Appendix F

Ecology Technical Report (Transmission Line)

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Kidston Connection Project
Powerlink Queensland
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Terrestrial Ecology Assessment

Electricity Transmission Line

Terrestrial Ecology Assessment

Electricity Transmission Line

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Executive Summary

Genex Power Limited (Genex) is seeking to establish the Kidston Renewable Energy Hub, a combination solar and hydro pump storage power generation facility at Kidston, approximately 270 kilometres (km) north-west of Townsville. Queensland Electricity Transmission Corporation Limited (trading as Powerlink Queensland) is proposing to connect this facility to its existing transmission network at Mount Fox, via a new 275 kilovolt (kV) electricity transmission infrastructure project known as the Genex Kidston Connection Project (the Project).

The Project comprises the following components:

- A 275 kV substation proposed in the locality of Mount Fox, Queensland (the 'Mount Fox substation').
- A 275 kV substation proposed in the locality of Kidston, Queensland (the 'Copperfield River substation').
- A 275 kV double circuit or single circuit transmission line up to 195 km between the Mount Fox Substation, Copperfield Substation and Genex's Kidston Solar 2 and Kidston Hydro substations (the 'transmission line').

Powerlink is currently working with Genex and other stakeholders to determine whether the Copperfield River substation will be required to connect Genex's project and potentially additional projects in the geographic area to the Queensland transmission network. If the substation is not required, this will result in a realignment of the transmission line west of Copperfield River so that it runs directly north-west into Genex's Kidston facility. AECOM Australia Pty Ltd (AECOM) has been engaged by Powerlink to undertake a terrestrial ecology assessment of both transmission line alignment options which are presented in this report (herein referred to as the Project site). The Mount Fox substation and Copperfield River substation are not assessed in this report and will not be mentioned further.

The aim of the terrestrial ecology assessment was to document the species and habitat types within and adjacent to the Project site, with particular reference to the occurrence of conservation significant species, and to recommend mitigation measures to minimise potential impacts from the Project.

The terrestrial ecology assessment was a two stage process involving a desktop assessment followed by targeted field surveys in November 2017, May - June 2018, July 2018 and August 2018. The desktop assessment analysed existing data to identify conservation significant flora and fauna species, vegetation communities and potential habitat values present. This review formed the basis of the field surveys, in which potentially present conservation significant species were targeted and ecological values documented. Note that, due to land access restrictions, targeted field surveys have not been undertaken on a 26 km section of the Project site traversing Lots 5234 SP275834 and 1 OC64. Survey effort within these lots has been limited to public roads where they are traversed by the Project site. Habitat mapping indicates these lots potentially support habitat for the conservation significant flora species *Leptospermum pallidum* (known population occurs adjacent to the Project site) and a range of conservation significant fauna species. Powerlink is currently undertaking an independent assessment process with the landholder which involves the use of experts nominated by Powerlink and the landholder to undertake a site inspection to assess the potential impact of the Project on the above properties and to document the findings in a joint expert report. Should the agreed findings propose a change in alignment for the Project site on the subject properties, Powerlink and its environmental consultant, AECOM, will undertake further environmental, social, technical and economic assessments to determine the suitability of any realignment in accordance with planning approval requirements.

Key findings of the terrestrial ecology assessment include the following.

- The Project site contains large areas of contiguous remnant vegetation containing 31 field-verified regional ecosystems (REs). The field surveys confirmed the presence of eight fauna habitat communities.
- The field surveys recorded 281 flora species and 163 fauna species.

- No conservation significant flora species were identified within the Project site; however *Leptospermum pallidum,* listed as Near Threatened under the *Nature Conservation Act 1992* (NC Act), was identified adjacent to the Project site (within 25 metres).
- A protected plants survey was undertaken on the eastern most extent of the alignment in accordance with the *Flora Survey Guidelines – Protected Plants* due to the high risk trigger area shown in Queensland Herbarium records. The survey effort did not reveal any conservation significant flora species.
- Four conservation significant fauna species were identified during the field surveys:
  - Squatter pigeon (southern) (*Geophaps scripta scripta*), listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the NC Act.
  - Sharman's rock-wallaby (*Petrogale sharmani*), listed as Vulnerable under the EPBC Act and the NC Act.
  - Greater glider (*Petauroides volans*), listed as Vulnerable under the EPBC Act and the NC Act.
  - Short-beaked echidna (*Tachyglossus aculeatus*), listed as Special Least Concern under the NC Act.
- Four (4) conservation significant flora, 10 conservation significant fauna, and 3 migratory species are considered to have a moderate or high likelihood of occurring within the Project site, based on recent/nearby records and/or the presence of suitable habitat.
- Habitat modelling was undertaken for the conservation significant species known to occur, or deemed a high likelihood of occurring (excluding short-beaked echidna (*Tachyglossus aculeatus*)). Habitat was modelled based on three categories: Primary Habitat (known), Primary Habitat (possible) and General Habitat.
- Primary Habitat (known or possible) was identified for all species:
  - *Leptospermum pallidum.*
  - Greater glider (*Petauroides volans*).
  - Sharman's rock-wallaby (*Petrogale sharmani*).
  - Squatter pigeon (southern) (*Geophaps scripta scripta*).
  - Northern quoll (*Dasyurus maculatus*).
  - Koala (*Phascolarctos cinereus*).
  - Black-throated finch (southern) (*Poephila cincta cincta*).
  - Ghost bat (*Macroderma gigas*).
- Mitigation measures to minimise potential impacts to conservation significant fauna and flora species have been provided where practical. Measures proposed for incorporation into the design process include:
  - Vegetation clearing to be minimised in sensitive environments, specifically riparian areas around creek lines and potential habitat for conservation significant flora and fauna species.
  - Appropriate erosion and sediment control measures will be installed and maintained.
  - A Biosecurity Management Plan will be developed and implemented which will cover the construction and operation periods of the Project.
  - Pre-clearance surveys to identify shelters and breeding places potentially utilised by Least Concern species, colonial breeders and conservation significant fauna will be undertaken.
  - Species-specific mitigation measures for conservation significant flora and fauna species have also been recommended to reduce and/or avoid impacts to the species.

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) has been engaged by Powerlink Queensland (Powerlink) to undertake a terrestrial ecology assessment of the Draft Alignment for the transmission line component of its proposed Genex Kidston Connection Project (the Project). The Project includes a new 275 kilovolt (kV) transmission line to connect the proposed Kidston Renewable Energy Hub to Powerlink's existing transmission network at Mount Fox in North Queensland, a distance of up to 195 kilometres (km) (Appendix A, Figure 1). Substations will be required at these end points; however, they do not form part of this report. Powerlink is currently working with stakeholders to determine the best alignment option west of the Copperfield River near Kidston. Two options are currently being assessed, both of which are presented in this report and are shown in Appendix A, Figure 1.

1.1 Aims and Objectives

The aim of the terrestrial ecology assessment was to document the terrestrial ecological values within and adjacent to the Project site, with particular reference to the occurrence of conservation significant ecological values. In meeting this aim, the following methodology was applied:

- Undertake a desktop assessment of existing terrestrial ecology data for the Project site.
- Complete field surveys during the early wet season (November 2017) and dry season (June 2018, July 2018, August 2018), specifically looking at:
  - Flora:
    - "Ground truthing" representative sample sites within targeted mapped regional ecosystems (REs).
    - Identification of weed species, including those declared noxious under State legislation and local policy.
    - Targeted surveys to confirm the presence of populations and suitable habitat for Endangered, Vulnerable or Near Threatened flora species.
  - Fauna:
    - Habitat assessments describing landform characteristics, habitat size, shape, integrity and connectivity with other habitats, and important habitat features (e.g. vegetation structure, water sources, food plant availability, cliffs, rocks, tree hollows, fallen timber).
    - Surveys for animal signs (e.g. diggings, scats, tracks, tree-scratchings, remains) within representative habitat, and subsequent analysis of scats to detect predatory and prey species.
    - Songmeter ultra-sonic detector surveys for conservation significant bat species.
    - Spotlighting and call playback for nocturnal fauna.
    - Camera traps to record visitation by nocturnal and diurnal animals.
    - Targeted surveys for conservation fauna species identified during the desktop assessment.
    - Visual and call identification surveys of birds.
    - Direct searches under leaf litter, bark and rocks for reptiles and amphibians.
    - Opportunistic observations of all faunal groups (including feral or exotic animals).
- Map potential habitat for conservation significant species identified as known to occur or deemed a high likelihood of occurring.
- Identify potential impacts of the Project on ecological values and provide recommendations for measures to avoid or mitigate adverse impacts at the construction and operational phases of the Project.

1.2 Project Site

The Project site assessed in this report is a 60 metre (m) wide proposed easement corridor that extends from near the township of Kidston, then travels in a easterly direction for up to 195 km to Mount Fox (Appendix A, Figure 1). The corridor is predominately co-located with the existing Ergon electricity infrastructure in the region, namely sections of the Ross to Kidston 132 kV transmission line and Greenvale 66 kV sub-transmission line. Co-location is a key land use recommendation identified in Powerlink's Corridor Selection Report completed in March 2017. Disturbance assessments in this report are based on the latest design as shown in Appendix A, Figure 1.

Between approximately Greenvale and Conjuboy, there is a 36 km stretch of the Project site where there are no existing Ergon lines. In this area, the Project site has been dictated by the location of an existing mining interest, the optimal path through large escarpments and landholder feedback. The easement corridor in this section will also be 60 m wide.

The Project site intersects three individual local government areas – Hinchinbrook Shire Council, Charters Towers Regional Council and Etheridge Shire Council. The Project site crosses a number of watercourses, including the Copperfield River, East Creek, Einasleigh River, Lee (McKinnons) Creek, Gray Creek, Burdekin River, and Camel Creek, as well as dozens of unnamed smaller creeks and drainage lines (Appendix A, Figure 1). Land tenure in the Project site is principally leasehold (Table 1). This land is held by the State of Queensland and is generally leased for specific purposes (grazing, agriculture, telecommunications etc.) for a specified period. These leases are generally for a long period, registered on title and, in many cases, offer the lessee exclusive rights over the land.

Table 1 Land Parcels and Tenure within the Project site

Lot	Registered Plan	Tenure	Local Government Area
59	SP237064	Freehold	Hinchinbrook Shire Council
3198	PH2177	Leasehold	Charters Towers Regional Council
3	WU48	Leasehold	Charters Towers Regional Council
6	WU50	Leasehold	Charters Towers Regional Council
1	OC64	Leasehold	Charters Towers Regional Council
5234	SP275834	Leasehold	Charters Towers Regional Council
1	CLK23	Leasehold	Charters Towers Regional Council
5	CLK23	Leasehold	Charters Towers Regional Council
11	CLK26	Leasehold	Charters Towers Regional Council
501	SP232789	Leasehold	Charters Towers Regional Council
547	SP242570	Leasehold	Charters Towers Regional Council
3	CLK34	Leasehold	Charters Towers Regional Council
4	CD35	Leasehold	Etheridge Shire Council
1	CD25	Freehold	Etheridge Shire Council
3	CD12	Leasehold	Etheridge Shire Council
14	LH8	Leasehold	Etheridge Shire Council
182	PH995	Leasehold	Etheridge Shire Council
66	SP287774	Leasehold	Etheridge Shire Council
44	USL33	Unallocated State Land	Etheridge Shire Council
2	SP289310	Freehold	Etheridge Shire Council
1	SP289310	Freehold	Etheridge Shire Council

2.0 Regulatory Framework

2.1 Commonwealth

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a process for environmental assessment and approval of proposed actions that have, will have or are likely to have a significant impact on Matters of National Environmental Significance (MNES) or on Commonwealth land.

MNES are outlined in the EPBC Act to include:

- World Heritage Properties.
- National Heritage Places.
- Wetlands of International Importance (listed under the Ramsar Convention).
- Listed Threatened Species and Ecological Communities.
- Migratory Species (listed under international agreements).
- Commonwealth Marine Areas.
- Great Barrier Reef Marine Park.
- A Water Resource, in relation to coal seam gas development and large coal mining development.

Under the EPBC Act, a referral to the Department of the Environment and Energy (DoEE) would be required if the Project had the potential to cause a 'significant impact' on MNES. The determination is made with reference to the *Matters of National Environmental Significance Significant Impact Guidelines 1.1* (DoE, 2013) and other EPBC Act policy statements including significant impact guidelines for individual threatened species, groups of species and threatened ecological communities.

2.1.2 Weeds of National Significance

Thirty two (32) Weeds of National Significance (WoNS) have been agreed by Australian governments using an assessment process that prioritised these weeds based on their invasiveness, potential for spread and environmental, social and economic impacts. For the existing 32 WoNS, customised and targeted plans have been developed. The presence of WoNS within the Project site was assessed during the field surveys.

2.2 Queensland

2.2.1 Nature Conservation Act 1992

The object of the *Nature Conservation Act 1992* (NC Act) is "the conservation of nature" (Section 4, NC Act). In support of the NC Act, the *Nature Conservation (Wildlife) Regulation 2006* lists 'protected wildlife' (flora and fauna species), which are considered to be 'Extinct in the Wild', 'Endangered', 'Vulnerable', 'Near Threatened' and 'Least Concern' wildlife. Under Sections 88 and 89 of the NC Act, it is an offense to take or use protected wildlife, which is outside a 'protected area', unless exemptions apply or an approval (e.g. clearing permit) is obtained from the Department of Environment and Science (DES). The presence of conservation significant flora and fauna species was assessed during the surveys.

2.2.1.1 Protected Plants Flora Survey Trigger Map

In Queensland, all plants that are native to Australia are protected plants under the NC Act to prevent whole plants or protected plant parts from being illegally removed from the wild or illegally traded. The protected plants flora survey trigger map shows high risk areas for protected plants and is used to help determine flora survey and clearing permit requirements for a particular location. High risk areas represent areas where Endangered, Vulnerable or Near Threatened plants are known to exist or are likely to exist.

Where clearing occurs within a high risk area, a flora survey is required to determine the presence of protected plants within the clearing impact area. The flora survey must then be lodged with DES to either obtain an approval, or an exemption notice (if none present).

2.2.2 Environmental Protection Act 1994

The object of the *Environmental Protection Act 1994* (EP Act) is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development) (refer Section 3, EP Act).

The EP Act provides the key legislative framework for the protection of the environment in Queensland. Section 319 of the EP Act imposes a 'general environmental duty', which specifies that a person must not undertake any activity that may harm the environment without taking reasonable and practical measures to prevent or minimise the harm.

2.2.3 Vegetation Management Act 1999

The *Vegetation Management Act 1999* (VM Act) regulates the clearing of native vegetation in Queensland. The purpose of the VM Act is to regulate the clearing of vegetation in a way that: (a) conserves remnant vegetation; (b) conserves vegetation in declared areas; (c) ensures that clearing does not cause land degradation; (d) prevents the loss of biodiversity; (e) maintains ecological processes; (f) manages the environmental effects of the clearing to achieve the matters mentioned in paragraphs (a) to (e); and (g) reduces greenhouse gas emissions (refer Section 3(1) of the VM Act).

The VM Act protects and regulates the clearing of native vegetation including 'remnant' and 'high value regrowth' (HVR) vegetation (shown as Category B and C on the Regulated Vegetation Management Map) on freehold land, Indigenous land and State tenures.

The VM Act also protects Category R vegetation; that is native woody vegetation on freehold land, Indigenous land or leasehold land granted for agriculture or grazing purposes, located within 50 m of a watercourse in the Burdekin, Mackay, Whitsunday and Wet Tropics Great Barrier Reef catchments.

Clearing of native vegetation is assessed under the *Planning Act 2016*. Regional ecosystems and values protected and managed under the VM Act are discussed in Section 4.0 of this Report.

2.2.3.1 Essential Habitat

Essential habitat is regulated under the VM Act and is vegetation in which threatened species listed under the NC Act have been known to occur. Clearing of essential habitat is assessed through the development assessment process under the *Planning Act 2016*. Where clearing cannot be reasonably avoided or minimised, an offset may occur.

2.2.4 Biosecurity Act 2014

The *Biosecurity Act 2014* is administered by the Department of Agriculture and Fisheries (DAF). The Act provides management measures to protect agricultural and tourism industries and the environment from pests, diseases and contaminants.

Under the Act, invasive plants and animals are categorised as either a 'Prohibited Matter' or a 'Restricted Matter' and replace the 'Declared' status under the superseded *Land Protection (Pest and Stock Route Management) Act 2002*.The *Biosecurity Act 2014* also requires every local government in Queensland to develop a biosecurity plan for their area.

Invasive plants and animals will be further assessed through secondary surveys and the Environmental Assessment Report prepared in support of the Infrastructure Designation process. Biosecurity Management Plans will be developed to support construction of the Project and to achieve requirements under the *Biosecurity Act 2014*.

2.2.5 Electricity Act 1994

The *Electricity Act 1994* sets out the requirements which all electricity industry participants must follow to ensure a safe, efficient and reliable supply of electricity. It also requires that the supply of electricity is undertaken in an environmentally sound manner. Under Section 31(b) of the *Electricity Act 1994*, a transmission entity is required to properly take into account the environmental effects of its activities under the transmission authority.

Section 112A of the *Electricity Act 1994* makes clearing of native vegetation on freehold land accepted development if the clearing is for operating works for a transmission entity on land designated for the operating works by a Minister under the *Planning Act 2016*.

2.3 Classifications of Conservation Values

Conservation significant flora and fauna are assigned status according to Queensland or Commonwealth legislation as described in the:

- NC Act and the subordinate *Nature Conservation (Wildlife) Regulation 2006.*
- EPBC Act.

Conservation significant species are listed under the NC Act in the following categories:

- Extinct in the Wild.
- Endangered.
- Vulnerable.
- Near Threatened.
- Special Least Concern (Least Concern species of special cultural significance: the short-beaked echidna (*Tachyglossus aculeatus*) and the platypus (*Ornithorhynchus anatinus*)).

Conservation significant species are listed under the EPBC Act in the following categories:

- Extinct.
- Extinct in the Wild.
- Critically Endangered.
- Endangered.
- Vulnerable.

The EPBC Act also identifies and protects Threatened Ecological Communities (TECs). Types of TECs listed under the EPBC Act include woodlands, grasslands, shrublands, forests, wetlands, marine, ground springs and cave communities.

Additionally, the EPBC Act and NC Act include a list of bird species (listed as Migratory under the EPBC Act and Special Least Concern under the NC Act), comprising:

- Migratory species which are native to Australia and are included in the appendices to the Bonn Convention.
- Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA).
- Native, migratory species identified in a list established under an international agreement such as the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

3.0 Methodology

3.1 Desktop Assessment

A desktop assessment was undertaken to characterise and identify potential flora and fauna species and their habitat that may be present in the Project site. The desktop assessment included a review of literature, and searches of publicly available datasets and online mapping. The following information sources were reviewed as part of this assessment –

- EPBC Act Protected Matters Search Tool (PMST) to identify MNES that may occur within the Project site.
- DES Wildlife Online database to identify flora and fauna species recorded from or surrounding the Project site.
- Atlas of Living Australia database to identify locations of previously recorded flora and fauna species within and adjacent to the Project site.
- Department of Natural Resources, Mines and Energy (DNRME) Regulated Vegetation Management Map to determine the extent of Category A, Category B, Category C and Category R vegetation within and surrounding the Project site.
- DNRME Vegetation Management regional ecosystems (RE) map including essential habitat mapping.
- DES Protected Plants Flora Survey Trigger Map to identify the high risk areas for protected plants and determine whether a flora survey and a clearing permit is required.
- DES certified Biodiversity Planning Assessment (BPA) mapping to identify significant wildlife corridors and areas of State, regional and local biodiversity significance.
- The Queensland Herbarium Regional Ecosystem Description Database (REDD) for current RE descriptions and geological and land zone descriptions.
- Desktop assessment reports completed for the Powerlink Corridor Selection Report (Powerlink, 2017) including:
    - Genex Kidston Final Corridor Selection Project – Brief Report on Woody Vegetation Mapping.
    - Ecological Constraints Assessment.
    - Preliminary Desktop-Based Likelihood of Occurrence Assessment.
- Species distribution maps from various current field guides.

Information collected as part of the desktop assessment was reviewed and used in the preparation of the field surveys, to identify flora and fauna species potentially found within and/or utilising the Project site and to determine appropriate survey techniques.

3.2 Field Surveys

3.2.1 Survey Coverage

Ongoing landholder consultation is underway to complete the survey coverage of the Project site. Due to landholder access restrictions, one property (Lots 5234/SP275834 and 1/OC64) has only been surveyed where public roads cross the Project site (Appendix A, Figure 2).

3.2.2 Flora

The flora surveys were undertaken to classify and map REs and to identify flora species, including conservation significant and introduced flora. The surveys were undertaken in accordance with the methodology developed by the Queensland Herbarium, *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland* (Neldner et al., 2017).

The vegetation was sampled using tertiary level transects as defined in Neldner et al. (2017), selected to sample the variation in vegetation observed, including both remnant and non-remnant areas, and targeting each RE identified from the Queensland Herbarium mapping. Quaternary sites were recorded between tertiary sites.

At each tertiary site a full species list and vegetation structural description was recorded including strata, height and cover values for each species. Quaternary sites were used to mark the transition between REs, or confirm the RE either by recording the dominant over storey species or noting the RE code. At both the tertiary and quaternary sites, a GPS location and photos were taken.

Each site was attributed to an RE based on the land zone and dominant species data, using the RE descriptions in the REDD (Queensland Herbarium, 2016). The Queensland Herbarium RE mapping was then adjusted based on the field verification. During the course of the surveys, opportunistic flora species not observed at the tertiary and observation sites were recorded. At each tertiary site, searches for threatened flora were performed for approximately 20 minutes within a 50 m radius of the survey location.

Documented survey locations are shown in Appendix A, Figure 2.

3.2.2.1 Protected Plants Survey

A protected plants survey in accordance with the *Flora Survey Guidelines – Protected Plants* (Department of Environment and Heritage Protection, 2016) was undertaken within the high risk area on the flora survey trigger map. A detailed methodology is provided within the Protected Plants Survey Report prepared for the Project.

3.2.3 Fauna

The baseline sampling of fauna species was undertaken using standard methodologies for the systematic survey of terrestrial fauna in Queensland (Eyre et al., 2014) as well as a number of non-standard observational methods. Methods employed during the field program included:

- Fauna habitat assessments.
- Active searches.
- Microchiropteran bat call detection.
- Camera traps.
- Spotlighting.
- Visual and auditory identification surveys of birds.
- Incidental observations.

The above methods are further described below, and documented survey locations are shown in Appendix A, Figure 2.

3.2.3.1 Fauna Habitat Assessments

Habitat assessments were undertaken to characterise the fauna habitat values within the Project site. These assessments provide an indication of likely fauna utilisation, and suitability for fauna species, including conservation fauna. Habitat attributes recorded during the assessment include:

- Vegetation structure and dominant species, including a description of canopy, shrub and ground layer structure and composition.
- Presence and abundance of tree hollows and stags.
- Presence and abundance of woody debris such as habitat logs and ground timber.
- Rocky habitat such as surface rocks, boulders, crevices, overhangs and caves.
- Proximity to water (both permanent and ephemeral).
- Disturbance from invasive weeds/pests.
- Other disturbances such as grazing pressure, clearing, thinning or fire.

- Any other significant habitat features or values present.

Included in the habitat assessments were searches for signs of animal activity, including tracks, scats, scratches, bones, fur, feathers, nests, foraging holes and diggings.

3.2.3.2 Active Searches

Active searches were undertaken for reptiles, amphibians, small mammals and cryptic or ground-dwelling bird species. This included scanning the trees and ground, searching beneath microhabitat such as rocks, fallen timber and peeling bark, digging through leaf litter and soil at tree bases and flushing birds from areas with a dense or grassy ground cover. Active searches were undertaken within suitable microhabitat at each habitat assessment site (i.e. across the broad range of habitat types throughout the Project site).

3.2.3.3 Microchiropteran Bat Call Detection

Microchiropteran bat echolocation calls were recorded using Songmeter SM2Bat+ ultrasonic bat call detectors, configured to record microchiropteran species potentially occurring in the area. Continuous access to properties was limited, restricting the number of locations and duration in which Songmeters could be deployed. Call data was forwarded for analysis to Balance! Environmental.

3.2.3.4 Camera Traps

Camera traps were deployed in strategic positions to record visitation by nocturnal and diurnal animals. Strategic locations included fauna corridors and watering points such as dams and creek lines. A combination of honey-oat mix and sardines or tuna was used as an attractant. Continuous access to properties was limited, restricting the number of locations and duration in which camera traps could be deployed.

3.2.3.5 Spotlighting

In order to locate nocturnal fauna, spotlighting on foot using head torches and hand-held spotlights was undertaken in areas of representative habitat. Spotlighting from the passenger window of a slow moving vehicle was undertaken along farm tracks, targeting larger ground and arboreal mammals and nocturnal birds.

3.2.3.6 Visual and Auditory Identification Surveys of Birds

Roaming/meandering bird surveys were undertaken using both visual and auditory identification. Surveys commenced at dawn and continued throughout the day. Surveys were conducted for the duration of each survey period at each habitat assessment site and during transit between sites. Hilltop vantage points were used to observe aerial hunters, feeders and scavengers. At least 15 minutes was spent at each survey site with an average time of approximately 30 minutes at each site.

3.2.3.7 Incidental Observations

All fauna observed incidentally within or in close proximity to the Project site were recorded, including those seen while travelling along roads and tracks. Fauna species identified at dams and wetlands were also recorded.

3.3 Likelihood of Occurrence Assessment

A likelihood of occurrence assessment for conservation significant flora and fauna species and communities identified during the desktop review was undertaken. The assessment considered known habitat and ecological requirements of the threatened species against the vegetation communities and habitat values identified in the field surveys.

Each species was assessed against the categories defined below.

- Unlikely: The species has no recent historical records, has no preferred habitat in the Project site and is considered unlikely to be present in the Project site.
- Low: Some of the preferred habitat present in the Project site. Species may infrequently visit the site en-route for foraging but will not roost or otherwise be dependent on habitats on the site for their survival. Migratory and aerial foraging birds may overfly the site.

- Moderate: Project site contains some of the preferred habitat to support a population of the species and/or the species has been recorded within the vicinity of Project site.
- High: Species has previously been recorded in the Project site. The site contains significant preferred habitat which is likely to support a population of the species, including roost sites
- Known: Species directly observed or recently recorded in the Project site.

3.4 Habitat Modelling

Potential habitat maps for the conservation significant flora and fauna identified in Sections 4.2.2.7 and 4.2.3.5 as having a likelihood presence of 'high' or 'known' have been created to identify potential habitat across the Project site. The maps will be used as a planning tool during the design and construction stage of the Project to assist in the placement of infrastructure. The maps will also be used to determine the potential impact of the Project on conservation significant species. Where applicable, they may also be used to estimate the offset requirements for the Project.

Where available, information from the publically available database was used as a basis to develop the 'modelling rules' for conservation significant species. Additionally, relevant species recovery plans (where available), referral guidelines, approved conservation advice, management plans and peer-reviewed journal articles were used to further develop the potential habitat modelling rules.

Each habitat map was developed with up to three habitat categories, provided in Table 2. Habitat maps are provided for the conservation significant species along the entire Project site, using the field-verified REs.

Table 2 Habitat Modelling Criteria

Potential Habitat Category	Definition
Primary Habitat (known)	Recent records (since 1980) or confirmed sightings, including remnant and regrowth vegetation within 1 km of the record.
Primary Habitat (possible)	Areas of potential habitat with a number of features or values known to contribute to, or be important for the occupation of the species.
General Habitat	Areas of potential habitat with some features or values known to contribute to, or be important for the occupation of the species. Includes areas for species requiring specific micro-habitat features that are unable to be determined at a large scale. Includes areas for species that have little information known about habitat characteristics.

4.0 Results

4.1 Desktop Assessment

4.1.1 Regional Context

The Project site is primarily located within the Einasleigh Uplands bioregion. This bioregion largely consists of a series of ranges and plateau surfaces, varying in altitude between 100 m in the west to 1,100 m in the east (Sattler and Williams, 1999).

Approximately 500 m of the eastern end of the Project site is within the Wet Tropics bioregion. This bioregion is dominated by rugged, rainforest mountains as well as extensive plateau areas and low lying coastal plains (Sattler and Williams, 1999).

4.1.2 Flora

4.1.2.1 Mapped Regional Ecosystems

In Queensland, remnant and HVR vegetation is described and mapped by the Queensland Herbarium as REs. REs are broad plant communities within a bioregion that consistently occur in association with a particular combination of geology, landform and soil (Neldner et al., 2017).

The Project site crosses 56 mapped REs (some in heterogeneous polygons), which are illustrated in Appendix A, Figure 3 and are listed in Appendix B. Based on classifications provided by the Queensland VM Act, 51 REs are listed as 'Least Concern' and 5 REs are 'Of Concern'.

4.1.2.2 Mapped Category R Vegetation

The eastern end of the Project site intersects with areas mapped as Category R vegetation, illustrated in Appendix A, Figure 3.

4.1.2.3 Threatened Ecological Communities

One Endangered (EPBC Act) Threatened Ecological Community (TEC) was identified as having potential to occur within the Project site. This TEC is: broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland.

In Queensland, this TEC corresponds to the following REs: 7.3.8a, 7.3.8b, 7.3.8c, 7.3.8d, 7.5.4g, 8.3.2a, 8.5.2c and 8.5.6.

4.1.2.4 Conservation Significant Flora

The desktop assessment identified 13 conservation significant flora species with the potential to occur within the Project site. These species and their respective conservation status under the EPBC Act and NC Act are detailed in Table 3 below.

Table 3 Desktop Results for Conservation Significant Flora

Common Name	Scientific Name	EPBC Act	NC Act
Cycads			
No common name	*Cycas cairnsiana*	Vulnerable	Vulnerable
Ferns			
No common name	*Lindsaea pulchella var. blanda*	Vulnerable	Extinct in the Wild
Higher Dicots			
Pink gidgee	*Acacia crombiei*	Vulnerable	Vulnerable
Tingoora wattle	*Acacia tingoorensis*	-	Vulnerable
No common name	*Cajanus mareebensis*	Endangered	-
No common name	*Leptospermum pallidum*	-	Near Threatened

Common Name	Scientific Name	EPBC Act	NC Act
No common name	*Marsdenia brevifolia*	Vulnerable	Vulnerable
No common name	*Tephrosia leveillei*	Vulnerable	Vulnerable
Monocots			
Miniature moss-orchid	*Bulbophyllum globuliforme*	Vulnerable	Near Threatened
No common name	*Corybas cerasinus*	-	Near Threatened
Bluegrass	*Dichanthium setosum*	Vulnerable	-
Lesser swamp-orchid	*Phaius australis*	Endangered	Endangered
No common name	*Phaius pictus*	Vulnerable	Vulnerable

4.1.2.5 Essential Habitat

At the eastern end (Mount Fox end) of the alignment, the Project site is adjacent to an area mapped as essential habitat for the conservation significant flora species *Acacia tingoorensis* (Tingoora wattle) (Appendix A, Figure 4). This species is listed as Vulnerable under the NC Act.

4.1.2.6 Protected Plants

Part of the Project site at the eastern end (Mount Fox end) is mapped as a high risk area on the protected plants flora survey trigger map (Appendix A, Figure 4). A protected plants survey was undertaken in this area and a separate Protected Plants Survey Report detailing the results of this survey has been prepared for the Project.

4.1.3 Fauna

4.1.3.1 Conservation Significant Fauna

The desktop assessment identified 31 conservation significant fauna species with the potential to occur within the Project site, including 11 bird, 14 mammal, 3 reptile and 3 amphibian species. These species and their respective conservation status under the EPBC Act and NC Act are detailed in Table 4 below.

Table 4 Desktop Results for Conservation Significant Fauna

Common Name	Scientific Name	EPBC Act	NC Act
Birds			
Curlew sandpiper	*Calidris ferruginea*	Critically Endangered	Endangered
Southern cassowary	*Casuarius casuarius johnsonii*	Endangered	Vulnerable
Red goshawk	*Erythrotriorchis radiatus*	Vulnerable	Endangered
Gouldian finch	*Erythrura gouldiae*	Endangered	Endangered
Grey falcon	*Falco hypoleucos*	-	Vulnerable
Squatter pigeon (southern)	*Geophaps scripta scripta*	Vulnerable	Vulnerable
Painted honeyeater	*Grantiella picta*	Vulnerable	Vulnerable
Eastern curlew	*Numenius madagascariensis*	Critically Endangered	Endangered
Black-throated finch (southern)	*Poephila cincta cincta*	Endangered	Endangered
Australian painted snipe	*Rostratula australis*	Endangered	Vulnerable

Common Name	Scientific Name	EPBC Act	NC Act
Masked owl (northern)	*Tyto novaehollandiae kimberli*	Vulnerable	Vulnerable
Mammals			
Northern quoll	*Dasyurus hallucatus*	Endangered	-
Spotted-tailed quoll	*Dasyurus maculatus gracilis*	Endangered	Endangered
Semon's leaf-nosed bat	*Hipposideros semoni*	Vulnerable	Endangered
Ghost bat	*Macroderma gigas*	Vulnerable	Endangered
Black-footed tree-rat	*Mesembriomys gouldii rattoides*	Vulnerable	-
Greater glider	*Petauroides volans*	Vulnerable	Vulnerable
Sharman's rock-wallaby	*Petrogale sharmani*	Vulnerable	Vulnerable
Koala	*Phascolarctos cinereus*	Vulnerable	Vulnerable
Spectacled flying-fox	*Pteropus conspicillatus*	Vulnerable	Vulnerable
Grey-headed flying-fox	*Pteropus poliocephalus*	Vulnerable	-
Large-eared horseshoe bat	*Rhinolophus philippinensis*	Vulnerable	Endangered
Bare-rumped sheath-tailed bat	*Saccolaimus saccolaimus nudicluniatus*	Vulnerable	Endangered
Chestnut dunnart	*Sminthopsis archeri*	-	Near Threatened
Short-beaked echidna	*Tachyglossus aculeatus*	-	Special Least Concern
Reptiles			
Common death adder	*Acanthophis antarcticus*	-	Vulnerable
Saltwater crocodile	*Crocodylus porosus*	Migratory	Vulnerable
Yakka Skink	*Egernia rugosa*	Vulnerable	Vulnerable
Amphibians			
Australian lace-lid	*Litoria dayi*	Endangered	Endangered
Waterfall frog	*Litoria nannotis*	Endangered	Endangered
Common mistfrog	*Litoria rheocola*	Endangered	Endangered

4.1.3.2 Migratory Fauna

The desktop assessment identified 16 migratory species with the potential to occur within the Project site, including 1 migratory marine bird, 9 migratory terrestrial and 6 migratory wetland species. These species and their respective conservation status under the EPBC Act and NC Act are detailed in Table 5 below.

Table 5 Desktop Results for Migratory Fauna

Common Name	Scientific Name	EPBC Act	NC Act
Migratory Marine Birds			
Fork-tailed swift	*Apus pacificus*	Migratory	Special Least Concern
Migratory Terrestrial Species			
Oriental cuckoo	*Cuculus optatus*	Migratory	Special Least Concern
White-throated needletail	*Hirundapus caudacutus*	Migratory	Special Least Concern
Barn swallow	*Hirundo rustica*	Migratory	Special Least Concern
Black-faced monarch	*Monarcha melanopsis*	Migratory	Special Least Concern
Grey wagtail	*Motacilla cinerea*	Migratory	Special Least Concern
Yellow wagtail	*Motacilla flava*	Migratory	Special Least Concern
Satin flycatcher	*Myiagra cyanoleuca*	Migratory	Special Least Concern
Rufous fantail	*Rhipidura rufifrons*	Migratory	Special Least Concern
Spectacled monarch	*Symposiarchus trivirgatus*	Migratory	Special Least Concern
Migratory Wetland Species			
Common sandpiper	*Actitis hypoleucos*	Migratory	Special Least Concern
Sharp-tailed sandpiper	*Calidris acuminata*	Migratory	Special Least Concern
Pectoral sandpiper	*Calidris melanotos*	Migratory	Special Least Concern
Latham's snipe	*Gallinago hardwickii*	Migratory	Special Least Concern
Osprey	*Pandion haliaetus*	Migratory	Special Least Concern
Common greenshank	*Tringa nebularia*	Migratory	Special Least Concern

4.1.3.3 Essential Habitat

The eastern end (Mount Fox end) of the Project site intersects an area mapped as essential habitat for the Sharman's rock-wallaby (*Petrogale sharmani*) (Appendix A, Figure 4). Essential habitat for the black-throated finch (southern) (*Poephila cincta cincta*) and the short-beaked echidna (*Tachyglossus aculeatus*) also occurs close to the Project site.

4.1.3.4 Biodiversity and Conservation Values

Biodiversity significance is attributed by DES on a bioregional scale through a Biodiversity Planning Assessment (BPA). BPAs assign three levels of overall biodiversity significance –

1. State significance - areas assessed as being significant for biodiversity at the bioregional or state scales. They also include areas assessed by other studies / processes as being significant at national or international scales.
2. Regional significance - areas assessed as being significant for biodiversity at the subregional scale. These areas have lower significance for biodiversity than areas assessed as being of State significance.

3. Local significance and/or other values - areas assessed as not being significant for biodiversity at state or regional scales. Local values are of significance at the local government scale.

An analysis of the BPA for the Einasleigh Uplands bioregion shows that the entire Project site is within areas of ‘State significance’, ‘regional significance’ and ‘local significance and/or other values’ (Appendix A, Figure 5).

The Queensland Government has identified Bioregional State Wildlife Corridors across Queensland. These are not statutory areas, but are priority conservation areas to be accorded special consideration when development applications are lodged. The Project site intersects State-wide ecological corridors, which are illustrated in Appendix A, Figure 5 and are described as:

- A terrestrial corridor that runs from Undara Volcanic National Park to Blackbraes National Park, west of Greenvale.
- A terrestrial corridor that runs along the east coast of Queensland, from Lakefield to Mackay.
- Riparian corridors along the Copperfield River, the Einasleigh River, Lee (McKinnons) Creek, Gray Creek, the Burdekin River and Douglas Creek.

4.2 Field Surveys

4.2.1 Survey Timing and Climatic Conditions

Five separate terrestrial ecology field surveys have been undertaken within the Project site (Table 6).

Table 6 Field Surveys within the Project Site

Survey Dates	Field Team	Lot/Plans Surveyed	Min. Temp (°C)*	Max. Temp (°C)*
13 – 19 November 2017	Flora and Fauna	• 3/CD12 • 1/CD25 • 4/CD35 • 5/CLK23 • 1/CLK23 • 6/WU50 • 3/WU48 • 3198/PH2177	20.0 – 23.0	34.4 – 37.6
28 May – 4 June 2018	Flora	• 14/LH8 • 3/CD12 • 4/CD35 • 547/SP242570 • 3/CLK34 • 501/SP232789 • 5/CLK23 • 1/CLK23 • 3/WU48 • 3198/PH2177	4.4 – 15.2	27.1 – 30.0
11 – 19 June 2018	Fauna	• 1/CD25 • 4/CD35 • 547/SP242570 • 3/CLK34 • 501/SP232789 • 1/CLK23 • 6/WU50 • 3/WU48 • 3198/PH2177	10.1 – 16.0	25.3 – 31.3
12 – 16 July 2018	Flora and Fauna	• 182/PH995 • 14/LH8 • 5234/SP275834 (roadside only) • 1/OC64 (roadside only) • 3198/PH2177 • 59/SP237064	7.6 – 11.3	28.5 – 30.0
7 August 2018	Flora and Fauna	• 66/SP287774 • 44/USL33 • 2/SP289310	19.9	30.5

* Bureau of Meteorology, (2018)

4.2.2 Flora

4.2.2.1 Species Diversity

The field surveys identified 281 flora species from 57 families. The dominant plant families recorded were Poaceae (45 species), followed by Fabaceae (32 species), Myrtaceae (32 species) and Mimosaceae (24 species). The full species list is provided in Appendix C.

4.2.2.2 Regional Ecosystems

Thirty one (31) REs were confirmed during the field surveys. The field-verified REs are shown in Appendix A, Figure 6 and the full list is provided in Table 7.

The field-verified REs identified consisted of Least Concern and Of Concern REs. Four Of Concern REs were confirmed to occur within the Project site, including REs 7.8.18, 9.12.10, 9.12.16 and 9.12.26. No Endangered REs were identified during the field surveys.

Within the Project site (60 m wide easement), REs are mapped over 1,704 hectares (ha) (Option A); 1,756 ha (Option B), of which approximately 95% is Least Concern REs, and 5% is Of Concern RE. Non-remnant vegetation covers the remainder of the Project site (approximately 588 ha) and is limited to the access tracks and the current powerline easement.

The Project site was dominated by remnant *Eucalyptus* woodland and open forests with undulating hills and large ephemeral creeks. Dominant canopy species include *Eucalyptus crebra* (narrow-leaved ironbark), *Eucalyptus persistens*, *Eucalyptus brownii* (Brown's box), *Eucalyptus camaldulensis* (river red gum), *Eucalyptus microneura* (Georgetown box), *Corymbia dallachiana* (Dallachy's gum), *Corymbia confertiflora* (rough leaf cabbage gum), and *Corymbia erythrophloia* (variable-barked bloodwood).

The Project site is relatively uniform in vegetation characteristics; however several distinct communities are present. These include the riparian community associated with the major creeks, *Acacia shirleyi* woodland on laterite jump ups, a rocky outcrop on basalt, hills on igneous rocks and non-remnant vegetation in cattle yards, access tracks and the existing powerline easement.

Table 7 Field-verified Regional Ecosystems within the Project site

RE ID	Short Description[1]	VM Act Status
7.8.18	*Corymbia intermedia* and/or *Lophostemon suaveolens* ± *Allocasuarina torulosa* open forest to woodland on basalt.	Of Concern
7.12.29	*Corymbia intermedia* and/or *Lophostemon suaveolens* open forest to woodland ± areas of *Allocasuarina littoralis* and *Allocasuarina torulosa* on uplands on granite and rhyolite.	Least Concern
9.3.1	*Eucalyptus camaldulensis* and/or *Eucalyptus tereticornis* +/- *Melaleuca* spp. +/- *Casuarina cunninghamiana* fringing woodland on channels and levees.	Least Concern
9.3.3	*Corymbia* spp. and *Eucalyptus* spp. dominated mixed woodland on alluvial flats, levees and plains.	Least Concern
9.3.3a	Floodplain (other than floodplain wetlands). Woodland to low open woodland of *Eucalyptus leptophleba* +/- *Eucalyptus platyphylla* (poplar gum) +/- *Corymbia confertiflora* +/- *Eucalyptus crebra* or *Eucalyptus cullenii* +/- *Corymbia clarksoniana.*	Least Concern
9.3.5	*Eucalyptus brownii* +/- *Eucalyptus* spp. +/- *Corymbia* spp. open woodland on alluvial plains.	Least Concern
9.3.6a	Woodland to open woodland of *Eucalyptus platyphylla* +/- *Corymbia clarksoniana* +/- *Corymbia tessellaris* +/- *Eucalyptus tereticornis*.	Least Concern
9.3.13	*Melaleuca* spp., *Eucalyptus camaldulensis* and *Casuarina cunninghamiana* fringing open forest on streams and channels.	Least Concern

RE ID	Short Description[1]	VM Act Status
9.3.16	*Eucalyptus tereticornis* and/or *Eucalyptus platyphylla* and/or *Corymbia clarksoniana* woodland on alluvial flats, levees and plains.	Least Concern
9.3.20	*Eucalyptus microneura* +/- *Corymbia* spp. +/- *Eucalyptus leptophleba* woodland on alluvial plains.	Least Concern
9.3.22a	Open woodland to woodland of *Eucalyptus crebra*, *Corymbia clarksoniana* and/or *Corymbia dallachiana* +/- *Eucalyptus platyphylla* +/- *Eucalyptus brownii* +/- *Eucalyptus* spp. on levees, terraces and banks of larger rivers and on flat to very gentle slopes associated with drainage lines.	Least Concern
9.3.25	*Dichanthium* spp., and/or *Astrebla* spp. +/- *Iseilema* spp. grassland on alluvial deposits derived from basalt soils.	Least Concern
9.5.3	*Eucalyptus crebra* or *Eucalyptus drepanophylla* and *Corymbia clarksoniana* woodland on sand plains.	Least Concern
9.5.11	*Eucalyptus persistens* +/- *Eucalyptus crebra* woodland on flats on Tertiary remnant plains.	Least Concern
9.7.1	*Eucalyptus persistens* woodland on lateritised and deeply weathered surfaces on undulating terrain.	Least Concern
9.7.2	*Acacia shirleyi* low open forest on mesas and lateritised surfaces.	Least Concern
9.8.1	Open woodland to woodland of *Eucalyptus crebra* +/- *Corymbia erythrophloia* +/- *Corymbia dallachiana* +/- *Corymbia* spp. +/- *Eucalyptus* spp. on basalt plains and rocky basalt plains and hills with varying depths of soil.	Least Concern
9.8.4	*Eucalyptus crebra* and/or *Eucalyptus tereticornis* open woodland on basalt plains.	Least Concern
9.8.13	*Iseilema* spp. and/or *Dichanthium* spp. tussock grassland on basalt plains.	Least Concern
9.11.1a	Low woodland to low open woodland of *Eucalyptus melanophloia* +/- *Eucalyptus persistens* +/- *Eucalyptus crebra* +/- *Corymbia dallachiana* +/- *Corymbia peltata* +/- *Eucalyptus brownii* +/- *Acacia julifera* on skeletal soils of slopes and crests of undulating rises and low hills of folded metasediments and other metamorphic rocks.	Least Concern
9.11.2a	Woodland to open woodland of *Eucalyptus crebra* +/- *Corymbia dallachiana* +/- *Corymbia erythrophloia* +/- *Corymbia clarksoniana* +/- *Eucalyptus* spp. +/- *Corymbia* spp. on metamorphic hills and rises.	Least Concern
9.11.5	*Eucalyptus persistens* +/- *Eucalyptus crebra* woodland on low metamorphic hills.	Least Concern
9.11.15a	Woodland to low open woodland of *Eucalyptus crebra* or *Eucalyptus cullenii* +/- *Corymbia erythrophloia* or *Corymbia pocillum* +/- *Corymbia dallachiana* +/- *Erythrophleum chlorostachys* +/- *Eucalyptus microneura* on low hills and rises with moderately deep soils derived from metamorphic geologies.	Least Concern
9.11.16	*Eucalyptus crebra* +/- *Corymbia erythrophloia* or *Corymbia pocillum* woodland on steep to rolling hills.	Least Concern

RE ID	Short Description[1]	VM Act Status
9.11.23b	Low open woodland to woodland of *Eucalyptus microneura* +/- *Eucalyptus cullenii* or *Eucalyptus crebra* on metamorphic hills.	Least Concern
9.12.1a	Woodland to low open woodland of *Eucalyptus crebra* +/- *Corymbia dallachiana* +/- *Corymbia erythrophloia* +/- *Corymbia clarksoniana* +/- *Corymbia spp. Eucalyptus exilipes* or *Eucalyptus granitica* can sometimes occur as a dominant.	Least Concern
9.12.10	*Corymbia confertiflora* and *Eucalyptus crebra* +/- *Corymbia clarksoniana* open woodland on rolling igneous hills.	Of Concern
9.12.12	*Eucalyptus crebra* and *Corymbia erythrophloia* ± *Eucalyptus microneura* open woodland on igneous rocks.	Least Concern
9.12.16	*Eucalyptus crebra* and *Corymbia dallachiana* +/- *Corymbia erythrophloia* open woodland on pre-Cainozoic basalt loams and flats to undulating plains.	Of Concern
9.12.26	*Eucalyptus moluccana* ± *Eucalyptus crebra and/or Eucalyptus granitica* woodland on igneous rocks.	Of Concern
9.12.32	*Eucalyptus persistens* woodland on rhyolites and granites.	Least Concern

1 Description of REs as contained in the REDD Version 10.0 (Queensland Herbarium, 2016)

4.2.2.3 Threatened Ecological Communities

No TECs were encountered during the field surveys. None of the REs confirmed during the field surveys, or identified in the Queensland Herbarium RE mapping, correspond to the Endangered TEC identified in the desktop assessment: broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland.

4.2.2.4 Conservation Significant Flora

One conservation significant flora species was identified during the field surveys:

- *Leptospermum pallidum*, listed as Near Threatened under the NC Act.

4.2.2.5 Protected Plants

A protected plants survey was undertaken in the most eastern extent of the Project site due to a high risk area shown on the protected plants flora survey trigger map. The protected plants survey was completed in accordance with the *Flora Survey Guidelines – Protected Plants*. The threatened species triggering the high risk area was not able to be confirmed by the Queensland Herbarium due to insufficient data. Therefore, a targeted search for *Acacia tingoorensis* (Tingoora wattle) was undertaken as an area of essential habitat is mapped by DES nearby. No conservation significant flora species were identified within the high risk trigger area.

4.2.2.6 Introduced Flora

The field surveys recorded 38 introduced flora species, accounting for 13% of the species observed (Appendix C). Four of these species are listed as Category 3 restricted invasive plants/biosecurity matter under the *Biosecurity Act 2014*, including:

- *Parthenium hysterophorus* (parthenium); also listed as a WoNS.
- *Lantana camara* (lantana); also listed as a WoNS.
- *Cryptostegia grandiflora* (rubber vine); also listed as a WoNS.
- *Argyreia nervosa* (Elephant creeper).

The solitary *Cryptostegia grandiflora* specimen that was detected within the Project site was affected by rubber vine rust (*Maravalia cryptostegiae*).

Although not recorded during the field surveys, the Department of State Development, Manufacturing, Infrastructure and Planning have advised that *Chromolaena odorata* (siam weed) has recently been identified in the region. Siam weed is a WoNS and a Category 3 restricted invasive plant under the *Biosecurity Act 2014*.

4.2.2.7 Likelihood of Occurrence

The likelihood of occurrence assessment identified four flora species with a moderate or high likelihood of occurring within the Project site based on the habitat encountered during the field surveys (Table 8). The likelihood of occurrence assessments for all conservation significant flora species is presented in Appendix D.

Table 8 Flora Likelihood of Occurrence Assessment Results

Value	Likelihood of Occurrence	
	Moderate	**High**
Conservation Significant Flora	• *Marsdenia brevifolia* • *Tephrosia leveillei* • *Acacia tingoorensis* (Tingoora wattle)	• *Leptospermum pallidum*

4.2.3 Fauna

4.2.3.1 Species Diversity

The field surveys recorded 163 fauna species, comprising 115 bird, 35 mammal, 9 reptile, 2 amphibian and 2 fish species (see Appendix E for the species list).

4.2.3.2 Conservation Significant Fauna

Four conservation significant fauna species were recorded during the field surveys:

- Squatter pigeon (southern) (*Geophaps scripta scripta*), listed as Vulnerable under the EPBC Act and the NC Act.
- Sharman's rock-wallaby (*Petrogale sharmani*), listed as Vulnerable under the EPBC Act and the NC Act.
- Greater glider (*Petauroides volans*), listed as Vulnerable under the EPBC Act and the NC Act.
- Short-beaked echidna (*Tachyglossus aculeatus*), listed as Special Least Concern under the NC Act.

The locations in which the above species were recorded are shown in Appendix A, Figure 7.

No migratory fauna were identified during the field surveys.

4.2.3.3 Introduced Fauna

The field surveys recorded seven introduced fauna species, five of which are restricted under the *Biosecurity Act 2014*:

- European rabbit (*Oryctolagus cuniculus*) – Listed as a category 3, 4, 5, 6 restricted matter under the *Biosecurity Act 2014.*
- Feral cat (*Felis catus*) - Listed as a category 3, 4, 6 restricted matter under the *Biosecurity Act 2014.*
- Feral pig (*Sus scrofa*) – Listed as a category 3, 4, 6 restricted matter under the *Biosecurity Act 2014.*
- Chital deer (*Axis axis*) – Listed as a category 3, 4, 6 restricted matter under the *Biosecurity Act 2014.*

- Wild dog/dingo (*Canis lupus*) – Listed as a category 3, 4, 6 restricted matter under the *Biosecurity Act 2014.*
- Cane toad (*Rhinella marina*).
- Helmeted guineafowl (*Numida meleagris*).

Other introduced fauna likely to occur within the Project site includes:

- European fox (*Vulpes vulpes*).
- Black rat (*Rattus rattus*).
- House mouse (*Mus musculus*).

4.2.3.4 Habitat Values

Eight dominant habitat types were recorded across the Project site (Table 9; Appendix A, Figure 7). A description of each habitat type is presented in Appendix F.

Table 9 Fauna Habitat Types

Habitat Type	Habitat Summary	Analogous REs	Area (ha) within Project Site Option A	Area (ha) within Project Site Option B
1	Open *Eucalyptus* Woodland on Alluvium or Sand Plains	9.3.3a, 9.3.5, 9.3.6a, 9.3.16, 9.3.20, 9.3.22a, 9.5.3, 9.5.11	311.3	311.3
2	Open *Eucalyptus*, *Casuarina* and *Melaleuca* Riparian Woodland	9.3.1, 9.3.13	57.0	58.1
3	Native Grassland	9.3.25, 9.8.13	4.7	4.7
4	Low Open Forest of *Acacia shirleyi* and *Eucalyptus persistens* on Laterite	9.7.1, 9.7.2	302.1	302.3
5	Open Woodland of *Eucalyptus* and *Corymbia* on Basalt	7.8.18, 9.8.1, 9.8.4	82.5	82.6
6	Woodland of *Eucalyptus* and *Corymbia* on Metamorphic Hills	9.11.1a, 9.11.2a, 9.11.5, 9.11.15a, 9.11.16, 9.11.23b	802.6	768.0
7	*Eucalyptus and Corymbia* Woodland on Igneous Hills and/or Granite	7.12.29, 9.12.1a, 9.12.10, 9.12.12, 9.12.16, 9.12.26, 9.12.32	139.1	227.7
8	Non-remnant Vegetation, Including Artificial Wetlands (Dams)	Non-remnant	552.4	552.2

4.2.3.5 Likelihood of Occurrence

The likelihood of occurrence assessment identified 10 conservation significant fauna species and 3 migratory species with a moderate or high likelihood of occurring within the Project site based on the habitat encountered during the field surveys (Table 10). Four conservation significants fauna species are known to occur as they were identified during the field surveys. The likelihood of occurrence assessments for all conservation significant fauna and migratory species is presented in Appendix D.

Table 10 Fauna Likelihood of Occurrence Assessment Results

Value	Likelihood of Occurrence		
	Moderate	**High**	**Known**
Conservation Significant Fauna	• Red goshawk (*Erythrotriorchis radiatus*) • Australian painted snipe (*Rostratula australis*) • Curlew sandpiper (*Calidris ferruginea*) • Common death adder (*Acanthophis antarcticus*) • Chestnut dunnart (*Sminthopsis archeri*) • Grey falcon (*Falco hypoleucos*)	• Koala (*Phascolarctos cinereus*) • Northern quoll (*Dasyurus hallucatus*) • Black-throated finch (southern) (*Poephila cincta cincta*) • Ghost bat (*Macroderma gigas*)	• Squatter pigeon (southern) (*Geophaps scripta scripta*) • Short-beaked echidna (*Tachyglossus aculeatus*) • Greater glider (*Petauroides volans*) • Sharman's rock-wallaby (*Petrogale sharmani*)
Migratory Fauna	• Oriental cuckoo (*Cuculus optatus*) • Common sandpiper (*Actitis hypoleucos*) • Common greenshank (*Tringa nebularia*)	-	-

4.3 Habitat Modelling

The likelihood of occurrence assessments identified nine conservation significant species (one flora and eight fauna) as either known to occur or considered to have a high likelihood of occurrence within the Project site. Potential habitat for these species (excluding short-beaked echidna (*Tachyglossus aculeatus*)) has been modelled within the Project site, using the modelling rules detailed in Appendix G.

The short-beaked echidna (*Tachyglossus aculeatus*) was excluded from habitat modelling despite its recorded presence due to its broad habitat requirements and lesser conservation status of Special Least Concern under the NC Act. This species is wide ranging, with remnant and non-remnant vegetation types constituting General Habitat for the species.

The results of the habitat modelling are outlined in Table 11 and the mapping is presented in Appendix G.

Table 11 Habitat Modelling Areas within the Project site

Species	Primary Habitat Known (ha)	Primary Habitat Possible (ha)	General Habitat (ha)
Option A			
Leptospermum pallidum	0.3	0.0	301.8
Greater glider (*Petauroides volans*)	2.5	60.0	258.0
Sharman's rock-wallaby (*Petrogale sharmani*)	21.7	106.1	53.8
Squatter pigeon (southern) (*Geophaps scripta scripta*)	46.5	606.5	739.4
Northern quoll (*Dasyurus hallucatus*)	0.0	59.2	194.4
Koala (*Phascolarctos cinereus*)	0.0	82.7	1,340.9
Black-throated finch (southern) (*Poephila cincta cincta*)	0.0	115.1	914.5
Ghost bat (*Macroderma gigas*)	0.0	27.8	152.4
Option B			
Leptospermum pallidum	0.3	0.0	301.8
Greater glider (*Petauroides volans*)	2.5	60.0	259.3
Sharman's rock-wallaby (*Petrogale sharmani*)	21.7	106.1	53.8
Squatter pigeon (southern) (*Geophaps scripta scripta*)	46.5	602.5	782.7
Northern quoll (*Dasyurus hallucatus*)	0.0	59.2	194.4
Koala (*Phascolarctos cinereus*)	0.0	83.8	1,392.0
Black-throated finch (southern) (*Poephila cincta cincta*)	0.0	115.2	980.6
Ghost bat (*Macroderma gigas*)	0.0	27.9	165.2

5.0 Potential Impacts and Mitigation Measures

The proposed transmission line will be located within a 60 m wide easement. This is Powerlink's standard easement width for a 275 kV transmission line and is based on the operational characteristics of the line under a wide range of wind conditions and Powerlink's current maintenance methodology.

Potential impacts to flora and fauna values may occur in the following phases of the Project:

1. Construction Phase.
2. Operation and Maintenance Phase.

Further information on the potential impacts associated with the Project is outlined below, as well as mitigation measures to minimise the potential impacts on flora and fauna values. Potential impacts to conservation significant species are detailed in Section 5.3.

5.1 Construction Phase

The most significant impacts on ecological values will occur during the Project's construction phase, when vegetation and habitat removal will occur.

5.1.1 Vegetation Clearance

The Project site contains large tracts of remnant vegetation, with 75% containing Least Concern and Of Concern REs.

Vegetation clearing for the Project will be limited to that only where there is a statutory requirement under the *Electricity Act 1994* and *Electrical Safety Regulation 2013* to maintain safe clearances between conductors and the vegetation, and to enable safe working conditions for construction and maintenance crews.

Based on a clearing width of 60 m, a maximum of between 1,704 ha (Option A) and 1,756 ha (Option B) of remnant vegetation may be cleared by the Project. However, following the incorporation of mitigation measures into the detailed design process, such as scalloping or spanning over sensitive environments, the final amount of vegetation clearing will be reduced.

One of the key benefits of co-locating the proposed transmission line with the existing Ergon lines will be the reduced amount of clearing required when compared to a standalone transmission line. The centreline of the proposed line will be located 40 m from the centreline of the Ergon lines to provide sufficient room for ground and aerial based maintenance activities and ensure all lines can be operated safely and reliably.

While the extent of the powerline development will mean that impacts on remnant vegetation communities are unavoidable, there are a range of measures that will be implemented to minimise the level of impact from clearing vegetation. These include:

- Vegetation clearing will be avoided or minimised in sensitive environments, specifically riparian areas around creek lines and modelled primary habitat for conservation significant flora and fauna species.
- The Project Environmental Management Plans will include vegetation management to provide clear guidance on areas to be cleared and retained, methods for clearing and other relevant environmental protection measures.
- Workers will be made aware of vegetation management requirements in induction training, Environmental Work Plans (EWPs) and through work instructions. Any clearing of mapped Category R vegetation will be undertaken under the relevant accepted development vegetation clearing code.

5.1.2 Loss of Fauna Habitat

The clearance of native vegetation can adversely affect native fauna species. Potential impacts resulting from clearing native vegetation can include:

- Loss of habitat causing a reduction of biological diversity or loss of local populations and genotypes.
- Fragmentation of populations, which can reduce gene flow between small isolated populations, reduce the potential for species to adapt to environmental change and loss or severe modification of the interactions between species.
- Disturbance which can permit the establishment and spread of exotic species that may displace native species.
- Loss of leaf litter, removing habitat for a wide variety of vertebrates and invertebrates.
- Loss of food resources such as foliage, flowers, nectar, fruit and seeds.

The riparian habitats on watercourses that are present in the Project site facilitate wildlife movement and provide food and water resources for a range of fauna species. There is the potential that these locations are used by conservation significant species and hence are considered environmentally sensitive areas. Additionally, large trees containing hollows are present throughout the Project site, and provide habitat opportunities for fauna. Due to the long time period required for trees to form hollows (100+ years); hollow-bearing trees are considered to be an important habitat feature in the landscape.

While the extent of vegetation clearing for the proposed powerline will mean that impacts on fauna habitat are unavoidable, there are a range of measures that may be taken to minimise the level of impact. These include:

- Powerlink's preferred approach in environmentally sensitive areas is to adopt a program of vegetation management that includes selective hand clearing, lopping/trimming and chemical treatment (where required) in preference to total clearing of the easement. Clearing of large habitat trees, particularly those around creek lines and those with hollows present should be avoided by implementing design measures such as spanning transmission lines overhead where possible.
- Suitably qualified fauna spotter catchers must be engaged to undertake pre-clearance habitat searches and be present during vegetation clearing activities to minimise fauna harm.
- EWPs and a Construction Environmental Management Plan will be prepared to provide clear guidance on areas to be cleared and retained, methods for clearing, role of the spotter-catcher and other relevant environmental protection matters.
- Identify and map clear no-go zones to avoid unauthorised disturbance of areas of sensitive vegetation and habitat; such as identified nests and trees that are to be retained.
- Habitat features such as felled trees and logs will be considered for relocation to other areas where practical to provide microhabitat for fauna.

5.1.3 Fauna Mortality or Injury

Clearing of vegetation can result in injury or mortality of fauna, particularly ground dwelling fauna (e.g. reptiles), that may be crushed by machinery or struck by vehicles. Arboreal mammals may be trapped in trees as they are felled. Mitigation measures to reduce the likelihood of injury or mortality to fauna include:

- Pre-clearance surveys to identify shelters and breeding places potentially utilised by Least Concern species, colonial breeders and conservation significant fauna will be undertaken.
- Fauna spotter-catchers will be used to capture and relocate fauna prior to clearing.
- No unauthorised off-track driving.

- Any injured, sick and dead vertebrate fauna will be recorded before (by fauna spotter-catchers), during and after construction and operation.

5.1.4 Changes to the Aquatic Environment

Direct construction impacts on the general aquatic environment will be negligible as Powerlink transmission structures will be located away from the banks of riparian areas and will not be located within any of the watercourses. Potential impacts may arise as a result of trimming/lopping of branches of larger trees that may lie within the Project site over the creeks, and any erosion and sedimentation that may occur as a result of access to the Project site and transmission structures in the immediate vicinity of the watercourses.

Additionally, spills of chemicals or significant erosion and sedimentation events during construction have the potential to affect the water quality of the surrounding watercourses. Such impacts upon water quality can also impact on aquatic ecosystem health, including aquatic plant damage and aquatic fauna health implications.

A range of measures will be incorporated into the construction phase of the Project to minimise the level of impact on the aquatic environments, including:

- Appropriate erosion and sediment control measures will be installed and maintained.
- Watercourses, waterways, lakes and low lying gullies, will be kept clear of felled trees, vegetation cuttings and debris.
- The integrity of the beds or banks will be maintained and disturbance in these areas minimised.
- The felling of large trees that may cause damage to protective bank vegetation may be stem injected and left standing providing there are no additional safety risks.
- The use of chemicals near any watercourse is to be strictly supervised by the contractor and no overall spraying is to occur. A separate operational risk assessment will be documented prior to this practise occurring.
- Interference to or disturbance of the beds and banks of watercourses by heavy equipment will be kept to an absolute minimum.
- Where located near watercourses, heaps will be made on the downstream side of the centre line of the transmission line. Heaps will have gaps between them of sufficient width to permit the safe passage of stock and vehicles. Such gaps will be spaced at no more than 50 m intervals.
- The heaped material will be located at least 50 m clear of all drains, watercourses or their flood banks so as to prevent any obstruction to water flow and 10 m clear of standing timber, scrub or undergrowth, or as directed.

5.1.5 Increased Spread of Weeds

Indirect impacts to vegetation through the construction phase of the Project include the potential introduction or exacerbation of weeds and erosion along the powerline alignment. The risk of these potential impacts can be appropriately mitigated and managed, with potential mitigation measures including the adoption of a Biosecurity Management Plan. The Plan will include:

- Staff and contractors must be equipped with information on the location of biosecurity threats, which enables them to move within ‘clean areas’ without the need to wash-down.
- When moving from a ‘dirty area’ to a clean area, a vehicle hygiene inspection will be required to determine whether a wash-down is necessary. Vehicle hygiene practices (including records) will be undertaken applying risk management principles in consultation with landholders.
- Known WoNS, Restricted Invasive or Regionally Declared weeds will be identified in the Project area.
- The origin of high risk construction materials, machinery and equipment will be identified to mitigate introduction of weed species.

- Management methods to control spread of weeds considered to be Restricted Matters must be in keeping with regional management practice or Queensland Department of Agriculture and Fisheries pest control prescriptions.
- Promote the awareness of weed management, by inclusion of weed issues, pictures and procedures into the Project's site induction program.
- Appropriate weed monitoring to identify any new incidence of weeds.

The Australian Weeds Strategy 2017 - 2027 outlines the principles that underpin weed management in Australia, including the control of WoNS. The vision, goals and priorities of the Strategy should be incorporated into the Project's Biosecurity Management Plan.

Additionally, Local Government Pest Management Plans identify current and potential pest species and includes well-planned strategies for their control, containment and eradication. The local government plans that should be considered during the Project include:

1. Hinchinbrook Local Government Area Biosecurity Plan:

   Key projects to manage priority pest species currently undertaken by Hinchinbrook Shire Council include an annual treatment and community awareness program for *Parthenium hysterophorus* (parthenium) in the Mount Fox area, protection of key assets from *Themeda quadrivalvis* (grader grass) in the Mount Fox region, and delimitation of all infestations of *Chromolaena odorata* (siam weed) to identify assets for protection and educate the community on identification and best management practice.

2. Etheridge Shire Local Government Pest Management Plan 2011–2015:

   Pest species managed under this plan include *Vachellia farnesiana* (sweet Acacia) (known as *Acacia farnesiana* in the plan), *Cryptostegia grandiflora* (rubber vine), *Parthenium hysterophorus* (parthenium) and *Lantana camara* (lantana). *Parthenium hysterophorus* (parthenium) is listed as a high priority for a treatment program with the strategic objective to control the species in the Etheridge Shire.

3. Charters Towers Regional Council Pest Management Plan 2013–2017:

   Pest species managed in this plan include *Parthenium hysterophorus* (parthenium), *Lantana camara* (lantana), *Cryptostegia grandiflora* (rubber vine), *Themeda quadrivalvis* (grader grass) (particularly in the Greenvale area), and *Chromolaena odorata* (siam weed).

The Project site is within three biosecurity zones:

- Cattle Tick Biosecurity Zone.
- Northern Banana Biosecurity Zone.
- Sugar Cane Biosecurity Zone 1.

Generally, a biosecurity certificate is required to move risk items (including machinery and soil) into and around Queensland. The Queensland Biosecurity Manual sets out how to treat, inspect, source and/or pack materials that present a biosecurity risk in order to receive a biosecurity certificate.

5.1.6 Increased Dust

Deposition of dust, sand and soil resulting from construction may have potential impacts on vegetation if excessive levels are sustained over extended periods. When dust settles on plant foliage it can reduce the amount of light penetration on the leaf surface, block and damage stomata, and slow rates of gas exchange and water loss (Farmer, 1993). Reduction in the ability to photosynthesise due to physical effects may result in reduced growth rates of vegetation and decreases in floral vigour and overall community health.

The dominant flora species of the vegetation communities in the Project site generally exhibit physiological qualities that are not sensitive to dust deposition. The sclerophyllous foliage of *Eucalyptus* and *Corymbia* species is generally pendulous (i.e. points down), with a thick smooth cuticle that does not encourage particulate matter to remain on the surface. The dominant woodland species

are also generally hardy and well adapted to adverse conditions (e.g. extended dry conditions and low nutrient soils).

To minimise the deposition of dust on adjacent vegetation, dust generation from Project activities will be minimised by engineering controls and dust suppression measures will be used, such as water trucks and sprinklers. Vehicle speeds will also be restricted on cleared tracks to minimise the generation of dust.

5.1.7 Edge Effects

Edge effects are zones of changed environmental conditions (e.g. altered light levels, wind speed, temperature) occurring along the edges of habitat fragments. Examples of edge effects include weed invasion and altered community assemblage. Clearing in remnant, high ecological value areas can promote the growth of different vegetation types (Moenting and Morris, 2006) and allow invasion by introduced species specialising in edge habitats. In the proposed co-located areas, vegetation has been cleared for the Ergon powerlines, and therefore significant increases in edge effects are not anticipated.

To minimise edge effects within the Project site, the following measures will be implemented:

- Clear demarcation of remnant vegetation at the boundary of the clearing footprint that must not be disturbed, to avoid inadvertent clearing and disturbance.
- Measures associated with weed management.

5.1.8 Activity and Noise

During the construction phase, there will be an increase in noise and activity in the Project site as machinery undertakes clearing and access, foundations, tower erection and line stringing activities. It is important to note that these potential impacts will not affect the entire Project site simultaneously nor will they persist in any one area for a considerable period of time (months). However, when activity and noise is occurring in areas adjoining retained habitat, potential impacts may include:

- Reduced foraging ability by auditory predators due to increased background noise.
- Increased risk of predation by visual predators due to increased background noise.
- Increased potential for collisions with vehicles.
- Human visitation causing disturbance to foraging or breeding behaviours.

Current research indicates that there are no government policies or other widely-accepted guidelines in respect to the noise levels which may be acceptable to wildlife. The levels or character of noise that may “startle” or otherwise affect the feeding or breeding pattern of birds or other wild animals are also not firmly established in the technical literature.

Sudden loud, impulsive or impact noises are capable of causing birds and other fauna to become startled, which if occurring over the longer term, may affect feeding and breeding behaviour in some species. It is expected that excavation, construction and earthmoving associated with the Project will potentially cause disturbance to all groups of fauna, especially birds. This will most likely result in avoidance of the area for the duration of these activities.

5.2 Operation and Maintenance Phases

As a distribution entity, Powerlink is obligated to manage electricity infrastructure to ensure the safe and reliable provision of electricity. To satisfy safety requirements, periodic vegetation management works will be undertaken within the Project site.

Impacts associated with the maintenance and access during the operational phase of the Project is similar to those identified for the construction phase. Impacts will be temporary, and mitigation measures outlined above will apply.

5.3 Conservation Significant Species

Potential impacts of the Project on conservation significant species are outlined below. Species-specific mitigation measures, in addition to those discussed in Sections 5.1 and 5.2, are recommended to reduce and/or avoid impacts to the species.

5.3.1 Known to Occur

5.3.1.1 Leptospermum pallidum

This species was discovered approximately 22 m north of the Project site (-18.971496, 144.723464) on Lot 547/SP242570. The location of the record is shown on Appendix A, Figure 7. The population was identified on the slopes of a lateritic jump-up (RE 9.7.2) and comprised >50 individuals. The species identification was confirmed by the Queensland Herbarium. As the nearest individual was 52 m from the centre of the alignment, the entire population is situated outside of the Project site.

Plate 1 ***Leptospermum pallidum***

Habitat modelling results are presented in Table 12 and is shown in Appendix G, Figure 8.

Table 12 Habitat Modelling Results for *Leptospermum pallidum*

Potential Habitat Category	Area (ha) Option A and B
Primary Habitat (known)	0.3
Primary Habitat (possible)	0.0
General Habitat	301.8

The confirmed population of *Leptospermum pallidum* is found within the Primary Habitat (known) area. The clearance of vegetation associated with lateritic geology zones (land zone 7) may result in the inadvertent loss of individuals or small populations of this species. While the current extent of *Leptospermum pallidum* within the Primary Habitat (known) area is found outside the Project site, suitable habitat for this species does occur within the Project site. Any vegetation clearing in this area must be undertaken carefully so as not to inadvertently disturb any individuals of this species.

Mitigation measures include:

- Prior to construction, individuals of this species will be identified and flagged to ensure all construction personnel are aware of its location. A picture of the species and its location will be included in all construction documents.
- Maintain a maximum distance as possible from all individuals.
- Maintain standard weed management practices.

5.3.1.2 Greater glider (*Petauroides volans*)

Greater gliders were recorded adjacent to the Project site within RE 9.3.6a on Lot 5/CLK23, at both a small unnamed creek that crosses the Project site, and at the Burdekin River where it meets Gray Creek (Appendix A, Figure 7). The greater glider is an arboreal, nocturnal marsupial, largely restricted to eucalypt forests and woodlands. During the day, this species spends most of its time denning in hollowed trees, with each animal inhabiting up to twenty different dens within its home range (Smith, Mathieson and Hogan, 2007). It is primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers.

Plate 2 Greater glider (*Petauroides volans*)

Hollows develop extraordinarily slowly in Australian eucalypts, with figures most often quoted as minimum lag times of 150–360 years from germination to the beginning of hollow development (Gibbons and Lindenmayer, 2002). A fall in the number of hollows below a minimum critical threshold for greater gliders could cause a decline in any local population and compromise population viability in the longer term if there is not a new cohort of hollow trees available to replace trees lost (Lindenmayer, Cunningham and Donnelly, 1997).

Potential impacts include the loss and/or fragmentation of habitat, particularly from the loss of hollow-bearing trees. The Project may also locally restrict movement of the species, particularly where the alignment is co-located along existing infrastructure and the combined easement width exceeds the volplane distance of the species (>100 m). Habitat modelling results are presented in Table 13 and is shown in Appendix G, Figure 9.

Table 13 Habitat Modelling Results for Greater Glider

Potential Habitat Category	Area (ha) Option A	Area (ha) Option B
Primary Habitat (known)	2.5	2.5
Primary Habitat (possible)	60.0	60.0
General Habitat	258.0	259.3

The greater glider is considered to be particularly sensitive to forest clearance and to intensive logging. Home ranges of this species are typically relatively small (1 - 4 ha), but are larger in lower productivity forests and more open woodlands (up to 16 ha). Notwithstanding the relatively small home ranges, but in part because of low dispersal ability, this species may be sensitive to fragmentation, have relatively low persistence in small forest fragments, and disperse poorly across vegetation that is not native forest.

As this species is highly dependent on forest connectivity and large mature trees, it is recommended that the Project avoids clearing hollow-bearing trees in areas of mapped primary greater glider habitat, where possible.

5.3.1.3 Sharman's rock-wallaby (*Petrogale sharmani*)

The Sharman's rock-wallaby was recorded in and adjacent to the Project site on Lot 3198/PH2177 within RE 9.12.1a (Appendix A, Figure 7). This species has a highly restricted distribution and is confined to an area of around 200,000 ha of the Seaview and Coane Ranges. The total population size is small, estimated at fewer than 800 mature individuals (Curtis et al., 2012). There are around 20 known subpopulations, of which 80% are found on Mount Zero-Taravale (managed by the Australian Wildlife Conservancy).

The Sharman's rock-wallaby occurs in a variety of rocky habitats (including rocky outcrops, boulder piles, gorges, cliff lines and rocky slopes) within open forests or grassy woodlands. It shelters during the day in rocky refuges or dense vegetation, emerging at dusk to feed (Eldridge, 2012). This species feeds in the surrounding woodland, although preliminary findings indicate that individuals only move an average distance of 209 m from their shelter site each night to forage, with a maximum distance of 758 m (C. Hayes, personal communication, 2018). They are opportunistic feeders and their diets include grasses, forbs, leaves, fruit, seeds and flowers, with fig species (*Ficus*) being a preferred food species (C. Hayes, personal communication, 2018). Fig trees were identified within the Sharman's rock-wallaby habitat in the Project site. Breeding has been observed in this species year-round (C. Hayes, personal communication, 2018).

Two distinct habitat features have been identified within the Sharman's rock-wallaby habitat: boulders and vegetation. The rocky boulders provide shelter sites, while the vegetation provides protection from predators while foraging, protection from the sun, and food. As this species tend to only move an average of 209 m away from their shelter site to forage, and individuals typically return to the same shelter site each night, both habitat features are considered important for the Sharman's rock-wallaby, both within the landscape and at a local scale.

Plate 3 Sharman's rock-wallaby (*Petrogale sharmani*)

Potential impacts to this species include the loss of suitable habitat, disturbances such as noise and stress related impacts such as mortality and/or abandonment of joeys.

Loss of Suitable Habitat

Habitat modelling results are presented in Table 14 and is shown in Appendix G, Figure 10.

Table 14 Habitat Modelling Results for Sharman's Rock-wallaby

Potential Habitat Category	Area (ha) Option A and B
Primary Habitat (known)	21.7
Primary Habitat (possible)	106.1
General Habitat	53.8

Any boulder removal or alteration will reduce the area of occupancy of this species and will consequently lead to population decline. Complete vegetation clearance on or within close proximity to the boulders under the alignment may render those boulders unsuitable for habitation (due to potential changes in microclimate, increased predation risk, and reduced foraging material within the immediate area). The loss of shelter sites indirectly from vegetation removal could result in population decline given the limited number of suitable boulder habitat available within the area. The removal of boulder shelter sites will be avoided.

Mitigation measures include:

- Identified habitat areas will be located on the EWP.
- The Project will retain the landscape structure (boulders) in known primary habitat areas to ensure no loss or reduction in the area of occupancy.
- Shrubs and preferred forage species such as fig trees will be retained throughout the known primary habitat areas.

- The Project will retain as much tall vegetation as possible within known primary habitat to help preserve shelter sites and reduce predation risk. Where possible, the Project will consider spanning transmission lines overhead of vegetation to avoid the impacts described above.

Disturbance, Mortality and/or Stress during Clearing and Construction

It is likely that the Sharman's rock-wallaby will temporarily vacate the Project site during any disturbance, such as the movement of vehicles and machinery, vegetation clearance, tower erection and line stringing activities. Stress has been known to result in the mortality of individuals, and females are known to 'throw' their pouch young when stressed (C. Hayes, personal communication, 2018).

Disturbances which occur over shorter time periods are likely to have reduced impacts, with individuals anticipated to return to the area upon completion of the works. Disturbances over a long time period increases the chance of losing breeding females (through stress) which may potentially alter the breeding structure and breeding success of the population.

Mitigation measures include:

- A spotter-catcher must thoroughly search the area for any individuals hiding in shrubs or grass during clearing works and other works likely to disrupt individuals.
- The clearing of canopy vegetation (where unavoidable) must be hand-cleared in primary habitat areas to reduce noise and machinery impacts.
- Works performed within the known primary habitat of this species should be conducted under a Species Management Plan for the Sharman's rock-wallaby.
- Minimise the workforce required to enter the identified habitat area to essential personnel only.
- Traffic and access will be restricted through known primary habitat areas.
- Project works must occur in one succession (rather than a gap in time between tasks). This is to avoid disturbance across multiple breeding cycles and also re-disturbing individuals that may re-establish in the area.

5.3.1.4 Squatter pigeon (southern) (*Geophaps scripta scripta*)

Two small groups (two to six individuals) of the squatter pigeon (southern) were identified adjacent to the Project site in RE 9.11.15a on Lot 4/CD35 and on Lava Plains Mount Fox Road (Appendix A, Figure 7). This species is ground dwelling and inhabits the grassy understorey of open eucalypt woodland, as well as sown grasslands with scattered remnant trees, disturbed areas (such as roads, railways, settlements and stockyards), scrubland, and *Acacia* regrowth. It is nearly always found near permanent water such as rivers, creeks and waterholes.

The squatter pigeon (southern) nests on the ground, and usually lays two eggs among or under vegetation. This species will breed throughout the year; however breeding is influenced by heavy rainfall and most commonly occurs during the dry season between May to June. It forages for seeds among sparse and low grass, in improved pastures, and beside railway lines and with domestic fowl around settlements.

The potential impacts on the squatter pigeon (southern) include habitat loss and/or fragmentation and direct mortality from vehicle strike or destruction of nests. Habitat modelling results are presented in Table 15 and is shown in Appendix G, Figure 11.

Table 15 Habitat Modelling Results for Squatter Pigeon (southern)

Potential Habitat Category	Area (ha) Option A	Area (ha) Option B
Primary Habitat (known)	46.5	46.5
Primary Habitat (possible)	606.5	602.5
General Habitat	739.4	782.7

Plate 4 Squatter pigeon (southern) (*Geophaps scripta scripta*)

Recommended mitigation measures for this species include:

- Identified habitat will be located on the EWP.
- Wherever practicable, signage should be erected to increase awareness of squatter pigeons (southern) in the area.
- Prior to site entry, all site personnel will be appropriately trained and made aware of the responses of this species to vehicle movement.
- Due to the tendency for this species to utilise disturbed areas (such as access tracks and pastoral grasslands) vehicle and machinery speed limits will be restricted to 40 km/hr within mapped squatter pigeons (southern) known primary habitat.
- Due to the location of nests (on ground) and the ground dwelling nature of the birds, all vehicles, plant, equipment and machinery will remain within the designated access tracks.
- Locate site offices, construction camps, stockpiling/laydown areas, plant and equipment storage areas away from identified habitat areas.

5.3.1.5 Short-beaked echidna (*Tachyglossus aculeatus*)

The short-beaked echidna was recorded in the Project site in REs 9.7.2, 9.11.2a/9.11.5, 9.11.23b and 9.12.32 (Appendix A, Figure 7). This species can live anywhere with a good supply of food, and regularly feast on ants and termites, and are most common in forested areas with abundant, termite-filled, fallen logs.

Plate 5 Short-beaked echidna (*Tachyglossus aculeatus*)

No systematic study of the ecology of the short-beaked echidna has been published, but studies of several aspects of their ecological behaviour have been conducted. This species live alone, and, apart from the burrow created for rearing young, no fixed shelter or nest site. The short-beaked echidna does not have a home territory, but range over a wide area. The range area has been observed to be between 21 and 93 ha (Augee, Gooden and Musser, 2006).

This species is not threatened with extinction, but human activities, such as hunting, vehicles, habitat destruction, and the introduction of foreign predatory species and parasites, have reduced its distribution in Australia. This species is listed as Special Least Concern under the NC Act due to its special cultural significance.

Habitat mapping has not been undertaken for the short-beaked echidna as this species has broad habitat requirements and is anticipated to occur across the entire Project site. Potential impacts include habitat loss and direct mortality from vehicle strike. Due to the ground dwelling nature of this species, recommended mitigation measures include:

- Identified habitat areas will be located on the EWPs.
- All vehicles, plant, equipment and machinery to remain within the designated access tracks in identified habitat areas.

5.3.2 High Likelihood of Occurrence

5.3.2.1 Northern quoll (*Dasyurus hallucatus*)

The northern quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Northern quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Rocky habitats are usually of high relief, often rugged and dissected but can also include tor fields or caves in low lying areas. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes.

Northern quolls are opportunistic omnivores, consuming a wide range of prey including beetles, grasshoppers, spiders, scorpions and centipedes. They also eat fruit, nectar, and are known to feed on carrion and human refuse. Vertebrates eaten include 11 species of mammal (e.g. bandicoots, sugar gliders, brush-tail possums and rats), eight species of birds, reptiles (skinks and snakes) and seven species of frog. They also eat bird eggs and nectar of eucalypt and grevillea flowers (Oakwood, 2008).

The Project site west of Lot 5234/SP275834 occurs outside the mapped distribution of the species. Within the mapped distribution, this species is expected to occur within the high relief areas of the Project site that are close to permanent water.

Potential impacts of the Project on this species include the loss and/or fragmentation of habitat, and a reduction in available prey species. Habitat modelling results are presented in Table 16 and is shown in Appendix G, Figure 12.

Table 16 Habitat Modelling Results for Northern Quoll

Potential Habitat Category	Area (ha) Option A and B
Primary Habitat (known)	0.0
Primary Habitat (possible)	59.2
General Habitat	194.4

The Project will retain all boulders and rocky screes within mapped areas of Primary Habitat (possible). Management for this species will be undertaken as per Section 5.1.

5.3.2.2 Koala (*Phascolarctos cinereus*)

Baseline fauna surveys, including spotlighting, canopy searches and general habitat assessments were undertaken to determine the presence of koala food trees and evidence of koala activity (including scats and scratch marks) within the Project site. No signs of koala activity were confirmed within the Project site; however scats collected were identified by Barbara Triggs as ‘probable’ koala. Koala food trees and suitable habitat occur across the majority of the site. Additionally, there was a confirmed recent occurrence of an individual koala within the Kidston Solar Farm - Stage 1 site (adjacent to the Project site), as well as two recent records along the Copperfield River.

Koalas eat a variety of eucalypt leaves and a few other related tree species, including *Lophostemon*, *Melaleuca* and *Corymbia* species. In northern Queensland, primary koala food trees include *Eucalyptus camaldulensis* (river red gum) and *Eucalyptus tereticornis* (forest red gum) (Mitchell, 2015), both of which were identified within the Project site. Other eucalypt species koalas preferentially feed on in this region that were identified within the Project site include *Eucalyptus brownii* (Brown's box) and *Eucalyptus moluccana* (grey box).

Towards the northern and western extents of their range, habitat preferences of koala include along or in close proximity to watercourse vegetation, with ambient temperature and leaf moisture influencing their distribution (Mitchell, 2015). Koalas are expected to occur primarily along the creeklines and rivers within the Project site, given the presence of preferred food trees and increased reliability to soil moisture in these areas. Koalas may infrequently disperse into other habitats as conditions allow.

Potential impacts of the Project on the koala are associated with habitat loss and fragmentation. Additionally, koalas may move between habitat patches and may be required to cross under the alignment. This will potentially make them vulnerable to dog attack and vehicle strike, particularly where the alignment is co-located along existing infrastructure. Habitat modelling results are presented in Table 17 and is shown in Appendix G, Figure 13.

Table 17 Habitat Modelling Results for Koala

Potential Habitat Category	Area (ha) Option A	Area (ha) Option B
Primary Habitat (known)	0.0	0.0
Primary Habitat (possible)	82.7	83.8
General Habitat	1,340.9	1,392.0

Recommended mitigation measures for this species include:

- If an individual is found prior to or during clearing activities, it must not be forcibly relocated. Any tree that has a koala present, as well as any tree with its crown overlapping that tree, must not be removed and remain in place until the koala vacates the tree of its own accord.
- Where possible, riparian vegetation and preferred food tree species along creeks and rivers will be retained within mapped koala primary habitat.

5.3.2.3 Black-throated finch (southern) (*Poephila cincta cincta*)

The black-throated finch (southern) occurs mainly in grassy, open woodlands and forests, typically dominated by *Eucalyptus*, *Corymbia* and *Melaleuca*, and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water. Some of the more common species of eucalypts in woodlands and forests frequented by the subspecies include narrow-leaved ironbark (*Eucalyptus crebra*), river red gum (*Eucalyptus camaldulensis*), silver-leaved ironbark (*Eucalyptus melanophloia*), Brown's box (*Eucalyptus brownii*), yellow jacket (*Eucalyptus similis*) and forest red gum (*Eucalyptus tereticornis*).

Black-throated finches (southern) require habitat where there is access to seeding grasses and water, and will utilise a variety of different habitats for foraging, particularly in north Queensland during the wet season. This subspecies feed on the seeds of grasses (such as *Urochloa mosambicensis*, *Digitaria ciliaris*, *Melinis repens*, *Chloris inflata*) and herbaceous plants.

The black-throated finch (southern) historically occurred from far south-eastern Queensland, near the Queensland-New South Wales border, through eastern Queensland north to the divide between the Burdekin and Lynd Rivers. The subspecies is now extinct at most sites south of Burdekin River, and is confined to a very few remaining 'pockets' of suitable habitat. Since 1998, birds likely to be of the southern subspecies have been recorded at Ingham and sites nearby (near Mutarnee, and near Mount Fox) (Black-throated Finch Recovery Team, 2004).

Potential impacts of the Project on this species include the potential loss and/or fragmentation of foraging grass seed and/or nesting habitat. However, whilst areas of canopy vegetation will be impacted, it is considered unlikely that the Project will alter the composition of grasses within the Project.

Habitat modelling results are presented in Table 18 and is shown in Appendix G, Figure 14.

Table 18 Habitat Modelling Results for Black-throated Finch (southern)

Potential Habitat Category	Area (ha) Option A	Area (ha) Option B
Primary Habitat (known)	0.0	0.0
Primary Habitat (possible)	115.1	115.2
General Habitat	914.5	980.6

Management for this species will be undertaken as per Section 5.1.

5.3.2.4 Ghost bat (*Macroderma gigas*)

Ghost bats are the largest microchiropteran bat in Australia and the second largest in the world. They currently occupy habitats ranging from the arid Pilbara to tropical savanna woodlands and rainforests. Ghost bats are carnivores, with a broad diet comprising small mammals including other bats, birds, reptiles, frogs and large insects.

From September to April, ghost bats aggregate in maternity roost sites to breed. Maternity roost sites used permanently are generally deep natural caves or disused mines with a relatively stable temperature of 23°−28°C and a moderate to high relative humidity of 50−100% (Pettigrew et al., 1986). Most of the colony disperses (up to 150 km) from maternity roosts during the non-breeding season in the cooler months. During this time, ghost bats use large numbers of caves, rock shelters, overhangs, vertical cracks, and mines as day roosts. Radio tracking by Tidemann et al. (1985) revealed ghost bats forages an average of 1.9 km from day roosts, over an area of 61 ha, generally returning to the same areas each night.

In Queensland the population size has been estimated at fewer than 1,000 individuals, and possibly as low as 470−680 individuals excluding the Calvert River/Pungalina population on the Northern Territory/Queensland border. Population estimates of this species surrounding the Project site include 50 within Blackbraes/Chudleigh and 150 at Girringun-Gugu Badhun West of Ingham/Cardwell.

This species may use the caves, large rock crevices and old mines that were identified within and adjacent to the Project site as day roosts, and may forage throughout the woodlands and open forest throughout the Project site.

Potential impacts of the Project on this species include the loss and/or minor fragmentation of foraging habitat. Habitat modelling results are presented in Table 19 and is shown in Appendix G, Figure 15.

Table 19 Habitat Modelling Results for Ghost Bat

Potential Habitat Category	Area (ha) Option A	Area (ha) Option B
Primary Habitat (known)	0.0	0.0
Primary Habitat (possible)	27.8	27.9
General Habitat	152.4	165.2

The caves and old mines identified within the Project site may be used as day roosts; however these will not be impacted by the Project. Management for this species will be undertaken as per Section 5.1.

5.3.3 Moderate Likelihood of Occurrence

The conservation significant species identified as having a moderate likelihood of occurrence within the Project site include:

- *Marsdenia brevifolia*.
- *Tephrosia leveillei*.
- *Acacia tingoorensis* (Tingoora wattle).
- Red goshawk (*Erythrotriorchis radiatus*).
- Australian painted snipe (*Rostratula australis*).
- Curlew sandpiper (*Calidris ferruginea*).
- Common death adder (*Acanthophis antarcticus*).
- Chestnut dunnart (*Sminthopsis archeri*).
- Grey falcon (*Falco hypoleucos*).
- Oriental cuckoo (Cuculus optatus) (migratory).
- Common sandpiper (Actitis hypoleucos) (migratory).
- Common greenshank (Tringa nebularia) (migratory).

No specific, additional management measures for the above are proposed. Management for these species will be undertaken as per Section 5.1.

6.0 Conclusion

This report documents the findings of terrestrial ecological surveys undertaken in November 2017, May-June 2018, July 2018 and August 2018.

Flora

Remnant vegetation is mapped across the majority of the Project site (75%), with non-remnant vegetation limited to access tracks and the current powerline easements. The desktop assessment identified a potential 56 REs within the Project site, of which 31 were verified during field surveys. Four Of Concern REs were recorded during the field program (RE 7.8.18, 9.12.10, 9.12.16 and 9.12.26).

The flora surveys recorded a total of 281 species, representing 57 families.

No conservation significant flora species were identified within the Project site; however *Leptospermum pallidum,* listed as Near Threatened under the NC Act, was identified adjacent to the Project site. Potential habitat for this species is mapped on Lots 5234/SP275834 and 1/OC64 (has only been surveyed where public roads cross the Project site) and therefore this species has a high likelihood of occurring within the Project site. An additional three conservation significant flora species are regarded as having a moderate or high likelihood of occurrence within the Project site, based on observed habitat and known species distributions.

Four introduced species are listed as Category 3 restricted invasive plants/biosecurity matter under the *Biosecurity Act 2014*, including:

- *Parthenium hysterophorus* (parthenium).
- *Lantana camara* (lantana).
- *Cryptostegia grandiflora* (rubber vine).
- *Argyreia nervosa* (Elephant creeper).

The first three species listed above are also listed as WoNS by the Australian government. The solitary *Cryptostegia grandiflora* specimen that was detected within the Project site was affected by rubber vine rust (*Maravalia cryptostegiae*).

Fauna

The fauna surveys identified a range of habitat values suitable to support both conservation significant and Least Concern species. Eight broad habitat types were recorded during the field surveys, all of which provide a range of habitat opportunities for all vertebrate groups. Fauna diversity recorded during the field surveys totalled 163 species, comprising 115 bird, 35 mammal, 9 reptile, 2 amphibian and 2 fish species.

Four conservation significant species were identified during the field surveys:

- Squatter pigeon (southern) (*Geophaps scripta scripta*), listed as Vulnerable under the EPBC Act and the NC Act.
- Sharman's rock-wallaby (*Petrogale sharmani*), listed as Vulnerable under the EPBC Act and the NC Act.
- Greater glider (*Petauroides volans*), listed as Vulnerable under the EPBC Act and the NC Act.
- Short-beaked echidna (*Tachyglossus aculeatus*), listed as Special Least Concern under the NC Act.

A further 10 conservation significant fauna species and 3 migratory species are regarded as having a moderate or high likelihood of occurrence within the Project site, based on observed habitat values and known species distributions.

Habitat Modelling

Habitat modelling was undertaken for one conservation significant flora species (high likelihood of occurrence) and seven conservation significant fauna species (three known to occur, four high likelihood of occurrence):

- *Leptospermum pallidum.*
- Greater glider (*Petauroides volans*).
- Sharman's rock-wallaby (*Petrogale sharmani*).
- Squatter pigeon (southern) (*Geophaps scripta scripta*).
- Northern quoll (*Dasyurus maculatus*).
- Koala (*Phascolarctos cinereus*).
- Black-throated finch (southern) (*Poephila cincta cincta*).
- Ghost bat (*Macroderma gigas*).

Primary Habitat (known or possible) was identified in the Project site for all species.

Potential Impacts

A number of potential impacts to flora and fauna may occur as a result of the Project. Potential impacts with the greatest risk to ecological values are associated with the direct clearing of vegetation during the construction phase of the Project. Mitigation and management measures are recommended to ensure the potential impact on ecological values are minimised or avoided.

7.0 References

Augee, M.L., Gooden, B.A. and Musser, A., 2006. *Echidna: extraordinary egg-laying mammal*. Collingwood: CSIRO Publishing.

Australian Wildlife Conservancy, 2018. *Species profile - Grey Falcon*. [online] Available at: <http://www.australianwildlife.org/wildlife/grey-falcon.aspx>.

Bean, A.R., 1992. The Genus Leptospermum Frost. ET Frost. F. (Myrtaceae) in northern Australia and Malesia. *Austrobaileya*, 3(4), pp.643–659.

Black-throated Finch Recovery Team, 2004. *Recovery Plan for the Black-throated Finch Southern Subspecies Poephila cincta cincta*. Hurstville and Brisbane.

Bureau of Meteorology, 2018. *Climate Statistics*. [online] Available at: <http://www.bom.gov.au/climate/averages/tables/ca_qld_names.shtml>.

Curtis, L., Dennis, A., McDonald, K., Kyne, P. and Debus, S. eds., 2012. *Queensland's Threatened Animals*. Collingwood: CSIRO Publishing.

Department of Environment and Heritage Protection, 2014. *Species profile - Acacia tingoorensis (Mimosaceae)*. [online] Available at: <https://environment.ehp.qld.gov.au/species-search/details/?id=21785>.

Department of Environment and Heritage Protection, 2016. *Flora Survey Guidelines - Protected Plants Nature Conservation Act 1992*. Brisbane.

Department of Environment and Heritage Protection, 2017. *Common death adder*. [online] Available at: <https://www.ehp.qld.gov.au/wildlife/animals-az/common_death_adder.html>.

Department of the Environment, 2015. *Referral guideline for 14 birds listed as migratory species under the EPBC Act*. [online] Available at: <http://www.environment.gov.au/system/files/resources/c05f5b87-0a99-4998-897e-7072c236cf83/files/migratory-birds-draft-referral-guideline.pdf>.

Department of the Environment, 2018. *Species Profile and Threats Database*. [online] Canberra. Available at: <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>.

Department of the Environment, Water, H. and the A., 2009. *Significant impact guidelines for the endangered black-throated finch (southern) (Poephila cincta cincta)*. [online] Available at: <www.ag.gov.au/cca.>.

Eldridge, M.D.B., 2012. Sharman's rock-wallaby Petrogale sharmani. In: L.K. Curtis, A.J. Dennis, K.R. McDonald, P.M. Kyne and S.J.S. Debus, eds., *Queensland's Threatened Animals*. Collingwood: CSIRO Publishing, pp.364–365.

Eyre, T.J., Ferguson, D.J., Hourigan, C. l., Smith, G.C., Mathieson, M.T., Kelly, A.L., Venz, M.F., Hogan, L.D. and Rowland, J., 2014. *Terrestrial Vertebrate Fauna Survey Guidelines*. Brisbane.

Farmer, A.M., 1993. The effects of dust on vegetation - a review. *Environmental Pollution*, [online] 79, pp.63–75. Available at: <https://pdfs.semanticscholar.org/a777/96f4b94f6af51c07efc705f6cf28f8486883.pdf>.

Gibbons, P. and Lindenmayer, D., 2002. *Tree hollows and wildlife conservation in Australia*. Collingwood: CSIRO Publishing.

Lindenmayer, D.B., Cunningham, R.B. and Donnelly, C.F., 1997. Decay and Collapse of Trees with Hollows in Eastern Australian Forests: Impacts on Arboreal Marsupials. *Ecological Applications*, [online] 7(2), pp.625–641. Available at: <http://www.jstor.org/stable/2269526?origin=crossref>.

Mitchell, D., 2015. *National Koala Tree Planting List*. [online] Available at: <https://www.savethekoala.com/sites/savethekoala.com/files/uploads/20150212_AKF_National_Koala_Tree_Planting_List.pdf>.

Moenting, A. and Morris, D., 2006. Disturbance and habitat use: is edge more important than area? *Oikos*, 115(1), pp.23–32.

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S. and Butler, D.W., 2017. *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland. Version 4.0.* Brisbane, QLD.

Oakwood, M., 2008. Northern quoll Dasyurus hallucatus. In: S. Van Dyck and R. Strahan, eds., *The Mammals of Australia (3rd ed)*. Sydney: Reed New Holland, pp.57–59.

Pettigrew, J., Baker, G.B., Baker-Gabb, D., Baverstock, G., Coles, R., Conoloe, L., Churchill, S., Fitzherbert, K., Guppy, A., Hall, L., Helman, P., Nelson, J., Priddel, D., Pulsford, I., Richards, G., Schulz, M. and Tidemann, C.R., 1986. The Australian Ghost Bat at Pine Creek, Northern Territory. *Macroderma*, 2, pp.8–19.

Powerlink, 2017. *Proposed Genex Kidston Connection Project - Corridor Selection Report*.

Queensland Herbarium, 2016. *Regional Ecosystem Description Database (REDD)*. Brisbane.

Sattler, P. and Williams, R., 1999. *The Conservation Status of Queensland's Bioregional Ecosystems*. Brisbane: Environmental Protection Agency, Queensland Government.

Smith, G.C., Mathieson, M. and Hogan, L., 2007. Home range and habitat use of a low-density population of greater gliders, Petauroides volans (Pseudocheiridae: Marsupialia), in a hollow-limiting environment. *Wildlife Research*, 34(6), pp.472–483.

Threatened Species Scientific Committee, 2012. *Approved Conservation Advice for Broad Leaf Tea-tree (Melaleuca viridiflora) Woodlands in High Rainfall Coastal North Queensland*. [online] Available at: <http://www.environment.gov.au/biodiversity/threatened/communities/pubs/122-conservation-advice.pdf>.

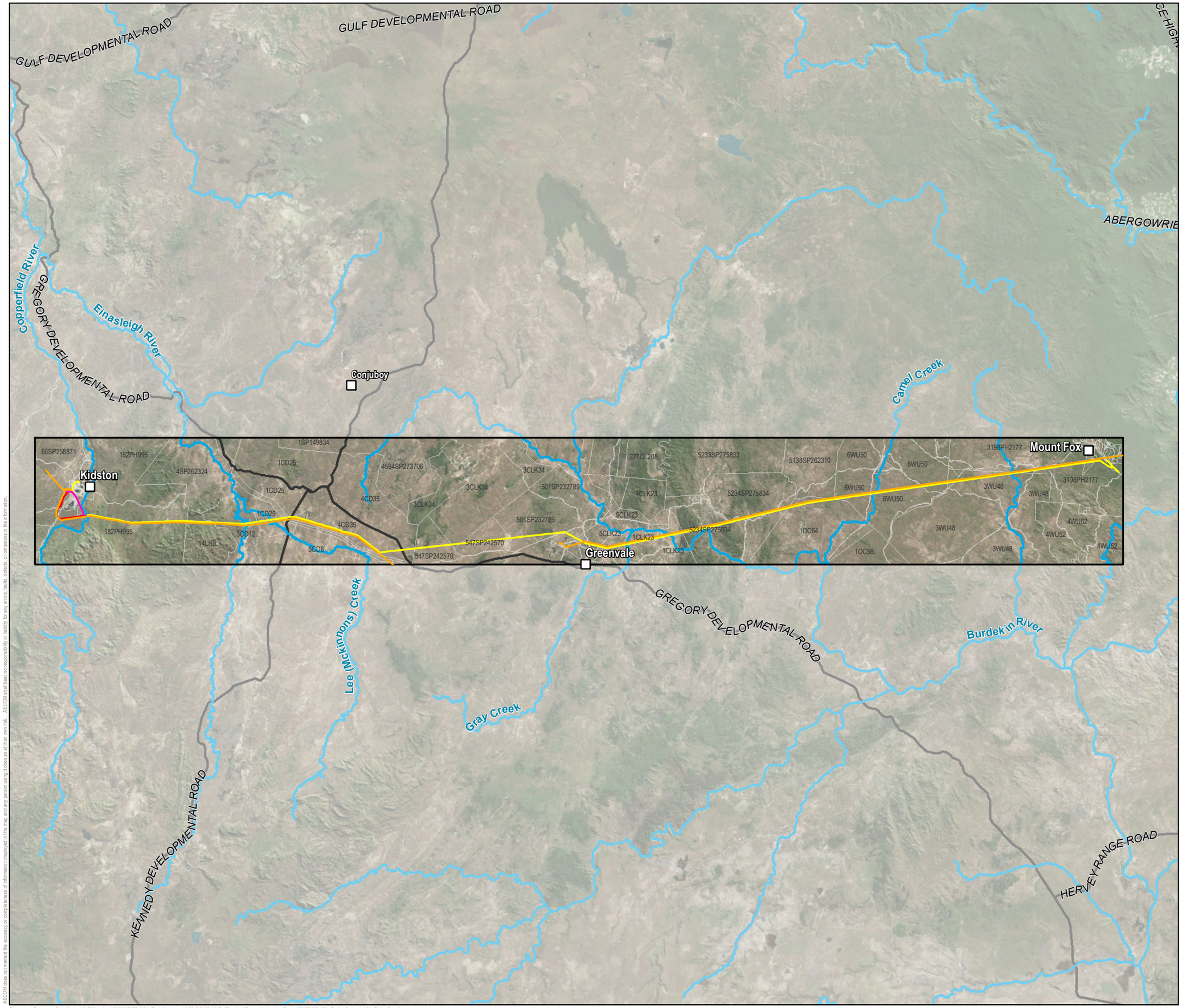
Tidemann, C.R., Priddel, D.M., Nelson, J.E. and Pettigrew, J.D., 1985. Foraging behaviour of the Australian Ghost Bat, Macroderma gigas (Microchiroptera: Megadermatidae). *Australian Journal of Zoology*, 33, pp.705–713.

WetlandInfo, 2018. *Tachyglossus aculeatus, Short-beaked Echidna*. [online] Available at: <https://wetlandinfo.ehp.qld.gov.au/wetlands/ecology/components/species/?tachyglossus-aculeatus>.

Wilson, D.E. and Reeder, D.M., 2005. *Mammal species of the world: a taxonomic and geographic reference*. Johns Hopkins University Press.

Appendix A

Figures



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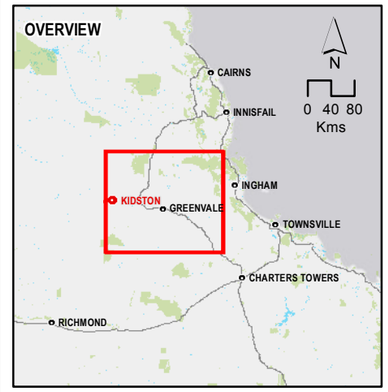

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Kidston Connection Project

Terrestrial Ecology Assessment:
Electricity Transmission Line

Project Context

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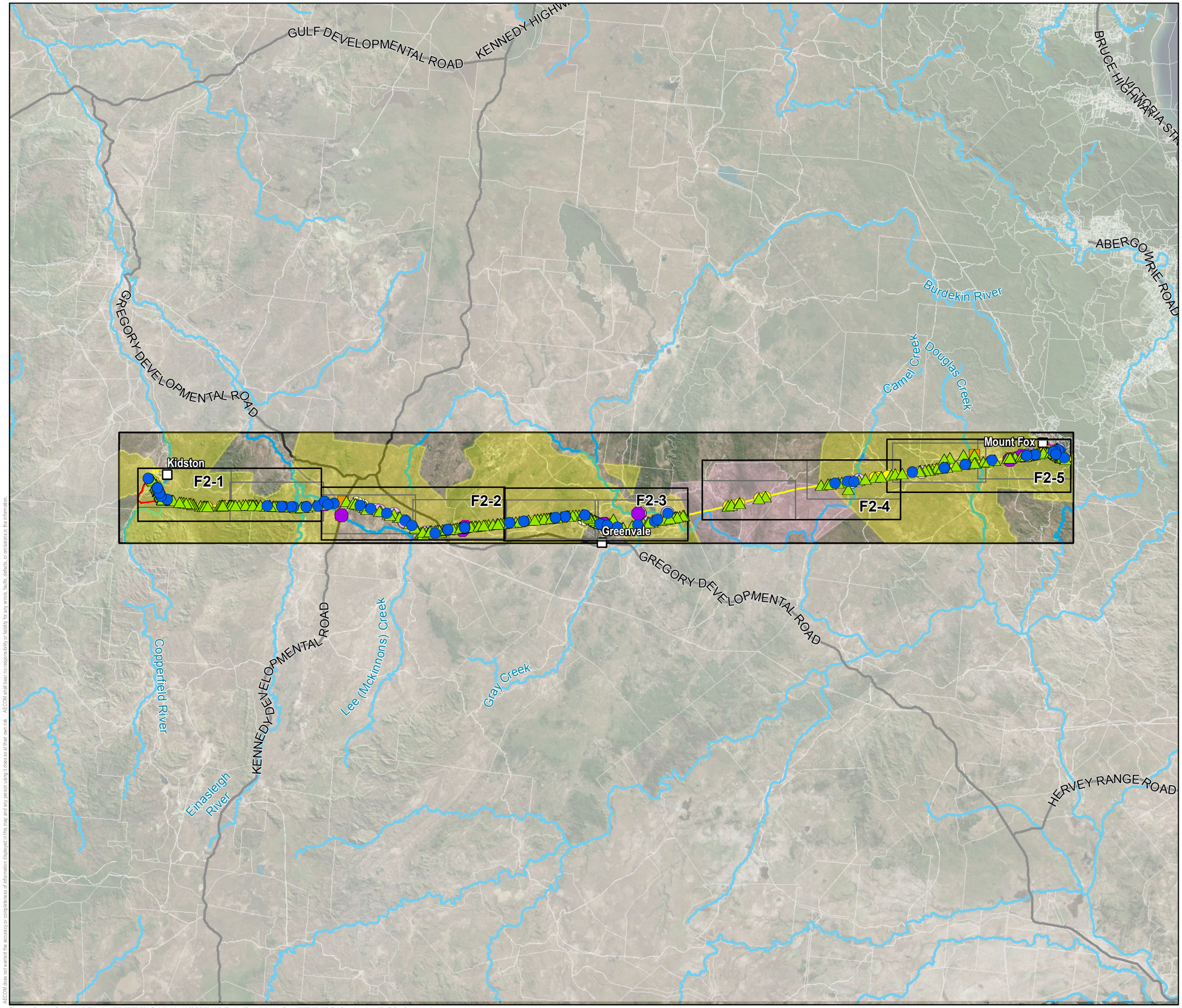

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- Flora Quaternary
- Spotlighting Locations
- Songmeter
- Fauna Observation
- Fauna Habitat Assessment
- Camera Trap
- Bird Survey
- Anabat
- Major Roads
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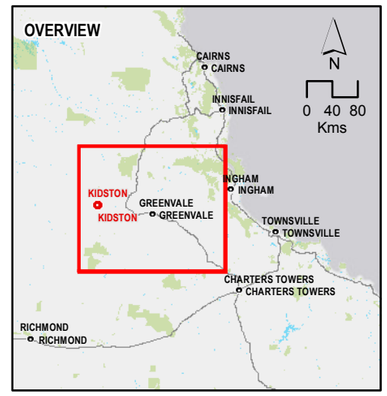

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Flora and Fauna Field Survey Locations

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Figure F2

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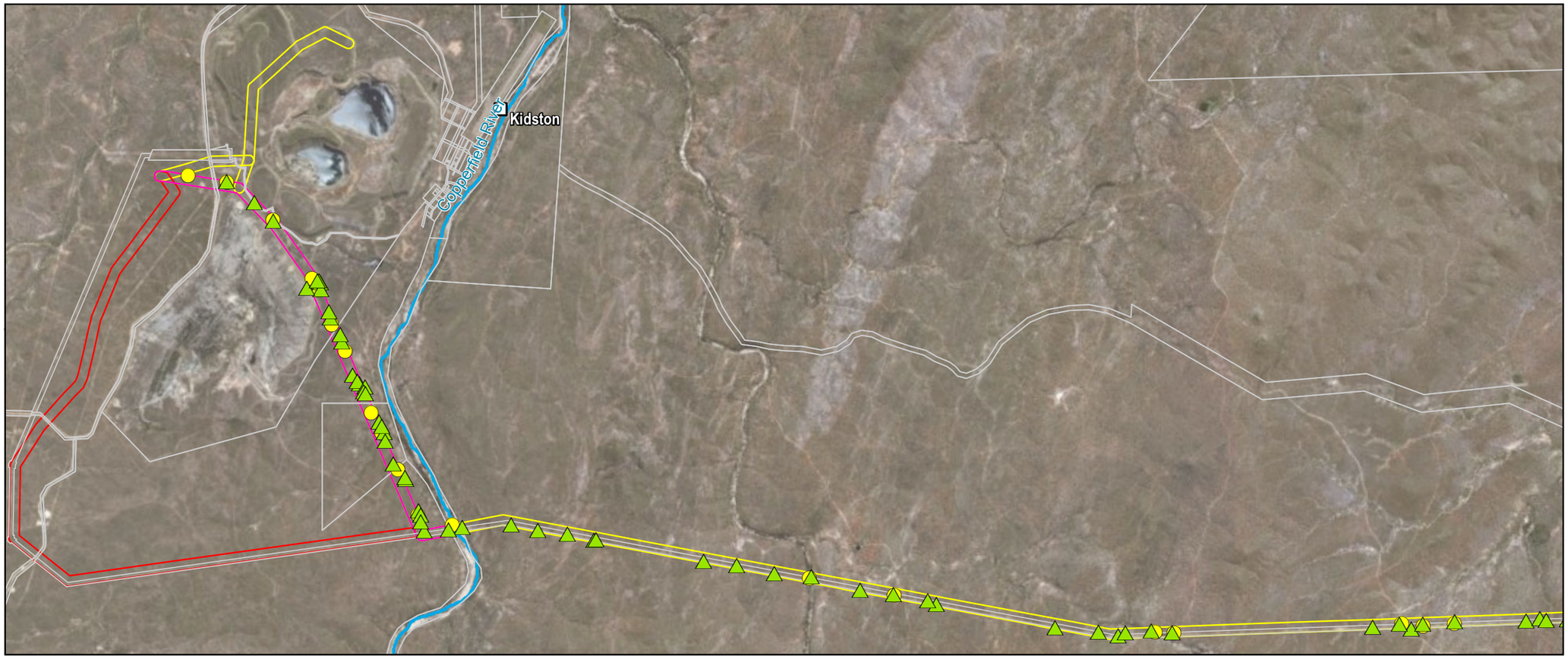

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- Spotlighting Locations
- Songmeter
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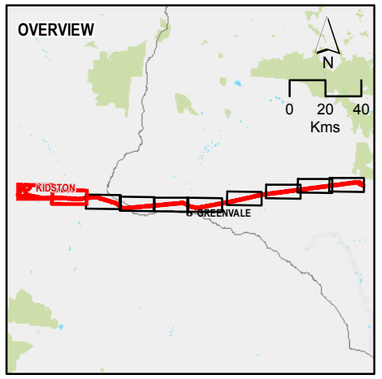

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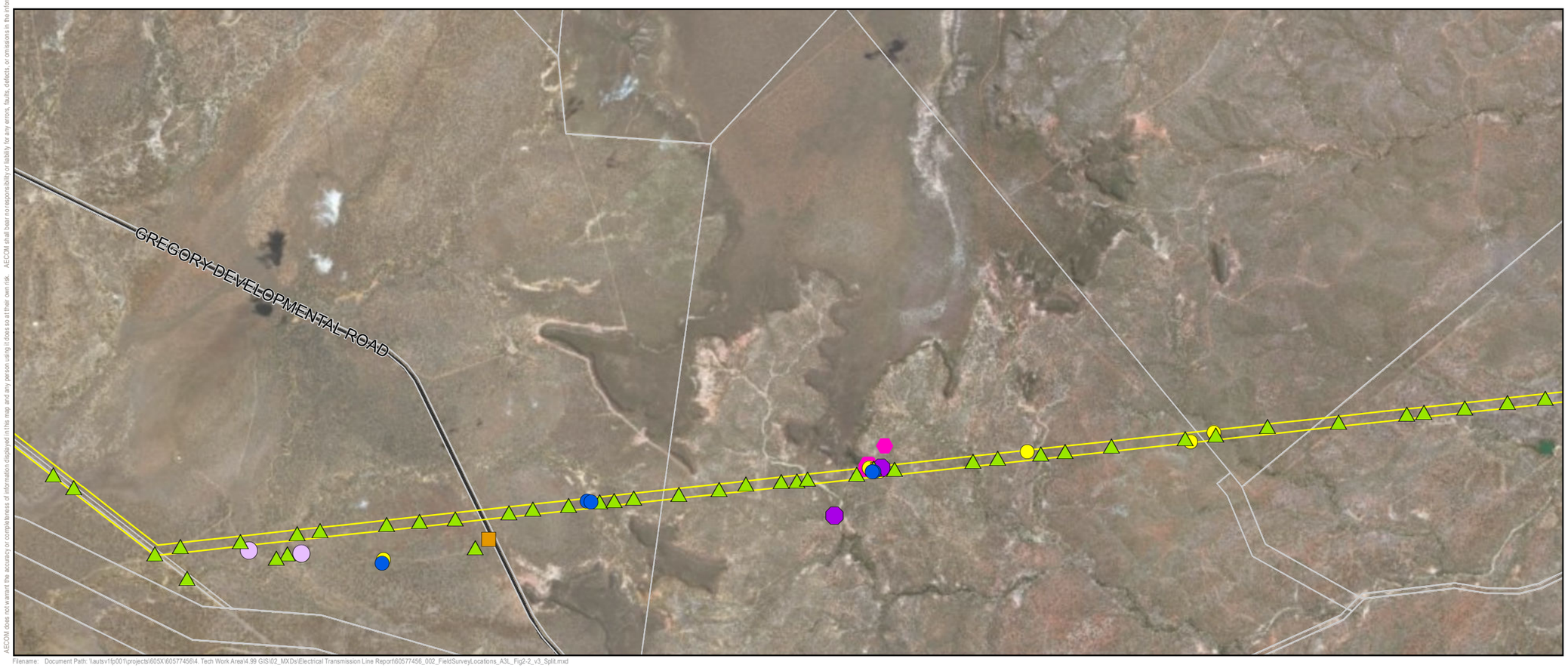

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- Flora Quaternary
- Spotlighting Locations
- Songmeter
- Fauna Observation
- Fauna Habitat Assessment
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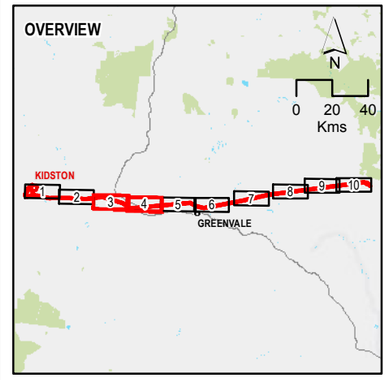

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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

0 650 1,300 1,950 2,600

Meters

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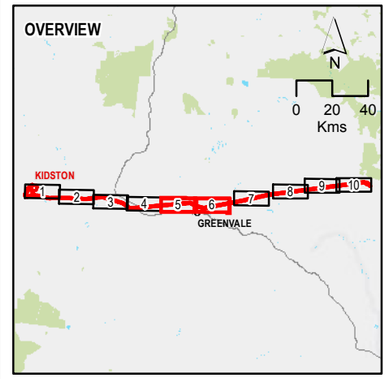
Legend

- Point Of Interest
- Flora Tertiary
- Flora Quaternary
- Spotlighting Locations
- Songmeter
- Fauna Observation
- Fauna Habitat Assessment
- Camera Trap
- Bird Survey
- Anabat
- Major Roads
- Major Watercourses
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B



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Kidston Connection Project

Terrestrial Ecology Assessment:
Electricity Transmission Line

Flora and Fauna Field Survey Locations

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 16/09/2018
VERSION:	2

Figure F2.3

A3 size

Filename: Document Path: \\autsv1fp001\projects\605X\60577456\4. Tech Work Area\4.99 GIS\02_MXDs\Electrical Transmission Line Report\60577456_002_FieldSurveyLocations_A3L_Fig2-3_v3_Split.mxd

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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

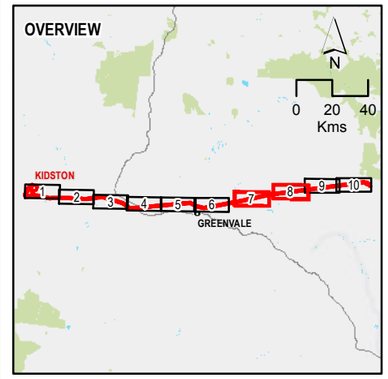
0 650 1,300 1,950 2,600

Meters

1:55,000 (when printed at A3)

Legend

- Point Of Interest
- Flora Tertiary
- Flora Quaternary
- Spotlighting Locations
- Songmeter
- Fauna Observation
- Fauna Habitat Assessment
- Camera Trap
- Bird Survey
- Anabat
- Major Roads
- Major Watercourses
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B



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Terrestrial Ecology Assessment:
Electricity Transmission Line

Flora and Fauna Field Survey Locations

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 16/09/2018
VERSION:	2

Figure F2.4

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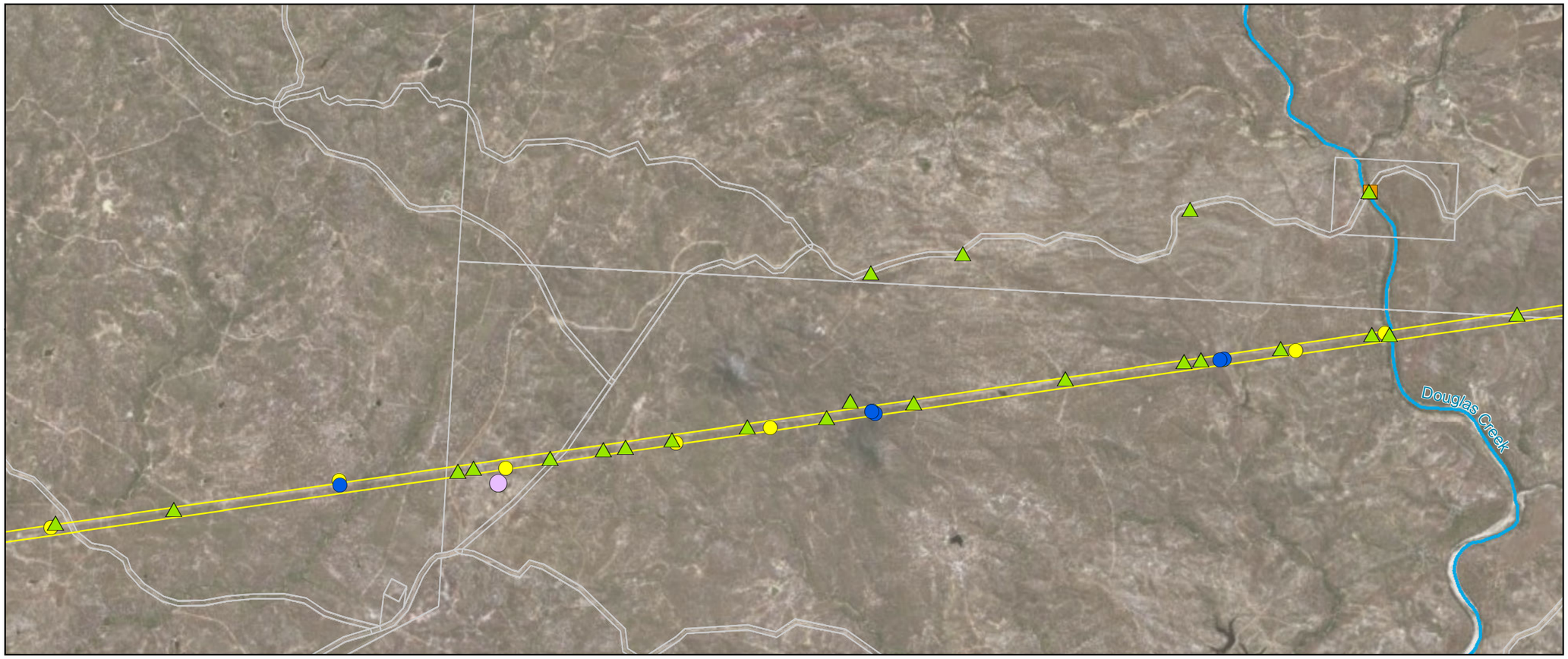

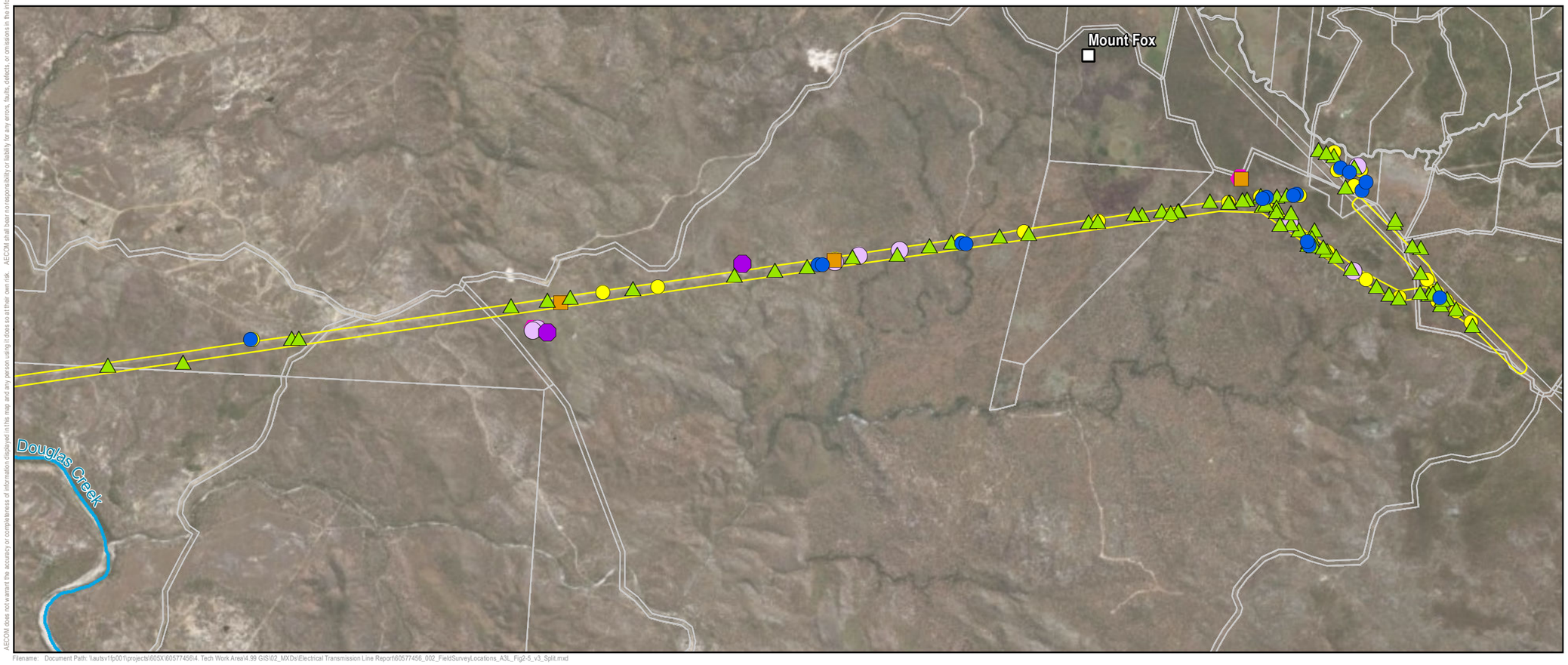

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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

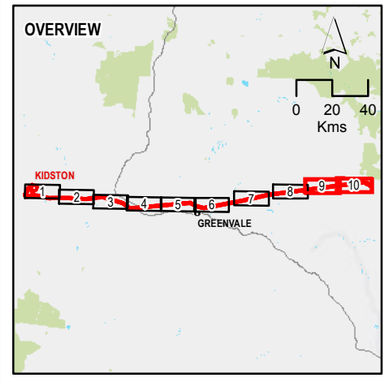
0 650 1,300 1,950 2,600

Meters

1:55,000 (when printed at A3)

Legend

- Flora Tertiary
- Flora Quaternary
- Spotlighting Locations
- Songmeter
- Fauna Observation
- Fauna Habitat Assessment
- Camera Trap
- Bird Survey
- Anabat
- Point Of Interest
- Major Roads
- Major Watercourses
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B



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Terrestrial Ecology Assessment:
Electricity Transmission Line

Flora and Fauna Field Survey Locations

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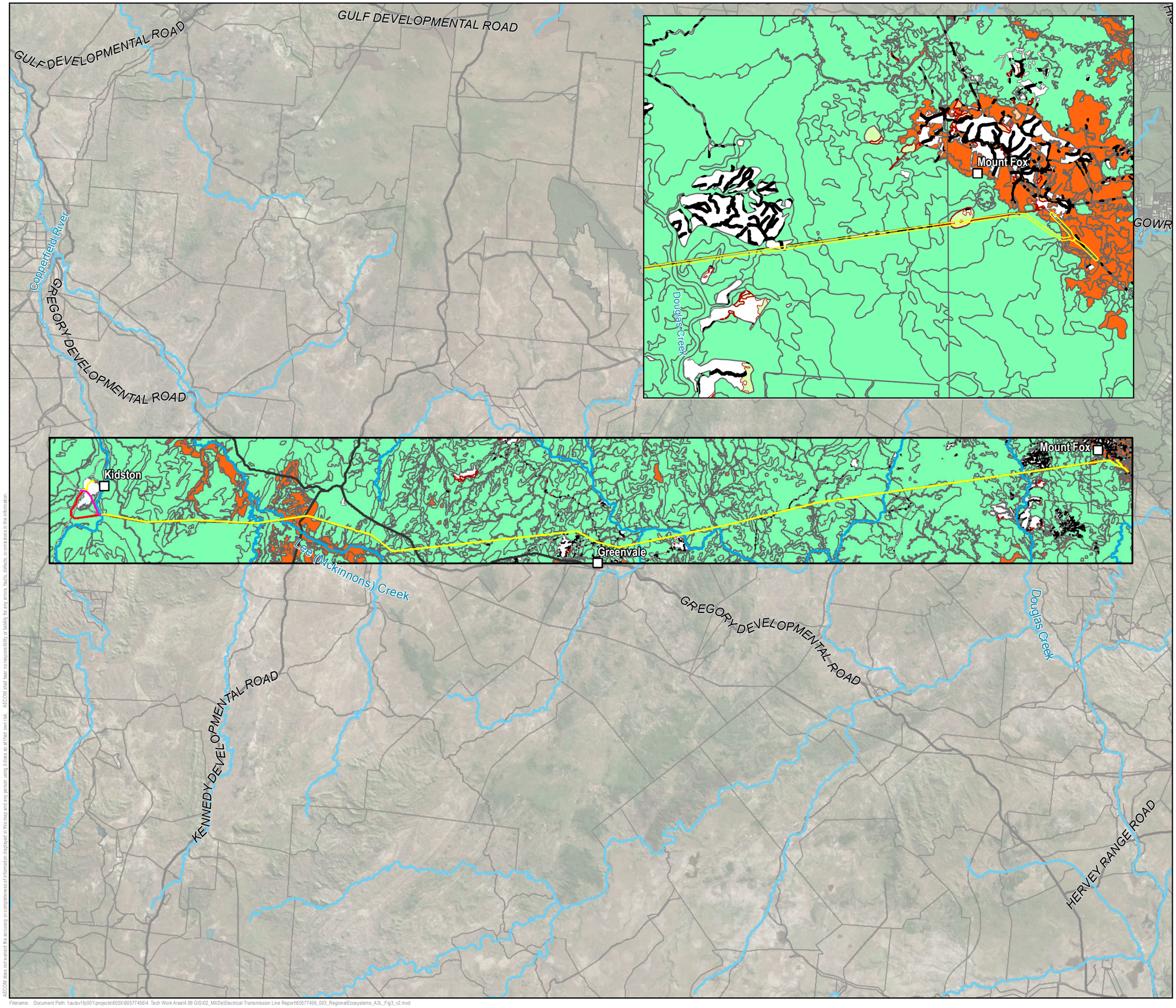
VERSION:	2

Figure F2.5

A3 size



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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

0 7.5 15 22.5 30
Kilometers

1:600,000 (when printed at A3)

Legend

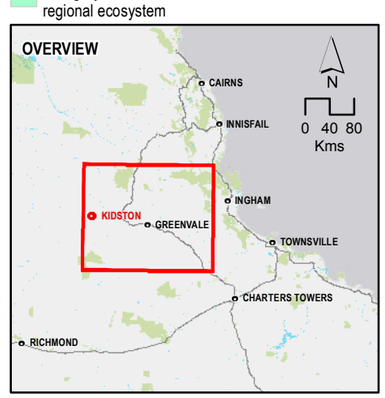
- Point Of Interest
- Major Roads
- Major Watercourses
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- High Value Regrowth

Regulated Vegetation Management

- Category R area

Regional Ecosystems

- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem



Data sources:
DCDB, Roads, Watercourses, Regional Ecosystems - DNRM 2017
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Terrestrial Ecology Assessment:
Electricity Transmission Line

Regional Ecosystems (Queensland Herbarium)

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CREATED BY:	JR
LAST MODIFIED:	CFS - 16/09/2018
VERSION:	2

Figure F3

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GULF DEVELOPMENTAL ROAD

GULF DEVELOPMENTAL ROAD

GREGORY DEVELOPMENTAL ROAD

Einasleigh River

Copperfield River

Burdekin River

ABERGOWR

Camel Creek

Douglas Creek

Kidston

Mount Fox

Lee (Mckinnons) Creek

Greenvale

GREGORY

Gray Creek

KENNEDY DEVELOPMENTAL ROAD

Inset: Mount Fox

Mount Fox

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Projection: Transverse Mercator

0 8 16 24 32

Kilometers

1:600,000 (when printed at A3)

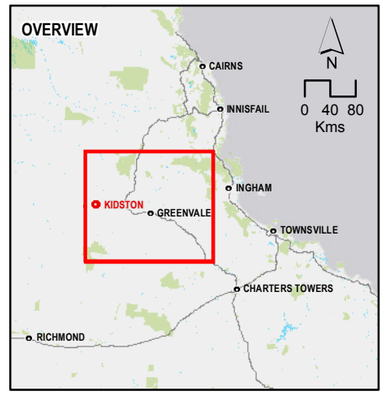
Legend

- Point Of Interest
- Major Roads
- Major Watercourses
- Regional Context Area
- Flora Survey Trigger Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B

Essential Habitat

- *Acacia tingoorensis (Tingoora wattle)*
- *Lepturus minutus*
- Sharman's rock-wallaby *(Petrogale sharmani)*
- Black-throated finch *(southern) (Poephila cincta cincta)*
- Short-beaked echidna *(Tachyglossus aculeatus)*

OVERVIEW



Data sources:
DCDB, Watercourses - DNRM 2017
Wildlife Habitat, Essential Habitat - DEHP 2017
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Terrestrial Ecology Assessment:
Electricity Transmission Line

Essential Habitat and Protected Plants

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CREATED BY:	JR
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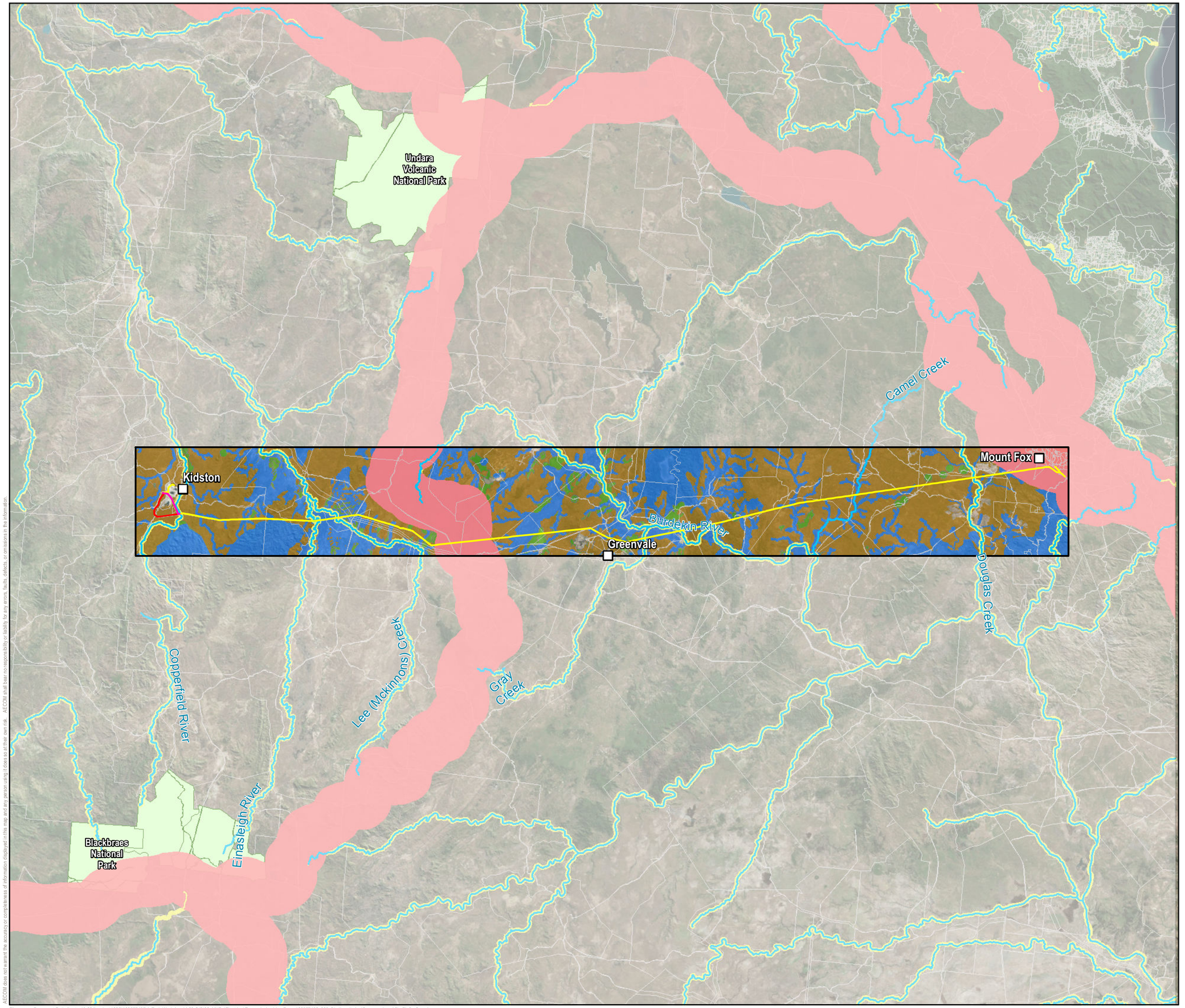
VERSION:	2

Figure F4

A3 size



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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

0 8 16 24 32
Kilometers

1:700,000 (when printed at A3)

Legend

- Point Of Interest
- Major Watercourses
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- National Park

Biodiversity Significance Einasleigh Uplands

- State Significance
- Regional Significance
- Local Significance

Statewide Ecological Corridors

- Terrestrial
- Riparian

Data sources:
DCDB, Watercourses - DNRM 2017
Biodiversity Planning Assessment, Statewide Ecological Corridors - DEHP 2017
Site Features and Layout - AECOM 2018
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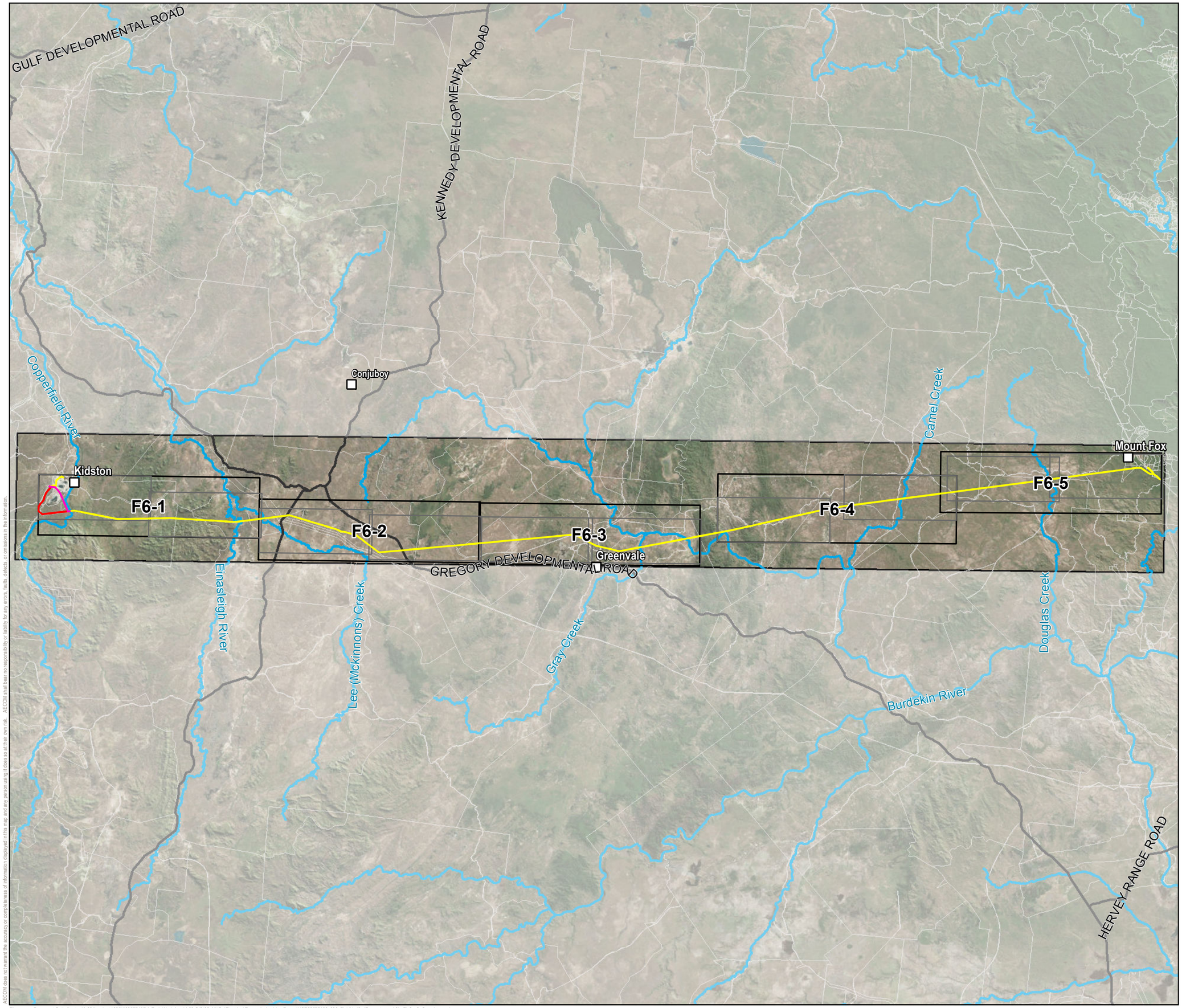
Terrestrial Ecology Assessment:
Electricity Transmission Line

Biodiversity Significance Einasleigh Uplands

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 16/09/2018
VERSION:	2

Figure F5

A3 size



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Coordinate System: GCS WGS 1984
0 8 16 24 32
Kilometers

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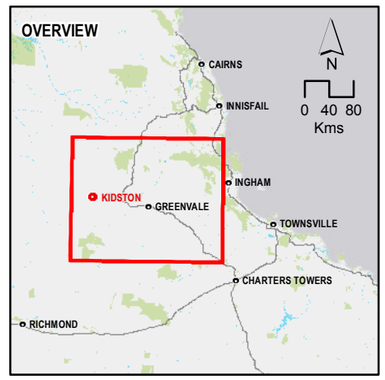
Legend

- Point Of Interest
- Major Roads
- Major Watercourses
- Cadastral Boundaries
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B

Field Verified Regional Ecosystems

- Of Concern RE
- Least Concern RE
- Non Remnant



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Sensitive Receptors
Powerlink Queensland

Project Overview

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CREATED BY:	JB
LAST MODIFIED:	CFS - 16/09/2018
VERSION:	1

Figure
F6

A3 size

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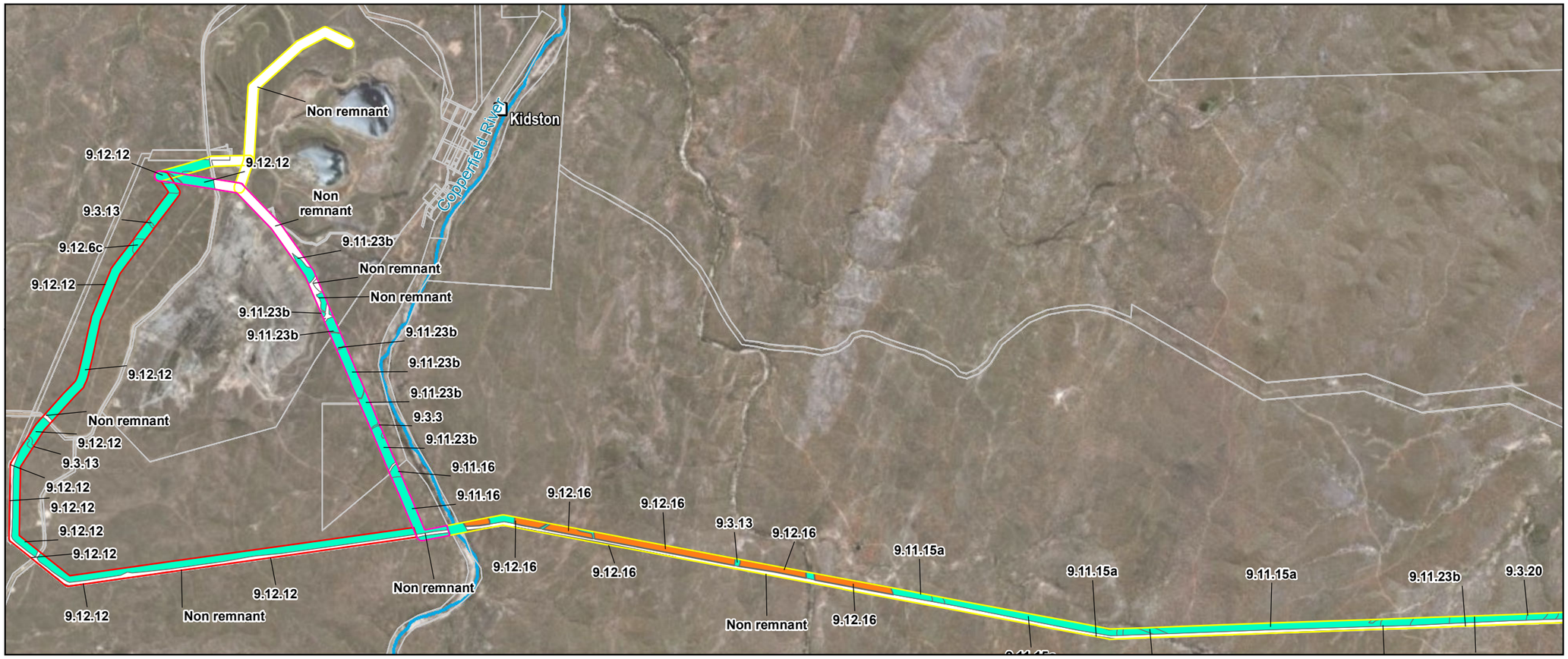

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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

0 650 1,300 1,950 2,600

Meters

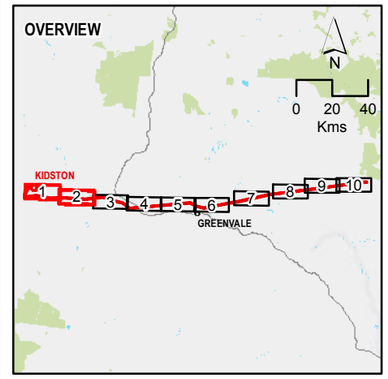
1:55,000 (when printed at A3)

Legend

- Point Of Interest
- Major Roads
- Major Watercourses
- Cadastral Boundaries
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B

Field Verified Regional Ecosystems

- Of Concern RE
- Least Concern RE
- Non Remnant



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Terrestrial Ecology Assessment:
Electricity Transmission Line

Flora Survey Locations and Field Verified Regional Ecosystems

PROJECT ID:	60554486
CREATED BY:	JR
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VERSION:	2

Figure F6.1

A3 size

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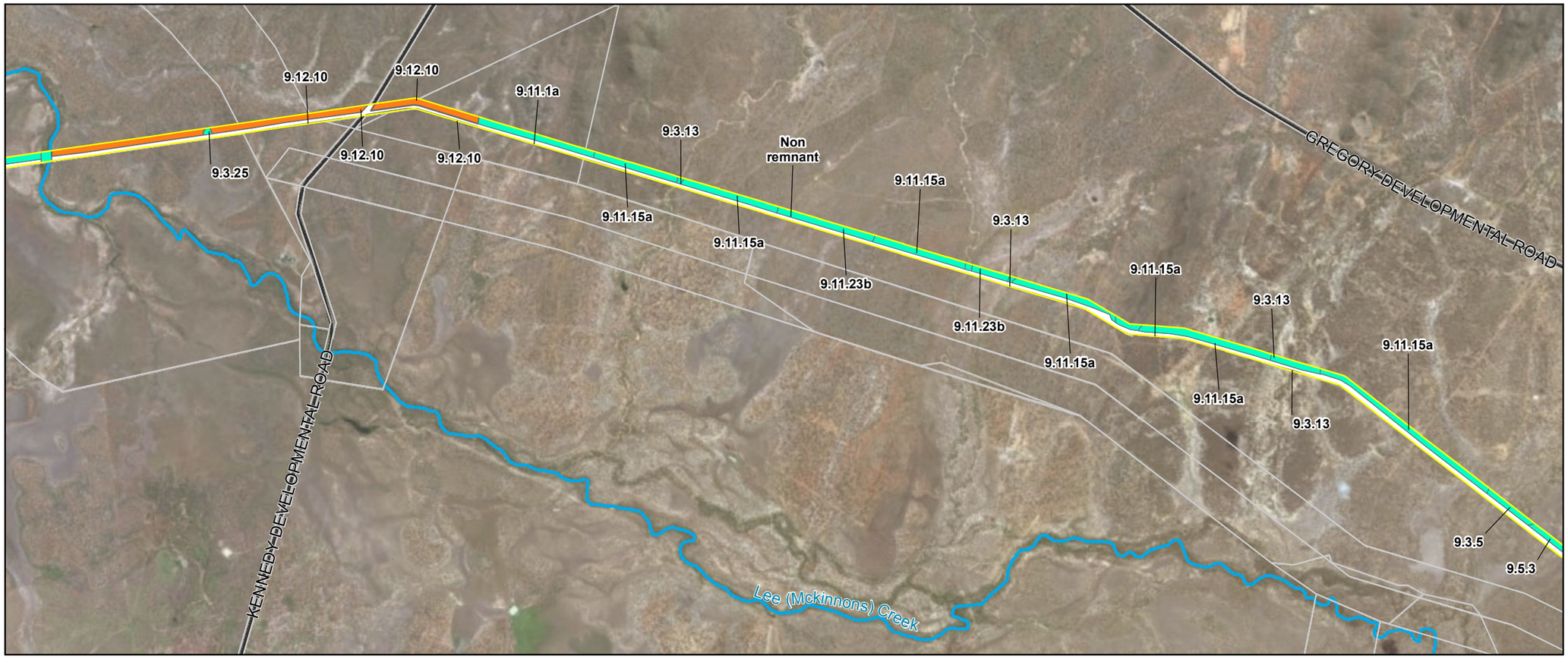

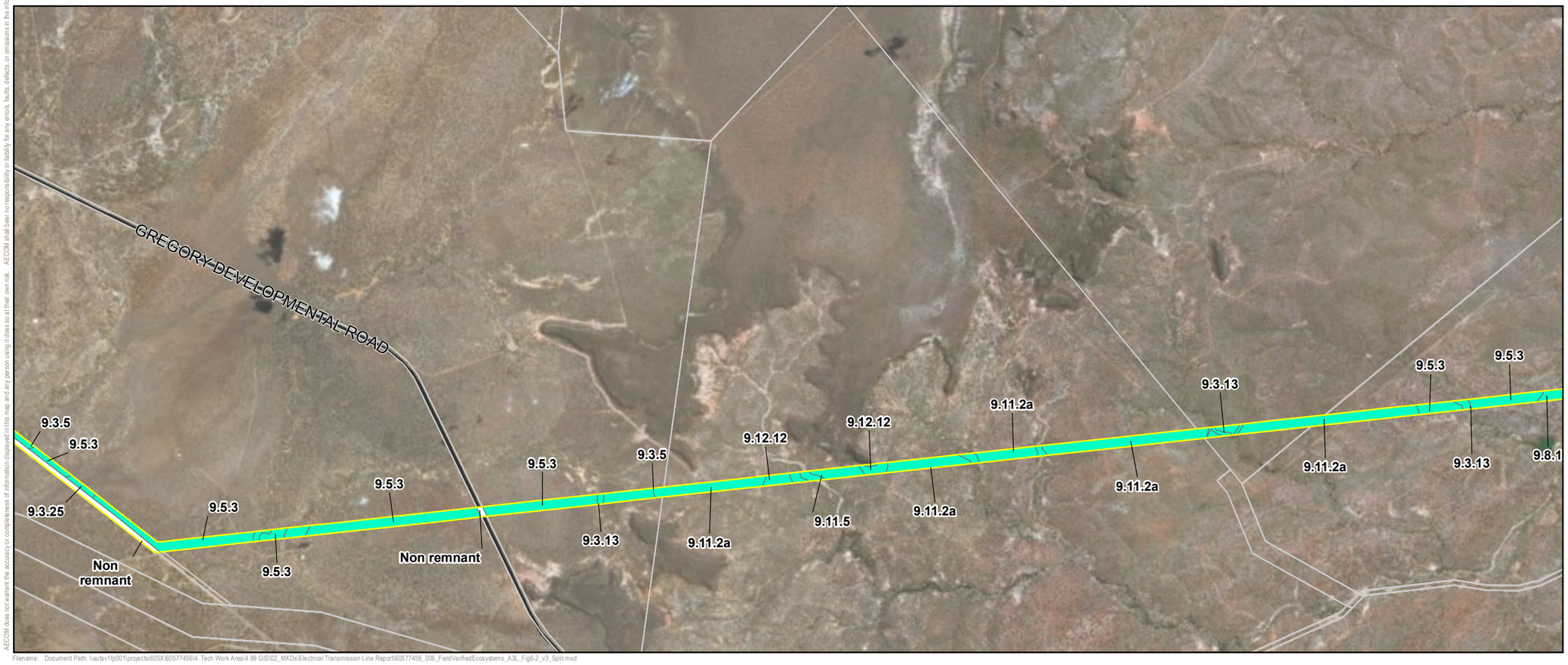

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Projection: Transverse Mercator

0 650 1,300 1,950 2,600

Meters

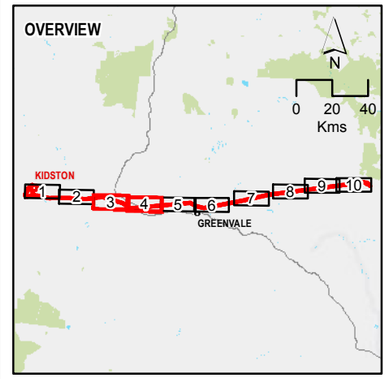
1:55,000 (when printed at A3)

Legend

- Point Of Interest
- Major Roads
- Major Watercourses
- Cadastral Boundaries
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B

Field Verified Regional Ecosystems

- Of Concern RE
- Least Concern RE
- Non Remnant



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Terrestrial Ecology Assessment:
Electricity Transmission Line

Flora Survey Locations and Field Verified Regional Ecosystems

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VERSION:	2

Figure F6.2

A3 size

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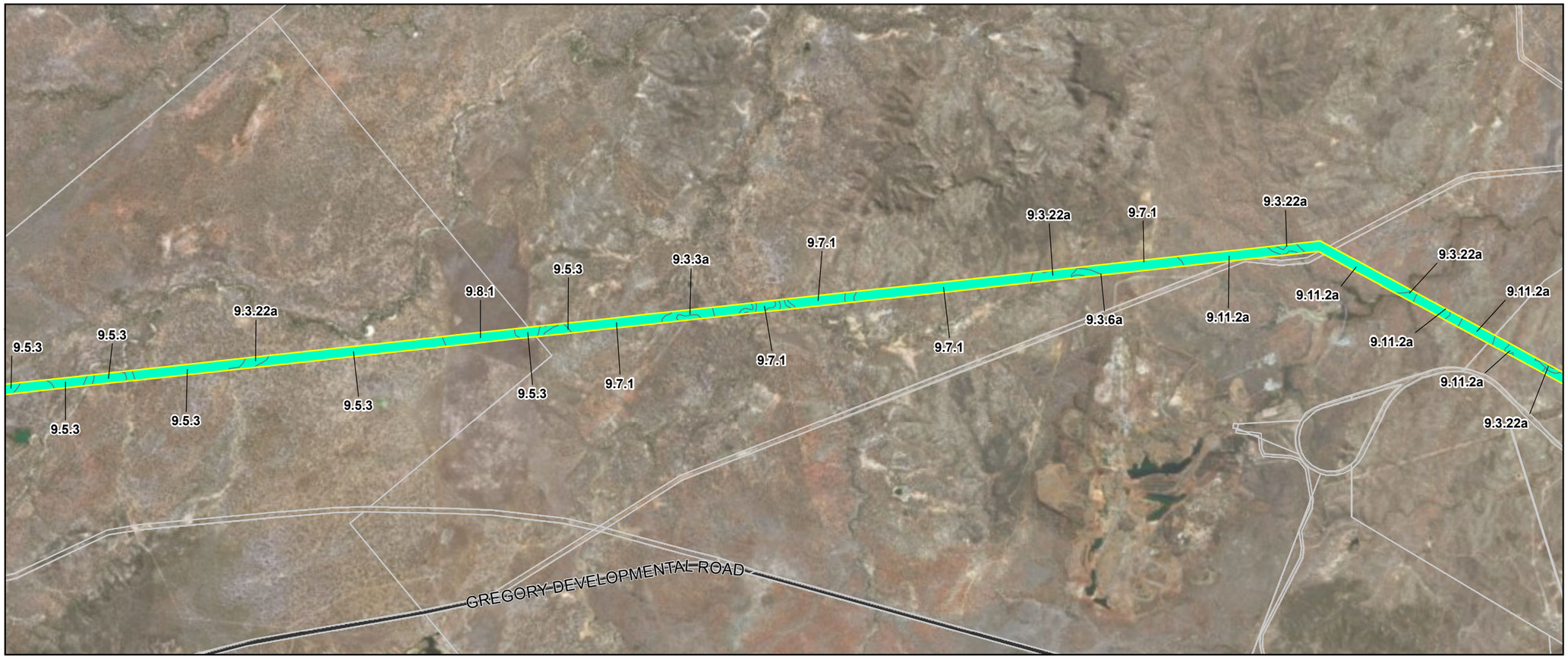

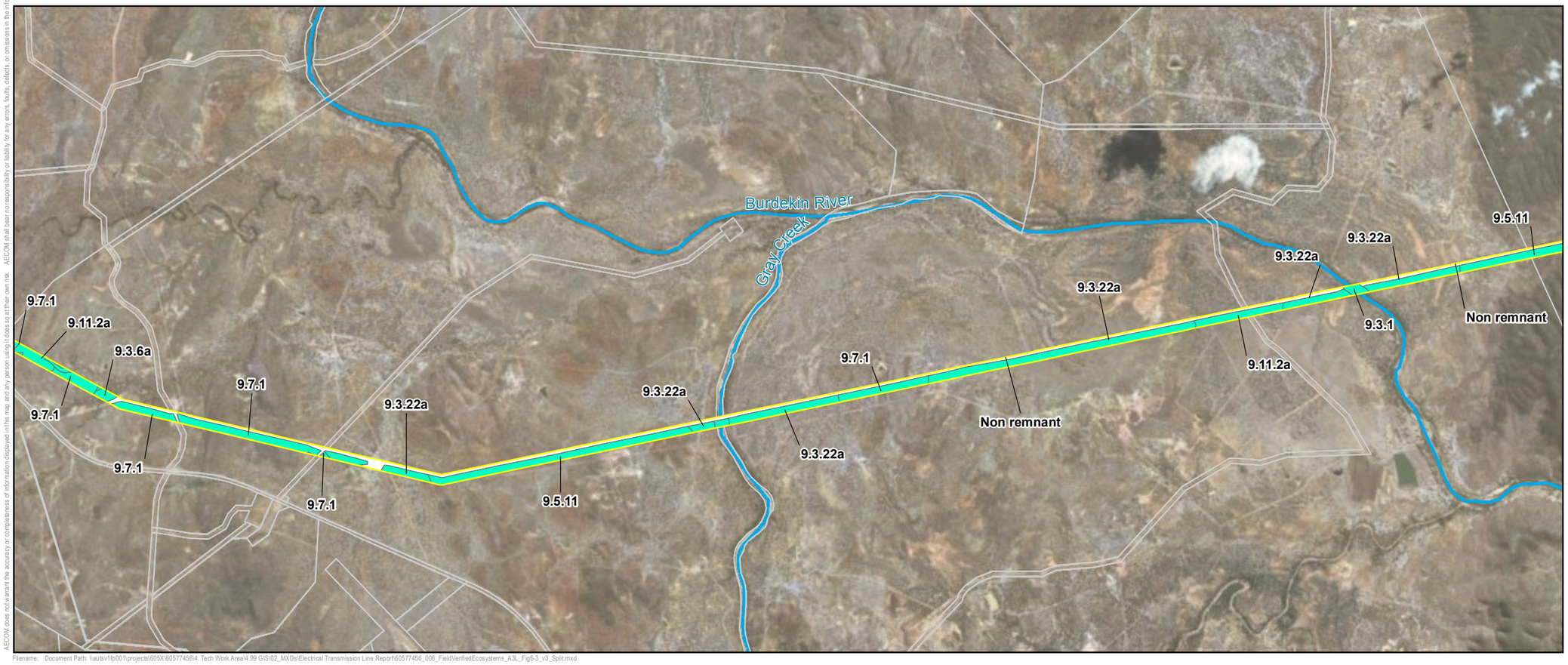

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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

0 650 1,300 1,950 2,600
Meters

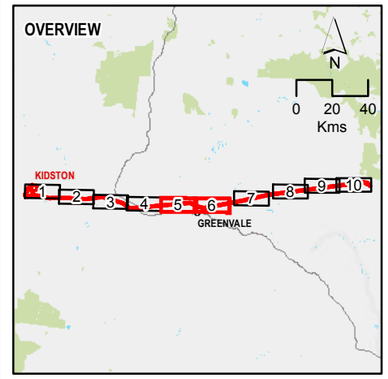
1:55,000 (when printed at A3)

Legend

- Point Of Interest
- Major Roads
- Major Watercourses
- Cadastral Boundaries
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B

Field Verified Regional Ecosystems

- Of Concern RE
- Least Concern RE
- Non Remnant



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Terrestrial Ecology Assessment:
Electricity Transmission Line

Flora Survey Locations and Field Verified Regional Ecosystems

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LAST MODIFIED:	CFS - 16/09/2018
VERSION:	2

Figure F6.3

A3 size

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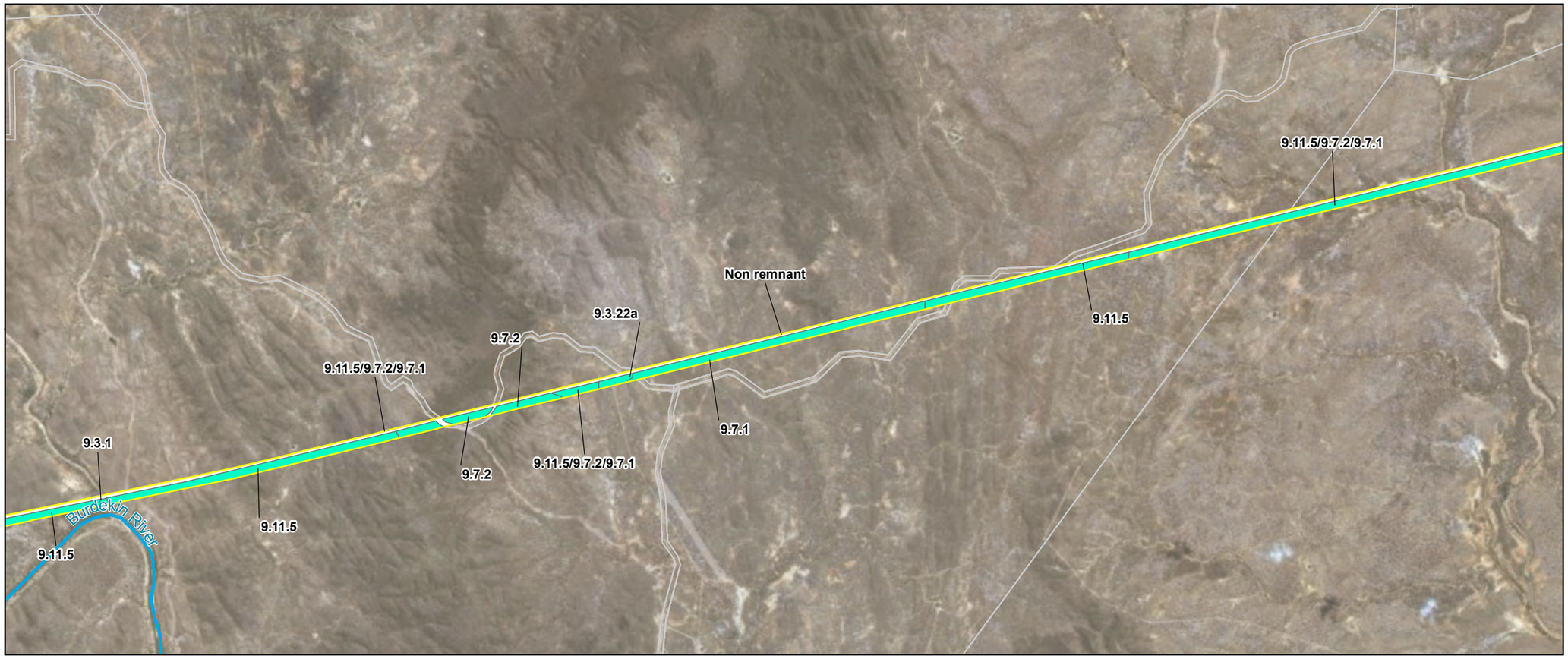

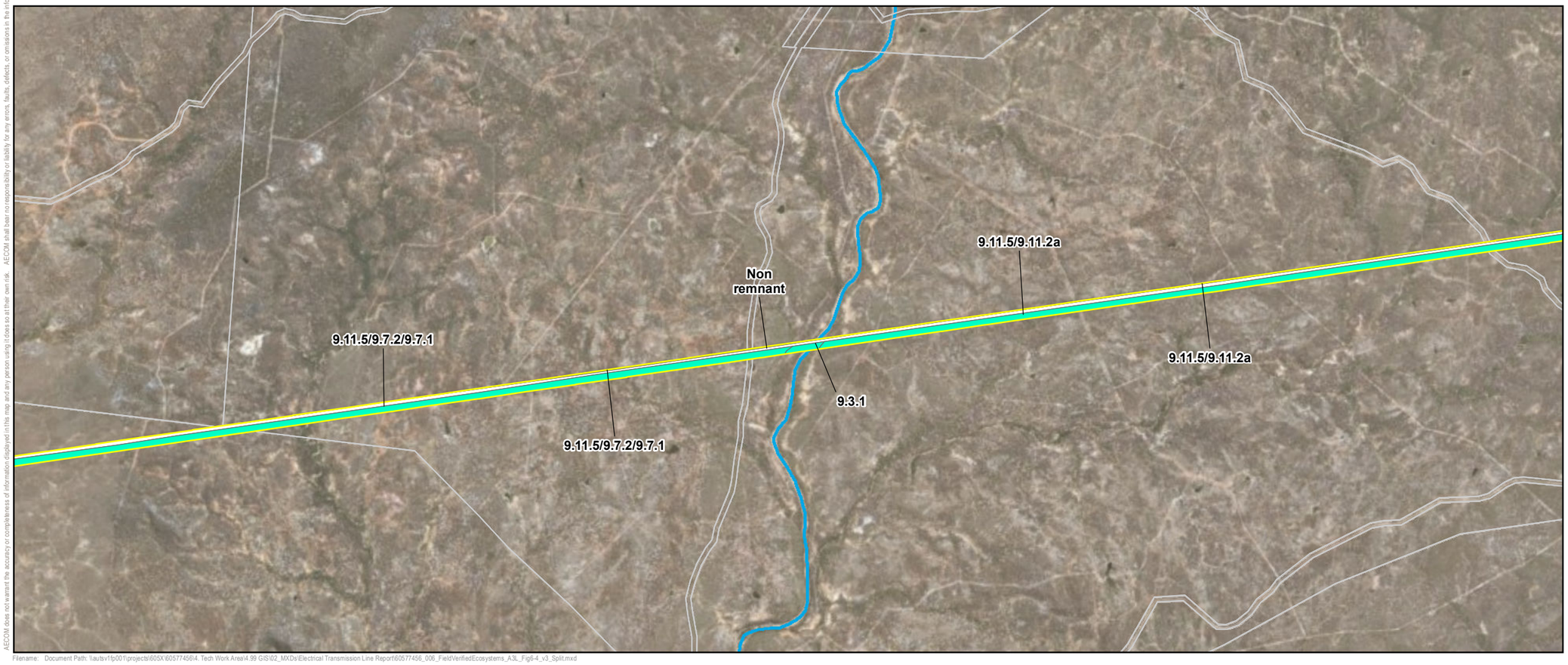

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Projection: Transverse Mercator

0 650 1,300 1,950 2,600
Meters

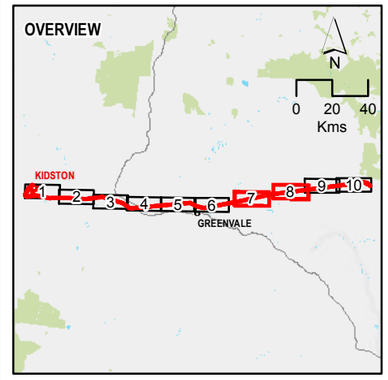
1:55,000 (when printed at A3)

Legend

- Point Of Interest
- Major Roads
- Major Watercourses
- Cadastral Boundaries
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B

Field Verified Regional Ecosystems

- Of Concern RE
- Least Concern RE
- Non Remnant



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Terrestrial Ecology Assessment:
Electricity Transmission Line

Flora Survey Locations and Field Verified Regional Ecosystems

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Figure F6.4

A3 size

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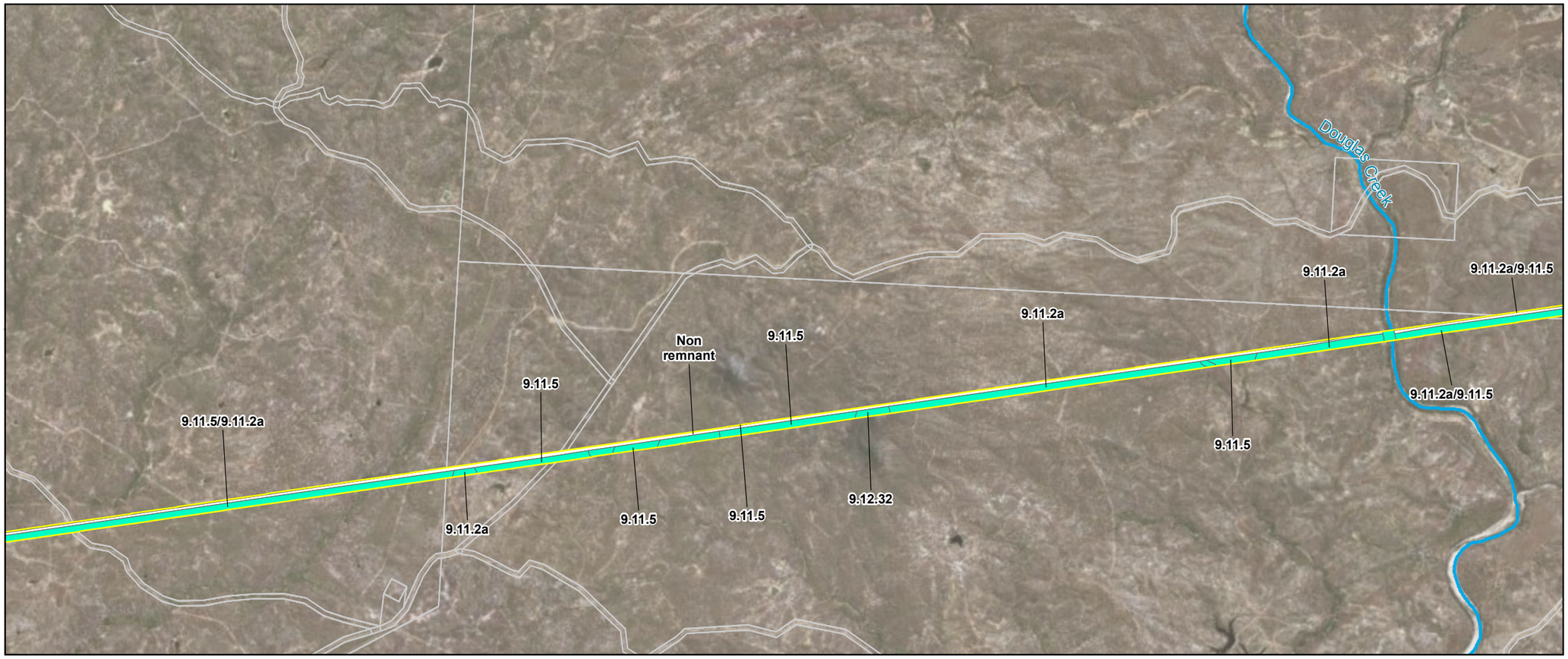

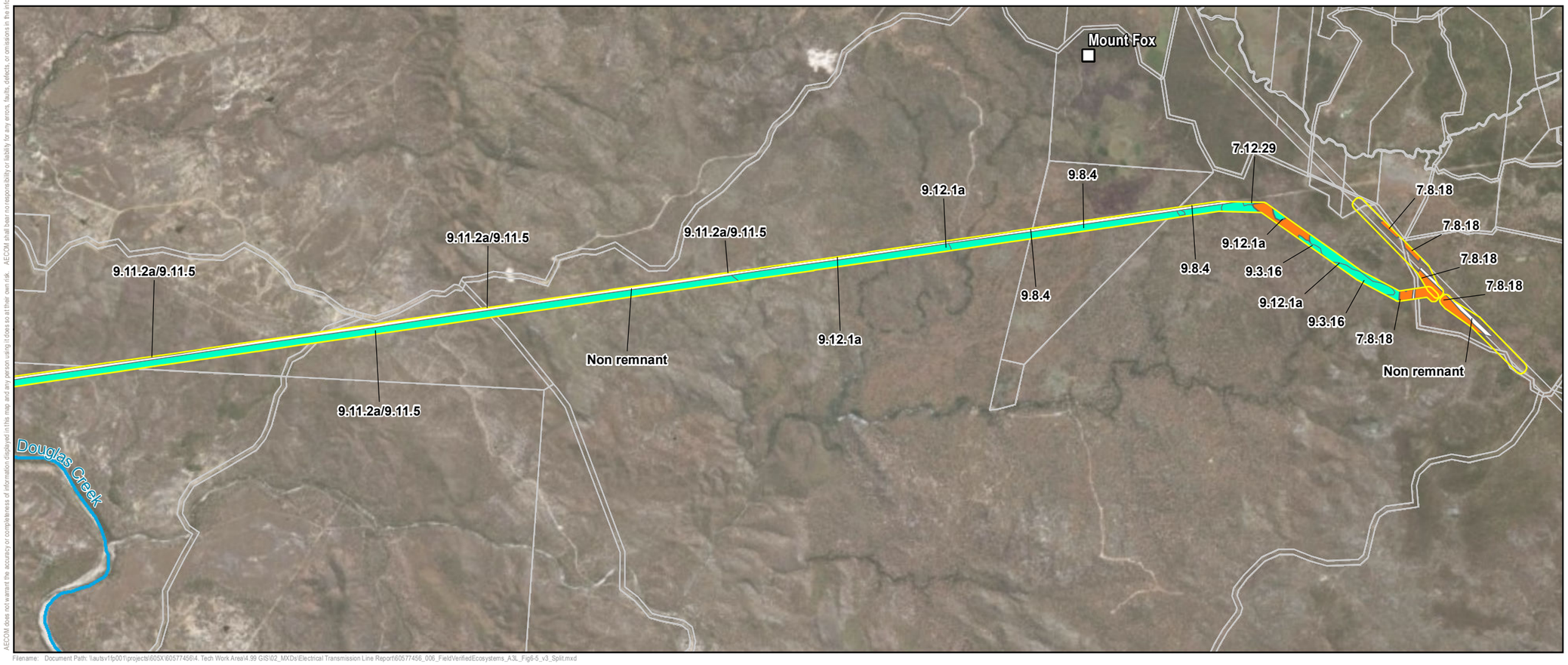

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0 650 1,300 1,950 2,600
Meters

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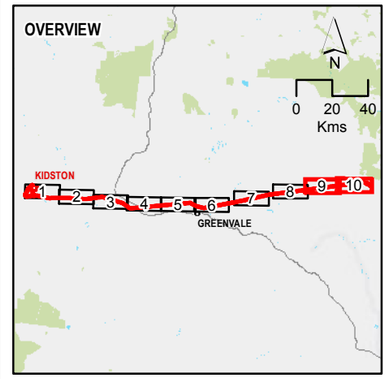
Legend

- Point Of Interest
- Major Roads
- Major Watercourses
- Cadastral Boundaries
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B

Field Verified Regional Ecosystems

- Of Concern RE
- Least Concern RE
- Non Remnant



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Terrestrial Ecology Assessment:
Electricity Transmission Line

Flora Survey Locations and Field Verified Regional Ecosystems

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VERSION:	2

Figure F6.5

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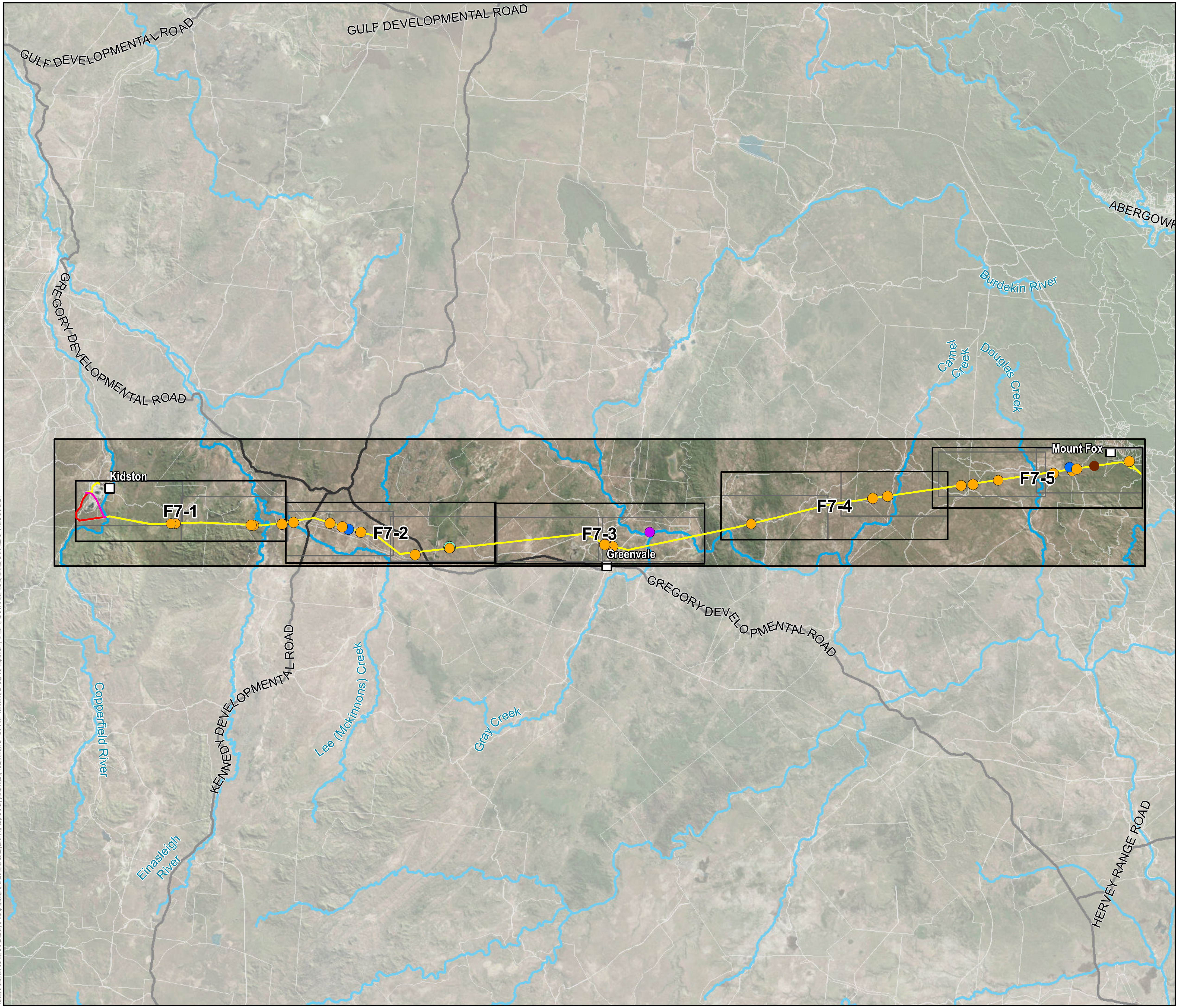

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Projection: Transverse Mercator

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Meters

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Legend

- Point Of Interest

Conservation Significant Species

- Short-beaked echidna (*Tachyglossus aculeatus*)
- Squatter Pigeon (southern subspecies) (*Geophaps scripta scripta*)
- Sharman's rock-wallaby (*Petrogale sharmani*)
- Greater glider (*Petauroides volans*)
- *Leptospermum Pallidum*
- Major Roads
- Major Watercourses
- Regional Context
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- Cadastral Boundaries

Conservation Significant Species Locations and Fauna Habitat Types

- Open Eucalyptus Woodland on Alluvium or Sand Plains
- Open Eucalyptus, Casuarina and Melaleuca Riparian Woodland
- Native Grassland
- Low Open Forest of Acacia shirleyi and Eucalyptus persistens on Laterite
- Open Woodland of Eucalyptus and Corymbia on Basalt
- Woodland of Eucalyptus and Corymbia on Metamorphic Hills
- Eucalyptus and Corymbia Woodland on Igneous Hills and/or Granite
- Non-remnant Vegetation, Including Artificial Wetlands (Dams)

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Conservation Significant Species Locations and Fauna Habitat Types

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VERSION:	2

Figure F7

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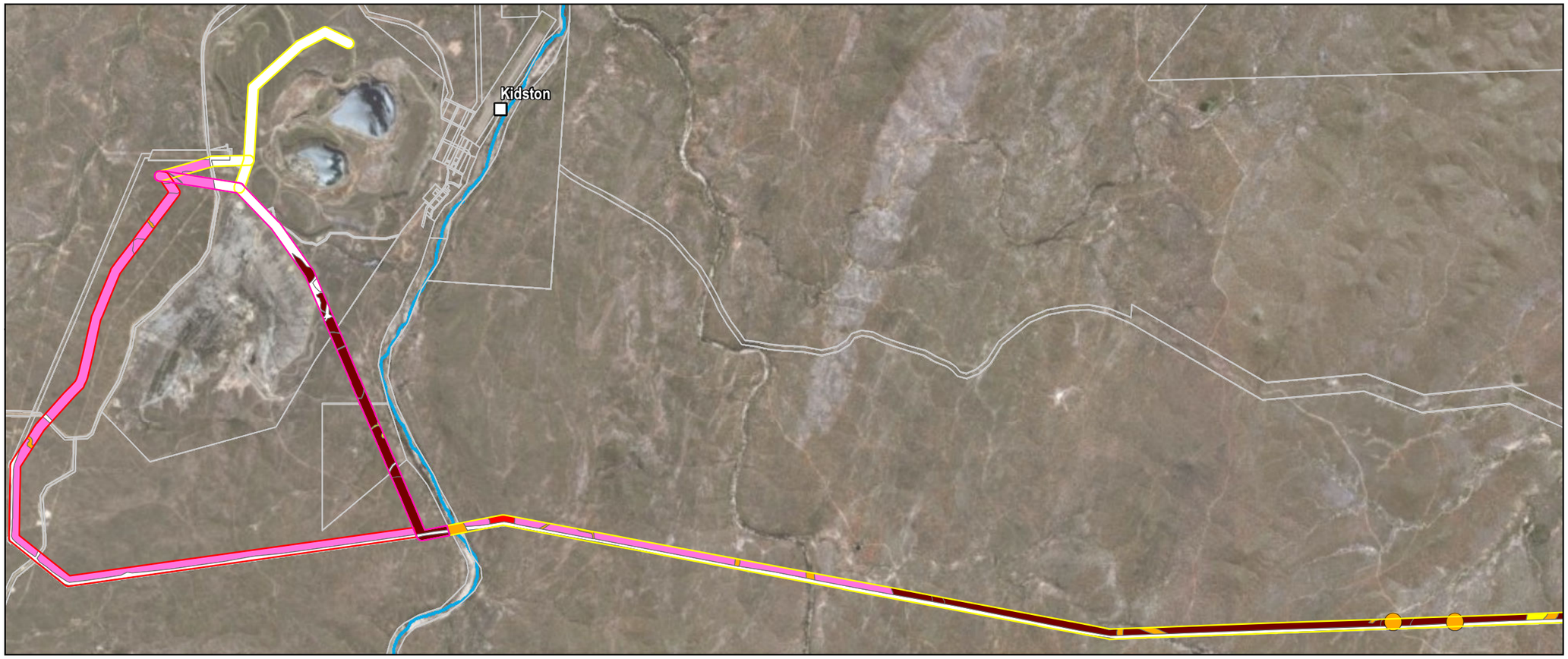

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Projection: Transverse Mercator

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Meters

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Legend

- Point Of Interest

EVNT Species

- Short-beaked echidna *(Tachyglossus aculeatus)*
- Squatter pigeon *(southern subspecies)* (Geophaps scripta scripta)
- Sharman's rock-wallaby *(Petrogale sharmani)*
- Greater glider *(Petauroides volans)*
- *Leptospermum pallidum*
- Major Roads
- Major Watercourses
- Regional Context
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- Cadastral Boundaries

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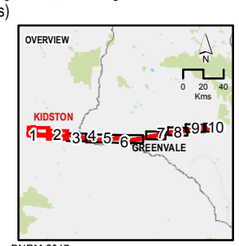
- Woodland of Eucalyptus and Corymbia on Metamorphic Hills
- Non-remnant Vegetation, Including Artificial Wetlands (Dams)



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Electricity Transmission Line

Conservation Significant Species Locations and Fauna Habitat Types

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Figure F7.1

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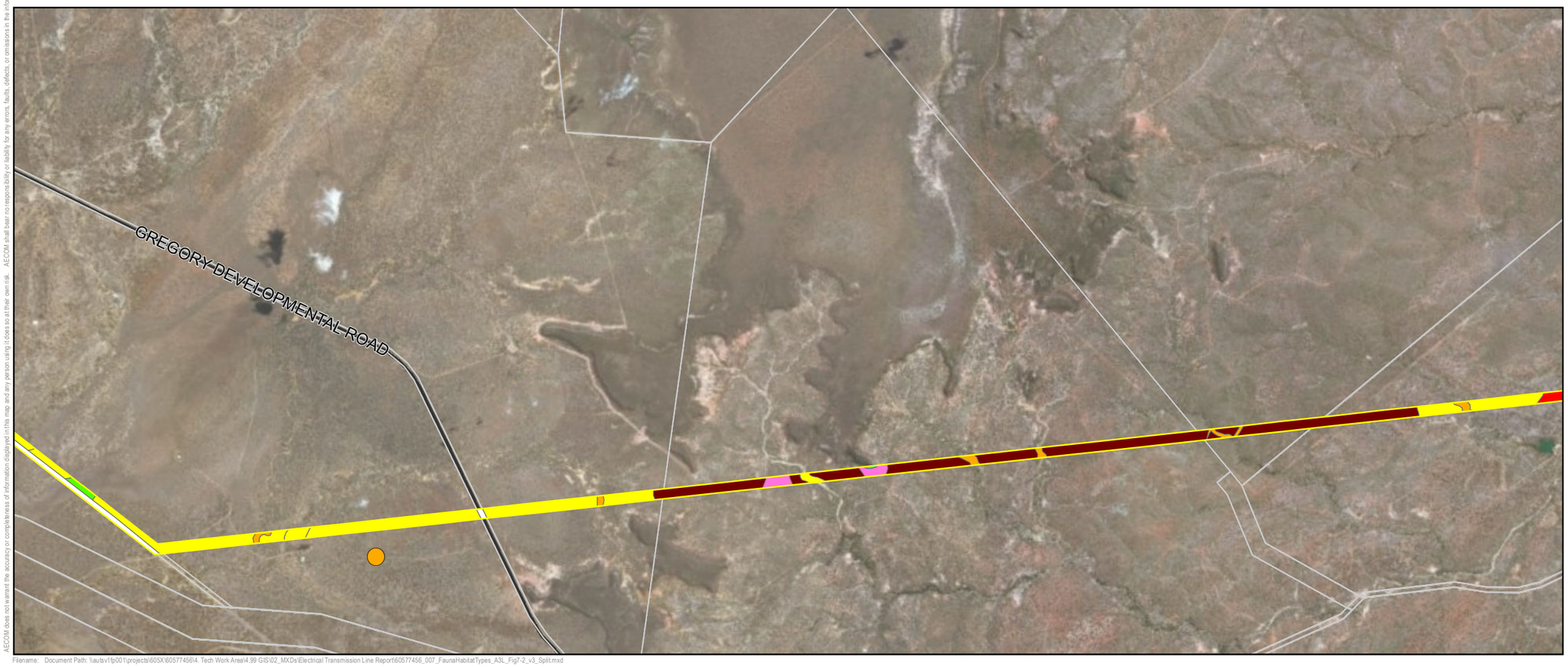

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Projection: Transverse Mercator

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Meters

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Legend

- Point Of Interest

EVNT Species Locations

- Short-beaked echidna *(Tachyglossus aculeatus)*
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- *Leptospermum pallidum*
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- Major Watercourses
- Regional Context Area
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- Draft Alignment A
- Draft Alignment B
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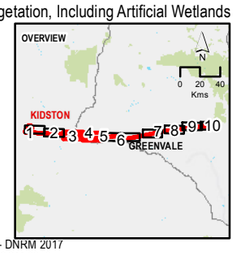
- Non-remnant Vegetation, Including Artificial Wetlands (Dams)



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Terrestrial Ecology Assessment:
Electricity Transmission Line

Conservation Significant Species Locations and Fauna Habitat Types

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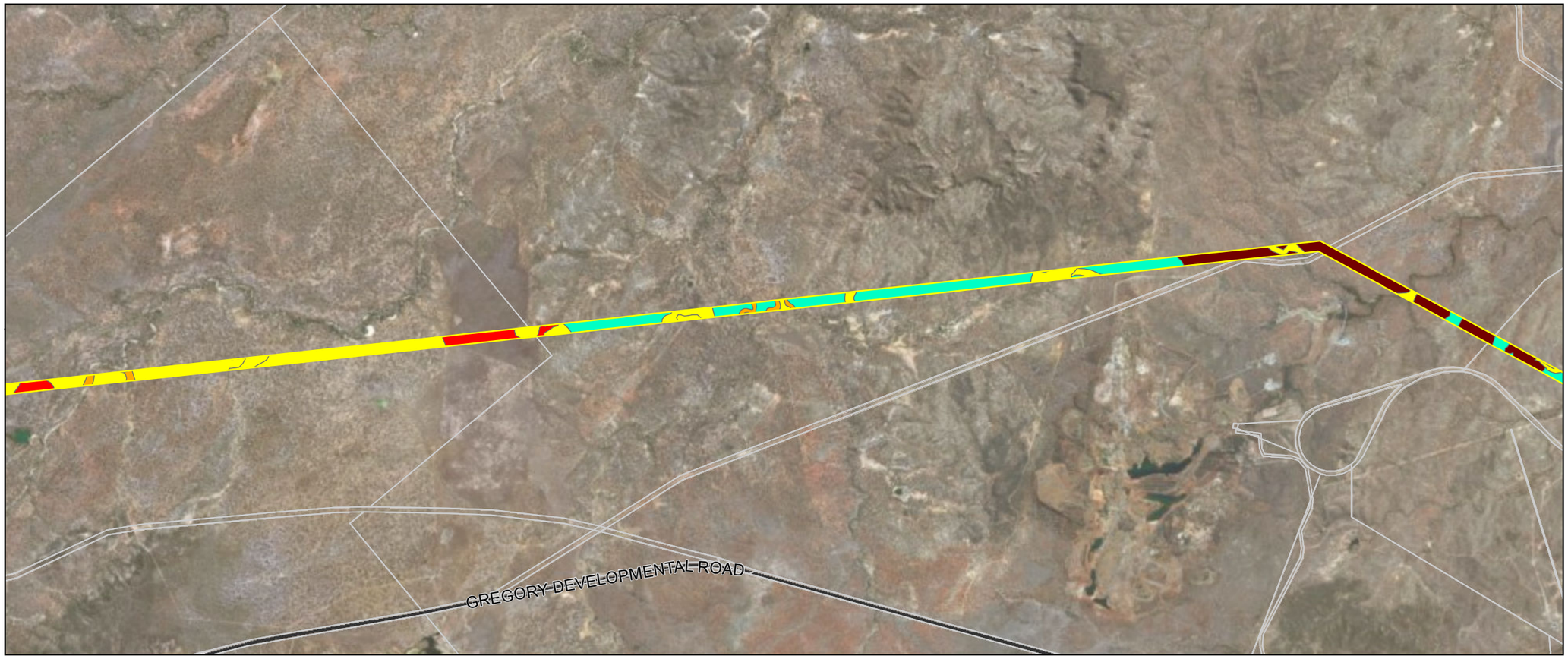
VERSION: 1

Figure F7.2

A3 size



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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

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Meters

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Legend

EVNT Species

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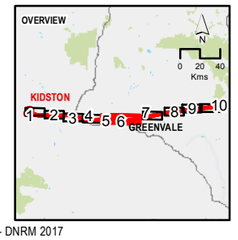

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Conservation Significant Species Locations and Fauna Habitat Types

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VERSION: 1

Figure F7.3

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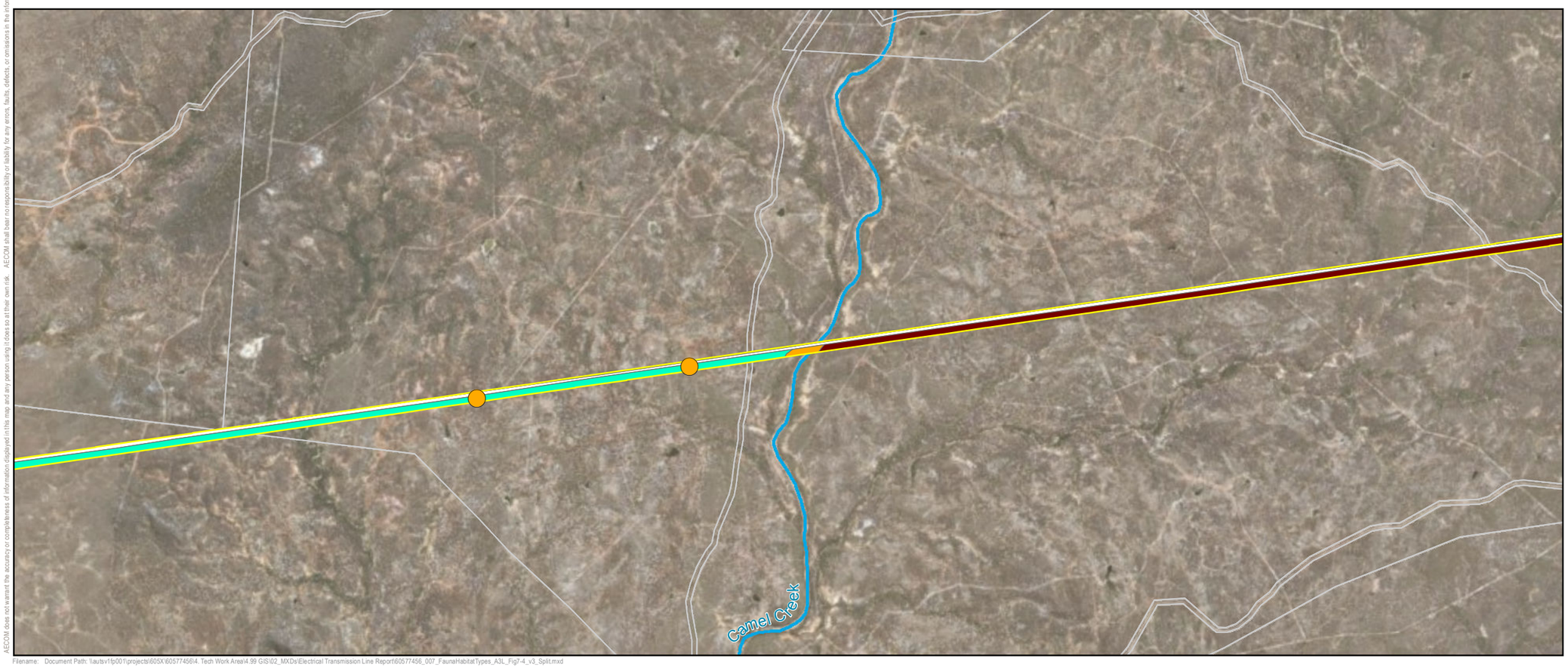

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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

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Meters

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Legend

EVNT Species Locations

- Short-beaked echidna *(Tachyglossus aculeatus)*
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Electricity Transmission Line

Conservation Significant Species Locations and Fauna Habitat Types

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Figure F7.4

A3 size

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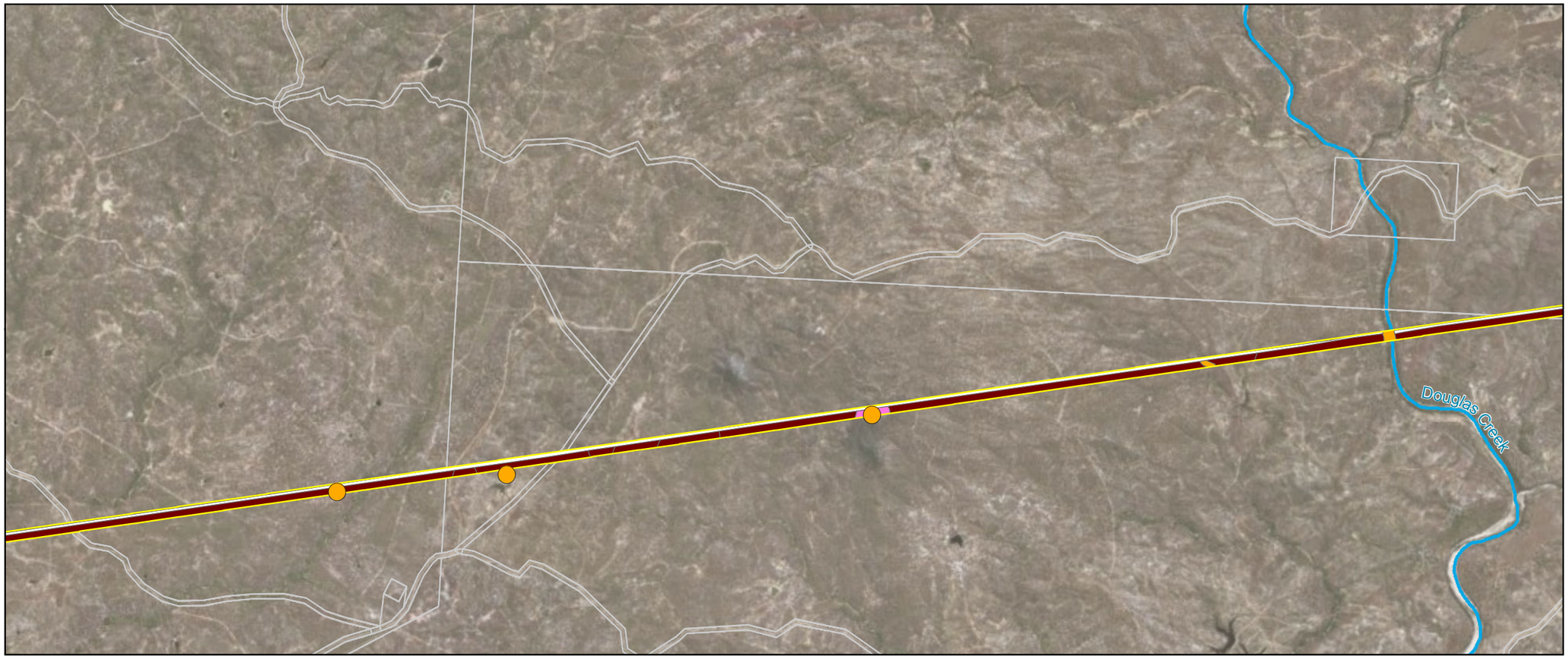

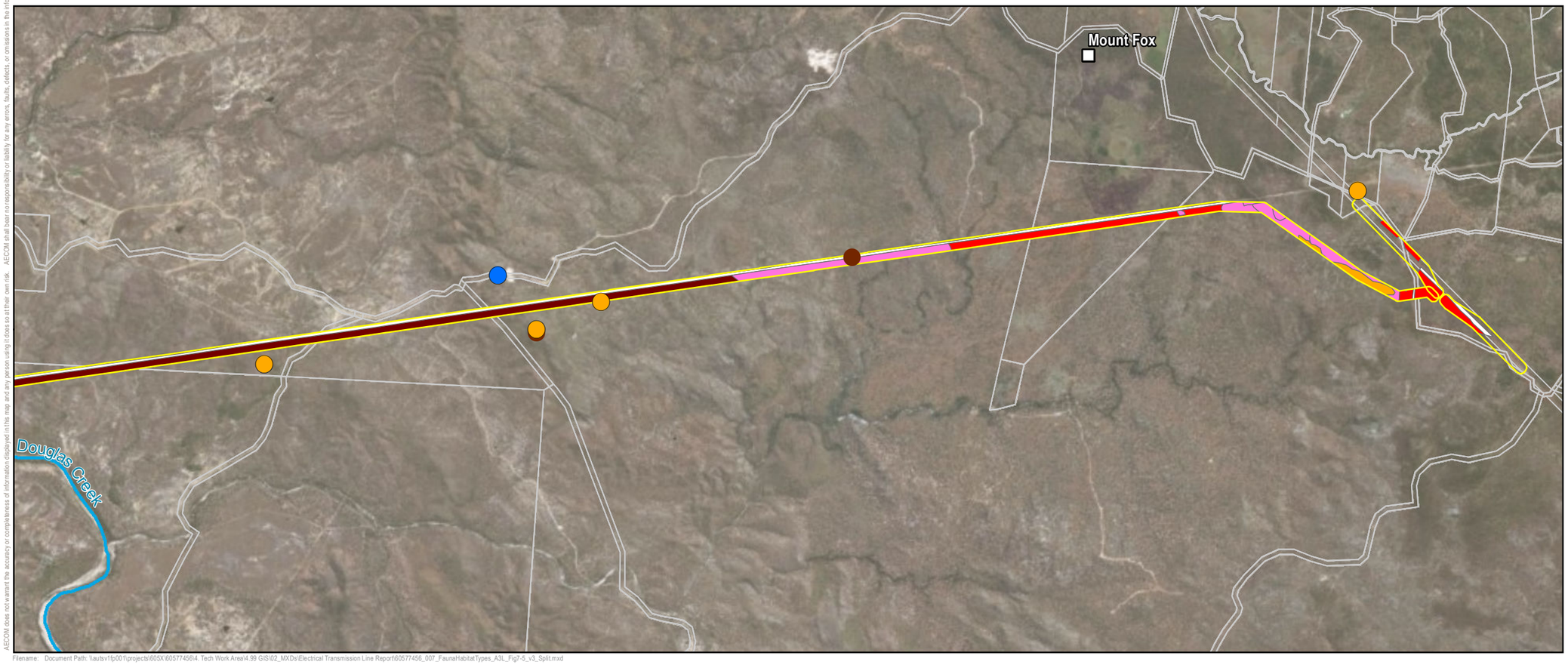

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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

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Legend

EVNT Species Locations

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- Greater glider *(Petauroides volans)*
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Terrestrial Ecology Assessment:
Electricity Transmission Line

Conservation Significant Species Locations and Fauna Habitat Types

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LAST MODIFIED: JB - 16/09/2018
VERSION: 1

Figure F7.5

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Appendix B

Mapped Regional Ecosystems (Queensland Herbarium)

Table 20 List of Mapped Regional Ecosystems (Queensland Herbarium)

RE ID	Short Description[1]	VM Act Status	Biodiversity Status
7.5.2	*Eucalyptus portuensis* +/- *Corymbia intermedia,* open forest to woodland of uplands on weathered soils of a remnant surface.	Of Concern	Of Concern
7.5.4f	*Corymbia intermedia*, *Allocasuarina torulosa*, *Lophostemon suaveolens* open forest and woodland. Deep weathered soils of basalt origin.	Of Concern	Of Concern
7.8.18a	*Corymbia intermedia, Eucalyptus tereticornis, Eucalyptus granitica* open forest to woodland with *Allocasuarina torulosa, Allocasuarina littoralis, Lophostemon suaveolens, Acacia cincinnata, Acacia flavescens, Banksia aquilonia* and *Xanthorrhoea johnsonii.* Basalt.	Of Concern	Of Concern
9.3.1	*Eucalyptus camaldulensis* and/or *Eucalyptus tereticornis* +/- *Melaleuca* spp. +/- *Casuarina cunninghamiana* fringing woodland on channels and levees.	Least Concern	Of Concern
9.3.3a	Woodland to low open woodland of *Eucalyptus leptophleba* +/- *Eucalyptus platyphylla* +/- *Corymbia confertiflora* +/- *Eucalyptus crebra* or *Eucalyptus cullenii* +/- *Corymbia clarksoniana* on alluvial plains and terraces.	Least Concern	Of Concern
9.3.5	*Eucalyptus brownii* +/- *Eucalyptus* spp. +/- *Corymbia* spp. open woodland on alluvial plains.	Least Concern	Of Concern
9.3.6a	Woodland to open woodland of *Eucalyptus platyphylla* +/- *Corymbia clarksoniana* +/- *Corymbia tessellaris* +/- *Eucalyptus tereticornis* on alluvial plains.	Least Concern	No Concern at Present
9.3.10	*Melaleuca bracteata* low closed forest +/- *Eucalyptus* spp. emergents or vine thicket species on swamps in basalt plains.	Least Concern	No Concern at Present
9.3.10b	Low open forest to open forest of *Melaleuca bracteata* +/- *Lysiphyllum carronii* along creek lines in basalt.	Least Concern	No Concern at Present
9.3.12	River beds and associated waterholes on major rivers and channels.	Least Concern	Of Concern
9.3.12a	Sandy river beds sometimes with patches of ephemeral grassland, herbland or sedgeland, which can include *Heteropogon contortus*, *Bothriochloa* spp., and *Ammannia multiflora*. Sandy river beds, riverine wetland or fringing riverine wetland.	Least Concern	Of Concern

RE ID	Short Description[1]	VM Act Status	Biodiversity Status
9.3.13	*Melaleuca* spp., *Eucalyptus camaldulensis* and *Casuarina cunninghamiana* fringing open forest on streams and channels.	Least Concern	Of Concern
9.3.16	*Eucalyptus tereticornis* and/or *Eucalyptus platyphylla* and/or *Corymbia clarksoniana* woodland on alluvial flats, levees and plains.	Least Concern	Of Concern
9.3.20	*Eucalyptus microneura* +/- *Corymbia* spp. +/- *Eucalyptus leptophleba* woodland on alluvial plains.	Least Concern	No Concern at Present
9.3.22	*Eucalyptus crebra* or *Eucalyptus cullenii* +/- *Corymbia* spp. open woodland on alluvial levees and terraces.	Least Concern	Of Concern
9.3.22a	Open woodland to woodland of *Eucalyptus crebra*, *Corymbia clarksoniana* and/or *Corymbia dallachiana* +/- *Eucalyptus platyphylla* +/- *Eucalyptus brownii* +/- *Eucalyptus* spp. on levees, terraces and banks of larger rivers and on flat to very gentle slopes associated with drainage lines.	Least Concern	Of Concern
9.3.23	*Acacia tephrina* open forest on alluvial clay plains.	Of Concern	Of Concern
9.3.24	*Melaleuca viridiflora* and/or *Melaleuca citrolens* low woodland +/- *Corymbia* spp. emergents on alluvial deposits.	Least Concern	No Concern at Present
9.3.25	*Dichanthium* spp., and/or *Astrebla* spp. +/- *Iseilema* spp. grassland on alluvial deposits derived from basalt soils.	Least Concern	Of Concern
9.3.26	Mixed grassland to open grassland including *Eragrostis* sp., *Aristida* sp., *Enneapogon* sp., *Iseilema* sp., *Chloris* sp., or *Dichanthium* sp. on non-basalt derived alluvial deposits.	Least Concern	Of Concern
9.5.3	*Eucalyptus crebra* or *Eucalyptus drepanophylla* and *Corymbia clarksoniana* woodland on sand plains.	Least Concern	No Concern at Present
9.5.11	*Eucalyptus persistens* +/- *Eucalyptus crebra* woodland on flats on Tertiary remnant plains.	Least Concern	No Concern at Present
9.7.1	*Eucalyptus persistens* woodland on lateritised and deeply weathered surfaces on undulating terrain.	Least Concern	No Concern at Present

RE ID	Short Description[1]	VM Act Status	Biodiversity Status
9.7.1a	Woodland to open woodland of *Eucalyptus persistens* +/- *Eucalyptus crebra* +/- *Corymbia erythrophloia* +/- *Corymbia dallachiana*. Occurs on pediments below scarps of lateritised Tertiary plateaus and on deeply weathered profiles on rolling hills.	Least Concern	No Concern at Present
9.7.1b	Low open forest of *Melaleuca uncinata* +/- emergents of *Eucalyptus persistens* and/or *Eucalyptus moluccana* and/or *Acacia shirleyi*. Occurs on pediments below scarps of lateritised Tertiary plateaus and on deeply weathered profiles on rolling hills.	Least Concern	No Concern at Present
9.7.1c	Woodland to low open woodland of *Eucalyptus persistens* and/or *Eucalyptus exserta* +/- *Eucalyptus crebra* +/- *Acacia shirleyi* +/- *Callitris intratropica* on deeply weathered granite hills.	Least Concern	No Concern at Present
9.7.2a	Woodland to low-woodland of *Acacia shirleyi* with only scattered *Corymbia trachyphloia* +/- *Corymbia lamprophylla* +/- *Eucalyptus persistens* +/- *Acacia leptostachya* +/- *Eucalyptus exserta* +/- *Corymbia* spp. on lateritised mesa slopes and tops, breakaways, scree slopes and remnant colluvium.	Least Concern	No Concern at Present
9.7.2b	Woodland to low open woodland of *Eucalyptus exserta* +/- a mix of subdominant to codominant species including *Acacia shirleyi*, *Corymbia lamprophylla*, *Corymbia peltata* and *Callitris intratropica*. Occurs on rolling hills.	Least Concern	No Concern at Present
9.7.3	*Eucalyptus crebra* or *Eucalyptus portuensis* +/- *Corymbia clarksoniana* woodland on lateritised surfaces and edges of Tertiary surfaces.	Least Concern	No Concern at Present
9.7.3c	Woodland to open woodland of *Eucalyptus crebra* +/- *Corymbia erythrophloia* +/- *Corymbia dallachiana* +/- *Corymbia confertiflora* on low rolling hills.	Least Concern	No Concern at Present
9.7.5	*Corymbia setosa* and/or *Corymbia peltata* low open woodland on lateritised and deeply weathered surfaces.	Least Concern	No Concern at Present
9.8.1	*Eucalyptus crebra* +/- *Corymbia dallachiana* +/- *Eucalyptus leptophleba* open woodland on plains and rocky rises of basalt geologies.	Least Concern	No Concern at Present
9.8.1a	Open woodland to woodland of *Eucalyptus crebra* +/- *Corymbia erythrophloia* +/- *Corymbia dallachiana* +/- *Corymbia* spp. +/- *Eucalyptus* spp. on basalt plains and rocky basalt plains and hills with varying depths of soil.	Least Concern	No Concern at Present

RE ID	Short Description[1]	VM Act Status	Biodiversity Status
9.8.1b	Open woodland to woodland of *Eucalyptus leptophleba* +/- *Corymbia erythrophloia* +/- *Corymbia dallachiana* on basalt plains and rocky basalt plains and hills with varying depths of soil.	Least Concern	No Concern at Present
9.8.4	*Eucalyptus crebra* and/or *Eucalyptus tereticornis* open woodland on basalt plains.	Least Concern	No Concern at Present
9.8.4a	Woodland to open woodland of *Eucalyptus crebra* or *Eucalyptus granitica* +/- *Corymbia intermedia* +/- *Corymbia dallachiana* +/- *Corymbia tessellaris* on basalt plains and rocky basalt plains and hills with varying depths of soil.	Least Concern	No Concern at Present
9.8.11	*Eucalyptus microneura* +/- *Corymbia* spp. +/- *Terminalia* spp. woodland on basalt plains.	Least Concern	No Concern at Present
9.8.13	*Iseilema* spp. and/or *Dichanthium* spp. tussock grassland on basalt plains.	Least Concern	No Concern at Present
9.11.1a	Low woodland to low open woodland of *Eucalyptus melanophloia* +/- *Eucalyptus persistens* +/- *Eucalyptus crebra* +/- *Corymbia dallachiana* +/- *Corymbia peltata* +/- *Eucalyptus brownii* +/- *Acacia julifera* on skeletal soils of slopes and crests of undulating rises and low hills of folded metasediments and other metamorphic rocks.	Least Concern	No Concern at Present
9.11.2a	Woodland to open woodland of *Eucalyptus crebra* +/- *Corymbia dallachiana* +/- *Corymbia erythrophloia* +/- *Corymbia clarksoniana* +/- *Eucalyptus* spp. +/- *Corymbia* spp. on metamorphic hills and rises.	Least Concern	No Concern at Present
9.11.4a	Open forest to open woodland of *Eucalyptus granitica, Corymbia clarksoniana* and/or *Corymbia intermedia*, *Corymbia citriodora* subsp. *citriodora* +/- *Eucalyptus portuensis* +/- *Corymbia dallachiana* +/- *Eucalyptus tereticornis* on metamorphic hills.	Least Concern	No Concern at Present
9.11.5	*Eucalyptus persistens* +/- *Eucalyptus crebra* woodland on low metamorphic hills.	Least Concern	No Concern at Present
9.11.15	*Eucalyptus crebra* and/or *Eucalyptus cullenii* and/or *Eucalyptus whitei* +/- *Corymbia pocillum* or *Corymbia erythrophloia* woodland on metamorphic hills.	Least Concern	No Concern at Present

RE ID	Short Description[1]	VM Act Status	Biodiversity Status
9.11.15a	Woodland to low open woodland of *Eucalyptus crebra* or *Eucalyptus cullenii* +/- *Corymbia erythrophloia* or *Corymbia pocillum* +/- *Corymbia dallachiana* +/- *Erythrophleum chlorostachys* +/- *Eucalyptus microneura* on low hills and rises with moderately deep soils derived from metamorphic geologies.	Least Concern	No Concern at Present
9.11.16	*Eucalyptus crebra* +/- *Corymbia erythrophloia* or *Corymbia pocillum* woodland on steep to rolling hills.	Least Concern	No Concern at Present
9.11.23	*Eucalyptus microneura* +/- *Corymbia erythrophloia* or *Corymbia pocillum* low open woodland on rolling metamorphic hills and rises.	Least Concern	No Concern at Present
9.11.23b	Low open woodland to woodland of *Eucalyptus microneura* +/- *Eucalyptus cullenii* or *Eucalyptus crebra* on metamorphic hills.	Least Concern	No Concern at Present
9.12.1	*Eucalyptus crebra* and/or *Eucalyptus xanthoclada* and/or *Eucalyptus drepanophylla* low open woodland on igneous rocks.	Least Concern	No Concern at Present
9.12.1a	Woodland to low open woodland of *Eucalyptus crebra* +/- *Corymbia dallachiana* +/- *Corymbia erythrophloia* +/- *Corymbia clarksoniana* +/- *Corymbia* spp. *Eucalyptus exilipes* on a variety of landforms from undulating plains to steep hills.	Least Concern	No Concern at Present
9.12.2	*Eucalyptus portuensis*, *Corymbia citriodora* subsp. *citriodora*, *Eucalyptus granitica* or *Eucalyptus crebra*, *Corymbia intermedia* or *Corymbia clarksoniana* mixed woodland on steep hills and ranges on igneous hills close to Wet Tropics boundary.	Least Concern	No Concern at Present
9.12.4a	Low woodland to occasionally a low open forest of *Eucalyptus shirleyi* and *Corymbia peltata* +/- *Eucalyptus crebra* +/- *Corymbia* spp. +/- *Acacia leptostachya* predominantly on sandy shallow soils derived from granitic or rhyolite geologies on rolling low hills to hills.	Least Concern	No Concern at Present
9.12.6b	Low open woodland to low woodland of *Eucalyptus microneura* +/- *Corymbia clarksoniana* +/- *Corymbia dallachiana* +/- *Terminalia platyptera* on granitic or rhyolite hills.	Least Concern	No Concern at Present
9.12.10	*Corymbia confertiflora* and *Eucalyptus crebra* +/- *Corymbia clarksoniana* open woodland on rolling igneous hills.	Of Concern	Of Concern
9.12.12	*Eucalyptus crebra* and *Corymbia erythrophloia* +/- *Eucalyptus microneura* open woodland on igneous rocks.	Least Concern	No Concern at Present

RE ID	Short Description[1]	VM Act Status	Biodiversity Status
9.12.19	*Eucalyptus crebra* or *Eucalyptus granitica* +/- *Corymbia citriodora* subsp. *citriodora* +/- *Eucalyptus portuensis* mixed woodland on igneous hills.	Least Concern	No Concern at Present
9.12.22	*Eucalyptus drepanophylla*, *Corymbia clarksoniana* or *Corymbia intermedia* and *Corymbia dallachiana* woodland on steep rugged igneous ranges.	Least Concern	No Concern at Present

1 Description of REs as contained in the REDD Version 10.0 (Queensland Herbarium, 2016)

Appendix C

Flora Species List

Table 21 Flora Species List

Family	Species
ACANTHACEAE	*Brunoniella acaulis*
	Brunoniella australis
	Rostellularia adscendens
ADIANTACEAE	*Cheilanthes sieberi*
AMARANTHACEAE	*Achyranthes aspera*
	*Gomphrena celosioides**
ANACARDIACEAE	*Euroschinus falcata*
	Pleiogynium timorense
APOCYNACEAE	*Alternanthera sp.*
	Alyxia spicata
	Cajanus scarabaeoides
	*Calotropis gigantean**
	*Calotropis procera**
	Carissa lanceolata
	Carissa ovata
	*Cryptostegia grandiflora**
	Wrightia saligna
ARALIACEAE	*Schefflera actinophylla*
ASTERACEAE	*Acanthospermum hispidum**
	Apowollastonia spilanthoides
	*Bidens pilosa**
	Chrysocephalum apiculatum
	Cyanthillium cinereum
	*Emilia sonchifolia**
	Olearia sp.
	*Parthenium hysterophorus**
	Peripleura hispidula
	*Praxelis clematidea**
	Pterocaulon sphacelatum
	*Tridax procumbens**
	*Xanthium occidentale**
	Xerochrysum bracteatum
BIGNONIACEAE	*Dolichandrone heterophylla*
BYTTNERIACEAE	*Waltheria indica*
CAESALPINIACEAE	*Cassia brewsteri*

Family	Species
	*Chamaecrista absus**
	Chamaecrista concinna
	Chamaecrista mimosoides
	Chamaecrista rotundifolia var. *rotundifolia**
	Erythrophleum chlorostachys
	Lysiphyllum cunninghamii
	Lysiphyllum hookeri
CAPPARACEAE	*Capparis arborea*
	Capparis lasiantha
CASUARINACEAE	*Allocasuarina torulosa*
	Casuarina cunninghamiana
CELASTRACEAE	*Denhamia cunninghamii*
	Denhamia disperma
	Denhamia oleaster
CHENOPODIACEAE	*Enchylaena tomentosa*
CONVOLVULACEAE	*Argyreia nervosa**
	Bonamia media
	Evolvulus alsinoides
	Jacquemontia browniana
	Polymeria longifolia
	Polymeria pusilla
CYPERACEAE	*Abildgaardia sp.*
	Bulbostylis barbata
	Cyperus gracilis
	Cyperus sp.
	Eleocharis plana
	Fimbristylis dichotoma
	Scleria brownii
EBENACEAE	*Diospyros humilis*
ERYTHROXYLACEAE	*Erythroxylum australe*
	Erythroxylum ellipticum
EUPHORBIACEAE	*Euphorbia drummondii*
	*Euphorbia hirta**
FABACEAE	*Crotalaria brevis*
	Crotalaria calycina
	Crotalaria medicaginea

Family	Species
	Desmodium gangeticum
	Desmodium muelleri
	Desmodium rhytidophyllum
	Desmodium varians
	Erythrina vespertilio
	Flemingia parviflora
	Galactia muelleri
	Galactia tenuiflora
	Glycine clandestina
	Glycine tomentella
	Hardenbergia violacea
	Hovea longipes
	Hovea tholiformis
	Indigofera hirsuta
	Indigofera linifolia
	Indigofera linnaei
	Indigofera pratensis
	Pycnospora lutescens
	Rhynchosia minima
	Solanum sp.
	*Stylosanthes humilis**
	*Stylosanthes scabra**
	Tephrosia filipes
	Tephrosia sp.
	Uraria lagopodioides
	Vigna lanceolata
	Zornia dyctiocarpa
	Zornia muriculata
	Zornia muelleriana
GOODENIACEAE	*Goodenia hederacea*
HEMEROCALLIDACEAE	*Dianella caerulea*
LAMIACEAE	*Ajuga australis*
	Clerodendrum floribundum
	Ocimum tenuiflorum
LAURACEAE	*Cassytha pubescens*
	Cassytha filiformis

Family	Species
LAXMANNIACEAE	*Eustrephus latifolius*
	Lomandra glauca
	Lomandra longifolia
	Lomandra multiflora
LOBELIACEAE	*Lobelia concolor*
LORANTHACEAE	*Amyema miquelii*
MALVACEAE	*Hibiscus meraukensis*
	*Malvastrum americanum**
	*Sida acuta**
	*Sida cordifolia**
	Sida fibulifera
	Sida hackettiana
MARSILEACEAE	*Marsilea hirsuta*
MIMOSACEAE	*Acacia calyculata*
	Acacia colei
	Acacia decora
	Acacia disparrima
	Acacia disparrima subsp. *calidestris*
	Acacia excelsa
	Acacia flavescens
	Acacia gonoclada
	Acacia hammondii
	Acacia holosericea
	Acacia hyaloneura
	Acacia implexa
	Acacia lazaridis
	Acacia leptocarpa
	Acacia leptostachya
	Acacia melanoxylon
	Acacia shirleyi
	Acacia umbellata
	Acacia victoriae
	Archidendropsis basaltica
	*Mimosa pudica**
	Neptunia gracilis
	*Vachellia bidwillii**

Family	Species
	*Vachellia farnesiana**
MORACEAE	*Ficus obliqua*
	Ficus opposita
MYRTACEAE	*Corymbia clarksoniana*
	Corymbia confertiflora
	Corymbia dallachiana
	Corymbia erythrophloia
	Corymbia intermedia
	Corymbia lamprophylla
	Corymbia leichhardtii
	Corymbia tessellaris
	Corymbia torelliana
	Corymbia setosa
	Eucalyptus brownii
	Eucalyptus camaldulensis
	Eucalyptus crebra
	Eucalyptus exilipes
	Eucalyptus howittiana
	Eucalyptus leptophleba
	Eucalyptus microneura
	Eucalyptus moluccana
	Eucalyptus persistens
	Eucalyptus platyphylla
	Eucalyptus portuensis
	Eucalyptus shirleyi
	Eucalyptus tereticornis
	Leptospermum pallidum
	Lophostemon grandiflorus
	Lophostemon suaveolens
	Melaleuca bracteata
	Melaleuca citrolens
	Melaleuca fluviatilis
	Melaleuca leucadendra
	Melaleuca nervosa
	Melaleuca trichostachya
OLEACEAE	*Jasminum didymum*

Family	Species
	Jasminum simplicifolium
ONAGRACEAE	*Ludwigia octovalvis*
ORCHIDACEAE	*Cymbidium canaliculatum*
	Dipodium variegatum
PAPAVERACEAE	*Argemone ochroleuca* subsp. *ochroleuca**
PASSIFLORACEAE	*Passiflora foetida**
	*Passiflora suberosa**
PENTAPETACEAE	*Melhania oblongifolia*
PHYLLANTHACEAE	*Breynia oblongifolia*
	Flueggea virosa
	Phyllanthus collinus
	Phyllanthus fuernrohrii
	Phyllanthus virgatus
PICRODENDRACEAE	*Petalostigma banksii*
	Petalostigma pubescens
PITTOSPORACEAE	*Bursaria incana*
	Bursaria spinosa
	Bursaria tenuifolia
	Pittosporum angustifolium
POACEAE	*Alloteropsis semialata*
	Aristida calycina
	Aristida latifolia
	Arundinella nepalensis
	Bothriochloa bladhii
	Bothriochloa decipiens
	*Bothriochloa pertusa**
	*Cenchrus ciliaris**
	Chloris pectinata
	Chrysopogon fallax
	Cleistochloa sclerachne
	Cymbopogon bombycinus
	Cymbopogon obtectus
	*Cynodon dactylon**
	*Dichanthium aristatum**
	Dichanthium fecundum
	Dichanthium sericeum

Family	Species
	Digitaria parviflora
	Enneapogon lindleyanus
	Enneapogon polyphyllus
	Enteropogon sp.
	Entolasia stricta
	Eragrostis elongata
	*Eragrostis pilosa**
	Eragrostis schultzii
	Eriachne mucronata
	Eriochloa crebra
	Heteropogon contortus
	Heteropogon triticeus
	Imperata cylindrica
	*Megathyrsus maximus**
	*Melinis repens**
	Panicum decompositum
	Panicum effusum
	Paspalidium rarum
	Perotis rara
	Schizachyrium fragile
	Sporobolus australasicus
	Themeda avenacea
	*Themeda quadrivalvis**
	Themeda triandra
	Triodia mitchellii
	Triodia pungens
	*Urochloa mosambicensis**
	*Urochloa mutica**
POLYGONACEAE	*Persicaria attenuata*
PORTULACACEAE	*Portulaca oleracea*
PROTEACEAE	*Grevillea glauca*
	Grevillea mimosoides
	Grevillea parallela
	Grevillea striata
	Grevillea wickhamii
	Hakea arborescens

Family	Species
	Hakea lorea
	Persoonia falcata
PUTRANJIVACEAE	*Drypetes deplanchei*
RHAMNACEAE	*Alphitonia excelsa*
	Alphitonia pomaderroides
RUBIACEAE	*Coelospermum reticulatum*
	Gardenia vilhelmii
	Larsenaikia ochreata
	Spermacoce brachystema
	*Spermacoce latifolia**
	Timonius timon
RUTACEAE	*Flindersia dissosperma*
	Geijera parviflora
	Geijera salicifolia
SANTALACEAE	*Exocarpos latifolius*
	Santalum lanceolatum
SAPINDACEAE	*Atalaya hemiglauca*
	Cupaniopsis anacardioides
	Dodonaea physocarpa
	Dodonaea viscosa
SCROPHULARIACEAE	*Eremophila mitchellii*
	Myoporum acuminatum
SPARRMANNIACEAE	*Corchorus aestuans*
	Grewia retusifolia
STERCULIACEAE	*Brachychiton diversifolius*
	Brachychiton populneus
VERBENACEAE	*Lantana camara**
VIOLACEAE	*Hybanthus stellarioides*
VITACEAE	*Cayratia trifolia*
	Clematicissus opaca

* Invasive species

Appendix D

Likelihood of Occurrence Assessments

Table 22 Likelihood of Occurrence Assessment - TEC

Value	Status (EPBC Act)	Preferred Habitat	Likelihood of Occurrence
TEC			
Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland	Endangered	*Melaleuca viridiflora* (broad leaf tea-tree) woodlands in high rainfall coastal north Queensland ecological community represents occurrences of woodland where *Melaleuca viridiflora* (broad leaf tea-tree) is dominant in the canopy and a diversity of grasses, sedges and forbs occupy the ground layer. The ecological community is restricted to the Wet Tropics and Central Mackay Coast bioregions in Queensland. The ecological community is typically woodland but can have a forest structure in some areas. It generally consists of two clear structural layers: a canopy of *Melaleuca viridiflora* (broad leaf tea-tree) and a diverse ground layer of grasses, sedges and forbs. Epiphytes are often conspicuous in the canopy trees. Shrubs may be present but are generally sparse although some sites have an obvious layer of *Xanthorrhoea* spp. (grass trees) (Threatened Species Scientific Committee, 2012). In Queensland, this TEC corresponds to the following REs: 7.3.8a, 7.3.8b, 7.3.8c, 7.3.8d, 7.5.4g, 8.3.2a, 8.5.2c and 8.5.6.	**Unlikely** *Melaleuca viridiflora* (broad leaf tea-tree) and the REs corresponding to this TEC were not identified within the Project site.

Table 23 Likelihood of Occurrence Assessment - Conservation Significant Flora

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Cycads			
Cycas cairnsiana	Vulnerable, Vulnerable	*Cycas cairnsiana* grows on skeletal, heavily grained soils formed by siliceous granites, often among large boulders, or sparse grasslands and sparse and low shrublands in open eucalypt woodlands. *Cycas cairnsiana* is known from three general locations in north-east Queensland: near Mount Surprise; in the upper reaches of the Roberston, Etheridge and Einasleigh River catchments; and near Kidston (Department of the Environment, 2018).	**Low** There were only a small number of large, rocky boulders recorded during the field surveys. No *Cycas* species were observed during the field surveys, despite searching within these habitat areas.
Ferns			
Lindsaea pulchella var. blanda	Vulnerable, Extinct in the Wild	*Lindsaea pulchella var. blanda* is known from a single specimen collected in 1926 in Rockingham. It is epiphyte that tends to grow on mosses on trees and on tree ferns from between 1500 - 2750 m altitude. It is very rarely terrestrial (Department of the Environment, 2018).	**Unlikely** No epiphytic mosses or tree ferns were detected during the flora survey. *Lindsaea pulchella var. blanda* is known from a single specimen collected in 1926 and is currently listed as extinct under the NC Act.
Higher Dicots			
Pink gidgee *Acacia crombiei*	Vulnerable, Vulnerable	Pink gidgee tends to occur in small, isolated populations on basalt soils in the northern extent of its range and on heavier loamy soils at the southern end of its range. Pink gidgee is endemic to central Queensland where it occurs in isolated populations. Populations occur from Muttaburra in the south to Richmond and Hughendon in the north (Department of the Environment, 2018).	**Low** The field surveys identified only a small portion of basalt plains soils (Land zone 8). These areas tended to be heavily impacted by grazing, invasive species and supported few *Acacia* species.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Tingoora wattle *Acacia tingoorensis*	-, Vulnerable	*Acacia tingoorensis* grows in *Eucalyptus* forests on deep red loam soils, gravelly soils and occasionally on shallow sandy soils. It tends to grow at an altitude of 400 – 500 m. *Acacia tingoorensis* is found near Kingaroy, in the Burnett district of south-eastern Queensland. It is also known from the Ingham area in north-eastern Queensland (Department of Environment and Heritage Protection, 2014).	**Moderate** Suitable elevated, gravely habitat was detected during the field surveys towards the eastern end of the alignment on the granitic geology (land zone 12). The field surveys thoroughly searched this habitat, including a targeted survey for this species within the high risk area near Mount Fox. No individuals were found.
Cajanus mareebensis	Endangered, -	*Cajanus mareebensis* is a prostrate, trailing annual herb that occurs in grassy woodlands composed of *Melaleuca-Acacia*, *Eucalyptus-Callitris* and *Eucalyptus-Corymbia* on mostly sandy, granite-derived soils. Before 2002, it was known only from two sites but it has recently been located at a further eight sites near Musgrave on Cape York Peninsula; at three sites from the Irvinebank to Petford area; and at one site south-west of Mount Garnet (Department of the Environment, 2018).	**Low** Only a small portion of the alignment supported granite derived soils (Land zone 12) supporting *Eucalyptus-Corymbia* woodland.
Leptospermum pallidum	-, Near Threatened	*Leptospermum pallidum* has a highly restricted distribution in Queensland. It mostly occurs around the Greenvale area on lateritic jump-ups, cliff edges and skeletal soil. It can also grow near vine thicket communities, on rocky slopes, in associated with *Eucalyptus persistens* and *Triodia* sp. (Bean, 1992). There are 20 recorded sightings to the southeast of Greenvale on either side of Gregory Highway, including near the Burdekin River.	**High** This species was recorded during the field surveys within 25 m of the Project site. Suitable laterite habitat (Land zone 7) occurs within the Project site.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Marsdenia brevifolia	Vulnerable, Vulnerable	*Marsdenia brevifolia* occurs on serpentine outcrops of crumbly black soils in eucalypt woodlands, often in association with *Eucalyptus fibrosa* or *Corymbia xanthope.* *Marsdenia brevifolia* occurs in north and central Queensland where it is known from near Townsville, Springsure and north of Rockhampton (Department of the Environment, 2018).	**Moderate** The nearest recording of the species is in the Paluma State Forest, which is 26 km to the south east of the eastern extent of the Project site. Suitable habitat consisting of *Corymbia leichhardtii* on granitic outcrops was detected at the eastern end of the alignment.
Tephrosia leveillei	Vulnerable, Vulnerable	*Tephrosia leveillei* is a low growing perennial herb that tends to grow on alluvial plains in association with *Eucalyptus cullenii*, *Corymbia erythrophloia, Erythrophleum chlorostachys* and *Grevillia glauca* as well as in tall open *Eucalyptus* and *Corymbia* forests with a dense understory of *Heteropogon contortus.* There are only five recorded collections of *Tephrosia leveillei*; however the Project site is mapped within the likely distribution of the species. It tends to occur in the habitat between Chillagoe and Forty Mile Scrub (Department of the Environment, 2018).	**Moderate** Alluvial plains with eucalypt above *Heteropogon contortus* was identified during the field surveys. The nearest known occurrence of this species is 80 km to the north of the western end of the Project site.
Monocots			
Miniature moss-orchid *Bulbophyllum globuliforme*	Vulnerable, Near Threatened	A tiny, rhizomatous, epiphytic orchid that has a preference for growing on the bark of the upper branches of emergent *Araucaria cunninghamii* (hoop pine) at altitudes between 500 to 900 m. It prefers cool, moist rainforest and upland subtropical rainforest. The Miniature moss-orchid is endemic to eastern Australia. The species is recorded from near Paluma, north-east Queensland and south to the McPherson Range on the Queensland/New South Wales border (Department of the Environment, 2018).	**Unlikely** No hoop pines were detected during the flora survey and all areas surveyed were subject to dry conditions, non-conducive of the growth of *Bulbophyllum globuliforme.* The closest known occurrence is 26 km to the south east of the eastern extent of the Project site near Paluma State Forest.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Corybas cerasinus	-, Near Threatened	*Corybas cerasinus* has been identified in a number of habitats including: • South of Cooktown on grey, gravelly loams • Beneath a dense understory off grasses and ferns in a *Casurina* woodland on dark, organic soils • Near Mount Roseville in an open eucalypt forest on granite hills that was recently burned • *Allocasuarina torulosa* and *Eucalyptus* species on granite • On black loam soil in an open forest with *Eucalyptus intermedia* and *Allocasuarina torulosa* • On steep slopes with an eastern aspect with grey, gravelly loam soils dominated by *Casuarina* and a *Themeda* understory.	**Low** *Corybas cerasinus* appears to prefer *Allocasuarina/Casuarina* forests on granitic and basaltic soils. Limited available habitat is available within the Project site, with the exception of the Mount Fox end of the alignment, where some granitic soils appear. Known occurrences of this species do not extend further inland than Mount Garnet.
Bluegrass *Dichanthium setosum*	Vulnerable, -	*Dichanthium setosum* occurs in heavy cracking clay or alluvial soils, often gilgaied, in brigalow or eucalypt communities in tropical or subtropical climates with marked seasonal drying. In Queensland the species has been reported from the Leichhardt, Morton, North Kennedy and Port Curtis regions (Department of the Environment, 2018).	**Low** No preferred habitat was recorded during the field surveys for this species. There are two previous sightings of *Dichanthium setosum* 340 km to the north of the alignment and 68 km to the south.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Lesser swamp-orchid *Phaius australis*	Endangered, Endangered	The lesser swamp orchid is restricted to the margins of swamps surrounded by dry sclerophyll, swampy rainforest or fringing open forest. It is often associated with rainforest communities and tends to be restricted to the coastal areas of Queensland. In North and Central Queensland, *Phaius australis* tends to be restricted to areas that are permanently wet (Department of the Environment, 2018).	**Low** There was no swamp habitat detected during the field surveys. The nearest known sighting of *Phaius australis* is 167 km to the north of the eastern end of the alignment in the Atherton tablelands. The vast majority of occurrences are within 70 km of the coastline due to the water requirements of the species.
Phaius pictus	Vulnerable, Vulnerable	The forest swamp orchid occurs in North Queensland and tends to have a highly localised distribution, being restricted to rainforest from 0 – 600 m in altitude in sheltered, humid sites among close to permanent sources of water and seepage among forest litter on boulders (Department of the Environment, 2018).	**Low** No suitable habitat was detected during the field surveys. Recordings of *Phaius pictus* are within the wet tropical regions and do not extend further north than Port Douglas, further south than Mission Beach and further inland than Tully Gorge National Park (approximately 41 km west of the coast).

Table 24 Likelihood of Occurrence Assessment - Conservation Significant Fauna

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Birds			
Australian painted snipe *Rostratula australis*	Endangered, Vulnerable	Preferred habitat includes shallow inland wetlands, brackish or freshwater, that are permanently or temporarily inundated. Breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Has been recorded from wetlands in all Australian states, however is most common in eastern Australia, especially the Murray-Darling Basin. Individuals are nomadic, and there is some evidence of partial migration from south-eastern wetlands to coastal central and northern Queensland in autumn and winter (Department of the Environment, 2018).	**Moderate** The Australian painted snipe may use the dams and other areas of permanent or seasonal inundation within the Project site. Records exist north-west at Georgetown and south-east around Townsville.
Black-throated finch (southern) *Poephila cincta cincta*	Endangered, Endangered	The black-throated finch's (southern) preferred habitat is grassy open woodland/forest dominated by *Eucalyptus*, *Melaleuca* or *Acacia*, but they are also known from pandanus flats and scrubby plains. The black-throated finch (southern) feeds on the seed of native grasses from the ground. Three resources are required for the species to persist: water, grass seeds and trees providing suitable habitat. If any of these three resources are not available, black-throated finch (southern) is unlikely to be present. Perennial grasses which are thought to dominate the black-throated finch's (southern) diet include: *Urochloa mosambicensis*, *Enteropogon acicularis*, *Panicum decompositum*, *Panicum effusum*, *Dichanthium sericeum*, *Alloteropsis semialata*, *Eragrostis sororia* and *Themeda triandra*. Additional species eaten by the black-throated finch (southern) include: *Schizachyrium* spp, *Echinopogon* sp, *Sorghum* spp and *Paspalum* sp (Department of the Environment, Water, 2009). The black-throated finch's (southern) primary stronghold is the region surrounding Townsville; however it is also known to occur in scattered locations across central-eastern Queensland (Department of the Environment, 2018).	**High** Records for this sub-species exist surrounding the Project site (Wildlife Online), including a record from Camel Creek Road near Mount Fox. Six of the eight preferred foraging grass species are found within the Project site: 'Essential habitat' for this species is mapped by DES in three locations surrounding the Project site.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Curlew sandpiper *Calidris ferruginea*	Critically Endangered, Endangered	Curlew sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They occur in both fresh and brackish waters. In Australia, curlew sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers (Department of the Environment, 2018).	**Moderate** Suitable habitat exists in the Project site in the form of permanent wetlands. Most records are along the coast; however there are scattered records in and surrounding the Project site.
Eastern curlew *Numenius madagascariensis*	Critically Endangered, Endangered	During the non-breeding season in Australia, the eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (*Zosteraceae*). Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. Within Australia, the eastern curlew has a primarily coastal distribution, they are rarely recorded inland (Department of the Environment, 2018).	**Unlikely** No suitable habitat exists within the Project site for this species and records indicate the species is predominately recorded in coastal areas.
Gouldian finch *Erythrura gouldiae*	Endangered, Endangered	The gouldian finch inhabits open woodlands that are dominated by *Eucalyptus* trees and support a ground cover of *Sorghum* and other grasses. The critical components of suitable core habitat for the gouldian finch appear to be the presence of favoured annual and perennial grasses (especially *Sorghum*), a nearby source of surface water and, in the breeding season, unburnt hollow-bearing *Eucalyptus* trees. This species is found in northern Australia from Cape York Peninsula through north-west Queensland and the north of the Northern Territory to the Kimberley Region of Western Australia (Department of the Environment, 2018).	**Low** The gouldian finch has undergone severe declines in Queensland and is now rarely observed in the wild. Recent records are scattered to the north west of the Project site, near Georgetown. Suitable nesting and foraging habitat is absent from the Project site.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Grey falcon *Falco hypoleucos*	-, Vulnerable	The grey falcon occurs very sparsely in the interior and north of the Australian mainland, where it prefers timbered lowland plains (especially those that are *Acacia*-dominated) which are interspersed with tree-lined watercourses or wetland areas where surface water attracts prey. The majority of its habitat has an average rainfall of less than 500 mm (Australian Wildlife Conservancy, 2018). The grey falcon been sighted over most of mainland Australia, except for Cape York.	**Moderate** The Project site supports large tracts of open woodland habitat for foraging and nesting habitat adjacent to permanent and semi-permanent water is present along the Burdekin and Einasleigh Rivers and some of the larger watercourses (Lee (McKinnons) Creek and Camel Creek).
Masked owl (northern) *Tyto novaehollandiae kimberli*	Vulnerable, Vulnerable	The masked owl is known to use a range of habitat types in Queensland including riparian woodland, rainforest, open forests, *Melaleuca* swamps and mangrove edges. In Queensland, there are historical records of the masked owl from the Normanton region, and from Pascoe, Archer, Chester and Watson Rivers on Cape York Peninsula. It occurs along the southern rim of the Gulf of Carpentaria, Cape York Peninsula and south to Atherton Tablelands and the Einasleigh-Burdekin divide (Department of the Environment, 2018).	**Low** The Project site is likely to support some preferred habitat; however is considered a low likelihood of occurrence given the absence of recent historical records, west of the Great Dividing Range.
Painted honeyeater *Grantiella picta*	Vulnerable, Vulnerable	The painted honeyeater occurs in dry forests and woodlands, where its primary food is mistletoes in the genus *Amyema*, though it will also take some nectar and insects. It is also known to occur in riparian woodland communities dominated by eucalypt species such as *Eucalyptus camaldulensis,* although its breeding distribution is dictated by the presence of mistletoes which are largely restricted to older trees. The species is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory. The greatest concentrations and almost all records of breeding come from south of 26ºS, on inland slopes of the Great Dividing Range between the Grampians, Victoria and Roma, Queensland (Department of the Environment, 2018).	**Low** The Project site is located just outside the distribution of this species. Suitable habitat exists in patches of woodland with abundant mistletoes and along the riparians corridors; however if present, this species would only be a vagrant visitor.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Red goshawk *Erythrotriorchis radiatus*	Vulnerable, Endangered	In northern Queensland, red goshawks are mainly associated with extensive, uncleared, mosaics of native vegetation, especially riparian vegetation, open forest and woodland that contain a mix of eucalypt, ironbark and bloodwood species. Permanent water (watercourses and wetlands) is usually present in close proximity, with tall emergent trees used for nesting. The red goshawk is thought to have a very large home range covering between 50 and 220 square kilometres. Sparsely distributed across coastal and sub-coastal Australia, from the western Kimberly to northern New South Wales. Appears to have been a contraction in range in recent years. Occasionally recorded from gorge country in central Australia and western Queensland (Department of the Environment, 2018).	**Moderate** Preferred nesting habitat, comprising woodlands with tall trees near permanent water, is found within the Project site. Vast areas of contiguous woodland containing a mix of eucalypt, ironbark and bloodwood species occur within the Project site.
Southern cassowary *Casuarius casuarius johnsonii*	Endangered, Vulnerable	While cassowaries live in and depend on tropical rainforest they will also utilise a mosaic of associated habitats when these are available as intermittent food sources and as connecting habitat between more suitable sites (Crome & Moore, 1990). Associated habitats utilised include mangroves, melaleuca, eucalypt woodlands, swamps and swamp forests. Cassowaries rely upon a year round supply of fleshy fruit and these associated habitats can provide crucial food resources at certain times of year. The cassowary is the only member of the cassowary family in Australia and occurs in three populations in north Queensland. In the Wet Tropics it is distributed widely from Cooktown to just north of Townsville. Core habitat is coastal lowlands between Ingham and Mossman, and uplands in the southern Atherton Tablelands and other ranges (Department of the Environment, 2018).	**Unlikely** The fleshy fruits of rainforest trees and shrubs required for foraging were not recorded. No rainforest elements were detected during field surveys, indicating the Project site is highly unlikely to support cassowary habitation. Records of the species exist in the denser forest to the east of Mount Fox.
Squatter pigeon (southern) *Geophaps scripta scripta*	Vulnerable, Vulnerable	The squatter pigeon occurs in dry grassy woodland and open forest, mostly in sandy areas close to water. This species is now largely (if not wholly) restricted to Queensland, from the New South Wales border, north to the Burdekin River, west to Charleville and Longreach, and east to the coast to Townsville and Proserpine (Department of the Environment, 2018).	**Known** This species was recorded within the Project site during the field surveys.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Mammals			
Bare-rumped sheath-tailed bat *Saccolaimus saccolaimus nudicluniatus*	Vulnerable, Endangered	The bare-rumped sheath-tailed bat occurs mostly in lowland areas, typically in a range of woodland, forest and open environments, and possibly rainforest. In Queensland, the bare-rumped sheath-tailed bat occurs from Ayr to the Iron Range, including Magnetic and possibly Prince of Wales Islands. Most records are near-coastal, but one record (at Jasper Gorge, Northern Territory) has been found 150 km inland (Department of the Environment, 2018).	**Unlikely** This species is known from lowland coastal areas in Queensland, and favours woodland communities dominated by *Eucalyptus platyphylla* and *Eucalyptus tetrodonta*. With no inland records within Queensland, this species is considered unlikely to occur within the Project site.
Black-footed tree-rat *Mesembriomys gouldii rattoides*	Vulnerable, -	In north Queensland, this species mostly occurs in eucalypt forests and woodlands, especially where hollows are relatively plentiful. The distribution of the black-footed tree rat (north Queensland) is poorly known. It has been recorded mostly from eucalypt forests and woodlands (but not rainforests) around Mareeba, but there are records sparsely across Cape York Peninsula (Department of the Environment, 2018).	**Low** Suitable habitat for this species was identified during the field surveys. One record of this species from 1986 occurs approximately 16 km south of the Project site, along Kennedy Development Road; however all recent records of this species are approximately 200 km north of the Project site.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Chestnut dunnart *Sminthopsis archeri*	-, Near Threatened	This species is known from open woodland to tall open forest and heathlands, but is thought to prefer stringybark woodlands on red earths, although little is known about its ecology and few surveys have been undertaken throughout its potential distribution across northern Queensland and the Northern Territory. The latest specimen, from Blackbraes National Park, was taken in bloodwood and ironbark eucalypt woodland on granite soils. The chestnut dunnart was thought to be restricted to southern Papua New Guinea and Cape York, until it was recorded in woodlands approximately 200 km west of Townsville at Blackbraes National Park (Wilson and Reeder, 2005).	**Moderate** Bloodwood and ironbark eucalypt woodland on granite occurs within the Project site. Given the poorly understood ecology of this species within Einasleigh Uplands and that the Project site supports similar woodland to that described in Blackbraes National Park, the species is a moderate occurrence, particularly in the granite derived woodlands.
Ghost bat *Macroderma gigas*	Vulnerable, Endangered	The ghost bat currently occupies habitats ranging from the arid Pilbara to tropical savanna woodlands and rainforests. During the daytime they roost in caves, rock crevices and old mines. Roost areas used permanently are generally deep natural caves or disused mines with a relatively stable temperature of 23°−28°C and a moderate to high relative humidity of 50−100%. The species' current range is discontinuous, with geographically disjunct colonies occurring in the Pilbara, Kimberley, Northern Territory, the Gulf of Carpentaria, coastal and near coastal eastern Queensland from Cape York to near Rockhampton, and western Queensland (Department of the Environment, 2018).	**High** Caves, large rock crevices and old mines were identified within and adjacent to the Project site and may provide roosting sites for this species. Records of this species exist surrounding the Project site. Ghost bat echolocation call is of low intensity, making it difficult to detect with a bat detector.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Grey-headed flying-fox *Pteropus poliocephalus*	Vulnerable, -	The grey-headed flying-fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, *Melaleuca* swamps and *Banksia* woodlands. The primary food source is blossom from *Eucalyptus* and related genera but in some areas it also utilises a wide range of rainforest fruits. Grey-headed flying-foxes occupy the coastal lowlands and slopes of south-eastern Australia from Bundaberg to Geelong and are usually found at altitudes < 200 m. Areas of repeated occupation extend inland to the tablelands and western slopes in northern New South Wales and the tablelands in southern Queensland (Department of the Environment, 2018).	**Low** Suitable foraging habitat was identified during the field surveys. However, no known grey-headed flying-fox roosts are mapped in the Project site, and no recent records exist in close proximity to the site. The closest known mixed colony flying-fox roost is at Ingham (~45 km east of the most eastern extent of the Project site).
Koala *Phascolarctos cinereus*	Vulnerable, Vulnerable	Koalas inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities. Koalas eat a variety of eucalypt leaves and a few other related tree species, including *Lophostemon*, *Melaleuca* and *Corymbia* species. Koalas are found in higher densities where food trees are growing on more fertile soils and along watercourses. They do, however, remain in areas where their habitat has been partially cleared and in urban areas. In north Queensland, the koala's distribution extends inland from the east coast: from the Wet Tropics bioregion, into the Einasleigh Uplands bioregion in the north of the state (Department of the Environment, 2018). The northern limit of the distribution of the koala in Queensland has contracted to the south, from approximately Cooktown to inland of Cairns, since the late 1960s.	**High** Suitable habitat for this species occurs within the Project site. Scats collected within the Project site were identified by Barbara Triggs as 'probable' koala. Anecdotal information acquired from on-site personnel and local residents have confirmed the recent occurrence of an individual koala within the Kidston Solar Farm - Stage 1 site, adjacent to the Project site, as well as two recent sightings along the Copperfield River. Additionally, anecdotal information provided by landowners of Lot 1/CLK23 and Lot 6/WU50 noted koala presence within these land parcels.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Large-eared horseshoe bat *Rhinolophus philippinensis*	Vulnerable, Endangered	The primary habitat of the large-eared horseshoe bat is rainforests. Daytime roosting habitat for this species includes caves and underground mines located in rainforest, and open eucalypt forest and woodland. The large-eared horseshoe bat occurs only in northern Queensland, from the Iron Range southwards to Townsville and west to the karst regions of Chillagoe and Mitchell-Palmer (Department of the Environment, 2018).	**Low** The Project site lacks the preferred habitat of rainforest and gallery forest-lined creeks. While caves and abandoned mines are found within the Project site, these are not located in the preferred rainforest habitat. All records of this species are found within tropical habitat.
Greater glider *Petauroides volans*	Vulnerable, Vulnerable	The greater glider is largely restricted to eucalypt forests. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The greater glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria, with an elevational range from sea level to 1200 m above sea level. An isolated inland subpopulation occurs in the Gregory Range west of Townsville, and another in the Einasleigh Uplands (Department of the Environment, 2018).	**Known** This species was recorded within the Project site during the field surveys.
Northern quoll *Dasyurus hallucatus*	Endangered, -	The northern quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Northern quoll are also known to occupy non rocky lowland habitats such as beachscrub communities in central Queensland. Northern quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes. In Queensland, the northern quoll is known to occur as far south as Gracemere and Mount Morgan, south of Rockhampton, as far north as Weipa in Queensland and extends as far west into central Queensland to the vicinity of Carnarvon Range National Park (Department of the Environment, 2018).	**High** Large tracts of suitable open woodland habitat exist across the Project site, with denning sites available in hollow logs, tree hollows and termitaria. Rock outcrops also exists within the Project site.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Semon's leaf-nosed bat *Hipposideros semoni*	Vulnerable, Endangered	Semon's leaf-nosed bat is found in tropical rainforest, monsoon forest, wet sclerophyll forest and open savannah woodland. The known broad-scale distribution for Semon's leaf-nosed bat includes coastal Queensland from Cape York to just south of Cooktown (Department of the Environment, 2018).	**Unlikely** This species is known from coastal areas and the closest records are approximately 375 km north of the Project site.
Sharman's rock-wallaby *Petrogale sharmani*	Vulnerable, Vulnerable	The species occurs in a variety of rocky habitats (including rocky outcrops, boulder piles, gorges, cliff lines and rocky slopes) within open forests or grassy woodlands. It shelters during the day in rocky refuges or dense vegetation, emerging at dusk to feed. The range of Sharman's rock-wallaby is limited. It is known from only about 20 colonies scattered within a 2,000 km^2 area of the Seaview and Coane Ranges, west of Ingham in north-eastern Queensland (Department of the Environment, 2018).	**Known** This species was recorded within the Project site during the field surveys.
Short-beaked echidna *Tachyglossus aculeatus*	-, Special Least Concern	The short-beaked echidna lives in forests and woodlands, heath, grasslands and arid environments. This species can live anywhere with a good supply of food, and regularly feast on ants and termites. The short-beaked echidna is found throughout Australia (WetlandInfo, 2018).	**Known** This species was recorded within the Project site during the field surveys.
Spectacled flying-fox *Pteropus conspicillatus*	Vulnerable, Vulnerable	This species was long assumed to feed primarily on rainforest species but individuals regularly feed on a wide variety of non-rainforest species, including eucalypts (*Eucalyptus* spp., *Corymbia* spp.) in tall open forests adjoining rainforest communities and in tropical woodland and savanna ecosystems. The spectacled flying-fox occurs in north-eastern Queensland, north of Cardwell with past records from Brisbane and Chillagoe. It is restricted to tropical rainforest areas, most specifically, the species occurs between Ingham and Cooktown, and between the McIlwrait and Iron Ranges of Cape York (Department of the Environment, 2018).	**Low** Suitable habitat in the form of wet, closed forest was not identified during the field surveys; however suitable foraging habitat within the Project site is present. No known spectacled flying-fox roosts are mapped in the Project site. The closest known roost is at Ingham (~45 km east of the Project site).

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Spotted-tailed quoll *Dasyurus maculatus gracilis*	Endangered, Endangered	The spotted-tailed quoll is mostly confined to the relatively cool, wet and climatically equable upland closed-forests (mostly above 900 m altitude) that occur in the upper catchments of rivers draining east and west of the Eastern Escarpment in the Wet Tropics bioregion of north-eastern Queensland. The northern taxon of this species is thought to be confined to two extant populations: one centered on the Windsor and Carbine Tablelands, Thornton Peak, Mount Finnegan and associated smaller ranges; and the other centered on the Atherton Tablelands and associated mountain ranges (Department of the Environment, 2018).	**Unlikely** Suitable habitat in the form of wet, closed forest was not identified during the field surveys. The Project site is just outside of the species distribution.
Reptiles			
Common death adder *Acanthophis antarcticus*	-, Vulnerable	Within its range, the species is found in a wide variety of habitats in association with deep leaf litter, including rainforests, wet sclerophyll forests, woodland, grasslands, chenopod dominated shrublands, and coastal heathlands. This species occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales, and through to the southern parts of South Australia and Western Australia (Department of Environment and Heritage Protection, 2017).	**Moderate** Suitable habitat exists within the Project site to support this species.
Saltwater crocodile *Crocodylus porosus*	Migratory, Vulnerable	The saltwater crocodile mostly occurs in tidal rivers, coastal floodplains and channels, billabongs and swamps up to 150 km inland from the coast. Preferred nesting habitat includes elevated, isolated freshwater swamps that do not experience the influence of tidal movements. In Queensland the saltwater crocodile inhabits reef, coastal and inland waterways from Gladstone on the east coast, throughout the Cape York Peninsula and west to the Queensland-Northern Territory border. A seven-year survey recorded 6,444 sightings of the species in the waterways of the Southern Gulf Plains, Northern Gulf Plains, north-west and north-east Cape York Peninsula, Lakefield National Park, East Coast Plains, the Burdekin River catchment and the Fitzroy River catchment (Department of the Environment, 2018).	**Low** While the Burdekin River flows through the Project site, all records of this species are closer to the coast.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Yakka skink *Egernia rugosa*	Vulnerable, Vulnerable	Habitat requirements for the yakka skink in the Einasleigh Uplands are poorly understood, although known to include • *Corymbia citriodora*, *Eucalyptus granitica*, *Corymbia stockeri*, *Eucalyptus portuensis* open forest on granite hillslopes. • Deciduous vine forest. • *Eucalyptus whitei* woodland. The known distribution of the yakka skink extends from the coast to the hinterland of sub-humid to semi-arid eastern Queensland. This vast area covers portions of the Brigalow Belt, Mulga Lands, South-east Queensland, Einasleigh Uplands, Wet Tropics and Cape York Peninsula Biogeographical Regions (Department of the Environment, 2018).	**Low** Limited suitable habitat is found within the Project site. The nearest records of this species are 150 km south of the Project site.
Amphibians			
Australian lace-lid *Litoria dayi*	Endangered, Endangered	This frog is a rainforest species, endemic to the Wet Tropics bioregion. It is associated with rainforests and rainforest margins. In montane areas the species prefers fast-flowing rocky streams although they also frequent slower watercourses where ample vegetation exists along the margins. The Australian lace-lid frog occurs throughout the Wet Tropics Bioregion from Paluma to Cooktown, northern Queensland, at altitudes between 0 and 1200 m (Department of the Environment, 2018).	**Unlikely** The Project site is in the distribution of the species; however it lacks the rainforest, rocky streams.
Common mistfrog *Litoria rheocola*	Endangered, Endangered	The common mistfrog is a rainforest specialist, endemic to the Wet Tropics Bioregion. The species is restricted to fast flowing rocky creeks and streams in rainforest as well as wet sclerophyll forest. Within these streams this species are often found in the slower more open sections, away from waterfalls. The common mistfrog historically occurred from Broadwater Creek National Park to Amos Bay, northern Queensland, at altitudes between 0 and 1180 m above sea level. It has since disappeared from most upland sites south of the Daintree River (Department of the Environment, 2018).	**Unlikely** The Project site is in the distribution of the species; however it lacks the necessary habitat.

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Waterfall frog *Litoria nannotis*	Endangered, Endangered	The Waterfall Frog is a stream dwelling species that is endemic to the Wet Tropics bioregion. It is restricted to rocky stream habitats in rainforest or wet sclerophyll forest where there is fast flowing water, waterfalls and cascades. The Waterfall Frog occurs throughout the Wet Tropics Bioregion, North Queensland, from Paluma to Cooktown (Department of the Environment, 2018).	**Unlikely** The Project site is in the distribution of the species; however it lacks the necessary habitat.

Table 25 Likelihood of Occurrence Assessment - Migratory Fauna

Species	Status (EPBC Act, NC Act)	Preferred Habitat	Likelihood of Occurrence
Migratory Marine Birds			
Fork-tailed swift *Apus pacificus*	Migratory, Special Least Concern	The fork-tailed swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. This species mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. Recorded generally east of the Great Dividing Range from Cooktown to the New South Wales border, but extends further west in southern Queensland (Department of the Environment, 2018).	**Low** Aerial species known to fly over broad habitat types. May occur in the airspace above the Project site.
Migratory Terrestrial Species			
Oriental cuckoo *Cuculus optatus*	Migratory, Special Least Concern	The species uses a range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types. The oriental cuckoo is a regular migrant to Australia, where it spends the non-breeding season (Sept- May) in coastal regions across northern and eastern Australia as well as offshore islands (Department of the Environment, 2015).	**Moderate** Suitable habitat occurs within the Project site and the species has been recorded surrounding the Project site.
White-throated needletail *Hirundapus caudacutus*	Migratory, Special Least Concern	The white-throated needletail is found across a range of habitats, more often over wooded areas, where it is almost exclusively aerial, though does occasionally roost in tree hollows and the foliage canopy. It forages for insects on the wing; flying anywhere between “cloud level” and “ground level” and readily forms mixed feeding flocks with other aerial insectivores. This species is widespread in eastern and south-eastern Australia. In eastern Australia, it is recorded in all coastal regions of Queensland and New South Wales, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (Department of the Environment, 2015).	**Low** Aerial species known to fly over broad habitat types. May occur in the airspace above the Project site.

Barn swallow *Hirundo rustica*	Migratory, Special Least Concern	In Australia, the barn swallow is recorded in open country in coastal lowlands, often near water, towns and cities. Birds are often sighted perched on overhead wires, and also in or over freshwater wetlands, paperbark *Melaleuca* woodland, mesophyll shrub thickets and tussock grassland. The barn swallow usually occurs in northern Australia, on Cocos-Keeling Island, Christmas Island, Ashmore Reef, and patchily along the north coast of the mainland from the Pilbara region, Western Australia, to Fraser Island in Queensland (Department of the Environment, 2015).	**Low** Suitable habitat is present in the Project site; however all records of the barn swallow are in coastal areas. If present, this species would only be an infrequent visitor.
Black-faced monarch *Monarcha melanopsis*	Migratory, Special Least Concern	The black-faced monarch is a wet forest specialist, occurring mainly in rainforests and riparian vegetation. This species mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrub land, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest. In Queensland, the black-faced monarch is widespread from the islands of the Torres Strait and on Cape York Peninsula, south along the coasts (occasionally including offshore islands) and the eastern slopes of the Great Divide, to the New South Wales border (Department of the Environment, 2015).	**Low** Wet forest and rainforest were not identified during the field surveys. Numerous records exist approximately 40 km east of Mount Fox, in the wetter forests around Paluma.
Spectacled monarch *Monarcha trivirgatus*	Migratory, Special Least Concern	This species occupies dense vegetation, mainly in rainforest but also in moist or wet sclerophyll forest and occasionally in other densely vegetated habitats such as mangroves, drier forest, woodlands, parks and gardens. The spectacled monarch is found in coastal north-eastern and eastern Australia, including coastal islands, from Cape York, Queensland to Port Stephens, New South Wales (Department of the Environment, 2015).	**Low** Wet forest and rainforest were not identified during the field surveys. Numerous records exist approximately 40 km east of Mount Fox, in the wetter forests around Paluma.

Grey wagtail *Motacilla cinerea*	Migratory, Special Least Concern	The species has a strong association with water. In their normal breeding range, grey wagtails are found across a variety of wetlands, especially watercourses, but also on the banks of lakes and marshes, as well as artificial wetlands such as sewage farms, reservoirs and fishponds. This association with water extends into non-breeding habitats with all confirmed Australian records being associated with water; especially creeks, rivers and waterfalls. The grey wagtail is a scarce but regular visitor to northern Australia, generally arriving during the last 10 days of October and departing around March (Department of the Environment, 2015).	**Low** Suitable habitat is present in the Project site; however all records of the grey wagtail are in coastal areas and this species is a scarce visitor to northern Australia. If present, this species would only be an infrequent visitor.
Yellow wagtail *Motacilla flava*	Migratory, Special Least Concern	Habitat requirements for the yellow wagtail are highly variable, but typically include open grassy flats near water. Habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, sometimes utilise tidal mudflats and edges of mangroves. The yellow wagtail is a regular wet season visitor to northern Australia. In Queensland this species is a regular visitor from Mossman south to Townsville. The species is a vagrant further south and on Heron Island (Department of the Environment, 2015).	**Low** Suitable habitat is present in the Project site; however all records of the yellow wagtail are in coastal areas. The Project site is just outside the species likely distribution.
Satin flycatcher *Myiagra cyanoleuca*	Migratory, Special Least Concern	Satin flycatchers are eucalypt forest and woodland inhabitants. During the non-breeding period, some individuals winter in northern Queensland around Innisfail and farther north around Atherton; however their movements are described as erratic. Wintering birds in northern Queensland will use rainforest - gallery forests interfaces, and birds have been recorded wintering in mangroves and paperbark swamps. In Queensland, this species is widespread but scattered in the east, being recorded on passage on a few islands in the western Torres Strait. Satin flycatchers are also found extensively along the Great Dividing Range (Department of the Environment, 2015).	**Low** Preferred wintering habitat such as rainforest - gallery forests interfaces, mangroves and paperbark swamps are not found within the Project site. If present, this species would only be a very infrequent migrant visitor.

Rufous fantail *Rhipidura rufifrons*	Migratory, Special Least Concern	In east and south-east Australia, the rufous fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts, usually with a dense shrubby understorey often including ferns. The rufous fantail is found in northern and eastern coastal Australia, being more common in the north. This species migrates to south-east Australia in October-April to breed, mostly in or on the coastal side of the Great Dividing Range (Department of the Environment, 2015).	**Low** Wet forest was not identified during the field surveys. Numerous records exist approximately 40 km east of Mount Fox, in the wetter forests around Paluma.
Migratory Wetland Species			
Common sandpiper *Actitis hypoleucos*	Migratory, Special Least Concern	The common sandpiper is known to occur in a range of wetland environments, both coastal and inland. Their primary habitat is rocky shorelines and narrow muddy margins of billabongs, lakes, estuaries and mangroves. Found along all coastlines of Australia and in many areas inland, the common sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia (Department of the Environment, 2018).	**Moderate** Suitable habitat exists in the Project site in the form of permanent wetlands. Most records are along the coast; however there are scattered records further inland surrounding the Project site.
Sharp-tailed sandpiper *Calidris acuminata*	Migratory, Special Least Concern	In Australasia, the sharp-tailed sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland. In Queensland, the sharp-tailed sandpiper are recorded in most regions, being widespread along much of the coast and are very sparsely scattered inland, particularly in central and south-western regions. Many inland records are of birds on passage (Department of the Environment, 2018).	**Low** Suitable habitat exists in the Project site in the form of permanent wetlands. However, most records of this species are along the coast. Scattered inland records do occur; however these are most likely of birds on passage.

Pectoral sandpiper *Calidris melanotos*	Migratory, Special Least Concern	This species is usually found in coastal or near coastal habitat but very occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. In Queensland, most records for the pectoral sandpiper occur around Cairns. There are scattered records elsewhere, mainly from east of the Great Divide between Townsville and Yeppoon. Records also exist in the south-east of the state as well as a few inland records at Mount Isa, Longreach and Oakley (Department of the Environment, 2018).	**Low** Records indicate the species is predominately recorded in coastal areas at Cairns and Townsville. If present, this species would only be an infrequent visitor.
Latham's snipe *Gallinago hardwickii*	Migratory, Special Least Concern	In Australia, the Latham's snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). Latham's snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia. This species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia. In Queensland, the range extends inland over the eastern tablelands in south-eastern Queensland (Department of the Environment, 2018).	**Low** This species has been recorded in the broader region, and dams within the Project site may support this species. However, this species is only a passage migrant to northern Australia.
Osprey *Pandion haliaetus*	Migratory, Special Least Concern	Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging. The breeding range of the osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in New South Wales; with a second isolated breeding population on the coast of South Australia, extending from Head of Bight east to Cape Spencer and Kangaroo Island (Department of the Environment, 2018).	**Low** This species may occasionally travel inland to the Project site along the major rivers; however if present, would only be an infrequent visitor.

Common greenshank *Tringa nebularia*	Migratory, Special Least Concern	The common greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. In Queensland, this species is widespread in the Gulf country and eastern Gulf of Carpentaria. It has been recorded in most coastal regions, possibly with a gap between north Cape York Peninsula and Cooktown. Inland, there have been a few records south of a line from near Dalby to Mount Guide, and sparsely scattered records elsewhere (Department of the Environment, 2018).	**Moderate** Suitable habitat exists in the Project site in the form of permanent wetlands. Most records are along the coast; however there are scattered records further inland surrounding the Project site.

Appendix E

Fauna Species List

Table 26 Fauna Species List

Common Name	Scientific Name	Incidental Sighting	Habitat Type							
			1	2	3	4	5	6	7	8
Birds										
Australian owlet-nightjar	*Aegotheles cristatus*			✓						
Azure kingfisher	*Alcedo azurea*			✓						
Chestnut teal	*Anas castanea*									✓
Grey teal	*Anas gracilis*									✓
Pacific black duck	*Anas superciliosa*									✓
Australasian darter	*Anhinga novaehollandiae*									✓
Australasian pipit	*Anthus novaeseelandiae*	✓								
Intermediate egret	*Ardea intermedia*									✓
Eastern great egret	*Ardea modesta*									✓
White-necked heron	*Ardea pacifica*	✓		✓						✓
Australian bustard	*Ardeotis australis*	✓	✓							
White-breasted woodswallow	*Artamus leucorynchus*	✓								
Red-winged parrot	*Aprosmictus erythropterus*	✓	✓	✓				✓		
Wedge-tailed eagle	*Aquila audax*		✓					✓		
Hardhead	*Aythya australis*									✓
Cattle egret	*Bubulcus ibis*									✓
Sulphur-crested cockatoo	*Cacatua galerita*	✓	✓	✓						✓

Common Name	Scientific Name	Incidental Sighting	Habitat Type							
			1	2	3	4	5	6	7	8
Fan-tailed cuckoo	*Cacomantis flabelliformis*			✓						
Red-tailed black-cockatoo	*Calyptorhynchus banksii*	✓						✓		
Pheasant coucal	*Centropus phasianinus*	✓	✓	✓			✓	✓	✓	
Horsfield's bronze-cuckoo	*Chalcites basalis*			✓						
Australian wood duck	*Chenonetta jubata*									✓
Great bowerbird	*Chlamydera nuchalis*	✓	✓				✓			
Brown treecreeper	*Climacteris picumnus*		✓				✓			
Black-faced cuckoo-shrike	*Coracina novaehollandiae*	✓	✓					✓	✓	
White-bellied cuckoo-shrike	*Coracina papuensis*	✓		✓						
White-throated treecreeper	*Cormobates leucophaea*			✓						
Little crow	*Corvus bennetti*	✓								
Australian raven	*Corvus coronoides*			✓						
Torresian crow	*Corvus orru*	✓	✓	✓			✓	✓	✓	✓
Brown quail	*Coturnix ypsilophora*	✓								
Grey butcherbird	*Cracticus torquatus*	✓	✓	✓		✓	✓	✓		✓
Pied butcherbird	*Cracticus nigrogularis*	✓	✓	✓				✓	✓	✓
Australian magpie	*Cracticus tibicen*	✓		✓		✓	✓	✓	✓	
Black swan	*Cygnus atratus*									✓

Common Name	Scientific Name	Incidental Sighting	Habitat Type							
			1	2	3	4	5	6	7	8
Laughing kookaburra	*Dacelo novaeguineae*		✓	✓		✓	✓	✓		
Blue-winged kookaburra	*Dacelo leachii*	✓					✓	✓		
Varied sittella	*Daphoenositta chrysoptera*								✓	
Plumed whistling duck	*Dendrocygna eytoni*									✓
Mistletoebird	*Dicaeum hirundinaceum*			✓						
Emu	*Dromaius novaehollandiae novaehollandiae*	✓	✓	✓				✓	✓	
Little egret	*Egretta garzetta*									✓
White-faced heron	*Egretta novaehollandiae*									✓
Black-fronted dotterel	*Elseyornis melanops*									✓
Blue-faced honeyeater	*Entomyzon cyanotis*	✓	✓	✓				✓		
Galah	*Eolophus roseicapillus*	✓	✓	✓				✓		✓
Eastern yellow robin	*Eopsaltria australis*						✓			
Red-kneed dotterel	*Erythrogonys cinctus*									✓
Pacific koel	*Eudynamys orientalis*		✓					✓		
Dollarbird	*Eurystomus orientalis*						✓			
Brown falcon	*Falco berigora*	✓								
Nankeen kestrel	*Falco cenchroides*	✓								
Australian hobby	*Falco longipennis*									✓

Common Name	Scientific Name	Incidental Sighting	Habitat Type							
			1	2	3	4	5	6	7	8
Eurasian coot	*Fulica atra*	✓								✓
Peaceful dove	*Geopelia striata*	✓		✓			✓	✓		
Squatter pigeon (northern)	*Geophaps scripta peninsulae*	✓								✓
Squatter pigeon (southern)	*Geophaps scripta scripta*	✓							✓	
White-throated gerygone	*Gerygone olivacea*		✓	✓				✓	✓	
Magpie-lark	*Grallina cyanoleuca*	✓		✓			✓			✓
Brolga	*Grus rubicunda*									✓
White-bellied sea-eagle	*Haliaeetus leucogaster*			✓						
Whistling kite	*Haliastur sphenurus*	✓	✓	✓						✓
Black-winged stilt	*Himantopus himantopus*									✓
Comb-crested jacana	*Irediparra gallinacea*									✓
Brown honeyeater	*Lichmera indistincta*	✓		✓		✓	✓	✓	✓	✓
Pink-eared duck	*Malacorhynchus membranaceus*									✓
Red-backed fairywren	*Malurus melanocephalus*	✓								
Yellow-throated miner	*Manorina flavigula*			✓						
Noisy miner	*Manorina melanocephala*	✓	✓	✓		✓	✓	✓	✓	
Lewin's honeyeater	*Meliphaga lewinii*	✓					✓			
White-throated honeyeater	*Melithreptus albogularis*		✓	✓			✓	✓	✓	

Common Name	Scientific Name	Incidental Sighting	Habitat Type							
			1	2	3	4	5	6	7	8
Rainbow bee-eater	*Merops ornatus*			✓		✓				
Little pied cormorant	*Microcarbo melanoleucos*									✓
Black kite	*Milvus migrans*	✓	✓	✓						✓
Leaden flycatcher	*Myiagra rubecula*		✓	✓						
Scarlet honeyeater	*Myzomela sanguinolenta*			✓			✓			✓
Red-browed finch	*Neochmia temporalis*						✓			
Cotton pygmy-goose	*Nettapus coromandelianus*									✓
Southern boobook	*Ninox novaeseelandiae*					✓				
Helmeted guineafowl	*Numida meleagris**	✓								
Nankeen night-heron	*Nycticorax caledonicus*									✓
Crested pigeon	*Ocyphaps lophotes*	✓	✓					✓		
Rufous whistler	*Pachycephala rufiventris*			✓			✓	✓		
Striated pardalote	*Pardalotus striatus*		✓	✓	✓	✓	✓	✓	✓	✓
Australian pelican	*Pelecanus conspicillatus*									✓
Tree martin	*Petrochelidon nigricans*	✓							✓	
Pied cormorant	*Phalacrocorax varius*									✓
Little black cormorant	*Phalacrocorax sulcirostris*									✓
Common bronzewing	*Phaps chalcoptera*	✓								

Common Name	Scientific Name	Incidental Sighting	Habitat Type							
			1	2	3	4	5	6	7	8
Little friarbird	*Philemon citreogularis*	✓	✓	✓		✓		✓		
Noisy friarbird	*Philemon corniculatus*	✓	✓	✓		✓		✓		✓
Pale-headed rosella	*Platycercus adscitus*	✓	✓	✓				✓	✓	✓
Glossy ibis	*Plegadis falcinellus*									✓
Tawny frogmouth	*Podargus strigoides*			✓					✓	
Grey-crowned babbler	*Pomatostomus temporalis*		✓	✓						
Purple swamphen	*Porphyrio porphyrio*									✓
Brown-backed honeyeater	*Ramsayornis modestus*			✓						
Grey fantail	*Rhipidura albiscapa*		✓	✓		✓	✓	✓	✓	
Willie wagtail	*Rhipidura leucophrys*	✓		✓				✓		✓
Channel-billed cuckoo	*Scythrops novaehollandiae*						✓	✓		
Weebill	*Smicrornis brevirostris*		✓					✓		
Freckled duck	*Stictonetta naevosa*									✓
Pied currawong	*Strepera graculina*	✓		✓		✓	✓	✓	✓	✓
Apostlebird	*Struthidea cinerea*	✓		✓						
Australasian grebe	*Tachybaptus novaehollandiae*									✓
Double-barred finch	*Taeniopygia bichenovii*		✓	✓						
Zebra finch	*Taeniopygia guttata*					✓				

Common Name	Scientific Name	Incidental Sighting	Habitat Type							
			1	2	3	4	5	6	7	8
Straw-necked ibis	*Threskiornis spinicollis*									✓
Sacred kingfisher	*Todiramphus sanctus*			✓						
Scaly-breasted lorikeet	*Trichoglossus chlorolepidotus*	✓								
Rainbow lorikeet	*Trichoglossus moluccanus*	✓	✓	✓			✓	✓	✓	
Forest kingfisher	*Todiramphus macleayii*			✓				✓	✓	
Grey-tailed tattler	*Tringa brevipes*									✓
Eastern barn owl	*Tyto javanica*			✓						
Masked lapwing	*Vanellus miles miles*	✓								✓
Fishes										
Spangled perch	*Leiopotherapon unicolor*	✓								
Sea mullet	*Mugil cephalus*	✓								
Mammals										
Rufous bettong	*Aepyprymnus rufescens*	✓		✓						✓
White-striped free-tailed bat	*Austronomus australis*		✓	✓						
Chital	*Axis axis**	✓								
Wild dog/dingo	*Canis lupus**	✓	✓	✓		✓		✓		
Northern freetail bat	*Chaerephon jobensis*		✓	✓				✓	✓	✓
Gould's wattled bat	*Chalinolobus gouldii*		✓	✓				✓	✓	✓

Common Name	Scientific Name	Incidental Sighting	Habitat Type							
			1	2	3	4	5	6	7	8
Chocolate wattled bat	*Chalinolobus morio*									✓
Hoary wattled bat	*Chalinolobus nigrogriseus*									✓
Bat species	*Chalinolobus nigrogriseus/Scotorepens* spp.		✓	✓				✓	✓	
Feral cat	*Felis catus**	✓	✓							
Northern brown bandicoot	*Isoodon macrourus*			✓						
Agile wallaby	*Macropus agilis*	✓						✓		
Antilopine wallaroo	*Macropus antilopinus*	✓								
Eastern grey kangaroo	*Macropus giganteus*	✓	✓	✓			✓	✓	✓	
Whiptail wallaby	*Macropus parryi*	✓							✓	
Common wallaroo	*Macropus robustus*	✓		✓			✓	✓	✓	✓
Red-necked wallaby	*Macropus rufogriseus*	✓								
Red kangaroo	*Macropus rufus*	✓								
Little bent-wing bat	*Miniopterus australis*		✓	✓				✓	✓	✓
Australasian bent-wing bat	*Miniopterus orianae*		✓	✓				✓	✓	
Eastern bent-wing bat	*Miniopterus schreibersii oceanensis*									✓
Nyctophilus species	*Nyctophilus* spp.			✓						✓
European rabbit	*Oryctolagus cuniculus**	✓	✓			✓		✓	✓	✓
Northern free-tailed bat	*Ozimops lumsdenae*		✓	✓				✓	✓	✓

Common Name	Scientific Name	Incidental Sighting	Habitat Type							
			1	2	3	4	5	6	7	8
Eastern free-tailed bat	*Ozimops ridei*		✓	✓				✓	✓	✓
Greater glider	*Petauroides volans*		✓							
Sharman's rock-wallaby	*Petrogale sharmani*								✓	
Smaller horseshoe bat	*Rhinolophus megaphyllus*								✓	
Yellow-bellied sheathtail bat	*Saccolaimus flaviventris*		✓					✓	✓	✓
Inland broad-nosed bat	*Scotorepens balstoni*									✓
Scotorepens species	*Scotorepens greyi/Scotorepens sanborni*									✓
Feral pig	*Sus scrofa**		✓	✓	✓			✓		✓
Short-beaked echidna	*Tachyglossus aculeatus*		✓			✓	✓	✓	✓	✓
Common brushtail possum	*Trichosurus vulpecular*		✓	✓				✓	✓	
Eastern cave bat	*Vespadelus troughtoni*		✓					✓	✓	
Swamp wallaby	*Wallabia bicolor*	✓	✓	✓						
Reptiles										
Brown tree snake	*Boiga irregularis*					✓				
Lined rainbow-skink	*Carlia jarnoldae*								✓	
Shaded-litter rainbow-skink	*Carlia munda*							✓	✓	
Lively rainbow-skink	*Carlia vivax*		✓							
Elegant snake-eyed skink	*Cryptoblepharus pulcher*							✓		

Common Name	Scientific Name	Incidental Sighting	Habitat Type							
			1	2	3	4	5	6	7	8
Yellow-faced whipsnake	*Demansia psammophis*	✓								
Tommy-round head	*Diporiphora australis*	✓						✓	✓	
Bynoe's gecko	*Heteronotia binoei*					✓		✓	✓	
Eastern brown snake	*Pseudonaja textilis*	✓								
Amphibians										
Cane toad	*Bufo marinus**	✓	✓	✓						
Green tree frog	*Litoria caerulea*								✓	

* Invasive species

Appendix F

Fauna Habitat Types

Habitat Type 1 Open *Eucalyptus* Woodland on Alluvium or Sand Plains
Analogous REs
9.3.3a, 9.3.5, 9.3.6a, 9.3.16, 9.3.20, 9.3.22a, 9.5.3, 9.5.11.
Vegetation Description
The canopy vegetation is typically dominated by *Eucalyptus platyphylla* (poplar gum), *Eucalyptus crebra* (narrow-leaved ironbark), *Eucalyptus brownii* (Brown's box) and *Corymbia dallachiana* (Dallachy's gum). The shrub layer was consistently sparse, primarily comprising species such as *Carissa lanceolata* (conkerberry), with the exotic weed *Sida cordifolia* (country mallow) dominating some areas. Ground cover was generally sparse to bare and was dominated by native grasses, including *Bothriochloa* sp. and *Lomandra longifolia* (spiny-head mat-rush).
Habitat Features
Key habitat values recorded in this community include fallen woody habitat logs, tree hollows, fine litter, and an abundance of terrestrial termitariums.
Conservation Significant Species
Known: • Greater glider (*Petauroides volans*). • Short-beaked echidna (*Tachyglossus aculeatus*). **Possible:** • Koala (*Phascolarctos cinereus*). • Black-throated finch (southern) (*Poephila cincta cincta*). • Ghost bat (*Macroderma gigas*). • Squatter pigeon (southern) (*Geophaps scripta scripta*). • Sharman's rock-wallaby (*Petrogale sharmani*). • Red goshawk (*Erythrotriorchis radiatus*) – foraging. • Grey falcon (*Falco hypoleucos*) – foraging and nesting. • Oriental cuckoo (*Cuculus optatus*). • *Tephrosia leveillei.*

Plate 6 Habitat Type 1

Habitat Type 2 Open *Eucalyptus*, *Casuarina* and *Melaleuca* Riparian Woodland
Analogous REs
9.3.1, 9.3.13.
Vegetation Description
This habitat type comprises riparian vegetation along stream and channel banks. This community contains a mixture of *Melaleuca fluviatilis* (river tea tree), *Eucalyptus camaldulensis* (river red gum) and *Casuarina cunninghamiana* (river she-oak), with some very large, mature *Eucalyptus platyphylla* (poplar gum) present. The shrub layer was rare to absent and the ground layer was dominated by the native grass *Dichanthium fecundum* (bundle-bundle). Bare, sandy plains were found in the dry creek beds.
Habitat Features
Key habitat features in this community include tree hollows, decorticating bark and ground litter. Fallen habitat logs were typically present on the upper edges of the banks.
Conservation Significant Species
Possible: • Koala (*Phascolarctos cinereus*). • Greater glider (*Petauroides volans*). • Black-throated finch (southern) (*Poephila cincta cincta*). • Squatter pigeon (southern) (*Geophaps scripta scripta*). • Ghost bat (*Macroderma gigas*). • Short-beaked echidna (*Tachyglossus aculeatus*). • Red goshawk (*Erythrotriorchis radiatus*) – foraging and nesting. • Grey falcon (*Falco hypoleucos*) – foraging and nesting. • Oriental cuckoo (*Cuculus optatus*).

Plate 7 Habitat Type 2

Habitat Type 3 Native Grassland
Analogous REs
9.3.25, 9.8.13.
Vegetation Description
This habitat type is described as a native grassland of *Dichanthium* spp.
Habitat Features
Habitat opportunities within this community were limited; however an abundance of grass and soil cracks were observed, providing opportunities for burrowing frogs, small mammals and reptiles.
Conservation Significant Species
Possible: • Short-beaked echidna (*Tachyglossus aculeatus*). • Squatter pigeon (southern) (*Geophaps scripta scripta*).

Plate 8 Habitat Type 3

Habitat Type 4 **Low Open Forest of *Acacia shirleyi* and *Eucalyptus persistens* on Laterite**
Analogous REs
9.7.1, 9.7.2.
Vegetation Description
This habitat type is defined as low open forest on laterite outcropping, dominated by *Acacia shirleyi* (lancewood) with emergent *Eucalyptus persistens* and *Corymbia* sp., over a sparse shrubland of *Santalum lanceolatum* (desert quandong) and *Petalostigma banksii* (smooth-leaved quinine). Occasional grass was recorded, primarily comprising *Poa* sp. and *Eriachne* sp.
Habitat Features
Habitat values within this site comprise both small and large fallen logs, tree hollows, decorticating bark, ground litter, and rocky screes.
Conservation Significant Species
Known: • Short-beaked echidna (*Tachyglossus aculeatus*). • *Leptospermum pallidum.* **Possible:** • Koala (*Phascolarctos cinereus*). • Northern quoll (*Dasyurus hallucatus*). • Ghost bat (*Macroderma gigas*). • Grey falcon (*Falco hypoleucos*) – foraging. • Red goshawk (*Erythrotriorchis radiatus*) – foraging. • Common death adder (*Acanthophis antarcticus*). • Oriental cuckoo (*Cuculus optatus*).

Plate 9 Habitat Type 4

Habitat Type 5 Open Woodland of *Eucalyptus* and *Corymbia* on Basalt
Analogous REs
7.8.18, 9.8.1, 9.8.4.
Vegetation Description
This open woodland community is defined by a sparse canopy of *Eucalyptus crebra* (narrow-leaved ironbark)*, Corymbia clarksoniana* (grey bloodwood)*, Corymbia erythrophloia* (variable-barked bloodwood) and *Corymbia confertiflora* (rough leaf cabbage gum). The shrub layer was sparse to bare and primarily contained *Grevillea wickhamii* (Wickham's grevillea). The ground layer was dense and contained a mixture of both native and exotic grasses.
Habitat Features
Habitat values in this community were abundant, and comprised rocky substrate, tree hollows, fallen logs, ground litter, decorticating bark, soil cracks and medium to large basalt rocks. One site contained a large rock outcrop with numerous basalt boulders creating rock crevices.
Conservation Significant Species
Known: • Short-beaked echidna (*Tachyglossus aculeatus*). **Possible:** • Koala (*Phascolarctos cinereus*). • Squatter pigeon (southern) (*Geophaps scripta scripta*). • Sharman's rock-wallaby (*Petrogale sharmani*). • Grey falcon (*Falco hypoleucos*) – foraging. • Red goshawk (*Erythrotriorchis radiatus*) – foraging. • Chestnut dunnart (*Sminthopsis archeri*). • Common death adder (*Acanthophis antarcticus*). • Oriental cuckoo (*Cuculus optatus*).

Plate 10 Habitat Type 5

Habitat Type 6 Woodland of *Eucalyptus* and *Corymbia* on Metamorphic Hills
Analogous REs
9.11.1a, 9.11.2a, 9.11.5, 9.11.15a, 9.11.16, 9.11.23b.
Vegetation Description
The dominant canopy vegetation was primarily a mixture of *Eucalyptus persistens, Eucalyptus crebra* (narrow-leaved ironbark)*, Eucalyptus microneura* (Georgetown box)*, Corymbia dallachiana* (Dallachy's gum)*, Corymbia confertiflora* (rough leaf cabbage gum), and *Corymbia erythrophloia* (variable-barked bloodwood). The shrub layer was open and was dominated by *Petalostigma pubescens* (quinine bush) and *Erythroxylum australe* (dogwood). The ground layer was dense and was dominated by the native grass *Themeda triandra* (kangaroo grass) and the exotic weed *Bothriochloa pertusa* (Indian bluegrass).
Habitat Features
Habitat values within this community include tree hollows, fallen logs, decorticating bark, ground litter, and medium to large rocks and boulders.
Conservation Significant Species
Known: • Short-beaked echidna (*Tachyglossus aculeatus*). **Possible:** • Koala (*Phascolarctos cinereus*). • Black-throated finch (southern) (*Poephila cincta cincta*). • Squatter pigeon (southern) (*Geophaps scripta scripta*). • Sharman's rock-wallaby (*Petrogale sharmani*). • Northern quoll (*Dasyurus hallucatus*). • Ghost bat (*Macroderma gigas*). • Grey falcon (*Falco hypoleucos*) – foraging. • Red goshawk (*Erythrotriorchis radiatus*) – foraging. • Common death adder (*Acanthophis antarcticus*). • Oriental cuckoo (*Cuculus optatus*).

Plate 11 Habitat Type 6

Habitat Type 7 *Eucalyptus and Corymbia* Woodland on Igneous Hills and/or Granite
Analogous REs
7.12.29, 9.12.1a, 9.12.10, 9.12.12, 9.12.16, 9.12.26, 9.12.32.
Vegetation Description
This community is defined by a canopy of mixed *Eucalypt* and *Corymbia* species, including *Eucalyptus crebra* (narrow-leaved ironbark), *Eucalyptus moluccana* (grey box), and *Corymbia erythrophloia* (variable-barked bloodwood), with an open shrub layer. The ground layer was dense and was dominated by native grasses, including *Heteropogon contortus* (spear grass) and *Themeda triandra* (kangaroo grass).
Habitat Features
The habitat values within this community include fallen logs, decorticating bark, ground litter, rocks, and very large boulders creating many rock crevices.
Conservation Significant Species
Known: • Sharman's rock-wallaby (*Petrogale sharmani*). • Short-beaked echidna (*Tachyglossus aculeatus*). • Squatter pigeon (southern) (*Geophaps scripta scripta*). **Possible:** • Koala (*Phascolarctos cinereus*). • Ghost bat (*Macroderma gigas*). • Northern quoll (*Dasyurus hallucatus*). • Grey falcon (*Falco hypoleucos*) – foraging. • Red goshawk (*Erythrotriorchis radiatus*) – foraging. • Chestnut dunnart (*Sminthopsis archeri*). • Common death adder (*Acanthophis antarcticus*). • *Marsdenia brevifolia* • *Acacia tingoorensis* (Tingoora wattle). • Oriental cuckoo (*Cuculus optatus*).

Plate 12 Habitat Type 7

Habitat Type 8 Non-remnant Vegetation, Including Artificial Wetlands (Dams)
Vegetation Description
Non-remnant vegetation was restricted to cleared areas for access tracks, the existing powerline easement, and artificial dams.
Habitat Features
Habitat values include the artificial dams and the surrounding vegetation, including reeds and macrophytes. Grass within the cleared areas may provide habitat opportunities for small mammals, reptiles and granivorous birds.
Conservation Significant Species
Known: • Short-beaked echidna (*Tachyglossus aculeatus*). **Possible:** • Squatter pigeon (southern) (*Geophaps scripta scripta*). • Australian painted snipe (*Rostratula australis*) – wetlands. • Curlew sandpiper (*Calidris ferruginea*) – wetlands. • Grey falcon (*Falco hypoleucos*) – foraging. • Red goshawk (*Erythrotriorchis radiatus*) – foraging. • Common sandpiper (*Actitis hypoleucos*) – wetlands. • Common greenshank (*Tringa nebularia*) – wetlands.

Plate 13 Habitat Type 8

Appendix G

Habitat Modelling Rules and Mapping

Table 27 Habitat Modelling Rules

Species	Habitat Category	Rules
Flora		
Leptospermum pallidum	Primary Habitat Known	Any RE polygon containing a recent (1980+), accurate (± 1000 m) record.
	Primary Habitat Possible	Any vegetation (remnant or HVR) on laterite (land zone 7) within 5 km of a recent (1980+), accurate (± 1000 m) record.
	General Habitat	Remnant vegetation on laterite (land zone 7).
Fauna		
Greater glider (*Petauroides volans*)	Primary Habitat Known	Any RE polygon containing a recent (1980+), accurate (± 1000 m) record.
	Primary Habitat Possible	Remnant woodlands comprising REs 9.3.1, 9.3.3a, 9.3.5, 9.3.13, 9.3.16, 9.3.20, 9.3.22a, 9.5.3, 9.11.4 within 5 km of any Primary Habitat Known area. All remnant 9.3.6a areas.
	General Habitat	Remnant woodlands comprising REs 9.3.1, 9.3.3a, 9.3.5, 9.3.13, 9.3.16, 9.3.20, 9.3.22a, 9.5.3, 9.11.4.
Sharman's rock-wallaby (*Petrogale sharmani*)	Primary Habitat Known	Any RE polygon containing a recent (1980+), accurate (± 1000 m) record in the area.
	Primary Habitat Possible	All remnant and HVR vegetation within 5 km of Primary Habitat Known areas. Areas mapped as essential habitat by DES.
	General Habitat	REs east of -18.8686, 145.6765, including 9.3.1, 9.3.3, 9.3.5, 9.3.6, 9.3.10, 9.3.13, 9.3.16, 9.3.20, 9.3.22, 9.3.23, 9.5.3, 9.5.11, 9.7.1, 9.7.2, 9.7.3, 9.7.5, 9.8.1, 9.8.4, 9.8.11, 9.11.1, 9.11.2, 9.11.4, 9.11.5, 9.11.15, 9.11.16, 9.11.23, 9.12.1, 9.12.4, 9.12.6, 9.12.10, 9.12.12, 9.12.19, 9.12.22.
Squatter pigeon (southern) (*Geophaps scripta scripta*)	Primary Habitat Known	All land (remnant or non-remnant), except tilled land, within 1 km of a recent (1980+), accurate (± 1000 m) record.
	Primary Habitat Possible	Remnant woodlands and HVR communities (REs 9.3.1, 9.3.3, 9.3.5, 9.3.6, 9.3.13, 9.3.16, 9.3.20, 9.3.22, 9.3.23, 9.5.3, 9.5.11, 9.7.2b, 9.7.3c, 9.7.5, 9.8.1, 9.8.4, 9.8.11, 9.11.1, 9.11.2, 9.11.4, 9.11.5, 9.11.15, 9.11.16, 9.11.23, 9.12.1, 9.12.4, 9.12.6, 9.12.10, 9.12.12, 9.12.19) where they exist within 1 km of a permanent waterbody or seasonal watercourse (stream order 4 and above, and Water Storage Points identified on the DNRME mapping).
	General Habitat	The REs listed above, within 3 km of a permanent waterbody or seasonal watercourse (stream order 4 and above, and Water Storage Points identified on the DNRME mapping). For heterogeneous polygons, the above rules are applied where the relevant REs are found in the polygon descriptions. The habitat value category refers only to that part of the polygon where suitable habitat is present.

Species	Habitat Category	Rules
Northern quoll (*Dasyurus hallucatus*)	Primary Habitat Known	Any RE polygon containing a recent (1980+), accurate (± 1000 m) record in the area.
	Primary Habitat Possible	High relief areas within 5 km of permanent water (stream order 4 and above, and Water Storage Points identified on the DNRME mapping); excluding areas west of Lot 5234/SP275834.
	General Habitat	High relief areas greater than 5 km from permanent water (stream order 4 and above, and Water Storage Points identified on the DNRME mapping); excluding areas west of Lot 5234/SP275834.
Koala (*Phascolarctos cinereus*)	Primary Habitat Known	Any RE polygon containing a recent (1980+), accurate (± 1000 m) record.
	Primary Habitat Possible	Any vegetation (remnant or HVR) within 1 km of a recent, accurate record. Riparian REs with river red gum, including RE 9.3.1, 9.3.13.
	General Habitat	Vegetation communities dominated by eucalypt species (REs, 9.3.3a, 9.3.5, 9.3.6a, 9.3.16, 9.3.20, 9.3.22a, 9.5.3, 9.5.11, 9.7.1a, 9.7.1b, 9.7.1c, 9.7.2a, 9.7.2b, 9.7.3c, 9.7.5, 9.8.1a, 9.8.1b, 9.8.4a, 9.8.11, 9.11.1a, 9.11.2a, 9.11.4a, 9.11.5, 9.11.15a, 9.11.16, 9.11.23b, 9.12.1a, 9.12.4a, 9.12.6b, 9.12.10, 9.12.12, 9.12.19, 9.12.22).
Black-throated finch (southern) (*Poephila cincta cincta*)	Primary Habitat Known	Any RE polygon containing a recent (1980+), accurate (± 1000 m) record.
	Primary Habitat Possible	Important areas as shown in the Black-throated finch significant impact guidelines (5 km buffer around -18.852463, 145.685317).
	General Habitat	Remnant and HVR vegetation within 3 km of a permanent waterbody (stream order 4 and above, and Water Storage Points identified on the DNRME mapping) comprising REs 9.3.1, 9.3.5, 9.3.13, 9.3.16, 9.3.20, 9.5.3, 9.5.11, 9.7.1, 9.7.2, 9.8.1, 9.8.4, 9.11.5, 9.11.16, 9.12.10, 9.12.12, 9.12.16, 9.12.26.
Ghost bat (*Macroderma gigas*)	Primary Habitat Known	Any RE polygon containing a recent (1980+), accurate (± 1000 m) record.
	Primary Habitat Possible	Scarp areas associated with RE 9.7.2, and vegetation within 500 m of -18.853760, 145.762656.
	General Habitat	Remnant and HVR vegetation within 2 km of -18.853760, 145.762656, and any abandoned mine identified on the DNRME mapping, comprising REs 9.3.1, 9.3.5, 9.3.13, 9.3.16, 9.3.20, 9.3.25, 9.5.3, 9.5.11, 9.7.1, 9.8.1, 9.8.4, 9.8.13, 9.11.5, 9.11.16, 9.12.10, 9.12.12, 9.12.16, 9.12.26, 9.12.32, 7.12.29.

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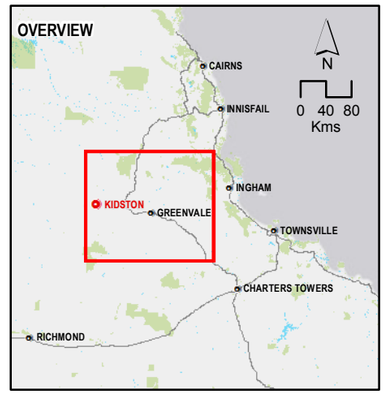
Legend

- Greater Glider Sighting Locations
- Point Of Interest
- Major Roads
- Major Watercourses
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- Primary Habitat Known
- Primary Habitat Possible
- General Habitat



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Electricity Transmission Line

Greater Glider Habitat

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Legend

- Greater Glider Sighting Locations
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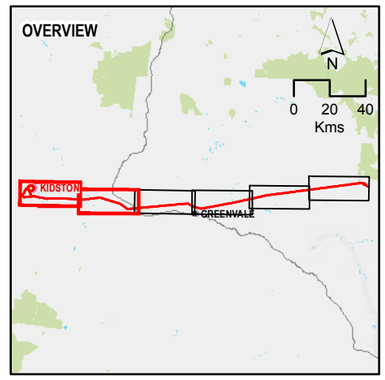
- Major Watercourses
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- Cadastral Boundaries
- Primary Habitat Known
- Primary Habitat Possible
- General Habitat



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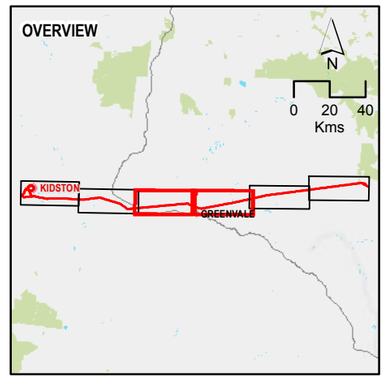
Legend

- Greater Glider Sighting Locations
- Point Of Interest
- Major Roads
- Major Watercourses
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- Cadastral Boundaries
- Primary Habitat Known
- Primary Habitat Possible
- General Habitat



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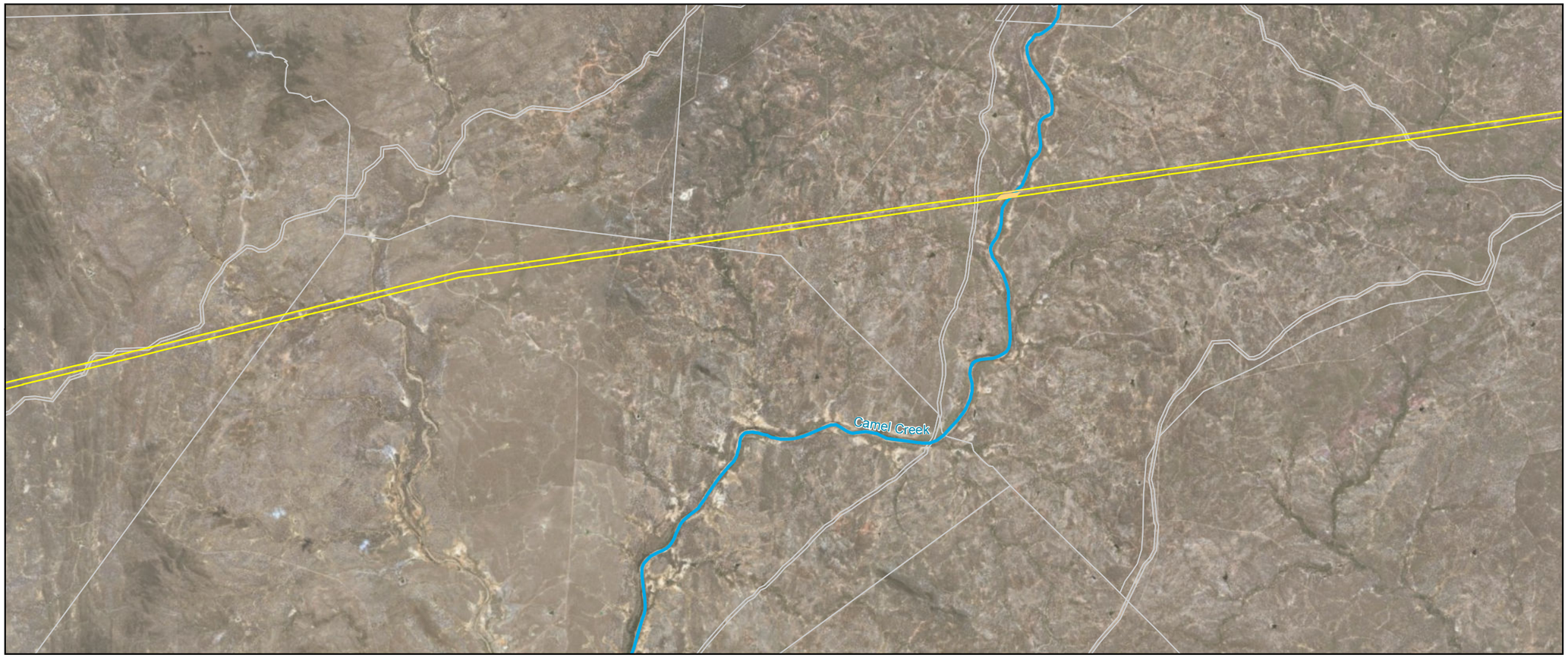

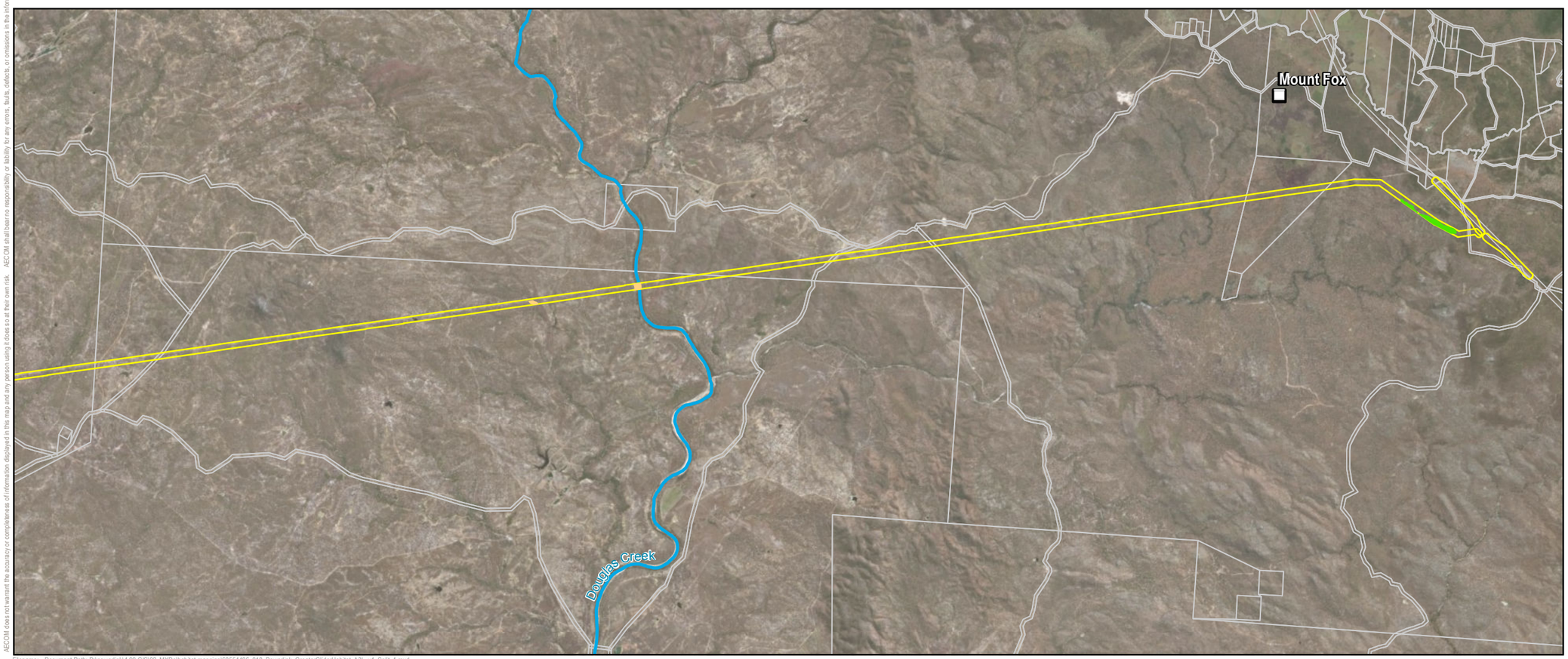

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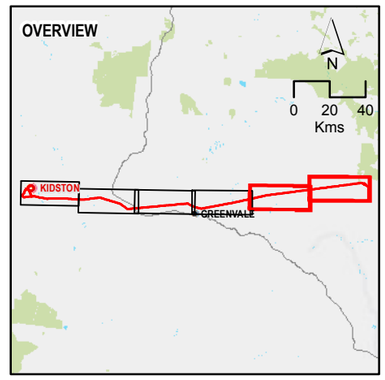
Legend

- Greater Glider Sighting Locations
- Point Of Interest
- Major Roads
- Major Watercourses
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- Cadastral Boundaries
- Primary Habitat Known
- Primary Habitat Possible
- General Habitat



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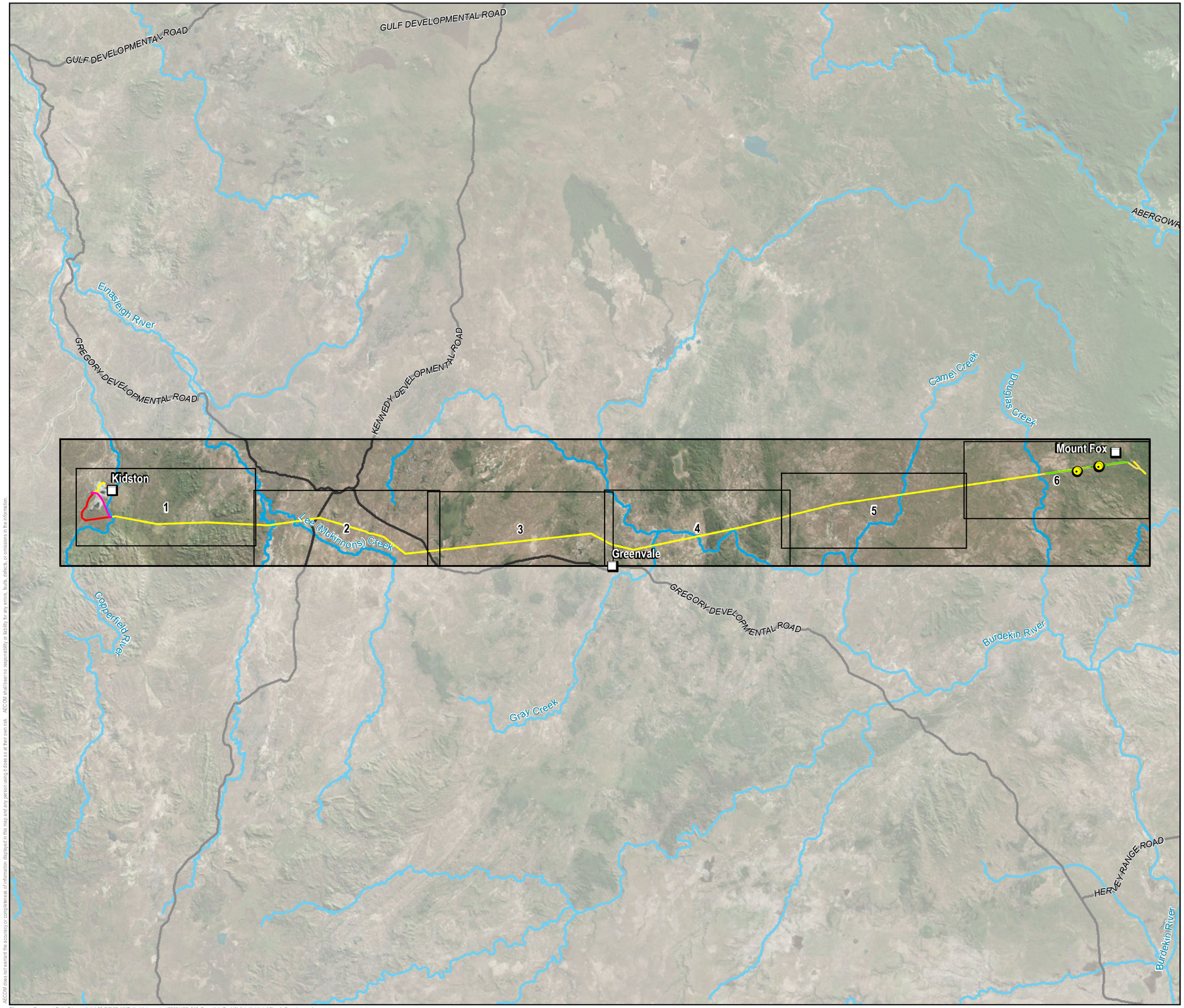

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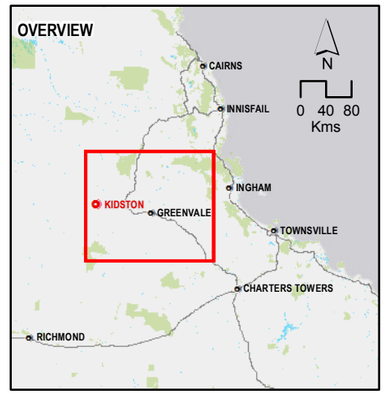
Legend

- Sharman Rock-wallaby Sighting Locations
- Point Of Interest
- Major Roads
- Major Watercourses
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- Primary Habitat Known
- Primary Habitat Possible
- General Habitat



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Sharman's Rock Wallaby Habitat

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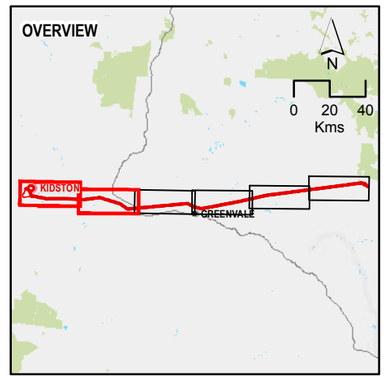
- Sharman Rock-wallaby Sighting Locations
- Point Of Interest
- Major Roads
- Major Watercourses
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- Cadastral Boundaries
- Primary Habitat Known
- Primary Habitat Possible
- General Habitat



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Genex Kidston Connection Project

Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Sharman's Rock Wallaby Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 10.2 (2 of 4)

A3 size

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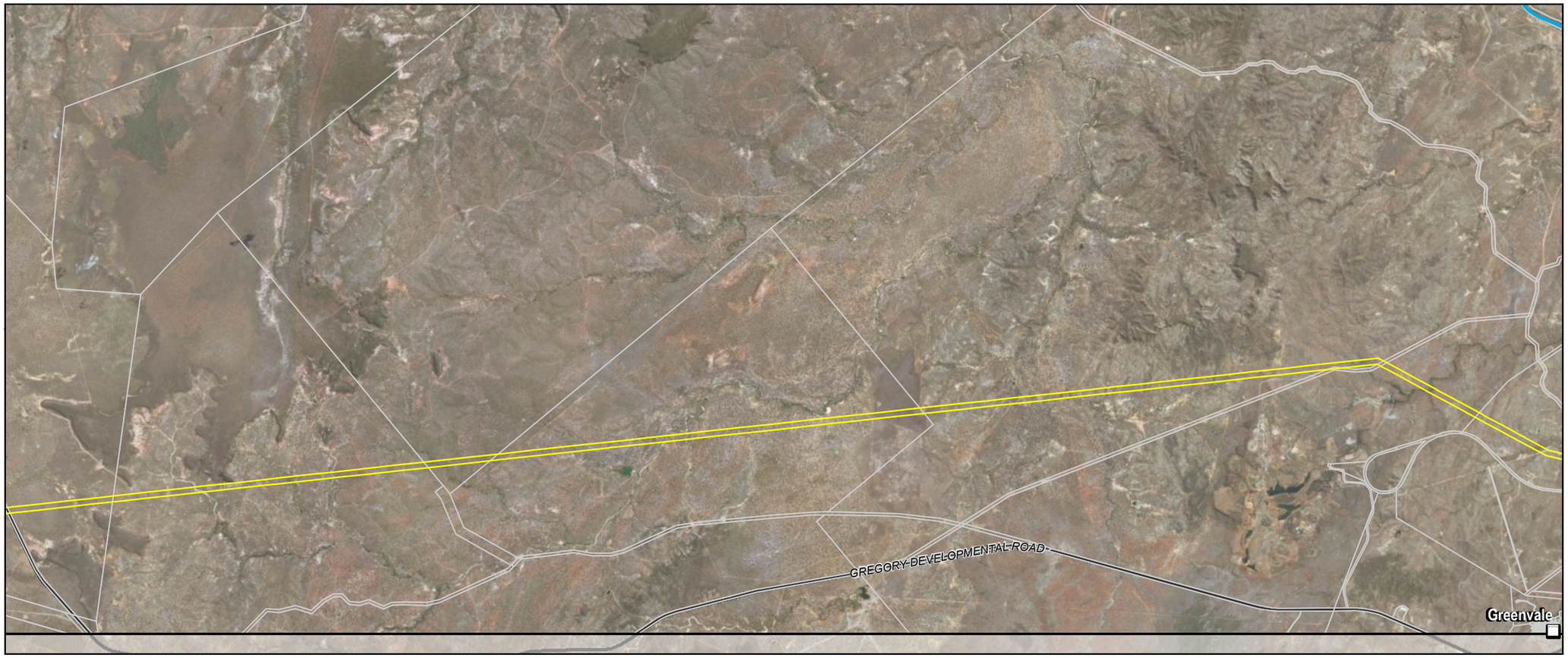

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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

0 1,100 2,200 3,300 4,400
Meters

1:95,000 (when printed at A3)

Legend

- Sharman Rock-wallaby Sighting Locations
- Point Of Interest
- Major Roads
- Major Watercourses
- Regional Context Area
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
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- Primary Habitat Known
- Primary Habitat Possible
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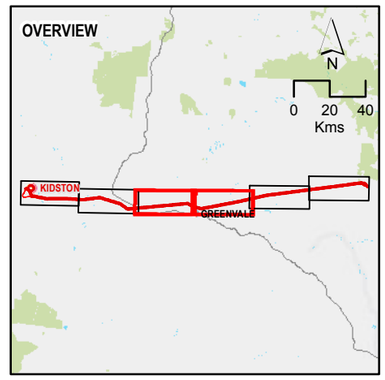

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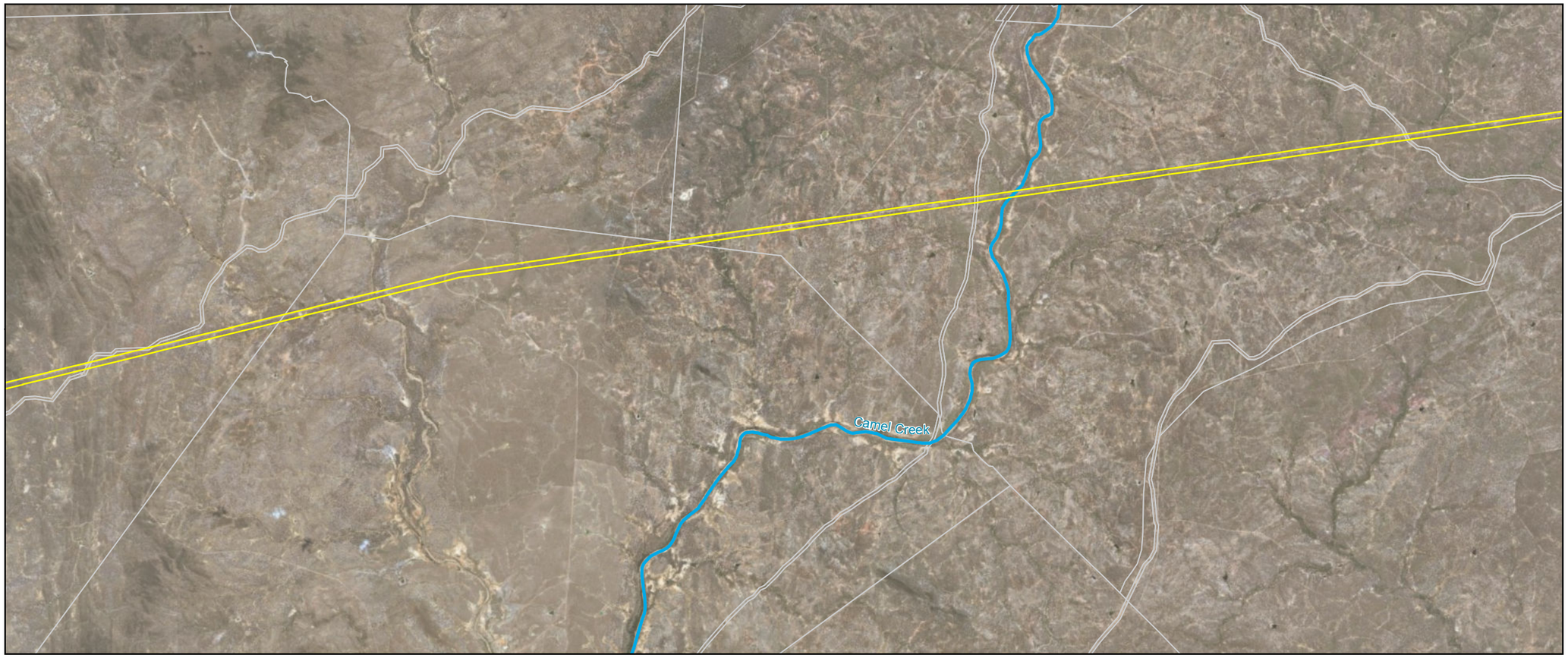
Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

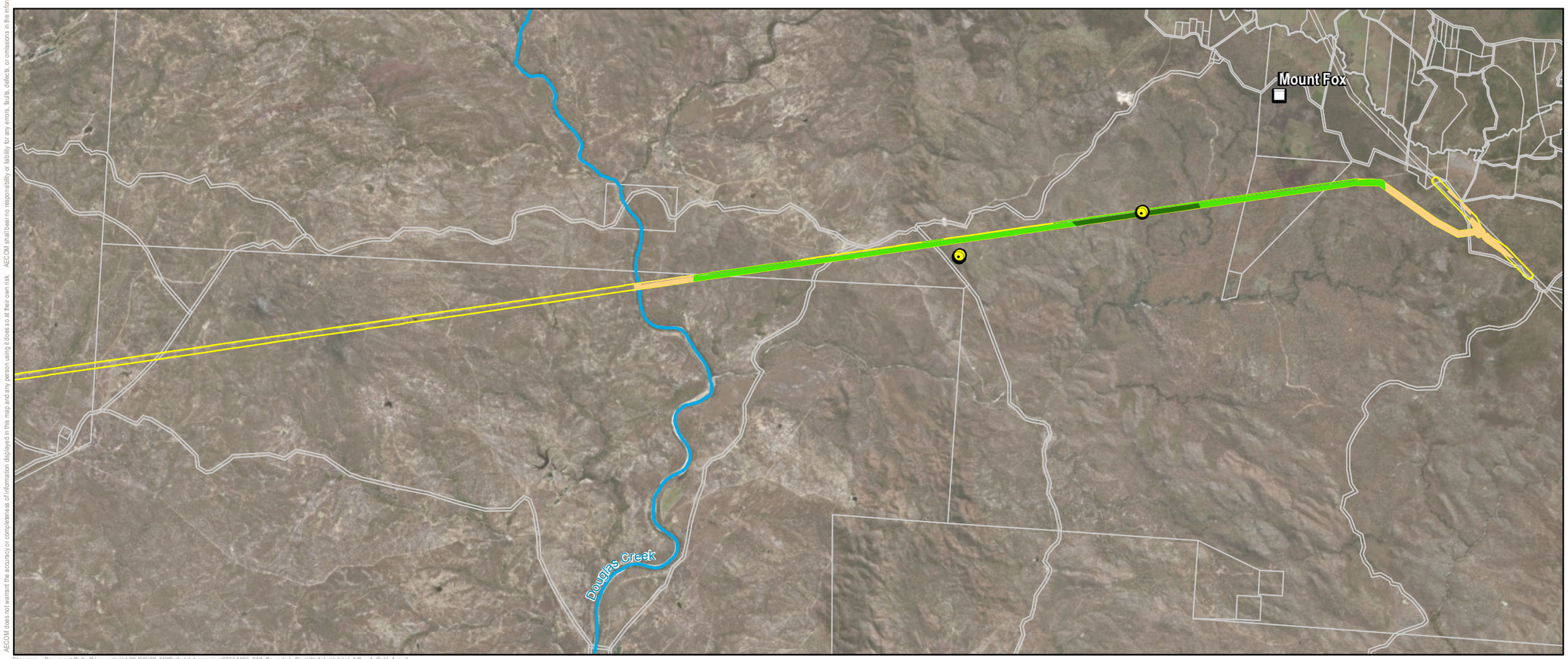
Sharman's Rock Wallaby Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 10.3 (3 of 4)

A3 size





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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

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Meters

1:95,000 (when printed at A3)

Legend

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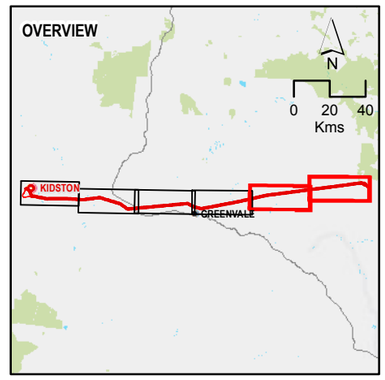

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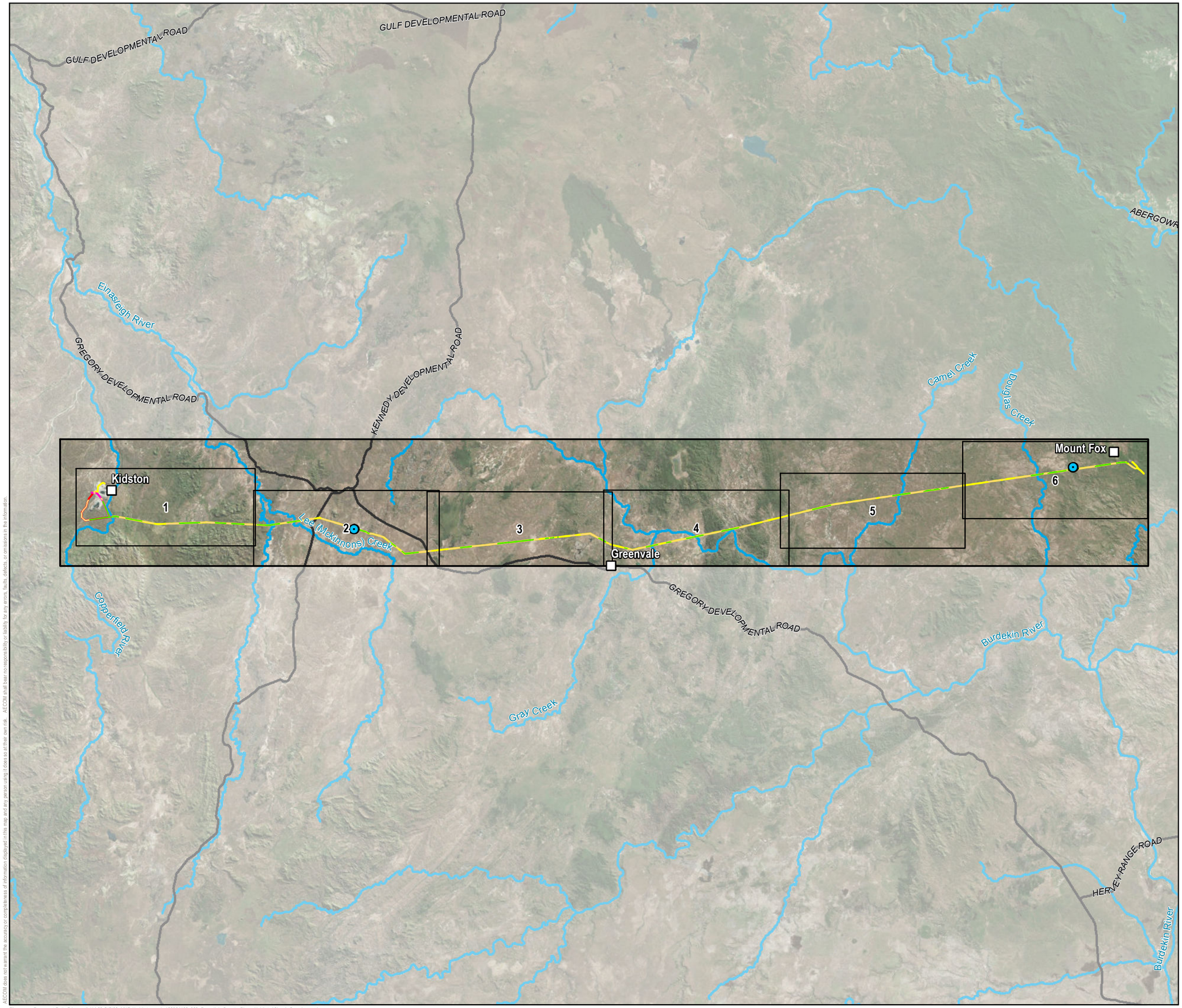
Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Sharman's Rock Wallaby Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 10.4 (4 of 4)

A3 size



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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

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Meters

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Legend

- Squatter Pigeon Sighting Locations
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Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Squatter Pigeon Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 16/09/2018
VERSION:	2

Figure 11.1 (1 of 4)

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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

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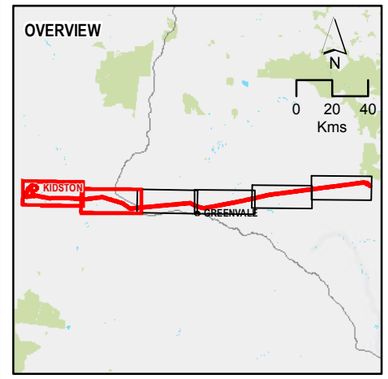

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Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Squatter Pigeon Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 11.2 (2 of 4)

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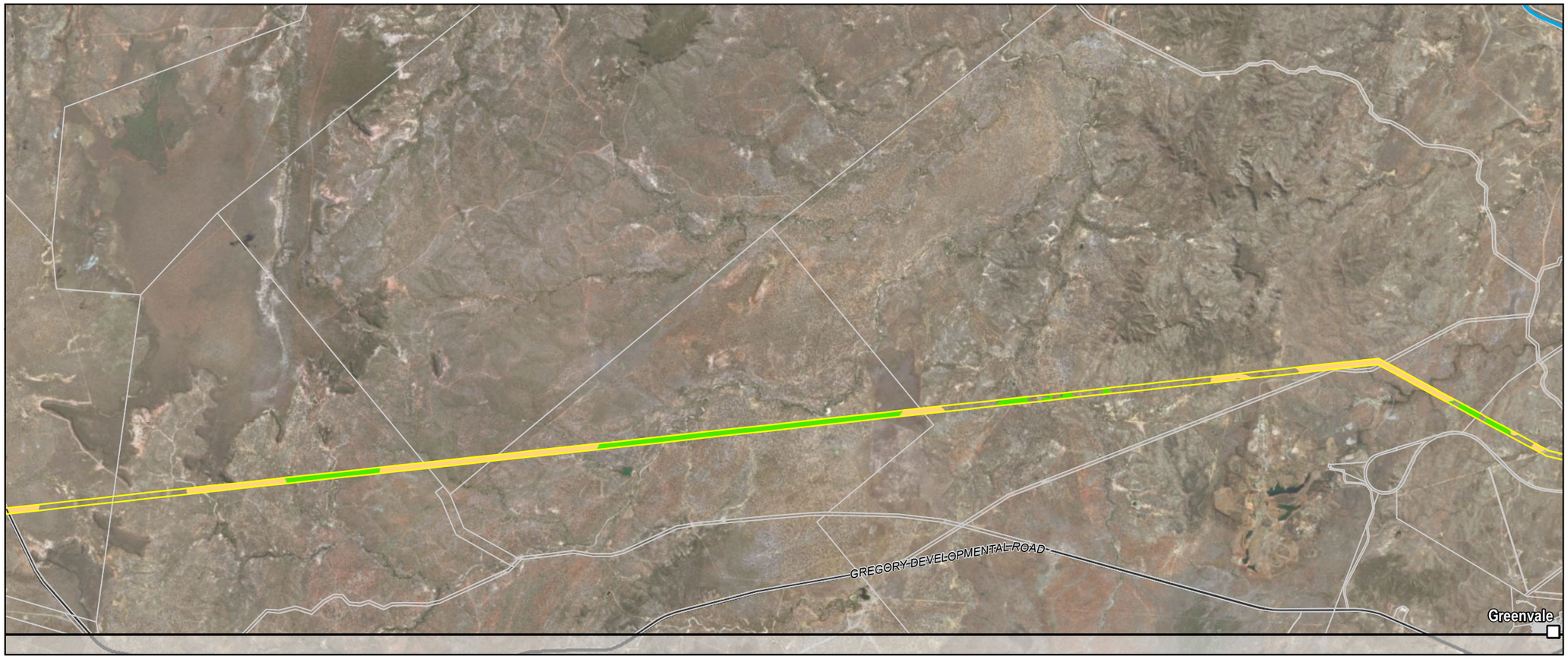

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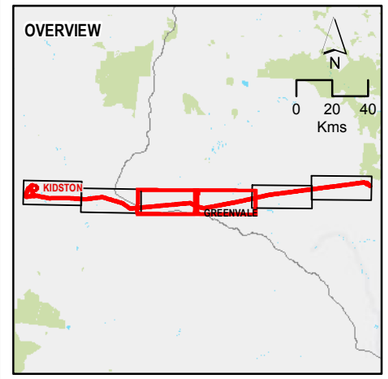

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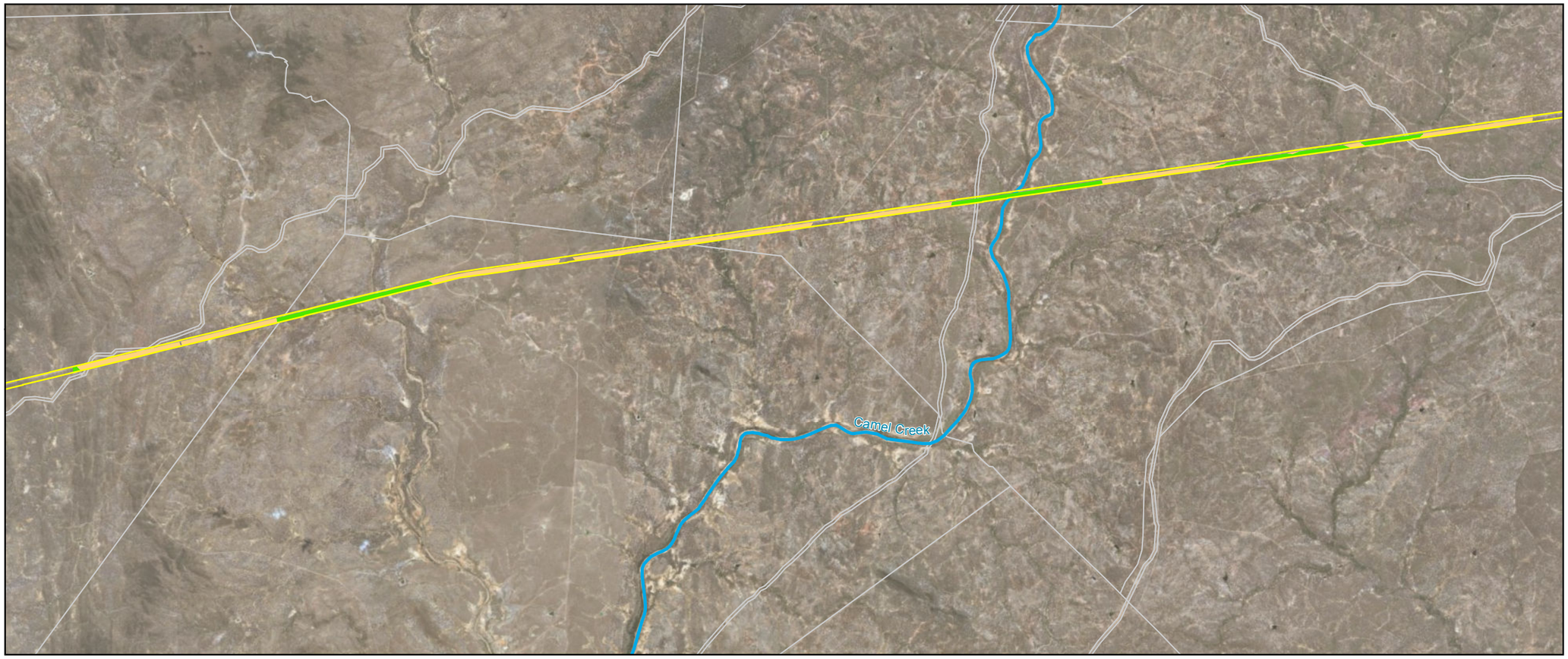
Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

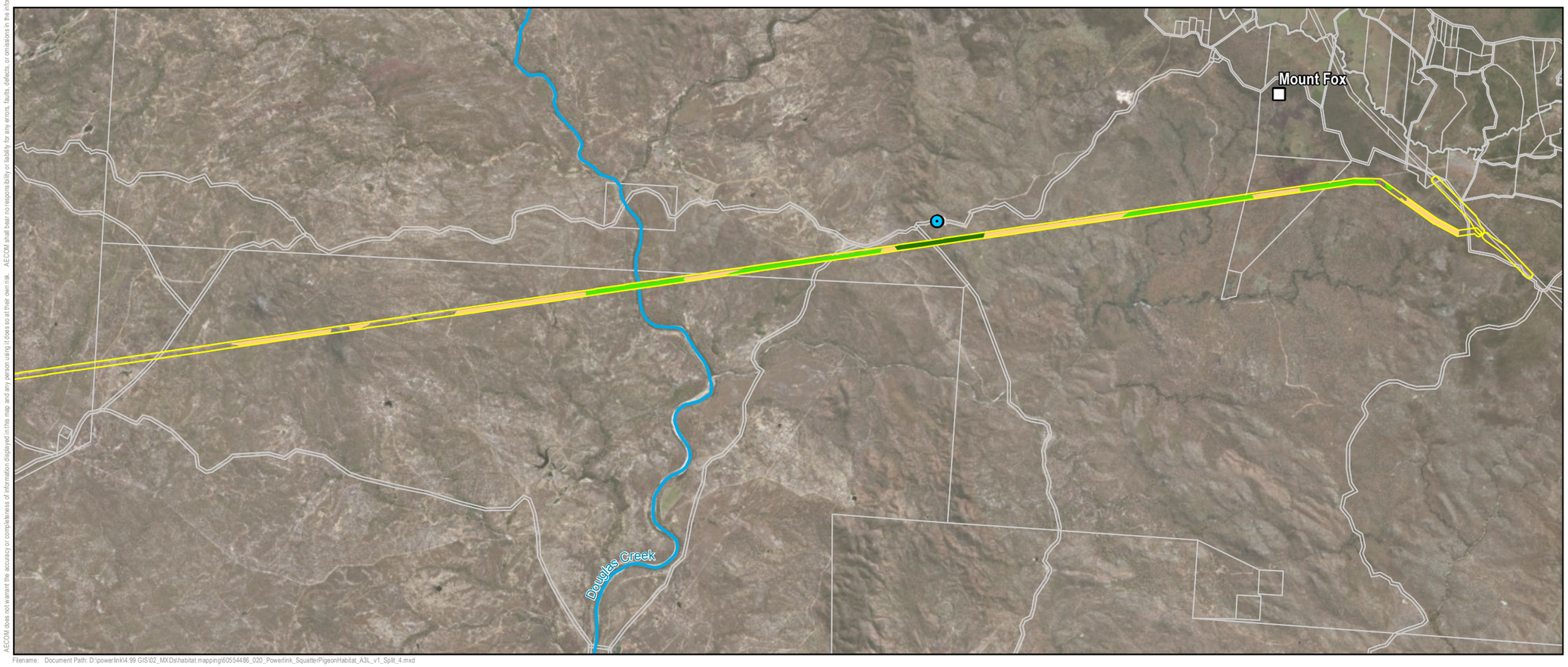
Squatter Pigeon Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 11.3 (3 of 4)

A3 size





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Projection: Transverse Mercator

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Meters

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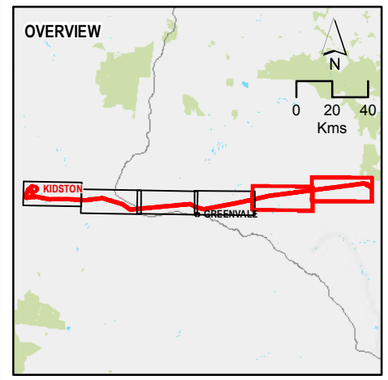

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Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Squatter Pigeon Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 11.4 (4 of 4)

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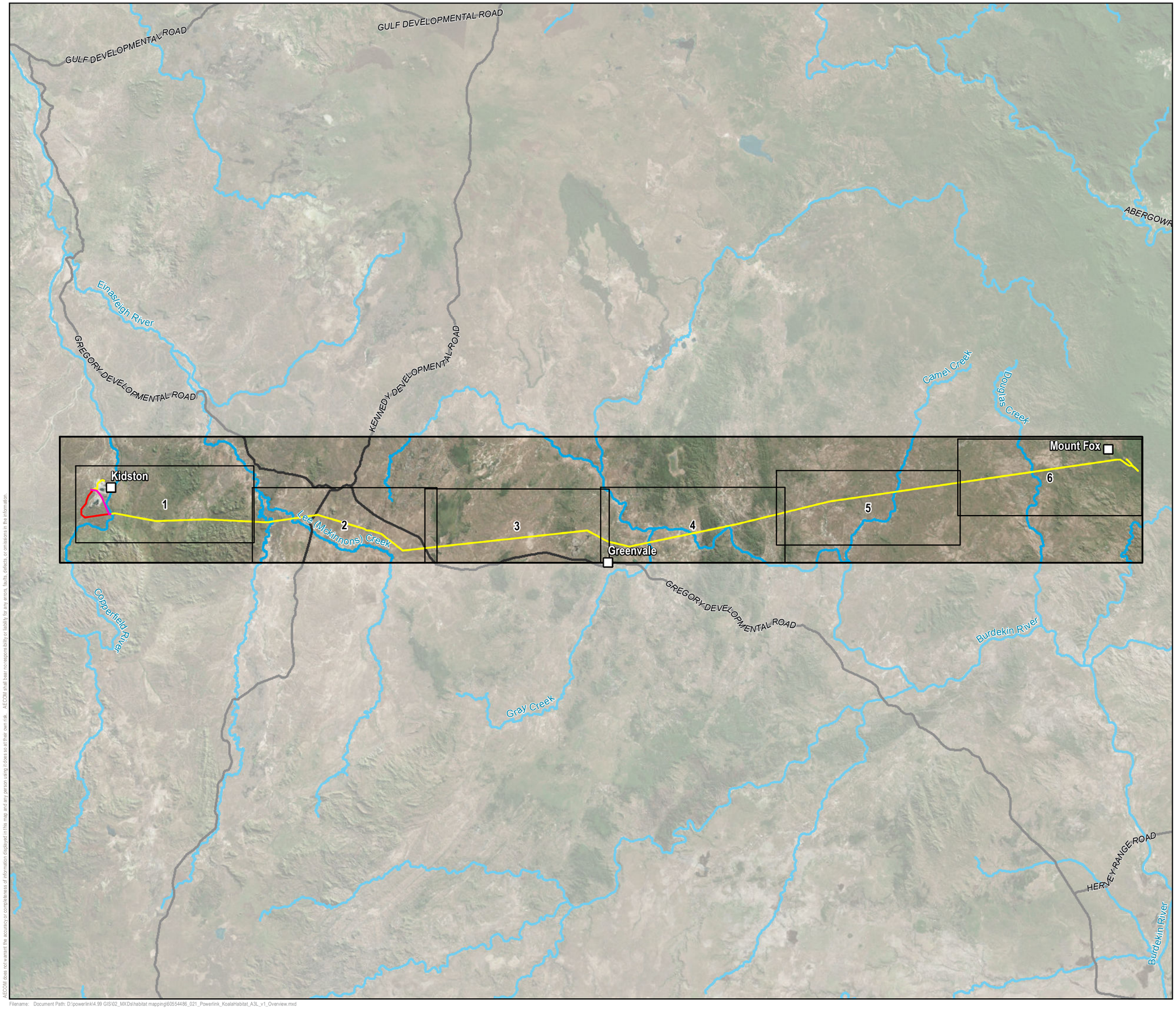

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Projection: Transverse Mercator

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Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Koala Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 16/09/2018
VERSION:	2

Figure
13.1
(1 of 4)

A3 size

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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

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Meters

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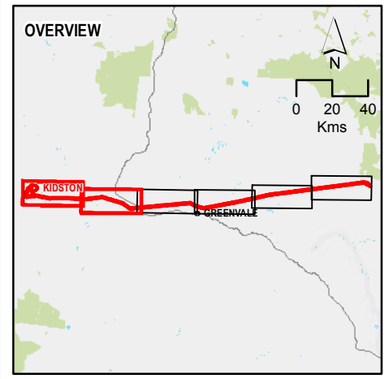

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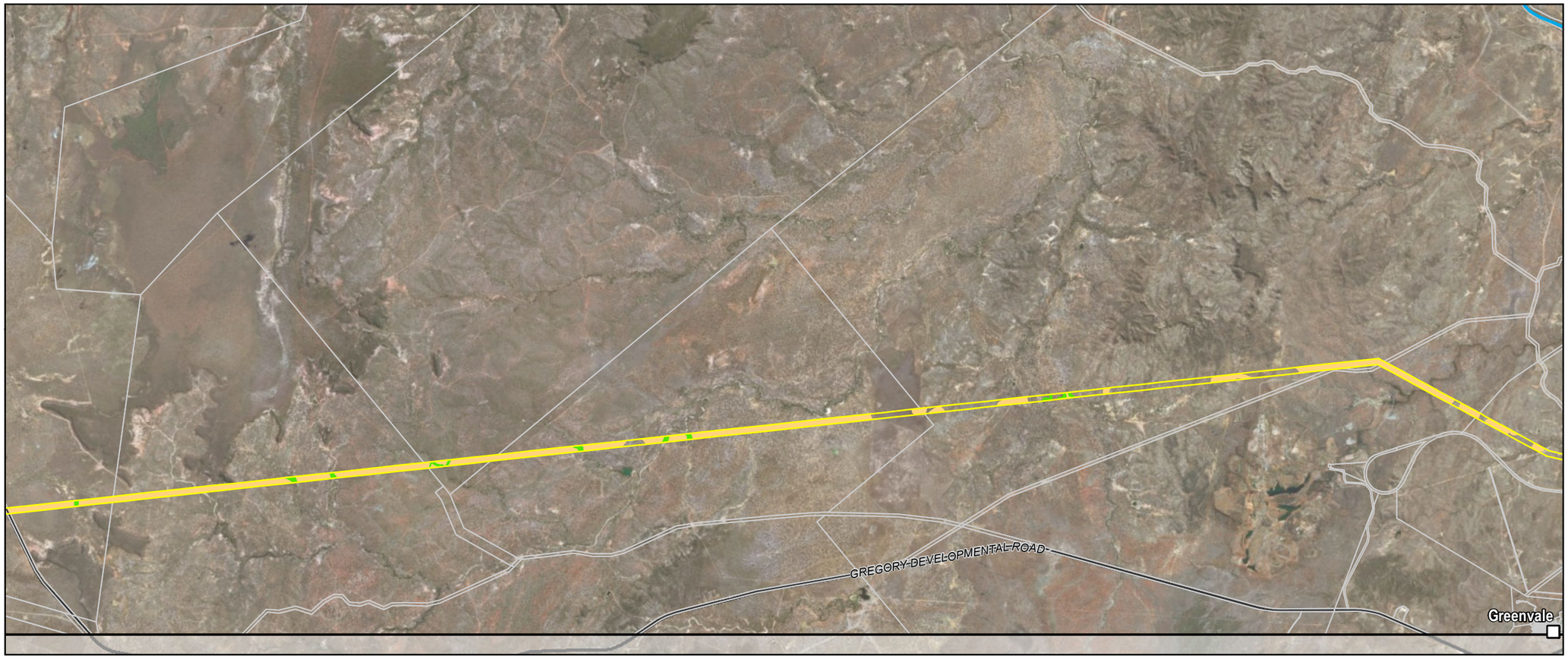
Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Koala Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 13.2 (2 of 4)

A3 size



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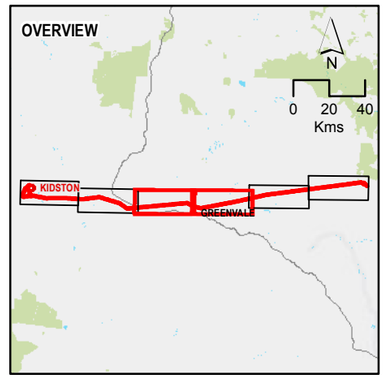

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Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Koala Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 13.3 (3 of 4)

A3 size

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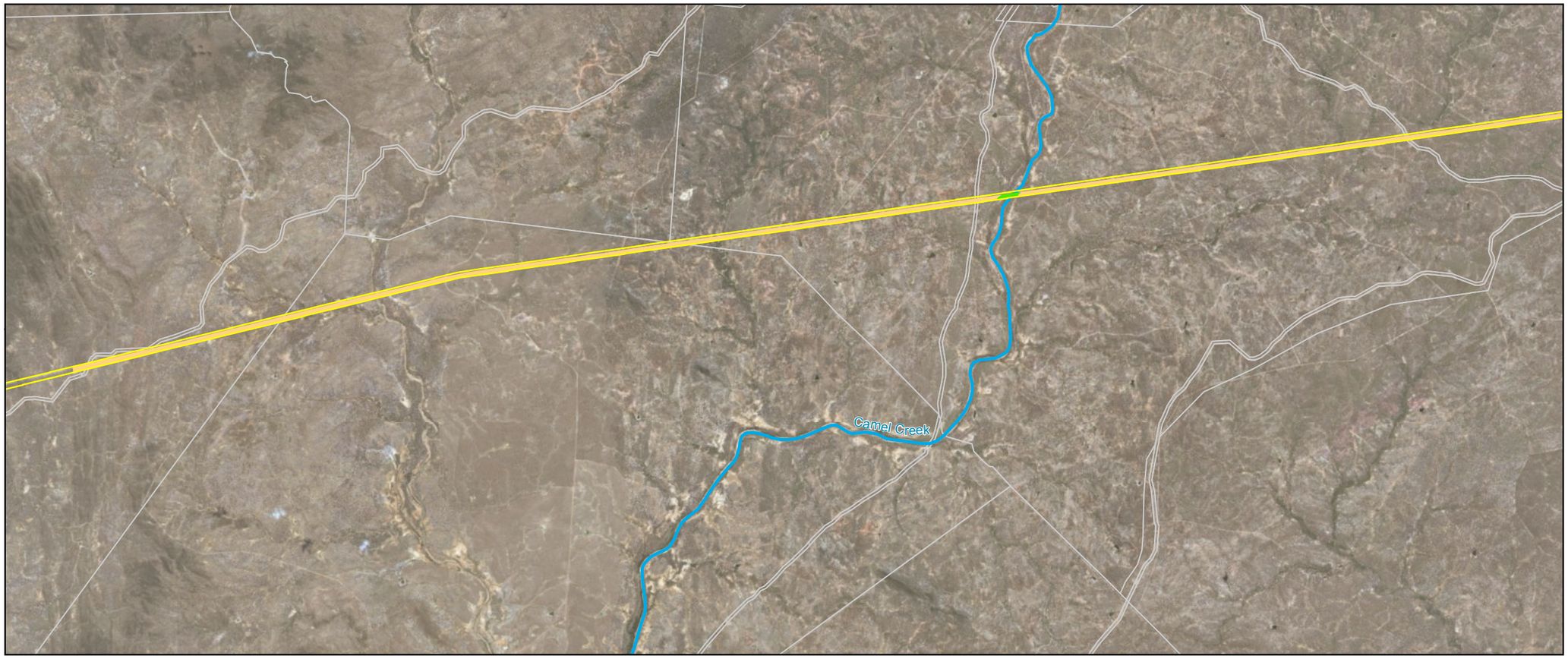

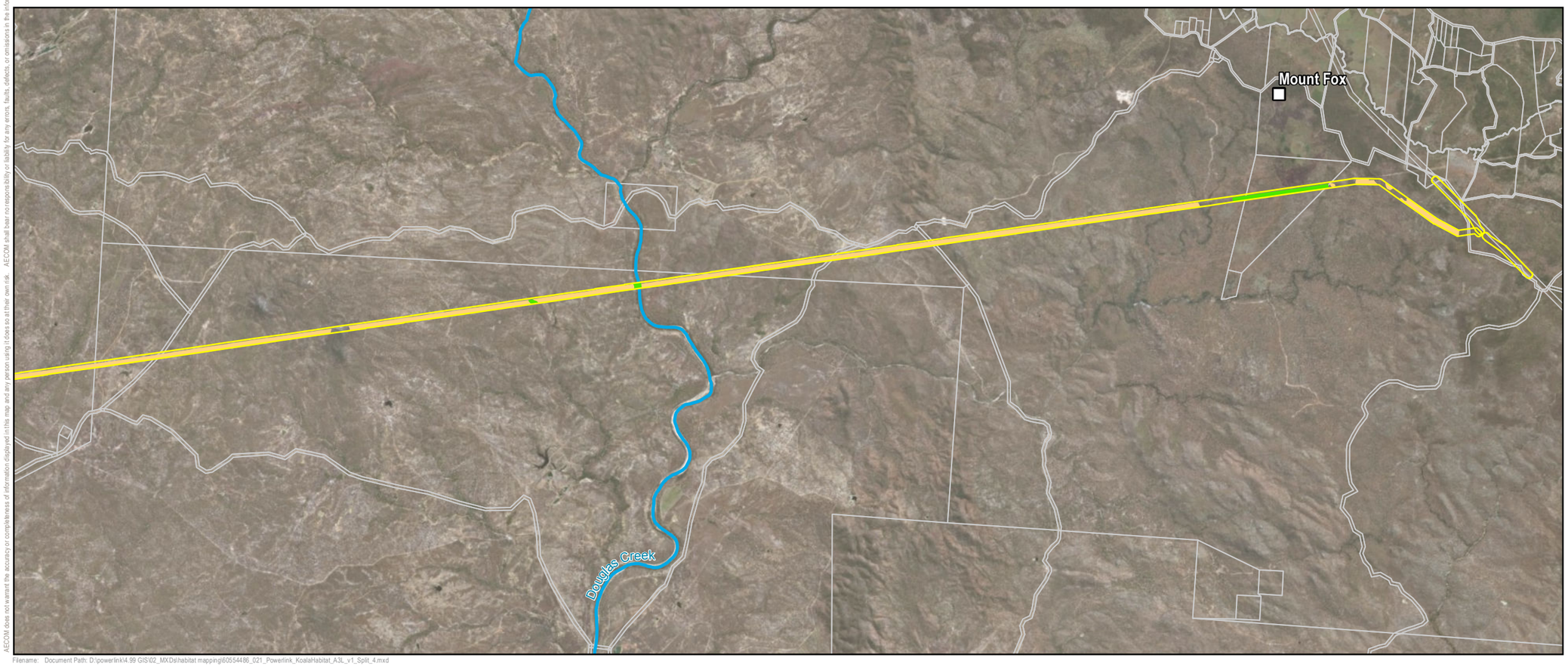

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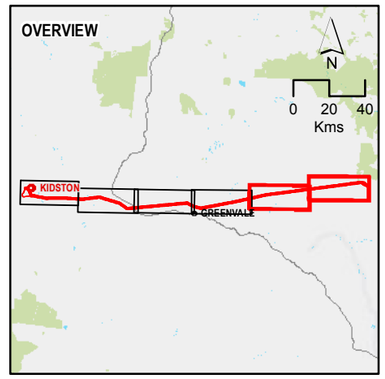

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Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Koala Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 13.4 (4 of 4)

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Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Northern Quoll Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 5/09/2018
VERSION:	2

Figure 12.1 (1 of 4)

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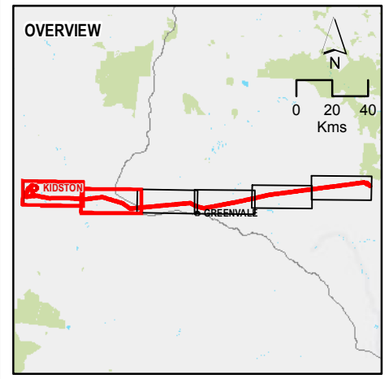

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Genex Kidston Connection Project

Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Northern Quoll Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 12.2 (2 of 4)

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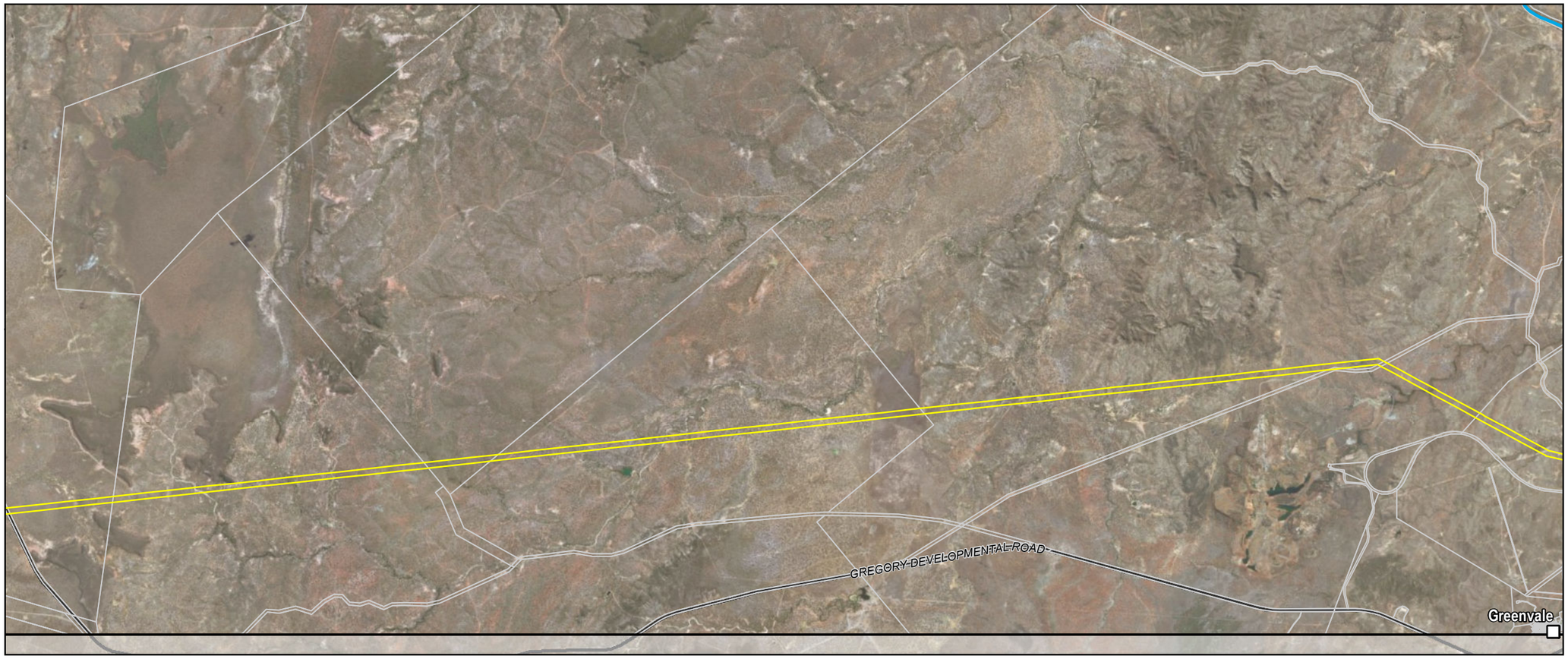

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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

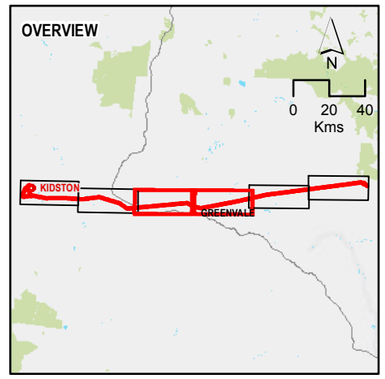
0 1,100 2,200 3,300 4,400

Meters

1:95,000 (when printed at A3)

Legend

- Point Of Interest
- Major Roads
- Major Watercourses
- Regional Context Area
- Cadastral Boundaries
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- Primary Habitat Known
- Primary Habitat Possible
- General Habitat



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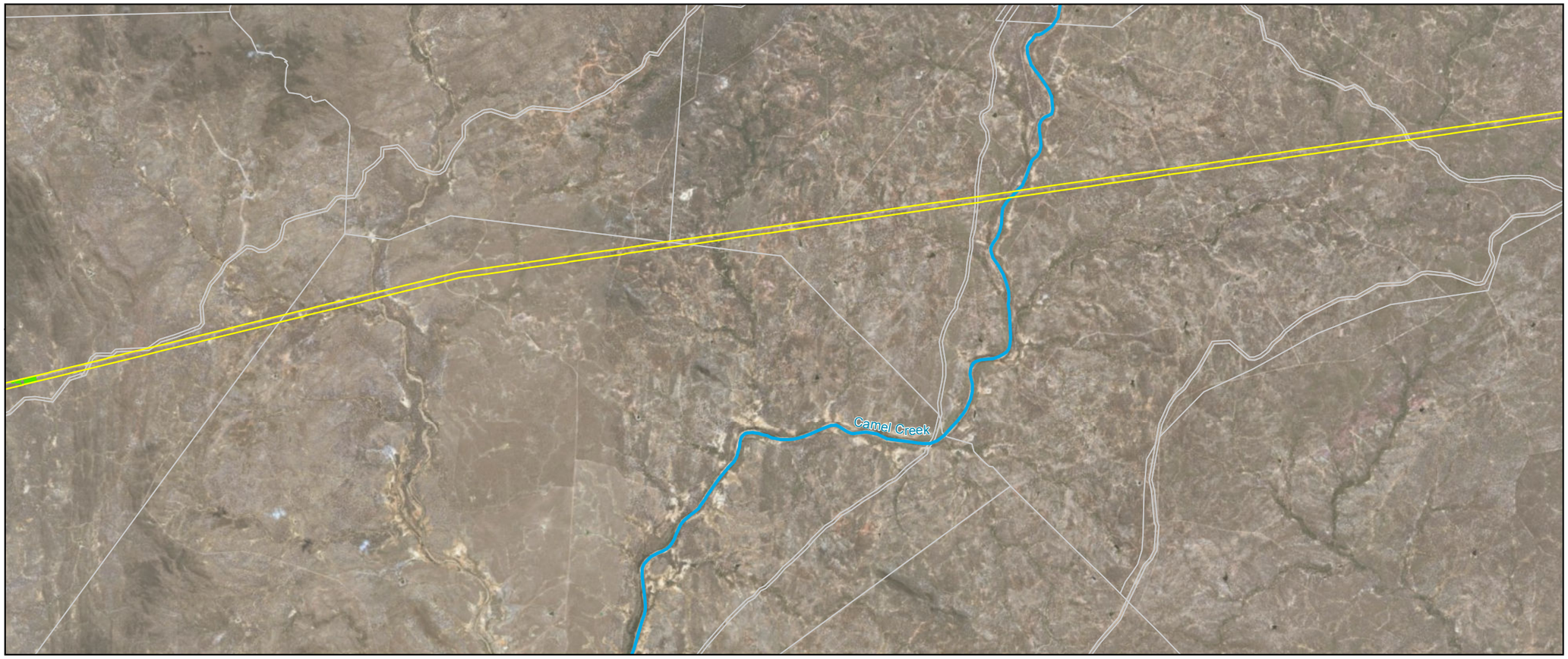
Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

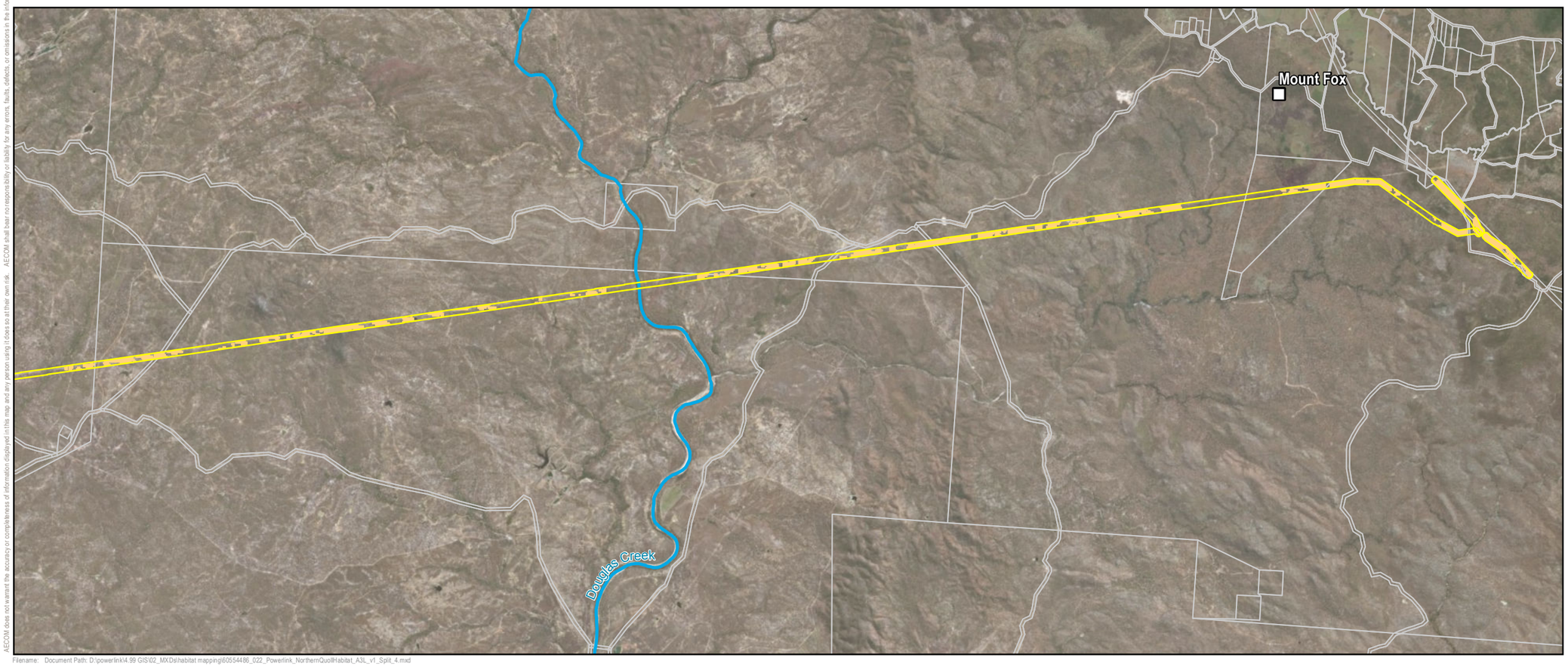
Northern Quoll Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 12.3 (3 of 4)

A3 size





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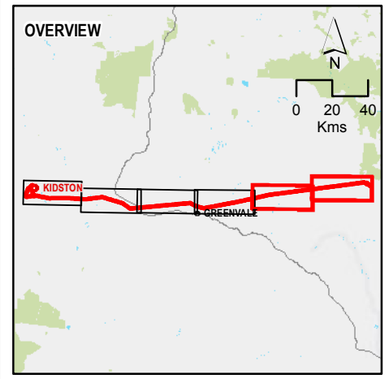

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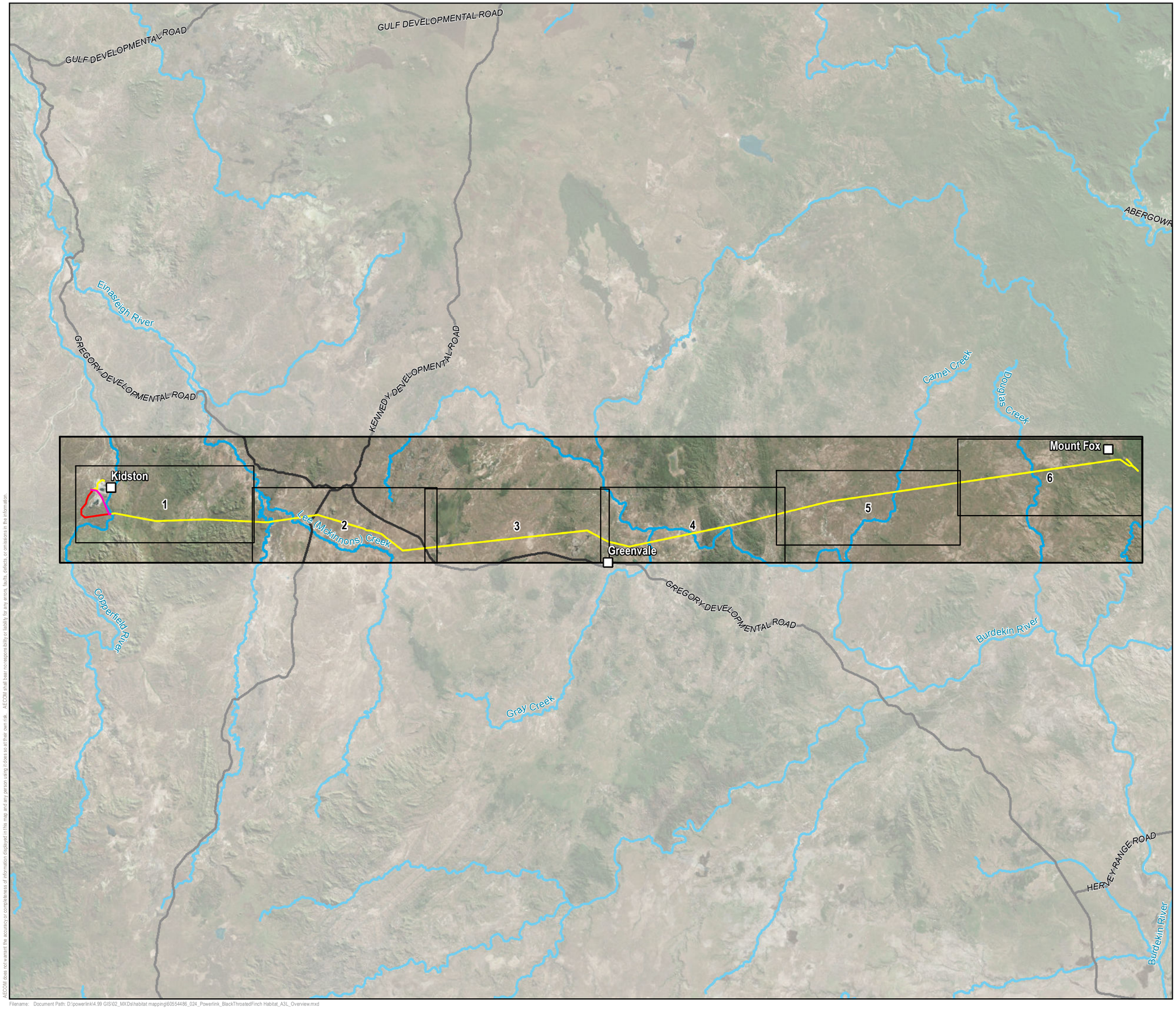
Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Northern Quoll Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 12.4 (4 of 4)

A3 size



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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

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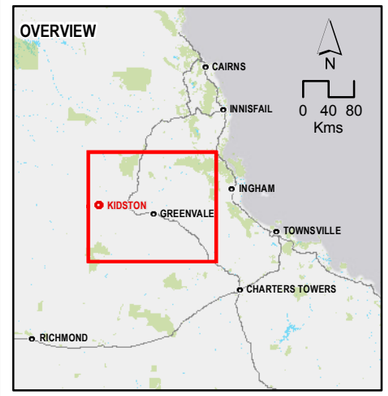

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Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Black-Throated Finch Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 16/09/2018
VERSION:	2

Figure 14.1 (1 of 4)

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Projection: Transverse Mercator

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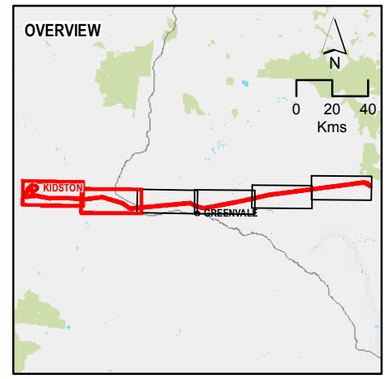

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Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Black-Throated Finch Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 14/08/2018
VERSION:	2

Figure 14.2 (2 of 4)

A3 size

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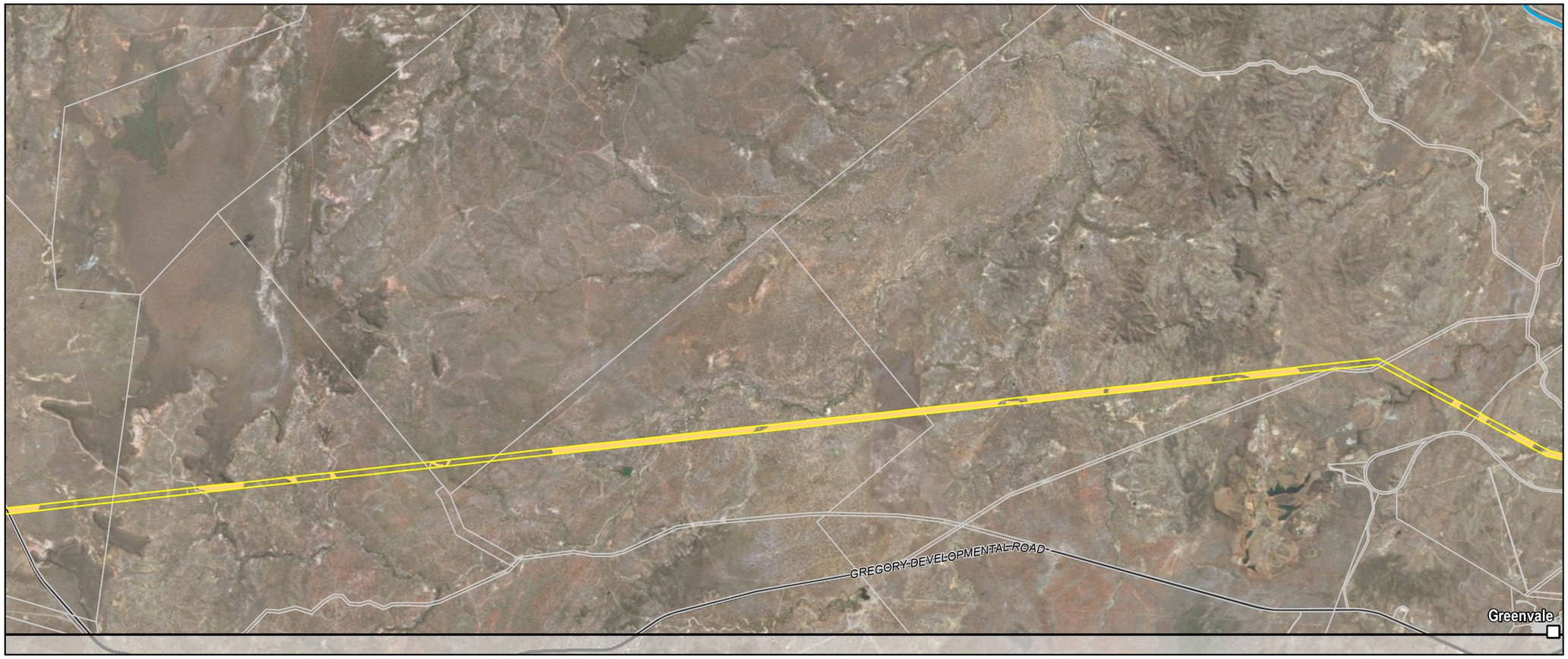

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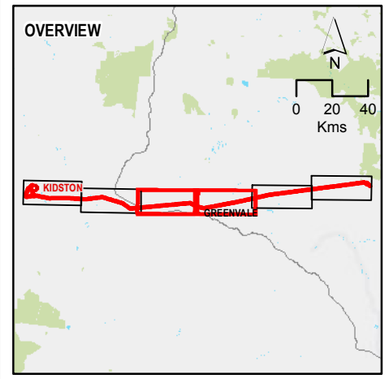

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Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Black-Throated Finch Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 14/08/2018
VERSION:	2

Figure 14.3 (3 of 4)

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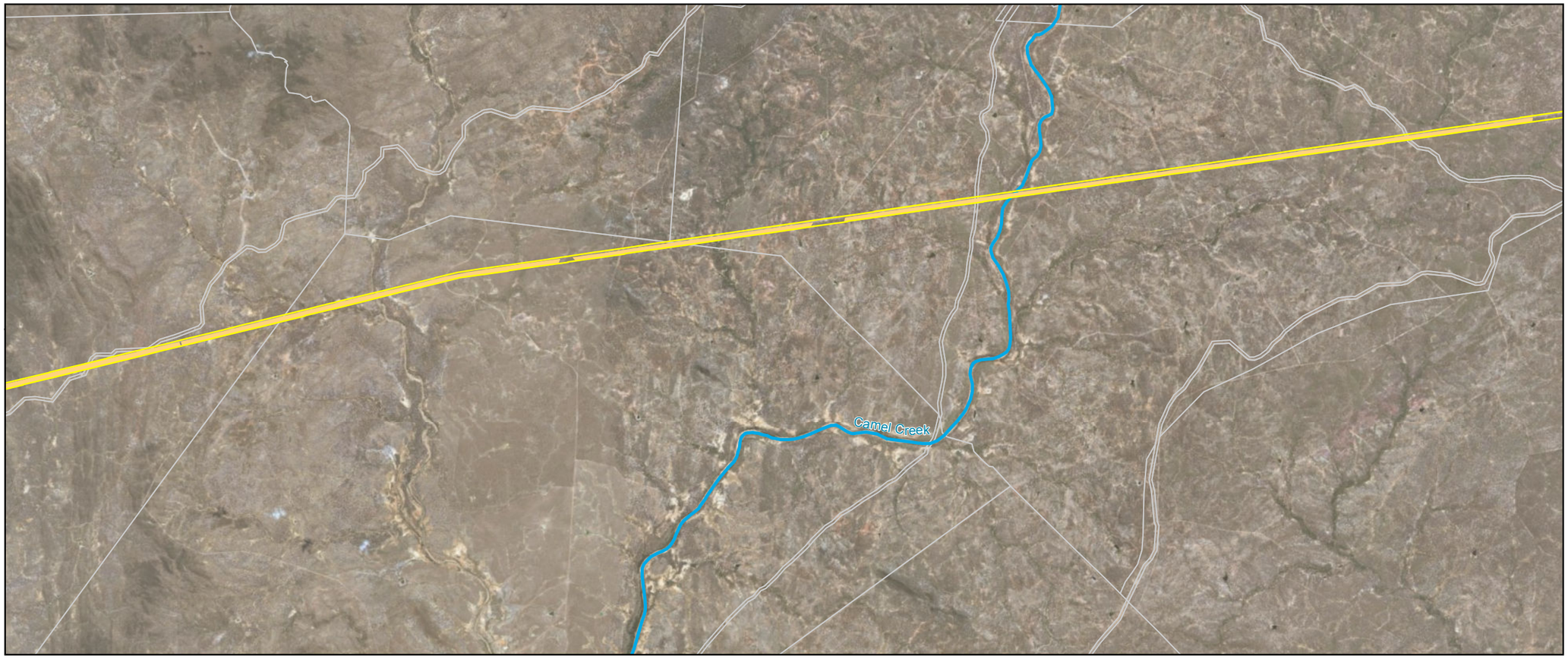

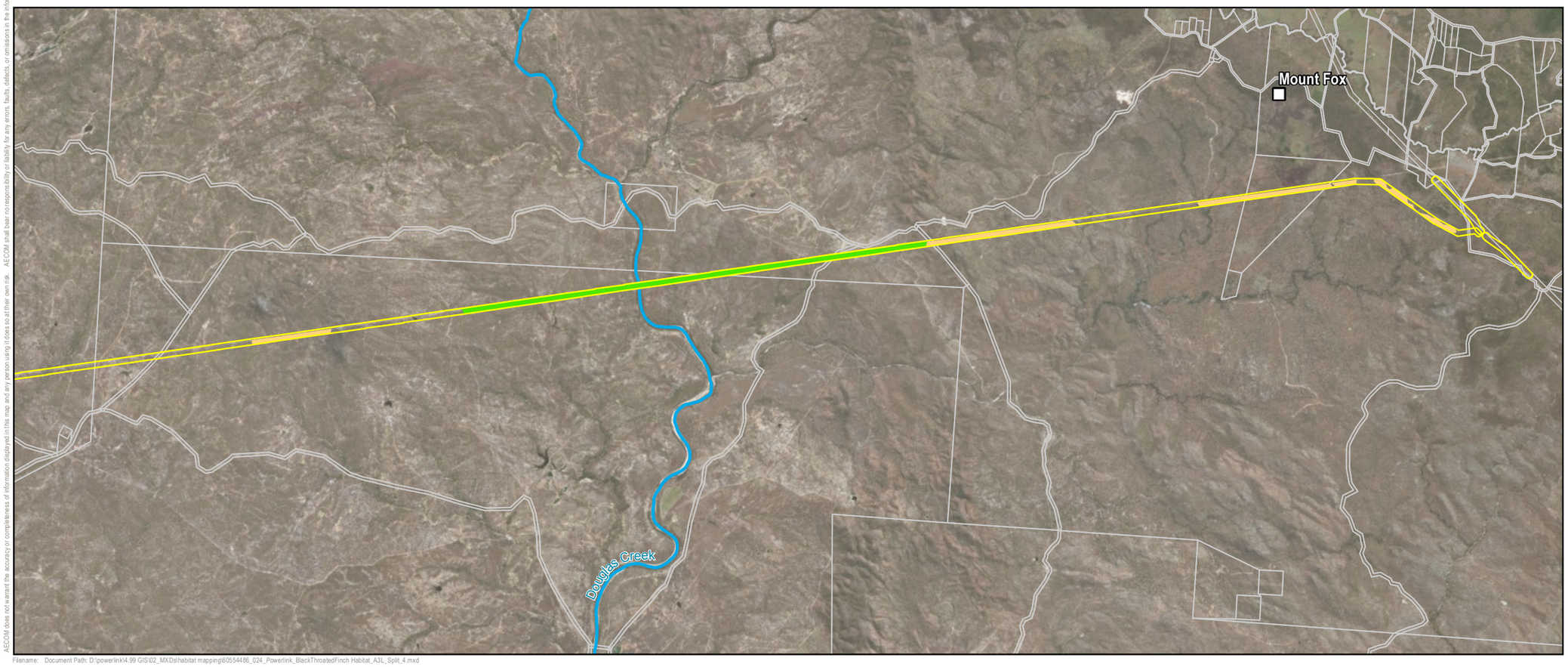

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Meters

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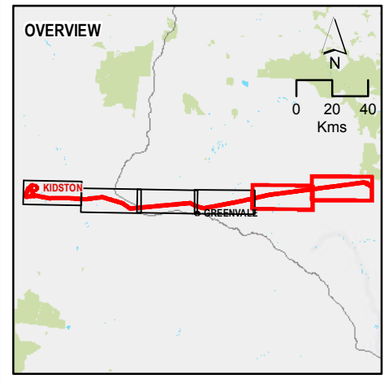

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Electricity Transmission Line
Powerlink Queensland

Black-Throated Finch Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 14/08/2018
VERSION:	2

Figure 14.4 (4 of 4)

A3 size

GULF DEVELOPMENTAL ROAD

GULF DEVELOPMENTAL ROAD

Einasleigh River

GREGORY DEVELOPMENTAL ROAD

KENNEDY DEVELOPMENTAL ROAD

Camel Creek

Douglas Creek

ABERGOWR

Kidston

Mount Fox

1

2

3

4

5

6

Lee (Mckinnons) Creek

Greenvale

Copperfield Riv.

GREGORY DEVELOPMENTAL ROAD

Burdekin River

Gray Creek

HERVEY RANGE ROAD

Burdekin River

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Meters

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Legend

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Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Ghost Bat Habitat

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 6/09/2018
VERSION:	2

Figure
15.1
(1 of 4)

A3 size

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Meters

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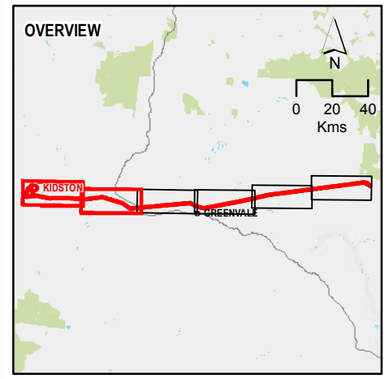

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Powerlink Queensland

Ghost Bat Habitat

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VERSION:	2

Figure 15.2 (2 of 4)

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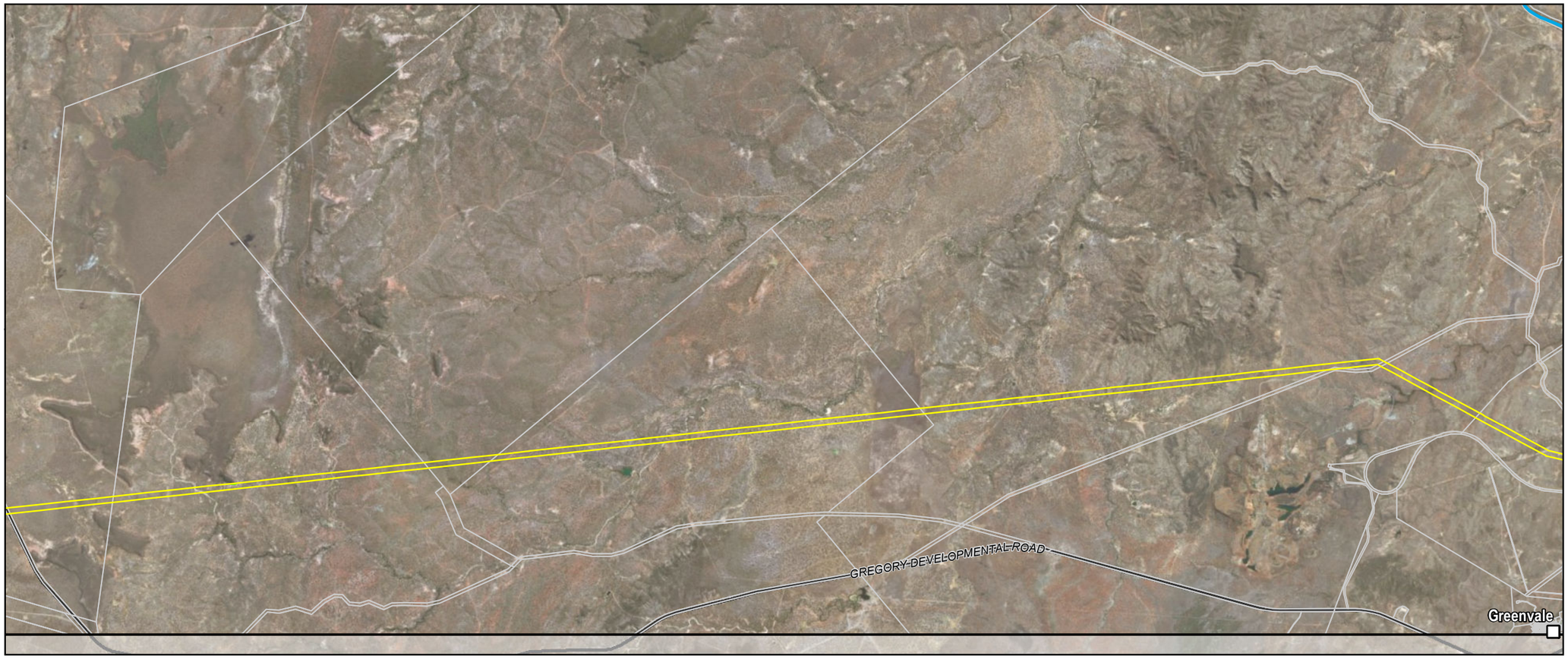

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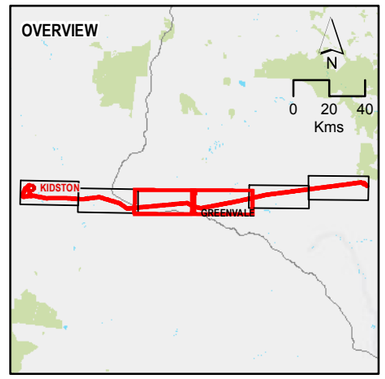

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Powerlink Queensland

Ghost Bat Habitat

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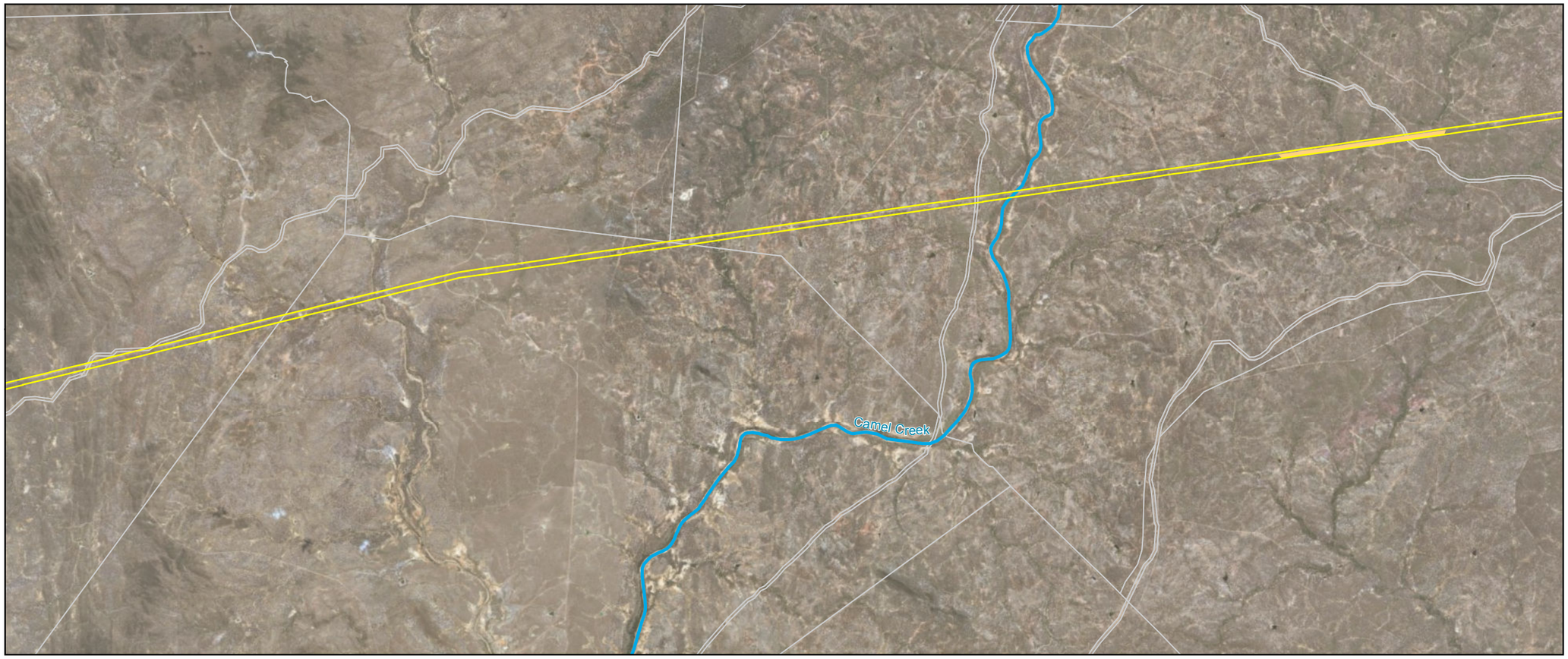
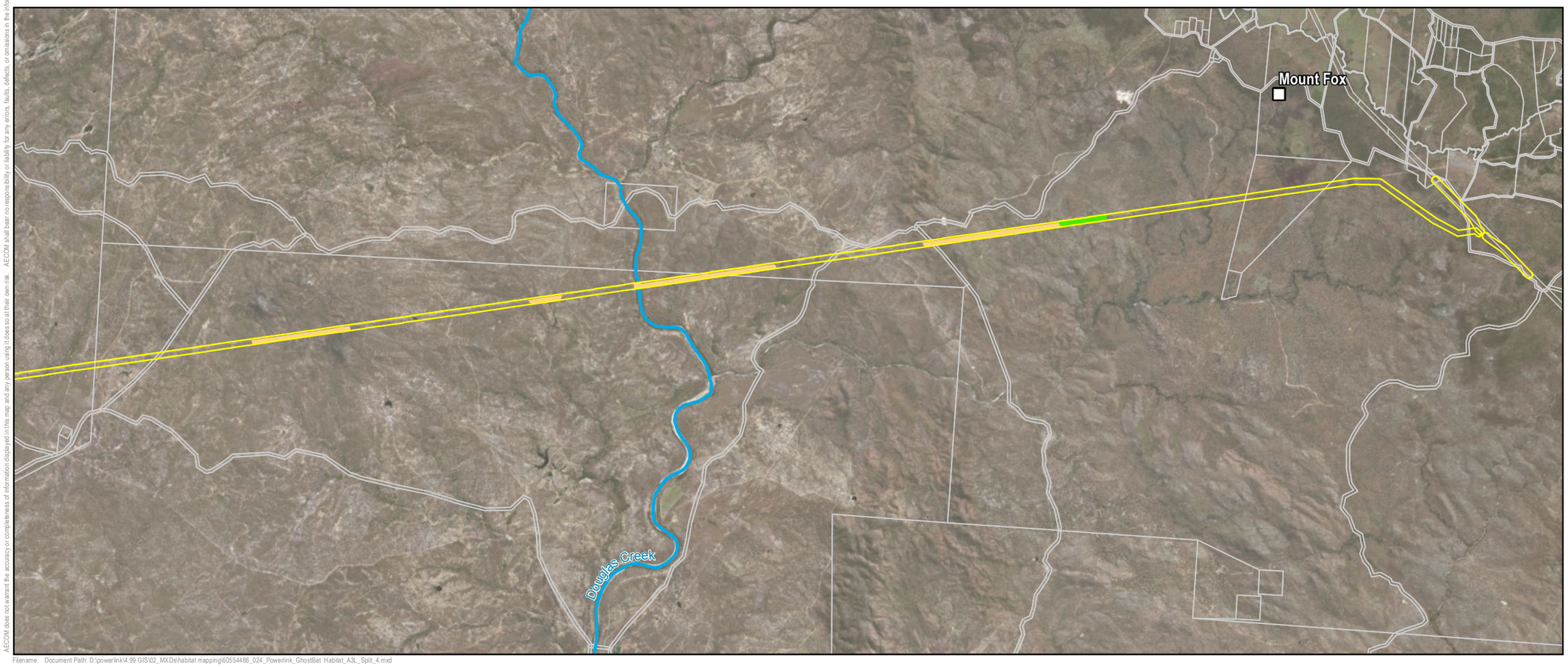
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 15.3 (3 of 4)

A3 size





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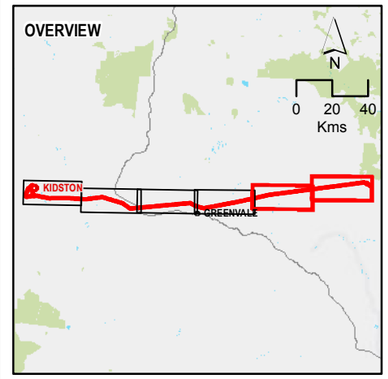

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Electricity Transmission Line
Powerlink Queensland

Ghost Bat Habitat

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LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 15.4 (4 of 4)

A3 size

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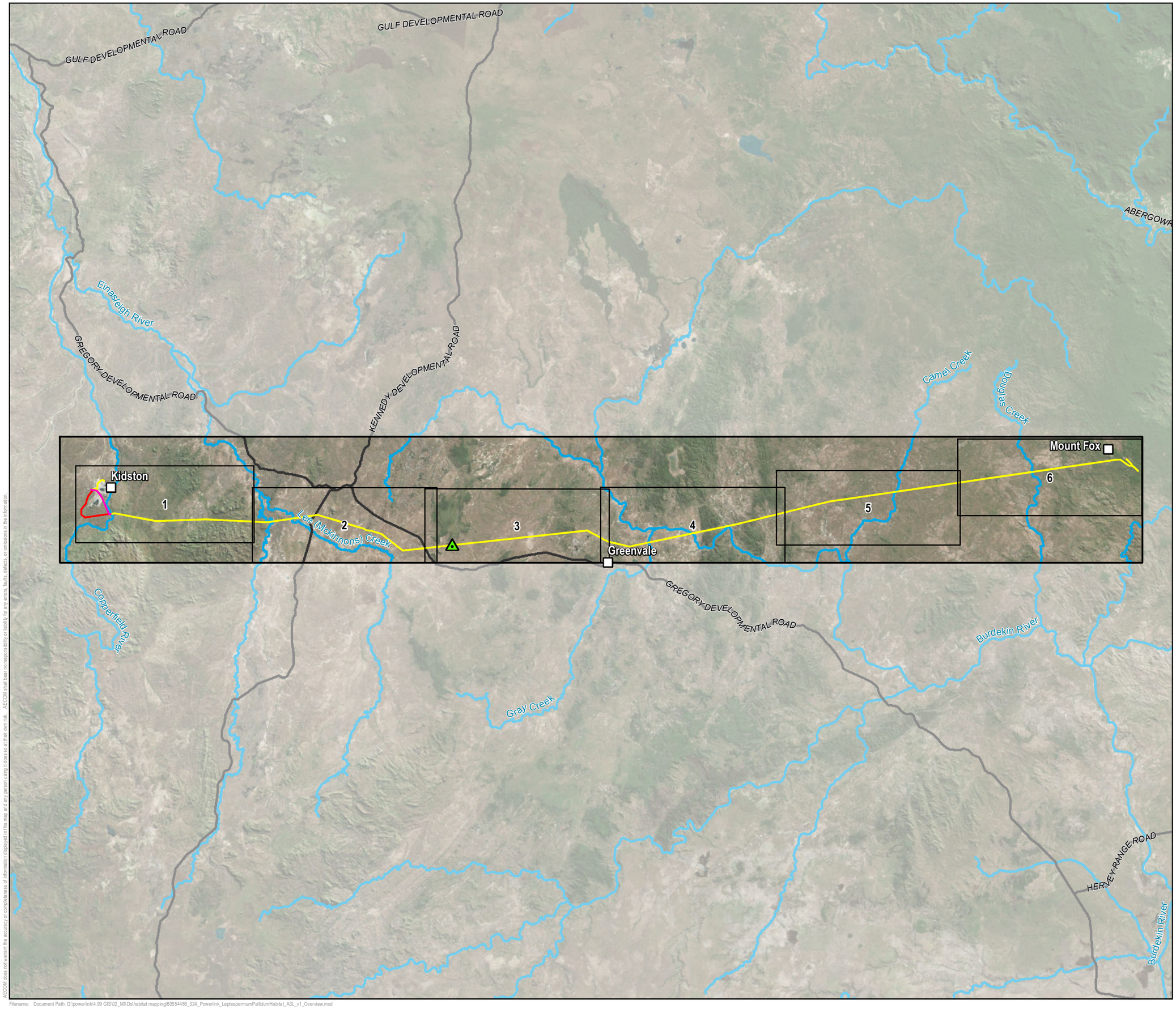

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Projection: Transverse Mercator

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Meters

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Legend

- Leptospermum pallidum Sighting Locations
- Point Of Interest
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Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Leptospermum pallidum **Habitat**

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Figure
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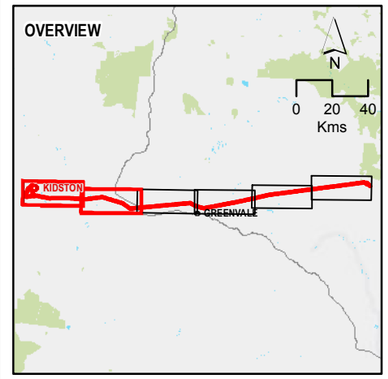

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Genex Kidston Connection Project

Terrestrial Ecology Assessment:
Electricity Transmission Line
Powerlink Queensland

Leptospermum pallidum **Habitat**

PROJECT ID:	60554486
CREATED BY:	JR
LAST MODIFIED:	CFS - 05/09/2018
VERSION:	2

Figure 8.2 (2 of 4)

A3 size

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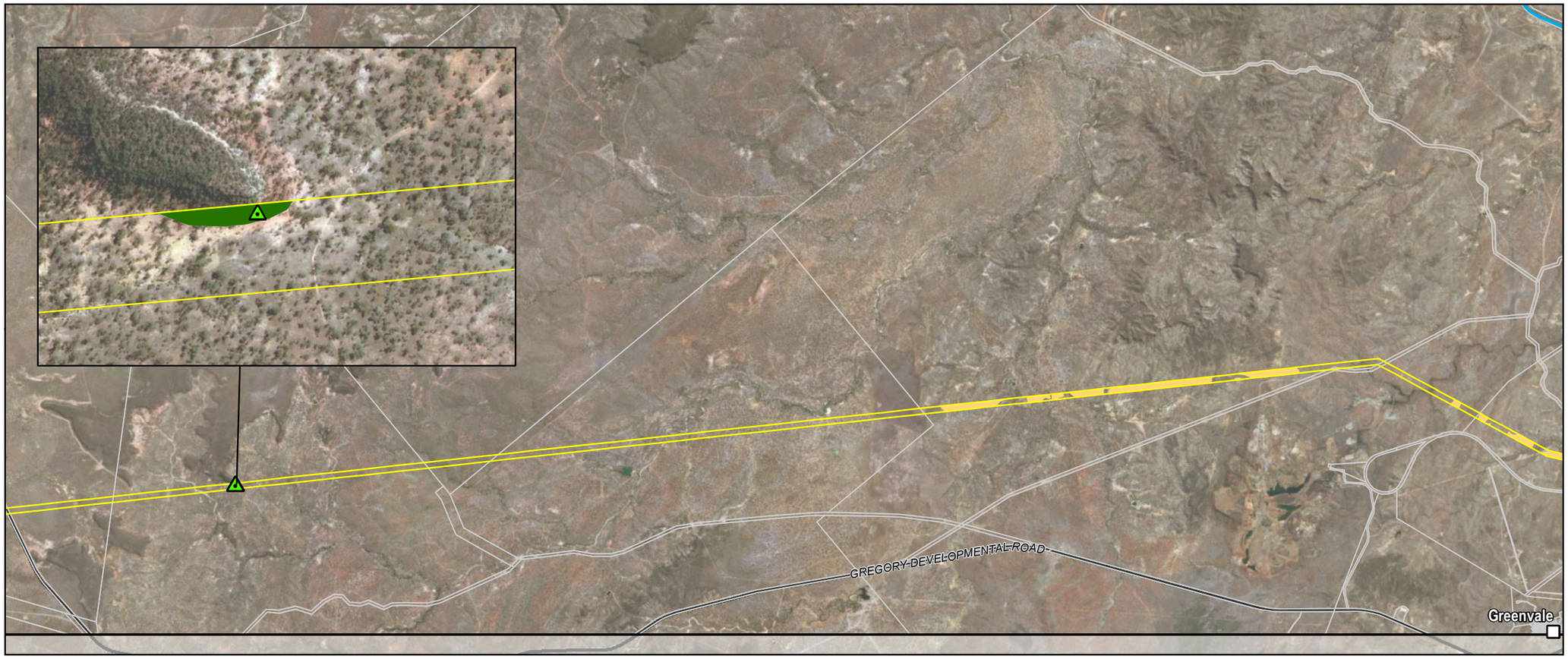

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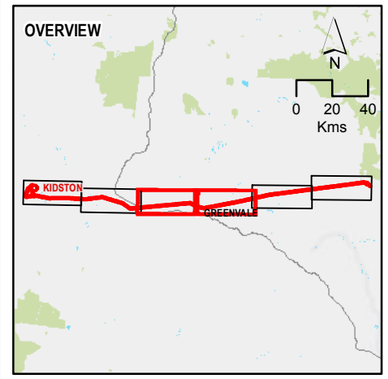
Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

0 1,100 2,200 3,300 4,400
Meters

1:95,000 (when printed at A3)

Legend

- Leptospermum pallidum Sighting Locations
- Point Of Interest
- Major Roads
- Major Watercourses
- Regional Context Area
- Cadastral Boundaries
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- Primary Habitat Known
- Primary Habitat Possible
- General Habitat



Data sources:
DCDB, Roads, Watercourses - DNRM 2018
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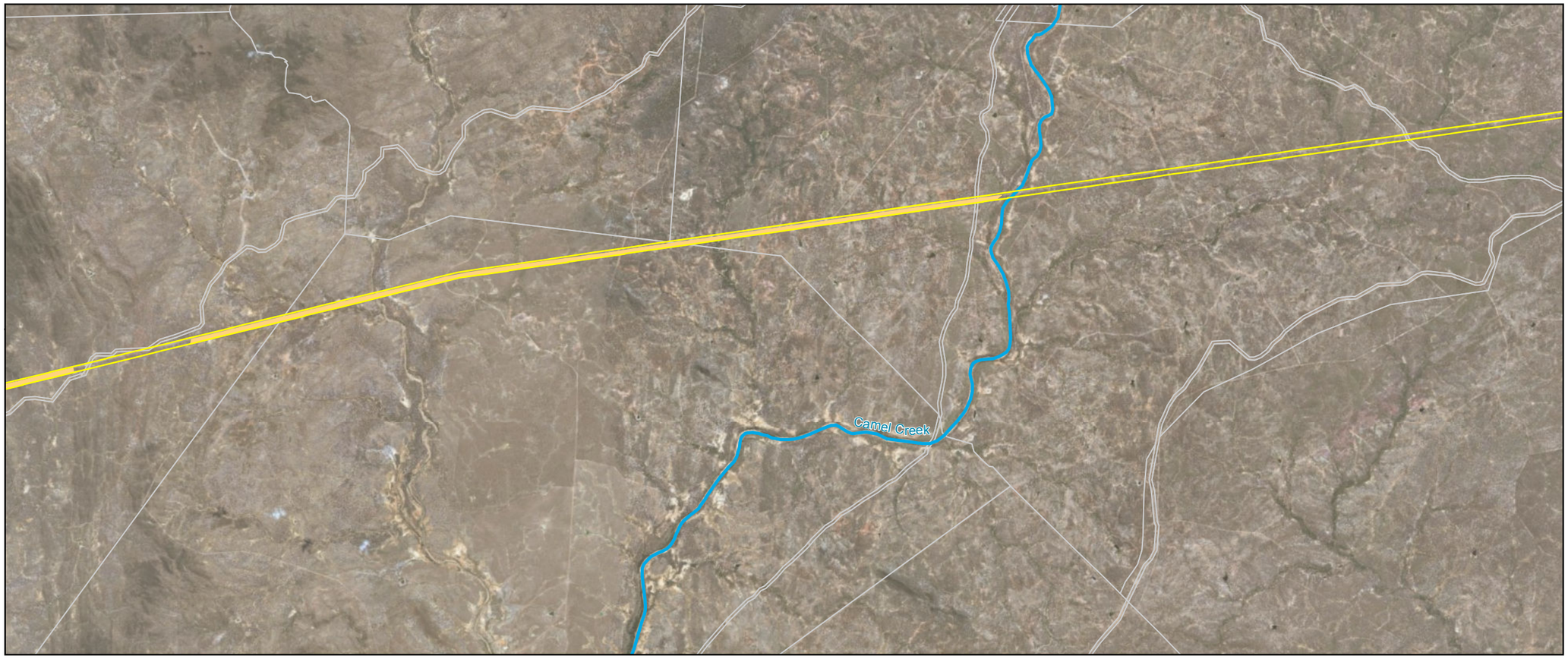
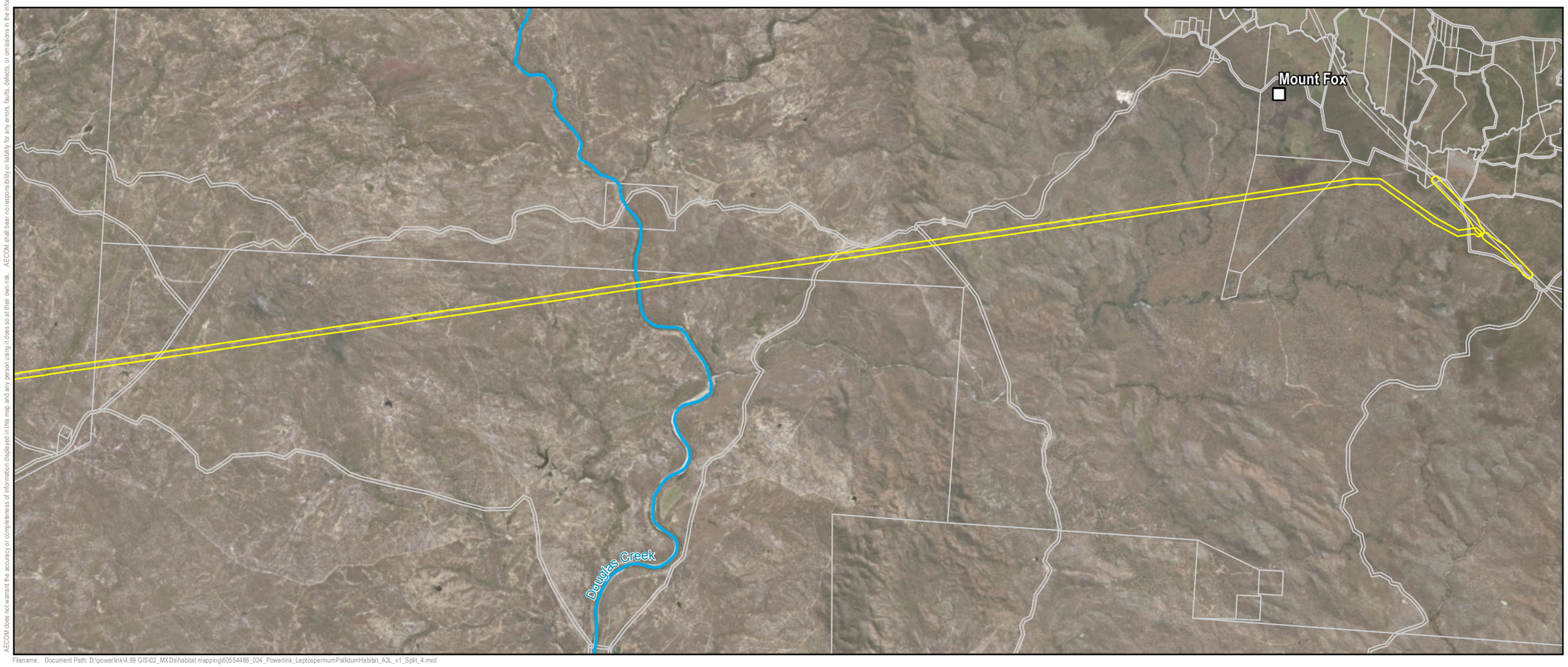
Figure 8.3 (3 of 4)

A3 size





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Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

0 1,100 2,200 3,300 4,400

Meters

1:95,000 (when printed at A3)

Legend

- Leptospermum pallidum Sighting Locations
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- Major Watercourses
- Regional Context Area
- Cadastral Boundaries
- Draft Alignment
- Draft Alignment A
- Draft Alignment B
- Primary Habitat Known
- Primary Habitat Possible
- General Habitat

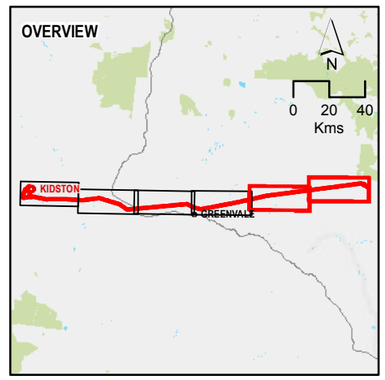

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Figure 8.4 (4 of 4)

A3 size

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