5. Ecological survey results

The site has been assessed by SHG Ecologists as part of a detailed ecological assessment. Site assessments were undertaken on the following dates: 14,15 and 17 March 2022. Refer to **Table 7** below for summary of weather during the survey period. This assessment included recording ecological values within the application area in accordance with Commonwealth and State ecological survey guidelines and identifying environmental constraints on development. Refer **Plan 1** for field survey effort.

Table 7: Survey weather data

Date	Min Temp (°C)	Max Temp (°C)	Rainfall (mm)
14 March 2022	14.8	24.1	0
15 March 2022	13.3	23.9	0
17 March 2022	15.5	25.5	0

Bureau of Meteorology: Station 041529

5.1. General site observation

The following observations have been made based on detailed field surveys:

- The investigation area incorporates five lots totalling approximately 49.5 ha. Access is via Toowoomba Gowrie Junction Road, through neighbouring properties, to the east. The site is bound by Toowoomba Bypass to the north and west, Toowoomba Connection Road to the south and Gowrie Junction Road further east.
- The investigation area is mapped as containing primarily Category X (non-remnant) vegetation with Category B (remnant) vegetation within Lot 118 and 119 on SP203198 and partially within Lot 117 on A345.
- One waterway is mapped in the northern corner of the site (on Lot 119 on SP203198).

5.2. Mapped Category B (remnant)

An area of approximately 12 hectares of Category B (remnant) vegetation is mapped within Lot 118 and 119 on SP203198 and partially on Lot 117 on A345 consisting of 'Least Concern' RE11.8.5. Vegetation within this area was dominated by *Eucalyptus orgadophila* (Mountain Coolibah) with scattered *Corymbia tessellaris* (Moreton Bay Ash). Retained large mature trees were present within this area as well as small specimens consistent with regrowth vegetation. The shrub layer was sparse, and the ground layer dominated by a combination of native and non-native pastoral grasses. Invasive species at the ground level exist in varying densities, predominantly *Verbena Tenuisecta* (Mayne's Pest), *Bidens pilosa* (Cobbler's Pegs) and *Verbena bonariensis* (Purple-top Verbena). Species observed within this area are indicative of the RE mapping of 11.8.5.



Detailed site assessment within the northern section identified the extent of the remnant polygon to be mapped incorrectly and to be less than the mapping overlay, where mapping overlays identified areas confirmed to be devoid of trees. Refer **Plan 2.2** for rectified Category B area. However, the development design intends to avoid this area (refer **Plan 3).**





Photo set 1: Category B (remnant) vegetation.

5.3. NCA (Protected Plants Flora Survey Trigger)

A portion of northern extent of the site is mapped by Protected Plants Flora Survey Trigger mapping as High Risk (refer **Figure 5**). No threatened plants were identified throughout either survey (refer **Section 5.7**). However, the development design intends to avoid this area (refer **Plan 2.2 and Plan 3**).

5.4. Waterways

One waterway is mapped on site and extends through the northern corner of lot 119 on SP203198. A detailed waterway assessment was completed for this waterway:

5.4.1 Mapped Waterway (Northern corner)

- Mapped as a watercourse of Stream Order 1 under the *Vegetation Management Act* as well as a Low value waterway for waterway barrier works (under the *Fisheries Act*). Extends partially through the northern corner of lot 119 on SP203198.
- This flow path is presently undefined under the Water Act.
- This mapped waterway does not retain any fish habitat for breeding or rearing of young and the mapped waterway does not provide access to any critical habitat for food and protection for fish species.
- The waterway is mapped as containing non-remnant vegetation. Canopy trees, sub-canopy trees and shrub regrowth of *Eucalyptus orgadophila* (Mountain Coolibah) and *Corymbia* tessellaris (Moreton Bay Ash) were identified in the extended area surrounding the mapped waterway.



Table 8: Mapped waterway (northern corner) observed attributes

Physica	Physical and Hydrological Attributes of a Waterway (Northern Waterway)				
1.	Defined bed and banks	The mapped waterway contained small sections of minor discontinuous bed and bank features identified throughout, however these features were mainly absent. All other features were minor erosion points in the central part of the waterway. Likely due to a lack of native vegetation and historical cattle grazing.			
2.	An extended, if non-permanent, period of flow.	No attributes throughout the mapped waterway would provide any opportunity for an extended period of flow or potential pooling. Some minor waterway features in the form of deposited material, rocks and bed and bank features were noted. However, there is no evidence of flow beyond the duration of major rain events with the flow path identified as discontinuous.			
3.	Flow adequacy.	No in-stream habitat, riparian vegetation (which is dependent upon significant water availability), or damp areas/features capable of sustaining ecological processes representative of a waterway, was identified throughout the mapped waterway. Connectivity along the mapped waterway is discontinuous. It is also noted that the downstream portion of the waterway continues offsite to a rocky drainage pathway with a nearby culvert from under the Toowoomba Bypass.			
4.	Fish habitat at, or upstream of, the site.	No in-stream habitat is identified throughout the mapped waterway. Water pooling and fish movement opportunities are non-existent with no obvious flow path identified in any portion of the mapped waterway. No overhanging embankments, flow path, wood debris, or wetland-dependant flora or fauna was identified throughout the mapped waterway.			



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Photo set 2: General observations of the mapped waterway (northern corner), no bed and bank features and a discontinuous channel up and down stream. Far culvert leading under Toowoomba Bypass to the west (bottom right).

5.5. Non-remnant vegetation (balance)

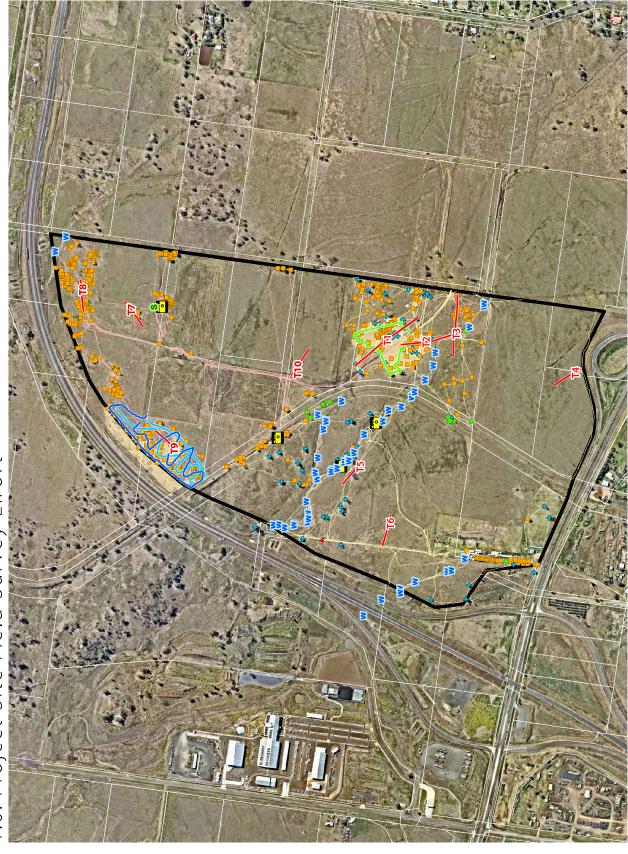
The balance of the site consists of Category X (non-remnant) vegetation supporting open paddocks with pasture grasses and limited scattered, mature trees, predominantly *Eucalyptus orgadophila* (Mountain Coolibah) and *Corymbia tessellaris* (Moreton Bay Ash) (see **Photo set 3**). A combination of both native and non-native grasses dominated throughout the entirety of the site, inclusive of *Aristida calycina* (Dark Wiregrass), *Heteropogon contortus* (Black Speargrass), *Themeda triandra* (Kangaroo Grass), *Dichanthium sericeum* (Bluegrass) and *Themeda quadrivalvis* (Grader Grass). Invasive ground cover species are present in varying densities across the site primarily *Verbena Tenuisecta* (Mayne's Pest), *Bidens pilosa* (Cobbler's Pegs) and *Verbena bonariensis* (Purple-top Verbena).





Photo set 3: Balance of the site, Category X (non-remnant).

1.0. Project Site Field Survey Effort



Waterway Observation Point

Habitat Quality Transects March 2022 Track Log

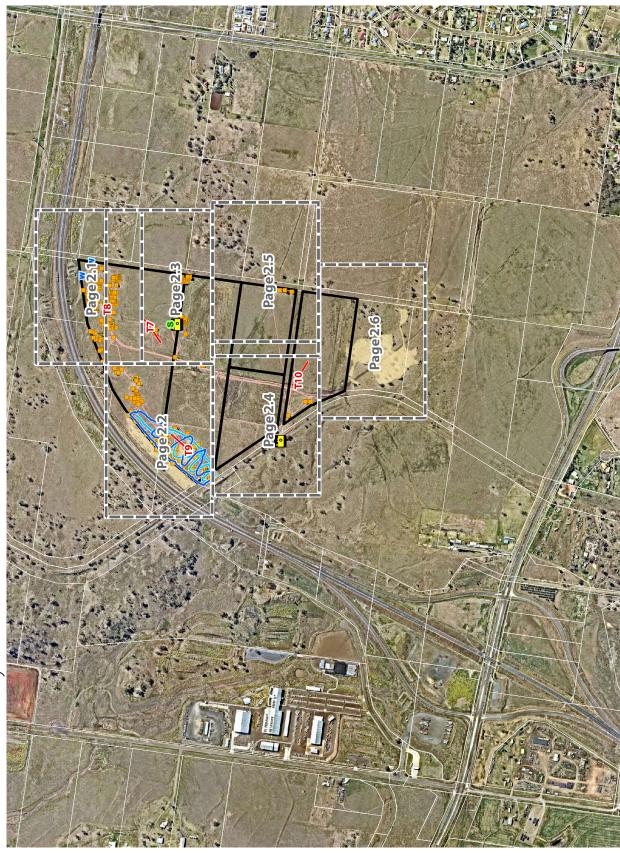
Legend







2.0. Field Survey Effort



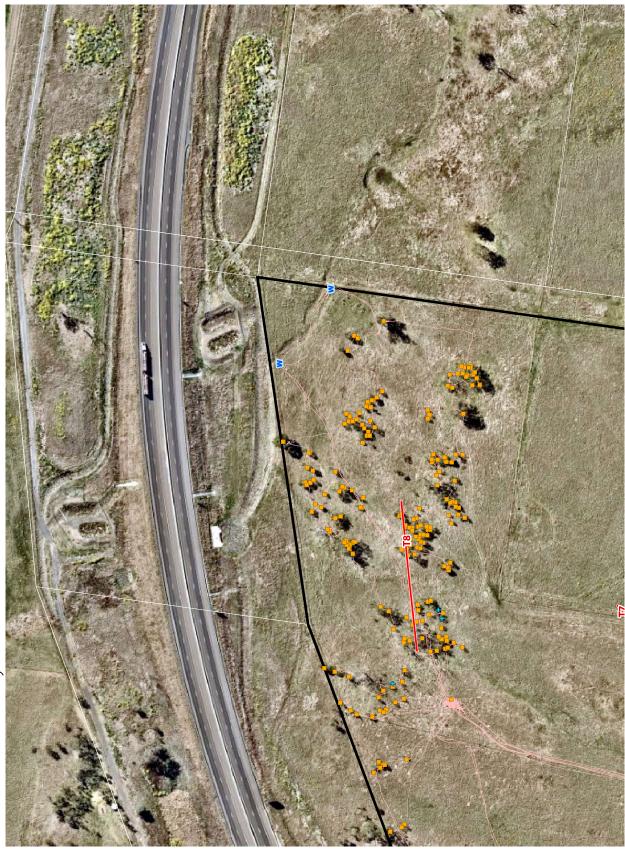
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Habitat Quality Transects

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2.1. Field Survey Effort

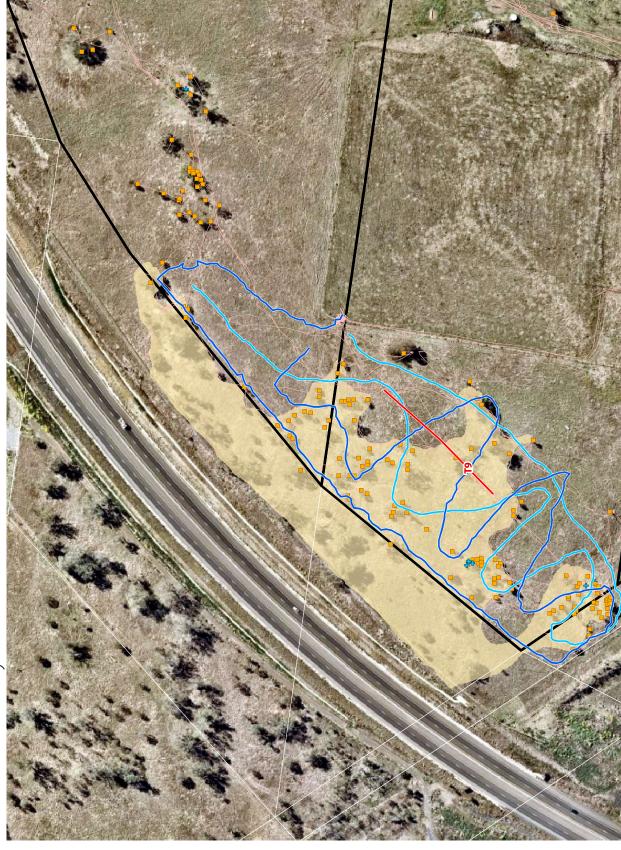


Legend

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2.2. Field Survey Effort



Legend

Track Log

Habitat Quality Transects

Waterway Observation Point

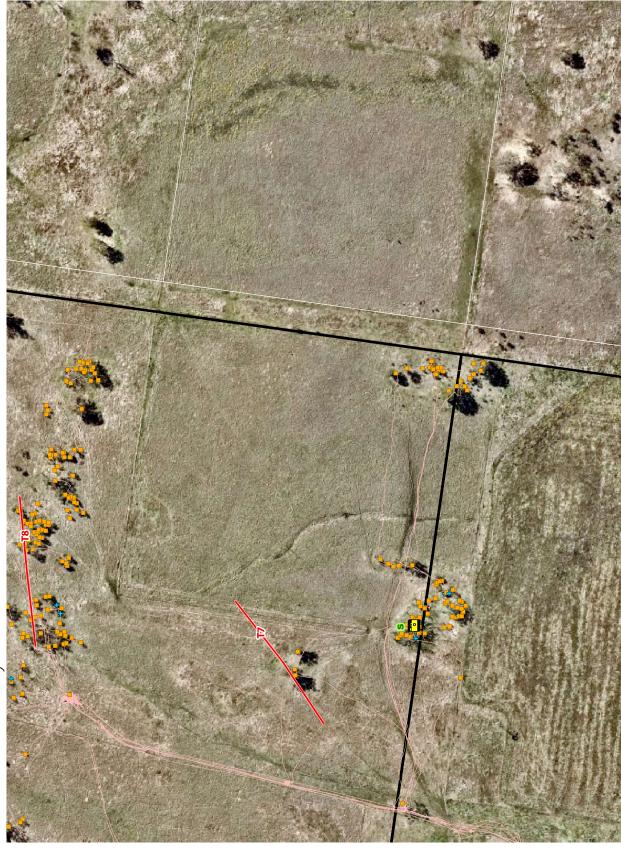
Fauna Camera Locations

GPS Tree Plot

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2.3. Field Survey Effort



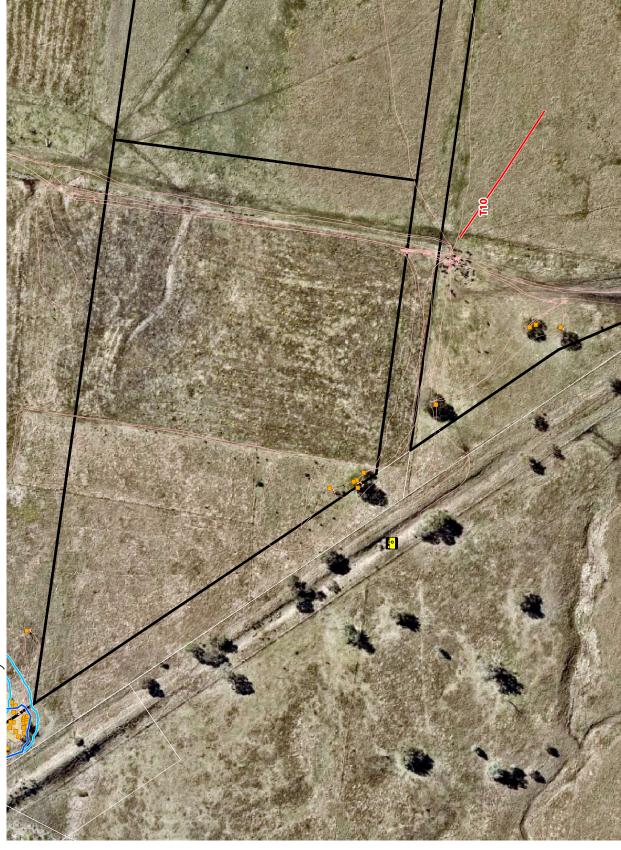
Legend

Habitat Quality Transects





2.4. Field Survey Effort



Legend

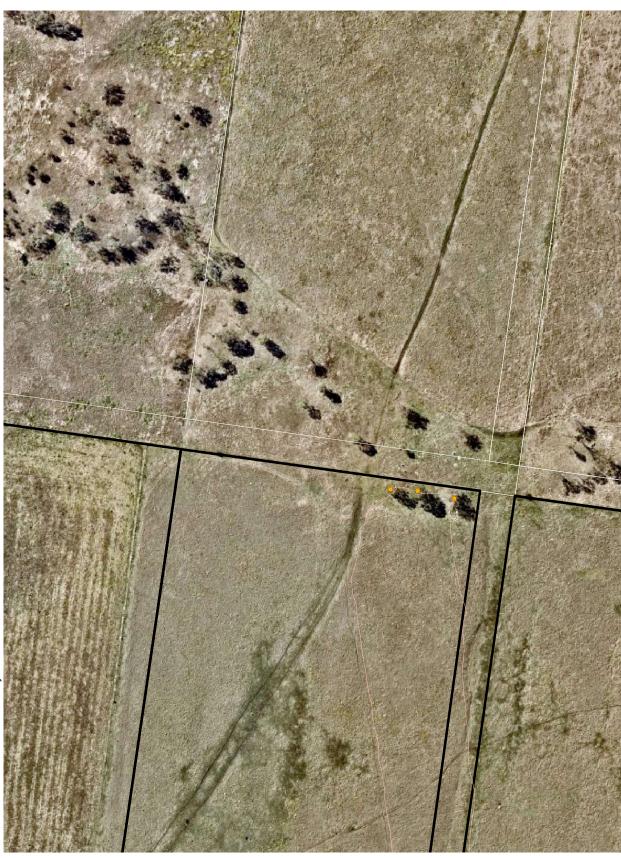
Track Log

Habitat Quality Transects

Waterway Observation Point

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2.5. Field Survey Effort



Legend

Habitat Quality Transects

Waterway Observation Point

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2.6. Field Survey Effort



Legend

Track Log

Habitat Quality Transects

Waterway Observation Point





5.6. Flora Survey Results

A total of 57 flora species were identified across the investigation area (refer to **Table 9**), made up of 30 natives and 27 invasive weeds. Two (2) of these species are listed as restricted matter under the *Biosecurity Act 2014*. The native and invasive flora composition is typical of a highly disturbed environment.

No flora species listed as threatened under state of federal legislation were detected onsite.

Table 9: Flora species list

Scientific name	Common name	Native/Invasive	Restricted matter listing under the <i>Biosecurity Act 2014</i>
Acacia salicina	Sally Wattle	Native	
Alphitonia excelsa	Soap Tree	Native	
Aristida calycina	Dark Wiregrass	Native	
Bidens pilosa	Cobbler's Pegs	Invasive	
Bothriochloa bladhii	Forest Mitchell Grass	Native	
Brachyscome basaltica	Basalt Daisy	Native	
Cassytha pubescens	Devil's Twine	Native	
Chamaesyce dallachyana	Caustic Weed	Invasive	
Cheilanthes distans	Bristle Cloak Fern	Native	
Chloris gayana	Rhodes Grass	Invasive	
Chloris truncata	Windmill Grass	Native	
Chrysocephalum apiculatum	Yellow Buttons	Native	
Cirsium vulgare	Spear Thistle	Invasive	
Convolvulus Erubescens	Australian bindweed	Native	
Conyza sumatrensis	Tall Fleabane	Invasive	
Corymbia tessellaris	Moreton Bay Ash	Native	
Cymbopogon refractus	Barbed Wire Grass	Native	
Cynondon dactylon	Green Couch	Native	



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Scientific name	Common name	Native/Invasive	Restricted matter listing under the <i>Biosecurity Act 2014</i>
Cyperus polystachyos	Bunchy Sedge	Native	
Cyperus rotundus	Nutgrass	Invasive	
Dianella caerulea	Blue Flax-lily	Native	
Dichanthium sericeum	Bluegrass	Native	
Dichondra repens	Kidney Weed	Native	
Elusine indica	Crowsfoot Grass	Invasive	
Eragrostis brownii	Brown's Lovegrass	Native	
Eucalyptus orgadophila	Mountain coolibah	native	
Eustrephus latifolius	Wombat Berry	Native	
Glycine clandestina	Twining Glycine	native	
Gomphocarpus physocarpus	Balloon Cotton Bush	Invasive	
Heliotropium amplexicaule	Blue Heliotrope	Invasive	
Heteropogon contortus	Black Speargrass	Native	
Hibiscus tridactylites	B l adder Ketmia	Native	
Hydrocotyle acutiloba	Pennywort	Native	
Leiocarpa brevicompta	Plains Plover-Daisy	Native	
Medicago polymorpha	Burr Medic	Invasive	
Melinis repens	Red Natal Grass	Invasive	
Mimosa Pudica	Sensitive weed	Invasive	
Neonotonia wightii	Glycine	Invasive	
Opuntia stricta	Prickly Pear	Invasive	Restricted – Category 3
Oxalis corniculata	Creeping Oxa l is	Invasive	
Panicum decompositum	Native Millet	Native	
Salsola australis	Tumbleweed	Invasive	



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Scientific name	Common name	Native/ Invasive	Restricted matter listing under the Biosecurity Act 2014
Sida rhombifolia	Common Sida	Native	
Solanum nigrum	Blackberry Nightshade	Invasive	
Sorghum halepense	Johnson Grass	Invasive	Restricted – Category 3
Sporobolus africanus	Parramatta grass	Invasive	
Sporobolus caroli	Fairy Grass	Native	
Taraxacum officinale	Common Dandelion	Invasive	
Themeda quadrivalvis	Grader Grass	Invasive	
Themeda triandra	Kangaroo Grass	Native	
Tradescantia albiflora	Wandering Jew	Invasive	
Trifolium repens	White Clover	Invasive	
Urochloa decumbens	Signal Grass	Invasive	
Verbena bonariensis	Purple-top Verbena	Invasive	
Verbena Tenuisecta	Mayne's Pest	Invasive	
Wahlenbergia stricta	Australian Blue Bell	Native	
Xyris complanata	Hat Pin	Native	
Zinnia sp.	Red daisy	Invasive	

5.7. NCA Survey Results

The NCA area was assessed on the 17th March 2022. Two (2) timed NCA meanders were done at given times throughout the day. A total transect length of 1,197 metres (NCA meander 1) and 938 metres (NCA meander 2) was searched for threatened species by a Senior Ecologist (qualified person) using the meander method. **Table 10** summaries the details of the timed meanders. A general description of the transect areas are provided in the subsections below.

No threatened plants were identified throughout either survey.



Table 10: Meander Survey Summary

Meander	Date	Start Time	Finish Time	Duration	Distance	No. Flora Species
1	17.03.2022	10:30 am	11:40 am	70 minutes	1,232 m	48
2	17.03.2022	12:00 pm	2:00 pm	120 minutes	903m	51

5.7.1 Meander Transect Areas 1 and 2

Transect 1 and 2 are located within the western portion of Lot 118 & 119 on SP203198, directly east of Toowoomba Bypass. The NCA meander's covers approximately 2,135 metres in total length and incorporates mapped remnant vegetation. The transect area consisted of limited scattered, mature trees, predominantly *Eucalyptus orgadophila* (Mountain Coolibah) and *Corymbia tessellaris* (Moreton Bay Ash). Retained large mature trees were present within this area as well as small specimens consistent with regrowth vegetation. The shrub layer was sparse, and the ground layer dominated by a combination of native and non-native pastoral grasses.

Regional Ecosystem mapping as well as Preclear vegetation data has mapped one (1) Regional Ecosystem including Least Concern RE11.8.5.

• Least Concern RE11.8.5 is described as *Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks.

Forty-eight (48) flora species were recorded along the total NCA Transect 1. Twenty-five (25) species are regarded as native species. The remaining twenty-three (23) are introduced or weed species. Whilst fifty-one (51) flora species were recorded along the total NCA Transect 2. Twenty-eight (28) species are regarded as native species. The remaining twenty-three (23) are introduced or weed species.

All native species are listed as common with no threatened species recorded. The majority of the site is utilised for cattle grazing and consists mainly of pastoral grasses. This usage has further reduced the likelihood of any threatened species occurring on the property. However, remnants of the regional ecosystem communities do remain on site. In conjunction with rehabilitation, these areas have potential to provide conditions to support these threatened species in the future, post-development, thus this location should be considered in areas requiring rehabilitation. As the development design presently details no development within this area, the vegetation will predominantly be retained (refer **Plan 3**).



5.8. Fauna Survey Results

Observational fauna surveys were carried out across multiple site visits as well as baited camera traps. The following observations were made during site surveys regarding fauna:

- A total of 15 fauna species were observed field survey effort and through analysis of camera footage, consisting of 5 mammals and 10 bird species (**Table 11** and **photo set 4**). Four (4) were introduced and the remaining 11 were native species.
- No evidence of the Koala activity was observed during field surveys.
- Numerous large, scattered trees throughout the site contained hollows which were being utilised by a range of avifauna.

Table 11: Fauna species list

Scientific name	Common name	Native/Introduced	Conservation status (NCA)	Conservation status (EPBC)
Birds				
Aquila audax	Wedge-tail Eagle	Native	Least Concern	N/A
Corvus orru	Torresian Crow	Native	Least Concern	N/A
Coturnix ypsilophora	Brown Quail	Native	Least Concern	N/A
Cracticus nigrogularis	Pied Butcherbird	Native	Least Concern	N/A
Eolophus roseicapilla	Galah	Native	Least Concern	N/A
Gymnorhina tibicen	Australian Magpie	Native	Least Concern	N/A
Manorina melanocephala	Noisy Miner	Native	Least Concern	N/A
Neophema pulchella	Turquoise parrots	Native	Least Concern	N/A
Nymphicus hollandicus	Cockatiel	Native	Least Concern	N/A
Platycercus adscitus	Pale-headed Rosella	Native	Least Concern	N/A
Mammals				
Lepus europaeus	European Hare	Introduced	N/A	N/A
Macropus giganteus	Eastern Grey Kangaroo	Introduced	N/A	N/A
Pogona barbata	Bearded Dragon	Native	N/A	N/A
Rattus rattus	B l ack Rat	Introduced	N/A	N/A
Vulpes vulpes	European Fox	Introduced	N/A	N/A



5.8.1 Fauna Camera Traps

Two (2) camera traps were installed across the northern investigation area (Refer to **Plan 1** for camera locations). The cameras were left to record for two (2) days, installed on the 14 March and removed on 17 March 2022. Fauna activity was identified consisting of *Lepus europaeus* (European Hare), *Macropus giganteus* (Eastern Grey Kangaroo), *Cracticus nigrogularis* (Pied Butcherbird) and *Vulpes vulpes* (European Fox) (See **photo set 4**).



Photo set 4: Camera trap locations (top row) and fauna observations on-site (bottom row).



6. Impact Assessment and Development Analysis

6.1. Proposed Development

The proposed development consists of a MCU to a sports precinct with indoor and outdoor facilities, internal access roads and open space (refer **Plan 3**). The site is zoned as sport and recreation under Toowoomba Regional Planning Scheme.

The proposed development impact area is located across 12 rural lots within Charlton. The northern 5 lots were assessed on-ground, with the remaining 7 having undergone prior on-ground assessment and reporting in September 2021. Vegetation across the investigation area consisted largely of open paddock areas where significant ecological values were generally absent. The majority of the site was observed to be highly modified and canopy trees were largely absent. Field surveys identified a number of large hollow-bearing native trees in both mapped Category B (remnant) vegetation and Category X (non-remnant) vegetation (refer **Section 4** for field survey findings). These habitat trees were identified as retaining the highest ecological value on-site.

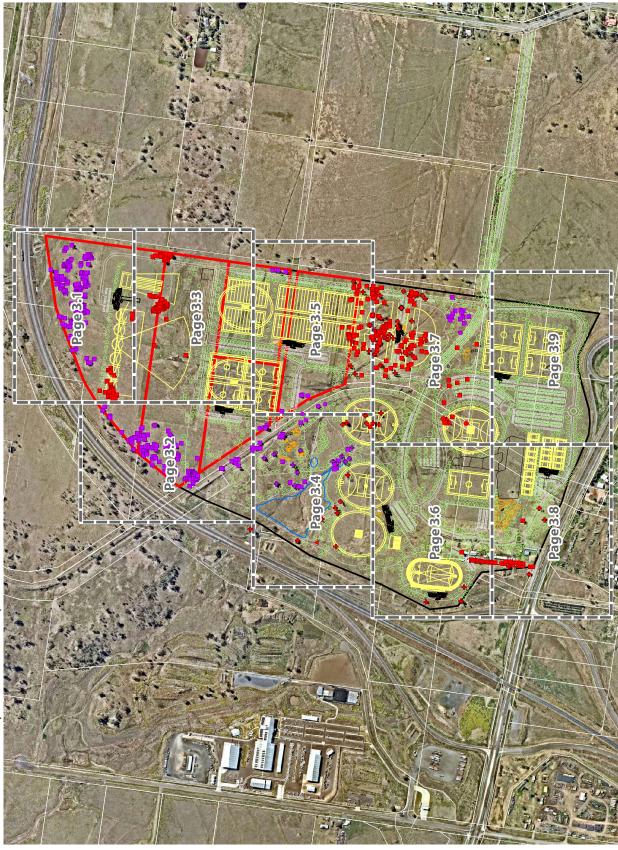
As part of the development design open space/recreation areas are proposed, in which significant habitat trees have the potential to be retained, dependant on the final development design (refer **Plan 3**). Further, habitat trees that fall within areas to be utilised for landscaping purposes may also have the potential to be retained where possible. It is recommended that where possible, these significant habitat trees be incorporated into the development footprint and managed within the landscaping and rehabilitation scope.

Mapped waterways impact assessment

One DAF-mapped *low* risk waterway for WWBW is present within the investigation area. The mapped waterway situated in the northern corner of the site was assessed on-ground and identified as containing no waterway features and no canopy cover or evidence of a flow path. As such, the proposed development will aim to avoid this area in the development design (refer **Plan 3**).



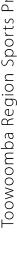
3.0. Development Impact Assessment



Non-juvenile Koala Habitat Tree: Potential to Retain Within Recreation Areas Introduced Species to Remove Habitat Tree: Potential to Retain Within Recreation Areas Native Tree: Potential to Retain Within Recreation Areas Habitat Tree to Remov Native Tree to Remove **Engineering Detail** GPS Tree Plot

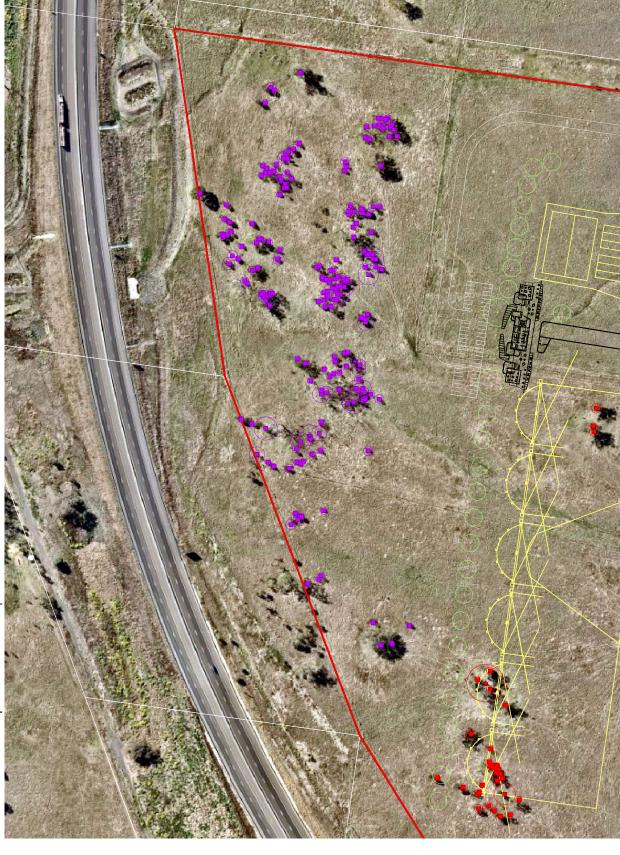








3.2. Development Impact Assessment



Engineering Detail

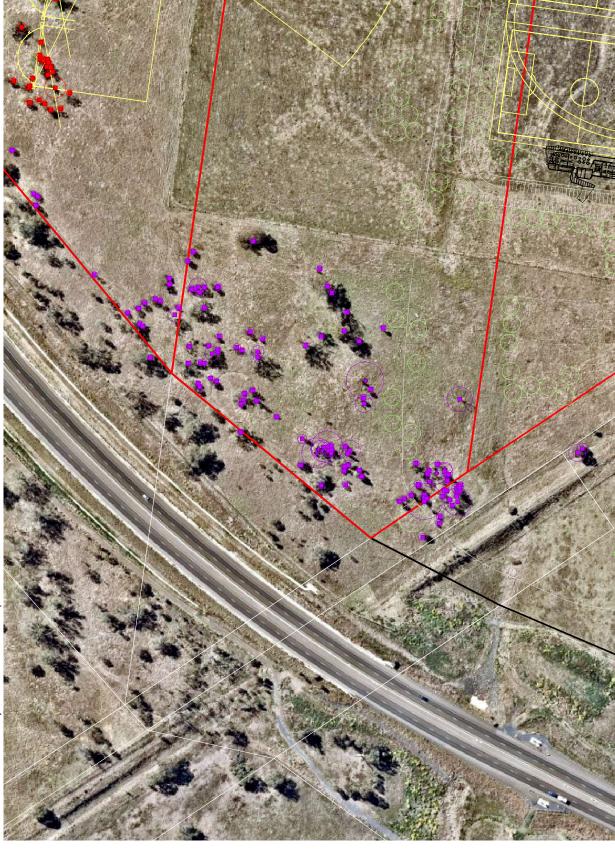
GPS Tree Plot

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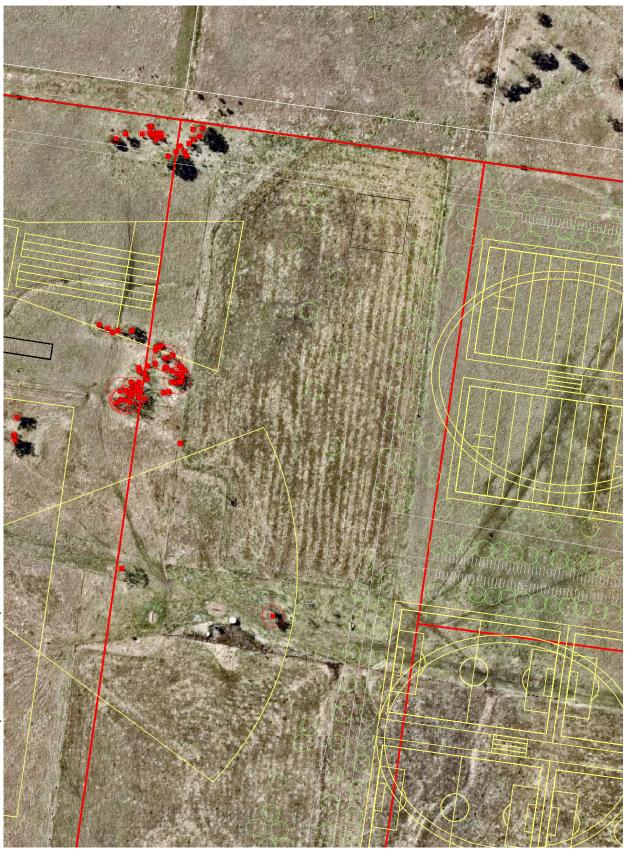
3.3. Development Impact Assessment



Old DCDB **Engineering Detail** GPS Tree Plot •



3.4. Development Impact Assessment



Old DCD8

Engineering Detail

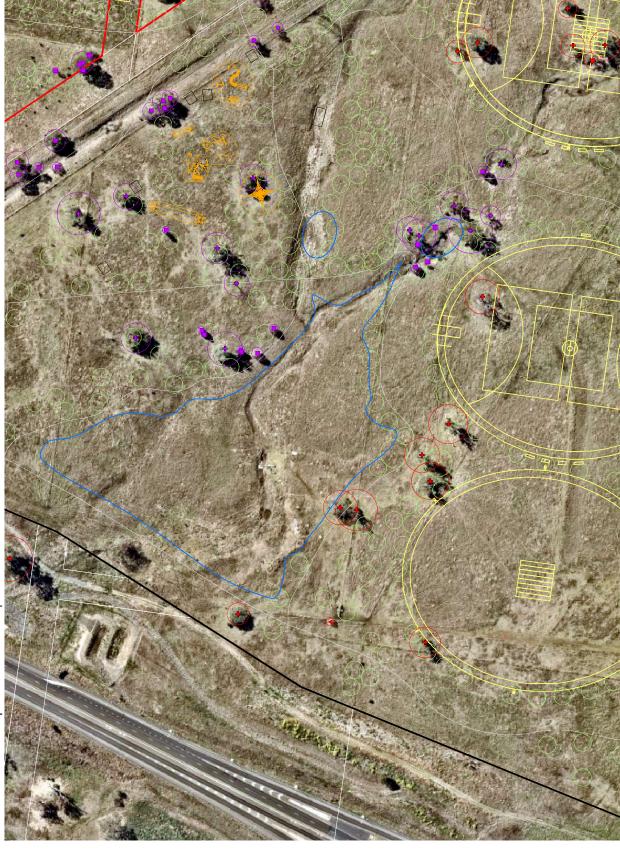
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Dead Tree/Stag to Remove

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3.5. Development Impact Assessment



Old DCD8

Engineering Detail

— Building Detail

Roads, Paths and Carparks

GPS Tree Plot

(4)

• •

Habitat Tree to Remove

Dead Tree/Stag to Remove

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3.6. Development Impact Assessment



Old DCD8

Engineering Detail

— Building Detail

Roads, Paths and Carparks

GPS Tree Plot

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Habitat Tree to Remove

(+)

Dead Tree/Stag to Remove

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