Reconnaissance and Targeted Flora and Vegetation Survey

Bowelling-Duranillin Road 30.09– 30.61 SLK

Prepared for the
Shire of West Arthur
March 2022

Ecoedge

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Executive summary

Ecoedge was engaged by the Shire of West Arthur (the Shire) in July 2021 to undertake a reconnaissance and targeted flora and vegetation survey of road reserve vegetation along the Bowelling – Duranillin Road between 30.09 and 36.1 straight line kilometres in the Shire of West Arthur.

The Shire is planning to upgrade the road and required the survey to inform any environmental assessment and approvals processes that may be required as part of the proposal.

The flora and vegetation survey was undertaken on 18 October 2021 by Russell Smith (flora permit FB61000473) and Colin Spencer (flora permit FB62000169) in accordance with the EPA (2016) Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment.

The total area surveyed was approximately 10.2 hectares (ha), of which 3.2 ha was native vegetation.

One hundred and sixty vascular flora taxa were found within the survey area, of which thirty-two were introduced species. No Threatened flora was found, but two Priority flora, *Banksia acanthopoda* (P2) and *Tetratheca exasperata* (P3), were found.

Apart from the two Priority species recorded, there were forty taxa given a post-survey likelihood of occurrence of "unlikely".

There were no Declared Pest Plants or Weeds of National Significance in the survey area.

Two vegetation units (unit A and unit B) were identified within the survey, both dominated by *Eucalyptus wandoo*. Both of the units, when they meet the relevant area and condition criteria, are considered to represent occurrences of the Critically Endangered Federally-listed TEC "Eucalypt Woodlands of the Western Australian Wheatbelt". In all, 1.46 ha out of the 3.2 ha of vegetation was classified as the TEC; 0.29 ha is in Degraded to Good condition ,0.570 ha is in Good condition and 0.29 ha is in Very Good condition.

About 55% of the survey area vegetation was classed as "Degraded to Good", "Good", or "Very Good" condition.

Three vegetation complexes are mapped to occur across the survey area, the Darkan 4 (Dk4) Complex, the Darkan 5 (Dk5) Complex and the Darkan 5f (Dk5f) Complex. The survey area vegetation is characteristic of only the Darkan 4 Complex in terms of dominant species and structure. The Darkan 5 Complex exceeds the targeted 30% of its pre-European extent of vegetation remaining at a state level but does not meet the target within the Shire. The Darkan 4 (Dk4) and Darkan 5f (Dk5f) complexes have less than 30% of their pre-European extent of native vegetation remaining at both the state and Shire level.

One Beard vegetation association, Association 4, is mapped across the survey area. This association has less than 30% of its pre-European extent of native vegetation remains at all levels. The association provides a reasonable match for the vegetation units described for the survey area.

Vegetation unit B is regarded as a wetland habitat as it is dominated by flora species typically restricted to wetlands, including the tall shrub *Melaleuca viminea* and several herbaceous taxa typical of claypans.

The survey area occurs within the unused Bowelling to Duranilling rail reserve, which provides an important function as an ecological corridor in an otherwise cleared agricultural landscape.

There are no ESAs within the survey area or near the survey area. The nearest ESA is located approximately 56 km northwest of the survey area.

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Statement of limitations

Reliance on data

In the preparation of this report, Ecoedge has relied on data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report. Unless stated otherwise in the report, Ecoedge has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report are based in whole or in part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Ecoedge will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, unavailable, misrepresented or otherwise not fully disclosed to Ecoedge.

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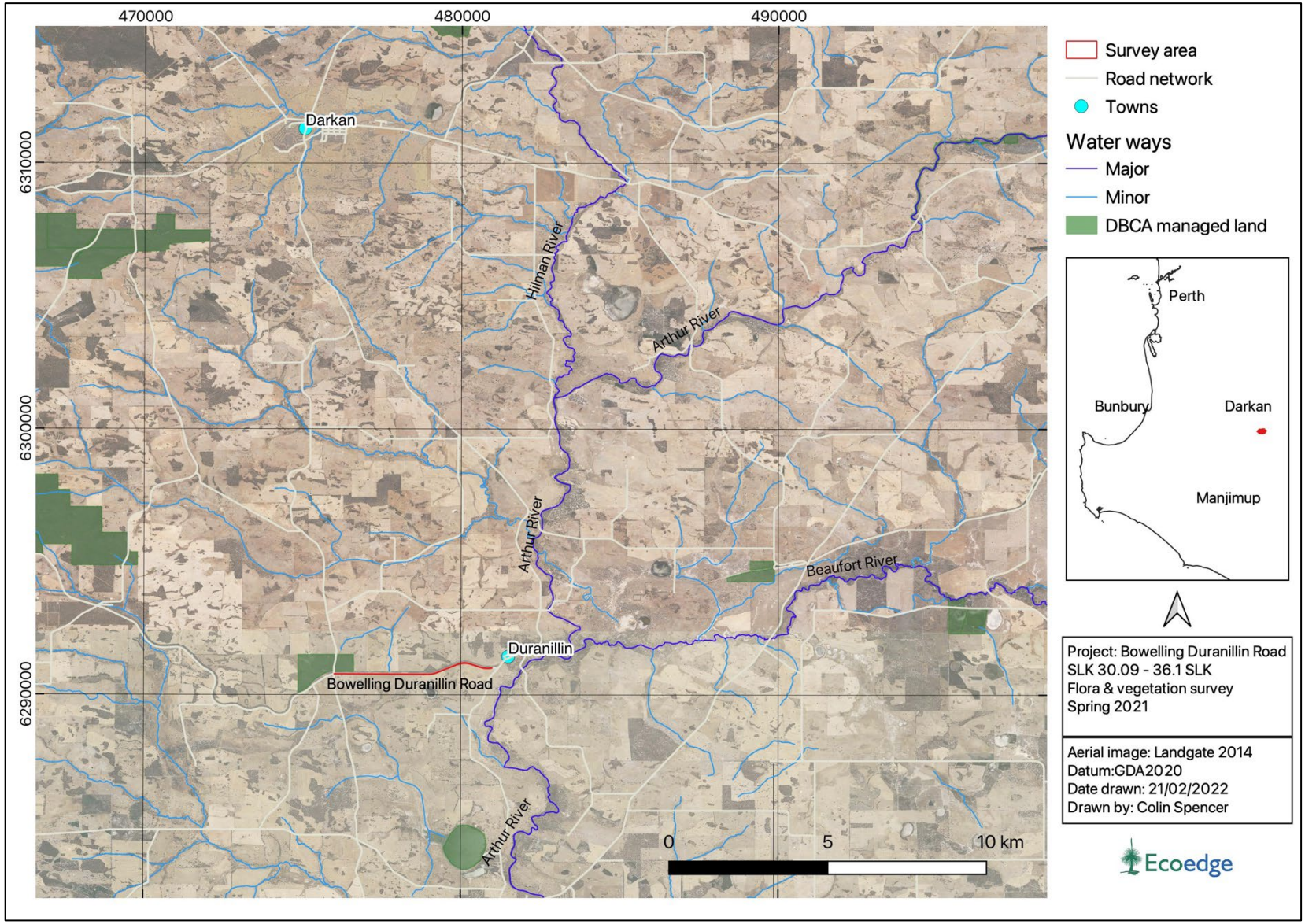
1 Introduction

Ecoedge was engaged by the Shire of West Arthur (the Shire) in August 2021 to undertake a reconnaissance and targeted flora and vegetation survey of road reserve vegetation along the Bowelling – Duranillin Road, in the Shire of West Arthur (the 'survey area'). The survey area is located between Capercup Road North/South and Darkan Road approximately 600 m southeast of the small town of Duranillin within a predominantly agricultural context (**Figure 1**). The Capercup Road North Nature Reserve is near the western end of the survey area.

The survey area is approximately 10.2 hectares in size, including road and verge, and occurs between 30.09 and 36.1 straight line kilometres (SLK). It extends approximately 3.5 meters (m) into the vegetation from the bitumen on the north side of the road and to the private property boundary on the south side of the road (**Figure 2**). The total area of vegetation is approximately 3.24 ha.

The Shire is planning to upgrade the road and required the survey in order to inform any environmental assessment and approvals processes that may be required as part of the proposal.

This report compiles the findings of the survey.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480000
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Darkan
Hilman River
Arthur River
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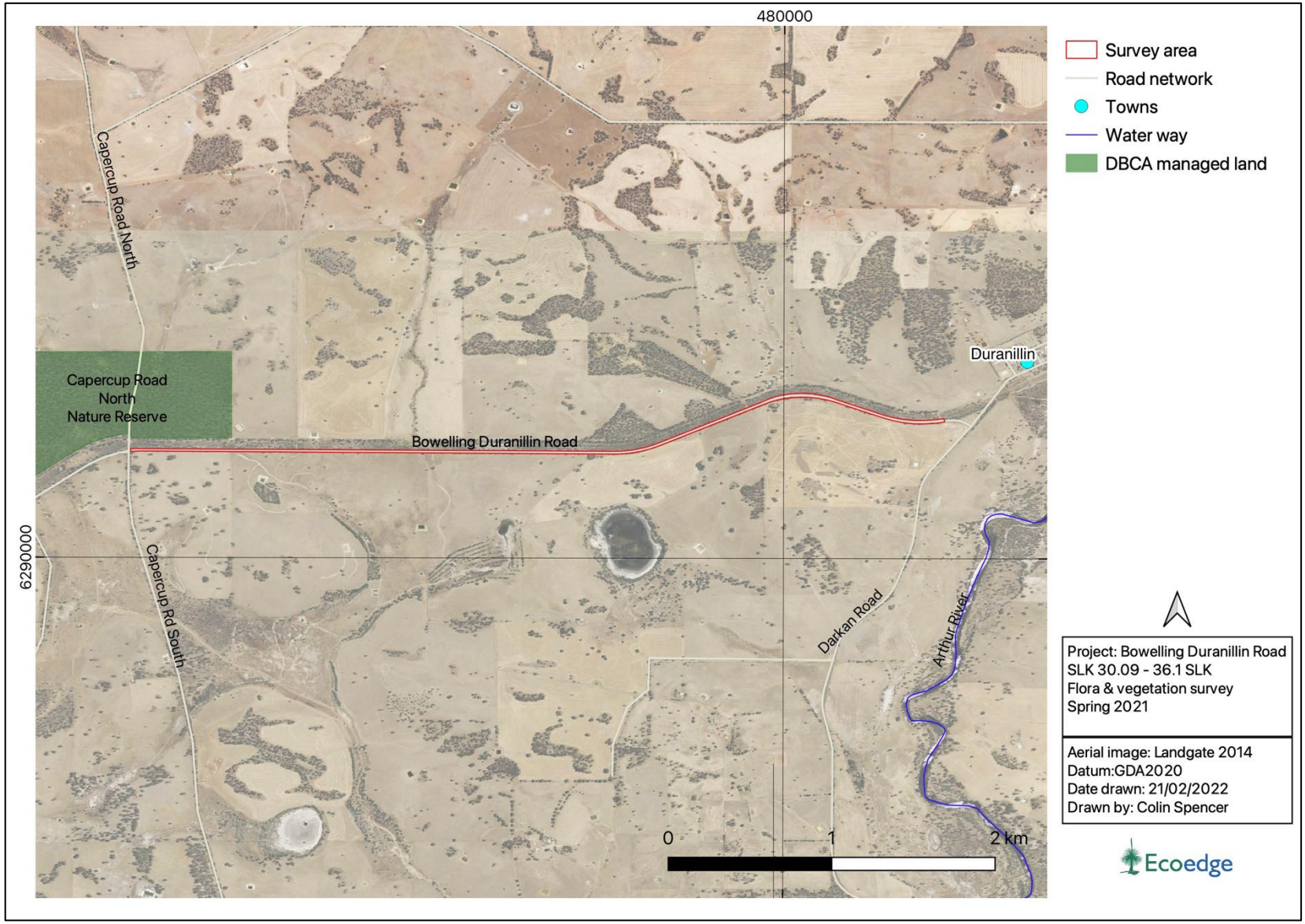
Arthur River
Beaufort River
Duranillin
Bowelling Duranillin Road
0
5
10 km
Survey area
Road network
Towns
Water ways
Major
Minor
DBCA managed land
Perth
Bunbury
Darkan
Manjimup
Project: Bowelling Duranillin Road
SLK 30.09 - 36.1 SLK
Flora & vegetation survey
Spring 2021
Aerial image: Landgate 2014
Datum:GDA2020
Date drawn: 21/02/2022
Drawn by: Colin Spencer
Ecoedge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Survey area
Road network
Towns
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Capercup Road North Nature Reserve
Bowelling Duranillin Road
Duranillin
Capercup Rd South
Darkan Road
Arthur River
0
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Project: Bowelling Duranillin Road
SLK 30.09 - 36.1 SLK
Flora & vegetation survey
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Aerial image: Landgate 2014
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2 Scope and objectives

The objective of the survey was to provide a report on outcomes of a reconnaissance and targeted flora and vegetation survey that delineated key flora and vegetation within the survey area.

The scope required a desktop assessment to be conducted prior to the field survey work to identify all biological features and constraints, which were in, or nearby the survey area, such as significant flora, Threatened and Priority ecological communities (TEC and PEC), riparian vegetation, unusual soil/landscape systems (e.g., granite outcrops), conservation estates, poorly represented vegetation associations and/or vegetation complexes and environmentally sensitive areas (ESA).

The field survey was required to ground-truth outcomes of the desktop assessment, including, as necessary, a targeted flora survey for potential significant flora and a targeted vegetation survey for any potential occurrences of TEC and PECs. The survey also required mapping of weeds of national significance (WONS), declared pest plants listed under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) and mapping of riparian vegetation.

The survey and report were required to be undertaken in accordance with the Environmental Protection Authority (EPA) Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016) and other State and Commonwealth guidelines for threatened species and communities, such as approved conservation advice for *Environmental Protection and Biodiversity Act 1999* (EPBC Act) threatened species and communities.

3 Methods

3.1 Desktop assessment

Prior to the field survey, a desktop assessment was undertaken over a 10 km buffer area (the 'study area') to provide contextual information on the flora and vegetation within the survey area. The desktop studies included a review of the following information.

- Regional geology and soil mapping (Percy et al. 2000).
- Vegetation complex mapping of the southwest forest region of Western Australia (Mattiske and Havel 1998) as updated by Webb et al. (2016).
- WA TEC and PEC Department of Biodiversity Conservation and Attraction (DBCA) database extracts (DBCA 2021a) and TEC and PEC listings (DBCA 2018a, DBCA 2021b).
- Extract from the Department's Threatened Flora database and the Western Australian Herbarium database (DBCA 2021c)
- Threatened and Priority flora Naturemap search results (DBCA 2021d).
- Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) results (DAWE 2021).
- Environmentally Sensitive Areas distribution maps and data (DWER 2020).
- Surface hydrology lines (National) (Crossman & Li 2015).
- Geomorphic Wetlands Darkan Duranillin, DBCA-016 (DBCA 2017)

3.1.1 Significant flora likelihood of occurrence

Prior to undertaking the survey, an assessment of the likelihood of occurrence of Threatened and Priority flora occurring within the survey area was undertaken. The rationale for determining this likelihood of occurrence is provided in **Appendix 1**. The rationale for the post-survey likelihood of occurrence is also provided in this Appendix.

3.2 Field survey

The flora and vegetation survey was undertaken on 18 October 2021 by Russell Smith (flora permit FB61000473) and Colin Spencer (flora permit FB62000169) in accordance with the Environmental Protection Authority (EPA) Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016).

The targeted survey for Threatened and Priority flora involved inspecting all potential habitat, including drainage lines and dampland wetlands. The time of the survey was within the optimum time for field identification of most of the Threatened and Priority flora identified as potentially occurring within the survey area.

The dominant and characteristic species, as well as some soil information, was collected at relevés across the survey area, and vegetation condition was recorded at these and other points. This information was used to describe vegetation units. In total, 230 vegetation condition points and 25 relevés, as well as track files, were recorded.

The relevé information was used to identify and describe vegetation units using the NVIS system (Level 5; NVIS 2017).

A map showing the location of data collection points (vegetation condition assessment points and relevés) and survey track files is provided in **Appendix 2.**

Flora species not identified in the field were either photographed or collected for later identification.

Vegetation condition was assessed using the method of the EPA (2016) (**Appendix 3**).

3.3 Survey limitations

Potential limitations with regard to the assessment are addressed in **Table 1.**

Table 1. Limitations of the field survey with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	Not a constraint	The survey scope was prepared in consultation with the Client and was designed to comply with EPA requirements.
Proportion of flora identified	Minor	The survey was carried out within the prime flowering season for the south-west jarrah forest.
Climatic and seasonal effects	Negligible	Climate and seasonal effects for the region had negligible impact on the survey. Rainfall from the nearest station (Valem) showed that rainfall for the year till the time of survey was 83% of the long-term mean. Even though rainfall was less than average, flowering was good.
Availability of contextual information	Minor	Few local flora survey reports are available, and no regional survey has been conducted.
Completeness of the survey	Minor	All the survey area vegetation was easily accessible.
Skill and knowledge of the botanists (vascular flora)	Not a constraint	The botanists have a combined 35 years of experience in flora surveys in the south-west of W.A.
Disturbance (fire, grazing, clearing etc.)	Minor	Part of the survey area had historically been cleared.

4 Desktop assessment results

4.1 Biogeographic region

The survey area is situated within the Southern Jarrah Forest (JF02) sub-region of the Jarrah Forest biogeographic region, as defined in the Interim Biogeographical Regionalisation for Australia (IBRA) (Commonwealth of Australia 2016).

4.2 Landform and soils

The survey area occurs within the dissected lateritic plateau of the Eastern Darling Range Zone (253). This zone has been divided into four separate systems based on patterns of landforms, soils and vegetation at a scale of 1:250,000. These systems are, the Boscabel 253 Bo, Darkan 253Dk, Boyup Brook Valleys 253Bv and Eulin Uplands 253Eu systems (Percy et al. 2000). The survey area occurs with the Darkan 253 Dk system which is characterised by rises and low hills with streams and rivers often forming broad alluvial plains. The main soils in the system are sandy gravels, in particular, duplex sandy gravels with yellow clay or clay loam subsoils. Shallow gravels, yellowish-brown loamy and deep sandy gravels and grey deep sandy duplex soils usually with yellow, slightly acid to neutral, sodic subsoils are also common (Percy et al. 2000).

The Darkan System (252Dk) has been divided into seven subsystems based on landform features and suites of soils at a 1:100,000 scale. Two subsystems are recognised within the survey area, the 253Dk_5 Darkan 5 Subsystem and the 253Dk_6f: Darkan 6 Subsystem, with the Darkan 6 Subsystem further divided into two phases (Percy et al. 2000). These subsystems and phases are described in **Table 2** and shown in **Figure 3.**

Table 2. Soil mapping units occurring within the survey area (Percy et al. 2000).

Subsystem / phase	Descriptions
253Dk_6f: Darkan 6 Subsystem footslopes phase	Foot slopes with mainly sandy and loamy gravels formed on Eocene sediments.
253Dk_6i: Darkan 6 Subsystem gravelly rises phase	Very low rises adjacent to alluvial plains with pale sandy gravels and pale sands, formed on Eocene sediments.
253Dk_5 Darkan 5 Subsystem	Valley flats and narrow alluvial plans (300 - 1000m wide) with mainly grey deep sandy duplex soils.

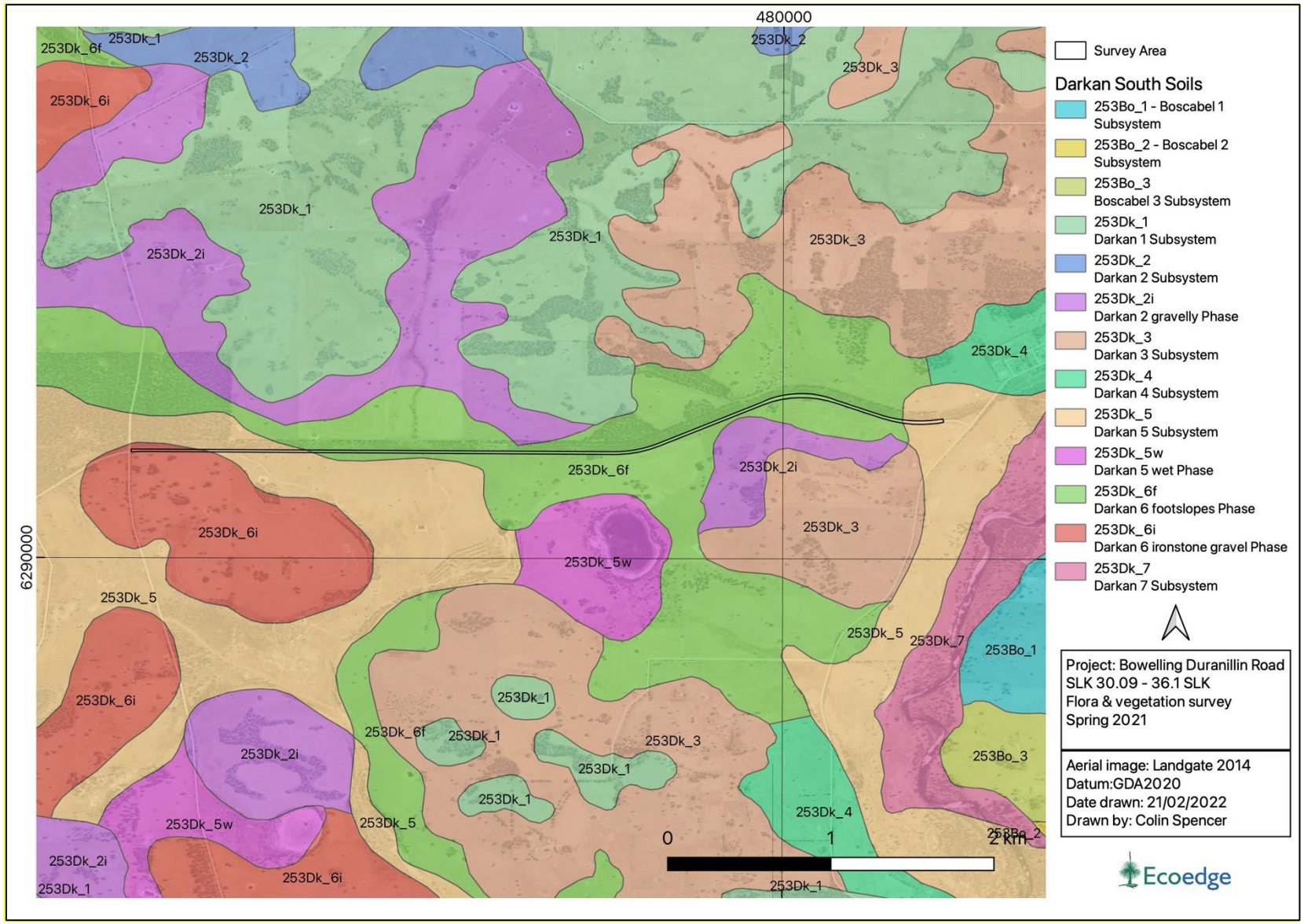

Figure 3. Soil units mapped in and nearby the survey area (Percy et al. 2000).

4.3 Vegetation description according to pre-European mapping datasets

4.3.1 Complexes

In 2016, the Department of Parks and Wildlife (DPaW) revised the vegetation mapping datasets for the Darling Scarp and Plateau Regional Forest Agreement (RFA) mapping of Mattiske and Havel (1998) and the Swan Coastal Plain mapping of Heddle et al. (1980). The purpose of the revision was to fill data gaps and improve alignment and correlation between the two datasets (Webb et al. 2016).

Three vegetation complexes, Darkan 4, Darkan 5 and Darkan 5f, occur within the survey area, according to the 1:50,000 mapping of the southwest forest region of Western Australia (Mattiske & Havel 1998) as updated by Webb et al. (2016). The Darkan5f complex makes up a large proportion of the survey area in terms of area. The complexes are described in **Table 3** and shown in **Figure 4**.

Table 3. Vegetation complexes mapped for the survey area (Webb et al. 2016).

Vegetation Complex Name	Description
Darkan 4, Dk4	Woodland of *Eucalyptus wandoo-Allocasuarina huegeliana-Acacia acuminata* on slopes and woodland of *Eucalyptus rudis* on lower slopes in the arid zone. (Valleys)
Darkan 5, Dk5	Low woodland of *Casuarina obesa*-Melaleuca spp. on low lying moister soils, and woodland of *Banksia prionotes* with occasional *Corymbia calophylla* and *Eucalyptus rudis* over *Acacia acuminata* on sandy lunettes in the arid zone. (Valley floors and swamps)
Darkan 5f, Dk5f	Woodland of *Eucalyptus rudis-Melaleuca* spp. on lower slopes, low forest of *Casuarina obesa* and shrubland of Melaleuca spp. on broad valley floors in the arid zone. (Valley floors and swamps)

4.3.2 Vegetation associations

A systematic survey of native vegetation in Western Australia was undertaken by J. S. Beard (along with others) during the 1970s, which described vegetation systems in the southwest of Western Australia at a scale of 1:250,000. Beard's vegetation maps attempted to depict the vegetation as it might have been prior to European settlement in terms of type and extent (Beeston et al. 2001). The Beard vegetation association dataset, also referred to as the pre-European native vegetation extent dataset, was digitised by Shepherd et al. (2002).

Beard vegetation associations have been described to a minimum standard of Level 3 "Broad Floristic Formation" for the National Vegetation Inventory System (NVIS) (state-wide to regional scale) [1].

[1] Beard's vegetation mapping units are referred to as 'associations' however these do not correspond to the NVIS Level 5 'Associations'. The NVIS system was developed long after Beard's work was completed, and while both classification systems use the same term, NVIS 'Associations' describe vegetation in more detail than do Beard's.

One Beard vegetation association, association 4, is mapped across the survey area. This is described in **Table 4** and shown in **Figure 5.**

Table 4. Beard vegetation associations mapped for the survey area.

Vegetation association	Description
4	Medium woodland; marri & wandoo

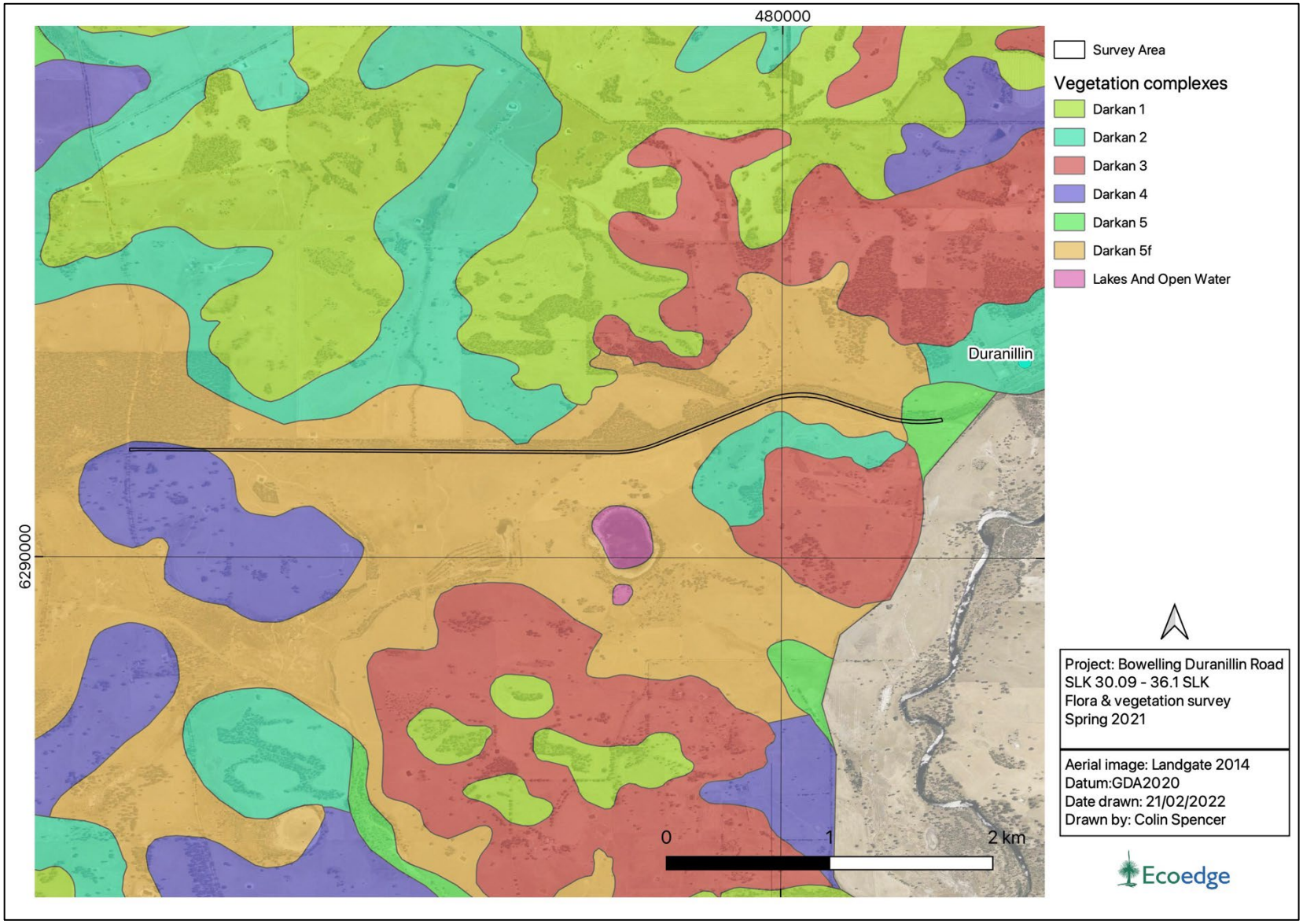

Figure 4. Vegetation complexes mapped in and nearby the survey area (Webb et al. 2016)

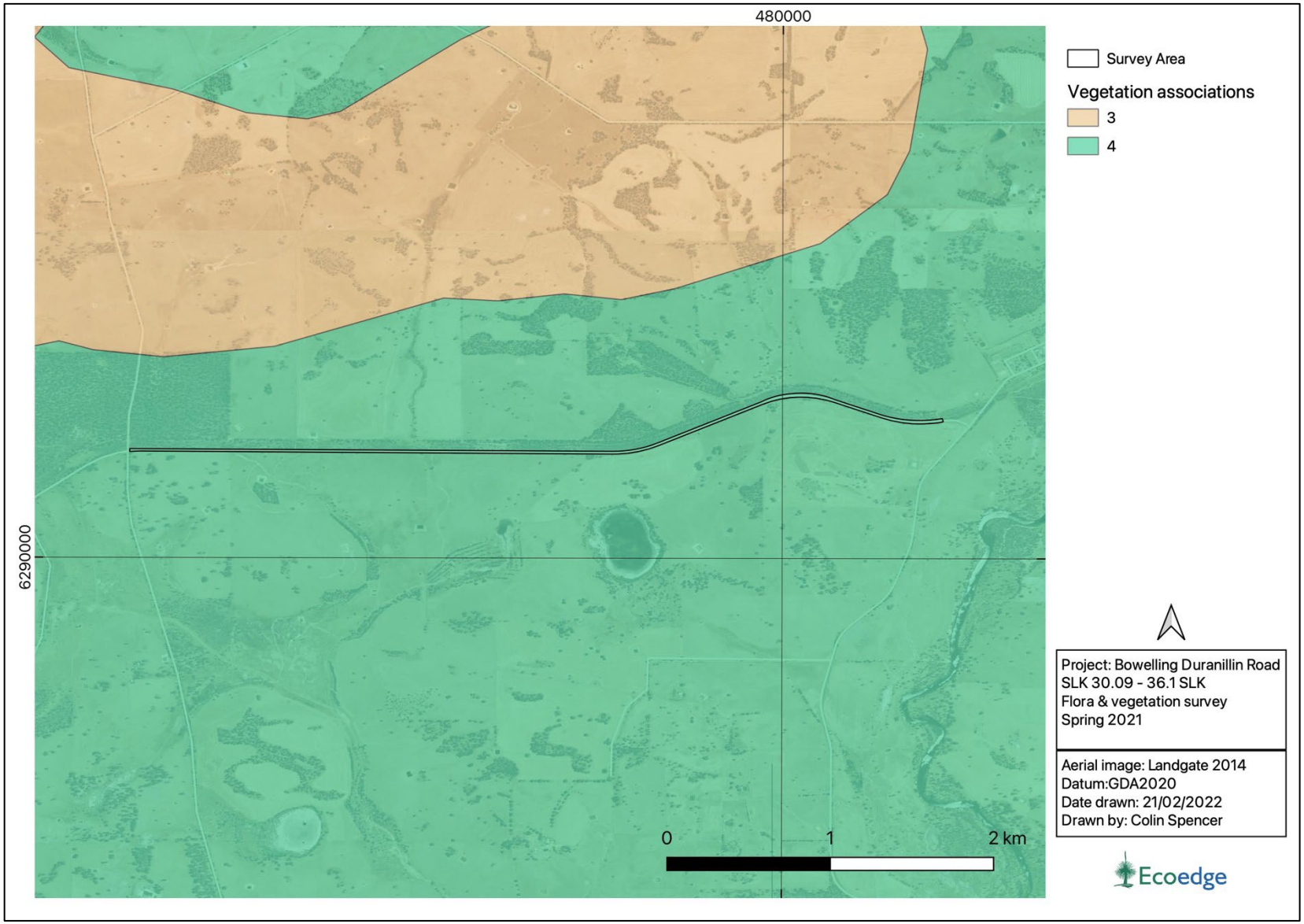

Figure 5. Vegetation associations mapped in and nearby the survey area.

4.3.3 Assessment of remaining extent against pre-European extent

In 2001, the Commonwealth of Australia stated national targets and objectives for biodiversity conservation, which recognised that the retention of 30%, or more, of the pre-clearing extent of each ecological community was necessary if Australia's biological diversity was to be protected (Environment Australia 2001).

In its report on the state-wide vegetation statistics incorporating the Comprehensive, Adequate and Representative (CAR) Reserve Analysis, the Government of Western Australia provides information on the pre-European and current extent of the ecological communities of Western Australia and reports on the status of the CAR reserve system for Western Australia (Government of Western Australia 2019a). This system is also based on the National retention targets of 30% overall. Only reserves managed by DBCA under the *Conservation and Land Management Act 1984* are considered for inclusion in the "CAR Reserve Analysis".

Table 5 presents the statistics as they relate to the percentage remaining of pre-European extent vegetation and the percentage of current extent in DBCA managed land of the three vegetation complexes identified within the survey area, the Darkan 4 Complex (Dk4), the Darkan 5(Dk5) Complex and Darkan 5f(Dk5f) Complex. Darkan 5f, Dk5f

Table 6 presents the same statistics for the one Beard vegetation association; association 4 mapped across the survey area. Association 4 also falls short of the 30% pre-European extent retention targets at the local and state government levels and for the Jarrah Forest (JAF) IBRA region and Southern Jarrah Forest IBRA subregion (JAF02).

The red, orange and yellow shading in the tables indicates the status of the Commonwealth 30% retention target.

Status of the commonwealth retention target	>30%	<30%	<10%

Table 5. Vegetation complexes mapped within the survey area with regard to the Commonwealth retention targets (Government of Western Australia 2019a).

Mapping region	Pre-European (ha)	Current Extent (ha)	% Remaining	% remaining in DBCA reserves
Darkan 4, Dk4 Valleys				
State-wide	9,401.17	1,399.66	14.89	0.36
Shire of West Arthur	7,262.69	1,004.38	13.83	77.25
Darkan 5, Dk5 Valley floors and swamps				
State-wide	5,216.30	1,824.97	34.99	0.01
Shire of West Arthur	3,230.56	831.32	25.73	61.93
Darkan 5f, Dk5f Valley floors and swamps				
State-wide	5,827.42	1,572.25	26.98	4.07
Shire of West Arthur	5,476.64	1,433.68	26.18	93.98

* Excludes Crown Freehold Department Interest Lands that are managed under Section 8(a) of the CALM Act.

Table 6. Vegetation associations within the survey area with regard to the Commonwealth retention targets (Government of Western Australia 2019b).

Mapping region	Pre-European (ha)	Current Extent (ha)	% Remaining	% remaining in DBCA Managed Land*
Association 4				
State-wide:	1,054,279.89	284,102.41	26.95	6.43
IBRA region: Jarrah Forest (JAF)	1,022,712.69	277,087.18	27.09	6.45
IBRA subregion: (JAF02)	408,511.88	79,183.37	19.38	1.34
Shire of West Arthur	59,916.45	12,436.16	20.76	1.61

* Excludes Crown Freehold Department Interest Lands managed under Section 8(a) of the CALM Act.

4.4 Threatened and Priority ecological communities

Ecological communities are defined by Western Australia's DBCA as "...naturally occurring biological assemblages that occur in a particular type of habitat. They are the sum of species within an ecosystem and, as a whole, they provide many of the processes which support specific ecosystems and provide ecological services." (DEC 2013).

Under Section 27 of the *Biodiversity Conservation Act 2016* (BC Act), the Western Australian Minister for Environment may list communities considered under significant threat as TECs. These TECs can be listed under one of three conservation categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU). The BC Act also provides for listing communities as collapsed ecological communities.

Possible TECs that do not meet survey criteria may be added to the DBCA's PEC lists under Priorities 1, 2 or 3 (referred to as P1, P2, P3). Ecological communities that are adequately known, are rare but not Threatened, meet criteria for near Threatened, or that have been recently removed from the Threatened list, are placed in Priority 4 (P4). These ecological communities require regular monitoring. Conservation dependent ecological communities are placed in Priority 5 (P5) (DEC 2013).

The current listing of TECs and PECs is specified in DBCA (2018a, 2021b). The conservation categories for these TECs and PECs are defined in **Appendix 4**.

TECs can also be listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). There are three categories of TEC under the EPBC Act: Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) (Department of Agriculture, Water and the Environment) (DAWE 2020a). These are defined in **Appendix 5.**

The desktop assessment of DBCA TEC PEC databases and a PMST query found one EPBC Act TEC and two BC Act listed TECs within 20 km of the survey area (DBCA 2021a, DAWE 2021). These communities are briefly described in **Table 7,** and the occurrences[2] of the DBCA TEC PEC records within and in proximity to Section 2 are shown in **Figure 6**.

No TECs or PECs have been previously recorded over the survey area.

Copies of the PMST results are provided in **Appendix 6.**

[2] Note the DBCA 2021a occurrences of the the Wheatbelt woodland TEC are only predicted indicative occurences only.

Table 7. Threatened and Priority ecological communities within 20km of survey area (DBCA 2021a, DAWE 2021).

Community Name	Status (WA)	Status (EPBC Act)
Eucalypt Woodlands of the Western Australian Wheatbelt	P3	CR
Blackwood Alluvial Flats, alluvial soils of the upper Blackwood River Woodlands and shrublands of the alluvial soils of the upper Blackwood River (Condinup and Darkan 5f soil-landscape sub-systems). Vegetation associations identified to date: Wet shrublands on alluvial clay flats, Jarrah-Marri woodlands on alluvial grey-brown loams, Wandoo woodlands on alluvial grey-brown clay-loams (includes vernal pools), Flooded Gum-Wandoo woodland on alluvial grey clays (includes vernal pools), Wandoo woodlands on grey sandy loams	P2	-

Note: This table only includes formally recognised TECs and PECs that are known of and mapped and included in the DBCA's database.

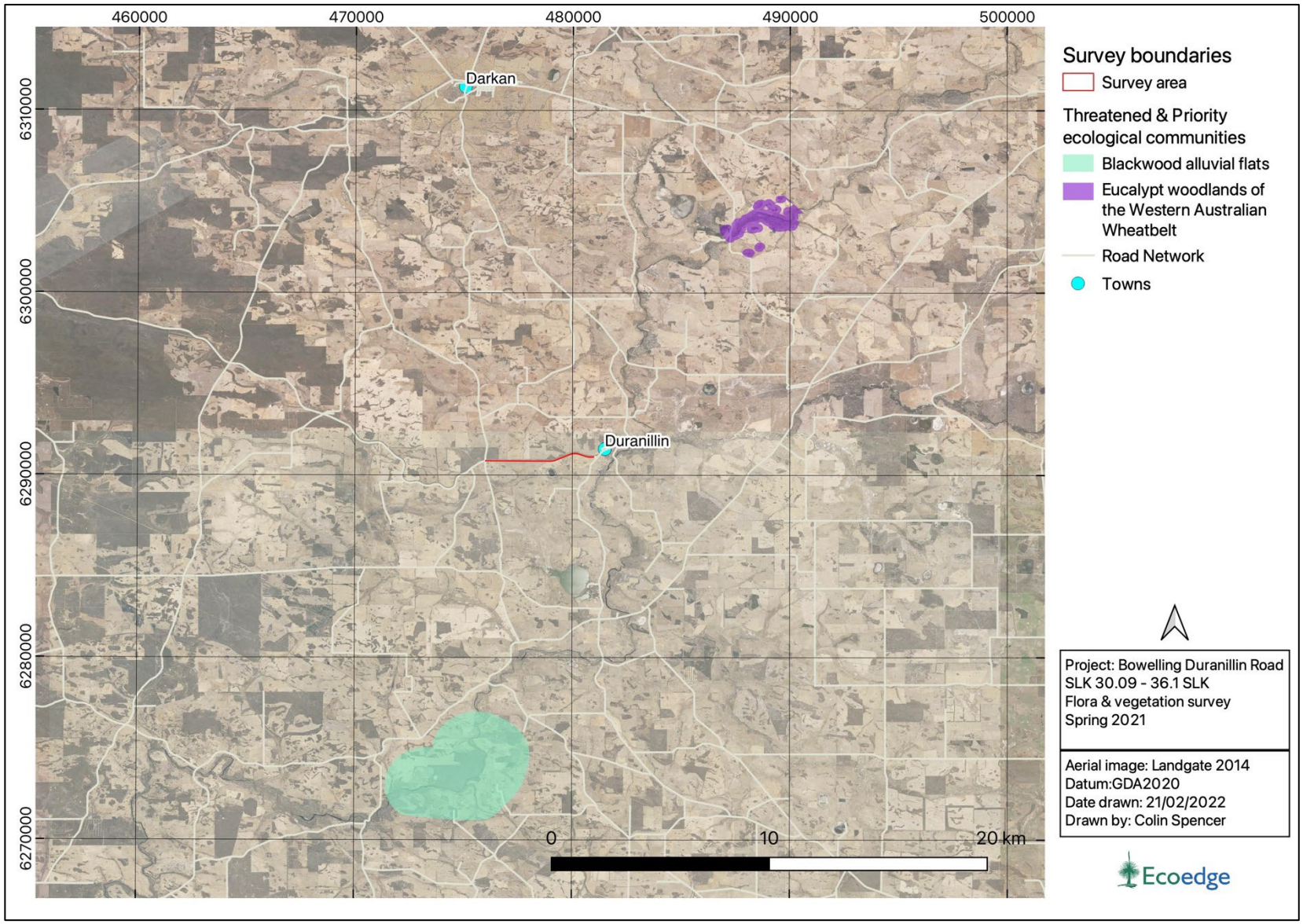

Figure 6. Threatened and Priority ecological communities known and indicatively mapped within 20 km of the survey area (DBCA 2021a).

4.5 Threatened and Priority flora

Species of flora and fauna are defined as having a Threatened or Priority conservation status where their extant populations are restricted geographically and/or under threat of possible extinction. The DBCA recognises these threats and consequently applies regulations towards population and species protection.

Threatened extant flora species are listed under Section 19 of the BC Act and are ranked according to their level of threat using the International Union for Conservation of Nature (IUCN) Red List categories and criteria of; Critically Endangered (CR), Endangered (EN), Vulnerable (VU). It is an offence to "take" or damage Threatened flora without Ministerial approval. Section 5 of the Act defines "to take" as "… to gather, pluck, cut, pull up, destroy, dig up, remove, harvest or damage flora by any means".

Priority flora is under consideration for future declaration as "Threatened flora", dependent on more information. Species classified as Priority One to Three (referred to as P1, P2 and P3) are in need of further survey to determine their status, while Priority Four (P4) species are adequately known rare or Threatened species that require regular monitoring.

Threatened flora lists are formally reviewed annually, whilst the Priority flora list is subject to a less formal ongoing review. The current listing of Threatened and Priority flora was updated on 5 December 2018 (DBCA 2018b).

Categories of Threatened and Priority flora as defined by the BC Act are presented in **Appendix 7** (DBCA 2019).

Threatened flora may also be protected under the EPBC Act and be listed in one of six categories; the definitions of these categories are summarised in **Appendix 8** (DAWE 2020a).

Threatened or Priority flora occurring within 20 km of the survey area are provided in a likelihood of occurrence table in **Appendix 2.** The list has been generated from a NatureMap search (DBCA 2021d), a PMST query (DAWE 2021) (**Appendix 6**) and DBCA and WA Herbarium Threatened and Priority flora data downloads (DBCA 2021c).

Forty-two significant species were identified as occurring (DBCA 2021d) or potentially occurring (DAWE 2021) within this search area. One species, *Boronia tenuis* (P4), was considered Likely to occur within the survey area, thirty possible and eleven Unlikely to occur within the survey area. No species were recorded within the survey area (DBCA 2021c).

A breakdown of the likelihood of occurrence according to conservation status is provided in **Table 8**, with the complete assessment provided in **Appendix 9**. Known occurrences of Threatened and Priority flora are shown in **Figure 7**.

Table 8. Pre-survey likelihood of occurrence according to conservation status.

Likelihood of occurrence	Total no	Priority 1	Priority 2	Priority 3	Priority 4	Threatened
Likely	**1**	0	0	0	1	0
Possible	**30**	2	7	9	5	7
Unlikely	**11**	1	1	3	1	5
Total	**42**	**3**	**8**	**12**	**7**	**12**

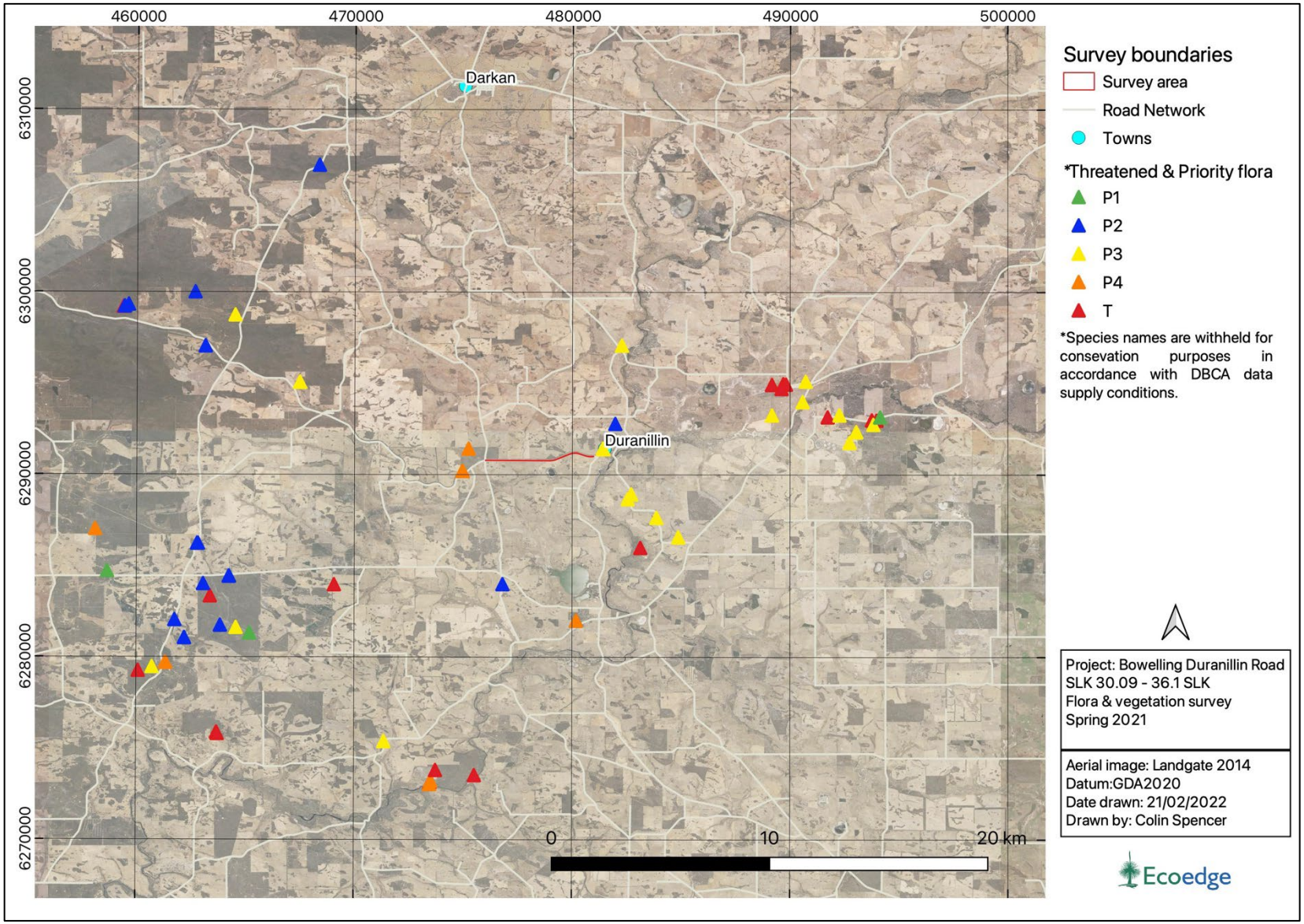

Figure 7. Threatened and Priority flora within 10 km of the survey area (DBCA 2021c).

4.6 Wetlands and watercourses

There are three wetland types mapped within proximity to the survey area according to the Geomorphic wetland mapping from Darkan to Duranillin (DBCA 2017b) and Crossman and Li (2015) drainage line mapping. These are palusplain wetlands (seasonally water-logged flats), damplands (seasonally waterlogged basins) and ephemeral, non-perennial creeks. These are shown in **Figure 8**.

Whilst the boundary of the wetland mapping does not intersect the area it is likely that the palusplain wetland, which is mapped to occur immediately north and south of the survey area in the area of the Capercup Road North Nature Reserve, does extend across the survey area. It appears, for some reason, that the mapping boundaries did not extend into local government managed road reserve in this area.

Similarly, there are no formally mapped water courses mapped to intersect the survey area (Crossman & Li 2015, DBCA 2017). However, an examination of the aerial imagery shows one minor, non-perennial creek in the western third of the survey that may intersect the area.

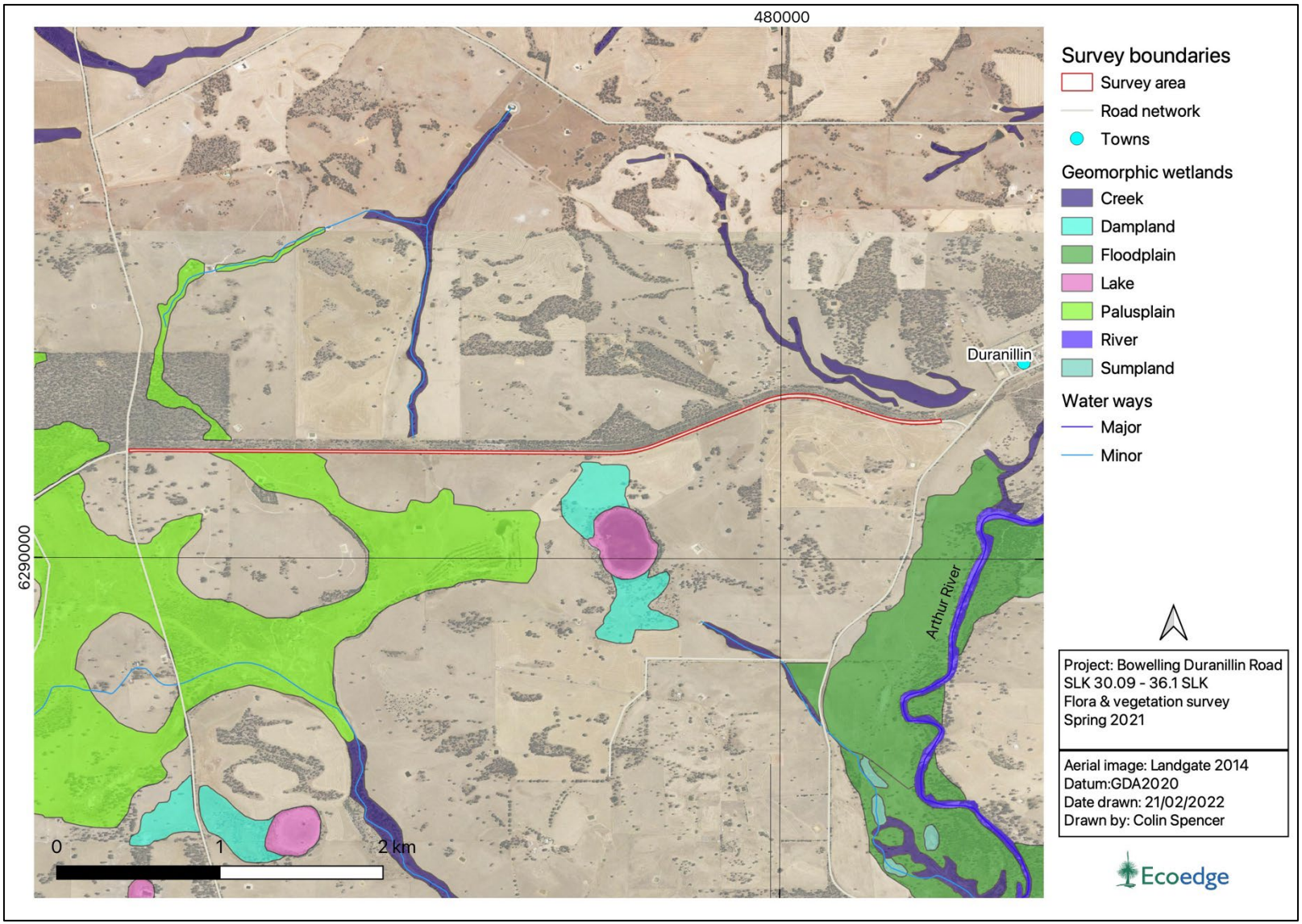

Figure 8. Type of wetland within the survey area (DBCA 2017, Crossman & Li 2015).

4.7 Ecological linkages

No formally mapped ecological linkage is known to occur across or in proximity to the survey area. However, the northern portion of the survey area occurs within an unused and vegetated railway reserve that is approximately 90 m wide and stretches east-west approximately 35 km between the townsites of Bowelling and Duranillin. In the west, towards Bowelling, it connects to large tracts of naturally vegetated private and state-managed land. In the east, the corridor connects with native vegetation associated with both the Arthur and Beaufort Rivers. A number of small to medium parcels of native vegetation also intersect this corridor, including vegetation in road reserves and drainage lines.

Aerial photography shows that this rail reserve is one of the few remaining naturally vegetated east-west aligned corridors in the region.

4.8 Environmentally Sensitive Areas

ESAs are protected under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004. They are selected for their environmental values at State or National levels (Government of Western Australia 2005). They include:

- Defined wetlands and riparian vegetation within 50 m
- Areas covered by Threatened ecological communities
- Areas of vegetation within 50 m of Threatened flora
- Bush Forever sites
- Declared World Heritage property sites.

There are no ESAs within the survey area, or near the survey area. The nearest ESA is located approximately 56 km northwest of the survey area.

5 Field survey results

5.1 Flora

One hundred and sixty vascular flora taxa were identified within the survey area, of which thirty-two were introduced species (**Appendix 10**). The two plant families with the highest representation were the Fabaceae (18 taxa, incl. 2 introduced species), Poaceae (16 with 9 introduced taxa) and 13 Proteaceae (all native).

No flora listed as Threatened under the EPBC Act or the BC Act were found within the survey area. However, two Priority species were found. A single plant of the Priority 3 taxon (*Tetratheca exasperata*) (**Figure 9**) and a species of Banksia which is probably the Priority 2 species *Banksia acanthopoda* (**Figure 10**). A specimen of the potential *Banksia acanthopoda* was collected and is being sent to the W.A. Herbarium for formal identification. The distribution of these taxa is shown in **Figure 11** below.

5.1.1 Flora of conservation significance

Scattered collections of *Tetratheca exasperata* (a subshrub to 0.3 metres) have been made over an area ranging from Harrismith (east of Narrogin) to Bowelling and south to Nyamup near Manjimup. It is represented by about a dozen records in the State herbarium. Most records are from small reserves in the Wheatbelt, but there are several from State forests.

Banksia acanthopoda, a spreading non-lignotuberous shrub up to 3 metres high, is found over a narrow range from Darkan to Badgebup east of Narrogin, with a single record from north-east of Cuballing. Most records are from small Wheatbelt reserves or road verges.

Figure 9. Photo of *Tetratheca exasperata* (P3)the flora found in the survey area.

Figure 10. Photo of *Banksia acanthopoda* (P2) found in the survey area.

5.1.2 Post survey likelihood of occurrence

A summary of the post-survey likelihood of occurrence according to conservation status is provided in **Table 9.**

Apart from the two Priority species recorded, there were forty taxa given a post-survey likelihood of occurrence of "unlikely". The main reason provided for this post-survey likelihood rating was because, although suitable habitat was present in the survey area, a thorough survey at an appropriate time of year failed to find these taxa.

Table 9. Vascular post-survey likelihood of occurrence according to conservation status.

Likelihood of occurrence	Total No.	Priority 1	Priority 2	Priority 3	Priority 4	Threatened
Possible						
Unlikely	**40**	3	7	11	7	12
Recorded	**2**		1	1	-	-
Total	**42**	**3**	**8**	**12**	**7**	**12**

5.2 Significant weeds

There were no Declared Pest Plants or Weeds of National Significance in the survey area.

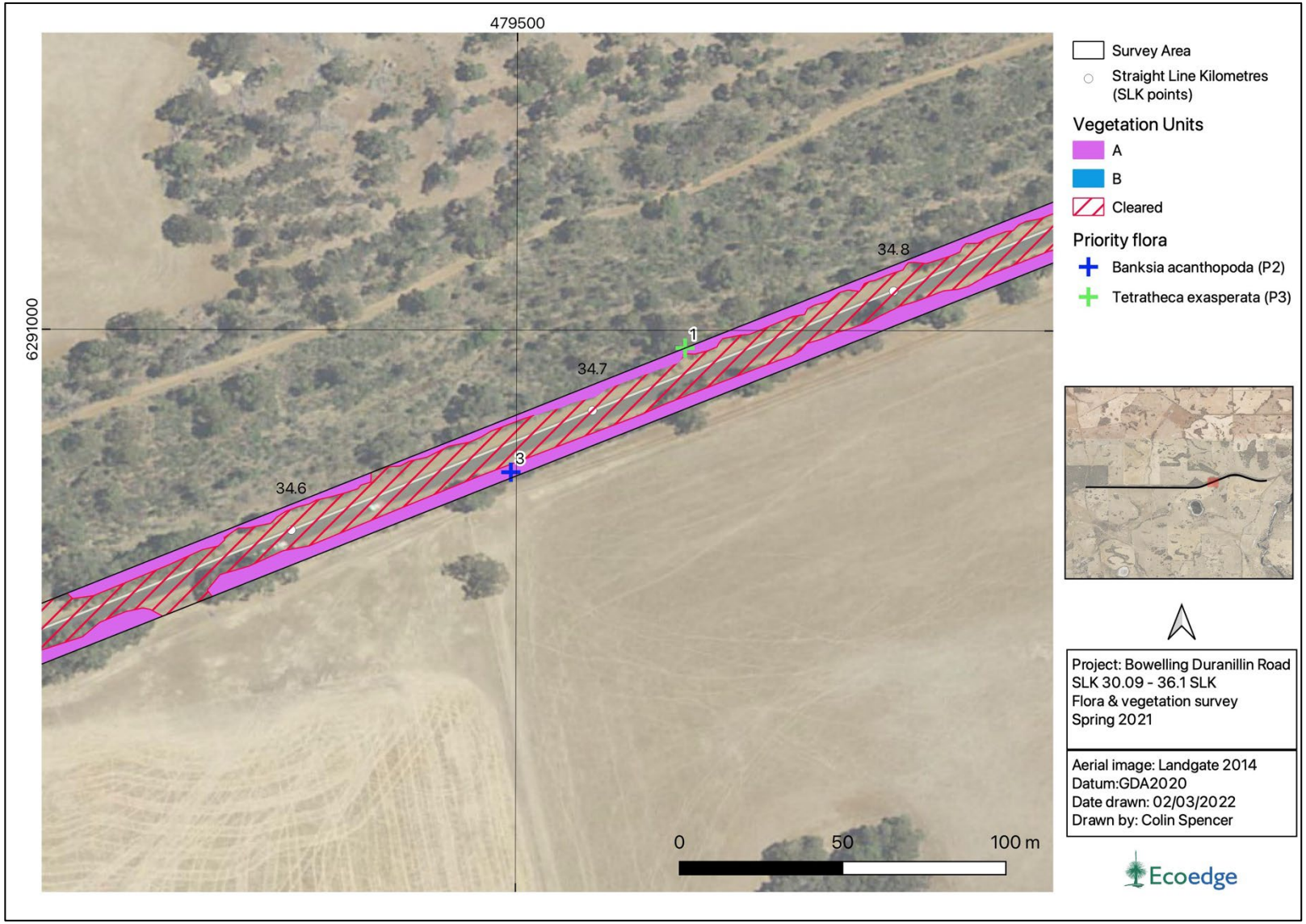

Figure 11. Location of Threatened and Priority Flora within the survey area 34.6 – 34.8 SLK.

5.3 Vegetation units

Two vegetation units were identified within the survey area and are described below. The location of the vegetation units is shown in **Appendix 11**. Vegetation unit A is by far the most extensive type, comprising more than 98% of the native vegetation.

Vegetation unit A. *Eucalyptus wandoo* (*E. marginata*, *Corymbia calophylla*) medium woodland over *Allocasuarina huegeliana* low woodland over *Acacia extensa*, (*Allocasuarina humilis*), *Hakea prostrata*, *Leptospermum erubescens*, *Petrophile squamata* medium open shrubland over *Bossiaea eriocarpa*, *Gastrolobium calycinum*, *Lechenaultia bilobum* low shrubland and *Dianella revoluta*, *Haemodorum discolor*, *Lomandra effusa*, *Stackhousia monogyna* open forbland and *Neurachne alopecuroidea* sparse grassland and *Mesomelaena tetragona* open sedgeland on gravelly red-brown loam (**Figure 12**).

Vegetation unit B. *Eucalyptus wandoo* medium woodland over *Melaleuca viminea* tall open shrubland over forbland including *Aphelia cyperoides*, *Centrolepis aristata*, *Drosera glanduligera*, **Lythrum hyssopifolia*, *Stylidium androsaceum*, sparse rushland of *Juncus articulatus*, **J. microcephala* and isolated *Lepidobolus preissianus* sedges on yellow-brown clay (**Figure 13**).

Figure 12. Typical example of Vegetation unit A.

Figure 13. Typical example of Vegetation unit B.

The extent and proportion of the total vegetated areas of each of these vegetation units is presented in **Table 10**.

Table 10. Area and condition classes for the various vegetation unit within the survey area.

Vegetation Unit	Condition	Area (ha)	%
A	Very Good	0.290	9.09
	Good	0.568	17.80
	Degraded to Good	0.586	18.36
	Degraded	0.447	14.01
	Completely Degraded	1.300	40.74
		3.191	100.00
B	Good	0.002	3.77
	Degraded	0.013	24.53
	Completely Degraded	0.038	71.70
		0.053	100.00

5.4 Vegetation condition

Just over half of the survey area vegetation (55%) was in Degraded or Completely Degraded condition. This is because it comprises a narrow strip along the verge that has been subject to disturbance by road maintenance activities in the past, as well as an influx of weeds from adjacent pasture.

A breakdown of the condition of vegetation within the survey area is provided in**Table 11**, and shown in **Appendix 12**.

Table 11. Area and percentage of the survey area in vegetation condition classes.

Condition	Area (ha)	%
Very Good	0.29	8.94
Good	0.57	17.57
Degraded to Good	0.60	18.46
Degraded	0.45	13.78
Completely Degraded	1.34	41.25
Total Native veg.	**3.24**	**100.00**
Cleared	6.98	
Total Survey Area	10.23	

5.5 Threatened and Priority Ecological communities

Portions of both vegetation units A and B meet the key diagnostics and area and condition thresholds for the Critically Endangered Federally-listed TEC "Eucalypt Woodlands of the Western Australian Wheatbelt" (DotEE 2015) and the State-listed Priority Three ecological community

Table 12 shows how parts of units A and B meet the key diagnostics criteria, and **Table 13** shows how they meet the condition and patch criteria thresholds. The maps of the TEC are provided in **Appendix 13**.

Table 14 provides a breakdown of the TEC / PEC patch area and condition within each of the vegetation units.

A copy of the completed Threatened Ecological Community Report form is provided in **Appendix 14.**

Table 12. Comparison of the survey area vegetation with the Eucalypt Woodlands of the Western Australian Wheatbelt TEC key diagnostic characteristics criteria (DotEE, 2015).

Condition Category	Comment
It occurs in one of the appropriate IBRA regions.	Yes, it occurs in the Jarrah Forest IBRA region in an area of less than 600 mm mean annual rainfall.[3]
The structure of the ecological community is a woodland in which the minimum crown cover of the tree canopy in a mature woodland is 10% (crowns measured as if they are opaque).	Yes, criteria met.
The key species of the tree canopy are species of *Eucalyptus* (typically with a single trunk).	Yes, it contains *Eucalyptus wandoo*.
A native understorey is present but is of variable composition, being a combination of grasses, other herbs and shrubs.	Yes, criteria met.

[3] Capercup, just west of the survey area has 510 mm annual rainfall, and Duranillin, 3 km east has 530 mm annual rainfall.

Table 13.Comparison of the survey area vegetation with Eucalypt Woodlands of the Western Australian Wheatbelt TEC condition and area criteria adapted from DotEE, 2015.

Condition Category	Mature trees	Minimum Patch Width (roadsides only)	Comment	Area (ha)
'Pristine, Excellent, Very Good'	Mature trees may be present or absent.	5 metres or more	Areas on the northern verge adjacent to the railway reserve and on the southern verge greater than 5 metres wide.	0.290 – Very Good
'Good'	Mature trees are present with at least 5 trees per 0.5 ha.	5 metres or more	Areas on the northern verge adjacent to the railway reserve.	0.570 - Good
'Degraded to Good'	Mature trees are present with at least 5 trees per 0.5 ha.	5 metres or more	Areas on the southern verge greater than 5 metres wide.	0.599 – Degraded to Good

Table 14. TEC PEC area and condition classes for the various vegetation unit within the survey area.

Vegetation Unit	Condition	Area (ha)	%	TEC
A	Very Good	0.290	9.09	Yes
	Good	0.568	17.80	Yes
	Degraded to Good	0.599	18.46	Yes
	Degraded	0.447	13.78	No
	Completely Degraded	1.300	40.74	No
		3.191	100.00	
B	Good	0.002	3.77	Yes
	Degraded	0.013	24.53	No
	Completely Degraded	0.038	71.70	No
		0.053	100.00	

6 Discussion and conclusions

6.1 Conservation Status of the Flora

One of the Priority species found within the survey area, *Tetratheca exasperata* (P3), is found over a wide area of the south-west (including in State-forest), from Harrismith (east of Narrogin) in the central Wheatbelt to near Manjimup. It is, however, represented by only about a dozen records in the W.A. Herbarium.

The other potential Priority species found within the survey area, *Banksia acanthopoda* (P2), has a more limited distribution. Most of the known populations appear to occur in small Wheatbelt reserves and on road verges.

6.2 Conservation Status of the Vegetation

In total, 1.46 ha of vegetation within the survey area meets the criteria to be considered part of the Eucalypt Woodlands of the Western Australian Wheatbelt TEC. These areas correspond to vegetation within both vegetation unit A and unit B assessed to be in better than Degraded to Good condition.

To the north of the survey area, and adjacent to it lies a much larger area (within Capercup NR and the old railway reserve) that meets the TEC criteria. The examples of this TEC road and rail verge represent an important example of a contiguous and relatively intact remnant of the woodlands in a largely cleared landscape.

6.3 Vegetation complexes and associations

Three vegetation complexes are mapped to occur across the survey area, the Darkan 4 (Dk4) Complex, the Darkan 5 (Dk5) Complex and the Darkan 5f (Dk5f) Complex. The Darkan 5 (Dk5) Complex makes up the greatest proportion of the survey area by area.

The survey area generally matches the Darkan 4 Complex description rather than the Darkan 5 and Darkan 5f Complex descriptions.

The Darkan 5 Complex exceeds the targeted 30% of its pre-European extent of vegetation remaining at a state level but does not meet the target within the Shire. The two other complexes have less than 30% of their pre-European extent of native vegetation remaining at both the state and Shire level.

One Beard vegetation association, Association 4, is mapped across the survey area. There is a fairly good match between the vegetation in the survey area and this is a very broadly defined Beard association in terms of the described dominant vegetation. Association 4 has less than 30% of its pre-European extent of native vegetation remains at all levels.

6.4 Wetland and riparian habitat

Vegetation unit B is regarded as a wetland habitat as it is dominated by flora species typically restricted to wetlands, including the tall shrub *Melaleuca viminea*, as well as several

herbaceous taxa typical of claypans. This correlates with its location within the DBCA (2017b) mapped occurrence of the palusplain wetland.

6.5 Regional ecological linkages

Aerial photography shows that the survey area occurs within the unused Bowelling to Duranilling rail reserve, which is one of the few remaining naturally vegetated east-west aligned naturally vegetated corridors in the region. This 90 m wide corridor stretches for approximately 35 km. It provides an important function as an ecological corridor connecting large tracts of uncleared vegetation, in the west, with small to medium parcels of vegetation as it progresses east into cleared agricultural lands. Beyond Duranillin, it connects to the vegetation associated with both the Arthur and Beaufort Rivers.

There is no statutory basis for the protection of the ecological corridors. However, the importance of ecological linkages, in general, has been recognised as an environmental policy consideration in EPA and Planning policy over the last decade (EPA 2008 and references therein).

6.6 Environmentally Sensitive Areas

There are no ESAs within the survey area or near the survey area. The nearest ESA is located approximately 56 km northwest of the survey area.

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Appendix 1. Threatened and Priority flora Likelihood of occurrence assessment methodology.

Rating	Presurvey rationale	Post survey rationale
Recorded	Na	Taxon was or has been recorded in the survey area.
Likely	Known to occur within one kilometre (km) of the survey area with suitable habitat known or predicted to occur within the survey area.	The taxon is known to occur within one km of the survey area and very suitable habitat was present, but the taxon was not observed for one of the following reasons. **L1.** The taxon was dormant at time of survey and could therefore not be located. **L2.** The habitat was compromised, for example due to a recent fire. **L3.** The survey area is challenging to survey and the taxon is non- descript and difficult to find because, for example, it occurs in large areas of rocky granite outcrops, or it occurs within an expanse of open water.
Possible	Known to occur within a five- ten km of the survey area with suitable habitat known or predicted to occur within the survey area.	The taxon is known from within a five to ten km radius of the survey area and suitable habitat for the species was present, but despite a thorough search being carried out the species was not observed. The taxon may however be present for any of the following reasons. **P1.** The taxon was dormant at time of survey and could therefore not be located. **P2.** The habitat was compromised for example, due to a recent fire. **P3.** The survey area is challenging to survey and the taxon is non- descript and difficult to find because, for example, it occurs in large areas of rocky granite outcrops, or it occurs within an expanse of open water.
Unlikely	Known or predicted to occur within ten km but no suitable habitat is known or predicted to occur within the survey area.	The taxon was not found and is unlikely to be present for one or more of the following reasons: **U1.** No suitable habitat was observed, and the taxon is known to be restricted to a narrow and clearly defined habitat type. **U2.** Suitable or potential habitat was present and appropriately searched but the taxon was not observed. **U3.** Suitable habitat present, but these areas were too degraded for the taxon to occur, for example, due to weed invasion and, or clearing.

Example of application of pre and post survey likelihood of occurence

Taxon	Cons Status	Flowering	Description	Pre survey likelihood	Post Survey Likelihood
Drakaea elastica	T (EN)	Oct-Nov	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red, green, yellow. White or grey sand. Low-lying situations adjoining winter-wet swamps.	**Likely**	**Unlikely (U3)**

Appendix 2. Track log and relevés points.

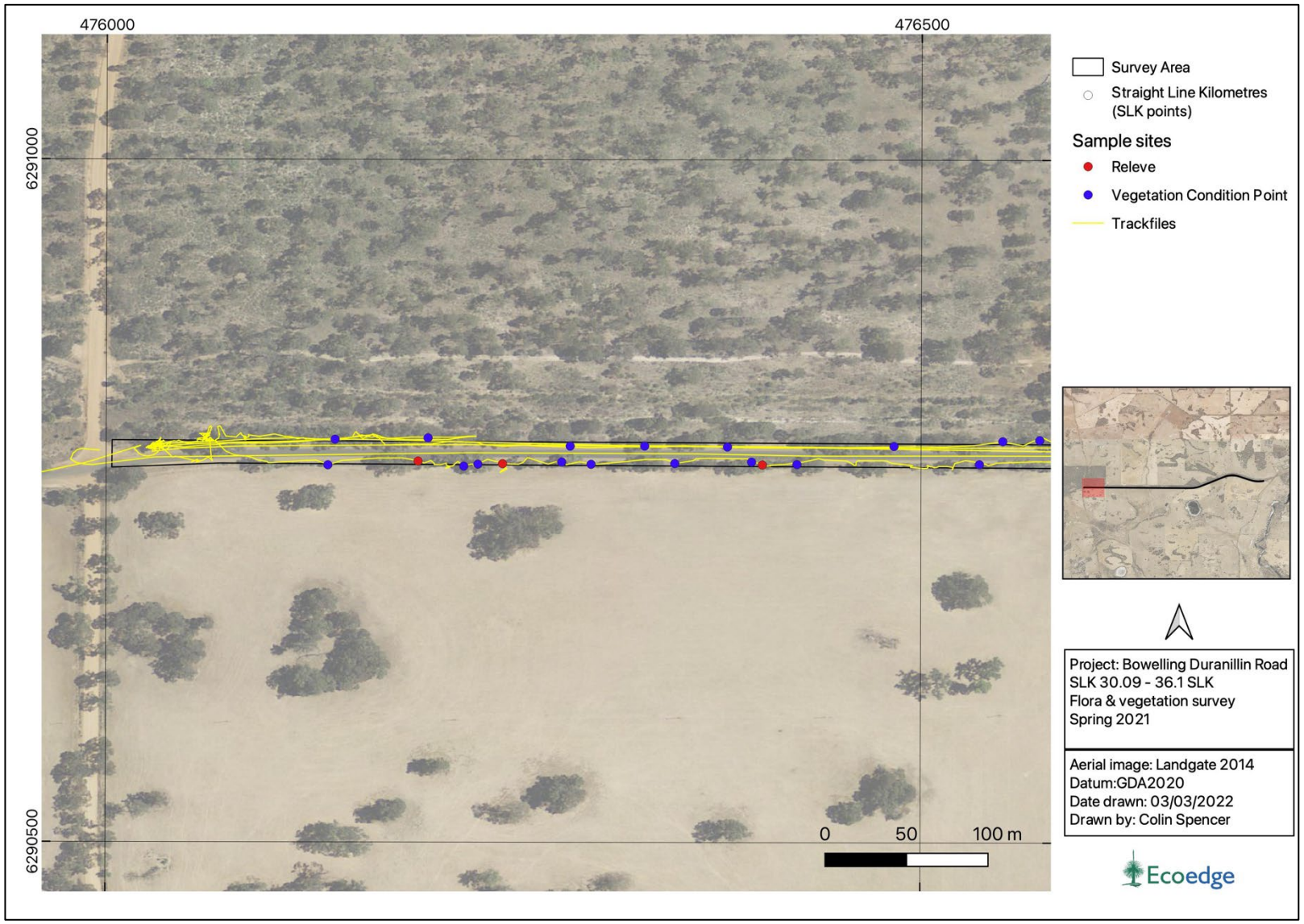


Figure A. Location of sample sites within the survey area SLK 31.06 – 31.6 SLK.

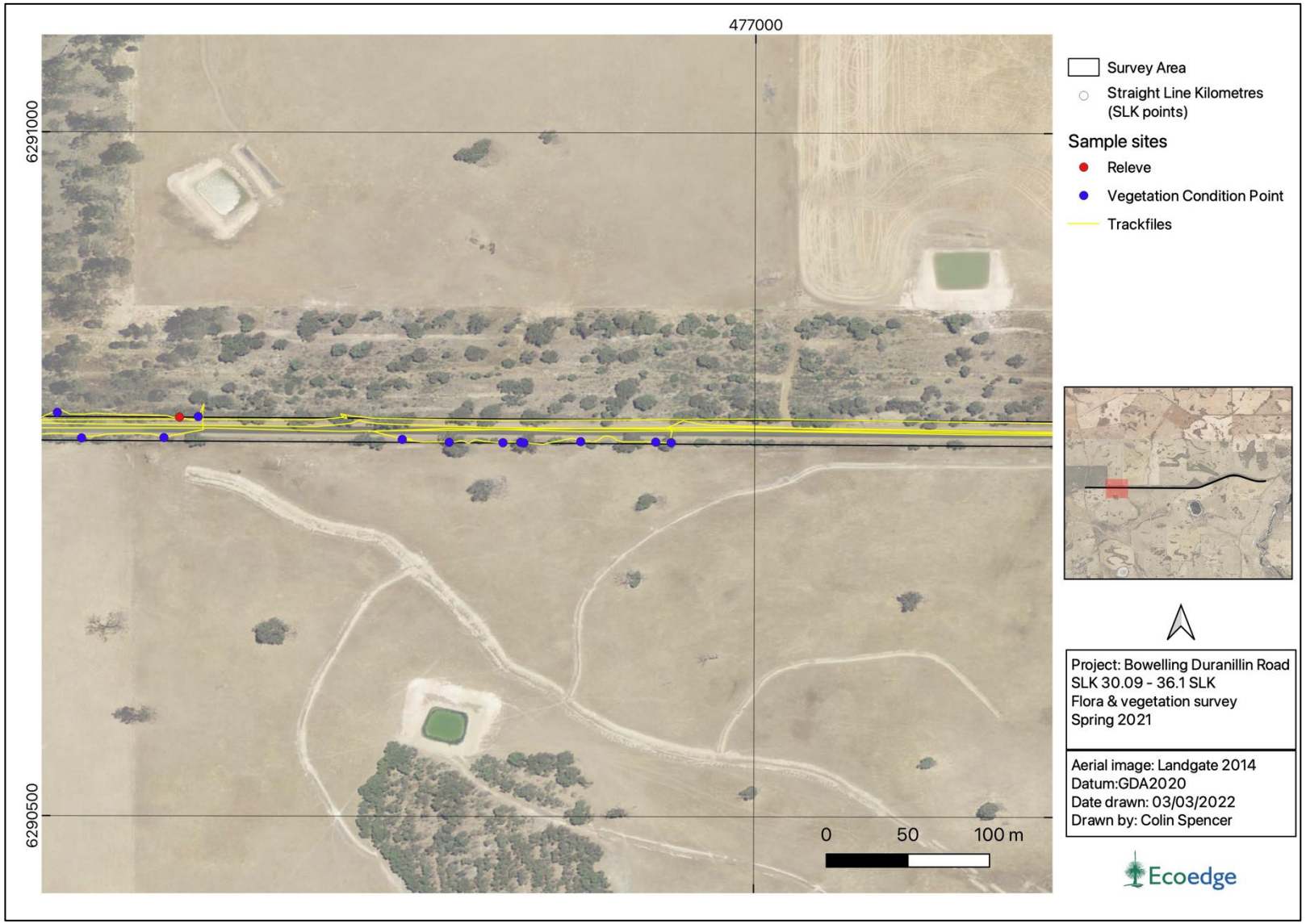


Figure B Location of sample sites within the survey area SLK 31.7 – 32.3 SLK.

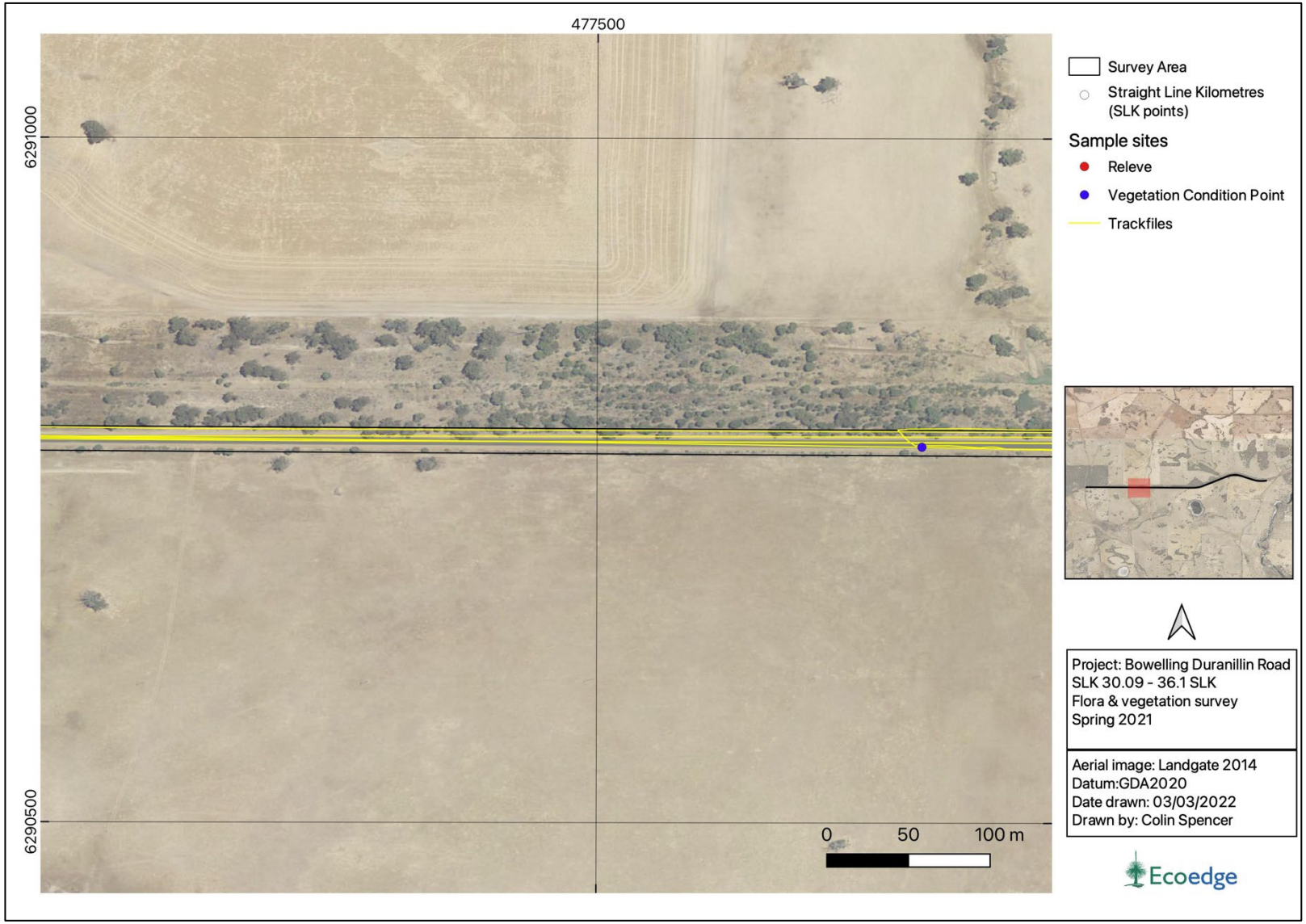


Figure C. Location of sample sites within the survey area SLK 32.3– 32.9 SLK.

Figure D. Location of sample sites within the survey area SLK 32.9 – 33.5 SLK.

Figure E. Location of sample sites within the survey area SLK 33.5 – 34.1 SLK.

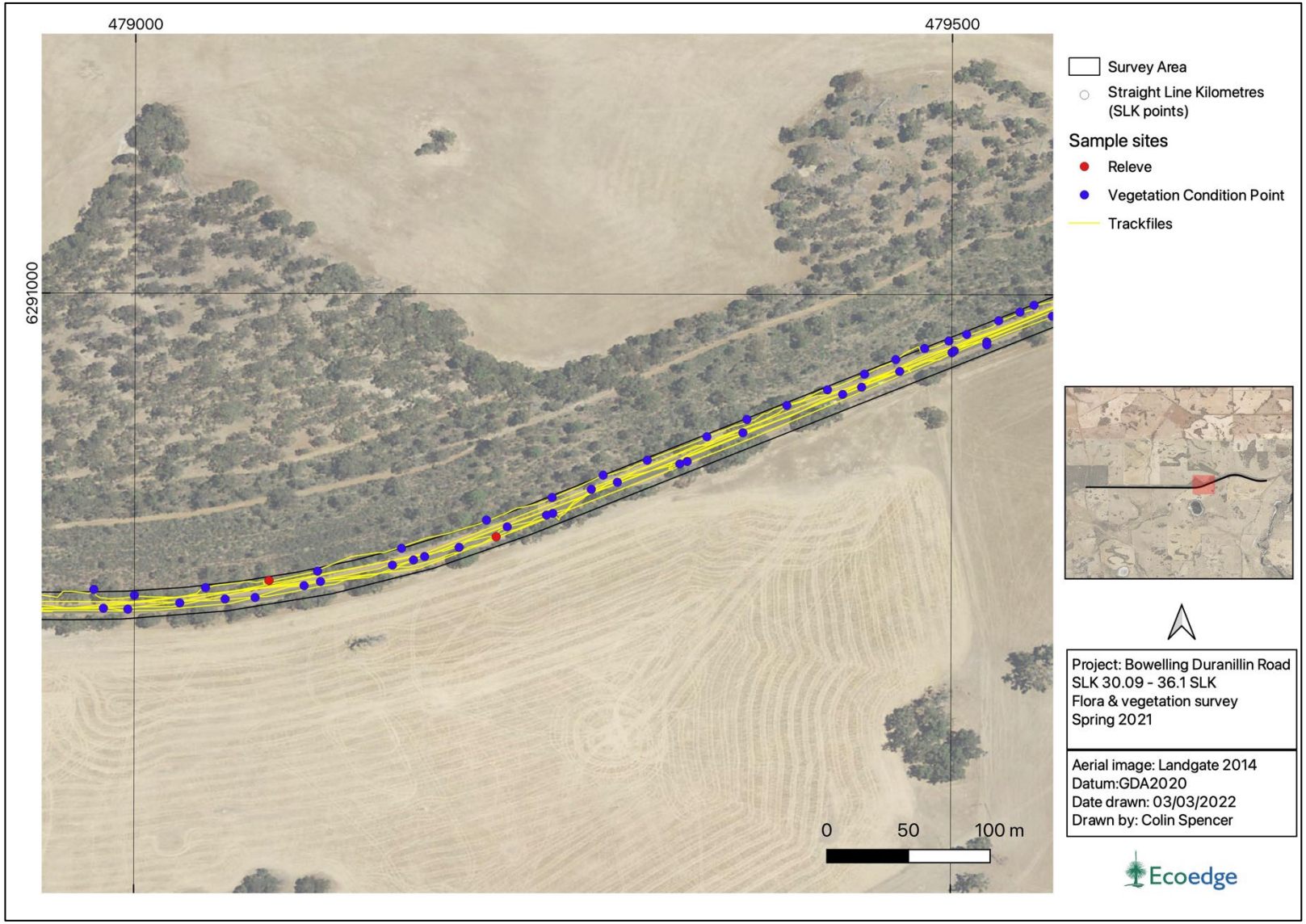


Figure F. Location of sample sites within the survey area SLK 34.1 – 34.7 SLK.

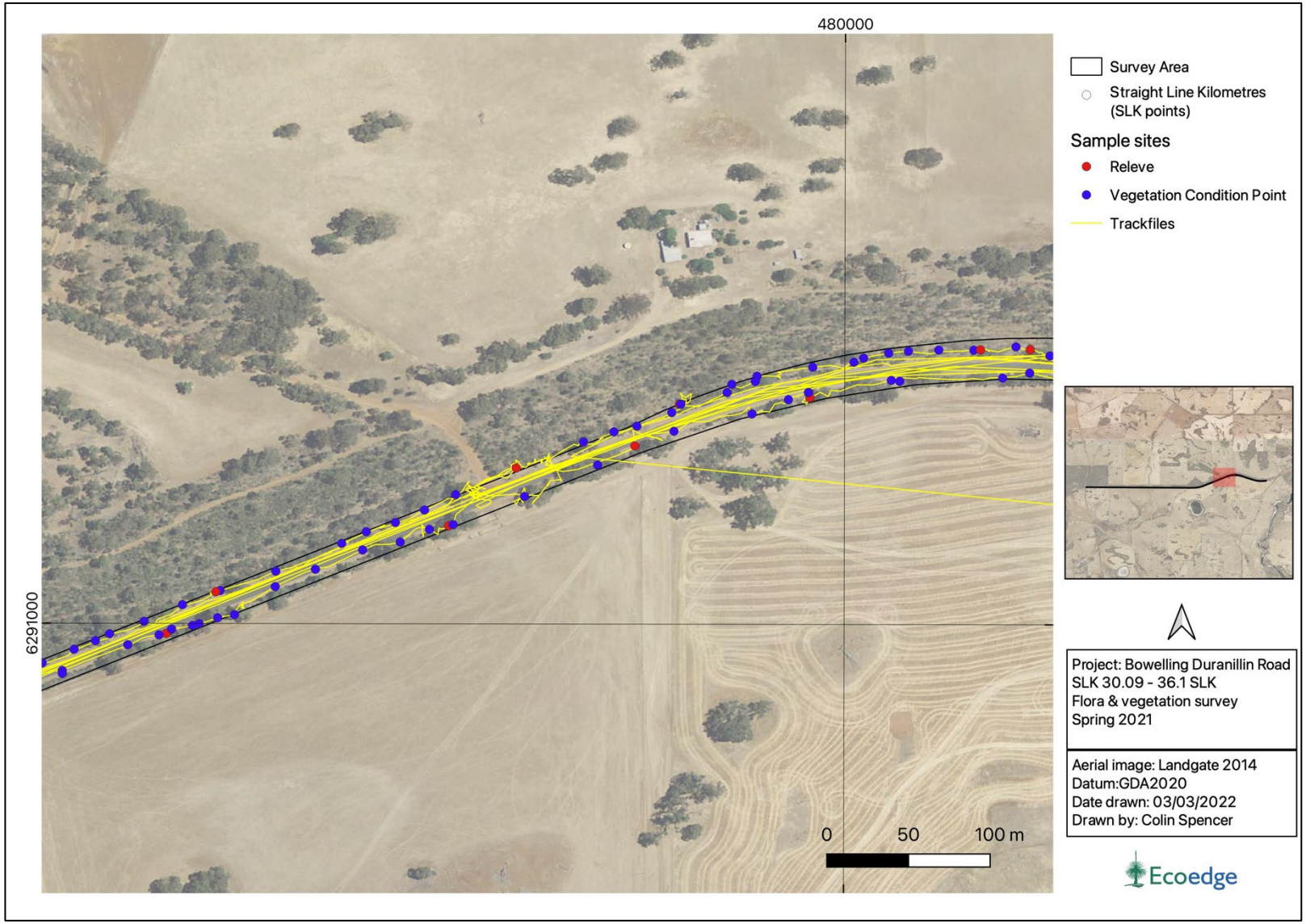


Figure G. Location of sample sites within the survey area SLK 34.7 – 35.3 SLK.

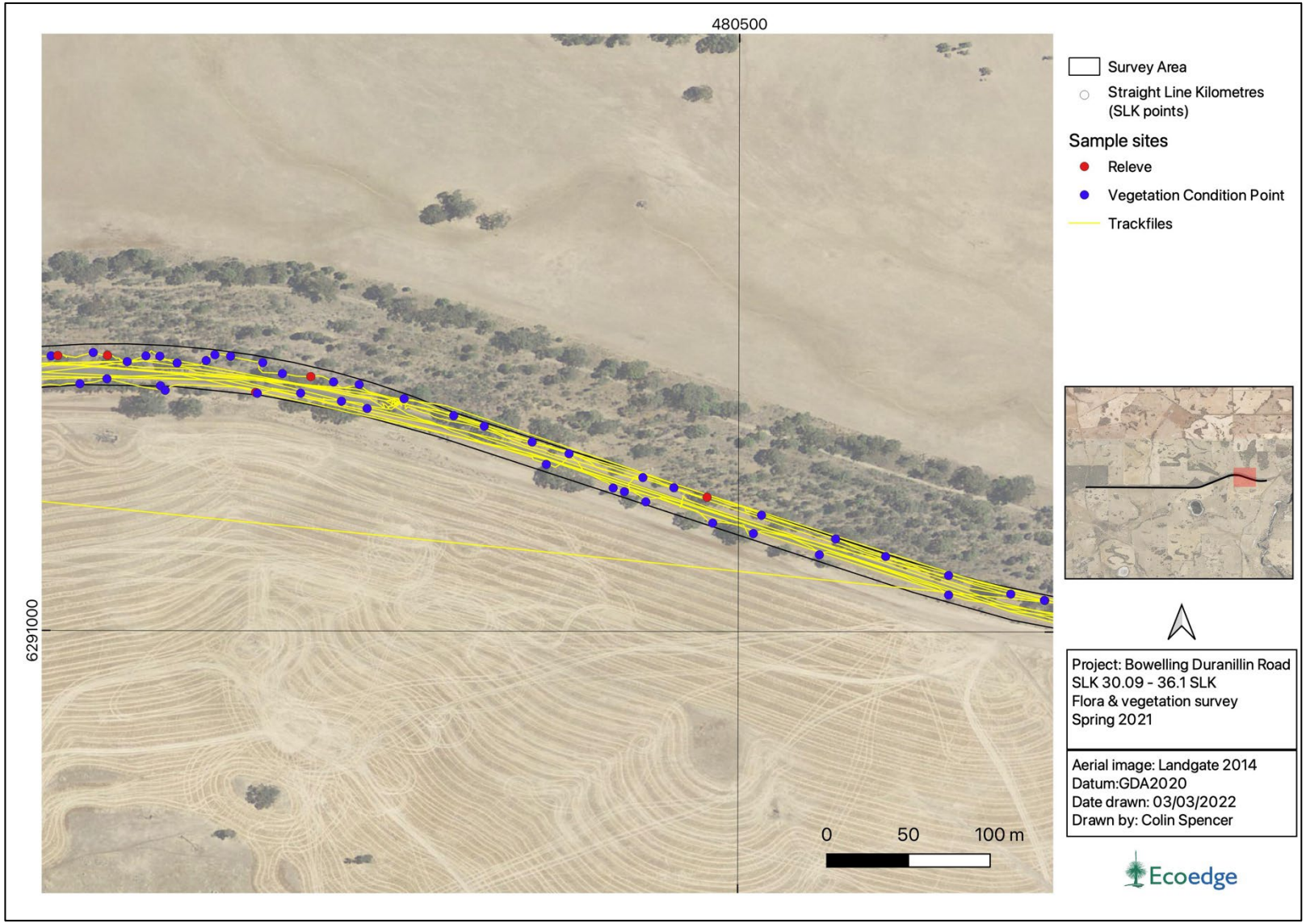


Figure H. Location of sample sites within the survey area SLK 35.3 – 35.9 SLK.

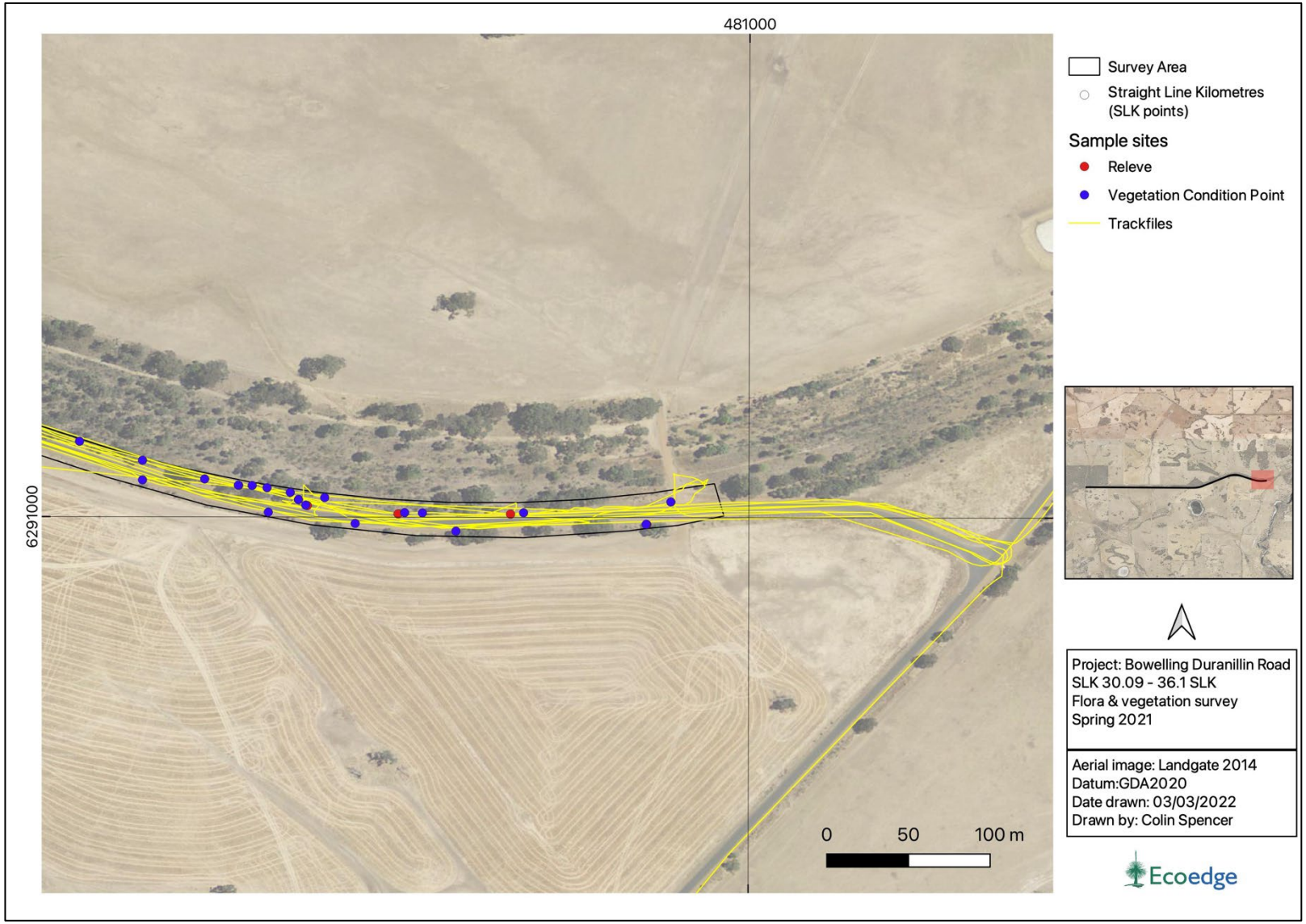


Figure I. Location of sample sites within the survey area SLK 35.9 – 36.3 SLK.

Appendix 3. Vegetation condition scale (EPA 2016).

Vegetation Condition	South West and Interzone Botanical Provinces
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

Appendix 4. Categories of threatened and priority ecological communities under the BC Act.

Conservation code	Category
(T) Threatened ecological community pursuant to Sect 27 of the *Biodiversity Conservation Act 2016.*	
T	(T) CR – Critically endangered An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.
	(T) EN - Endangered An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.
	(T) VU - Vulnerable An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.
(P) Priority species – possible threatened communities.	
P1	Poorly known communities Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤ 100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Conservation code	Category
P2	Poorly known communities Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
P3	Poorly known communities a) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: b) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or; c) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.
P4	Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
P5	Conservation dependent ecological communities Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Appendix 5. Categories of Threatened ecological communities under the EPBC Act.

Category	Definition
Critically endangered (CR)	If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).
Endangered (EN)	If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).
Vulnerable (VU)	If, at that time, an ecological, community is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium–term future (indicative timeframe being the next 50 years).

Appendix 6. Protected Matters Search Tool and NatureMap reports.

NatureMap
Mapping Western Australia's biodiversity

Bowelling Duranillin Rd NatureMap Species Report 15/10/21_20km

Created By Guest user on 16/10/2021

Kingdom Plantae
Conservation Status Conservation Taxon (T, X, IA, S, P1-P5)
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 116° 46' 08" E,33° 31' 21" S
Buffer 20km

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1.	14725	*Acacia ataxiphylla subsp. ataxiphylla*		P3	
2.	32687	*Banksia acanthopoda*		P2	
3.	32176	*Banksia acuminata*		P4	
4.	32158	*Banksia porrecta*		P4	
5.	32040	*Banksia subpinnatifida var. imberbis*		P3	
6.	4444	*Boronia tenuis (Blue Boronia)*		P4	
7.	48778	*Bossiaea lalagoides*		P3	
8.	15336	*Caladenia bryceana subsp. bryceana*		T	
9.	19313	*Calectasia obtusa*		P3	
10.	40921	*Commersonia erythrogyna*		T	
11.	1433	*Conostylis drummondii (Drummond's Conostylis)*		T	
12.	31601	*Cryptandra beverleyensis*		P3	
13.	12938	*Diuris micrantha*		T	
14.	13634	*Drakaea confluens*		T	
15.	17605	*Eleocharis keigheryi*		T	
16.	20743	*Eutaxia nanophylla*		P3	
17.	14526	*Grevillea elongata*		T	
18.	5146	*Hibbertia montana*		P4	
19.	5026	*Lasiopetalum cardiophyllum*		P4	
20.	6426	*Leucopogon ozothamnoides*		P1	
21.	44225	*Leucopogon subsejunctus*		P2	
22.	38000	*Logania sylvicola*		P2	
23.	13276	*Melaleuca pritzelii*		P3	
24.	2874	*Montia australasica*		P2	
25.	36200	*Ornduffia submersa*		P4	
26.	43801	*Pauridia sp. Beaufort (V. Crowley DKN 629)*		P1	
27.	12844	*Stylidium coatesianum*		P2	
28.	7747	*Stylidium lepidum (Redcaps)*		P3	
29.	17579	*Stylidium tylosum*		P2	
30.	16867	*Synaphea grandis*		P4	
31.	16769	*Synaphea hians*		P3	
32.	16762	*Synaphea otiostigma*		P3	
33.	31761	*Tetratheca exasperata*		P3	
34.	10862	*Thelymitra stellata (Star Orchid)*		T	
35.	35519	*Thysanotus unicupensis*		P3	

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Australian Government

Department of Agriculture, Water and the Environment

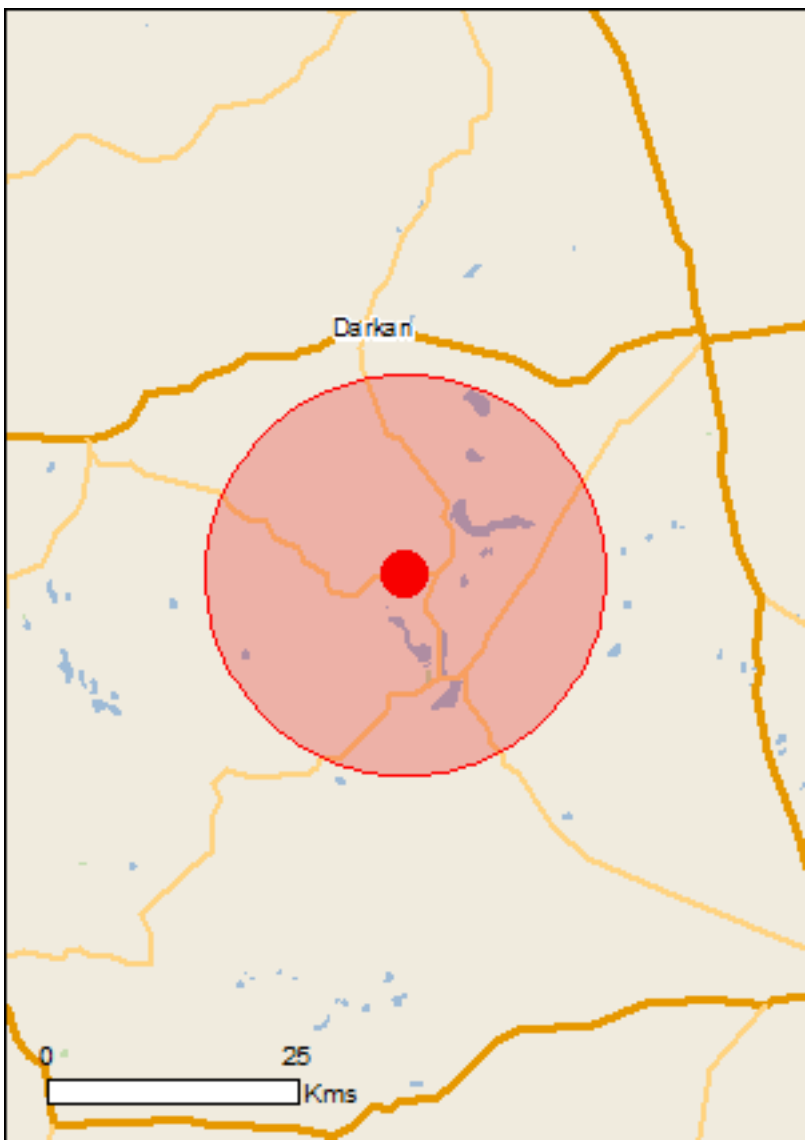
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

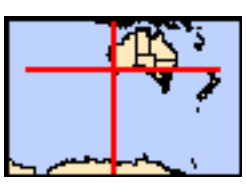
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 16/10/21 23:47:08



Coordinates

Buffer: 20.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	22
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	13
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	7
Regional Forest Agreements:	1
Invasive Species:	17
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Eucalypt Woodlands of the Western Australian Wheatbelt	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Species or species habitat likely to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Fish		
Nannatherina balstoni Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat may occur within area
Mammals		
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Myrmecobius fasciatus Numbat [294]	Endangered	Translocated population known to occur within area

Name	Status	Type of Presence
[Phascogale calura](#) Red-tailed Phascogale, Red-tailed Wambenger, Kenngoor [316]	Vulnerable	Species or species habitat likely to occur within area
Plants		
[Adenanthos pungens subsp. effusus](#) Sprawling Spiky Adenanthos [10742]	Endangered	Species or species habitat may occur within area
[Andersonia gracilis](#) Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
[Caladenia bryceana subsp. bryceana](#) Dwarf Spider-orchid [64503]	Endangered	Species or species habitat known to occur within area
[Commersonia erythrogyna](#) Trigwell's Rulingia [86397]	Endangered	Species or species habitat likely to occur within area
[Conostylis drummondii](#) Drummond's Conostylis [5885]	Endangered	Species or species habitat known to occur within area
[Diuris micrantha](#) Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
[Drakaea confluens](#) Late Hammer-orchid [56778]	Endangered	Species or species habitat known to occur within area
[Eleocharis keigheryi](#) Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat likely to occur within area
[Hemigenia ramosissima](#) Branched Hemigenia [18568]	Critically Endangered	Species or species habitat likely to occur within area
[Thelymitra stellata](#) Star Sun-orchid [7060]	Endangered	Species or species habitat known to occur within area
[Verticordia fimbrilepis subsp. fimbrilepis](#) Shy Featherflower [24631]	Endangered	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Capercup Road North	WA
Haddleton	WA
NTWA Bushland covenant (0033)	WA
NTWA Bushland covenant (0138)	WA
Towerrining	WA
Unnamed WA38731	WA
Wild Horse Swamp	WA

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.52249 116.76887

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix 7. Definitions of conservation codes for Threatened and Priority flora.

Conservation code	Category
(T) Threatened species pursuant to Sect 19 of the BC Act 2016.	
T	(T) CR – Critically endangered Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".
	(T) EN - Endangered Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".
	(T) VU - Vulnerable Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".
(P) Priority species – possible Threatened species.	
P1	Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

Conservation code	Category
P3	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Appendix 6. Categories of Threatened species under the EPBC Act.

Category	Definition
Extinct (Ex)	A native species is eligible to be included in the ***extinct*** category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (ExW)	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered (CR)	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (EN)	A native species is eligible to be included in the endangered category at a particular time if, at that time (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable (VU)	A native species is eligible to be included in the vulnerable category at a particular time if, at that time (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
Conservation Dependent (CD)	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

Appendix 9. Pre and post survey likelihood of occurrence table.

Species	Category	Flowering	Description and habitat	Likelihood	Post Survey Likelihood
Banksia sp. Boyup Brook (L.W. Sage LWS 2366)	P1	No info avail	Low, prostrate, lignotuberous shrub, to 0.4 m high. Upper slope/ mid slope. Light brown/yellow sandy loam with lateritic gravel.	Possible	Unlikely (U2)
Leucopogon ozothamnoides	P1	May	Upright, open, many-stemmed shrub 50 cm high x 40 cm wide, flowers white. Mid slopes. Dry white sand.	Possible	Unlikely (U1)
Pauridia sp. Beaufort (V. Crowley DKN 629)	P1	Sep - Oct?	Small, upright herb 10 cm high x 3 cm wide. Flowers yellow. Red striped under- neath. Stems green-reddish. Flat. Wet grey clay.	Unlikely	Unlikely (U2)
Banksia acanthopoda	P2	Jul to Oct	Spreading, non-lignotuberous shrub, 0.9-3 m high, up to 5 m wide. Fl. yellow. Gravelly clay-sand over laterite. Low ridges.	Possible	Recorded?
Banksia subpinnatifida var. *imberbis*	P2	Sep-Oct	Erect or straggling, non-lignotuberous shrub, 0.3–1.5 m high. Fl. yellow. Laterite.	Possible	Unlikely (U2)
Leucopogon subsejunctus	P2	Aug-Sep	Erect shrubs to c. 80 cm high and 80 cm wide. Inflorescence erect, terminal and upper-axillary. Corolla tube white, lobes white - pink, or pink throughout, much longer than tube. The deeply lobed fruit is a distinguishing feature. Grows in *Eucalyptus marginata-Corymbia calophylla* woodland over lateritic soils.	Possible	Unlikely (U2)
Logania sylvicola	P2	Aug-Sep	Spreading, compact shrub to 40 cm x 50 cm. Inflorescence more or less pendant. Flowers cream. Mid slopes. Dry brown gravelly, sandy loam over laterite.	Possible	Unlikely (U2)

Species	Category	Flowering	Description and habitat	Likelihood	Post Survey Likelihood
Stylidium coatesianum	P2	Sep to Nov	Rosetted perennial, herb, 0.15-0.38 m high, Leaves tufted, narrowly oblanceolate, 1-4.5 cm long, 1-4 mm wide, apex subacute, margin entire, hoary. Scape glabrous at base, glandular on inflorescence axis. Inflorescence racemose. Fl. yellow. Lateritic soils. Upper slopes, breakaways. Open woodland, mallee shrubland.	Possible	Unlikely (U1)
Stylidium tylosum	P2	Oct - Nov	Caespitose perennial, herb, 0.06-0.13 m high, Leaves narrowly oblanceolate to oblanceolate, 0.5-1 cm long, 0.8-2 mm wide, apex subacute, margin entire, glandular. Scape mostly glabrous, sparingly glandular on inflorescence axis. Inflorescence racemose. Fl. yellow. Sandy clay. Hillslopes, or adjacent to granite outcrops. Open woodland, shrubland.	Possible	Unlikely (U2)
Thysanotus unicupensis	P2	Oct to Dec	Erect perennial dwarf shrub, height to 15 cm, width to 11 cm; flowers purple. Jarrah - Marri forest	Possible	Unlikely (U2)
Montia australasica	P2	Oct-Jan	Terrestrial or aquatic perennial herb, rooting from leaf nodes, terrestrial plants densely tufted and carpeting, aquatics loose and open, 0.03-0.05 m high Fl. White to pale pink,	Unlikely	Unlikely (U2)
Acacia ataxiphylla subsp. *ataxiphylla*	P3	Nov - Dec or Jan	Prostrate, sprawling shrub, 0.15-0.5 m high, to 1 m wide. Fl. yellow. Gravelly clay loam, white/grey sand. Flats, roadsides.	Possible	Unlikely (U2)
Austroparmelina macrospora	P3		Foliose lichen. Occurs on live bark	Possible	Unlikely (U2)
Bossiaea lalagoides	P3	Aug?	Small upright shrub 20-30 cm high. Standard gold/brown, pink behind. Wings brownish, keel dark red. Gravel soil, sloping to watercourse.	Possible	Unlikely (U2)
Calectasia obtusa	P3	Aug to Sep	Erect, low herb, 0.25-0.4 m high, to 0.2; with aerial roots. Fl. blue. Sand, clay loam, gravel, laterite. Flats.	Possible	Unlikely (U2)

Species	Category	Flowering	Description and habitat	Likelihood	Post Survey Likelihood
Cryptandra beverleyensis	P3	Aug-Sep	Shrub, 0.4-1.3 m high, branchlets not spinescent. Clay soils with sand, laterite gravel. Undulating landscape, plains.	Possible	Unlikely (U2)
Synaphea hians	P3	Jul-Nov	Prostrate or decumbent shrub, 0.15-0.6 m high, to 1 m wide. Fl. Yellow. Sandy soils. Rises.	Possible	Unlikely (U2)
Synaphea otiostigma	P3		Decumbent to erect small shrub. Fl. yellow, Oct to Nov. Clayey laterite, gravelly loam, sand.	Possible	Unlikely (U2)
Tetratheca exasperata	P3	Sep-Oct	Few-branched shrub (subshrub), 0.1–0.35 m high. Fl. pink, purple. White-grey sand, sandy loam with gravel, orange-brown gravelly loam.	Possible	Unlikely (U2)
Eutaxia nanophylla	P3	Oct to Nov	Straggly, rounded shrub, to 0.35 m high. Fl. Yellow & orange & red. Clayey sand, red clay, stoney clayey loam. Low-lying areas, damp flats, slopes, undulating plains, low stony ridges.	Unlikely	Unlikely (U2)
Melaleuca pritzelii	P3	Aug-Oct or Dec	Shrub, 0.7-1.6 m high. Fl. cream. Sandy or clayey soils. Swampy areas.	Unlikely	Unlikely (U2)
Stylidium lepidum	P3	Oct-Nov	Spreading, rosetted perennial, herb, ca 0.05 m high, forming densely packed colonies. Fl. pink, orange. Gravelly sand or loam, clay. Winter-wet depressions.	Unlikely	Unlikely (U2)
Boronia tenuis	P4	Aug-Nov	Procumbent or erect & slender shrub, 0.1–0.5 m high. Fl. blue, pink, white. Laterite, stony soils, granite.	Likely	Unlikely (U2)
Banksia acuminata	P4	Oct	Prostrate, lignotuberous shrub, to 0.2 m high, to 1 m wide. Fl. yellow-orange. Gravelly soils	Possible	Unlikely (U2)
Banksia porrecta	P4	Jul to Aug	Prostrate, sprawling, mat-forming, lignotuberous shrub, 0.2-0.35 m high, 0.6-4 m wide. Fl. white-cream. White/grey sand, sandy loam.	Possible	Unlikely (U2)

Species	Category	Flowering	Description and habitat	Likelihood	Post Survey Likelihood
Hibbertia montana	P4	Jul-Oct	Erect, straggling or sprawling shrub, 0.1-0.7 m high. Fl. yellow. Loam over granite, lateritic soils, gravel. Granite rocks, lateritic ridges & boulders, hills.	Possible	Unlikely (U2)
Lasiopetalum cardiophyllum	P4	Aug-Jan	Erect, multi-stemmed shrub, 0.2–0.5 m high. Fl. pink. Lateritic gravelly soils, sandy clay. Flats, hillslopes.	Possible	Unlikely (U2)
Synaphea grandis	P4	Oct-Nov	Tufted shrub, ca 0.3 m high. Fl. yellow. Laterite.	Possible	Unlikely (U2)
Ornduffia submersa	P4	Sep-Oct	Tuberous emergent aquatic perennial dwarf shrub, height to 35 cm; flowers white; leaves floating on surface of water. Clay-based ponds and swamps (semi-aquatic)	Unlikely	Unlikely (U2)
Conostylis drummondii	T (EN)	Oct - Nov	Rhizomatous, tufted perennial, grass-like or herb, 0.1-0.3 m high. Fl. yellow. White, grey or yellow sand, gravel.	Possible	Unlikely (U2)
Hemigenia ramosissima	T (CR)	Nov-Dec or Jan	Slender shrub, to 0.5 m high. Fl. blue-purple. Lateritic soils, clay. Granite outcrops.	Possible	Unlikely (U2)
Thelymitra stellata	T (EN)	Oct to Nov.	Tuberous, perennial, herb, 0.15-0.25 m high. Fl. yellow & brown. Sand, gravel, lateritic loam.	Possible	Unlikely (U2)
Adenanthos pungens subsp. *effusus*	T (EN)	Aug to Nov	Prostrate shrub, to 0.5 m high, forming large mats to 3 m wide. Fl. pink. White siliceous sand.	Possible	Unlikely (U1)
Caladenia bryceana subsp. *bryceana*	T (EN)	Aug to Oct	Tuberous, perennial, herb, 0.05-0.1 m high. Fl. green-yellow. Sand, loam. Adjacent to watercourses, winter-wet sites.	Possible	Unlikely (U2)
Drakaea confluens	T (EN)	Oct-Nov	Tuberous, perennial, herb, 0.15-0.3 m high. Fl. red & brown & yellow. White-grey sand.	Possible	Unlikely (U1)
Verticordia fimbrilepis subsp. *fimbrilepis*	T (EN)	Oct-Dec, Jan	Shrub, 0.3-0.7 m high. Fl. pink-white. Gravelly sandy or clayey soils. Flats, road verges.	Possible	Unlikely (U2)
Commersonia erythrogyna	T (EN)	Aug-Sep or Oct	Shrub, stems glabrous, leaves 12-35 mm long, 8-20 mm wide, not lobed, Calyx cream or white. Mid slope, damp areas, granite outcrop, lateritic ridge. Brown peaty soil between granite outcrops.	Unlikely	Unlikely (U1)

Species	Category	Flowering	Description and habitat	Likelihood	Post Survey Likelihood
Andersonia gracilis	T (EN)	Sep-Nov	Slender erect or open straggly shrub, 0.1-0.5(-1) m high. Fl. white-pink-purple. White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	Unlikely	Unlikely (U2)
Diuris micrantha	T (VU)	Sep-Oct	Tuberous, perennial, herb, 0.3–0.6 m high. Fl. yellow, brown. Brown loamy clay. Winter-wet swamps, in shallow water.	Unlikely	Unlikely (U1)
Eleocharis keigheryi	T (VU)	Aug-Nov	Rhizomatous, clumped perennial, grass-like or herb (sedge), to 0.4 m high. Fl. green. Clay, sandy loam. Emergent in freshwater: creeks, claypans	Unlikely	Unlikely (U2)
Grevillea elongata	T (VU)	Oct	Shrub, 1.5-2 m high. Fl. white-cream. Gravelly clay, sandy clay, sand. Road verges, swamps, creek banks.	Unlikely	Unlikely (U2)

Appendix 10. List of vascular flora found within the survey area.

#	Family_name	Species	Naturalised	Consv_code
1	Araliaceae	*Trachymene pilosa*		
2	Asparagaceae	*Dichopogon capillipes*		
3	Asparagaceae	*Lomandra effusa*		
4	Asparagaceae	*Lomandra micrantha*		
5	Asparagaceae	*Lomandra sericea*		
6	Asparagaceae	*Sowerbaea laxiflora*		
7	Asparagaceae	*Thysanotus tenellus*		
8	Asteraceae	*Arctotheca calendula*	*	
9	Asteraceae	*Cotula turbinata*	*	
10	Asteraceae	*Hyalosperma demissum*		
11	Asteraceae	*Hypochaeris glabra*	*	
12	Asteraceae	*Lactuca serriola*	*	
13	Asteraceae	*Pseudognaphalium luteoalbum*		
14	Asteraceae	*Sonchus asper*	*	
15	Asteraceae	*Trichocline spathulata*		
16	Asteraceae	*Ursinia anthemoides*	*	
17	Boraginaceae	*Halgania anagalloides*		
18	Campanulaceae	*Lobelia rhombifolia*		
19	Campanulaceae	*Monopsis debilis*	*	
20	Campanulaceae	*Wahlenbergia capensis*	*	
21	Caryophyllaceae	*Petrorhagia dubia*	*	
22	Caryophyllaceae	*Polycarpon tetraphyllum*	*	
23	Casuarinaceae	*Allocasuarina huegeliana*		
24	Casuarinaceae	*Allocasuarina humilis*		
25	Casuarinaceae	*Allocasuarina microstachya*		
26	Celastraceae	*Stackhousia monogyna*		
27	Centrolepidaceae	*Aphelia cyperoides*		
28	Centrolepidaceae	*Centrolepis aristata*		
29	Centrolepidaceae	*Centrolepis polygyna*		
30	Colchicaceae	*Burchardia monantha*		
31	Colchicaceae	*Burchardia multiflora*		
32	Crassulaceae	*Crassula decumbens*		
33	Cyperaceae	*Caustis dioica*		
34	Cyperaceae	*Chorizandra enodis*		
35	Cyperaceae	*Isolepis cernua*		
36	Cyperaceae	*Isolepis marginata*		
37	Cyperaceae	*Lepidosperma apricola*		
38	Cyperaceae	*Lepidosperma pubisquameum*		
39	Cyperaceae	*Lepidosperma sp.*		
40	Cyperaceae	*Lepidosperma squamatum*		
41	Cyperaceae	*Mesomelaena tetragona*		
42	Cyperaceae	*Schoenus plumosus*		

43	Cyperaceae	*Tetraria octandra*		
44	Dilleniaceae	*Hibbertia commutata*		
45	Dilleniaceae	*Hibbertia hypericoides*		
46	Dilleniaceae	*Hibbertia polystachya*		
47	Dilleniaceae	*Hibbertia rupicola*		
48	Droseraceae	*Drosera glanduligera*		
49	Elaeocarpaceae	*Tetratheca exasperata*		3
50	Elaeocarpaceae	*Tetratheca virgata*		
51	Fabaceae	*Acacia acuminata*		
52	Fabaceae	*Acacia browniana* var. *obscura*		
53	Fabaceae	*Acacia chrysocephala*		
54	Fabaceae	*Acacia incurva*		
55	Fabaceae	*Acacia lasiocarpa* var. *sedifolia*		
56	Fabaceae	*Acacia pycnocephala*		
57	Fabaceae	*Bossiaea eriocarpa*		
58	Fabaceae	*Bossiaea ornata*		
59	Fabaceae	*Chorizema aciculare* subsp. *laxum*		
60	Fabaceae	*Gastrolobium calycinum*		
61	Fabaceae	*Gastrolobium spinosum*		
62	Fabaceae	*Jacksonia condensata*		
63	Fabaceae	*Jacksonia sternbergiana*		
64	Fabaceae	*Kennedia prostrata*		
65	Fabaceae	*Labichea punctata*		
66	Fabaceae	*Trifolium campestre*	*	
67	Fabaceae	*Trifolium arvense*		
68	Fabaceae	*Viminaria juncea*		
69	Goodeniaceae	*Dampiera juncea*		
70	Goodeniaceae	*Dampiera linearis*		
71	Goodeniaceae	*Goodenia coerulea*		
72	Goodeniaceae	*Lechenaultia biloba*		
73	Goodeniaceae	*Lechenaultia formosa*		
74	Goodeniaceae	*Scaevola calliptera*		
75	Haemodoraceae	*Anigozanthos bicolor*		
76	Haemodoraceae	*Anigozanthos humilis*		
77	Haemodoraceae	*Conostylis aculeata*		
78	Haemodoraceae	*Haemodorum discolor*		
79	Haloragaceae	*Glischrocaryon aureum*		
80	Hemerocallidaceae	*Caesia micrantha*		
81	Hemerocallidaceae	*Dianella revoluta*		
82	Hemerocallidaceae	*Chamaescilla corymbosa*		
83	Iridaceae	*Patersonia occidentalis* var. *occidentalis*		
84	Juncaceae	*Juncus articulatus*	*	
85	Juncaceae	*Juncus microcephalus*	*	
86	Linaceae	*Linum marginale*		
87	Linaceae	*Linum usitatissimum*	*	
88	Loganiaceae	*Phyllangium paradoxum*		
89	Lythraceae	*Lythrum hyssopifolia*	*	
90	Myrtaceae	*Calothamnus quadrifidus*		

91	Myrtaceae	*Calytrix leschenaultii*		
92	Myrtaceae	*Corymbia calophylla*		
93	Myrtaceae	*Darwinia vestita*		
94	Myrtaceae	*Eucalyptus marginata* subsp. *marginata*		
95	Myrtaceae	*Eucalyptus wandoo*		
96	Myrtaceae	*Hypocalymma angustifolium*		
97	Myrtaceae	*Kunzea recurva*		
98	Myrtaceae	*Leptospermum erubescens*		
99	Orchidaceae	*Caladenia longicauda*		
100	Orchidaceae	*Disa bracteata*	*	
101	Orchidaceae	*Pterostylis barbata*		
102	Orchidaceae	*Thelymitra macrophylla*		
103	Oxalidaceae	*Oxalis glabra*	*	
104	Papaveraceae	*Fumaria capreolata*	*	
105	Phyllanthaceae	*Poranthera microphylla*		
106	Pittosporaceae	*Billardiera fusiformis*		
107	Pittosporaceae	*Billardiera variifolia*		
108	Poaceae	*Austrostipa elegantissima*		
109	Poaceae	*Austrostipa hemipogon*		
110	Poaceae	*Austrostipa* sp.		
111	Poaceae	*Austrostipa variabilis*		
112	Poaceae	*Austrostipa trichophylla*		
113	Poaceae	*Avena barbata*	*	
114	Poaceae	*Briza maxima*	*	
115	Poaceae	*Briza minor*	*	
116	Poaceae	*Bromus diandrus*	*	
117	Poaceae	*Bromus hordeaceus*	*	
118	Poaceae	*Cynodon dactylon*	*	
119	Poaceae	*Ehrharta calycina*	*	
120	Poaceae	*Ehrharta longiflora*	*	
121	Poaceae	*Eragrostis curvula*	*	
122	Poaceae	*Neurachne alopecuroidea*		
123	Poaceae	*Rytidosperma setaceum*		
124	Polygalaceae	*Comesperma calymega*		
125	Polygonaceae	*Muehlenbeckia adpressa*		
126	Polygonaceae	*Rumex crispus*	*	
127	Polygonaceae	*Rumex acetosella*	*	
128	Primulaceae	*Lysimachia arvensis* var. *caerulea*	*	
129	Proteaceae	*Banksia acanthopoda*		2
130	Proteaceae	*Banksia dallanneyi* var. *dallanneyi*		
131	Proteaceae	*Banksia fraseri*		
132	Proteaceae	*Banksia sessilis*		
133	Proteaceae	*Grevillea trifida*		
134	Proteaceae	*Hakea prostrata*		
135	Proteaceae	*Hakea trifurcata*		
136	Proteaceae	*Hakea undulata*		
137	Proteaceae	*Isopogon dubius*		
138	Proteaceae	*Petrophile serruriae*		

139	Proteaceae	*Petrophile squamata*		
140	Proteaceae	*Petrophile striata*		
141	Proteaceae	*Synaphea petiolaris*		
142	Restionaceae	*Desmocladus asper*		
143	Restionaceae	*Desmocladus fasciculatus*		
144	Restionaceae	*Desmocladus flexuosus*		
145	Restionaceae	*Lepidobolus preissianus* subsp. *preissianus*		
146	Restionaceae	*Leptocarpus canus*		
147	Restionaceae	*Leptocarpus kraussii*		
148	Rubiaceae	*Galium murale*	*	
149	Rubiaceae	*Opercularia vaginata*		
150	Santalaceae	*Leptomeria ellytes*		
151	Santalaceae	*Leptomeria lehmannii*		
152	Santalaceae	*Santalum acuminatum*		
153	Solanaceae	*Solanum nigrum*	*	
154	Stylidiaceae	*Levenhookia pusilla*		
155	Stylidiaceae	*Stylidium androsaceum*		
156	Stylidiaceae	*Stylidium caricifolium*		
157	Stylidiaceae	*Stylidium ciliatum*		
158	Thymelaeaceae	*Pimelea angustifolia*		
159	Xanthorrhoeaceae	*Xanthorrhoea drummondii*		
160	Xanthorrhoeaceae	*Xanthorrhoea preissii*		

Appendix 11. The location of vegetation units within the survey area.

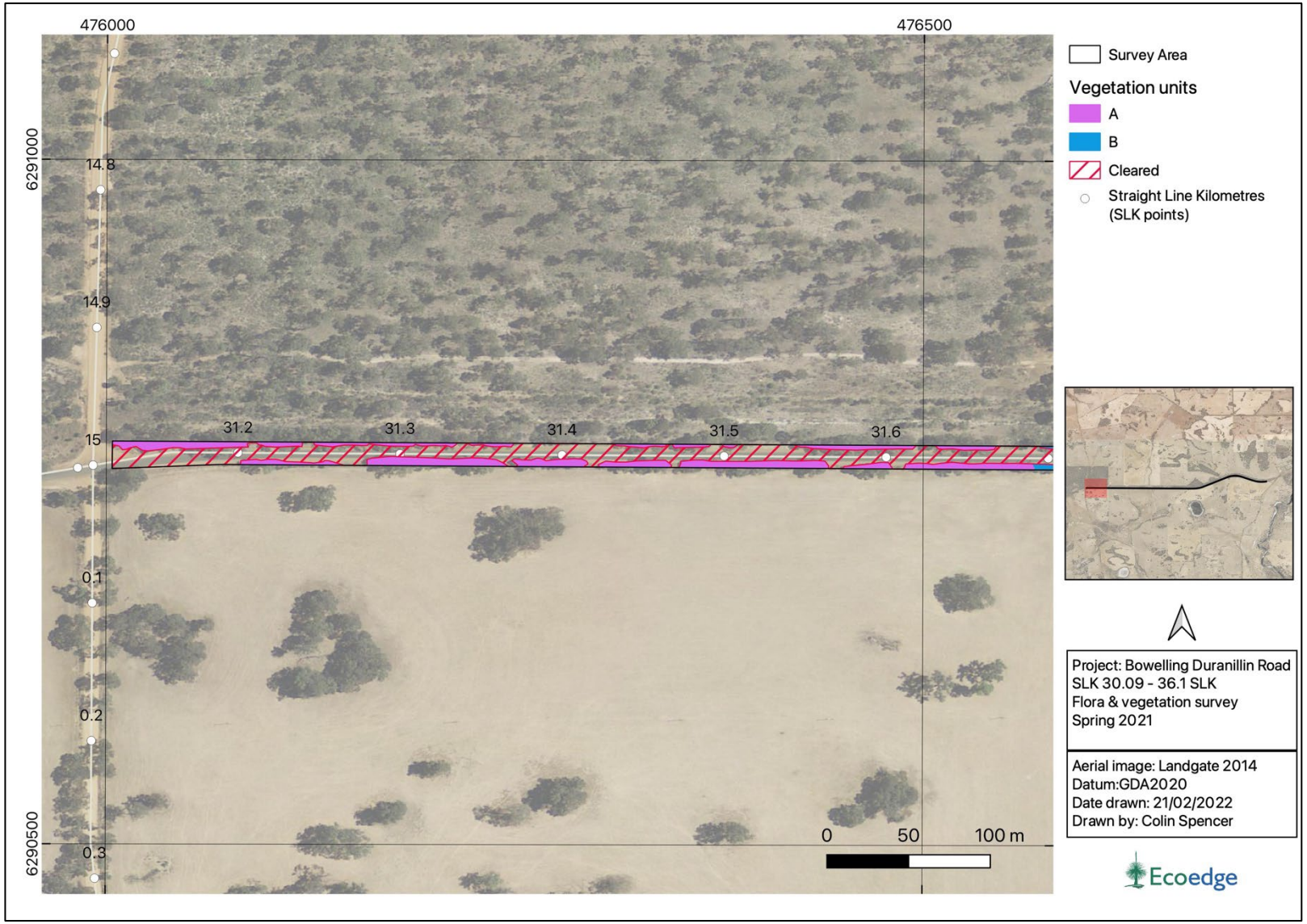

Figure J. Vegetation units within the survey area SLK 31.06 – 31.6 SLK.

Figure K Vegetation units within the survey area SLK 31.7 – 32.3 SLK.

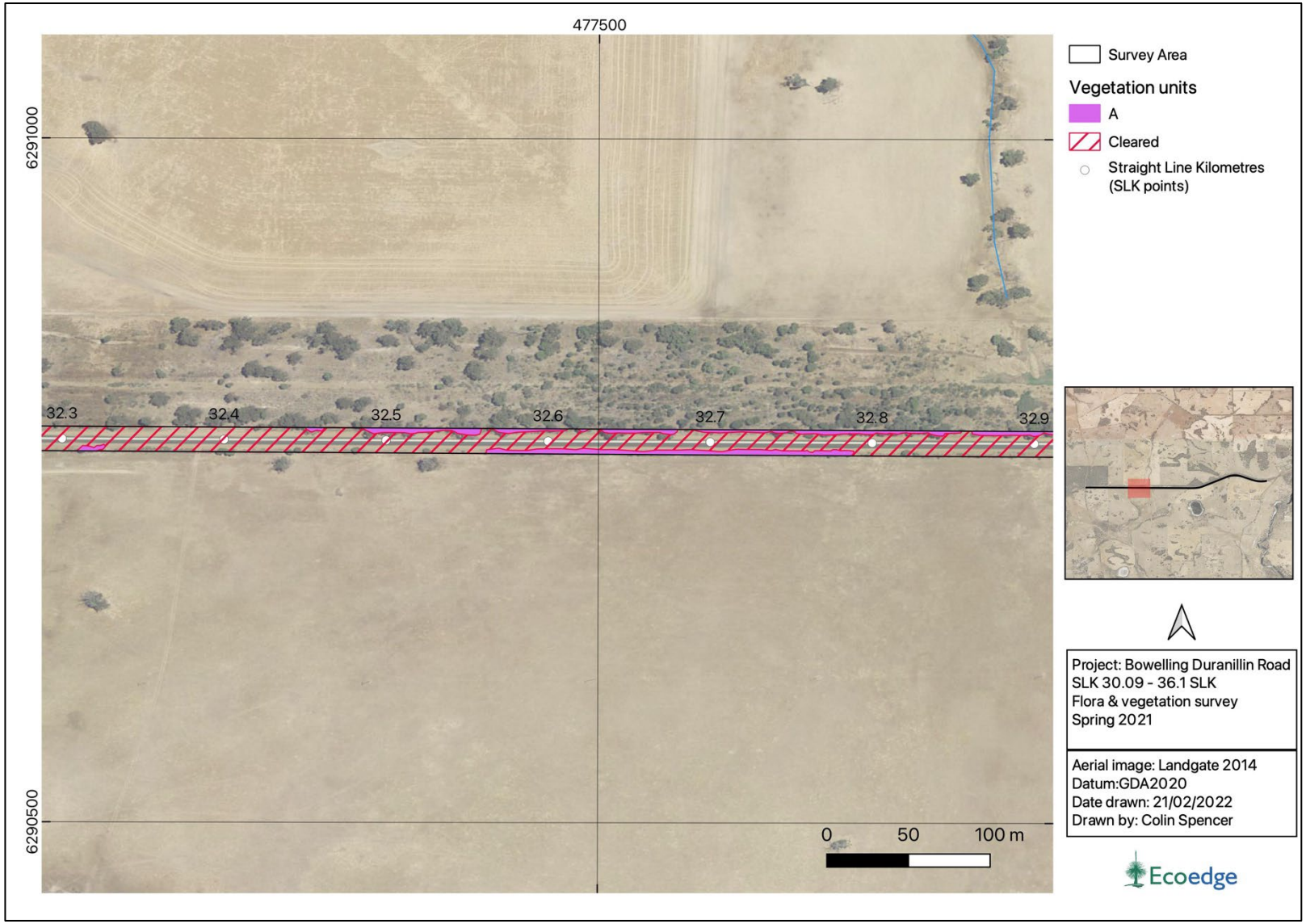

Figure L. Vegetation units within the survey area SLK 32.3– 32.9 SLK.

Figure M. Vegetation units within the survey area SLK 32.9 – 33.5 SLK.

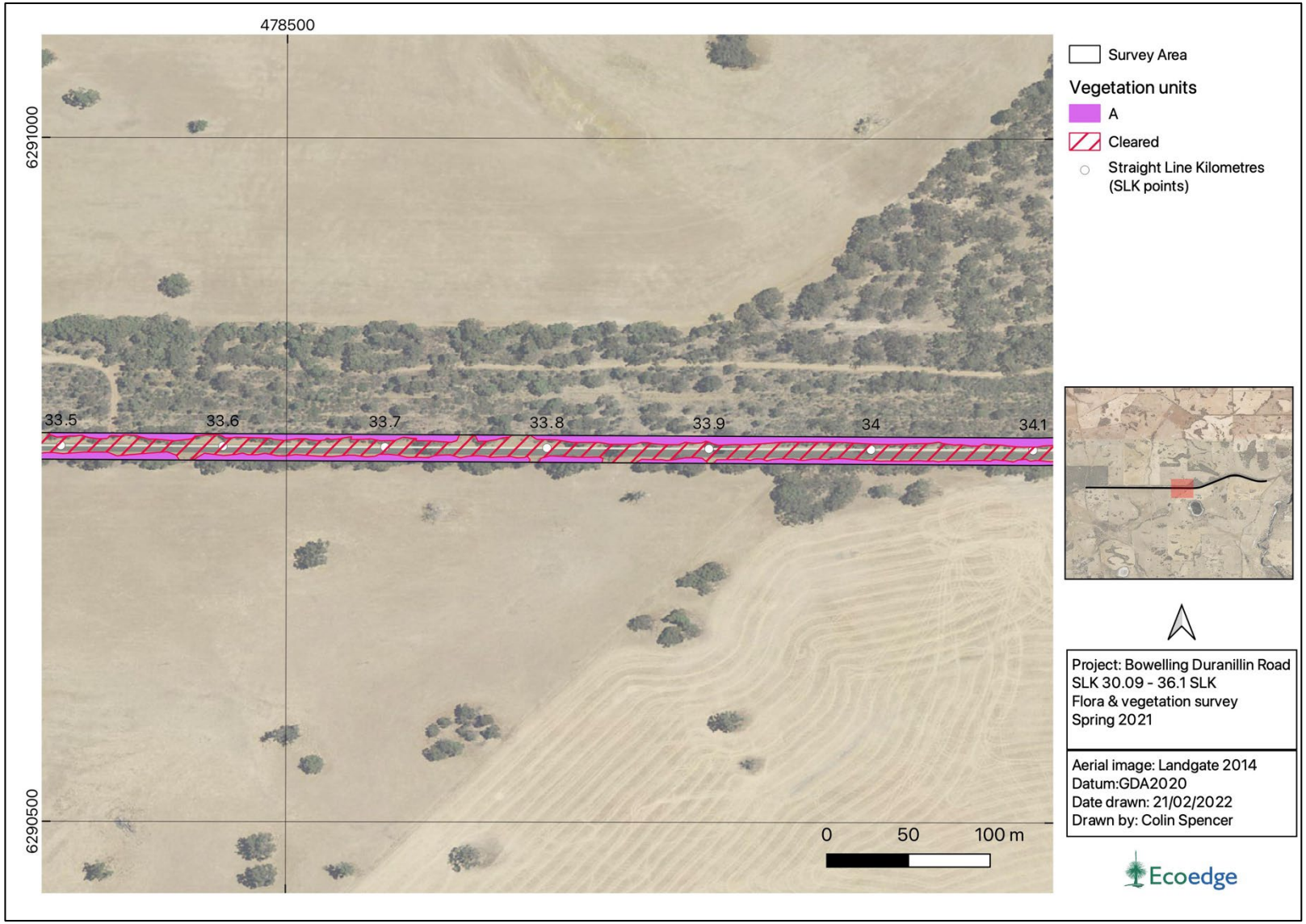

Figure M. Vegetation units within the survey area SLK 33.5 – 34.1 SLK.

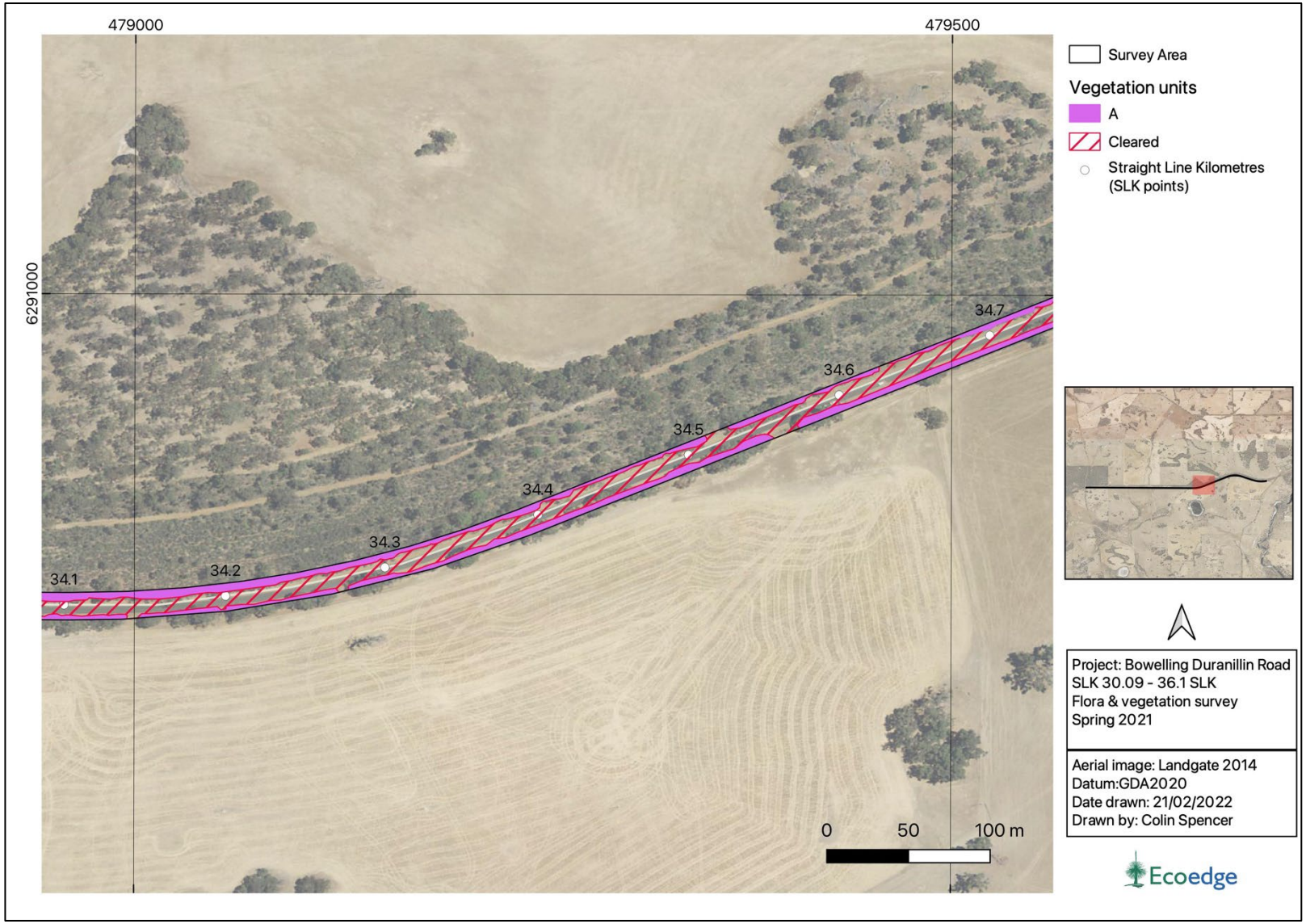

Figure N. Vegetation units within the survey area SLK 34.1 – 34.7 SLK.

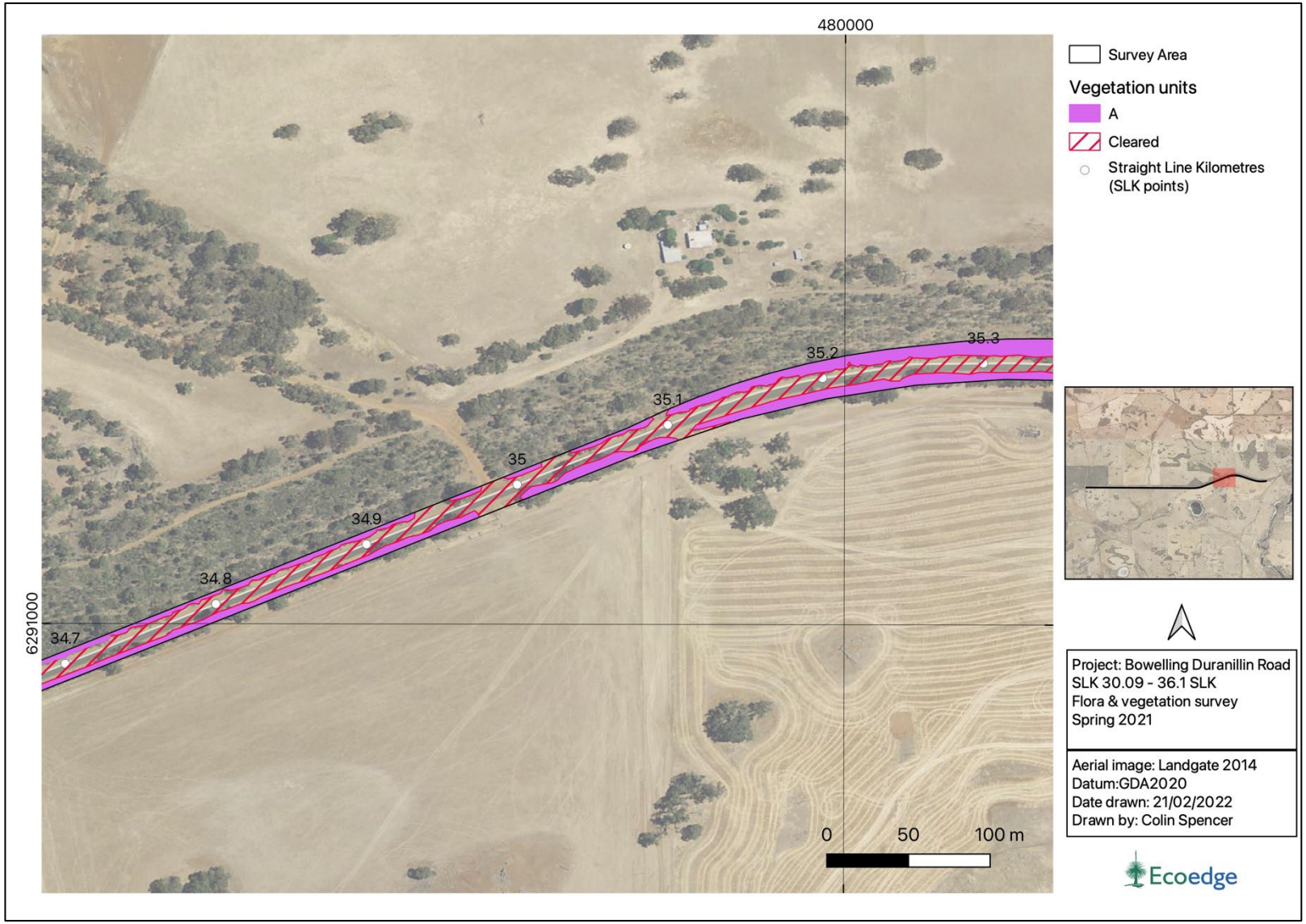

Figure O. Vegetation units within the survey area SLK 34.7 – 35.3 SLK.

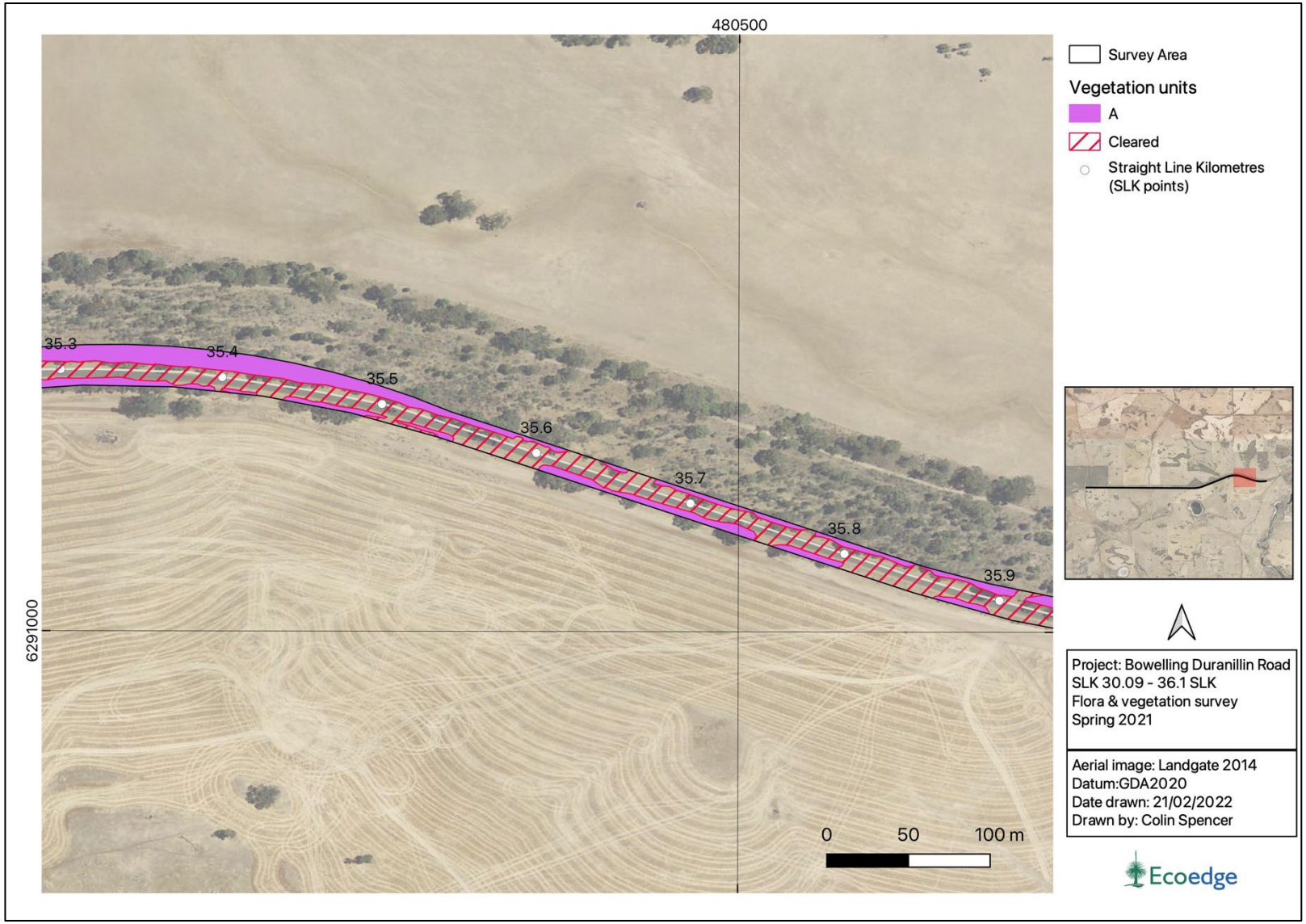

Figure P. Vegetation units within the survey area SLK 35.3 – 35.9 SLK.

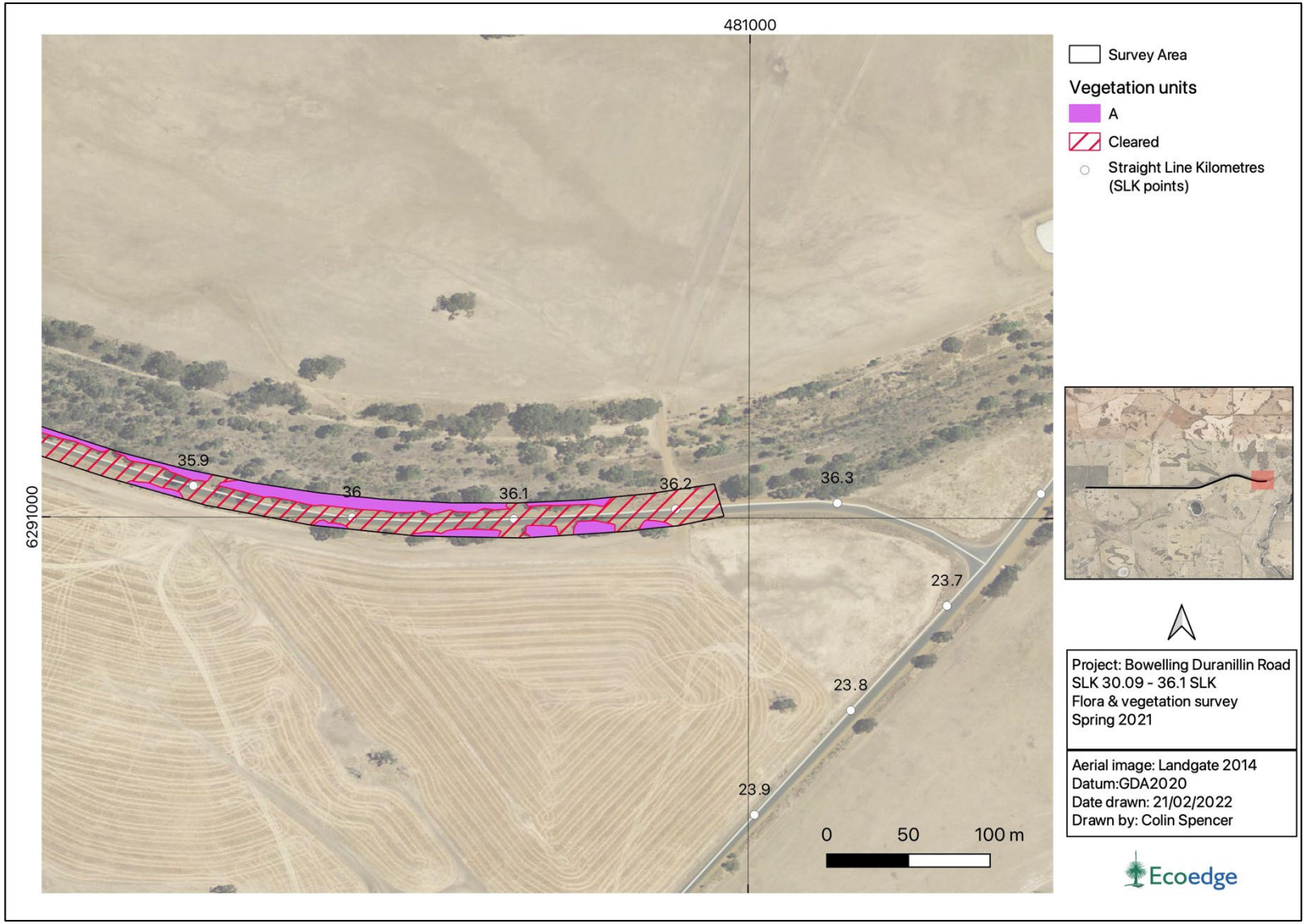

Figure Q. Vegetation units within the survey area SLK 35.9 – 36.3 SLK.

Appendix 12. Vegetation condition maps for the survey area.

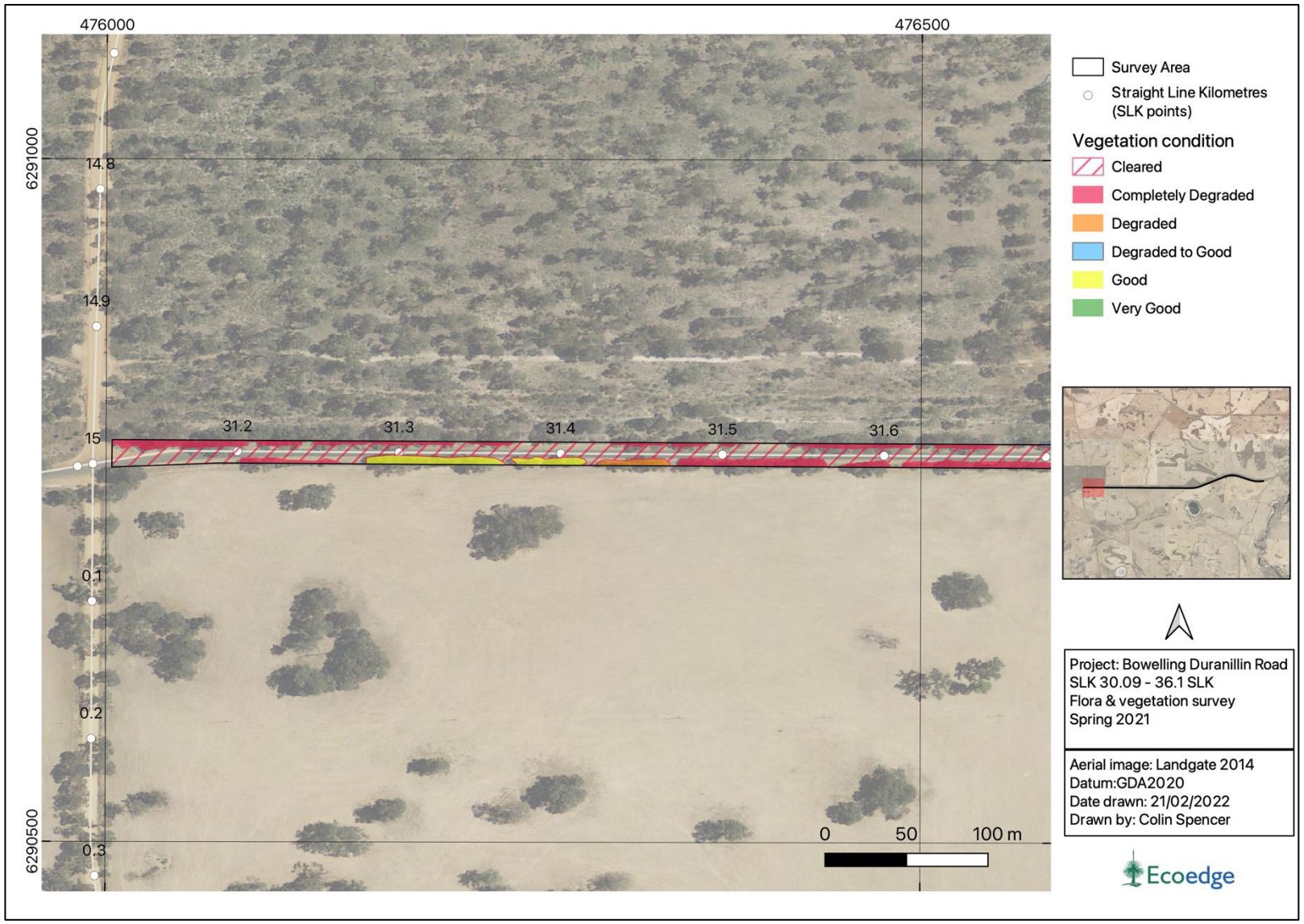

Figure R. Vegetation condition within the survey area SLK 31.06 – 31.6 SLK.

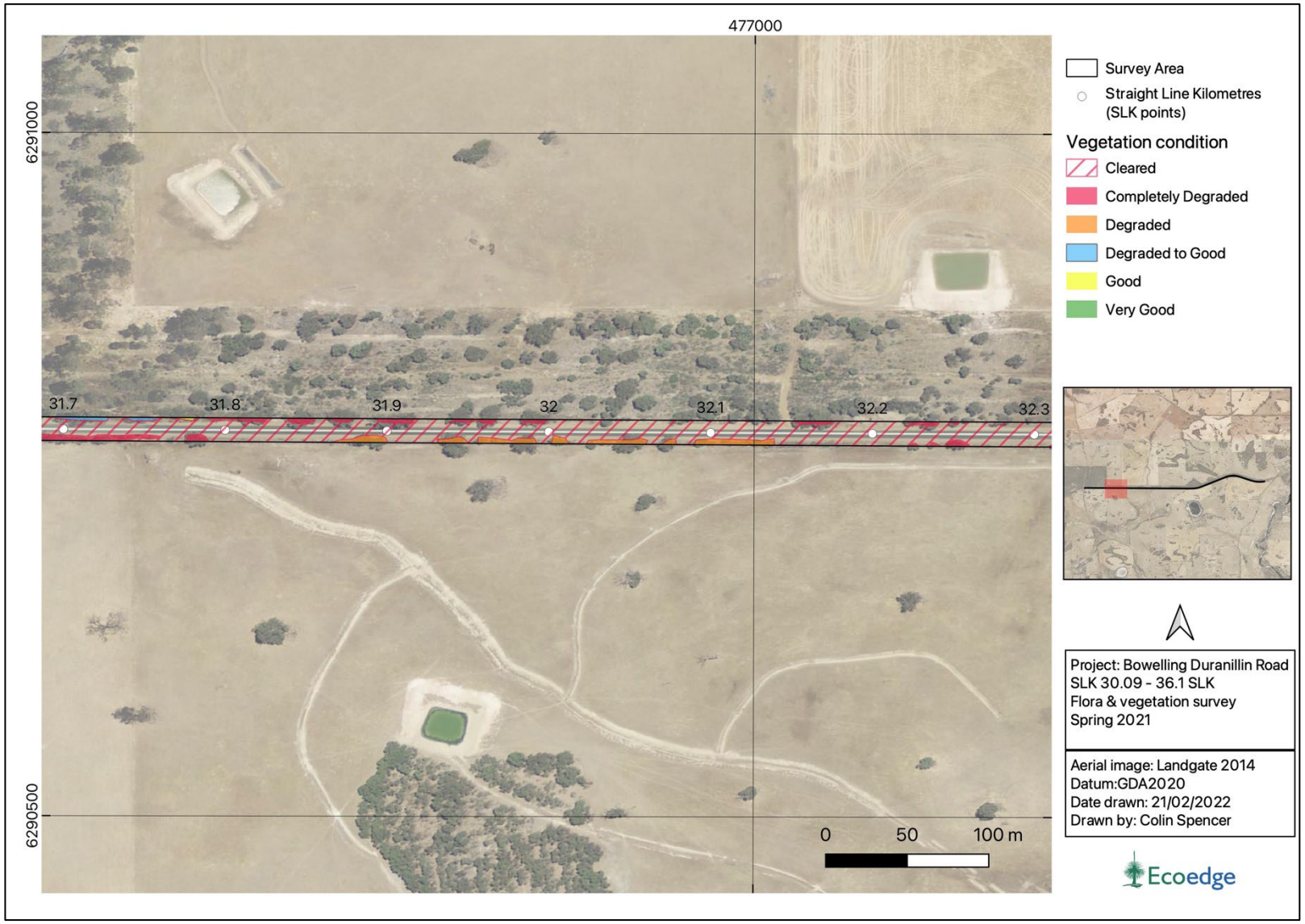

Figure S. Vegetation condition within the survey area SLK 31.7 – 32.3 SLK.

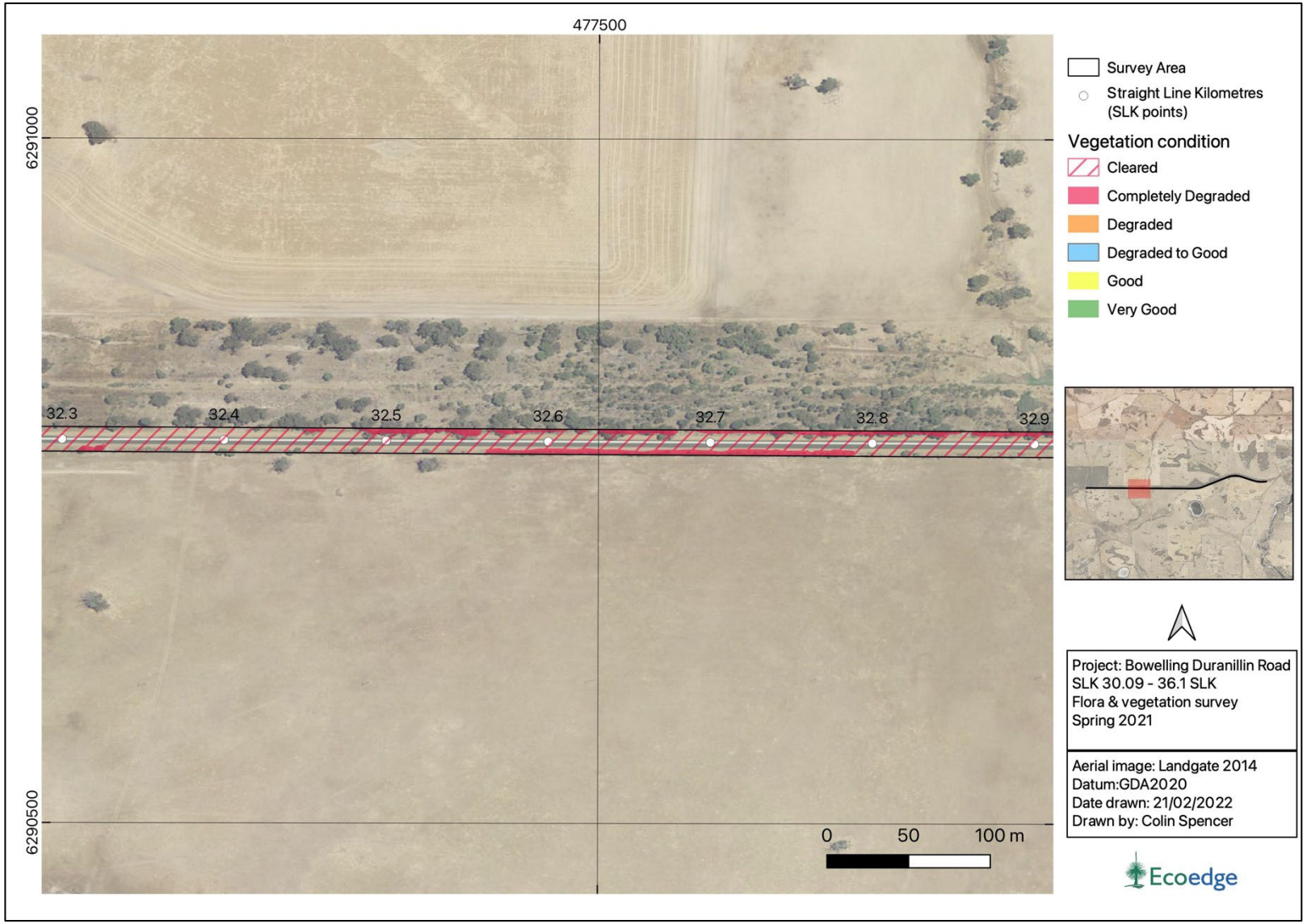

Figure T. Vegetation condition within the survey area SLK 32.3– 32.9 SLK.

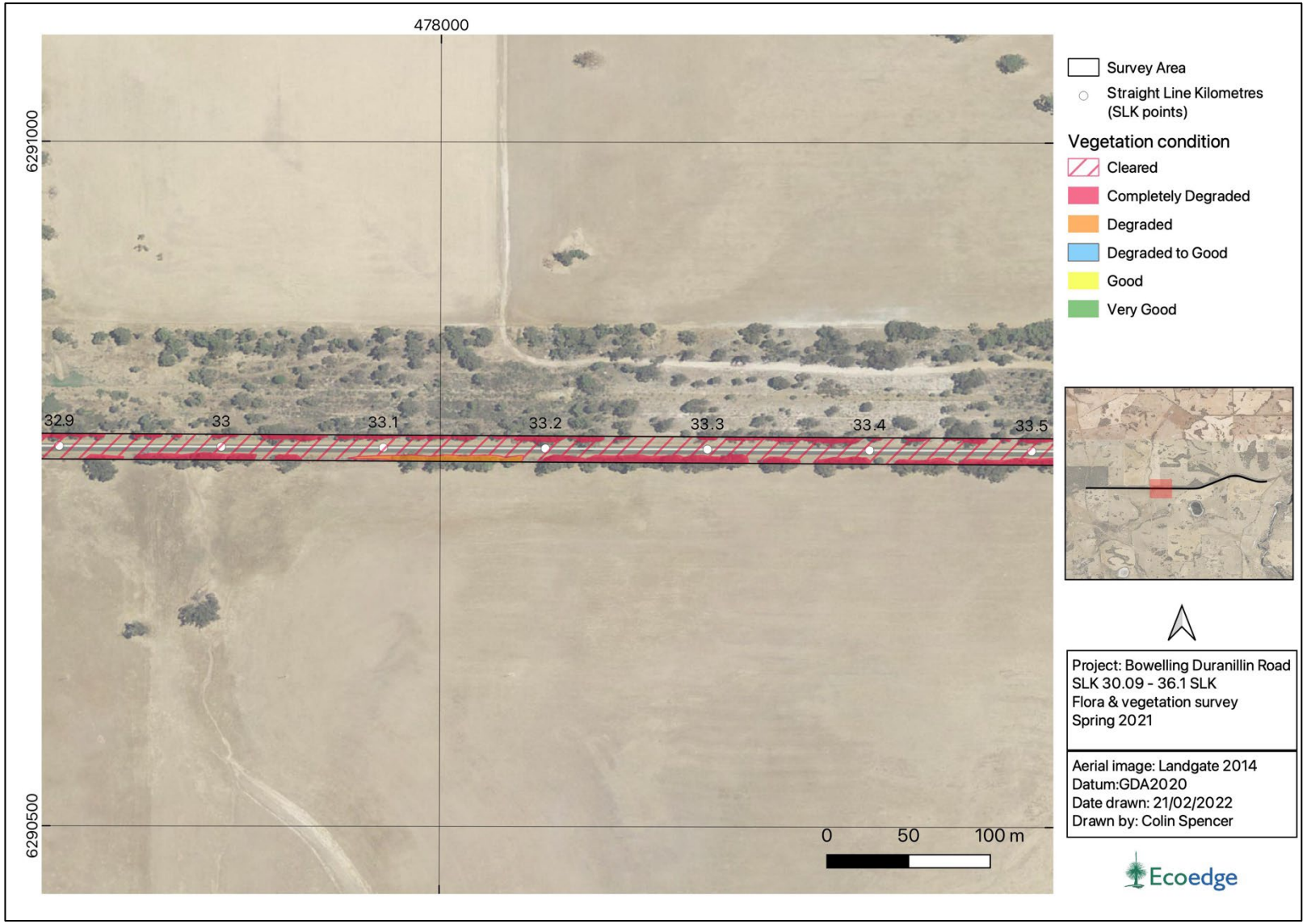

Figure U. Vegetation condition within the survey area SLK 32.9 – 33.5 SLK.

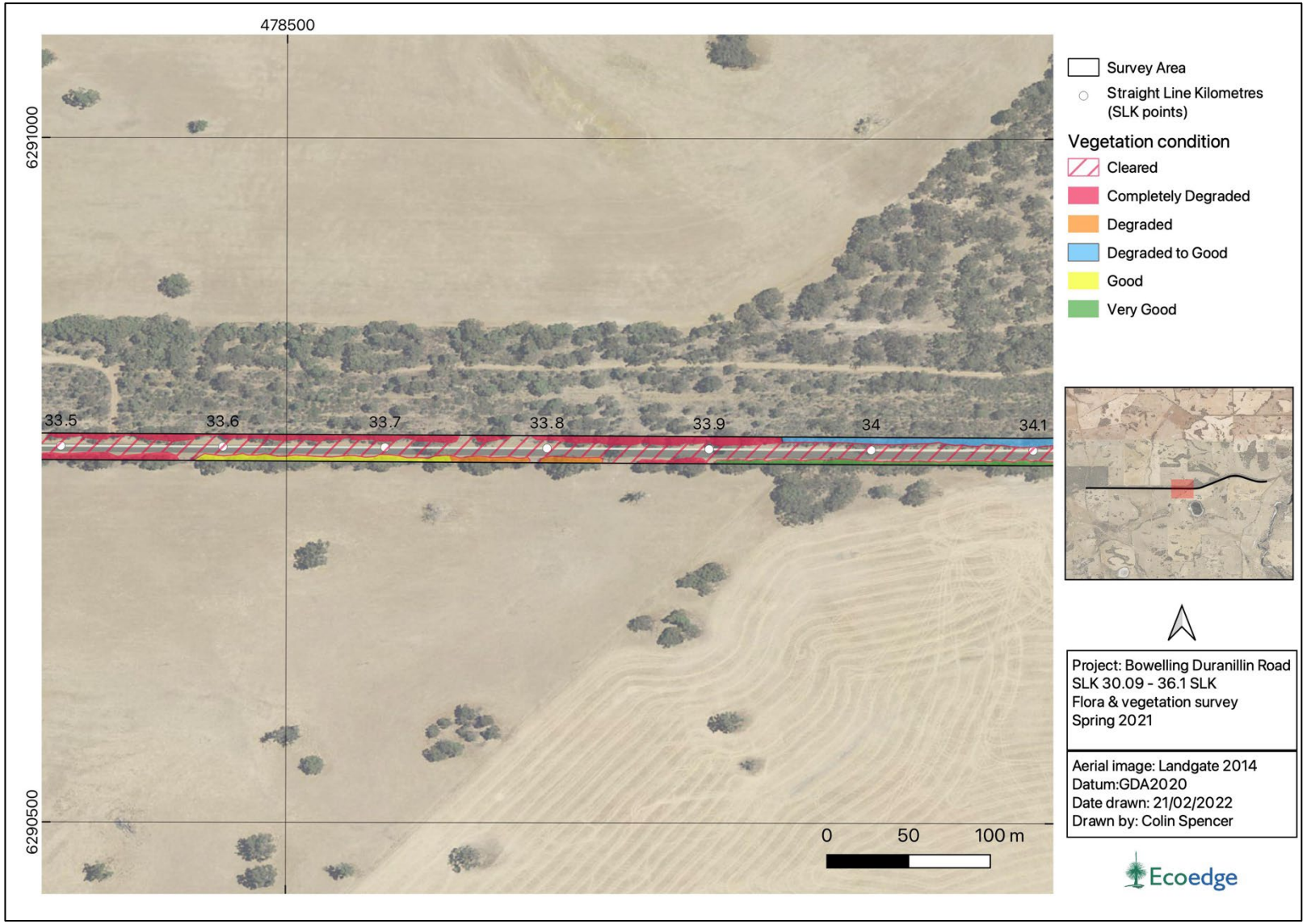

Figure V. Vegetation condition within the survey area SLK 33.5 – 34.1 SLK.

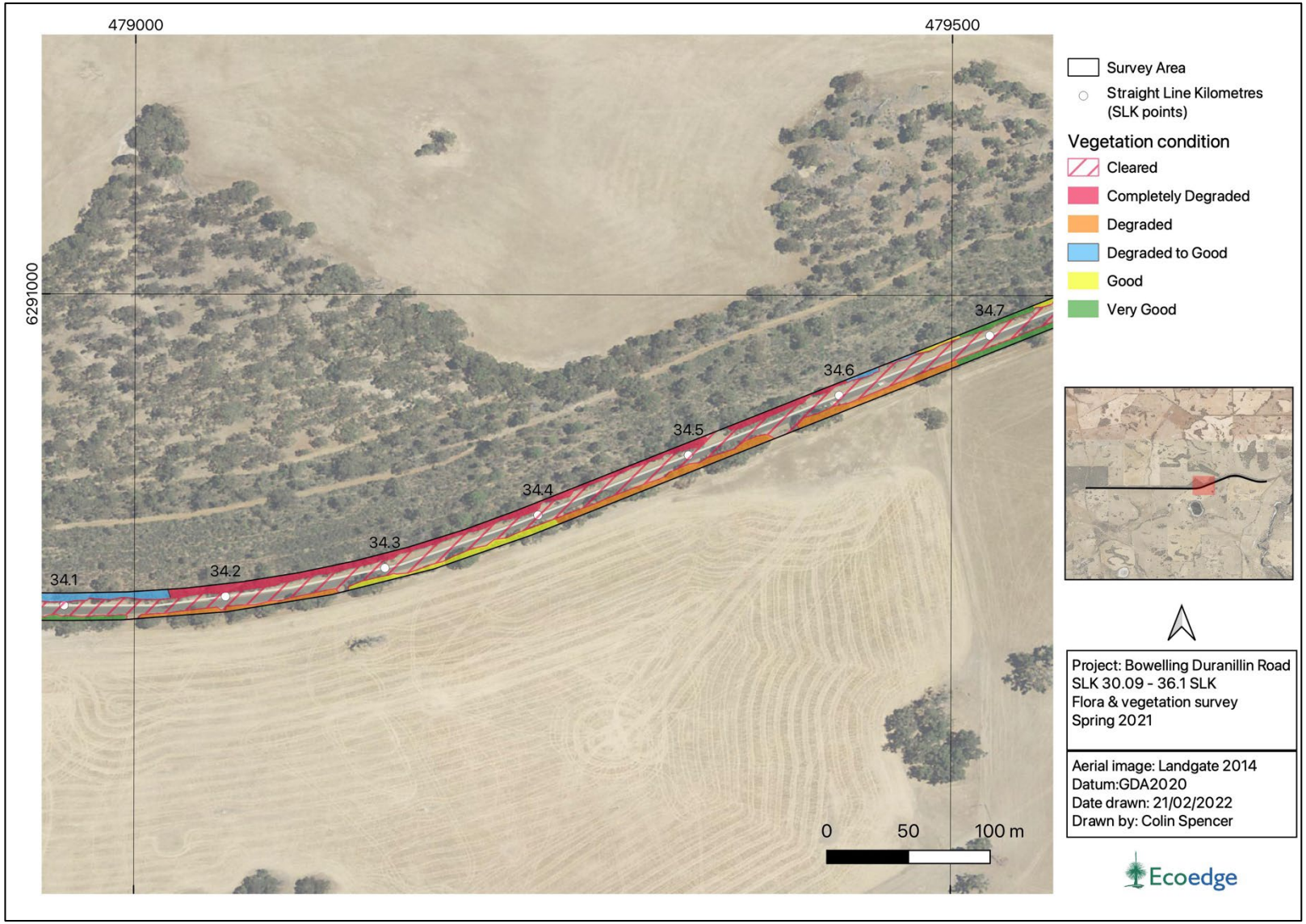

Figure W. Vegetation condition within the survey area SLK 34.1 – 34.7 SLK.

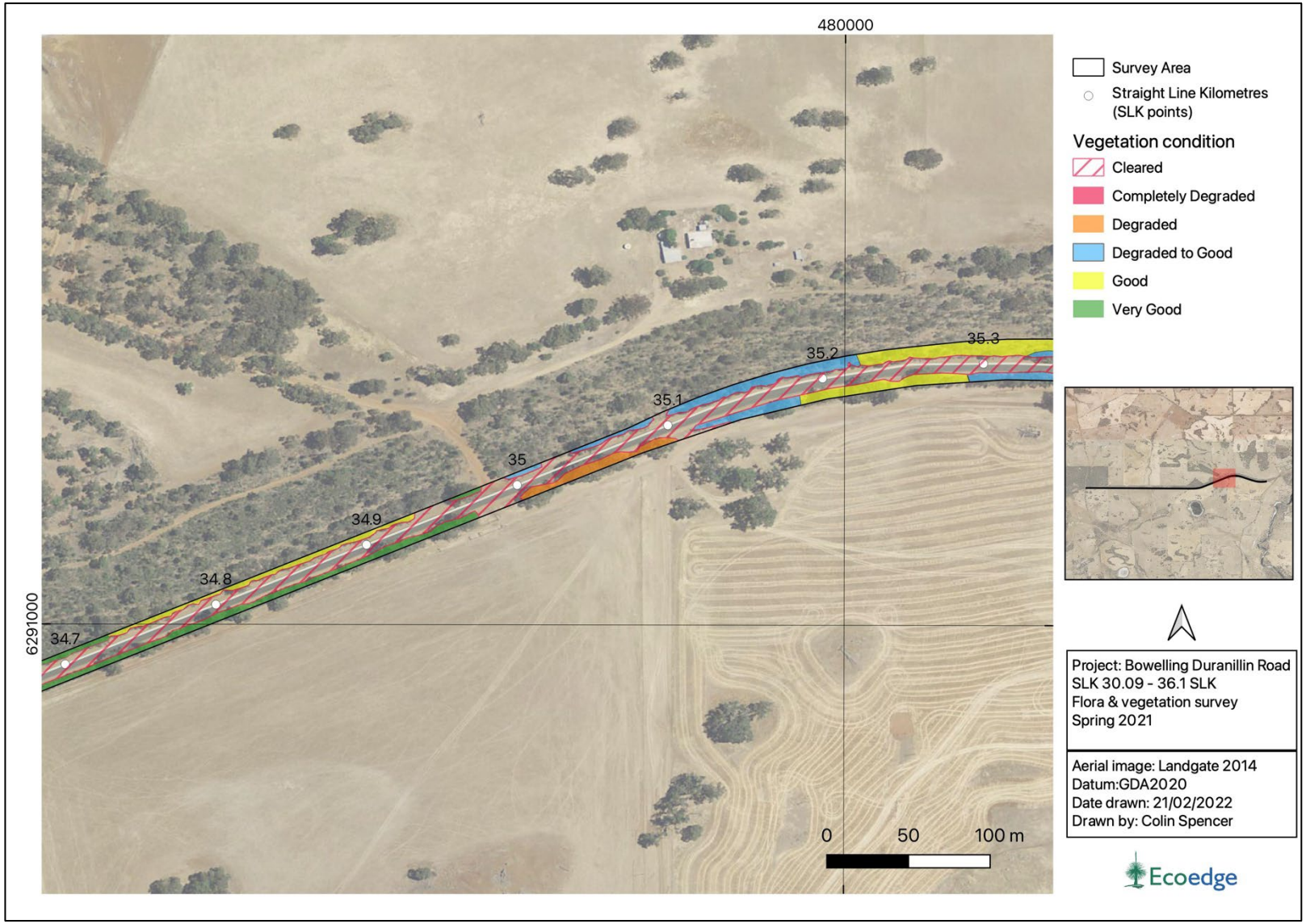

Figure X. Vegetation condition within the survey area SLK 34.7 – 35.3 SLK.

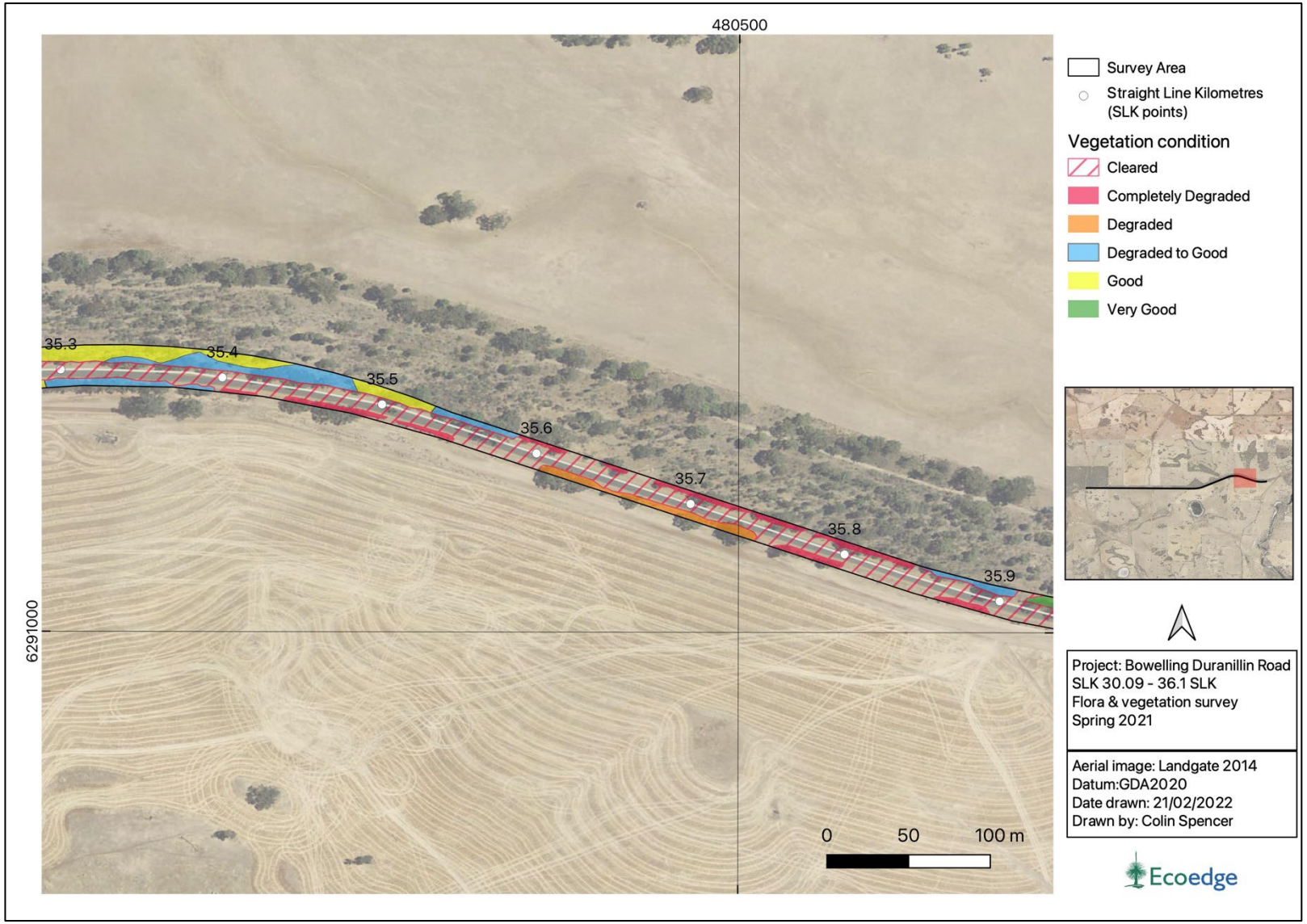

Figure Y. Vegetation condition within the survey area SLK 35.3 – 35.9 SLK.

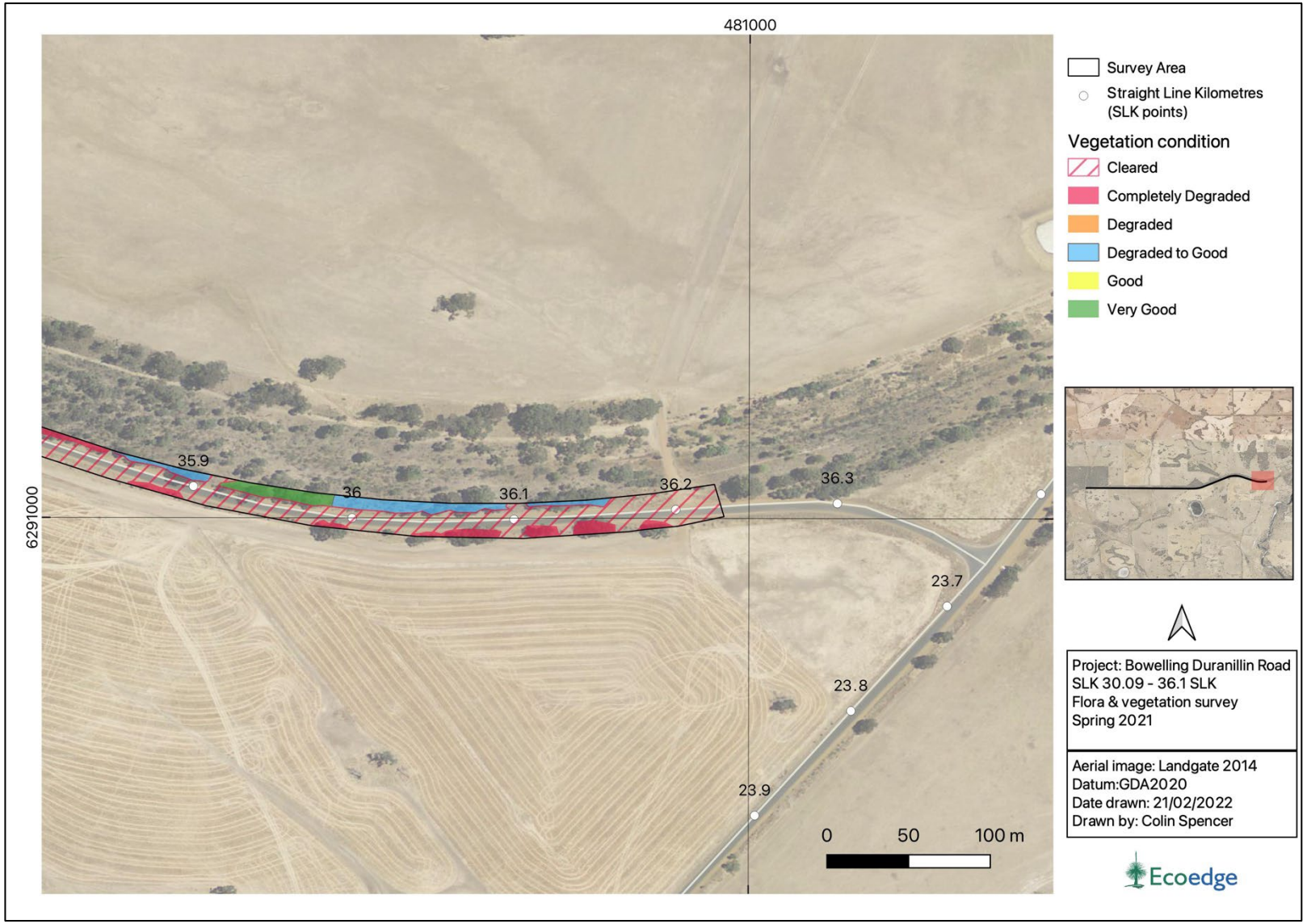

Figure Z. Vegetation condition within the survey area SLK 35.9 – 36.3 SLK.

Appendix 13. The location, condition and area of Threatened ecological communities within the survey area.

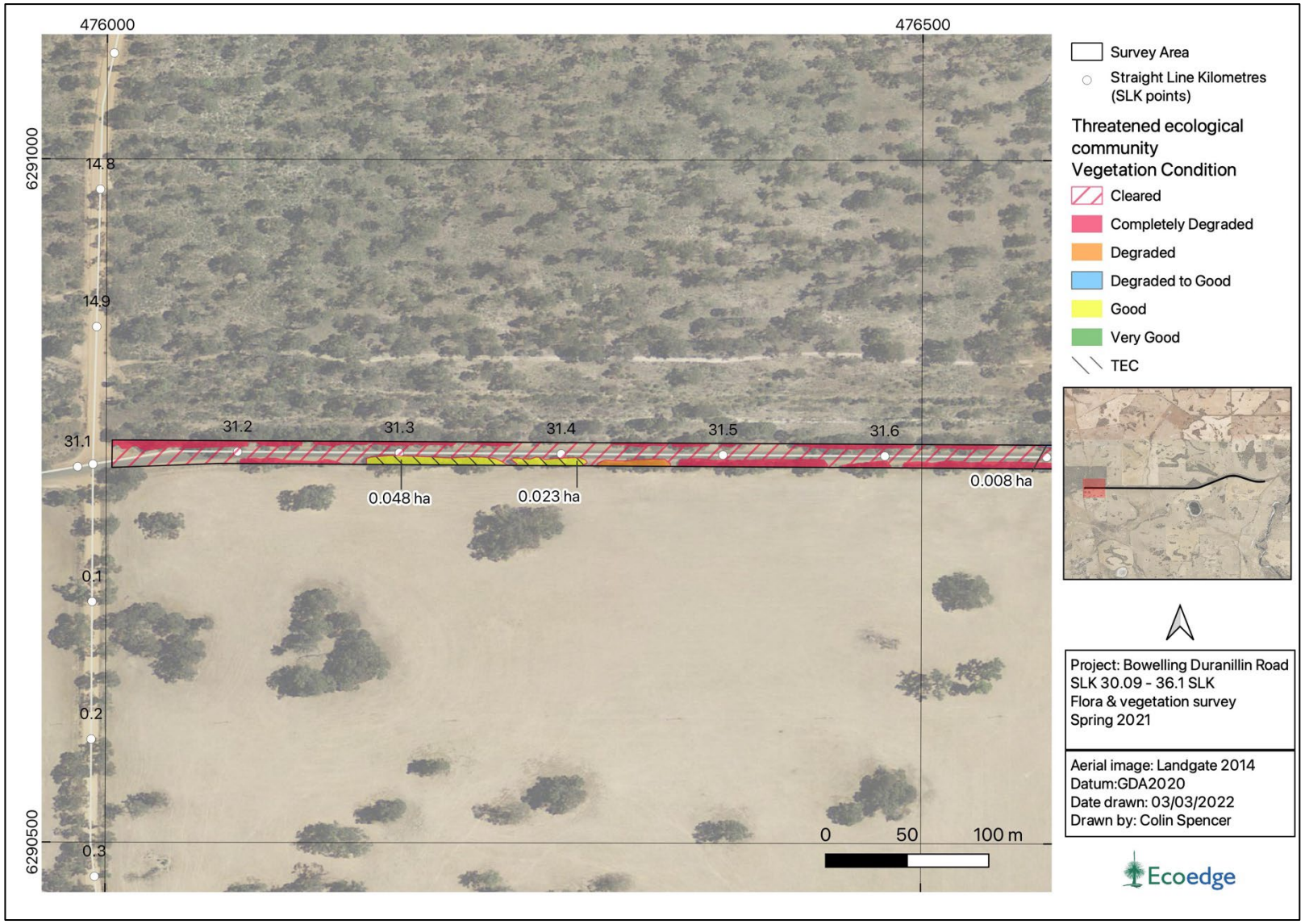

Figure AA. The condition and area of TECs within the survey area SLK 31.06 – 31.6 SLK.

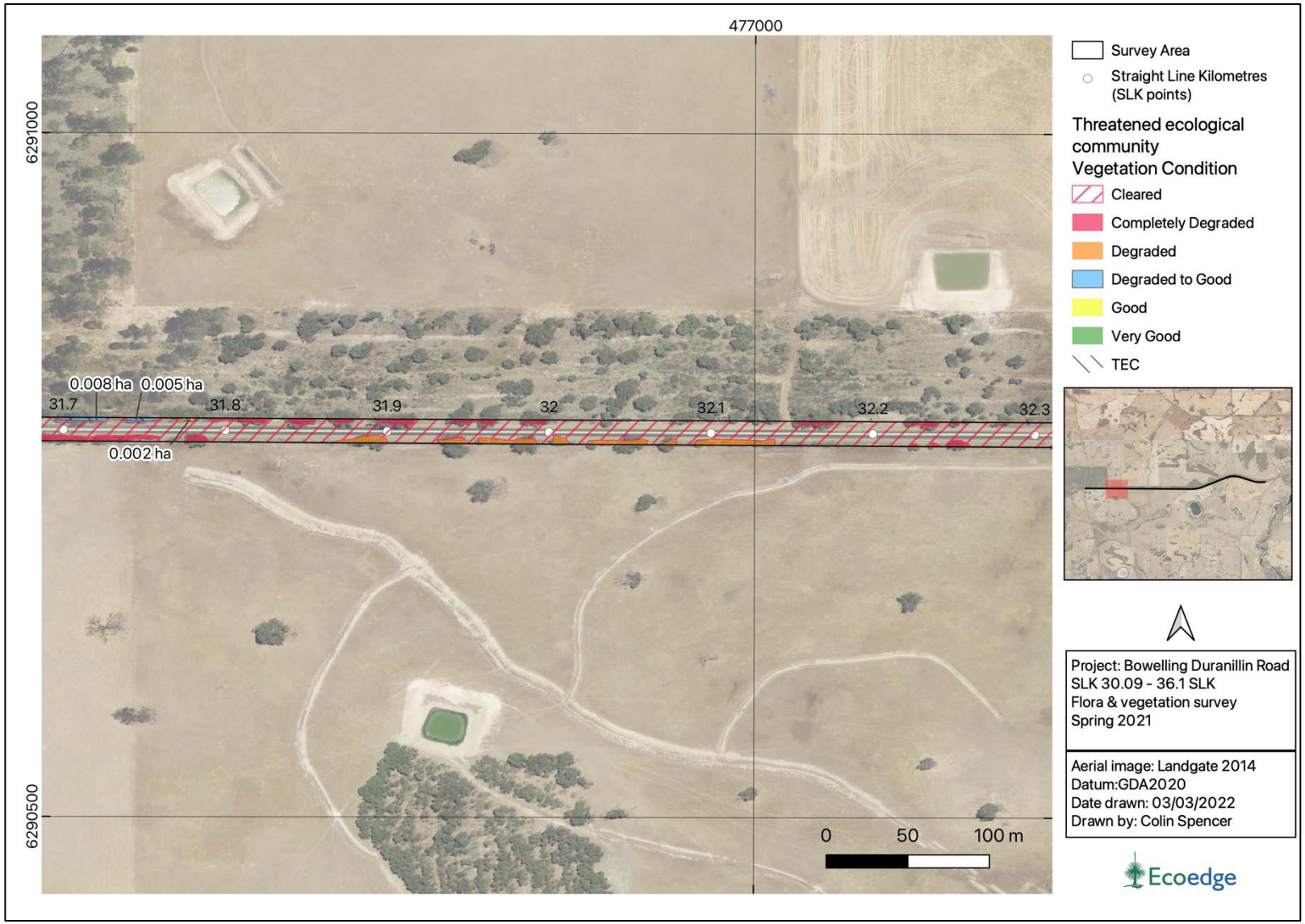

Figure BB. The condition and area of TECs within the survey area SLK 31.7 – 32.3 SLK.

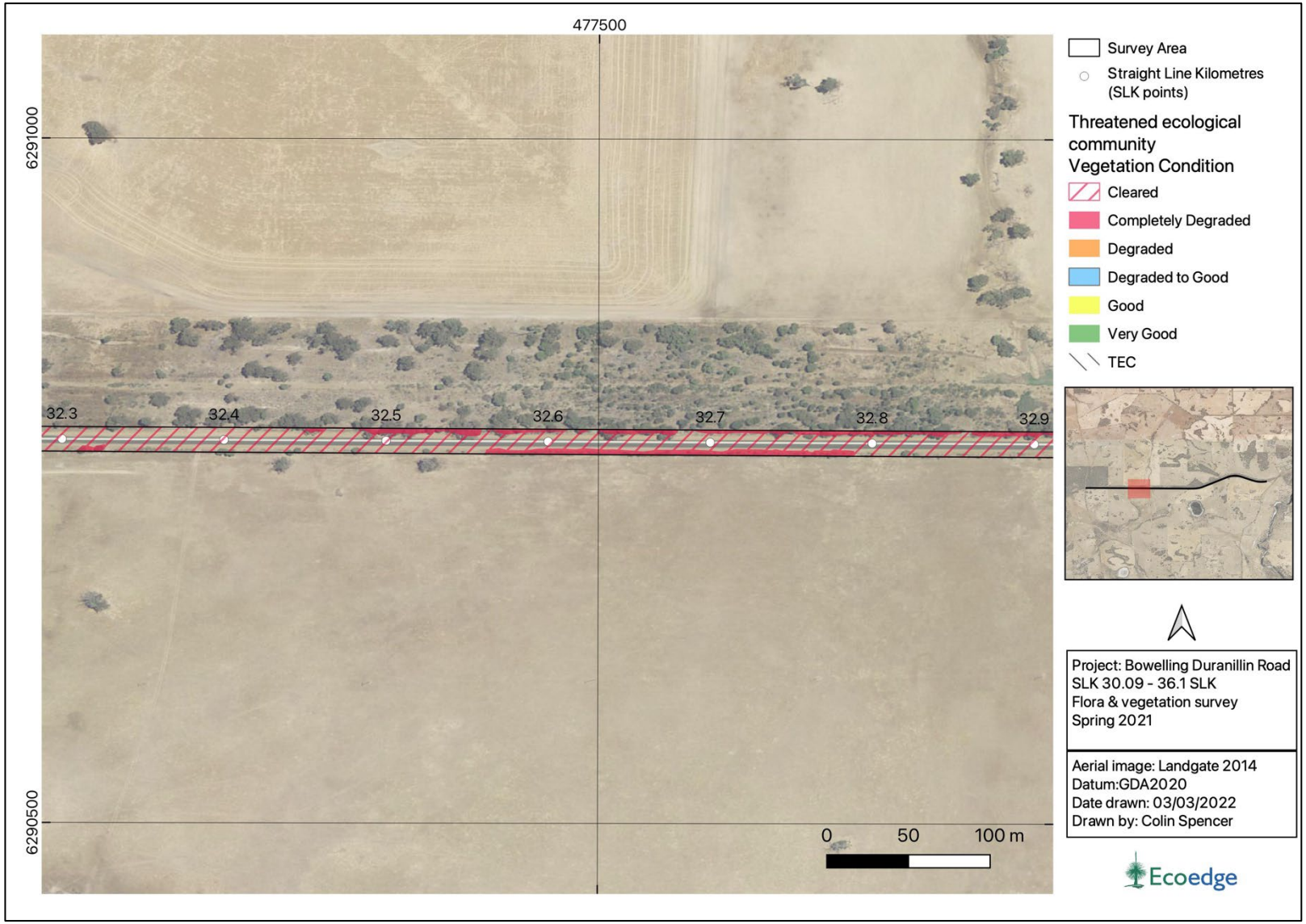

Figure CC. The condition and area of TECs within the survey area SLK 32.3– 32.9 SLK.

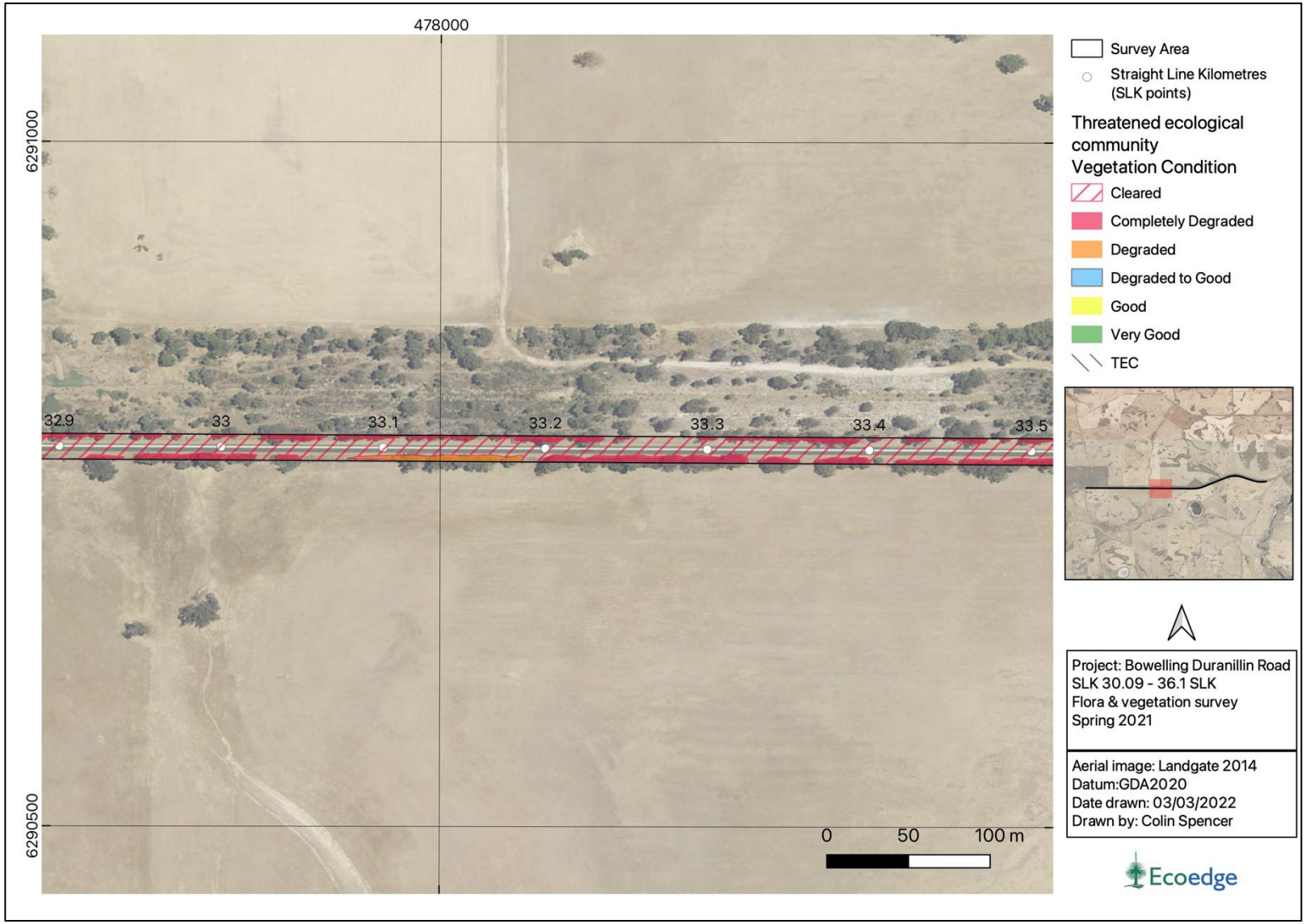

Figure DD. The condition and area of TECs within the survey area SLK 32.9 – 33.5 SLK.

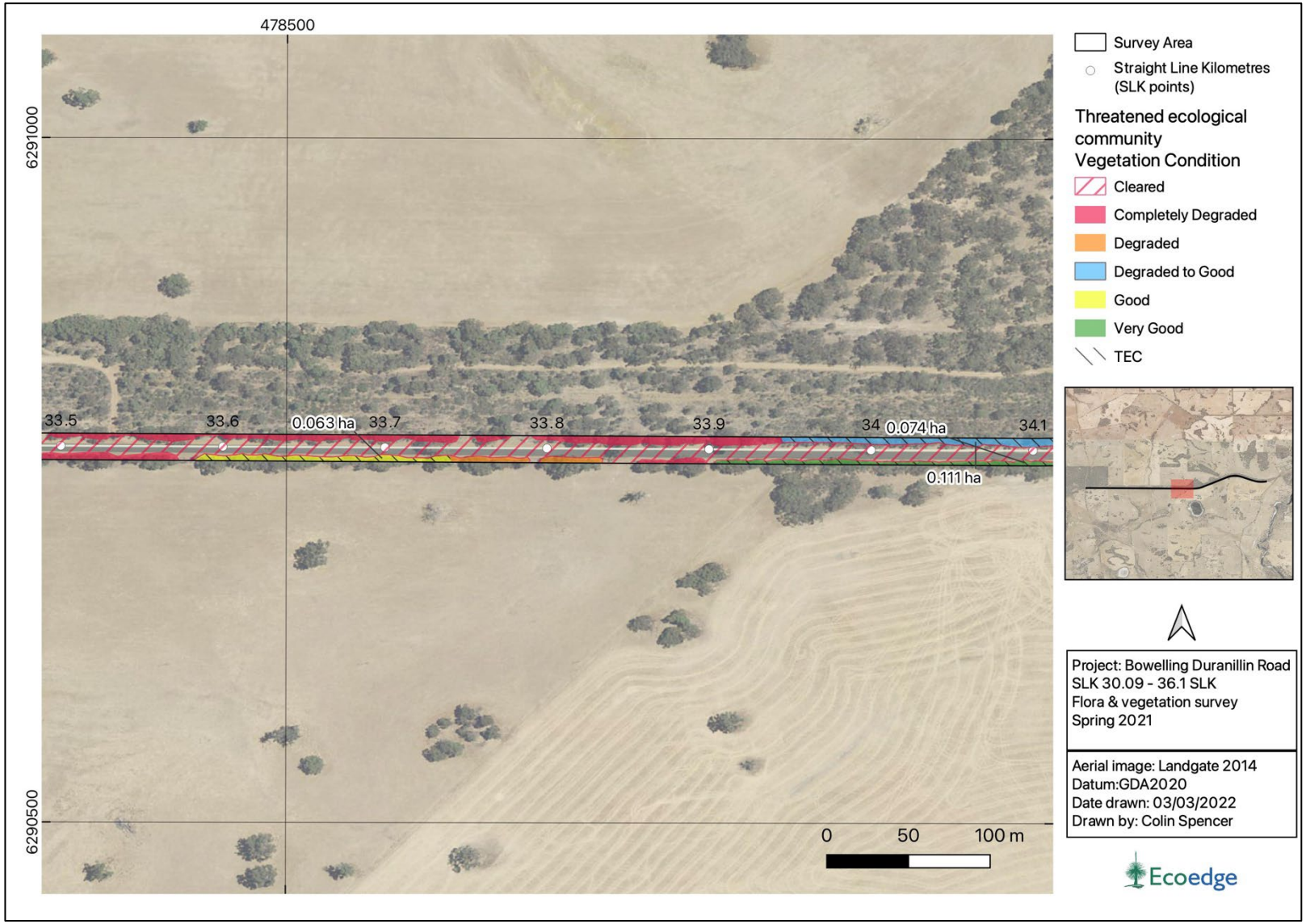

Figure EE. The condition and area of TECs within the survey area SLK 33.5 – 34.1 SLK.

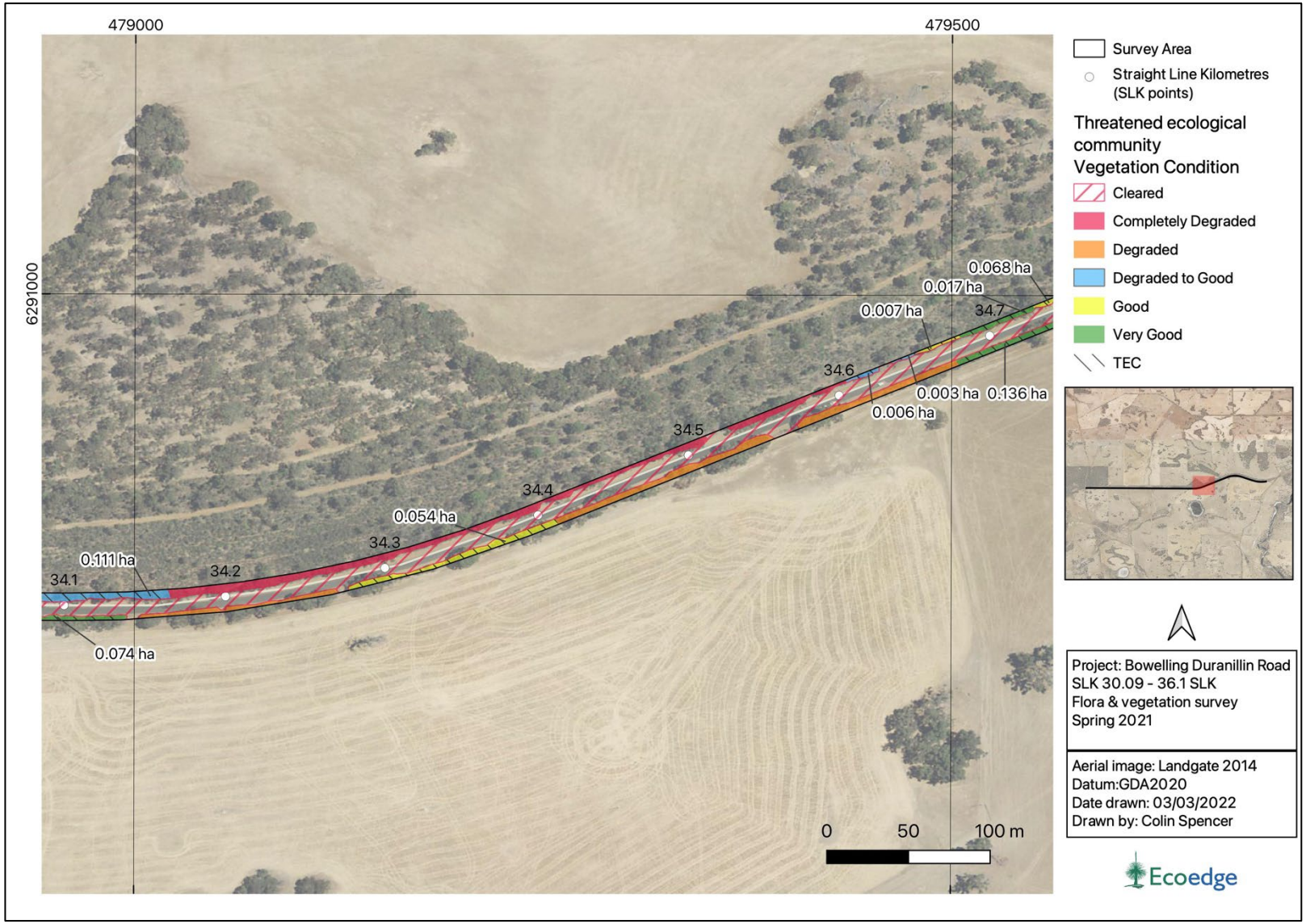

Figure FF. The condition and area of TECs within the survey area SLK 34.1 – 34.7 SLK.

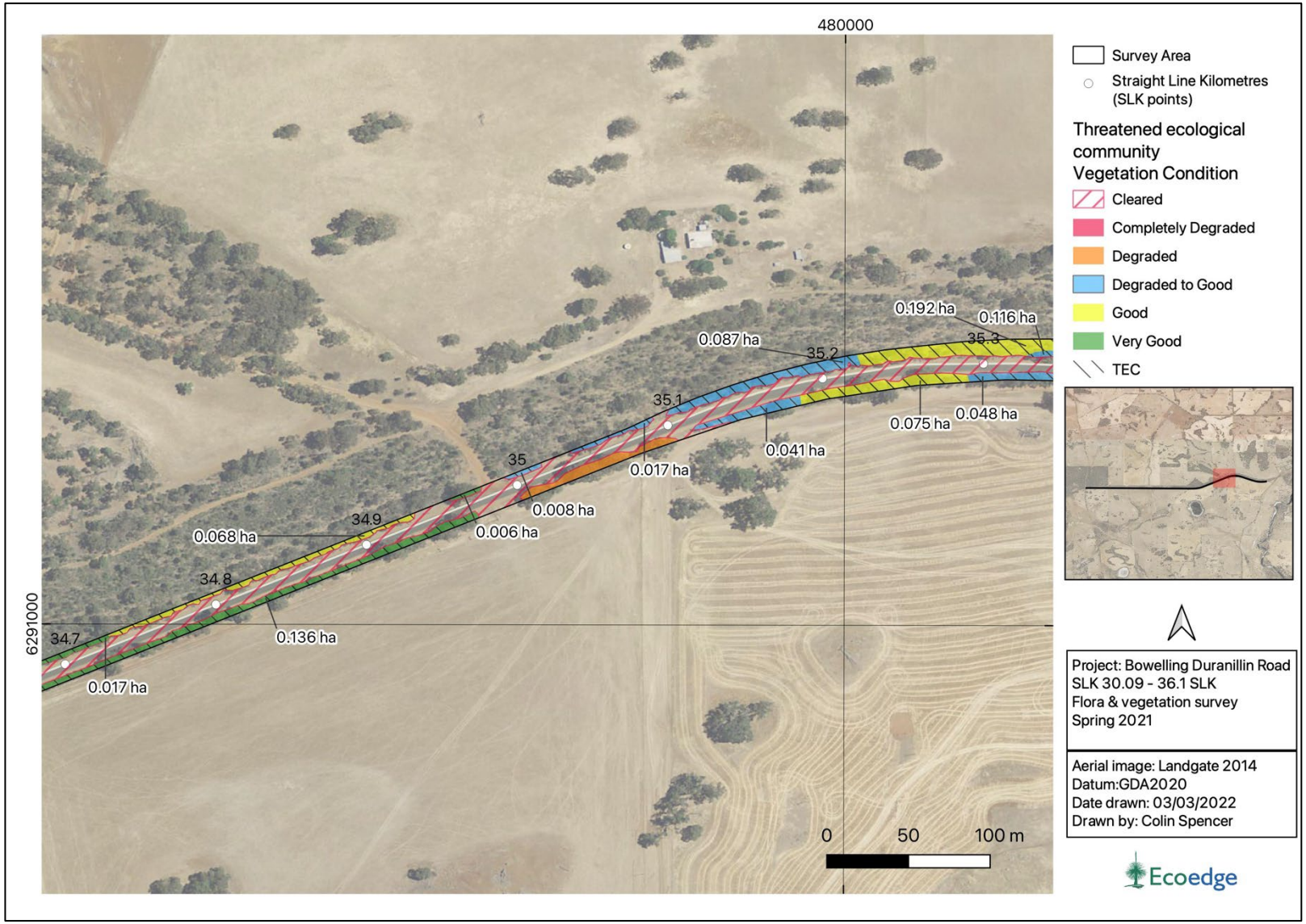

Figure GG. The condition and area of TECs within the survey area SLK 34.7 – 35.3 SLK.

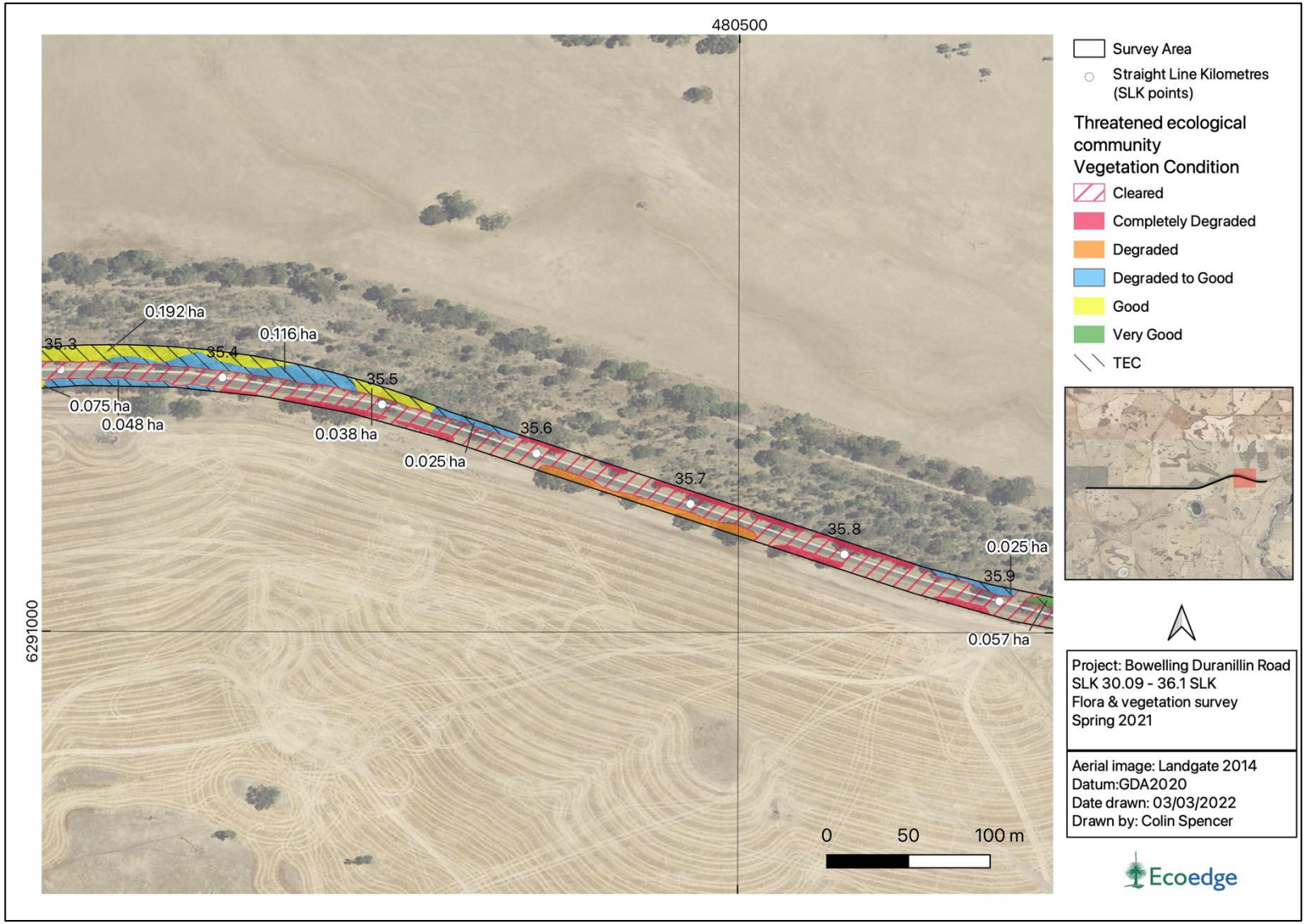

Figure HH. The condition and area of TECs within the survey area SLK 35.3 – 35.9 SLK.

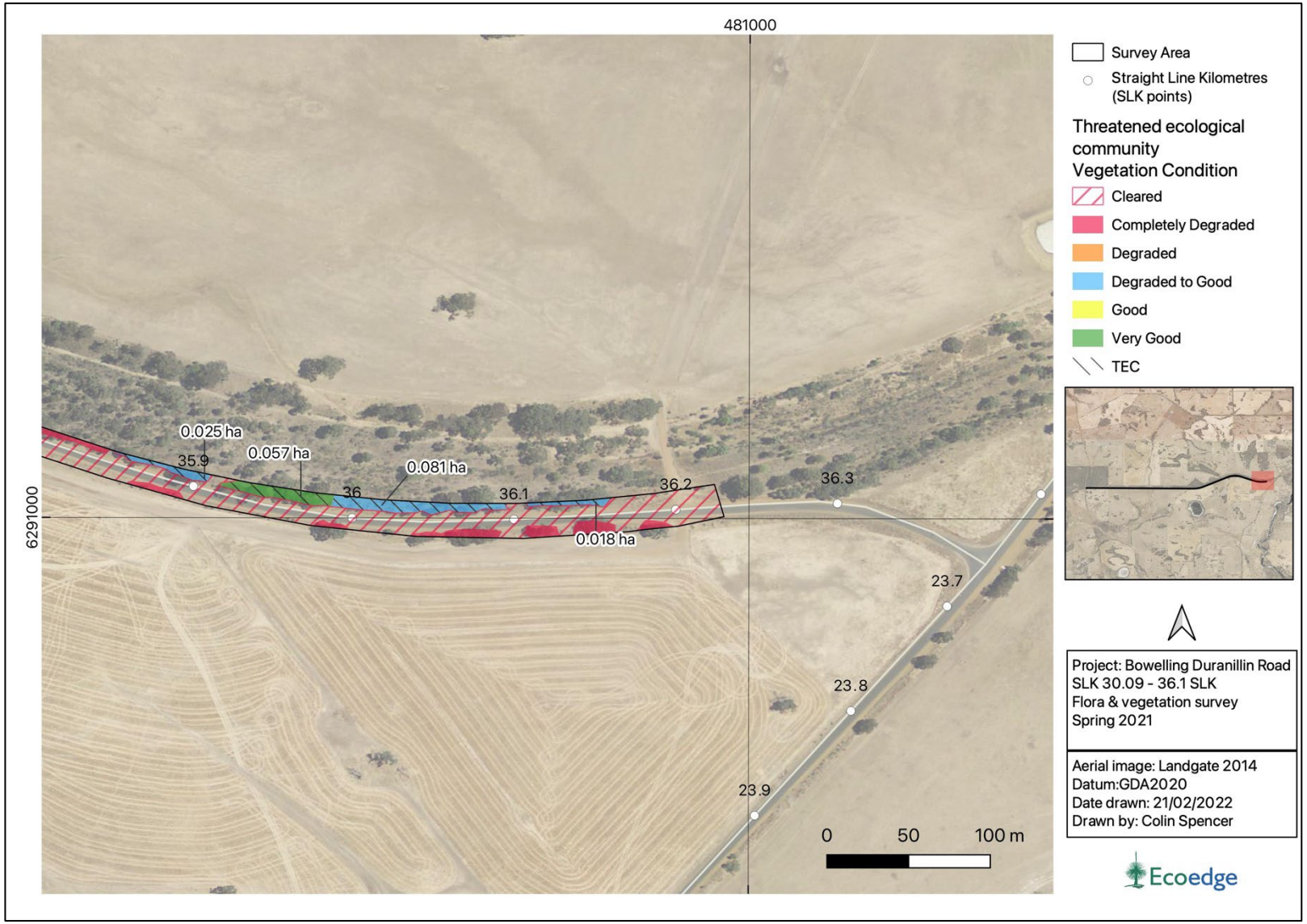

Figure II. The condition and area of TECs within the survey area SLK 35.9 – 36.3 SLK.

Appendix 14. Darkan South TEC _Occurrence Reporting Form.

Department of Parks and Wildlife

Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

Version 6.0 July 2013

COMMUNITY: Eucalypt Woodlands of the Western Australian Wheatbelt **OBSERVATION DATE:** 18/10/2021

New occurrence ☒ **Site ID:** **CONS STATUS:** CR

OBSERVER/S: Russell Smith & Colin Spencer **PHONE:** 0447809124

ROLE: botanists **ORGANISATION:** Ecoedge

EMAIL: russell@ecoedge.com.au

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):

Along Bowelling-Duranillin Road east of Capecup Reserve

Reserve No:

DISTRICT: **LGA:** West Arthur Land manager present: ☐

DATUM:

GDA94 / MGA94 ☒
AGD84 / AMG84 ☐
WGS84 ☐
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)

DecDegrees ☐ DegMinSec ☐ UTMs ☒

Lat / Northing: 6290823

Long / Easting: 477856

Zone: 50

METHOD USED:

GPS ☒ Differential GPS ☐ Map ☐

No. satellites: Map used:

Boundary polygon captured: ☐ Map used:

LAND TENURE:

Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☒
National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐
Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole _____ to _____ Specify other: _____

AREA ASSESSMENT: Edge survey ☒ Partial survey ☐ Full survey ☐ Area observed (m²): 10,000

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

THREATS - type, and supporting information: e.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents.	**Cause/Agent:** e.g. weed type, grazing species, recreation type	Area affected	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			

*Rate current and potential threat impact: **N=Nil, L=Low, M=Medium, H=High, E=Extreme**

*Estimate time to potential impact: **S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)**

CONDITION OF OCCURRENCE: (Bush Forever Scale) (estimate % of area in each)

Pristine ☐ _____% Very Good ☒ _____% Degraded ☒ _____%

Excellent ☐ _____% Good ☒ _____% Completely Degraded ☐ _____%

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

*Record entered by:*_____ *Date entered:*_____ *Database no:*_____

Department of Parks and Wildlife

Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

Version 6.0 July 2013

RECOMMENDED MANAGEMENT ACTIONS: e.g. roadside markers, weed control, etc.

ACTIONS IMPLEMENTED (include date):

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest ☐	Granite ☐	(on soil surface; e.g. gravel, quartz fields)	Sand ☐	Red ☒	Well drained ☒
Hill ☐	Dolerite ☐		Sandy loam ☐	Brown ☒	Seasonally inundated ☒
Ridge ☐	Laterite ☒	0-10% ☒	Loam ☒	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☐	10-30% ☐	Clay loam ☐	White ☐	Tidal ☐
Slope ☐	Limestone ☐	30-50% ☐	Light clay ☐	Grey ☐	
Flat ☒	Quartz ☐	50-100% ☐	Peat ☐	Black ☐	
Open depression ☐					
Drainage line ☐	Specify other:		Specify other:	Specify other:	Specify other:
Closed depression ☐					
Wetland ☐					

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐ Cracked ☐ Saline ☐ Other:

VEGETATION CLASSIFICATION:	1. medium woodland
	2. medium open shrubland
	3. low shrubland
	4. open forbland

FIRE HISTORY:

Last Fire: Season/Month: Year: **Fire Intensity:** High ☐ Medium ☐ Low ☐ No evidence of fire ☒

Actual Occurrence Landuse:

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

*Record entered by:*_____ *Date entered:*_____ *Database no:*_____

Department of Parks and Wildlife

Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

Version 6.0 July 2013

Adjacent Landuse:	farming

Associated Flora Species:
Eucalyptus wandoo (E. marginata, Corymbia calophylla) medium woodland over (Allocasuarina huegeliana low woodland) over Acacia extensa, (Allocasuarina humilis, Banksia squarrosa), Hakea prostrata, Leptospermum erubescens, Petrophile squamata medium open shrubland o
ver Bossiaea eriocarpa, Gastrolobium calycinum, Lechenaultia bilobum low shrubland and Dianella revoluta, Haemodorum sp., Lomandra effusa, Stackhousia monogyna open forbland and Neurachne alopecuroidea sparse grassland and Mesomelaena tetragona open sedgeland on gravelly red-brown loam.

Associated Fauna Species:

OTHER COMMENTS:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐

Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of record: **Russell Smith** **Role:** **botanist**

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

*Record entered by:*_____ *Date entered:*_____ *Database no:*_____

Signature:	**Russell Smith**	**Date submitted:**	**18/01/2022**