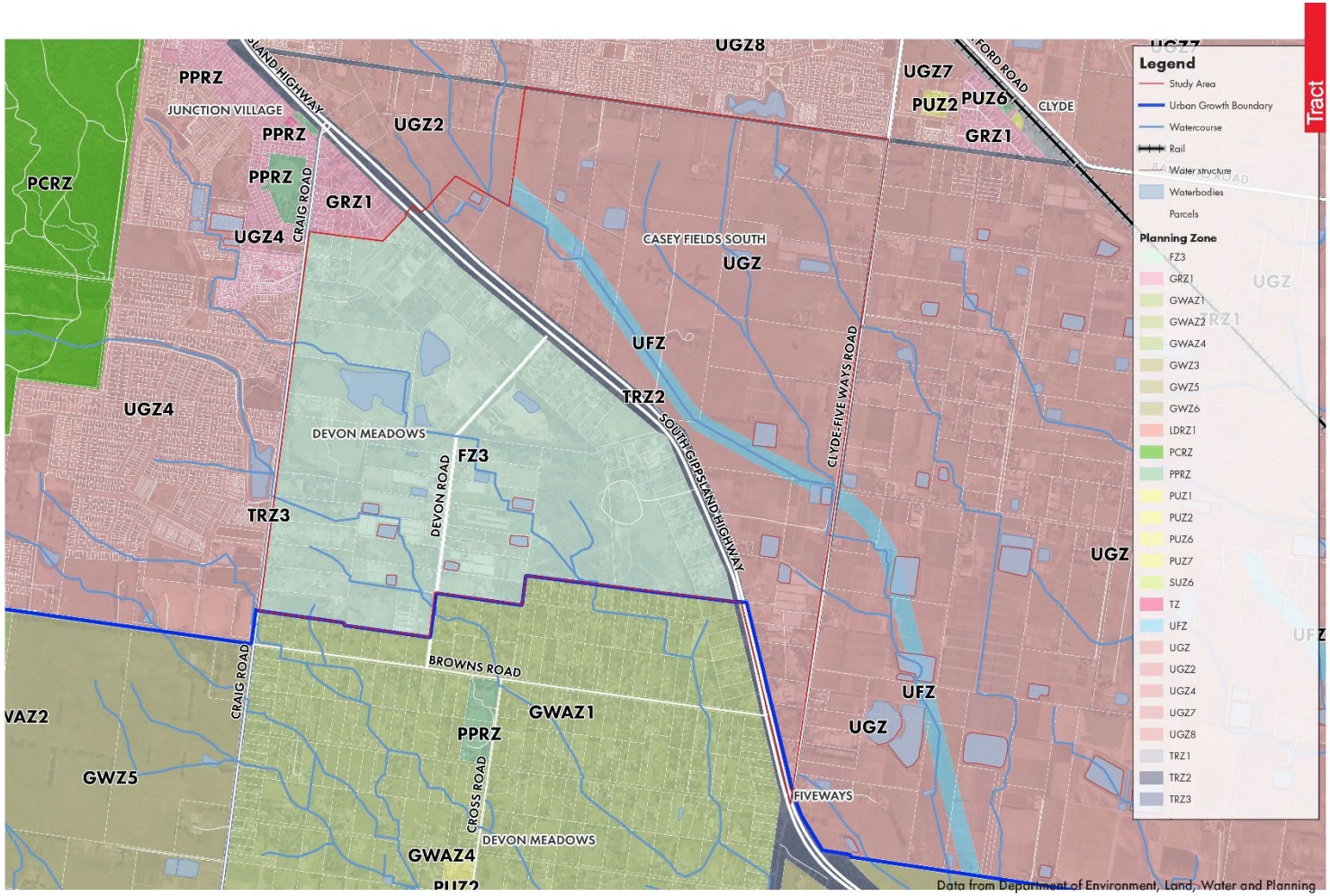
...In 1917 the Koo Wee Rup Flood Protection District, now administered by Southern Rural Water, was proclaimed to oversee an improved drainage system for the whole area, which was affected by severe flooding again in 1911. The needs of World War I promoted vegetable growing in the area and later led to land subdivision for the creation of small holdings for returned soldiers ("soldier settlements")...

...By the time of World War II potato growing in the area had become less profitable due to market fluctuations, and the area then became the prime supplier of Melbourne's milk and vegetables. Through the 1950s and 1960s this trend was accelerated by an influx of growers who were forced out of Melbourne's traditional market gardens in Dingley and Oakleigh by urban expansion. Potatoes again took over as the dominant land use replacing dairying, which moved further out to Gippsland.

New sources of water were needed to provide for this expansion and a permit system was introduced in the 1950s to regulate farmers' capacity to pump water directly from the main drain.

Groundwater began being extracted from the sub- ground aquifers from 1922 for stock and domestic requirements. This process went unchecked until water levels in the aquifers had dropped by 15m and in the 1967/68 drought, they fell below pumping levels, meaning no water could be extracted.

The area was declared a Groundwater Conservation Area in 1971, which meant that the rate and volume of ground water being extracted from it was controlled and that new bores were prohibited in some areas.'



Drawing Title	Project Name	Drawing No	Revision	Date	Drawn	Checked	Project Principal	Scale
Land Use and Infrastructure	Casey Fields South and Devon Meadows Landscape Character Assessment	322-0265-00-L-01-DR01	00	15.12.2022	IV			

Figure 12: Land Use and Infrastructure

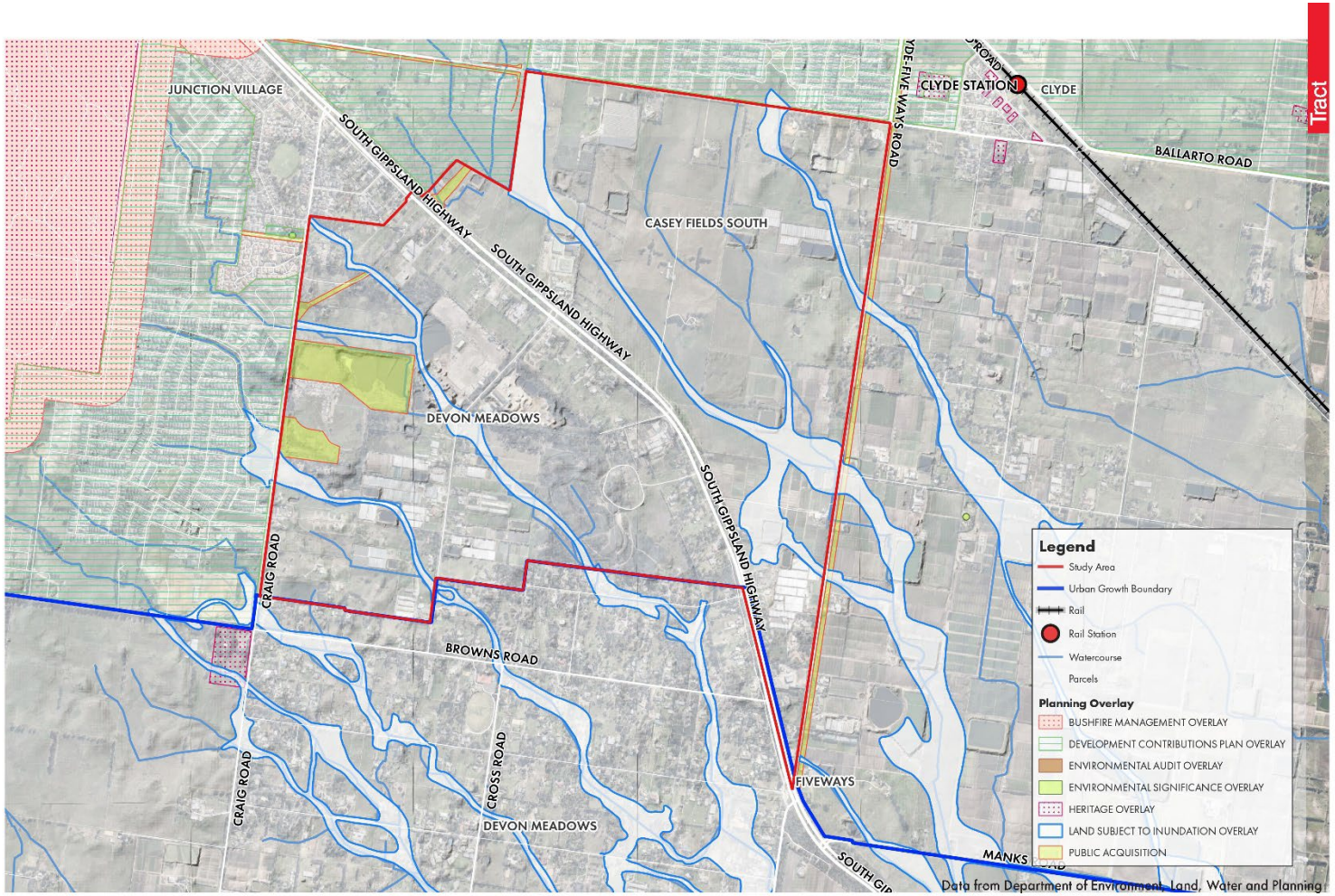


Figure 13: Planning Overlays

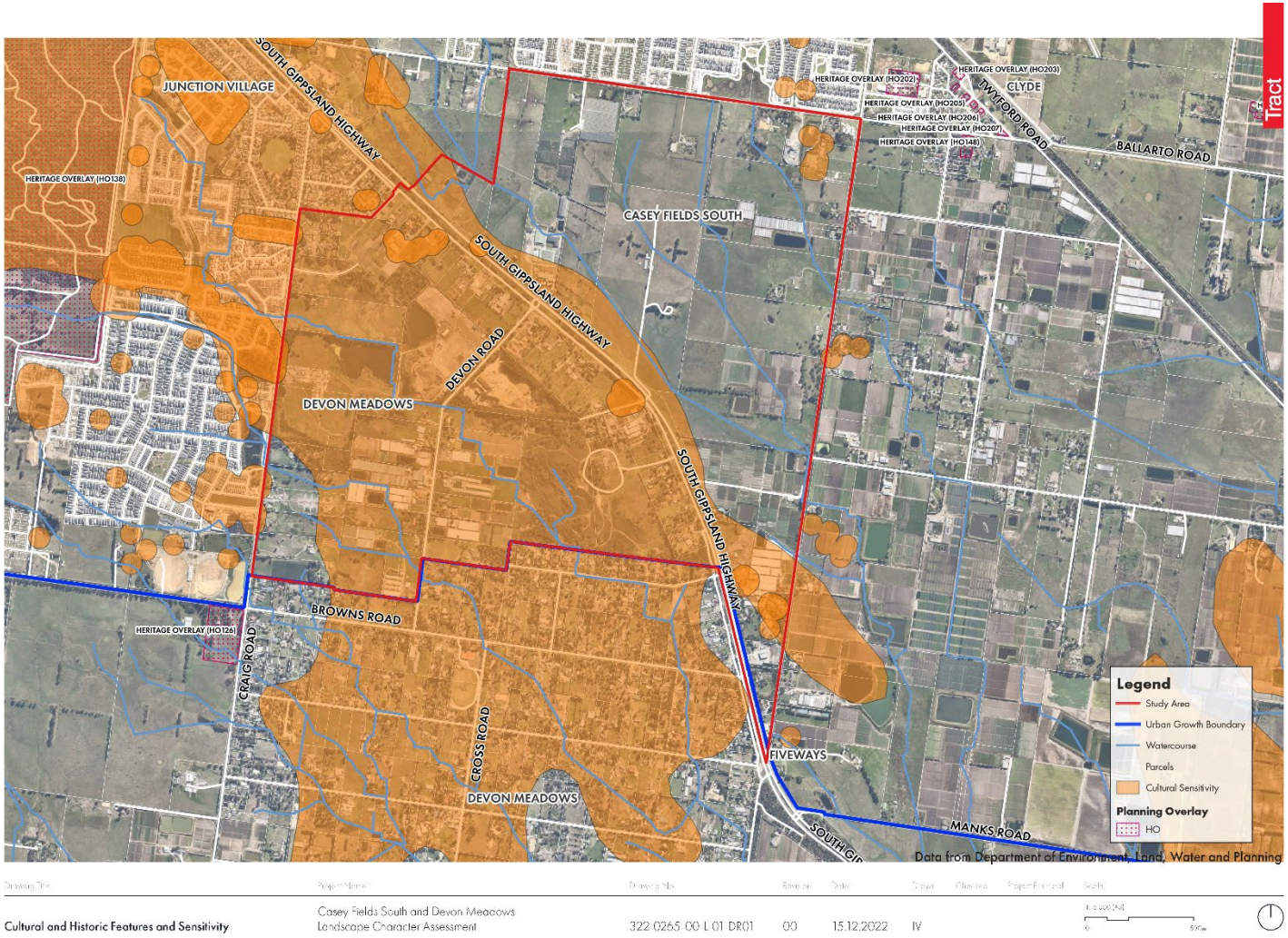


Figure 14: Cultural and Historic Features and Sensitivity

3.4 Scenic Quality

According to *Landscape character types of Victoria: with frames of reference for scenic quality assessment* (Leonard & Hammond, 1984), '*...Scenic quality is the relative nature or character of landscape features expressed as an overall impression by man after perceiving an area of land...*'

In the above study, the benchmark for scenic quality within the Character Type: **Southern Lowlands** is of relevance. This study characterises scenic quality in the landscape in terms of formal properties of landscape based on expert evaluations, linked to the following:

- Degree of uniqueness and naturalness
- Diversity in topography
- Variety of vegetation types and patterns

The descriptions for scenic quality are therefore based on the variety in landform, vegetation covers and watercourses. The relative range of scenic quality (high, moderate and low) is addressed in terms of these descriptive criteria for scenic values.

In this context, however, the landscape is modified with little remaining in a natural state, so if evaluated against the above criteria, would score a low value. This is not necessarily a true reflection of the actual scenic value of the landscape, which has a particular quality, associated with its rural and agricultural nature. In this respect modified rural agricultural landscapes have additional criteria for scenic quality, as follows:

High quality modified landscapes may exhibit the following characteristics:

- Contrasting land uses forming a distinctive pattern or patchwork;
- Naturally appearing transitions to adjacent natural landscapes;
- Unique rural architecture that references local landscapes;
- Distinctive roadside vegetation or windrows.

Moderate quality modified landscapes contain a combination of the following characteristics:

- Patterns evident but not immediately distinct; may only be distinct over large areas;
- A combination of soft and rigid transitions to adjacent land;
- Rural architecture which has some reference to local conditions;
- Roadside vegetation that is common throughout the character type.

Low quality modified landscapes include:

- Large stretches of similar vegetation with no variation;
- Sharp formal transitions to adjacent natural landscapes;
- Local architecture with no reference to the nearby area;
- Long sections of road with no adjacent vegetation.

The overall scenic quality of the landscape in the region is strongly influenced by land use.

3.4.1 Casey Fields South Precinct:

In the north eastern Casey Fields South Precinct, the scenic quality of the agricultural landscape is considered **low to moderate** overall. Both the architecture and the pastures lack distinction and clear patterning (i.e. such as a dominant landscape material like stone used in construction). However, the aesthetic is simple, typical and strongly associated with rural agriculture-based settlement in this region.

The undulating, rolling topography allows a significant depth of vision into the rural properties along the road, except where roadside vegetation contains visibility to the road itself, giving a strong sense of enclosure.

There is a relatively high incidence of vegetation along the roadways, but the form, texture and condition is varied and inconsistent. Hedgerows are interspersed with mixed tree stands, individual trees and even formal hedges. Often, this roadside vegetation is elevated above road level on top of the windrows. The result is a constant awareness of trees and mid canopy vegetation within a larger pastoral landscape dotted with homesteads and farming infrastructure. Powerlines and fencing tend to flank the roads and are visible throughout.

While Clyde-Five Ways Road is fairly well lined with trees and hedgerows on either side, Ballarto Road in the north is somewhat less so, with visual enclosure varying along its length. The south eastward bound side of the South Gippsland Highway is even less visually constrained by vegetation, especially as the adjacent landscape tends to be lower in elevation to the north east of the road.

Of note is the significant amount of traffic along Clyde-Five Ways Road, including heavy vehicles travelling at high speeds. This high traffic volume detracts from both the visual quality and the strong rural character of the surrounding landscape on either side of the road.

The urban infill on the north eastern side of Ballarto Road is visually unmitigated, meaning it is highly visible with roadside vegetation mostly cleared. This transition between the suburban residential development and the rural landscape is abrupt despite remnant roadside vegetation in the west. The scenic quality along this road is reduced to low because of this visual disparity, and not because of the nature of the new development. In fact, the latter has many landscape aspects that are commendable, such as street trees, wetlands and public open space which are positive visual environments visible from Ballarto Road.

Notwithstanding the above, it is the roadways of the Casey Fields South Landscape that represent the best scenic quality in the precinct. The pastures beyond the roads are green and peaceful, but are largely unremarkable, as are the farming homesteads. The commercial operations and local nodes are mostly utilitarian looking and have developed with little care for aesthetic, local identity or retention of vegetation. The lowest scenic quality in the precinct are these latter commercial operations and nodes, which contrast starkly with the adjacent fields and pastures.

Photo 1: looking north along Clyde-Five Ways Road

Photo 2: depth of visibility along Clyde-Five Ways Road

Photo 3: visual enclosure along Clyde-Five Ways Road

Photo 4: hedgerow vegetation along Clyde-Five Ways Road

Photo 5: pastoral landscape of the Casey Fields South landscape

Photo 6: receding visual enclosure along Ballarto Road

Photo 7: visual connectivity along the north eastern side of the South Gippsland Highway

Photo 8: urban infill along Ballarto Road

Photo 9: pastoral landscape of the Casey Fields South Precinct looking south from Ballarto Road

3.4.2 Devon Meadows Precinct

The scenic quality of the Devon Meadows Precinct in the south west is a mix of **moderate and low** scenic quality due to the mix of current and adjacent land uses.

The quarry area, although stripped of vegetation, and having a low scenic quality in its own right, is only visible in glimpses from Devon Road, due to the roadside vegetation. The roadside vegetation is varied and dense, enclosing visibility and resulting in a **moderate** scenic quality along the road. Some fencing, and powerline infrastructure is visible, but little quarrying activity.

Conversely, the wrecking yard in the north end of Devon Road and the intensive horticultural infrastructure south of the quarry is highly visible from the road, resulting in a **lower** scenic quality despite this area being punctuated with open paddocks between.

The scenic quality of rural landscape along the north western bound South Gippsland Highway is **moderate** as a result of significant roadside vegetation, on the south side

and along the central median. Although the form, texture and condition is varied and inconsistent, the result is a continuous awareness of trees and mid canopy vegetation enclosing views along the road. Hedgerows are interspersed with mixed tree stands, individual trees and even formal hedges. Often, this roadside vegetation is elevated above road level on top of the windrows. Powerlines and fencing tend to flank the roads and are visible throughout.

The scenic quality along the roads in the south of the site is also **moderate** even where residential development densifies. The landscape consists of rural homesteads appearing in a recognisable rhythm along the road, with local variation in architecture and vegetation, although nothing is remarkable. There is high visibility of homes, powerlines and fences, but also a high occurrence of hedgerows, mixed tree stands and individual large trees, contributing to a pleasant rural character overall. This same scenic quality applies to the other local roads (i.e. Seymore Road and Facey Road).

The north end of Craig Road is urban in nature, with a lot of visual clutter along the road. This transitions to a more rural landscape on the east side, while on the west side, the new suburb of Botanic Ridge is highly visible and unencumbered by roadside vegetation. The transition between suburban residential in the west and rural in the east is abrupt despite significant roadside vegetation in the south (i.e. along the western boundary of the Devon Meadows Precinct). The scenic quality along this road is reduced to **low** because of this visual disparity, rather than the nature of the new Botanic Ridge development. In fact, the latter has many landscape aspects that are commendable, such as street trees, wetlands and public open space which are positive visual environments visible from Craig Road.

Of note is that a new residential development is currently under construction on the eastern side of Craig Road, and at present, it is unknown what the visual quality or nature of the interface with Craig Road will be.

As was noted for the Casey Fields South Precinct, commercial operations and local nodes are mostly utilitarian looking and have developed with little care for aesthetic, local identity or retention of vegetation. The lowest scenic quality in the precinct are these latter commercial operations and nodes, which contrast starkly with the adjacent tree stands and hedgerows.

Photo 10: scenic quality along northern part of Craig Road (agricultural)

Photo 11: scenic quality along northern part of Craig Road (storage yard)

Photo 12: scenic quality along southern Craig Road (Botanic Ridge interface)

Photo 13: scenic quality along northern part of Devon Road

Photo 14: quarry activities along Devon Road

Photo 15: scenic quality along southern part of Devon Road (mixed land use)

Photo 16: visual enclosure along SW side of the South Gippsland Highway

Photo 17: Scenic quality along Facey Road in the south of Devon Meadows

Photo 18: scenic quality along the southern part of Craig Road

Photo 19: interface with wetland at Botanic Ridge along Craig Road

3.5 Patterns of Viewing

Essentially, patterns of viewing address what is seen, where and for how long. In this respect, a number of aspects are considered, including the following:

- Key regional views and viewpoints / vantage points
- Site view lines and significant views (to, from, within, elevated viewpoints, adjacent developments, community facilities, road users, high points, entrance points to precinct, windrows)
- Visual connections
- Corridors
- Nodes
- Edge and interface conditions / key relationships with surrounding areas
- Potential issues / conflicts (adjacent land uses, precincts, highway, cumulative considerations)

3.5.1 Movement Routes

Because of the limited number of access routes, the landscape is mostly perceived and recognised from the roads, which are the primary corridors to, from, and through the study area. These corridors are significant on a state level (i.e. the South Gippsland Highway), regionally (i.e. Craig Road, Browns Road, Clyde-Five Ways Road and Ballarto Road) and locally (i.e. Devon Road, Facey Road and Seymore Road).

Medium to long range visibility from within the site and immediate surrounds are influenced by the local watershed to the north west of the site, the gentle fall of the land to the south east and the foothills of the Dandenong Mountains rising in the distant north and north east and south east. These factors, along with the flat and undulating nature of the topography and the high occurrence of roadside and scattered vegetation stands have resulted in predominantly limited medium range visibility.

Long range views of the Dandenong foothills are available head on the northern most sections Craig and Devon Roads, while sidelong views are available from the South Gippsland Highway (travelling south west) and along Ballarto Road, roadside vegetation permitting. Distant views of the Strzelecki Ranges (some 40km away) are possible when travelling south east on the South Gippsland Highway and from the northern parts of Clyde-Five Ways Road.

The roadside vegetation and hedgerows represent a strong visual pattern and cohesive visual influence throughout the study area, despite its inconsistent nature. Breaks in roadside vegetation often open up internal views of properties and plots against a backdrop of internal vegetation stands.

This visual cohesion disintegrates along the south east bound South Gippsland Highway and along Clyde-Five Ways Road, where roadside vegetation recedes, to offer medium range views over farmland.

Natural punctuation within the visual landscape occurs at road intersections, junctions and where the adjacent land use changes are visible, along with clearing of roadside and lot vegetation. Such nodes are subtle where the roadside vegetation has been retained (i.e. within the residential area in the south east of Devon Meadows) and obvious where vegetation has been cleared (i.e. at junctions with the South Gippsland Highway).

The transition of farmland to a more urban character occurs gradually when north bound along Craig Road and in the north west of the Devon Meadows Precinct along the South Gippsland Highway. This transition is more abrupt along the south part of Craig Road (along the interface with Botanic Ridge) and along the eastern part of Ballarto Road.

Overall, the landscape character is strongly connected to the movement corridors through the site, strengthened by the significant presence of roadside vegetation and stands of mixed vegetation and trees. The importance of this vegetation is most evident where it has been removed to make way for development, particularly along Craig and Ballarto Roads, where landscape character is seen to disintegrate along the urban interface.

Of note also, is that despite the presence of numerous drainage lines and dams throughout the study area, there is little awareness of the presence of water or water systems when passing through or past the site.

3.5.2 Land parcels

While visually separated from and by the roads through the area, some significant land parcels are worth mentioning in terms of their internal visual characteristics. Views into these areas are generally obscured by roadside vegetation, and glimpses from adjacent roads are possible. Views outward are generally contained and defined by vegetation with some edges allowing middle-distance views out:

- In the centre of the Devon Meadows Precinct, the, quarry is characterised by open internal views of unvegetated gravel areas, sporadic vegetation (primarily on the periphery) and large water bodies.
- To the south of the quarry lies an undeveloped, low lying area of remnant vegetation. This area is characterised by patchy canopy and substantial understory vegetation, forming the largest patch of vegetation on the site. Access to this area is restricted, with a series of informal trails winding around the perimeter
- In the far north of the Devon Meadows Precinct, an area of remnant eucalypt woodland is in contrast to the adjacent open grass paddocks to the south and rectilinear horticultural plantings to the north-east. This area consists of woodland with some understorey on the eastern side, and diminishing on the western side.
- The Casey Fields South Precinct is characterised by large allotments overall, which offer open views internally, but are visually defined by hedgerows and roadside planting. Similar allotments occur on the eastern side of Craig Road in the Devon Meadows Precinct, although more site vegetation and built infrastructure are evident.

Photo 20: distant view of Strzelecki Ranges from the Clyde-Five Ways north

Photo 21: distant view of Dandenong Ranges from Ballarto Road

Photo 22: head on views of the Dandenong Ranges from north Craig Road

Photo 23: head on views of the Dandenong Ranges from north Devon Road

Photo 24: sidelong views of the Dandenong Ranges from the South Gippsland Highway

Photo 25: head on views of the Strzelecki Ranges from the South Gippsland Highway

Photo 26: view along Devon Road looking south

Photo 27: medium range view over farmland looking north from the South Gippsland Highway

Photo 28: medium range view over farmland along Clyde-Five Ways Road

Photo 29: transition of land use along the north part of Craig Road

Drawing Title	Project Name	Drawing No.	Revision	Date	Drawn	Checked	Project Principal	Scale
Photographic Reference	Casey Fields South and Devon Meadows Landscape Character Assessment	322-0265-00-L-01-DR01	00	15/12/2022	IV	MVDW	MN	1:3 000 (A3) 0 500m

Figure 15: Photographic Reference

3.6 Landscape and Visual Character

'...Landscape is about the relationship between people and place. It provides the setting for our day-to-day lives...It results from the way that different components of our environment - both natural (the influences of geology, soils, climate, flora and fauna) and cultural (the historical and current impact of land use, settlement, enclosure and other human interventions) interact together and are perceived by us ...

...People's perceptions turn land into the concept of landscape. This is not just about visual perception,, or how we see the land, but also how we hear smell and feel our surroundings, and the feelings, memories or associations that they evoke. Landscape character, which is the pattern that arises from particular combinations of the different components, can provide a sense of place to our surroundings...

... Particular combinations of geology, landform, soils, vegetation, land use, field patterns and human settlement create character. Character makes each part of the landscape distinct, and gives each its particular sense of place...' (The Countryside Agency and the Scottish Natural Heritage, 2002).

The characterisation of the Landscape deals with defining the character of the perceived landscape in terms of perceived character and key features. This is undertaken on two scales, namely broad scale Character Types, and where relevant, smaller Character Areas.

According to *Landscape character types of Victoria: with frames of reference for scenic quality assessment* (Leonard & Hammond, 1984), a landscape character type is a broad scale area of land with common distinguishing visual characteristics. Delineation of each is based upon an inventory of the physical landscape and its overall visual appearance. Total visual character is presented as an amalgamation of landform, climate, vegetation, water form and land use pattern.

Landscape character areas are smaller, visually identifiable geographical units within the same Character Type. Existing land use changes and individual site features do not in themselves represent a Landscape Character Area. Rather, these are reliant on a more detailed understanding of local scenic quality, and patterns of viewing.

Landscape Character Types of Victoria – with frames of reference for scenic quality assessment (Leonard & Hammond, 1984) is the primary reference for the characterisation and evaluation of the landscape, along with site observations, assessment and professional experience and judgements.

3.6.1 Landscape Character Types

According to *Landscape character types of Victoria: with frames of reference for scenic quality assessment* (Leonard & Hammond, 1984), the study area falls within the **Southern Lowlands** Landscape Character Type close to its interface with the **Foothills**.

A summary of the characteristics of the western section of the Southern Lowlands is extracted from the above publication is as follows:

- Landform - Flat to undulating alluvial plains and drained swamps.
- Vegetation - Agricultural clearings with scattered shelterbelts.
- Land use pattern - Agricultural pasture and fodder crops.
- Significant features - Pastoral landscapes, sand dunes and terraces.

Reportedly, the western part of this character type was originally forested, severely restricting settlement eastwards from Melbourne through extensive dense forests and treacherous swamps. Virtually this entire area is now cleared farmland with native vegetation confirmed to small remnant stands, road reserves and stream sides. On the better sites, these remnants reportedly consist of mixed species stands, while on poorer sites, both open scrub and occasionally closed scrub and open heath formations occur.

Dairy farming is widespread in the western part of this character type, with land comprising of non irrigated pasture, although supplementary fodder crops are also common. Some sheep and beef growing also occurs, while market crops are grown on the drained swamps.

3.6.2 Landscape Character Areas

At local level, the landscape character has been further considered in terms of recognisable patterns within the natural environment, the man made environment and the visual environment.

This landscape is considered to be an organically evolved rural landscape, that has developed over time without any overt design intent (Heritage Council Victoria, 2015). It expresses the interaction between land use and natural systems as an accumulation of layers of change from pre-settlement to present day. The uses that have shaped this vernacular landscape are ongoing, and the landscape's character is still evolving.

There are areas where relics of past uses and natural systems are still evident, and others where more recent disturbance, development and land use have completely removed any visible remnants, resulting in a completely altered environment.

Considering the above, the character of the landscape is understood in terms of the following:

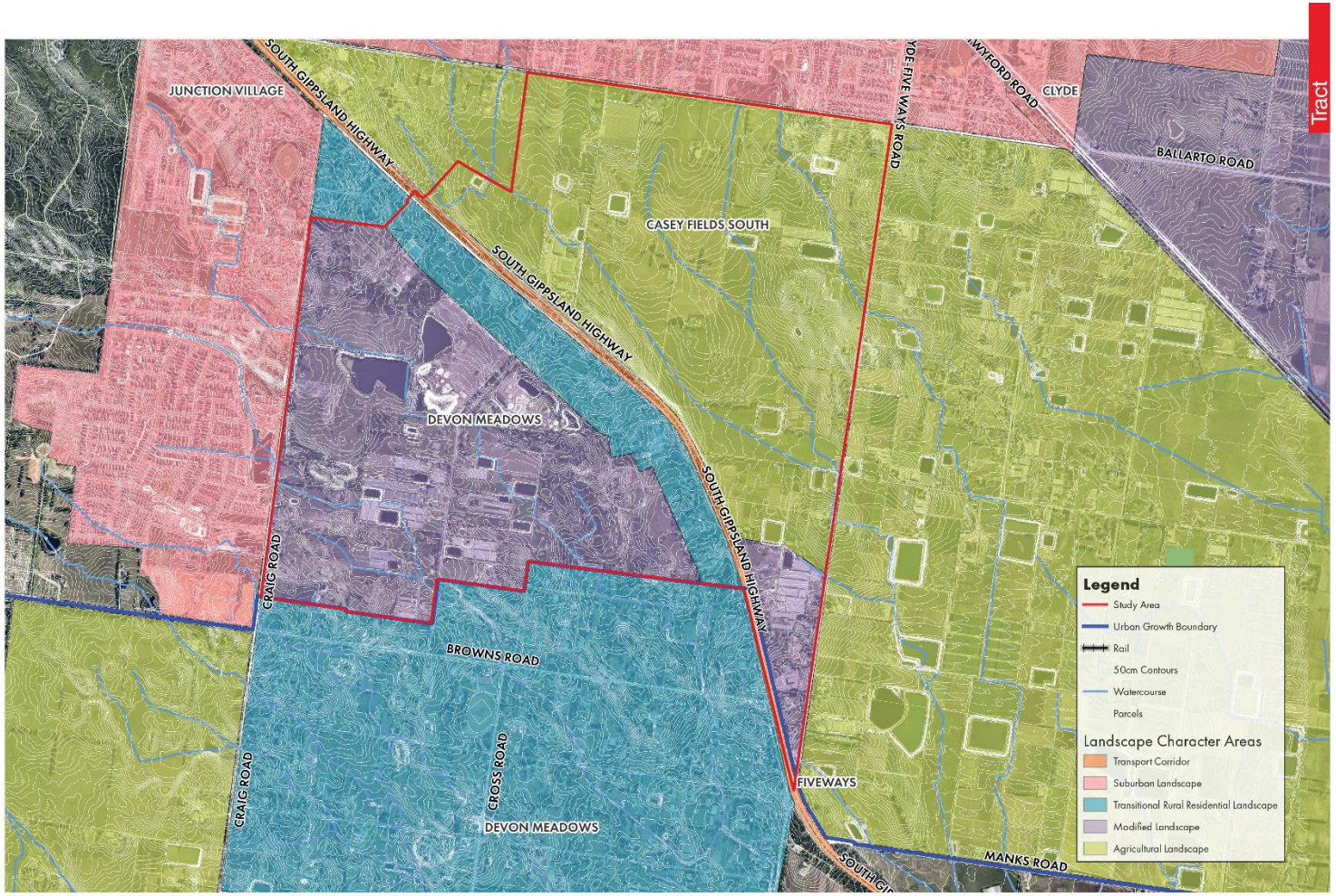
- An **Agricultural Landscape** consisting of geometric grassed pastures on flat to undulating topography with open medium to long range views. The historic vegetation (EVC) is *Plains Grassland / Plains Grassy Woodland Mosaic*. Waterways are present but not evident, and highly modified, with numerous small, on and off stream man-made dams. Mixed tree and shrub vegetation stands are sparse and tend to follow paddock boundaries and road verges as hedgerows, and are clustered around residences as rural homesteads.
- A **Transitional Rural-Residential Landscape** consisting of geometric rural allotments with on flat to undulating topography with considerable vegetation constraining visual connectivity and views. There are substantial stands of mixed tree and shrub vegetation, some native, lining roadways and established within properties, where residences are intermittently visible. There are many tall and noteworthy trees. The historic vegetation (EVC) is mainly a mix of *Plains Grassland / Plains Grassy Woodland Mosaic* and *Heathy Woodland. Swampy Riparian Woodland* once occurred along a watercourse. Waterways are evident with riparian accent in some areas. Roadside open storm water drains are a common, recognisable feature within this landscape.
- A **Modified / Disturbed Landscape** characterised by large stands of mixed vegetation, some native, on flat to undulating topography. Relics of past agricultural land use remain as substantial hedgerows along roads. These, along with the vegetated stands, constrain visibility to short range views, effectively screening many of the existing land uses. Long range views are rare, except along road corridors. The historic vegetation (EVC) is primarily *Heathy Woodland. Swampy Riparian Woodland* once occurred along a watercourse. Waterways are evident but interrupted, with numerous small on and off stream dams.
- **Suburban Landscape** with an established medium density suburban residential priority and commercial / retail nodes at intervals (adjacent to the site to the west and north). The landscape consists of designed precincts with street tree planting. Open space is visible in the form of wetlands and parkland.

Photo 30: Typical Agricultural landscape looking south from Ballarto Road

Photo 31: Typical Modified landscape south of Craig Road

Photo 32: Typical Transitional landscape looking south toward Browns Road

Photo 33: South Gippsland Highway transport corridor - typical



Drawing Title	Project Name	Drawing No.	Revision	Date	Drawn	Checked	Project Principal	Scale
Landscape Character Areas	Casey Fields South and Devon Meadows Landscape Character Assessment	322-0265-00-L-01-DR01	00	15.12.2022	IV			1:15 000 (A3) 0 500m

Figure 16: Landscape Character Areas

3.7 Landscape and Visual Value

Unlike Landscape Character, the assessment of the Value of the Landscape is the relative value that is attached to the landscape by society. Essentially, Landscape Value is s a function of Landscape Character and Scenic Quality, but also considers the condition of the landscape and the community and cultural associations with the landscape.

Separate from the type of landscape, the community value attached thereto may be related to its aesthetic, archaeological, historical, scientific, social, or architectural values, any or all of which could co-exist in the one place. These values may be significant to communities at local, state, national or world (universal) levels.

Landscape and visual values are described as follows:

High value:

There is a direct relationship to or dependence on the landscape and visual environment, with a high degree of familiarity with the place and its landscape and scenic qualities. Changes to or impacts on the landscape or visual environment would be highly noticeable and would impact the livelihood, lifestyle or quality of life of the receptor in a meaningful way.

Moderate value:

There exists a relationship with the landscape and visual environment, with moderate familiarity with the place and its landscape and scenic qualities. Changes to or impacts on the landscape or visual environment would be noticeable, but would not significantly impact the livelihood, lifestyle or quality of life of the receptor in any meaningful way.

Low value:

There is little relationship with the landscape and visual environment, with limited familiarity with the place and its landscape and scenic qualities. Changes to or impacts on the landscape or visual environment may be noticed, but would not impact the livelihood, lifestyle or quality of life of the receptor in any way.

It is expected that current **rural and agricultural land owners** would have a strong and direct connection with land and landscape character in its existing form, and that they value the landscape character and quality of the existing environment.

It is expected that **tourists** travelling along the South Gippsland Highway enroute to regional destinations would have an awareness of a transition between urban and rural landscape character when travelling to and from local and regional tourism and recreation destinations. The value attached to landscape character and quality by these receptors may be high, although not necessarily conscious.

Commuters travelling along the South Gippsland Highway and on local roads are expected to have a peripheral awareness of landscape in terms of orientation and legibility. The value attached to landscape character and quality is likely to range from moderate to low, depending on their personal values (which are widely varied) and their personal emotional investment in the area (i.e. whether they live, work, recreate and have businesses in the area).

Aboriginal community values associated with the site are not known as no Cultural Heritage Assessment has yet been undertaken, however, the likelihood of encountering sites of Aboriginal heritage and cultural significance is not discounted as the entire Devon Meadows Precinct is designated as an *'area of cultural heritage sensitivity'*.

Based on the above expectations, the following is proposed in terms of the Value of the Landscape Character Areas (refer to section 2.4 for a description of the approach to determining value):

- The **Agricultural Landscape** of the Casey Fields South Precinct has a low to moderate scenic quality and exhibits a recognisable and largely intact agricultural character. The value of this landscape to receptors is considered to be **high**.
- The **Transitional Rural-Residential Landscape** in the south of the study area and along the south western side of the highway has a moderate scenic quality, mostly as a result of roadside vegetation. The character of this landscape is neither unique or remarkable, but is quite distinct and relatively intact. The value of this landscape to receptors is considered to be **high**.

- The **Modified / Disturbed Landscape** of the Devon Meadows Precinct has a low to moderate scenic quality due to the mix of current and adjacent land uses but the condition of this landscape is widely varied, ranging from natural to severely disturbed. The level of intactness is low overall. The value of this landscape to receptors is considered to be **moderate**.

3.8 Landscape and Visual Sensitivity

Landscape and visual sensitivity is a measure of the ability of landscape to resist the change direct or indirect effects of developments on a landscape, which could include physical elements, landscape character and cultural values. Landscape and visual sensitivity are effectively a function of scenic quality, value and the susceptibility of the landscape and visual environment to change.

Landscape and visual sensitivity levels are described as follows:

High sensitivity:

Key characteristics of the landscape are highly vulnerable to the type of change being assessed, with such change likely to result in a significant change in valued character.

Moderate sensitivity:

Some of the key characteristics of the landscape may be vulnerable to the type of change being assessed. Although the landscape may have some ability to absorb change, some alteration in character may result. Considerable care may be needed in locating and designing change within the landscape.

Low sensitivity:

Key characteristics of the landscape are less likely to be adversely affected by the proposed change. Change can potentially be more easily accommodated without significantly altering character and there may be opportunities to positively create new character. Sensitive design is still needed to accommodate change.

The landscape character areas within the study area will have varied sensitivity to different types of changes and development, such as changes in land use, development densification and the removal of vegetation.

The following is noted in terms of the sensitivity of Landscape Character Areas in this regard:

- The **Agricultural Landscape** of the Casey Fields South Precinct in the north east is expected to be **highly susceptible** to change in land use and the removal of vegetation stands and roadside vegetation. This is specifically because of its open, unrestricted internal views and reliance on vegetation for visual screening and enclosure. This, combined with a **high value** rating, results in a landscape of **high sensitivity**. The landscape's sensitivity to change is evident where lots have been developed for other land uses. These developments stand out in stark contrast to the pastoral landscape, especially where vegetation has been cleared.
- The **Transitional Rural-Residential Landscape** in the south of the study area and along the south western side of the highway is **moderately susceptible** to land use change and densification. Part of its character relates to a relatively high visibility of built form, but the scale of building is small and fragmented within a highly vegetated context. This, combined with a **high value** rating, results in a landscape of **high sensitivity**. If the visual pattern of this landscape is retained, then this character area can withstand both land use change and densification.
- The **Modified / Disturbed Landscape** of the Devon Meadows Precinct in the south west is expected to have a **low susceptibility** to change in land use, but it is **highly susceptible** to the removal of vegetation, which, where left intact, effectively screens operations within the land parcel beyond. This, combined with a **moderate value** rating, results in a landscape of **moderate sensitivity**. The landscape's mixed sensitivity is evident along Devon Road, where quarry operations are barely noticeable along the vegetated roadway, but the adjacent wrecking yard is a significant eyesore.

4 Opportunities, Constraints and Recommendations

The sensitive integration of past, present and future land uses may be accomplished through the retention of that which is key to the landscape character. Within this landscape, the natural environment is largely unremarkable with few visible features that contribute to landscape character. It is the vernacular landscape that is most recognisable - the evolution of pastoral land use in the region has given rise to a landscape with a number of key identifiable visual features. The following is a summary of relevant considerations in this regard:

- The **Agricultural Landscape** of the Casey Fields South Precinct and the area extending to the east is characterised by geometric grassed pastures with open medium to long range views. Waterways are present but not evident, and highly modified, with numerous small, on and off stream man-made dams. Mixed tree and shrub vegetation stands are sparse and tend to follow road verges and to a lesser extent, paddock boundaries, as hedgerows, and are clustered around residences as rural homesteads. *This landscape is considered to have a high landscape and visual value and a high sensitivity to change due to mostly open, unobstructed visibility across the landscape.*
- The **Transitional Rural-Residential Landscape** in the south of the study area and extending along the southern side of the South Gippsland Highway is characterised by rural allotments with considerable vegetation constraining visual connectivity and views. There are substantial stands of mixed tree and shrub vegetation, some native, lining roadways and established within properties, where residences are intermittently visible. There are many tall and noteworthy trees. Waterways are evident with riparian accent in some areas. Roadside open storm water drains are a common, recognisable feature within this landscape. *This landscape is considered to have a high landscape and visual value and a high sensitivity to change, as the removal of vegetation would completely alter the rural residential character.*
- The **Modified / Disturbed Landscape** of the Devon Meadows Precinct is characterised by large stands of mixed vegetation, some native, on flat to undulating topography. Relics of past agricultural land use remain as substantial hedgerows along roads. These, along with the vegetated stands, constrain visibility to short range views, effectively screening many of the existing land uses. Long range views are rare, except along road corridors. Waterways are evident but interrupted, with numerous small on and off stream dams. *This landscape is considered to have a moderate landscape and visual value and a moderate sensitivity to change.*

Some of the above key features of the existing landscape character of Devon Meadows and Casey Fields South are worth preserving, some are worth enhancing, and some need re-inventing. The following is a summary of opportunities, constraints and associated recommendations in this regard. The recommendations have been represented spatially in Figure 17 that follows.

OPPORTUNITIES	CONSTRAINTS	RECCOMMENDED RESPONSE
Policy Context		
• Policy level recognition that roadsides have important conservation and landscape values (Roadside Vegetation Management Plan). • Policy level support of re-establishment of native vegetation on cleared land (Revegetation Strategy) • Policy level support to retain sense of place beyond the UGB. • Policy level support to implement conservation actions for the Southern Brown Bandicoot. • The areas covered by the LSIO overlays are reserved for flood management. These are development exclusions and opportunities for ecological connectivity. • The areas covered by the PAO overlays are reserved for municipal purposes. These are development exclusions and opportunities for ecological connectivity. • Buffers of 50m on either side of the drainage lines are generally accepted to be flood zones. These are development exclusions and opportunities for ecological connectivity.	• The fixed interface between the Urban Growth Boundary and the Western Port Green Wedge is a potential constraint to fluid land use transition. • Pressure for maximum developability within Urban Growth Area is a potential constraint to fluid land use transition. • The areas covered by the PAO overlays are reserved for municipal purposes. These are development exclusions and cover large areas within the precincts. • Buffers of 50m on either side of the drainage lines are generally accepted to be flood zones. These are development exclusions and cover large areas within the precincts.	• Conserve and integrate roadside vegetation into a landscape framework to improve ecological and landscape connectivity. • Utilise native vegetation to revegetate new development areas. *This should ideally be done in accordance with a targeted Biodiversity Reinstatement Programme developed in consultation with a Specialist Ecologist.* • Tie in with recognised regional conservation corridors for the Southern Brown Bandicoot (aspirational to the northwest and south) and the Growling Grass Frog (assumed to follow drainage lines). • Utilise / optimise development exclusion areas covered by LSIO, PAO and 50m drainage line buffers for ecological connectivity. • Rationalise the alignment of LSIO areas and drainage lines. These should relate directly with one another. This will improve the efficiency of this land use and reduce the extent of development exclusion zones within the precinct. *This would require a dedicated Hydrological Study and will require buy-in and guidance from the relevant Water Management Authority.* • Address the UGB interface along the southern edge of the site as a transitional interface to preserve the landscape character within the Western Port Green Wedge.
Natural Environment		
• Drainage lines are opportunities for green corridors, open space and for the improvement of environmental infrastructure and biodiversity, including Growling Grass Frog habitat.	• Drainage corridors are highly modified / disturbed / diverted with off stream dams and bear little resemblance to the original natural systems.	• Prioritise aspirational conservation corridors for the Southern Brown Bandicoot (to the northwest and south of the Devon Meadows precinct) as primary ecological corridors within the precinct.

• Remnants of native vegetation exist along roads, paddock edges and around homes and settlements are opportunities for green corridors, open space and for the improvement of environmental infrastructure and biodiversity. • Larger stands of remnant EVC's within the Devon Meadows Precinct are opportunities for the improvement of environmental infrastructure and biodiversity including Southern Brown Bandicoot Habitat. • Connection with Southern Brown Bandicoot habitat corridors on the western boundary of the Devon Meadows Precinct is an opportunity to reinstate regional connectivity beyond the site.	• Flooded quarry excavations and off stream dams are isolated from the drainage systems. • Native vegetation is significantly altered with only remnants of EVC's left intact and exotic species. • Casey Fields South Precinct is almost entirely cleared for grazing (limited inherent biodiversity). • There is a mix of native and exotic species throughout (compromised biodiversity and no pristine EVC's).	• Reinstate drainage lines as green corridors, providing the basis for flood management, biodiversity conservation and open space planning. These drainage lines may either be retained in their current configuration or re-aligned back to their original courses. *This would require a dedicated Hydrological Study and will require buy-in and guidance from the relevant Water Management Authority.* • Reclaim farm dams and quarry excavations as part of the redesigned hydrological system and replace these with functional wetland areas where appropriate. • Retain existing vegetation corridors along road verges, medians and within properties, providing the basis for preserving the vegetated landscape character of the area. • Incorporate threatened species habitat into the design of green corridors and other development exclusion areas. *This should ideally be undertaken as a specialist Ecological Design response (refer also to the guidelines in Appendix 2 & 3).* • Retain remnant stands of EVC's within property lots through specific development guidelines and optimise these stands as supplementary conservation and threatened species habitat areas. *This should ideally be done in accordance with guidelines included in Appendix 2.* • Incrementally replace exotic vegetation with suitable native species over time so as to preserve landscape structure in the short term but improve biodiversity value in the long term. *This should ideally be done in accordance with a targeted Biodiversity Reinstatement Programme developed in consultation with a Specialist Ecologist (refer also to the guidelines in Appendix 2 & 3).*
Man Made Environment		
• South Gippsland Highway bisects the site into 2 separate precincts. There is opportunity to improve connection between the 2 sites. • Vegetated verges of the South Gippsland Highway and major roads are an opportunity to screen adjacent	• South Gippsland Highway and other major roads are noisy and visually disruptive. • Few existing and established access roads – limited pattern of movement.	• Retain existing roads and roadside vegetation for continued contextual orientation and legibility.

land use from visibility, noise and visual impact of the road. • Layout of existing roads and connectors are an opportunity to retain familiarity of use and movement and travel by local users. • Nearby open space and conservation allow opportunity to establish reginal connections for green corridors. These include the Botanical Gardens Cranbourne to the west and Casey Fields Reserve to the north. • Hedgerow planting are opportunities to retain a connection with historic land uses (i.e. these were traditionally used for paddock boundaries, visual screens, food supply, erosion control, windbreaks etc). • Public open space and development exclusion areas are opportunities to acknowledge and establish links with Aboriginal Heritage and Living Culture.	• Devon Meadows Precinct lies within an area of potential Aboriginal Cultural Heritage sensitivity (i.e. within the geological unit 'Inland dune deposits'). The existence, nature and extent of sites is unknown until a Cultural Heritage assessment is undertaken.	• Retain existing vegetation corridors along road verges, medians and within properties, providing the basis for preserving the vegetated landscape character of the area. • Establish a hierarchy of vegetated setbacks along noisy and visually disruptive roads, primarily the South Gippsland Highway, but also along existing and new connectors. *The hierarchy of setbacks should be subject to a traffic study and road design for the precinct.* • Recognise interfaces with open space in adjacent precincts and align green corridors with these to support regional open space connectivity. • Utilise roadside planting as a cohesive landscape feature, retaining hedgerows along existing roads and within property lots where possible, and establishing hedgerows along new roads. • Enrich open space corridors with historic and cultural reference through design and interpretation. *This should ideally be undertaken as part of an integrated open space design and be informed by a Cultural Heritage Study.*
Visual Considerations - regional		
• The north eastern side of the South Gippsland Highway is an opportunity for visual connection to the Casey Fields South Precinct and views beyond towards foothills of the Dandenong Ranges and the distant Strzelecki Ranges to the south east. • The northern parts of Craig Road and Devon Road are opportunities for head on long range views to the foothills of the Dandenong Ranges. • Smaller side access roads off the highway offer similar view opportunities in a north eastern direction. • The northern side of Ballarto Road has limited opportunity for sidelong views of the foothills of	• New higher density residential development to the west (Botanic Ridge) and north (Clyde) contrasts with current land use. The interface is abrupt despite roadside vegetation on the opposite verge. • Existing commercial operations and local nodes are utilitarian with small regard for aesthetic, local identity or vegetation retention – these represent the lowest scenic quality with visual stark contrast.	• Retain visual connectivity with the immediate north eastern side of the South Gippsland Highway, and retain regional views to the north east, east and south east. • Retain and frame regional views to the north east and east at the Devon Road intersection with the South Gippsland Highway, as well as any other new and retained junctions with the highway from the Devon Meadows precinct (*subject to a traffic study and road design for the precinct).* • Facilitate the transition from adjacent residential development along the western and northern edges of the precinct by mirroring the nature, scale and grain of the adjacent development along Ballarto and Craig Road edges. • Facilitate the transition from adjacent rural and agricultural land uses along the southern and eastern edges of the precinct by mirroring the

Dandenong Ranges, roadside vegetation and adjacent land use permitting. • Grain, density and character of rural-suburban homes south, south east and east represent an opportunity to retain landscape character in transitional land use..		nature, scale and grain of the adjacent rural and agricultural land use along Clyde-Five Ways Road and along the UGB to the south. • Incorporate screening and buffer guidelines for land uses of potential inherent visual prominence (such as larger scale buildings, buildings with larger bulk or denser, urban built form).
Visual Considerations - site		
• Local high points (both subtle and obvious) are opportunities for vantage points, views and orientation points. • Vegetated road verges and hedgerows are opportunities to retain and enhance scenic quality and landscape character. • Remnant vegetation patches (Devon Meadows Precinct) and the existing quarry area are opportunities for land uses requiring visual containment with limited internal views.	• Casey Fields South Precinct is characterised by unrestricted internal visibility due to lack of vegetation. • Significant visual clutter along main roads of Devon Meadows Precinct. • Traffic along Clyde-Five Ways Road detracts from visual quality and character. • Visual cohesion disintegrates along the south east bound South Gippsland Highway and along Clyde-Five Ways Road, where roadside vegetation recedes. • Landscape character disintegrates where roadside vegetation has been removed to make way for development, particularly along Craig and Ballarto Roads.	• Incorporate local high points as placemaking and / or interpretive spaces, within or supplementary to the open space network. *This should ideally be undertaken as part of an integrated open space design and be informed by a Cultural Heritage Study.* • Retain existing vegetation corridors along road verges, medians and within properties, providing the basis for preserving the vegetated landscape character of the area. • Utilise roadside planting as a cohesive landscape feature, retaining hedgerows along existing roads and within property lots where possible, and establishing hedgerows along new roads. • Establish a hierarchy of vegetated setbacks along noisy and visually disruptive roads, primarily the South Gippsland Highway, but also along existing and new connectors. *The hierarchy of setbacks should be subject to a traffic study and road design for the precinct.* • Locate visually compatible land uses on the immediate north eastern side of the South Gippsland Highway, as foreground to the regional views to the north east, east and south east. • Locate land uses of potential inherent visual prominence (such as larger scale buildings, buildings with larger bulk or denser, urban built form) within the heart of the Devon Meadows precinct, where they can be visually contained and successfully screened by existing vegetation. • Locate land uses of potential inherent visual prominence (such as larger scale buildings, buildings with larger bulk or denser, urban built form) within the heart of the Casey Fields South precinct, where they can be visually contained and successfully screened by surrounding land uses.

• A key feature of all of the Landscape Character Areas is vegetation in the form of hedgerow planting along roads. Additional planting along paddock edges, and remnant stands of mixed species are also relevant. • A second key feature of Landscape Character Areas within the site is the presence of waterways, even those that are disturbed, diverted or artificial. • A third key feature is the incidence of vegetation in remnant stands of mixed species (i.e. remnant EVC's), along paddock boundaries and at homesteads. • The roadside storm water drain (albeit limited in extent in this landscape) is characteristic of rural and agricultural areas, and represents an opportunity to celebrate historic context and character.	•	• Utilise roadside planting as a cohesive landscape feature, retaining hedgerows along existing roads and within property lots where possible, and establishing hedgerows along new roads. • Utilise reinstated drainage lines and native riparian planting as a cohesive landscape feature, scaffolding the planning of connecting roads and neighbourhoods off the hydrological framework. • Utilise remnant vegetation stands (both remnant EVC's and other mixed planting stands) as an extension of the vegetated landscape character, both within open space areas and within property lots. The latter could be accomplished through specific development guidelines. • Utilise roadside stormwater drains as a new landscape feature that extends throughout the precinct. These could be retained in their current state or re-imagined as modified Water Sensitive Urban Design (WSUD) infrastructure along precinct roads

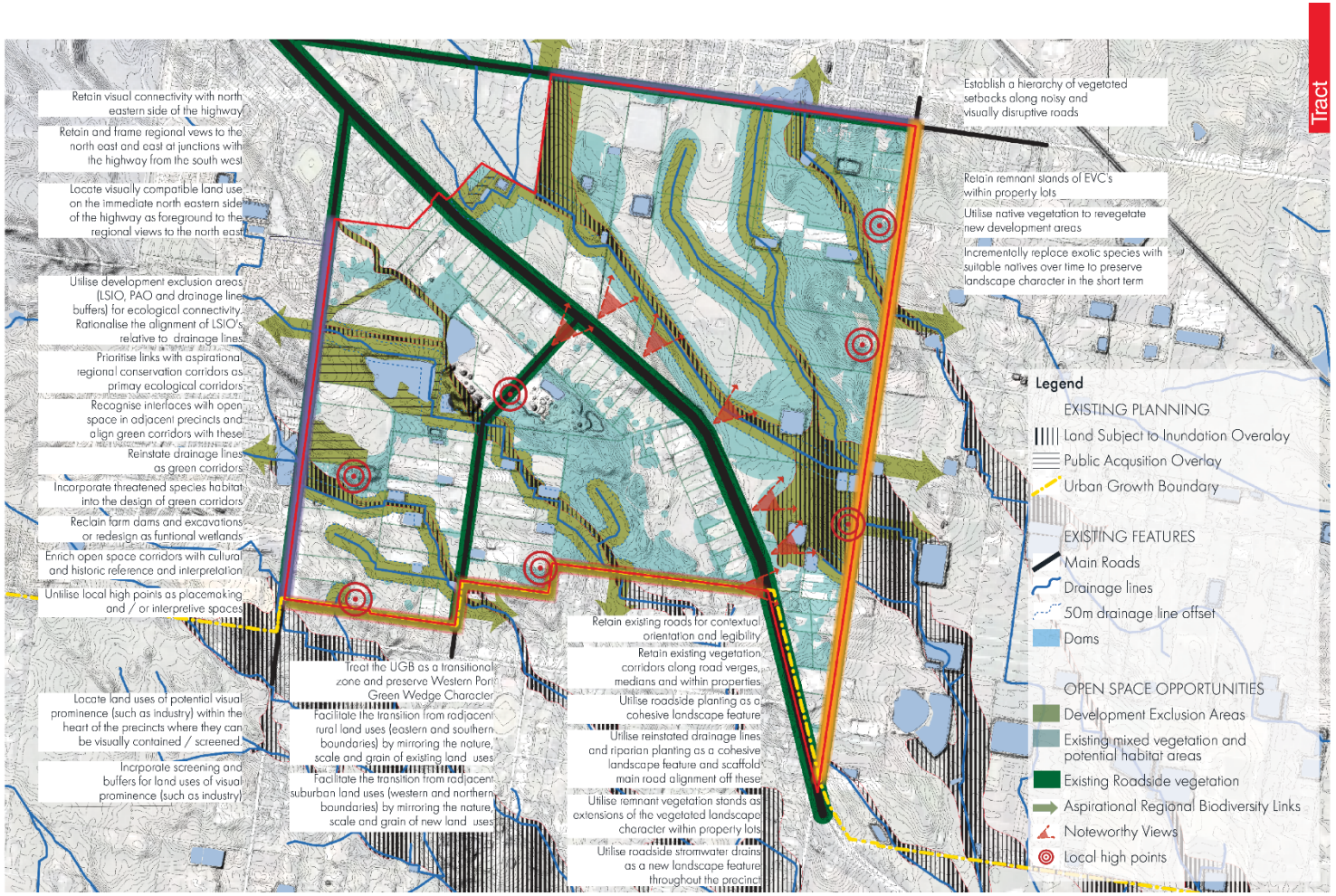


Figure 17: Summary of Recommendations

5 Recommended Landscape Framework

Based on an understanding of the site and surrounds, the associated Opportunities and Constraints presented for the precinct and the proposed Responses to these, it is recommended that future development and land use planning be overlaid by a Landscape Framework and aligned with Landscape and Visual Guidelines.

5.1 Recommended Framework Objectives

The recommended objectives of the Landscape Framework are:

- To maintain the integrity of high value landscape character areas through the preservation and enhancement of key defining aspects of the landscape character.
- To uplift landscape character areas of moderate value though the upliftment and supplementation of features key to the creation of landscape character.
- To integrate the visual character and environmental function of the landscape as a dynamic system that underpins, informs and supports planning, land use allocation and development.

This will facilitate the meaningful transition of the landscape from current to future land use; the transition of Urban Growth Area to Green Wedge and the transition of one neighbourhood to another. It will also support the development of identity and placemaking, which are cornerstones of community building and cohesion.

5.2 Recommended Framework Strategies and Guidelines

The recommended strategies and guidelines for the framework are summarised below and further illustrated in the associated precedent images.

5.2.1 Landscape Character

Recommended Strategy

- To acknowledge both past and present Landscape Character by retaining and enhancing key features.

Recommended Guidelines

- Existing hedgerow planting along roadways should be retained / extended to preserve Landscape Character, except where views are proposed.
- Existing hedgerow planting should be extended along new roadway edges and property subdivisions to acknowledge links to historic land use.
- Roadside planting along the South Gippsland Highway should be retained / extended, screening the road from adjacent land use and adjacent land use from the road, except where views are proposed.
- Appropriate property setbacks should be retained / created along main and secondary roads to facilitate and support the continuity of new and existing hedgerow planting.
- Roadside stormwater drains should be retained as a key Landscape Character features where they exist, and extended throughout the precinct. These could be retained in their current state or re-imagined as modified Water Sensitive Urban

Design (WSUD) infrastructure along precinct roads. These drains could replace the requirement for subsurface stormwater drainage systems.

Figure 18 Example of a mature tree retained as a landscape feature

5.2.2 Key Views and View Lines

Recommended Strategy

- To protect and enhance panoramic and long-distance views to significant landmarks (i.e. the Dandenong Foothills).

Recommended Guidelines

- Long distance sidelong views of the Dandenong Foothills should be preserved from the north eastern side of the South Gippsland Highway, but short range views of precinct land use along the south western side of the highway should ideally be screened.
- Head on views of the Dandenong Foothills should be preserved from the northern parts of Craig Road and Devon Roads.
- New road junctions with the South Gippsland Highway (subject to Traffic Study recommendations) should be aligned to capitalise on potential head-on views of the Dandenong Foothills to the north east from the Devon Meadows.
- Identified local high points could be incorporated into private or public open space from which local views may be enjoyed.

Recommended Strategy

- To create and maximise opportunities for short range views from roads and properties into open space.

Recommended Guidelines

- Opportunities for views into open space should be created through the placement of roads and pathways along the edges of or cutting through open space areas.
- Where hedgerows line roadways, strategic breaks in the hedgerow planting would frame views into open space areas and create visual connections with open space.
- Where open space exists in adjacent neighbourhoods (specifically to the west and north), visual connections should be maintained / created with corresponding open space within the Casey Fields South and Devon Meadows precinct.

5.2.3 Place Making

Recommended Strategy

- To establish and build an identity of place through the inclusion of places of community value.

Recommended Guidelines

- Cultural Heritage sites and features, should these be integrated into open space and acknowledged as appropriate (subject to Cultural Heritage Study recommendations).
- Additional places of community value should scaffold off natural assets for new urban configurations (i.e. such as village greens, community gardens, recreations reserves etc) and align with the principles of the '20 minute neighbourhood'.

Recommended Strategy

- To support the creation of local identity through the enhancement of overall landscape character and the optimisation of places of community value:

Recommended Guidelines

- Local places of community value within the precinct should ideally be connected through walking circuits with interpretive signage and a local palette of materials to encourage appreciation and build awareness.
- Links with regional places of community value should be created by connecting with regional trails, shared paths and equestrian trails as recommended in Casey's Southern Urban Rural Interface Design Guide 2020.
- New and existing roads should be designed as walkable streets with positive edge interfaces and adequate walking paths, catering for children's independent mobility.

Figure 19 Example of shared paths around wetland feature

Recommended Strategy

- To acknowledge the transition from Green Wedge to Urban Growth Area in the south east of the precinct as a landscape gateway.

Recommended Guidelines

- Refer to Design Concepts from Casey's Southern Urban Rural Interface Design Guide 2020 (*Interface 2: Key Gateway – South Gippsland Highway and Future Clyde South PSP*). Refer also to typical cross section in that report. Treatments include Casey Gateway signage, public art, tree planting etc.

5.2.4 Edges and Interfaces

Recommended Strategy

- To facilitate a sensitive and respectful transition between existing and future land uses within the precinct.

Recommended Guidelines

- Housing lots and road vistas should be orientated towards open spaces where possible to maximise visual connectivity between street networks and open space.
- The backing or siding of lots onto open spaces should ideally be avoided. Where this is not possible, then the interface should be softened through the use of low, visually permeable fencing or other measures which provide visual access and support passive surveillance.
- The visual interface between large scale / high density developments and the public realm should be graded through the use of appropriate setbacks, the fragmentation of built form, the gradual increase of building scale and the inclusion of planting buffers (hedgerows) at increasing heights.
- The interface between the public realm and commercial and activity nodes, including areas of existing (and potentially unsightly) built form should be softened. This could be done by supplementing hedgerow planting along road reserves and within development set-backs to create a visual buffer.

- Physical and visual access into natural and recreational landscapes should be framed / celebrated by opening up hedgerow planting, increasing visual permeability and framing views of and to the amenity beyond.

Figure 20 Example of housing orientated towards linear open space

Figure 21 Example of tree retention along rural property fence line

Figure 22 Example of a landscape mound to soften new residential interface.

Recommended Strategy

- To facilitate a sensitive and respectful transition between the future land use of the precinct and surrounding land uses.

Recommended Guidelines

- The northern interface with Clyde (along Ballarto Road) and the western interface with Botanic Ridge (along Craig Road) are the interfaces with medium density residential infill development. These should be visually buffered through mirrored development type and density along the edge of the new precinct, as well as road verge planting (preferably hedgerow).
- The eastern interface with the agricultural landscapes along Clyde-Five Ways Road should be softened by retaining larger lot sizes along the eastern precinct edge, and through a visual buffer (hedgerow planting) along the road.
- The visual buffer along the north eastern and south western interfaces with the South Gippsland Highway should be retained / extended in the form of roadside

hedgerow planting. Where visual connection is required along the north eastern side of the road, then the visual buffer should open up to frame the view.

- The southern interface with the Green Wedge should be softened by retaining existing lot sizes along the southern precinct edge. New roads should not be developed along the actual edge – these should ideally be located deeper within the precinct to soften the transition from Green Wedge to Urban Growth area.
- Existing and new roads should be visually buffered through road verge planting (preferably hedgerow) and links with regional open space corridors should be established.

Figure 23 Example of shared path along open space

5.2.5 Corridors

Recommended Strategy

- To enhance the functionality and recreational value of drainage lines, recreational open space and hedgerow planting.

Recommended Guidelines

- Drainage lines should be rehabilitated and reinstated as functional hydrological and ecological systems within the site, which link with regional systems within the greater area.
- Hedgerow planting along roadways and along property boundaries should be enriched and extended as continuous visual and ecological corridors.
- The ecological value of easements and servitudes should be included as functional parts of the ecological and habitat corridors.
- Links should be maximised across the South Gippsland Highway between the two precincts (subject to Traffic Study recommendations). These should ideally include both movement (road) links and ecological corridor linkages.
- Regional connections with Blue-Green Links as per Casey's Southern Urban Rural Interface Design Guide (2020) should be facilitated. These are tree reserves with Water Sensitive Urban Design and passive infiltration opportunities.

Recommended Strategy

- To preserve, enhance, and extend the habitat of threatened species regionally and within the precinct.

Recommended Guidelines

- The open space systems within the precinct should be optimised to support biodiversity and habitat creation, specifically (but not exclusively) for the Southern Brown Bandicoot and Growling Grass Frog, which are expected to occur in the region and on the site. Specialist input should ideally be sought in the design of suitable habitat, according to accepted guidelines (refer also to Appendix 2 and 3).
- Links with the Royal Botanic Gardens Cranbourne and the Future Clyde Regional Park should be facilitated through the continuation of open space corridors beyond the boundaries of the precinct, with appropriate attention to habitat requirements within these corridors.
- Bandicoot crossings / culverts should be employed where required over roads within and on the edges of the precinct to facilitate the proposed migration of the Southern Brown Bandicoot. Refer to *Design Concepts from Casey's Southern*

Urban Rural Interface Design Guide 2020 (Interface 7: Bandicoot Corridor Intersection on Browns Road). Refer also to typical cross section in the report).

5.2.6 Development Controls

Recommended Strategy

- To protect the integrity of landscape and visual character through the appropriate location, configuration and design of land uses (refer also to Casey's Employment Land Design Guide (2022)).

Recommended Guidelines

- Potentially visually incompatible or high density land uses should ideally be positioned within existing visually screened areas or areas that are able to be screened via land uses of lower visual impact.
- Development controls for large scale / higher density developments should be implemented to preserve the visual quality. This could be done through open space percentage requirements, the fragmentation of built form to reduce bulk and the inclusion of vegetation buffers along edges.
- Local commercial and retail nodes should be designed and developed in the spirit of rural village centres, which are also community gathering and support spaces and extensions of public open space.
- Multi use development nodes and single use enterprises should both respect the landscape character intent and limit visual clutter and undue visual intrusion into the public realm.
- Where existing land uses are to be retained, remediation of the visual environment within road reserves and within development setbacks should be undertaken to align with the landscape character intent.
- Flood risk should always be accounted for, so that the integrity of both development and habitat can be protected.

5.3 Recommended Landscape Framework Plan

The following is an explanation of the rationale for the development of the Recommended Landscape Framework Plan for the Casey Fields South and Devon Meadows Precinct. The figure that follows is a graphic representation of this rationale, supported by the design sketches that follow.

1. As a first step, it is proposed to retain **key structuring elements**, specifically the existing main roads, for continued contextual orientation and legibility.
2. Second, it is proposed to create a **Primary Landscape Framework**, which is essentially a biodiversity conservation and water management system.

   This system should provide ecosystem services (specifically regional storm water management and flood control), safeguard reinstated native vegetation, provide protected habitats for threatened species (specifically, but not exclusively Growling Grass Frog and Southern Brown Bandicoot) and present opportunity for integrated recreational open space for the community.

   The Primary Framework should ideally include the following:

   a. Demarcated LSIO's, with priority systems being those that have potential to connect with adjacent precincts and those which form part of the aspirational conservation corridors for the Southern Brown Bandicoot. These LSIO's have a conservation priority and could either be retained in their current configuration or adjusted to relate more closely with the drainage lines (which would help to reduce the overall extent of development exclusion areas).

   b. The demarcated PAO's. These areas have dedicated municipal functions but could also contribute meaningfully to habitat and water management as supplementary biodiversity areas.

   c. The drainage lines and required riparian offset zones on either side. These drainage lines have a mainly hydrological function, with additional conservation and / or open space potential. Where they correspond with priority LSIO's, they will be conservation specific.

Where they extend beyond the priority LSIO's, they may function either as recreational open space or as local neighbourhood green links. These drainage lines may either be retained in their current configuration or re-aligned back to their original courses. The historic Swampy Riparian Woodland EVC within the Devon Meadows precinct may even be reinstated. As these drainage lines are currently disturbed and modified, they should be rehabilitated as natural systems and existing dams and excavations reclaimed as part of the rehabilitated system. Where appropriate, selected dams may be reinstated as functional wetlands.

The PSP response would require input from a dedicated Hydrological Study and would require buy-in and guidance from the relevant Water Management Authority. In addition, specialist ecological input into the design of Southern Brown Bandicoot and Growling Grass Frog habitat is recommended (refer Appendix 2 and 3).

3. Third, it is proposed to base the planning of **main roads** on the priority LSIO's, aligning these along the edge of the priority corridors to optimise visual connectivity and physical integration with open space.

   The PSP response would require input from a dedicated Traffic Study and Road Design.

4. As a next step, it is proposed that **Landscape Character Management Zones** be identified across both precincts to facilitate landscape and visual quality, continuity and sensitive transition through the retention of key landscape features. The following is of relevance:

   a. **Rural / Agricultural Interface Areas** along Clyde-Five Ways Road in the east and along the Urban Growth boundary in the south, mirroring the nature, scale and grain of adjacent rural / agricultural allotments. These are essentially mid sized lots with domestic scale structures and large open space allocations and larger setbacks.

   b. **Suburban Residential Interface Areas** along Ballarto Road in the north and along Craig Road in the west, mirroring the nature, scale and grain of adjacent suburban precincts. These are essentially low to medium density lots with domestic scale structures and small open space allocations. Larger setbacks with roadside vegetation screening would improve visual quality within the public realm, support landscape character.

   c. **Fringe Character Areas** articulating the transition of the above sensitive interface zones to more intensive land uses, as well as along the interface with the highway. The intent of the latter is to preserve the landscape integrity of the highway corridor through sensitive transition. These character areas would consist of medium to high density built form on varying lot sizes with sufficient street setbacks to support the vegetated landscape character and contribute positively to the public realm. Roadside vegetation would contain a high vegetation screening component.

   d. **Civic Character Areas** accommodating larger scale buildings, buildings with larger bulk or denser, urban built form contained within the central parts of the precincts, capitalising on easy road access and vegetation screening potential. These may include a variety of lot sizes, land uses and a variety of building sizes and scales that step down to meet the public realm at a human scale. Along the street interface, the integrity of the pedestrian realm is retained through continuous vegetation / roadside planting as well as canopy tree planting, high quality landscape amenity and interconnected civic and open spaces.

   e. Places of Cultural and Historic interpretation, located on local high points and incorporated within or supplementary to the open space network.

The PSP response would require input from a Cultural Heritage Study.

5. Next it is proposed to establish a **Secondary Landscape Framework** consisting of an extended network of interconnected green corridors along new neighbourhood roads.

   This system could transform road corridors into landscape features linking with the Primary Framework and within itself. In addition to acknowledging the historic pastoral landscape, this secondary framework could also expand habitat potential and provide additional support for ecosystem services (specifically local stormwater management).

   The corridors should ideally consist of a diverse mix of locally appropriate native trees, shrubs and groundcovers, but should also include existing roadside hedgerows, road reserves, development setbacks and road medians. Of importance would be the retention and framing of regional views through breaks in the roadside vegetation at identified locations as follows:

   a. To the north east along the north eastern side of the East Gippsland Highway from Devon Road southwards. This would entail open space in the foreground to facilitate this visual connectivity.
   b. To the north east at the Devon Road intersection with the South Gippsland Highway, as well as any other new and retained junctions with the highway from the Devon Meadows precinct.
   c. To the north of Ballarto Road where the precinct open space interfaces with open space of the Clyde precinct.

   The neighbourhood road geometry could be based on existing lot geometry to tie in with the structure of the historic pastoral landscape but should ideally emulate the dendritic flow of water along lesser tributaries toward the drainage lines.

6. Lastly, it is proposed to formalise a **Tertiary Landscape Framework** comprising mixed native vegetation pockets (i.e. tree, shrub and ground cover vegetation) within property lots. This framework should ideally be based on remnant stands of vegetation and significant tree specimens within the precinct (beyond the Primary and Secondary Framework areas) but could also be extended as new pockets within selected land use areas.

   The intention of this framework would be to maintain and extend the existing vegetated character of the landscape by integrating vegetation pockets into property lots through development and management requirements.

   In addition to supporting landscape character, these tertiary vegetation pockets could also provide visual screening, enhance biodiversity, supplement the ecosystem services provided by the Primary and Secondary Frameworks (i.e. through water infiltration, urban cooling and carbon offsetting) and support habitat (specifically, but not exclusively Southern Brown Bandicoot habitat).

   Habitat integrity within existing stands could be improved over time through the incremental replacement of exotic species with appropriate native mixes.

The PSP response would benefit from specialist ecological input into the design of Southern Brown Bandicoot and Growling Grass Frog habitat (refer Appendix 2 and 3).

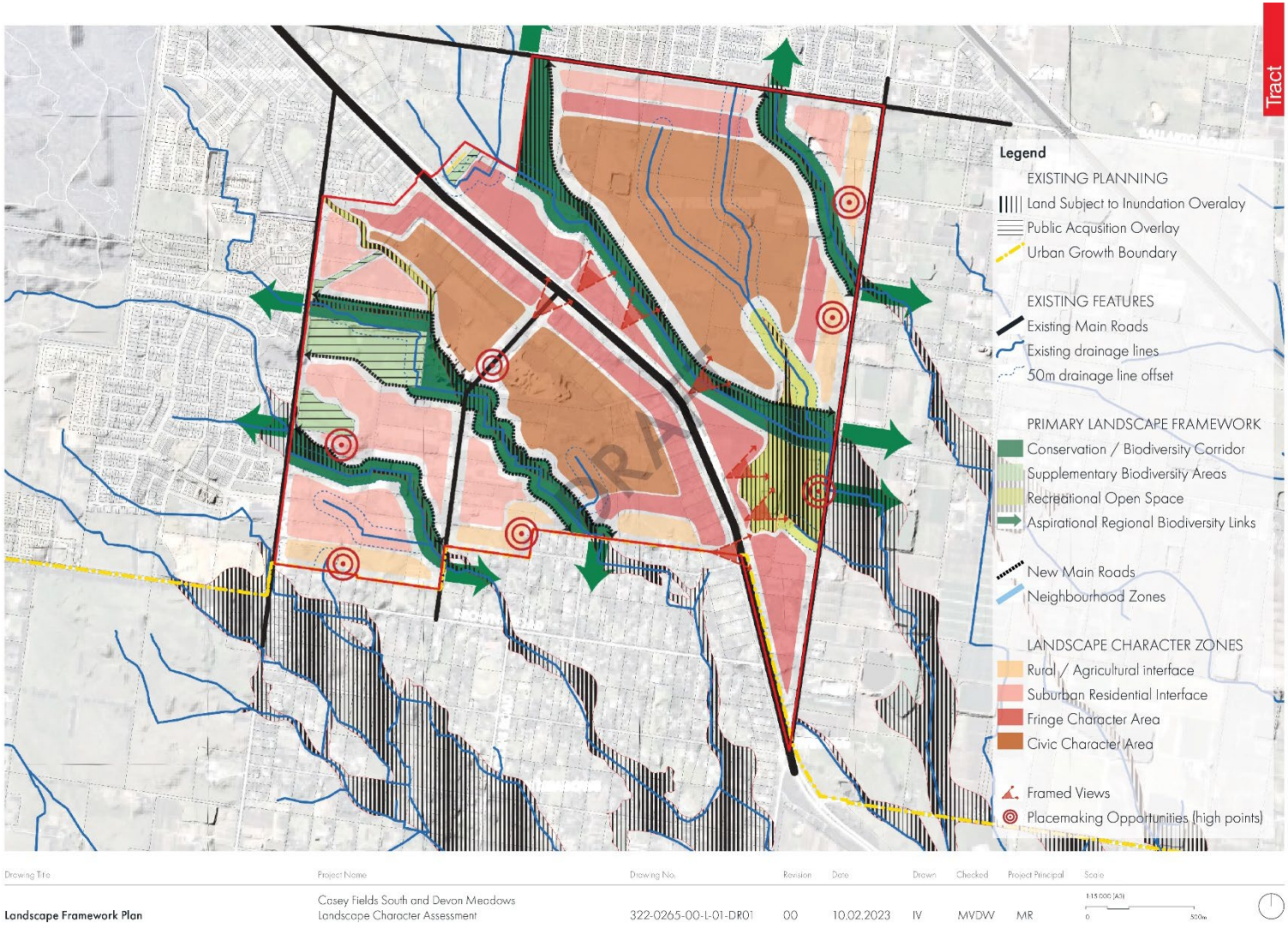


Figure 24: Landscape Framework

5.4 Landscape Design Sketches

5.4.1 Precinct Interfaces

Figure 25: Design Sketch: Rural / Agricultural Interface with Precinct at Urban Growth Boundary

Figure 26: Design Sketch: Suburban / Residential Interface with Precinct

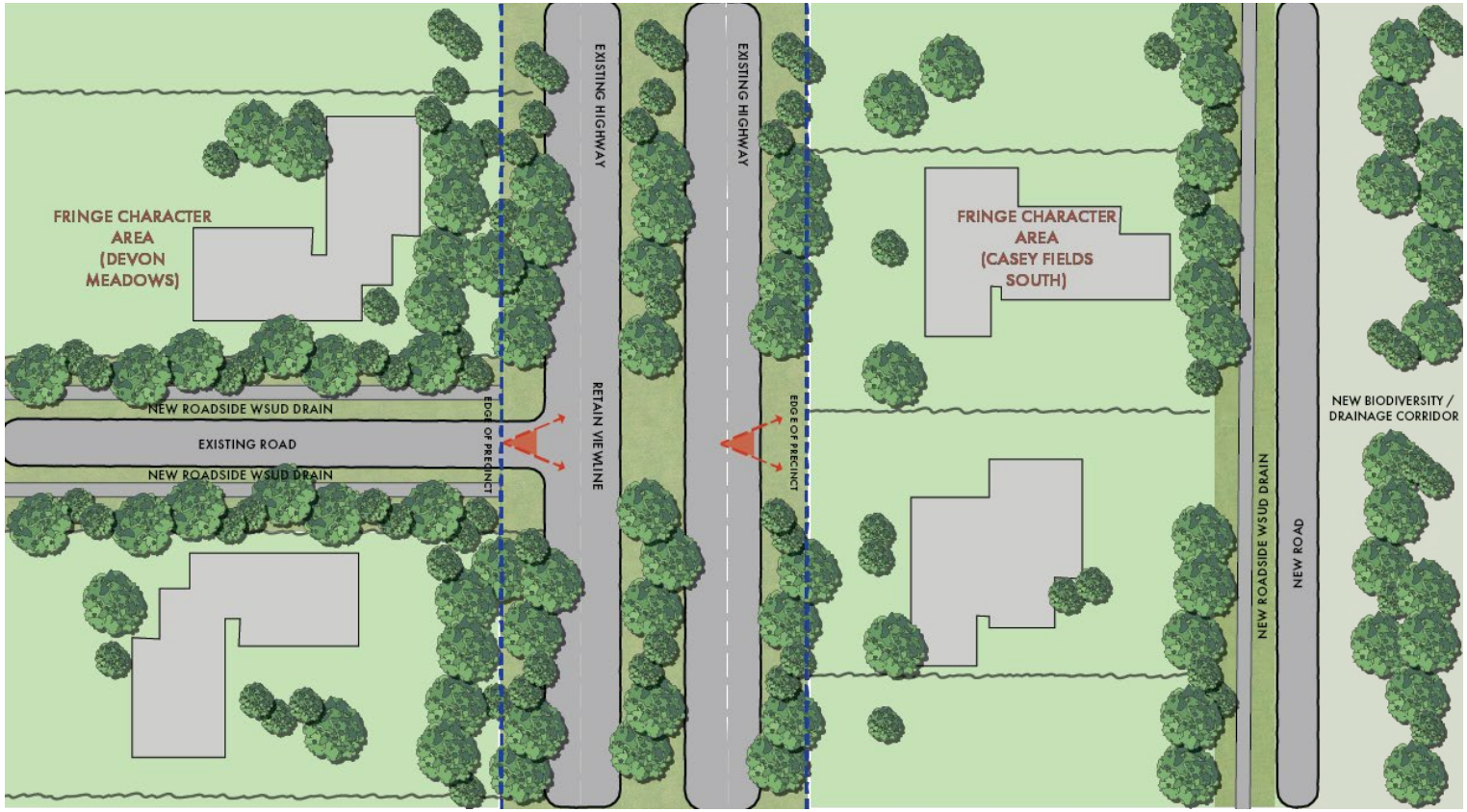


Figure 27: Design Sketch: Fringe Character Area Interface with Highway

5.4.2 Land Use Interfaces

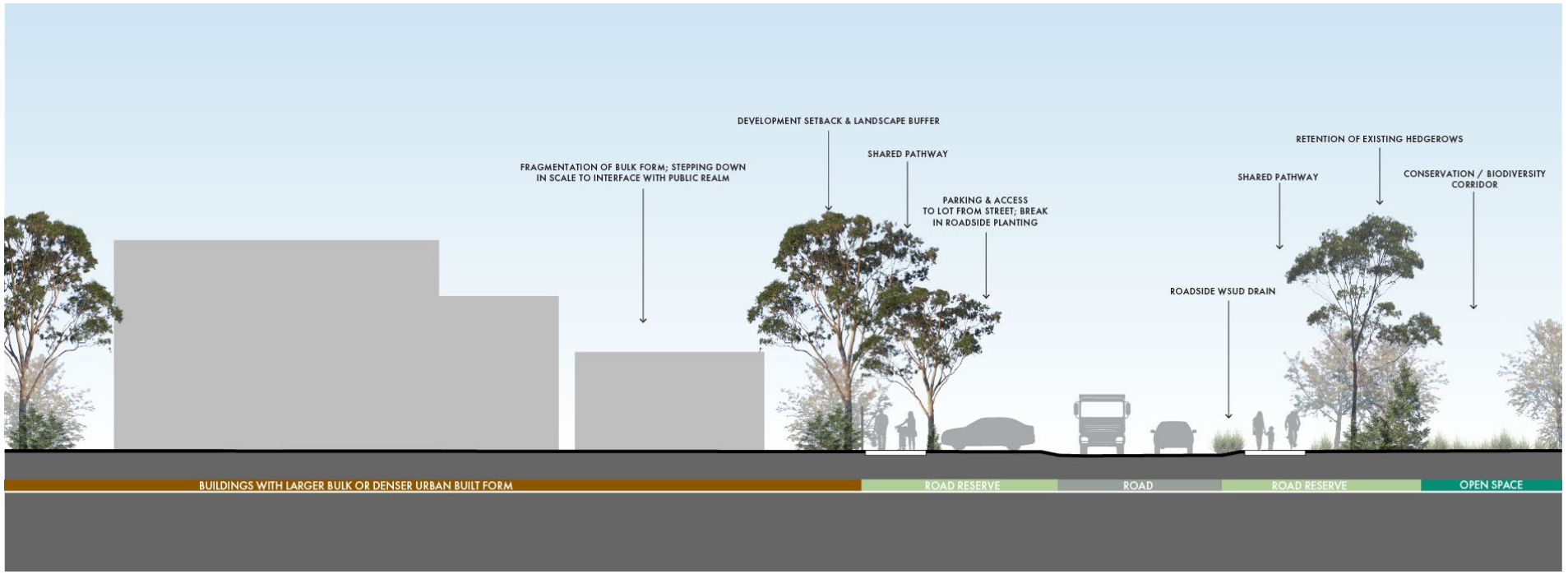


Figure 28: Design Sketch: Civic Character along a Main Road and Open Space Corridor

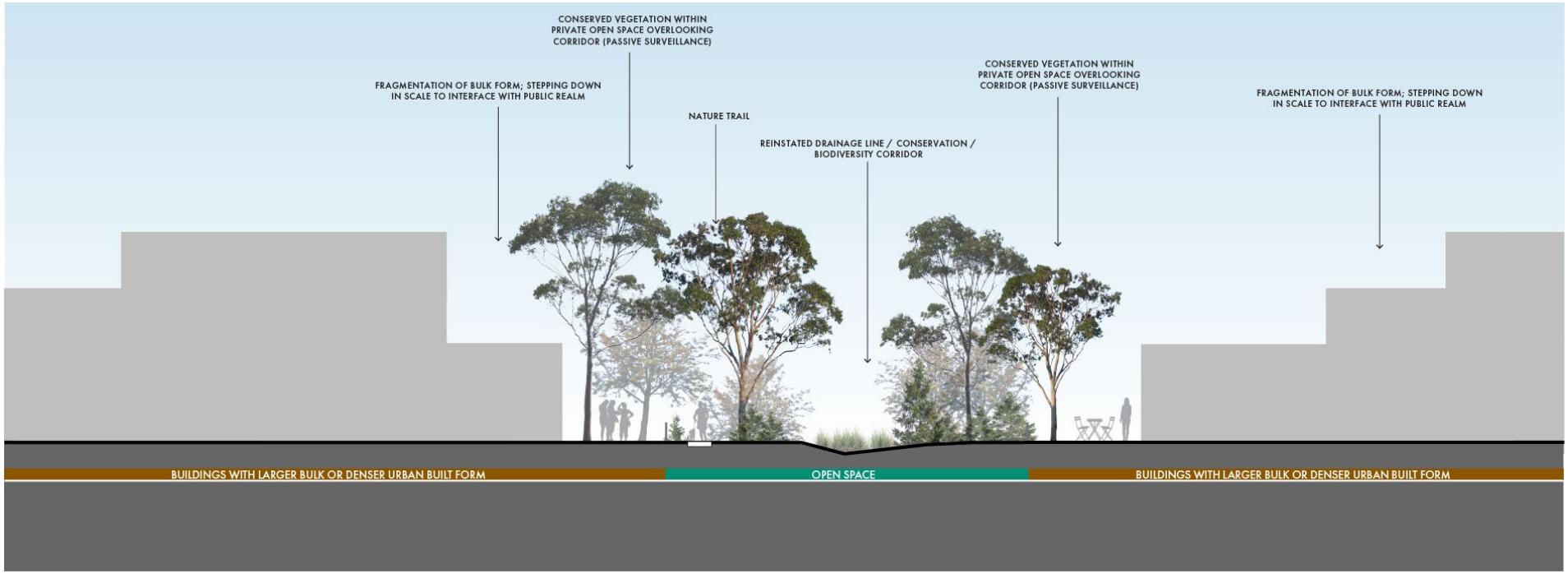


Figure 29: Design Sketch: Minor Drainage Line within Civil Character Area

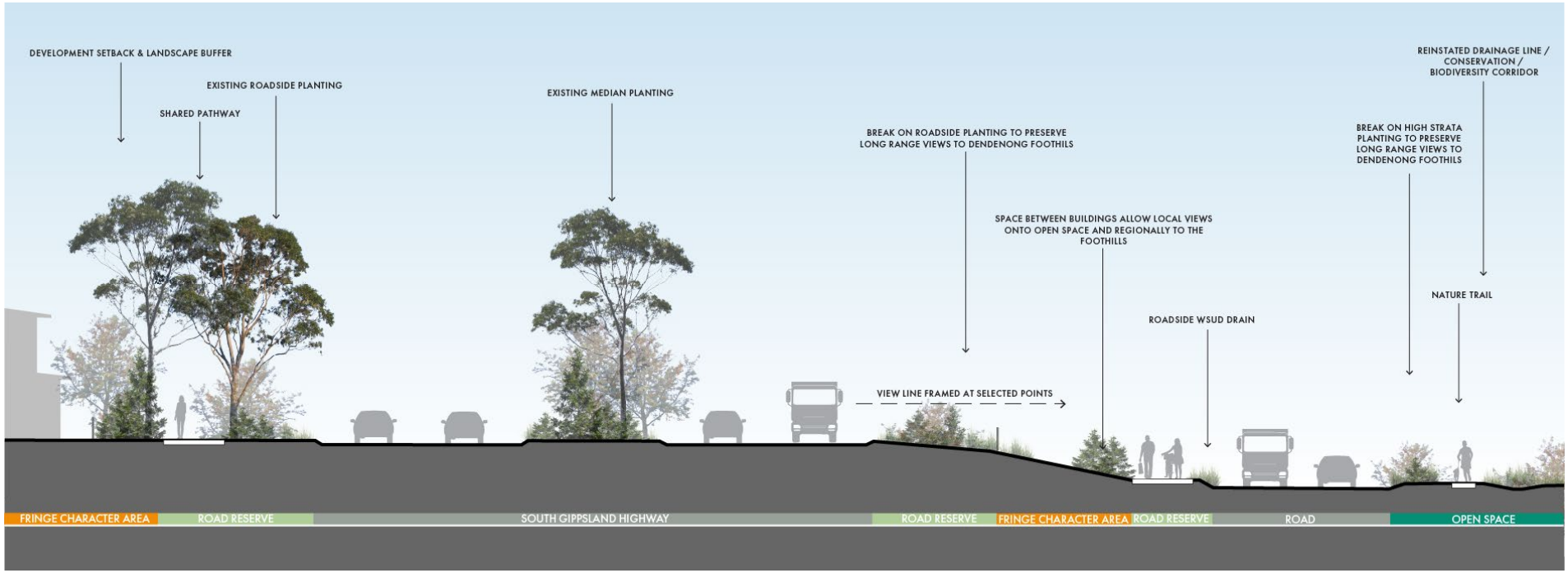


Figure 30: Design Sketch: Fringe Character Area Interface with Highway

Figure 31: Design Sketch: Interface between Rural Agricultural, Suburban Residential, Main Road and Open Space

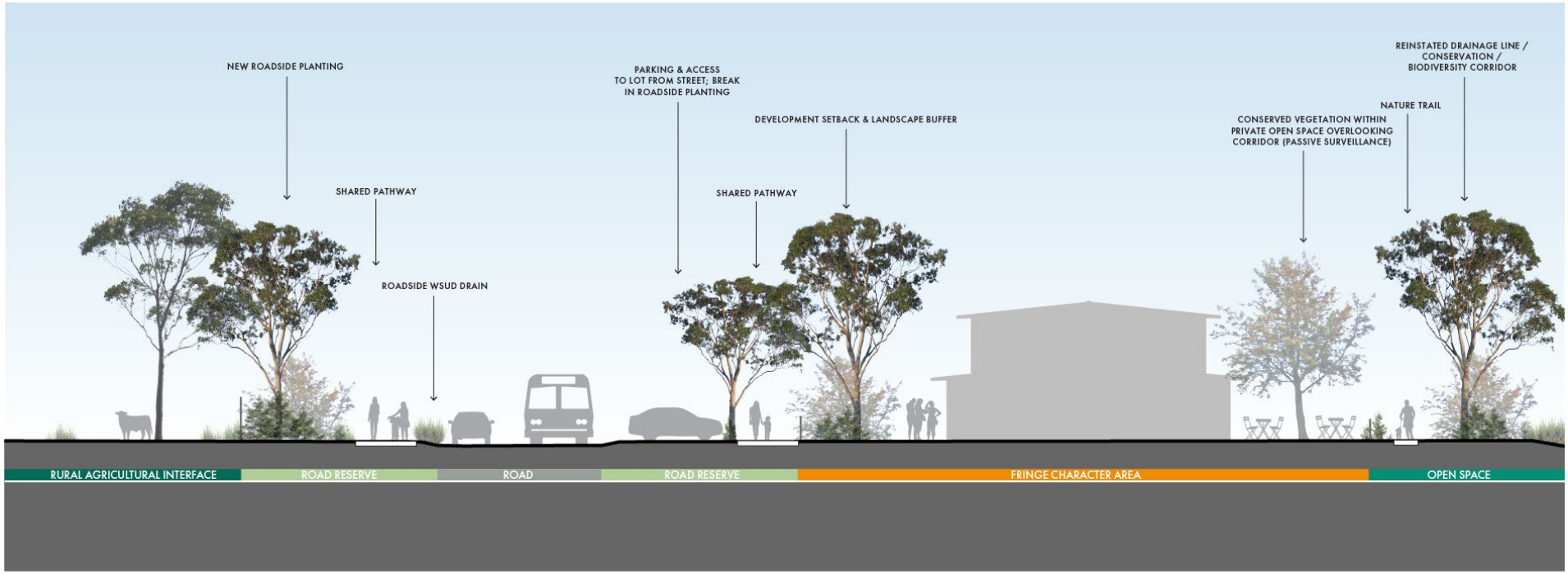


Figure 32: Design Sketch: Interface between Rural Agricultural, Main Road and Fringe Character backing onto Open Space

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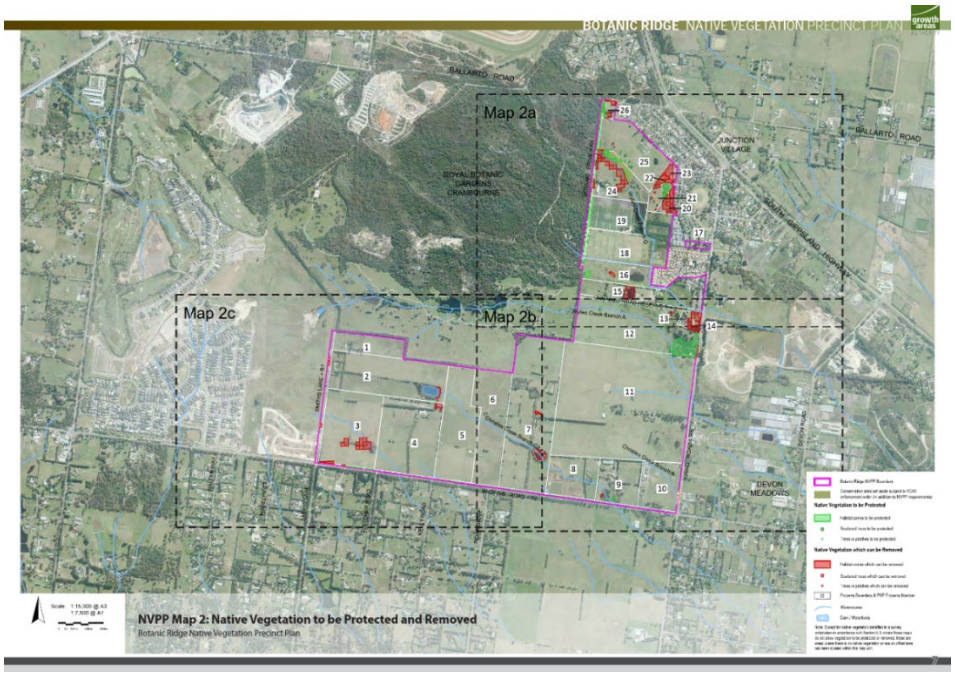
Appendix 1: Other Policy Considerations

BOTANIC RIDGE PRECINCT STRUCTURE PLAN (PSP)

The Botanic Ridge PSP applies to the area directly west of the subject site, sharing a boundary with Devon Meadows. To the north-west of this PSP area is the Royal Botanic Gardens – Cranbourne which has informed the precinct design. The relevant Precinct Structure Plans are listed below:

Botanic Ridge Precinct Structure Plan - Native Vegetation Precinct Plan (NVPP)

7. The Native Vegetation Precinct Plan aims to protect and manage the long term health and habitat value of native vegetation and allow for passive recreation on the edge of habitat and conservation areas.
    a. Specify the native vegetation to be protected and the native vegetation that can be removed, destroyed or lopped.
    b. Ensure that areas set aside to protect native vegetation are managed to conserve ecological values in accordance with the Botanic Ridge Precinct Structure Plan.
    c. Ensure native vegetation specified to be protected is consistent with conserving the ecological values of these areas and is in accordance with Melbourne's Strategic Assessment (under Part 10 of the Environmental Protection and Biodiversity Conservation Act 1999) and Victoria's Native Vegetation Management – a Framework for Action, DSE 2002.
    d. Set out the works or other necessary actions required to offset the removal, destruction or lopping of native vegetation.
8. Certain native vegetation has been identified 'to be protected' on the basis of a landscape wide approach to retention and removal of native vegetation across the NVPP area rather than a site-by-site approach (see Figure 3).
9. The native vegetation shown as native vegetation that 'can be removed' in the figure below can be removed, destroyed or lopped subject to the conditions and requirements set out in the NVPP.



Botanic Ridge Precinct Structure Plan – 3.1 Image and Character

10. Aims to ensure development is sensitive to the landscape and environmental characteristics of the site including hillsides and ridgelines.
11. Streets, parks and other public spaces must be planted with indigenous or Australian native species
12. *Streetscape planning must:*
    a. Be indigenous species in streets adjoining conservation areas.
    b. Be suited to the scale of the street and planted to densities and size profiles.
    c. Unless otherwise approved by council, utilise listed species in relevant adopted City of Casey street tree strategies.
    d. Be suitable for the ground condition, where planted in swales or similar.
    e. Match or complement adjoining development and/or street planting that has already been approved and/or commenced.

CASEY FIELDS SOUTH RESIDENTIAL PRECINCT STRUCTURE PLAN (PSP)

The Casey Fields South Residential Precinct Structure Plan (PSP) applies to the land directly north of the subject site which shares a boundary with Casey Fields South. The PSP is a long-term plan for urban development. It describes how the land is expected to be developed, and how and where services are planned to support development.

Image Character and Heritage requirements:

13. Street trees must be provided on both sides of all roads and streets (excluding laneways) at regular intervals appropriate to tree size at maturity.
14. Trees in parks and streets must be suitable for local conditions and planted in modified and improved soil as required to support tree longevity.
15. Tree planting must use locally appropriate species and be consistent with any guidance provided on the relevant cross section within this PSP unless otherwise approved by the responsible authority.

Biodiversity, Threatened Species requirements:

16. Where located adjacent or nearby each other, design and construct local parks to maximise integration with conservation areas.
17. Where appropriate co-locate public open space areas with conservation areas and waterways to assist with buffering.
18. Drainage of stormwater wetlands should be designed to minimise the impact of urban stormwater on the biodiversity values of the conservation area.
19. Planting adjacent to the conservation area, waterway corridors and retained indigenous vegetation should be indigenous species.

20. Street trees and public open space landscaping should contribute to habitat for indigenous fauna species.
21. In general, trees should not be planted within 10 metres of native grassland or wetlands.

CITY OF CASEY POLICY

The following documents produced by the City of Casey are of relevance to landscape character and visual amenity.

Council Plan

The Council Plan outlines how the City of Casey will achieve the Long-Term Community Vision 2031 - to become a more connected, bold and resilient community while also focusing on they will work with the community, key stakeholders, community organisations, surrounding municipalities and other levels of government. The Council Plan is a legislatively required document (Local Government Act 2020, Section 89) which sets the strategic direction for the City of Casey from 2021-2025. The plan was developed based on the feedback and insights obtained through community engagement.

Landscape specific strategic objectives:

22. Strategic Objective 1: Deliver sustainable infrastructure and activate places.
23. 1.3 Design, build and cultivate places that create a sense of belonging, connection, and pride.
24. 1.6 Create and maintain safe and clean open spaces and places
25. Strategic Objective 3: Foster environmentally sustainable practices and work towards being climate ready.
26. 3.1 Conserve, enhance and restore the natural environment.

Tree Guide

The aim of the tree guide is to provide information about the Council's Urban Forest, which consists of streetscapes and parks throughout the municipality. There are an estimated 250,000 trees growing in streets, parklands and several hundred thousand on private land across the municipality. The City of Casey is committed to the preservation and expansion of its urban forest, which includes the streets and reserves and those trees on private land. Parks and Reserves are the department responsible for the tree guide and it was last updated in 2014.

Design Principle Guidelines for Street and Parkland Planting:

27. Use a diverse range of species including a selection of both exotic and native tree species suited to the varied environments.
28. Select appropriate species according to the opportunities and constraints presented within a site.
29. In a standard residential nature strip a small tree species should be planted.
30. Use single-species plantings in streets to provide unity in the landscape. Reinforce and extend existing plantings, and identify new opportunities for plantings.

The guide also covers information on tree pruning, tree removal, tree protection and development, tree root management and preservation and protection of significant trees.

Environment Strategy 2021-2025

The City of Casey's Environment Strategy 2021-25 sets out the council plans to achieve Objective 3 of the Casey Council Plan 2021-25 which is to foster environmentally sustainable practices and work towards being climate ready (resilient). Driven and informed by community engagement and the Council Plan, the Strategy presents an analysis of immediate and emerging conditions. It illustrates how the City of Casey will implement a holistic approach to environmentally sustainable management to improve outcomes across the organisation and for the community.

The Strategy includes five main objectives and associated targets which address climate change mitigation and adaptation, a circular economy, the natural

environment, water efficiency and public participation. Relevant landscape targets include:

31. Tree canopy cover increase from 16% to 21% by 2030.
32. Renewal of all Council WSUD assets.
33. Commitment to incorporating traditional land and resource management values and practices into the City's biodiversity planning and management approaches.

Growth Area Heritage Places Policy

The Growth Area Heritage Places Policy was last updated in 2015 for the purposes of providing a framework for decision making regarding heritage places in Casey's growth areas. The policy applies to the strategic planning, planning scheme amendments and proposals to use, develop or subdivide any property subject to the Heritage Overlay within Casey's growth areas.

Through this framework, Council is seeking to facilitate early intervention to manage heritage conservation from the first stage of development, while working closely with landowners and developers through the Precinct Structure Plan stages, pre-application discussions, permit applications, subdivisions and other stages. Here, heritage is not limited to the built form, but also extends into the environment and its surrounds.

Roadside Vegetation Management Plan

The Roadside Vegetation Management Plan was adopted in 2002 and affects all rural roads (588km) in the City of Casey, with the aim to preserve, enhance and properly manage roadsides for their conservation and landscape values while maintaining their functional roles. The plan recognised that road reserves are used not only for transport, but also as service corridors, in fire prevention, for recreation and, occasionally, for agriculture. Vegetation on roadsides is important for land protection, flora and fauna habitat, and landscape character.

The plan includes an 'operations manual' with management prescriptions for each road section identified as having medium and high value conservation significance. It also includes generic prescriptions for low conservation value roadsides, and roads with cultural landscape values. Additional information is provided on priority weeds and on indigenous species for revegetation works.

Revegetation Strategy

The Revegetation Strategy is long-term municipal strategy adopted in 2009 aimed at providing a coordinated and strategic approach to revegetation across the City of Casey. Further, the strategy provided revegetation plans for 20 priority sites - ten on public land and ten on private land. This was in response to a recognition that major loss of native vegetation in the municipality had seen remnant vegetation cover reduced to just 7%.

Revegetation in this context is focussed on re-establishing native vegetation on cleared land. This does not override strategies and objectives of management plans in areas of remnant vegetation. The revegetation strategy is designed to assist in the prioritising of revegetation sites to achieve several objectives such as land and water management and biodiversity conservation. The strategy also provides information on techniques of revegetation and potential funding sources for works.

Employment Land Design Guide

The Employment Land Design Guide is a resource developed by the City of Casey in 2022 to aid discussions on commercial, light industrial and industrial land use related development applications. The Guide provides guidance on good design principles and a series of recommendations on how high quality built form and public realm outcomes can be achieved in Casey's employment areas.

The Key urban Design Themes addressed in terms of Design Guidelines include:

34. Urban Structures and Interfaces
35. Accessibility and Movement
36. Built Form and Architecture
37. Landscape and Environment
38. Public Realm and Amenity
39. Services and Maintenance.

Environmentally Sustainable Development (ESD) principles are an integral part of the design guidelines and it applies across all of following design elements.

In addition to the above, guidelines on a number of Building Typologies for various lot sizes are also showcased. The illustrations included in this section for each of the development typologies describe when best to use them and assist in the site planning and building design.

STATE GOVERNMENT POLICY

South-East Growth Corridor Plan

The South-East Growth Corridor Plan frames the development of this region within Metropolitan Melbourne. Within this region the Plan emphasises retaining and enhancing the existing sense of place. Specifically, the following landscape elements are mentioned:

40. Retention of distant views to the Dandenong Ranges to the north
41. Retention of the rural character of the areas adjoining the UGB. The planning and design of activities along this interface need to ensure that urban activities within the UGB do not adversely impact on the functions or amenity of these rural edges.

BIODEIVERSITY STRATEGIES

Implementation Plan for the Southern Brown Bandicoot Sub-Regional Species Strategy 2016

This plan outlines the key directions for conservation actions for the Southern Brown Bandicoot under the Melbourne Strategic Assessment (MSA) and how they will be delivered over the next ten years. The strategy and this implementation plan focus on the Southern Brown Bandicoot Management Area (management area). The management area is approximately 60,000 ha and includes the RBGC and the habitat connectivity corridors in Botanic Ridge and Devon Meadows, and a large area adjacent to the UGB.

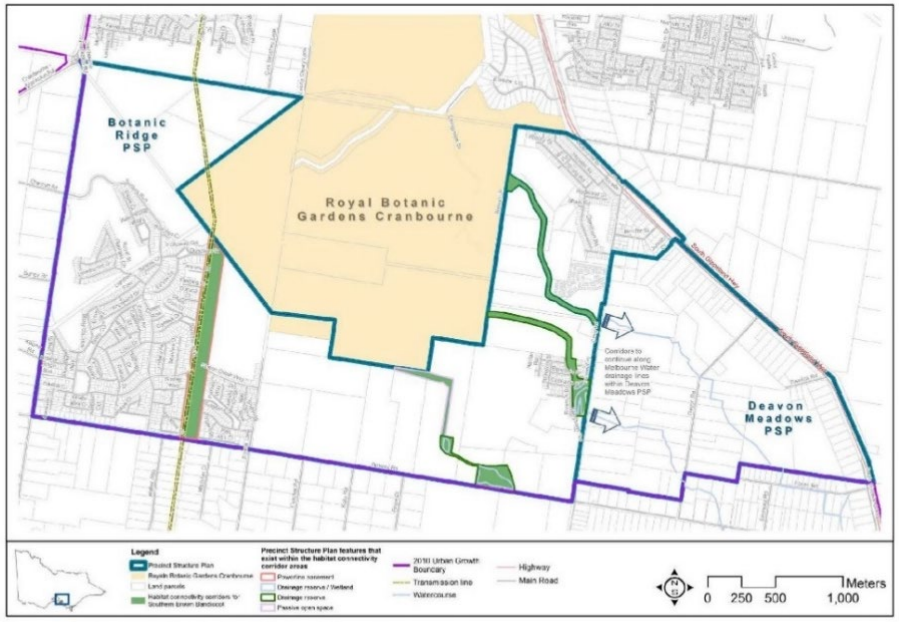


Figure 2: Southern Brown Bandicoot habitat connectivity corridors

Habitat Connectivity Supplement for the Southern Brown Bandicoot 2014

The strategy clarifies the commitments made to create and enhance habitat in the Botanic Ridge and Devon Meadows precincts to provide habitat connectivity that enables the Southern Brown Bandicoot to disperse between the Royal Botanic Gardens Cranbourne and rural areas to the south outside the Urban Growth Boundary (UGB).

The following principles are relevant for the Devon Meadows Precinct:

42. The Victorian government, through DEPI, the Metropolitan Planning Authority, Melbourne Water and the City of Casey, will create and enhance habitat

within drainage reserves, passive open space reserves and other areas unsuitable for urban development in the Devon Meadows Precinct for the Southern Brown Bandicoot and link these areas with the areas of habitat connectivity provided in the Botanic Ridge Precinct.

43. The drainage reserves, passive open space reserves and other areas subject to the creation and enhancement of habitat, and the management arrangements for this land, will be determined in consultation with the Metropolitan Planning Authority, Melbourne Water and the City of Casey during the precinct structure planning stage. The Country Fire Authority will be consulted to ensure that there is no increased fire risk to adjacent residential areas.

44. The provision of habitat connectivity for the Southern Brown Bandicoot will occur on land unsuitable for urban development and will not result in any loss of developable land in the Devon Meadows Precinct.

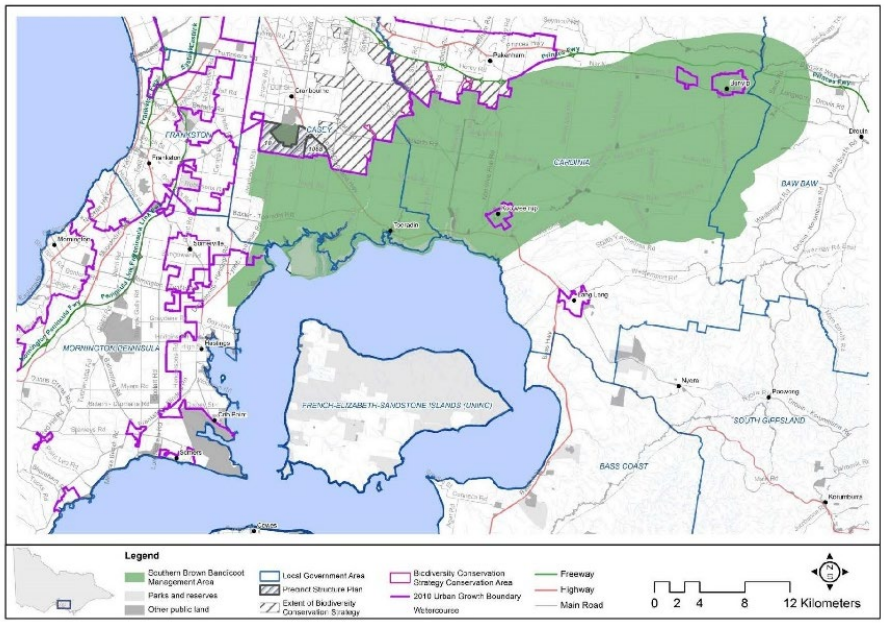


Figure 1: Southern Brown Bandicoot Management Area.

MANAGEMENT PLANS AND GUIDELINES

Western Port Green Wedge Management Plan 2019

The Casey Western Port Green Wedge Management Plan is a strategic land use plan that will guide the planning and management of the Green Wedge over the next 20 years. It provides objectives and strategies based on clear evidence and extensive community consultation that will assist Council in setting priorities and making decisions about the future of the Green Wedge.

The southern boundary of the study site interfaces directly with the Western Port Green Wedge along the latter's Precinct 2. The vision for this precinct is as follows:

- *The Casey Urban Growth Boundary Interface Precinct will help protect the Western Port Green Wedge from the impacts of urban development and further urban expansion.*
- *The Precinct will be managed to ensure that the current UGB is defensible in the long term and by providing a clear edge to metropolitan urban growth.*
- *The Precinct has the opportunity to "showcase" environmental living in Melbourne's South East by taking advantage of, and building on, its remnant indigenous fora and fauna, and its close proximity to the Royal Botanic Gardens, Cranbourne and the Western Port coast.*
- *Planning for the Precinct will also take advantage of the close relationship that exists between agriculture (including horse breeding and training) and its productive soils.*

Future Directions:

- *provide a permanent edge to metropolitan Melbourne*
- *maintain its rural character*
- *provide a transitional area leading to the Casey Rural Living and Agriculture Precinct and to the Casey Horticulture and Food Production Precinct*
- *provide a preferred location for non-rural uses such as primary and secondary schools and Places of Worship, specifically within the area bounded by Cranbourne-Frankston Road, Pearcedale Road and Browns Road, subject to strategic justification.*
- *protect and enhance native vegetation cover to provide habitat and movement corridors for native fauna, having regard to bushfire management issues.*
- *continue to be a location for animal breeding and training for the horse racing industry.*
- *offer a location for environmentally sustainable agriculture and horticulture.*
- *discourage the location of urban infrastructure therein without strategic and environmental justification proving that it could support the Precinct's vision.*

Casey's Southern Urban Rural Interface Design Guide 2020

The purpose of this Guide is to provide design guidance for the area interfacing the southern UGB in Casey. The guide provides a series of design principles and options that will assist Council's advocacy during the future Precinct Structure Planning of the urban areas and green wedge areas. The design solutions laid out in this document are high level design vision only. This document is not a statutory plan and does not provide guidance on land use. Rather, the guide promotes the southern urban-rural interface as an ecological, recreational, agri-industry and tourism asset and creates an attractive and sustainable edge to the city.

The Western Port Green Wedge has an internationally recognised environment, fertile soils, established equestrian and agriculture and horticulture industries. The Urban-Rural Interface aims to become an attractive and meaningful edge by enhancing these existing features of the area. The interface would limit development within the UGB, act as a buffer for agricultural uses, protect natural habitat, and offer passive recreational opportunities. The interface would limit development within the UGB, act as a buffer for agricultural uses, protect natural habitat, and offer passive recreational and storm-water management opportunities.

Relevant Urban Design Principles and Guidelines extracted from *Casey's Southern Urban Rural Interface Design Guide 2020* include the following:

Ecological – create a place with abundant landscape and canopy cover, habitat corridors and drainage waterways:

- Native vegetation - Strengthen native vegetation and increase the canopy cover along the corridor and within the urban area:

- Align with the goals and actions set out within the City of Casey Urban Forest Strategy.
- Support the City of Casey Revegetation Strategy.
- Protect and retain existing native vegetation and focus on native planting for introduced plant species.
- Ensure new vegetation plantings retain an appropriate setback for defendable space around dwellings.
- Ensure new native plantings in ecological corridors are of local provenance.

- Biodiversity - Connect habitat areas through linear landscape linkages that provide safe havens for native fauna and work to restore and enhance the natural environment.

- Ensure the width and nature of habitat areas and corridors are appropriate to support threatened species such as the Southern Brown Bandicoot and Growling Grass Frog.
- Provide and strengthen ecological connections to Royal Botanic Gardens Cranbourne and the future Clyde Regional Park.
- Manage pest animals and weeds and their impact on native fauna and flora.
- Support the City of Casey Biodiversity Strategy.
- Provide road underpasses and roadside fencing, at each roadway along the interface, to facilitate the movement of land-based native animals along the proposed green links.

- Along-side the Water Sensitive Urban Design (WSUD) initiatives, provide a separate habitat corridor that is not subject to inundation during storm events.

- Connection to nature - Support eco-tourism by creating a strong emotional and physical connection to nature, strengthening environmental interpretation and educational experiences linked to the habitat areas and celebrating the natural environment

- Support eco-tourism of the area by promoting key messaging around the environmental values of the area.
- Introduce signage and education aspects in specific locations that tie together to tell a holistic story around ecology along the interface.
- Consider the ongoing management of ecology and biodiversity areas and access to these important sites through path and trail connections and supporting infrastructure, whilst maintaining focus on protection.

- Integrated Water Management - Implement integrated water management and water sensitive Urban Design (WSUD) initiatives to enhance community liveability, reduce the negative impact of stormwater runoff on environment and promote sustainable water usage practices.

- Support provision for tree reserve with WSUD and passive infiltration (drainage assets) opportunities where necessary and practical along the edge of the UGB. This blue-green link can be a destination place for the wider community whilst supporting water management.

- Consider aspects of landscape design to support passive infiltration and integrated water management including filtration systems, water features and permeable surfaces to reduce surface runoff and assist in treating stormwater.
- Retain natural drainage systems and waterways, particularly those feeding into the rural area.
- Encourage sustainable water use practices within future development through inclusion of stormwater storage and reuse opportunities.
- Support the objectives of the City of Casey Integrated Water Management Plan.
- Utilise treated storm water runoff for any uses that are fit for purposes.

Liveability – Create a liveable mixed-use neighbourhood underpinned by strategic principles around 20-minute neighbourhoods, sustainable land use and economic growth:

- Transitional Land Uses and Built Form - Use transitional land uses and built form to ease the abrupt interface between urban development and traditional green wedge uses.

- Subdivision of land along the UGB interface should consider options for appropriate and gentle density transitions from medium to low density.
- All development along the interfaces to road 1 category, open spaces and key landscape features should provide active frontages and path connectivity.

- Agrihood Communities – Leverage 'agrihood' opportunities benefitting residents from the proximity of farming and agriculture activities, connecting urban communities through shared interest, where possible.

- Include productive landscapes where appropriate in landscape design (noting a preference for native vegetation overall).
- Adopt agricultural theming within the public realm and in landscape architecture.
- Investigate the development of community gardens where possible during subdivision stages.

- Walkable and Safe - Employ principles of walkability, accessibility and good neighbourhood design along the southern urban rural interface and the surrounding precincts to ensure the area is well connected, liveable and feels safe.

- Provide an appropriate urban density and well-designed streets that provide Crime Prevention Through Environmental Design, passive surveillance and safe public areas.
- Create nodes of activity as focal points within the public realm.
- Ensure streets are walkable streets with positive edge interfaces and adequate walking paths.
- Ensure that children's independent mobility is catered for within neighbourhoods to strengthen the sense of community.
- Avoid development backing onto the corridor to prevent any orientation issues.

- Urban Rural Participation - Encourage community and industry participation in neighbourhood activities to build a sense of belonging and promote a unique and locally relevant identity and sense of community.

- Establish a business owners group, if there is no existing group and facilitate road side stalls precinct where possible.
- Consider use of car parks for community markets over the weekend.

Recreation and Amenity – optimise outdoor lifestyle benefits, aesthetic quality and a strong sense of recreational amenity for the community:

- Landscape and Heritage Character - Celebrate the green character, rural feel, scenic amenity within the setting and Indigenous and European heritage along the corridor.

- Identify significant vegetation and its merit for retention.
- Create a continuous tree canopy along the corridor to reduce the impact of climate change by introducing 'drought tolerant' street tree planting plan to supplement existing trees where appropriate.
- Include greenery within open spaces including shrubs and canopy trees to enhance the green character
- Retain long views and vistas to the wider rural setting where possible including views to the Dandenongs at the eastern edge of the corridor.
- Include listed heritage structures during design interventions
- Investigate ways to promote and preserve the indigenous cultural heritage of the area through interpretation, design reference and other means to be determined in consultation with the traditional owners of the land.

- Open Spaces - Provide a diversity of open spaces to meet a range of recreation and environmental needs and create a range of activities to support community health and wellbeing.

- Include different types of open space including passive, active and linear open space.
- Develop, manage and program parkland to provide unique offerings and target a broad range of the community to connect socially and be active, including spaces for children and elderly to enjoy the outdoors.
- Maximise opportunities for residents and visitors by creating destinations that celebrate and incorporate water features, bushland, nature, recreation, sport, and historical uses of land.
- Support the objectives and strategies contained within the City of Casey Open Space Strategy and the Victorian Government's Metropolitan Open Space Strategy
- Leverage existing and future waterways, disused railways etc for increased recreational amenity.

- Outdoor Trails - Encourage outdoor, healthy lifestyles that capitalise on the location and its inherent amenity and support connectivity through walking, cycling and equestrian use.

- Develop an integrated active trail / shared user path network that provides numerous route opportunities including loop systems that link

key precincts, land uses and natural areas. Provision of bicycle facilities along this network.

- Provide paths, potentially dedicated as per Casey's Walk & Ride Strategy that connect to existing trails and the future regional trail along Cardinia Creek.
- Lifestyle related land uses – golf, bushwalking, orienteering and trail running and riding.
- Consider heritage walks celebrating farming history.

- Gateways and Markers - Use gateway treatments and markers to enrich the public realm and assist with wayfinding.

- Delineate key intersections and celebrate the transition between the urban and rural communities through public realm treatments, public art and landscape statements.
- Reference heritage within the public realm statement pieces including a potential avenue of honour, the history of agriculture in the area and indigenous cultural heritage.

- Buffers - Utilise roadways and linear open space to provide a sense of separation where land uses are not complementary.

- Buffer planting that exists along the corridor should be retained.
- Additional buffer planting should be introduced where required.

3. Vision

"To create a permanent and sustainable urban-rural interface by transforming the Southern UGB from an abrupt edge to a dynamic place that celebrates the meeting of the urban and the rural settings"

Image 9: Urban Design Principles Plan

Appendix 2: Habitat Design Guidelines for the Southern Brown Bandicoot

The following information has been extracted from various sources, including:

- *Guidelines for Best Practice Management of Modified Habitats for Southern Brown Bandicoots (MASTERS, N., TAYLOR, R and MACLAGAN, S., 2019)*
- *Southern Brown Bandicoot Strategic Management Plan for the Former Koo Wee Rup Swamp Area (Ecology Australia, 2009).*

The Southern Brown Bandicoot (*Isoodon obesulus obesulus*) is listed as Endangered under Commonwealth EPBC Act and threatened under the state FFG Act. It is listed as Near Threatened in Victoria on the state advisory list.

It is a medium sized, ground dwelling marsupial with brindled grey-brown, buff and black fur, a long, pointed snout, small eyes, short rounded ears, a compact body, large rump and sparsely furred short, thin tail approximately half of the body length (Menkhorst 1995). Southern Brown Bandicoots are largely solitary animals and usually forage alone at night.

Threats:

- Predation by introduced carnivores;
- Habitat loss, fragmentation and isolation; Inappropriate fire regimes;
- Introduction of weeds and disease;
- Grazing pressures;
- Changes in hydrological regimes;
- Broad-scale removal of important exotic habitat; and Road mortality.

General Habitat Requirements:

- Southern Brown Bandicoots (eastern) are known to inhabit a variety of habitats including heathland, shrubland, sedgeland, heathy open forest and woodland and are usually associated with infertile, sandy and well drained soils, but can be found in a range of soil types (Coates et al. 2008; Menkhorst and Seebeck 1990; NSW DEC 2006; Paull 1993).
- Species experts define suitable habitat for Southern Brown Bandicoots (eastern) to be any patches of native or exotic vegetation, within their distribution, which contains understorey vegetation structure with 50–80% average foliage density in the 0.2–1 m height range.
- Vegetation structure appears to be more influential than floristics in determining Southern Brown Bandicoot (eastern) abundance (Brown & Main 2010). In particular, the density of ground layer vegetation appears to be important - sites with greater vegetation density in the ground layer are generally preferred (Claridge & Barry 2000; Claridge et al. 1991; Lobert 1985; Lobert 1990; Opie 1980; Paull 1993; Paull 1999; Wilson 2004).

	Dominant species	Structure	Suitability
Tallest stratum	*Banksia* spp.	heathland	Optimal
	Casuarina spp.	low woodland, low open woodland	Optimal
	Eucalyptus spp.	tall open forest, open forest, low open forest, woodland, open woodland, low woodland, low open woodland, open scrub tall shrubland, tall open shrubland	Optimal
	Melaleuca spp.	low woodland, low open woodland	Optimal
	Acacia spp.	low open woodland	Suboptimal
	Mixed or other	low woodland, low open woodland, tall shrubland, tall open shrubland, heathland, open heathland	Suboptimal
Lower stratum		low shrubs <2 m	Optimal
		low trees <10 m	Suboptimal
		tall shrubs >2 m	Suboptimal

- Southern Brown Bandicoots (eastern) use dense, low vegetation for nest and shelter sites (Lobert & Lee 1990; Paull 1993; Stodart 1977; Wilson 2004), construct leaf/grass nests in depressions within this vegetation (Paull 1993; Paull 1995) and possibly also dig burrows (Long 2009, cited in Brown & Bain 2010).
- Coarse woody debris is also important, as logs may offer shelter and nesting sites (Claridge 1988). Southern Brown Bandicoots (eastern) in northern Sydney have also demonstrated opportunistic use of spaces under rocks and burrows created by other animals (Ecotone Ecological Consultants 2003, cited in Brown & Main 2010). The subspecies may dig its own burrows to avoid extreme weather conditions and fire (Long 2009, cited in Brown & Main 2010).

Connectivity Corridors:

- Corridors should be as wide as possible to maximise habitat potential. Ideally, they should have a minimum width >10m, but a width of 30m or greater is better.

- Corridors as narrow as 5m wide still have some value for SBB and should be provided wherever possible.

Interface 7: Bandicoot Re-vegetation Intersection

This cross section provides a solution for locations where a bandicoot trail crosses the UGB and the roads that intersect with the UBG interface. Such crossings are needed to facilitate the proposed migration of Southern Brown Bandicoots between the Royal Botanic Gardens Cranbourne and the Future Clyde Regional Park.

Revegetation:

- Staged, minimal disturbance weed control and revegetation with tube-stock will be the primary method of habitat enhancement.

- Revegetation should be based on the original vegetation of the local area. All plants used in revegetation must be of indigenous species naturally occurring in the former or current EVC.
- Promote the development of a continuous, dense layer of understorey vegetation, up to approximately 1.5 m in height.
- Plants must be planted at the correct densities, which will provide 'rapid closure' or the rapid growth of an impenetrable ground and understorey layer.
- Dense plantings will also suppress the growth of weeds.
- Overstorey or canopy species (i.e. trees), must not impede the understorey. Trees should be planted sparsely to form an open canopy.
- Similarly, Melaleuca species should be planted in scattered clumps, allowing dense understorey vegetation to establish and persist in intervening areas.
- Medium shrubs and small shrubs can be planted relatively close together, and at the field layer, large graminoids should be spaced very closely to provide the maximum amount of cover.

Roads and Railways:

- For roads with adjacent SBB habitat, reduce speed limits, install speed humps/traps or erect appropriate signage to highlight conservation significance.
- Where necessary, install small gauge fences along roads/rail corridors (25x25mm gauge) that lead to or end at a crossing point (underpass/overpass). SBB move freely through 50mm diamond mesh fencing.
- Fencing may not be appropriate if it: fragments habitat, reduces connectivity, isolates SBB populations, prevents movement during critical periods (fire events), leads to entrapment of any species, funnels species towards roads/rail corridors, leads to mortality or blocks escape routes.
- Provide alternative crossing points such as underpasses, tunnels, pipes or culverts beneath road/rail corridors to assist with SBB connectivity.
    - >300mm diameter recommended. Limit length to encourage SBB usage.
    - Limit the length of crossing structures where possible to encourage SBB usage.
    - If longer than 30m in length provide light and drainage openings.
    - Provide woody structures, thick, dense vegetation at entrances and implement a predator control program.
    - Consider the use of wooden bridging structures within culverts to allow for SBB movement when culvert is flooded. Bridging structures should be square sided (not rounded) and be approximately 200mm wide.
- Any gaps in vegetation should be no greater than 7m along road/rail corridors whenever possible.

Artificial Shelters:

- Artificial structures can provide SBB with additional cover and protection from introduced predators although they should not be used to replace the cover provided by dense vegetation.

- Man-made structures can be placed in areas where SBB are known to inhabit, and where natural options for cover or nesting are limited.
- Piles of brush and woody debris can also be used to provide shelter. Use existing, natural woody debris (logs, branches etc.) and place it in piles of at least 1.0m2 in areas where SBB are known to occur, especially if vegetation cover is lacking.
- Place shelters a maximum of 10m apart in areas where the vegetation has been cleared to facilitate the movement of SBB between areas of suitably dense vegetation.

Predator Management:

- Adopt domestic animal exclusion zones within 1 km of SBB habitat in urban-fringe areas; and within 2.4 km of SBB habitat in rural areas. Where this is not possible, enforce or encourage confinement of domestic animals to private properties.
- Erect predator exclusion fencing where possible to protect important SBB Habitat.
- Establish an integrated pest control program with a strong collaborative approach between stakeholders, including land managers and local experts.

Vegetation Management:

- SBB require dense groundcover vegetation with >50% average foliage density within the 0.2-1m height range. Aim to maintain habitat connectivity for SBB by avoiding gaps >7m wide.
- Where grassy vegetation needs slashing/mowing, retain a >3m wide contiguous strip of cover to allow for SBB movement.
- Limit stock grazing and vehicle access in areas of vegetation likely to provide habitat for SBB.
- Provide buffer zones of suitable dense vegetation >10m wide between developments and known or likely SBB habitat.
- SBB are often slow to move from the path of vehicles/machinery. Where vehicles/machinery are required to move through SBB habitat, they should not exceed a speed of 5km/hr (i.e. walking speed) to allow animals a greater chance of moving out of their path.
- To "push" SBB towards suitable habitat, any vegetation slashing or clearing should be done in a pattern that maintains connectivity of habitat for as long as possible and avoids creating isolated patches (i.e. strip or zig-zag pattern).
- Where possible, cutting blades should be set at a height of 20cm or higher, to avoid the chance of blades striking SBB.
- Where substantial vegetation is being removed, provide artificial structures to provide alternative refuge for SBB (see Guideline on "Artificial Shelters").

Appendix 3: Habitat Design Guidelines for the Growling Grass Frog

The following information has been extracted from *Growling Grass frog Habitat Design Standards (Victoria Department of Environment, land, Water and Planning, 2017)*.

The Growling Grass Frog *Litoria raniformis* is listed as a threatened species under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

It is a large species of frog growing to a size of 85 millimetres. It is dull green to bright emerald green with blotches of brown or rich golden bronze, numerous large warts above and whitish flesh below. It has a narrow blackish stripe from the nostrils along each side to the groin. The groin itself is bright blue or blue-green (Cogger 2000).

The Growling Grass Frog is predominantly aquatic and associated with vegetation fringing permanent waterbodies such as streams, lagoons, farm dams and old quarry sites (Cogger 2000). It is usually associated with water bodies supporting large areas of fringing and aquatic vegetation such as Common Reed (Phragmites australis), Cumbungi (Typha spp.) and Water Ribbons (Cycnogeton procerum) (Organ 2002).

Growling Grass Frogs breed in summer and prefer permanent waterbodies or those in close proximity to permanent water so that tadpoles have sufficient water in which to complete development. In these areas, frogs over-winter beneath thick vegetation, logs, rocks and other ground debris, sometimes at considerable distances from waterbodies (Smith and Clemann 2008).

It has been reported that Growling Grass Frogs are capable of moving up to one kilometre in 24 hours (Smith and Clemann 2008). Where multiple waterbodies occur in close proximity, metapopulation dynamics appear to be important (Heard et al. 2006). The long-term viability of such metapopulations is dependent on the rate of dispersal. Hence, alterations to the landscape that decrease connectivity between habitat patches or create barriers to dispersal are likely to have negative consequences for the viability of the metapopulation (Smith and Clemann 2008).

Threats:

- Permanent removal of habitat through constructing infrastructure, draining wetlands and filling quarry pits;
- Changed hydrological regimes including timing, frequency, volume and speed of flows, and lowering of groundwater through pumping of aquifers;
- Poor water quality including nutrients, turbidity (cloudiness caused by suspended particles), pesticides, detergents and heavy metals. High levels of nutrients cause eutrophication (dense growth of algae and plants) which results in lowered dissolved oxygen levels that do not support tadpoles (Hamer et al. 2004);
- Aquatic vegetation changes including scouring of vegetated pools, or overgrowth due to increased nutrient levels;

- Disease and death caused by the chytrid fungus Batrachochytrium dendrobatidis;
- Predation by introduced fish and yabbies;
- Loss of connectivity between habitats, including barriers posed by roads, other infrastructure or unsuitable habitat;
- Overshadowing of pools;
- Overly dense terrestrial vegetation adjacent to a wetland; and
- Grazing damage to wetland margins, including removal of vegetation and shelter, and reduction in water quality.

Cluster Designs:

- Existing wetlands within conservation areas that support populations of Growling Grass Frog should be retained;
- Existing wetlands within conservation areas with the potential to support Growling Grass Frog populations over the long term should be enhanced to improve their suitability as habitat (for example by increasing their size, permanency and aquatic vegetation cover) where this will not impact on existing values (e.g. Seasonal Herbaceous Wetland);
- Clusters should contain at least 10 off-stream breeding wetlands, although smaller clusters may be acceptable in shorter reaches where there are fewer opportunities for wetland creation;
- The cluster total includes existing waterbodies to be enhanced or expanded, but does not include instream pools or billabongs that are likely to be frequently inundated because of the higher risk that these will become unsuitable for breeding;
- Wetlands should be no further apart than 200 - 300 m where possible, taking into account limitations in where wetlands can actually be constructed;
- At least three-quarters of the wetlands within a cluster should be permanent, or as close to permanent as practicable (excluding naturally seasonal wetlands); the critical period in which water is required is the breeding season which is generally between September and February;
- Each cluster should include a variety of wetland types to provide conditions suitable for different frog lifecycle stages (tadpoles, adults, breeding, egg-laying) and the control of chytrid fungus in adult Growling Grass Frogs;
- At least half of the wetlands within a cluster must be designed as "anti-chytrid" refuges with rocky basking sites and warm shallows, and preferably groundwater-fed; and
- All new wetlands must be constructed offline (that is, not within, or hydrologically connected to, a stream other than during exceptional floods).

Size:

- The surface area of most new wetlands in a cluster must be at least 0.3 ha where space allows. Where space is limited, the surface area of wetlands can be reduced, but not below 0.15 ha. In all cases the submergent zone must be at least 0.1 ha in area; and
- If possible, at least one wetland in a cluster should be large (greater than 0.7 ha); in some cases this could be achieved by merging two standard (medium) sized wetlands.

Shape:

- Wetlands must be wide enough to efficiently provide the required area of deep water for submerged vegetation; and
- Islands within the wetland are not permitted, as they are likely to encourage excessive numbers of waterbirds which may increase predation pressure and contaminate the shallows with concentrated droppings.

Water Depth and Gradient:

- All wetlands must incorporate a deep water submergent vegetation zone, constituting a minimum of 50 per cent and preferably 60–70 per cent of the total wetland surface area at normal water level;
- The water depth in the submergent zone must be maintained at greater than 1.5 m. Wetlands with greater maximum depths are desirable and should be constructed if feasible;
- The emergent vegetation zone should occupy approximately 30–40 per cent of the wetland area, and should include a littoral zone with fluctuating water levels (for example between normal water level and the summer drawdown level); and
- A variety of slopes must be incorporated into the design of the banks, including steep drop-offs wherever this can be accommodated within land managers' safety standards.

Wetland Hydroperiod:

- At least three-quarters of the wetlands in a cluster should have a permanent hydroperiod, and as many as possible should hold water over the breeding season (September to February). Ideally water levels should draw down naturally over late summer and autumn;
- Semi-permanent and ephemeral wetlands may be acceptable where there is limited capacity to provide a permanent wetland or if there is a specific requirement (for example to maintain a natural Seasonal Herbaceous Wetland); and
- New wetlands should be designed to allow them to be periodically dried out for management and maintenance purposes (for example the control of predatory fish).

Wetland Lining and Substrate:

- The wetland must be lined (usually with clay rather than synthetic material) to prevent leakage; and
- A layer of soil must be placed over the liner. It must be suitable for establishment and long-term persistence of aquatic plants, and must not result in high turbidity after wetland establishment. Clay soil is acceptable for use as a substrate.

Thermal Properties:

- Wetlands must be large and deep to provide thermal inertia;

- Wetlands must incorporate an extensive, shallow, permanently inundated emergent zone where water temperatures will be elevated due to the heat of the sun;
- All wetlands should incorporate jumbled piles of rocks around at least 20 per cent of the margin, extending into the wetland at least one metre from normal water level;
- "Anti-chytrid" wetlands in the basalt region (where excavated material can be used on site rather than paying for disposal offsite) should incorporate rocks around 50 per cent of the wetland margin if within budget; and
- Embankments to cut prevailing winds may be useful, and can be constructed from excavated material.

Wetland Water Source:

- Groundwater is generally preferred, where feasible; and
- Use the best possible source of water in response to each set of circumstances (more information on water source and quality standards is available in *Growling Grass frog Habitat Design Standards, 2017*).

Aquatic Vegetation:

- It is assumed that initial plantings will spread quickly if wetland conditions are suitable, so the whole wetland does not need to be planted out. For example, submergent species would normally be planted on the slopes of the wetland, rather than at the maximum depth. The proportion of a wetland to be planted will be determined during the project planning phase;
- Planting density must be such that it results in the establishment of a dense (target 50 per cent) cover of submergent/floating vegetation in the deep water zone and patches of emergent vegetation within several years. As a guide, planting densities to create patches of emergent vegetation are generally 4 – 6 plants per square metre. Planting densities for patches of submergent vegetation can be lower;
- A diversity of vegetation is highly desirable;
- Species to be planted in Growling Grass Frog wetlands must be selected from those shown in Appendix 1, taking account of local water quality conditions (brackish wetlands should be planted out with species adapted to growing in moderately salty conditions);
- In the deep water zone, submergent/floating species must include Water Ribbons (Cycnogeton procerum - formerly Triglochin procera) and species from the genus Potamogeton – or if the water is brackish, Fennel Pondweed (Stuckenia pectinata - formerly Potamogeton pectinatus);
- Exotic species must not be used; and
- Common Reed (Phragmites australis) and bulrushes (Typha spp.) do not need to be planted as they are likely to establish naturally over time.

Predator Control :

- All newly constructed wetlands must be offline. Wetlands constructed within a floodplain should incorporate bund walls to reduce the frequency of fish incursion; and

- Incorporate a fish exclusion filter in the hydraulic connection system between the source of treated stormwater or creek/river water and the Growling Grass Frog wetland.
- depth – deep water may assist with predator avoidance (especially predatory birds) and some predatory fish species such as Eastern Gambusia prefer to aggregate in shallow parts of the wetland where temperatures are higher;
- hydroperiod – dry wetlands out as required to remove or control populations of fish, yabbies and other predators; and
- aquatic vegetation – provides refuge for tadpoles.

Terrestrial Habitat:

- A minimum 50 m buffer from development must surround each wetland, in which major infrastructure such as roads, car parks, and buildings should be avoided (unless the wetland is constructed closer than 50 m to the conservation area boundary because of space constraints);
- Shared use paths, other minor infrastructure for passive recreation and stormwater assets must not be constructed closer than 30 m from the normal water level of a breeding wetland;
- Approximately 50 per cent of the area within 10 m of the wetland's normal water level must designed to be maintained as low, grassy vegetation up to 10 cm in height;
- Where tussock-forming grasses and sedges are used in the zone that is within 10 m of normal water level, planting density should allow for no greater than 20 per cent cover when mature;
- Mulch must not be used within 50 m of a wetland;
- Shrubs must not be planted within 10 m of the wetland's normal water level;
- Rock piles at least one metre deep must be constructed adjacent to the wetland margin using a variety of rock sizes between 10 cm and one metre in diameter;
- Where possible, the area between 10 m and up to 100 m (where space is available) from the wetland should be designed to be maintained primarily as short, mown grass with an open structure (for example 20 per cent cover);
- Tree cover within 100 m of a wetland should not exceed 10 per cent;
- Shrub cover within 100 m of a wetland should not exceed 10 per cent;
- A patchy arrangement of denser plantings of tussock-forming species is encouraged to maintain some potential terrestrial shelter sites;
- Low, grassy vegetation areas do not need to be native vegetation (mown pasture grasses and even lawn are acceptable); and
- Invasive plant species must not be used anywhere within the terrestrial habitat zone.

Figure 1 Growling Grass Frog conservation area overview

Figure 2 Growling Grass Frog habitat design

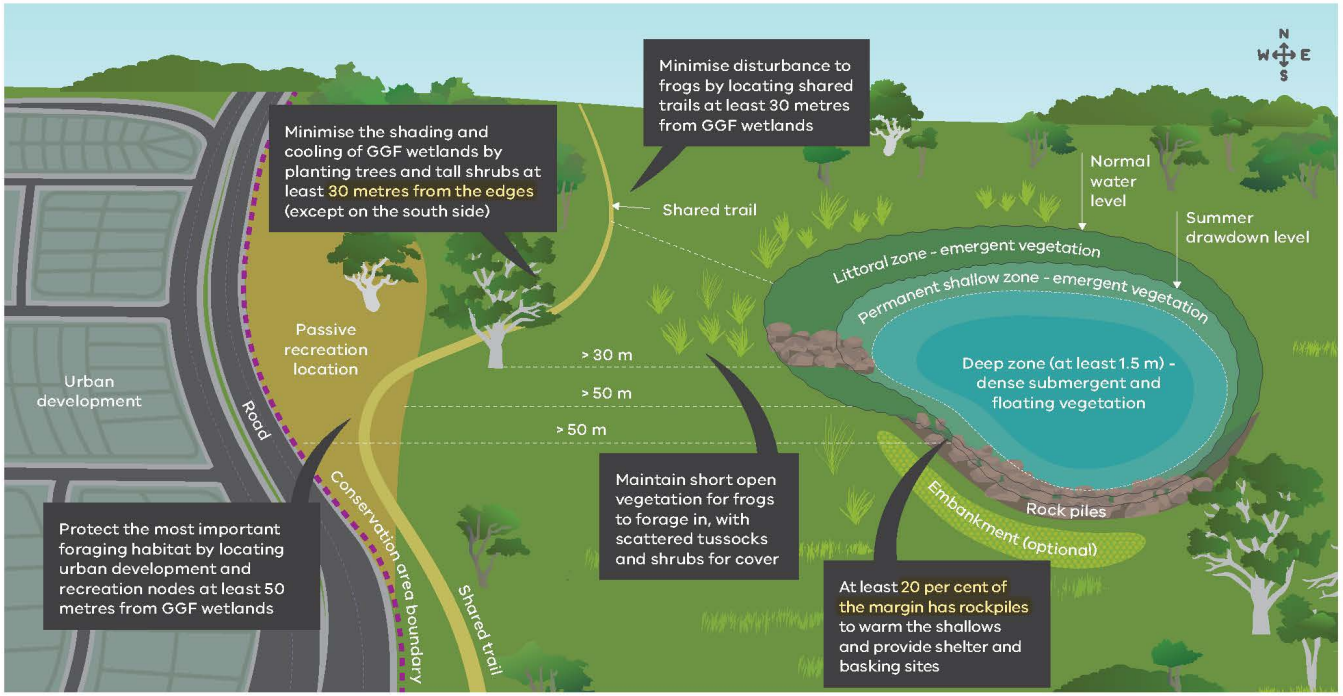
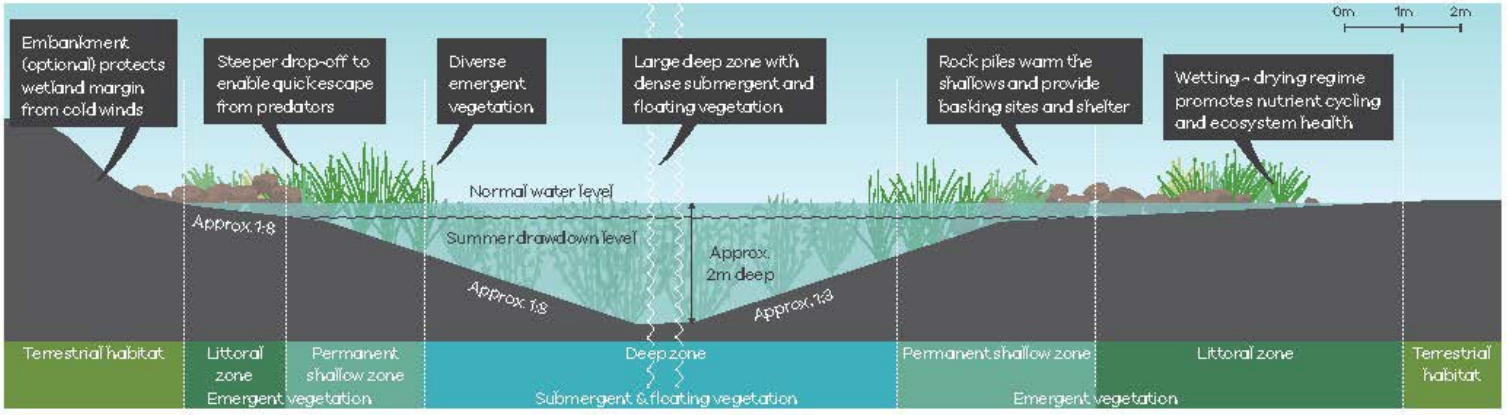


Figure 3 Growling Grass Frog wetland attributes



Embankment
Photo by Nina Polon, Melbourne Water

Jumbled rock piles
Photo by Peter Robertson, Wildlife Profiles Pty Ltd