

Appendix G

Visual Amenity Technical Report

Powerlink Kidston Connection Project

Landscape and Visual Impact Assessment



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Powerlink Kidston Connection Project

Landscape and Visual Impact Assessment

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1. Introduction

Powerlink is proposing a new 195 kilometre (km) long, 275 kilovolts (kV), electricity transmission line between Kidston and Mount Fox in Queensland. This is known as the Kidston Connection Project (the Project). The purpose of the Project is to connect to the Kidston Renewable Energy Hub, where Genex Power Limited (Genex) is seeking to establish a combination solar and hydro pump storage power generation facility, to supply power the National Electricity Market.

Lat27 was commissioned by AECOM Australia Pty Ltd (AECOM) to undertake a Landscape and Visual Impact Assessment (LVIA) of the Project to inform an Environmental Assessment Report that AECOM is preparing to support an Infrastructure Designation application under the *Planning Act 2016*.

The purpose of the Landscape and Visual Impact Assessment is to:

- undertake a high level baseline assessment describing existing environmental values of the Project Area with respect to values including landscape character and visual amenity;
- describe the existing landscape (landscape receptors) and identify those people who are likely to experience and value views of the landscape (visual receptors) based on desk-top assessment and imagery provided by AECOM;
- identify key project risks on landscape and/or visual values during day and/or night; and
- evaluate the potential significance of the impacts of the project activities on landscape, views and visual receptors during construction, operation and decommissioning/closure.

The transmission line is located within the Etheridge Shire, Charters Towers Regional Council and Hinchinbrook Shire Local Government Areas (LGAs).

The location of the project is shown in **Figure 1**.

2. Approach and Methodology

2.1. Assessment limitations and assumptions

Our LVIA approach draws upon a range of locally and internationally recognized techniques including:

- Guidelines for Landscape and Visual Impact Assessment (GLVIA) 3rd edition (2014); and
- Australian Institute of Landscape Architects Queensland Guidance Note for Landscape and Visual Assessment Draft (AILA GNLVA) (due to be published 2018).

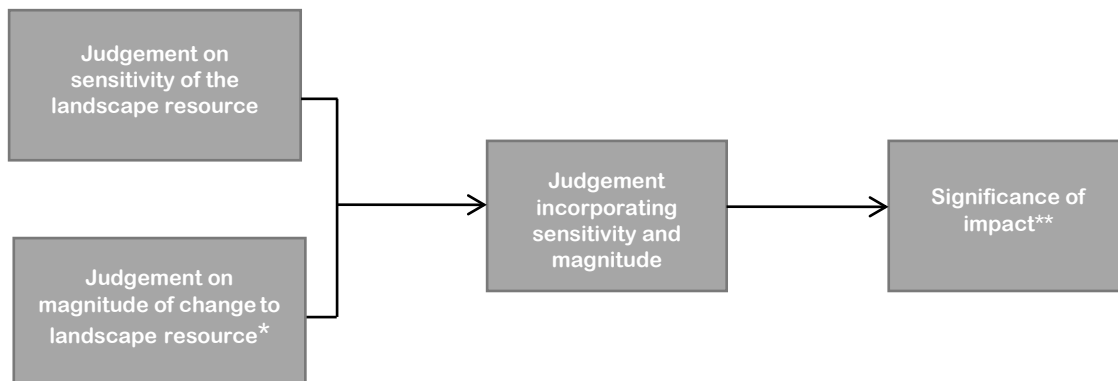
Limitations associated with the LVIA include the following aspects:

- The LVIA process aims to be objective and describe factually any anticipated changes to landscape, views and visual amenity. Potential changes as a result of the Project have been defined; however, the assessment of the effects of these changes requires qualitative judgements to be made. The conclusions to this assessment combine objective measurement and professional interpretation; which are, therefore, in part subjective.
- The description and understanding of the Project is based on the description of the Project available at the time of assessment.

- Lat27 has not undertaken a site visit. Lat27's assessment is based upon desk-top review of documents, combined with use of photographic imagery of the Project Area provided by AECOM and available on-line (for example Google Earth and Queensland Globe).
- On the basis that minimal lighting is proposed, no night time assessment of existing lighting has been undertaken and no full obtrusive lighting analysis carried out in accordance with AS 4282.

2.2. LVIA methodology overview

Unlike other technical disciplines (such as acoustics) there are no established, measurable thresholds of significance that exist for landscape or visual impacts. The significance of impact is therefore determined by considering the sensitivity of the landscape or visual receptor and the magnitude of change expected because of the proposed development. This is illustrated in the diagram in Plate 1:



* There is no standard methodology for the quantification of the magnitude of effects; however, it is generally based on the scale or degree of change to the landscape resource, the nature of the effect and its duration.

** Overall landscape impact is determined by combining the sensitivity of the landscape resource with the magnitude of landscape change. Professional judgement used to determine the overall significance of impact based on these two elements.

Plate 1: Approach to evaluating the significance of impact on landscape and visual values

In accordance with the Guidance Note for Landscape and Visual Assessment (AILA, June 2018):

- Sensitivity is defined as the capacity of a landscape or receptor to change without losing valued attributes
- Magnitude is defined as the extent of change that will be experienced by receptors. This change can be adverse or beneficial. Factors that could be considered in assessing magnitude are: the proportion of the view / landscape affected; extent of the area over which the change occurs; the size and scale of the change; the rate and duration of the change; the level of contrast and compatibility.

2.3. Landscape assessment methodology

“An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern here is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character”

(Landscape Institute and Institute of Environmental Management and Assessment, 2013)

Landscape sensitivity

This step involved classifying the sensitivity of the landscape and viewers (sensitive receptors) to the development.

The sensitivity of a landscape is assessed based on the extent to which it can accept change of a particular type and scale without adverse effects on its character. Sensitivity varies according to the type of development and the nature of the landscape, including:

- Its inherent landscape value (its condition, perceptual qualities, cultural importance, and any specific values that may apply e.g. landscape planning designations).
- The likely congruency of the proposed change (i.e. the extent to which the proposal may fit or be 'visually absorbed' into the scale, landform, land use, pattern, texture of the existing landscape).

A guide to these are defined in Table 1.

Table 1: Defining landscape sensitivity

Sensitivity of landscape	Attributes of landscape sensitivity categories
High	A landscape protected by national designation and/ or widely acknowledged for its quality and value; a landscape with distinctive character and low capacity to accommodate the type of change envisaged.
Medium	A moderately valued landscape, perhaps a regionally important landscape and / or protected by regional/state designation, or where its character, land use, pattern and scale may have some capacity to accommodate a degree of the type of change envisaged.
Low	A landscape valued to a limited extent, perhaps a locally important landscape or where its character, land use, pattern and scale is likely to have the capacity to accommodate the type of change envisaged.
Negligible	A landscape which is not valued for its scenic quality or where its character, existing land use, pattern and scale are tolerant of the type of change envisaged, and the landscape has capacity to accommodate change.

Magnitude of change to landscape amenity

The magnitude of change to landscape character depends on the nature, scale and duration of the change that is expected to occur. The magnitude of change also depends on the loss, change or addition of any feature to the existing landscape and is based upon that part of the landscape character type which is likely to be impacted to the greatest extent by the Project before the application of any mitigation.

Magnitude of change is described as Negligible (barely perceptible change), Low (noticeable change), Medium (considerable change) or High (dominant change), as illustrated in Table 5. The descriptions of magnitude and sensitivity are indicative as there is no defined boundary between levels of impacts.

These are defined in Table 2:

Table 2: Defining magnitude of change to landscape character

Magnitude of Change	Typical Examples
High	<u>Dominant change</u> : A clearly evident and frequent/continuous change in landscape characteristics affecting an extensive area, which is likely to fundamentally change the character of the landscape.
Medium	<u>Considerable change</u> : A considerable change in landscape characteristics, frequent or continuous and over a wide area or a clearly evident change, but over a restricted area.
Low	<u>Noticeable change</u> : A noticeable change in landscape characteristics over a wide area or a considerable change over a restricted area, but will not fundamentally change the character of the landscape.
Negligible	<u>Barely perceptible change</u> : An imperceptible, barely or rarely perceptible change in landscape characteristics.

Note: If the Project will not be perceptible at all then there is no magnitude of change and “No impact” is recorded.

Significance of effect on landscape amenity

An evaluation of overall potential impacts on landscape amenity is based on the sensitivity of the existing landscape to change and the magnitude of change that is likely to occur. No prescribed methods for assessing the significance of landscape impacts exist; therefore, professional judgement and experience are applied to identify the level of significance. Each landscape character type is assessed on its own merits, as factors unique to each circumstance need to be considered. However, there are general principles that can be used as a guide to this process, providing transparency about how judgements have been made. The overall significance of change to landscape character is determined by using Table 3.

Table 3: Determining level of effect on landscape amenity

Level of effect		Magnitude of change in landscape			
		High (Dominant change)	Medium (Considerable change)	Low (Noticeable change)	Negligible (Barely perceptible change)
Sensitivity of landscape	High	Major	Moderate to Major	Moderate	Minor to Moderate
	Medium	Moderate to Major	Moderate	Minor to Moderate	Minor
	Low	Moderate	Minor to Moderate	Minor	Minor to Negligible
	Negligible	Minor to Moderate	Minor	Minor to Negligible	Negligible



Denotes a 'Significant' impact.

Denotes a 'Not Significant' impact.

Note: If the Project will not be perceptible at all then there is no magnitude of change and “No impact” is recorded.

2.4. Visual Assessment methodology

“An assessment of visual effects deals with the effects of change and development on the views available to people and their visual amenity. The concern here is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and/or introduction of new elements” (Landscape Institute and Institute of Environmental Management and Assessment, 2013)

Visual receptor audiences are assessed and described in terms of the views that can be obtained from selected representative viewpoints within the Project area. Representative viewpoints have been identified and described as part of the assessment. Visual receptors have been identified based on a number of parameters, including:

- Proximity of the receptor to the Project
- Type of visual receptor experiencing the view e.g. residents, people passing through the area in vehicles, recreational users or workers.

Visual sensitivity

For the purposes of this assessment, the sensitivity of the viewers at the viewpoints is considered to be dependent upon:

- The importance of the view i.e. the scenic qualities of the view, including the presence of other existing manmade elements in the view.
- The nature of the visual receptor (type and volume of sensitive receptors or viewers) experiencing the view; for example, residents and visitors to important/valued landscapes are considered to have a higher sensitivity to their visual environment than, say, visitors to non-designated areas or motorists passing through the landscape.

This is defined in Table 4:

Table 4: Defining viewpoint sensitivity

Sensitivity of viewpoint	Attributes of viewpoint sensitivity categories
High	Large numbers of viewers or those with proprietary interest and prolonged viewing opportunities such as residents and users of attractive and/or well-used recreational facilities. Views from a regionally important location whose interest is specifically focussed on the landscape e.g. national park.
Medium	Medium numbers of residents (e.g. rural communities and townships) and moderate numbers of visitors with an interest in their environment e.g. visitors to state forests, including bush walkers, horse riders, trail bikers. Larger numbers of travellers with an interest in their surroundings e.g. local designated scenic routes.
Low	Small numbers of visitors with a passing interest in their surroundings or transient views e.g. those travelling along principal roads. Viewers whose interest is not specifically focussed on the landscape e.g. workers, commuters, truck drivers.
Negligible	Very occasional numbers of viewers with a passing interest in their surroundings e.g. those travelling along minor roads and views from the air.

Magnitude of change to visual amenity from representative viewpoints

The magnitude of change to views and visual amenity depends on the nature, scale and duration of the change that is expected to occur. The magnitude of change also depends on the loss, change or addition of any feature in the field of view of the receptor; or any change to the backdrop to, or outlook from, a viewpoint. The assessment assumes a worst-case scenario without any mitigation (excepting that inherent in the proposal). The level of effects on a view depend on the extent of visibility, degree of obstruction of existing features, degree of contrast with the existing view, angle of view, duration of view and distance from the Project.

Magnitude of change is described as being barely perceptible, noticeable, considerable or dominant, as illustrated in Table 6. Full descriptions on the magnitude of change from each representative viewpoint are discussed further in 7.2below.

Table 5: Defining magnitude of change to visual amenity

Magnitude of change	Typical examples
High	<u>Dominant change</u> : Major changes in view at close distances, affecting a substantial part of the view, continuously visible for a long duration, or obstructing a substantial part or important elements of view. Generally, short distances (typically < 500m) to the nearest transmission tower and one or more transmission towers visible in their entirety.
Medium	<u>Considerable change</u> : Clearly perceptible changes in views at intermediate distances, resulting in either a distinct new element in a significant part of the view, or a more wide-ranging, less concentrated change across a wider area. Generally, short to medium views (typically 500m – 1 km) to the nearest transmission towers.
Low	<u>Noticeable change</u> : Minor changes in views at long distances or visible for a short duration, and/or are expected to blend in with the existing view to a moderate extent. Generally, medium to long distance views (typically 1 – 2.5 km to the nearest transmission tower).
Negligible	<u>Barely perceptible change</u> : Change which is barely visible at a very long distance or visible for a very short duration, and/or is expected to blend with the existing view. Distant views (generally, >2.5 km) to the nearest transmission towers.



Note: If the Project will not be perceptible at all then there is no magnitude of change and “No impact” is recorded.

Overall significance of impact on visual amenity from representative viewpoints

The evaluation of overall potential impacts on visual amenity is based on the sensitivity of existing views to change and the magnitude of change that is likely to occur. No prescribed methods to assess significance of impacts exist; therefore, professional judgement and experience are applied to identify the level of significance. Each viewpoint is assessed on its own merits, as factors unique to each circumstance need to be considered. However, there are general principles that can be used as a guide to this process; which provides transparency about how judgements have been made. The overall significance of change to visual amenity and individual viewpoints, which is determined by using Table 6:

Table 6: Determining level of effect on visual amenity

		Magnitude of change on views			
		High (Dominant change)	Medium (Considerable change)	Low (Noticeable change)	Negligible (Barely perceptible change)
Sensitivity of viewer	High	Major	Moderate to Major	Moderate	Minor to Moderate
	Medium	Moderate to Major	Moderate	Minor to Moderate	Minor
	Low	Moderate	Minor to Moderate	Minor	Minor to Negligible
	Negligible	Minor to Moderate	Minor	Minor to Negligible	Negligible

	Denotes a 'Significant' impact.
	Denotes a 'Not Significant' impact.

Note: If the Project will not be perceptible at all then there is no magnitude of change and “No impact” is recorded.




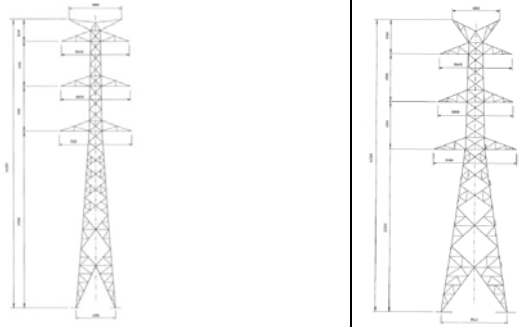
3. Potential impacts


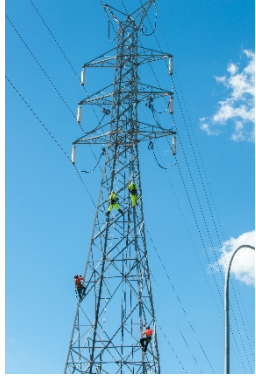


3.1. Key sources of potential impact

Key components of the development activities anticipated for the construction and operation which are relevant to the assessment of landscape and visual impacts are described in the Project Description. Those of the greatest relevance to the assessment of landscape and visual impacts are described in Table 7 below including:

- Construction impacts: The construction phase of the Project is temporary and is estimated to be approximately 18 months.
- Operational impacts: The overhead power infrastructure will lead to the direct loss of discrete areas of rural farmland and vegetated bushland. The operational phase of the Project is estimated to be approximately 50 years.

Table 7: Potential project impacts

Development activities and infrastructure	Typical Imagery	
Construction Phase		
<p>Vegetation clearing Select vegetation clearing where required associated with location of transmission lines and towers and construction of substations</p>	 <p>Image: Lat27</p>	
<p>Construction of Project infrastructure including two substations, the transmission structures and associated foundations.</p>	 <p>Image: Powerlink</p>	
<p>Construction (stringing) of high voltage overhead transmission lines. Stringing of high voltage lines is undertaken using a helicopter.</p>	 <p>Image: Powerlink</p>	
Operation Phase		
<p>Presence of 275 kV electricity transmission towers and associated overhead power lines.</p> <p>Detailed design is currently underway to optimise the configuration. For the purposes of this assessment it has been assumed that development scenarios would include up to 195 km of double circuit 275 kV suspension or tension transmission lines supported by galvanised steel lattice transmission towers at up to 45 m high. These would be located approximately every 400 to 500m depending on local topography. This structure design has the most significant impact on visual amenity. Alternative scenarios include the use of single circuit designs which have less physical components and, therefore, less significant visual impacts.</p> <p>High voltage overhead feeder lines (conductors connecting the cable marshalling points to the</p>		

Development activities and infrastructure	Typical Imagery	
<p>main switchboard and the solar farm substation).</p> <p>It is noted that Powerlink is currently working with stakeholders to determine whether the Copperfield substation (see below) will be adopted to connect the Kidston Renewable Energy Hub as well as additional projects in the geographic area to the Queensland transmission network. If the Copperfield 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. Both alignment options – Draft Alignment A and Draft Alignment B - are considered in this Landscape and Visual Impact Assessment report.</p>	 <p>Typical suspension tower</p> <p><i>Image: Powerlink</i></p>	 <p>Typical tension tower</p> <p><i>Image: Queensland Government of Powerlink Tower</i></p>
<p>Substations</p> <p>Two substations are proposed:</p> <ul style="list-style-type: none"> • Mount Fox substation with switching capability (275 kV) – approximately 210 m long by 150 m wide located near Knuckledown and Furber Roads, Mount Fox. • Copperfield River substation (275 kV) - approximately 210m long by 150m wide located near Gilberton Road, Kidston. 	 <p><i>Image: Powerlink</i></p>	
<p>Easement and Access Tracks</p> <p>The transmission line will be located within a 60 m wide easement and vegetation clearing will be required to maintain safe electrical clearances.</p> <p>Access tracks will be required to access the corridor. Locations of these are not yet confirmed.</p>	 <p><i>Image: Powerlink</i></p>	

4. Project Area Context

The proposed transmission line is a linear corridor of approximately 195km in length. The Project Area and its wider landscape context are illustrated in **Figure 1**, **Figures 2.1 to 2.4** and **Figures 3.1 to 3.4** included in the Appendices.

4.1. Settlement and infrastructure

The Project Area lies in a predominantly rural area comprising isolated farmsteads, rural rangelands used predominantly for cattle grazing and areas of forested and natural landscapes.

The Project comprises a linear corridor running in an approximately east-west direction. As shown in **Figures 2.1 to Figure 2.4**, the area around the corridor is sparsely settled. The Project alignment is located near a number of rural townships and population centres. The Project traverses outside the rural townships/localities of Mount Fox, Greenvale, Conjuboy and Kidston. The proposed substation at Mount Fox will be located within the Hinchinbrook Shire Council LGA. The nearest locality to the substation would be Mount Fox and the nearest population centre is Ingham (approximately 40 km north-east of Mount Fox). The proposed Copperfield River substation will be located within Etheridge Shire Council with the nearest population centre being Einasleigh (approximately 40 km north of Kidston). Approximately 115 km of the proposed transmission line will be located within Charters Towers Regional Council with the nearest population centre being Greenvale. This small township has a population of 232 people (ABS census data, 2016) and lies just over 3 km south of the central part of the proposed transmission line. Mount Fox at the eastern end has 87 people (ABS census data, 2016). Other localities include Conjuboy and Kidston but these areas have only a scattering of dwellings and do not have 2016 census data. The Kidston township was established for the purpose of the historical Kidston Gold Mine, which is the location of the proposed Kidston Renewable Energy Hub. Draft Alignment A and Draft Alignment B both pass close to this small township, with Draft Alignment A being somewhat closer for most of its length.

The Gregory Developmental Road and Kennedy Developmental Road are the key transport routes around the Project Area, converging and crossing at Conjuboy. Annual Average Daily Traffic (AADT) counts on these roads are low – typically less than 200 vehicles a day with approximately a quarter being heavy vehicles (Queensland Government traffic census data, 2016). The ‘Great Inland Way’ from Sydney to Cairns which passes along and through Conjuboy (via The Gregory Highway and Kennedy Developmental Road) is nominated and promoted as a Tourist Drive (‘Great Queensland Drives’) by the Outback Queensland Tourism Association (OQTA).

Key local roads around the Project Area include The Crater Road, Lava Plains - Mount Fox Road, Kangaroo Hills Road, Ewan Mount Fox Road, Kallanda Road, Valley of Lagoons Road, Lincoln Springs Road, Tarroni Road, Craiglee Road, Poison Lake Road, Greenvale Valley Road, Conjuboy Road, Welcome Downs Road, Rycon Road, Kidston Dam Road and Gilberton Road, however, many parts of the corridor do not lie in close proximity to any public roads and fall within large agricultural land holdings with a dispersed network of private access tracks. There are no operational railway lines close to the project.

The Ergon Ross-Kidston 132kV transmission line and Greenvale 66kV sub-transmission line are located within the Project area. Powerlink is proposing to co-locate its transmission line with this infrastructure for a portion of its length. Powerlink’s existing double circuit 275 kV Ross to Chalumbin transmission line, to which this project will connect, lies in the far eastern end of the corridor at Mount Fox. The Kidston Renewable Energy Hub is located at the far western end of the corridor and will comprise a pumped storage hydroelectric power scheme utilising an abandoned gold mine as well as associated solar farm.

4.2. Landform, hydrology and rural land use

As illustrated on **Figures 3.1 to 3.4**, landform within the Project Area and wider landscape is varied. In the east lies the elevated Seaview Range. The Mount Fox crater (810m AHD) forms a prominent landmark at the eastern end of the corridor. Travelling westwards, the transmission line route passes north of Mount Claro, south of Mount Jimmy (579 m AHD), then crosses the Pelican Range near Ironstone Mountain (636m AHD) east of Greenvale. From here the topography is less pronounced – typically at around 470 m AHD. It then crosses the Great Dividing Range in the centre of the project area close to Conjuboy, where it passes to the south of Mount Esk (726 m AHD). The route continues westwards south of Ironstone Knobs (656m AHD) with both Draft Alignment A and Draft Alignment B terminating near Kidston, close to Paddys Knob (608 m AHD).

The topography is further emphasised by the hydrology of the Project Area. The main watercourse in the east of the Project Area is the Burdekin River. Two significant tributaries join the Burdekin - Gray Creek located near Greenvale and Douglas Creek in the east near Mount Fox. In the centre of the Project Area the main river is the Einasleigh River which converges with Lee McKinnons Creek near Conjuboy. The western part of the Project Area is crossed by the Copperfield River close to Kidston.

Existing land use within and adjacent to the Project Area is predominantly rural, characterised by grazing properties for livestock production (predominantly beef cattle). Queensland Globe identifies predominantly low pasture production (less than 1500kg/ha) across the Project Area with localised areas of medium and high pasture production (up to 3500kg/ha) associated with the Burdekin River valley.

4.3. Regional landscape context and vegetation

Bioregions have been defined by the Queensland Government's Environmental Resources Information Network (ERIN) as part of the Interim Biogeographic Regionalisation for Australia (IBRA). IBRA represents a landscape-based approach to classifying the land surface of Australia. The IBRA data consists of two datasets: IBRA bioregions, which are a larger scale regional classification of homogenous ecosystems; and sub regions, which are more localised. Version 7 delineates 89 biogeographic regions and 419 sub regions, each reflecting a unifying set of major environmental influences which shape the occurrence of flora and fauna and their interaction with the physical environment across Australia. The Project Area comprises the following bioregions and sub-bioregions as shown on **Figure 4.1 to 4.4**:

- Wet Tropics Bioregion
 - WET05: Paluma Seaview
- Einasleigh Uplands Bioregion
 - IEU02: Kidston
 - IEU04: Broken River
 - IEU05: Undara Toomba Basalts

Whilst bioregions have been defined mainly for the purposes of ecosystem planning and monitoring, the nominal attributes that make up IBRA are climate, lithology/geology, landform, vegetation, flora and fauna, and land use. As these are the themes that are normally used to define landscape character at a high level, use of the IBRA subregions is appropriate for the purposes of informing the likely sensitivities/impacts on landscape amenity. The bioregion descriptions are presented in Table 8:

Table 8 IBRA Sub bioregion descriptions

IBRA Bioregion, Subregion, Code and Total Area (Ha)	Description
Wet Tropics Bioregion	
WET05 Paluma Seaview (275102)	Encompasses the southern ranges of the bioregion and is separated from the subregions to its north by the Herbert River Gorge. Rainforested areas are separated into three distinct sections, the Mt Lee, Mt Spec and Mt Halifax sections, by open forest and woodlands. Estimated mean annual rainfall for much of this subregion is barely above the rainforest threshold of 1300mm and only exceeds 1600mm at higher elevations. Much of the Seaview Range section is below 800m but the Paluma Range section is generally above 800m with significant areas above 900m. The combined effects of greater distance from the coast and lower elevation have resulted in significantly lower rainfall for the Seaview Range section. The geology of this province is complex, but the principal rocks are granites and acid volcanics.
Einiasleigh Uplands Bioregion	
IEU02 Kidston (2990944)	Lies east of subregion 1, at higher elevations but on similar geologies. Most of the subregion lies between 500 and 800m ASL. Narrow-leaved ironbark (<i>Eucalyptus crebra</i>) dominates the vegetation of these hills and ranges, although small areas of Mesozoic sandstone occur in the west. The subregion lies in the rainshadow of the Great Dividing Range and drains into the Gulf of Carpentaria. It forms the headwaters of the Walsh, Lynd and Einiasleigh Rivers.
IEU04 Broken River (3240487)	Includes most of the south-eastern part of the bioregion. It is dominated by hills and shallow soils on Palaeozoic sediments, but there are also extensive areas of acid volcanics and granites. It is an essentially hilly subregion, with shallow soils dominated by narrow-leaved ironbark (<i>Eucalyptus crebra</i>) communities. Reid River box (<i>Eucalyptus brownii</i>) woodlands are common in lower parts of the landscape. There are also areas of Tertiary plateaus and sand sheets, and of alluvium. Alluvials reach their greatest development in the bioregion in this subregion, along the Burdekin River. The subregion contains almost the entire upper catchment of the Burdekin River.
IEU05 Undara Toomba Basalts (2255445)	Contains the four major basalt areas of the bioregion. It includes the McBride, Chudleigh, Sturgeon and Nulla basalt flows (Henderson and Stephenson, 1980). All are characterised by red or black soils dominated by ironbark (<i>Eucalyptus</i> spp.) woodlands, with varying amounts of open woodlands and grasslands. Specialised habitats associated with this subregion include lava tunnels, springs and spring-fed wetlands. The Toomba basalts of the Nulla flows, and the Kinrara basalts of the McBride shield volcano, are amongst the youngest in Australia. They are characterised by extensive dry rainforests on unweathered lava.

5. Landscape Planning Context

The emphasis of this section is to identify those aspects of landscape or visual amenity that will require assessment under legislation or relevant planning schemes so that these can be appropriately identified and assessed within the landscape assessment or visual assessment process. The purpose is to determine the extent to which valued and protected landscape and/or visual aspects may be potentially affected. Notably, it is not a formal assessment of the acceptability of the Project from a planning perspective. Where a document is in draft, the LVIA has proceeded based on current adopted schemes and accepted national and international practice for landscape and visual assessment.

The provisions of these guidelines and planning schemes applicable to landscape and scenic amenity are described in Table 9 to Table 11 and shown, where applicable, on **Figure 2.1 to 2.4**:

5.1. National planning and legislative context

Assessment guidance for this LVIA has referred to international, national and state assessment standards.

As shown on **Figure 2.4**, the closest nationally-significant landscape is Girringun National Park incorporating an area around Mount Fox crater, located 500 m at its closest point from the eastern end of the transmission line. These areas are protected through the *Nature Conservation Act 1992*. Mount Fox is located 42 kilometres south-west of Ingham along a well signposted route from Trebonne via the Herbert River Valley and the Seaview Range. A lookout provides views across the valley. Department of National Parks, Sport and Racing (2018) states that:

“A relic of north Queensland's volcanic past, Mount Fox is an isolated, well-preserved, dormant volcano, protected within the 215 hectare area of Mount Fox, Girringun National Park.”

“While most of the route is unsealed and the road up the range is narrow and windy, it can still be accessed using a conventional vehicle. In summer, storms may restrict access to four-wheel-drive vehicles... There are no wheelchair-accessible tracks or facilities in this section of Girringun National Park... Camping is not permitted at Mount Fox, Girringun National Park. Camping is permitted nearby at Wallaman Falls, Girringun National Park, and at Broadwater, Abergowrie State Forest.”

Other nationally-protected landscapes such as Undarra Volcanic National Park and Blackbraes National Park are located over 50 km from the Project so will not be affected by the proposals.

Table 9: Review of key state policy and guidance relevant to LVIA

NATIONAL	
National Parks –Girringun National Park	
The Girringun National Park is legislated under the <i>Nature Conservation Act 1992</i>	
Issue/Concern	Purpose/Intent
The Girringun National Park (Mount Fox section) is located close to the corridor. The provisions of the <i>Nature Conservation Act</i> therefore need to be considered.	(1) A national park is to be managed to— (a) provide, to the greatest possible extent, for the permanent preservation of the area's natural condition and the protection of the area's cultural resources and values; and (b) present the area's cultural and natural resources and their values; and (c) ensure that the only use of the area is nature-based and ecologically sustainable; and (d) provide opportunities for educational and recreational activities in a way consistent with the area's natural and cultural resources and values; and (e) provide opportunities for ecotourism in a way consistent with the area's natural and cultural resources and values

5.2. State planning and legislative context

There are some large tracts of State Forest within the wider landscape context to the Project Area including Lannercost State Forest, located approximately 4 km north east of the eastern end of the Project corridor. State Forests are not a landscape designation and do not imply any special landscape or visual qualities. However, State Forests are sometimes used for recreation and appreciated for their natural qualities and, therefore, have been considered from both a landscape and visual perspective in the LVIA.

5.3. Local planning and legislative context

At the local level, the Project falls within three local government areas (LGAs): Hinchinbrook Shire Council, Charters Towers Regional Council and Etheridge Shire.

The Project commences near Mount Fox and traverses approximately 200 m through the Hinchinbrook Shire LGA. The transmission line then extends westwards through the Charters Towers LGA for approximately 125 km. It then continues westwards for approximately 68 km within Etheridge Shire Council LGA.

Table 11 below sets out landscape and visual amenity provisions of the relevant Local Plans for these areas:

Table 10: Review of key local policy and guidance relevant to LVIA

LOCAL	
<i>Hinchinbrook Shire (2017)</i>	
The current planning scheme, the Hinchinbrook Shire Council Planning Scheme 2005, was prepared under the Integrated Planning Act 1997. The Draft Hinchinbrook Shire Planning Scheme was prepared in 2017 and came into effect on 2 July 2018. There are no scenic amenity overlays or landscape overlays or associated policies included in the scheme.	
Policy / Objective	Purpose / intent
Major Electricity Infrastructure Assessment	
Table 5.5.1 Categories of Development and Assessment.	Table 5.5.1 states that electricity infrastructure is deemed acceptable development within the Rural, General Residential, Mixed Use, Centre, Industry, Recreation and Open Space, Environmental Management and Conservation and Community Facilities Zone.
Rural Zone Code	
Map 15 Zoning Map (ZM-15) shows the area associated with the proposed electricity corridor is zoned Rural. The area around Mount Fox is zoned Environmental Management and Conservation and, it is noted, is also shown as having High Value vegetation on the Environmental Significance overlay map OM-07	<p>6.1.2.3 Rural Zone</p> <p>(1) The purpose of the rural zone is to— (a) provide for rural uses and activities; and (b) provide for other uses and activities that are compatible with. (ii) the character and environmental features of the zone; ...</p> <p>(2) The purpose of the rural zone code will be achieved through the following overall outcomes: (h) Development maintains the rural and landscape character, scale and amenity of the zone.</p>
<i>Charters Tower Regional Planning Scheme – Dalrymple Shire Planning Scheme (August 2006)</i>	
Charters Tower Region is currently covered by two (2) separate Planning Schemes: Aligned Charters Towers City Council Planning Scheme; and, Aligned Dalrymple Shire Council Planning Scheme. This is a consequence of the amalgamation of the former Charters Towers City Council and the former Dalrymple Shire Council in March 2008. Council is currently in the process of preparing a unified scheme. However, in the interim the provisions of the Dalrymple Shire Planning Scheme apply, where relevant, to the Project.	
There are no scenic amenity overlays or landscape overlays or associated policies included in the scheme.	
Policy / Objective	Purpose / intent
DEOs	

Desired Environmental Outcomes include 2.1.1 and 2.1.2: Character	<p>DEO 1 seeks to ensure: The Rural character and amenity of the Shire including settlements is maintained to ensure the health and safety of people is maximised.</p> <p>DEO 2 seeks to ensure: The values of significant natural features are not compromised and the value of significant cultural features are conserved and protected as much as practicable.</p>
Rural Zone	
<p>Most of the landscape is zoned Rural (Planning Scheme Map 1 – Structure). A small area is zoned open space and recreation in the east of the LGA.</p> <p>The small settlement of Greenvale near the corridor has land zoned Township and Community Purposes.</p>	<p>3.7.1 Rural Planning Area Code</p> <p>Outcome</p> <p>(a) The Rural Planning Area is intended to continue its primary role for rural pursuits, such as grazing and cropping and are characterised by large holdings and development of varying scale and intensity such as agriculture, animal husbandry, resource extraction, rural tourism and rural industries.</p> <p>There is no specific guidance on community infrastructure such as electricity transmission infrastructure.</p>
Shire of Etheridge Planning Scheme (October 2005)	
<p>The Shire of Etheridge Planning Scheme (October 2005) applies to the western part of the transmission line corridor around Kidston, including the location of Draft Alignment A and Draft Alignment B.</p> <p>There are no scenic amenity overlays or landscape overlays or associated policies included in the scheme.</p>	
Policy / Objective	Purpose / intent
Rural Zone	
<p>The landscape around Kidston is zoned Rural (Planning Scheme Map 2). Within the settlement of Kidston an area is zoned (Planning Scheme Map 10) Community Infrastructure and Residential.</p> <p>The corridor passes through areas shown as High Agricultural Quality (Good Quality Agricultural Land Overlay Map) and/Medium Bushfire Hazard (Bushfire Management Overlay Map).</p>	<p>3.1.2 Rural Zone Objectives recognises that “...<i>the Shire contains natural features, natural resources (including extractive and mineral resources), cultural features and homestay activities which are of interest to tourists</i>” It is required that</p> <p>(e) The health and safety of residents in, and visitors to, the rural area, and the amenity they enjoy, are maintained;</p> <p>The purpose of the Rural Zone Code (3.3.1) includes:</p> <p>(b) to ensure all new defined uses or use classes implement and continue appropriate measures to maintain the existing biodiversity, natural and semi-natural habitats of the Shire;</p> <p>(e) to ensure that a defined use or use class does not adversely impact on the Shire’s National Parks and landscape areas...</p>
5.9.3 Specific Outcomes and Probable Solutions for the General Development Code	
Table 5.9 is the only reference to visual amenity. This	Outcomes: Vegetation:

is in relation to the visual amenity of vegetation.	<p>The visual amenity of the surrounding uses and of the Shire is protected. A defined use or use class does not adversely impact on the ecological or landscape values of vegetation.</p> <p>Probable solutions for development:</p> <p>Trees and shrubs whether natural growth or planted are retained on the site except where on the site of a proposed building construction or posing a fire hazard to the development.</p>
5.9.3 Specific Outcomes and Probable Solutions for the General Development Code	
Table 5.1 refers to visual matters relating to electricity infrastructure	<p>Outcomes: Built Form</p> <p>The built form must be compatible with the desired character and amenity of the surrounding area and must not adversely affect the visual amenity.</p> <p>Probable solutions:</p> <p>The maximum height of a building or structure other than electricity works and telecommunications facilities, is 8.5m.</p>

6. Landscape Impact Assessment


Four basic existing and emerging landscape character types (LCT) have been identified within the Project Area. These are identified in **Figures 4.1 to 4.4** (refer Appendices).

- Type A: Transitional Landscape (LCT A)
- Type B: Rural River Valleys and Plains (LCT B)
- Type C: Rural Rangelands (LCT C)
- Type D: Forested and Wooded Uplands (LCT D)

The preliminary landscape character types are described in Table 12 to Table 15 below. These tables also assess the likely sensitivities for each identified landscape character types in relation to the proposed transmission line development and provide a preliminary indication of the likely magnitude of change and consequent likely significance of that effect on landscape amenity.

Landscape Character Area A


Table 11: Summary description of LCT A: Transitional Landscape

Type A: Transitional Landscape	
Landscape Baseline Assessment	
Location and boundaries	This landscape lies in the west of the Project Area. It comprises a large area associated with the Kidston Renewable Energy Hub.
Typical character images:	
	
Image: Genex – Kidston Renewable Energy Hub	
Key characteristics	<ul style="list-style-type: none"> • Disturbed flat to undulating landscape typically between 500 and 600 m AHD. • Very small settlement of Kidston associated with former gold mine (too small for census data) • Primarily defined by former and emerging land uses • Site of the old Kidston Gold Mine with associated dams and disturbed landscape • Currently under development as a renewable energy hub with a 50MW Solar Project, 270MW Solar Project, 250MW Pumped Storage Hydro Project and proposed future 150MW Solar Project associated with adjoining escarpment. • This landscape type is interspersed with the Copperfield River (LCT B).
Precedent modifications and infrastructure elements	<ul style="list-style-type: none"> • Site of former gold mine • Increasing presence of energy infrastructure including hydro scheme and large areas of solar arrays.
Landscape Character Sensitivity Assessment	<ul style="list-style-type: none"> • Open landscape • Few viewers to experience this landscape – over 15km from nearest main road - Conjuboy-Einasleigh Road • No landscape designations • History of use as a gold mine and now renewable energy hub so presence of much existing infrastructure • The overall inherent sensitivity is considered to be Negligible.

Landscape Evaluation	
Magnitude of Change Assessment	<ul style="list-style-type: none"> Proposed transmission line connects through this landscape. Two options are being considered – Draft Alignment A and Draft Alignment B – as shown on Figure F2.1. The transmission towers of either Draft Alignment A and Draft Alignment B will be readily assimilated into the existing infrastructure of this landscape. Against the context of existing development overall the magnitude of change is considered to be noticeable i.e. low.
Significance of Effect	<ul style="list-style-type: none"> Minor to negligible effect due to negligible sensitivity and low magnitude of change. Not significant.

Landscape Character Area B

Table 12: Summary description of LCT B: Rural River Valleys and Plains

Type B: River Valleys and Plains	
Landscape Baseline Assessment	
Location and boundaries	This landscape type applies to a network of watercourses that traverse the whole of the Project Area at regular intervals.
Typical character images:	
	
Image: AECOM	
Key characteristics	<ul style="list-style-type: none"> Network of river valleys that are low lying in relation to the surrounding landscape and often incised into the landscape with steep banks. Typically, well-vegetated river banks with mature eucalypts Seasonal flows – ranging between dry and flooded conditions Includes Burdekin River with its significant tributaries Gray Creek and Douglas Creek in the east of Project Area; Einasleigh River in the centre, which converges with Lee McKinnons Creek near Conjuboy and Copperfield River close to Kidston to the west. Road bridges over the river create visual interest. Visually interesting natural character.

	<ul style="list-style-type: none"> Not the subject of any landscape planning designations but likely to be valued for scenic amenity.
Precedent modifications and infrastructure elements	<ul style="list-style-type: none"> Natural landscape with minimal infrastructure comprising road bridges and the existing Ergon power line.
Landscape Character Sensitivity Assessment	<ul style="list-style-type: none"> Natural character with significant fringing vegetation However, none of this LCT is protected in planning scheme for scenic qualities – anticipated to be valued at the local level. The overall sensitivity is considered to be Low.
Landscape Evaluation	
Magnitude of Change Assessment	<ul style="list-style-type: none"> The Powerlink transmission line will cross this LCT in locations: <ul style="list-style-type: none"> Copperfield River (east of Kidston), Einasleigh River and Lee McKinnons Creek (west of Conjuboy) Gray Creek and Burdekin River (east of Greenvale) Douglas Creek (west of Mount Fox) The transmission line will result in localised removal of vegetation and the intrusion of built infrastructure on natural landscape values. However, many of these locations are remote from main roads so the crossing will not be accessible to many people/only visible from minor roads. Therefore, overall the magnitude of change is predicted to be Low.
Significance of Effect	<ul style="list-style-type: none"> Minor effect due to low sensitivity and low magnitude.

Landscape Character Area C

Table 13: Summary description of LCT C: Rural Rangelands



Type C: Rural Rangelands	
Landscape Baseline Assessment	
Location and boundaries	This landscape type occurs across most of the Study Area typically occupying the land lying between the Rural River Valleys and Plains (LCT B) and the more undulating and elevated wooded and forested landscape (of LCT D)
Typical character images:	
	

Image: AECOM	
Key characteristics	<ul style="list-style-type: none"> • Generally flat to gently undulating landscape • Typically located between around 500 and 550 m AHD in the west of the area around Kidston and at slightly lower elevations between around 450m and 500m AHD in the east of the area • Land use is primarily pasture land with open woodland on more elevated and undulating areas and along minor creek lines. Richer and more productive pasture located closer to the River systems (LCT B). • Areas of open views but more intimate mosaic character creates visual interest and forms the backdrop to views from the major transit corridors through the region. • Very sparsely settled landscape with large land holdings (stations) scattered farmsteads and Greenvale is the only settlements. • Natural and rural character but fairly typical of landscapes found over a wide area of Queensland.
Precedent modifications and infrastructure elements	<ul style="list-style-type: none"> • Natural and rural landscape with little above-ground large-scale infrastructure. The existing power line easement runs across this landscape between Mount Fox and Kidston.
Landscape Character Sensitivity Assessment	<ul style="list-style-type: none"> • The Rural Rangelands LCT is contained, with a sparsely settled rural character and few large-scale infrastructure elements. • Long distant views are possible in some parts of the landscape to surrounding landscape types • None of this character type is defined as a Scenic Area or protected in a local planning scheme overlay. • The overall inherent sensitivity is considered to be Low.
Landscape Evaluation	
Magnitude of Change Assessment	<ul style="list-style-type: none"> • The power line will directly traverse many areas of this landscape type. • The power line will not prevent cattle grazing activities which will continue. • There will be localised clearance of vegetation around the power line easement. However scattered vegetation in the wider landscape will assist in integrating the power line into the rural character. • The powerline will result in a noticeable change over a wide area of landscape and is, therefore, considered to have a low magnitude of change.
Significance of Effect	<ul style="list-style-type: none"> • Minor effect due to low sensitivity and low magnitude.

Landscape Character Area D

Table 14: Summary description of LCT D: Forested and Wooded Uplands

Type D: Forested and Wooded Uplands	
Landscape Baseline Assessment	
Location and boundaries	This landscape lies in distinct areas across the Project Area defined by elevated topography, steeper slopes and the presence of woodlands and forests.
Typical character images:	
 <p>Image: AECOM</p>	
Key characteristics	<ul style="list-style-type: none"> • Generally undulating and elevated landscape relative to the surrounding rangelands; typically, above around 550 or 600 m AHD in the west of the Project Area and above around 500m AHD in the east, with elevations reaching up to around 800m AHD. • Land use is primarily natural land with pasture incursions comprising woodland and forested tracts • Extensive tree and woodland cover, species related to underlying soil and geological conditions. • Incised with numerous seasonal creek lines. • Creates distinctive landform that provides a backdrop to views across the adjacent Rural Rangelands and Rural River Valleys landscape type. • Little to no settlement within this landscape type
Precedent modifications and infrastructure elements	<ul style="list-style-type: none"> • Natural landscape with little above-ground large-scale infrastructure
Landscape Character Sensitivity Assessment	<ul style="list-style-type: none"> • Natural character • Elevated location makes parts of this landscape more visually prominent and sensitive to intrusion by infrastructure • Sensitive to removal of mature vegetation and trees • Most of this landscape type is not protected by any planning designation; however, an area in the east of the Project Area around Mount Fox is designated as National Park (it is an outlier to Girringun National Park as discussed previously) • The overall inherent sensitivity is considered to be up to Medium.

Landscape Evaluation	
Magnitude of Change Assessment	<ul style="list-style-type: none"> To the greatest extent possible, the route has been aligned to avoid traversing this landscape type or, where necessary, aligned through the least sloping and lower-lying areas. The potential impact of the Project is related to removal of a vegetation corridor, particularly where clearance easements cut through elevated and sloping areas where they can become visually prominent. The Girringun National Park, Mount Fox Section area is not directly affected (views are considered separately below) although the route does travers the lower slopes (lying outside of the national park area) Localised impacts on lower slopes of Mount Esk (south of Conjuboy), and small areas around Mount Jimmy and Mount Claro (west of Mount Fox). As the corridor would affect a small linear area of this LCT and often follows the existing easement overall, this is anticipated to have a low change which will not fundamentally change the character of the area.
Significance of Effect	<ul style="list-style-type: none"> Minor to moderate effect due to low sensitivity and low magnitude

7. Visual Impact Assessment

There are currently very few residents living in this rural area. Those receptors with potential to be affected by the Project are indicated on **Figure 5.1 to 5.4** and are described and discussed below.

7.1. Visual Context

The visual baseline has been assessed and is described in terms of potential for views to be obtained by selected visual audiences within the Project Area.

It is considered that the viewers (visual receptors) who may experience views of the Project are likely to include:

- Residents including those living in rural settlements (such as the nearby rural village of Greenvale) and those living on rural properties in the farmland surrounding the Project Area (including houses, homesteads and cottages) as well as 'weekender' properties such as at the old tin mine on Lava Plains – Mt Fox Road
- People working in the countryside including farmers
- Recreational users walking in the landscape including those visiting Girringun National Park (Mount Fox section)
- Recreational users using the local river systems for kayaking/canoeing, noting that many rivers are only navigable during the wet season
- Tourists passing through the Project Area by vehicle, including 'The 'Great Inland Way' tourist drive, which passes through Greenvale (as described previously)
- Travellers using major and minor roads within the Project Area, including motorists on the Gregory Developmental Road, Kennedy Developmental Road and from local roads that traverse or overlook the transmission route such as The Crater Road, Lava Plains Mount Fox Road, Kangaroo Hills Road, Ewan Mount Fox Road, Valley of Lagoons Road, Craiglee Road, and Conjuboy Road.

Based on an understanding of the Project, ten viewpoints are assessed in detail below to provide an indication of the potential impact of the project on a range of representative views:

- Viewpoint 1: Mount Fox, Girringun National Park looking southeast
- Viewpoint 2: Mount Fox Settlement, looking south-west
- Viewpoint 3: View from Kangaroo Hills Road near Lava Plains Road, looking south
- Viewpoint 4: View from Greenvale settlement, looking northeast
- Viewpoint 5: View from Gregory Developmental Road, looking north
- Viewpoint 6: View from Gregory Developmental Road, looking northwest
- Viewpoint 7: View from Gregory Developmental Road, looking southeast
- Viewpoint 8: View from Kennedy Developmental Road, looking south
- Viewpoint 9: View from Kennedy Developmental Road, looking northeast
- Viewpoint 10: View from Kennedy Developmental Road, looking south-west

The locations of the selected representative viewpoints are shown on **Figure 5.1 to 5.4**:


7.2. Viewpoint assessment

The likely visual impact anticipated during the operation of the Project is provided for each viewpoint in Table 16 to Table 25. Construction impacts are temporary and, therefore, considered to be of lower significance.

The potential impact of the substations at Mount Fox and Copperfield River on visual amenity has also been considered. However, these are located in remote locations accessible only via unsealed roads used by few people. For example, there is only one residential property lying close to the Mount Fox substation, which is over 1.2 km away with intervening open woodland. Similarly, the Copperfield River substation is located around 4.7 km from the nearest residence so is not expected to have a significant impact on visual amenity.

Viewpoint 1


Table 15: Likely visual effect of the Project on Viewpoint 1

VP01: Mount Fox, Girringun National Park looking southeast	
Visual Baseline Assessment	
	
<p>Existing view from Viewpoint 1: Mount Fox, Girringun National Park looking south-east Refer to Viewpoint 1, in Appendix 2 for appropriate scaled image.</p>	
Location and description	<ul style="list-style-type: none"> • GPS Location: -18.84043027°S 145.80785151°E • Elevation: 688m • South-easterly view from the base of the track towards the summit of Mount Fox, near Mount Fox Combined Break Road. • Proposed transmission towers are situated to the south, with the nearest tower approximately 1.0km to the south of this viewpoint. • Represents typical and accessible views of nearby residents, tourists and visitors of the Girringun National Park Mount Fox section, on the approach to the Mount Fox summit.

	<ul style="list-style-type: none"> South-easterly views from the summit point provide panoramic views towards the proposed Powerlink corridor Existing transmission tower and lines are somewhat screened by existing vegetation.
Key visual sensitivities	<ul style="list-style-type: none"> High sensitivity of receptors, including nearby residents, tourists and visitors of the Girringun National Park Mount Fox section. The presence of existing transmission lines reduces the overall sensitivity of this view. This viewpoint it is considered to have a High sensitivity overall to the change proposed, due to the high sensitivity of viewers (e.g. tourists, visitors and nearby residents) and its classification as National Park.
Visual Evaluation	
Magnitude of Change Assessment	<p>The nearest towers to this viewpoint and the nearby summit of Mount Fox are located approximately 1.0km to the south of this viewpoint. The substation is located approximately 4.0km away. Existing transmission towers are predominately screened by dense vegetation, and the magnitude of change on this receptor is anticipated to be Medium, due to the following factors:</p> <ul style="list-style-type: none"> Noticeable change due to the close proximity of this scenic viewpoint to the proposed transmission line. High visibility of the easement and associated towers, visible from the summit of Mount Fox. Mount Fox substation located around 4.0km south-east from this viewpoint so views are anticipated to be largely buffered by the presence of intervening landform and vegetation. At this distance, whilst the towers will be evident they will not change the fundamental visual character of the landscape and will 'blend' with the existing view to a considerable extent introducing another simple and repetitive element into this large-scale landscape. The bases of the transmission towers will be screened by foreground vegetation and changes in landform; The towers will form a visible but not defining element of the view.
Significance of effect	The effect of the Project on VP01 is considered to be Moderate to Major and therefore Significant .

Viewpoint 2


Table 16: Likely visual effect of the Project on Viewpoint 2

VP02: Mount Fox Settlement, looking southwest
Visual Baseline Assessment

<p>Existing view from Viewpoint 2: Mount Fox Settlement, looking southwest Refer to Viewpoint 1, in Appendix 2 for appropriate scaled image.</p>

Location and description	<ul style="list-style-type: none"> GPS Location: -18.81883849°S 145.79453048°E Elevation: 630m South west view from Mount Fox Road showing Mount Fox school. Nearest transmission tower is approximately 3.5km south of this viewpoint. Represents typical and accessible views of nearby residents, school students and teachers, visitors, workers and tourists travelling along Mount Fox Road; a sealed two-lane road. Obscured views towards the proposed Powerlink corridor
Key visual sensitivities	<ul style="list-style-type: none"> Receptors, including nearby residents, school students and teachers and visitors, workers and tourists travelling along Mount Fox Road Receptors are likely to be interested in the view, however, very small numbers would be present in this location. Although this view comprises a strong rural character; the presence of existing powerlines reduces the overall sensitivity of this view. This viewpoint it is considered to have a medium sensitivity overall to the change proposed (e.g. local residents).
Visual Evaluation	
Magnitude of Change Assessment	<ul style="list-style-type: none"> The nearest tower to this viewpoint is located approximately 3.5 km south of this viewpoint. The skyline is already affected by the presence of powerlines, and the magnitude of change on this receptor is anticipated to be negligible, due to the following factors: <ul style="list-style-type: none"> From this viewpoint, the Powerlink corridor will be screened by vegetation and the presence of intervening landform. At this distance, the towers will not be evident and will not impact the fundamental visual character of the landscape.
Significance of effect	The effect of the project on VP02 is considered to be Minor and therefore Not Significant .

Viewpoint 3

Table 17: Likely visual effect of the Project on Viewpoint 3

VP03: View from Kangaroo Hills Road near Lava Plains Road, looking south	
Visual Baseline Assessment	
 <p>Existing view from Viewpoint 3: View from Kangaroo Hills Road near Lava Plains Road, looking south Refer to Viewpoint 1, in Appendix 2 for appropriate scaled image.</p>	
Location and description	<ul style="list-style-type: none"> GPS Location: -18.86069566°S 145.71608006°E Elevation: 432m Southerly view from Kangaroo Hills Road. Nearest transmission tower is approximately 100m to the south-west of this viewpoint. Represents typical and accessible views of visitors and workers travelling along Kangaroo Hill Road; an un-sealed two-lane road Southerly views from this point provide open views towards the proposed

	<ul style="list-style-type: none"> Existing Telegraph poles and powerlines punctuate the skyline. This viewpoint is also partially representative of potential private views from the 'weekender' located on private land at the old KML tin mine accessed off Lava Plains Road, to the east of this viewpoint around 4 km to the east of this viewpoint – refer to text below table.
Key visual sensitivities	<ul style="list-style-type: none"> Receptors include travellers along <i>Kangaroo Hill Road</i>. Although this view comprises a strong rural character; the presence of existing powerlines reduces the overall sensitivity of this view. Due to this viewpoint already containing powerlines with associated easement and the low number of receptors anticipated in this location, it is considered to have a Low sensitivity overall to the change proposed.
Visual Evaluation	
Magnitude of Change Assessment	<p>The nearest tower to this viewpoint is located approximately 100m south-west of this viewpoint. The skyline from this vantage point is already affected by the presence of powerlines, and the magnitude of change on this receptor is anticipated to be considerable, therefore Medium, due to the following factors:</p> <ul style="list-style-type: none"> From this viewpoint, the transmission towers will be highly visible. At this distance, the towers will be highly evident, however existing power infrastructure reduces the visual overall sensitivity and new towers will not change the fundamental visual character of the landscape. The towers will form a visible, but not defining element of the view.
Significance of effect	The effect of the project on VP03 is considered to be Minor to Moderate and therefore Not Significant .

The disused KML tin mine is located around 4 km east of this viewpoint. As it is private property it was not possible to access for the purposes of the visual impact assessment. The old tin mine camp is understood to be powered but used as a weekender (not a permanent residence). The Powerlink line will be 100m south from the old buildings on this site and, therefore, is at a similar distance and direction as Viewpoint 3. Due to the low number of people anticipated to be present on this property and its 'temporary' use, the sensitivity of the viewpoint is assessed to be 'low' and the impact medium for the reasons described above. Therefore, the significance of the effect is minor to moderate and not significant. However, for this vantage point, liaison with the landowner to discuss localised mitigation, as described in Section 8, would be beneficial.

Viewpoint 4


Table 18: Likely visual effect of the Project on Viewpoint 4

VP04: View from Greenvale settlement, looking northeast
Visual Baseline Assessment
 <p>Existing view from Viewpoint 4: View from Greenvale settlement, looking northeast Refer to Viewpoint 1, in Appendix 2 for appropriate scaled image.</p>

Location and description	<ul style="list-style-type: none"> GPS Location: -19.00332912°S 144.98351404°E Elevation: 450m North-easterly view from Gregory Developmental Road close to Redbank Drive at the entrance to Greenvale settlement. Nearest transmission tower is approximately 3.7km north of this viewpoint. Represents typical and accessible views of residents of Greenvale and visitors driving along Gregory Developmental Road; a partly-sealed two-lane road. Northerly views from this point towards the proposed Powerlink are screened by dense foreground vegetation and changes in topography.
Key visual sensitivities	<ul style="list-style-type: none"> Receptors, predominately nearby residents of Greenvale, likely to be a relatively high number of receptors relative to the surrounding landscape. This viewpoint it is considered to have a medium sensitivity overall to the change proposed, due to the type of viewers (residents, visitors and tourists) and relative concentration.
Visual Evaluation	
Magnitude of Change Assessment	<ul style="list-style-type: none"> The nearest tower to this viewpoint is located 3.7km north of this viewpoint. The skyline from this vantage point is already affected by the presence of powerlines and infrastructure associated with the town of Greenvale. From this viewpoint, the Powerlink corridor will not be visible due to the distance from the Project Area, and dense foreground vegetation to the north of Greenvale settlement and the change in topography that will screen the transmission tower structures. Therefore, there will be no impact.
Significance of effect	The effect of the project on VP04 is considered to be No impact and, therefore, Not Significant .

Viewpoint 5


Table 19: Likely visual effect of the Project on Viewpoint 5

VP05: View from Gregory Developmental Road, looking north	
Visual Baseline Assessment	
 <p>Existing view from Viewpoint 5: View from Gregory Developmental Road, looking north Refer to Viewpoint 1, in Appendix 2 for appropriate scaled image.</p>	
Location and description	<ul style="list-style-type: none"> GPS Location: -18.98820268°S 144.84789929°E Elevation: 508m Northerly view from Gregory Developmental Road, looking across Lucky Downs Station. Nearest transmission tower is approximately 3.1km north of this viewpoint. Represents typical and accessible views of nearby residents, visitors and workers travelling along Gregory Developmental Road; a partly sealed two-lane road. Northerly views from this point proposed Powerlink are screened by dense foreground vegetation.

Key visual sensitivities	<ul style="list-style-type: none"> Low sensitivity of receptors, including nearby residents and travellers along Gregory Developmental Road ('Great Inland Way' Tourist Drive). This view comprises a strong rural character, however is considered to have a low sensitivity overall to the change proposed, because viewers would experience transient views at speed.
Visual Evaluation	
Magnitude of Change Assessment	<p>The nearest tower to this viewpoint is located approximately 3.1km north of this viewpoint. The skyline from this point is open and screened by vegetation, and the magnitude of change on this receptor is anticipated to be barely perceptible, therefore negligible, due to the following factors:</p> <ul style="list-style-type: none"> From this viewpoint, the majority of towers will be screened by existing vegetation; The towers will form a barely visible, but not defining element of the view.
Significance of effect	The effect of the project on VP05 is considered to be Minor to negligible and therefore Not Significant .

Viewpoint 6


Table 20: Likely visual effect of the Project on Viewpoint 6

VP06: View from Gregory Developmental Road, looking northwest	
Visual Baseline Assessment	
 <p>Existing view from Viewpoint 6: View from Gregory Developmental Road, looking northwest Refer to Viewpoint 6, in Appendix 2 for appropriate scaled image.</p>	
Location and description	<ul style="list-style-type: none"> GPS Location: -18.97584365°S 144.68121870°E Elevation: 568m North-westerly view from Gregory Developmental Road. Nearest transmission tower is approximately 100m north-east of this viewpoint. Represents typical and accessible views of nearby residents, visitors and workers travelling along Gregory Developmental Road, a sealed two-lane road in this location.
Key visual sensitivities	<ul style="list-style-type: none"> Low sensitivity of receptors, including nearby residents and travellers along Gregory Developmental Road ('Great Inland Way' Tourist Drive). This view comprises a strong rural character, however is considered to have a low sensitivity overall to the change proposed due to the relatively small number and type of viewers (drivers at speed).
Visual Evaluation	
Magnitude of Change Assessment	<p>The electricity line crosses the road around 60 m north of this viewpoint and the nearest tower is located approximately 100m north-east. The skyline from this view point is obstructed by some remnant vegetation. Overall, the magnitude of change on this receptor is anticipated to be noticeable, therefore medium, due to the following factors:</p>

	<ul style="list-style-type: none"> From this viewpoint, the towers will be clearly visible on the horizon, straddling and crossing the road seen against an open sky. Much of the lower parts of the transmission tower structures are likely be partly screened by existing vegetation. The towers will introduce a new element into the view but will not change the fundamental visual character of the landscape and will 'blend' with the existing view introducing another simple and repetitive element into this large-scale landscape.
Significance of effect	The effect of the project on VP06 is considered to be Moderate and, therefore, Not Significant .

Viewpoint 7


Table 21: Likely visual effect of the Project on Viewpoint 7

VP07: View from Gregory Developmental Road, looking southeast	
Visual Baseline Assessment	
 <p>Existing view from Viewpoint 7: View from Gregory Developmental Road, looking southeast Refer to Viewpoint 7, in Appendix 2 for appropriate scaled image.</p>	
Location and description	<ul style="list-style-type: none"> GPS Location: -18.97328993°S 144.67995889°E Elevation: 565m South-easterly view from Gregory Developmental Road. Nearest transmission tower is approximately 300m south-east of this viewpoint. Represents views of nearby residents, visitors and workers travelling along Gregory Developmental Road, a sealed two-lane road in this location.
Key visual sensitivities	<ul style="list-style-type: none"> Low sensitivity of receptors, including nearby residents and travellers along Gregory Developmental Road ('Great Inland Way' Tourist Drive). This view comprises a strong rural character, however is considered to have a low sensitivity overall to the change proposed, due to the people travelling at speed with fast transient views.
Visual Evaluation	
Magnitude of Change Assessment	<p>The nearest tower to this viewpoint is located approximately 300m south-east of this viewpoint. The skyline from this view point is obstructed by some remnant vegetation, and the magnitude of change on this receptor is anticipated to be barely perceptible, therefore negligible, due to the following factors:</p> <ul style="list-style-type: none"> From this viewpoint, the towers will be intermittently visible on the distant horizon, seen against an open sky. Most of the transmission tower structures will be partly screened by existing vegetation. At this distance, whilst the towers will be evident they will not change the fundamental visual character of the landscape and will 'blend' with the existing view to a considerable extent introducing another simple and repetitive element into this large-scale landscape.

	<ul style="list-style-type: none"> The towers will form a barely visible, but not defining element of the view.
Significance of effect	The effect of the transmission line on VP07 is considered to be Negligible and therefore Not Significant .


Viewpoint 8

Table 22: Likely visual effect of the Project on Viewpoint 8

VP08: View from Kennedy Developmental Road near Lynd Oasis Roadhouse, looking south	
Visual Baseline Assessment	
 <p>Existing view from Viewpoint 8: View from Kennedy Developmental Road, looking south Refer to Viewpoint 8, in Appendix 2 for appropriate scaled image.</p>	
Location and description	<ul style="list-style-type: none"> GPS Location: -18.87960012°S 144.54385322°E Elevation: 590m South-easterly view from Kennedy Developmental Road. Nearest transmission tower is approximately 5.6km south-east of this viewpoint. Represents typical and accessible views of nearby residents, visitors and workers travelling along Kennedy Developmental Road; a sealed two-lane road. South-easterly views from this point towards the Powerlink corridor are screened by existing vegetation and changes in topography. The 'Lynd Oasis Roadhouse' is visible in the foreground of this view.
Key visual sensitivities	<ul style="list-style-type: none"> Receptors include travellers along Kennedy Developmental Road, nearby residents and workers. This viewpoint is considered to have a medium sensitivity overall to the change proposed, due to the medium sensitivity of viewers i.e. travellers and residents at a tourist resort who are likely to be interested in the quality of the view.
Visual Evaluation	
Magnitude of Change Assessment	<p>The nearest tower to this viewpoint is located approximately 5.6km south-east of this viewpoint. The magnitude of change on this receptor is not visible and therefore no impact due to the following factors:</p> <ul style="list-style-type: none"> From this viewpoint, the Powerlink corridor will not be visible due to the distance from the transmission route and presence of dense foreground vegetation to the south of the Lynd Oasis Roadhouse and the change in topography that will screen the transmission tower structures.
Significance of effect	The effect of the project on VP08 is considered to be No impact and, therefore, Not Significant .


Viewpoint 9

Table 23: Likely visual effect of the Project on Viewpoint 9

VP09: View from Kennedy Developmental Road, looking north-east	
Visual Baseline Assessment	
 <p>Existing view from Viewpoint 9: View from Kennedy Developmental Road, looking northeast Refer to Viewpoint 9, in Appendix 2 for appropriate scaled image.</p>	
Location and description	<ul style="list-style-type: none"> • GPS Location: -18.92663475°S 144.49609464°E • Elevation: 544m • North-easterly view from Kennedy Developmental Road. • Nearest transmission tower is approximately 480m north of this viewpoint. • Represents typical and accessible views of nearby residents, visitors and workers travelling along Kennedy Developmental Road; a sealed two-lane road. • North-easterly views from this point towards the Powerlink corridor are screened by existing vegetation.
Key visual sensitivities	<ul style="list-style-type: none"> • Low sensitivity of receptors, including travellers along Kennedy Developmental Road, nearby residents and workers. • This viewpoint is considered to have a low sensitivity overall to the change proposed, due to the relatively low number and fast speed of viewers with intermittent.
Visual Evaluation	
Magnitude of Change Assessment	<p>The nearest tower to this viewpoint is located approximately 480m north of this viewpoint. The skyline from this point is predominately screened by vegetation, and the magnitude of change on this receptor is noticeable, therefore low, due to the following factors:</p> <ul style="list-style-type: none"> • From this viewpoint, the towers will be visible on the horizon • Most of the transmission tower structures will be partly screened by existing vegetation. • At this distance, whilst the towers will be evident they will not change the fundamental visual character of the landscape and will 'blend' with the existing view to a considerable extent introducing another simple and repetitive element into this large-scale landscape.
Significance of effect	<p>The effect of the project on VP09 is considered to be Minor and therefore Not Significant.</p>

Viewpoint 10

Table 24: Likely visual effect of the Project on Viewpoint 10

VP10: View from Kennedy Developmental Road, looking southwest	
Visual Baseline Assessment	
 <p>Existing view from Viewpoint 10: View from Kennedy Developmental Road, looking southwest Refer to Viewpoint 10, in Appendix 2 for appropriate scaled image.</p>	
Location and description	<ul style="list-style-type: none"> GPS Location: -18.92130956°S 144.50111012 °E Elevation: 552m South-westerly view along Kennedy Developmental Road. Corridor crosses road to south and the nearest transmission tower is approximately 100m south-east of this viewpoint. Represents typical and accessible views of nearby residents, visitors and workers travelling along Kennedy Developmental Road; a sealed two-lane road. South-easterly views from this point towards the Powerlink corridor are screened by existing vegetation and changes in topography.
Key visual sensitivities	<ul style="list-style-type: none"> Receptors include travellers along Kennedy Developmental Road, nearby residents and workers. This viewpoint is considered to have a low sensitivity overall to the change proposed, due to the relatively low number and fast speed of viewers. The view also includes an existing transmission tower.
Visual Evaluation	
Magnitude of Change Assessment	<p>The nearest tower to this viewpoint is located approximately 100m south-east of this viewpoint. The skyline from this point is predominately screened by vegetation, however the new transmission towers will be highly visible crossing the road so the magnitude of change on this receptor is considerable, therefore medium, due to the following factors:</p> <ul style="list-style-type: none"> From this viewpoint, the towers will be visible on the horizon, seen against an open sky. Most of the transmission tower structures will be partly screened by existing vegetation. At this distance, whilst the towers will be evident they will not change the fundamental visual character of the landscape and will 'blend' with the existing view to a considerable extent introducing another simple and repetitive element into this large-scale landscape. The towers will form a barely visible, but not defining element of the view.
Significance of effect	<p>The effect of the towers on VP10 is considered to be Minor to moderate and, therefore, Not Significant.</p>

In addition to the views considered above, impacts on recreational kayakers/canoeists using the rivers that a traversed by the project have been considered. As the crossing points are remote from roads and located within private land no formal viewpoint has been assessed. However, although the kayakers would be interested in the visual quality of the landscape these viewpoint locations are

assessed to have low sensitivity because the rivers are only navigable for part of the year as for much of the year they are typically dry and there are anticipated to be very few kayakers in these locations. Furthermore, a recreational kayaker would pass under the alignment very quickly so would experience only transient views of the project infrastructure. Therefore, overall, it is unlikely that any of these viewpoints would experience significant impacts.

8. Mitigation

This section outlines the standard operating procedures and other factors considered to reduce and manage the impact of the electricity transmission line on the landscape, views and visual amenity. It is acknowledged that due to the size of the proposed structures, which at up to 55 m are taller than mature trees, it is not possible to fully 'screen' or 'hide' the transmission towers or associated infrastructure within the landscape. The measures outlined below could assist in providing a more harmonious appearance to the Project overall, particularly when viewed from sensitive viewing locations or in relation to those views experienced from residential properties lying close to the Project.

The mitigation framework seeks, as a first priority, to minimise adverse landscape and visual impacts through careful design and siting of infrastructure then, secondly, to implement detailed design tailored to the specific location to manage any adverse impacts identified.

During the alignment selection process, the visual impacts of the surrounding visual receptors were considered and the selected alignment was positioned as far as practicable away from visual receptors and to take advantage of screening by existing vegetation and topography where possible. Table 26 describes preliminary measures identified to mitigate landscape and visual impact.

Table 25: Potential mitigation measures to minimise landscape and visual effects

Proposed mitigation category	Description of measures to minimise landscape and visual effects
Activities undertaken during construction and operation	
Facilities siting and design – detailed design	<ul style="list-style-type: none"> Transmission towers will generally be located at least 450 m apart over generally flat terrain, except where longer spans are required to avoid particular areas (such as cropping land or important vegetation). Through the detailed design phase, transmission towers are to be located to minimise tree and other vegetation removal where practicable. It is acknowledged that there will be more flexibility in the detailed siting of suspension towers (i.e. towers where the line is travelling in a straight line) whereas tension structures (i.e. angle structures) are relatively fixed. To the greatest extent possible, seek to avoid tower placement in locations that are potentially visually prominent from residences and public viewing points on local roads, including the 'Great Inland Way' Tourist Drive. Consider increases to tower heights to permit retention of any identified visually important vegetation communities and/or to span identified watercourses. Site structures carefully where they cross river corridors, in particular aim to minimise disturbance of existing visually-significant vegetation through these zones to the greatest extent possible. The natural line of the landscape will be used wherever practicable to reduce visibility and assist integration of the Project infrastructure.
Landscape strategy to hide / screen the substation and other elements	<ul style="list-style-type: none"> During the detailed design of the Project, landscape elements (landform, vegetation, hard elements as appropriate) that will interrupt sightlines from sensitive vantage points may be considered where a significant visual impact is identified; and particularly where nearby residences are likely to be affected (following consultation with landowners). Attention is to be given to the design of towers that lie immediately adjacent to the

Proposed mitigation category	Description of measures to minimise landscape and visual effects
	<p>'Great Inland Way' Tourist Route.</p> <ul style="list-style-type: none"> Retain existing vegetation around the corridor or associated with roads and properties near the corridor to the greatest extent compatible with safety.
Construction management and rehabilitation	<ul style="list-style-type: none"> A construction environmental management plan will be developed that includes measures that seek to manage vegetation, dust, waste and other elements that have the potential to impact landscape and/or visual amenity:

9. Conclusions and recommendations

Powerlink is proposing a new 275 kilovolt (kV) electricity transmission line, up to 195 kilometres (km) long, between Kidston and Mount Fox in Queensland, known as the Kidston Connection Project. This will connect to the Kidston Renewable Energy Hub, where Genex is seeking to establish a combination solar and hydro pump storage power generation facility to supply power to the National Electricity Market. The transmission towers will generally be around 45m high and are predominantly co-located with existing Ergon lines. Two alignment options are being considered in the far western part of the project - Draft Alignment A and Draft Alignment B – both of which are considered in this assessment.

A Landscape and Visual Impact Assessment (LVIA) of the Project has been undertaken to inform an Environmental Assessment Report that AECOM is preparing to support an Infrastructure Designation application under the *Planning Act 2016*.

The LVIA has identified the landscape and visual values across a wide Project Area, within the potential viewshed of the project.

The area is a rural and natural landscape and is very sparsely settled. Consequently, the corridor is predominantly located at distance from potential viewer locations/viewpoints. There are no designated landscapes within the study corridor, although Mount Fox, an outlying area of Girringun National Park, is located close to the eastern end of the proposed Project Area. Potential impacts on this landscape have been considered.

As the area is sparsely settled there are few residents in the area to experience visual impacts. Key receptors are travellers along the Gregory and Kennedy Developmental Roads, which have relatively low numbers of travellers. Consideration has been given to impacts on these receptors as well as the residents of Greenvale, Mount Fox settlement and rural properties including the Lynd Roadhouse and 'weekender' at the old tin mine on Lava Plains – Mt Fox Road. Impacts on recreational viewers including walkers within Girringun National Park and (occasional) kayakers on the seasonal river systems have also been considered. The potential impact of the substations at Mount Fox and Copperfield River on visual amenity has also been considered. However, these are located in remote locations accessible via unsealed roads and accessible by few people with few residential properties nearby (the closest is a single dwelling lying around 1.2 km from the Mount Fox substation).

The significance of the anticipated impact on landscape, views and visual receptors has been considered.

A summary of the overall likely landscape impact anticipated during the operation of the Project is presented in Table 27.

Table 26: Summary landscape assessment

Landscape Character Type	Landscape Sensitivity	Magnitude of change	Potential Landscape Effect	Significance of Effect
Type A: Transitional Landscape	Negligible	Low	Minor to negligible	Not Significant
Type B: Rural River Valleys and Plains	Low	Low	Minor	Not Significant
Type C: Rural Rangelands	Low	Low	Minor	Not Significant
Type D: Forested and Wooded Uplands	Medium	Low	Minor to moderate	Not Significant

A summary of the overall likely visual impact anticipated during the operation of the Project is presented in Table 28.

Table 27: Summary visual assessment

Viewpoint name	Anticipated approximate distance to nearest tower	Viewpoint Sensitivity	Magnitude of change	Potential Visual Effect	Significance of Effect
Viewpoint 1: Mount Fox, Girringun National Park looking south-east	Nearest transmission tower is approximately 1.0km to the south of this viewpoint	High	Medium	Moderate to Major	Significant
Viewpoint 2: Mount Fox Settlement, looking south-east	Nearest transmission tower is approximately 3.5km south of this viewpoint	Medium	Negligible	Minor	Not Significant
Viewpoint 3: View from Kangaroo Hills Road near Lava Plains Road, looking south	Nearest transmission tower is approximately 100m to the south-west of this viewpoint.	Low	Medium	Minor to Moderate	Not Significant
Viewpoint 4: View from Greenvale settlement, looking north	Nearest transmission tower is approximately 3.7km north of this viewpoint.	Medium	No impact	No impact	Not Significant
Viewpoint 5: View from Gregory Developmental Road, looking north	Nearest transmission tower is approximately 3.1km north of this	Low	Negligible	Minor to Negligible	Not Significant

Viewpoint name	Anticipated approximate distance to nearest tower	Viewpoint Sensitivity	Magnitude of change	Potential Visual Effect	Significance of Effect
	viewpoint.				
Viewpoint 6: View from Gregory Developmental Road, looking north-west	Nearest transmission tower is approximately 100m north-east of this viewpoint.	Low	Medium	Moderate	Not Significant
Viewpoint 7: View from Gregory Developmental Road, looking south-east	Nearest transmission tower is approximately 300m south-east of this viewpoint.	Low	Negligible	Negligible	Not Significant
Viewpoint 8: View from Kennedy Developmental Road, looking south	Nearest transmission tower is approximately 5.6km south-east of this viewpoint.	Medium	No impact	No impact	Not Significant
Viewpoint 9: View from Kennedy Developmental Road, looking north-east	Nearest transmission tower is approximately 480m north of this viewpoint.	Low	Low	Minor	Not Significant
Viewpoint 10: View from Kennedy Developmental Road, looking south-west	Nearest transmission tower is approximately 100m south-east of this viewpoint.	Low	Medium	Minor to moderate	Not Significant

In conclusion, only one potentially significant impact has been identified – the impact of the transmission towers on views from Mount Fox in Girringun National Park. All other judgements of impact range from no impact to moderate and are, therefore, not considered significant.

There is no difference in the significance of the landscape and visual impact associated with the Draft Alignment A or Draft Alignment B.

A number of potential mitigation measures have been proposed for construction and operation phases of the Project. It is considered that these provide further opportunities to minimise impacts on visual and landscape amenity that will assist in the assimilation of the transmission line into its landscape setting.

10. Glossary

10.1. Acronyms

AADT	Annual Average Daily Traffic
ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
AILA GNLVA	AILA Queensland Guidance Note for Landscape and Visual Assessment
Client	AECOM Australia Pty Ltd
DTMR	Department of Transport and Main Roads
LCA	Landscape Character Area
LCT	Landscape Character Type
LGA	Local Government Area
LVA	Landscape and Visual Assessment
LVIA	Landscape and Visual Impact Assessment
OQTA	Outback Queensland Tourism Association
Genex	Genex Kidston Project
GLVIA	Guidelines for Landscape and Visual Impact Assessment
kV	Kilo Volt
Powerlink	The Proponent of the Genex Kidston Connection Project
Project Area	LVIA Project Area; comprising land within the potential viewshed of and forming the wider landscape context of the Project
the Project	Proposed upgrade of the Pacific Motorway between Varsity Lakes and Tugun as shown on relevant engineering drawings prepared by AECOM
REF	Review of Environmental Factors

10.2. Glossary of Assessment Terms

Amenity	The pleasantness of a place as conveyed by desirable attributes including visual, noise, odour etc.
Artist's impression	An indicative visual representation illustrating the appearance of a proposal. Typically to communicate a concept when photomontages are not available and / or when accuracy cannot be assured.
Character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, and often conveys a distinctive sense of place. This term does not imply a level of value or importance.
Effect	The landscape or visual outcome of a proposed change. It may be the combined result of sensitivity together with the magnitude of the change.
Impact	The categorisation of effects. Legislative context is considered in defining impacts and their significance.
Landscape	Landscape is an all-encompassing term that refers to areas of the earth's surface at various scales. It includes those landscapes that are: urban, rural, and natural; combining bio-physical elements with the cultural overlay of human use and values.
Magnitude of change	The extent of change that will be experienced by receptors. This change can be adverse or beneficial. Factors that could be considered in assessing magnitude are: the proportion of the view / landscape affected; extent of the area over which the change occurs; the size and scale of the change; the rate and duration of the change; the level of contrast and compatibility.
Mitigation	Measures to avoid, reduce and manage identified potential adverse impacts.
Receptor	A place, route, viewer audience or interest group which may require assessment.
Sensitivity	Capacity of a landscape or receptor to change without losing valued attributes.
Values	Any aspect of landscape or views people consider to be important. Landscape and visual values may be reflected in local, state or federal planning regulations, other published documents or be established through community consultation and engagement, or as professionally assessed.
View	Any sight, prospect or field of vision as seen from a place, and may be wide or narrow, partial or full, pleasant or unattractive, distinctive or nondescript, and may include background, mid ground and/or foreground elements or features.
Viewpoint	The specific location of a view, typically used for assessment purposes.
Viewshed	Areas visible from a particular location (may be modelled or field-validated).

Visual catchment	Areas visible from a combination of locations within a defined setting (may be modelled or field-validated).
Visual audience	Groups of visual receptors with common attributes and sensitivities to changes in views (e.g. residents, golfers, road travellers, walkers, shoppers, beach goers, farmers, recreational users).
Visual absorption capacity	Potential for a landscape or scene to absorb a particular change without a noticeable loss of valued attributes.
Visual amenity	The attractiveness of a scene or view.
Photomontages/ Visualisations	A visual representation of a proposal from a particular receptor viewpoint, on a photographic base. The methodology for the preparation of any photomontage and its accuracy should be defined.
Scenic amenity	A measure of the relative contribution of each place in the landscape to the collective appreciation of open space as viewed from places that are important to the public. (Department of Natural Resources, 2001).

11. References

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APPENDIX 1: PLANS

The following plans prepared by AECOM have been used to inform this assessment:

Figure 1: Regional Context

Figure 2.1 to Figure 2.4: LVIA Project Area

Figure 3.1 to Figure 3.4: Landform and Hydrological Context

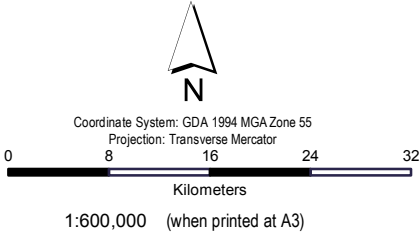
Figure 4.1 to Figure 4.3: Landscape Character Types

Figure 5.1 to Figure 5.4: Key Visual Receptors and Location of Representative Viewpoints



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- Legend**
- Places
 - Main Roads
 - Highways
 - Draft Alignment
 - Draft Alignment A
 - Draft Alignment B

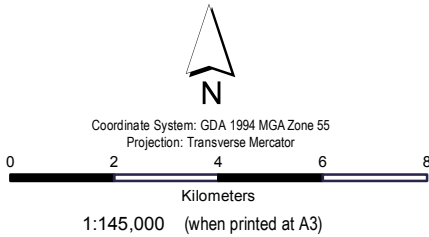
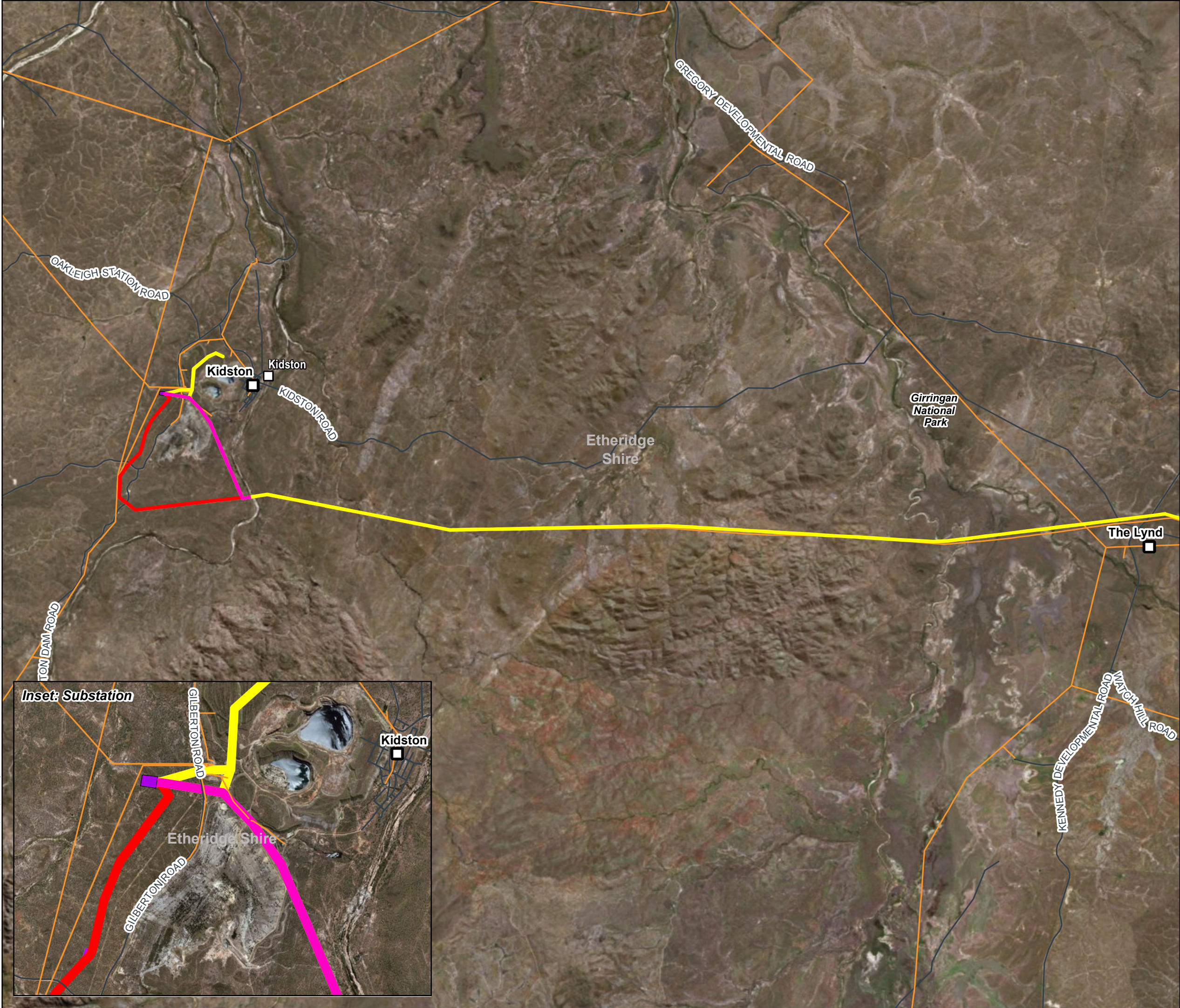


Data sources:
DCDB, Roads, Watercourses - DNRM 2017
Site Features and Layout - AECOM 2018
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Kidston Connection Project

Regional Context		Figure F1
PROJECT ID:	60577456	
CREATED BY:	JB	
LAST MODIFIED:	JB - 10-Sep-18	
VERSION:	1	



- Legend**
- Places
 - Overhead Power Lines
 - Main Roads
 - Draft Alignment
 - Draft Alignment A
 - Draft Alignment B
 - Proposed Substation
 - Local Government Area



Data sources:
DCDB, Roads, Watercourses - DNRM 2017
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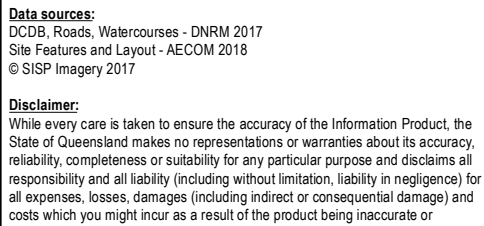
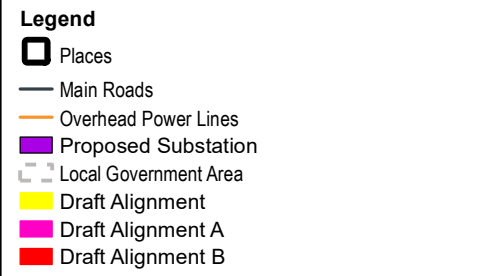
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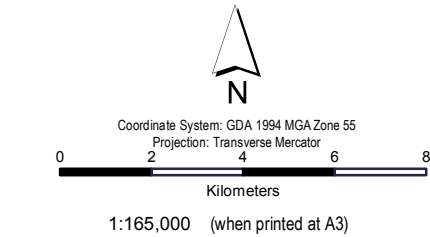
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Figure
F2-1

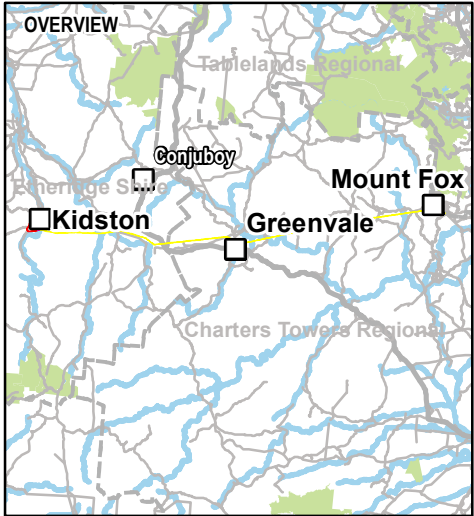


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VERSION: 1



- Legend**
- Places
 - Overhead Power Lines
 - Draft Alignment
 - Main Roads
 - Local Government Area



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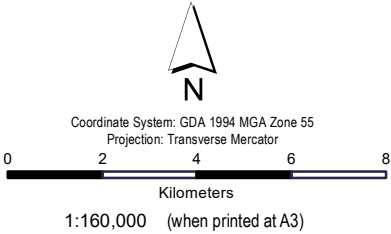
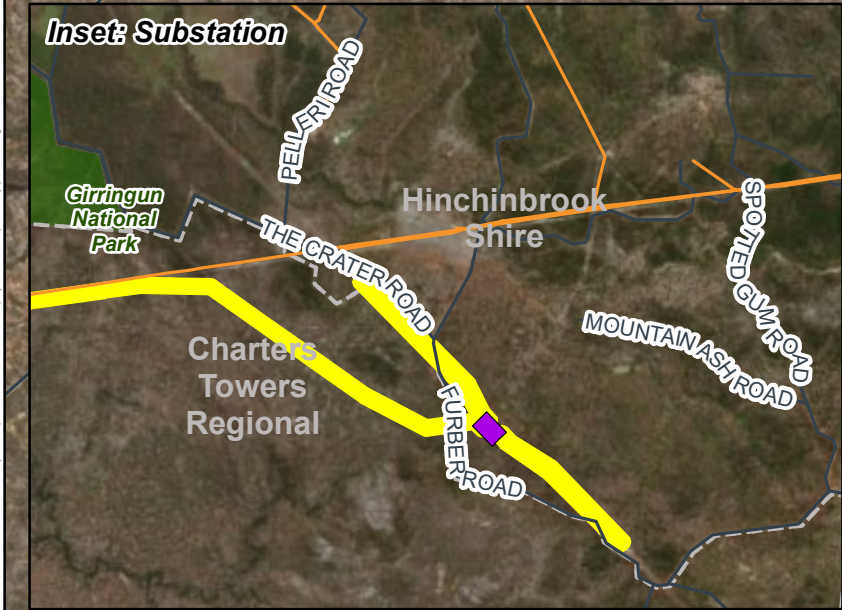
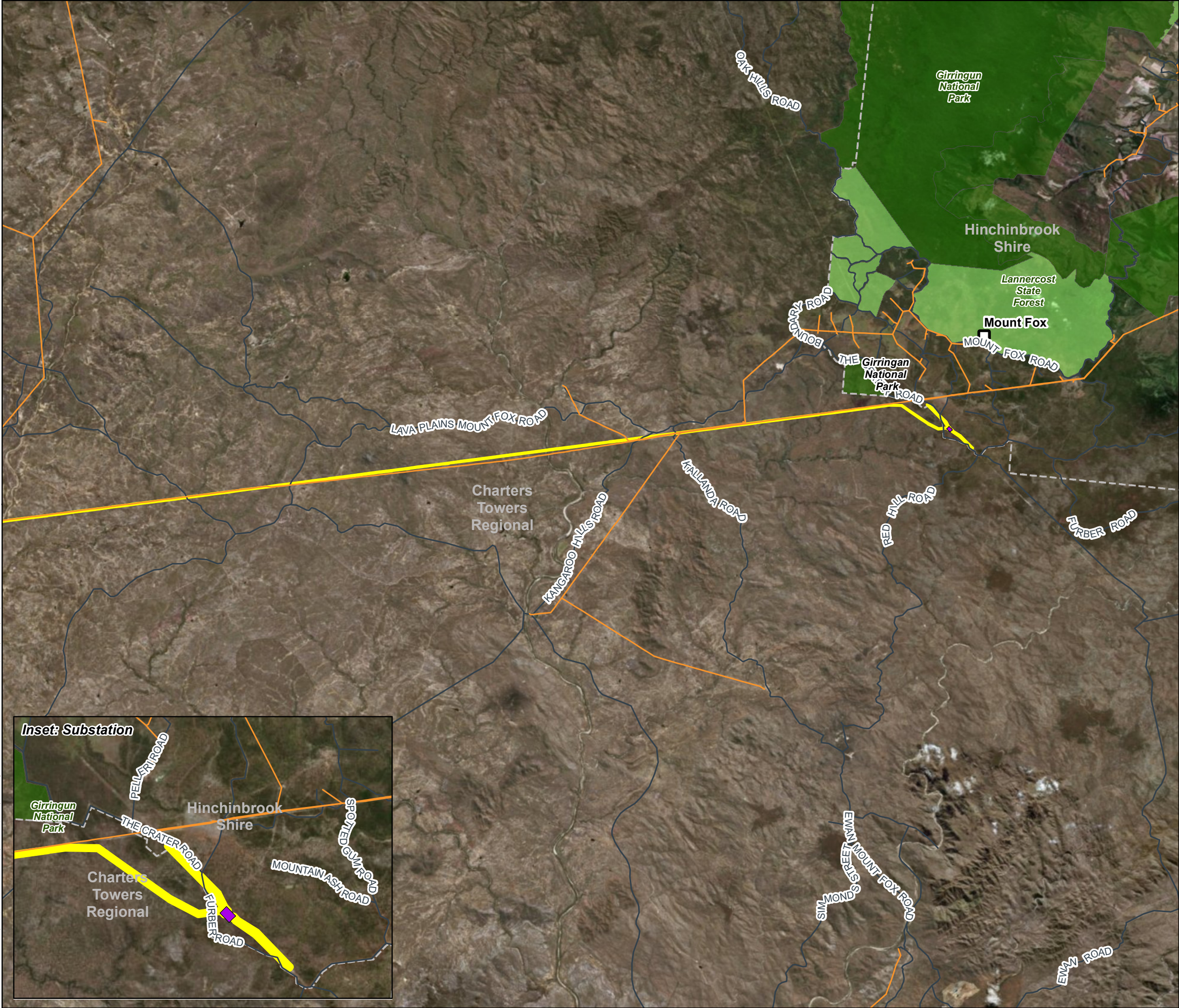
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**Figure
F2-3**



- Legend**
- Places
 - Overhead Power Lines
 - Main Roads
 - Draft Alignment
 - Proposed Substation
 - Local Government Area
 - Protected Areas**
 - National Park
 - State Forest



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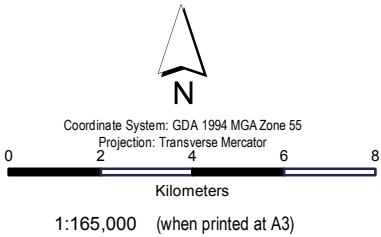
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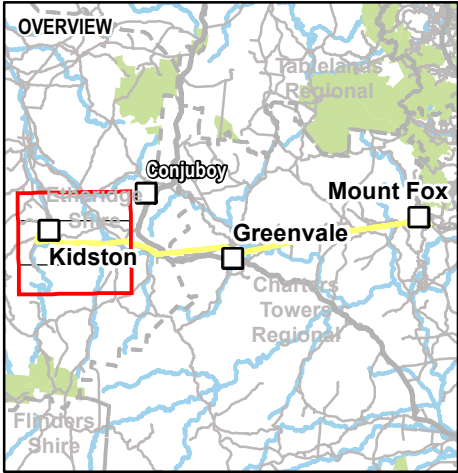


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- Legend**
- Places
 - Mountain
 - Dams and Weirs
 - Ranges
 - Contour, 50 m
 - Overhead Power Lines
 - Major Watercourse
 - Lakes
 - Draft Alignment
 - Draft Alignment A
 - Draft Alignment B



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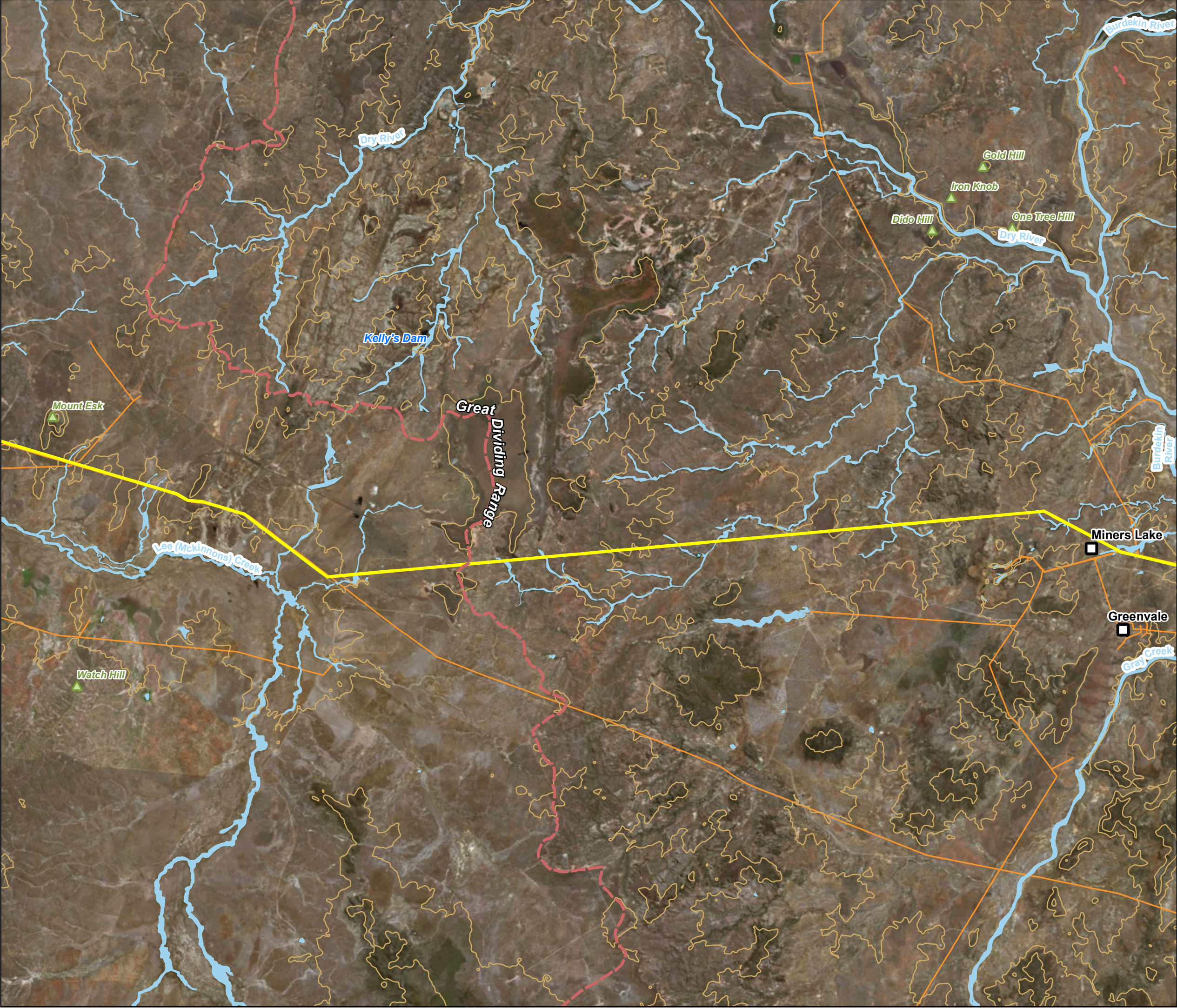
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Landform and Hydrological Context

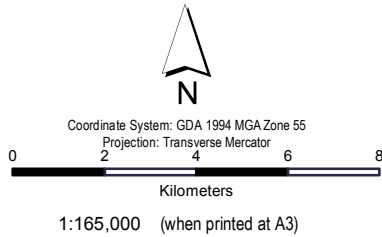
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**Figure
F3-1**

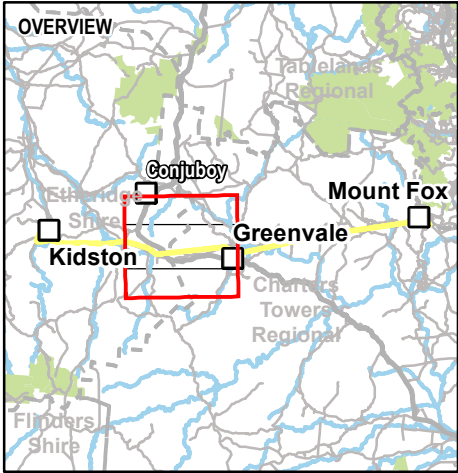


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- Legend**
- Places
 - Mountain
 - Ranges
 - Contour, 50 m
 - Overhead Power Lines
 - Major Watercourse
 - Lakes
 - Draft Alignment



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Kidston Connection Project

Landform and Hydrological Context

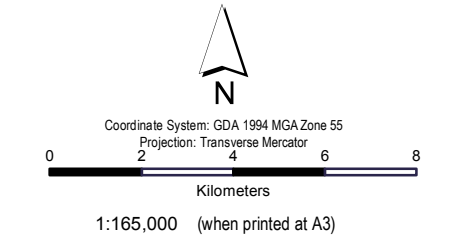
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Figure
F3-2

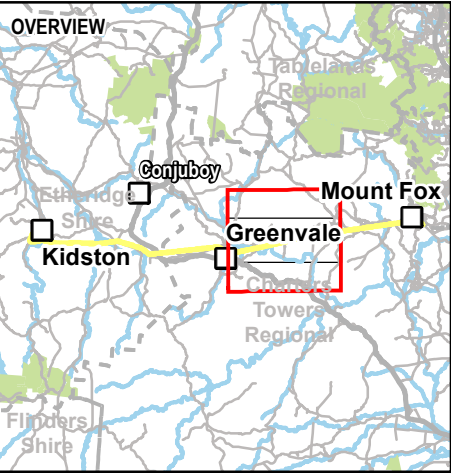


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- Legend**
- Places
 - Mountain
 - Minor Watercourse
 - Ranges
 - Contour, 50 m
 - Overhead Power Lines
 - Major Watercourse
 - Lakes
 - Draft Alignment



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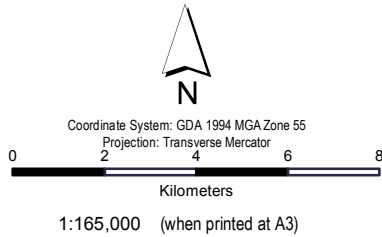
Landform and Hydrological Context

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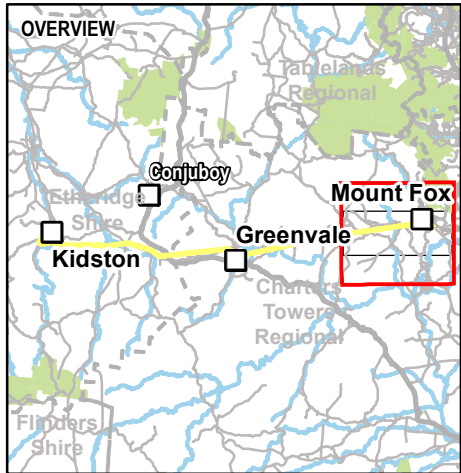
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Legend

- Places
- Mountain
- Minor Watercourse
- Ranges
- Contour, 50 m
- Overhead Power Lines
- Major Watercourse
- Lakes
- Draft Alignment



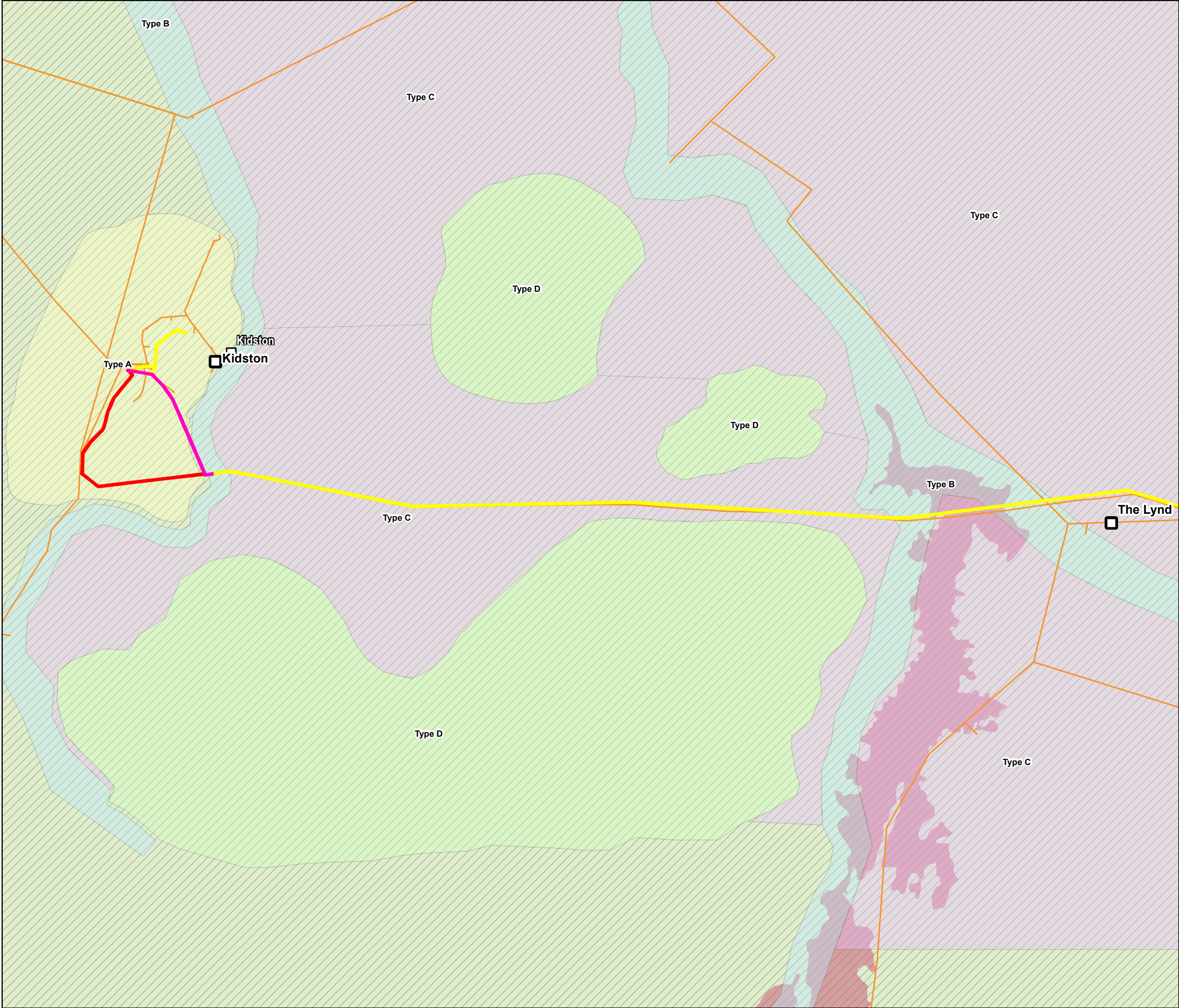
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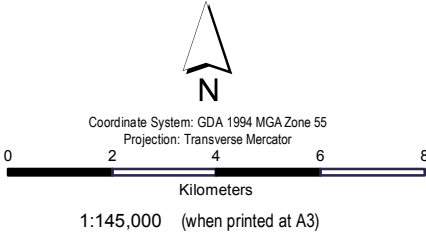
Landform and Hydrological Context

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- Legend**
- Overhead Power Lines
 - Draft Alignment
 - Draft Alignment A
 - Draft Alignment B
- Landscape Character Types**
- Type A
 - Type B
 - Type C
 - Type D
- Bioregions (ERIN)**
- Einasleigh Uplands
 - Wet Tropics
- Subregions**
- EIU02: Kidston
 - EIU04: Broken River
 - EIU05: Undara - Toomba Basalts
 - WET05: Paluma - Seaview

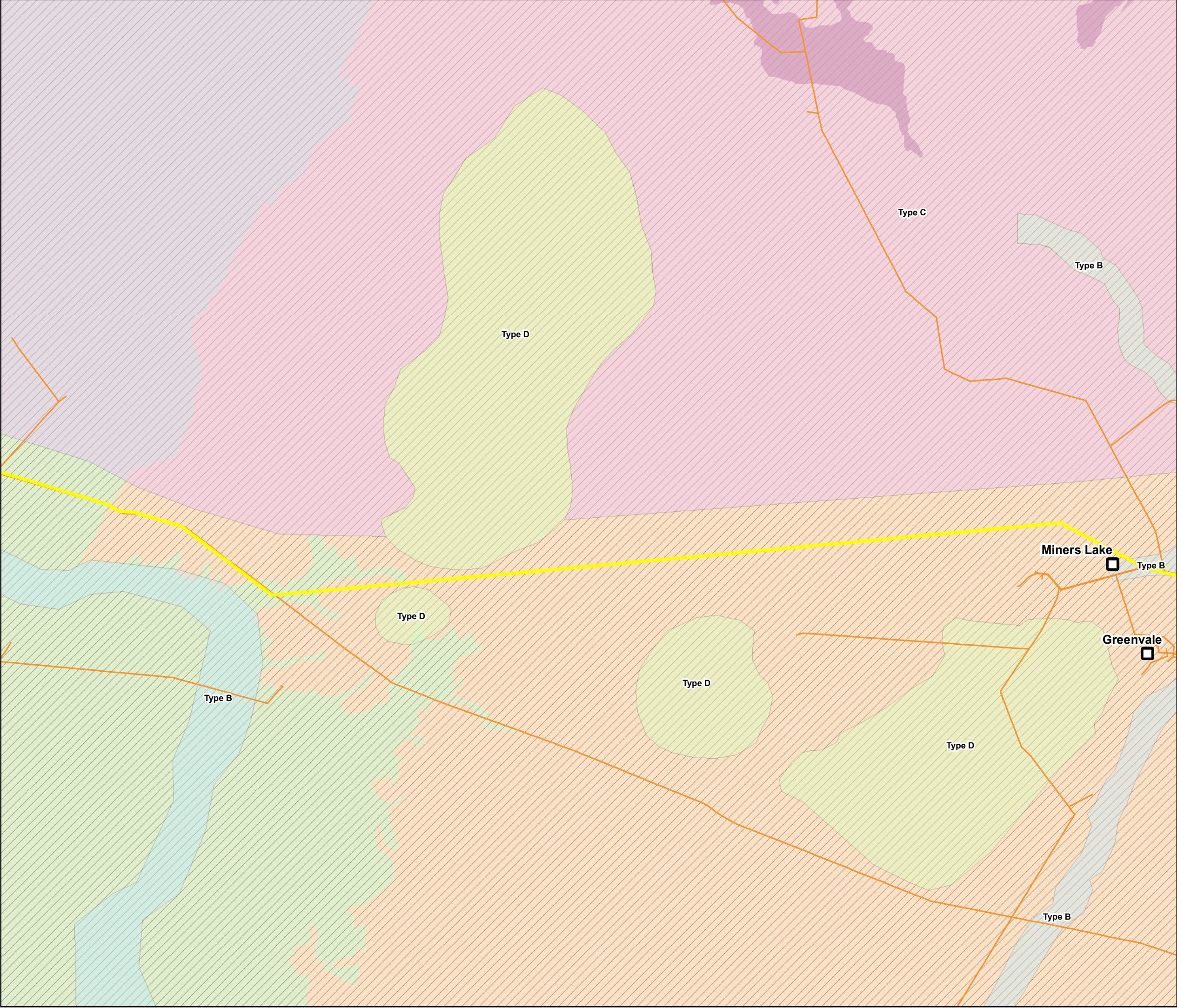


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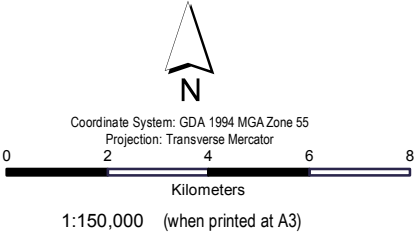
Kidston Connection Project

Landscape Character Types		Figure F4-1
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- Legend**
- Overhead Power Lines
 - Draft Alignment
 - Landscape Character Types**
 - Type B
 - Type C
 - Type D
 - Bioregions (ERIN)**
 - Einiasleigh Uplands
 - Subregions**
 - EIU02: Kidston
 - EIU04: Broken River
 - EIU05: Undara - Toomba Basalts



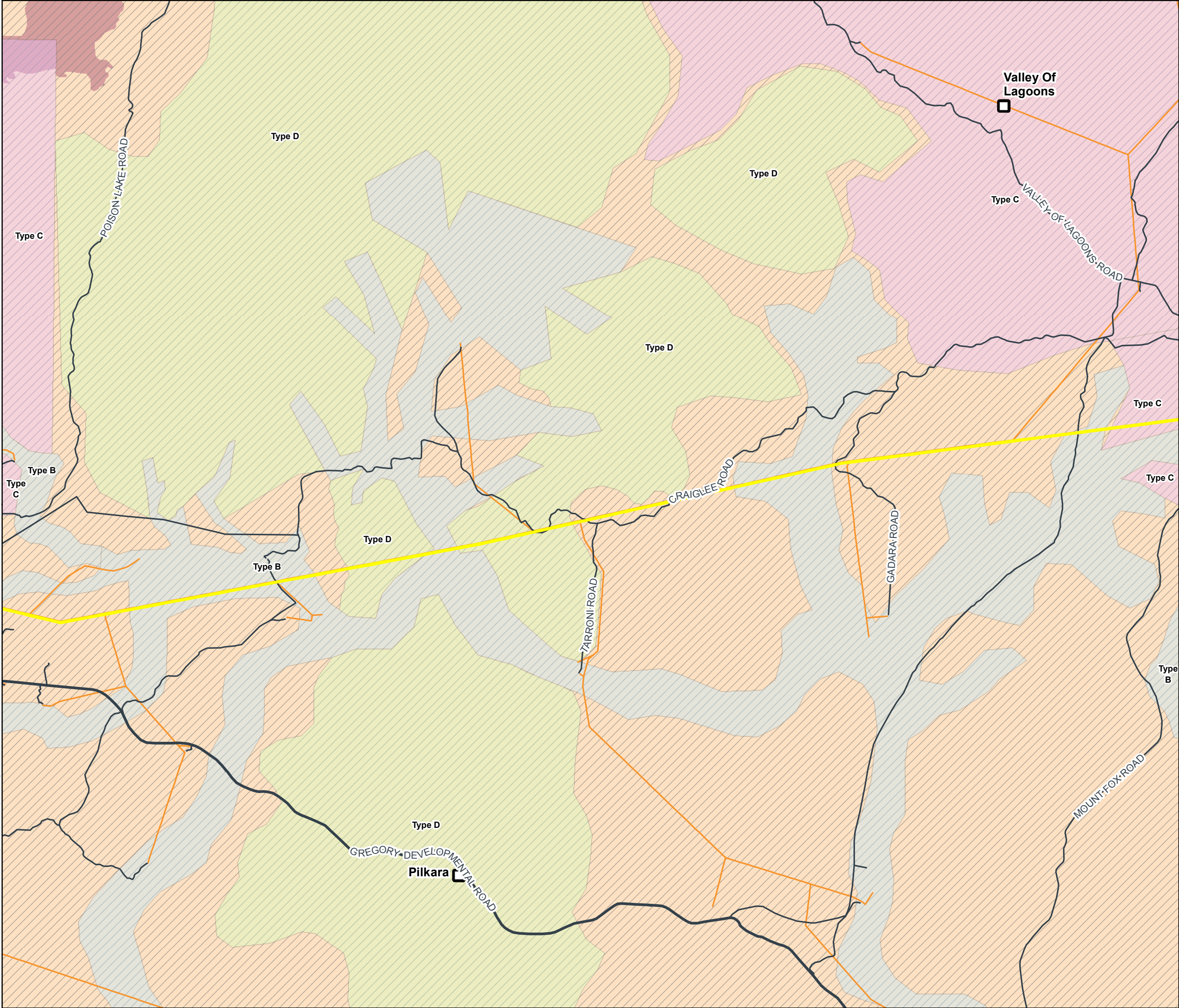
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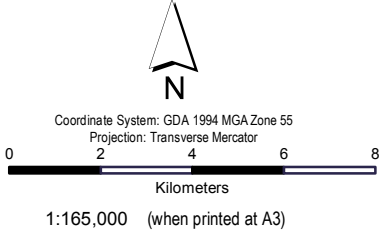
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Landscape Character Types

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- Legend**
- Overhead Power Lines
 - Highways
 - Main Roads
 - Draft Alignment
- Landscape Character Types**
- Type B
 - Type C
 - Type D
- Bioregions (ERIN)**
- Einiasleigh Uplands
- Subregions**
- EIU04: Broken River
 - EIU05: Undara - Toomba Basalts



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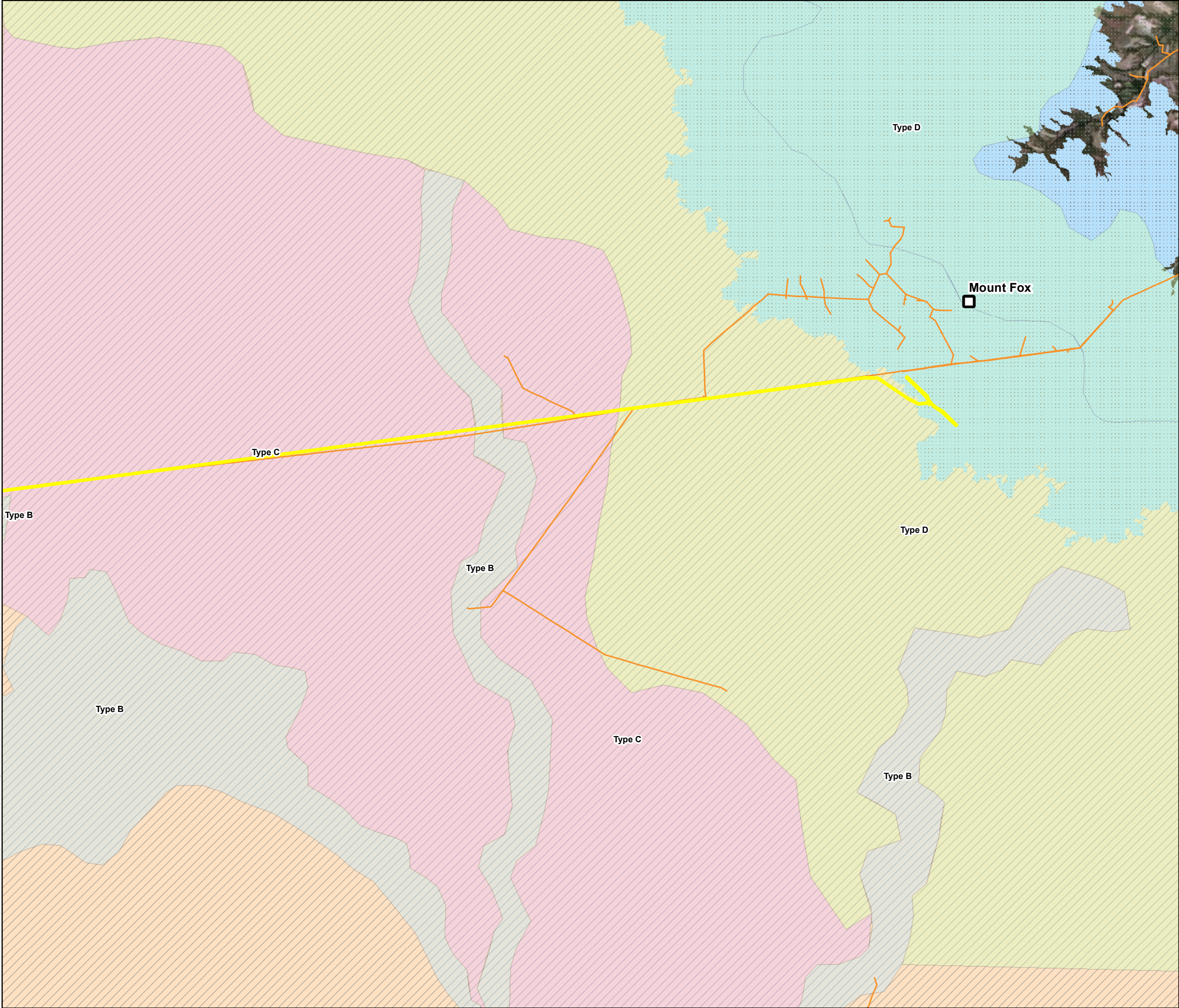
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Landscape Character Types

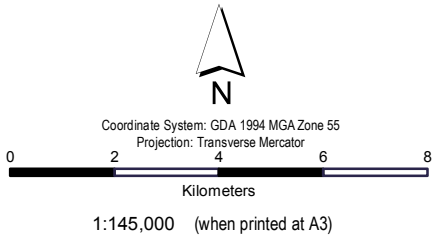
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Figure
F4-3



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- Legend**
- Overhead Power Lines
 - Draft Alignment
- Landscape Character Types**
- Type B
 - Type C
 - Type D
- Bioregions (ERIN)**
- Einasleigh Uplands
 - Wet Tropics
- Subregions**
- EIU04: Broken River
 - WET05: Paluma - Seaview



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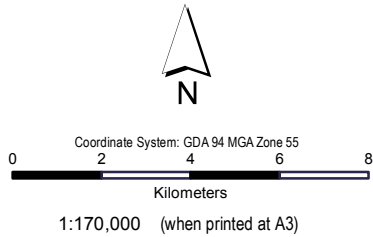
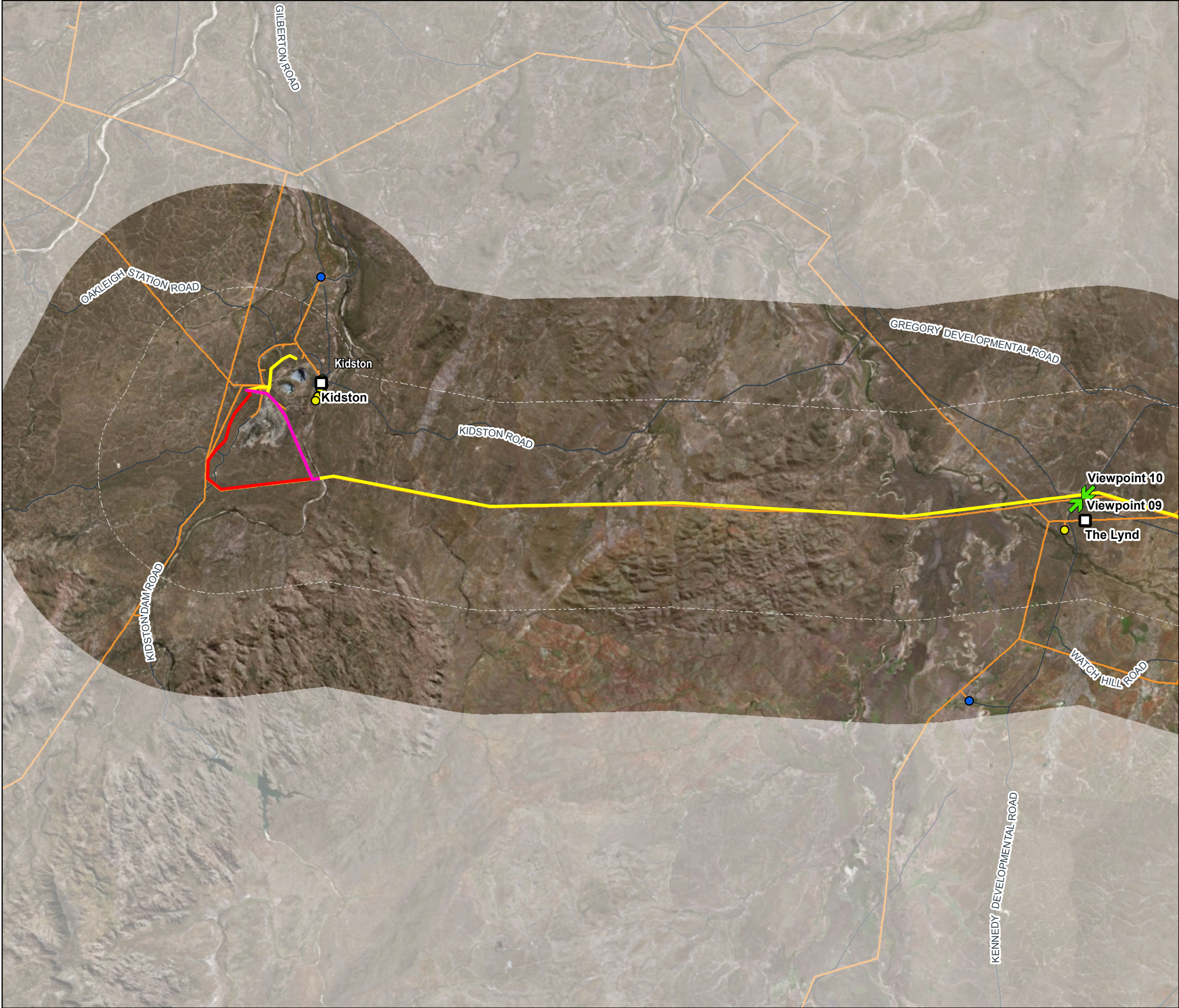
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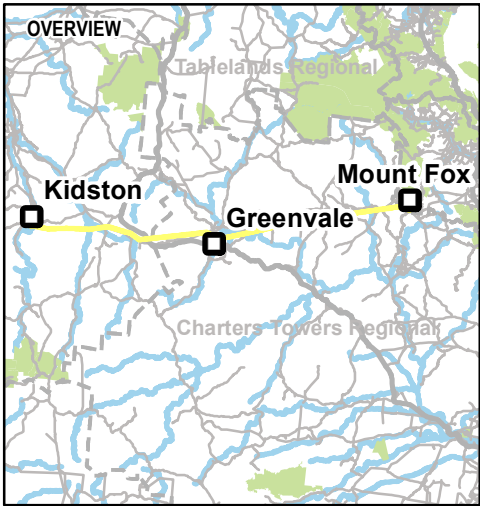
Landscape Character Types

PROJECT ID: 60577456
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Figure
F4-4



- Legend**
- Places
 - Viewpoints
 - Residential Receptors, within 5 km
 - Residential Receptors, within 10 km
 - Main Roads
 - Overhead Power Lines
 - Protected Areas
 - Draft Alignment
 - Draft Alignment A
 - Draft Alignment B



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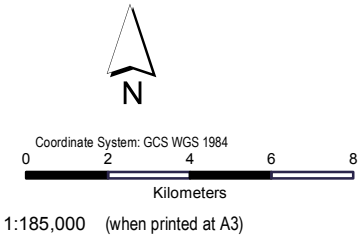
Key Visual Receptors and Location of Representative Viewpoints

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Figure
F5-1



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- Legend**
- Places
 - Viewpoints
 - Residential Receptors, within 5 km
 - Residential Receptors, within 10 km
 - Main Roads
 - Overhead Power Lines
 - Draft Alignment



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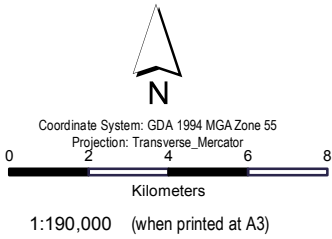
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Key Visual Receptors and Location of Representative Viewpoints		
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VERSION:	1	

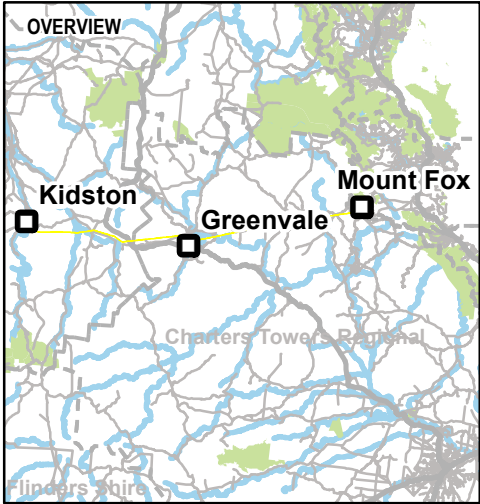


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- Legend**
- Places
 - Viewpoints
 - Residential Receptors, within 5 km
 - Residential Receptors, within 10 km
 - Overhead Power Lines
 - The Great Inland Way
 - Main Roads
 - Project Site 5 km Buffer
 - Project Site 10 km Buffer
 - Draft Alignment



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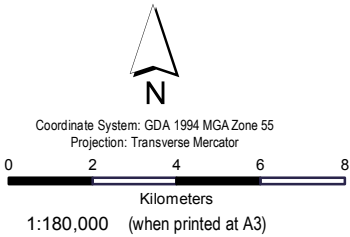
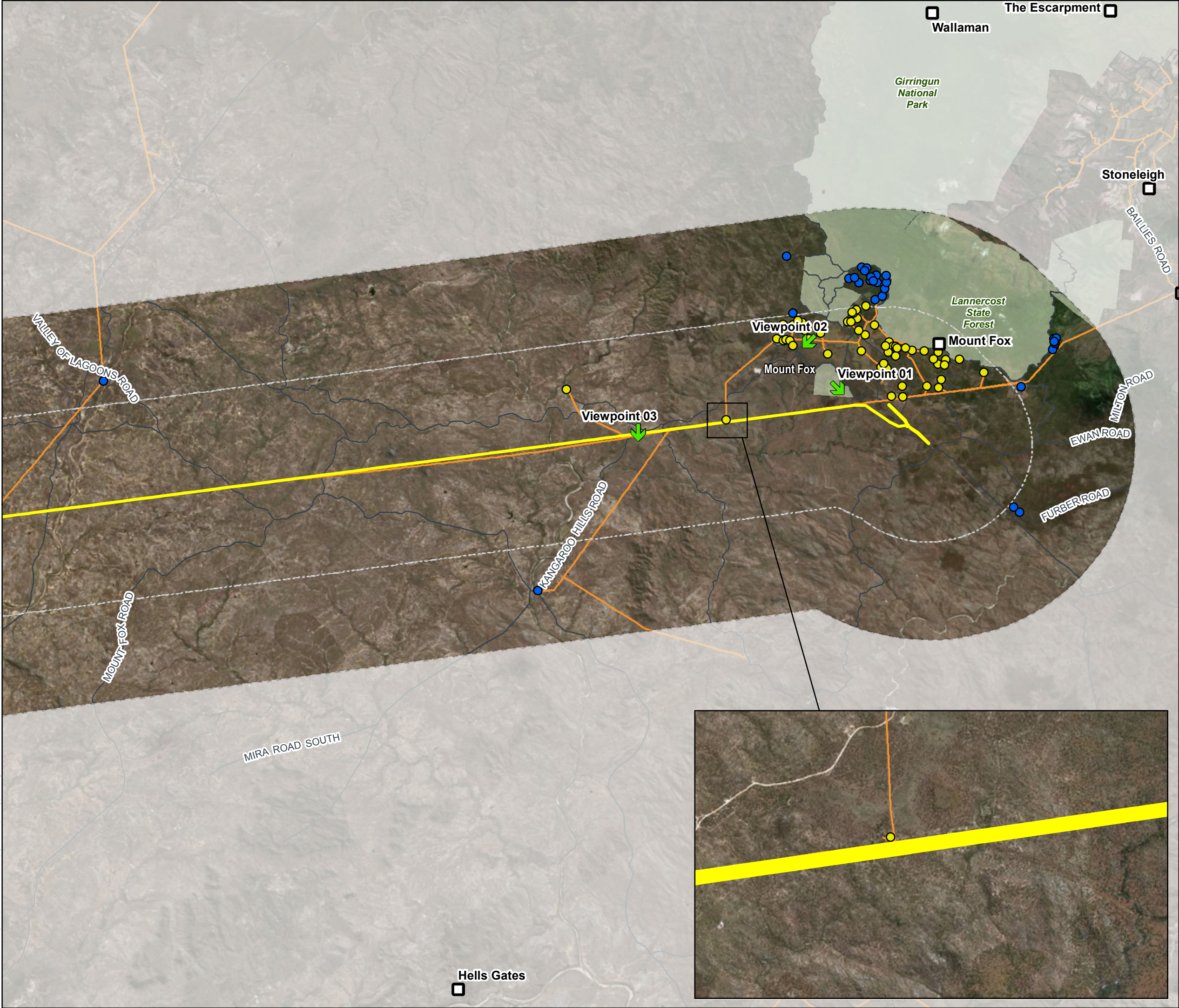
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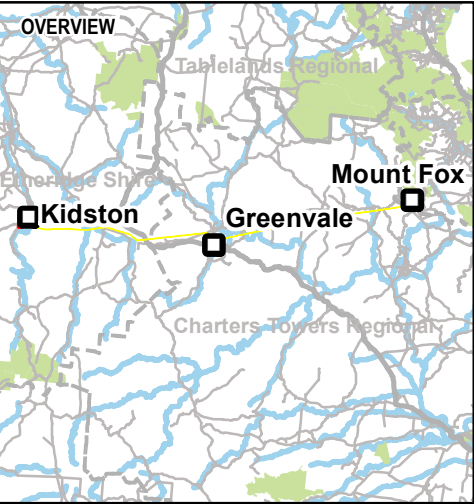
Key Visual Receptors and Location of Representative Viewpoints

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VERSION: 1

**Figure
F5-3**



- Legend**
- Places
 - Viewpoints
 - Residential Receptors, within 5 km
 - Residential Receptors, within 10 km
 - Overhead Power Lines
 - Main Roads
 - Protected Areas
 - Project 5 km Buffer
 - Project 10 km Buffer
 - Draft Alignment



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Key Visual Receptors and Location of Representative Viewpoints

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VERSION: 1

Figure
F5-4

APPENDIX 2: VIEWPOINTS

Viewpoint 1: Mount Fox, Girringun National Park looking southeast

Viewpoint 2: Mount Fox Settlement, looking south-west

Viewpoint 3: View from Kangaroo Hills Road near Lava Plains Road, looking south

Viewpoint 4: View from Greenvale settlement, looking northeast

Viewpoint 5: View from Gregory Developmental Road, looking north

Viewpoint 6: View from Gregory Developmental Road, looking northwest

Viewpoint 7: View from Gregory Developmental Road, looking southeast

Viewpoint 8: View from Kennedy Developmental Road, looking south

Viewpoint 9: View from Kennedy Developmental Road, looking northeast

Viewpoint 10: View from Kennedy Developmental Road, looking south-west

Figure 6: Viewpoint 1: Mount Fox, Girringun National Park looking south-east

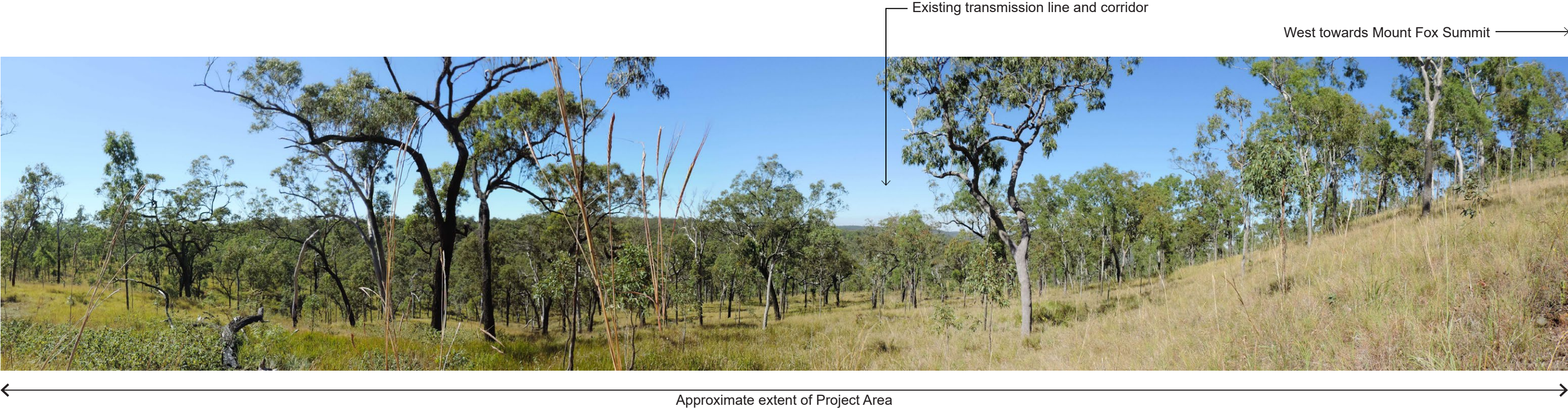


Figure 7: Viewpoint 2: Mount Fox Settlement, looking south-west

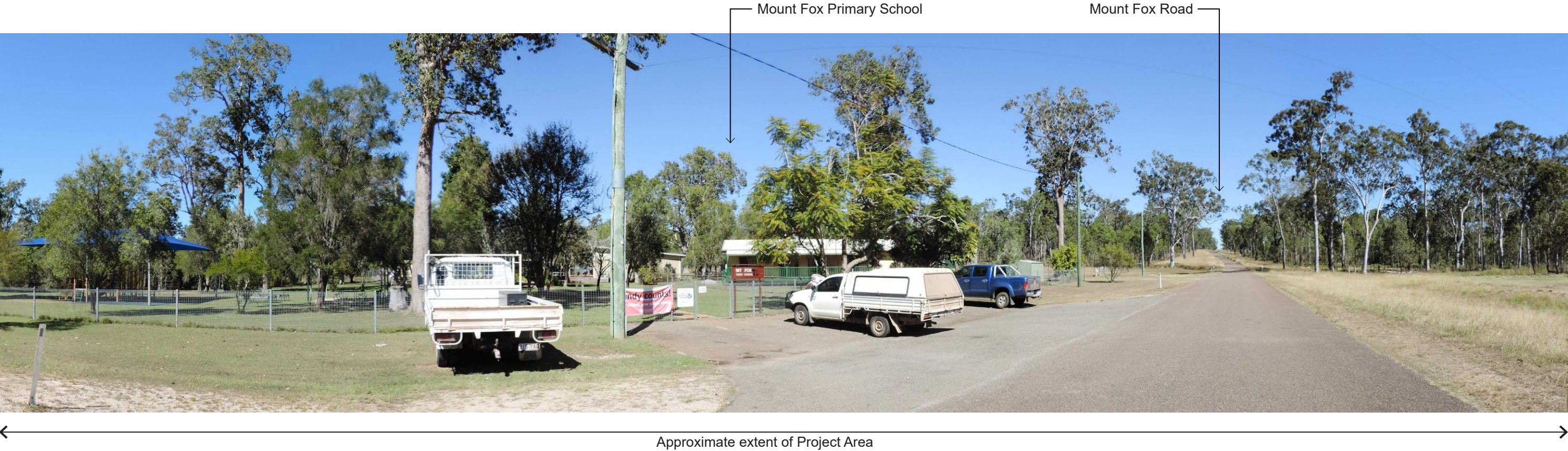


Figure 8: Viewpoint 3: View from Kangaroo Hills, near Lava Plain Road, looking south



Figure 9: Viewpoint 4: View from Greenvale settlement, looking north-east

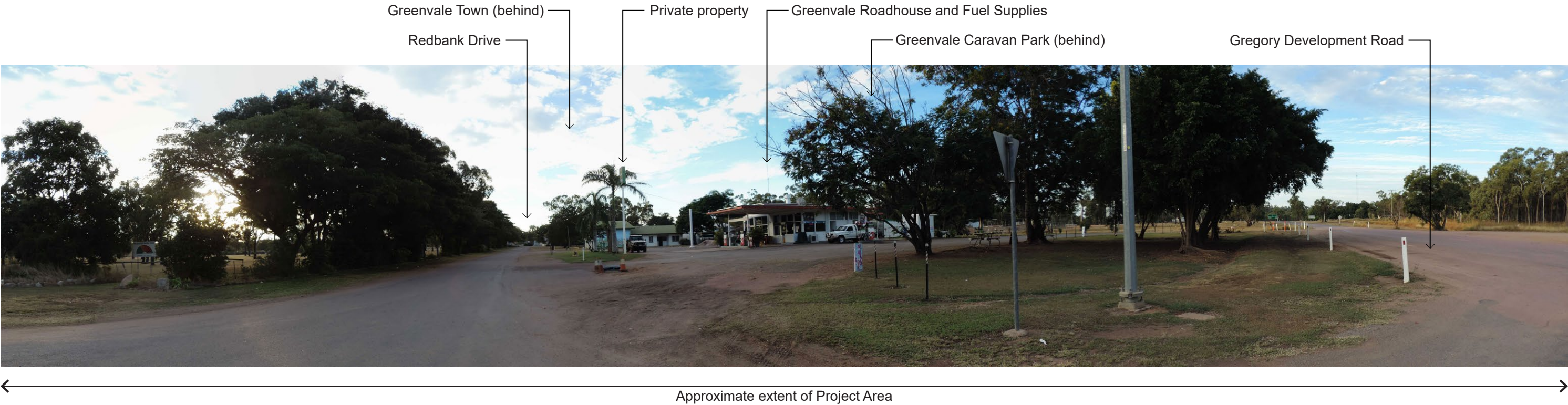


Figure 10: Viewpoint 5: View from Gregory Development Road, looking north



Figure 11: Viewpoint 6: View from Gregory Development Road, looking north-west



Figure 12: Viewpoint 7: View from Gregory Developmental Road, looking south-east

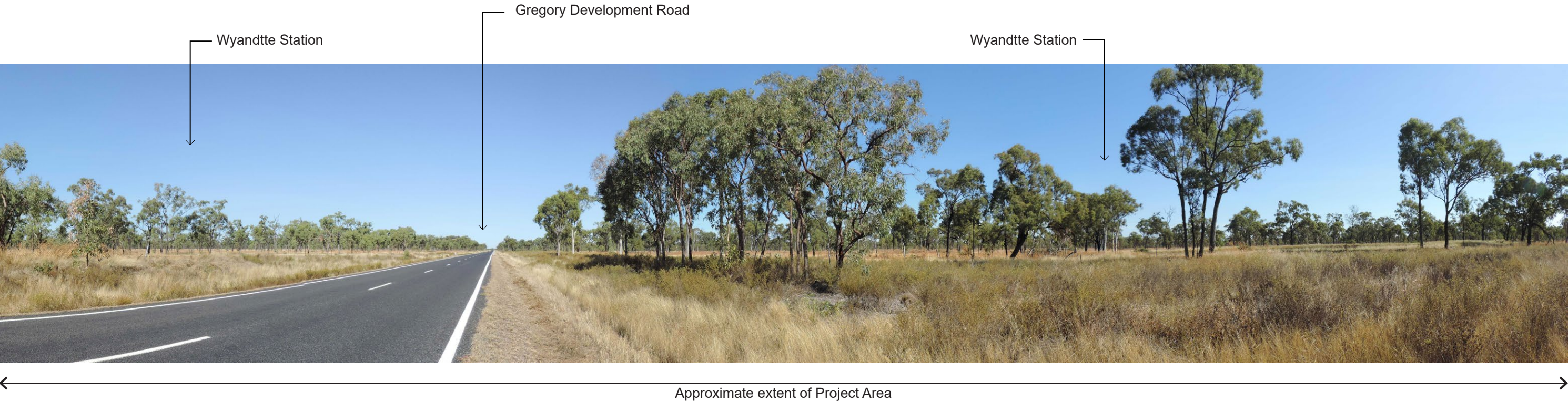


Figure 13: Viewpoint 8: View from Kennedy Developmental Road, looking south



Figure 14: Viewpoint 9: View from Kennedy Developmental Road, looking north-east

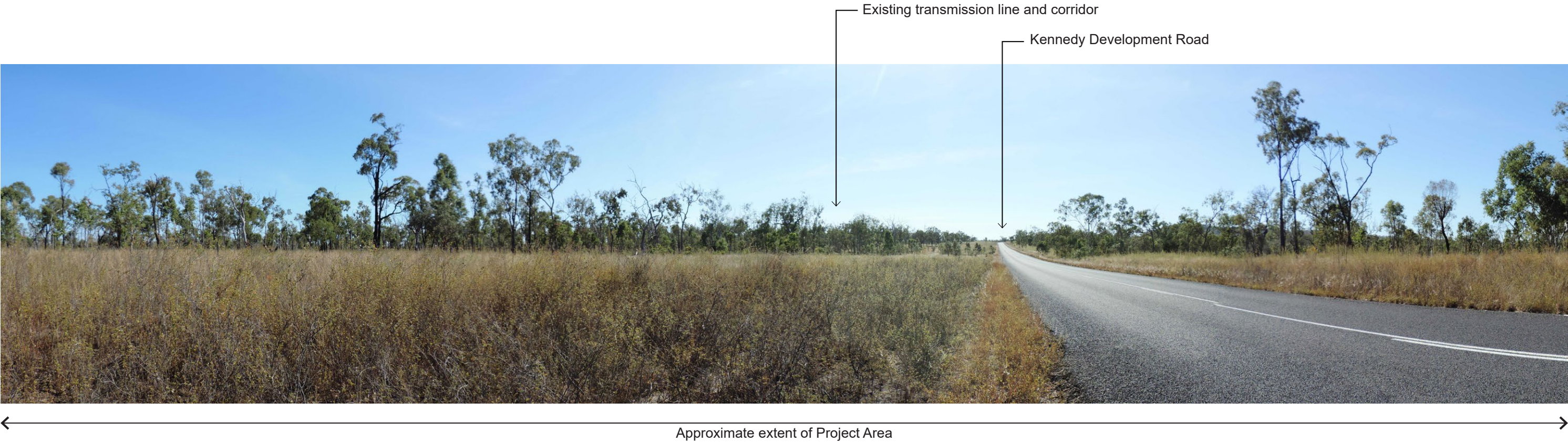


Figure 15: Viewpoint 10: View from Kennedy Developmental Road, looking south-west

