

AL | Railway Corridor – Proposed Soils Survey Methodology





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Hancock Prospecting Pty Ltd

Report for Alpha Coal Project (Rail)

Proposed Soil Survey Methodology

August 2011



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Executive Summary

Hancock Prospecting Pty Ltd (HPPL) is proposing to construct a standard gauge, single track, non-electrified, 495 kilometre (km) railway line for the purposes of transporting processed coal from the Alpha Coal Mine to the Port of Abbot Point in Bowen, hereafter referred to as the Project. The Project will be an essential part of opening up the Galilee Basin for the export of thermal coal and will benefit the Central Queensland region, State of Queensland and the nation.

A requirement of the initial Terms of Reference (ToR) for the Project was to undertake a soil survey, at a suitable scale along the proposed rail alignment.

Referring to both published and draft guidelines a proposed soil survey methodology has been developed for this project. As this soil survey will require a substantial undertaking it is intended that this methodology will also assist HPPL with resourcing for the task and develop timeframe and associated budgets. The proposed soil study methodology has been developed with reference to the following references and guidelines:

1. *Australian Soil and Land Survey: Guidelines Surveying Soil and Land Resources* (McKenzie *et al* 2008);
2. *Draft for Discussion - Soil Survey Methodology along Linear Feature*, (DERM, 2011)

In addition to the above guidelines, some limited consultation with the Department of Environment and Resource Management (DERM) in regards to soil surveying requirements for linear projects has occurred. The information and advice provided has also informed this methodology.

A desktop assessment of the project alignment was conducted to ascertain preliminary mapping units. The desktop assessment included a review of published and available information regarding soils, land resources, geology, topography, regional ecosystem mapping, and aerial imagery.

A total of 5 publicly available land systems and soil survey reports were reviewed to distinguish varying landscapes and soil types along the proposed rail alignment, of these reports, 3 were at a scale of 1:100,000 and 2 were at a scale of 1:1 000,000. These reports and datasets provided an indication of the dominant soils and landforms expected to occur along the alignment.

In addition to the 5 soils and land system reporting, geological mapping and regional ecosystem mapping / data was used to further delineate changes in soil and landforms along the alignment. From this exercise, Preliminary Mapping Units (PMU's) have been established for the entire alignment.

The PMU's within the alignment have been developed to identify tracts of land that share similar attributes; which can be separated from neighboring tracts of land with a different pattern of attribute values. A PMU is an area of a pre-defined class that is not considered to be unique in the sense that the same PMU (soil, geology, vegetation, and landform) may be encountered more than once elsewhere along the alignment.



Where 1:100 000 mapping was available, polygon data from the *Combined Soils Database* (DERM, 2010) was used as the primary identifiers for the development of PMU's. The main exception to this was where these polygons were large in size and where pre-clearing regional ecosystem (RE) mapping indicated changes in either vegetation communities or land zones. In these cases soil polygons were split based upon the pre-clearing RE mapping.

Along the portions of the alignment where 1:100 000 mapping was not available the PMU's were developed with equal weighting based on soils, geology, and pre-clearing RE mapping. The scale of soil mapping in these areas was understood to be at a scale between 1:1 000 000 and 1: 2 000 000. Hence, the decision was made to use geological and pre-clearing RE mapping, to further refine the PMU's as the scale of these datasets were at t 1: 500,000 and 1:100 000 respectively. These preliminary mapping units will then be assessed in the field, with the results of the field work used to map the Unique Mapping Areas (UMA).

During the field component of the soil survey it is important that every PMU receives at least one ground observation, and that each resultant UMA produced contains at least one detailed site description.

In areas where 1:100 000 mapping currently exists a ground truthing soil study will be undertaken of this existing mapping. In areas where 1:100 000 mapping does not exist a more detailed soil study will be required. The primary difference between the Ground Truthing Survey and the Detailed Survey is in the proportion of different ground observations required. The different types of ground observations are as follows:

- ▶ Full morphological description with full analysis
- ▶ Full morphological description with diagnostic analysis
- ▶ Brief morphological observation
- ▶ Brief surface observation

The information collected at each ground observation site varies, and will be used to map soil types, validate the presence of existing soils in the landscape, formulate soil mapping boundaries, and aid in the implementation of management strategies to deal with problematic soils, and good quality soils.



1. Introduction

Hancock Prospecting Pty Ltd (HPPL) is proposing to construct a standard gauge, single track, non-electrified, 495 kilometre (km) railway line for the purposes of transporting processed coal from the Alpha Coal Mine to the Port of Abbot Point in Bowen, hereafter referred to as the Project. The Project will be an essential part of opening up the Galilee Basin for the export of thermal coal and will benefit the Central Queensland region, State of Queensland and the nation.

This document has been developed for HPPL (the Proponent) to provide a methodology for a soil survey for the Project. The Land Chapter within the Environmental Impact Statement (EIS) provides details of the soil and landscape environmental values of the project alignment with an overview of the expected impacts that will occur as a result of the project; and details of the possible mitigation measures.

The Land chapter of the Alpha Coal Project EIS (Volume 3, Section 5) provided an overview of the expected soil types likely to be encountered along the project corridor. The information contained within this EIS was at a broad scale, detailing the environmental values, likely impacts, and proposed mitigation strategies. Volume 3, Section 5.1 of the EIS states that a field assessment is required in order to provide a more detailed assessment of the soils and landforms along the alignment. This assessment will be required to be done prior to construction. This soil survey methodology forms a critical component in addressing the soil survey requirements for this project.

This soil survey methodology has been developed in order for the soil survey to be of great assistance in the planning, construction and management of the Project. The benefits in undertaking a soil survey in accordance with this methodology will assist the project in a number of areas. The following details these benefits:

- ▶ Identification of problematic soils, such as saline, acidic and sodic (dispersive) soils;
- ▶ Implementation of the appropriate management strategy for each problematic soil type identified;
- ▶ Construction program planning, particularly when dealing with soils that will likely cause issues during wet weather, such as cracking clay soils;
- ▶ Identification of good quality re-usable topsoil, which is vital for when rehabilitation is required, likewise identification of poor quality topsoil, requiring amelioration for use in rehabilitation;
- ▶ Preliminary information to allow site evaluation for potential areas that may be considered for suitability for effluent irrigation from the temporary construction camps along the alignment.

In addition to the assessment undertaken for the EIS, additional information has been provided to HPPL, detailing a 'road map' in developing the soil study methodology and



meeting the EIS Terms of Reference (ToR) condition relating to the soil study, detailed in Section 1.6.

The requirements / steps detailed to HPPL required to develop a soil study methodology, and implementation of the methodology are included in Table 1.

Table 1 Soil Study Requirements for the Alpha Rail Project

| Requirement in Developing and Undertaking Soil Study | Status |
|--|---|
| Desktop Assessment | This report satisfies the desktop assessment requirement. |
| Development of Preliminary Mapping Units | Preliminary Mapping Units (PMU's) have been developed following the desktop assessment and is detailed within this report. Following the field component of the soil study, development of Unique Mapping Areas will be developed, which will allow for the implementation of the soil management action plans. |
| Development of Field Study Program | This report satisfies the development of a field survey program requirement. |
| Consultation with DERM | Consultation will be required with DERM Officers prior to undertaking the field survey and upon completion of the report and any management plans associated with the soil study. |
| Undertaking Soil Study | The soil study will be undertaken prior to the start of the construction program in accordance with this soil study methodology. |
| Development of Soil Management Action Plans | Soil management action plans can be developed prior to the soil study field work, and will need to be in place prior to construction. |

1.1 Purpose

The purpose of the document is to develop a methodology for the 1:100,000 linear soil study for the Project. Recently the Department of Environment and Resource Management (DERM) released a draft guideline for discussion on the methodology for soil survey requirements for linear surveys (DERM 2011). The concepts of this draft guideline have been referenced in this document and it is intended that HPPL will present this proposed soil study methodology for the Project to DERM for discussion prior to undertaking the task. As this soil study will require a substantial undertaking it



is intended that this methodology will also assist HPPL with resourcing for the task and develop timeframe and associated budgets.

1.2 Scope

The scope for this Proposed Soil Study Methodology is for a 1:100 000 linear soil survey of the Alpha Rail component of the Alpha Coal Project. This scope is based on the current alignment of approximately 495 km and is generally limited to a 60 metre (m) wide corridor.

Other areas of disturbances such as Borrow Pits / Quarries and Construction Camps will require a similar assessment to be undertaken; however this is not included within this scope.

1.3 Objectives

The objectives of this Proposed Soil Study Methodology are as follows:

1. Undertake a desktop assessment to determine what existing land resource survey information is available and of relevance to the project.
2. Identify areas where 1:100 000 mapping already exists, and will therefore only require ground truthing of the existing mapping;
3. Identify areas where 1:100 000 mapping does not exist, and will therefore require a detailed soil survey;
4. Using existing DERM polygon data, establish Preliminary Mapping Units (PMU's) that will require ground observations.
5. Develop a proposed soil survey field program methodology to a degree that will allow HPPL to:
 - Resource the task and develop timeframe and associated budgets; and
 - Present the recommendations to DERM for discussion prior to undertaking the task.

1.4 Project Description

HPPL is proposing to construct a standard gauge, single track, non-electrified, 495 kilometre (km) railway line for the purposes of transporting processed coal from the Alpha Coal Mine to the Port of Abbot Point in Bowen. This line will connect the Galilee Basin in Central Queensland to the coastal Port at Abbot Point. The Galilee Basin spans over 247,000 km² of land and holds over 14 billion tonnes of Joint Ore Reserves Committee (JORC) compliant coal that has been identified by several proponents.

The Alpha Coal Project will be an essential part of opening up the Galilee Basin for the export of thermal coal and will benefit the Central Queensland region, State of Queensland and the nation. As the northern section of the Project enters the Abbot Point State Development Area (APSDA) and ends at a rail loop and dump station



immediately south of the proposed Abbot Point Coal Terminal, it will also benefit future industrial development of the APSDA.

The Project will enable the export of 60 million tonnes per annum (Mtpa) of quality thermal coal with a mine lifespan of approximately 30 years. With construction of additional passing loops to the single line track and selective partial duplication, there is potential to further increase the tonnage and thus service other potential mines from the Galilee Basin. HPPL has agreed to make the track available to third party users under a Voluntary Undertaking pursuant to the *Trade Practices Act 1974* (TPA). In addition to the main line from the Alpha Coal Mine to the Port of Abbot Point, the Project also involves construction of the following:

- ▶ Two balloon loops, one at the Alpha Coal Mine and one at the Port of Abbot Point for loading and unloading;
- ▶ Nine passing loops each approximately five km's long to accommodate for export of 60 Mtpa of coal;
- ▶ Maintenance sidings along the railway line;
- ▶ Marshalling yard (including a passing loop at the entry) at Salisbury Plains; and
- ▶ Five temporary workers' camps accommodating 400 to 500 personnel per camp for the construction phase of the proposed works. Three semi-permanent and two temporary accommodation facilities will be constructed.

1.5 Project Alignment Study Area

The Project stretches between the Alpha Coal Mine, located 38 km northwest of the Alpha Township and the Abbot Point Coal Export Terminal, 25 km north of Bowen. The Project corridor proceeds in a generally north-easterly direction from the Alpha Coal Mine, crossing the Belyando River and several of its tributaries within the first 100 km.

The Project corridor crosses relatively flat lowlands before commencing a gentle climb from near Eaglefield (around 272 km from the Alpha Coal Mine) adjacent to the Suttor River, to a point near the existing Newlands mine (approximately around 280 km from the Alpha Coal Mine). This is the highest point on the Project corridor, at approximately 300 m above sea level (m ASL). In the vicinity of the Newlands mine, the Project corridor runs parallel to the Queensland Rail (QR) Northern Missing Link (NML) railway for approximately 70 km through a pass in the Leichhardt Range and parallel to the Newlands Railway to a point near the Bowen River.

The Project corridor then travels in a north- westerly direction on crossing the Bowen River at approximately 344 km from the Alpha Coal mine, and then passes down the Bowen River valley through mostly grazing land toward Mt Herbert. The Project corridor passes to the west of Mt Herbert through a pass in the Clarke Range. From this point, the Project corridor travels north-easterly crossing the Bogie River at a distance of about approximately 436 km from the Alpha Coal Mine, then finally in an easterly direction entering the Abbot Point area on its western boundary at 495 km from the Alpha Coal Mine.



The Project corridor passes approximately 70 km to the northeast of the town of Clermont, 55 km to the northeast of the town of Moranbah, 35 km to the east of Mt Coolon, 20 km to the west of Collinsville, and enters the APSDA 25 km west of Bowen.

1.6 Approval and Project Requirements

It is expected that the detailed soil survey will be undertaken as part of the approval conditions associated with an 'Environmental Authority' issued to the project and be undertaken prior to commencement of major vegetation clearing and earthworks. A transcript of the soil survey requirements included in Section 3.2.2.1 of the Alpha Coal Project ToR is included below.

A soil survey of sites affected by the project should be conducted at a suitable scale, with particular reference to the physical and chemical properties of the materials that will influence erosion potential, storm water run-off quality, rehabilitation and agricultural productivity. Information should also be provided on soil stability, suitability for construction of proposed facilities and any approved soil conservation plans.

Soil profiles should be mapped at a suitable scale and described according to the Australian Soil and Land Survey Field Handbook (McDonald et al, 1990) and Australian Soil Classification (Isbell, 2002). An appraisal of the depth and quality of useable soil should be undertaken. Information should be presented according to the standards required in the Planning Guidelines: the Identification of Good Quality Agricultural Land (DPI & DHLGP, 1993), and the State Planning Policy 1/92: Development and the Conservation of Agricultural Land (DME, 1995).

The requirement for soils mapping in terms of area and mapping scale should follow the Queensland Department of Mines and Energy: Technical Guidelines for Environmental Management of Exploration and Mining in Queensland, 1995, specifically Section 6.1: Land Suitability Assessment Techniques. These guidelines recommend that disturbed areas be mapped more intensively than non-disturbed areas and provide guidance on acceptable mapping scale and site intensity.

2. Desktop Methodology

2.1 References and Guidelines

The proposed soil study methodology has been developed with reference to the following references and guidelines:

- ▶ Australian Soil and Land Survey: Guidelines Surveying Soil and Land Resources (McKenzie et al 2008);
- ▶ Draft for Discussion - Soil Survey Methodology along Linear Feature, (DERM, 2011)

2.2 Desktop Assessment

The desktop assessment of the project alignment included a review of published and available information regarding soils, land resources, geology, topography, regional ecosystem mapping, and aerial imagery.

2.2.1 Existing Soil and Land System Information

The initial task required establishing what existing soil and land system mapping was available and to identify any mapping that was at a scale of 1:100 000 or greater. A total of five (5) publicly available land systems and soil survey reports were reviewed to distinguish varying landscapes and soil types along the proposed rail alignment and provide an indication of the dominant soils and landforms that are expected to occur along the alignment.

The existing soil and land system mapping reports together with their associated scales and the relevant chainages of the alignment are included in Table 2. A figure indicating the coverage's of these soil and land system studies is included in Appendix A.

Table 2 Land System and Soil Survey Reports Relevant to Alpha Coal Project Alignment

| Land System and Soil System Report | Scale | Relevance to Rail Corridor (km) |
|--|-------------|--|
| <i>The Desert Uplands: An overview of the Strategic Land Resource Assessment Project</i> , (Lorimer, 2005) | 1:100,000 | CH0 to CH31,000 |
| <i>Lands of the Nogoa - Belyando Area, Queensland - Land Research Series No. 18</i> . (Gunn et al 1967). | 1:1 000 000 | CH31,000 to CH286,000 |
| <i>Burdekin - Townsville Region, Queensland, Resource Series, Soils</i> . Isbell, R, Murtha, G (1970). | 1:1 000 000 | CH286,000 to CH399,000 CH412,000 to CH448,000 |

| Land System and Soil System Report | Scale | Relevance to Rail Corridor (km) |
|--|-----------|---------------------------------|
| <i>Soils of the Lower Burdekin Valley, North Queensland - Redbank Creek to Bob's Creek and south to Bowen River.</i> (Thompson, 1990). | 1:100 000 | CH399,000 to C412,000 |
| <i>Soils of the Elliot River - Bowen Area, North Queensland.</i> (Aldrick, 1988). | 1:100 000 | CH448,000 to CH505,000 |

DERM were approached to determine if additional information was able to be made available, particularly information contained within the Soil and Land Information (SALI) database, the response was that this information was not available to the public in a user friendly format. Instead the *Combined Soils Database* that has been made publically available by DERM was used. It was found that the polygons of the *Combined Soils Database* typically coincided with the polygons of the published mapping and also contained the same land descriptor coding to allow identification and cross referencing.

At a preliminary desktop assessment level the soil types (Australian Soil Classification) has been mapped for the alignment using the *Combined Soils Database* and is provided in Appendix A. This soils mapping alone, particularly in areas mapped at 1:1 000,000 is not adequate in distinguishing changes in landscape and soil types, but has been provided as an overview of expectant soil types within the project area.

2.2.2 Aerial Photography and Regional Ecosystem Information

In preparing for soil surveys stereo pair aerial photo interpretation is typically the preferred method for defining PMU's and polygon boundaries. Observations of distinctive patterns and changes in tone and texture are used to identify soil landscapes with different sets of attributes.

Air photo interpretation has been completed by the Queensland Herbarium in developing Regional Ecosystems (REs) mapping at a scale of 1:100 000 for the majority of Queensland, and at a scale of 1:50 000 for some areas in Southeast Queensland. The RE mapping developed by the Queensland Herbarium has established an internationally recognized methodology for vegetation survey and mapping. Pre-clearing RE mapping vegetation communities were drawn from 1960's aerial photos with the aid of any available land system, geology, soils, other land resource mapping as well as early surveyor's records. This air photo interpretation was followed by extensive field sampling, ground truthing and data collection. This information was then collated and analysed before different photo patterns were assigned to different ecosystem types.

RE mapping identifies vegetation communities that are consistently associated with a particular combination of geology, landform and soil in a bioregion. Data and polygon line work from Pre-clearing RE mapping has been used in developing PMU's that will require ground observations in the soil study field program. Relevant RE datasheets have been supplied in Appendix C.



2.2.3 Geological Information

Three (3) datasets of 1:250,000 scale Geology maps from Geological Survey Queensland Digital Geology were analysed. These included in Table 3.

Table 3 Geology Map Coverage

| Geology Map | Chainage Range |
|--|------------------------|
| Geology of North Eromanga. <i>Australia 1:250,000 Geological Series</i> , 1:1 000,000, (Mond <i>et al</i> , 1976) | CH0 to CH108 000 |
| Geology of Bowen Basin. <i>Australia 1:250,000 Geological Series</i> , Sheet SF 55-3, 1:500,000 (Balfe <i>et al</i> , 1985), | CH108 000 to CH384 200 |
| Geology of Burdekin River. <i>Australia 1:250,000 Geological Series</i> , 1:500,000 (Paine & Cameron, 1970). | CH384 200 to CH509 000 |

2.2.4 Topographical Features Information

Google satellite imagery was captured and geo-referenced and used in the production of figures and PMU's. Contour data at 10 m intervals obtained from DERM was the only data available over the alignment, as this is a large scale contour data, its usefulness in identifying subtle changes in landform was considered limited, and omitted from the establishment of the PMU's.

2.3 Development of Preliminary Mapping Units

The PMU's within the alignment have been developed to identify tracts of land that share similar attributes; which can be separated from neighboring tracts of land with a different pattern of attribute values. A PMU is an area of a pre-defined class that is not considered to be unique in the sense that the same PMU (soil, geology, vegetation, and landform) may be encountered more than once. The development of PMU's for the alignment has been undertaken based upon review of existing information by utilizing GIS to overlay mapping of land systems, soils, vegetation communities, land zones, and geology. Based on previous discussions with DERM with similar projects it is understood that for linear soil surveys at a scale of 1:100 000 that ground observations sites are desired to occur at intervals of 500m to 1000m depending on the simplicity/complexity of the landscape. Therefore the PMU's have been developed with this requirement in consideration to address this level of detail required.

Along the portions of the alignment where 1:100 000 mapping is available then the existing soils polygon data from the *Combined Soils Database* (DERM, 2010) was used as the primary identifiers for the development of PMU's. The main exception to this was where these polygons were large in size and where pre-clearing RE mapping indicated changes in either vegetation communities or land zones. In these cases the soils polygon was split based upon the pre-clearing RE mapping.

Along the portions of the alignment where 1:100 000 mapping is not available the PMU's were developed with equal weighting based on soils, geology, and pre-clearing RE mapping. The scale of soil mapping in these areas is understood to be at a scale



between 1:1 000 000 and 1: 2 000 000, therefore the geological mapping at 1: 250 000 and pre-clearing RE mapping of 1:100 000 was utilized to further refine the PMU's.

The products of the PMU's mapping include a set of figures (Appendix A) and a PMU reference table (Appendix B). The figures include the polygon line work within a 4 km corridor along the alignment. The PMU reference table includes summary data of the attributes that have been used to define each PMU. Each of these PMU's has been assigned a unique number and approximate chainage that cross references to the figures.

In situations where polygon line work boundaries run parallel with the rail alignment or meander along the rail alignment PMU's have been assigned with approximate chainages; but additional polygon line work for these PMU's has not been developed. These sections of the rail alignment are likely to be complex landscapes or are perceived to be occurring on or near boundaries between tracts of land with different patterns or attributes.

3. Review of Available Information

3.1 The Desert Uplands Strategic Land Resource Assessment (DUSLARA) – 1:100,000

The DUSLARA land resource study is based on the land system concept and involved the use of remote sensing techniques initially to identify broad geomorphic features, followed by an intensive period of field work to collect site, soil and vegetation information. The land system method in which soil-vegetation associations conform to a predictable and recurring pattern within areas of similar geology, physiography and climate, provides a consistent, logical identification of different land types across the whole bioregion. The DUSLARA land resource study has been mapped at a scale of 1:100,000 (Lorimer, 2005).

The Alpha Rail alignment traverses the DUSLARA land resource study area from KP0 to KP31, 000. Within this section of the proposed rail alignment three different Land Systems and nine different subsequent Land Units are traversed. Details of the three land systems traversed by the Alpha Rail alignment are discussed below.

3.1.1 Relevant DUSLARA Land Systems

The Land Systems delineate areas with a specific geology, landform pattern, climatic range, and a consistent pattern of land units. Each land unit has a distinctive landscape position and a characteristic soil / vegetation association. The three Land Systems covered by the Alpha Rail alignment include *Belyando River*, *Joe Joe*, and *Surbiton*. Brief descriptions are as follows:

- ▶ Belyando River: This Land System represents the Belyando River floodplain, a distance of approximately 140 km, on the eastern side of the Project area. Within the broad riparian zone four land units are intersected by the proposed rail.
- ▶ Joe Joe: This Land System represents a prominent ridge of sandstones north of Alpha Township. Six land units are traversed by the proposed rail.
- ▶ Surbiton: This Land System consists of a relatively small area of basalt country approximately 90 km north of Alpha Township and represents an outlier of the adjacent Brigalow bioregion. Six land units are traversed by the proposed rail.

3.1.2 Relevant DUSLARA Land Units

Of the three Land Systems identified, nine (9) individual land units are traversed by the rail alignment. These are briefly described below in Table 4.

Table 4 Land Unit Descriptions (Lorimer, 2005)

| Land Systems | Land Unit |
|----------------|--|
| Belyando River | (BR2) Alluvial terrace. Very deep red gradational soils with sandy loam topsoils and light clay subsoils. Tall woodlands of silver-leaved ironbark with desert oak, black spear grass and wire grass. Regional Ecosystem |

| Land Systems | Land Unit |
|--------------|--|
| Joe Joe | (RE) 11.3.6 is predominant. |
| | (JJ2) Crests and upper slopes. Shallow, red to yellowish brown texture contrast soils with sandy loam topsoils and an ironstone hardpan within 0.5 m of the surface. Mid-tall open woodlands of silver-leaved ironbark with occasional ghost gum and poplar box. RE 10.7.11 is predominant, in addition to areas of RE 10.5.5. |
| | (JJ4) Lower slopes. Deep, texture-contrast profiles with sandy loam topsoils and yellowish-brown clayey subsoils. Tall woodlands of silver-leaved ironbark. RE 10.5.5 is predominant. |
| | (JJ5) Drainage depressions. Texture-contrast profiles with sodic, mottled clay subsoils. A sandy wash layer may be present. Tall woodlands of poplar box, river red gum is common and Brigalow occurs on the lower reaches where heavy clay soils appear. RE 10.3.14 and RE 10.3.27 are predominant. |
| | (JJ6) Alluvial fans. Very deep, reddish-brown, uniform sandy loams overlie a buried clay soil. Woodlands of silver-leaved ironbark, poplar box and ghost gum. RE 10.5.5 is predominant, in addition to significant areas of RE 10.3.12. |
| Surbiton | (SN2) Plains. Moderately deep, red-brown, gradational-textured soils overlying ferricrete at approximately 1 m depth. Tall open woodlands of silver-leaved ironbark with ghost gum and a dense pasture of bluegrass, kangaroo grass and wiregrass. RE 11.8.4 is predominant. |
| | (SN3) Plains. Uniform, grey, cracking-clay soils with self-mulching topsoils. Tall, very sparse woodlands of gum-topped bloodwood with isolated shrubs of mimosa and a ground layer of desert bluegrass, red flinders grass and silky browntop. RE 11.8.11 is predominant. |
| | (SN4) Lower plains. Very deep, dark grey and black, uniform, cracking-clay soils, often with pronounced linear Gilgai micro relief. Sparse, low woodlands of Brigalow with an understorey of forest bluegrass and Flinders grass. RE 11.8.11 is predominant. |
| | (SN5) Drainage depressions. Very deep, grey cracking-clay soils with silty clay topsoils. Mid-tall open woodlands of coolabah. RE 11.3.3 is predominant. |
| | |

3.2 Soils of the Lower Burdekin Valley, North Queensland – 1:100,000

The soil survey titled *The Soils of the Lower Burdekin Valley, North Queensland, Redbank Creek to Bob's Creek and south to the Bowen River* (Thompson *et al*, 1990) is at a scale of 1:100,000 and covers a 212,000 hectare (ha) area. The Alpha rail alignment transects this area from approximately CH 399,000 to CH 412,000 whereby it traverses two different topographical forms, and five different soil types.

The topographical forms traversed by the Alpha Rail include:

- Miscellaneous Alluvial Deposits:** This topographical form includes both Holocene alluvial deposits of present streams and covers levees, deltas, recent alluvial fans and prior streams. Pleistocene stream alluvia within the river flood plain are also included within this topographical form. These alluvia include distributary channels of the major rivers, past major river stream courses, deltas and flood plain splays.

- *Weakly to moderately undulating plains on basic extrusive*: This topographical form occurs only in the Lizzie Creek volcanics east of the Millaroo Fault zone. The Lizzie Creek volcanics are an extensive lava flow of basalts, andesites and associated materials extending from Collinsville down the Bowen River and almost to the Bogie River. The landscape varies from gently undulating plains of deep cracking clays to broken dissected uplands with shallow cracking and non-cracking clays. Basalt is the dominant rock within the survey area.

3.2.1 Soil Types

A brief description of the principle profile class is included in Table 5.

Table 5 Topographical Forms and Soil Profile Class (Thompson *et al*, 1990)

| Topographical Forms | Soil Profile Class |
|---|--|
| Miscellaneous Alluvial Deposits | (6Uga) Grey, dark occasionally bleached cracking and non-cracking clays. |
| Weakly to moderately undulating plains on basic extrusive | (7DbA) Red-brown earths with 15 cm to 25 cm A horizon |
| | (7Ufa) Non-cracking dark and brown clays 70 cm deep. Linearly gilgaied. |
| | (7Uga) Black earths and brown clays 70 cm deep. Linearly gilgaied |
| | (7Ugb) Deep black earths |

3.3 Soils of the Elliot River – Bowen Area – 1:100,000

The Soils of the Elliot River – Bowen Area, North Queensland (Aldrick, 1998) describes a 1:100 000 soil survey of 107,000 ha of land in the Elliot River-Bowen area, North Queensland. Free survey techniques were used. Fifty-one soil profile classes are identified and mapped into 38 soil mapping units plus 12 miscellaneous mapping units. The soil mapping units are grouped into 14 landscape units. The Alpha Rail alignment transects this area from approximately CH 480,000 to CH 505,000 and traverses two different topographical forms consisting of thirty-three different soil mapping units. A brief description of the principle profile class is included in Table 6.

Table 6 Landscape units and associated soils types (Aldrick, 1998)

| Landscape Unit | Soil Type |
|-------------------------------|---|
| Floodplains of minor streams. | Tabletop (Tt) Self-mulching black medium-heavy clay over neutral to alkaline black heavy clay, over dark brown heavy clay. Some carbonate. Normal gilgai. |
| Floodplains of minor streams. | Wilmington (Wm) 250 mm - 350 mm black structured organic clay loam to silty clay over buried soil material, mainly very dark neutral heavy clay, over layered |

| | |
|---|--|
| | estuarine deposits. |
| Alluvial terraces: level plains on cemented fine gravel | Greentop (Gt) 600 mm - 900 mm greyish or yellowish brown coarse sand with conspicuously bleached A2 over neutral yellowish clayey coarse sand colour B horizon. Minor Ornstein. |
| Alluvial terraces: level plains on cemented fine gravel | Kangaroo (Kr) 300 mm - 450 mm greyish or yellowish loamy coarse sand or coarse sandy clay loam with bleached A2 over neutral brownish mottled coarse sandy clay to medium clay B horizon. |
| Alluvial terraces: Poorly drained gentle slopes, plains and prior streams | Seven Sisters (Ss) 200 mm - 450 mm dark greyish loamy sand to sandy clay loam with conspicuously BI cached A2 over slopes, yellowish-brown mottled medium clay or heavy sandy clay B horizon. Some carbonate. |
| Alluvial terraces: relict levees and backplains | Castlevue (Cv) 450 mm - 600 mm brownish sand or sandy loam with conspicuously bleached A2 over neutral yellowish-brown mottled medium clay B horizon. Some ferruginous nodules. |
| Alluvial terraces: relict levees and backplains | Gumlu (Gu) 150 mm - 350 mm dark brownish fine sandy loam or light sandy clay, often with bleached A2, over alkaline dark brown sandy clay or medium clay B horizon. Some carbonate. |
| Alluvial terraces: stagnant alluvial plains | Carew (Cr) Self-mulching dark medium heavy clay over neutral to alkaline very dark grey heavy clay, over dark yellowish brown heavy clay. Some carbonate. Normal gilgai. |
| Alluvial terraces: stagnant alluvial plains | Goodbye (Gb) 150 mm - 250 mm dark greyish brown sandy clay loam with sporadically bleached A2 over alkaline dark greyish mottled heavy clay B horizon. Some carbonate. |
| Alluvial terraces: stagnant alluvial plains | Gathalunga (Gi) Self-mulching greyish clay over neutral to alkaline grey heavy clay. Some carbonate. Normal gilgai. |
| Alluvial terraces: stagnant alluvial plains | Splitters (Sp) 100 mm - 250 mm dark brownish loamy sand or sandy clay loam with sporadically bleached A2 over neutral to alkaline brown heavy sandy clay or light-medium clay B horizon. |
| Alluvial terraces: stagnant alluvial plains | Tolgai, strongly gilgai variant (TgSv) Thinly self-mulching greyish heavy clay over neutral to alkaline grey dense heavy clay. Few carbonate nodules. Strong cracking and gilgai. |
| Creek flats and stream channels | Creekflats and Streams (C) Undifferentiated groups of alluvial soils, siliceous sands, minimal prairie soils, black earths, and marginal solodic soils adjacent to stream channels; flooded annually or more frequently. |

| | |
|---|---|
| Dissected undulating rises on intermediate intrusive rocks | Glenroc (Gr) 250 mm - 450 mm dark greyish or brownish sand to light sandy clay loam with unbleached A2 over neutral to alkaline yellowish-brown mottled medium clay B horizon. Some carbonate. |
| Dissected undulating rises on intermediate intrusive rocks | Glenroc Stony Phase (GrSp) As for Glenroc, but with 10% surface and profile stone. |
| Dissected undulating rises on intermediate intrusive rocks | Wygong (Wg) Self-mulching black medium heavy clay over neutral to alkaline black heavy clay, over weathering rock. Weak normal and linear gilgai. |
| Pediments: Active upper colluvial slopes | Knobbies (Kn) 100 mm dark sandy clay loam over alkaline reddish light clay B horizon. Some carbonate. |
| Pediments: Active upper colluvial slopes | Maiden (Md) 600 mm - 750 mm brownish sand to sandy loam with sporadically bleached A2 over neutral yellowish-brown mottled sandy clay or medium clay B horizon. Few ferruginous nodules. |
| Pediments: Active upper colluvial slopes | Sixmile (Sm) 200 mm - 300 mm dark brown sand with sporadically bleached A2 over alkaline brownish sandy clay to. Medium clay B horizon. Some carbonates. |
| Pediments: Relict lower colluvial slopes | Roundback (Rb) 200 mm - 350 mm brownish sandy or sandy clay loam with conspicuously bleached or sporadically bleached A2 over neutral to alkaline yellowish-brown medium or heavy clay B horizon. Some carbonate. |
| Pediments: Relict lower colluvial slopes | Salisbury (Sb) Self-mulching black medium or heavy clay over neutral to alkaline black heavy clay B. horizon, over greyish dark clay. Some carbonate. Linear and normal gilgai. |
| Undulating plains on acid intrusive rocks | Buckley (Bl) 250 mm - 350 mm dark sand with conspicuously bleached A2 over alkaline brown mottled medium clay B horizon. |
| Undulating plains on acid intrusive rocks | Kailla (Kl) 350 mm - 550 mm dark loamy sandy with unbleached A2 horizon over acid neutral yellowish brown mottled sandy clay B horizon. |
| Undulating plains on intermediate intrusive rocks | Finley (Fl) 150 mm - 300 mm brownish sandy clay loam to light clay A horizon over neutral reddish-brown medium clay B horizon. |
| Undulating rises on yellowish-brown sandy clay loam intrusive rocks | Thurso (Ts) 250 mm - 350 mm brownish loamy sand intensely dissected with unbleached A2 over neutral B horizon. Rock fragments throughout and increasing below. Shallow soils. |
| Miscellaneous | Sand dunes (SD) |
| Miscellaneous | Saline flats (SF) |

| | |
|---------------|--|
| Miscellaneous | Sand sheets (SSs) |
| Miscellaneous | Swamps (fresh or brackish water) (Sw) |
| Miscellaneous | Gullied and eroded areas in alluvial terraces (EA) |
| Miscellaneous | Gullied and eroded banks of major streams (EM). |
| Miscellaneous | Gullied and eroded areas in sedentary soils (ES) |

3.4 Lands of Nogoa Belyando – 1: 1 000 000

The survey area covers 90,000 km² in Central Queensland. The land system mapping is based on the identification of distinctive patterns on aerial photographs. These patterns are mapped initially by stereoscopic examination and then studied systematically in the field. Variations in tone, texture, and relief in the patterns reflect mainly differences in land form and vegetation as governed by geomorphic history, lithology, soil, and climate. The final interpretation of these areas and mapping was done after completion of the detailed site survey (Gunn et al, 1967).

The dominant soil types expected to be traversed along the proposed alignment, are provided in Appendix A.

3.5 Burdekin - Townsville Region Soils – 1:1 000 000

The soils of the Region have been grouped on the basis of *A Factual Key for the Recognition of Australian Soils* (Northcote 1965). In this arrangement all mineral soils are grouped into three major divisions according to their texture profiles. The major divisions are as follows; *uniform texture profiles*, *gradational texture profiles* and *texture contrast or duplex 'soils'*. Further breakdown of the subdivisions is made on other soil properties which may be readily seen or determined by field examination (Isbell, 1967).

The delineation of the map units was done on air photo mosaics and was based on large numbers of soil profile examinations along extensive road traverses supported and extended by air-photo interpretation. The occurrence of soil units at the level of principal profile forms is too complex and individual areas too small to be shown separately on a map of the scale necessary to cover the Region in a single sheet. However, soils commonly occur in distinctive patterns in which one kind of soil is usually dominant in area; these patterns are characteristically related to particular landscapes and usually recur over fairly large areas. The soils of the Region have been mapped on this basis. The individual map units are defined as 'associations' of soils characterised by the dominant soil group (Isbel 1967).

Relevant soil types likely to traverse the proposed alignment are detailed in Table 7.

Table 7 Mapped Soil Units (Isbell, R, Murtha, G 1970)

| Regional Soil Group | Soil Types |
|---|------------------------------------|
| Low hilly or strongly undulating lands with | <i>Deep Sands</i> - Deep sands and |

| Regional Soil Group | Soil Types |
|--|--|
| some latentic or sandstone mesas: soils are moderately deep. On the mesas are leached sands or red massive sandy earths (Sb10) | sandy loams showing little profile differentiation |
| Moderate to strongly undulating lands with some low stony hills, basalt outcrop is common moderately deep clays. Associated on higher sites are shallow stony dark or red non-cracking clays and shallow stony loams. Small areas of brown or red cracking clays also occur (Ce7) | <i>Dark Medium to Shallow Cracking Clays</i> - Dark structured clay soils which crack significantly on drying and consist of dense coherent aggregates overlying weathered rock at medium to shallow depths: surface commonly self-mulching. |
| Moderate to gently undulating plains moderately deep grey clays, often with a pronounced linear gilgai. Associated are deep grey or dark clays in lower sites, and thin-surfaced alkaline red, brown, or grey duplex soils on some ridges (Cc5) | <i>Grey and Brown Deep Cracking Clays</i> - Deep structured clay soils which crack significantly on drying and consist of dense coherent aggregates: surface often self-mulching |
| Alluvial plains associated with major drainage lines; subject to seasonal inundation, soils are deep grey clays with slight gilgai. Associated are lesser brown clays and small clay pans with loamy alkaline bleached duplex soils (Cc17) | |
| Undulating or level plains occasionally with a slight gilgai micro-relief: brown clays of medium depth associated are similar grey clays and lesser areas of grey, brown, and dark deep cracking clays and red friable earths. Some low basalt hills with shallow stony friable loams and clays, and small alluvial plains with alkaline bleached duplex soils are included (Cc18) | |
| Alluvial plains with slight to moderate gilgai relief, deep brown clays with lesser grey clays. Associated soils are small areas of thin surfaced loamy brown and grey alkaline duplex soils (Cd15). | <i>Grey and Brown Gilgaied Deep Cracking Clays</i> - Deep structured clay soils which crack prominently on drying and consist of dense coherent aggregates and have melon hole gilgai greater than 12 in deep |
| Undulating or gently undulating plains deep clays with a prominent linear gilgai on slopes. Associated drainage lines have small floodplains with loamy alkaline dark or brown bleached duplex soils (Cf14) | <i>Dark Deep Cracking Clays</i> - Deep structured clay soils which crack significantly on drying and consist of dense coherent aggregates: surface often self-mulching |
| Gently undulating plateau surface, often bounded by steep lateritic scarps: soils are deep and slightly acid. Associated are small areas of yellow massive loamy earths, and some shallow stony loams on the marginal | <i>Red Massive Loamy Earths</i> - Red massive soils with texture increasing gradually from loams or sandy clay loams at the surface to clays at depth |



| Regional Soil Group | Soil Types |
|--|--|
| scarps (Mb2). | |
| Moderately to strongly undulating lands dissected by many small stream channels; rock outcrop is frequent' soils are usually red mottled. Associated are brown or grey bleached duplex soils and small plains of grey deep cracking clays (RF5). | <i>Alkaline Red Bleached Duplex Soils</i> - Soils with red structured clay subsoils abruptly overlain by neutral hard-setting loamy surface soils with bleached A, horizons: strongly alkaline deeper subsoils. |
| Gently undulating alluvial floodplains with marked terraces and shallow drainage depressions dominant soils occur on older terraces and levees They have a deep sandy surface and an A ₂ horizon. Closely associated are similar yellow-grey, mottled, and brown duplex soils. Deep friable loams occur on more recent terraces (RD2) | <i>Neutral Red Duplex Soils (deep)</i> - Soils with red strongly structured clay subsoils overlain by slightly acid loamy surface soils, commonly bard-setting and without pale A, horizons: neutral to mildly alkaline subsoils. |
| Moderate to strongly undulating lands with occasional high strike ridges with sandstone outcrop' soils are loamy-surfaced. Closely associated are neutral and alkaline red duplex soils. Deep yellow-grey duplex soils occur on small alluvial plains and shallow stony loams and sands on high ridges and adjacent to rock outcrop (GG9) | <i>Alkaline Mottled Yellow and Grey Bleached Duplex Soils</i> - Soils with mottled, coarse-structured tough clay subsoils abruptly overlain by slightly acid sandy to loamy surface soils with a bleached A, horizon: strongly alkaline subsoils |



4. Proposed Soil Study Field Program

4.1 Objectives

The objective of the soil study is to obtain sufficient information about soils and their occurrence along the alignment of the Project. This information is to be used for the following:

- ▶ Develop and implement measures, at an appropriate level of detail to mitigate any adverse impacts and preserve the environment values of the surrounding areas.
- ▶ Development of detailed soil mapping that will allow soils and landscapes at risk to hazards such as erosion, salinity, acidity, and sodicity impacts to be identified such that appropriate environmental management may occur.

The soil mapping will also allow for the quantification and accounting for disturbances to Good Quality Agricultural land (QGAL) and Strategic Cropping Land (SCL).

4.2 References and Guidelines

The proposed soil study program has been developed in reference to the following guidelines:

- ▶ *Australian Soil and Land Survey: Guidelines Surveying Soil and Land Resources* (McKenzie *et al*, 2008);
- ▶ *Land Suitability Assessment Techniques*. (DME, 1995); and
- ▶ *Draft for Discussion - Soil Survey Methodology along Linear Feature*, (DERM, 2011).

4.3 Scale

In reference to the *Draft for Discussion - Soil Survey Methodology along Linear Feature* (DERM, 2011) the recommended scale for linear projects such as railway lines is 1:50 000 to 1:100 000. To obtain sufficient data to achieve this level of reliable mapping the intensity of ground observations sites needs to be at a rate of 1 site per 0.5-1.0 km.

4.4 Timing

The implementation of this soil study methodology will be required to be done prior to the development of the Erosion and Sediment Control Plans (ESCP), Rehabilitation Management Plans (RMP), Soil Management Plans (SMP) and Construction Environmental Management Plan (CEMP).

The most effective time to undertake a soil study is during the dry winter months, as the wetter months make identification of shallow and deep cracking clays very difficult. Issues arising from trafficking the Project alignment during wet weather will also hamper the delivery of the soil study.

Co-ordination with planned geotechnical investigations will aid in planning the fieldwork activities and reduce the requirement on engaging multiple sub-contractors and having to revisit areas. However a soil survey is considerably different to a geotechnical investigation in regards to what information is required, depth of investigations and sampling requirements. The soil survey will be required to be undertaken by a suitably qualified person, described in Section 4.5.

4.5 Suitably Qualified Person

The soil survey needs to be undertaken by a suitably qualified professional in soil survey. The minimum qualification requirements for professionals conducting soil survey:

- ▶ Certified Practicing Soil Scientist (CPSS) Level 2 competency accreditation in soil survey;
- ▶ a minimum of 5 years demonstrated experience in soil surveying; or
- ▶ persons recognised and agreed upon by the DERM Soil and Land Resource Assessment section prior to commencement of works

4.6 Ground Observation Types and Proportions

During the soil study field works the target is to ensure that every PMU should receive a ground observation; and every Unique Mapping Area (UMA) that is produced in the resultant mapping, following the field work, should contain at least one detailed site description.

In areas where 1:100 000 mapping already exists a ground truthing soil study will be undertaken of existing mapping. In areas where 1:100 000 mapping does not exist a more detailed soil study will be required. The primary difference between the Ground Truthing Survey and the Detailed Survey is in the proportion of different ground observations required. A brief description of the ground observation is provided below. Break down of the types and approximate proportion of these sites is included Table 8.

Table 8 Different Ground Observation Types for Alpha soil survey

| Ground Observation Types | Proportion of sites (approximate only) | |
|--|--|------------------------------------|
| | Ground Truthing Survey | Detailed Survey |
| | 1:100 000 mapping is available | 1:100 000 mapping is not available |
| 1. Full morphological description with full analysis | ~5% | ~10% |
| <i>Detailed descriptions of one or more representative profile soil types (more for major soils) with full profile</i> | | |

| Ground Observation Types | Proportion of sites (approximate only) | |
|--------------------------|---|--|
| | Ground Truthing Survey | Detailed Survey |
| | 1:100 000 mapping is available | 1:100 000 mapping is not available |

laboratory analysis to 1.5 m, rock or trench depth.

2. Full morphological description with diagnostic analysis

~20%

~50%

Detailed profile descriptions to 1.5 m or rock, or to proposed trench or excavation depth for pipelines or channels if depth >1.5 m; adequate subsoil chemical analysis (diagnostic sampling) to identify and classify the soils.

3. Brief morphological observation

~50%

~20%

Less detailed soil descriptions with cores to sufficient depth to identify the soil; minimum description and recording.

4. Brief surface observation

~25%

~20%

Surface features check sites in large uniform areas and to establish soil boundaries. Check sites should have a minimum of data recorded to confirm the mapped soil type, such as location, landform, vegetation, surface characteristics, surface horizon characteristics, relevant notes, and soil type.

Using the above ratio breakdown of ground observations, the number of proposed ground observations for areas mapped at 1:100,000 and those mapped at 1: 1000, 000 is provided in Table 9 below.

Table 9 Indicative Observation Site Breakdown for Alpha Coal Project

| Chainage ¹ | Length (km) | Scale | Number of PMU's | Number of Observation Types ² | | | | |
|-----------------------|----------------|------------|-----------------------|--|-----|----|----|-------|
| | | | | 1 | 2 | 3 | 4 | Total |
| 0 – 31000 | 31 | 1:100,000 | 53 | 3 | 11 | 27 | 13 | 54 |
| 31000 to 286,000 | 255 | 1:1000,000 | 378 | 37 | 189 | 76 | 76 | 378 |
| 286000 to 399000 | 113 | 1:1000,000 | 128 | 13 | 63 | 26 | 26 | 128 |
| 399000 to 412000 | 13 | 1:100,000 | 23 | 1 | 5 | 11 | 6 | 23 |

| | | | | | | | | |
|--------------------|----|-----------|-----|----|-----|-----|-----|-----|
| 412,000 to 448,000 | 36 | 1,100,000 | 32 | 5 | 19 | 8 | 8 | 40 |
| 448,000 to 510,000 | 62 | 1:100,000 | 160 | 8 | 32 | 80 | 40 | 160 |
| Total | | | | 67 | 319 | 228 | 169 | 783 |

1. Refer to Section 2.2.1 for relevant soil and land system reports for each area
2. Refer to Table 8 for details on each observation type.

This breakdown is indicative only, and is likely to change depending on what is encountered whilst on-site. Areas of broad soil units will require less intensive investigations as opposed to those areas that have a more complex landscape.

4.7 Data Collection

Data to be collected from ground observation sites will be in reference with the *Australian Soil Survey and Land Survey Field Handbook* (The National Committee on Soil and Terrain, 2009). An example soil description sheet is provided in Appendix D.

At all sites this data is to include; but is not limited to:

- ▶ Geo location;
- ▶ Land use management
- ▶ Landscape attributes (landform, vegetation, land degradation, erosion, scalds; etc.)
- ▶ Micro-relief
- ▶ Full morphological description or correlate to existing mapping with sites within the survey.

4.8 Full Morphological Descriptions

Full morphological descriptions will include collection and recording of the following details:

- ▶ Horizon depths;
- ▶ Horizon designation;
- ▶ Boundary distinctness;
- ▶ Field texture;
- ▶ Colour (Munsell colour chart);
- ▶ Mottles;
- ▶ Coarse fragments;
- ▶ Structure;
- ▶ Segregations; and
- ▶ Field tests (e.g. pH, salinity, dispersion).



4.9 Laboratory Analysis

Laboratory analysis will be undertaken by National Association of Testing Authorities (NATA) or Australian Soil and Plant Analysis Council (ASPAC) accredited laboratories. Different analytical suites will be adopted based on the site description. The proposed analytical suites for the *full morphological description with full analysis*; and *full morphological description with diagnostic analysis* sites are included below.

Full morphological description with full analysis

- ▶ pH, electrical conductivity, chloride (1:5 soil water ratio);
- ▶ Exchangeable cations, cation exchange capacity, and exchangeable sodium percentage:
 - If pH is equal to or greater than 7.0 the alcoholic cations method for exchangeable cations will be used;
 - If pH is less than <7.0, the aqueous cations method for exchangeable cations, will be used, and the sodium value adjusted for soluble sodium.
- ▶ If pH < 5.5 (i.e. strongly acid soils), exchangeable acidity, exchangeable aluminium and DTPA iron and manganese will be tested;
- ▶ Particle size analysis (this may be captured within the Geotechnical investigation);
- ▶ Fertility suite (macro and micronutrients) – topsoil only; and
- ▶ Organic carbon, total nitrogen, available P - topsoil only.

Full morphological description with diagnostic analysis

Adequate subsoil chemical analysis (diagnostic sampling) will be undertaken to identify and classify the soils. This may include but is not limited to:

- ▶ pH, electrical conductivity, chloride (1:5 soil water ratio);
- ▶ Exchangeable cations, cation exchange capacity, and exchangeable sodium percentage:

4.10 Sample Collection Protocol

Standard sample depths are 0-10, 20-30, 50-60, 80-90, 110-120, 140-150, 170-180 cm particularly for uniform or gradational soils. However, these depths are modified to ensure that significant horizon boundaries are not crossed in the sample e.g. an A2/B1 boundary.

In collecting samples the following practices will be required to be adopted:

- ▶ Samples should not span significant horizon boundaries;
- ▶ Samples should not be bulked between sites;
- ▶ No sample interval should exceed 30 cm;
- ▶ Samples must be from a detailed profile description site;
- ▶ Samples for chemical analysis will be placed into zip locked bags and approximately 500 grams will be required to adequately analyse the sample.



4.11 Excavation of Test Pits and Drilling of Soil Bores

Site descriptions may be made from either augered holes, undisturbed cores or excavated pits. Pits or cores are preferred to manually or mechanically augered holes, as a more accurate representation of horizon depths is obtained and soil features such as structure are preserved for inspection.

Generally soil profile descriptions are to be depths of 1.2-1.8 m unless refusal occurs. At hill slope sites soils will be described to bedrock (C or R horizon) where soil depth is <2 m. Approximately 80% of the total number of ground observations will require some level of excavation / drilling.

Where an excavator or drill rig is used a licensed contractor will be subcontracted to undertake the works under the supervision of a suitably qualified environmental / soil scientist.

4.12 Reporting

A soil report(s) will be prepared that includes descriptions of the soil landscape units, figures of the soil distributions, laboratory results, soil classifications, and landscape details, limitations and constraints, and recommendations.

The soils report is a factual report detailing the findings of the soil study, a skeleton Table of Contents is provided in Appendix E.

Findings of the soil study will be used to inform the development of Erosion and Sediment Control Plans (ESCP), Rehabilitation Management Plans (RMP), Construction Environmental Management Plans (CEMP), and Soil Management Plans (SMP).

Soil Management Plans are expected to be a requirement within the Environmental Authority License Conditions for this project. An example of such license conditions is provided below:

The holder of this environmental authority must develop and implement soils management procedures for areas to be disturbed prior to commencement of activities in these areas to prevent or minimise the impacts of soil disturbance. These procedures must include but not be limited to:

- a) the establishment of baseline soils information for areas to be disturbed including soil depth, pH, electrical conductivity (EC), chloride, cations (calcium, magnesium and sodium), exchangeable sodium percentage (ESP), particle size and soil fertility (including nitrogen, phosphorous, potassium, sulphur and micronutrients);*
- b) the identification of baseline soil units at a scale of 1:100,000 for areas to be disturbed in accordance with the Guidelines for Surveying Soil and Land Resources, 2nd Edition (McKenzie et al. 2008), Australian Soil and Land Survey Handbook, 3rd Edition (National Committee on Soil and Terrain 2009) and The Australian Soil Classification (Isbell 2002);*
- c) the development of soil descriptions that are relevant to assessment for agricultural suitability, topsoil assessment, erodibility and rehabilitation, for example:*



- i. shallow cracking clay soils;*
- ii. deep cracking clay soils;*
- iii. deep saline and / or sodic cracking clay soils with melon holes;*
- iv. thin surface, sodic duplex soils; .*
- v. medium to thick surface (>15 cm), sodic duplex soils; and*
- vi. non-sodic duplex soils.*
- d) Assessment of the potential impacts of the activity with appropriate mitigation measures and construction methods applicable to the identified soil types or landforms;*
- e) Identification by ground truthing of all sensitive soil and landform areas along the pipeline corridor including Good Quality Agricultural Land and Strategic Cropping Land;*
- f) Measures to protect and restore any Good Quality Agricultural Land and land that could qualify as Strategic Cropping Land under the Government's Protecting Queensland's strategic cropping land - A policy framework, August 2010;*
- g) A soils monitoring program outlining the parameters to be monitored, frequency of monitoring and maximum limits for each parameter;*
- h) Detailed mitigation measures and procedures to manage the risk of adverse soil disturbance in the carrying out of the activity; and*
- i) For areas of good quality agricultural land, detailed methods to be undertaken to minimise potential impacts.*

Both the reports produced following the soil study and the ESCP, CEMP, RMP and SMP's that will be developed based on the information gathered during the field survey, will be required to be submitted to DERM for review and depending on the document, approval will be required, prior to works proceeding

4.12.1 Mapping

The mapping exercise following the field work will develop Unique Mapping Areas (UMA's) which will reflect variations in geology, landform, drainage, and vegetation along the alignment¹. Each delineated UMA is presumed to be unique until an explicit classification proves it be some sense similar or identical to other tracts. A UMA is an area of land where the attribute values are sufficiently uniform or distinct from neighbouring areas to justify its delineation.

Soil types should be grouped by parent material and position in the landscape with examples including:

- shallow, stony loamy soil;

¹ Different soil types could be expected on the crests and upper slopes, middle slopes and lower slopes of different lithology's (basalt, granite, sandstone, mudstone, etc.), as well as in narrow drainage flats, floodplains, relict alluvial plains, and river levees.



- shallow cracking clay;
- deep cracking clay;
- deep saline and/or sodic cracking clay;
- deep saline and/or sodic cracking clay with melon holes;
- shallow non-cracking clay;
- deep non-cracking clay;
- deep saline and/or sodic non-cracking clay;
- loamy surface, non-sodic duplex soil;
- thin surface, sodic duplex soil;
- medium to thick surface (>15 cm), sodic duplex soil; and
- massive gradational textured soil.

All maps will follow cartographic conventions, and include the following:

- Scale for polygonal data, cell size and scale for rasters
- North arrow
- MGA grid
- Appropriate locality data e.g. towns, administrative boundaries
- Legend
- Due reference to data sources and currency of data
- Date of preparation
- Statement of any limitations of the data/map e.g. related to scale, accuracy, reliability;
- Location of soil profile descriptions and sampling sites must always be provided on a suitable map e.g. soil/landscape map.



5. References

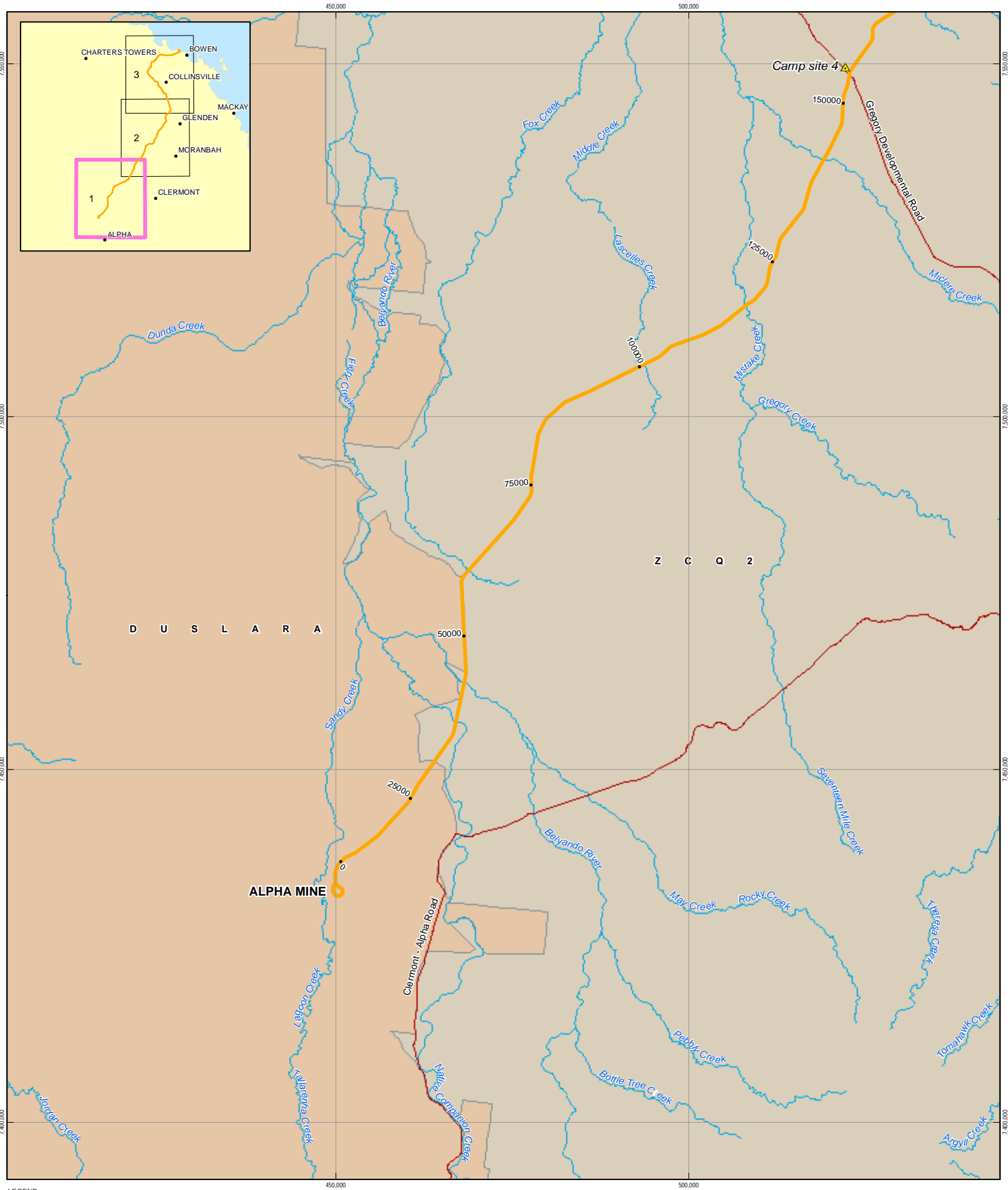
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Appendix A

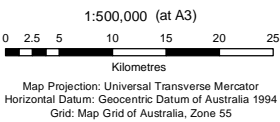
Figures

- Figure 1 Existing Soil and Land System Mapping Coverage**
- Figure 2 Preliminary Mapping Units**
- Figure 3 Australian Soils Classification (Queensland Combined Soils Database Mapping)**



- LEGEND**
- Town
 - Camp
 - Marshalling Yards
 - Construction Depot
 - Proposed Alignment
 - State Road
 - Existing Railway
 - Watercourse
 - Waterbody
- Relevant Soil Survey and Land System Reports**
- BER: Soils of the Elliot River, Bowen Area - 1:100,000
 - BSA: Soils of the Lower Burdekin Valley, North Queensland, Redbank Creek to Bob's Creek and South to Bowen River - 1:100,000
 - DUSLARA: The Desert Uplands Strategic Land Resource Assessment Database - 1:100,000
 - ZCO2 - Lands of the Nogoa Belyando Resource Area 1967 - 1:100,000
 - ZEB: Soils of the Burdekin - Townsville Region - CSIRO Research Series - 1:1,000,000

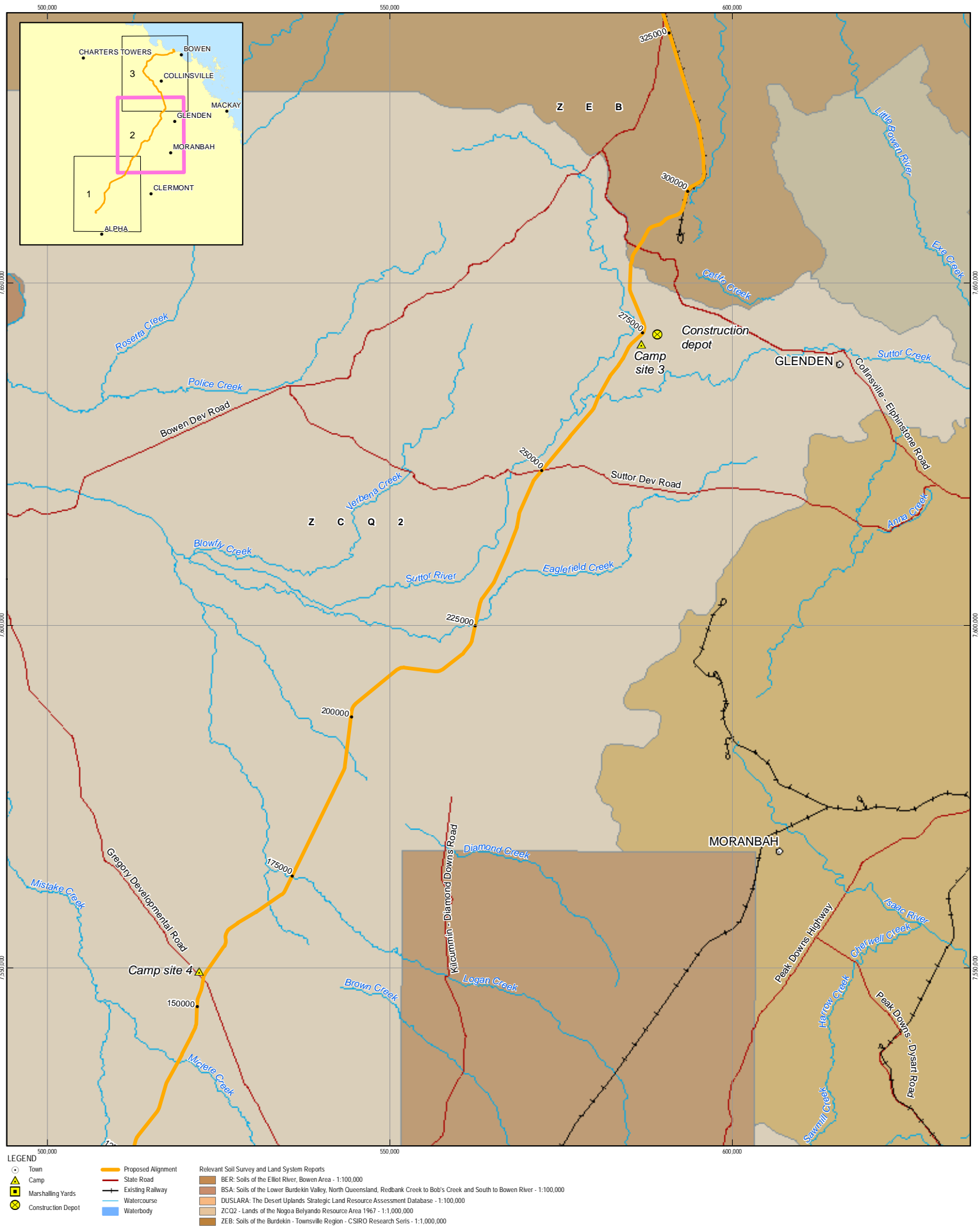
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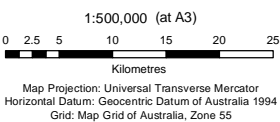
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Revision A
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Figure 1
Sheet 1 of 3



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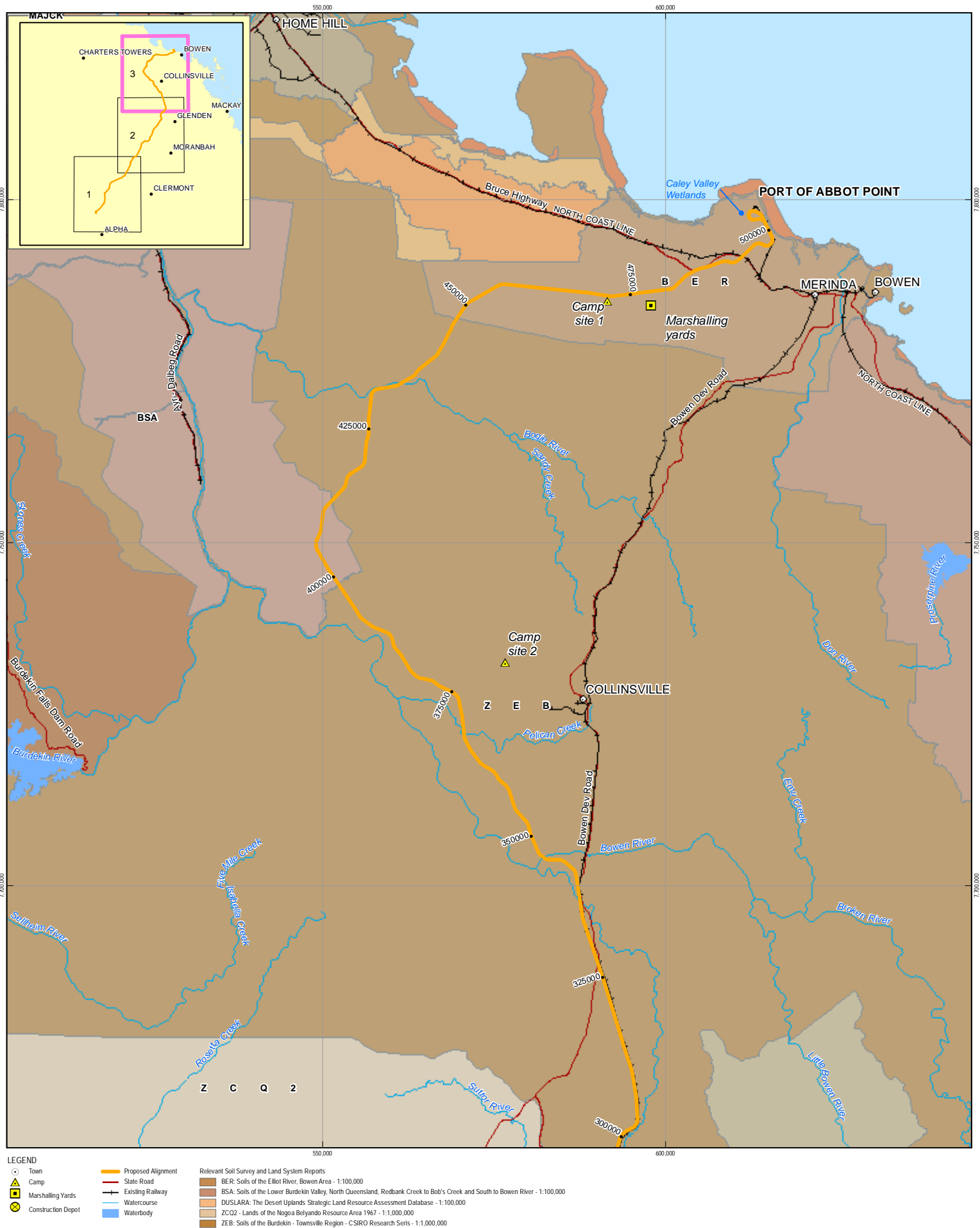
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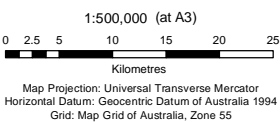
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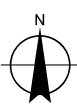
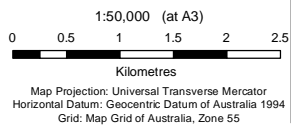
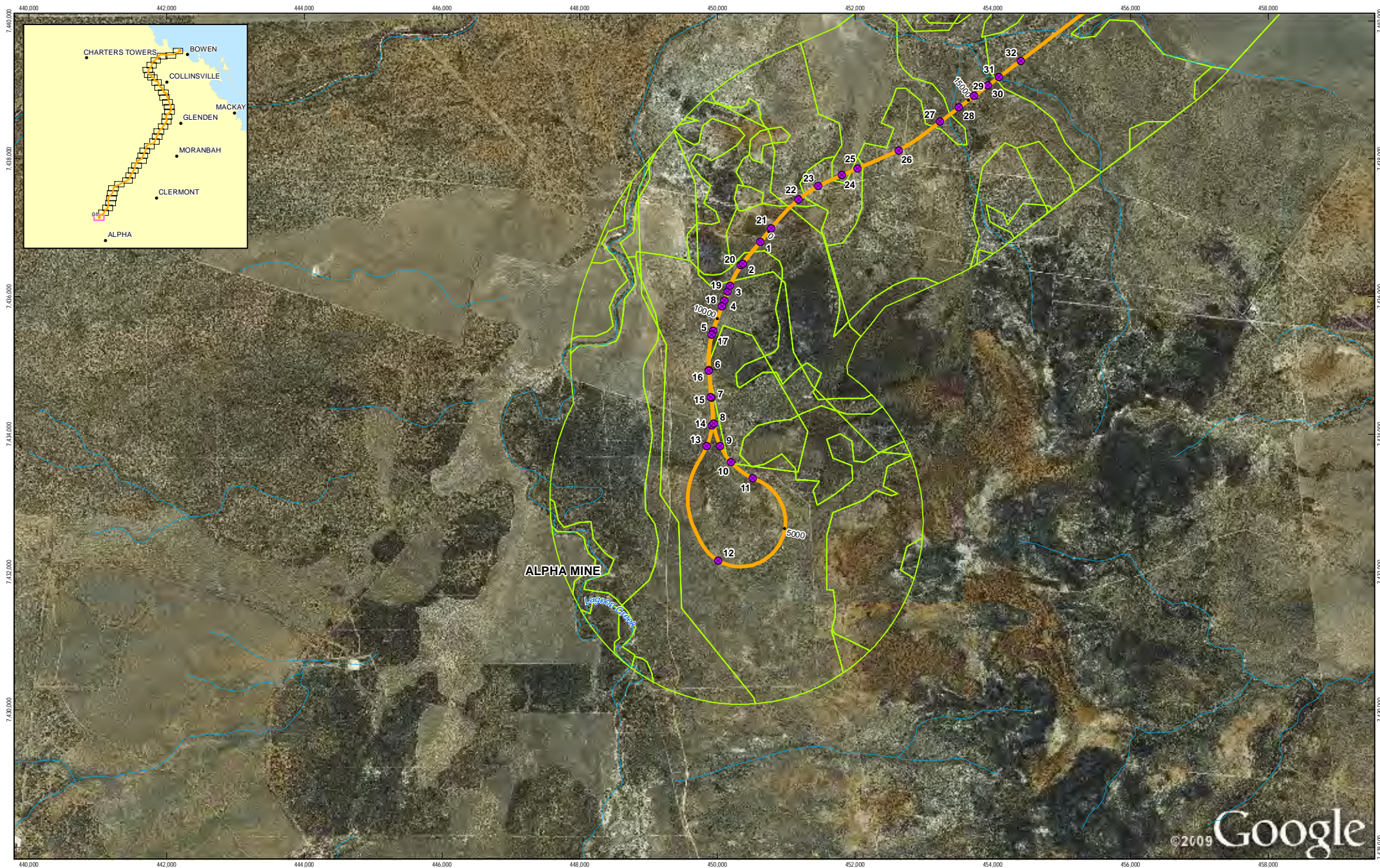
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LEGEND

- Town
- PMU Reference Number
- Camp
- Marshalling
- Yards
- Depot
- Proposed Alignment
- State Road
- Existing Railway
- Stream Network
- Preliminary Mapping Unit
- Waterbody

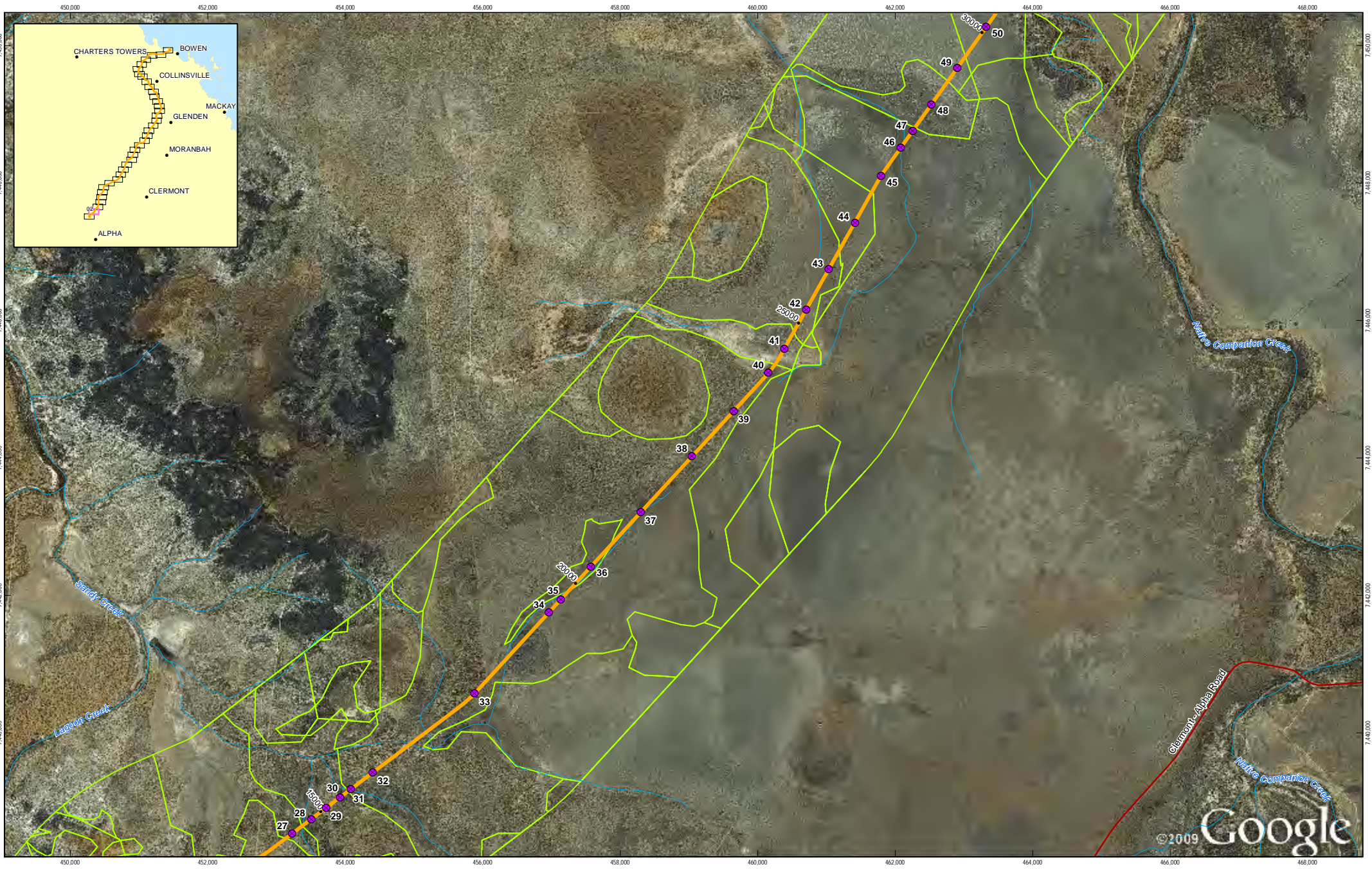
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Job Number 41-23742
Revision C
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Figure: 2
Sheet 1 of 37



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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55

N

Town

PMU Reference Number

Camp

Marshalling Yards

Depot

Proposed Alignment

State Road

Existing Railway

Stream Network

Preliminary Mapping Unit

Waterbody

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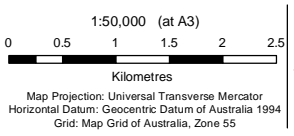
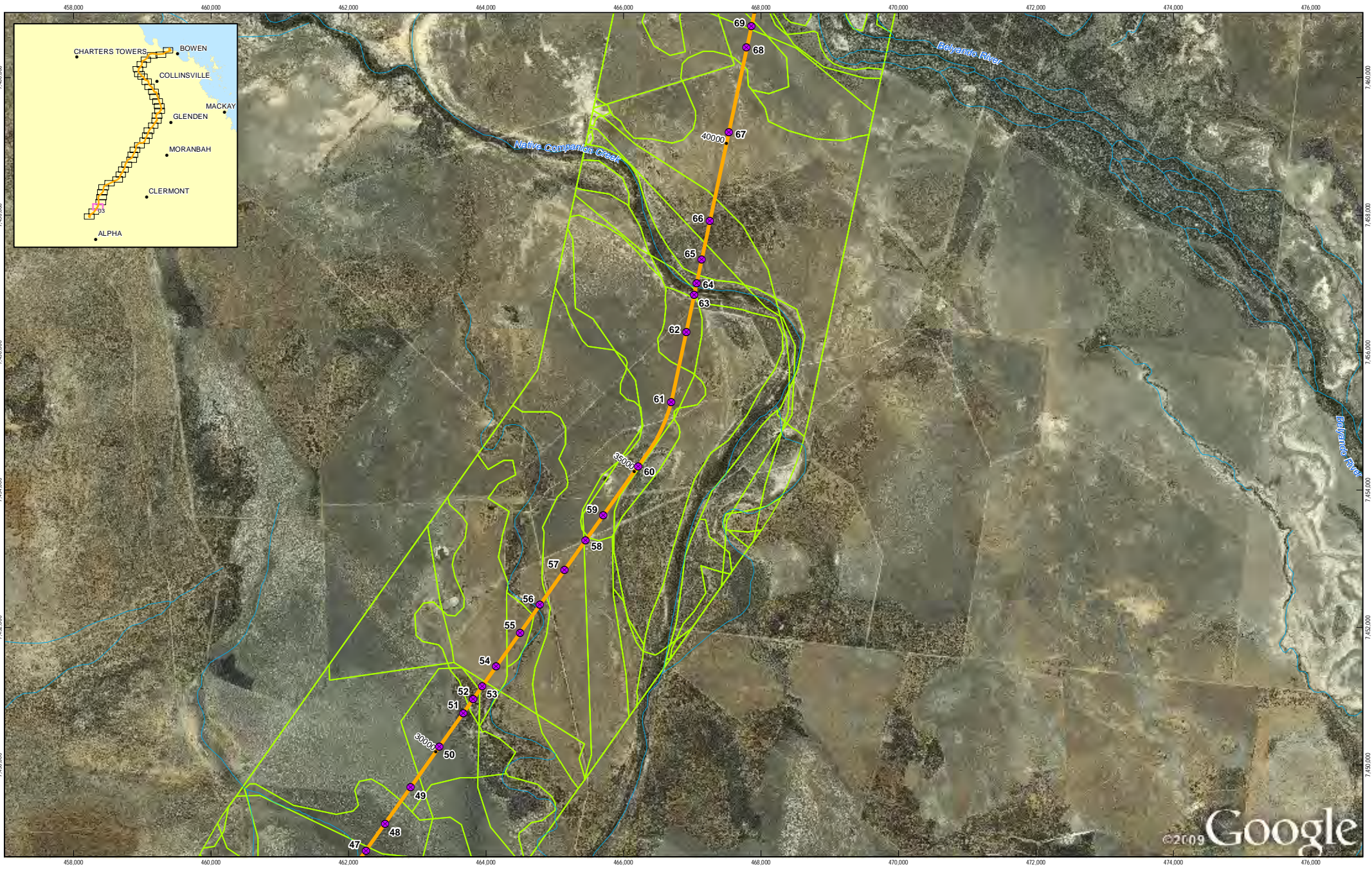
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- LEGEND**
- | | | |
|----------------------|--------------------|--------------------------|
| Town | Proposed Alignment | Preliminary Mapping Unit |
| PMU Reference Number | State Road | Waterbody |
| Camp | Existing Railway | |
| Marshalling | Stream Network | |
| Yards | | |
| Depot | | |
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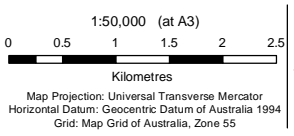
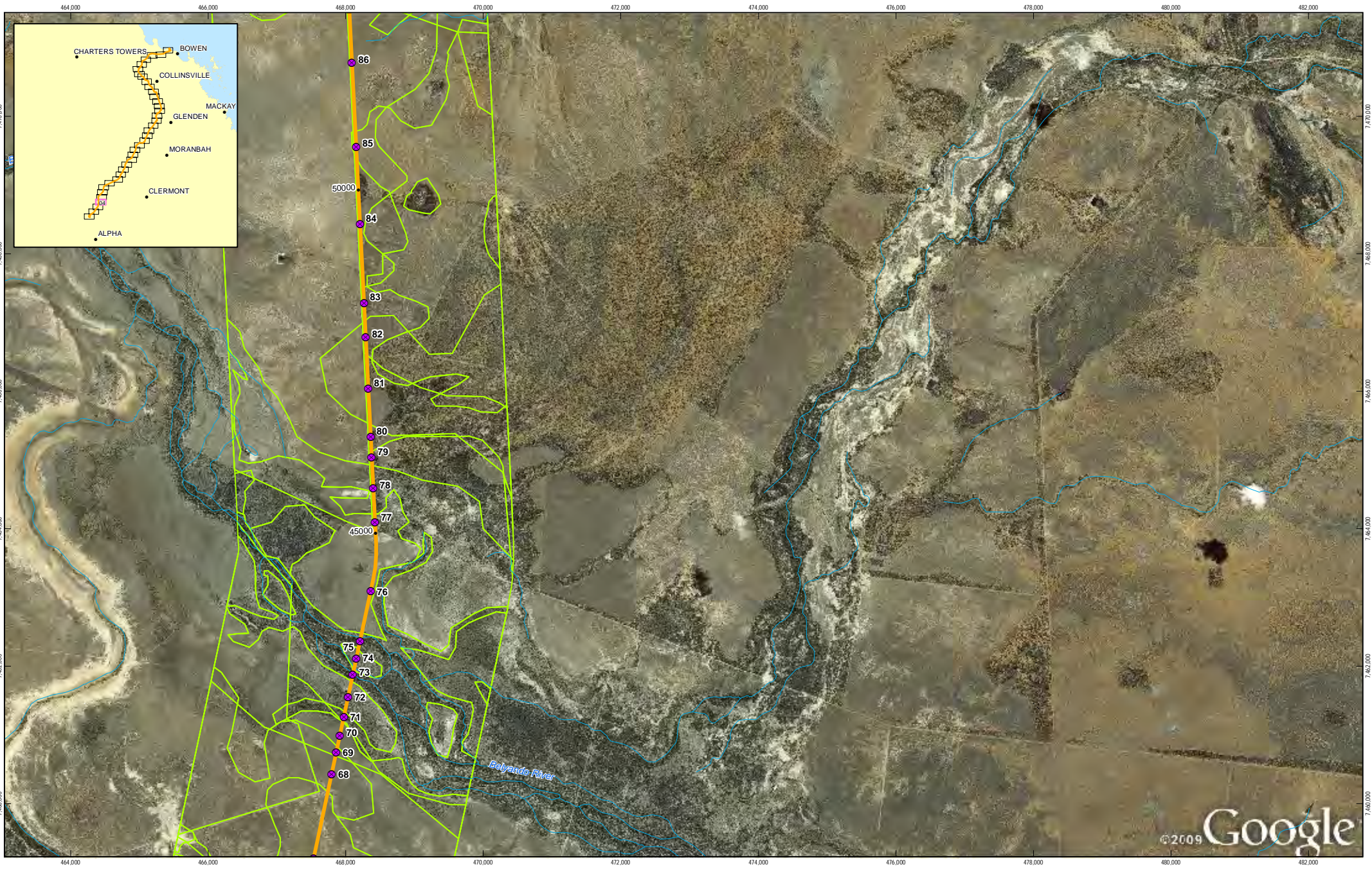
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- LEGEND**
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 - Camp
 - Marshalling Yards
 - Depot
 - Proposed Alignment
 - State Road
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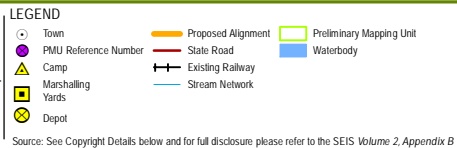
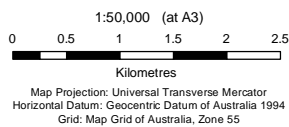
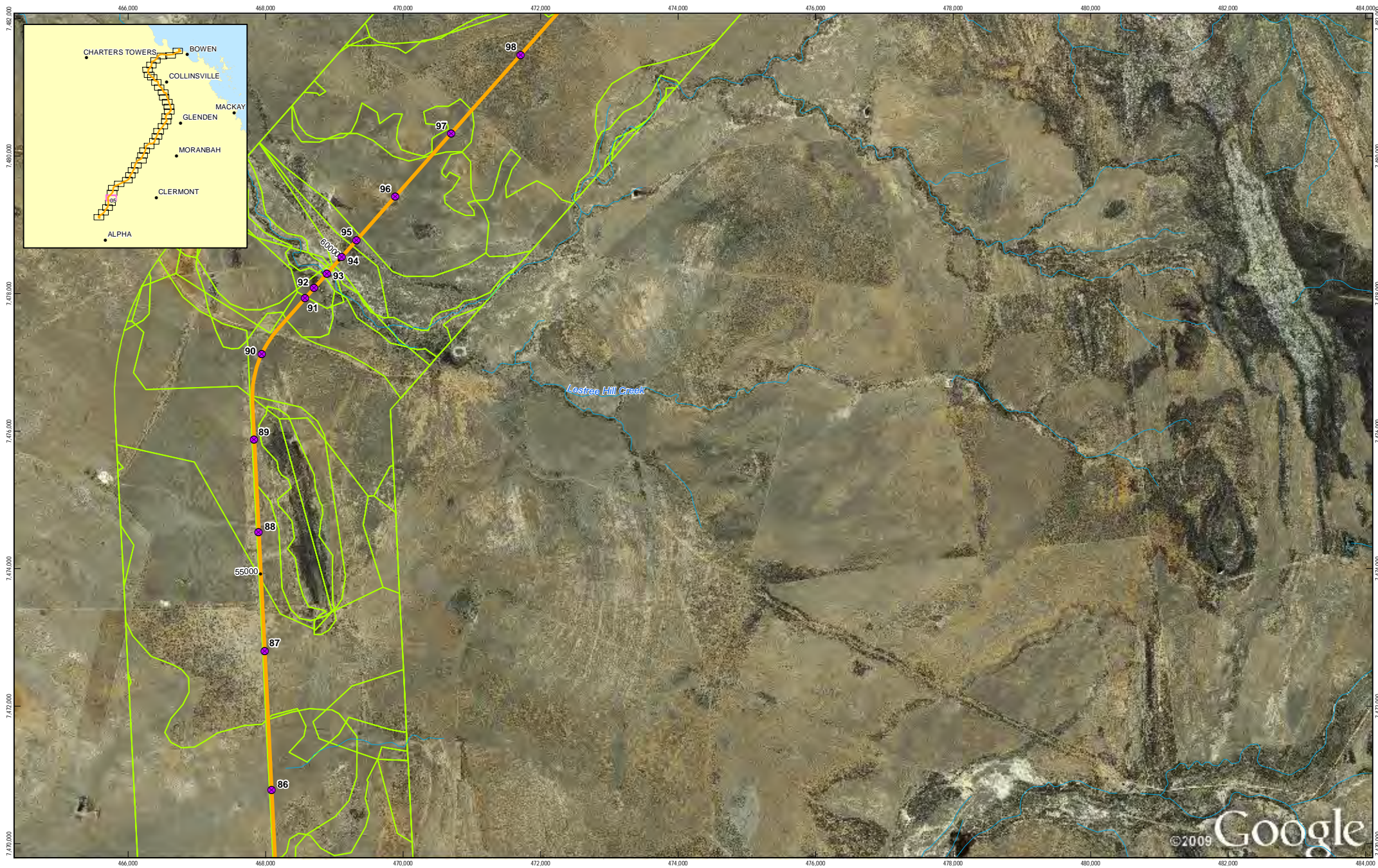
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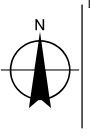
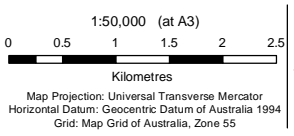
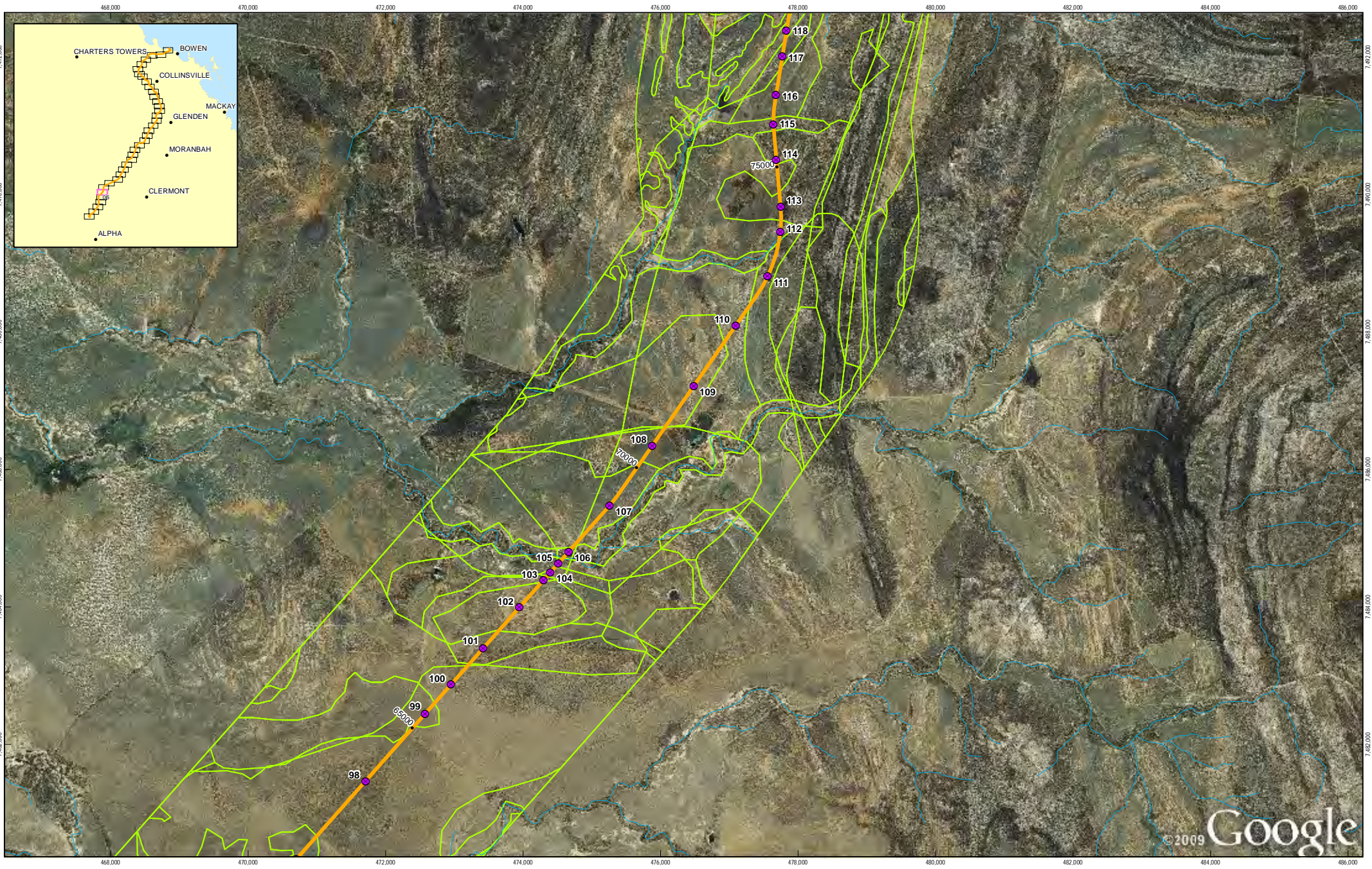
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- LEGEND**
- Town
 - PMU Reference Number
 - Camp
 - Marshalling
 - Yards
 - Depot
 - Proposed Alignment
 - State Road
 - Existing Railway
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 - Preliminary Mapping Unit
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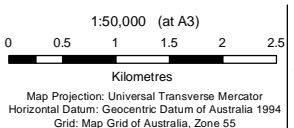
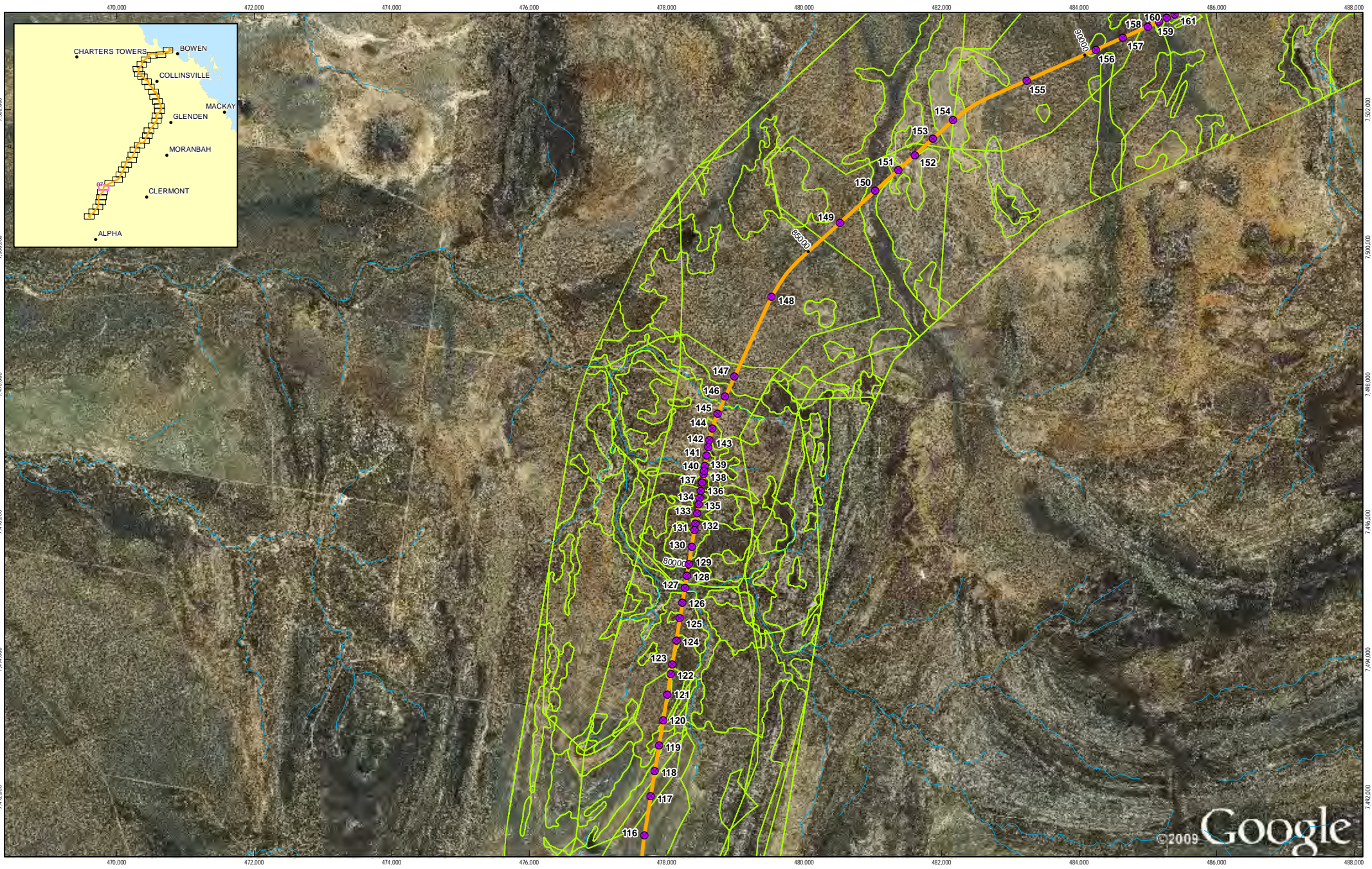
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LEGEND

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|----------------------|--------------------|--------------------------|
| Town | Proposed Alignment | Preliminary Mapping Unit |
| PMU Reference Number | State Road | Waterbody |
| Camp | Existing Railway | |
| Marshalling | Stream Network | |
| Yards | | |
| Depot | | |

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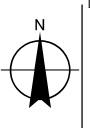
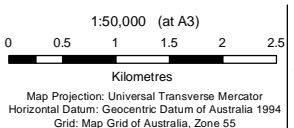
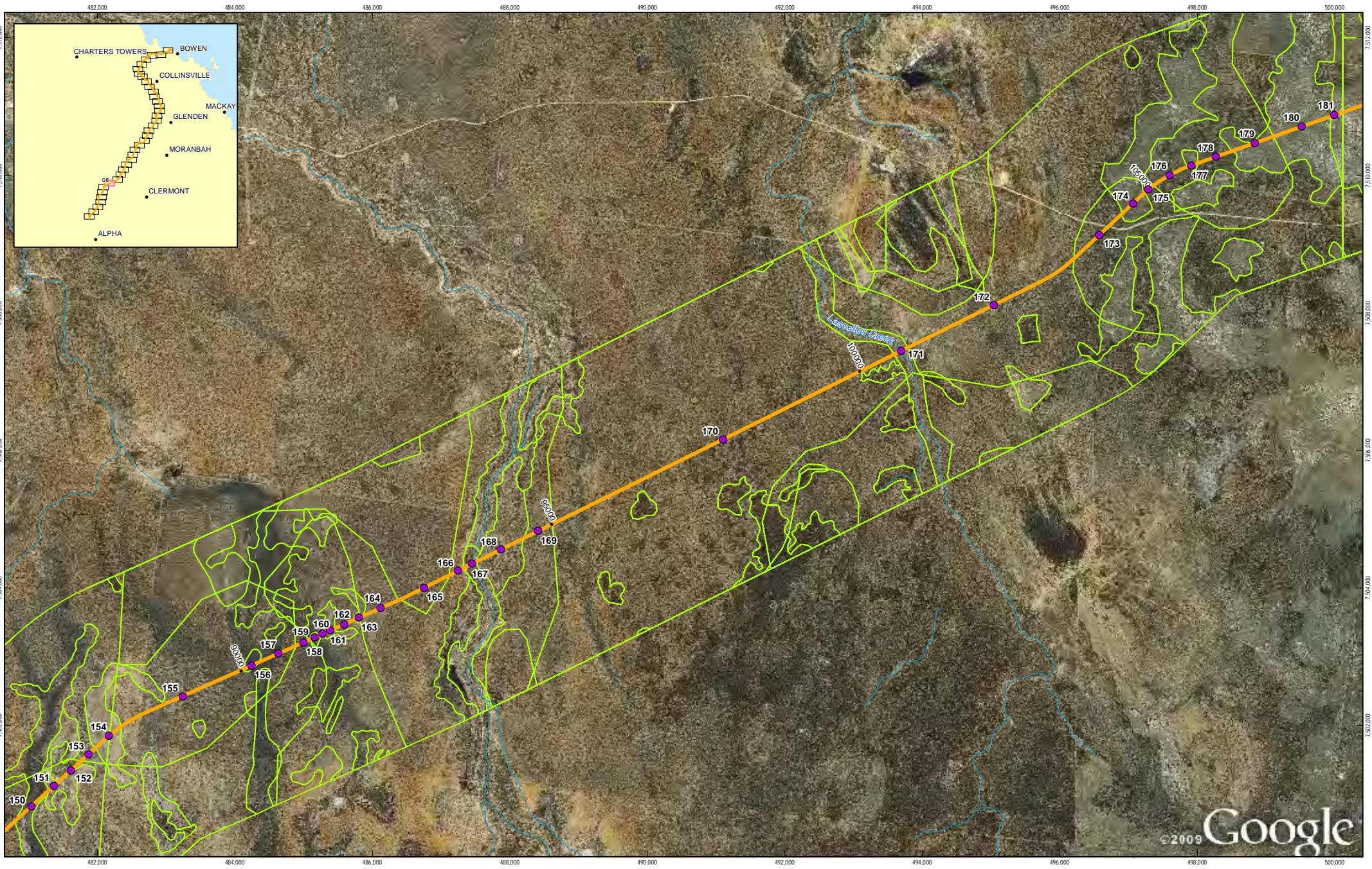
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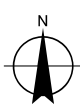
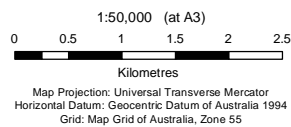
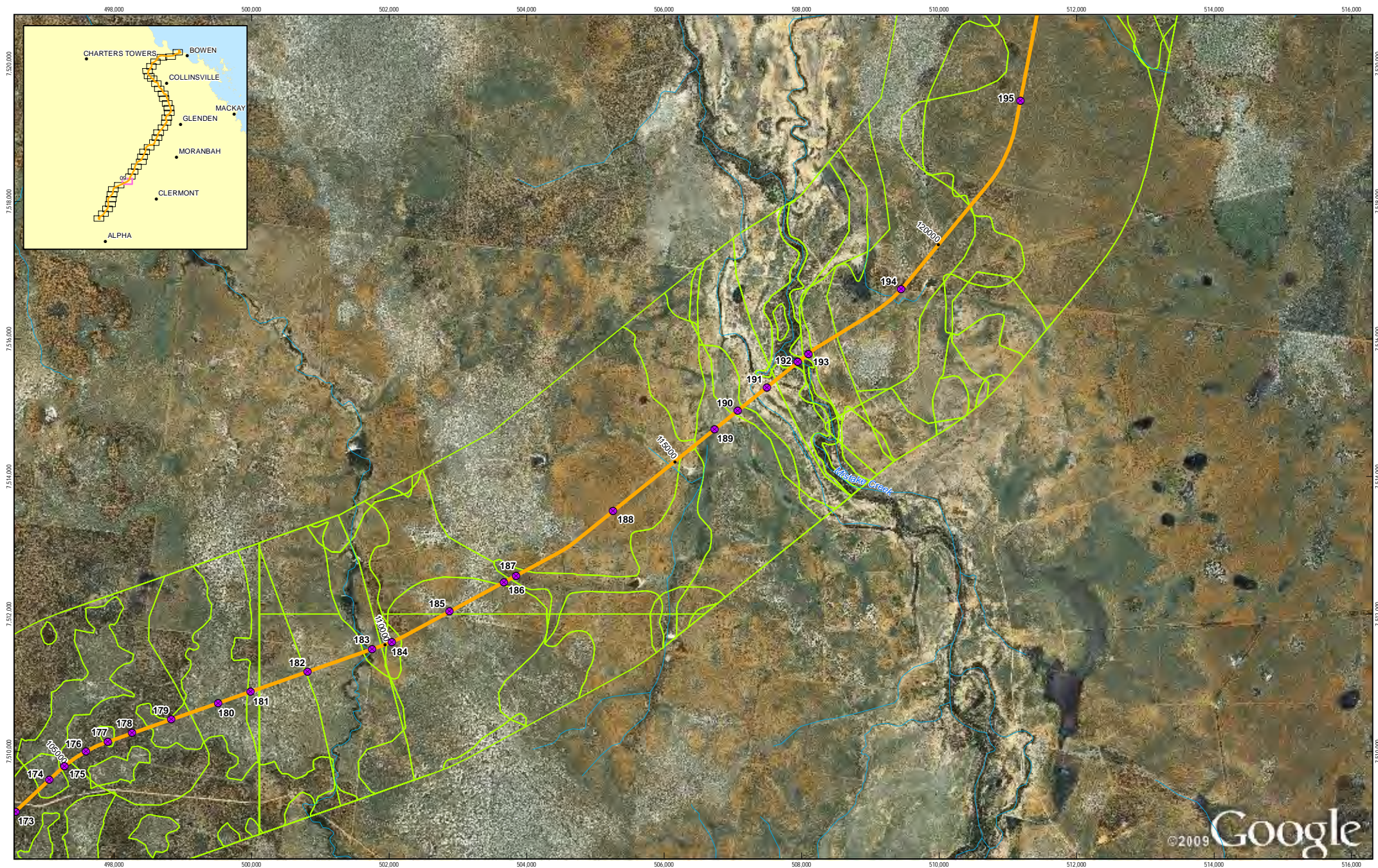
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LEGEND

- Town
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- ▲ Camp
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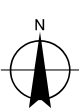
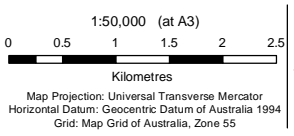
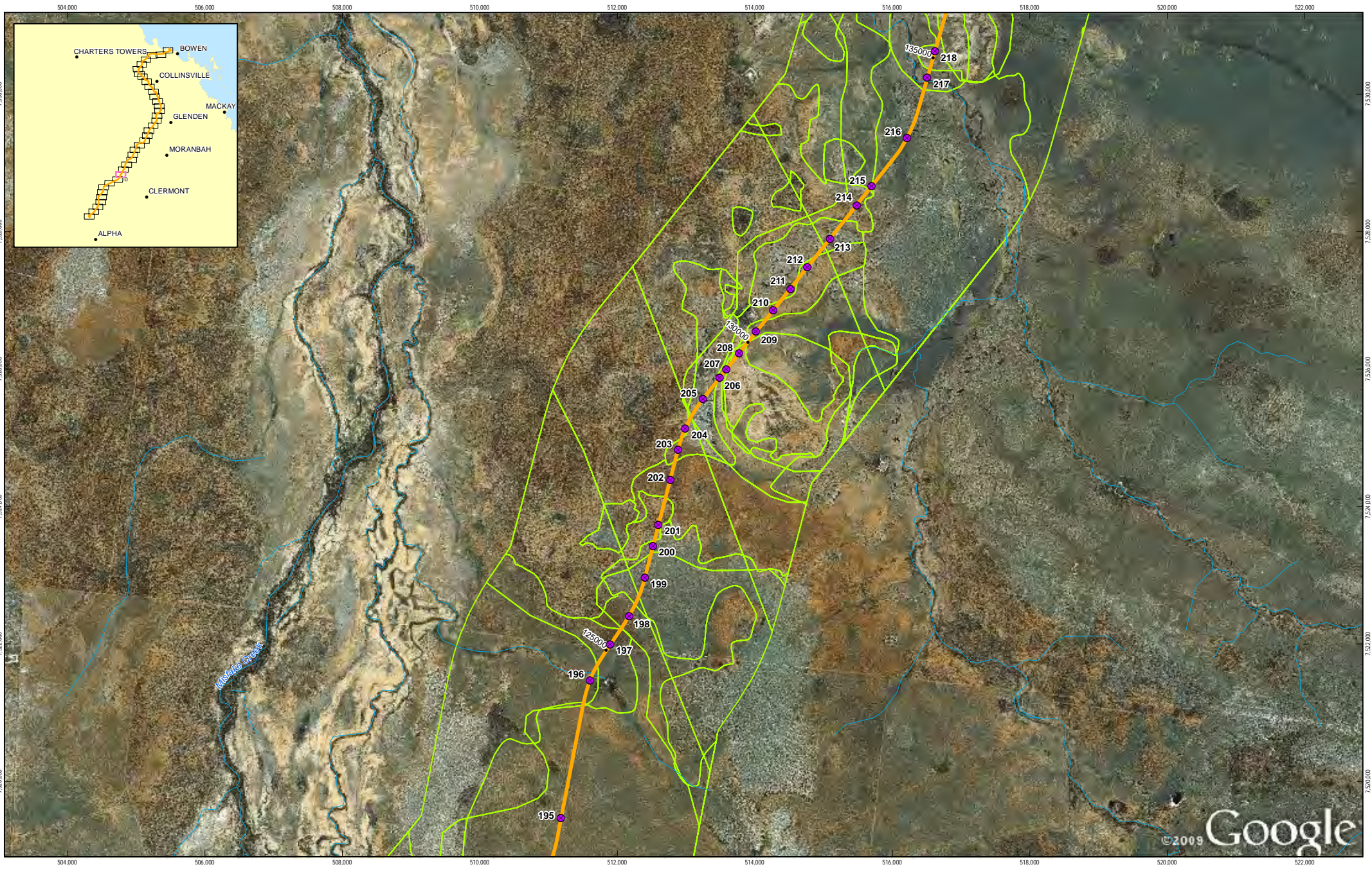
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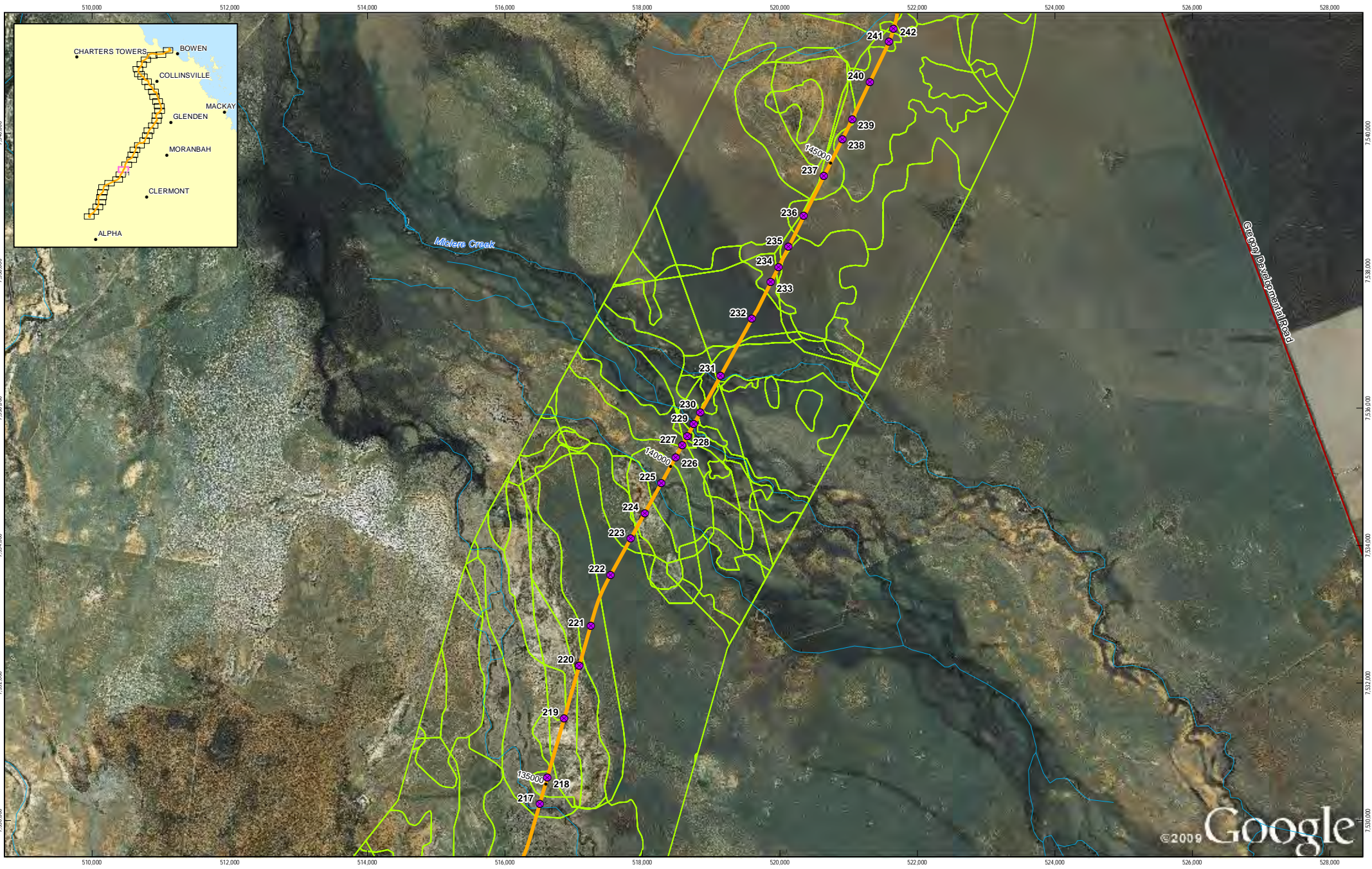
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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55

N

Town

PMU Reference Number

Camp

Marshalling

Yards

Depot

Proposed Alignment

State Road

Existing Railway

Stream Network

Preliminary Mapping Unit

Waterbody

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HANCOCK PROSPECTING PTY LTD

Alpha Coal Project

Supplementary Environmental Impact Statement

SOIL PRELIMINARY

MAPPING UNITS (PMU)

Job Number 41-23742

Revision C

Date 26-07-2011

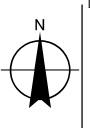
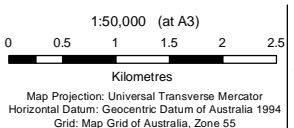
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- LEGEND**
- Town
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 - Camp
 - Marshalling Yards
 - Depot
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Alpha Coal Project
Supplementary Environmental Impact Statement

SOIL PRELIMINARY MAPPING UNITS (PMU)

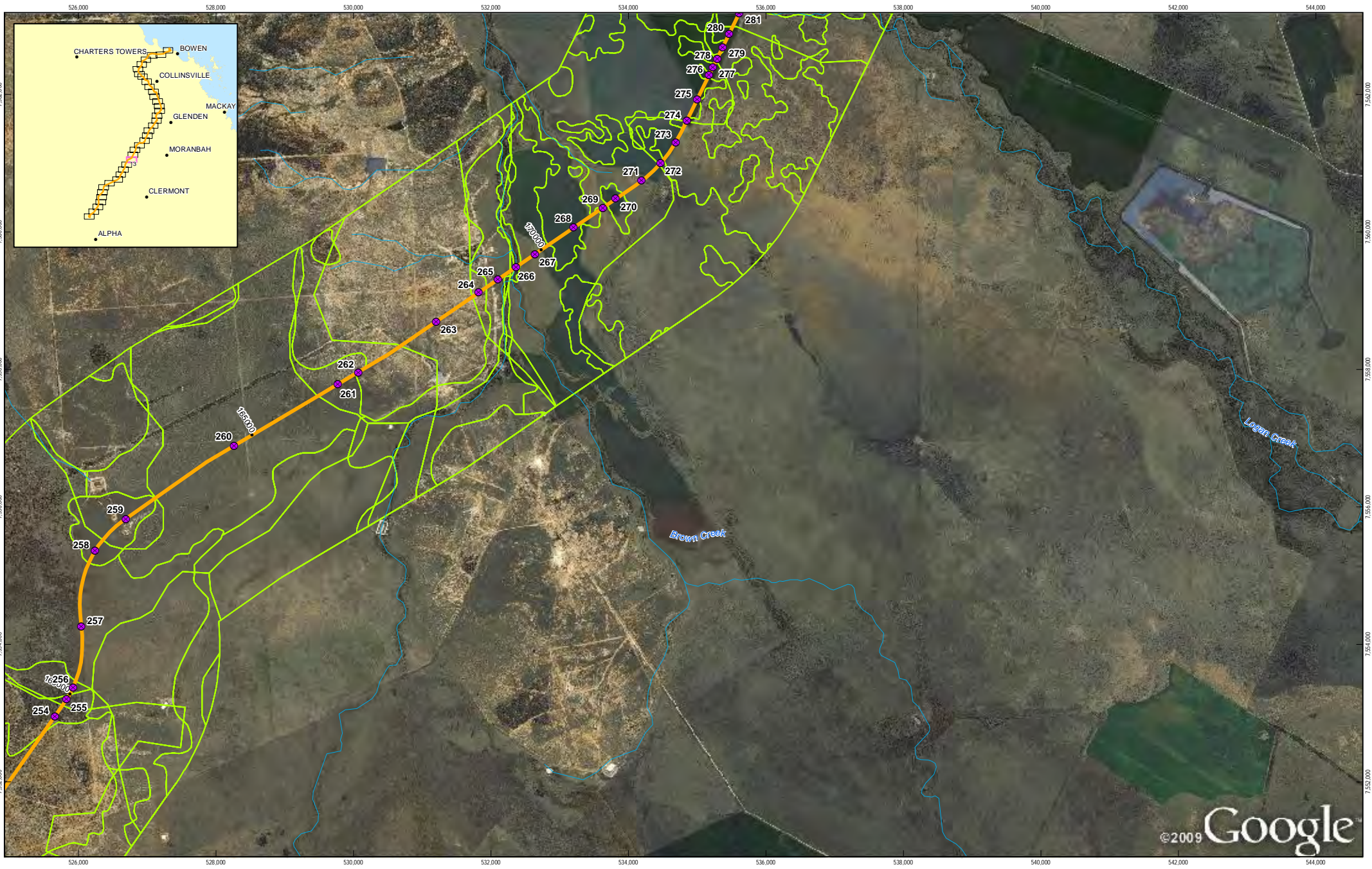
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Kilometres

Map Projection: Universal Transverse Mercator

Horizontal Datum: Geocentric Datum of Australia 1994

Grid: Map Grid of Australia, Zone 55

N

▲

● Town

● PMU Reference Number

▲ Camp

▲ Marshalling Yards

● Depot

— Proposed Alignment

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HANCOCK PROSPECTING PTY LTD

Alpha Coal Project

Supplementary Environmental Impact Statement

SOIL PRELIMINARY

MAPPING UNITS (PMU)

Job Number 41-23742

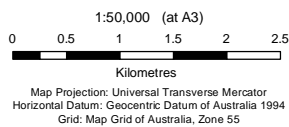
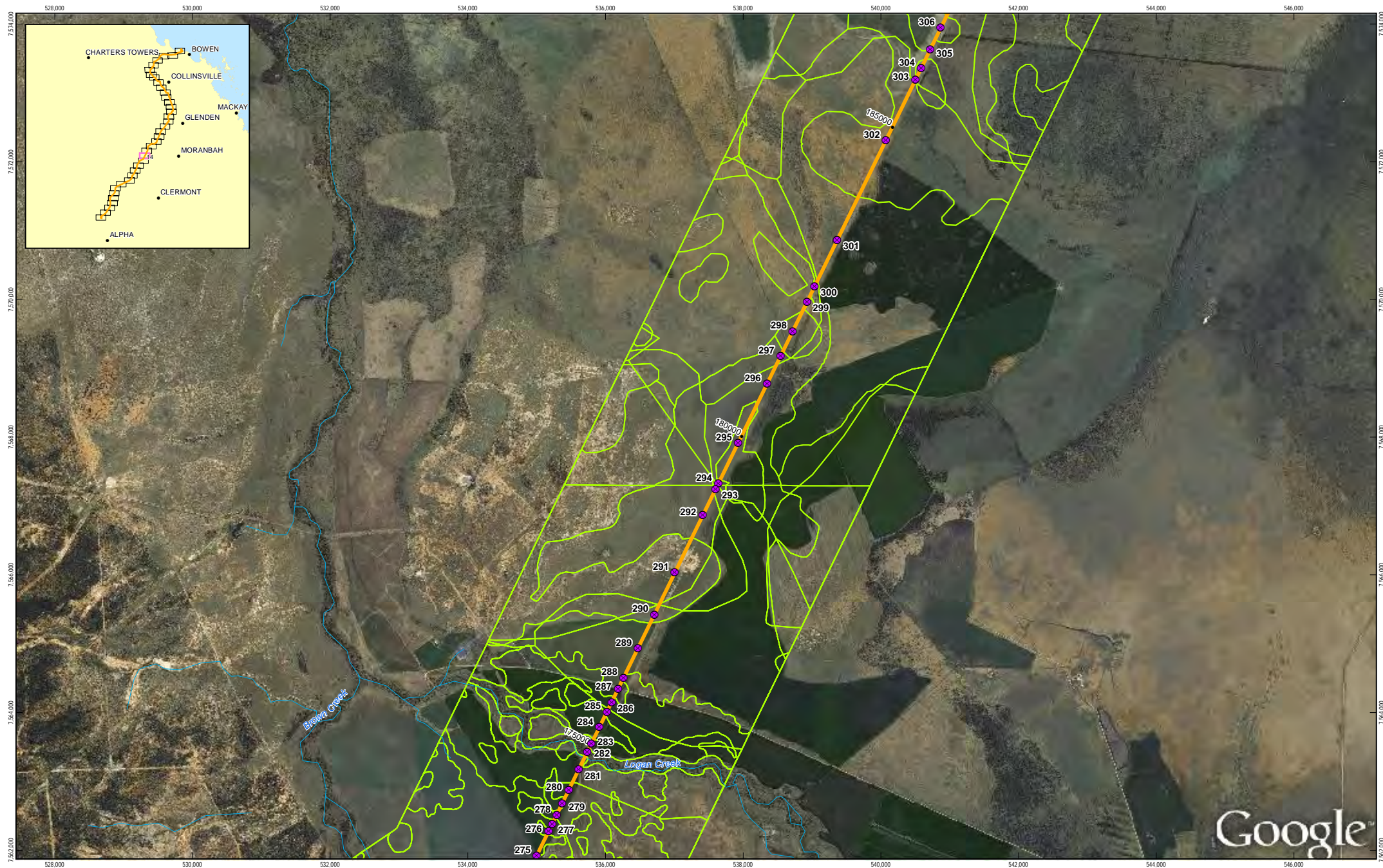
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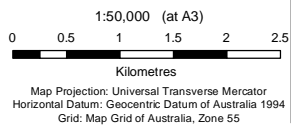
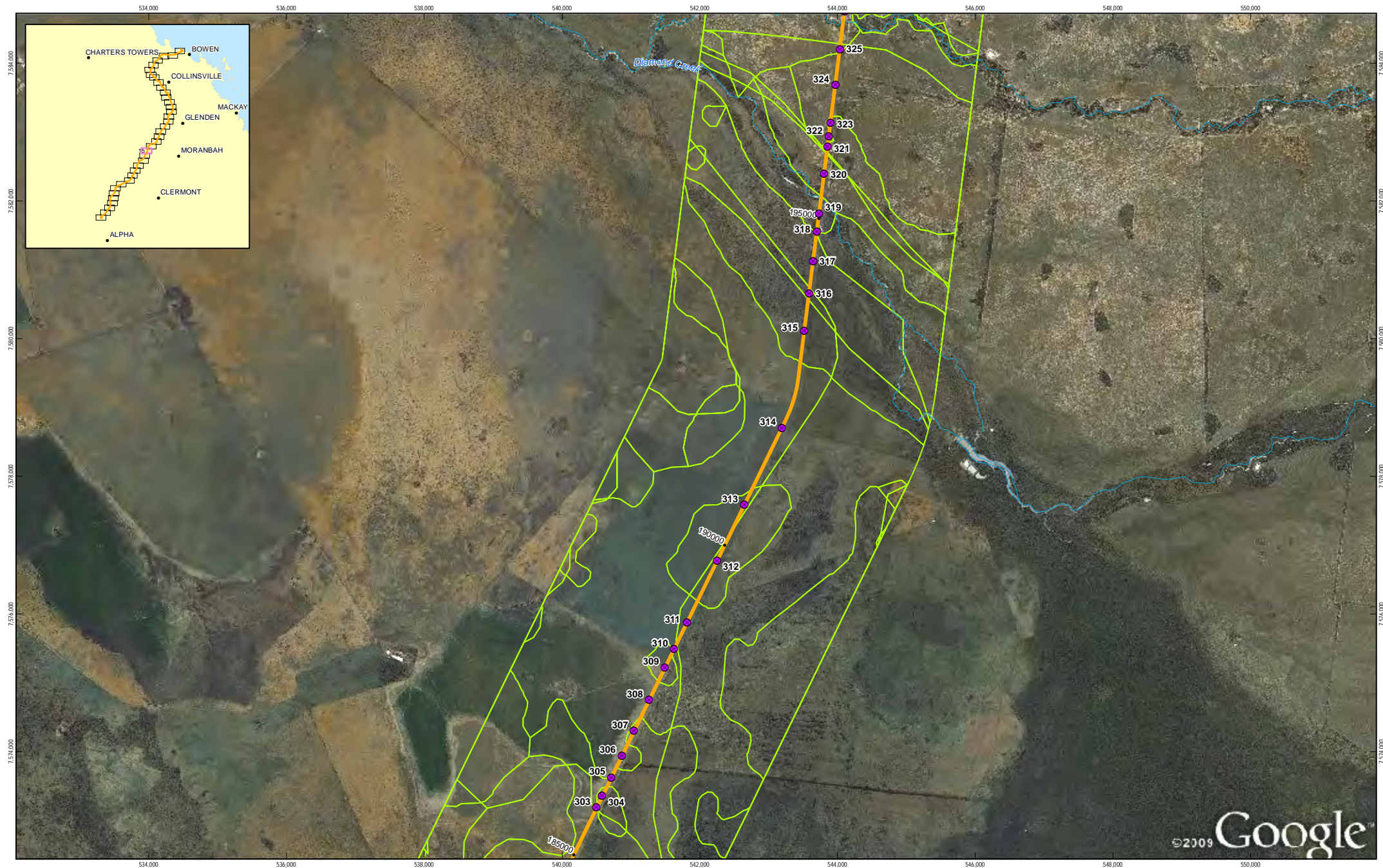
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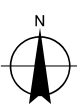
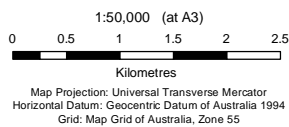
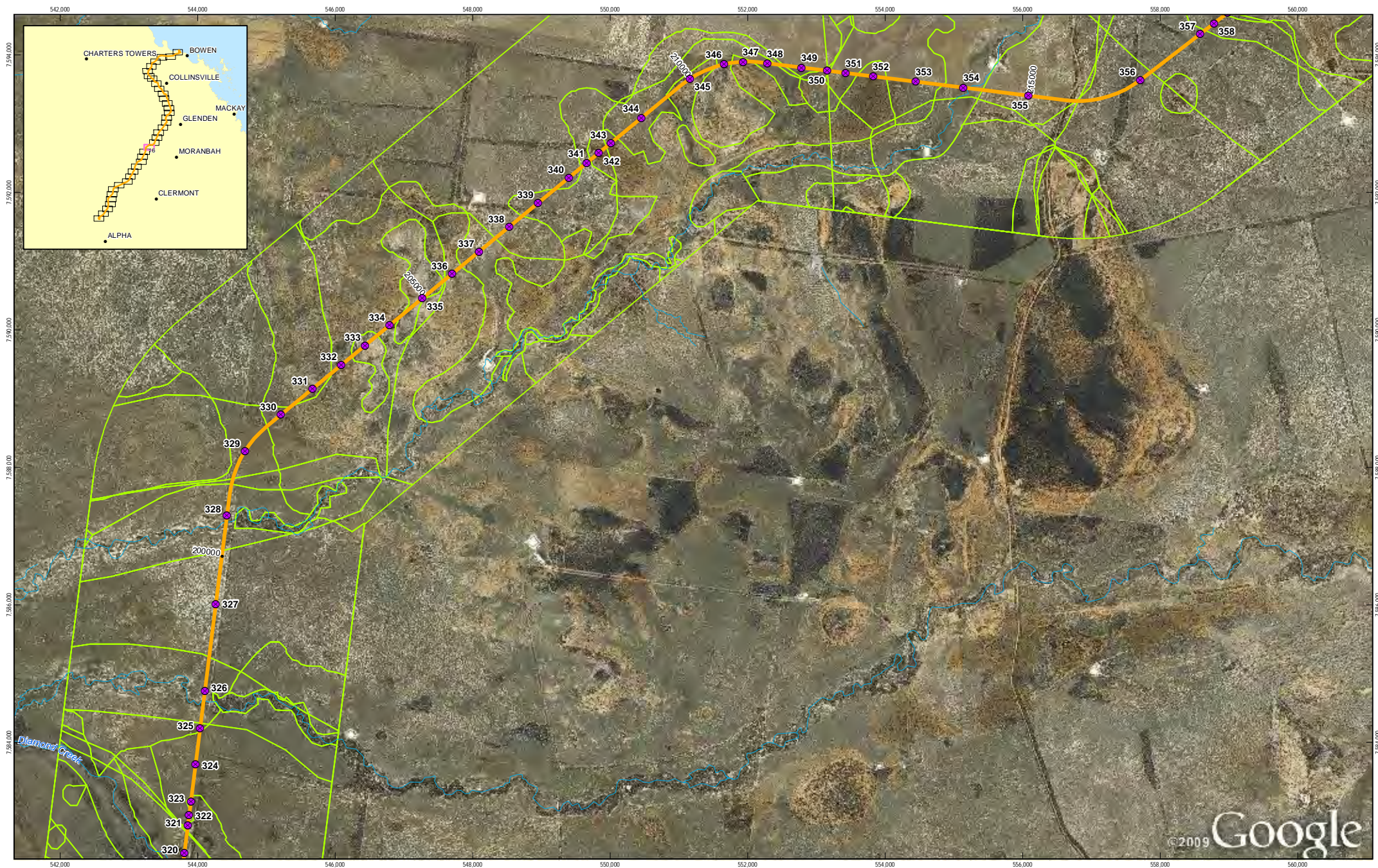
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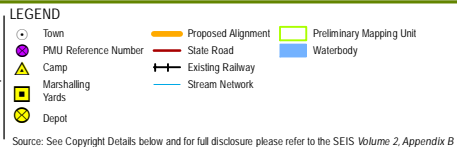
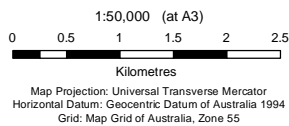
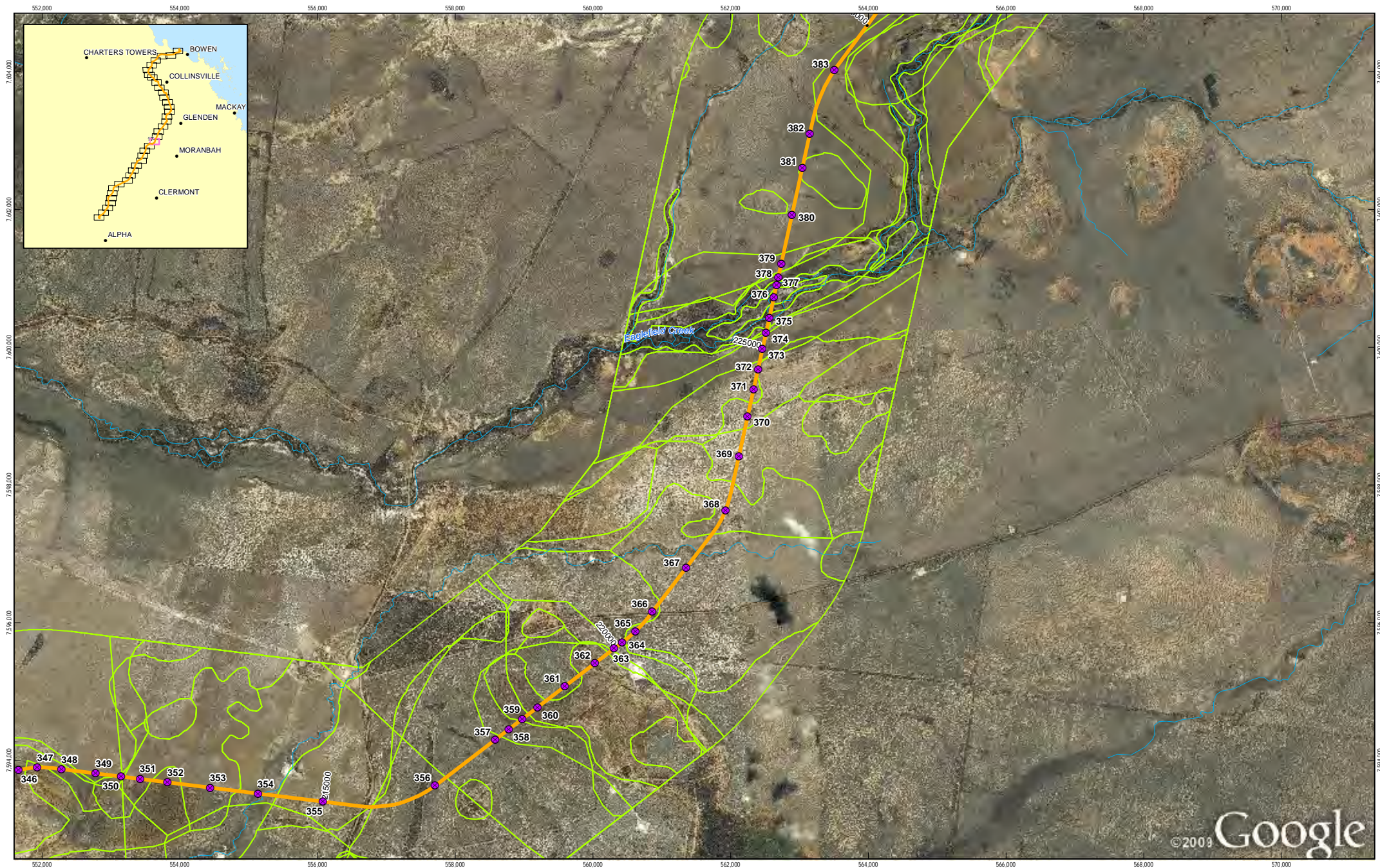
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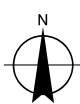
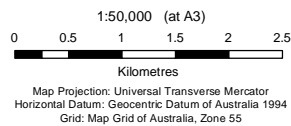
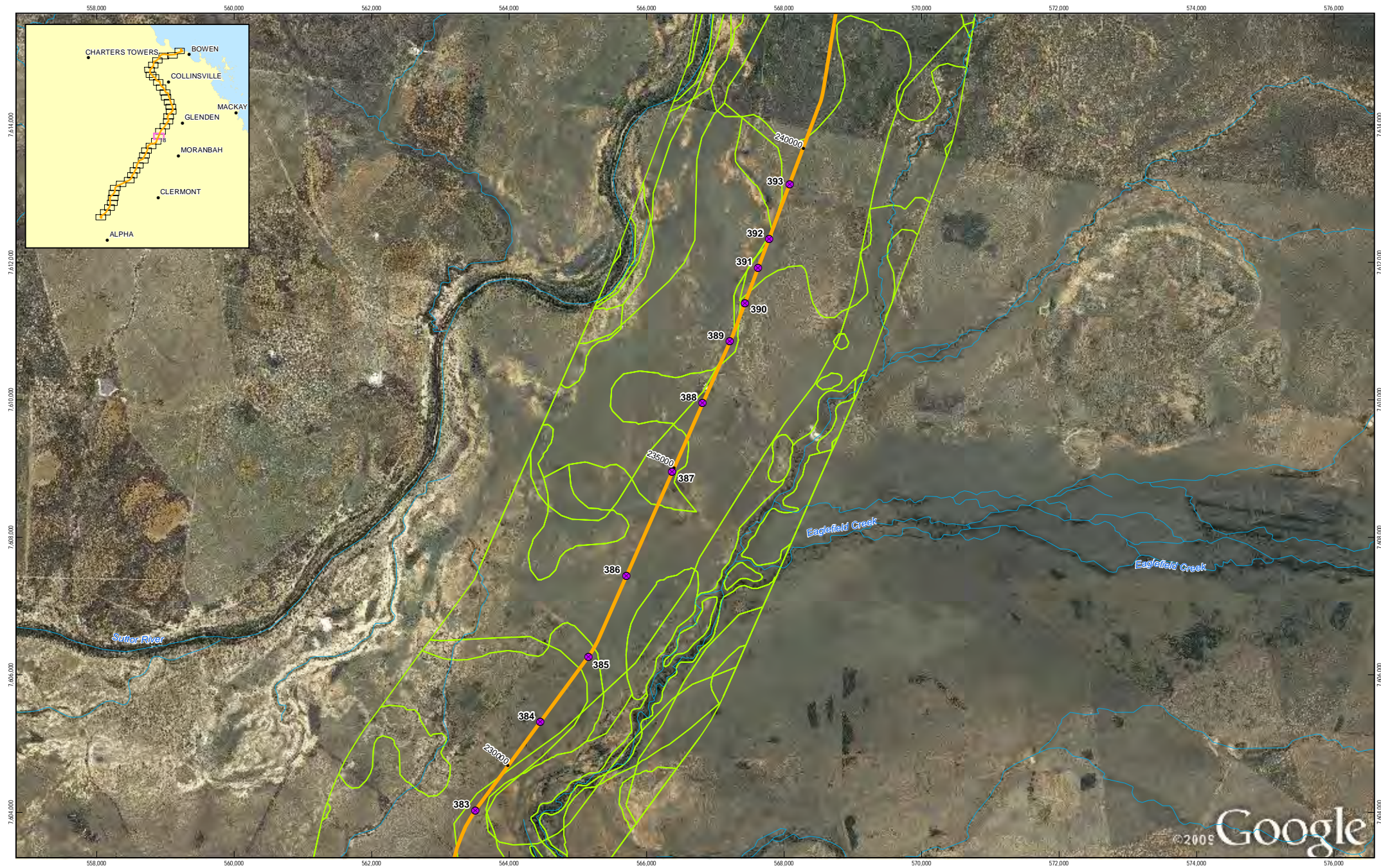
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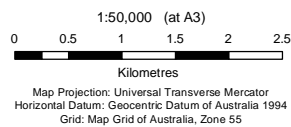
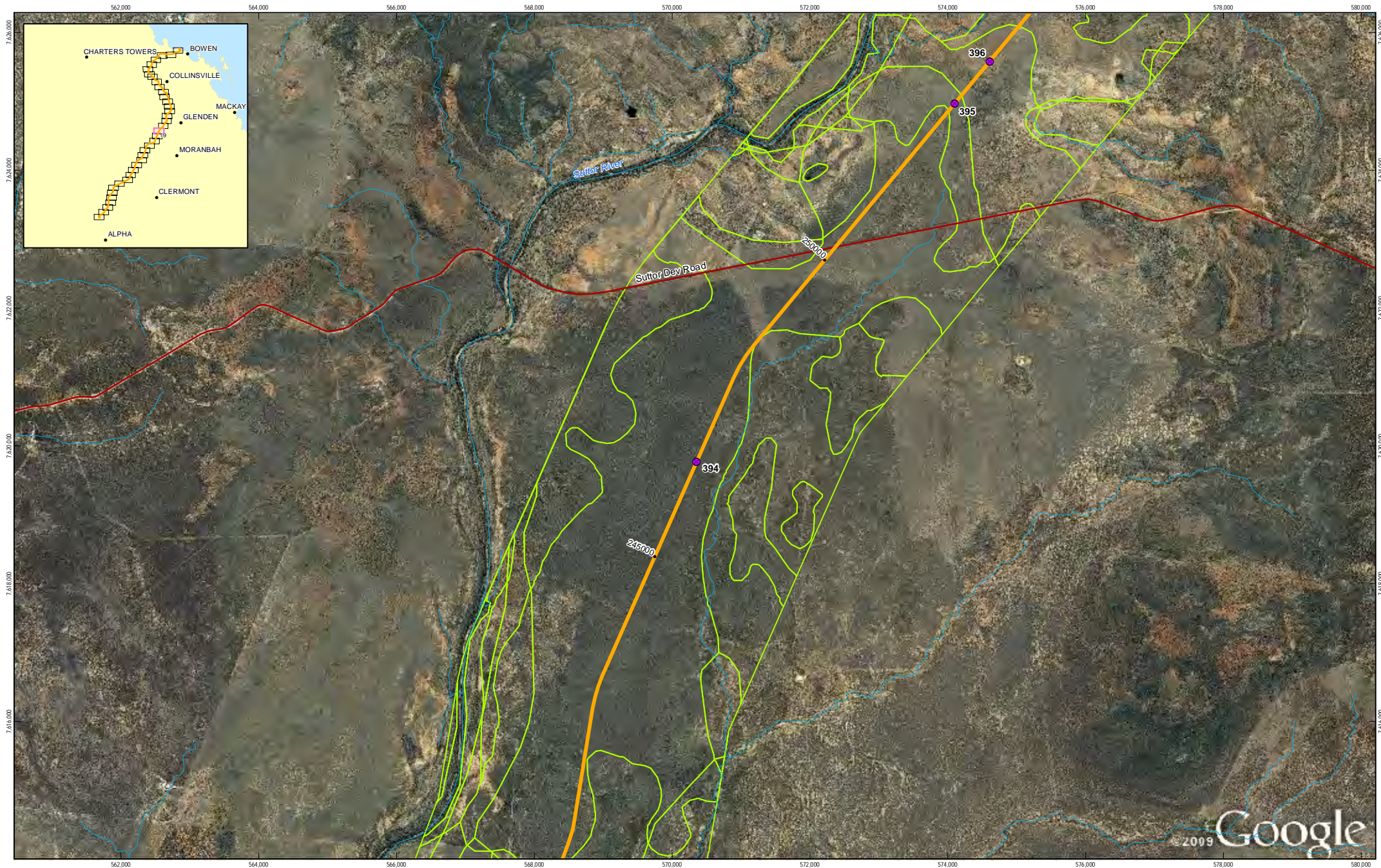
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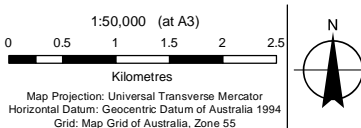
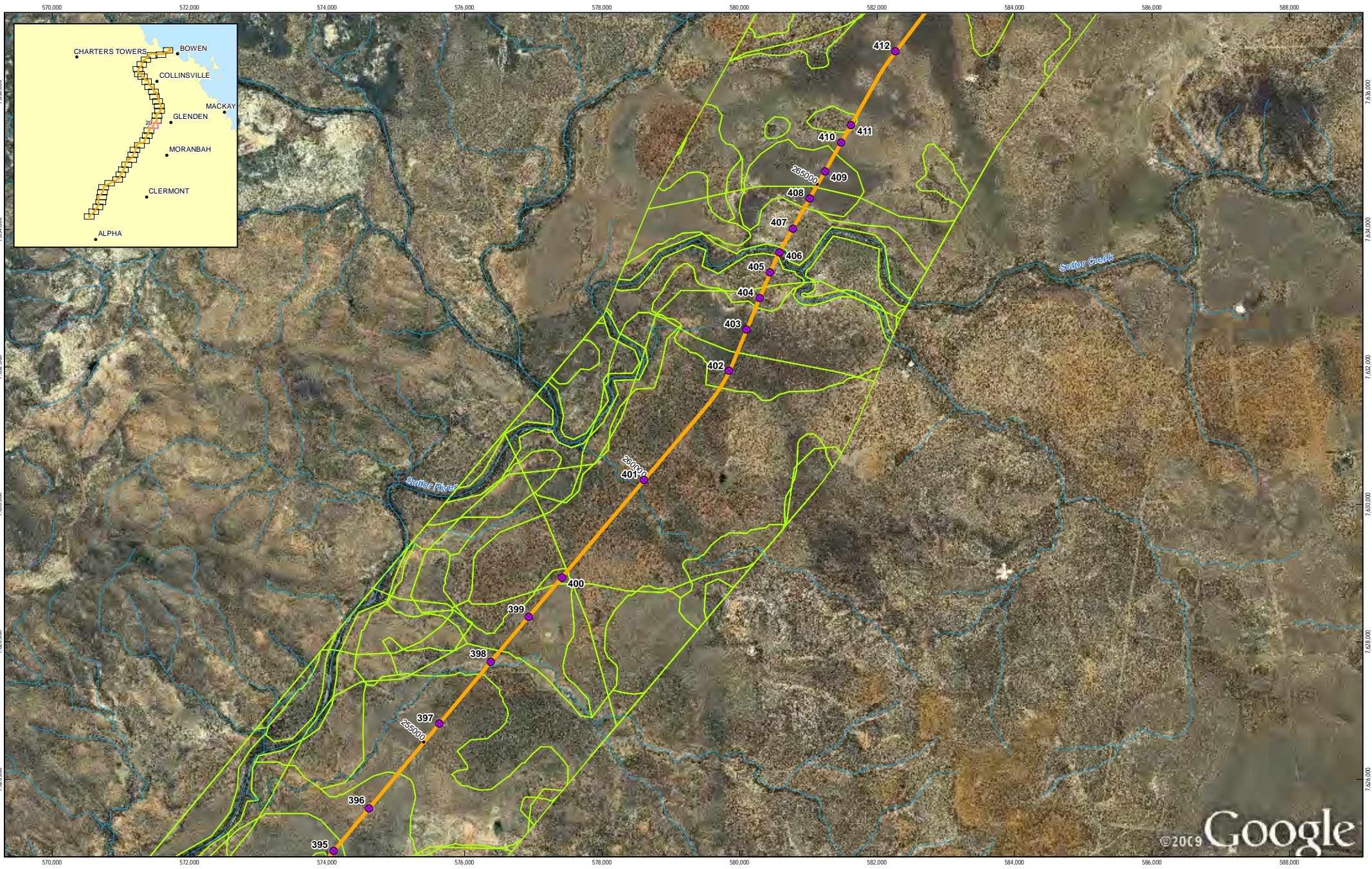
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HANCOCK PROSPECTING PTY LTD

Alpha Coal Project
Supplementary Environmental Impact Statement

SOIL PRELIMINARY MAPPING UNITS (PMU)

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| Job Number | 41-23742 |
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| Date | 26-07-2011 |

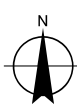
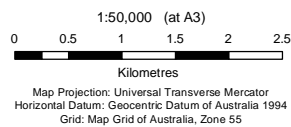
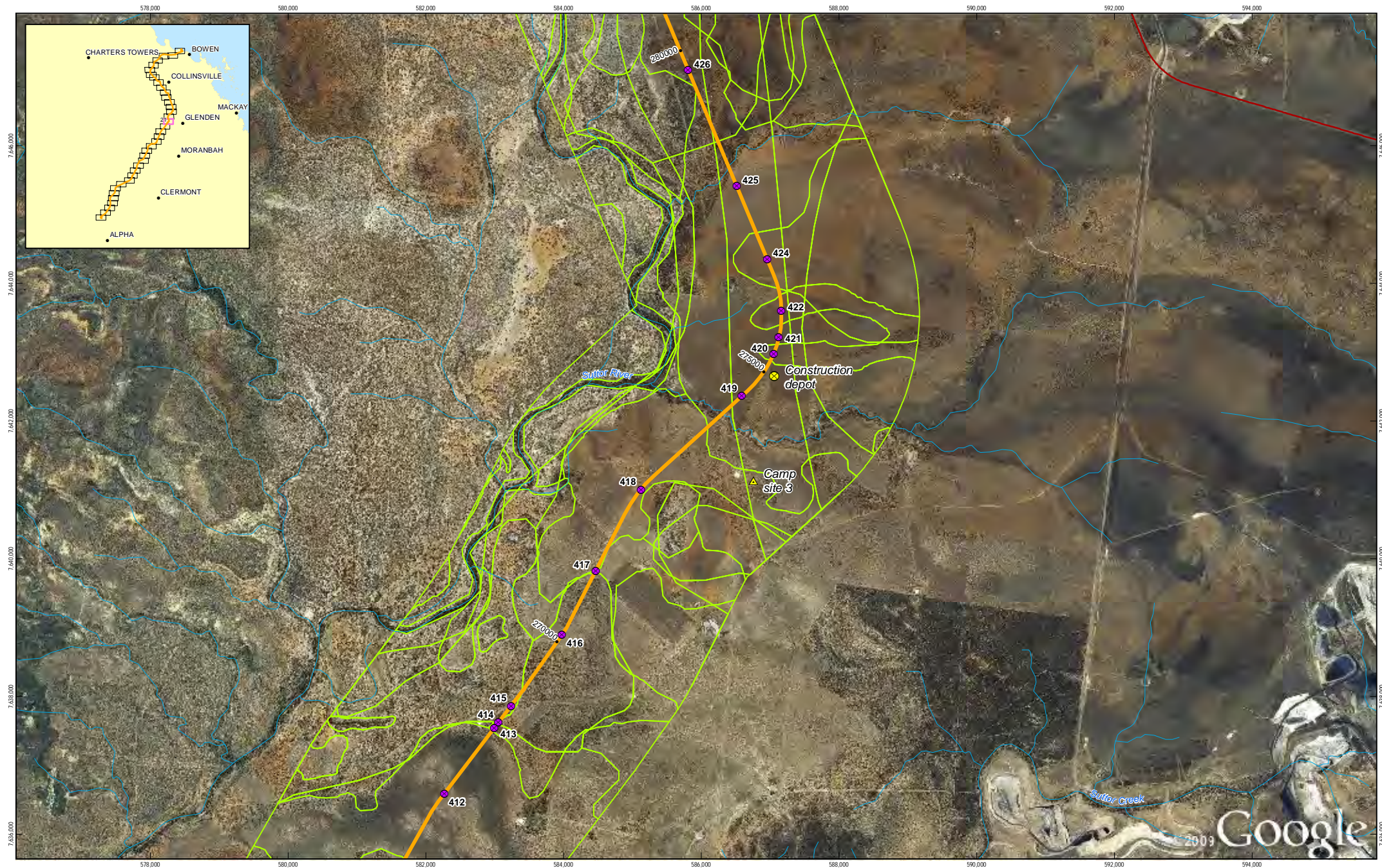
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LEGEND

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|----------------------|--------------------|--------------------------|
| Town | Proposed Alignment | Preliminary Mapping Unit |
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| Marshalling | Stream Network | |
| Yards | | |
| Depot | | |

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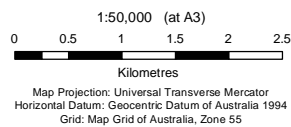
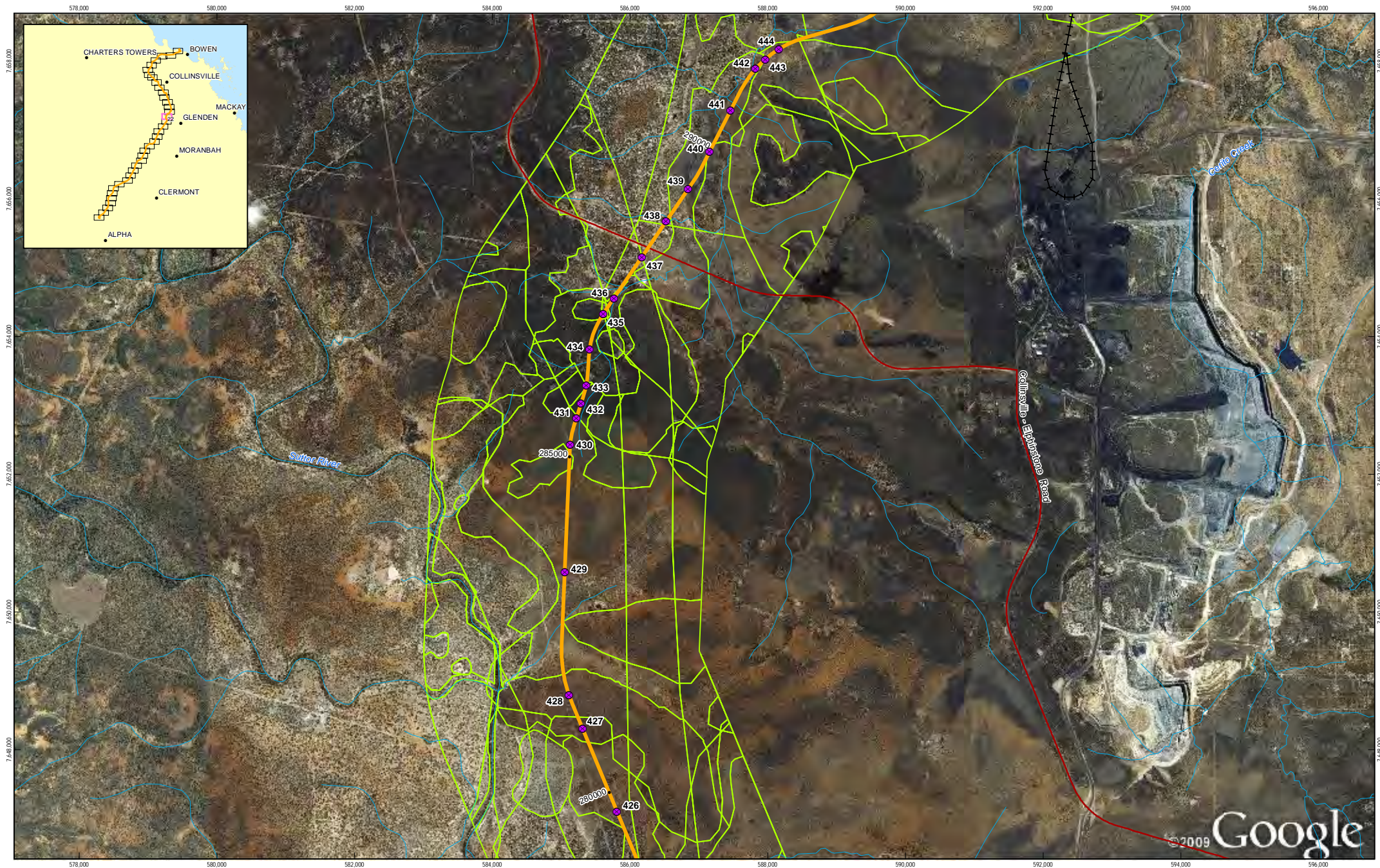
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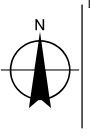
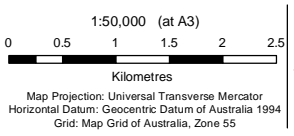
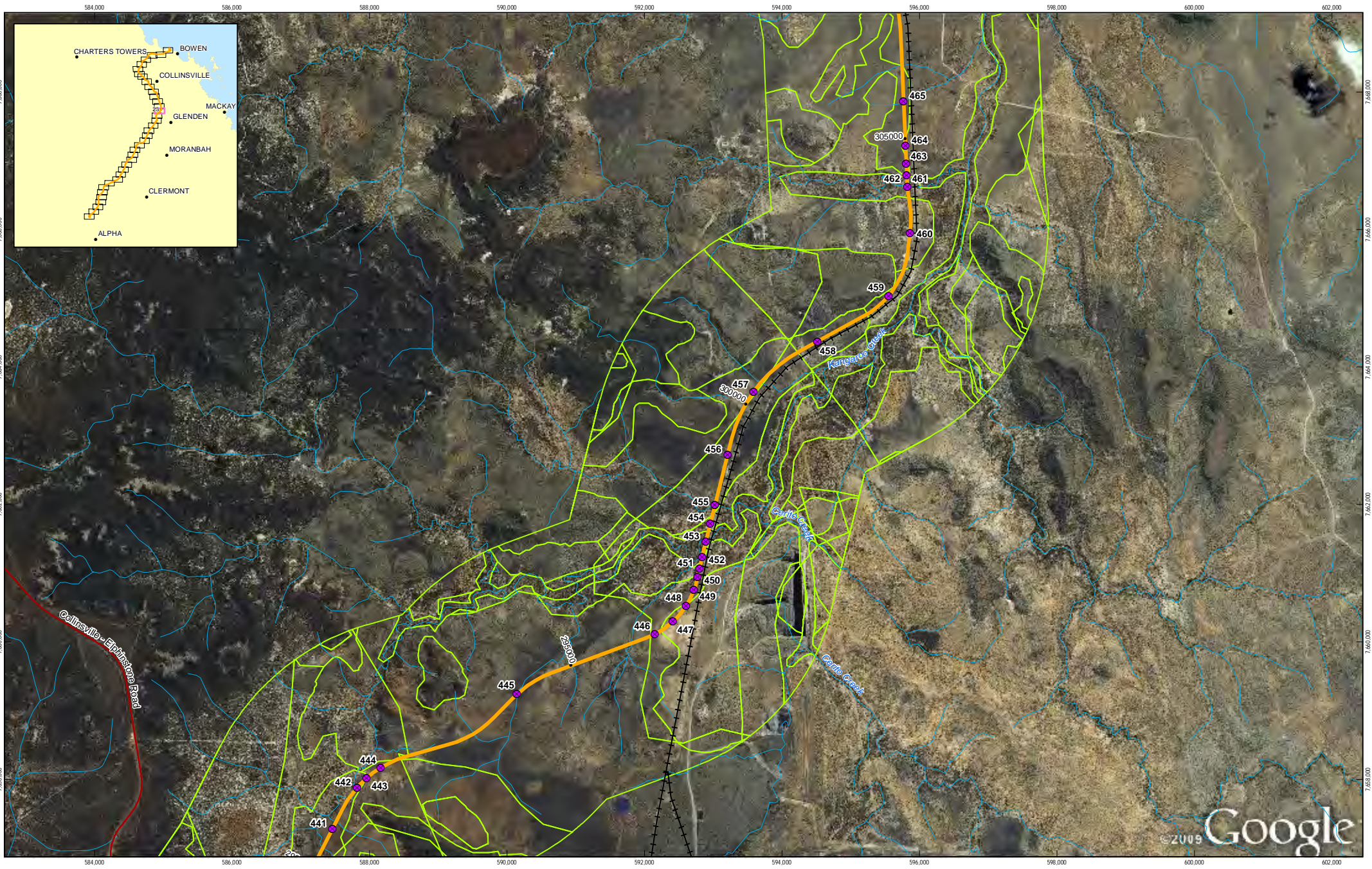
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- LEGEND**
- Town
 - PMU Reference Number
 - Camp
 - Marshalling Yards
 - Depot
 - Proposed Alignment
 - State Road
 - Existing Railway
 - Stream Network
 - Preliminary Mapping Unit
 - Waterbody
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Alpha Coal Project
Supplementary Environmental Impact Statement

SOIL PRELIMINARY MAPPING UNITS (PMU)

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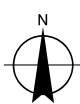


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Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55



LEGEND

- Town
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Alpha Coal Project
Supplementary Environmental Impact Statement

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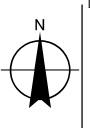
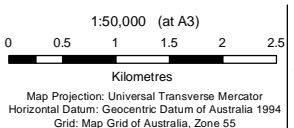
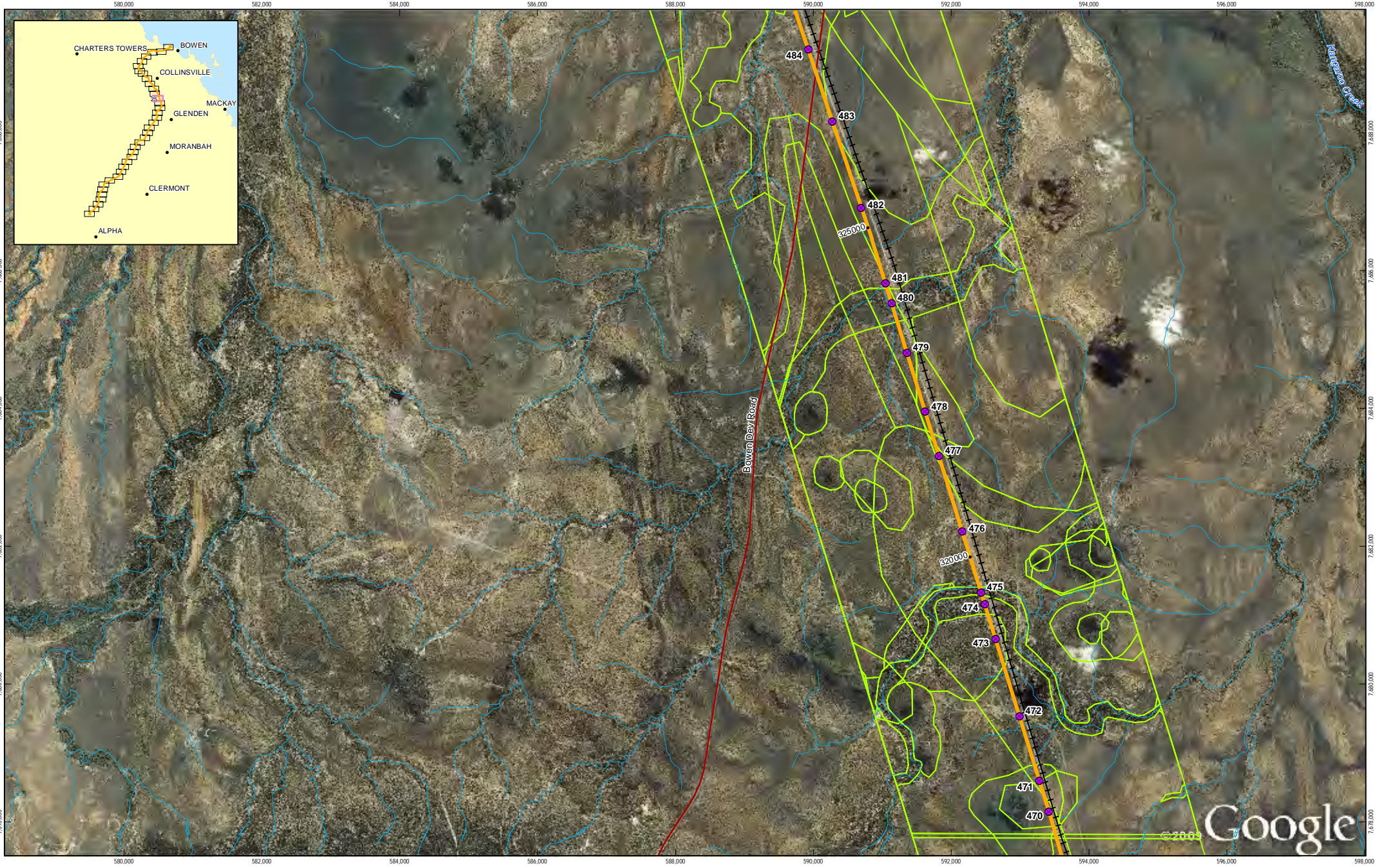
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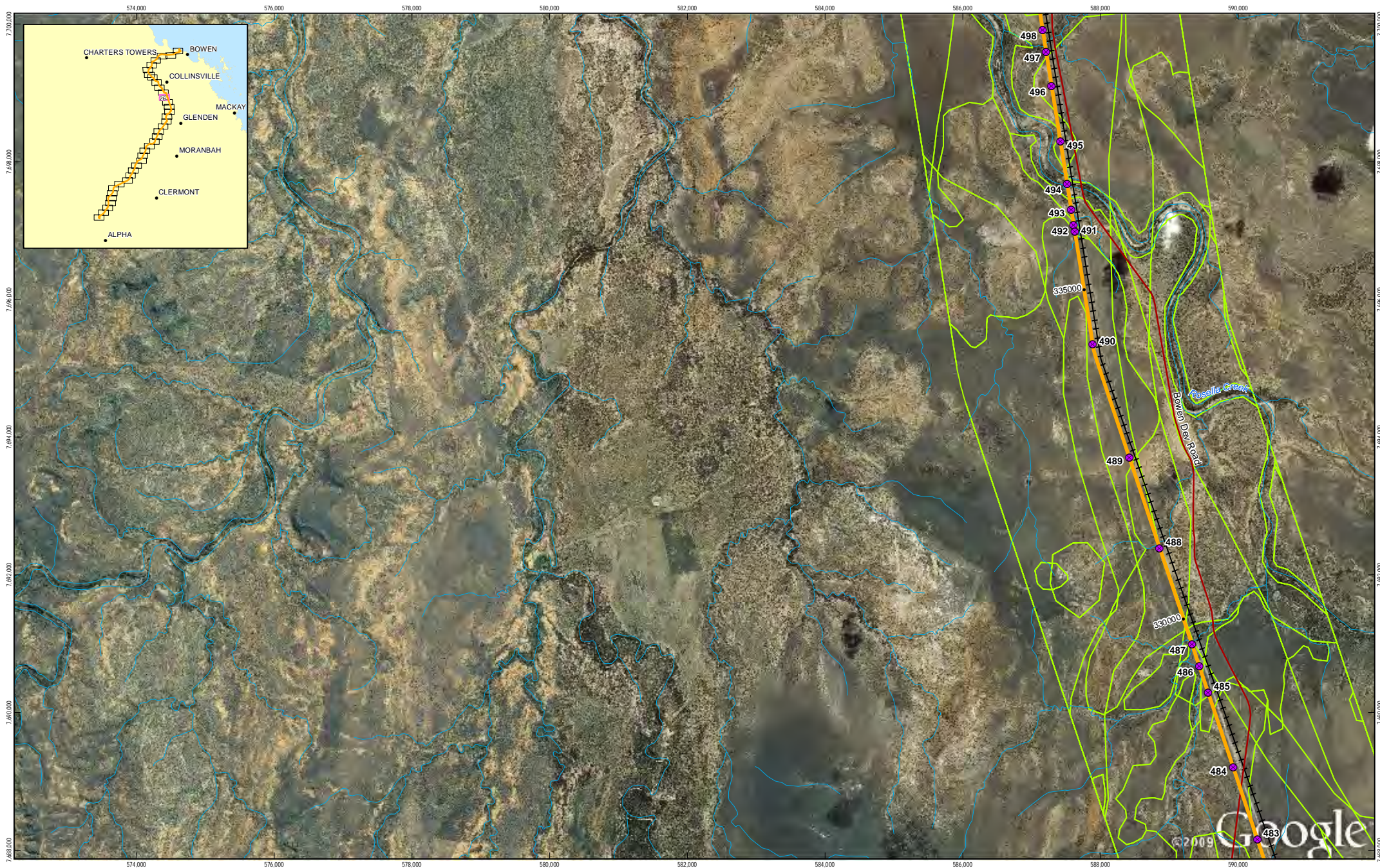
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1:50,000 (at A3)

0 0.5 1 1.5 2 2.5

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55



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Alpha Coal Project
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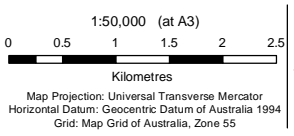
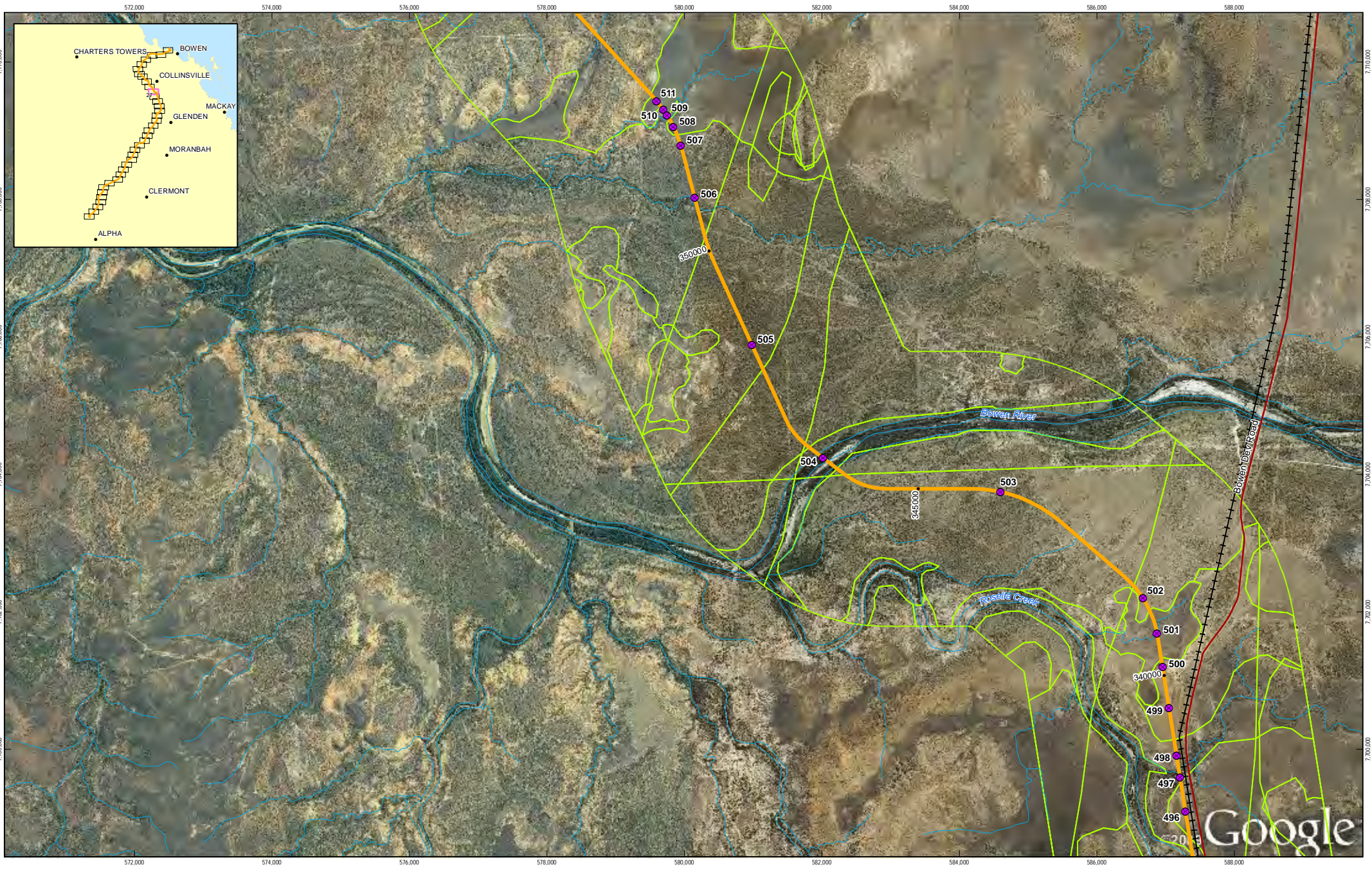
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Alpha Coal Project
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Job Number 41-23742
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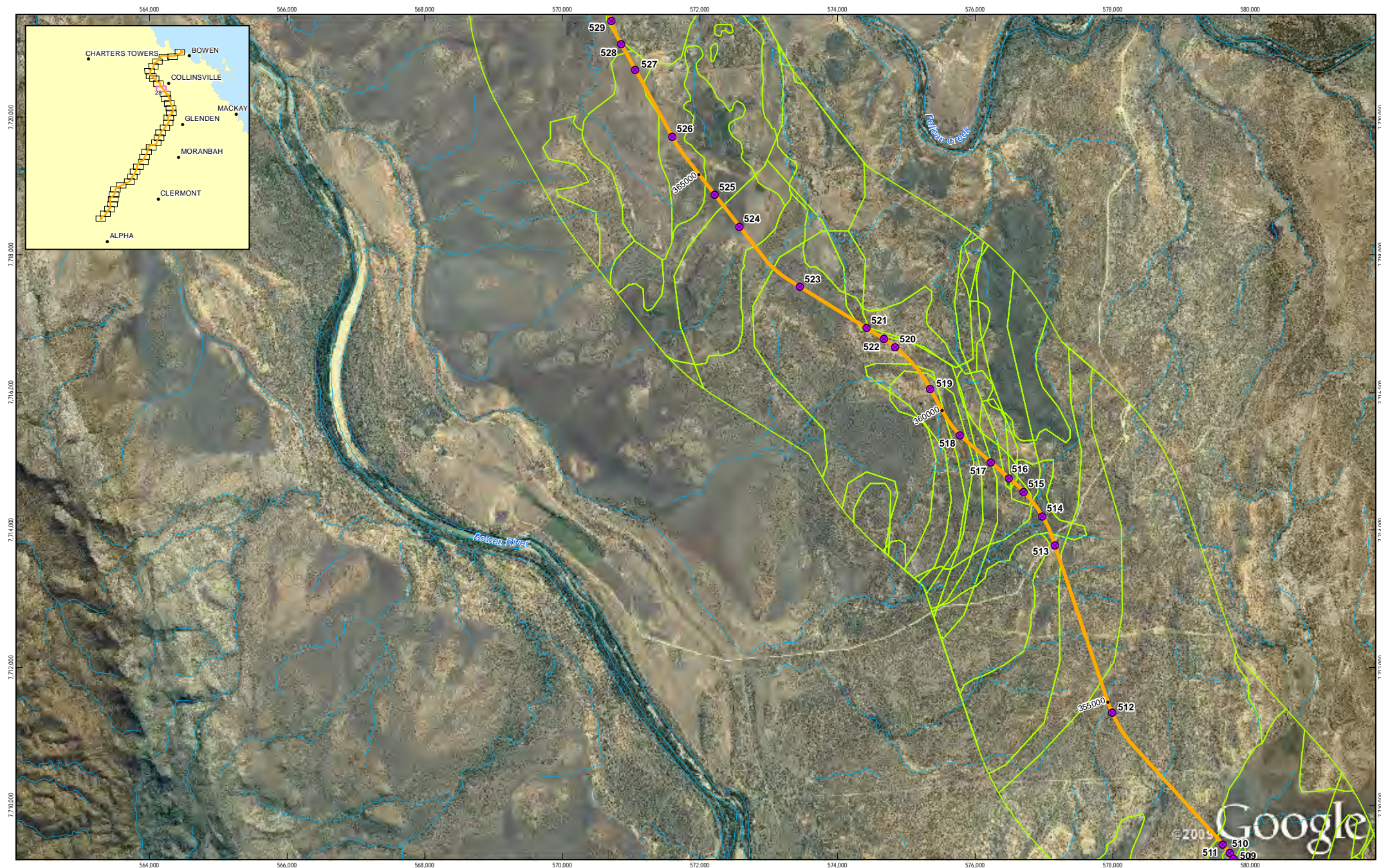
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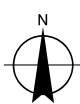


1:50,000 (at A3)

0 0.5 1 1.5 2 2.5

Kilometres

Map Projection: Universal Transverse Mercator
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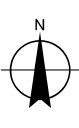
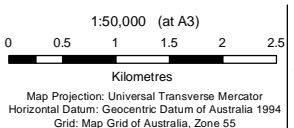
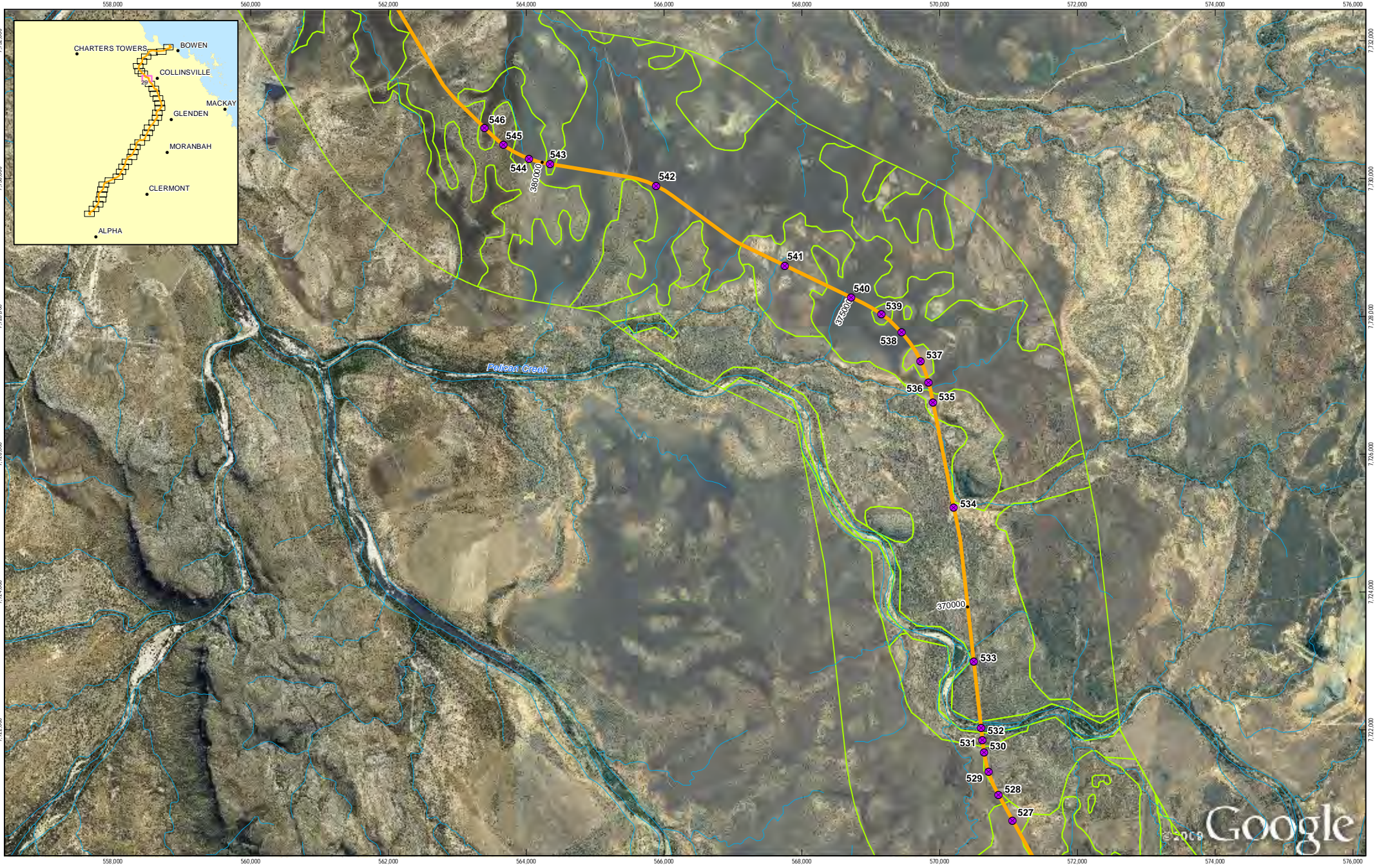
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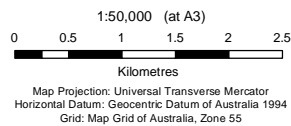
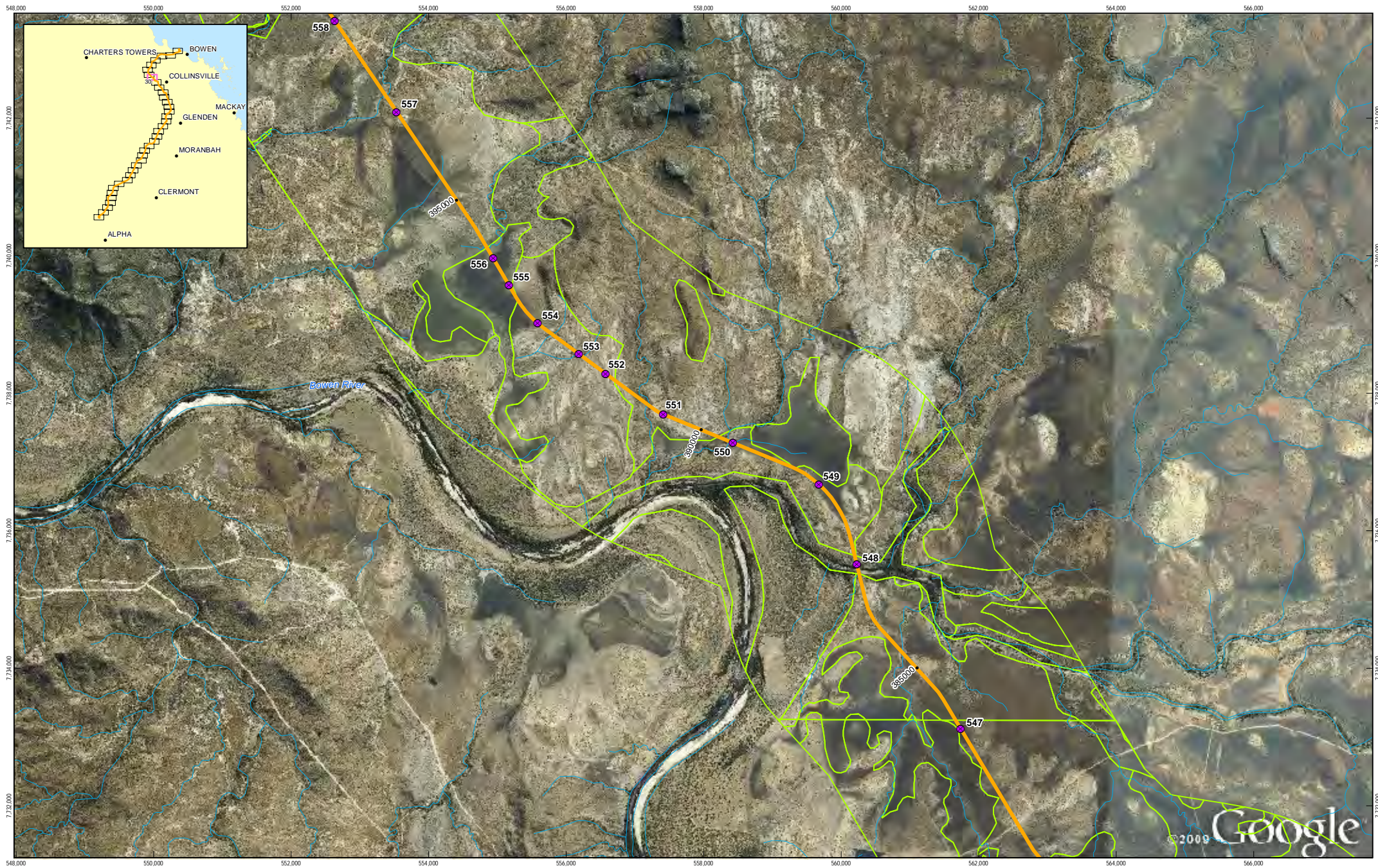
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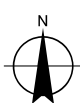
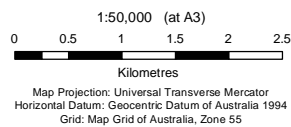
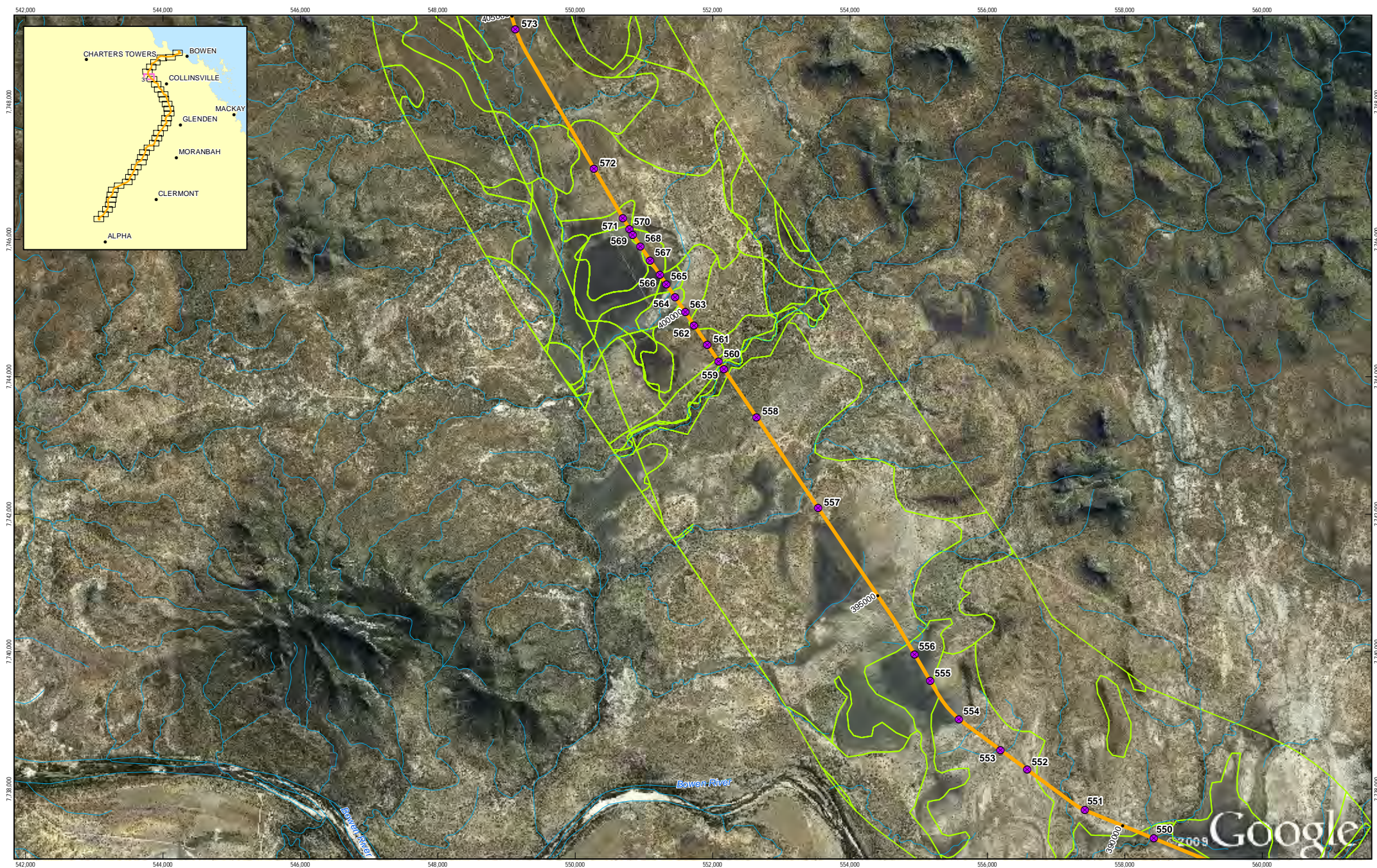
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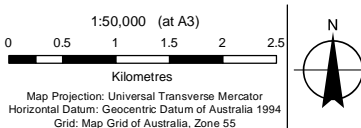
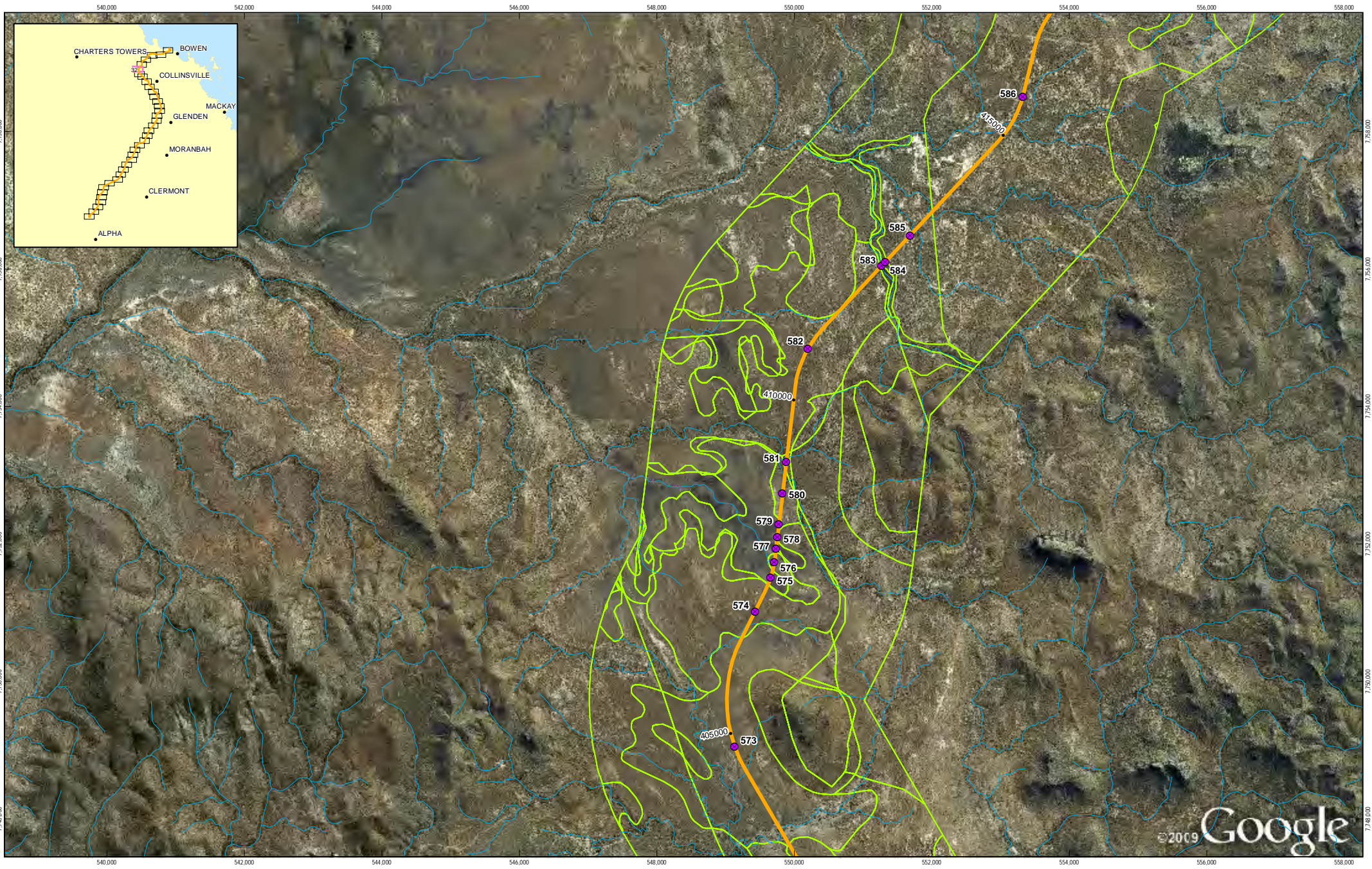
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LEGEND

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|----------------------|--------------------|--------------------------|
| Town | Proposed Alignment | Preliminary Mapping Unit |
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| Depot | | |

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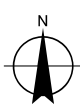
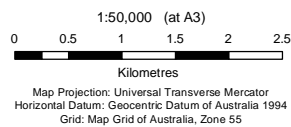
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LEGEND

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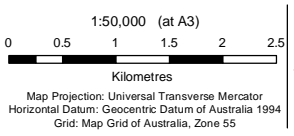
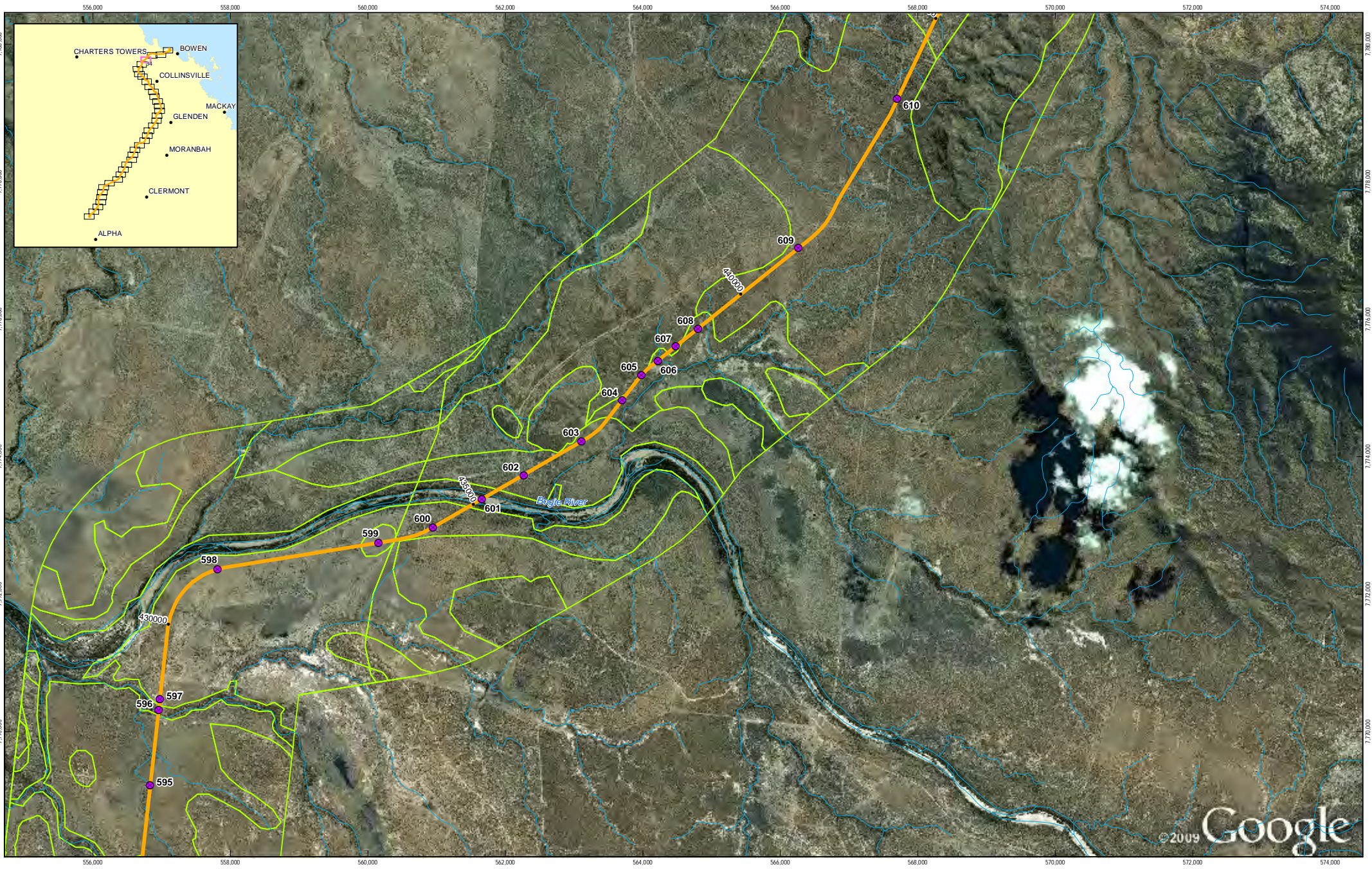
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HANCOCK PROSPECTING PTY LTD

Alpha Coal Project
Supplementary Environmental Impact Statement

SOIL PRELIMINARY MAPPING UNITS (PMU)

| | |
|------------|------------|
| Job Number | 41-23742 |
| Revision | C |
| Date | 26-07-2011 |

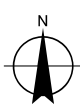
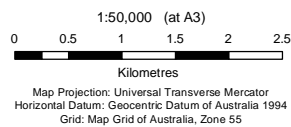
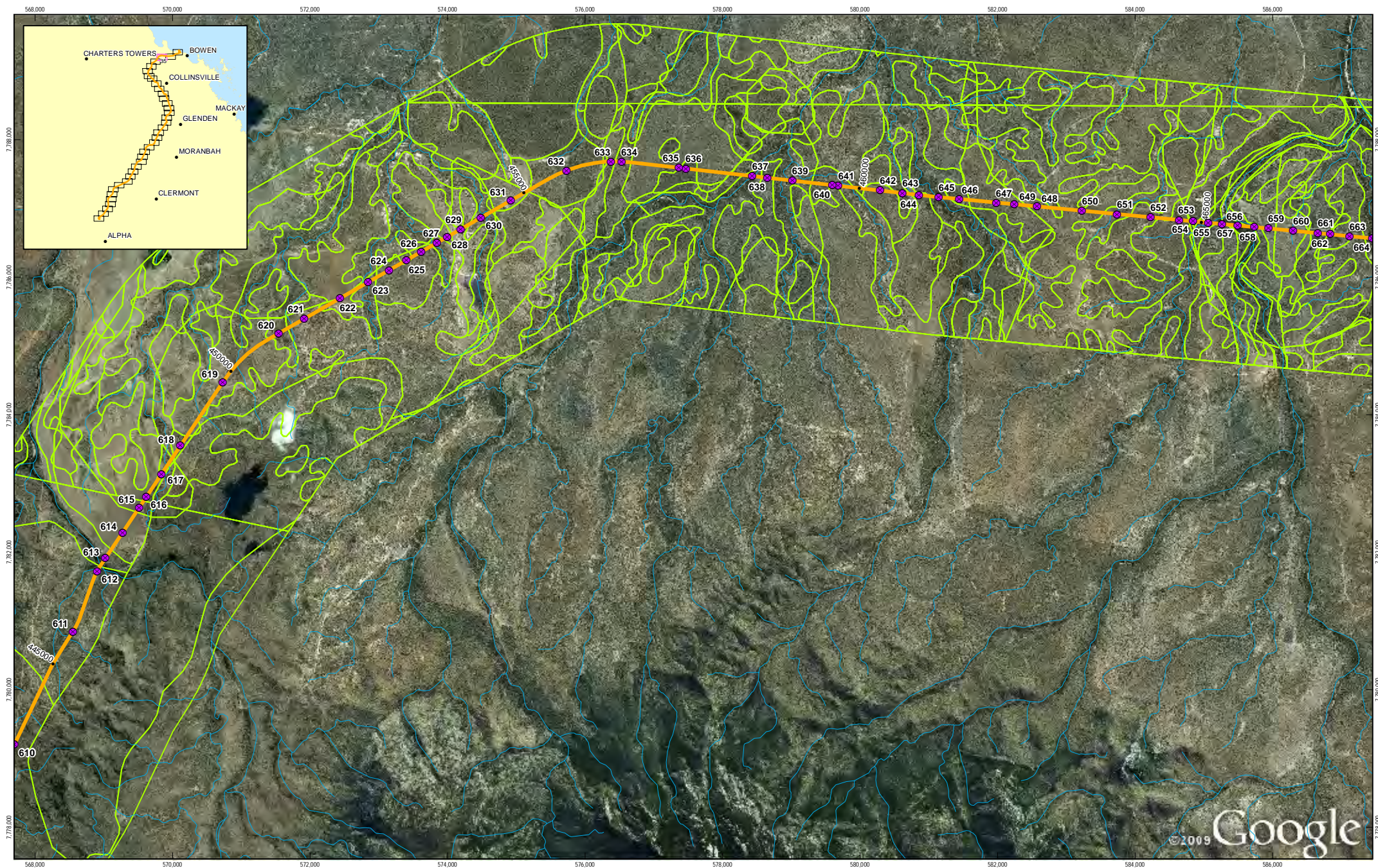
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LEGEND

- Town
- PMU Reference Number
- ▲ Camp
- Marshalling Yards
- Depot
- Proposed Alignment
- State Road
- Existing Railway
- Stream Network
- Preliminary Mapping Unit
- Waterbody

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SOIL PRELIMINARY MAPPING UNITS (PMU)

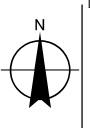
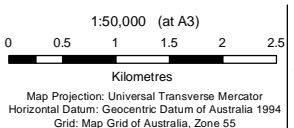
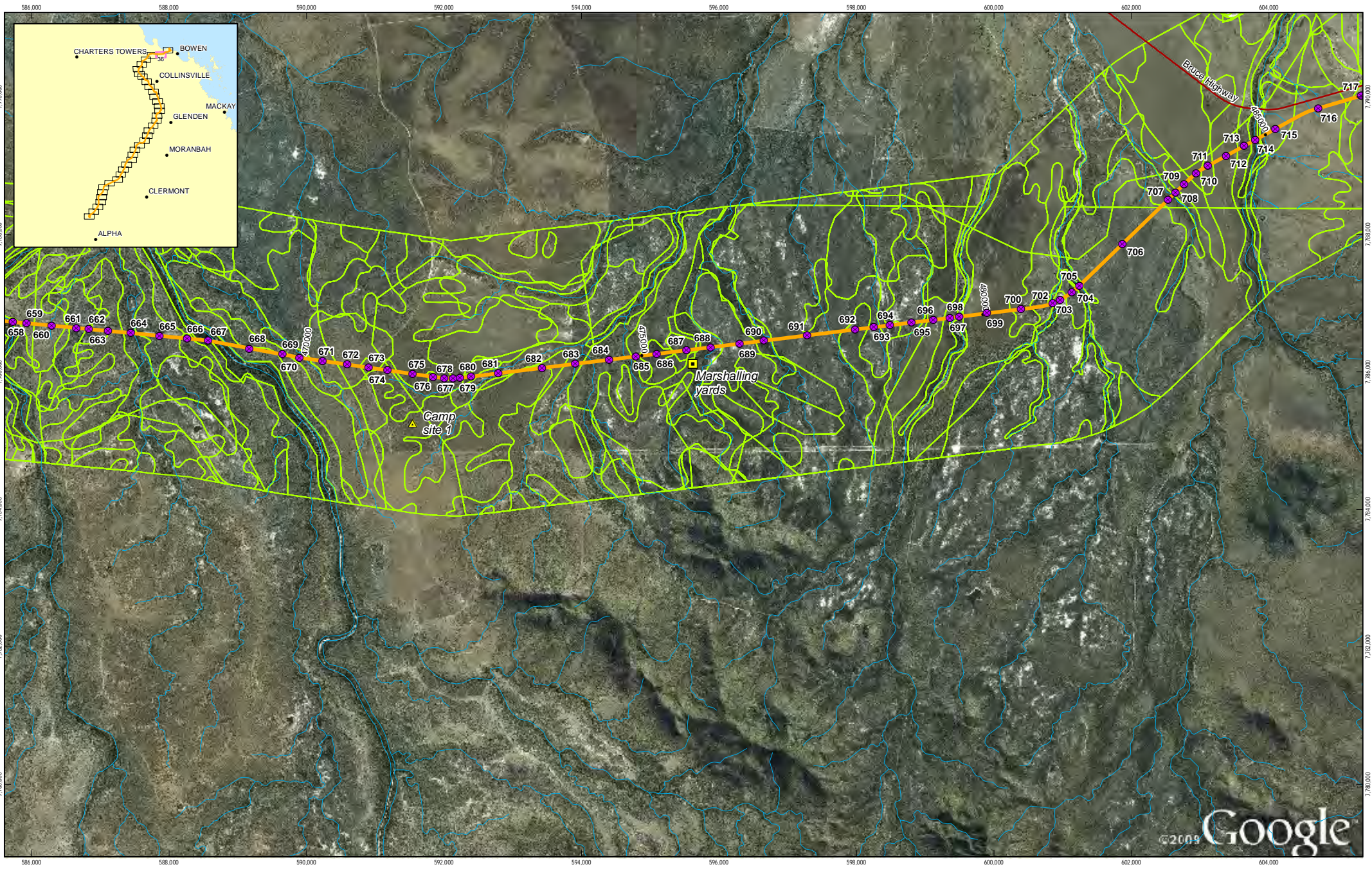
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- LEGEND**
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HANCOCK PROSPECTING PTY LTD

Alpha Coal Project
Supplementary Environmental Impact Statement

SOIL PRELIMINARY MAPPING UNITS (PMU)

Job Number 41-23742
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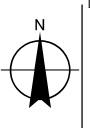
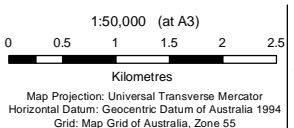
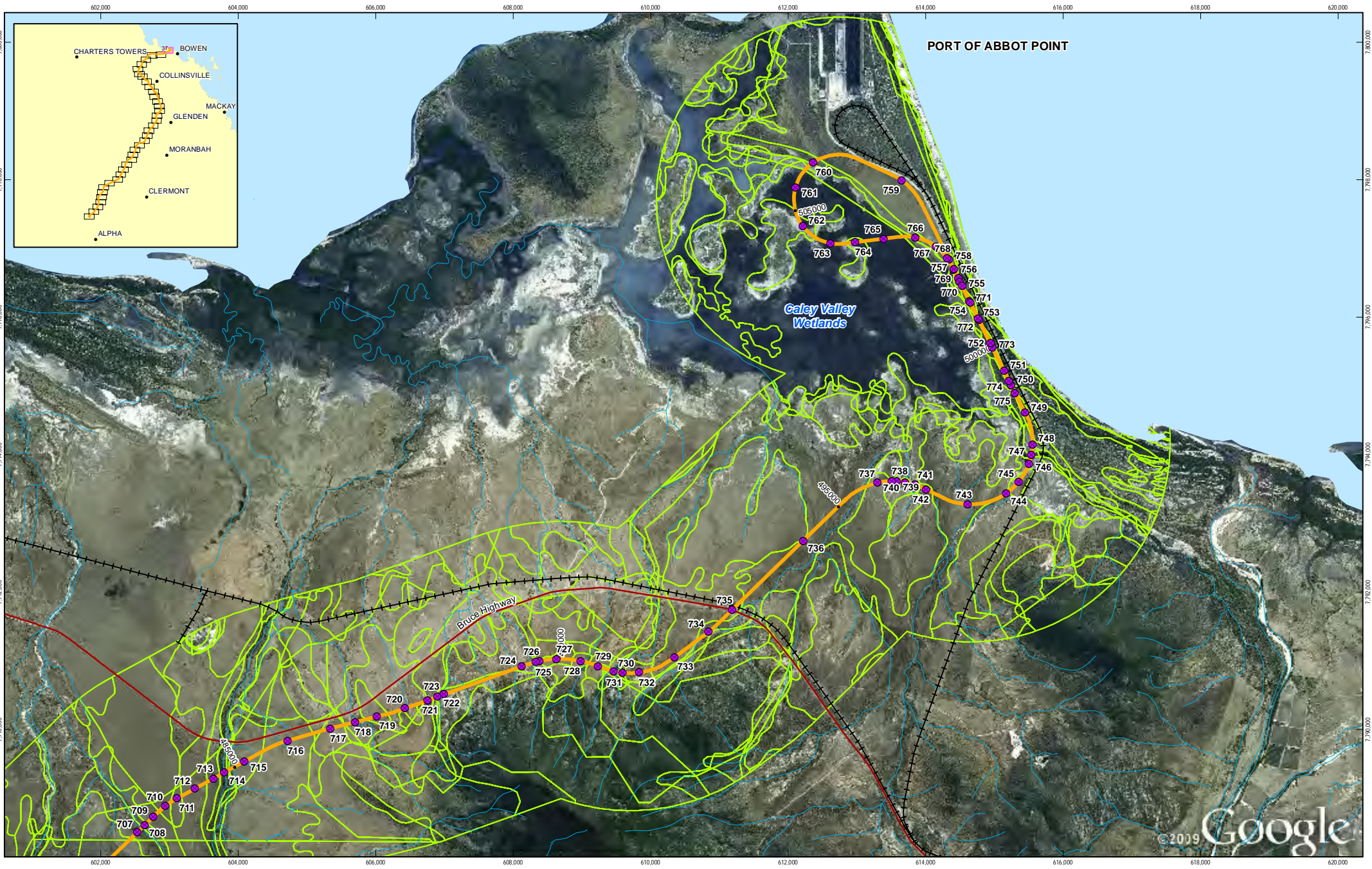
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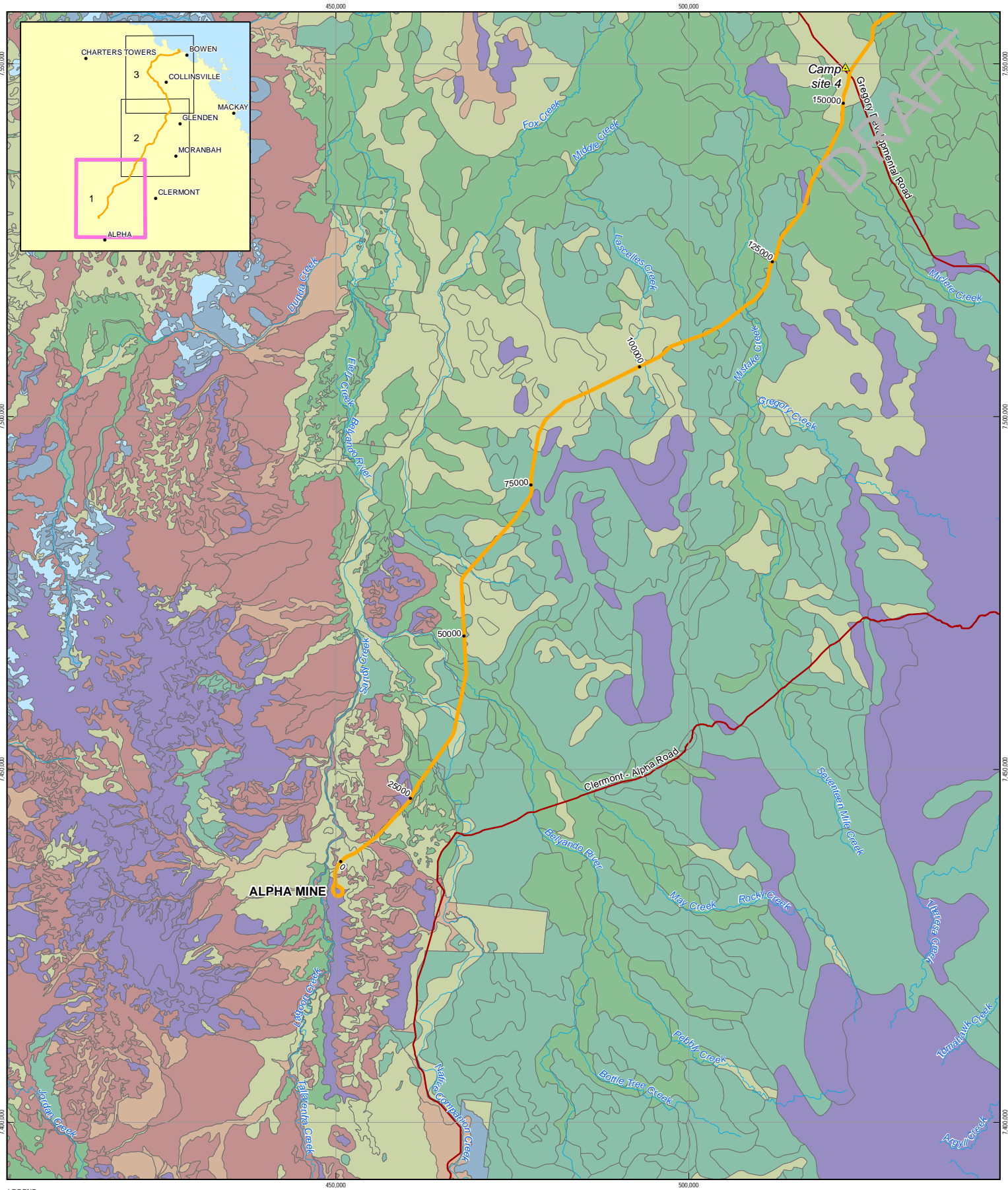
Alpha Coal Project
Supplementary Environmental Impact Statement

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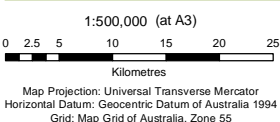
**Figure: 2
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| | | |
|---|--|---|
| <ul style="list-style-type: none"> Town Camp Marshalling Yards Construction Depot | <ul style="list-style-type: none"> Proposed Alignment State Road Existing Railway Watercourse Waterbody | Australian Soils Classification <ul style="list-style-type: none"> ANTHROSOL CHROMOSOL DERMOSOL HYDROSOL KANDASIL KUROSOL RUDOSOL SODOSOL TENOSOL VERTOSOL |
|---|--|---|

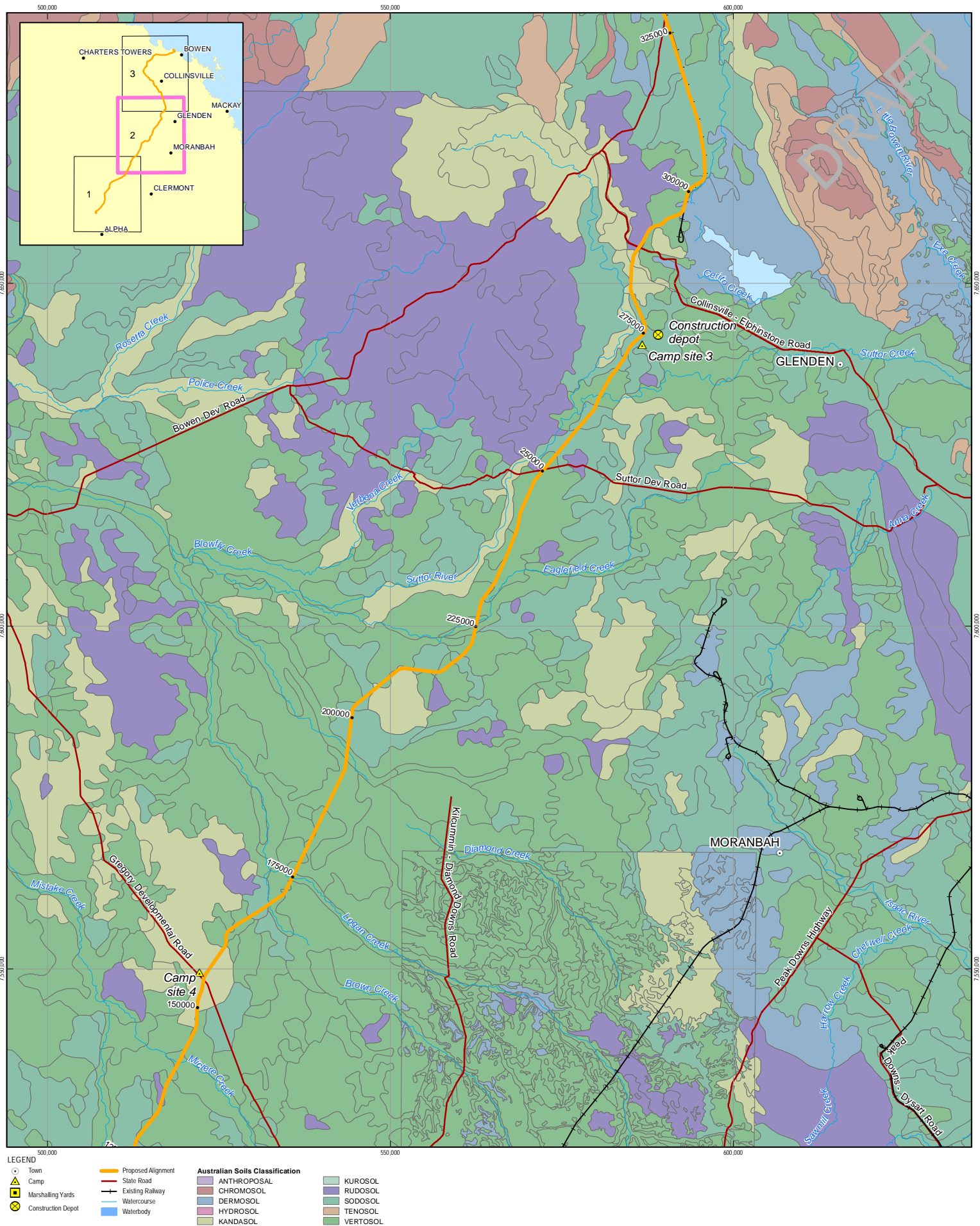
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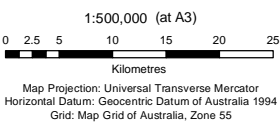
SOIL TYPES - AUSTRALIAN SOILS CLASIFICATION

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Revision A
Date 25-07-2011

Figure 3
Sheet 1 of 3



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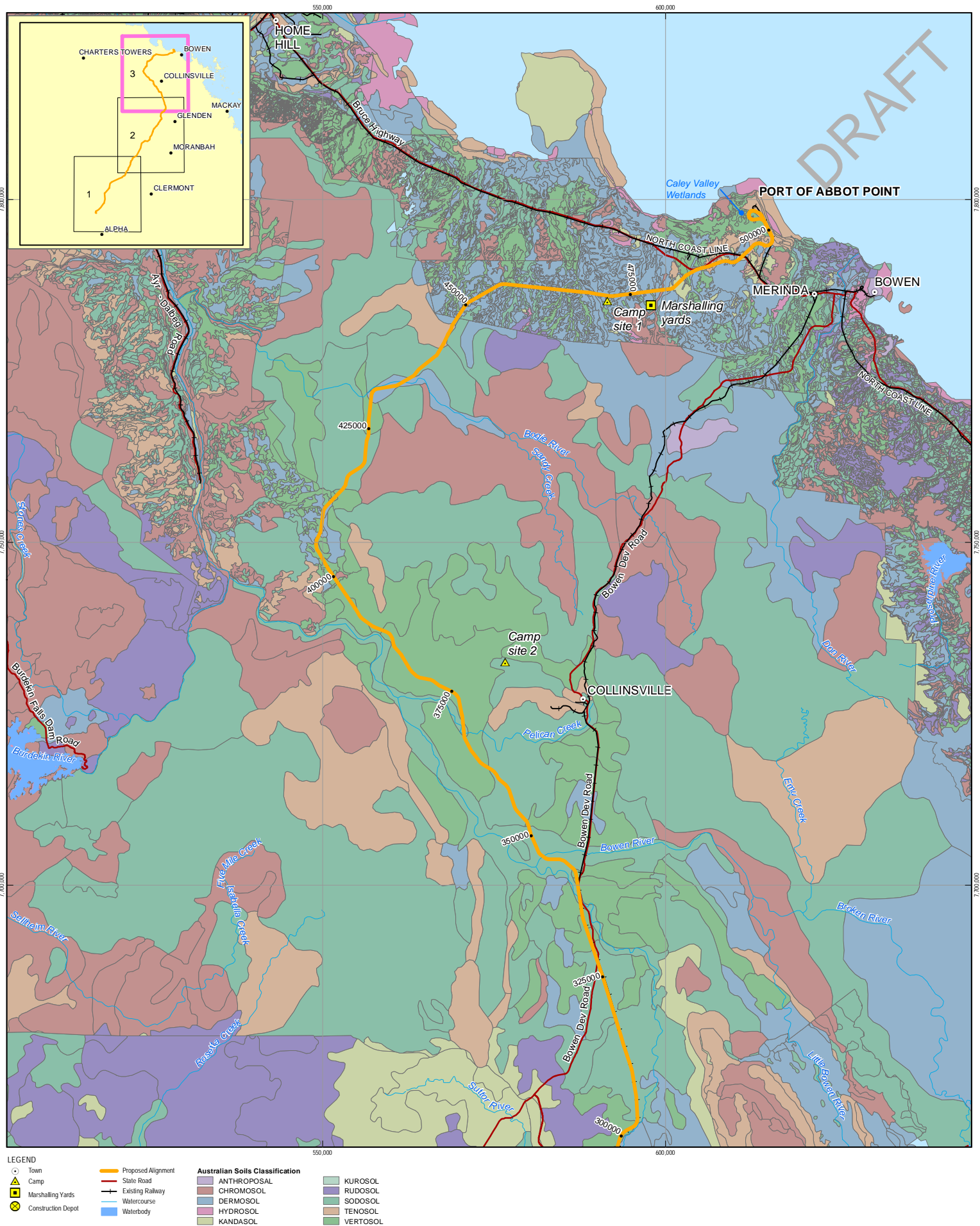
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Job Number 41-22090
Revision A
Date 25-07-2011

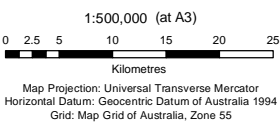
Figure 3
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SOIL TYPES - AUSTRALIAN SOILS CLASIFICATION

Job Number 41-22090
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Figure 3
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Appendix B

Preliminary Mapping Units Reference Table

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|---|-------------------------------|--------------------------------------|---|--------------------|--------------------------------|--------------------------------------|------------------|
| 1 | 0 | 400 | Arenite (Po) - Quartz sandstone, pebbly quartz sandstone, miner conglomerate and sandstone | Kandasol | DUSLARA | NA | Joe Joe | JJ4 | 10.5.1b / 10.5.5a / 10.7.3b | 70 / 20 / 5 |
| 2 | 400 | 800 | Arenite (Po) - Quartz sandstone, pebbly quartz sandstone, miner conglomerate and sandstone | Kandasol | DUSLARA | NA | Joe Joe | JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 3 | 800 | 1150 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 4 | 1150 | 1250 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | JJ5 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 5 | 1250 | 2100 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 6 | 2100 | 2400 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil / Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | DUSLARA | NA | Joe Joe | JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 7 | 2400 | 2900 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 8 | 2900 | 3150 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Rudosol | DUSLARA | NA | Joe Joe | JJ6 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 9 | 3150 | 3600 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 10 | 3600 | 3700 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil / Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 11 | 3700 | 4400 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 12 | 4500 | 8000 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Rudosol | DUSLARA | NA | Joe Joe | 3JJ6 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 13 | 8000 | 8250 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol / Rudosol | DUSLARA | NA | Joe Joe | 3JJ6 / 5JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 14 | 8250 | 8600 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Rudosol | DUSLARA | NA | Joe Joe | 3JJ6 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 15 | 8600 | 9100 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 16 | 9100 | 9350 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil / Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 17 | 9350 | 10150 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 18 | 10150 | 10250 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 3JJ5 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.5 | 70 / 15 / 10 / 5 |
| 19 | 10250 | 10600 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.6 | 71 / 15 / 10 / 5 |
| 20 | 10600 | 11100 | Arenite (Po) - Quartz sandstone, pebbly quartz sandstone, miner conglomerate and sandstone | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.5.12 / 10.3.2a / 11.5.7 | 72 / 15 / 10 / 5 |
| 21 | 11100 | 12000 | Arenite (Po) - Quartz sandstone, pebbly quartz sandstone, miner conglomerate and sandstone | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.1b / 10.5.5a / 10.7.3b | 70 / 20 / 5 |
| 22 | 12000 | 12250 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.3.27a | 80 / 20 |
| 23 | 12250 | 12700 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.7.7b | 80 / 20 |
| 24 | 12700 | 13000 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.3.27a | 100 |
| 25 | 13000 | 13200 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.7.7b | 80 / 20 |
| 26 | 13200 | 14300 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.5.12 | 70 / 30 |
| 27 | 14300 | 14650 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 3JJ5 | 10.3.27a | 100 |
| 28 | 14650 | 15000 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 3JJ5 | 10.5.5a / 10.5.12 | 70 / 30 |
| 29 | 15000 | 15200 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 5JJ4 | 10.5.5a / 10.5.12 | 70 / 30 |
| 30 | 15200 | 15500 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 3JJ5 | 10.5.5a / 10.5.12 | 70 / 30 |
| 31 | 15500 | 15600 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 3JJ5 | 10.5.12 / 10.5.5a | 70 / 30 |
| 32 | 15600 | 16300 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Chromosol | DUSLARA | NA | Joe Joe | 5JJ2 | 10.5.12 / 10.5.5a | 70 / 30 |
| 33 | 16300 | 19350 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 3JJ5 | 10.5.12 / 10.5.5a | 70 / 30 |
| 34 | 19350 | 19500 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe / Surbiton | 3JJ5 / 8SN2 | 10.5.12 / 10.5.5a | 70 / 30 |
| 35 | 19500 | 19850 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 3JJ5 | 10.5.12 / 10.5.5a | 70 / 30 |
| 36 | 19850 | 20800 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 3JJ5 | 10.3.3b | 100 |
| 37 | 20800 | 22000 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | DUSLARA | NA | Joe Joe | 3JJ5 | 10.5.12 / 10.5.5a | 70 / 30 |
| 38 | 22200 | 22800 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Rudosol | DUSLARA | NA | Joe Joe | 3JJ6 | 10.5.12 / 10.5.5a | 70 / 30 |
| 39 | 22800 | 24000 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Rudosol / Kandasol | DUSLARA | NA | Joe Joe | 3JJ6 / 3JJ5 | 10.5.12 / 10.5.5a | 70 / 30 |
| 40 | 24000 | 24300 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Rudosol | DUSLARA | NA | Joe Joe | 3JJ6 | 10.5.12 / 10.5.5a | 70 / 30 |
| 41 | 24300 | 24850 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Rudosol | DUSLARA | NA | Joe Joe | 3JJ6 | 10.7.5 / 10.3.3b / 10.5.5a | 50 / 40 / 10 |
| 42 | 24850 | 25600 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Rudosol | DUSLARA | NA | Joe Joe | 3JJ6 | 10.5.12 / 10.5.5a | 70 / 30 |
| 43 | 25600 | 26200 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Vertosol | DUSLARA | NA | Surbiton | 8SN4 | 10.5.12 / 10.5.5a | 70 / 30 |
| 44 | 26200 | 27150 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Vertosol | DUSLARA | NA | Surbiton | 8SN4 | 11.8.4 / 11.8.11 | 90 / 10 |
| 45 | 27150 | 27750 | Basalt (Czb) - Olivine basalt lava flows | Vertosol | DUSLARA | NA | Surbiton | 8SN4 | 11.8.4 / 11.8.11 | 90 / 10 |
| 46 | 27700 | 28200 | Basalt (Czb) - Olivine basalt lava flows | Vertosol | DUSLARA | NA | Surbiton | 3SN5 | 11.8.4 / 11.8.11 | 90 / 10 |
| 47 | 28200 | 28300 | Basalt (Czb) - Olivine basalt lava flows | Vertosol | DUSLARA | NA | Surbiton | 8SN3 | 11.8.4 / 11.8.11 | 90 / 10 |
| 48 | 28300 | 29150 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Vertosol | DUSLARA | NA | Surbiton | 8SN3 | 11.8.4 / 11.8.11 | 90 / 10 |
| 49 | 29150 | 29600 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Vertosol | DUSLARA | NA | Surbiton | 8SN3 | 11.3.5 / 11.3.2 / 11.3.3 | 80 / 15 / 5 |
| 50 | 29600 | 30600 | Basalt (Czb) - Olivine basalt lava flows | Vertosol | DUSLARA | NA | Surbiton | 8SN3 | 11.3.5 / 11.3.2 / 11.3.3 | 80 / 15 / 5 |
| 51 | 30600 | 30800 | Basalt (Czb) - Olivine basalt lava flows | Sodosol | DUSLARA | NA | Belyando River | 3BR2 | 11.3.5 / 11.3.2 / 11.3.3 | 80 / 15 / 5 |
| 52 | 30800 | 31100 | Basalt (Czb) - Olivine basalt lava flows | Sodosol | DUSLARA | NA | Belyando River | 3BR2 | 11.3.2 | 100 |
| 53 | 31100 | 31250 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | DUSLARA | NA | Belyando River | 3BR2 | 11.3.2 | 100 |
| 54 | 31250 | 31800 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.2 | 100 |
| 55 | 31800 | 32450 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.7 | 100 |
| 56 | 32450 | 32800 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.3 / 11.3.2 / 11.3.7 | 50 / 40 / 10 |
| 57 | 32800 | 33700 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.2 | 100 |
| 58 | 33700 | 33850 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.2 | 100 |
| 59 | 33850 | 34600 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.1 / 11.3.2 | 90 / 10 |
| 60 | 34600 | 35600 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Sodosol / Kandasol | ZCQ | NA | Monteagle / Alpha | NA | 11.3.1 / 11.3.2 | 90 / 10 |
| 61 | 35600 | 36700 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.1 / 11.3.2 | 90 / 10 |
| 62 | 36700 | 37700 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.2 / 11.3.3 | 90 / 10 |
| 63 | 37700 | 37800 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.3 / 11.3.25 | 90 / 10 |
| 64 | 37800 | 38050 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Kandasol | ZCQ | NA | Alpha | NA | 11.3.3 / 11.3.25 | 90 / 10 |
| 65 | 38050 | 38500 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Kandasol | ZCQ | NA | Alpha | NA | 11.3.2 / 11.5.3 / 11.3.1 | 80 / 10 / 10 |
| 66 | 38500 | 39200 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Alpha | NA | 11.3.2 / 11.5.3 / 11.3.1 | 80 / 10 / 10 |
| 67 | 39200 | 41150 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.2 / 11.5.3 / 11.3.1 | 80 / 10 / 10 |

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|---|-------------------------------|--------------------------------------|---|---------------------------|--------------------------------|-----------------------------------|------------------|
| 68 | 41150 | 41700 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.5 / 11.3.3 | 90 / 10 |
| 69 | 41700 | 41800 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.5 / 11.3.3 | 90 / 10 |
| 70 | 41800 | 42200 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.5 / 11.3.1 / 11.3.2 / 11.3.3 | 75 / 10 / 10 / 5 |
| 71 | 42200 | 42350 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 / 11.3.25 | 90 / 10 |
| 72 | 42350 | 42800 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol | ZCQ | NA | Funnel | NA | 11.3.5 / 11.3.1 / 11.3.2 / 11.3.3 | 75 / 10 / 10 / 5 |
| 73 | 42800 | 43000 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 / 11.3.25 | 90 / 10 |
| 74 | 43000 | 43300 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol | ZCQ | NA | Funnel | NA | 11.3.7 / 11.3.3 | 50 / 50 |
| 75 | 43300 | 43500 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 / 11.3.25 | 90 / 10 |
| 76 | 43300 | 45000 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol | ZCQ | NA | Funnel | NA | 11.3.2 / 11.3.3 / 11.4.6 | 85 / 10 / 5 |
| 77 | 45000 | 45300 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol | DUSLARA / ZCQ | NA | Belyando River / Funnel | 2BR2 | 11.3.2 / 11.3.3 / 11.4.6 | 85 / 10 / 5 |
| 78 | 45300 | 46000 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol | DUSLARA / ZCQ | NA | Belyando River / Funnel | 2BR2 | 11.3.2 / 11.3.5 / 11.3.3 | 60 / 35 / 5 |
| 79 | 46000 | 46200 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol | DUSLARA / ZCQ | NA | Belyando River / Funnel | 2BR2 | 11.4.9 / 11.4.8 / 11.3.2 | 50 / 30 / 20 |
| 80 | 46200 | 46600 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol / Sodosol | DUSLARA / ZCQ | NA | Belyando River / Humboldt | 4BR1 | 11.4.9 / 11.4.8 / 11.3.2 | 50 / 30 / 20 |
| 81 | 46600 | 47600 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Vertosol / Sodosol | DUSLARA / ZCQ | NA | Belyando River / Humboldt | 4BR1 | 11.4.9 / 11.4.8 / 11.3.2 | 50 / 30 / 20 |
| 82 | 47600 | 48100 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Vertosol / Kandasol | DUSLARA / ZCQ | NA | Belyando River / Lennox | 4BR1 | 11.4.9 / 11.4.8 / 11.3.2 | 50 / 30 / 20 |
| 83 | 48100 | 48600 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol / Kandasol | DUSLARA / ZCQ | NA | Belyando River / Lennox | 4BR1 | 11.4.9 / 11.4.8 / 11.3.2 | 50 / 30 / 20 |
| 84 | 48600 | 50400 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol / Sodosol | DUSLARA / ZCQ | NA | Belyando River / Humboldt | 4Br1 | 11.4.9 / 11.4.8 / 11.3.2 | 50 / 30 / 20 |
| 85 | 50400 | 50850 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol / Sodosol | DUSLARA / ZCQ | NA | Belyando River / Humboldt | 4Br1 | 11.5.3 / 11.3.1 | 95 / 5 |
| 86 | 50850 | 52850 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Vertosol / Sodosol | DUSLARA / ZCQ | NA | Belyando River / Humboldt | 4Br1 | 11.4.9 / 11.4.8 / 11.3.2 | 50 / 30 / 20 |
| 87 | 52850 | 54900 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Kandasol / Kandasol | DUSLARA / ZCQ | NA | Belyando River / Lennox | 3BR2 | 11.5.3 / 11.3.1 | 95 / 5 |
| 88 | 54900 | 56300 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol / Kandasol | DUSLARA / ZCQ | NA | Belyando River / Lennox | 3BR2 | 11.5.3 / 11.3.1 | 95 / 5 |
| 89 | 56300 | 57600 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol / Kandasol | DUSLARA / ZCQ | NA | Belyando River / Disney | 3BR2 | 11.5.3 / 11.3.1 | 95 / 5 |
| 90 | 57600 | 58850 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol / Kandasol | DUSLARA / ZCQ | NA | Belyando River / Lennox | 3BR2 | 11.5.3 / 11.3.1 | 95 / 5 |
| 91 | 58850 | 59650 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.11.13 / 11.11.9 / 11.11.16 | 70 / 20 / 10 |
| 92 | 59250 | 59650 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Kandasol | ZCQ | NA | Lennox | NA | 11.11.13 / 11.11.9 / 11.11.16 | 70 / 20 / 10 |
| 93 | 59650 | 59800 | Alluvium (TQw) - Silt, clay, sandy clay; miner sand and gravel; fluvial | Kandasol | ZCQ | NA | Lennox | NA | 11.3.25 / 11.3.2 | 90 / 20 |
| 94 | 59800 | 60300 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Alpha | NA | 11.3.1 / 11.3.2 / 11.3.3 | 70 / 20 / 10 |
| 95 | 60300 | 60450 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Alpha | NA | 11.4.8 / 11.4.9 | 80 / 20 |
| 96 | 60450 | 62000 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.8 / 11.4.9 | 80 / 20 |
| 97 | 62000 | 62900 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Monteagle | NA | 11.4.8 / 11.4.9 | 80 / 20 |
| 98 | 62900 | 65050 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3 | 100 |
| 99 | 65050 | 65500 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Monteagle | NA | 11.4.8 / 11.4.9 | 50 / 50 |
| 100 | 65500 | 66200 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3 | 100 |
| 101 | 66200 | 66900 | Arenite Mudrock (Cu) - Feldspatholithic sandstone, mudstone, siltstone (commonly tuffaceous, minor algal and oolitic limestone) | Kandasol | ZCQ | NA | Disney | NA | 11.5.3 | 100 |
| 102 | 66900 | 67800 | Arenite Mudrock (Cu) - Feldspatholithic sandstone, mudstone, siltstone (commonly tuffaceous, minor algal and oolitic limestone) | Kandasol | ZCQ | NA | Disney | NA | 11.11.9 / 11.11.10 / 11.11.13 | 60 / 30 / 10 |
| 103 | 67800 | 67950 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Disney | NA | 11.11.9 / 11.11.10 / 11.11.13 | 60 / 30 / 10 |
| 104 | 67950 | 68100 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Disney | NA | 11.5.3 / 11.4.8 | 90 / 10 |
| 105 | 68100 | 68300 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Vertosol | ZCQ | NA | Blackwater | NA | 11.5.3 / 11.4.8 | 90 / 10 |
| 106 | 68300 | 68550 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Vertosol | ZCQ | NA | Blackwater | NA | 11.3.25 / 11.3.2 | 90 / 10 |
| 107 | 68550 | 70100 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Vertosol | ZCQ | NA | Blackwater | NA | 11.5.3 / 11.4.8 / 11.3.1 | 85 / 10 / 5 |
| 108 | 70100 | 70700 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Vertosol | ZCQ | NA | Blackwater | NA | 11.11.9 / 11.11.13 / 11.11.10 | 80 / 15 / 5 |
| 109 | 70700 | 72200 | Arenite Mudrock (Cu) - Feldspatholithic sandstone, mudstone, siltstone (commonly tuffaceous, minor algal and oolitic limestone) | Sodosol | ZCQ | NA | Rutland | NA | 11.11.9 / 11.11.13 / 11.11.10 | 80 / 15 / 5 |
| 110 | 72200 | 72850 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Rutland | NA | 11.11.9 / 11.11.13 / 11.11.10 | 80 / 15 / 5 |
| 111 | 72850 | 73900 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Rutland | NA | 11.5.3 | 100 |
| 112 | 73900 | 74200 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Rutland | NA | 11.11.9 / 11.11.13 / 11.11.10 | 80 / 15 / 5 |
| 113 | 74200 | 74650 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Rutland | NA | 11.11.13 / 11.5.3 / 11.3.1 | 70 / 25 / 5 |
| 114 | 74650 | 75550 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Rutland | NA | 11.11.9 / 11.11.13 / 11.11.10 | 80 / 15 / 5 |
| 115 | 75550 | 75700 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Rutland | NA | 11.3.25 / 11.3.2 | 90 / 10 |
| 116 | 75700 | 76400 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Rutland | NA | 11.11.9 / 11.11.13 / 11.11.16 | 50 / 45 / 5 |
| 117 | 76400 | 76850 | Arenite Mudrock (Cu) - Feldspatholithic sandstone, mudstone, siltstone (commonly tuffaceous, minor algal and oolitic limestone) | Sodosol | ZCQ | NA | Rutland | NA | 11.11.9 / 11.11.13 / 11.11.16 | 50 / 45 / 5 |
| 118 | 76850 | 77150 | Arenite Mudrock (Cu) - Feldspatholithic sandstone, mudstone, siltstone (commonly tuffaceous, minor algal and oolitic limestone) | Sodosol | ZCQ | NA | Rutland | NA | 11.11.9 / 11.11.10 | 50 / 50 |
| 119 | 77150 | 77600 | Arenite Mudrock (Cu) - Feldspatholithic sandstone, mudstone, siltstone (commonly tuffaceous, minor algal and oolitic limestone) | Sodosol | ZCQ | NA | Rutland | NA | 11.11.13 | 100 |
| 120 | 77600 | 77900 | Arenite Mudrock (Cu) - Feldspatholithic sandstone, mudstone, siltstone (commonly tuffaceous, minor algal and oolitic limestone) | Sodosol | ZCQ | NA | Rutland | NA | 11.7.1 | 100 |
| 121 | 77900 | 78350 | Arenite Mudrock (Cu) - Feldspatholithic sandstone, mudstone, siltstone (commonly tuffaceous, minor algal and oolitic limestone) | Sodosol | ZCQ | NA | Rutland | NA | 11.5.3 | 100 |
| 122 | 78350 | 78500 | Arenite Mudrock (Cu) - Feldspatholithic sandstone, mudstone, siltstone (commonly tuffaceous, minor algal and oolitic limestone) | Sodosol | ZCQ | NA | Rutland | NA | 11.7.7 | 100 |
| 123 | 78500 | 78650 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Rutland | NA | 11.7.7 | 100 |
| 124 | 78650 | 79200 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Rutland | NA | 11.5.3 | 100 |
| 125 | 79200 | 79300 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Rutland | NA | 11.7.1 | 100 |
| 126 | 79300 | 79650 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Rutland | NA | 11.5.3 | 100 |
| 127 | 79650 | 79750 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Rutland | NA | 11.3.2 / 11.3.25 | 60 / 40 |
| 128 | 79750 | 80000 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 | 100 |
| 129 | 80000 | 80100 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.7.1 | 100 |
| 130 | 80100 | 80500 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 | 100 |
| 131 | 80500 | 80600 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.7.1 | 100 |
| 132 | 80600 | 80700 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 | 100 |

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|--------------------------------|------------------------------------|-------------------|
| 133 | 80700 | 80900 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.7.1 | 100 |
| 134 | 80900 | 80950 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 | 100 |
| 135 | 80950 | 81100 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.7.1 | 100 |
| 136 | 81100 | 81150 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 | 100 |
| 137 | 81150 | 81350 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.7.1 | 100 |
| 138 | 81350 | 81400 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 | |
| 139 | 81400 | 81450 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 / 11.7.1 | 50 / 50 |
| 140 | 81450 | 81550 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.7.1 | 100 |
| 141 | 81550 | 81750 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 | 100 |
| 142 | 81750 | 81800 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.7.1 | 100 |
| 143 | 81800 | 81950 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 | 100 |
| 144 | 81950 | 82150 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 / 11.7.1 | 50 / 50 |
| 145 | 82150 | 82400 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 | 100 |
| 146 | 82400 | 82700 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 / 11. 7.1 | 50 / 50 |
| 147 | 82700 | 83050 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Tichbourne | NA | 11.5.3 | 100 |
| 148 | 83050 | 85250 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 149 | 85250 | 86000 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 150 | 86000 | 86650 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 / 11.3.2 | 70 / 30 |
| 151 | 86650 | 86900 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Lennox | NA | 11.5.10 | 100 |
| 152 | 86900 | 87300 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 153 | 87300 | 87600 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 154 | 87600 | 88100 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.5.10 | 100 |
| 155 | 88100 | 90050 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 156 | 90050 | 90300 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.5.10 | 100 |
| 157 | 90300 | 90900 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 158 | 90900 | 91100 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 159 | 91100 | 91250 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Disney | NA | 11.4.8 | 100 |
| 160 | 91250 | 91350 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Disney | NA | 11.5.3 | 100 |
| 161 | 91350 | 91500 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Disney | NA | 11.5.10 | 100 |
| 162 | 91500 | 91800 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Disney | NA | 11.5.3 | 100 |
| 163 | 91800 | 91950 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Disney | NA | 11.5.10 | 100 |
| 164 | 91950 | 92500 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 165 | 92500 | 93350 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 166 | 93350 | 93600 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 167 | 93600 | 93800 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Lennox | NA | 11.3.2 | 100 |
| 168 | 93800 | 94550 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Lennox | NA | 11.3.2 / 11.3.7 | 100 |
| 169 | 94550 | 95000 | Sedimentary Rock (T) - Quartzose sandstone conglomerate and siltstone | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 170 | 95000 | 100550 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 171 | 100550 | 100800 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.3.25 / 11.5.3 | 50 / 50 |
| 172 | 100800 | 103550 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 173 | 103550 | 104500 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Humboldt | NA | 11.5.3 | 100 |
| 174 | 104500 | 104900 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.8 / 11.5.3 | 90 / 10 |
| 175 | 104900 | 105100 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Humboldt | NA | 11.5.3 | 100 |
| 176 | 105100 | 105650 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 177 | 105650 | 105800 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.4.8 | 100 |
| 178 | 105800 | 106400 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 179 | 106400 | 107000 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Kandasol | ZCQ | NA | Lennox | NA | 11.4.8 / 11.4.9 | 80 / 20 |
| 180 | 107000 | 107850 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.8 / 11.4.9 | 80 / 20 |
| 181 | 107850 | 108000 | Alluvium (Q) - Alluvium of older flood plains, sand, gravel, soil | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.8 / 11.4.9 / 11.5.3 | 70 / 20 / 10 |
| 182 | 108000 | 109600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.8 / 11.4.9 / 11.5.4 | 71 / 20 / 10 |
| 183 | 109600 | 110000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.5.3 | 100 |
| 184 | 110000 | 110200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.5.3 | 100 |
| 185 | 110200 | 111900 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.8 / 11.4.9 / 11.5.3 | 70 / 20 / 10 |
| 186 | 111900 | 112000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.8 / 11.4.9 / 11.5.3 | 70 / 20 / 10 |
| 187 | 112000 | 112300 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.5.3 | 100 |
| 188 | 112300 | 115400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.9 / 11.5.3 | 50 / 50 |
| 189 | 115400 | 116100 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.9 | 100 |
| 190 | 116100 | 116250 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Comet | NA | 11.4.9 | 100 |
| 191 | 116250 | 117200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Comet | NA | 11.3.3 / 11.3.2 / 11.3.1 / 11.3.5 | 40 / 40 / 10 / 10 |
| 192 | 117200 | 117400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Comet | NA | 11.3.25 | 100 |
| 193 | 117400 | 117600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.3.37 / 11.3.2 / 11.3.1 / 11.3.5 | 40 / 40 / 10 / 10 |

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|--------------------------------|---------------------------|---------------|
| 194 | 117600 | 120700 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.9 / 11.4.6 | 80 / 20 |
| 195 | 120700 | 124200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3 / 11.4.9 / 11.4.6 | 90 / 5 / 5 |
| 196 | 124200 | 124800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.9 / 11.4.6 | 80 / 20 |
| 197 | 124800 | 125400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.4.9 / 11.4.6 | 80 / 20 |
| 198 | 125400 | 125800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.5.3 / 11.4.9 / 11.4.6 | 90 / 5 / 5 |
| 199 | 125800 | 126600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.6 | 100 |
| 200 | 126600 | 126750 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.4.6 | 100 |
| 201 | 126600 | 127400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3 | 100 |
| 202 | 127400 | 127950 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3 / 11.4.9 / 11.4.6 | 90 / 5 / 5 |
| 203 | 127950 | 128300 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.4.9 / 11.5.3 | 60 / 40 |
| 204 | 128300 | 128600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3 | 100 |
| 205 | 128600 | 129300 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.9 / 11.5.3 | 60 / 40 |
| 206 | 129300 | 129400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.5.3 / 11.4.9 / 11.4.6 | 90 / 5 / 5 |
| 207 | 129400 | 129600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.5.3 | 100 |
| 208 | 129600 | 130000 | Arenite (Cr) - Flaggy quartzose sandstone, siltstone and minor limestone | Vertosol | ZCQ | NA | Blackwater | NA | 11.5.3 | 100 |
| 209 | 130000 | 130400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.9 / 11.4.6 / 11.5.3 | 40 / 40 / 20 |
| 210 | 130400 | 130800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.5.3 / 11.4.9 / 11.4.6 | 90 / 5 / 5 |
| 211 | 130800 | 131200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.9 / 11.4.6 / 11.5.3 | 40 / 40 / 20 |
| 212 | 131200 | 131600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.5.3 / 11.4.9 / 11.4.6 | 90 / 5 / 5 |
| 213 | 131600 | 132250 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.9 / 11.4.6 / 11.5.3 | 40 / 40 / 20 |
| 214 | 132250 | 132850 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.5.3 | 100 |
| 215 | 132850 | 132950 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.9 / 11.4.6 / 11.5.3 | 40 / 40 / 20 |
| 216 | 132950 | 134600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.9 / 11.4.6 / 11.3.37 | 40 / 40 / 20 |
| 217 | 134600 | 134800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Rudosol | ZCQ | NA | Borilla | NA | 11.4.9 / 11.4.6 / 11.3.37 | 40 / 40 / 20 |
| 218 | 134800 | 135400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Rudosol | ZCQ | NA | Borilla | NA | 11.12.1 / 11.4.8 | 90 / 10 |
| 219 | 135400 | 136600 | Felsites (Lavas, Clastics, and High Level Intrusives (DCs) - Rhyolite, dacite, rhyolitic ignimbrite, volcaniclastic sediments, sinter, minor sandstone and siltstone | Rudosol | ZCQ | NA | Borilla | NA | 11.12.1 / 11.4.8 | 90 / 10 |
| 220 | 136600 | 137000 | Felsites (Lavas, Clastics, and High Level Intrusives (DCs) - Rhyolite, dacite, rhyolitic ignimbrite, volcaniclastic sediments, sinter, minor sandstone and siltstone | Vertosol | ZCQ | NA | Borilla | NA | 11.12.1 / 11.4.8 | 90 / 10 |
| 221 | 137000 | 137800 | Felsites (Lavas, Clastics, and High Level Intrusives (DCs) - Rhyolite, dacite, rhyolitic ignimbrite, volcaniclastic sediments, sinter, minor sandstone and siltstone | Vertosol | ZCQ | NA | Borilla | NA | 11.4.6 | 100 |
| 222 | 137800 | 138600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Borilla | NA | 11.4.6 | 100 |
| 223 | 138600 | 139000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.6 | 100 |
| 224 | 139000 | 139450 | Felsites (Lavas, Clastics, and High Level Intrusives (DCs) - Rhyolite, dacite, rhyolitic ignimbrite, volcaniclastic sediments, sinter, minor sandstone and siltstone | Vertosol | ZCQ | NA | Islay | NA | 11.12.1 / 11.4.8 | 90 / 10 |
| 225 | 139450 | 140000 | Felsites (Lavas, Clastics, and High Level Intrusives (DCs) - Rhyolite, dacite, rhyolitic ignimbrite, volcaniclastic sediments, sinter, minor sandstone and siltstone | Vertosol | ZCQ | NA | Islay | NA | 11.3.1 / 11.3.5 / 11.3.37 | 35 / 35 / 30 |

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|--------------------------------|---------------------------|---------------|
| 226 | 140000 | 140300 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.3.1 / 11.3.5 / 11.3.37 | 35 / 35 / 30 |
| 227 | 140300 | 140400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.1 | 100 |
| 228 | 140400 | 140600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Funnel | NA | 11.4.1 | 100 |
| 229 | 140600 | 140800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Funnel | NA | 11.3.1 / 11.3.5 / 11.3.37 | 35 / 35 / 30 |
| 230 | 140800 | 141000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 / 11.3.1 | 90 / 10 |
| 231 | 141000 | 142000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Funnel | NA | 11.3.1 / 11.3.25 / 11.3.3 | 60 / 30 / 10 |
| 232 | 142000 | 142900 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 / 11.3.1 / 11.3.5 | 70 / 20 / 10 |
| 233 | 142900 | 143200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Funnel | NA | 11.4.4 | 100 |
| 234 | 143200 | 143400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.4 | 100 |
| 235 | 143400 | 143850 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.9 / 11.4.6 / 11.5.3 | 35 / 35 / 30 |
| 236 | 143850 | 144400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.12 / 11.4.8 | 90 / 10 |
| 237 | 144400 | 145150 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.11.16 | 100 |
| 238 | 145150 | 145600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.11 | 100 |
| 239 | 145600 | 145800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.11.16 | 100 |
| 240 | 145800 | 146800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.11 | 100 |
| 241 | 146800 | 147100 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.9 / 11.4.6 / 11.4.8 | 35 / 35 / 30 |
| 242 | 147100 | 147200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.11 | 100 |
| 243 | 147200 | 147900 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Lennox | NA | 11.4.9 / 11.4.6 / 11.4.8 | 35 / 35 / 30 |
| 244 | 147900 | 148500 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.11 | 100 |
| 245 | 148500 | 148900 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.5.3 | 100 |
| 246 | 148900 | 149200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.11 | 100 |
| 247 | 149200 | 149400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Lennox | NA | 11.4.11 | 100 |
| 248 | 149400 | 151100 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 | 100 |
| 249 | 151100 | 151400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Lennox | NA | 11.5.9c / 11.5.3 | 50 / 50 |
| 250 | 151400 | 152100 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Lennox | NA | 11.4.6 / 11.5.3 | 50 / 50 |
| 251 | 152100 | 153100 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Lennox | NA | 11.5.9c / 11.5.3 | 50 / 50 |
| 252 | 153100 | 157000 | Ferricrete (Czd) - Laterite | Kandasol | ZCQ | NA | Lennox | NA | 11.5.9c / 11.5.4 | 51 / 50 |
| 253 | 157000 | 159400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3 / 11.5.9C | 80 / 20 |
| 254 | 159400 | 159800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Lennox | NA | 11.5.3/11.4.9/11.4.6 | 60 / 20 / 20 |
| 255 | 159800 | 160000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Lennox | NA | | |
| 256 | 160000 | 160200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.5.3/11.4.9/11.4.7 | 61 / 20 / 20 |
| 257 | 160000 | 162000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.6 / 11.4.9 | 70 / 30 |
| 258 | 162000 | 162300 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.6 | 100 |
| 259 | 162300 | 163300 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.6 | 100 |
| 260 | 163300 | 166100 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.9/11.4.6/11.5.3 | 35 / 35 / 30 |
| 261 | 166100 | 166800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.4.9/11.4.6/11.5.3 | 35 / 35 / 30 |
| 262 | 166100 | 167500 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3/11.5.9c/11.4.9 | 40 / 40 / 20 |
| 263 | 167500 | 168800 | Ferricrete (Czd) - Laterite | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3/11.5.9c/11.4.9 | 40 / 40 / 20 |
| 264 | 168800 | 169000 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3/11.5.9c/11.4.9 | 40 / 40 / 20 |

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|--------------------------------|-----------------------|---------------|
| 265 | 169000 | 169480 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.1/11.3.5/11.3.25 | 45 / 45 / 10 |
| 266 | 169480 | 169630 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.25 | 100 |
| 267 | 169630 | 170150 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 | 100 |
| 268 | 170150 | 171000 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.21 | 100 |
| 269 | 171000 | 171180 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 | 100 |
| 270 | 171180 | 171450 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.1 | 100 |
| 271 | 171450 | 172100 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 | 100 |
| 272 | 172100 | 172200 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Avon | NA | 11.3.3 | 100 |
| 273 | 172200 | 172850 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Avon | NA | 11.3.21 | 100 |
| 274 | 172850 | 172900 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.21 | 100 |
| 275 | 172900 | 173550 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 | 100 |
| 276 | 173550 | 173680 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.21 | 100 |
| 277 | 173680 | 173800 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 | 100 |
| 278 | 173800 | 173970 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Avon | NA | 11.3.21 | 100 |
| 279 | 173970 | 174170 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Avon | NA | 11.3.3 | 100 |
| 280 | 174170 | 174400 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Avon | NA | 11.3.21 | 100 |
| 281 | 174400 | 174830 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.21 | 100 |
| 282 | 174830 | 174970 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.25 | 100 |
| 283 | 174970 | 175100 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.21 | 100 |
| 284 | 175100 | 175500 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 | 100 |
| 285 | 175500 | 175600 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.21 | 100 |
| 286 | 175600 | 175800 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Avon | NA | 11.3.21 | 100 |
| 287 | 175800 | 176050 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Avon | NA | 11.4.11 | 100 |
| 288 | 176050 | 176150 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Avon | NA | 11.3.21 | 100 |
| 289 | 176150 | 177000 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Avon | NA | 11.4.11 | 100 |
| 290 | 177000 | 177250 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Avon | NA | 11.4.9 | 100 |
| 291 | 177250 | 178350 | Ferricrete (Czd) - Laterite | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.9 | 100 |
| 292 | 178350 | 179100 | Ferricrete (Czd) - Laterite | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.11 | 100 |
| 293 | 179100 | 179200 | Ferricrete (Czd) - Laterite | Vertosol | ZCQ | NA | Avon | NA | 11.4.11 | 100 |
| 294 | 179200 | 179280 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Avon | NA | 11.4.11 | 100 |
| 295 | 179280 | 180500 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Avon | NA | 11.4.4 | 100 |
| 296 | 180500 | 181200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Avon | NA | 11.4.11 | 100 |
| 297 | 181200 | 181400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Avon | NA | 11.4.11 | 100 |
| 298 | 181400 | 182000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Avon | NA | 11.4.9 / 11.3.2 | 80 / 20 |
| 299 | 182000 | 182350 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.4.6 | 100 |
| 300 | 182350 | 182500 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.4.4 | 100 |
| 301 | 182500 | 183850 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Avon | NA | 11.4.4 | 100 |
| 302 | 183850 | 185720 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Avon | NA | 11.4.6 | 100 |

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|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|--------------------------------|-------------------------------------|-------------------|
| 303 | 185720 | 185800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.4.6 | 100 |
| 304 | 185800 | 186100 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.4.11 / 11.4.6 | 90 / 10 |
| 305 | 186100 | 186400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.4.6 | 100 |
| 306 | 186400 | 186800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.4.11 / 11.4.6 | 80 / 20 |
| 307 | 186800 | 187200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.4.6 | 100 |
| 308 | 187200 | 187800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.4.11 / 11.4.6 | 80 / 20 |
| 309 | 187800 | 188250 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.4.6 | 100 |
| 310 | 188250 | 188400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.4.11 / 11.4.6 | 80 / 20 |
| 311 | 188400 | 189100 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Moray | NA | 11.4.11 / 11.4.6 | 80 / 20 |
| 312 | 189100 | 190400 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Moray | NA | 11.4.6 | 100 |
| 313 | 190400 | 190900 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.4.6 | 100 |
| 314 | 190900 | 192900 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.4.11 / 11.4.6 | 80 / 20 |
| 315 | 192900 | 193800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Moray | NA | 11.3.3 / 11.4.11 | 70 / 30 |
| 316 | 193800 | 194000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 / 11.4.11 | 70 / 30 |
| 317 | 194000 | 194750 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 / 11.4.11 | 70 / 30 |
| 318 | 194750 | 194850 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.3 / 11.3.21 / 11.3.5 / 11.4.11 | 25 / 25 / 25 / 25 |
| 319 | 194850 | 195300 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.3.5 | 100 |
| 320 | 195300 | 196000 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Funnel | NA | 11.4.9 | 100 |
| 321 | 196000 | 196100 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.9 | 100 |
| 322 | 196100 | 196300 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.5 / 11.4.9 | 80 / 20 |
| 323 | 196300 | 196500 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.9 | 100 |
| 324 | 196500 | 197400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.5 / 11.4.9 | 80 / 20 |
| 325 | 197400 | 197550 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.9 / 11.5.3 | 90 / 10 |
| 326 | 197550 | 198500 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.9 / 11.5.3 | 90 / 10 |
| 327 | 198500 | 200100 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.9 / 11.5.3 | 90 / 10 |
| 328 | 200100 | 201100 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.9 / 11.5.3 | 90 / 10 |
| 329 | 201100 | 202050 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.4.9 / 11.5.3 | 90 / 10 |
| 330 | 202050 | 202600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3/11.7.2/11.4.9 | 60 / 30 / 10 |
| 331 | 202600 | 203250 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.5.3/11.7.2/11.4.10 | 61 / 30 / 10 |
| 332 | 203250 | 203680 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3/11.7.2/11.4.10 | 61 / 30 / 10 |
| 333 | 203680 | 204150 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.12.1 | 100 |
| 334 | 204150 | 204600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3/11.7.2/11.4.9 | 60 / 30 / 10 |
| 335 | 204600 | 205380 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.12.1 | 100 |
| 336 | 205380 | 205720 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Disney | NA | 11.5.3/11.7.2/11.4.9 | 60 / 30 / 10 |
| 337 | 205720 | 206400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.5 / 11.4.9 | 60 / 40 |
| 338 | 206400 | 206850 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.5 / 11.4.9 | 60 / 40 |
| 339 | 206850 | 207500 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.8 | 100 |

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|--------------------------------|--------------------------|---------------------------|---|-------------------------------|--------------------------------------|---|-------------|--------------------------------|-----------------|---------------|
| 340 | 207500 | 208000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.5 / 11.4.9 | 60 / 40 |
| 341 | 208000 | 208180 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.8 | 100 |
| 342 | 208180 | 208450 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.5.3 | 100 |
| 343 | 208450 | 208640 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Disney | NA | 11.5.3 | 100 |
| 344 | 208640 | 209600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Disney | NA | 11.4.8 | 100 |
| 345 | 209600 | 210450 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Disney | NA | 11.5.3 | 100 |
| 346 | 210450 | 210690 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Disney | NA | 11.4.8 | 100 |
| 347 | 210690 | 211000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Disney | NA | 11.5.3 | 100 |
| 348 | 211000 | 211400 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZCQ | NA | Disney | NA | 11.4.8 | 100 |
| 349 | 211400 | 212000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.5 / 11.4.9 | 60 / 40 |
| 350 | 212000 | 212150 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.9 | 100 |
| 351 | 212150 | 212550 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.4.9 | 100 |
| 352 | 212550 | 212950 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.3 | 100 |
| 353 | 212950 | 213800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.4.9 | 100 |
| 354 | 213800 | 214350 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.3.2 / 11.3.5 | 50 / 50 |
| 355 | 214350 | 215700 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.4.8 / 11.4.6 | 90 / 10 |
| 356 | 215700 | 217750 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 357 | 217750 | 217900 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 358 | 217900 | 218250 | Felsites (Lavas, Clastics, and High Level Intrusives (Cvb) - Rhyolitic to dacitic ignimbrite and lava flows and domes | Vertosol | ZCQ | NA | Somerby | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 359 | 218250 | 218400 | Felsites (Lavas, Clastics, and High Level Intrusives (Cvb) - Rhyolitic to dacitic ignimbrite and lava flows and domes | Vertosol | ZCQ | NA | Somerby | NA | 11.7.2 | 100 |
| 360 | 218400 | 218800 | Felsites (Lavas, Clastics, and High Level Intrusives (Cvb) - Rhyolitic to dacitic ignimbrite and lava flows and domes | Sodosol | ZCQ | NA | Ulcanbah | NA | 11.7.2 | 100 |
| 361 | 218800 | 219400 | Felsites (Lavas, Clastics, and High Level Intrusives (Cvb) - Rhyolitic to dacitic ignimbrite and lava flows and domes | Sodosol | ZCQ | NA | Ulcanbah | NA | 11.4.6 | 100 |
| 362 | 219400 | 219900 | Felsites (Lavas, Clastics, and High Level Intrusives (Cvb) - Rhyolitic to dacitic ignimbrite and lava flows and domes | Sodosol | ZCQ | NA | Ulcanbah | NA | 11.7.2 | 100 |
| 363 | 219900 | 220100 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Ulcanbah | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 364 | 220100 | 220200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 365 | 220200 | 220600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.8 / 11.4.6 | 90 / 10 |
| 366 | 220600 | 220950 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 367 | 220950 | 222200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.8 / 11.4.6 | 90 / 10 |
| 368 | 222200 | 223000 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.2 / 11.4.6 | 90 / 10 |
| 369 | 223000 | 223800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.8 / 11.4.6 | 90 / 10 |
| 370 | 223800 | 224200 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.8 / 11.4.6 | 90 / 10 |
| 371 | 224200 | 224600 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 372 | 224600 | 224800 | Miscellaneous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.8 / 11.4.6 | 90 / 10 |
| 373 | 224800 | 225200 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Islay | NA | 11.4.9 / 11.4.5 | 60 / 40 |

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|--------------------------------|--------------------------|---------------------------|---|-------------------------------|--------------------------------------|---|-------------|--------------------------------|-----------------|---------------|
| 374 | 225200 | 225280 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Islay | NA | 11.3.1 | 100 |
| 375 | 225280 | 225650 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Comet | NA | 11.3.25 | 100 |
| 376 | 225650 | 225900 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Comet | NA | 11.3.1 | 100 |
| 377 | 225900 | 226000 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Comet | NA | 11.3.25 | 100 |
| 378 | 226000 | 226130 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Comet | NA | 11.3.1 | 100 |
| 379 | 226130 | 226400 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Comet | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 380 | 226400 | 227600 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 381 | 227600 | 227800 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.5.3 / 11.4.9 | 60 / 40 |
| 382 | 227800 | 228600 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 383 | 228600 | 229800 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Islay | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 384 | 229800 | 231800 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Islay | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 385 | 231800 | 232150 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.9 / 11.4.5 | 60 / 40 |
| 386 | 232150 | 234400 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.9 / 11.4.8 | 70 / 30 |
| 387 | 234400 | 235450 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.2 / 11.4.4 | 50 / 50 |
| 388 | 235450 | 236600 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.9 / 11.4.8 | 70 / 30 |
| 389 | 236600 | 237400 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.2 / 11.4.4 | 50 / 50 |
| 390 | 237400 | 237800 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.9 / 11.4.8 | 70 / 30 |
| 391 | 237800 | 238500 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.5.3 / 11.4.9 | 60 / 40 |
| 392 | 238500 | 238700 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.2 / 11.4.4 | 50 / 50 |
| 393 | 238700 | 240200 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.5.3 / 11.4.9 | 60 / 40 |
| 394 | 240200 | 252800 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.12.1 | 100 |
| 395 | 252800 | 253100 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Somerby | NA | 11.4.8 | 100 |
| 396 | 253100 | 254400 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.8 | 100 |
| 397 | 254400 | 256300 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.3.2 / 11.4.9 | 80 / 20 |
| 398 | 256300 | 256750 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.9 / 11.4.8 | 70 / 30 |
| 399 | 256750 | 258000 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.9 | 100 |
| 400 | 258000 | 258250 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.4.9 | 100 |
| 401 | 258250 | 261700 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.5.9c | 100 |
| 402 | 261700 | 262300 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Monteagle | NA | 11.4.1 | 100 |
| 403 | 262300 | 263000 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.1 | 100 |
| 404 | 263000 | 263300 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.3.2 | 100 |
| 405 | 263300 | 263800 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Blackwater | NA | 11.3.2 | 100 |
| 406 | 263800 | 263950 | Alluvium (Cza) - Alluvium, mainly clay, silt, sand and gravel | Vertosol | ZCQ | NA | Blackwater | NA | 11.3.25 | 100 |
| 407 | 263950 | 264600 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.3.2 | 100 |
| 408 | 264600 | 264950 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.4 | 100 |
| 409 | 264950 | 265500 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.4 | 100 |
| 410 | 265500 | 265900 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.9 | 100 |

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|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|--------------------------------|--------------------------|---------------|
| 411 | 265900 | 266100 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.5.3 | 100 |
| 412 | 266100 | 268400 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.9 | 100 |
| 413 | 268400 | 268500 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Blackwater | NA | 11.4.2 / 11.4.9 | 80 / 20 |
| 414 | 268500 | 268600 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.2 / 11.4.9 | 80 / 20 |
| 415 | 268600 | 269100 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.3.2 / 11.5.3 | 60 / 40 |
| 416 | 269100 | 271150 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.2 / 11.4.9 | 80 / 20 |
| 417 | 271150 | 271200 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.2 / 11.4.9 | 80 / 20 |
| 418 | 271200 | 273850 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.4.9 | 100 |
| 419 | 273850 | 275200 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.8.13 | 100 |
| 420 | 275200 | 275400 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.8.5 | 100 |
| 421 | 275400 | 275700 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.8.13 | 100 |
| 422 | 275700 | 276180 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.8.5 | 100 |
| 423 | 276180 | 26300 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.8.13 | 100 |
| 424 | 276300 | 277150 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Vertosol | ZCQ | NA | Kinsale | NA | 11.8.13 | 100 |
| 425 | 277150 | 278600 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZCQ | NA | Humboldt | NA | 11.8.13 | 100 |
| 426 | 278600 | 280800 | Colluvium (Cvs) - Sandstone, claystone, siltstone, conglomerate, laterite, oil shale, brown coal, sandstone breccia. | Sodosol | ZCQ | NA | Humboldt | NA | 11.8.13 | 100 |
| 427 | 280800 | 281200 | Colluvium (Cvs) - Sandstone, claystone, siltstone, conglomerate, laterite, oil shale, brown coal, sandstone breccia. | Sodosol | ZCQ | NA | Humboldt | NA | 11.7.4 | 100 |
| 428 | 281200 | 281850 | Colluvium (Cvs) - Sandstone, claystone, siltstone, conglomerate, laterite, oil shale, brown coal, sandstone breccia. | Kandasol | ZCQ | NA | Lennox | NA | 11.7.4 | 100 |
| 429 | 281850 | 284800 | Colluvium (Cvs) - Sandstone, claystone, siltstone, conglomerate, laterite, oil shale, brown coal, sandstone breccia. | Kandasol | ZCQ | NA | Lennox | NA | 11.7.4 / 11.8.3 | 60 / 40 |
| 430 | 284800 | 285550 | Colluvium (Cvs) - Sandstone, claystone, siltstone, conglomerate, laterite, oil shale, brown coal, sandstone breccia. | Kandasol | ZCQ | NA | Lennox | NA | 11.8.3 | 100 |
| 431 | 285550 | 285600 | Colluvium (Cvs) - Sandstone, claystone, siltstone, conglomerate, laterite, oil shale, brown coal, sandstone breccia. | Kandasol | ZCQ | NA | Lennox | NA | 11.7.4 / 11.8.3 | 60 / 40 |
| 432 | 285600 | 286000 | Colluvium (Cvs) - Sandstone, claystone, siltstone, conglomerate, laterite, oil shale, brown coal, sandstone breccia. | Kandasol | ZEB | mb21 | NA | NA | 11.7.4 / 11.8.3 | 60 / 40 |
| 433 | 286000 | 286150 | Colluvium (Cvs) - Sandstone, claystone, siltstone, conglomerate, laterite, oil shale, brown coal, sandstone breccia. | Kandasol | ZEB | mb21 | NA | NA | 11.8.3 | 100 |
| 434 | 286150 | 287050 | Colluvium (Cvs) - Sandstone, claystone, siltstone, conglomerate, laterite, oil shale, brown coal, sandstone breccia. | Kandasol | ZEB | mb21 | NA | NA | 11.5.15 | 100 |
| 435 | 287050 | 287250 | Colluvium (Cvs) - Sandstone, claystone, siltstone, conglomerate, laterite, oil shale, brown coal, sandstone breccia. | Kandasol | ZEB | mb21 | NA | NA | 11.5.9c | 100 |
| 436 | 287250 | 287600 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Kandasol | ZEB | mb21 | NA | NA | 11.5.15 | 100 |
| 437 | 287600 | 288700 | Miscellenous Unconsolidated Sediments (Czr) - Soil, alluvium, gravel, scree, 'billy', sand duricrust. | Sodosol | ZEB | Sb10 | NA | NA | 11.5.3 | 100 |
| 438 | 288700 | 288850 | Basal (Czb) - Olivine basalt lava flows. | Sodosol | ZEB | Sb10 | NA | NA | 11.5.3 | 100 |
| 439 | 288850 | 289850 | Basal (Czb) - Olivine basalt lava flows. | Sodosol | ZEB | Sb10 | NA | NA | 11.8.13 | 100 |
| 440 | 289850 | 290100 | Basal (Czb) - Olivine basalt lava flows. | Sodosol | ZEB | Sb10 | NA | NA | 11.4.9 / 11.5.15 | 80 / 20 |
| 441 | 290100 | 291200 | Basal (Czb) - Olivine basalt lava flows. | Vertosol | ZEB | Ce7 | NA | NA | 11.8.13 | 100 |
| 442 | 291200 | 291500 | Basal (Czb) - Olivine basalt lava flows. | Sodosol | ZEB | Sb10 | NA | NA | 11.8.13 | 100 |
| 443 | 291500 | 291600 | Basal (Czb) - Olivine basalt lava flows. | Sodosol | ZEB | Sb10 | NA | NA | 11.4.9 / 11.5.15 | 100 |
| 444 | 291600 | 292000 | Basal (Czb) - Olivine basalt lava flows. | Vertosol | ZEB | Ce7 | NA | NA | 11.4.9 / 11.5.15 | 100 |
| 445 | 292000 | 296200 | Basal (Czb) - Olivine basalt lava flows. | Vertosol | ZEB | Ce7 | NA | NA | 11.8.5 | 100 |
| 446 | 296200 | 296400 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Vertosol | ZEB | Ce7 | NA | NA | 11.8.5 | 100 |
| 447 | 296400 | 296850 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Vertosol | ZEB | Ce7 | NA | NA | 11.9.9 / 11.9.2 / 11.9.5 | 50 / 40 / 10 |
| 448 | 296850 | 297000 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Vertosol | ZEB | Rf5 | NA | NA | 11.9.9 / 11.9.2 / 11.9.5 | 50 / 40 / 10 |
| 449 | 297000 | 297350 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Vertosol | ZEB | Rf5 | NA | NA | 11.8.5 | 100 |

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|--------------------------------|--------------------------|---------------------------|---|-------------------------------|--------------------------------------|---|-------------|--------------------------------|------------------------|---------------|
| 450 | 297350 | 297400 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Vertosol | ZEB | Rf5 | NA | NA | 11.8.5 | 100 |
| 451 | 297400 | 297600 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Vertosol | ZEB | Rf5 | NA | NA | 11.3.1 / 11.3.25 | 80 / 20 |
| 452 | 297600 | 297750 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Vertosol | ZEB | Rf5 | NA | NA | 11.3.25/11.3.1/11.3.10 | 75 / 20 / 5 |
| 453 | 297750 | 298050 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Dermosol | ZEB | Ce7 | NA | NA | 11.3.25/11.3.1/11.3.10 | 75 / 20 / 5 |
| 454 | 298050 | 298300 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Dermosol | ZEB | Ce7 | NA | NA | 11.3.1 / 11.3.25 | 80 / 20 |
| 455 | 298300 | 298600 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Dermosol | ZEB | Ce7 | NA | NA | 11.8.5 | 100 |
| 456 | 298600 | 299800 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Vertosol | ZEB | Ce7 | NA | NA | 11.8.5 | 100 |
| 457 | 299800 | 300600 | Basal (Czb) - Olivine basalt lava flows. | Vertosol | ZEB | Ce8 | NA | NA | 11.8.5 | 100 |
| 458 | 300600 | 302200 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Vertosol | ZEB | Ce9 | NA | NA | 11.8.5 | 100 |
| 459 | 302200 | 303080 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.3.1 / 11.3.25 | 80 / 20 |
| 460 | 303080 | 304150 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.9.3/11.9.2/11.3.25 | 50 / 45 / 5 |
| 461 | 304150 | 304450 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.3.1/11.3.25 | 80 / 20 |
| 462 | 304450 | 304480 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.9.3/11.9.2/11.3.25 | 50 / 45 / 5 |
| 463 | 304480 | 304780 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.9.1 | 100 |
| 464 | 304780 | 305000 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.9.3/11.9.2/11.3.25 | 50 / 45 / 5 |
| 465 | 305000 | 306080 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.9.1 | 100 |
| 466 | 306080 | 308550 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.9.3/11.9.2/11.3.25 | 50 / 45 / 5 |
| 467 | 308550 | 308880 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.9.2 | 100 |
| 468 | 308880 | 314200 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.9.3/11.9.2/11.3.25 | 50 / 45 / 5 |
| 469 | 314200 | 315850 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | Cc5 | NA | NA | 11.9.3/11.9.2/11.3.25 | 50 / 45 / 5 |
| 470 | 315850 | 316400 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | Cc5 | NA | NA | 11.8.13 | 100 |
| 471 | 316400 | 316800 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.8.13 | 100 |
| 472 | 316800 | 318350 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.9.3/11.9.2/11.3.25 | 50 / 45 / 5 |
| 473 | 318350 | 319150 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.3.4 / 11.5.3 | 90 / 10 |
| 474 | 319150 | 319400 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.9.3/11.9.2/11.3.25 | 50 / 45 / 5 |

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|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|--------------------------------|------------------------|---------------|
| 475 | 319400 | 319520 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.3.25/11.3.1/11.3.10 | 75 / 20 / 5 |
| 476 | 319520 | 321250 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.9.2 | 100 |
| 477 | 321250 | 321800 | Sedimentary Rock (PWT) - Sandstone, conglomerate, mudstone, carbonaceous shale, coal, cherty tuff | Sodosol | ZEB | Cc5 | NA | NA | 11.9.1 | 100 |
| 478 | 321800 | 322600 | Granitoid (Ki) - Gabbro, leuco-diorite, quartz hornblende diorite, biotite-hornblende granodiorite, microgranite, rhyolite, trachyte | Sodosol | ZEB | Cc5 | NA | NA | 11.9.1 | 100 |
| 479 | 322600 | 323600 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | Cc5 | NA | NA | 11.9.2 | 100 |
| 480 | 323600 | 324100 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | Cc5 | NA | NA | 11.3.1/11.3.10/11.3.25 | 75/20/5 |
| 481 | 324100 | 324200 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | Cc5 | NA | NA | 11.9.2/11.9.10/11.9.9 | 75/20/5 |
| 482 | 324200 | 326400 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | Cc5 | NA | NA | 11.9.2/11.9.10/11.9.9 | 75/20/5 |
| 483 | 326400 | 326850 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | Cc5 | NA | NA | 11.9.10 | 100 |
| 484 | 326850 | 328600 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | Cc5 | NA | NA | 11.9.2/11.9.10/11.9.9 | 75/20/5 |
| 485 | 328600 | 329150 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | Cc5 | NA | NA | 11.9.3 | 100 |
| 486 | 329150 | 329400 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | Cc5 | NA | NA | 11.9.10 | 100 |
| 487 | 329400 | 329820 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Vertosol | ZEB | Cc18 | NA | NA | 11.9.10 | 100 |
| 488 | 329820 | 332350 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Vertosol | ZEB | Cc5 | NA | NA | 11.9.2/11.9.10/11.9.9 | 75/20/5 |
| 489 | 332350 | 332600 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Vertosol | ZEB | Cc6 | NA | NA | 11.9.10 | 100 |
| 490 | 332600 | 335800 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Vertosol | ZEB | Cc7 | NA | NA | 11.9.10 | 100 |
| 491 | 335800 | 335900 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Vertosol | ZEB | Cc8 | NA | NA | 11.5.3 | 100 |
| 492 | 335900 | 336000 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | RD2 | NA | NA | 11.5.3 | |
| 493 | 336000 | 336350 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | RD3 | NA | NA | 11.9.2/11.9.10/11.9.9 | 75/20/5 |
| 494 | 336350 | 336760 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | RD4 | NA | NA | 11.3.25/11.3.1/11.3.10 | 75/20/5 |
| 495 | 336760 | 337600 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | RD5 | NA | NA | 11.3.1/11.3.10/11.3.25 | 60 / 30 / 10 |
| 496 | 337600 | 338400 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | RD6 | NA | NA | 11.9.5 | 100 |
| 497 | 338400 | 338600 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | RD7 | NA | NA | 11.3.1/11.3.10/11.3.25 | 60 / 30 / 10 |
| 498 | 338600 | 339050 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Vertosol | ZEB | Cd15 | NA | NA | 11.3.1/11.3.10/11.3.25 | 60 / 30 / 10 |
| 499 | 339050 | 340000 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Vertosol | ZEB | Cd15 | NA | NA | 11.3.10/11.3.1/11.3.35 | 75 / 20 / 5 |

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|--------------------------------|------------------------------|------------------|
| 500 | 340000 | 340250 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Vertosol | ZEB | Cf14 | NA | NA | 11.3.10/11.3.1/11.3.35 | 75 / 20 / 5 |
| 501 | 340250 | 341000 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Vertosol | ZEB | Cf14 | NA | NA | 11.3.1 | 100 |
| 502 | 341000 | 341350 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Vertosol | ZEB | Cf14 | NA | NA | 11.3.35 | 100 |
| 503 | 341350 | 346250 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | RD2 | NA | NA | 11.3.35 | 100 |
| 504 | 346250 | 346780 | Arenite - Mudrock (Pwb) - Labile sandstone, siltstone, mudstone, coal, conglomerate in the east | Sodosol | ZEB | RD3 | NA | NA | 11.3.25b | 100 |
| 505 | 346780 | 350200 | Arenite - Mudrock (Pbx) - Quartzose to sublabile sandstone, siltstone, mudstone, rare limestone | Sodosol | ZEB | RD4 | NA | NA | 11.3.30/11.3.9/11.3.7/11.3.4 | 50 / 25 / 20 / 5 |
| 506 | 350200 | 351400 | Sedimentary Rock (Pbe) - Micaceous siltstone, pebbly in places, labile sandstone, quartzose lithic sandstone, coquinite, limestone | Sodosol | ZEB | RD5 | NA | NA | 11.3.30/11.3.9/11.3.7/11.3.4 | 50 / 25 / 20 / 5 |
| 507 | 351400 | 351750 | Sedimentary Rock (Pbe) - Micaceous siltstone, pebbly in places, labile sandstone, quartzose lithic sandstone, coquinite, limestone | Vertosol | ZEB | Cc18 | NA | NA | 11.3.30/11.3.9/11.3.7/11.3.4 | 50 / 25 / 20 / 5 |
| 508 | 351750 | 352000 | Sedimentary Rock (Pbe) - Micaceous siltstone, pebbly in places, labile sandstone, quartzose lithic sandstone, coquinite, limestone | Sodosol | ZEB | GG9 | NA | NA | 11.9.12 | 100 |
| 509 | 352000 | 352125 | Sedimentary Rock (Pbe) - Micaceous siltstone, pebbly in places, labile sandstone, quartzose lithic sandstone, coquinite, limestone | Sodosol | ZEB | GG9 | NA | NA | 11.3.30/11.3.9/11.3.7/11.3.4 | 50 / 25 / 20 / 5 |
| 510 | 352125 | 352200 | Sedimentary Rock (Pbe) - Micaceous siltstone, pebbly in places, labile sandstone, quartzose lithic sandstone, coquinite, limestone | Sodosol | ZEB | GG9 | NA | NA | 11.9.12 | 100 |
| 511 | 352200 | 352450 | Sedimentary Rock (Pbe) - Micaceous siltstone, pebbly in places, labile sandstone, quartzose lithic sandstone, coquinite, limestone | Sodosol | ZEB | GG9 | NA | NA | 11.9.12 | 100 |
| 512 | 352450 | 357200 | Sedimentary Rock (Pbe) - Micaceous siltstone, pebbly in places, labile sandstone, quartzose lithic sandstone, coquinite, limestone | Sodosol | ZEB | GG9 | NA | NA | 11.9.3 / 11.9.9 | 60 / 40 |
| 513 | 357200 | 357600 | Sedimentary Rock (Pbc) - Quartzose sandstone, conglomerate, siltstone, coal | Sodosol | ZEB | GG9 | NA | NA | 11.9.3 / 11.9.9 | 60 / 40 |
| 514 | 357600 | 358125 | Sedimentary Rock (Pbc) - Quartzose sandstone, conglomerate, siltstone, coal | Sodosol | ZEB | GG9 | NA | NA | 11.3.30/11.3.9/11.3.7/11.3.4 | 50 / 25 / 20 / 5 |
| 515 | 358125 | 358500 | Sedimentary Rock (Pbc) - Quartzose sandstone, conglomerate, siltstone, coal | Sodosol | ZEB | GG9 | NA | NA | 11.12.1/11.11.9/11.3.10 | 60 / 20 / 20 |
| 516 | 358500 | 358700 | Granitoid (Ki) - Gabbro, leuco-diorite, quartz hornblende diorite, biotite-hornblende granodiorite, microgranite, rhyolite, trachyte | Sodosol | ZEB | GG9 | NA | NA | 11.12.1/11.11.9/11.3.10 | 60 / 20 / 20 |
| 517 | 358700 | 359200 | Sedimentary Rock (Pbc) - Quartzose sandstone, conglomerate, siltstone, coal | Sodosol | ZEB | GG9 | NA | NA | 11.12.1/11.11.9/11.3.10 | 60 / 20 / 20 |
| 518 | 359200 | 359900 | Granitoid (Ki) - Gabbro, leuco-diorite, quartz hornblende diorite, biotite-hornblende granodiorite, microgranite, rhyolite, trachyte | Sodosol | ZEB | GG9 | NA | NA | 11.12.1/11.11.9/11.3.10 | 60 / 20 / 20 |
| 519 | 359900 | 360800 | Sedimentary Rock (Pbc) - Quartzose sandstone, conglomerate, siltstone, coal | Sodosol | ZEB | GG9 | NA | NA | 11.12.1/11.11.9/11.3.10 | 60 / 20 / 20 |
| 520 | 360800 | 361500 | Granitoid (Ki) - Gabbro, leuco-diorite, quartz hornblende diorite, biotite-hornblende granodiorite, microgranite, rhyolite, trachyte | Sodosol | ZEB | GG9 | NA | NA | 11.12.1/11.11.9/11.3.10 | 60 / 20 / 20 |
| 521 | 361500 | 361800 | Sedimentary Rock (Pbc) - Quartzose sandstone, conglomerate, siltstone, coal | Sodosol | ZEB | GG9 | NA | NA | 11.12.1/11.11.9/11.3.10 | 60 / 20 / 20 |
| 522 | 361800 | 360900 | Granitoid (Ki) - Gabbro, leuco-diorite, quartz hornblende diorite, biotite-hornblende granodiorite, microgranite, rhyolite, trachyte | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1/11.11.9/11.3.10 | 60 / 20 / 20 |
| 523 | 361900 | 363680 | Granitoid (Ki) - Gabbro, leuco-diorite, quartz hornblende diorite, biotite-hornblende granodiorite, microgranite, rhyolite, trachyte | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1/11.11.9/11.3.10 | 60 / 20 / 20 |
| 524 | 363680 | 364400 | Granitoid (Ki) - Gabbro, leuco-diorite, quartz hornblende diorite, biotite-hornblende granodiorite, microgranite, rhyolite, trachyte | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 | 100 |
| 525 | 364400 | 364850 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 | 100 |
| 526 | 364850 | 366500 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 / 11.11.9 | 50 / 50 |
| 527 | 366500 | 367070 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 | 100 |

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|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|--------------------------------|------------------------------|------------------|
| 528 | 367070 | 367350 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.9.12 / 11..9.10 | 60 / 40 |
| 529 | 367350 | 367800 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.3.10 | 100 |
| 530 | 367800 | 367950 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Sodosol | ZEB | RD2 | NA | NA | 11.3.10 | 100 |
| 531 | 367950 | 368150 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Sodosol | ZEB | RD3 | NA | NA | 11.3.35 | 100 |
| 532 | 368150 | 368300 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Sodosol | ZEB | RD4 | NA | NA | 11.3.25b | 100 |
| 533 | 368300 | 370100 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Sodosol | ZEB | RD5 | NA | NA | 11.3.30/11.3.9/11.3.7/11.3.4 | 50 / 25 / 20 / 5 |
| 534 | 370100 | 372800 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.3.30/11.3.9/11.3.7/11.3.4 | 50 / 25 / 20 / 5 |
| 535 | 372800 | 373200 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 | 100 |
| 536 | 373200 | 373400 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.4.4 | 100 |
| 537 | 373400 | 373870 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 | 100 |
| 538 | 373870 | 374400 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.4.4 | 100 |
| 539 | 374400 | 374660 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 | 100 |
| 540 | 374660 | 375400 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.4.4 | 100 |
| 541 | 375400 | 376800 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 | 100 |
| 542 | 376800 | 379800 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.4.4 | 100 |
| 543 | 379800 | 379950 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 | 100 |
| 544 | 379950 | 380440 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.4.4 | 100 |
| 545 | 380440 | 380800 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 | 100 |

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|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|---|----------------------|---------------|
| 546 | 380800 | 381180 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.4.4 | 100 |
| 547 | 381180 | 386640 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 | 100 |
| 548 | 386640 | 386950 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.3.25b | 100 |
| 549 | 386950 | 389250 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.3.9/11.3.7/11.3.4 | 50 / 45 / 5 |
| 550 | 389250 | 389750 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | YD11 | NA | NA | 11.3.9/11.3.7/11.3.4 | 50 / 45 / 5 |
| 551 | 389750 | 391430 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | YD11 | NA | NA | 11.12.1 / 11.2.2 | 90 / 10 |
| 552 | 391430 | 391800 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | YD11 | NA | NA | 11.12.1 | 100 |
| 553 | 391800 | 392400 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 | 100 |
| 554 | 392400 | 393300 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | YD11 | NA | NA | 11.12.1 | 100 |
| 555 | 393300 | 393800 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | YD11 | NA | NA | 11.4.4 | 100 |
| 556 | 393800 | 394200 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.4.4 | 100 |
| 557 | 394200 | 398900 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 | 100 |
| 558 | 397400 | 398900 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | YD11 | NA | NA | 11.12.1 | 100 |
| 559 | 398900 | 399084 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | YD11 | NA | NA | 11.3.25 / 11.3.1 | 100 |
| 560 | 399084 | 399164 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 6Uga | NA | Miscellaneous Alluvial Deposits | 11.12.1 / 11.12.2 | 50 / 50 |
| 561 | 399164 | 399682 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |
| 562 | 399682 | 399848 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Chromosol | BSA | 7Db | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |
| 563 | 399848 | 400138 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |

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|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|---|-------------------|---------------|
| 564 | 400138 | 400369 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |
| 565 | 400369 | 400600 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Ugb | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |
| 566 | 400600 | 400707 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga - 7DbA | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |
| 567 | 400707 | 401100 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga - 7DbA | NA | Weakly to moderately undulating plains on basic extrusive | 11.4.4 | 100 |
| 568 | 401100 | 401209 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga | NA | Weakly to moderately undulating plains on basic extrusive | 11.4.4 | 100 |
| 569 | 401209 | 401500 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga - 7DbA | NA | Weakly to moderately undulating plains on basic extrusive | 11.4.4 | 100 |
| 570 | 401400 | 401500 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga | NA | Weakly to moderately undulating plains on basic extrusive | 11.4.4 | 100 |
| 571 | 401500 | 401771 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |
| 572 | 401771 | 403174 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga - 7DbA | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |
| 573 | 403174 | 406422 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |
| 574 | 406422 | 407286 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Dermosol | BSA | 7Ufa | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |
| 575 | 407286 | 407508 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga | NA | Weakly to moderately undulating plains on basic extrusive | 11.3.31 / 11.3.9 | 90 / 10 |
| 576 | 407508 | 407756 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Dermosol | BSA | 7Ufa | NA | Weakly to moderately undulating plains on basic extrusive | 11.3.31 / 11.3.9 | 90 / 10 |
| 577 | 407756 | 407901 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga | NA | Weakly to moderately undulating plains on basic extrusive | 11.3.31 / 11.3.9 | 90 / 10 |
| 578 | 407901 | 408087 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |
| 579 | 408087 | 408277 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga | NA | Weakly to moderately undulating plains on basic extrusive | 11.3.31 / 11.3.9 | 90 / 10 |
| 580 | 408277 | 409000 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | BSA | 7Uga | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |
| 581 | 409000 | 409206 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcanoclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcanoclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Dermosol | BSA | 7-Ufa - R | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|---|------------------------|---------------|
| 582 | 409206 | 412363 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Dermosol | BSA | 7-Ufa | NA | Weakly to moderately undulating plains on basic extrusive | 11.12.1 / 11.12.2 | 50 / 50 |
| 583 | 412363 | 412440 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Dermosol | BSA | 7-Ufa | NA | Weakly to moderately undulating plains on basic extrusive | 11.3.25b | 100 |
| 584 | 412440 | 412510 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.3.25b | 100 |
| 585 | 412510 | 413500 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 / 11.12.2 | 50 / 50 |
| 586 | 413500 | 417750 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemite | Vertosol | ZEB | YD11 | NA | NA | 11.12.1 / 11.12.2 | 50 / 50 |
| 587 | 417750 | 417860 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Sodosol | ZEB | GG4 | NA | NA | 11.3.10/11.3.7/11.3.34 | 60 / 35 / 5 |
| 588 | 417860 | 418420 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Sodosol | ZEB | GG4 | NA | NA | 11.12.1 / 11.12.2 | 50 / 50 |
| 589 | 418420 | 419800 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Sodosol | ZEB | GG4 | NA | NA | 11.3.10/11.3.7/11.3.34 | 60 / 35 / 5 |
| 590 | 419800 | 420200 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Sodosol | ZEB | GG4 | NA | NA | 11.12.1 / 11.12.2 | 50 / 50 |
| 591 | 420200 | 423400 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Sodosol | ZEB | GG4 | NA | NA | 11.12.1 / 11.12.2 | 50 / 50 |
| 592 | 423400 | 423500 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Sodosol | ZEB | GG4 | NA | NA | 11.3.25b | 100 |
| 593 | 423500 | 424200 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Sodosol | ZEB | GG4 | NA | NA | 11.12.1 / 11.12.2 | 50 / 50 |
| 594 | 424200 | 426600 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.12.1 / 11.12.2 | 50 / 50 |
| 595 | 426600 | 428675 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.3.10/11.3.7/11.3.34 | 60 / 35 / 5 |
| 596 | 428675 | 428800 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.3.25b | 100 |
| 597 | 428800 | 429000 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Vertosol | ZEB | Cf17 | NA | NA | 11.3.30 | 100 |
| 598 | 429000 | 433250 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Dermosol | ZEB | YE16 | NA | NA | 11.3.30 | 100 |
| 599 | 433250 | 433750 | Mafites (Lavas, Clastics, and Highlevel Intrusives) (Pvz) - Basaltic to andesitic lava and volcaniclastic rocks (including breccia and arenite), rhyolitic to dacitic lava and volcaniclastic rocks (including ignimbrite); local siltstone, shale and polymictic conglomerate | Dermosol | ZEB | YE16 | NA | NA | 11.3.10/11.3.7/11.3.34 | 60 / 35 / 5 |
| 600 | 433750 | 434900 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemite | | | | NA | NA | 11.3.10/11.3.7/11.3.34 | 60 / 35 / 5 |
| 601 | 434900 | 435400 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemite | Dermosol | ZEB | YE16 | NA | NA | 11.3.25b | 100 |

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|--|---------------------------------|------------------|
| 602 | 435400 | 436300 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | ZEB | YE16 | NA | NA | 11.3.7/11.3.9/11.3.10 | 60 / 30 / 10 |
| 603 | 436300 | 437350 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Sodosol | ZEB | GH27 | NA | NA | 11.3.7/11.3.9/11.3.10 | 60 / 30 / 10 |
| 604 | 437350 | 438000 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Sodosol | ZEB | GH27 | NA | NA | 11.3.10/11.3.25/11.3.7/11.3.34 | 60 / 20 / 15 / 5 |
| 605 | 438000 | 438280 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Sodosol | ZEB | GH27 | NA | NA | 11.12.1/11.3.10/11.12.9/11.3.32 | 40 / 40 / 15 / 5 |
| 606 | 438280 | 438630 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Sodosol | ZEB | GH27 | NA | NA | 11.3.10/11.3.25/11.3.7/11.3.34 | 60 / 20 / 15 / 5 |
| 607 | 438630 | 438950 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Sodosol | ZEB | GH27 | NA | NA | 11.12.1/11.3.10/11.12.9/11.3.32 | 40 / 40 / 15 / 5 |
| 608 | 438950 | 439450 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Sodosol | ZEB | GH27 | NA | NA | 11.3.10/11.3.25/11.3.7/11.3.34 | 60 / 20 / 15 / 5 |
| 609 | 439450 | 442700 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Sodosol | ZEB | GH27 | NA | NA | 11.12.1/11.3.10/11.3.30 | 60 / 20 / 20 |
| 610 | 442700 | 444700 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Tenosol | ZEB | RC12 | NA | NA | 11.12.1/11.3.10/11.3.30 | 60 / 20 / 20 |
| 611 | 444700 | 446400 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Tenosol | ZEB | RC12 | NA | NA | 11.12.1 / 11.12.9 | 60 / 40 |
| 612 | 446400 | 446600 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Tenosol | ZEB | RC12 | NA | NA | 11.12.1 | 100 |
| 613 | 446600 | 446850 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | ZEB | RC15 | NA | NA | 11.12.1 | 100 |
| 614 | 446850 | 447500 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | ZEB | RC15 | NA | NA | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 615 | 447500 | 447720 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | ZEB | RC15 | NA | NA | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 616 | 447720 | 447870 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | GrSp - Glenroc - Stony Phase | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 617 | 447870 | 448520 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Vertosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 618 | 448520 | 448860 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | Ts - Thurso | NA | Undulating rises on yellowish-brown sandy clay loam intrusive rock | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 619 | 448860 | 450740 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | GrSp - Glenroc - Stony Phase | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 620 | 450740 | 451050 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Vertosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 621 | 451050 | 451590 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | Ts - Thurso | NA | Undulating rises on yellowish-brown sandy clay loam intrusive rock | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 622 | 451590 | 452250 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | Gr - Glenroc | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 623 | 452250 | 452530 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Vertosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 624 | 452530 | 452955 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | GrSp - Glenroc - Stony Phase | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 625 | 452955 | 453110 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Vertosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 626 | 453110 | 453450 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | GrSp - Glenroc - Stony Phase | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 627 | 453450 | 453640 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Vertosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 628 | 453640 | 453785 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | GrSp - Glenroc - Stony Phase | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 629 | 453785 | 454100 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | Bl - Buckley | NA | Undulating plains on acid intrusive rocks | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 630 | 454100 | 454470 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Vertosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.35/11.3.30/11.3.12/11.3.34 | 50 / 30 / 15 / 5 |
| 631 | 454470 | 455095 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | GrSp - Glenroc - Stony Phase | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.35/11.3.31/11.3.30 | 85 / 10 / 15 |
| 632 | 455095 | 456310 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Gr - Glenroc | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.35/11.3.31/11.3.30 | 85 / 10 / 15 |
| 633 | 456310 | 456420 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Gu - Gumlu | NA | Alluvial terraces: relict levees and backplains | 11.3.30 / 11.3.35 | 60 / 40 |
| 634 | 456420 | 456620 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Vertosol | BER | Cr - Carew | NA | Alluvial terraces: stagnant alluvial plains | 11.3.30 / 11.3.35 | 60 / 40 |
| 635 | 456620 | 458100 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Vertosol | BER | Cr - Carew | NA | Alluvial terraces: stagnant alluvial plains | 11.3.29a/11.3.35 | 50 / 50 |
| 636 | 456620 | 458300 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Sodosol | BER | Cv - Castlevew | NA | Alluvial terraces: relict levees and backplains | 11.3.30 / 11.3.35 | 60 / 40 |
| 637 | 458300 | 458565 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Sodosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.30 / 11.3.35 | 60 / 40 |
| 638 | 458565 | 458740 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | TgSv - Tolgai strongly gilgaied variant | NA | Alluvial terraces: stagnant alluvial plains | 11.3.30 / 11.3.35 | 60 / 40 |

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|--|-------------|--|---------------------------------|-------------------|
| 639 | 458740 | 459300 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Sodosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.30 / 11.3.35 | 60 / 40 |
| 640 | 459300 | 459910 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Sodosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.29a/11.3.35 | 50 / 50 |
| 641 | 459300 | 460080 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Gr - Glenroc | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.29a/11.3.35 | 50 / 50 |
| 642 | 460080 | 460525 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Wg - Wygong | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.29a/11.3.35 | 50 / 50 |
| 643 | 460525 | 460740 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | ES - Gullied and eroded areas in sedentary soils | NA | Miscellaneous | 11.3.29a/11.3.35 | 50 / 50 |
| 644 | 460740 | 461000 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Gr - Glenroc | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.29a/11.3.35 | 50 / 50 |
| 645 | 461000 | 461320 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Sodosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.29a/11.3.35 | 50 / 50 |
| 646 | 461320 | 461600 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Gr - Glenroc | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.29a/11.3.35 | 50 / 50 |
| 647 | 461600 | 462400 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Gr - Glenroc | NA | Dissected undulating rises on intermediate intrusive rocks | 11.12.1/11.3.10/11.3.30/11.3.32 | 40 / 40 / 15 / 5 |
| 648 | 462400 | 462800 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | Gr - Glenroc | NA | Dissected undulating rises on intermediate intrusive rocks | 11.12.1/11.3.10/11.3.30/11.3.32 | 40 / 40 / 15 / 5 |
| 649 | 461600 | 462940 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | ES - Gullied and eroded areas in sedentary soils | NA | Miscellaneous | 11.12.1/11.3.10/11.3.30/11.3.32 | 40 / 40 / 15 / 5 |
| 650 | 462940 | 463570 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | Gr - Glenroc | NA | Dissected undulating rises on intermediate intrusive rocks | 11.12.1/11.3.10/11.3.30/11.3.32 | 40 / 40 / 15 / 5 |
| 651 | 463570 | 463960 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | ES - Gullied and eroded areas in sedentary soils | NA | Miscellaneous | 11.12.1/11.3.10/11.3.30/11.3.32 | 40 / 40 / 15 / 5 |
| 652 | 463960 | 464550 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | Gr - Glenroc | NA | Dissected undulating rises on intermediate intrusive rocks | 11.12.1/11.3.10/11.3.30/11.3.32 | 40 / 40 / 15 / 5 |
| 653 | 464550 | 464800 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemitite | Dermosol | BER | ES - Gullied and eroded areas in sedentary soils | NA | Miscellaneous | 11.12.1/11.3.10/11.3.30/11.3.32 | 40 / 40 / 15 / 5 |
| 654 | 464800 | 464950 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | ES - Gullied and eroded areas in sedentary soils | NA | Miscellaneous | 11.3.7 / 11.3.13 | 75 / 25 |
| 655 | 464950 | 465250 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Vertosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 656 | 465250 | 465350 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | EA - Gullied and eroded areas in alluvial terraces | NA | Miscellaneous | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 657 | 465350 | 465700 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Vertosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.25 | 100 |
| 658 | 465700 | 465850 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Vertosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 659 | 465850 | 466100 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | GI - Guthalungra | NA | Alluvial terraces: stagnant alluvial plains | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 660 | 466100 | 466580 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | GI - Guthalungra | NA | Alluvial terraces: stagnant alluvial plains | 11.3.31 | 100 |
| 661 | 466580 | 466820 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | TgSv - Tolgai strongly gilgaied variant | NA | Alluvial terraces: stagnant alluvial plains | 11.3.4 | 100 |
| 662 | 466820 | 466940 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | TgSv - Tolgai strongly gilgaied variant | NA | Alluvial terraces: stagnant alluvial plains | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 663 | 466940 | 467390 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | EA - Gullied and eroded areas in alluvial terraces | NA | Miscellaneous | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 664 | 467390 | 467600 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Vertosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 665 | 467600 | 468230 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Kr - Kangaroo | NA | Alluvial terraces: level plains on cemented fine gravel | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 666 | 468230 | 468405 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | EA - Gullied and eroded areas in alluvial terraces | NA | Miscellaneous | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 667 | 468405 | 468840 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | EM - Gullied and eroded banks of major streams | NA | Miscellaneous | 11.3.25 | 100 |
| 668 | 468840 | 469630 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | EM - Gullied and eroded banks of major streams | NA | Miscellaneous | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 669 | 469630 | 469820 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Gb - Goodbye | NA | Alluvial terraces: stagnant alluvial plains | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 670 | 469820 | 470130 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 671 | 470130 | 470500 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | FI - Finely | NA | Undulating plains on intermediate intrusive rocks | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 672 | 470500 | 470850 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | FI - Finely | NA | Undulating plains on intermediate intrusive rocks | 11.12.10 | 100 |
| 673 | 470850 | 471140 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | FI - Finely | NA | Undulating plains on intermediate intrusive rocks | 11.12.1/11.3.32/11.3.10/11.12.9 | 60 / 20 / 10 / 10 |
| 674 | 471140 | 471405 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | ES - Gullied and eroded areas in sedentary soils | NA | Miscellaneous | 11.12.1/11.3.32/11.3.10/11.12.9 | 60 / 20 / 10 / 10 |
| 675 | 471405 | 471870 | Granitoid (Cud) - Diorite, quartz diorite, tonalite, gabbro, granodiorite; rare adamellite, norite, monzonite, granite; abundant dykes | Dermosol | BER | FI - Finely | NA | Undulating plains on intermediate intrusive rocks | 11.12.1/11.3.32/11.3.10/11.12.9 | 60 / 20 / 10 / 10 |

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|--|-------------|--|---------------------------------|-------------------|
| 676 | 471870 | 472010 | Granitoid (Cud) - Diorite, quartz diorite, tonalite, gabbro, granodiorite; rare adamellite, norite, monzonite, granite; abundant dykes | Dermosol | BER | ES - Gullied and eroded areas in sedentary soils | NA | Miscellaneous | 11.12.1/11.3.32/11.3.10/11.12.9 | 60 / 20 / 10 / 10 |
| 677 | 472010 | 472195 | Granitoid (Cud) - Diorite, quartz diorite, tonalite, gabbro, granodiorite; rare adamellite, norite, monzonite, granite; abundant dykes | Dermosol | BER | Fl - Finely | NA | Undulating plains on intermediate intrusive rocks | 11.12.1/11.3.32/11.3.10/11.12.9 | 60 / 20 / 10 / 10 |
| 678 | 472195 | 472260 | Granitoid (Cud) - Diorite, quartz diorite, tonalite, gabbro, granodiorite; rare adamellite, norite, monzonite, granite; abundant dykes | Dermosol | BER | Wg - Wygong | NA | Dissected undulating rises on intermediate intrusive rocks | 11.12.1/11.3.32/11.3.10/11.12.9 | 60 / 20 / 10 / 10 |
| 679 | 472260 | 472400 | Granitoid (Cud) - Diorite, quartz diorite, tonalite, gabbro, granodiorite; rare adamellite, norite, monzonite, granite; abundant dykes | Dermosol | BER | ES - Gullied and eroded areas in sedentary soils | NA | Miscellaneous | 11.12.1/11.3.32/11.3.10/11.12.9 | 60 / 20 / 10 / 10 |
| 680 | 472400 | 472590 | Granitoid (Cud) - Diorite, quartz diorite, tonalite, gabbro, granodiorite; rare adamellite, norite, monzonite, granite; abundant dykes | Dermosol | BER | ES - Gullied and eroded areas in sedentary soils | NA | Miscellaneous | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 681 | 472590 | 473200 | Granitoid (Cud) - Diorite, quartz diorite, tonalite, gabbro, granodiorite; rare adamellite, norite, monzonite, granite; abundant dykes | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 682 | 473200 | 473860 | Granitoid (Cud) - Diorite, quartz diorite, tonalite, gabbro, granodiorite; rare adamellite, norite, monzonite, granite; abundant dykes | Dermosol | BER | Gr - Glenroc | NA | Dissected undulating rises on intermediate intrusive rocks | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 683 | 473860 | 474180 | Granitoid (Cud) - Diorite, quartz diorite, tonalite, gabbro, granodiorite; rare adamellite, norite, monzonite, granite; abundant dykes | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 684 | 474180 | 474850 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 685 | 474850 | 474960 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Kr - Kangaroo | NA | Alluvial terraces: level plains on cemented fine gravel | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 686 | 474960 | 475470 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Sodosol | BER | Kb - Knobbies | NA | Pediments: Active upper colluvial slopes | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 687 | 475470 | 475830 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemite | Dermosol | BER | Kr - Kangaroo | NA | Alluvial terraces: level plains on cemented fine gravel | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 688 | 475830 | 476180 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 689 | 476180 | 476670 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Kr - Kangaroo | NA | Alluvial terraces: level plains on cemented fine gravel | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 690 | 476670 | 476900 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 691 | 476900 | 477940 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Kr - Kangaroo | NA | Alluvial terraces: level plains on cemented fine gravel | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 692 | 477940 | 478310 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Sodosol | BER | Gt - Greentop | NA | Alluvial terraces: level plains on cemented fine gravel | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 693 | 478310 | 478480 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Kr - Kangaroo | NA | Alluvial terraces: level plains on cemented fine gravel | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 694 | 478480 | 478780 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Gt - Greentop | NA | Alluvial terraces: level plains on cemented fine gravel | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 695 | 478780 | 479120 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Kr - Kangaroo | NA | Alluvial terraces: level plains on cemented fine gravel | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 696 | 479120 | 479420 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Ss - Seven Sisters | NA | Alluvial terraces: Poorly drained gentle slopes, plains and prior stre | 11.3.9 | 100 |
| 697 | 479420 | 479600 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Chromosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.9 | 100 |
| 698 | 479600 | 479700 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Chromosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.25 | 100 |
| 699 | 479700 | 480410 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Ss - Seven Sisters | NA | Alluvial terraces: Poorly drained gentle slopes, plains and prior stre | 11.3.9 | 100 |
| 700 | 480410 | 480700 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Kandasol | BER | Sp - Splitters | NA | Alluvial terraces: stagnant alluvial plains | 11.3.9 | 100 |
| 701 | 480700 | 841000 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Kr - Kangaroo | NA | Alluvial terraces: level plains on cemented fine gravel | 11.3.9 | 100 |
| 702 | 481000 | 481050 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Kr - Kangaroo | NA | Alluvial terraces: level plains on cemented fine gravel | 11.3.25 | 100 |
| 703 | 481050 | 481240 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Kr - Kangaroo | NA | Alluvial terraces: level plains on cemented fine gravel | 11.3.32/11.3.30/11.3.33 | 70 / 25 / 5 |
| 704 | 481240 | 481440 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Kandasol | BER | Sp - Splitters | NA | Alluvial terraces: stagnant alluvial plains | 11.3.32/11.3.30/11.3.33 | 70 / 25 /5 |
| 705 | 481440 | 481550 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.25 | 100 |
| 706 | 481550 | 483180 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Kandasol | BER | Sp - Splitters | NA | Alluvial terraces: stagnant alluvial plains | 11.3.32/11.3.30/11.3.33 | 70 / 25 /5 |
| 707 | 483180 | 483400 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.32/11.3.30/11.3.33 | 70 / 25 /5 |
| 708 | 483400 | 483480 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Kandasol | BER | Sp - Splitters | NA | Alluvial terraces: stagnant alluvial plains | 11.3.32/11.3.30/11.3.33 | 70 / 25 /5 |
| 709 | 483480 | 483750 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Vertosol | BER | Tt - Tabletop | NA | Floodplains of minor streams. | 11.3.32/11.3.30/11.3.33 | 70 / 25 /5 |
| 710 | 483750 | 483950 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Vertosol | BER | Tt - Tabletop | NA | Floodplains of minor streams. | 11.3.31/11.3.7/11.3.13 | 75 / 15 / 10 |
| 711 | 483950 | 484150 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Vertosol | BER | Tt - Gu - Tabletop - Gumlu Complex | NA | Floodplains of minor streams.- Alluvial terraces: relict levees and b | 11.3.31/11.3.7/11.3.13 | 75 / 5 /10 |
| 712 | 484150 | 484550 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Vertosol | BER | Tt - Gu - Tabletop - Gumlu Complex | NA | Floodplains of minor streams.- Alluvial terraces: relict levees and b | 11.3.32/11.3.30/11.3.33 | 70 / 25 /5 |

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|--|-------------------------------|--------------------------------------|---|-------------|---|---------------------------------|---------------|
| 713 | 484550 | 484760 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.32/11.3.30/11.3.33 | 70 / 25 /5 |
| 714 | 484760 | 484910 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.3.25 | 100 |
| 715 | 484910 | 485430 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Sb - Salisbury | NA | Pediments: Relict lower colluvial slopes | 11.3.32/11.3.30/11.3.33 | 70 / 25 /5 |
| 716 | 485430 | 486300 | Colluvium (Qs) - Residual and colluvial soil, sand, gravel, rubble, some semi-consolidated material | Dermosol | BER | Sb - Salisbury | NA | Pediments: Relict lower colluvial slopes | 11.3.29a / 11.3.35 | 50 / 50 |
| 717 | 486300 | 486730 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemite | Kandasol | BER | Rb - Roundback | NA | Pediments: Relict lower colluvial slopes | 11.3.29a / 11.3.35 | 50 / 50 |
| 718 | 486730 | 487040 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemite | Tenesol | BER | Sm - Sixmile | NA | Pediments: Active upper colluvial slopes | 11.3.29a / 11.3.35 | 50 / 50 |
| 719 | 487040 | 487380 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemite | Kandasol | BER | Rb - Roundback | NA | Pediments: Relict lower colluvial slopes | 11.3.29a / 11.3.35 | 50 / 50 |
| 720 | 487380 | 487900 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemite | Tenesol | BER | Sm - Sixmile | NA | Pediments: Active upper colluvial slopes | 11.3.29a / 11.3.35 | 50 / 50 |
| 721 | 487900 | 488080 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemite | Tenesol | BER | Kl - Kailla | NA | Undulating plains on acid intrusive rocks | 11.3.29a / 11.3.35 | 50 / 50 |
| 722 | 488080 | 488200 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemite | Tenesol | BER | Sm - Sixmile | NA | Pediments: Active upper colluvial slopes | 11.3.29a / 11.3.35 | 50 / 50 |
| 723 | 488200 | 488280 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemite | Tenesol | BER | Sm - Sixmile | NA | Pediments: Active upper colluvial slopes | 11.12.13 / 11.12.4 | 50 / 50 |
| 724 | 489280 | 489610 | Granitoid (CPg) - Adamellite, granodiorite, granite; minor microgranite, porphyry, quartz diorite, granophyre, microtrondhjemite | Tenesol | BER | Sm - Sixmile | NA | Pediments: Active upper colluvial slopes | 11.12.1 / 11.12.4 | 95 / 5 |
| 725 | 489610 | 489700 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | Sm - Sixmile | NA | Pediments: Active upper colluvial slopes | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 726 | 489700 | 489730 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Kandasol | BER | Rb - Roundback | NA | Pediments: Relict lower colluvial slopes | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 727 | 489730 | 490195 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Hydrosol | BER | Md - Maiden | NA | Pediments: Active upper colluvial slopes | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 728 | 490195 | 490430 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 729 | 490430 | 490730 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Hydrosol | BER | Md - Maiden | NA | Pediments: Active upper colluvial slopes | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 730 | 490730 | 490900 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 731 | 490900 | 491000 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 732 | 491000 | 491375 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Dermosol | BER | Sm - Sixmile | NA | Pediments: Active upper colluvial slopes | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 733 | 491375 | 492150 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Kandasol | BER | Rb - Roundback | NA | Pediments: Relict lower colluvial slopes | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 734 | 492150 | 492610 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Dermosol | BER | C - Creek flats and stream channels | NA | Creek flats and stream channels | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 735 | 492610 | 493080 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Kandasol | BER | Rb - Roundback | NA | Pediments: Relict lower colluvial slopes | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 736 | 493080 | 495500 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | Wm - Wilmington | NA | Floodplains of minor streams. | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 737 | 495500 | 495860 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Vertosol | BER | Cr - Carew | NA | Alluvial terraces: stagnant alluvial plains | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 738 | 495860 | 495920 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Dermosol | BER | Gb - Goodbye | NA | Alluvial terraces: stagnant alluvial plains | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 739 | 495920 | 496010 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | SF - Saline Flats | NA | Miscellaneous | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 740 | 496010 | 496160 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Dermosol | BER | Gb - Goodbye | NA | Alluvial terraces: stagnant alluvial plains | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 741 | 496160 | 496300 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | SF - Saline Flats | NA | Miscellaneous | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 742 | 496300 | 496510 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Dermosol | BER | Gb - Goodbye | NA | Alluvial terraces: stagnant alluvial plains | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 743 | 496510 | 497600 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | Wm - Wilmington | NA | Floodplains of minor streams. | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 744 | 497600 | 497700 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Dermosol | BER | Gb - Goodbye | NA | Alluvial terraces: stagnant alluvial plains | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 745 | 497700 | 498100 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | SF - Saline Flats | NA | Miscellaneous | 11.12.1/11.3.10/11.3.30/11.3.32 | 40/40/15/5 |
| 746 | 498100 | 498300 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | SF - Saline Flats | NA | Miscellaneous | 11.3.27x1c/11.1.2b | 60 / 40 |
| 747 | 498300 | 498380 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | SF - Saline Flats | NA | Miscellaneous | 11.1.4 | 100 |
| 748 | 498380 | 498600 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | SF - Saline Flats | NA | Miscellaneous | 11.1.2 | 100 |
| 749 | 498600 | 499330 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SF - Saline Flats | NA | Miscellaneous | 11.2.5 | 100 |

| Preliminary Mapping Unit (PMU) | Estimated Chainage Start | Estimated Chainage Finish | Geology | ASC - Combined Soils Database | Land System / Soils Report and Scale | Existing Soil Description Reference Sheet/s | Land System | Land Unit / Topographical Form | RE Code | RE Percentage |
|--------------------------------|--------------------------|---------------------------|---|-------------------------------|--------------------------------------|---|-------------|--------------------------------|------------|---------------|
| 750 | 499330 | 499500 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SD - Sand Dunes | NA | Miscellaneous | 11.2.5 | 100 |
| 751 | 499500 | 499800 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SD - Sand Dunes | NA | Miscellaneous | 11.2.3 | 100 |
| 752 | 499800 | 500400 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | SD - Sand Dunes | NA | Miscellaneous | 11.2.3 | 100 |
| 753 | 500400 | 500550 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SD - Sand Dunes | NA | Miscellaneous | 11.2.3 | 100 |
| 754 | 500550 | 500960 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SF - Saline Flats | NA | Miscellaneous | 11.2.3 | 100 |
| 755 | 500960 | 501100 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SD - Sand Dunes | NA | Miscellaneous | 11.2.3 | 100 |
| 756 | 501100 | 501200 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SSs - Sand sheets | NA | Miscellaneous | 11.2.3 | 100 |
| 757 | 501200 | 501400 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SSs - Sand sheets | NA | Miscellaneous | 11.2.5 | 100 |
| 758 | 501400 | 501520 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Vertosol | BER | Sw - Swamps | NA | Miscellaneous | 11.2.5 | 100 |
| 759 | 501520 | 504100 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SSs - Sand sheets | NA | Miscellaneous | 11.2.5 | 100 |
| 760 | 504100 | 504300 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Vertosol | BER | SF - Saline Flats | NA | Miscellaneous | 11.2.5 | 100 |
| 761 | 504300 | 505000 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Vertosol | BER | Sw - Swamps | NA | Miscellaneous | 11.3.27x1c | 100 |
| 762 | 505000 | 505500 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Vertosol | BER | SF - Saline Flats | NA | Miscellaneous | 11.3.27x1c | 100 |
| 763 | 505500 | 505970 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Vertosol | BER | Sw - Swamps | NA | Miscellaneous | 11.3.27x1c | 100 |
| 764 | 505970 | 506220 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Vertosol | BER | SF - Saline Flats | NA | Miscellaneous | 11.3.27x1c | 100 |
| 765 | 506220 | 506800 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Vertosol | BER | Sw - Swamps | NA | Miscellaneous | 11.3.27x1c | 100 |
| 766 | 506800 | 507150 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Vertosol | BER | Sw - Swamps | NA | Miscellaneous | 11.2.5 | 100 |
| 767 | 507150 | 507470 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SSs - Sand sheets | NA | Miscellaneous | 11.2.5 | 100 |
| 768 | 507470 | 507610 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Vertosol | BER | Sw - Swamps | NA | Miscellaneous | 11.2.5 | 100 |
| 769 | 507610 | 507850 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SSs - Sand sheets | NA | Miscellaneous | 11.2.5 | 100 |
| 770 | 507850 | 508030 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SD - Sand Dunes | NA | Miscellaneous | 11.2.3 | 100 |
| 771 | 508030 | 508460 | Colluvium (Qr) - Clay, silt, sand, gravel and soil; colluvial and residual deposits | Tenesol | BER | SF - Saline Flat | NA | Miscellaneous | 11.2.3 | 100 |
| 772 | 508460 | 508600 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | SD - Sand Dunes | NA | Miscellaneous | 11.2.3 | 100 |
| 773 | 508600 | 509400 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | SD - Sand Dunes | NA | Miscellaneous | 11.2.3 | 100 |
| 774 | 509400 | 509680 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | SD - Sand Dunes | NA | Miscellaneous | 11.2.5 | 100 |
| 775 | 509680 | 509800 | Alluvium (Qa) - Alluvium, coastal mud flats, minor evaporites, colluvium, soil | Tenesol | BER | SF - Saline Flat | NA | Miscellaneous | 11.2.5 | 100 |



Appendix C

Relevant Regional Ecosystem Description Sheets

Regional ecosystem 9.5.4

Description: Woodland to open-woodland of *Eucalyptus melanophloia* (silver-leaved ironbark) +/- *Corymbia dallachiana* (Dallachy's gum) +/- *E. crebra* (narrow-leaved ironbark). There is often an open sub-canopy, which can include canopy species, *Petalostigma pubescens* (quinine), *Bursaria incana* (prickly pine) and *Alphitonia excelsa* (soapbush). An open shrub layer often contains juvenile canopy species as well as *Melaleuca nervosa* (woodland paperbark), *P. banksii* (smooth-leaved quinine) and *Carissa* spp. There is a sparse to mid-dense grassy ground layer of *Heteropogon contortus* (black speargrass), *Themeda triandra* (kangaroo grass) and/or *Triodia pungens* (spinifex). Occurs on gently undulating terrain with sandy loam to sandy clay soils on Quaternary sandplains. (BVG1M: 17b)

Supplementary descriptions:

Subregion: 4, 11.3, 5, (11.7)

Protected areas: Great Basalt Wall NP

Extent in reserves: Low

Wetland:

Special values:

Comments: Occurs close to the Desert Uplands boundary in the south of the bioregion.

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 10.3.2

- Description:** Open-woodland to woodland of *Acacia argyrodendron* or open-woodland of *Eucalyptus cambageana* usually with an understorey of *A. argyrodendron*. Very open tussock grassland understorey. Occurs on alluvial plains with mostly grey clay soils and some areas of duplex soils in the east. (BVG1M: 26a)
- Major vegetation communities include:
- 10.3.2a: *Acacia argyrodendron* low open-woodland on alluvium. *Acacia argyrodendron* dominates the very sparse canopy (10-20m tall). *A. cambagei* is occasionally a codominant in the canopy. *A. argyrodendron*, *Lysiphyllum carronii*, *Terminalia oblongata* are frequently present as scattered trees but may occasionally form a very sparse subcanopy (5-10m tall). *Eremophila mitchellii* and *Atalaya hemiglauc*a are frequently present as scattered small trees (3-6m tall). *Carissa lanceolata* usually dominates the very sparse shrub layer (0.3-2.0m tall). The dominant graminoids are variable including *Paspalidium* spp., *Sporobolus* spp., *Bothriochloa ewartiana*, *Ancistrachne uncinulata* and *Fimbristylis dichotoma*. Other graminoids that are commonly occurring include *Brachyachne* spp., *Dactyloctenium radulans*, *Astrebula squarrosa* and *Aristida latifolia*. Occurs on grey cracking clays sometimes with massive gilgai and texture contrast soils. (BVG1M: 26a)
- 10.3.2b: *Eucalyptus cambageana* open-woodland to woodland usually with *Acacia argyrodendron* understorey on alluvium. *Eucalyptus cambageana* dominates the very sparse to sparse canopy (15-25m tall). *Acacia argyrodendron* is occasionally present in the canopy and is frequently dominant in the very sparse to sparse small subcanopy layer (8-18m tall). *Eremophila mitchellii* is often present and *Terminalia oblongata* and *Atalaya hemiglauc*a are occasionally present in the low tree layer (4-8m tall). *Carissa lanceolata* frequently dominates the very sparse shrub layer (0.2-2.0m tall). *Enteropogon ramosus*, *Tripogon loliiformis*, *Eulalia aurea*, *Paspalidium caespitosum*, *Aristida personata* and *Sporobolus caroli* have been recorded as dominant graminoids in the very sparse to sparse ground layer. Other graminoids usually present include *Aristida jerichoensis*, *Paspalidium constrictum*, *Eriochloa pseudoacrotricha*, *Oxychloris scariosa*, *Bothriochloa ewartiana* and *Chrysopogon fallax*. Commonly present forbs include *Rostellularia adscendens*, *Phyllanthus virgatus*, *Evolvulus alsinoides*, *Enchylaena tomentosa* and *Brunoniella australis*. Occurs on alluvial plains (eastern). (BVG1M: 25a)
- 10.3.2bx1: *Eucalyptus cambageana* dominates the very sparse tree layer (18-24 m tall) (5-20% cover) usually with very sparse understorey of *Acacia argyrodendron*, scattered shrubs or very sparse shrub layer, and very sparse ground layer (8-16% cover) with *Chrysopogon fallax*, *Enchylaena tomentosa*, *Enteropogon acicularis*, *Paspalidium caespitosum* and *Sporobolus caroli* present. Occurs on flat to gently undulating terrain with clayey soil. (BVG1M: 25a)
- Supplementary descriptions:** Thompson and Turpin (in prep), A10e, E65j
- Subregion:** 3, (2)
- Protected areas:** No representation
- Extent in reserves:** No representation
- Wetland:**
- Special values:**
- Comments:** This regional ecosystem is confined to eastern (subregions 2 and 3) parts of the bioregion. This ecosystem is subject to clearing for pasture development. Occurrences on texture contrast soils are subject to scalding. There is potential for *Parthenium* invasion on the heavy clay soils.
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** Of concern
- Biodiversity status notes:** Pasture degradation and scalding. Cracking clay soils with significant loss of ground cover.
- Vegetation Management Act class:** Least concern

Regional ecosystem 10.3.3

Description: Low open-woodland of *Acacia harpophylla* +/- *Eucalyptus cambageana* emergents or open-woodland of *Eucalyptus cambageana* +/- understorey of *Acacia harpophylla* over a very open tussock grassland ground layer. Occurs on alluvial plains. (BVG1M: 25a)

Major vegetation communities include:

10.3.3a: *Eucalyptus cambageana* open-woodland with or without *Acacia harpophylla* understorey. *Eucalyptus cambageana* dominates the very sparse canopy (17-28m tall). *Acacia harpophylla* is occasionally present as scattered small trees (6-12m tall) with *E. cambageana*, *Flindersia dissosperma*, *Lysiphyllum carronii* and *Eremophila mitchellii*. *Carissa lanceolata* usually dominates the very sparse shrub layer (0.5-4.0m tall). *Eremophila mitchellii*, *Sydrax oleifolium* and *Atalaya hemiglauc*a are usually present in the shrub layer. Dominant graminoids in the ground layer are variable and include *Enteropogon acicularis*, *Bothriochloa ewartiana*, *Paspalidium caespitosum*, *Sporobolus actinocladus*, *Oxychloris scariosa*, *Chrysopogon fallax*, **Pennisetum ciliare* and *Fimbristylis dichotoma*. Graminoids commonly present include *Heteropogon contortus*, *Sporobolus australasicus*, *Eriochloa pseudoacrotricha*, *Panicum decompositum*, *Dactyloctenium radulans* and *Aristida* spp. Forbs frequently present include *Ammannia multiflora*, *Enchylaena tomentosa* and *Sida* spp. Occurs on alluvial plains. (BVG1M: 25a)

10.3.3b: Frequently inundated areas (not wetlands or floodplains). *Acacia harpophylla* low woodland to woodland on alluvium. *Acacia harpophylla* dominates the sparse canopy (8-15m tall). Emergent trees (16-24m tall) occasionally present include *Eucalyptus cambageana* and *E. thozetiana*. Scattered small trees usually present include *Lysiphyllum carronii*, *Eremophila mitchellii*, *Atalaya hemiglauc*a and *Terminalia oblongata*. *Eremophila mitchellii* and *Carissa lanceolata* sometime dominate the very sparse shrub layer (0.5-3m tall). Other shrubs occasional present include *Eremophila deserti* and *Sydrax oleifolium*. Dominant graminoids in the ground layer include *Enteropogon acicularis*, *Sporobolus actinocladus* and sometimes *Aristida calycina*. Other graminoids commonly present include *Oxychloris scariosa*, *Sporobolus caroli*, *S. scabridus* and *Paspalidium caespitosum*. Forbs frequently present include *Enchylaena tomentosa* and *Sclerolaena* spp. Occurs on heavy clay soils on alluvial plains. (BVG1M: 25a)

Supplementary descriptions: Thompson and Turpin (in prep), A11, E65; Turner et al. (1978), W2

Subregion: 4, 3, 2

Protected areas: Cudmore NP, Cudmore RR

Extent in reserves: Low

Wetland:

Special values:

Comments: Widespread across eastern parts of the DEU occurring in subregions 2, 3 and 4. This regional ecosystem is subject to clearing for pasture development. Occurrences on texture contrast soils are subject to scalding.
10.3.3a: **Ocimum basilicum* frequently present.

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 10.3.27

- Description:** Open-woodland to woodland of *Eucalyptus populnea* occasionally with understorey of *Archidendropsis basaltica*. Occurs on alluvial plains with sandy duplex soils and sometimes clayey soils. (BVG1M: 17a)
Major vegetation communities include:
10.3.27a: *Eucalyptus populnea* open-woodland to woodland. *Eucalyptus populnea* dominates the very sparse to sparse canopy (10-22m tall). A very sparse to sparse small tree layer (3-7m tall) can be present sometimes dominated by *Eremophila mitchellii*. *Flindersia dissosperma*, *Alectryon oleifolius* subsp. *elongatus*, *Geijera parviflora*, *Acacia harpophylla*, *Atalaya hemiglaucula* and *Ventilago viminalis* are occasionally present. *Carissa ovata* commonly dominates the very sparse to sparse shrub layer (0.5-2.5m tall), *Senna artemisioides*, *Maytenus cunninghamii* and *Denhamia oleaster* occur occasionally in this layer. The ground layer is variable ranging from very sparse to mid-dense. *Enteropogon acicularis*, *Bothriochloa ewartiana*, *Dichanthium fecundum*, *Aristida calycina*, *Themeda triandra*, *Chloris pectinata*, *Eriachne mucronata*, *Eragrostis lacunaria* and *Paspalidium caespitosum* are usually common to subdominant graminoids. Forbs commonly present include *Einadia hastata*, *Cyperus fulvus*, *Evolvulus alsinoides*, *Glycine tomentella*, *Waltheria indica*, *Zornia muriculata* and *Rostellularia adscendens*. Occurs on alluvial plains. (BVG1M: 17a)
10.3.27b: *Archidendropsis basaltica* open-woodland to woodland. *Archidendropsis basaltica* dominates the very sparse canopy (5-9m tall). *Eucalyptus populnea* may be present as an emergent or in the canopy. *Eremophila mitchellii* is occasionally present in the tall shrub layer (2-5m tall). *Carissa ovata* usually dominates the shrub layer (0.5-2.5m tall) when present. The ground layer varies from very sparse to sparse. Graminoids frequently present include *Aristida calycina*, *Bothriochloa ewartiana*, *Chloris pectinata*, *Eragrostis lacunaria*, *Eriachne mucronata*, *Paspalidium caespitosum* and *Themeda triandra*. Occurs on alluvial plains (southern). (BVG1M: 27a)
10.3.27c: Palustrine wetland (e.g. vegetated swamp). *Eucalyptus populnea* open-woodland Occurs on closed depressions on or adjacent to floodplains (BVG1M: 17a)
- Supplementary descriptions:** Thompson and Turpin (in prep), E17B
- Subregion:** 4
- Protected areas:** Cudmore RR, Cudmore NP
- Extent in reserves:** Low
- Wetland:**
- Special values:** Only known record for *Eragrostis jerichoensis* is from this regional ecosystem.
- Comments:** Threatening processes include increase in salinity due to clearing of recharge areas, clearing for pasture development, and woody weed invasion due to high total grazing pressures and absence of fire. This ecosystem is subject to sheet erosion and scalding. The clayey subsoils have a very low permeability are often sodic. It is suggested that ground cover be kept dense to slow the rate of water flow which helps prevent channelling of the flow and thereby minimises erosion. Overgrazing reduces competition from pasture species and tends to increase the cover of false sandalwood and current bush. *Eucalyptus brownii* intergrades with *E. populnea* in some areas including near Barcardine. Further to determine the extent of the vegetation communities on clays and texture contrast soils and to provide comprehensive species lists for these communities.
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** Of concern
- Biodiversity status notes:** Approximately 50% of the RE has been cleared, with 40% of the remaining ground stratum being subject to moderate degradation.
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.1.2

- Description:** Samphire forbland or bare mud-flats on Quaternary estuarine deposits. Mainly salt pans and mudflats with clumps of saltbush including one or several of the following species; *Tecticornia* spp. (e.g. *Tecticornia indica* subsp. *julacea*, *Tecticornia indica* subsp. *leiostachya*), *Sesuvium portulacastrum*, *Sarcocornia quinqueflora* subsp. *quinqueflora*, *Suaeda australis*, *S. arbusculoides*, *Tecticornia australasica*, *Salsola kali*, algal crusts and the grass *Sporobolus virginicus*. Sedges are also common. Occurs on supratidal flats with deep saline clay soils and formed from Quaternary estuarine sediments. Occurs along the landward edge of the intertidal zone in a hypersaline environment that is only inundated by the highest spring tides. Soils are grey mottled clays with a crusting surface, and are highly saline. (BVG1M: 35b)
- Major vegetation communities include:**
- 11.1.2a: Estuarine wetlands (e.g. mangroves). Bare mud flats on Quaternary estuarine deposits, with very isolated individual stunted mangroves such as *Avicennia marina* and/or *Ceriops tagal*. May have obvious salt crusts on the soil surface. (BVG1M: 35b)
- 11.1.2b: Estuarine wetlands (e.g. mangroves). Samphire forbland on Quaternary estuarine deposits. Mainly salt pans and mudflats with clumps of saltbush including one or several of the following species; *Tecticornia* spp. (e.g. *Tecticornia indica* subsp. *julacea*, *Tecticornia indica* subsp. *leiostachya*), *Sesuvium portulacastrum*, *Sarcocornia quinqueflora* subsp. *quinqueflora*, *Suaeda australis*, *S. arbusculoides*, *Tecticornia australasica*, *Scleria ciliaris*, *Marsilea mutica*, *Salsola kali*, algal crusts and the grass *Sporobolus virginicus*. Sedges may be common. (BVG1M: 35b)
- Supplementary descriptions:** Christian et al. (1953), Littoral; Forster and Barton (1995), Carpentaria; Speck et al. (1968), Carpentaria (3,4); Bruinsma (2000); Byron and Hall (1998); Danaher (1995); Gunn and Nix (1977) LU 140
- Subregion:** 14, 1, (2)
- Protected areas:** Bowling Green Bay NP, Bowling Green Bay CP, Townsville Town Common CP, MacKenzie Island CP, Cape Upstart NP, Broad Sound Islands NP, Shoalwater Bay CP, Charon Point CP, Newport CP, Keppel Sands CP, Rundle Range NP, Causeway Lake CP, Abbott Bay RR, [Bolger Bay CP]
- Extent in reserves:** High
- Wetland:** Estuarine wetlands (e.g. mangroves).
- Special values:** Provides estuarine wetland habitat.
- Comments:** More extensive in the hypersaline marine plains around Broad Sound and the Fitzroy River Delta, in the south of the BBN bioregion. Subject to modification/conversion to salt evaporation ponds in the Fitzroy River Delta with about 3000 ha in this locality converted to this use (Bruinsma 2000).
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** No concern at present
- Biodiversity status notes:**
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.1.4

- Description:** Mangrove low forest on Quaternary estuarine deposits. Low open-shrubland to closed forest of mangrove species forming a variety of associations, depending on position in relation to salt water inundation. *Avicennia marina* is the most common dominant but also other trees such as *Aegiceras corniculatum*, *Rhizophora* spp. and *Ceriops tagal* dominate often in pure stands. There is often a shrub layer consisting of juvenile plants of the above species. Other species such as *Excoecaria agallocha*, *Bruguiera* spp., *Lumnitzera racemosa* and *Alchornea ilicifolia* may also occur. Occurs on intertidal flats which are often dissected by tidal streams. Soils are usually deep saline clays. (BVG1M: 35a)
- Major vegetation communities include:
- 11.1.4a: Estuarine wetlands (e.g. mangroves). *Rhizophora* spp. open-forest on Quaternary estuarine deposits. This may include *Rhizophora stylosa* or *R. apiculata* as dominants, with occasional *Avicennia marina* as emergents, and subdominant *Bruguiera gymnorhiza* and/or *Ceriops tagal*. In northern areas, occasional *Xylocarpus moluccensis* may also occur. A shrub layer is usually not present. Occurs on fringing waterways low in intertidal zone, with roots submerged during high tides (Danaher 1995) (BVG1M: 35a)
- 11.1.4b: Estuarine wetlands (e.g. mangroves). *Avicennia marina* low open-shrubland to closed forest on Quaternary estuarine deposits. There may be occasional *Ceriops tagal*, *Rhizophora* spp., *Bruguiera* spp., *Excoecaria agallocha* or *Lumnitzera* spp. An occasional presence of species such as *Aegialitis annulata* and/or *Aegiceras corniculatum* may occur. Open-shrublands of *Avicennia marina* may have a sparse presence of samphires such as *Suaeda* spp., *Tecticornia australasica* and *Sarcocornia* spp. Occurs in all intertidal environments from the seaward edge (as a pioneer) to accreting banks (as a fringe), to the landward edge adjacent to claypans (Bruinsma 2000; Danaher 1995) (BVG1M: 35a)
- 11.1.4c: Estuarine wetlands (e.g. mangroves). *Ceriops tagal*, +/- *Avicennia marina* open forest on Quaternary estuarine deposits. Other mangrove species may be present as occasional individuals including *Rhizophora* spp., *Bruguiera* spp., *Lumnitzera* spp., and *Sonneratia* spp. A shrub layer is not usually present. Occurs on upstream creek edges, and toward the landward edge of the upper intertidal limit. Only inundated by spring tides (Bruinsma 2000). (BVG1M: 35a)
- 11.1.4d: Estuarine wetlands (e.g. mangroves). Dominated by a range of species from genera such as from *Avicennia* sp., *Ceriops* sp., *Rhizophora* sp. and *Bruguiera* sp. which form a closed forest. A low shrub layer composed of species such as *Acanthus ilicifolius*, *Acrostichum speciosum*, *Crinum pedunculatum* or juvenile canopy species is often present. Epiphytes on the canopy are common. Occurs on the landward edge of the tidal flats and in the upper tidal reaches of creeks and rivers where there is a high freshwater influence. (BVG1M: 35a)
- Supplementary descriptions:** Christian et al. (1953), Littoral; Danaher (1995); Bruinsma (2000); Bruinsma (1999); Speck et al. (1968) Carpentaria (5,6); Byron and Hall (1998), Gunn and Nix (1977) LU 142
- Subregion:** 14, 1, (2)
- Protected areas:** Bowling Green Bay NP, Bowling Green Bay CP, Townsville Town Common CP, Cape Upstart NP, Charon Point CP, Shoalwater Bay CP, Broad Sound Islands NP, Newport CP, MacKenzie Island CP, Causeway Lake CP, Abbott Bay RR, [Capricorn Coast NP], [Bolger Bay CP], [Rundle Range NP], [Magnetic Island NP]
- Extent in reserves:** High
- Wetland:** Estuarine wetlands (e.g. mangroves).
- Special values:** Provides estuarine wetland habitat.
- Comments:** Some areas within the Burdekin Delta have recorded dense infestations of Rubber vine (**Cryptostegia grandiflora*) in upper areas of the intertidal zone (Danaher 1995). This regional ecosystem often occurs in close proximity to *Sporobolus virginicus* grasslands (11.1.1) and salt flats (11.1.2) which occur in areas less subject to tidal inundation. Specifically protected under the Fisheries Act 1994.
11.1.4c: Occurs landward of, and in slightly more elevated situations than *Rhizophora* spp. communities (RE 11.1.4a). May also occur around salt pans (RE 11.1.2).
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 11.12.1

- Description:** Eucalyptus crebra +/- Corymbia erythrophloia shrubby woodland. E. melanophloia is often present and may be locally dominant. Also includes localised areas dominated by E. persistens. Occurs on ranges on igneous rocks. (BVG1M: 13c)
Major vegetation communities include:
11.12.1a: Eucalyptus crebra +/- E. exserta woodland. Occurs on undulating rises. (BVG1M: 13c)
11.12.1b: Eucalyptus persistens low woodland. (BVG1M: 19d)
11.12.1c: Dichanthium spp. grassland +/- scattered Eucalyptus crebra, Corymbia erythrophloia. (BVG1M: 30b)
- Supplementary descriptions:** Christian et al. (1953), Heidelberg; Forster and Barton (1995), Glassford; Kent (1987), Pt1; Speck et al. (1968), Hillmore, Irving, Toonda, Ohio, Bouldercombe
- Subregion:** 22, 2, 12, 5, 18, (14), (1), (4), (27)
- Protected areas:** Eungella NP, Homevale RR, Homevale NP, Cape Upstart NP, Goodeedulla NP, Mount Aberdeen NP, Bouldercombe Gorge RR, Kroombit Tops NP, Auburn River NP, Tolderodden CP, Charon Point CP, Cania Gorge NP, Abbott Bay RR, Mount Hopeful CP, Mount Archer NP, Bowling Green Bay NP, [Beeron NP]
- Extent in reserves:** Low
- Wetland:**
- Special values:**
- Comments:**
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** No concern at present
- Biodiversity status notes:**
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.2.3

- Description:** Microphyll/notophyll vineforest to semi-deciduous vine thicket on Quaternary coastal dunes. Commonly consists of several of the following trees: *Pleiogynium timorense*, *Mimusops elengi*, *Cupaniopsis anacardioides*, *Exocarpos latifolius*, *Sersalisia sericea* and *Diospyros geminata*. In dry, exposed and windswept locations, this RE may only reach 4-5 m, and include deciduous emergent species such as *Gyrocarpus americanus* and *Brachychiton australis*. At its best development this formation grows to 15 m and includes further species such as *Ficus virens*, *Aglaia brownii*, *Polyalthia nitidissima*, *Canarium australianum*, *Miliusa brahei* and *Ficus* spp. A shrub layer may be present with *Carissa ovata*, *Capparis sepiaria*, *Eugenia reinwardtiana*, *Drypetes deplanchei* and *Aidia racemosa*. Vines are common, including *Sarcostemma viminalis* subsp. *australe*, *Jasminum didymum*, *J. simplicifolium*, *Abrus precatorius* and *Cissus* spp. A ground layer is sparse or absent. Occurs on Quaternary coastal dunes and adjacent swales. Best developed on secondary dune swales and areas protected from strong winds. Soils are fine to coarse beach sands possibly enriched by calcareous sediments. (BVG1M: 3b)
- Supplementary descriptions:** Forster and Barton (1995), Joskeleigh; Christian et al. (1953), Littoral; Pollock (1995); Lavarack (1991); Cumming (2000); McCarthy (2000)
- Subregion:** 14, 1, 2
- Protected areas:** Shoalwater Bay CP, Cape Upstart NP, Capricorn Coast NP, Abbott Bay RR, MacKenzie Island CP, Broad Sound Islands NP, Charon Point CP, Magnetic Island NP, [Bowling Green Bay NP], [Horseshoe Bay Lagoon CP]
- Extent in reserves:** High
- Wetland:**
- Special values:** Provides habitat for the threatened flora species *Livistona drudei* (V).
- Comments:** Widespread between the Fitzroy River and Townsville, but highly localised. Reaches best development between Station Creek and the Elliot River, S. of Cape Upstart. Prone to weed invasion in some areas, particularly by rubber vine **Cryptostegia grandiflora*, Chinese apple **Zizyphus mauritiana* and prickly Acacia **Acacia nilotica*, and is subject to clearing for coastal development. Occurs usually as a narrow community immediately adjacent to RE 11.2.2 or RE 11.2.5.
- Estimated extent:** In December 2006, remnant extent was < 10,000 ha and >30% of the pre-clearing area remained
- Biodiversity status:** Of concern
- Biodiversity status notes:**
- Vegetation Management Act class:** Of concern

Regional ecosystem 11.2.5

| | |
|----------------------------------|---|
| Description: | <p>Beach ridge woodland with <i>Melaleuca dealbata</i> in swales and <i>Corymbia tessellaris</i> woodland on Quaternary dune systems. Ridges: Usually a woodland to open forest of <i>Corymbia tessellaris</i> with occasional <i>Acacia crassicaarpa</i>, <i>Cupaniopsis anacardioides</i>, <i>Pleiogynium timorense</i> and <i>Terminalia muelleri</i>. A sparse to dense shrub layer may include <i>Acacia oraria</i>, <i>A. crassicaarpa</i>, <i>Planchonia careya</i>, <i>Alphitonia excelsa</i>, <i>Exocarpos latifolius</i>, <i>Senna surattensis</i> and <i>Dodonaea viscosa</i>. Ground layer includes <i>Aphyllodium biarticulatum</i>, <i>Themeda triandra</i>, <i>Heteropogon contortus</i>, <i>Elionurus citreus</i>, <i>Aristida holathera</i>, <i>Cymbopogon refractus</i> and <i>Perotis rara</i>. Swales: Open forest of <i>Melaleuca dealbata</i>, (sometimes <i>M. leucadendra</i> or <i>M. viridiflora</i>), <i>Livistona drudei</i> or <i>L. decora</i>, with shrubs of <i>Pandanus spiralis</i>. Ground layer of <i>Chrysopogon filipes</i>, <i>Imperata cylindrica</i>, <i>Sporobolus virginicus</i> and <i>Lepturus repens</i>. In some areas sedges are common, including <i>Cyperus javanicus</i>, <i>Fimbristylis dichotoma</i>, <i>F. polytrichoides</i>. Small vines are commonly present including <i>Cynanchum carnosum</i>, <i>Abrus precatorius</i>, and <i>Jasminum didymum</i>. Occurs on Quaternary undulating stabilised dunes with narrow linear depressions. Associated soils are generally well drained siliceous sands, swales with humic hydrosols (BVG1M: 28b)</p> <p>Major vegetation communities include:</p> <p>11.2.5a: Woodland to open forest of <i>Eucalyptus tereticornis</i> x <i>platyphylla</i> with <i>Corymbia tessellaris</i> and occasional <i>M. viridiflora</i> (BVG1M: 28b)</p> <p>11.2.5b: Palustrine wetland (e.g. vegetated swamp). Swales: Open forest of <i>Melaleuca dealbata</i>, (sometimes <i>M. leucadendra</i> or <i>M. viridiflora</i>), <i>Livistona drudei</i> or <i>L. decora</i>, with shrubs of <i>Pandanus spiralis</i>. Ground layer of <i>Chrysopogon filipes</i>, <i>Imperata cylindrica</i>, <i>Sporobolus virginicus</i> and <i>Lepturus repens</i>. In some areas sedges are common, including <i>Cyperus javanicus</i>, <i>Fimbristylis dichotoma</i>, <i>F. polytrichoides</i>. Small vines are commonly present including <i>Cynanchum carnosum</i>, <i>Abrus precatorius</i> and <i>Jasminum didymum</i>. (BVG1M: 22b)</p> |
| Supplementary descriptions: | Christian et al. 1953, Bowling Green, Littoral; Cumming (2000), 28; Pollock (1995); Bean (1992) |
| Subregion: | 1, 14, (2) |
| Protected areas: | Bowling Green Bay NP, Townsville Town Common CP, Bowling Green Bay CP, Cape Upstart NP, Abbott Bay RR, Broad Sound Islands NP, Keppel Sands CP, Capricorn Coast NP, Causeway Lake CP, [Cape Pallarenda CP] |
| Extent in reserves: | Medium |
| Wetland: | Contains palustrine wetland (e.g. in swales). |
| Special values: | |
| Comments: | <p>Swales have been heavily invaded by rubber vine <i>Cryptostegia grandiflora</i> in some localities. Mechanical disturbance has facilitated an increase in weeds such as buffel grass <i>*Pennisetum ciliare</i> and <i>Tridax procumbens</i>. Other common weeds include <i>Hyptis suaveolens</i>, <i>Stachytarpheta jamaicensis</i> and <i>Jatropha gossypifolia</i>, which are associated with high total grazing pressure. Other areas have infestations of giant rats tail <i>Sporobolus pyramidalis</i>. The invasive red Natal grass <i>Melinis repens</i> has been present in this community since the early 1950's (Christian et al. 1953). Extensively cleared for coastal development. Naturalised species associated with this regional ecosystem include <i>*Passiflora foetida</i>. The swale portion of this RE is generally not mappable at 1:100 000 scale, and usually occurs as a narrow linear strip between the dune and a saltmarsh/saltpan. RE 11.2.4 always occurs between two or more dune swales, and does not usually abut saline vegetation.</p> <p>11.2.5b: Naturalised species associated with this regional ecosystem include <i>*Passiflora foetida</i>.</p> |
| Estimated extent: | In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained. |
| Biodiversity status: | No concern at present |
| Biodiversity status notes: | |
| Vegetation Management Act class: | Least concern |

Regional ecosystem 11.3.1

Description: Open-forest dominated by *Acacia harpophylla* and/or *Casuarina cristata* (particularly in southern parts), with or without scattered emergent *Eucalyptus* spp. such as *E. coolabah*, *E. largiflorens*, *E. populnea*, *E. orgadophila*, and *E. woollsiana*. A low tree layer dominated by *Geijera parviflora* and *Eremophila mitchellii* is usually present. The vegetation sometimes occurs as low open-forest or woodland. Tree height generally about 11-15m and the low tree (to tall shrub) understorey layer is between 2 and 8m high (where present). Ground cover is generally sparse. Associated with Cainozoic alluvial plains which may be occasionally flooded. Landforms range from level to very gently sloping plains, alluvial flats, drainage floors, back-swamps and abandoned channels. Associated soils are predominantly deep to very deep cracking clays, sometimes with gilgai or texture contrast soils with sandy surface (particularly where *Eucalyptus populnea* is present). (BVG1M: 25a)

Major vegetation communities include:

11.3.1a: *E. orgadophila* woodland on alluvium with basaltic influence. Occurs on alluvium with basaltic influence. (BVG1M: 25a)

11.3.1b: Palustrine wetland (e.g. vegetated swamp). Open-forest dominated by *Acacia harpophylla* and/or *Casuarina cristata* (particularly in southern parts), generally with scattered emergent *Eucalyptus* spp. such as *E. coolabah*, *E. largiflorens*, *E. populnea*, *E. orgadophila*, and *E. woollsiana*. A low tree layer may be present with species such as *Terminalia* spp., *Eremophila* spp. and *Lysiphillum* spp. common. The ground layer may be sparse with *Muehlenbeckia florulenta* and a range of sedges prominent in depressions. Associated with closed and drainage depressions on Cainozoic alluvial plains. Characteristic landforms include drainage floors, back-swamps and abandoned channels. Associated soils are predominantly deep to very deep cracking clays, sometimes with gilgai or texture contrast soils with sandy surface (particularly where *Eucalyptus populnea* is present). (BVG1M: 25a)

11.3.1d: Palustrine wetland (e.g. vegetated swamp). *Acacia omalophylla* low open-forest +/- *A. harpophylla* fringing or mixed with open areas. Occurs on old lake bed. (BVG1M: 25a)

Supplementary descriptions: Gunn et al. (1967), Alpha (3), Blackwater (5), Borilla (5), Comet (6, 7), Craven (6), Cungelella (4), Borilla (5), Disney (4), Durrandella (5), Hillalong (4), Hope (4), Islay (5), Lennox (5), Loudon (6), Monteagle (6), Pinehill (4), Portwine (4), Rutland (6), Skye (5), Somerby (6), Tichbourne (5), Ulcanbah (4), Wharton (6), Willows (5); Story et al. (1967), Barwon (4), Comet (3, 5), Connors (6), Funnel (3), Monteagle (6), Somerby (6); Speck et al. (1968), Barwon (4), Coreen (3-6), Dakenba (5-8), Eurombah (10, 11), Ramsay (8); Galloway et al. (1974), LU 50, 70; Gunn and Nix (1977), LU 127, 132; Vandersee (1975), Dalby (4); Neldner (1984), 6 (124); Forster and Barton (1995), Coreen; Burgess (2003) Honeycomb, Tralee, Langley

Subregion: 11, 31, 7, 21, (18), (19), (14), (6), (36), (8), (37), (13), (20), (3), (15)

Protected areas: Culgoa Floodplain NP, Dipperu NP (S), Carnarvon NP, Nairana NP, Taunton NP (S), Epping Forest NP (S), Albinia NP, Narrien Range NP, Nairana NP (R), Junea NP, Mazeppa NP, Mount OConnell NP, Rundle Range RR, Rundle Range NP, Mount Etna Caves NP, Blackwood NP, [Lake Broadwater CP], [Nuga Nuga NP]

Extent in reserves: Low

Wetland:

Special values: Habitat for threatened fauna species including painted honeyeater, *Grantiella picta* particularly in subregion 35 (Oliver et al. 2003).

Comments: Extensively cleared for cropping and pasture.
11.3.1b: Extensively cleared for cropping and pasture. Occurs in depressions and abandoned channels on Cainozoic alluvial plains of Brigalow. May grade into *Eucalyptus coolabah* dominated associations with variation in seasonal flooding regimes.

Estimated extent: In December 2006, <10% of the pre-clearing area remained.

Biodiversity status: Endangered

Biodiversity status notes:

Vegetation Management Act class: Endangered

Regional ecosystem 11.3.2

- Description:** Eucalyptus populnea woodland to open-woodland. E. melanophloia may be present and locally dominant. There is sometimes a distinct low tree layer dominated by species such as Geijera parviflora, Eremophila mitchellii, Acacia salicina, Acacia pendula, Lysiphyllum spp., Cassia brewsteri, Callitris glaucophylla and Acacia excelsa. The ground layer is grassy dominated by a range of species depending on soil and management conditions. Species include Bothriochloa decipiens, Enteropogon acicularis, Aristida ramosa and Tripogon loliiformis. Occurs on Cainozoic alluvial plains with variable soil types including texture contrast, deep uniform clays, massive earths and sometimes cracking clays. (BVG1M: 17a)
Major vegetation communities include:
11.3.2a: Eucalyptus conica woodland. (BVG1M: 15b)
11.3.2b: Palustrine wetland (e.g. vegetated swamp). Eucalyptus camaldulensis (sometimes E. populnea and or E. tereticornis) woodland in drainage depressions. Ground layer of grasses or sedges. Occurs on seasonally inundated drainage depressions (BVG1M: 17a)
11.3.2c: Floodplain (other than floodplain wetlands). Eucalyptus populnea on floodplains (BVG1M: 17a)
- Supplementary descriptions:** Dawson (1972), 1, 3, 4, 5; Fensham (1998a); Fensham and Fairfax (1997); Galloway et al. (1974), LU62, LU64, LU68; Gunn et al. (1967), Alpha; Mullins (1980); Tavoy; Neldner (1984), 23b, 24; Speck et al. (1968), Wooroonah; Story et al. (1967); Connors, Funnel; Vandersee (1975); Oakey, Brookstead; Burgess (2003), Parrot, Roper, Stephens
- Subregion:** 26, 31, 24, 11, 21, (8), (32), (27), (13), (20), (7), (6), (15), (25), (16), (36), (18), (9), (22), (14), (19), (35)
- Protected areas:** Carnarvon NP, Expedition (Limited Depth) NP, Dipperu NP (S), Homevale RR, Chesterton Range NP, Homevale NP, Expedition RR, Taunton NP (S), Tregole NP, Nuga Nuga NP, Isla Gorge NP, Blackdown Tableland NP, Alton NP, Dawson River CP, Narrien Range NP, Bouldercombe Gorge RR, Lake Murphy CP, Epping Forest NP (S), Carraba CP, Homevale CP, Lake Broadwater CP, [Highworth Bend CP], [Lake Broadwater RR]
- Extent in reserves:** Low
- Wetland:** Contains palustrine wetland (e.g. in swales).
- Special values:** Habitat for threatened flora species Homopholis belsonii.
- Comments:** Extensively cleared or modified by grazing. There are unmapped patches of low Acacia harpophylla (11.3.1) or grassland (11.3.21) associated with this regional ecosystem in some areas. This regional ecosystems may include small areas dominated by Acacia pendula (Neldner 1984, Association 41).
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained
- Biodiversity status:** Of concern
- Biodiversity status notes:**
- Vegetation Management Act class:** Of concern

Regional ecosystem 11.3.3

| | |
|-----------------------------|---|
| Description: | <p>Eucalyptus coolabah woodland to open-woodland with a grassy understorey. A mid layer is often absent but scattered tree or shrub species, such as <i>E. populnea</i>, <i>Melaleuca bracteata</i>, <i>Alectryon oleifolius</i>, <i>Terminalia oblongata</i> (in the north) and <i>Acacia pendula</i>, <i>A. cambagei</i>, and occasionally <i>Muehlenbeckia florulenta</i> may be present. The ground layer is dominated by a range of grass and forb species depending on season, soil and management conditions. Can include small areas of grassland with scattered trees. Occurs on Cainozoic alluvial plains or levees with clay or sometimes texture contrast soils. (BVG1M: 16c)</p> <p>Major vegetation communities include:</p> <p>11.3.3a: Riverine wetland or fringing riverine wetland. <i>Melaleuca bracteata</i> woodland. On alluvial plains. (BVG1M: 21b)</p> <p>11.3.3b: Low open-shrubland of <i>Sclerolaena</i> spp. with scalding and sometimes emergent trees or shrubs including <i>Eucalyptus coolabah</i>, <i>Acacia harpophylla</i>, <i>Lysiphyllum hookeri</i> and <i>Alectryon oleifolius</i> and <i>Eremophila mitchellii</i>, which are often associated with <i>Eucalyptus coolabah</i> woodlands. (BVG1M: 31a)</p> <p>11.3.3c: Palustrine wetland (e.g. vegetated swamp). <i>Eucalyptus coolabah</i> woodland to open-woodland (to scattered trees) with a sedge or grass understorey in back swamps and old channels. The ground layer is dominated by a range of sedge or grass species depending on hydrological regime, soil and management conditions. Characteristic ground layer species include <i>Eleocharis</i> spp. or <i>Marsilea</i> spp. in more frequently inundated sites tending toward a grassy ground layer in less frequently flooded sites. Occurs in flooded back swamps and old channels on Cainozoic alluvial plains or levees. Generally clay or sometimes texture contrast soils. (BVG1M: 16c)</p> <p>11.3.3x1: <i>Atriplex</i> spp, <i>Sclerolaena</i> spp. +/- <i>Astrebla</i> spp. +/- short grasses. Occurs on scalded Cainozoic alluvial plains. (BVG1M: 31a)</p> |
| Supplementary descriptions: | <p>Forster and Barton (1995), Coolabah; Galloway et al. (1974), LU71 (in part); Gunn et al. (1967), Funnel, Comet; Neldner (1984), 32a, 32b; Story et al. (1967), Comet; Speck et al. (1968) Coolabah (6); Burgess (2003), Lindsay, Bluchers; Shields and Williams (1991) Moramana, Jeffray</p> |
| Subregion: | 11, 7, 37, 35, 10, 8, (26), (14), (13), (36), (25), (21), (20), (3), (27) |
| Protected areas: | <p>Culgoa Floodplain NP, Dipperu NP (S), Nairana NP, Albinia NP, Epping Forest NP (S), Nairana NP (R), Vandyke Creek CP, Mazeppa NP, Mount Archer NP, Precipice NP, Palmgrove NP (S), Wilandspey CP, Peak Range NP, Minerva Hills NP</p> |
| Extent in reserves: | Low |
| Wetland: | Floodplain (other than floodplain wetlands). |
| Special values: | <p>Mature trees provide hollows for fauna especially nesting birds. Associated with a high number fauna species (Dick 1992, Venz et al. 2002).</p> <p>11.3.3c: Mature trees provide hollows for fauna especially nesting birds. Associated with a high number fauna species (Dick 1992, Venz et al. 2002).</p> |
| Comments: | <p>The ground layer of remnants of this regional ecosystem is often extensively modified by grazing. The structure of the tree canopy has often been modified by past thinning which has included the removal of many of the larger hollow bearing trees. Naturalised species associated with this regional ecosystem include <i>*Parkinsonia aculeata</i>, <i>*Malvastrum americanum</i> and <i>*Acacia farnesiana</i>. <i>*Parkinsonia aculeata</i> has invaded some areas. Areas of grassland > 5ha are defined as regional ecosystem 11.3.21, while less extensive areas are treated as a component of 11.3.3.</p> <p>11.3.3c: The ground layer of remnants of this regional ecosystem is often extensively modified by grazing. The structure of the tree canopy has often been modified by past thinning which has included the removal of many of the larger hollow bearing trees. <i>Parkinsonia</i> (<i>Parkinsonia aculeata</i>) has invaded some areas. Generally shallow drainage features grading into Billabongs (11.3.27b) where deeper definable cut-off channels are evident with a developed 'wetland' understorey. Larger areas (>5ha) of grassland are mapped as regional ecosystem 11.3.21.</p> |
| Estimated extent: | In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained |
| Biodiversity status: | Of concern |

Biodiversity status notes:

Vegetation Management Act class: Of concern

Regional ecosystem 11.3.5

Description: *Acacia cambagei* +/- *A. harpophylla* low woodland or open-forest sometimes clumped, on Cainozoic alluvial plains. *Acacia cambagei* dominates the canopy (8-16m high) sometimes in association with *A. harpophylla* as a sub-dominant. *Eucalyptus coolabah*, *E. largiflorens* (subregion 35) or *Acacia harpophylla* may be present. Often *Eremophila mitchellii* is present as an open low tree layer (1.5-4m high) or as scattered shrubs to small trees. *Psydrax oleifolia* and *Atalaya hemiglaucula* are occasionally present. A small shrub layer sometimes occurs dominated by *Senna artemisioides* with or without suckers of *Acacia cambagei* or both species may occur as scattered shrubs. The ground layer is often poorly formed except under the canopy where there is usually a very sparse cover of dominants which include *Paspalidium caespitosum*, *Sporobolus actinocladius* and *Brachyachne convergens*. Other graminoids frequently present are *Bothriochloa ewartiana*, *Iseilema vaginiflorum*, *Eragrostis microcarpa* and *Aristida latifolia*. Occurs on levees on alluvial plains which are rarely flooded. Associated soils are often texture contrast with sandy surfaces. (BVG1M: 26a)

Supplementary descriptions: Gunn et al. (1967), Funnel, Banchory; Galloway et al. (1974), LU73; Gunn and Nix (1977), LU 130, LU 123

Subregion: 7, 8, 37, (13), (4), (3)

Protected areas: Culgoa Floodplain NP, Epping Forest NP (S), Nairana NP, Nairana NP (R), Mazeppa NP, Narrien Range NP

Extent in reserves: Low

Wetland:

Special values:

Comments: Occurs along north-west margins of bioregion. Extensively cleared for pasture.

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: Of concern

Biodiversity status notes: under review

Vegetation Management Act class: Least concern

Regional ecosystem 11.3.9

- Description:** Eucalyptus platyphylla +/- Corymbia clarksoniana +/- C. intermedia +/- E. tereticornis +/- Lophostemon suaveolens woodland. This association has a grassy ground layer, with species including Heteropogon contortus, Sorghum nitidum, Chrysopogon fallax, Alloteropsis semialata and Aristida holathera, or with heavier grazing short grasses such as Chloris spp., Fimbristylis dichotoma, Cyperus spp., Schizachyrium fragile and Ectrosia leporina. Occurs on Cainozoic alluvial plains, on sandy surface with clay subsoil. Usually with "wet" influence, either closely adjacent to major river, or undergoes inundation relatively frequently. May occur in wet depressions. (BVG1M: 9e)
Major vegetation communities include:
11.3.9a: Eucalyptus acmenoides +/- E. drepanophylla, +/- E. platyphylla woodland. (BVG1M: 18a)
- Supplementary descriptions:** Christian et al. (1953), Manton, Clare; Forster and Barton (1995), Daly
- Subregion:** 1, 14, 2, (3), (6), (12)
- Protected areas:** Shoalwater Bay CP, Bowling Green Bay NP, Mount Jim Crow NP, Bolger Bay CP, Mount Archer NP, [Magnetic Island NP], [Bowling Green Bay CP]
- Extent in reserves:** Low
- Wetland:** Floodplain (other than floodplain wetlands).
- Special values:**
- Comments:** Understorey modified by total grazing pressure. Has undergone invasion by rubber vine *Cryptostegia grandiflora Trees are usually widely spaced, reaching 10-14 m tall. Emergents can be taller than this. Distinguished from 11.3.35 by greater frequency of inundation, usually few shrubs/low trees, woodland to open-woodland structure.
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** No concern at present
- Biodiversity status notes:**
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.3.12

Description: *Melaleuca viridiflora* with occasional *M. argentea* +/- *M. dealbata* woodland to open-woodland. Occasional midstratum of *Grevillea pteridifolia* and *Acacia leptocarpa*. Ground layer of perennial grasses such as *Themeda triandra*, *Elionurus citreus*, *Ectrosia leporina*, *Eriachne rara*, *Eremochloa bimaculata*, *Thaumastochloa pubescens*, *Eragrostis brownii* and *Ischaemum australe*. Occurs on older alluvial plains on strongly duplex clay soils with restricted drainage. (BVG1M: 21a)

Major vegetation communities include:

11.3.12a: Palustrine wetland (e.g. vegetated swamp). *Melaleuca leucadendra* and *Livistona decora* dominate the open-forest canopy, while *Corymbia tessellaris* and *Nauclea orientalis* are also present. The shrub / understorey layer is dense, including *Atractocarpus fitzalanii*, *Chionanthus ramiflora*, *Carallia brachiata*, *Macaranga tanarius*, *Ficus copiosa* and *Hibiscus tiliaceus*. The ground layer is sparse to moderately dense. *Scleria polycarpa* forms pure stands in swampy parts. Other common species are *Ludwigia octovalvis*, *Crinum pedunculatum*, *Eclipta prostrata* and *Basilicum polystachyon*. Several vine species are present, such as *Entada phaseoloides*, and *Luffa aegyptiaca*. Occurs in depressions on coastal floodplains. (BVG1M: 22c)

Supplementary descriptions: Christian et al. (1953), Manton; Cumming (2000)

Subregion: 1, (2)

Protected areas: Bowling Green Bay NP, Horseshoe Bay Lagoon CP, Cape Upstart NP, [Bowling Green Bay CP]

Extent in reserves: Low

Wetland: Contains palustrine wetland (e.g. in swales).

Special values:

Comments: Extensively cleared for cropping and pasture.
11.3.12a: Naturalised species associated with this regional ecosystem include
**Asclepias curassavica*, **Argyrea nervosa* and **Passiflora suberosa*.

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 11.3.21

- Description:** Grassland dominated by *Dichanthium sericeum* and/or *Astrebla* spp. (*A. lappacea*, *A. elymoides* and *A. squarrosa*). A wide range of other grass and forb species are usually present and may dominant depending on seasonal conditions and management regime. Frequently occurring species include the grasses *Aristida leptopoda*, *A. latifolia*, *Bothriochloa bladhii* subsp. *bladhii*, *Brachyachne convergens*, *Heteropogon contortus*, *Panicum decompositum*, *Eriochloa* spp., *Sporobolus mitchellii* and *Thellungia advena* and the forbs *Abelmoschus ficulneus*, *Corchorus trilocularis*, *Commelina ensifolia*, *Chamaesyce coghlanii*, *Ipomoea lonchophylla*, *Neptunia gracilis*, *Phyllanthus maderaspatensis*, *Sida trichopoda* and *Trichodesma zeylanicum* var. *latisepalum*. Scattered trees and shrubs may occur including *Eucalyptus coolabah*, *E. populnea*, *E. tereticornis* or *Acacia* spp. Occurs on Cainozoic alluvial plains that are near level (slope <1%), i.e. on flats associated with rivers and creeks, including back-plains, terraces, low levees and back-swamps. Associated soils are usually cracking clays that lack gilgai, are often self mulching, usually deep and range in colour from dark grey-brown to grey or black. (BVG1M: 30a)
- Supplementary descriptions:** Gunn et al. (1967), Alpha (4), Comet (2), Funnel (2), Karalee (5), Mantuan (2), Somerby (6), Waterford (2), Wondabah (4); Speck et al. 1967), Kiddell (10), Westwood (7); Story et al. (1967), Funnel (2), Waterford (3); Galloway et al. (1974), LU 69; Dawson (1972), Jimbour; Vandersee (1975), Oakey (3), Jimbour (1-3), Tipton (1, 3); Gunn and Nix (1977), LU 131; Neldner (1984); 70a (140); Fensham and Fairfax (1997), 19, grassland; Fensham (1998) grassland; Fensham (1999), Mitchell grass on alluvium; Hobson (2002), fauna survey; Burgess (2003) Lindsay (VA28)
- Subregion:** 31, 15, (10), (37), (7), (35), (11), (6)
- Protected areas:** Carnarvon NP, Vandyke Creek CP
- Extent in reserves:** Low
- Wetland:** Floodplain (other than floodplain wetlands).
- Special values:** Habitat for threatened flora species including *Thesium australe*, *Picris evae*, *Dichanthium queenslandicum* and the near threatened flora species *Digitaria porrecta* and fauna species including grassland earless dragon *Tympanocryptis pinguicolla*, five-clawed worm skink *Anomalopus mackayi* and grey snake *Hemiaspis damelii*.
- Comments:** Many of the larger areas (subregions 30, 32, 36) have been extensively cultivated for cropping and pasture. Extensive areas are subject to invasion by **Parthenium hysterophorus* in northern parts of the bioregion and to a lesser extent the exotic grass **Pennisetum ciliare* (Fensham 1999) particularly after periods of heavy grazing or drought. Presence of the dominant grass species varies with grazing and seasonal conditions. In the south-western part of its occurrence, the ground layer of grasses and forbs may be 0.5-1 m high, with a projected foliage cover of 10-40% (Neldner 1984). Grazing may adversely impact on fauna values particularly during periods of drought (Hobson 2002). Naturalised species associated with this regional ecosystem include **Sida spinosa*. In some areas e.g. Nebo Shire, this RE occurs within larger areas of RE 11.3.4 along broad alluvial plains that are associated with adjacent or upstream basaltic or andesitic landscapes.
- Estimated extent:** In December 2006, <10% of the pre-clearing area remained.
- Biodiversity status:** Endangered
- Biodiversity status notes:**
- Vegetation Management Act class:** Endangered

Regional ecosystem 11.3.25

Description: *Eucalyptus camaldulensis* or *E. tereticornis* open-forest to woodland. Other tree species such as *Casuarina cunninghamiana*, *E. coolabah*, *Melaleuca bracteata*, *Melaleuca viminalis*, *Livistona* spp. (in north), *Melaleuca* spp. and *Angophora floribunda* are commonly present and may be locally dominant. An open to sparse, tall shrub layer is frequently present dominated by species including *Acacia salicina*, *A. stenophylla* or *Lysiphyllum carronii*. Low shrubs are present, but rarely form a conspicuous layer. The ground layer is open to sparse and dominated by perennial grasses, sedges or forbs such as *Imperata cylindrica*, *Bothriochloa bladhii*, *B. ewartiana*, *Chrysopogon fallax*, *Cyperus dactyloides*, *C. difformis*, *C. exaltatus*, *C. gracilis*, *C. iria*, *C. rigidellus*, *C. victoriensis*, *Dichanthium sericeum*, *Leptochloa digitata*, *Lomandra longifolia* or *Panicum* spp. Occurs on fringing levees and banks of major rivers and drainage lines of alluvial plains throughout the region. Soils are very deep, alluvial, grey and brown cracking clays with or without some texture contrast. These are usually moderately deep to deep, soft or firm, acid, neutral or alkaline brown sands, loams or black cracking or non-cracking clays, and may be sodic at depth (Burgess 2003). (BVG1M: 16a)

Major vegetation communities include:

11.3.25a: Riverine wetland or fringing riverine wetland. *Eucalyptus raveretiana* (sometimes emergent), *Melaleuca fluviatilis* woodland. A range of other species may be present including *Melaleuca leucadendra*, *Corymbia clarksoniana*, *Casuarina cunninghamiana*, *Melaleuca viminalis* and *Nauclea orientalis*. There is often a dense low tree layer dominated by species such as *Acacia salicina*, *Geijera salicifolia*, *Diospyros humilis* and *Mallotus philippensis*. (BVG1M: 22c)

11.3.25b: Riverine wetland or fringing riverine wetland. *Melaleuca leucadendra* and/or *M. fluviatilis*, *Nauclea orientalis* open forest. A range of other canopy or sub canopy tree species also occur including *Pandanus tectorius*, *Livistona* spp., *Eucalyptus tereticornis*, *Corymbia tessellaris*, *Millettia pinnata*, *Casuarina cunninghamiana*, *Livistona decora*, *Lophostemon suaveolens* or *L. grandiflorus*, rainforest species and, along drainage lines, *Eucalyptus camaldulensis* or *E. tereticornis*. A ground layer of tall grasses such as *Chionachne cyathopoda*, *Mnesithea rottboellioides* or *Heteropogon triticeus* may be present. Often occurs on coarse sand spits and levees within larger river channels. (BVG1M: 22c)

11.3.25c: Riverine wetland or fringing riverine wetland. *E. camaldulensis* or *E. tereticornis* open-forest to woodland. Occurs fringing drainage lines derived from Serpentine. (BVG1M: 16a)

11.3.25d: Riverine wetland or fringing riverine wetland. *Melaleuca bracteata* woodland to open-forest. Occurs on fringing alluvial soils or near-channel levees on heavy wet clays. (BVG1M: 22c)

11.3.25e: Riverine wetland or fringing riverine wetland. *Eucalyptus camaldulensis*, *E. tereticornis* woodland fringing larger, permanent water courses. A range of other tree species commonly occur including *Melaleuca trichostachya*, *Casuarina cunninghamiana*, and *Melaleuca viminalis*. Ground layer is composed of grasses and forbs. Occurs fringing permanent water courses. (BVG1M: 16a)

11.3.25f: Riverine wetland or fringing riverine wetland. Main river channels. Open water or exposed stream bed and bars. Usually devoid of emergent vegetation although scattered trees and shrubs such as *Melaleuca viminalis* or *Melaleuca* spp. may be present and aquatic species may be abundant particularly in water holes and lagoons. Occurs on river channels. (BVG1M: 16d)

11.3.25g: Riverine wetland or fringing riverine wetland. Vegetation is seasonal and may consist of open water and/or a range of mainly aquatic species such as *Nymphoides crenata* or *Hydrilla verticillata*. Often with fringing woodland, commonly *E. camaldulensis* or *E. coolabah* and a ground layer that may include species such as *Pseudoraphis spinescens*, *Marsilea drummondii*, *M. mutica*, *Persicaria subsessilis* and *Eleocharis* spp. Occurs on waterholes in larger drainage lines and rivers. (BVG1M: 16d)

11.3.25h: Riverine wetland or fringing riverine wetland. Low open-forest or low woodland of *Melaleuca viminalis*, often in association with *Melaleuca trichostachya*, occasionally with *Cryptocarya triplinervis*, and sometimes with emergent layer of *Eucalyptus tereticornis* or *Casuarina cunninghamiana*. The shrub layer is sparse but includes *Ficus opposita*. The ground layer includes *Lomandra hystrix* and *Oplismenus aemulus*. Occurs fringing drainage lines. (BVG1M: 22c)

Supplementary descriptions: Dawson (1972), 1; Dowling and Stephens (1997), 8b; Fensham (1998a); Fensham and Fairfax (1997); Gunn et al. (1967), Funnell; Mullins (1980), Tavoy, Lynwood; Neldner (1984), 18c; Speck et al. (1968), Kroombit; Taylor and Grimshaw (1994-95),

- Subregion: 26, 11, 22, 1, 6, (14), (2), (31), (18), (7), (3), (32), (13), (15), (29), (27), (24), (16), (21), (25), (36), (12), (20), (10), (9), (33)
- Protected areas: Carnarvon NP, Expedition (Limited Depth) NP, Palmgrove NP (S), Homevale NP, Bowling Green Bay NP, Expedition RR, Taunton NP (S), Goodedulla NP, Blackdown Tableland NP, Homevale RR, Nairana NP, Eungella NP, Nuga Nuga NP, Albinia NP, Precipice NP, Dipperu NP (S), Lake Murphy CP, Mount Archer NP, Auburn River NP, Narrien Range NP, Cape Upstart NP, Nairana NP (R), Princhester CP, Bell Creek CP, Tregole NP, Minerva Hills NP, Cania Gorge NP, Kroombit Tops NP, Rundle Range RR, Mount Hopeful CP, Tooloombah Creek CP, Bouldercombe Gorge RR, Vandyke Creek CP, Shoalwater Bay CP, Rundle Range NP, Dawson River CP, Tolderodden CP, Junea NP, Bowling Green Bay CP, Bukkulla CP, Mount OConnell NP, Homevale CP, [Mount Jim Crow NP], [Paluma Range NP], [Bolger Bay CP], [Long Island Bend CP], [Highworth Bend CP], [Peak Range NP]
- Extent in reserves: Low
- Wetland: Riverine wetland or fringing riverine wetland.
- Special values: Habitat for threatened flora species including *Eucalyptus raveretiana*. Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle *Rheodytes leukops*. Known to be important habitat for other riparian freshwater turtle species.
- Comments: Impact by total grazing pressure. Weeds particularly rubber vine **Cryptostegia grandiflora* (in the north of the bioregion) and buffel grass **Pennisetum ciliare* have invaded many areas. Some areas have been modified by weir construction (Eberhard 1999). Often associated with regional ecosystems 11.3.2 and 11.3.4 which may occur on adjacent alluvial plains. In highly cleared subregions a narrow fringe of riparian vegetation is often the only surviving woody vegetation. This regional ecosystem includes sandy or rocky banks and beds and water within channel which can be extensive in some of the larger coastal rivers.
 11.3.25a: Naturalised species associated with this regional ecosystem include **Grewia asiatica*. As the low tree layer becomes denser, this vegetation community grades into 11.3.11.
 11.3.25b: Weeds particularly rubber vine *Cryptostegia grandiflorus* (in the north of the bioregion) and *Lantana camara* have invaded many areas. Very frequently disturbed by natural flood events
 11.3.25g: Larger waterholes (> 5ha) are included here while smaller ones are included with river channels (11.3.25f).
 11.3.25h: Naturalised species associated with this regional ecosystem include **Megathyrsus maximus* and **Cynodon dactylon*.
- Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status: Of concern
- Biodiversity status notes: Threatening processes other than clearing.
- Vegetation Management Act class: Least concern

Regional ecosystem 11.3.27

- Description:** Freshwater wetlands. Vegetation is variable including open water with or without aquatic species and fringing sedgeland and eucalypt woodlands. Occurs in a variety of situations including lakes, billabongs, oxbows and depressions on floodplains. (BVG1M: 34d)
- Major vegetation communities include:
- 11.3.27a: Lacustrine wetland (e.g. lake). Vegetation ranges from open water +/- aquatics and emergents such as *Chara* spp., *Nitella* spp., *Myriophyllum verrucosum*, *Nymphaea violacea*, *Pyrngillus javanicus*, *Potamogeton crispus*, *P. tricarinatus*, *Ottelia ovalifolia*, *Vallisneria caulescens* and *Nymphoides indica*. A narrow fringing woodland commonly dominated by *E. camaldulensis* or *E. coolabah* but also a range of other tree species may be present. Larger ephemeral - permanent water bodies (lakes). (BVG1M: 34a)
- 11.3.27b: Lacustrine wetland (e.g. lake). Vegetation ranges from open water +/- aquatics and emergents such as *Potamogeton crispus*, *Myriophyllum verrucosum*, *Chara* spp., *Nitella* spp., *Nymphaea violacea*, *Ottelia ovalifolia*, *Nymphoides indica*, *N. crenata*, *Potamogeton tricarinatus*, *Cyperus difformis*, *Vallisneria caulescens* and *Hydrilla verticillata*. Often with fringing woodland, commonly *Eucalyptus camaldulensis* or *E. coolabah* but also a wide range of other species including *Eucalyptus platyphylla*, *E. tereticornis*, *Melaleuca* spp., *Acacia holosericea* or other *Acacia* spp. Occurs on billabongs no longer connected to the channel flow. (BVG1M: 34d)
- 11.3.27c: Palustrine wetland (e.g. vegetated swamp). Mixed grassland or sedgeland with areas of open water +/- aquatic species. Dominated by a range of species including *Eleocharis* spp., *Nymphoides* spp. and sometimes *Phragmites australis*. Occurs on closed depressions on alluvial plains that are intermittently flooded in inland parts of the bioregion. (BVG1M: 34d)
- 11.3.27d: Palustrine wetland (e.g. vegetated swamp). *Eucalyptus camaldulensis* and/or *E. tereticornis* woodland. A range of sedges and grasses occur in the ground layer including *Fimbristylis vagans*, *Myriophyllum striatum*, *Nitella pseudoflabellata* and *Pseudoraphis* sp. Occurs fringing large lakes. (BVG1M: 34a)
- 11.3.27e: Palustrine wetland (e.g. vegetated swamp). Vegetation ranges from open water +/- aquatics sometimes with fringing trees and shrubs. Fringing tree species include *Melaleuca dealbata*, *Nauclea orientalis*, *M. leucadendra*, *Lophostemon suaveolens* and *Corymbia tessellaris*. Shrub layers are usually absent although scattered *Pandanus* spp. may be present. The ground layer is often open water with emergent aquatic species or sedges and grasses including *Leersia hexandra*, *Cyperus dactyloides*, *Cyperus lucidus*, *Nymphaea* spp. and *Gymnanthera oblonga*. Occurs on billabongs and oxbows with permanent to ephemeral water regime. (BVG1M: 34d)
- 11.3.27f: Palustrine wetland (e.g. vegetated swamp). *Eucalyptus coolabah* and/or *E. tereticornis* open-woodland to woodland fringing swamps. Ground layer and treeless areas range from open water +/- aquatics and emergents such as *Potamogeton crispus*, *Myriophyllum verrucosum*, *Chara* spp., *Eleocharis* spp., *Nitella* spp., *Cyperus difformis*, *Hydrilla verticillata*. Occurs on closed depressions on floodplains associated with old drainage courses that are intermittently flooded. (BVG1M: 34d)
- 11.3.27g: Lacustrine wetland (e.g. lake). Lakes with or without fringing *Eucalyptus coolabah* low open-woodland Occurs on closed depressions on floodplains associated with old drainage courses. (BVG1M: 34a)
- 11.3.27h: Lacustrine wetland (e.g. lake). Lakes with mainly open water or bare lake bed. May be *Muehlenbeckia florulenta* low shrubland +/- scattered *E. coolabah* trees fringing or scattered across the area. Occurs on floodplains. Seasonally dry. (BVG1M: 34a)
- 11.3.27i: Palustrine wetland (e.g. vegetated swamp). *Eucalyptus camaldulensis* or *E. tereticornis* woodland to open-woodland with sedgeland ground layer. Other tree species such as *E. coolabah* and *E. largiflorens* may be present or locally dominant. Ground layer dominated by sedges, ferns or herbs such as *Eleocharis* spp., *Juncus* spp. and *Marsilea* spp. Occurs in depressions on floodplains. (BVG1M: 34d)
- 11.3.27j: Palustrine wetland (e.g. vegetated swamp). *Acacia stenophylla* and other shrubby species Occurs in frequently flooded depression on floodplains. (BVG1M: 34d)
- 11.3.27x1a: Palustrine wetland (e.g. vegetated swamp). Sedgelands to grasslands on old marine planes. Often occurs as an *Eleocharis* spp. (*E. dulcis*, *E. sphacelata*) sedgeland but a variety of other species dominate in local areas including *Typha orientalis*, *Cyperus alopecuroides*, *Phragmites australis* and *Ludwigia octovalvis*. A range of other sedges, grasses small shrubs and herbs (<40 cm) are abundant, and include *Ammannia multiflora*, *Cyperus polystachyos*, *Sporobolus virginicus*, *Chloris virgata*, *Fimbristylis ferruginea*,

Ceratopteris thalictroides, *Phyla nodiflora* var. *nodiflora* and *Persicaria attenuata*. The vines *Passiflora foetida* may occur in some areas. Trees and large shrubs are generally absent. Occurs in depressions on Quaternary estuarine deposits which are seasonally inundated with fresh water. (BVG1M: 34c)

11.3.27x1b: Palustrine wetland (e.g. vegetated swamp). Sedgeland to grasslands on Quaternary deposits. Often occurs as an *Eleocharis dulcis* sedgeland but a variety of other species dominate in local areas including *Typha orientalis* and *Phragmites australis*. Trees and large shrubs are generally absent. Occurs on broad drainage depressions situated on old alluvial plains. (BVG1M: 34c)

11.3.27x1c: Palustrine wetland (e.g. vegetated swamp). Sedgeland to grasslands on Quaternary deposits. Sedgeland areas typically dominated by *Schoenoplectus litoralis* although a range of other sedges and grasses may also dominate localised areas. Other dominant species include the sedges *Eleocharis philippinensis*, *Cyperus alopecuroides*, *C. scariosus* and *C. iria* and the grasses *Phragmites australis*, *Sporobolus virginicus* and *Paspalum vaginatum*. Other typical species in shallower margins include *Fimbristylis ferruginea*, *Phyla nodiflora* and *Cyperus polystachyos*. Occasional twiners such as *Cynanchum carnosum* may be present. Occurs in depressions on old Quaternary estuarine deposits. These are seasonally inundated with fresh water but become more brackish as they dry. Dry out completely before the next season's rain. (BVG1M: 34c)

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|-----------------------------|--|
| Supplementary descriptions: | Pollock and Edginton (1999), we-3, wc-3; ANCA (1996); Speck et al. (1968), Palmtree (8); Burgess (2003), (VA21) Thirteenmile, Bluchers; Gunn and Nix (1977) LU 136; Blackman et al. (2002) |
| Subregion: | 1, 14, 11, 20, (36), (2), (35), (37), (7), (27), (26), (6), (31), (32), (30), (13), (21), (25), (18) |
| Protected areas: | Bowling Green Bay CP, Bowling Green Bay NP, Lake Murphy CP, Culgoa Floodplain NP, Lake Broadwater CP, Townsville Town Common CP, Carnarvon NP, Horseshoe Lagoon CP, Nairana NP, Nuga Nuga NP, Tolderodden CP, [Kroombit Tops NP], [Horseshoe Bay Lagoon CP], [Bolger Bay CP] |
| Extent in reserves: | Low |
| Wetland: | Palustrine wetland (e.g. vegetated swamp). |
| Special values: | Habitat for a diverse range of fauna species (Venz et al. 2002) particularly birds. <i>Hydrocharis dubia</i> is a vulnerable water plant that occasionally occurs in this RE. 11.3.27a: Provides wetland habitat for a flora and fauna. |
| Comments: | Many smaller wetlands in the Brigalow Belt bioregion are too small to map at a 1:100 000 scale. 11.3.27b: Naturalised species associated with this regional ecosystem include <i>*Egeria densa</i> . This vegetation community is flooded by overland flow in contrast to 12.3.25g which is directly to channels. Smaller billabongs are classified as palustrine wetlands while areas with more extensive open water are classified as lacustrine wetlands often with a fringing palustrine system. 11.3.27d: Occurs as a narrow fringe around many wetlands although is only mapped on larger lakes and billabongs 11.3.27e: Subject to trampling by domestic and feral animals. Impacted by modification of hydrology due to irrigation and water extraction from the wetland or surrounding catchment. 11.3.27f: Naturalised species associated with this regional ecosystem include <i>*Egeria densa</i> . Similar to old billabongs but not as deep or linear 11.3.27x1a: Many areas are impacted by and sometimes formed from levees and bunds build to stabilise the encroachment from salt water. These areas may become brackish as they dry out. <i>E. dulcis</i> is more common in slightly brackish areas while <i>E. sphacelata</i> tends to occur in less salty areas. Includes areas of saline grasslands/sedgeland now removed from tidal influence and dominated by native freshwater grass species (e.g. around St Lawrence). 11.3.27x1b: Many areas are impacted by and sometimes formed from levees and bunds build to stabilise the encroachment from salt water. Generally a palustrine wetland although also some areas have been converted to lacustrine water bodies associated with the construction of bunding and levees. 11.3.27x1c: Naturalised species include <i>*Cynodon dactylon</i> var. <i>dactylon</i> . Often associated with modified hydrology caused by levees. |
| Estimated extent: | In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained. |
| Biodiversity status: | Of concern |

Biodiversity status notes: Subject to trampling by domestic and feral animals. Impacted by modification of hydrology due to irrigation and water extraction from the wetland or surrounding catchment.

Vegetation Management Act class: Least concern

Regional ecosystem 11.3.30

Description: Eucalyptus crebra or E. paedoglaucula and Corymbia dallachiana woodland. Forms a open-woodland to open forest in places. Has a grassy ground layer of Heteropogon contortus, Bothriochloa bladhii, Themeda triandra, Sehima nervosum, Enneapogon spp., with forbs such as Indigofera spp., Glycine tabacina, Galactia tenuiflora and Tephrosia juncea common. Occurs on older floodplain complexes on Cainozoic alluvial plains. (BVG1M: 18b)
Major vegetation communities include:
11.3.30a: Eucalyptus paedoglaucula woodland. (BVG1M: 18a)
11.3.30b: E. drepanophylla/paedoglaucula +/- C. dallachiana +/- E. platyphylla woodland. (BVG1M: 18a)
11.3.30d: E. drepanophylla/paedoglaucula +/- C. dallachiana +/- E. platyphylla woodland. (BVG1M: 18b)

Supplementary descriptions: Christian et al. (1953), Bowen, Northcote, Rocky Ponds, Mookara

Subregion: 1, 2, (6)

Protected areas: Bowling Green Bay NP

Extent in reserves: Low

Wetland:

Special values:

Comments:

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 11.3.32

Description: *Allocasuarina luehmannii* low open-woodland. Dominated by *Allocasuarina luehmannii*, with occasional emergent *Corymbia dallachiana* and *C. erythrophloia*. The midstratum is dominated by juvenile *Allocasuarina luehmannii* with occasional *Bursaria incana* and/or *Maytenus cunninghamii*. More frequently a midstratum is sparse or absent. A thin ground stratum of perennial grasses or sedges such as *Heteropogon contortus*, *Sporobolus australasicus*, *Fimbristylis dichotoma*, *Alloteropsis semialata*, *Dichanthium fecundum*, *Aristida* spp. and forbs such as *Phyllanthus virgatus* or *Polymeria marginata* may be present. Occurs on older floodplain complexes on Cainozoic alluvial plains. (BVG1M: 18a)

Supplementary descriptions: Christian et al. (1953), Manton; Kutt and Kemp (1998);

Subregion: 2, 1

Protected areas: No representation

Extent in reserves: No representation

Wetland:

Special values:

Comments: Extensively cleared for cropping or modified by total grazing pressure. Subject to invasion by rubber vine (**Cryptostegia grandiflora*), prickly acacia (**Acacia nilotica*) and chinee apple (**Ziziphus mauritiana*)

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 11.3.33

Description: *Eremophila mitchellii* low open-woodland to 5-6 m tall. May have emergent isolated *Grevillea striata* or *Corymbia tessellaris* or *C. dallachiana*. Occasional shrubs of *Acacia bidwillii*, *Carissa ovata* or *Grevillea striata* may occur. There may be a ground layer of *Enchylaena tomentosa* and *Sporobolus* spp. or *Fimbristylis* spp. Usually the ground layer is sparse or bare and scalded. Occasional grasses include *Oxychloris scariosa*, *Eragrostis* spp., and *Aristida* spp. Occurs on older floodplain complexes on Cainozoic alluvial plains. Common soils are yellow podsoles and grey clays or sandy loams over heavy clays. (BVG1M: 26a)

Supplementary descriptions: Christian et al. (1953), Northcote, Rocky Ponds, Kilbogey

Subregion: 2, 1, (13), (7), (8)

Protected areas: No representation

Extent in reserves: No representation

Wetland:

Special values:

Comments: Of very limited extent, probably less than 30,000 ha. Extensively cleared for cropping or modified by total grazing pressure. The ecology of *Eremophila mitchellii* is well studied (Beeston and Webb 1977). This RE appears to be closely related to adjacent *Acacia tephрина* (RE 11.3.34) or *Grevillea striata* (RE 11.3.13) communities, and may grow in close association with them in some locations.

Estimated extent: In December 2006, remnant extent was < 10,000 ha and >30% of the pre-clearing area remained

Biodiversity status: Endangered

Biodiversity status notes: Threatening processes other than clearing.

Vegetation Management Act class: Of concern

Regional ecosystem 11.3.35

Description: Eucalyptus platyphylla, Corymbia clarksoniana woodland. This association usually occurs as woodland of Eucalyptus platyphylla and Corymbia clarksoniana with Corymbia tessellaris occurring in some areas. A low tree layer of species such as Planchonia careya, Pandanus spiralis, Melaleuca viridiflora or M. nervosa and Petalostigma pubescens is often present. The ground layer is usually grassy with common species including Themeda triandra, Heteropogon contortus, Mnesithea rottboellioides and Bothriochloa decipiens, together with herbs or forbs such as Glycine tabacina, Galactia tenuiflora or Sida hackettiana. Occurs on Cainozoic alluvial plains. Older floodplain complexes, major stream levees and lighter deltaic deposits. (BVG1M: 9e)

Major vegetation communities include:

11.3.35a: Corymbia tessellaris, C. clarksoniana and Eucalyptus platyphylla woodland.
(BVG1M: 9e)

Supplementary descriptions: Christian et al. (1953), Clare, Milleroo; Cumming (2000)

Subregion: 1, 2, 6, (11)

Protected areas: Bowling Green Bay NP, Townsville Town Common CP, Cape Pallarenda CP, Paluma Range NP, [Bolger Bay CP]

Extent in reserves: Low

Wetland:

Special values:

Comments: Invaded by chinee apple (*Ziziphus mauritiana) and rubber vine (*Cryptostegia grandiflora) in some districts.

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 11.3.37

Description: Eucalyptus coolabah with Eucalyptus camaldulensis form a distinct but discontinuous woodland to low woodland canopy layer (7-11m high). Other scattered trees such as Lysiphyllum gilvum, Melaleuca trichostachya, Melaleuca bracteata and Eucalyptus populnea may occur. The mid layer varies from absent to a tall shrubland dominated by species such as Acacia stenophylla and Acacia salicina. Ground cover is variable composed of grasses and sedges. Includes larger waterholes within the stream channels. Occurs on fringing stream channels, usually braided. Soils are bed loads of clay or silt with cobbles and boulders in some areas. Predominantly western sub-regions of the Brigalow Belt, for example the Suttor River catchment. (BVG1M: 16a)

Supplementary descriptions: Galloway et al. (1974), LU76 (in part); Gunn and Nix (1977) LU 135

Subregion: 7, 37, 13, 11, 36, 10, 15, (35), (21), (8)

Protected areas: Mazeppa NP, Nairana NP, Vandyke Creek CP, Nairana NP (R)

Extent in reserves: Low

Wetland: Riverine wetland or fringing riverine wetland.

Special values:

Comments: Habitat for a diverse range of fauna particularly birds.

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 11.4.1

- Description:** Semi-evergreen vine thicket +/- *Casuarina cristata*. May commonly include *Planchonella cotinifolia*, *Lysiphyllum hookeri*, *Capparis* spp. and *Terminalia oblongata*, with lower stratum of *Elaeodendron australe*, *Denhamia oleaster* and *Pittosporum spinescens*. A ground layer of *Ancistrachne uncinulata*, *Cheilanthes* spp., and *Solanum ellipticum* may be present. Occurs on Cainozoic clay plains including extensively weathered Tertiary basalt. (BVG1M: 7a)
- Supplementary descriptions:** Fensham and Fairfax (1997a); Fensham (1995); Fensham and Streimann (1997); Story et al. (1967), Racecourse
- Subregion:** 11, 10, 21, 2, (6), (17), (22), (27)
- Protected areas:** Dipperu NP (S)
- Extent in reserves:** Medium
- Wetland:**
- Special values:** Habitat for the near threatened plant *Macropteranthes leiocaulis*
- Comments:** Extensively cleared for pasture.
- Estimated extent:** In December 2006, <10% of the pre-clearing area remained.
- Biodiversity status:** Endangered
- Biodiversity status notes:**
- Vegetation Management Act class:** Endangered

Regional ecosystem 11.4.2

Description: Eucalyptus populnea/brownii or E. melanophloia +/- Corymbia dallachiana +/- C. tessellaris +/- E. crebra +/- E. platyphylla woodland. Occurs on Cainozoic clay plains, often on rises or patches of coarser textured material. Cracking clay and texture contrast soils. (BVG1M: 17a)

Supplementary descriptions: Forster and Barton (1995), Plainview; Gunn et al. (1967), Humboldt, Blackwater; Story et al. (1967), Nebo; Gunn and Nix (1977), LU 87, 90, Burgess (2003) (VA7), (VA20), Collawmar, Foxleigh

Subregion: 11, 14, 6, 21, (10), (8), (12), (13), (7), (15), (2), (16), (20), (18)

Protected areas: Homevale RR, Dipperu NP (S), Tooloombah Creek CP, Expedition (Limited Depth) NP, Homevale NP, Taunton NP (S), [Snake Range NP]

Extent in reserves: Low

Wetland:

Special values:

Comments: This regional ecosystem is associated with both fine-textured Cainozoic sediments (land zone 4) and coarser-textured Cainozoic material (land zone 5).

Estimated extent: In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained

Biodiversity status: Of concern

Biodiversity status notes:

Vegetation Management Act class: Of concern

Regional ecosystem 11.4.4

- Description:** Tussock grassland dominated by *Dichanthium* spp. +/- *Astrebla* spp. (mainly *A. lappacea* and *A. pectinata*). Other grasses frequently present include *Thellungia advena*, *Panicum* spp. and *Aristida* spp. Forbs and annual grasses may become common with seasonal rains. Occasional shrubs and trees may be present in places. Occurs on flat to gently undulating clay plains formed from Cainozoic or weathered basalt unconsolidated sediments. Soils are generally moderately to deep to very deep dark grey self mulching cracking clays with linear gilgai. Gravel or stone may be present in some areas. (BVG1M: 30b)
- Supplementary descriptions:** Gunn et al. (1967), Avon (1), Kinsale (5), Moray (3), Wondabah (1); Speck et al. (1978), Highworth (4); Gunn and Nix (1977), LU 43, 102, 109; Fensham (1999), Mitchell grass on alluvium (in part); Burgess (2003) (VA28), Carfax
- Subregion:** 7, 11, 2, 10, 21, (6), (15)
- Protected areas:** No representation
- Extent in reserves:** No representation
- Wetland:**
- Special values:** Habitat for threatened flora species including *Dichanthium queenslandicum*. Often occurs adjacent to lower lying areas dominated by regional ecosystems 11.4.11 and 11.3.3.
- Comments:** Subject to invasion by *Parthenium hysterophorus* particularly in association with high total grazing pressure or periods of drought. The presence of dominant grass species varies with grazing and seasonal conditions.
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** Of concern
- Biodiversity status notes:** Threatening processes other than clearing. Under review.
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.4.5

- Description:** *Acacia argyrodendron* dominates the very sparse canopy (12-16m high). There are usually scattered small trees (6-10m high) including *A. argyrodendron*, *Terminalia oblongata*, *Owenia acidula*, *Lysiphyllum carronii* and *Eremophila mitchellii*. Grasses usually dominate the very sparse to mid-dense ground layer. *Dichanthium sericeum*, *Panicum decompositum* and *Aristida latifolia* can also be dominants. Occurs on flat to gently undulating plains formed from unconsolidated Cainozoic deposits. (BVG1M: 26a)
- Supplementary descriptions:** Gunn et al. (1967), Blackwater, Somerby, Disney; Burgess (2003) (VA 37) Turon, Warwick; Gunn and Nix (1977) LU 40, LU 36; Burgess (2003) (VA37), (VA4), Warwick, Turon
- Subregion:** 7, 11
- Protected areas:** Nairana NP, Nairana NP (R), Wilandspey CP
- Extent in reserves:** Low
- Wetland:**
- Special values:**
- Comments:** Extensively cleared for pasture. The exotic species **Pennisetum ciliare* often dominates the ground layer.
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained
- Biodiversity status:** Endangered
- Biodiversity status notes:** Under review
- Vegetation Management Act class:** Of concern

Regional ecosystem 11.4.6

Description: *Acacia cambagei* dominates the tree canopy (10-13m high). There is a sparse to open low tree layer (7-9m high) dominated by *Lysiphyllum carronii*, *Geijera parviflora*, *Acacia harpophylla*, and sometimes *A. argyrodendron*, *Terminalia oblongata*, and *Eremophila mitchellii*. An open shrub layer (1m high) dominated by species such as *Carissa ovata*, *Capparis lasiantha*, *Eremophila deserti*, *Apophyllum anomalum* and *Alectryon diversifolius* is also often present. The ground layer is sparse to open and dominated by grasses. Occurs on gently undulating plains formed from Cainozoic sediments. Associated soils are texture contrast with thin sandy or loamy surface horizons and strongly alkaline clay subsoils. (BVG1M: 26a)

Supplementary descriptions: Gunn et al. (1967), Islay, Pine Hill, Ulcanbah; Gunn and Nix (1977), LU 35, LU 39

Subregion: 7, 8, 10, (3), (13)

Protected areas: Wilandspey CP, Mazeppa NP, Nairana NP (R), Epping Forest NP (S), Nairana NP, Narrien Range NP

Extent in reserves: Low

Wetland:

Special values:

Comments: Extensively cleared for pasture.

Estimated extent: In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained

Biodiversity status: Endangered

Biodiversity status notes: Under review

Vegetation Management Act class: Of concern

Regional ecosystem 11.4.8

Description: Woodland to open-forest dominated by *Eucalyptus cambageana* and *Acacia harpophylla* or, sometimes in the north, *A. argyrodendron*. *E. thozetiana* is sometimes present on shallower soils. There is a moderately dense low tree layer (5m high) layer dominated by species such as *Eremophila mitchellii* and a low shrub layer (2m high) dominated by species such as *Carissa ovata* and *Geijera parviflora*. Occurs on level to gently undulating plains formed from Cainozoic deposits. Associated soils are usually deep texture contrast with thin loamy or sandy surface horizons overlying strongly alkaline clay subsoils. Surface or subsurface gravel is common. (BVG1M: 25a)

Major vegetation communities include:

11.4.8a: Palustrine wetland (e.g. vegetated swamp). Gilgai and small depressions on clay plains usually associated with *Acacia harpophylla* ecosystems. Generally support a range of sedges, grasses and, when wet, aquatic species. (BVG1M: 34d)

Supplementary descriptions: Gunn et al. (1967), Blackwater (2,3), Borilla (4), Disney (3), Durrandella (4), Humboldt (3), Islay (2), Pinehill (3), Playfair (4), Portwine (3), Ulcanbah (2), Willows (3); Story et al. (1967), Connors (6), Somerby (2); Speck et al. (1968), Highworth (2), Kiddell (4), Ramsay (1), Thomby (3); Gunn and Nix (1977), LU 34, 124; Burgess (2003), (VA4) Turon, Warwick, (VA5) Racetrack, Pomegranate

Subregion: 11, 7, 21, 8, (15), (6), (10), (13)

Protected areas: Dipperu NP (S), Nairana NP (R), Junee NP, Humboldt NP, Narrien Range NP, Wilandspey CP, Roundstone CP, Nairana NP, Zamia Creek CP

Extent in reserves: Low

Wetland:

Special values:

Comments: Extensively cleared for pasture.

Estimated extent: In December 2006, <10% of the pre-clearing area remained.

Biodiversity status: Endangered

Biodiversity status notes:

Vegetation Management Act class: Endangered

Regional ecosystem 11.4.9

Description: Open-forest, occasionally woodland, dominated by *Acacia harpophylla* usually with a low tree mid-storey of *Terminalia oblongata* and *Eremophila mitchellii*. *Casuarina cristata* sometimes replaces *Acacia harpophylla* in the overstorey and *Lysiphyllum cunninghamii* sometimes co-dominates. Other low tree or shrub species such as *Alectryon diversifolius*, *Carissa ovata*, *Pittosporum spinescens*, *Ehretia membranifolia*, *Geijera parviflora* and *Flindersia dissosperma* may occur in the mid-storey or low shrub layer. *Acacia harpophylla* trees have been recorded as 11- 17m high, the mid-storey layer 2- 8m high and the low shrub layer 1- 2m high. Occurs on level to gently undulating Cainozoic plains, including weathered basalt. Associated soils are predominantly moderately deep to deep cracking clays that may be brown, red-brown or grey-brown, and with much surface gravel in some areas. (BVG1M: 25a)

Major vegetation communities include:

11.4.9a: *Acacia harpophylla*, *Lysiphyllum carronii* +/- *Casuarina cristata* open-forest to woodland. (BVG1M: 25a)

11.4.9b: *Acacia harpophylla*, *Eucalyptus thozetiana* (sometimes *E. cambageana*) open-forest to woodland. (BVG1M: 25a)

Supplementary descriptions: Gunn et al. (1967), Avon (2), Blackwater (2, 3, 4), Cungelella (3), Disney (3), Durrandella (4), Humboldt (4, 5), Islay (2), Kareela (3), Kinsale (1,3,4), Loudon (5), Monteagle (5), Peak Vale (3), Playfair (4), Somerby (2,3,4), Ulcanbah (3), Waterford (2), Willows (3,4), Wondabah (2, 5); Story et al. (1967), Blackwater (2, 3, 4), Humboldt (5,6), Monteagle (5), Moorooloo (3), Racecourse (2), Somerby (4,5); Speck et al. (1968), Dakenba (2-4), Doonkuna (8), Highworth (3,6,8), Juandah (3), Kiddell (4,7), Ramsay (7), Thomby (5,7), Wandoan (8, 10), Westwood (6), Woleebee (4,9); Gunn and Nix (1977), LU 34, 37, 38, 40, 41, 46, 50, 51, 52, 53, 72, 93, 100, 101, 127; Forster and Barton (1995), Somerby, Blackwater; Burgess (2003) (VA1), (VA8) Pomegranate, Racetrack, Turon, Warwick

Subregion: 11, 7, 10, 21, 6, (14), (13)

Protected areas: Carnarvon NP, Dipperu NP (S), Junea NP, Nairana NP (R), Taunton NP (S), Peak Range NP, Zamia Creek CP, Mazeppa NP, Humboldt NP, Roundstone CP, Albinia NP, [Nairana NP], [Narrien Range NP], [Snake Range NP], [Tooloombah Creek CP], [Albinia CP]

Extent in reserves: Low

Wetland:

Special values:

Comments: Extensively cleared for cropping and pasture. The presence of *Terminalia oblongata* often distinguishes this regional ecosystem from *Acacia harpophylla* on clay plains in southern Queensland (11.4.3). Areas mapped as 11.4.9b have been re-classified as 11.4.8a (*Acacia harpophylla*, *Eucalyptus cambageana* open-forest to woodland).

Estimated extent: In December 2006, <10% of the pre-clearing area remained.

Biodiversity status: Endangered

Biodiversity status notes:

Vegetation Management Act class: Endangered

Regional ecosystem 11.4.11

- Description:** *Dichanthium sericeum* and *Astrebla* spp. grassland with patches of low *Acacia harpophylla* or *Eucalyptus coolabah*. Grassland dominated by *Dichanthium sericeum* and forms a mosaic with clumps of *Acacia harpophylla*, *Lysiphyllum hookeri* and *L. carronii* (usually 8+/-3m high). A wide range of other grass and forb species are usually present and may dominant depending on seasonal conditions and management regime. Frequently occurring species include the grasses *Aristida leptopoda*, *A. latifolia*, *Astrebla lappacea*, *Bothriochloa erianthoides*, *Digitaria brownii*, *D. divaricatissima*, *Eriochloa crebra*, *Panicum decompositum*, *P. queenslandicum*, *Paspalidium globoideum* and the forbs *Abelmoschus ficulneus*, *Boerhavia dominii*, *Corchorus trilocularis*, *Cyperus bifax*, *Glycine latifolia*, *Hibiscus trionum* var. *vesicarius*, *Ipomoea lonchophylla*, *Phyllanthus maderaspatensis*, *Tribulus micrococcus* and *Rhynchosia minima*. Occurs in shallow open valleys and poorly drained Cainozoic clay plains with deep cracking clay soils. (BVG1M: 30b)
- Supplementary descriptions:** Gunn et al. (1967), Avon (3); Fensham (1999), Mitchell Grass on alluvium; Gunn and Nix (1977) LU43, LU 44
- Subregion:** 7, 6, (10)
- Protected areas:** Mazeppa NP
- Extent in reserves:** Low
- Wetland:**
- Special values:**
- Comments:** Subject to very heavy infestation by the exotic species *Parthenium hysterophorus* which dominates the ground layer in many areas. Naturalised species associated with this regional ecosystem include **Malvastrum americanum*. This regional ecosystem may include low lying areas that occur on alluvium (land zone 3) and is often associated with similar regional ecosystems on gently undulating clay plains (11.4.4) and more low lying areas (11.3.3 and 11.3.21).
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained
- Biodiversity status:** Of concern
- Biodiversity status notes:** Threatening processes other than clearing. Under review.
- Vegetation Management Act class:** Of concern

Regional ecosystem 11.4.12

Description: Eucalyptus populnea predominates forming a distinct but discontinuous canopy (12-19m high). Scattered Eucalyptus spp. may be present at some sites, but most frequently E. populnea alone forms the canopy. Scattered trees such as Callitris glaucophylla and Acacia excelsa may also be present and occasionally form a distinct low tree layer (8-10m high). There is generally a low tree/tall shrub layer (4-8m high) dominated by Eremophila mitchellii, Acacia pendula and Geijera parviflora. A low shrub layer may occur, particularly on upper slopes. The ground layer is generally open but may be moderately dense in disturbed areas. The perennial grasses Aristida spp. and Eragrostis spp. are usually dominant, and forbs are conspicuous. Occurs on eroding edge of Tertiary clay plains. (BVG1M: 17a)
Major vegetation communities include:
11.4.12a: Acacia maranoensis +/- Eucalyptus populnea woodland. (BVG1M: 17a)

Supplementary descriptions: Dawson (1972), 13; Neldner (1984), 23b

Subregion: 31, 30, 34, 33, 26, 29, (32), (15)

Protected areas: No representation

Extent in reserves: No representation

Wetland:

Special values:

Comments: Extensively cleared for pasture or modified by total grazing pressure.

Estimated extent: In December 2006, <10% of the pre-clearing area remained.

Biodiversity status: Endangered

Biodiversity status notes:

Vegetation Management Act class: Endangered

Regional ecosystem 11.5.3

Description: *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* +/- *C. dallachiana* and occasionally *E. cambageana* or *E. brownii* dominate the tree layer (14m median height and 11-15m range) woodland. Localised areas may be dominated by *E. melanophloia*, occasionally *E. crebra* and other canopy species. There is generally a distinctive low tree layer (8, 6-11m high) dominated by species such as *Eremophila mitchellii*, *Geijera parviflora*, *Archidendropsis basaltica*, *Erythroxylum australe*, *Cassia brewsteri*, *Ventilago viminalis* and occasionally *Allocasuarina luehmannii* or *Callitris glaucophylla*. A low shrub layer (2-6m high) dominated by species such as *Carissa ovata*, *Erythroxylum australe*, *Capparis lasiantha* is also often present. Occurs on flat to gently undulating plains formed from Cainozoic sediments. Associated soils are generally deep texture contrast with thick sandy surface horizons with some deep red earths. (BVG1M: 17a)

Major vegetation communities include:

11.5.3a: *E. melanophloia* +/- *Corymbia clarksoniana* +/- *C. dallachiana* dominate the tree layer (14m median height and 11-15m range) woodland. There is generally a low tree layer (8, 6-11m high) present. (BVG1M: 17b)

11.5.3b: Palustrine wetland (e.g. vegetated swamp). *Eucalyptus populnea* on closed depressions Occurs on closed depressions in sandplains. (BVG1M: 17a)

Supplementary descriptions: Gunn et al. (1967), Pine Hill, Humboldt, Islay, Lennox, Monteagle (1,4), Tichbourne; Story et al. (1967), Monteagle; Gunn and Nix (1977), LU 23

Subregion: 7, 11, 6, 8, (15), (5), (13), (9), (10), (12)

Protected areas: Dipperu NP (S), Humboldt NP, Narrien Range NP, Wilandspey CP, Carnarvon NP, Nairana NP (R), Junee NP, Mazeppa NP, Albinia NP, Nairana NP, Epping Forest NP (S)

Extent in reserves: Low

Wetland:

Special values:

Comments: Extensively cleared for pasture or modified by total grazing pressure and invasion by the exotic pasture species **Pennisetum ciliare*. Management priorities or bird habitat protection are cessation of broad scale clearing, management of regrowth, maintenance of fallen woody debris increased fire frequency and reduction in grazing and exotic pasture grass (Hannah et al 2007).

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 11.5.5

- Description:** *Eucalyptus melanophloia* predominates forming a distinct but discontinuous canopy (12-18m high) often in association with *E. populnea* which may dominate localised areas. Scattered other *Eucalyptus* spp. may be present such as *E. chloroclada* (in south) *Corymbia tessellaris* (in north) and sometimes *E. crebra*. *Callitris glaucophylla* dominates the lower tree layer (9-12m high), with occasional *Acacia* spp. and *Allocasuarina luehmannii* trees. The shrub layer is often absent or sparse but may be prominent and dominated by tall shrubs such as *Geijera parviflora* and *Eremophila mitchellii* and scattered low shrubs, especially in disturbed areas. The ground layer is sparse to open, and dominated by perennial grasses such as *Aristida* spp., *Bothriochloa decipiens* and *Eragrostis* spp. Occurs on undulating plains and rises formed on Cainozoic deposits. Associated soils are usually deep texture contrast soils, with thick, sandy surface horizons overlying yellow, mottled clay subsoil's. (BVG1M: 17b)
- Major vegetation communities include:
- 11.5.5a: *Eucalyptus melanophloia*, *Callitris glaucophylla* +/- *E. populnea* woodland. (BVG1M: 17b)
- 11.5.5b: *Callitris glaucophylla*, *Eucalyptus melanophloia*, *Eucalyptus populnea* +/- *Corymbia tessellaris* woodlands (BVG1M: 20a)
- 11.5.5c: *Eucalyptus melanophloia*, and/or *Eucalyptus populnea* +/- *Callitris glaucophylla* +/- *Allocasuarina luehmannii* sometimes *E. conica* is present in the overstorey. (BVG1M: 17b)
- Supplementary descriptions:** Galloway et al. (1974)LU 25, LU48; Isbell (1957), 1957 MU12; Neldner (1984), 19b; Gunn and Nix (1977), LU 21
- Subregion:** 26, 29, 8, (11), (16), (33), (34), (24), (15), (30), (6.1), (10.4)
- Protected areas:** Alton NP, Humboldt NP, Morven CP, Narrien Range NP
- Extent in reserves:** Low
- Wetland:**
- Special values:**
- Comments:** Extends into adjacent parts of the Mulga Lands bioregion.
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** No concern at present
- Biodiversity status notes:**
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.5.6

Description: *Triodia* spp. grassland +/- shrubs and scattered low trees. *Triodia mitchellii* or *Triodia* spp. predominate forming a distinct but very discontinuous ground layer canopy. *Eucalyptus melanophloia* is a frequent emergent tree (6-10 m high). Scattered emergent trees such as *Corymbia clarksoniana* or *C. terminalis* are often present. A shrub layer is often present. Its density and composition is highly variable and is affected by the frequency of fires. Scattered tussock grasses and seasonally prominent forbs occur between the dominant hummock grasses. Occurs on Cainozoic sandplains. (BVG1M: 33b)

Supplementary descriptions: Isbell (1957), MU12; Neldner (1984), 65 (147)

Subregion: 34

Protected areas: No representation

Extent in reserves: No representation

Wetland:

Special values:

Comments: Can be floristically diverse but requires appropriate burning to maintain species composition.

Estimated extent: In December 2006, remnant extent was < 10,000 ha and >30% of the pre-clearing area remained

Biodiversity status: Of concern

Biodiversity status notes:

Vegetation Management Act class: Of concern

Regional ecosystem 11.5.7

Description: Eucalyptus acmenoides and Angophora leiocarpa open-forest. There is generally a sparse tall shrub to low tree layer (median height 5m, range 2-6m) dominated by species such as Lysicarpus angustifolius, Alphitonia excelsa and Petalostigma pubescens. Occurs on flat to gently undulating plains formed from Cainozoic deposits. Associated soils are generally deep texture contrast with thick soft sandy surface horizons over acid mottled massive clayey subsoils. (BVG1M: 18a)

Supplementary descriptions: Speck et al. (1968), Wooroonah (4); Gunn and Nix (1977), LU 31

Subregion: 16

Protected areas: No representation

Extent in reserves: No representation

Wetland:

Special values:

Comments:

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: Of concern

Biodiversity status notes: under review

Vegetation Management Act class: Least concern

Regional ecosystem 11.5.9

- Description:** Eucalyptus crebra and/or Eucalyptus melanophloia woodland. Other tree species that may be present and locally dominant include Corymbia citriodora or C. clarksoniana sometimes in association with C. intermedia, C. dallachiana, C. lamprophylla, E. tenuipes, E. exserta, E. cloeziana, E. acmenoides. The mid layer ranges from absent to a sparse to dense shrubland typically dominated by Acacia spp. (such as A. excelsa, A. leiocalyx), Petalostigma pubescens, Lysicarpus angustifolius, Alphitonia excelsa and occasionally Melaleuca nervosa (on texture contrast soils). Occurs on plateaus and broad crests of hills and ranges which are formed by Cainozoic sandplains. Soils are generally deep red earths. (BVG1M: 18b)
Major vegetation communities include:
11.5.9a: E. melanophloia woodland. (BVG1M: 17b)
11.5.9b: E. crebra, E. tenuipes, Lysicarpus angustifolius +/- Corymbia spp. woodland. (BVG1M: 18b)
11.5.9c: Eucalyptus crebra +/- Corymbia intermedia +/- E. moluccana +/- C. dallachiana woodland. (BVG1M: 18b)
11.5.9d: C. citriodora and/or E. crebra woodland. (BVG1M: 10a)
- Supplementary descriptions:** Dowling and Stephens (1997), 2, 9; Forster and Barton (1995), Woodstock; Galloway et al. (1974), LU20; Gunn et al. (1967), Tichbourne; Speck et al. (1968), Melbadale, Perch, Duaringa; Story et al. (1967), Junee; Gunn and Nix (1977), LU 25
- Subregion:** 11, 6, 16, 5, 3, (14), (7), (25), (26), (1), (15)
- Protected areas:** Blackdown Tableland NP, Junee NP, Nairana NP, Nairana NP (R), Taunton NP (S)
- Extent in reserves:** Low
- Wetland:**
- Special values:**
- Comments:** Variation in structure and floristic composition of the understorey may be associated with fire history. Eucalyptus moluccana is sometimes locally common especially on lower slopes where it merges into regional ecosystem 11.5.2. Acacia shirleyi may be present on rises where it merges into regional ecosystem 11.7.2.
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** No concern at present
- Biodiversity status notes:**
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.5.10

Description: *Melaleuca tamariscina* open-shrubland occasionally with scattered emergent trees. Occurs on Cainozoic sandplains often on tops of mesas or ranges. Soils are generally shallow to moderately shallow, with ironstone gravel on the surface and overlying a hard pan. (BVG1M: 21b)

Supplementary descriptions: Gunn et al. (1967), Lennox, Tichbourne; Gunn and Nix (1977) LU 3 (in part)

Subregion: 3, 5, 7, (13), (26), (15)

Protected areas: [Blackwood NP]

Extent in reserves: Low

Wetland:

Special values:

Comments:

Estimated extent: In December 2006, remnant extent was < 10,000 ha and >30% of the pre-clearing area remained

Biodiversity status: Of concern

Biodiversity status notes:

Vegetation Management Act class: Of concern

Regional ecosystem 11.5.15

- Description:** Semi-evergreen vine thicket. The following species are commonly present in the tree layer: *Flindersia australis*, *Flindersia collina*, *Alstonia constricta*, *Excoecaria dallachyana*, *Geijera parviflora*, *Notelaea* spp., *Planchonella pubescens*, *Diospyros humilis* and *Denhamia oleaster*, with emergent *Brachychiton rupestris* or *Flindersia australis*. A dense shrub layer of *Psydrax odorata* and *Acalypha eremorum* is often present. May contain emergent *Eucalyptus decorticans* or *Eucalyptus melanoleuca* in some southern locations. Occurs on remnant Tertiary surfaces. Deep red and yellow earths. (BVG1M: 7a)
- Supplementary descriptions:** Fensham (1995); Fensham and Streimann (1997); Kent (1987), Cz1; Story et al. (1967), Junee; Gunn and Nix (1977) LU 14, LU 30
- Subregion:** 18, 6, 11, 3, 9.4, 22, (27), (21)
- Protected areas:** Bania NP, Gurgeena CP, Reinke Scrub CP, [Newport CP]
- Extent in reserves:** Low
- Wetland:**
- Special values:** Habitat for threatened flora species including *Fontainea fugax*, *Pomaderris clivicola* and *Cadellia pentastylis* and the near threatened species *Macropteranthes leiocaulis*; a wide range of flora and fauna species with disjunct distributions.
- Comments:** Cleared for pasture. Mapped areas sometimes include small areas eroded scarp slopes or areas of duricrust (land zone 7). If these areas are large enough (> 5ha) they are mapped as 11.7.1x1.
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** Endangered
- Biodiversity status notes:** Under review
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.7.1

Description: *Eucalyptus thozetiana* predominates forming a distinct but discontinuous canopy (13-21m high) although localised areas may be dominated by a wide range of species. Occasionally scattered *E. microcarpa* or *Casuarina cristata* or *Acacia harpophylla* and sometimes *E. cambageana* (12-13m emergents) are present in the canopy or locally dominant. On the deeper soils of the lower slopes, there is a moderately dense low tree layer of *C. cristata* and/or *Acacia harpophylla*. *Acacia catenulata* and *A. microsperma* may be present towards crests. *Cadellia pentastylis* is sometimes present and may be locally dominant. A tall shrub layer of *Geijera parviflora* and less frequently, *Eremophila mitchellii* is usually developed, and a low shrub layer is often developed. The ground layer is sparse and usually dominated by forbs. Occurs on the slopes and scarps of rocky residual ranges with Cainozoic lateritic duricrust. The soils are shallow, gravelly, acidic loams and clays on the upper slopes, with deep (70-105 cm deep), uniform, brown clays with surface gravel on the lower slopes. (BVG1M: 25a)

Major vegetation communities include:

11.7.1x1: Semi-evergreen vine thicket. The following species are commonly present in the tree layer: *Flindersia australis*, *Flindersia collina*, *Alstonia constricta*, *Excoecaria dallachyana*, *Geijera parviflora*, *Notelaea* spp., *Planchonella pubescens*, *Diospyros humilis* and *Denhamia oleaster*, with emergent *Brachychiton rupestris* or *Flindersia australis*. A dense shrub layer of *Psyrax odorata* and *Acalypha eremorum* is often present. May contain emergent *Eucalyptus decorticans* or *Eucalyptus melanoleuca* in some southern locations. (BVG1M: 7a)

Supplementary descriptions: Galloway et al. (1974), LU28, 35, 36; Neldner (1984), 27a, 27b; Gunn and Nix (1977) LU 19

Subregion: 26, 11, 29, (3), (5), (28), (15), (19), (6)

Protected areas: Tregole NP, Junee NP, Narrien Range NP, Blackwood NP, Stones Country RR, [Chesterton Range NP], [Blackdown Tableland NP]

Extent in reserves: Low

Wetland:

Special values: Habitat for threatened flora species including *Cadellia pentastylis*.

Comments: Lower slopes of this regional ecosystem, which are a natural saline discharge area, have often been heavily cleared. Upper slopes often merge into *Acacia catenulata* dominated regional ecosystems (11.7.2) while lower slopes may merge into *Acacia harpophylla* dominated regional ecosystems (11.9.1 or 11.9.5).

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: Of concern

Biodiversity status notes: Threatening processes other than clearing.

Vegetation Management Act class: Least concern

Regional ecosystem 11.7.2

- Description:** Monospecific stands of *Acacia* spp. forest/woodland on Cainozoic lateritic duricrusts. *Acacia shirleyi* and or *Acacia catenulata* usually predominate the woodland to low woodland to low open-forest tree canopy (7-12m high). Other *Acacia* spp. that commonly occur and occasionally dominate the tree layer include *A. rhodoxylon*, *A. burrowii*, *A. sparsiflora*, *A. crassa* and *A. blakei*. Emergent eucalypt species such as *Eucalyptus thozetiana*, *E. crebra*, *E. decorticans* and *E. exserta* may be present. A low shrub layer is sometimes present and dominated by species such as *Acalypha eremorum*, *Croton phebaloides* and *Carissa ovata*. The ground layer is extremely sparse and dominated by grasses such as *Aristida caput-medusae*, *Paspalidium rarum*, *Urochloa foliosa*. Forbs are usually rare although *Sida filiformis* may be conspicuous. Occurs on scarps and adjacent tops and slopes of dissected tablelands, mesas and buttes formed from chemically altered sediments and duricrusts. The soils are shallow to very shallow lithosols with surface stone and boulders. The vegetation is often growing in pockets of shallow lithosol soil between bare rock. (BVG1M: 24a)
- Supplementary descriptions:** Dawson (1972), 19, 23, 25; Galloway et al. (1974), LU22; Gunn et al. (1967), Tichbourne; Neldner (1984), 5a, 15d, 35; Speck et al. (1968), Duaringa; Story et al. (1967), Junee; Taylor and Grimshaw (1994-95), Goondiwindi MU8A, 19D, Dalby MU6B; Gunn and Nix (1977) LU 17
- Subregion:** 29, 11, 26, 5, 16, 6, 7, (3), (15), (34), (21), (13)
- Protected areas:** Taunton NP (S), Junee NP, Humboldt NP, Blackdown Tableland NP, Narrien Range NP, Goodedulla NP, Blackwood NP, [Stones Country RR]
- Extent in reserves:** Low
- Wetland:**
- Special values:** Habitat for threatened flora species including *Acacia wardellii*.
- Comments:** Have been subject to clearing. This regional ecosystem may include adjacent areas which extend onto adjacent plateaus and plains with deeper soils (land zone 5).
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** No concern at present
- Biodiversity status notes:**
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.7.4

Description: Mixed *Eucalyptus* spp. woodland on Cainozoic lateritic duricrusts. Species can include *Eucalyptus crebra*, *E. decorticans*, *Corymbia trachyphloia*, *E. tenuipes*, *C. watsoniana* and *Callitris glaucophylla*. There is usually a distinct low tree to tall shrub layer comprising species including *Lysicarpus angustifolius* or *Acacia* spp. Occurs on low hills and ranges with shallow soils. (BVG1M: 12a)
Major vegetation communities include:
11.7.4c: *Eucalyptus decorticans* +/- *Eucalyptus* spp. +/- *Acacia* spp Occurs on low hills and ranges with shallow soils. (BVG1M: 12a)

Supplementary descriptions: Galloway et al. (1974), LU20; Kent (1987), CZ1; Gunn and Nix (1977) LU 12

Subregion: 32, 27, 29, 26, 11, (30), (33), (22), (31), (18), (28), (19)

Protected areas: Wondul Range NP, Beeron NP, Junee NP, Stones Country RR, Taunton NP (S), [Gurgeena CP]

Extent in reserves: Low

Wetland:

Special values:

Comments: Many areas have been subject to past logging which has resulted in a decrease in the number of trees in the larger size classes including many important habitat trees.

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 11.9.2

- Description:** Eucalyptus melanophloia and/or E. orgadophila grassy woodland to open-woodland. Other tree species occasionally present as subdominants include Corymbia erythrophloia, Eucalyptus populnea or Corymbia dallachiana. Occurs on rises on undulating plains with cracking clay or texture contrast soils. (BVG1M: 17b)
Major vegetation communities include:
11.9.2a: Eucalyptus melanophloia shrubby woodland and/or E. orgadophila grassy woodland. Shrub and low tree species include Acacia spp., Archidendropsis basaltica and Carissa ovata. (BVG1M: 10a)
- Supplementary descriptions:** Galloway et al. (1974), LU12, LU13; Neldner (1984), 31b; Gunn et al. (1967), Girrah (in part); Speck et al. (1968), Woleebee, Wandoan; Gunn and Nix (1977) LU 94; Burgess (2003) (VA19), (VA17), Mt Stuart, Red-one
- Subregion:** 6, 15, 11, 21, 23, 26, 29, (20), (31), (24), (27), (22)
- Protected areas:** Carnarvon NP, Homevale NP, Palmgrove NP (S), Taunton NP (S), Homevale RR, Bunya Mountains NP, Highworth Bend CP
- Extent in reserves:** Medium
- Wetland:**
- Special values:**
- Comments:** Intergrades with grasslands (11.9.3) in many areas.
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** No concern at present
- Biodiversity status notes:**
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.9.5

Description: Open-forest dominated by *Acacia harpophylla* and/or *Casuarina cristata* (10-20m) or *Acacia harpophylla* with a semi-evergreen vine thicket understorey. Open-forest dominated by *C. cristata* is more common in southern parts of the bioregion. A prominent low tree or tall shrub layer dominated by species such as *Geijera parviflora* and *Eremophila mitchellii*, and often with semi-evergreen vine thicket species is often present. The latter include *Flindersia dissosperma*, *Brachychiton rupestris*, *Excoecaria dallachyana*, *Macropteranthes leichhardtii* and *Acalypha eremorum* in eastern areas, and species such as *Carissa ovata*, *Owenia acidula*, *Croton insularis*, *Denhamia oleaster* and *Notelaea microcarpa* in south-western areas. *Melaleuca bracteata* may be present along watercourses. Occurs on fine-grained sediments. The topography includes gently undulating plains, valley floors and undulating footslopes and rarely on low hills. The soils are generally deep texture-contrast and cracking clays. The cracking clays are usually black or grey to brown or reddish-brown in colour, often self mulching and sometimes with gilgai microrelief in flatter areas. Some texture contrast soils are shallow to only moderately deep. (BVG1M: 25a)

Major vegetation communities include:

11.9.5a: *Acacia harpophylla* predominates and forms a fairly continuous canopy (10-18m high). Other tree species such as *Eucalyptus populnea*, *Casuarina cristata*, *Cadellia pentastylis* and *Brachychiton* spp. may also be present in some areas and form part of the canopy or emerge above it. Scattered *Eucalyptus orgadophila* may occur, especially on upper slopes and crests. A dense tall shrub layer dominated by a range of species is usually present, while a more open low shrub layer often occurs. Common species in these layers include *Croton insularis*, *Denhamia oleaster*, *Apophyllum anomalum*, *Croton phebaloides*, *Alectryon diversifolius* and *Carissa ovata*. The ground layer is sparse, most frequently composed of *Ancistrachne uncinulata* and *Eragrostis megalosperma* and varies with the density of the shrub layers. Occurs on undulating plains and rises formed mainly on shales. The soils are predominantly cracking clay soils, which are strongly alkaline at or near the surface and acidic beneath, or dark brown and grey-brown gradational soils, with a coarse-textured surface grading into an alkaline, clayey subsoil. (BVG1M: 25a)

Supplementary descriptions: Dawson (1972), Ulimaroa (1-3); Galloway et al. (1974), LU 38, 40, (41), 43, 44; Gunn and Nix (1977), LU 34, 37, 38, 41, 46, 50, 53, 72, 75, 93, 100, 101; Gunn et al. (1967), Craven (4), Cungelella (1,3), Hillalong (3), Kareela (4), Rutland (4), Skye (4), Wharton (4); Story et al. (1967), Arcadia (2), Daunia (4), Rewan (3); Speck et al. (1968), Eurombah (8,10), Ramsay (5), Surprise (7), Wandoan (7), Womblebank (6); Vandersee (1975), Moola (1,3,4); Mullins (1980), Bringalilly, Burnt Creek, Greys Gate; Neldner (1984), 5, 6, 7, 9 (123, 124, 131); Young and McDonald (1989) 9h, 12a; Burgess (2003) (VA1), (VA8) Stateschool, Ternallum, Tiny, Burradoo, Farlane

Subregion: 26, 25, 21, 20, 27, 15, (33), (32), (6), (11), (31), (29), (28), (19), (24)

Protected areas: Carnarvon NP, Palmgrove NP (S), Expedition (Limited Depth) NP, Tregole NP, Chesterton Range NP, Isla Gorge NP, Precipice NP, Roundstone CP, Homevale NP, Lake Murphy CP, Nuga Nuga NP, Carraba CP, Taunton NP (S), Irongate CP, Homevale RR, Bunya Mountains NP

Extent in reserves: Low

Wetland:

Special values: Habitat for threatened fauna species including *Jalmenus eubulus*, pale imperial hairstreak butterfly (Eastwood et al. 2008)

Comments: Extensively cleared for cropping and pasture.

Estimated extent: In December 2006, <10% of the pre-clearing area remained.

Biodiversity status: Endangered

Biodiversity status notes:

Vegetation Management Act class: Endangered

Regional ecosystem 11.9.10

- Description:** Eucalyptus populnea predominates forming a distinct but discontinuous canopy (15-18 m tall). Acacia harpophylla and sometimes Casuarina cristata usually forms a lower tree layer (8-14 m tall) which occasionally becomes the dominant layer. An open to moderately dense layer of tall shrubs is usually present and dominated by Eremophila mitchellii and Geijera parviflora with Acacia excelsa, Atalaya hemiglauca, Psydrax oleifolia, Alectryon oleifolius frequent. Scattered low shrubs such as Carissa ovata and Eremophila deserti are frequently present. The ground cover is usually sparse, and dominated by the grasses Aristida ramosa, Enteropogon acicularis, Bothriochloa decipiens and Paspalidium spp. Occurs on Cainozoic to Proterozoic consolidated, fine-grained sediments. Occurs on lower parts of undulating plains often with deep texture-contrast soils. Occurs on sodic and saline soils which may act as a discharge area if adjacent to alluvium. (BVG1M: 25a)
- Supplementary descriptions:** Galloway et al. (1974), LU37, LU39; Neldner (1984), 22a; Speck et al. (1968), Woleebee; Story et al. (1967), Arcadia
- Subregion:** 26, 6, 25, (28), (15), (29), (31), (6.2)
- Protected areas:** Carnarvon NP, Tregole NP, Chesterton Range NP, Homevale NP, Morven CP
- Extent in reserves:** Low
- Wetland:**
- Special values:**
- Comments:** Extensively cleared for cropping and pasture. Sometimes the Acacia harpophylla and/or Casuarina cristata forms small clumps. Where these clumps are > 5 ha they are defined as 11.9.5.
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained
- Biodiversity status:** Endangered
- Biodiversity status notes:** Threatening processes other than clearing.
- Vegetation Management Act class:** Of concern

Regional ecosystem 11.8.3

- Description:** Semi-evergreen vine thicket which may have emergent *Acacia harpophylla*, *Casuarina cristata* and *Eucalyptus* spp. Occurs on Cainozoic igneous rocks. Generally restricted to steeper, rocky hillsides. (BVG1M: 7a)
- Supplementary descriptions:** Fensham: (1995); Fensham and Fairfax (1997); Fensham and Streimann (1997); Neldner (1984), 1; Speck et al. (1968), Lawgi, Grevillea; Story et al. (1967), Britton; Vandersee (1975), Westbrook; Galloway et al. (1974), LU9;
- Subregion:** 31, 21, 26, 22, 10, 6, 15, (19), (27), (32), (23), (24)
- Protected areas:** Bunya Mountains NP, Peak Range NP, Carnarvon NP, Mount Leura CP, Mount Dumaresq CP, Minerva Hills NP, Homevale RR, [Main Range NP]
- Extent in reserves:** Low
- Wetland:**
- Special values:** Habitat for threatened flora species *Croton magneticus*.
- Comments:** Many remaining areas in coastal parts of the region have been invaded by the exotic *Lantana camara* and pasture grasses. These exotic weed species provide increased fuel loads which leads to increased wildfire and associated damage to the tree layer. Semi-evergreen vine thicket may invade adjacent regional ecosystems, particularly brigalow-belah in the absence of fire. Areas in subregion 31 are contiguous with similar vegetation in the South East Queensland bioregion.
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained
- Biodiversity status:** Of concern
- Biodiversity status notes:** Threatening processes other than clearing.
- Vegetation Management Act class:** Of concern

Regional ecosystem 11.8.4

Description: Eucalyptus melanophloia and/or E. crebra +/- E. orgadophila +/- Corymbia erythrophloia grassy woodland. Macrozamia moorei is a conspicuous element of the mid layer in the Central Highlands. Localised patches of Corymbia citriodora occur on volcanic plugs such as Minerva Hills. Generally occurs on slopes of steep mountains and hills formed from Cainozoic igneous rocks usually with shallow stony soils and extensive outcropping. (BVG1M: 11a)

Major vegetation communities include:

11.8.4a: Corymbia citriodora woodland. (BVG1M: 10a)

Supplementary descriptions: Forster and Barton (1995), Barmoya; Galloway et al. (1974), LU18; Speck et al. (1968), Lawgi, Westwood; Story et al. (1967), Britton, Moorooloo, Percy; Gunn and Nix (1977) LU 104, 105

Subregion: 23, 10, 24, 31, 22, 21, (20), (15), (8), (18), (19), (11), (26), (16)

Protected areas: Carnarvon NP, Minerva Hills NP, Homevale NP, Kroombit Tops NP, Peak Range NP, Homevale RR

Extent in reserves: High

Wetland:

Special values:

Comments: This regional ecosystem occurs on steeper slopes and shallower soils compared to 11.8.5 which occurs on undulating plains and low hills with deeper soils.

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 11.8.5

- Description:** *Eucalyptus orgadophila* grassy open-woodland. *Eucalyptus orgadophila* predominates and forms a distinct but discontinuous canopy sometimes with other sub-dominant species such as *Corymbia erythrophloia*, *E. melanophloia* and occasionally *E. crebra*. Shrubs are usually scarce and scattered although a well defined shrubby layer does develop in some areas. On the lower slopes at better sites, softwood scrub species may form tall and low shrub layers under the canopy of *Eucalyptus orgadophila*. The ground layer is moderately dense to dense, and dominated by species that include the grasses *Aristida lazaridis*, *A. ramosa*, *Bothriochloa ewartiana*, *Dichanthium sericeum*, *Chrysopogon fallax*, *Heteropogon contortus*, *Enneapogon gracilis*, *Themeda triandra* and *Tragus australianus* and the herbs *Brunoniella australis*, *Evolvulus alsinoides*, *Galactia tenuiflora* and *Indigofera linnaei*. Occurs on undulating plains, rises, low hills or sometimes flat tablelands on top of mountains, formed from basalt. Generally soils are shallow to moderately shallow, often rocky or stony clays. (BVG1M: 11a)
Major vegetation communities include:
11.8.5a: *Eucalyptus orgadophila* woodland with a dense understorey of low trees species including *Geijera parviflora*, *Callitris glaucophylla*, *Pittosporum angustifolium*, *Alectryon oleifolius*, *Psyrax odorata* and *Notelaea microcarpa*. (BVG1M: 11a)
- Supplementary descriptions:** Fensham (1998a); Fensham and Fairfax (1997); Fensham (1999), mountain coolabah woodland on basalt; Galloway et al. (1974), LU18; Neldner (1984), 33; Vandersee (1975), Westbrook; Story et al. (1967), Waterford; Gunn et al. (1968), Peak Vale (2); Young and McDonald (1989), 10h; Gunn and Nix (1977) LU 107,108
- Subregion:** 10, 31, 6, 23, (26), (11), (24), (2), (15)
- Protected areas:** Carnarvon NP, Albinia NP, Peak Range NP, Homevale NP, Bunya Mountains NP, Minerva Hills NP, Albinia CP, Mount Leura CP, [Main Range NP]
- Extent in reserves:** Low
- Wetland:**
- Special values:** In southern part of bioregion, habitat for a number of threatened flora species including *Picris evae* and *Thesium australe* and near threatened species *Digitaria porrecta* and *Discaria pubescens*.
- Comments:** Extensively thinned, cleared or cultivated in many areas. Some areas in central Queensland are subject to invasion by **Parthenium hysterophorus* (Fensham 1999) associated with periods of low summer rainfall combined with high or moderate grazing pressure (Fensham et al. 1999). The occurrence of *Parthenium* may be reversible with appropriate management and season in the medium term (Fensham 1999). Naturalised species associated with this regional ecosystem include **Sida spinosa*. Areas of open-woodland to grassland that occur on footslopes of basalt hills are included as 11.8.5 in situations where they represent a narrow (< 75m wide) ecotone adjacent to the alluvial land zone.
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** No concern at present
- Biodiversity status notes:**
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.8.11

Description: Grassland dominated by *Dichanthium sericeum*, *Aristida* spp., *Astrebula* spp. and *Panicum decompositum* with or without trees such as *Eucalyptus orgadophila*, *E. melanophloia*, *Corymbia erythrophloia* and *Acacia salicina*, (height 11+/-3 m). However, dominance and cover may vary with seasonal and other environmental conditions. Frequently occurring and sometimes locally dominant, species include the grasses *Aristida lazaridis*, *A. ramosa*, *Bothriochloa ewartiana*, *Dichanthium sericeum*, *Chrysopogon fallax*, *Heteropogon contortus*, *Enneapogon gracilis*, *Themeda triandra* and *Tragus australianus* and the herbs *Brunoniella australis*, *Evolvulus alsinoides*, *Galactia tenuiflora* and *Indigofera linnaei*. Isolated emergent trees (tree height 12+/-4 m - species including *Eucalyptus orgadophila*, *E. melanophloia* and *Corymbia erythrophloia*) or small areas of open-woodland may also be present. Occurs on Cainozoic igneous rocks, particularly fresh basalt, and is generally associated with undulating to gently undulating rises. It usually occurs on the crests and middle and upper slopes (slopes 2-6%), although in places is occasionally present on lower slopes and flat areas (slopes 0-2%). Associated soils are moderately shallow to deep cracking clay soils, dark brown to reddish brown in colour, often self mulching, and with gravel, stone or linear gilgai sometimes present. Surface stone 10-15 cm diameter is present in the south-western remnants. (BVG1M: 30b)

Major vegetation communities include:

11.8.11a: *Melaleuca bracteata* woodland drainage depressions. Occurs in drainage depressions. (BVG1M: 21b)

Supplementary descriptions: Gunn et al. (1967), Kinsale (5), Oxford (1-3), Waterford (1); Story et al. (1967), Moorooloo (2), Oxford (1-3), Racecourse (3), Waterford (1, 2); Speck et al. (1968), Westwood (1, 2, 4), *Grevillea* (2, 3); Galloway et al. (1974), LU 19; Gunn and Nix (1977), LU 47, 107, 108, 109, 110; Fensham et al. 1999), grasslands on basaltic substrate; Fensham 1999, blue grass on basalt; Burgess (2003) (VA28) May

Subregion: 10, 6, (11)

Protected areas: Albinia NP, Peak Range NP, Carnarvon NP, Albinia CP, Albinia RR, Minerva Hills NP

Extent in reserves: Low

Wetland:

Special values: Habitat for threatened flora species including *Trioncinia retroflexa* and *Dichanthium queenslandicum*. *T. retroflexa* is currently known from three small populations.

Comments: Extensively utilised for cropping, and rapid decline is predicted on current trends. Large areas remaining have lost perennial grass cover which may be replaced by annuals including the exotic herb **Parthenium hysterophorus*. These changes may be associated with periods of low summer rainfall combined with high or moderate grazing pressure (Fensham et al. 1999). The occurrence of *Parthenium* may be reversible with appropriate management and season in the medium term (Fensham 1999). Species such as *Dichanthium sericeum* and *D. queenslandicum* are likely to have been more dominant in the absence of high or moderate grazing pressure (Fensham 1999). At the end of the wet season, the biomass of the vegetation may range from 5 to 10 t/ha, but may be negligible after the wet season under extreme grazing pressure (Fensham et al. 2002). Naturalised species associated with this regional ecosystem include **Sida spinosa*. Areas of woodland/open-woodland larger than 5 ha are defined as 11.8.5, while less extensive trees areas are treated as a component of 11.8.11.

Estimated extent: In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained

Biodiversity status: Of concern

Biodiversity status notes:

Vegetation Management Act class: Of concern

Regional ecosystem 11.8.13

Description: Semi-evergreen vine thicket and microphyll/notophyll rainforest. In drier or rockier habitats, *Casuarina cristata* or *Acacia harpophylla* may dominate the tree layer. A dense shrub layer of *Acalypha eremorum*, *Diospyros humilis* and *Planchonella cotinifolia* is always present. In a few localities, emergent *Eucalyptus orgadophila* or *Corymbia erythrophloia* may persist after invasion by "vine-thicket" species. Occurs on gently undulating plains, rises and low hills on Cainozoic igneous rocks. (BVG1M: 7a)

Supplementary descriptions: Forster and Barton (1995), Barmoya, Rossmoya; Speck et al. (1968), Grevillea;

Subregion: 6, 22, 19, 11, 14, (27)

Protected areas: Homevale NP, Mount Scoria CP

Extent in reserves: Low

Wetland:

Special values: Habitat for threatened flora species *Croton magneticus*.

Comments: The microphyll/notophyll vine forest component of this regional ecosystem is restricted to subregion 14 and contiguous with similar regional ecosystems in the Central Queensland Coast bioregion. May invade areas of adjacent woodlands, such as RE 11.8.5

Estimated extent: In December 2006, remnant extent was < 10,000 ha and 10-30% of the pre-clearing area remained

Biodiversity status: Endangered

Biodiversity status notes:

Vegetation Management Act class: Endangered

Regional ecosystem 11.9.9

- Description: Eucalyptus crebra grassy woodland. Eucalyptus moluccana sometimes conspicuous on lower slopes. Occurs on Cainozoic to Proterozoic consolidated, fine-grained sediments. (BVG1M: 13c)
Major vegetation communities include:
11.9.9a: Eucalyptus albens +/- E. crebra +/- E. tereticornis +/- Callitris baileyi woodland. Occurs in southern part of bioregion (BVG1M: 15a)
11.9.9b: Eucalyptus crebra +/- E. exserta +/- Corymbia spp. woodland. (BVG1M: 13c)
- Supplementary descriptions: Story et al. (1967), Rewan; Young and McDonald (1989), 10e
- Subregion: 6, 31, 32, 21, 20, (19), (2), (22), (18)
- Protected areas: Homevale NP, Homevale RR, Carnarvon NP, Morgan Park CP, Homevale CP
- Extent in reserves: Low
- Wetland:
- Special values:
- Comments: Extensively cleared or thinned for pasture.
- Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status: No concern at present
- Biodiversity status notes:
- Vegetation Management Act class: Least concern

Regional ecosystem 11.12.1

- Description: Eucalyptus crebra +/- Corymbia erythrophloia shrubby woodland. E. melanophloia is often present and may be locally dominant. Also includes localised areas dominated by E. persistens. Occurs on ranges on igneous rocks. (BVG1M: 13c)
Major vegetation communities include:
11.12.1a: Eucalyptus crebra +/- E. exserta woodland. Occurs on undulating rises. (BVG1M: 13c)
11.12.1b: Eucalyptus persistens low woodland. (BVG1M: 19d)
11.12.1c: Dichanthium spp. grassland +/- scattered Eucalyptus crebra, Corymbia erythrophloia. (BVG1M: 30b)
- Supplementary descriptions: Christian et al. (1953), Heidelberg; Forster and Barton (1995), Glassford; Kent (1987), Pt1; Speck et al. (1968), Hillmore, Irving, Toonda, Ohio, Bouldercombe
- Subregion: 22, 2, 12, 5, 18, (14), (1), (4), (27)
- Protected areas: Eungella NP, Homevale RR, Homevale NP, Cape Upstart NP, Goodedulla NP, Mount Aberdeen NP, Bouldercombe Gorge RR, Kroombit Tops NP, Auburn River NP, Tolderodden CP, Charon Point CP, Cania Gorge NP, Abbott Bay RR, Mount Hopeful CP, Mount Archer NP, Bowling Green Bay NP, [Beeron NP]
- Extent in reserves: Low
- Wetland:
- Special values:
- Comments:
- Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status: No concern at present
- Biodiversity status notes:
- Vegetation Management Act class: Least concern

Regional ecosystem 11.11.6

Description: *Corymbia leichhardtii*, *C. clarksoniana* tall shrubby open-woodland with *Lophostemon grandiflorus* in gullies. Occurs on inland hills and ranges formed on moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 13c)

Supplementary descriptions: Gunn et al. (1967), Borilla, Carborough

Subregion: 13, 3, 5, 7, (15)

Protected areas: Narrien Range NP, Blackwood NP, Snake Range NP

Extent in reserves: High

Wetland:

Special values:

Comments:

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 11.11.9

Description: Eucalyptus populnea or E. brownii woodland to open-woodland. Occurs on undulating rises and lower slopes of hills formed on moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 17a)

Supplementary descriptions: Gunn et al. (1967), Craven, Hope; Speck et al. (1968), Ohio, Torsdale; Story et al. (1967), Hillalong

Subregion: 13, 3, 18, 8, (7), (6), (15), (2), (10.3), (19)

Protected areas: Nairana NP, Narrien Range NP, Nairana NP (R), [Blackwood NP]

Extent in reserves: Low

Wetland:

Special values:

Comments:

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 11.3.25

Description: *Eucalyptus camaldulensis* or *E. tereticornis* open-forest to woodland. Other tree species such as *Casuarina cunninghamiana*, *E. coolabah*, *Melaleuca bracteata*, *Melaleuca viminalis*, *Livistona* spp. (in north), *Melaleuca* spp. and *Angophora floribunda* are commonly present and may be locally dominant. An open to sparse, tall shrub layer is frequently present dominated by species including *Acacia salicina*, *A. stenophylla* or *Lysiphyllum carronii*. Low shrubs are present, but rarely form a conspicuous layer. The ground layer is open to sparse and dominated by perennial grasses, sedges or forbs such as *Imperata cylindrica*, *Bothriochloa bladhii*, *B. ewartiana*, *Chrysopogon fallax*, *Cyperus dactyloides*, *C. difformis*, *C. exaltatus*, *C. gracilis*, *C. iria*, *C. rigidellus*, *C. victoriensis*, *Dichanthium sericeum*, *Leptochloa digitata*, *Lomandra longifolia* or *Panicum* spp. Occurs on fringing levees and banks of major rivers and drainage lines of alluvial plains throughout the region. Soils are very deep, alluvial, grey and brown cracking clays with or without some texture contrast. These are usually moderately deep to deep, soft or firm, acid, neutral or alkaline brown sands, loams or black cracking or non-cracking clays, and may be sodic at depth (Burgess 2003). (BVG1M: 16a)

Major vegetation communities include:

11.3.25a: Riverine wetland or fringing riverine wetland. *Eucalyptus raveretiana* (sometimes emergent), *Melaleuca fluviatilis* woodland. A range of other species may be present including *Melaleuca leucadendra*, *Corymbia clarksoniana*, *Casuarina cunninghamiana*, *Melaleuca viminalis* and *Nauclea orientalis*. There is often a dense low tree layer dominated by species such as *Acacia salicina*, *Geijera salicifolia*, *Diospyros humilis* and *Mallotus philippensis*. (BVG1M: 22c)

11.3.25b: Riverine wetland or fringing riverine wetland. *Melaleuca leucadendra* and/or *M. fluviatilis*, *Nauclea orientalis* open forest. A range of other canopy or sub canopy tree species also occur including *Pandanus tectorius*, *Livistona* spp., *Eucalyptus tereticornis*, *Corymbia tessellaris*, *Millettia pinnata*, *Casuarina cunninghamiana*, *Livistona decora*, *Lophostemon suaveolens* or *L. grandiflorus*, rainforest species and, along drainage lines, *Eucalyptus camaldulensis* or *E. tereticornis*. A ground layer of tall grasses such as *Chionachne cyathopoda*, *Mnesithea rottboellioides* or *Heteropogon triticeus* may be present. Often occurs on coarse sand spits and levees within larger river channels. (BVG1M: 22c)

11.3.25c: Riverine wetland or fringing riverine wetland. *E. camaldulensis* or *E. tereticornis* open-forest to woodland. Occurs fringing drainage lines derived from Serpentine. (BVG1M: 16a)

11.3.25d: Riverine wetland or fringing riverine wetland. *Melaleuca bracteata* woodland to open-forest. Occurs on fringing alluvial soils or near-channel levees on heavy wet clays. (BVG1M: 22c)

11.3.25e: Riverine wetland or fringing riverine wetland. *Eucalyptus camaldulensis*, *E. tereticornis* woodland fringing larger, permanent water courses. A range of other tree species commonly occur including *Melaleuca trichostachya*, *Casuarina cunninghamiana*, and *Melaleuca viminalis*. Ground layer is composed of grasses and forbs. Occurs fringing permanent water courses. (BVG1M: 16a)

11.3.25f: Riverine wetland or fringing riverine wetland. Main river channels. Open water or exposed stream bed and bars. Usually devoid of emergent vegetation although scattered trees and shrubs such as *Melaleuca viminalis* or *Melaleuca* spp. may be present and aquatic species may be abundant particularly in water holes and lagoons. Occurs on river channels. (BVG1M: 16d)

11.3.25g: Riverine wetland or fringing riverine wetland. Vegetation is seasonal and may consist of open water and/or a range of mainly aquatic species such as *Nymphoides crenata* or *Hydrilla verticillata*. Often with fringing woodland, commonly *E. camaldulensis* or *E. coolabah* and a ground layer that may include species such as *Pseudoraphis spinescens*, *Marsilea drummondii*, *M. mutica*, *Persicaria subsessilis* and *Eleocharis* spp. Occurs on waterholes in larger drainage lines and rivers. (BVG1M: 16d)

11.3.25h: Riverine wetland or fringing riverine wetland. Low open-forest or low woodland of *Melaleuca viminalis*, often in association with *Melaleuca trichostachya*, occasionally with *Cryptocarya triplinervis*, and sometimes with emergent layer of *Eucalyptus tereticornis* or *Casuarina cunninghamiana*. The shrub layer is sparse but includes *Ficus opposita*. The ground layer includes *Lomandra hystrix* and *Oplismenus aemulus*. Occurs fringing drainage lines. (BVG1M: 22c)

Supplementary descriptions: Dawson (1972), 1; Dowling and Stephens (1997), 8b; Fensham (1998a); Fensham and Fairfax (1997); Gunn et al. (1967), Funnell; Mullins (1980), Tavoy, Lynwood; Neldner (1984), 18c; Speck et al. (1968), Kroombit; Taylor and Grimshaw (1994-95),

- Subregion: 26, 11, 22, 1, 6, (14), (2), (31), (18), (7), (3), (32), (13), (15), (29), (27), (24), (16), (21), (25), (36), (12), (20), (10), (9), (33)
- Protected areas: Carnarvon NP, Expedition (Limited Depth) NP, Palmgrove NP (S), Homevale NP, Bowling Green Bay NP, Expedition RR, Taunton NP (S), Goodedulla NP, Blackdown Tableland NP, Homevale RR, Nairana NP, Eungella NP, Nuga Nuga NP, Albinia NP, Precipice NP, Dipperu NP (S), Lake Murphy CP, Mount Archer NP, Auburn River NP, Narrien Range NP, Cape Upstart NP, Nairana NP (R), Princhester CP, Bell Creek CP, Tregole NP, Minerva Hills NP, Cania Gorge NP, Kroombit Tops NP, Rundle Range RR, Mount Hopeful CP, Tooloombah Creek CP, Bouldercombe Gorge RR, Vandyke Creek CP, Shoalwater Bay CP, Rundle Range NP, Dawson River CP, Tolderodden CP, Junea NP, Bowling Green Bay CP, Bukkulla CP, Mount OConnell NP, Homevale CP, [Mount Jim Crow NP], [Paluma Range NP], [Bolger Bay CP], [Long Island Bend CP], [Highworth Bend CP], [Peak Range NP]
- Extent in reserves: Low
- Wetland: Riverine wetland or fringing riverine wetland.
- Special values: Habitat for threatened flora species including *Eucalyptus raveretiana*. Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle *Rheodytes leukops*. Known to be important habitat for other riparian freshwater turtle species.
- Comments: Impact by total grazing pressure. Weeds particularly rubber vine **Cryptostegia grandiflora* (in the north of the bioregion) and buffel grass **Pennisetum ciliare* have invaded many areas. Some areas have been modified by weir construction (Eberhard 1999). Often associated with regional ecosystems 11.3.2 and 11.3.4 which may occur on adjacent alluvial plains. In highly cleared subregions a narrow fringe of riparian vegetation is often the only surviving woody vegetation. This regional ecosystem includes sandy or rocky banks and beds and water within channel which can be extensive in some of the larger coastal rivers.
 11.3.25a: Naturalised species associated with this regional ecosystem include **Grewia asiatica*. As the low tree layer becomes denser, this vegetation community grades into 11.3.11.
 11.3.25b: Weeds particularly rubber vine *Cryptostegia grandiflorus* (in the north of the bioregion) and *Lantana camara* have invaded many areas. Very frequently disturbed by natural flood events
 11.3.25g: Larger waterholes (> 5ha) are included here while smaller ones are included with river channels (11.3.25f).
 11.3.25h: Naturalised species associated with this regional ecosystem include **Megathyrsus maximus* and **Cynodon dactylon*.
- Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status: Of concern
- Biodiversity status notes: Threatening processes other than clearing.
- Vegetation Management Act class: Least concern

Regional ecosystem 11.11.2

Description: *Acacia shirleyi* or *A. catenulata* low open-forest. Eucalypt species may be present as emergent trees including *Eucalyptus crebra* and *E. thozetiana*. Occurs on hills and ranges formed on moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 24a)

Supplementary descriptions: Gunn et al. (1967), Loudon, Hope, Copperfield

Subregion: 3, 9, 13, 7, (4), (11), (5), (6)

Protected areas: Blackwood NP, Snake Range NP

Extent in reserves: Low

Wetland:

Special values:

Comments:

Estimated extent: In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Biodiversity status: No concern at present

Biodiversity status notes:

Vegetation Management Act class: Least concern

Regional ecosystem 11.11.16

Description: Eucalyptus cambageana, Acacia harpophylla open-forest to woodland. Occurs on gently undulating plains and rises formed on moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 25a)

Supplementary descriptions: Speck et al. (1968), Malakoff, Highworth

Subregion: 13, 8, 7, 10.3, 15, 3, 9, 14, 19, (5), (21), (11), (17), (10)

Protected areas: Narrien Range NP, Snake Range NP, Blackwood NP

Extent in reserves: Low

Wetland:

Special values:

Comments: Extensively cleared for pasture.

Estimated extent: In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained

Biodiversity status: Of concern

Biodiversity status notes:

Vegetation Management Act class: Of concern

Regional ecosystem 11.11.15

- Description:** *Eucalyptus crebra* +/- *Corymbia erythrophloia* +/- *E. populnea* +/- *E. melanophloia* +/- *C. tessellaris* +/- *C. clarksoniana* woodland often with a shrubby layer. *Eucalyptus exserta* and *E. platyphylla* present in central coastal part of bioregion. Occurs on undulating rises and low hills, often with distinct strike pattern formed on moderately to strongly deformed and metamorphosed sediments and interbedded volcanics and Permian sediments. (BVG1M: 13c)
Major vegetation communities include:
11.11.15a: *Eucalyptus crebra*, *E. exserta* woodland. (BVG1M: 13c)
11.11.15b: *Eucalyptus drepanophylla* and/or *E. platyphylla* woodland +/- vine thicket species. (BVG1M: 13c)
11.11.15c: Woodland with *Corymbia setosa* present to dominant, usually with *Corymbia clarksoniana*, *Eucalyptus melanophloia*, *Corymbia dallachiana* and *Eucalyptus crebra*, with occasional shrubs of *Petalostigma pubescens* and *Alphitonia excelsa*. (BVG1M: 13c)
11.11.15d: Woodland with *Corymbia setosa* present to dominant, usually with *Corymbia clarksoniana*, *Eucalyptus melanophloia*, *Corymbia dallachiana* and *Eucalyptus crebra*, with occasional shrubs of *Petalostigma pubescens* and *Alphitonia excelsa*. Occurs on low rises and short hills derived from Devonian-Carboniferous sediments (mainly conglomerates in Beresford Stn). Associated soils are hard gravelly to stony, (BVG1M: 13c)
- Supplementary descriptions:** Forster and Barton (1995), Artillery; Speck et al. (1968), Bannockburn
- Subregion:** 18, 13, 3, 14, 9, 22, (4), (12)
- Protected areas:** Kroombit Tops NP, Narrien Range NP, Rundle Range NP, Nairana NP (R), Goodedulla NP, Cania Gorge NP, Shoalwater Bay CP, Nairana NP, Rundle Range RR, Bouldercombe Gorge RR, Broad Sound Islands NP, Blackwood NP, Gurgeena CP, Bania NP, Mount Etna Caves NP, Mount OConnell NP, Dawes NP, Dan Dan NP, Newport CP, Futter Creek CP
- Extent in reserves:** Low
- Wetland:**
- Special values:**
- Comments:** This regional ecosystem subject to periodic canopy dieback due to drought in parts of central Queensland (Fensham and Holman, 1999).
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** No concern at present
- Biodiversity status notes:**
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.11.13

Description: *Acacia harpophylla* shrubby open-forest or *A. argyrodendron* shrubby low open-forest or woodland. *Terminalia oblongata*, *Eremophila mitchellii* are common components in the understorey. Emergent *Eucalyptus* spp. may be present, especially *E. populnea*. Occurs on undulating rises and low hills often with distinct strike pattern formed on moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 25a)

Supplementary descriptions: Gunn et al. (1967), Rutland; Story et al. (1967), Hillalong

Subregion: 13, 3, 7, (4), (10.3), (5), (15)

Protected areas: Nairana NP, Nairana NP (R), Narrien Range NP, Blackwood NP, [Snake Range NP]

Extent in reserves: Low

Wetland:

Special values:

Comments:

Estimated extent: In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained

Biodiversity status: Of concern

Biodiversity status notes:

Vegetation Management Act class: Of concern

Regional ecosystem 11.11.10

- Description: Eucalyptus melanophloia +/- E. crebra +/- Corymbia dallachiana +/- C. erythrophloia grassy or occasionally shrubby woodland or low woodland. Occurs on moderately to strongly deformed and metamorphosed sediments and Permian sediments. (BVG1M: 17b)
Major vegetation communities include:
11.11.10a: Eucalyptus moluccana woodland. Eucalyptus moluccana, E. tereticornis may be prominent components of the tree layer, particularly on lower slopes. (BVG1M: 13d)
- Supplementary descriptions: Forster and Barton (1995), Carrara, Macksford (in part); Gunn et al. (1967), Craven, Hope, Rutland; Speck et al. (1968), Ohio, Bannockburn, Boomer, Malakoff
- Subregion: 13, 18, (12), (14), (17), (3), (22), (5), (9), (15), (21)
- Protected areas: Goodedulla NP, Kroombit Tops NP, Charon Point CP, Shoalwater Bay CP, Narrien Range NP, Bania NP, Snake Range NP, [Gurgeena CP]
- Extent in reserves: Low
- Wetland:
- Special values:
- Comments: This regional ecosystem is subject to periodic canopy dieback due to drought in parts of central Queensland (Fensham and Holman, 1999). Sometimes aligned in bands along strike belt.
- Estimated extent: In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained
- Biodiversity status: Of concern
- Biodiversity status notes:
- Vegetation Management Act class: Of concern

Regional ecosystem 11.11.1

- Description:** Eucalyptus crebra woodland or tall woodland, often with Acacia rhodoxylon. Other species that may be present include Corymbia citriodora, C. leichhardtii, E. melanophloia, C. erythrophloia, C. clarksoniana, E. fibrosa subsp. fibrosa (subregion 18) and E. moluccana on lower slopes (subregions 14, 17, 18). Macrozamia spp. sometimes present in shrub layer. Lophostemon grandiflorus occurs in gullies within this regional ecosystem in the north of the bioregion. Occurs mainly on sub-coastal hills and ranges formed on moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 13c)
- Supplementary descriptions:** Forster and Barton (1995), Rosewood, Boomer; Gunn et al. (1967), Copperfield, Borilla; Kent (1987), Ra6, Cd3; Speck et al. (1968), Boomer, Malakoff, Rosewood; Gunn and Nix (1977) LU 62
- Subregion:** 17, 9, 6, 18, 14, (11), (12), (2), (4), (7)
- Protected areas:** Goodeddulla NP, Homevale NP
- Extent in reserves:** Medium
- Wetland:**
- Special values:**
- Comments:**
- Estimated extent:** In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.
- Biodiversity status:** No concern at present
- Biodiversity status notes:**
- Vegetation Management Act class:** Least concern

Regional ecosystem 11.2.2

Description: Ipomoea pes-caprae and Spinifex sericeus grassland +/- Casuarina equisetifolia. Casuarina equisetifolia varies from clumps of open-forest, to woodland, to isolated trees. Other scattered trees or shrubs may be present including Pandanus tectorius, Hibiscus tiliaceus, Terminalia muelleri, Alphitonia excelsa, Caesalpinia bonduc and Cupaniopsis anacardioides. The ground layer. The ground layer is quite dense, and includes Ipomoea pes-caprae, Cyperus pedunculatus, Bulbostylis barbata, Aphyllodium biarticulatum (prostrate form), and Spinifex sericeus. Several species are prostrate, but the only climbing vine is Cassytha pubescens. Occurs on Quaternary coastal fore dunes and beaches. (BVG1M: 28a)

Major vegetation communities include:

11.2.2a: Grassland with Heteropogon triticeus, various other grasses and herbaceous spp. Includes narrow prostrate strandline vegetation. (BVG1M: 28a)

11.2.2b: Complex of vegetation on Quaternary coastal dunes and beaches. Characterised by Casuarina equisetifolia, which varies in structure from clumps of open-forest, to woodland, to isolated trees. Other scattered trees may be present including Pandanus tectorius, Hibiscus tiliaceus, Terminalia muelleri, Alphitonia excelsa, and Cupaniopsis anacardioides. There may be a shrub layer of Clerodendrum spp., Caesalpinia bonduc, Vitex trifolia and/or Scaevola taccada. The ground layer usually includes Eragrostis interrupta, Thuarea involuta, Eriachne triodioides, Spinifex sericeus, Ipomoea pes-caprae, Canavalia rosea and Cyperus pedunculatus. There is usually a distinct zonation along the strandline. On gentle to moderately sloping foredunes and immediate swales, usually within 200 m of the high tide mark. Occurs in environments subject to salt-laden winds. Associated with exposed and loose aeolian (wind-transported) pale siliceous sands. (BVG1M: 28a)

Supplementary descriptions: Forster and Barton (1995), Joskeleigh; Christian et al. (1953), Littoral

Subregion: 1, 14, (2), (7.1)

Protected areas: Bowling Green Bay NP, Shoalwater Bay CP, Townsville Town Common CP, Cape Upstart NP, MacKenzie Island CP, Capricorn Coast NP, Cape Pallarenda CP, Magnetic Island NP, Broad Sound Islands NP, Abbott Bay RR

Extent in reserves: High

Wetland:

Special values:

Comments: Naturalised species associated with this regional ecosystem include *Tridax procumbens.
11.2.2b: Some areas between Bowen and Ayr known to be infested with chinee apple *Zizyphus mauritiana and rubber vine *Cryptostegia grandiflora. Other areas are being invaded by guinea grass *Panicum maximum var. maximum (e.g. Alma Beach area near Ayr). Other common weeds include *Hyptis suaveolens, *Stachytarpheta jamaicensis and Jatropha gossypifolia. Naturalised species associated with this regional ecosystem include *Tridax procumbens. Many areas too narrow to map at 1:100K scale.

Estimated extent: In December 2006, remnant extent was < 10,000 ha and >30% of the pre-clearing area remained

Biodiversity status: Of concern

Biodiversity status notes:

Vegetation Management Act class: Of concern



Appendix D

Example Ground Observation and Soil Morphological Description Sheet

HEADER RECORD

| | | | | | | | |
|-----------------------|--------------|---------------|-----------|------------------------|-------------------------|-----------------------|------------|
| Record Type | | | | | | | |
| <u>0 0 0 1</u> | | | | | | | |
| Survey Code | | Site | | Code No. | | | |
| | | | | | | | |
| Great Soil Group Code | | | | Principal Profile Form | | Soil or Land Class | |
| | | | | | | | |
| Described by | Air Photo | | Reference | | | Date | |
| | Film Number | Run No. | Frame No. | East | North | Day | Month Year |
| | | | | | | | |
| Map Sheet Number | Map Scale 1: | | Map Zone | Type | Map Reference | | |
| | | | | | Eastings / Latitude | Northings / Longitude | |
| | | | | | | | |
| Eval. | Slope Value | Elevation (m) | Aspect | Depth of Regolith (m) | Depth of Standing Water | Rainfall (mm) | |
| | | | | + - | | | |
| | | | | | | | |

| |
|-------------|
| Record Type |
| 0, 0, 0, 2 |

LANDFORM, VEGETATION, LANDSURFACE, SUBSTRATE MATERIAL RECORD

LANDFORM

LANDFORM ELEMENT
MORPHOLOGICAL TYPE

- | | |
|------|-------------------|
| AA01 | Crest |
| AA02 | Upper Slope |
| AA03 | Mid-Slope |
| AA04 | Lower Slope |
| AA05 | Simple Slope |
| AA06 | Flat |
| AA07 | Open Depression |
| AA08 | Closed Depression |
| AA09 | Hillock |
| AA10 | Ridge |

RUN-OFF

- | | | |
|------|--------------------------|------------------|
| DA01 | <input type="checkbox"/> | None |
| DA02 | <input type="checkbox"/> | Very Slow |
| DA03 | <input type="checkbox"/> | Slow |
| DA04 | <input type="checkbox"/> | Moderately Rapid |
| DA05 | <input type="checkbox"/> | Rapid |
| DA06 | <input type="checkbox"/> | Very Rapid |

INTERNAL DRAINAGE

PERMEABILITY

- | | | |
|------|--------------------------|----------------------|
| EA01 | <input type="checkbox"/> | Slowly Permeable |
| EA02 | <input type="checkbox"/> | Moderately Permeable |
| EA03 | <input type="checkbox"/> | Highly Permeable |

DRAINAGE

- | | | |
|------|--------------------------|-------------------------|
| EB01 | <input type="checkbox"/> | Very Poorly Drained |
| EB02 | <input type="checkbox"/> | Poorly Drained |
| EB03 | <input type="checkbox"/> | Imperfectly Drained |
| EB04 | <input type="checkbox"/> | Moderately Well Drained |
| EB05 | <input type="checkbox"/> | Well Drained |
| EB06 | <input type="checkbox"/> | Rapidly Drained |

ROCK OUTCROP

- | | | |
|------|--------------------------|----------|
| FA01 | <input type="checkbox"/> | None |
| FA02 | <input type="checkbox"/> | <10% |
| FA03 | <input type="checkbox"/> | 10 - 50% |
| FA04 | <input type="checkbox"/> | >50% |

EROSION

STATE OF EROSION

- | | | |
|------|--------------------------|-------------------|
| GA01 | <input type="checkbox"/> | Active |
| GA02 | <input type="checkbox"/> | Stabilized |
| GA03 | <input type="checkbox"/> | Partly Stabilized |

WIND EROSION

- | | | |
|------|--------------------------|-------------|
| GBØ1 | <input type="checkbox"/> | None |
| GBØ2 | <input type="checkbox"/> | Minor |
| GBØ3 | <input type="checkbox"/> | Moderate |
| GBØ4 | <input type="checkbox"/> | Severe |
| GBØ5 | <input type="checkbox"/> | Very Severe |

WATER EROSION

- | | |
|------|------------------------|
| GC01 | No Sheet Erosion |
| GC02 | Minor Sheet Erosion |
| GC03 | Moderate Sheet Erosion |
| GC04 | Severe Sheet Erosion |
| GD01 | No Rill Erosion |
| GD02 | Minor Rill Erosion |
| GD03 | Moderate Rill Erosion |
| GD04 | Severe Rill Erosion |
| GE01 | No Gully Erosion |
| GE02 | Minor Gully Erosion |
| GE03 | Moderate Gully Erosion |
| GE04 | Severe Gully Erosion |

GULLY EROSION DEPTH

- | | | |
|------|--------------------------|------------|
| GFØ1 | <input type="checkbox"/> | <1.5m |
| GFØ2 | <input type="checkbox"/> | 1.5 - 3.0m |
| GFØ3 | <input type="checkbox"/> | >3.0m |

WATER EROSION

- | | |
|------|-----------------------|
| GG01 | No Tunnel Erosion |
| GG02 | Tunnel Erosion |
| GH01 | No Streambank Erosion |
| GH02 | Streambank Erosion |
| GJ01 | No Wave Erosion |
| GJ02 | Wave Erosion |
| GK01 | No Mass Movement |
| GK02 | Mass Movement |
| GL01 | Other Erosion |

DISTURBANCE OF SITE

- | | | |
|------|--------------------------|--|
| HA01 | <input type="checkbox"/> | No Effective Disturbance (NED) |
| HA02 | <input type="checkbox"/> | NED Except Hoofed Animals |
| HA03 | <input type="checkbox"/> | Limited Clearing |
| HA04 | <input type="checkbox"/> | Extensive Clearing |
| HA05 | <input type="checkbox"/> | Complete Clearing, Pasture, Never Cultivated |
| HA06 | <input type="checkbox"/> | Complete Clearing, Pasture, Cultivated |
| HA07 | <input type="checkbox"/> | Cultivation Dryland |
| HA08 | <input type="checkbox"/> | Cultivation Irrigated Past / Present |
| HA09 | <input type="checkbox"/> | Highly Disturbed |

SUBSTRATE MATERIAL

STRENGTH

- | | | |
|------|--------------------------|-------------|
| IA01 | <input type="checkbox"/> | Very Weak |
| IA02 | <input type="checkbox"/> | Weak |
| IA03 | <input type="checkbox"/> | Moderate |
| IA04 | <input type="checkbox"/> | Strong |
| IA05 | <input type="checkbox"/> | Very Strong |

LITHOLOGY

- | Soil Parent Material | LITHOLOGY | Underlying Material |
|----------------------|--------------------------|---------------------|
| IØ1 | <u>Not Identified</u> | ICØ1 |
| IØ2 | <u>Igneous</u> | ICØ2 |
| IØ3 | Serpentine | ICØ3 |
| IØ4 | Diorite | ICØ4 |
| IØ5 | Granodiorite | ICØ5 |
| IØ6 | Granite | ICØ6 |
| IØ7 | Basalt / Dolerite | ICØ7 |
| IØ8 | Andesite | ICØ8 |
| IØ9 | Trachyte / Syenite | ICØ9 |
| IØ10 | Rhyolite | ICØ10 |
| IDØ1 | <u>Sedimentary</u> | IEØ1 |
| IDØ2 | Conglomerate | IEØ2 |
| IDØ3 | Sandstone | IEØ3 |
| IDØ4 | Shale | IEØ4 |
| IDØ5 | Mudstone / Siltstone | IEØ5 |
| IDØ6 | Limestone | IEØ6 |
| IFØ1 | <u>Metamorphic</u> | IGØ1 |
| IFØ2 | Amphibolite / Greenstone | IGØ2 |
| IFØ3 | Slate / Hornfels | IGØ3 |
| IFØ4 | Schist / Phyllite | IGØ4 |
| IFØ5 | Gneiss | IGØ5 |
| IFØ6 | Quartzite | IGØ6 |
| IIØ1 | <u>Unconsolidated</u> | IIØ1 |
| IIØ2 | Gravel | IIØ2 |
| IIØ3 | Sand | IIØ3 |
| IIØ4 | Silt | IIØ4 |
| IIØ5 | Clay | IIØ5 |
| IJØ1 | Other | IKØ1 |

TYPE OF SOIL OBSERVATION

- | | | |
|------|--------------------------|----------------------------|
| JA01 | <input type="checkbox"/> | Soil Pit |
| JA02 | <input type="checkbox"/> | Existing Vertical Exposure |
| JA03 | <input type="checkbox"/> | Soil Core |
| JA04 | <input type="checkbox"/> | Auger Boring |

ADDENDUM

| | | | |
|---|---|---|---|
| | | | |
| . | . | . | . |
| . | . | . | . |
| . | . | . | . |
| . | . | . | . |
| . | . | . | . |

| |
|-------------|
| Record Type |
| 0003 |

NOTES RECORD

SOIL PROFILE RECORD 'A'

| Record Type | | Total No. of Layers | Dominant Colour (Munsell Code) | | | | | | | | | | Mottle | | | | | pH | | | |
|-------------|---------|-------------------------|--------------------------------|--|--|--|--|-----|--|--|--|--|---------|------|--------|-----------|--------|----|------|--------|--------|
| 0 0 0 4 | | | Moist | | | | | Dry | | | | | Primary | | | Secondary | | | | | |
| Layer No. | Horizon | Lower Average Depth (m) | | | | | | | | | | | Abund. | Size | Contr. | Colour | Abund. | | Size | Contr. | Colour |
| 1 | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | |

Record Type
0 0 0 5

SOIL PROFILE RECORD 'B'

FIELD TEXTURE

SAND FRACTION

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|--------|
| MA01 | | | | | | Fine |
| MA02 | | | | | | Coarse |

GRADE

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|-------------------|
| MB01 | | | | | | Sand |
| MB02 | | | | | | Loamy Sand |
| MB03 | | | | | | Clayey Sand |
| MC01 | | | | | | Sandy Loam |
| MC02 | | | | | | Fine Sandy Loam |
| MC03 | | | | | | Light Sandy Clay |
| MD01 | | | | | | Loam |
| MD02 | | | | | | Loam, Fine Sandy |
| MD03 | | | | | | Silt Loam |
| MD04 | | | | | | Sandy Clay Loam |
| ME01 | | | | | | Clay Loam |
| ME02 | | | | | | Silty Clay Loam |
| ME03 | | | | | | Fine Sandy Clay |
| MF01 | | | | | | Sandy Clay Loam |
| MF02 | | | | | | Silty Clay |
| MF03 | | | | | | Light Clay |
| MG01 | | | | | | Light Medium Clay |
| MG02 | | | | | | Medium Clay |
| | | | | | | Heavy Clay |

COARSE FRAGMENTS

ABUNDANCE

| 0 1 2 3 4 5 6 | | | | | | |
|---------------|--|--|--|--|--|--------|
| NA01 | | | | | | None |
| NA02 | | | | | | 0-2% |
| NA03 | | | | | | 2-10% |
| NA04 | | | | | | 10-20% |
| NA05 | | | | | | 25-50% |
| NA06 | | | | | | 50-90% |
| NA07 | | | | | | >90% |

SHAPE

| 0 1 2 3 4 5 6 | | | | | | |
|---------------|--|--|--|--|--|------------|
| NB01 | | | | | | Rounded |
| NB02 | | | | | | Subrounded |
| NB03 | | | | | | Subangular |
| NB04 | | | | | | Angular |

DISTRIBUTION

| 0 1 2 3 4 5 6 | | | | | | |
|---------------|--|--|--|--|--|-------------|
| NC01 | | | | | | Reoriented |
| NC02 | | | | | | Undisturbed |
| NC03 | | | | | | Stratified |
| NC04 | | | | | | Dispersed |

SIZE

| 0 1 2 3 4 5 6 | | | | | | |
|---------------|--|--|--|--|--|-----------|
| ND01 | | | | | | 2-6 mm |
| ND02 | | | | | | 6-20mm |
| ND03 | | | | | | 20-60 mm |
| ND04 | | | | | | 60-200mm |
| ND05 | | | | | | 200-600mm |
| ND06 | | | | | | >600mm |

LITHOLOGY

| 0 1 2 3 4 5 6 | | | | | | |
|---------------|--|--|--|--|--|-------------------------|
| NE01 | | | | | | Quartz |
| NE02 | | | | | | Igneous |
| NE03 | | | | | | Sedimentary |
| NE04 | | | | | | Metamorphic |
| NE05 | | | | | | Same As Parent Material |
| NE06 | | | | | | Not Identified |

STRUCTURE

GRADE

| Primary | | | | | | |
|-------------|--|--|--|--|--|---------------------|
| 1 2 3 4 5 6 | | | | | | |
| PA01 | | | | | | Apedal Single Grain |
| PA02 | | | | | | Apedal Massive |
| PA03 | | | | | | Weak Pedality |
| PA04 | | | | | | Moderate Pedality |
| PA05 | | | | | | Strong Pedality |

| Secondary | | | | | | |
|-------------|--|--|--|--|--|--|
| 1 2 3 4 5 6 | | | | | | |
| PB01 | | | | | | |
| PB02 | | | | | | |
| PB03 | | | | | | |
| PB04 | | | | | | |
| PB05 | | | | | | |

PED SIZE

| Primary | | | | | | |
|-------------|--|--|--|--|--|-----------|
| 1 2 3 4 5 6 | | | | | | |
| PC01 | | | | | | <2mm |
| PC02 | | | | | | 2-5mm |
| PC03 | | | | | | 5-10mm |
| PC04 | | | | | | 10-20mm |
| PC05 | | | | | | 20-50mm |
| PC06 | | | | | | 50-100mm |
| PC07 | | | | | | 100-200mm |
| PC08 | | | | | | 200-500mm |
| PC09 | | | | | | >500mm |

| Secondary | | | | | | |
|-------------|--|--|--|--|--|--|
| 1 2 3 4 5 6 | | | | | | |
| PD01 | | | | | | |
| PD02 | | | | | | |
| PD03 | | | | | | |
| PD04 | | | | | | |
| PD05 | | | | | | |
| PD06 | | | | | | |
| PD07 | | | | | | |
| PD08 | | | | | | |
| PD09 | | | | | | |

PED TYPE

| Primary | | | | | | |
|-------------|--|--|--|--|--|-------------------|
| 1 2 3 4 5 6 | | | | | | |
| PE01 | | | | | | Platy |
| PE02 | | | | | | Prismatic |
| PE03 | | | | | | Columnar |
| PE04 | | | | | | Angular Blocky |
| PE05 | | | | | | Subangular Blocky |
| PE06 | | | | | | Polyhedral |
| PE07 | | | | | | Lenticular |
| PE08 | | | | | | Granular |
| PE09 | | | | | | Cast |

| Secondary | | | | | | |
|-------------|--|--|--|--|--|--|
| 1 2 3 4 5 6 | | | | | | |
| PF01 | | | | | | |
| PF02 | | | | | | |
| PF03 | | | | | | |
| PF04 | | | | | | |
| PF05 | | | | | | |
| PF06 | | | | | | |
| PF07 | | | | | | |
| PF08 | | | | | | |
| PF09 | | | | | | |

FABRIC

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|------------|
| QA01 | | | | | | Earthy |
| QA02 | | | | | | Sandy |
| QA03 | | | | | | Smooth Ped |
| QA04 | | | | | | Rough Ped |

CUTANS

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|-----------------|
| RA01 | | | | | | None |
| RA02 | | | | | | Few (<10%) |
| RA03 | | | | | | Common (10-50%) |
| RA04 | | | | | | Many (>50%) |

VOIDS

PORES

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|---------------|
| SA01 | | | | | | Macropores |
| SA02 | | | | | | No macropores |

CRACK WIDTH

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|---------|
| SB01 | | | | | | <5mm |
| SB02 | | | | | | 5-10mm |
| SB03 | | | | | | 10-20mm |
| SB04 | | | | | | 20-50mm |
| SB05 | | | | | | >50mm |

CONSISTENCE

STRENGTH

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|-------------------|
| TA01 | | | | | | Loose |
| TA02 | | | | | | Very Weak |
| TA03 | | | | | | Moderately Weak |
| TA04 | | | | | | Moderately Firm |
| TA05 | | | | | | Very Firm |
| TA06 | | | | | | Moderately Strong |
| TA07 | | | | | | Very Strong |
| TA08 | | | | | | Rigid |

PLASTICITY TYPE

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|------------------|
| TB01 | | | | | | Superplastic |
| TB02 | | | | | | Normal Plastic |
| TB03 | | | | | | Subplastic |
| TB04 | | | | | | Strongly Plastic |

STICKINESS

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|-------------------|
| TC01 | | | | | | Non Sticky |
| TC02 | | | | | | Slightly Sticky |
| TC03 | | | | | | Moderately Sticky |

PANS

CEMENTATION

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|------------------------|
| UA01 | | | | | | Uncemented |
| UA02 | | | | | | Weakly Cemented |
| UA03 | | | | | | Moderately Cemented |
| UA04 | | | | | | Strongly Cemented |
| UA05 | | | | | | Very Strongly Cemented |

TYPE

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|-----------------|
| UB01 | | | | | | No Pans |
| UB02 | | | | | | Calcrete |
| UB03 | | | | | | Silcrete |
| UB04 | | | | | | Iron Pan |
| UB05 | | | | | | Sesquioxide Pan |
| UB06 | | | | | | Ortstein |
| UB07 | | | | | | Coffee Rock |
| UB08 | | | | | | Other |

CONTINUITY

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|---------------|
| UC01 | | | | | | Continuous |
| UC02 | | | | | | Discontinuous |
| UC03 | | | | | | Broken |

SEGREGATIONS

ABUNDANCE

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|--------|
| VA01 | | | | | | 0 |
| VA02 | | | | | | <2% |
| VA03 | | | | | | 2-10% |
| VA04 | | | | | | 10-20% |
| VA05 | | | | | | 20-50% |
| VA06 | | | | | | >50% |

NATURE

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|---------------|
| VB01 | | | | | | Calcareous |
| VB02 | | | | | | Gypseous |
| VB03 | | | | | | Ferruginous |
| VB04 | | | | | | Manganiferous |
| VB05 | | | | | | Organic |
| VB06 | | | | | | Other |

FORM

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|-------------------|
| VC01 | | | | | | Nodules |
| VC02 | | | | | | Crystals |
| VC03 | | | | | | Soft Segregations |

SIZE

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|---------|
| VD01 | | | | | | <2mm |
| VD02 | | | | | | 2-6mm |
| VD03 | | | | | | 6-20mm |
| VD04 | | | | | | 20-60mm |
| VD05 | | | | | | >60mm |

ROOTS

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|----------|
| WA01 | | | | | | None |
| WA02 | | | | | | Few |
| WA03 | | | | | | Common |
| WA04 | | | | | | Many |
| WA05 | | | | | | Abundant |

BOUNDARY

DISTINCTNESS

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|--------------------|
| XA01 | | | | | | Sharp (<5mm) |
| XA02 | | | | | | Abrupt (5-20mm) |
| XA03 | | | | | | Clear (20-50mm) |
| XA04 | | | | | | Gradual (50-100mm) |
| XA05 | | | | | | Diffuse (>100mm) |

SHAPE

| 1 2 3 4 5 6 | | | | | | |
|-------------|--|--|--|--|--|-----------|
| XB01 | | | | | | Smooth |
| XB02 | | | | | | Wavy |
| XB03 | | | | | | Irregular |
| XB04 | | | | | | Broken |



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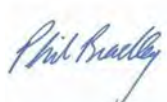
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Document Status

| Rev No. | Author | Reviewer | | Approved for Issue | | |
|---------|------------------------|-------------|---|--------------------|---|----------|
| | | Name | Signature | Name | Signature | Date |
| 0 | D Doolan S Buchanan | S Griffiths |  | P. Bradley |  | 01/08/11 |
| 1 | D Doolan | S Griffiths |  | P. Bradley |  | 04/08/11 |