BHP Billiton Iron Ore

FLORA AND VEGETATION SURVEY

Goldsworthy

January 2013

ONSHORE ENVIRONMENTAL

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Executive Summary

Onshore Environmental Consultants (Onshore Environmental) was commissioned by BHP Billiton Iron Ore Pty Ltd (BHPBIO) to undertake a single season Level 2 flora and vegetation survey of the Goldsworthy deposit, hereafter referred to as the study area. BHPBIO currently operates a number of open cut iron ore mines as part of the Goldsworthy Iron Ore Mining Operations (Yarrie), located approximately 200 kilometres (km) east of Port Hedland in the north-eastern Pilbara region of Western Australia. The company is planning to undertake exploratory drilling in the study area, which is located approximately 81 km north-west of the Yarrie mining operations. The BHP Billiton Yarrie to Port Hedland Rail line passes through the study area. BHPBIO is required to submit a Native Vegetation Clearing Permit (NVCP) Application prior to the commencement of drilling, and the Level 2 flora and vegetation assessment is required to support this application.

A single season field survey was completed by five botanists from Onshore Environmental between the 1st and 11th September 2012. A total number of 286 plant taxa (including varieties and subspecies) from 44 families and 136 genera were recorded from the study area. Species representation was greatest among the Fabaceae, Poaceae, Malvaceae, Amaranthaceae, Asteraceae, Convolvulaceae, Myrtaceae and Goodeniaceae families, which is typical for the Pilbara Bioregion. The most speciose genus was *Acacia* (19 taxa), followed by *Eriachne* (10 taxa), *Senna* (8 taxa), *Sida* (8 taxa), *Ptilotus* (8 taxa) and *Tephrosia* (8 taxa).

None of the plant taxa were gazetted as Declared Rare Flora (DRF) pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950) (WC Act), or listed under the Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act (*1999) (EPBC Act).

One Priority 2 flora species was previously recorded from a single point just outside the south-east corner of the study area; *Euphorbia clementii* (Pilbara Flora 2008). However, re-sampling of the known location and intensive survey of the surrounding landforms by Onshore Environmental in September 2012 failed to relocate this taxon. There was suitable habitat present, but *Euphorbia clementii* was not recorded from the wider survey area.

Phyllanthus aridus is a Priority 3 flora taxon recorded from a single point in the south-east sector of the study area by Onshore Environmental in September 2012. The landform was a distinctive sandstone ridge and the taxon is likely to be more widely distributed along the length of the ridge. The Goldsworthy record represents the southern extent of the known range for this taxon.

A total of eight introduced (weed) species have been recorded from the study area; **Aerva javanica* (Kapok Bush), **Calotropis procera* (Calotrope), **Cenchrus ciliaris* (Buffel Grass), **Cenchrus setiger* (Birdwood Grass), **Cynodon dactylon* (Couch Grass), **Tamarix aphylla* (Athel Pine), **Vachellia farnesiana* (Mimosa Bush) and **Passiflora foetida* var. *hispida* (Wild Passionfruit). Two of these taxa are listed as Declared Weeds under the ARRP Act; **Calotropis procera* and **Tamarix aphylla*.

A total of 31 vegetation associations were described and mapped within the study area. The vegetation associations were classified into 13 Broad Floristic Formations on the basis of the dominant vegetation stratum.

Half of the vegetation associations mapped within the study area supported vegetation condition rated as Excellent or Excellent to Very Good, with two localized vegetation associations rated as Degraded. As is typical for the Pilbara, there was a trend for vegetation condition to improve with increasing landform relief. Vegetation occurring on floodplains, plains and drainage lines showed reduced condition, primarily linked to grazing by domestic stock causing reduced species richness, introduction of weeds, and surface soil instability. Areas in close proximity to the rail line including the ballast also showed a high presence of introduced species. Vegetation condition also declined within rehabilitated areas of the decommissioned Goldsworthy mine site and the old Goldsworthy townsite.

None of the vegetation associations were representative of Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs), and database searches confirmed there were no previous records within a 100 km radius of the study area.

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1.0 Introduction

1.1 Preamble

BHPBIO currently operates a number of open cut iron ore mines as part of the Goldsworthy Iron Ore Mining Operations situated at Yarrie, approximately 200 kilometres (km) east of Port Hedland in the north-eastern Pilbara region of Western Australia. The company is planning to undertake exploratory drilling at the Goldsworthy deposit, herein referred to as the study area, located approximately 81 km north-west of the Yarrie mining operations (Figure 1). The BHP Billiton Yarrie to Port Hedland Rail line passes through the study area.

BHPBIO is required to submit a Native Vegetation Clearing Permit (NVCP) Application prior to the commencement of exploration drilling, and a Level 2 flora and vegetation assessment is required to support this application. Onshore Environmental was commissioned by BHPBIO to undertake a single season Level 2 flora and vegetation survey of their Goldsworthy tenements in September 2012.

1.2 Location

The study area is located approximately 97 km east of Port Hedland, 81 km to the north-west of the Yarrie mining operations, and approximately 30 km inland from the coast. The study area incorporates the decommissioned Mt Goldsworthy Mine which operated for 27 years between 1965 and 1992 and was the first major iron ore development in the Pilbara. The mine void, rehabilitated waste dumps and infrastructure areas, and the old Goldsworthy townsite are situated in the south-east corner of the study area. The remainder of the study area supports native vegetation.

1.3 Previous Surveys

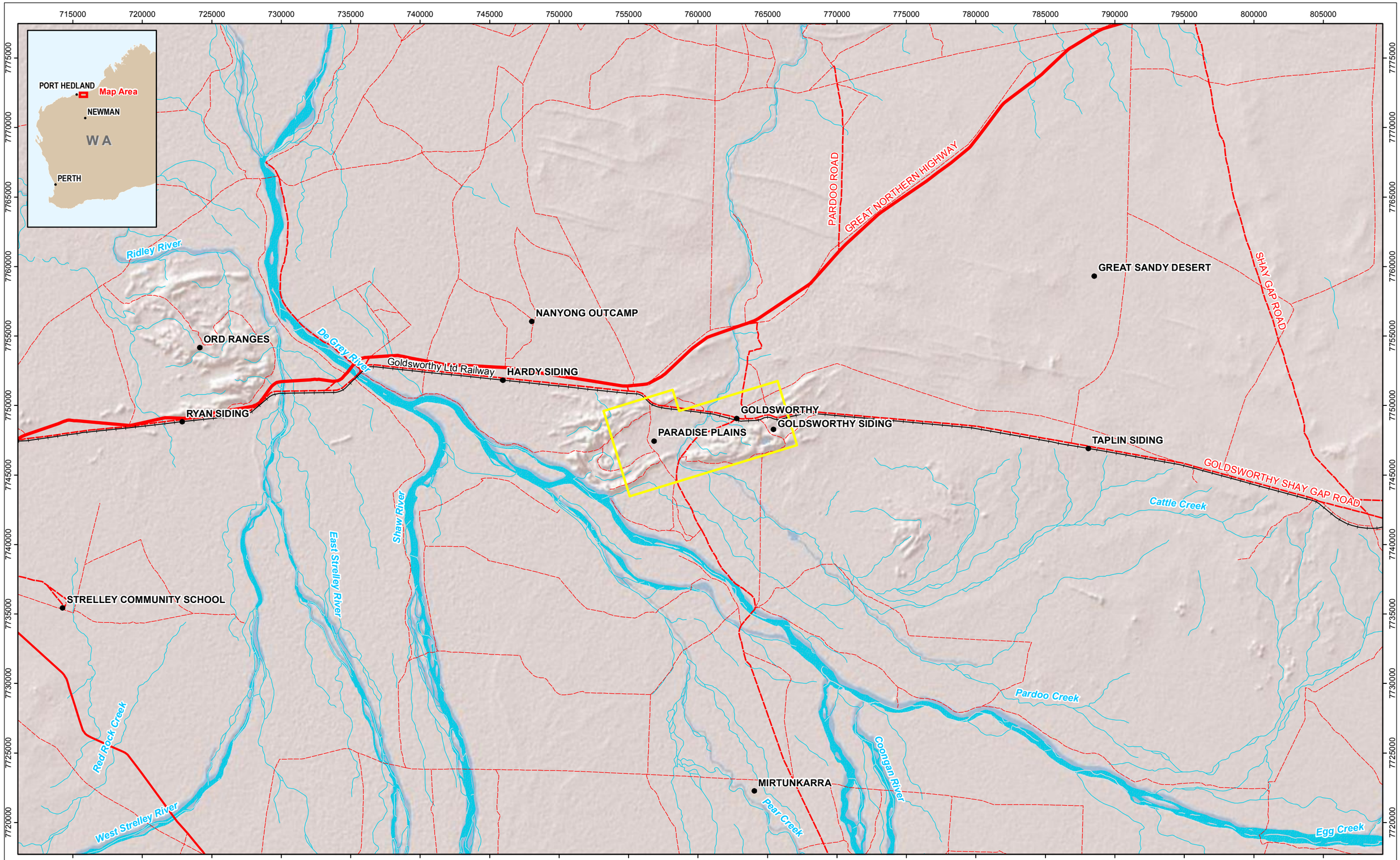
A survey of the decommissioned Mt Goldsworthy Mine and surrounds was completed by Pilbara Flora in 2008. The survey covered a total area of 1,236 ha, with 724 ha supporting native vegetation and the remainder covering rehabilitated areas of the Mt Goldsworthy Mine including waste dumps, mine void and the old townsite.

- Pilbara Flora (2009) *Flora and Vegetation Survey of the Goldsworthy Minesite*.

In 2011 the rail line corridor extending between Port Hedland and Yarrie was surveyed by Ecologia Environment. The alignment extends through a small section of the study area.

- Ecologia Environment (2011) *BHP Billiton Iron Ore Rail Operations Goldsworthy Junction to Yarrie Flora Survey*.

A total of 13 additional surveys have been completed in close proximity to the study area. These surveys are summarised in Appendix 1.



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Kilometers

1:250,000

Datum: GDA94

Projection: MGA Zone 50

GOLDSWORTHY

SURVEY AREA LOCATION

Legend

Study Area

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1.5 Biogeographic Regions

Thackway and Cresswell (1995) describe a system of 85 'biogeographic regions' (bioregions) and 403 subregions covering the entire Australian continent. Bioregions are defined on the basis of climate, geology, landforms, vegetation and fauna. The study area is located close to the border of several subregions including the Chichester and Roebourne subregions (PIL1 and PIL4) of the Pilbara bioregion, the Pindanland subregion (DL2) of the Dampierland bioregion and the McLarty subregion (GSD1) of the Great Sandy Desert bioregion (Thackway and Cresswell 1995). These four subregions are described in Table 1.

Table 1 Bioregions and subregions in close proximity to the Goldsworthy Study area.

Bioregion: Pilbara	**Subregion: Chichester**	**Area: 9,044,560 ha**
The Chichester subregion (PIL 1) comprises the northern section of the Pilbara Craton. The Subregion consists of undulating Archaean granite and basalt plains with significant areas of basaltic ranges. Plains support a shrub steppe with *Acacia inaequilatera* over *Triodia wiseana* (formerly *Triodia pungens*) hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on ranges. Drainage occurs to the north via numerous rivers (e.g. De Grey, Oakover, Nullagine, Shaw, Yule, Sherlock).		
Bioregion: Pilbara	**Subregion: Roebourne**	**Area: 2,008,983 ha**
The Roebourne Subregion consists of quaternary alluvial and older colluvial coastal and sub-coastal plains with a grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia stellaticeps* or *A. pyrifolia* and *A. inaequilatera*. Uplands are dominated by *Triodia* hummock grasslands. Ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands. Samphire, *Sporobolus* and mangroves occur on marine alluvial flats and river deltas. Resistant linear ranges of basalts occur across the coastal plains, with minor exposures of granite. Islands are either Quaternary sand accumulations, or composed of basalt or limestone, or combinations of any of these three.		
Bioregion: Dampierland	**Subregion: Pindanland**	**Area: 5,198,904 ha**
There are four basic components to the Pindanland subregion. These comprise; Quaternary sandplain overlying Jurassic and Mesozoic sandstones with Pindan, Quaternary marine deposits on coastal plains, with mangal, samphire – Sporobolus spp. grasslands, *Melaleuca alsophila* low forests, and *Spinifex* spp. –*Crotalaria* spp. strand communities and Quaternary alluvial plains associated with the Permian and Mesozoic sediments of Fitzroy Trough supporting tree savannahs of ribbon grass (*Chrysopogon* spp.) – bluegrass (*Dichanthium* spp.) grasses with scattered Coolibah (*Eucalyptus microtheca*) -*Bauhinia cunninghamii*. There are riparian forests of river red gum (*Eucalyptus camaldulensis*) and Cadjeput (*Melaleuca* spp.) fringe drainages. The Pindanland subregion comprises sandplains of the Dampier Peninsular and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. It is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. The vegetation is described primarily as pindan. This is the coastal, semi-arid, north-western margin of the Canning Basin.		

Bioregion: Great Sandy Desert	Subregion: McLarty	Area: 13,173,266 ha
The McLarty Subregion is mainly tree steppe grading to shrub steppe in south; comprising open hummock grassland of *Triodia pungens* and *Triodia schinzii* with scattered trees of *Owenia reticulata* and *Bloodwoods*, and shrubs of *Acacia* spp, *Grevillea wickhamii* and *G. refracta*, on Quaternary red longitudinal sand dune fields overlying Jurassic and Cretaceous sandstones of the Canning and Armadeus Basins. *Allocasuarina decaisneana* (Desert Oak) occurs in the far east of the region. Gently undulating lateritised uplands support shrub steppe such as *Acacia pachycarpa* shrublands over *Triodia pungens* hummock grass. Calcrete and evaporite surfaces are associated with occluded palaeo-drainage systems that traverse the desert; these include extensive salt lake chains with samphire low shrublands, and *Melaleuca glomerata - M. lasiandra* shrublands. It includes the Mandora Paleoriver System. Red brown dunefields with finer texture than further south. Includes gravely surfaces of Anketell Ridge along its northern margin. The subregion is arid tropical with summer rain and is influenced by monsoonal activity. Morning fogs are recorded during the dry season.		

1.6 Existing Land Use

Land tenure in the Pilbara region consists of Aboriginal and leasehold reserves, national parks and reserves and crown land which fall under a range of pastoral and mining leases. The dominant land uses in the Pilbara are pastoralism (in the form of cattle grazing), mining, conservation (and associated tourism), unallocated crown land, crown reserves and urban areas (Kendrick 2001).

1.6.1 Pastoral

The pastoral industry in the Pilbara has become increasingly reliant on overseas export of live cattle through Port Hedland, with a progressive decline in sheep numbers. In 2010, mining companies hold many of the pastoral leases in the Central Pilbara to ensure security of access to land adjacent to mines and infrastructure. The Study area occurs within De Grey and Pardoo Stations, which are currently both active cattle stations.

1.6.2 Mining

The first mining exploration in the Pilbara commenced in the early 1800s and currently the Pilbara region provides the majority of WA's petroleum, gas and iron ore export, while gold mining is also an important industry (ANRA 2008). The Mt Goldsworthy Mine was the first major iron ore development in the Pilbara running from 1965 to 1992. Development of iron ore deposits was accelerated in the 1960's after the Commonwealth lifted the export embargo on iron ore. Development of the iron ore industry in the region has historically focused on the exploitation of high grade (65-66% Fe) Brockman ores, but more recently there has been exploration and mining of pisolitic channel iron deposits and marra mamba ore (Kneeshaw 2008).

1.7 Landforms

The south-east sector of the study area has previously been disturbed and subsequently rehabilitated as part of the Goldsworthy mining operations, and includes the old Goldsworthy townsite, mine void and waste dumps.

The intact landscape consists of low ridges in the north-west and southern sectors of the study area, interspersed by large flat drainage zones.

The ridges are generally covered in skeletal soils with areas of exposed rock. The lower drainage zones consist of drainage channels and large areas of stony and clay plains. The De Grey River occurs in close proximity to the west of the study area.

1.8 Soils

The soils of the Pilbara Region have been defined and mapped at a scale of 1:2,000,000 by Bettenay *et al*. (1967). The dominant soil types mapped in the study area are defined as "loamy soils with weak pedologic development". Tille (2006) collated the most recent and detailed mapping of Western Australia's Rangelands and Arid Interior into a hierarchy of soil-landscape mapping units. The study area falls within the Fortescue Province, an area that occupies approximately 160,050 km^2 (6.3% of Western Australia) and includes the towns of Port Hedland, Karratha, Dampier, Roebourne, Newman, Tom Price, Paraburdoo, Pannawonica, Marble Bar, Nullagine and Jigalong. Soils and landform for the Fortescue Province are described as "Hills and ranges (with stony plains and some alluvial plains and sandplains) on the volcanic, granitic and sedimentary rocks of the Pilbara Craton. Stony soils with red loamy earths and red shallow loams (and some red/brown non-cracking clays, red deep sandy duplexes and red deep sands)" (Tille 2006).

The Fortescue Province is divided into ten soil-landscape zones:

- Nullagine Hills Zone;
- De Grey-Roebourne Lowlands Zone;
- Chichester Ranges Zone;
- Abydos Plains and Hills Zone;
- Fortescue Valley Zone;
- Hamersley Plateaux Zone;
- Karratha Coast Zone;
- Warrawagine Hills Zone;
- Jigalong Plains Zone; and
- Harding Hills and Plains Zone.

The study area occurs within the Nullagine Hills Zone. The dominant landform features within this zone are hills and ranges with stony plains on volcanic and sedimentary rocks of the Pilbara Craton. The soils of the area are stony red shallow loams and sands supporting spinifex grasslands with Kanji (*Acacia inaequilatera)* and Snappy Gums (*Eucalyptus leucophloia*). The study area is bordered to the east by the Canning Province, which is described as deep red sands and red sandy earths on sandplains and dunes on the sedimentary rocks of the Canning Basin. In depressions between dunes red loamy earths and shallow gravels occur. Two soil landscape zones within the Canning Province occur in close proximity to the study area:

- Eighty Mile Coast and Flats Zone (4,700 km^2): consisting of coastal plains, dunes and alluvial plains with areas of tidal flats and beaches on marine shoreline and Aeolian deposits over Cretaceous Canning Basin sedimentary rocks. The soils are calcareous loamy earths, tidal soils and loamy duplexes with red deep sands, calcareous deep sands and calcareous shallow loams. Vegetation includes tussock grassland and halophytic shrublands with bare tidal flats, *Melaleuca* thickets and mangroves.
- Nita Sandplain Zone (26,200 km^2): consists of sandplains and dunes on cretaceous Canning Basin sedimentary rocks. Red deep sands and some red sandy earths support Pindan shrublands and shrubby spinifex grasslands.

1.9 Geology

The Pilbara region comprises a portion of the ancient continental Western Shield that dominates the geology of Western Australia. It is comprised of pre-Cambrian Proterozoic and Archaean rocks, which contain some of the earth's oldest rock formations, thought to be around 3.5 billion years old (ANRA 2008). Associated with the rock formations are important mineral reserves, including iron ore which is prevalent in the Pilbara.

The study area lies on the border between the Fortescue Province and the Canning Province. The Fortescue Province (as defined by Tille 2006) lies over the Pilbara Craton. In the south, the Pilbara Craton is dominated by the Hamersley Basin. In the north of the Hamersley Basin are the Archaean basalt, shale, sandstone, conglomerate, tuff and carbonate of the north-west and north-east Pilbara Sub-basins. These rocks are collectively known as the Fortescue Group and, with a narrow strip of banded iron formation, they make up the Chichester Ranges. To the south, the Hamersley Range has formed on the late Archaean-Palaeoproterozoic metamorphosed banded iron formations, shales, dolerite, carbonate, chert and rhyolite of the South Pilbara Sub-basin. These rocks belong to the Hamersley Group and make up part of the Ophthalmia Fold Belt (Tille 2006).

The Canning Province is situated over the Phanerozoic sedimentary rocks of the Canning Basin. The Basin is made up of marine and continental shale, siltstone and sandstone from the Cretaceous, Jurassic and Permian periods as well as Carboniferous- Permian glacigee, marine and continental silclastic sedimentary rocks (Tille 2006).

1.10 Flora and Vegetation

Historical systematic flora surveys of the Pilbara are limited to work completed by Burbidge (1959) and Beard (1975), and further refining of the original Beard mapping by Shepherd *et al*. (2002). Beard (1975) mapped vegetation of the Pilbara at a scale of 1:1,000,000. The original vegetation mapping undertaken by Beard (1975) was refined by Shepherd *et al*. (2002), who defined three vegetation associations present within the Study area (Figure 3). While the Pre-European extent for each vegetation association is greater than 99.9%, less than ten per cent of each association occurs within formal or informal reserves (Table 2).

Table 2 Pre-European Extent of Vegetation Associations occurring over the study area (Shepherd et. al. 2002).

Vegetation Sub-Association	Description	Pre-Euro. Extent Remaining	% remaining IUCN Class I-IV Reserves	% remaining Other Reserves	% remaining DEC Managed PL
93	Hummock Grasslands, shrub steppe; kanji over soft spinifex	100	0.4	0.0	1.7
117	Hummock Grasslands, grass steppe; soft spinifex	100	13.3	1.0	0.0
175	Short bunch grassland – savannah/grass plain (Pilbara)	100	4.1	0.1	0.0

A comprehensive and systematic field review of the entire Pilbara's regional flora, fauna, aquatic life and ecosystems is currently in preparation by the DEC. The $12.5 million biological survey has included 800 study sites distributed across the entire Pilbara region between 2002 and 2007.

The resources boom in the Pilbara over the past decade has resulted in a significant number of site-specific biological surveys being completed as part of the formal environmental approvals process. Two flora and vegetation surveys have occurred within the boundary of the study area in previous years, with numerous other surveys completed in close proximity (summarised in Appendix 1). These fine-scale surveys have contributed greatly to the identification of locally significant flora and vegetation values.

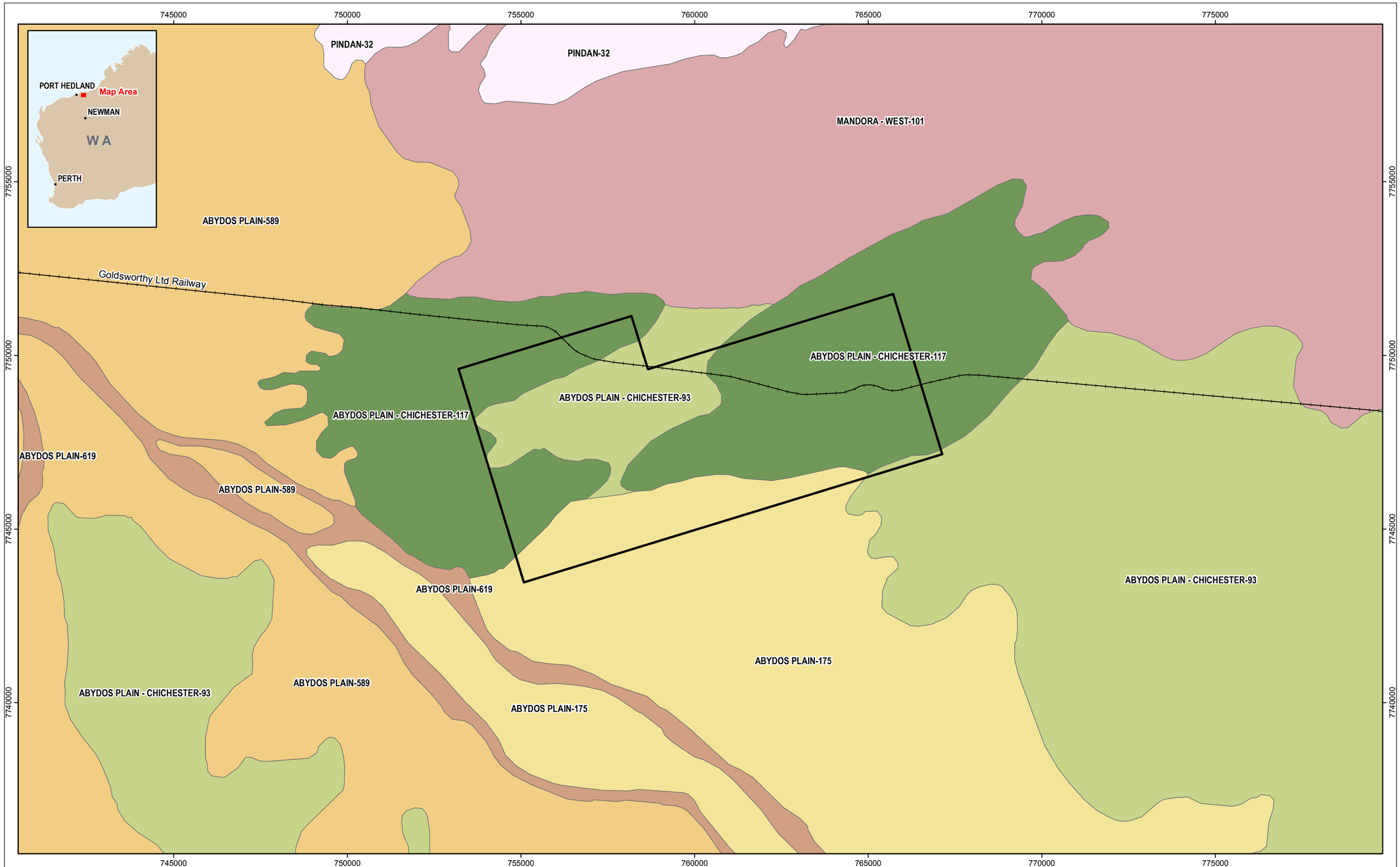
1.11 Land Systems

The Department of Agriculture has conducted inventory and condition surveys of the Pilbara (van Vreeswyk *et al*. 2004) using an integrated survey method involving the land system approach to rangeland description and evaluation. The primary objective of the surveys was to provide comprehensive descriptions and mapping of the biophysical resources of the region as well as an evaluation on the condition of soils and vegetation.

A total of 102 land systems were defined in the Pilbara at a scale of 1:250,000 (van Vreeswyk *et al*. 2004), with six land systems occurring within the study area (Table 3, Figure 4). The dominant land system represented is the Capricorn Land System, comprising the hills and ridges of sandstone and dolomite. The Boolgeeda Land System is well represented in the study area as stony slopes and flood plains, while the Nita Land System consists of sandplains with shrubby spinifex grasslands and occasional trees.

Table 3 Land systems occurring within the study area (descriptions from Van Vreeswyk et al. 2004).

Land System	Representation in the Pilbara	Description
Boolgeeda	7,748 km^2 or 4.3%	Stony plains with hard spinifex grasslands or mulga shrublands. The geology is quaternary colluvium
Capricorn	5,296 km^2 or 2.9%	Hills and ridges of sandstone and dolomite supporting low shrublands of shrubby spinifex grasslands
Nita	11,250 km^2 or 6.2%	Sandplains supporting shrubby spinifex grasslands with occasional trees
Horseflat	1,261 km^2 or 0.7%	Gilgaied clay plains supporting tussock grasslands and minor grassy snakewood shrublands
Billygoat	2,235 km^2or 1.2%	Dissected plains and slopes supporting hard spinifex grasslands
Paradise	1,479 km^2 or 0.8%	Alluvial plains supporting soft spinifex grasslands and tussock grasslands
Mine	NA	Old Goldsworthy Mine Site



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GOLDSWORTHY

PRE-EUROPEAN VEGETATION (BEARD - 1975)

Legend

Study Area

PreEuropeanVegetation selection
System, Veg Assoc.

- ABYDOS PLAIN - CHICHESTER, 117
- ABYDOS PLAIN - CHICHESTER, 93
- ABYDOS PLAIN, 175
- ABYDOS PLAIN, 589
- ABYDOS PLAIN, 619
- MANDORA - WEST, 101
- PINDAN, 32

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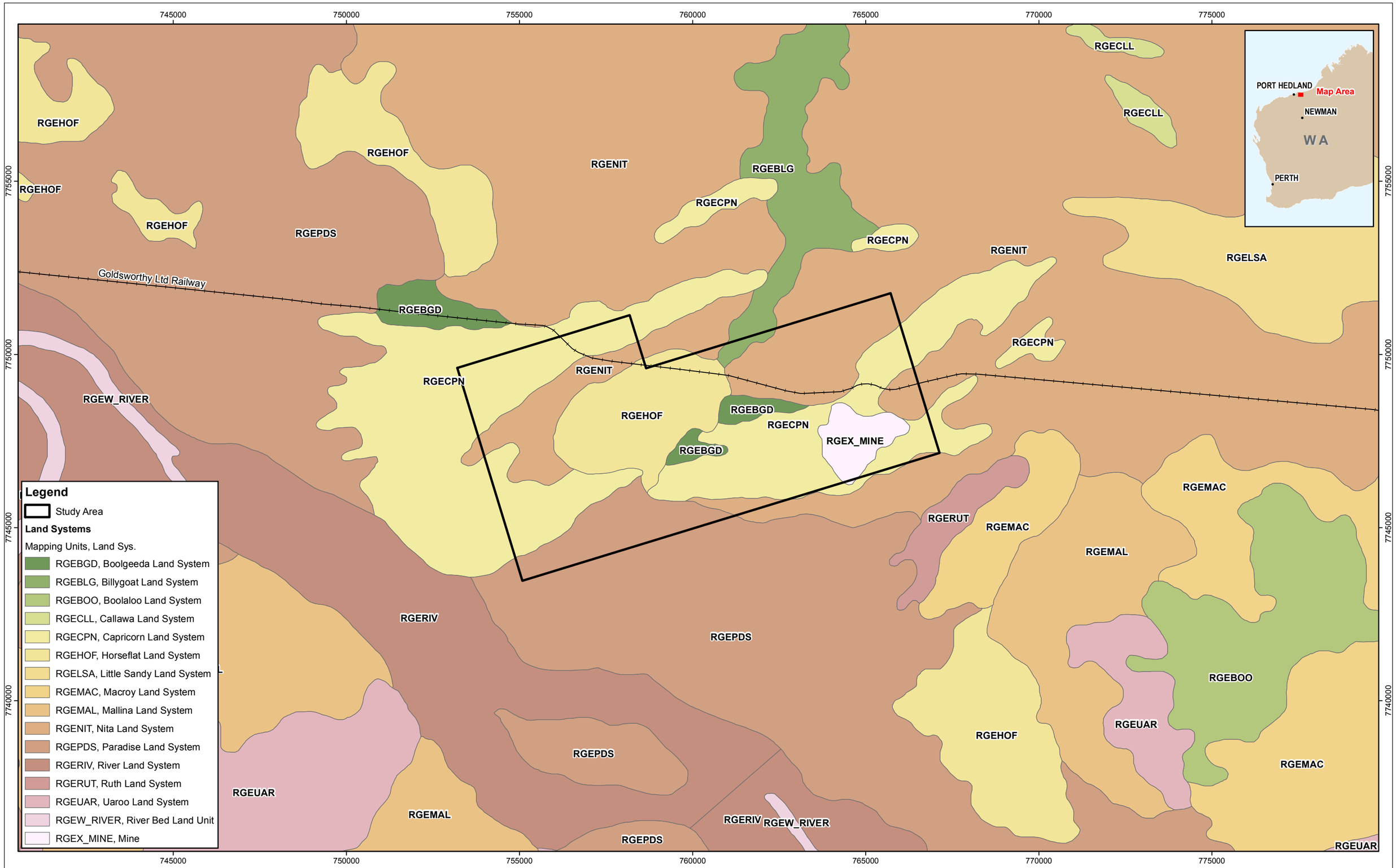

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GOLDSWORTHY

LAND SYSTEMS

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2.0 Methodology

2.1 Background

The flora and vegetation survey was carried out in a manner that was compliant with Environmental Protection Authority (EPA) requirements for the environmental surveying and reporting of flora and vegetation in Western Australia:

- *Environmental Protection of Native Vegetation in Western Australia: Clearing of Native Vegetation with Particular Reference to Agricultural Areas. Position Statement No. 2* (EPA 2000);
- *Terrestrial Biological Surveys as an Element of Biodiversity Protection. Position Statement No. 3* (EPA 2002); and
- *EPA Guidance for the Assessment of Environmental Factors: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia No. 51* (EPA 2004).

The survey was also conducted in accordance with BHPBIO's *Guidance for Flora and Vegetation Surveys in the Pilbara* (BHP Billiton Iron Ore 2010).

2.2 Desktop Searches

Three desktop searches were undertaken for information relating to rare flora, TECs and PECs previously collected or described within, or in close proximity to, the Study area. The search was extended beyond the immediate survey limits to place flora values into a local and regional context. The database search was conducted for an area from a 50 km radius around the study area. The search co-ordinates used were GDA94 Zone50 - 762000E 7748000N. The State database search investigated three DEC databases:

1. The DEC Threatened (Declared Rare) Flora Database;
2. The DEC Declared Rare and Priority Flora List; and
3. The Western Australian Herbarium Specimen Database for priority species opportunistically collected in the area of interest.

A search of the EPBC Act Protected Matters database was undertaken (Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC) 2012), as well as a search of the International Union for Conservation of Nature database (IUCN 2012).

2.3 Field Survey Methodology

2.3.1 Timing and Personnel

A single season field survey was completed by five botanists from Onshore Environmental between the 1st and 11th September 2012; Project Manager Dr Darren Brearley, Principal Botanist Dr Jerome Bull, Senior Botanist Ms Ellen Palmer and Botanists Ms Jessica Waters and Mr Daniel Roberts.

2.3.2 Sampling of Study Sites

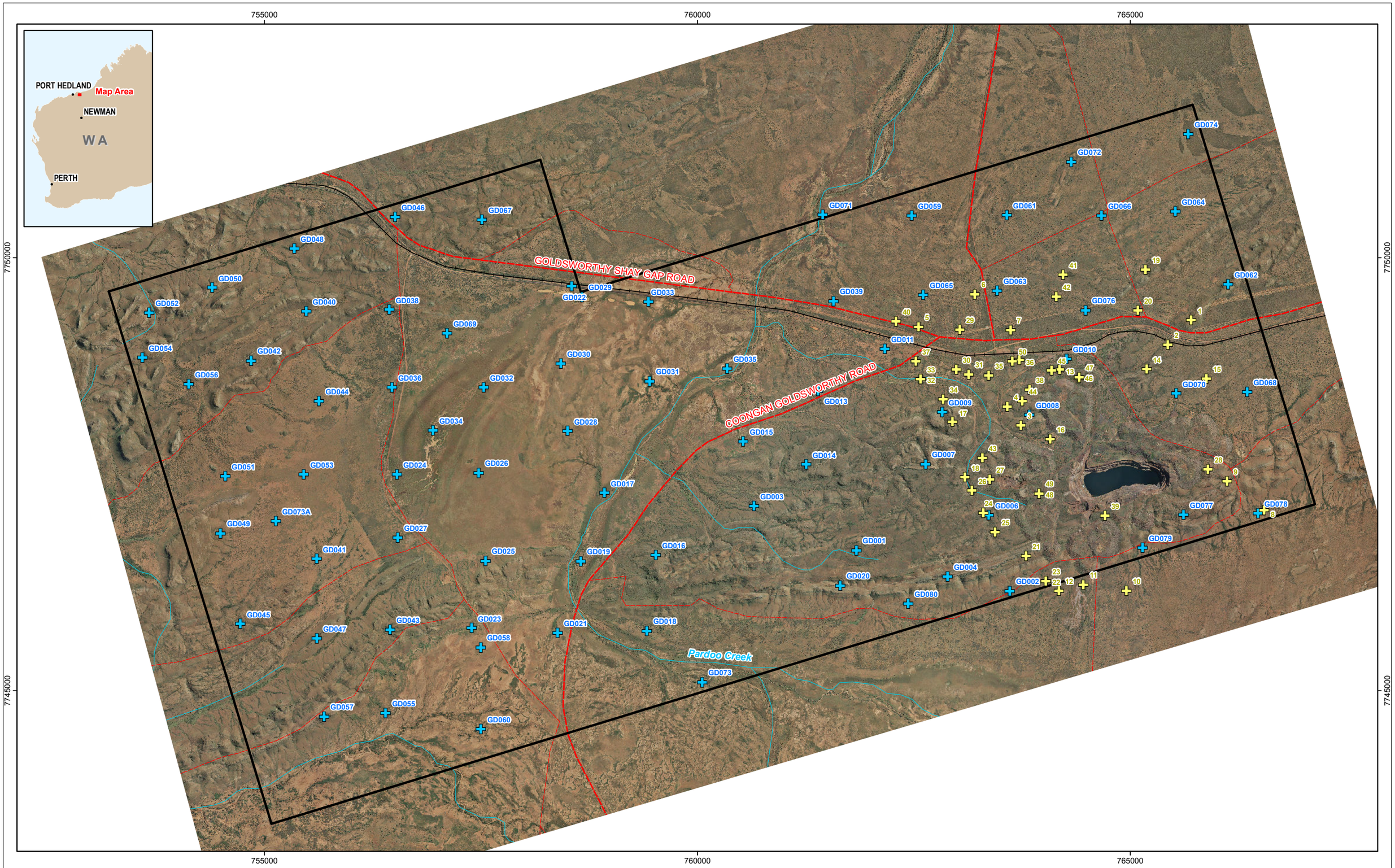
The survey involved systematic sampling using quadrats and some transects (referred to as study sites). The study sites were generally 50 m by 50 m, or an equivalent area (2,500 m^2) along narrow associations such as minor drainage lines. The area sampled for each study site is standard for the Pilbara bioregion. The number of study sites sampled was determined by the size and heterogeneity of the study area with a minimum density requirement of one quadrat per square kilometre. For the study area a total of 81 quadrats were sampled (Figure 5).

The sampling sites were assessed to provide a comprehensive list of the total flora occurring within the study area, and to allow for data to be collected on a range of environmental parameters including:

- Landform and habitat;
- Aspect;
- Soil colour and soil type;
- Rock type;
- Slope (angle);
- Percentage of bare ground, logs, twigs and leaves;
- Vegetation condition;
- Disturbance (caused by fire, clearing, grazing etc.);
- Age since fire;
- Broad floristic formation;
- Vegetation association description; and
- Height and percentage ground cover provided by individual plant taxa.

Other parameters recorded for each study site were:

- Study site number and date of assessment;
- Names of the botanists undertaking the assessment;
- Location description and waypoint - GPS coordinate (GDA94) using a handheld GPS; and
- Photograph number.



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Projection: MGA Zone 50

GOLDSWORTHY

SAMPLE LOCATIONS

Legend

Study Area

Sample Locations

Organisation

- Onshore Environmental
- Pilbara Flora

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2.3.3 Targeted Surveys for Conservation Significant Species

There was a single record for a Priority 2 flora *Euphorbia clementii* from within the study area identified from the database searches. The previous Priority flora record was re-visited in the field to confirm the collection record, and where possible, extend the known distribution.

The entire study area was ground truthed at 1 km intervals during assessment of study sites and mapping of vegetation associations. This ground coverage provided the opportunity to record additional locations for Declared Rare Flora and Priority flora, and also undertake closer examination of specific landforms where significant flora may be expected to occur.

2.3.4 Weed Survey and Mapping

A total of five introduced (weed) species were identified as having been previously recorded within the study area during desktop searches and the literature review. These were **Tamarix aphylla, *Cenchrus ciliaris, *Aerva javanica, *Calotropis procera* and **Vachellia farnesiana*. Previous weed records were re-visited to confirm presence and distribution. Opportunistic records for weed species were made while moving between study sites during the field survey, and additional targeted weed searches were completed in high moisture habitats including medium and large drainage lines and flood plains.

2.3.5 Vegetation Association Mapping

Prior to undertaking the field survey a variety of topographic, vegetation, and land system maps were used to provide preliminary vegetation classification across the study area. The location of 81 quadrats (50 m x 50 m or 2,500m^2 in equivalent area) was pre-selected prior to field work, with quadrats distributed across vegetation association polygons defined using high-resolution aerial photography. The final positioning of study sites was confirmed in the field.

The vegetation mapping utilised aerial photography of the entire study area at a scale of 1:20,000, with definition of vegetation polygons based on different shading patterns evident. Ground truthing by up to five botanists occurred on a grid-like pattern at less than 1 km intervals. Releve vegetation descriptions were made within defined vegetation polygons to confirm dominant structural layers and associated plant taxa where formal study sites were not assessed.

Description of vegetation structure follows the height, life form and density classes of Specht (1970) as modified by Aplin (1979) and Trudgen (see Appendix 2). This is largely a structural classification suitable for broader scale mapping, but taking all ecologically significant strata into account. Vegetation condition for each of the sampling sites was determined using a recognised rating scale (based on Keighery 1994, see Appendix 3).

2.3.6 Vouchering

At least one voucher specimen was taken for each species collected to verify identification. Specimen identifications were confirmed by Dr Jerome Bull and Dr Eleanor Bennett, with voucher specimens provided to a botanist at the Western Australian Herbarium, Mr Steve Dillon. Use was made of the Western Australian State Herbarium for confirmation of species identification. Nomenclature follows Green (1985 and 1987), Paczkowska and Chapman (2000) and the Western Australian Herbarium.

2.3.7 Field Survey Constraints

The EPA Guidance Statement for Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA 2004) list twelve potential constraints that field surveys may encounter. These constraints are addressed in Table 4.

Table 4 Relevance of constraints, as identified by EPA (2004), to the flora and vegetation survey.

Constraint	Relevance
Scope	The scope was established by BHP Billiton Iron Ore in compliance with relevant EPA Guidance Statements.
Proportion of flora collected and identified	Although above average rainfall was received during the summer of 2011/2012, below average rainfall was received for the five months leading up the September 2012 survey (22.5 mm). Average seasonal conditions at the time of survey meant that many grass species and small annual herbs were in poor condition for collection and identification. Total flora records would benefit from a second season survey under optimum rainfall conditions.
Sources of information	In addition to the current survey, two flora and vegetation surveys had previously been completed across parts of the study area. Numerous additional surveys have been undertaken in close proximity, providing an extensive local database.
The proportion of the task achieved and further work which might be needed	The survey work was completed to a high standard with all allocated tasks achieved. A second season survey under good seasonal conditions is recommended to capture all annual and ephemeral taxa and confirm identification for a number of the grass species.
Timing / weather / season / cycle	Low rainfall was experienced prior to the September 2012 survey work. Previous survey work within the study area provides additional data under better seasonal conditions; however, the majority of this work was completed in the south-east corner of the current study area.
Disturbances, e.g. fire, flood	There were no disturbances encountered that prevented the survey from being conducted, or influenced survey results. A large portion of the study area including the minesite, waste dumps and old townsite had been rehabilitated.
Intensity	A total of 81 quadrats were established in September 2012 by Onshore Environmental at a density approximating one quadrat per km^2. A further 50 quadrats had previously been sampled by Pilbara Flora (2008) in the south-east corner of the study area. The entire study area was ground truthed at less than 1 km intervals as part of targeted searches and vegetation mapping.
Completeness	The study area woukld benefit from a second assessment under good seasonal conditions.
Resources	Appropriate resources were applied to the first season survey, with a total of 60 person days allocated to the September 2012 field survey.
Access problems	The entire study area was able to be accessed on foot at less than 1 km intervals, noting that vegetation mapping was facilitated by high resolution aerial photography.

Constraint	Relevance
Availability of contextual information	Two flora and vegetation surveys have previously been completed within parts the study area. Numerous additional surveys have been undertaken in close proximity, providing an extensive local database.
Experience levels	The Project Manager and Principal Botanist have over 20 years Pilbara experience. In addition, the Senior Botanist and two Botanists have completed numerous field surveys within the Pilbara over the past three years.

2.3.8 Assessment of Conservation Significance

The conservation significance of flora and ecological communities are classified on a Commonwealth, State and Local level on the basis of various Acts and Agreements (EPA *Guidance Statement No. 51,* EPA 2004).

Commonwealth Level:

- *EPBC Act 1999*: SEWPaC lists Threatened Flora and Ecological Communities, which are determined by the Threatened Species Scientific Committee according to criteria set out in the Act. The Act lists flora that are considered to be of conservation significance under one of six categories (Appendix 4).

State Level:

- *Wildlife Conservation Act 1950*: At a State level, native flora species are protected under the WC Act. A number of plant species are assigned an additional level of conservation significance based on a limited number of known populations and the perceived threats to these locations. Species of the highest conservation significance are gazetted DRF under subsection 2 of section 23F of the WC Act. It is an offence to take or damage DRF without Ministerial approval. Section 23F of the WC Act defines 'to take' as "to gather, pick, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means".
- DEC Priority list: DEC produces a list of Priority species and ecological communities that have not been assigned statutory protection under the WC Act. Priority Flora are under consideration for declaration as 'Rare Flora', classified as in urgent need of further survey (Priority One to Three) or require monitoring every 5-10 years (Priority Four, see Appendix 5). The list of Priority Ecological Communities identifies those that need further investigation before nomination for Threatened Ecological Community (TEC) status.

Local Level:

- Species may be considered of local conservation significance because of their patterns of distribution and abundance. Although not formally protected by legislation, such species are acknowledged to be in decline as a result of threatening processes, primarily habitat loss through land clearing.

3.0 Results

3.1 Desktop Review

3.1.1 Threatened Flora listed under the Commonwealth Environment Protection and Biodiversity Conservation Act (EPBC Act)

A search of the EPBC Act Protected Matters Database (DSEWPaC 2012) identified no records of 'Vulnerable' plant taxa occurring within the study area. There were no records identified from the IUCN database search (IUCN 2012).

3.1.2 Declared Rare and Threatened Flora listed under the WA Wildlife Conservation (Rare Flora) Notice

The DEC database search (DEC 2012) identified no DRF as occurring within a 50 km radius of the study area.

3.1.3 Priority Flora recognised by the DEC

The DEC database search (DEC 2012) identified 13 Priority flora within a 50 km search radius of the study area, with one of these taxa previously recorded within the boundary of the study area; *Euphorbia clementii* (Table 5, Appendix 6).

Table 5 Significant flora previously recorded from a 50 km search radius around the study area.
SCC - State Conservation Code (WC Act) and DEC (2012)

Species	SCC
Acacia glaucocaesia	3
Aphyllodium sp. Great Sandy Desert (C.P. Campbell 3689)	1
Atriplex eremitis	1
Bulbostylis burbidgeae	4
Comesperma pallidum	3
Desmodium pullenii	1
Eragrostis crateriformis	3
Eremophila maculata subsp. *filifolia*	1
Euphorbia clementii	2
Euphorbia inappendiculata	3
Euryomyrtus patrickiae	3
Fimbristylis sp. Shay Gap (KR Newbey 10293)	1
Goodenia hartiana	2
Heliotropium murinum	3
Heliotropium parviantrum	1
Indigofera ammobia	3
Josephinia sp. Marandoo (M.E. Trudgen 1554)	1
Mimulus clementii	1
Phyllanthus aridus	3

Species	SCC
Polymeria distigma	3
Pterocaulon xenicum	3
Ptilotus mollis	4
Rostellularia adscendens var. *latifolia*	3
Rothia indica subsp. *australis*	1
Sauropus arenosus	3
Tephrosia bidwillii	3
Vigna sp. Central (M.E. Trudgen 1626)	2

3.1.4 Threatened Ecological Communities (TEC's) listed under State and Federal legislation

A search of the EPBC Act Protected Matters database (DSEWPaC 2012) confirmed there were no Federal listed TECs previously recorded within, or adjacent to, the study area. Similarly, a search of the State database by DEC confirmed there were no State listed TEC records within a 100 km radius of the study area (DEC 2012).

3.1.5 Priority Ecological Communities (PEC's) recognised by DEC

A search of the State database by DEC confirmed there are no PEC records within a 100 km radius of the study area (DEC 2012).

However, the De Grey River situated 15 km south- south west of Goldsworthy is listed as a wetland of national importance. It runs from the junction of the Oakover and Nullagine Rivers to the Indian Ocean at Poissonnier Point. The De Grey River is a major river system with a series of permanent pools running to a small estuary with associated mud flats and coastal flats. The permanent pools are an important drought refuge for freshwater fish and birds. Vegetation consists of *Eucalyptus camaldulensis, Melaleuca leucadendra* and *Sesbania formosa* with permanent pools supporting sedges such as *Schoenoplectus litoralis*. Dominant mangrove species on the coast include *Avicennia marina, Rhizophora stylosa* and *Excoecaria* sp. (DSEWPaC 2012b).

3.1.6 Declared Weeds listed under the Agriculture and Related Resources Protection Act, 1976 and other environmental weed species

A total of five environmental weed species had been recorded from within the study area during previous flora and vegetation surveys; **Aerva javanica, *Calotropis procera, *Cenchrus ciliaris, *Tamarix aphylla,* and **Vachellia farnesiana*. Two of these plant taxa are listed as Declared Weeds under the *Agriculture and Related Resources Protection Act, 1976* (ARRP Act); **Tamarix aphylla* and **Calotropis procera*. A list of coordinates for all previous weed species records within the study area is provided in Appendix 7.

3.1.7 Previous Flora Surveys in the Study Area and Surrounds

The results from previous flora and vegetation surveys completed within, or in close proximity to the study area are presented in Table 6 and summarised in Appendix 1. Two

previous surveys cover sections of the current study area with a further thirteen surveys completed in close proximity:

- Pilbara Flora (2008) *Goldsworthy Minesite Flora and Vegetation Survey;*
- Ecologia Environment (2011) *Rail Operations Goldsworthy Junction to Yarrie Flora and Vegetation Survey;*
- Halpern Glick and Maunsell (1998) *Yarrie Crustal Deposits Baseline Biological and Soil Survey;*
- Ecologia Environment (1999) *Yarrie Biological and Soil Survey;*
- Ecologia Environment (2005a) *Cundaline Biological Assessment Survey;*
- Ecologia Environment (2005b) *Callawa Biological Assessment Survey;*
- Ecologia Environment (2005c) *Goldsworthy Extension Project, Cattle Gorge Haul Road Biological Assessment Survey*;
- Ecologia Environment (2005d) *Goldsworthy Extension Biological Assessment Survey;*
- Ecologia Environment (2005e) *Goldsworthy Extension Project Follow-up Flora Surveys;*
- ENV Australia (2007) *Ord Ridley Exploration Lease Flora and Vegetation Assessment*;
- ENV Australia (2008) *Goldsworthy Iron Ore Mining Operations – Cundaline and Callawa Mining Operations Flora and Vegetation Assessment*;
- ENV Australia (2009) *Goldsworthy Rail Duplication Flora and Vegetation Assessment;*
- Onshore Environmental (2010) *Shay Gap Aerodrome and Yarrie Area A and Yarrie Area B Level 2 Flora and Vegetation Survey and Level 1 Fauna Survey*;
- Astron Environmental Services (2011a) *Yarrie Mine Site Weed Survey and Mapping;* and
- Astron Environmental Services (2011b) *Nimingarra and Shay Gap Vegetation and Flora Survey.*

Table 6 Summary of significant flora and environmental weeds recorded during previous flora and vegetation surveys within, or in close proximity to, the study area.

Report	Company	Field Survey Dates	Conservation Significant Flora Recorded	Introduced (Weed) Taxa Recorded
Surveys completed within the study area				
Flora and Vegetation Survey of Goldsworthy Minesite	Pilbara Flora (2009)	11-18 June 2008 (Flora & Vegetation Survey component)	*Euphorbia clementii* (Priority 2)	**Aerva javanica* (Kapok), **Calotropis procera* (Calotropis), **Cenchrus ciliaris* (Buffel Grass), **Tamarix aphylla* (Athel Pine), **Vachellia farnesiana* (Mimosa Bush)
Flora Survey Goldsworthy Junction to Yarrie	Ecologia Environment (2011)	17 - 26 March 2010 (Flora & Vegetation Survey component)	*Pterocaulon sp. A Kimberley Flora* (Priority 3), *Tephrosia bidwillii* (Priority 3), *Bulbostylis burbidgeae* (Priority 4), *Goodenia nuda* (Priority 4).	**Parkinsonia aculeate (*Parkinsonia), **Tamarix aphylla* (Athel Tree), **Aerva javanica (*Kapok Bush*), *Alternanthera pungens* (Khaki Weed), **Argemone ochroleuca* subsp. *ochroleuca* (Mexican Poppy), **Calotropis procera* (Rubber Tree), **Cenchrus ciliaris* (Buffel Grass), **Cenchrus echinatus* (Burrgrass), **Chloris barbata* (Purpletop Chloris), **Citrullus lanatus* (Pie Melon), **Cynodon dactylon* (Couch), **Datura leichhardtii (*Native Thornapple), **Eragrostis cilianensis* (Stinkgrass), * *Gossypium hirsutum* (Upland Cotton), **Indigofera oblongifolia, *Merremia dissecta, *Nerium oleander* (Oleander), **Passiflora foetida* var. *hispida* (Passion Flower), **Ricinus communis* (Castor Oil Plant), **Stylosanthes hamata (Verano Stylo), *Trianthema portulacastrum* (Giant Pigweed), **Vachellia farnesiana* (Mimosa Bush).
Surveys completed in close proximity to the Study area				
Yarrie Biological and Soil Survey	Ecologia Environment (1999)	3-9 June 1998	*Euphorbia clementii* (Priority 2), *Euphorbia drummondii*[1]	**Cenchrus ciliaris*, **Acacia* (*Vachellia*) *farnesiana* (Mimosa Bush), **Aerva javanica* (Kapok Bush) and **Chloris gayana* (Rhodes Grass)
Cundaline Biological Assessment Survey	Ecologia Environment (October 2005)	13-17 May 2005 (Flora and Vegetation survey)	*Stemodia* sp. Shay Gap, *Sida macropoda*[2]	No introduced species recorded

[1] No longer listed as a Priority species

[2] Recorded as *Sida* sp. Callawa (a species of interest) and now known as *Sida macropoda* (not Threatened)

Report	Company	Field Survey Dates	Conservation Significant Flora Recorded	Introduced (Weed) Taxa Recorded
Callawa Biological Assessment Survey	Ecologia Environment (October 2005)	9-17 June 2005 (Flora & Vegetation survey) 12-14 September (Vegetation mapping)	Sida sp. Callawa[3]	**Passiflora foetida* var. *hispida*
Goldsworthy Extension Project, Cattle Gorge Haul Road Biological Assessment Survey	Ecologia Environment (August 2005)	19-21 January and 11 May 2005 (Flora and vegetation)	*Acacia glaucocaesia* (Priority 3)	**Cenchrus ciliaris, *Chloris virgata, *Citrullus colocynthis*
Goldsworthy Extension Biological Assessment Survey	Ecologia Environment (2005)	3-9 June 1998 (Yarrie), 3-7 February, 11-14 March 2004 (Cattle Gorge), 20-28 October 2004, 12-14 January 2005 (Nimingarra), 29 October – 8 November 2004, 15-18 January 2005 (Sunrise Hill)	*Euphorbia inappendiculata* (Priority 3)[4] *Euphorbia clementii* (Priority 2), *Stemodia* sp. Shay Gap	**Cenchrus ciliaris, *Aerva javanica, *Vachellia farnesiana, *Chloris gayana, *Malvastrum americanum, *Nerium oleander*
Goldsworthy Extension Project Follow-up Flora Surveys	Ecologia Environment (2005)	2-11 May 2005	*Euphorbia clementii* (Priority 2), *Stemodia* sp. Shay Gap	No survey for introduced species was conducted
Ord Ridley Exploration Lease Flora and Vegetation Assessment	ENV Australia (2007)	28 March- 3 April 2007	No Conservation Significant Flora were recorded	**Aerva javanica, *Cenchrus ciliaris, *Chloris barbata, *Cucumis melo subsp. agrestis, *Cynodon dactylon, *Indigofera oblongifolia, *Parkinsonia aculeata, *Passiflora foetida* var. *hispida.*

[3] Not currently listed on FloraBase
[4] Was known as *Euphorbia drummondii* subsp. Pilbara (B.G. Thomson 3503)

Report	Company	Field Survey Dates	Conservation Significant Flora Recorded	Introduced (Weed) Taxa Recorded
Goldsworthy Iron Ore Mining Operations – Cundaline and Callawa Mining Operations Flora and Vegetation Assessment	ENV Australia (2008)	26-31 March, 13-15 September 2008	*Euphorbia clementii* (Priority 2), *Goodenia nuda* (Priority 4)	**Cenchrus ciliaris* (Buffel Grass), **Echinochloa colona* (Awnless Barnyard Grass), **Chloris virgata* (Feathertop Rhodes Grass), **Portulaca oleracea* (Purslane), **Passiflora foetida* var. *hispida* (Passion flower), **Cucumis melo* subsp. *agrestis* (Ulcardo Melon).
Goldsworthy Rail Duplication Flora and Vegetation Assessment	ENV Australia (2009)	14-16 October 2008	*Tephrosia rosea* var. *venulosa* (Priority 1)	**Aerva javanica, *Cenchrus ciliaris, *Tamarix aphylla, *Stylosanthes hamate, *Chloris virgata, *Citrullus colocynthis, *Portulaca oleracea*
Shay Gap Aerodrome and Yarrie Area A and Yarrie Area B Level 2 Flora and Vegetation Survey and Level 1 Fauna Survey	Onshore Environmental (2010)	9-15 September 2010	No Conservation Significant Flora were recorded	**Aerva javanica*, **Cenchrus ciliaris*, **Chloris virgata*, **Cucumis melo* subsp. *agrestis*, **Portulaca oleracea*.
Yarrie Mine Site Weed Survey and Mapping	Astron Environmental Services (2011)	31 August – 5 September 2011	No Conservation Significant Flora were recorded	**Aerva javanica*, **Cenchrus ciliaris*, **Chloris virgata*, **Vachellia farnesiana*. *Cenchrus setiger* (Birdwood Grass), **Citrullus colocynthis*, **Conyza bonariensis* (Flaxleaf Fleabane), **Cucumis melo* subsp. *agrestis*, **Cynodon dactylon* (Couch), *Digitaria ciliaris (Summer Grass), **Echinochloa colona*, **Euphorbia hirta* (Asthma Plant), **Flaveria trinervia* (Speedy Weed), **Gomphrena celasiodes* (Gomphrena Weed), **Oxalis corniculata* (Yellow Wood Sorrel), **Polycarpon tetraphyllum* (Fourleaf Allseed), **Solanum nigrum* (Blackberry Nightshade), **Sonchus oleraceus* (Common Sowthistle), **Tridax procumbens*, potentially an unconfirmed species *Tribulus* sp. (possibly **Tribulus terrestris* (Caltrop)).
Nimingarra and Shay Gap Vegetation and Flora Survey	Astron Environmental Services (2011)	14-25 March, 11-20 April 2011	*Rothia indica* subsp. *australis* (Priority 1), *Croton aridus* (Priority 3), *Nicotiana umbratica* (Priority 3)	**Aerva javanica, *Calotropis procera, *Cenchrus ciliaris, *Cenchrus setiger, *Chloris barbata, *Citrullus colocynthis, *Cucumis melo* subsp. *agrestis, *Cynodon dactylon, *Digitaria ciliaris, *Echinochloa colona, *Flaveria trinervia, *Gomphrena celosioides, *Jatropha gossypiifolia, *Passiflora foetida* var. *hispida, *Portulaca oleracea, *Senna occidentalis, *Trianthema portulacastrum*

3.2 Flora Species

A total number of 286 plant taxa (including varieties and subspecies) from 44 families and 136 genera have been recorded from the study area (Appendix 8). Species representation was greatest among the Fabaceae, Poaceae, Malvaceae, Amaranthaceae, Asteraceae, Convolvulaceae, Myrtaceae and Goodeniaceae families, which is typical for the Pilbara Bioregion (Table 7). The most speciose genus was *Acacia* (19 taxa), followed by *Eriachne* (10 taxa), *Senna* (8 taxa), *Sida* (8 taxa), *Ptilotus* (8 taxa) and *Tephrosia* (8 taxa).

Table 7 Statistics for total flora recorded from the study area.

Parameter	No. Taxa
No. Families	44
No. Genera	136
No. Species (incl. subspecies & varieties)	286
No. Native Species (incl. subsp. & var.)	278
Declared Rare Flora	0
Priority Flora	2
No. Introduced Species	8
Speciose Families	
Fabaceae	62
Poaceae	54
Malvaceae	28
Amaranthaceae	16
Asteraceae	10
Convolvulaceae	10
Myrtaceae	9
Proteaceae	7
Goodeniaceae	7
Euphorbiaceae	7
Speciose Genera	
Acacia (Fabaceae)	19
Eriachne (Poaceae)	10
Senna (Fabaceae)	8
Sida (Malvaceae)	8
Ptilotus (Amaranthaceae)	8
Tephrosia (Fabaceae)	8

3.3 Conservation Significant Flora Species

3.3.1 Declared Rare Flora

No plant taxa gazetted as DRF pursuant to subsection (2) of section 23F of the WC Act or listed under the EPBC Act were recorded from the study area by Onshore Environmental in September 2012.

3.3.2 Priority Flora

One Priority 2 flora species was previously recorded from just outside the south-east corner of the study area; *Euphorbia clementii* (Pilbara Flora 2008) (Figure 6, Appendix 6). *Euphorbia clementii* is an erect herb reaching 0.6 metres in height

(Plate 1). It grows on gravelly hillsides and stony ground in the north-eastern Pilbara. Within the study area it was recorded on an undisturbed gravelly sand plain approximately 400 m south of the southern most waste dump (known as Billy Goat Dump) providing a ground cover of less than 1%. Re-sampling of the known location and intensive survey of the surrounding landforms by Onshore Environmental in September 2012 failed to relocate this taxon. Although there was suitable habitat present, *Euphorbia clementii* was not recorded from the wider survey area.

Plate 1 ***Euphorbia clementii*** **(photograph sourced from WAH).**

Phyllanthus aridus is a Priority 3 flora taxon recorded from a single point in the south-east sector of the study area by Onshore Environmental in September 2012 (Figure 6). The landform was a distinctive sandstone ridge and the taxon is likely to be more widely distributed along the length of the ridge. *Phyllanthus aridus* is an erect, much-branched shrub that grows to 0.5 m high (Plate 2). It is characterised by small, inconspicuous cream and green coloured, male and female flowers. It flowers and fruits from March to August. The species is typically associated with sandstones, with the majority of known locations occurring in the Kimberley from the King Edward River and Cockburn Range southwards to Camballin. The Goldsworthy record represents the southern extent of the known range for this taxon.

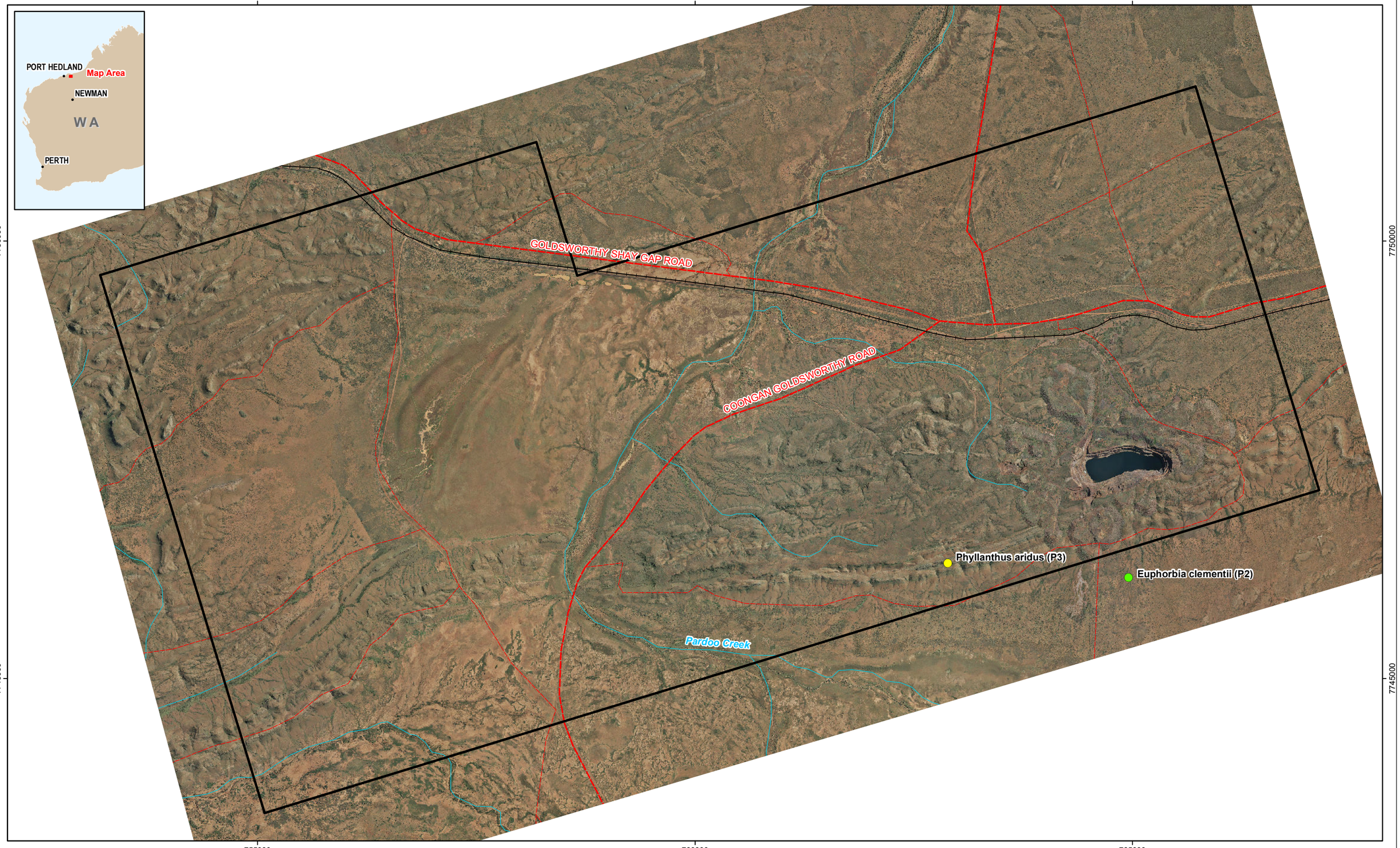
Plate 2 ***Phyllanthus aridus*** **associated with sandstone geology.**

3.4 Introduced Flora

A total of eight introduced (weed) species have been recorded from the study area (Figure 7):

- **Aerva javanica* (Kapok Bush);
- **Calotropis procera* (Calotrope);
- **Cenchrus ciliaris* (Buffel Grass);
- **Cenchrus setiger* (Birdwood Grass);
- **Cynodon dactylon* (Couch Grass);
- **Tamarix aphylla* (Athel Pine);
- **Vachellia farnesiana* (Mimosa Bush); and
- **Passiflora foetida* var. *hispida* (Wild Passionfruit).

Two of these taxa are listed as Declared Weeds under the ARRP Act; **Calotropis procera* and **Tamarix aphylla*.



ON SHORE ENVIRONMENTAL CONSULTANTS

Date:	18/12/2012		
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: DB	GSM Reference: Goldsworthy Significant Flora	

N

0 500 1,000 1,500 2,000

Meters

1:40,000

Datum: GDA94

Projection: MGA Zone 50

GOLDSWORTHY

SIGNIFICANT FLORA

Legend

- Study Area

Significant Flora

- Euphorbia clementii (P2)
- Phyllanthus aridus (P3)

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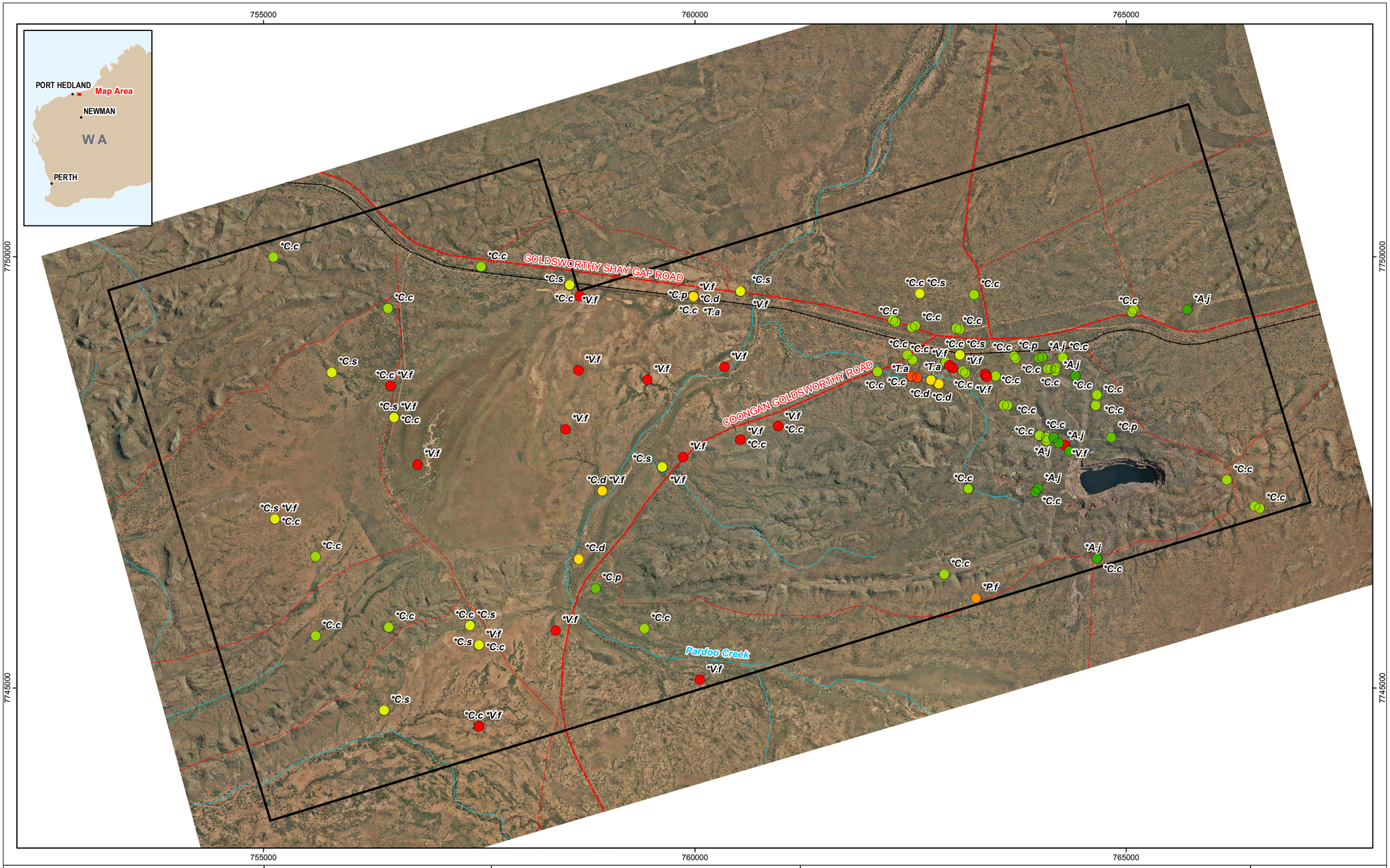

ON SHORE ENVIRONMENTAL CONSULTANTS

Date:	18/12/2012		
Sheet Size:	A3	Status:	Final
Drawn by: GSM	Requested by: DB	GSM Reference: Goldsworthy Intro Flora Locations	

N

0 500 1,000 1,500 2,000

Meters
1:40,000

Datum: GDA94
Projection: MGA Zone 50

GOLDSWORTHY

INTRODUCED FLORA

Legend

Study Area

Introduced Flora

- *Aerva javanica (*A.j)
- *Calotropis procera (*C.p)
- *Cenchrus ciliaris (*C.c)
- *Cenchrus setiger (*C.s)
- *Cynodon dactylon(*C.d)
- *Passiflora foetida (*P.f)
- *Tamarix aphylla (*T.a)
- *Vachellia farnesiana (*V.f)

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A summary for each of the eight weed species is provided below.

*<u>*Aerva javanica*</u>

**Aerva javanica* (Kapok Bush) is an erect branched perennial herb that grows to between 0.4 m and 1.6 m in height, flowering (white) between January and October (Plate 3). This species prefers sandy soils and is commonly found along drainage lines. **Aerva javanica* is native to northern Africa and south-west Asia but is found across northern Western Australia, Queensland, South Australia and the Northern Territory (Hussey *et al*. 1997).

Within the study area **Aerva javanica* was found scattered on bare ground typically along road and rail verges, and also within rehabilitation at the decommissioned mine site area. It was generally present at low desnity and not recorded within intact vegetation areas.

Plate 3 ***Aerva javanica* (Kapok Bush).**

Calotropis procera

**Calotropis procera* is a shrub or tree reaching four metres in height. It produces cream/white or purple flowers all year round and occurs on sandy and clayey soils (Plate 4). Mature plants have corrugated corky bark and produce an inflated pod up to 12 cm long that burst to release seeds. Leaves are opposite and elliptical up to 20 cm long. The plant produces a milky white sap. It is native to tropical Asia and Africa but is now found in northern Australia across WA, South Australia, the Northern Territory and Queensland. It invades roadsides, drainage lines, and heavily grazed areas. It is toxic to humans and may also be toxic to stock.

**Calotropis procera* is a Priority 3 Declared Plant in the Shire of Ashburton, Shire of East Pilbara, the Town of Port Hedland and the Shire of Roebourne. This requires that infested areas must be managed to prevent the spread of seed or plant parts (Department of Agriculture 2012).

**Calotropis procera* was concentrated in the south-east sector of the study area associated with previously disturbed areas around the decommissioned mine site and Goldsworthy town site. There was a single outlying record from a drainage line in the south-west sector. It typically occurred as scattered plants or small clusters of plants ranging from seedlings to low trees.

Plate 4 ***Calotropis procera*.**

*<u>*Cenchrus ciliaris*</u>

**Cenchrus ciliaris* (Buffel Grass) is a tufted perennial grass introduced from the Middle East as a fodder species by pastoralists. It grows in dense tussocks up to 1m tall and typically occurs in monospecific stands on loamy plains and creek line levee banks (Plate 5). It is an aggressive colonising species that has become well established along roadsides, creeklines, river edges and various other habitats throughout the Pilbara, Gascoyne and Murchison regions of Western Australia, and is continuing to spread in the south west (Hussey *et al*. 1997).

Within the study area **Cenchrus ciliaris* was commonly found growing on disturbed ground including the rail line, roadsides, the old Goldsworthy town site and along the levee banks of medium and major drainage lines. Plant density ranged from a few scattered plants to large expanses supporting dense tussock grasslands. It was also recorded with **Cenchrus setiger* on small sand dunes in the south of the study area. These two species generally formed dense monospecific stands where they occurred together.

Plate 5 *Cenchrus ciliaris* (Buffel Grass).

Cenchrus setiger

**Cenchrus setiger* (Birdwood Grass) is an erect tussocky, stoloniferous perennial grass that reaches up to 0.5 m in height with cream or purple flowers (between April and May) (Plate 6). It favors brown sand, red loam and pindan soils on sand dunes, plains, stony hillsides and floodplains. It is distributed across Western Australia in areas north of Geraldton (Hussey *et al*. 1997).

**Cenchrus setiger* was recorded from eight locations on roadsides, along creek banks and small dunes often growing with **Cenchrus ciliaris*. It typically provided less than 10% ground coverage, with one record up to 25% cover.

Plate 6 ***Cenchrus setiger* (Birdwood Grass).**

Cynodon dactylon

**Cynodon dactylon* (Couch Grass) is a prostrate rhizomatous perennial grass like herb that grows up to 0.3 m in height and flowers (green and purple) from June to November/February (Plate 7). **Cynodon dactylon* grows on sand, loam or clay soils and occurs across Western Australia (Hussey *et al*. 1997). It is usually found in open areas that are prone to disturbances such as grazing, flooding and fire. Couch Grass originates from Africa and southern Europe and was introduced into Western Australia for use as turf and pasture.

**Cynodon dactylon* was recorded from five localized points around the old Goldsworthy townsite where it provided <5 % ground coverage.

Plate 7 *Cynodon dactylon* (Couch Grass).

Tamarix aphylla

**Tamarix aphylla* (Athel Pine) is a tree reaching 15 m in height with a trunk up to 1 m in diameter (Plate 8). It produces pink-white flowers during February or May held on 30-40 mm long spikes. The bell shaped fruit with a hairy tuft produces numerous small cylindrical seeds. Tufts of hairs on the seed assist dispersal by wind. It is generally recorded growing along river banks. **Tamarix aphylla* is classified as a weed of national significance. It is regarded as one of the worst weeds in Australia due to its invasiveness, potential to spread, and it's economic and environmental impacts. It forms dense stands along inland rivers and consumes water rapidly affecting the pastoral industry. It also concentrates and excretes salt through it's leaves making the ground underneath it saline and unsuitable for native pasture grasses (Natural Heritage Trust 2003). It is also classified as a Declared Plant by the Department of Agriculture and Food. **Tamarix aphylla* is considered a Priority 1 Declared Weed for the whole of the State which prohibits the introduction and movement of the plant or seeds within the State (Department of Agriculture 2012).

Within the study area **Tamarix aphylla* was recorded as four low trees at the old Goldsworthy townsite growing along the levee banks of drainage lines.

Plate 8 ***Tamarix aphylla* (Athel Pine).**

Vachellia farnesiana

**Vachellia farnesiana* (Mimosa Bush) is an erect spreading thicket forming thorny tree or shrub (Plate 9). It grows up to 4 m in height and produces yellow flowers from June to August. Mimosa Bush grows on stony, sandy, clay or loam soils and is common in low lying areas such as creeks and river banks as well as in disturbed areas. It is widespread from the Kimberly to near Perth (Hussey *et al*. 1997).

**Vachellia farnesiana* was recorded from 27 point locations throughout the study area occurring in creeklines and on stony or clay plains with a heavy grazing history. Each record was typically represented as low numbers of scattered mid to tall shrubs (maximum of 25 plants recorded from a single location) providing less than 5% ground coverage.

Plate 9 ***Vachellia farnesiana* (Mimosa Bush).**

Passiflora foetida var. *hispida* (Wild Passionfruit)

Passiflora foetida var. *hispida* (Wild Passionfruit, see Plate 10) is a woody climber / vine (with an unpleasent smell) growing to 9 m high. The flower colour ranges from cream to white to blue, with flowering occurring between February and November. It grows in disturbed native vegetation amongst medium sized trees, or less commonly in herblands and vine thickets. Its seeds are believed to be spread by birds. Wild Passionfruit occurs in a range of habitats including coastal dunes, river and creek banks, gorges, rocky slopes, hill slopes and valley plains. The preferred soil types range from rocky or stony soil, gravelly soil, sand, loam and clay. *Passiflora foetida* var. *hispida* is native to the West Indies and South America. It has been introduced to Western Australia, Northern Territory, Queensland and New South Wales.

Within the study area *Passiflora foetida* var. *hispida* occurred as scattered plants on low lying waste dump surfaces situated west of the Goldsworthy mine void, and at a single location within a minor drainage line on the southern boundary (Figure 7). *Passiflora foetida* var. *hispida* is a minor component at present, but there is evidence that seed is being dispersed by birds.

Plate 10 *Passiflora foetida* var. *hispida* (Wild Passionfruit).

3.5 Threatened & Priority Ecological Communities

No TECs or PECs occur within a 100 km radius of the study area.

The De Grey River is a wetland of National Importance, located approximately 15km south south-west of study area.

3.6 Vegetation

A total of 31 vegetation associations were described and mapped within the study area (Figure 8). The vegetation associations have been classified into 13 Broad Floristic Formations on the basis of the dominant vegetation stratum (Table 8). Data for the 81 sampling sites (quadrats) assessed within the study area is provided as Appendix 9.

Table 8 Vegetation descriptions for 31 vegetation associations described and mapped within the study area.

Code	Sites	Broad Floristic Formation	Vegetation Association	Other Strata	Characteristics of Vegetation
1	GD04, GD43	Terminalia Low Woodland	Low Woodland of *Terminalia canescens* and *Atalaya hemiglauca* over Open Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Ehretia saligna, Ficus brachypoda* and *Acacia acradenia* in brown sandy loam on cliff lines and steep gullies		Characterised by *Terminalia canescens*.
2	GD08, GD54, GD67, GD79	Acacia Closed Scrub	Closed Scrub of *Acacia monticola, Acacia acradenia* and *Grevillea wickhamii* over Hummock Grassland of *Triodia epactia* with Low Open Mallee of *Eucalyptus odontocarpa* in brown sandy loam along minor drainage lines dissecting undulating hills	Scattered Low Trees of *Corymbia hamersleyana*.	Characterised by *Acacia* scrub with *Eucalyptus odontocarpa* mallee in drainage lines.
3a	GD10, GD61, GD65, GD68, GD70, GD78	Acacia Open Scrub	Open Scrub of *Acacia ancistrocarpa, Acacia tumida* var. *pilbarensis* and *Grevillea wickhamii* over Hummock Grassland of *Triodia schinzii* with Open Tussock Grassland of *Paraneurachne muelleri, Aristida holathera* and *Eragrostis eriopoda* in red loamy sand on sandplains	Scattered Low Trees of *Corymbia hamersleyana, Corymbia flavescens, Corymbia zygophylla* Low Open Shrubland of *Bonamia rosea, Ptilotus astrolasius*.	Characterised by *Acacia ancistrocarpa* open scrub and *Triodia schinzii, Corymbia zygophylla* dominates on deeper sands.
3b	GD03, GD38, GD40, GD41, GD48, GD56, GD76	Acacia Open Scrub	Open Scrub of *Acacia tumida* var. *pilbarensis* over Hummock Grassland of *Triodia epactia* with Low Open Woodland of *Corymbia hamersleyana* and *Corymbia flavescens* in red brown sand on pindan sandplains and sandy drainage zones	Low Open Shrubland of *Bonamia rosea, Crotalaria ramosissima, Ptilotus astrolasius,* Very Open Tussock Grassland of *Aristida holathera, Eragrostis eriopoda, Chrysopogon fallax*.	Characterised by *Acacia tumida* scrub on sandplains. *Corymbia zygophylla* becomes the dominant tree species on deep sands.
4	Pilbara Flora (2008)	Grevillea Open Scrub	Open Scrub of *Grevillea wickhamii* over Scattered Hummock Grasses of *Triodia epactia* in variable mine overburden on rehabilitated post-mining infrastructure areas		Waste dumps – rehabilitated.

Code	Sites	Broad Floristic Formation	Vegetation Association	Other Strata	Characteristics of Vegetation
5	GD39, GD59, GD63, GD66, GD71, GD74	Acacia Low Open Heath	Low Open Heath of *Acacia stellaticeps* over Open Hummock Grassland of *Triodia epactia* and *Triodia schinzii* with High Open Shrubland of *Grevillea wickhamii, Acacia ancistrocarpa* and *Hakea macrocarpa* in red orange sand on stony sandplains		Characterised by low heath of *Acacia stellaticeps* on sandplains. This unit could be separated into two subunits; *Acacia stellaticeps* over *Triodia epactia*, and *Acacia stellaticeps* over *Triodia schinzii*.
6a	GD01, GD06, GD07, GD09, GD13, GD14, GD16, GD25, GD45, GD47, GD49, GD62,	Triodia Hummock Grassland	Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Grevillea wickhamii, Acacia inaequilatera* and *Petalostylis labicheoides* over Open Shrubland of *Acacia acradenia* in orange silty loam on sandstone hill crests and slopes	Scattered Low Trees of *Corymbia hamersleyana,* Scattered Annual Grasses of *Eriachne ciliata,* Scattered Low Sedges of *Fimbristylis dichotoma.*	Characterised by *Grevillea wickhamii* and *Acacia acradenia* over *Triodia epactia* on hill slopes and crests.
6b	GD02	Triodia Hummock Grassland	Hummock Grassland of *Triodia wiseana* with Low Open Shrubland of *Tephrosia rosea* var. *clementii* and *Corchorus parvifolius* with Scattered High Shrubs of *Grevillea wickhamii* and *Acacia inaequilatera* in brown sandy loam on dolerite rises, low hills and footslopes	Scattered Low Trees of *Corymbia hamersleyana*	Characterised by *Triodia wiseana* dominated spinifex grasslands with scattered shrubs.
6c	GD05, GD80	Triodia Hummock Grassland	Hummock Grassland of *Triodia epactia* with Scattered High Shrubs of *Acacia inaequilatera, Grevillea wickhamii* and *Acacia acradenia* over Scattered Low Shrubs of *Corchorus parvifolius* in orange silty loam on footslopes of sandstone hills		Characterised by *Triodia epactia* dominated spinifex grasslands with scattered shrubs.
6d	GD50, GD77	Triodia Hummock Grassland	Hummock Grassland of *Triodia epactia* and *Triodia wiseana* with Low Mallee of *Eucalyptus odontocarpa* over Scattered High Shrubs of *Acacia acradenia, Grevillea wickhamii* and *Acacia inaequilatera* in brown sandy loam on steep sandstone hill slopes	Scattered Low Trees of *Corymbia hamersleyana*	Characterised by *Eucalyptus odontocarpa* mallee on steep slopes.

Code	Sites	Broad Floristic Formation	Vegetation Association	Other Strata	Characteristics of Vegetation
6e	GD20	Triodia Hummock Grassland	Hummock Grassland of *Triodia epactia* with Scattered High Shrubs of *Petalostylis labicheoides, Acacia inaequilatera* and *Grevillea wickhamii* over Low Open Shrubland of *Corchorus parvifolius, Tephrosia rosea* var. *clementii* and *Isotropis atropurpurea* in brown loamy sand (mudstone at surface) on open valleys	Scattered Low Trees of *Corymbia hamersleyana*	Characterised by hummock grasslands with scattered shrubs. This unit differs from the sandstone hill vegetation in that there are few shrubs.
6f	GD42, GD52, GD57, GD72	Triodia Hummock Grassland	Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Grevillea wickhamii, Acacia orthocarpa* and *Acacia monticola* over Low Open Shrubland of *Acacia adoxa* var. *adoxa, Acacia hilliana* and *Acacia stellaticeps* in brown sandy loam on low hills		Characterised by hummock grasslands with a variety of low *Acacia* shrubs.
6g	GD44, GD51, GD64	Triodia Hummock Grassland	Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Acacia ancistrocarpa, Acacia tumida* var. *pilbarensis* and *Grevillea wickhamii* over Low Open Shrubland of *Ptilotus astrolasius, Corchorus* cf. *elachocarpus* and *Bonamia rosea* in red orange sand on sandplains		Characterised by hummock grasslands with high shrublands of *Acacia* and *Grevillea* spp. This unit may be merged into the other sandplain units.
6h	GD53, GD69	Triodia Hummock Grassland	Hummock Grassland of *Triodia epactia* with Low Open Shrubland of *Pluchea tetranthera* and Scattered High Shrubs of *Acacia inaequilatera, Acacia ancistrocarpa* and *Acacia tumida* var. *pilbarensis* in orange sandy loam on plains		Characterised by hummock grasslands with scattered shrubs.

Code	Sites	Broad Floristic Formation	Vegetation Association	Other Strata	Characteristics of Vegetation
6i	GD12, GD18, GD23	Triodia Hummock Grassland	Hummock Grassland of *Triodia epactia* and *Triodia longiceps* with Open Tussock Grassland of *Chrysopogon fallax* and **Cenchrus ciliaris* with Low Open Woodland of *Corymbia flavescens, Bauhinia cunninghamii* and *Eucalyptus victrix* in orange loamy sand on floodplains and drainage zones	Open Annual Grassland of *Eragrostis cumingii,* Scattered Trees of *Eucalytpus victrix,* High Open Shrubland of *Acacia colei, *Vachellia farnesiana.*	Characterised by mixed tree species with a mixed hummock / tussock grassland understorey. This differs from other medium drainage line units in that hummock grasslands codominate rather than tussock grasslands dominating.
6j	jg107, jg108, jg111	Triodia Hummock Grassland	Hummock Grassland of *Triodia wiseana* with High Open Shrubland of *Grevillea wickhamii, Acacia inaequilatera* and *Acacia sclerosperma* over Low Open Shrubland of *Acacia stellaticeps* in light brown sandy loam on low calcrete rises		Characterised by dominance of *Triodia wiseana* rather than *Triodia epactia* and presence of *Acacia sclerosperma* in shrub layer.
6k	jg51	Triodia Hummock Grassland	Hummock Grassland of *Triodia epactia* in orange loam on plains		Characterised by dominance of *Triodia epactia* with very scattered shrubs and grasses. Forms the transition zone between the *Triodia epactia* / Tussock unit and the *Acacia* dominated shrublands on sandplains.
7a	GD15, GD22, GD27, GD35, GD36, GD37, GD55, GD60	Triodia Open Hummock Grassland	Open Hummock Grassland of *Triodia epactia* with Very Open Tussock Grassland of *Eragrostis xerophila, Eriachne benthamii* and *Eriachne flaccida* over Very Open Annual Grassland of *Eragrostis cumingii* and *Sporobolus australasicus* in brown silty clay loam on plains	Scattered Low Trees of *Eucalyptus victrix,* Scattered High Shrubs of **Vachellia farnesiana,* Scattered Herbs of *Ptilotus murrayi,* Open Sedges of *Fimbristylis dichotoma.*	Characterised by mixed hummock and tussock grasslands with scattered herbs, shrubs and trees. This unit has a number of drainage scalds, and wind scalds.

Code	Sites	Broad Floristic Formation	Vegetation Association	Other Strata	Characteristics of Vegetation
7b	Pilbara Flora (2008)	Triodia Open Hummock Grassland	Open Hummock Grassland of *Triodia epactia* with Open Scrub of *Acacia ancistrocarpa, Acacia acradenia* and *Acacia tumida* var. *pilbarensis* and Scattered Low Trees of *Eucalyptus camaldulensis* var. *obtusa* in orange clay loam on rehabilitated townsite area		Townsite - rehabilitation
8	GD21, GD28, GD33	Eragrostis Tussock Grassland	Tussock Grassland of *Eragrostis xerophila* with Very Open Hummock Grassland of *Triodia epactia* and Very Open Herbs of *Ptilotus murrayi* in orange medium clay on stony cracking clay plains	Scattered High Shrubs of **Vachellia farnesiana*. Other tussock grass species include *Eriachne benthamii* and *Dichanthium sericeum*.	Characterised by tussock grasslands of *Eragrostis xerophila*. This unit differs from other grassland units in that *Eragrostis xerophila* is the dominant species.
9a	GD17, GD19, GD24, GD31, GD32, GD73	Eriachne Tussock Grassland	Tussock Grassland of *Eriachne benthamii* with Low Open Woodland of *Eucalyptus victrix* over Open Herbland of *Marsilea hirsuta* and *Centipeda minima* subsp. *macrocephala* in brown sandy clay on plains and drainage lines	Scattered High Shrubs of **Vachellia farnesiana*.	Characterised by tussock grasslands of *Eriachne benthamii* with trees of *Eucalyptus victrix*. This unit differs from the other *E. victrix* unit in that tussock grasses (ie *E. benthamii)* are dominant rather than spinifex grasses.
9b	GD34	Eriachne Tussock Grassland	Tussock Grassland of *Eriachne* cf. *glauca, Eriachne benthamii* and *Elytrophorus spicatus* over Very Open Herbland of *Marsilea hirsuta, Centipeda minima* subsp. *macrocephala* and *Alternanthera nodiflora* in orange light medium clay on gilgai plains		Characterised by scattered herbs and grasses growing in clayey drainage channels, and fringed by closed tussock grasslands dominated by *Eriachne* cf. *glauca*. This unit could be separated into bare channel bed vegetation and fringing floodplain with tussock grasslands.
9c	jg35, jg38, jg48	Eriachne Tussock Grassland	Tussock Grassland of *Eriachne benthamii* and *Sporobolus mitchelii* in orange light medium clay on gilgai plains		Characterised by the co dominance of two species on gilgai plains.

Code	Sites	Broad Floristic Formation	Vegetation Association	Other Strata	Characteristics of Vegetation
10	Pilbara Flora (2008)	*Cenchrus Tussock Grassland	Tussock Grassland of **Cenchrus ciliaris* with Open Shrubland of *Acacia ancistrocarpa* and *Acacia tumida* var. *pilbarensis* and Open Hummock Grassland of *Triodia angusta* and *Triodia epactia* in orange clay loam on rehabilitated post-mining infrastructure areas		Infrastructure areas - rehabilitation
11	GD29	Eriachne Open Tussock Grassland	Open Tussock Grassland of *Eriachne benthamii*, **Cynodon dactylon* and *Eragrostis xerophila* over Very Open Herbland of *Centipeda minima* subsp. *macrocephala, Glinus lotoides* and *Marsilea hirsuta* with Scattered Tall Shrubs of **Vachellia farnesiana* in brown medium heavy clay on drainage ponds, depressions and borrow pits		Characterised by intermittent ponds with bare mud and annual herbs and fringed by tussock grasses.
12	GD26, GD30, GD58	Eragrostis Very Open Tussock Grassland	Very Open Tussock Grassland of *Eragrostis xerophila* and *Eriachne benthamii* with Very Open Herbs of *Ptilotus murrayi, Sida fibulifera* and *Trianthema triquetra* over Very Open Annual Grassland of *Sporobolus australasicus, Eragrostis cumingii* and *Dactyloctenium radulans* in brown light clay on plains		Characterised by bare areas interspersed with scattered to very open tussock grasslands of *Eragrostis xerophila*. This unit differs from other grassland units in the scattered distribution of vegetation.
13a			Bare		Mine drainage areas
13b			Regrowth		Gas pipeline - pindan sand plain
13c			Bare		Disturbed ground - no rehabilitation
13d			Bare		BHPBIO Rail
13e			Bare		Mine void

Broad Floristic Formation	1. *Terminalia* Low Woodland
Vegetation Association	Low Woodland of *Terminalia canescens* and *Atalaya hemiglauca* over Open Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Ehretia saligna, Ficus brachypoda* and *Acacia acradenia* in brown sandy loam on cliff lines and steep gullies
	
Area Mapped	164 ha
Quadrats Sampled	GD04, GD43
Location	Aligned east-west along the entire length of the southern one third of the study area
Leaf Litter Cover (%)	2-7%
Bare Ground (%)	35-50%
Soils and Geology	Brown sandy loam
Land System	Capricorn Land System
Land Form	Cliff lines and steep gullies
Priority Ecological Community	None
Rare Flora	*Phyllanthus aridus*
Introduced (Weed) Species	**Cenchrus ciliaris*
Vegetation Condition	Excellent to Very Good
Disturbances	Minor Buffel Grass
Average Fire Age	Young to Very Old
Vegetation Structure & Floristics	
Trees <10m	*Terminalia canescens, Atalaya hemiglauca*
Tall Shrubs >2m	*Ehretia saligna, Ficus brachypoda, Terminalia canescens, Acacia pyrifolia, Acacia inaequilatera, Acacia acradenia*
Hummock Grasses	*Triodia epactia*

Broad Floristic Formation	2. *Acacia* Closed Scrub
Vegetation Association	Closed Scrub of *Acacia monticola, Acacia acradenia* and *Grevillea wickhamii* over Hummock Grassland of *Triodia epactia* with Low Open Mallee of *Eucalyptus odontocarpa* in brown sandy loam along minor drainage lines dissecting undulating hills

Area Mapped	54 ha
Quadrats Sampled	GD08, GD54, GD67, GD79
Location	North-west and south-east sectors of the study area
Leaf Litter Cover (%)	5-15%
Bare Ground (%)	5-15%
Soils and Geology	Brown sandy loam
Land System	Capricorn Land System
Land Form	Minor drainage lines dissecting undulating hills
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	None
Vegetation Condition	Excellent to Very Good
Disturbances	Access tracks, livestock, decommissioned mine site
Average Fire Age	Moderate to Old
Vegetation Structure & Floristics	
Trees <10m	*Corymbia hamersleyana*
Mallee <5m	*Eucalyptus odontocarpa*
Tall Shrubs >2m	*Acacia monticola, Acacia acradenia, Grevillea wickhamii, Petalostylis labicheoides, Acacia tumida* var. *pilbarensis*
Hummock Grasses	*Triodia epactia*

Broad Floristic Formation	3a. *Acacia* Open Scrub
Vegetation Association	Open Scrub of *Acacia ancistrocarpa, Acacia tumida* var. *pilbarensis* and *Grevillea wickhamii* over Hummock Grassland of *Triodia schinzii* with Open Tussock Grassland of *Paraneurachne muelleri, Aristida holathera* and *Eragrostis eriopoda* in red loamy sand on sandplains
	
Area Mapped	611 ha
Quadrats Sampled	GD10, GD61, GD65, GD68, GD70, GD78
Location	North-east sector of the study area
Leaf Litter Cover (%)	2-20%
Bare Ground (%)	15%
Soils and Geology	Red loamy sand
Land System	Nita Land System
Land Form	Sandplain
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Cenchrus ciliaris, *Cenchrus setiger*
Vegetation Condition	Very Good
Disturbances	Access tracks, livestock, weeds, mine rehabilitation
Average Fire Age	Old to Very Old
Vegetation Structure & Floristics	
Trees <10m	*Corymbia hamersleyana, Corymbia flavescens, Corymbia zygophylla*
Tall Shrubs >2m	*Acacia ancistrocarpa, Grevillea wickhamii, Acacia tumida* var. *pilbarensis, Petalostylis labicheoides*
Shrubs <1m	*Bonamia rosea, Ptilotus astrolasius*
Hummock Grasses	*Triodia schinzii, Triodia epactia*
Tussock Grasses	*Paraneurachne muelleri, Aristida holathera, Eragrostis eriopoda*

Broad Floristic Formation	3b. *Acacia* Open Scrub
Vegetation Association	Open Scrub of *Acacia tumida* var. *pilbarensis* over Hummock Grassland of *Triodia epactia* with Low Open Woodland of *Corymbia hamersleyana* and *Corymbia flavescens* in red brown sand on pindan sandplains and sandy drainage zones
	
Area Mapped	612 ha
Quadrats Sampled	GD03, GD38, GD40, GD41, GD48, GD56, GD76
Location	North-east and central southern sectors of the study area
Leaf Litter Cover (%)	2-15%
Bare Ground (%)	15-35%
Soils and Geology	Red brown sand
Land System	Capricorn and Nita Land Systems
Land Form	Pindan sandplains and sandy drainage zones
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Cenchrus ciliaris*
Vegetation Condition	Excellent to Very Good
Disturbances	Seasonal flooding, access tracks, livestock, weeds, fire
Average Fire Age	Old (one site Young)
Vegetation Structure & Floristics	
Trees <10m	*Corymbia hamersleyana, Corymbia flavescens, Corymbia zygophylla*
Tall Shrubs >2m	*Acacia tumida* var. *pilbarensis, Petalostylis labicheoides, Acacia acradenia*
Shrubs <1m	*Bonamia rosea, Crotalaria ramosissima, Ptilotus astrolasius, Hybanthus aurantiacus, Pluchea tetrathera, Isotropis atropurpurea, Jacksonia aculeata, Dampiera candicans*
Hummock Grasses	*Triodia epactia, Triodia schinzii*
Tussock Grasses	*Aristida holathera, Eragrostis eriopoda, Chrysopogon fallax*

Broad Floristic Formation	4. *Grevillea* Open Scrub
Vegetation Association	Open Scrub of *Grevillea wickhamii* over Scattered Hummock Grasses of *Triodia epactia* in variable mine overburden on rehabilitated post-mining infrastructure areas

Area Mapped	195 ha
Quadrats Sampled	Pilbara Flora (2008)
Location	South-east sector of study area surrounding mine void; rehabilitation approximately 20 years old.
Leaf Litter Cover (%)	2-25%
Bare Ground (%)	30-50%
Soils and Geology	Variable mine waste rock, assorted size fractions from fines to massive boulders, some sulphidic shales.
Land System	Capricorn Land System
Land Form	Massive waste dumps with moonscaping on batters and ripping on top surfaces.
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Aerva javanica, *Cenchrus ciliaris, *Calotropis procera, *Passiflora foetida* var. *hispida*
Vegetation Condition	Good to Degraded
Disturbances	Weeds, evidence of acid mine drainage commencing
Average Fire Age	Very Old
Vegetation Structure & Floristics	
Tall Shrubs >2m	*Grevillea wickhamii, Capparis spinosa* var. *nummularia, Senna artemisioides* subsp. *oligophylla, Acacia inaequilatera, Senna glutinosa* subsp. *luersenii, Acacia maitlandii, Gossypium robinsonii*
Herbs	*Ptilotus exaltatus, Salsola australis*
Tussock Grasses	**Cenchrus ciliaris, Cymbopogon ambiguus, Cymbopogon obtectus, Aristida contorta*
Hummock Grasses	*Triodia epactia*

Broad Floristic Formation	5. *Acacia* Low Open Heath
Vegetation Association	Low Open Heath of *Acacia stellaticeps* over Open Hummock Grassland of *Triodia epactia* and *Triodia schinzii* with High Open Shrubland of *Grevillea wickhamii, Acacia ancistrocarpa* and *Hakea macrocarpa* in red orange sand on stony sandplains

Area Mapped	428 ha
Quadrats Sampled	GD39, GD59, GD63, GD66, GD71, GD74
Location	Northern one third of the study area
Leaf Litter Cover (%)	5-45%
Bare Ground (%)	<10%
Soils and Geology	Red orange sand
Land System	Nita Land System
Land Form	Stony sandplains
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	None
Vegetation Condition	Excellent to Very Good
Disturbances	Great Northern Highway nearby, powerline corridor, access tracks, livestock, fire
Average Fire Age	Moderate to Very Old
Vegetation Structure & Floristics	
Tall Shrubs >2m	*Grevillea wickhamii, Acacia ancistrocarpa, Hakea macrocarpa, Acacia tumida* var. *pilbarensis*
Shrubs <1m	*Acacia stellaticeps, Jacksonia aculeate, Acacia sphaerostachya, Acacia acradenia*
Hummock Grasses	*Triodia epactia, Triodia schinzii, Triodia longiceps*

Broad Floristic Formation	6a. *Triodia* Hummock Grassland
Vegetation Association	Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Grevillea wickhamii, Acacia inaequilatera* and *Petalostylis labicheoides* over Open Shrubland of *Acacia acradenia* in orange silty loam on sandstone hill crests and slopes
	
Area Mapped	906 ha
Quadrats Sampled	GD01, GD06, GD07, GD09, GD13, GD14, GD16, GD25, GD45, GD47, GD49, GD62
Location	Central western and central southern sectors of the study area
Leaf Litter Cover (%)	<2%
Bare Ground (%)	25-60%
Soils and Geology	Orange silty loam
Land System	Capricorn Land System
Land Form	Sandstone hill crests and slopes
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Cenchrus ciliaris*
Vegetation Condition	Excellent to Very Good
Disturbances	Exploration, rail corridor, stockyards, access tracks, livestock, fire
Average Fire Age	Old
Vegetation Structure & Floristics	
Trees <10m	*Corymbia hamersleyana*
Mallee <5m	*Eucalyptus odontocarpa*
Tall Shrubs >2m	*Grevillea wickhamii, Acacia inaequilatera, Petalostylis labicheoides, Acacia monticola, Acacia tumida* var. *pilbarensis, Acacia acradenia, Acacia pyrifolia*
Shrubs 1-2 m	*Acacia acradenia, Grevillea pyramidalis*
Hummock Grasses	*Triodia epactia*
Tussock Grasses	*Eriachne ciliata, Aristida holathera*
Sedges	*Fimbristylis dichotoma*

Broad Floristic Formation	6b. *Triodia* Hummock Grassland
Vegetation Association	Hummock Grassland of *Triodia wiseana* with Low Open Shrubland of *Tephrosia rosea* var. *clementii* and *Corchorus parvifolius* with Scattered High Shrubs of *Grevillea wickhamii* and *Acacia inaequilatera* in brown sandy loam on dolerite rises, low hills and footslopes

Area Mapped	34 ha
Quadrats Sampled	GD02
Location	South-east sector of the study area
Leaf Litter Cover (%)	<1%
Bare Ground (%)	15-20%
Soils and Geology	Brown sandy loam, dolerite
Land System	Capricorn Land System
Land Form	Dolerite rises, low hills and footslopes
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	None
Vegetation Condition	Very Good
Disturbances	Fire, rehabilitation, mine site, access tracks
Average Fire Age	Young
Vegetation Structure & Floristics	
Tall Shrubs >2m	*Grevillea wickhamii, Acacia inaequilatera*
Shrubs <1m	*Tephrosia rosea* var. *clementii, Corchorus parvifolius*
Hummock Grasses	*Triodia wiseana, Triodia epactia*

Broad Floristic Formation	6c. *Triodia* Hummock Grassland
Vegetation Association	Hummock Grassland of *Triodia epactia* with Scattered High Shrubs of *Acacia inaequilatera, Grevillea wickhamii* and *Acacia acradenia* over Scattered Low Shrubs of *Corchorus parvifolius* in orange silty loam on footslopes of sandstone hills
	
Area Mapped	563 ha
Quadrats Sampled	GD05, GD80
Location	North-west sector of the study area, and extending east west along the entire southern fringe of the study area
Leaf Litter Cover (%)	<1%
Bare Ground (%)	45-55%
Soils and Geology	Orange silty loam, sandstone
Land System	Capricorn Land System
Land Form	Footslopes of sandstone hills
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	None
Vegetation Condition	Excellent to Very Good
Disturbances	Fire, rehabilitation, mine site, access tracks
Average Fire Age	Young to Old (variable)
Vegetation Structure & Floristics	
Tall Shrubs >2m	*Acacia inaequilatera, Grevillea wickhamii, Acacia acradenia*
Shrubs <1m	*Corchorus parvifolius, Ptilotus calostachyus*
Hummock Grasses	*Triodia epactia*

Broad Floristic Formation	6d. *Triodia* Hummock Grassland
Vegetation Association	Hummock Grassland of *Triodia epactia* and *Triodia wiseana* with Low Mallee of *Eucalyptus odontocarpa* over Scattered High Shrubs of *Acacia acradenia, Grevillea wickhamii* and *Acacia inaequilatera* in brown sandy loam on steep sandstone hill slopes

Area Mapped	384 ha
Quadrats Sampled	GD50, GD77
Location	North west sector of the study area
Leaf Litter Cover (%)	<1%
Bare Ground (%)	20-45%
Soils and Geology	Brown sandy loam, sandstone
Land System	Capricorn Land System
Land Form	Steep sandstone hill slopes
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	None
Vegetation Condition	Excellent to Very Good
Disturbances	Mine site rehabilitation nearby
Average Fire Age	Moderate to Old
Vegetation Structure & Floristics	
Trees <10m	*Corymbia hamersleyana*
Mallee <5m	*Eucalyptus odontocarpa*
Tall Shrubs >2m	*Acacia acradenia, Grevillea wickhamii, Acacia inaequilatera*
Shrubs <1m	*Acacia adoxa* var. *adoxa, Indigofera monophylla*
Hummock Grasses	*Triodia epactia, Triodia wiseana*

Broad Floristic Formation	6e. *Triodia* Hummock Grassland
Vegetation Association	Hummock Grassland of *Triodia epactia* with Scattered High Shrubs of *Petalostylis labicheoides, Acacia inaequilatera* and *Grevillea wickhamii* over Low Open Shrubland of *Corchorus parvifolius, Tephrosia rosea* var. *clementii* and *Isotropis atropurpurea* in brown loamy sand (mudstone at surface) on open valleys

Area Mapped	39 ha
Quadrats Sampled	GD20
Location	Central southern fringe of the study area
Leaf Litter Cover (%)	<1%
Bare Ground (%)	30%
Soils and Geology	Brown loamy sand,;BIF and mudstone
Land System	Capricorn Land System
Land Form	Open valleys
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	None
Vegetation Condition	Excellent
Disturbances	Fire
Average Fire Age	Young
Vegetation Structure & Floristics	
Tall Shrubs >2m	*Petalostylis labicheoides, Acacia inaequilatera, Grevillea wickhamii*
Shrubs <1m	*Corchorus parvifolius, Tephrosia rosea* var. *clementii, Isotropis atropurpurea*
Hummock Grasses	*Triodia epactia*

Broad Floristic Formation	6f. *Triodia* Hummock Grassland
Vegetation Association	Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Grevillea wickhamii, Acacia orthocarpa* and *Acacia monticola* over Low Open Shrubland of *Acacia adoxa* var. *adoxa, Acacia hilliana* and *Acacia stellaticeps* in brown sandy loam on low hills

Area Mapped	114 ha
Quadrats Sampled	GD42, GD52, GD57, GD72
Location	South-west sector of the study area
Leaf Litter Cover (%)	<2%
Bare Ground (%)	25-35%
Soils and Geology	Brown sandy loam; sandstone with granite? / dolerite?
Land System	Capricorn Land System
Land Form	Low hills
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	None
Vegetation Condition	Excellent
Disturbances	Fire, access tracks, livestock
Average Fire Age	Old
Vegetation Structure & Floristics	
Trees <10m	*Corymbia hamersleyana*
Tall Shrubs >2m	*Acacia inaequilatera*
Shrubs 1-2 m	*Grevillea wickhamii, Acacia orthocarpa, Acacia monticola*
Shrubs <1m	*Acacia adoxa* var. *adoxa, Acacia hilliana, Acacia stellaticeps, Dampiera candicans*
Hummock Grasses	*Triodia epactia, Triodia* sp. Shovelanna Hill

Broad Floristic Formation	6g. *Triodia* Hummock Grassland
Vegetation Association	Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Acacia ancistrocarpa, Acacia tumida* var. *pilbarensis* and *Grevillea wickhamii* over Low Open Shrubland of *Ptilotus astrolasius, Corchorus* cf. *elachocarpus* and *Bonamia rosea* in red orange sand on sandplains

Area Mapped	393 ha
Quadrats Sampled	GD44, GD51, GD64
Location	Western sector of the study area
Leaf Litter Cover (%)	<5%
Bare Ground (%)	30-55%
Soils and Geology	Red orange sand
Land System	Nita Land System
Land Form	Sandplains
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	None
Vegetation Condition	Excellent to Very Good
Disturbances	Access tracks, livestock
Average Fire Age	Moderate to Old
Vegetation Structure & Floristics	
Tall Shrubs >2m	*Acacia ancistrocarpa, Acacia tumida* var. *pilbarensis, Grevillea wickhamii, Acacia inaequilatera*
Shrubs <1m	*Ptilotus astrolasius, Corchorus* cf. *elachocarpus, Bonamia rosea, Pluchea tetranthera, Acacia stellaticeps*
Hummock Grasses	*Triodia epactia, Triodia schinzii*
Tussock Grasses	*Eragrostis eriopoda*

Broad Floristic Formation	6h. *Triodia* Hummock Grassland
Vegetation Association	Hummock Grassland of *Triodia epactia* with Low Open Shrubland of *Pluchea tetranthera* and Scattered High Shrubs of *Acacia inaequilatera*, *Acacia ancistrocarpa* and *Acacia tumida* var. *pilbarensis* in orange sandy loam on plains

Area Mapped	135 ha
Quadrats Sampled	GD53, GD69
Location	Western sector of the study area
Leaf Litter Cover (%)	<1%
Bare Ground (%)	30-55%
Soils and Geology	Orange sandy loam
Land System	Nita Land System
Land Form	Plains
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	None
Vegetation Condition	Very Good to Good
Disturbances	Access tracks, livestock
Average Fire Age	Old
Vegetation Structure & Floristics	
Tall Shrubs >2m	*Acacia inaequilatera, Acacia ancistrocarpa, Acacia tumida* var. *pilbarensis*
Shrubs <1m	*Pluchea tetranthera*
Hummock Grasses	*Triodia epactia, Acacia stellaticeps*
Tussock Grasses	*Cymbopogon obtectus, Paraneurachne muelleri, Eriachne obtusa, Aristida contorta*

Broad Floristic Formation	6i. *Triodia* Hummock Grassland
Vegetation Association	Hummock Grassland of *Triodia epactia* and *Triodia longiceps* with Open Tussock Grassland of *Chrysopogon fallax* and **Cenchrus ciliaris* with Low Open Woodland of *Corymbia flavescens, Bauhinia cunninghamii* and *Eucalyptus victrix* in orange loamy sand on floodplains and drainage zones

Area Mapped	160 ha
Quadrats Sampled	GD12, GD18, GD23
Location	Scattered through the middle of the study area adjacent to Pardoo Creek
Leaf Litter Cover (%)	<4%
Bare Ground (%)	15-30%
Soils and Geology	Orange loamy sand
Land System	Horseshoe Flats, Boolgeeda and Nita Land Systems
Land Form	Floodplains and drainage zones
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Vachellia farnesiana, *Cenchrus ciliaris, *Cenchrus setiger*
Vegetation Condition	Very Good to Degraded
Disturbances	Access tracks, livestock, weeds, fencelines
Average Fire Age	Old
Vegetation Structure & Floristics	
Trees <10m	*Corymbia flavescens, Bauhinia cunninghamii, Eucalyptus victrix*
Tall Shrubs >2m	*Acacia colei*
Hummock Grasses	*Triodia epactia, Triodia longiceps*
Tussock Grasses	*Chrysopogon fallax, *Cenchrus ciliaris, Eragrostis cumingii*

Broad Floristic Formation	6j. *Triodia* Hummock Grassland
Vegetation Association	Hummock Grassland of *Triodia wiseana* with High Open Shrubland of *Greville wickhamii, Acacia inaequilatera* and *Acacia sclerosperma* over Low Open Shrubland of *Acacia stellaticeps* in light brown sandy loam on low calcrete rises

Area Mapped	10 ha
Quadrats Sampled	jg107, jg108, jg111
Location	Localised areas in the north-east sector of the study area
Leaf Litter Cover (%)	<5%
Bare Ground (%)	15-30%
Soils and Geology	Light brown sandy loam
Land System	Nita Land System
Land Form	Low calcrete rises and stony sandy loam plains
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	None
Vegetation Condition	Very Good
Disturbances	Livestock grazing
Average Fire Age	Old
Vegetation Structure & Floristics	
Tall Shrubs >2m	*Grevillea wickhamii, Acacia inaequilatera, Acacia sclerosperma*
Low Shrubs <1m	*Acacia stellaticeps*
Hummock Grasses	*Triodia wiseana*

Broad Floristic Formation	6k. *Triodia* Hummock Grassland
Vegetation Association	Hummock Grassland of *Triodia epactia* in orange loam on plains
	
Area Mapped	85 ha
Quadrats Sampled	jg51
Location	Localised areas in the western and central sector of the study area
Leaf Litter Cover (%)	<2%
Bare Ground (%)	30-55%
Soils and Geology	Orange loam
Land System	Nita and Capricorn land Systems
Land Form	Plains
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	None
Vegetation Condition	Very Good
Disturbances	Access tracks, livestock
Average Fire Age	Old
Vegetation Structure & Floristics	
Tall Shrubs 1-2m	*Grevillea wickhamii*
Hummock Grasses	*Triodia epactia*

Broad Floristic Formation	7a. *Triodia* Open Hummock Grassland
Vegetation Association	Open Hummock Grassland of *Triodia epactia* with Very Open Tussock Grassland of *Eragrostis xerophila, Eriachne benthamii* and *Eriachne flaccida* over Very Open Annual Grassland of *Eragrostis cumingii* and *Sporobolus australasicus* in brown silty clay loam on plains

Area Mapped	553 ha
Quadrats Sampled	GD15, GD22, GD27, GD35, GD36, GD37, GD55, GD60
Location	South-west corner and extending north-east through middle of the study area (adjacent to Pardoo Creek)
Leaf Litter Cover (%)	<5%
Bare Ground (%)	20-70%
Soils and Geology	Brown silty clay loam
Land System	Boolgeeda, Horseflats, Paradise Land Systems
Land Form	Plains
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Vachellia farnesiana, *Cenchrus ciliaris, *Cenchrus setiger*
Vegetation Condition	Very Good to Good
Disturbances	Access tracks, livestock, feral animals (goats and horses), weeds, fire, spoon drain
Average Fire Age	Old
Vegetation Structure & Floristics	
Tall Shrubs >2m	**Vachellia farnesiana*
Shrubs <1m	*Pluchea tetranthera*
Hummock Grasses	*Triodia epactia*
Tussock Grasses	*Eragrostis xerophila, Eriachne benthamii, Eriachne flaccida, Eragrostis cumingii, Sporobolus australasicus, Dactyloctenium radulans*

Broad Floristic Formation	7b. *Triodia* Open Hummock Grassland
Vegetation Association	Open Hummock Grassland of *Triodia epactia* with Open Scrub of *Acacia ancistrocarpa, Acacia acradenia* and *Acacia tumida* var. *pilbarensis* and Scattered Low Trees of *Eucalyptus camaldulensis* var. *obtusa* in orange clay loam on rehabilitated townsite area

Area Mapped	47 ha
Quadrats Sampled	Central eastern sector of the study area – north-west of the old Goldsworthy Mine
Location	Rehabilitated areas encompassing the old Goldsworthy townsite in the eastern sector of the study area
Leaf Litter Cover (%)	<2%
Bare Ground (%)	40-60%
Soils and Geology	Disturbed soils, generally sand with areas of gravel scree
Land System	Nita Land System
Land Form	Plains (disturbed)
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Cenchrus ciliaris, *Cenchrus setiger, *Vachellia farnesiana*
Vegetation Condition	Degraded
Disturbances	Weeds, livestock
Average Fire Age	Old
Vegetation Structure & Floristics	
Low Trees <10m	*Eucalyptus camaldulensis* var. *obtusa*
Tall Shrubs 1-2m	*Acacia ancistrocarpa, Acacia acradenia, Acacia tumida* var. *pilbarensis, Acacia bivenosa, Senna artemisioides* subsp. *oligophylla*
Tussock Grasses	**Cenchrus ciliaris*
Hummock Grasses	*Triodia epactia*

Broad Floristic Formation	8. *Eragrostis* Tussock Grassland
Vegetation Association	Tussock Grassland of *Eragrostis xerophila* with Very Open Hummock Grassland of *Triodia epactia* and Very Open Herbs of *Ptilotus murrayi* in orange medium clay on stony cracking clay plains
	
Area Mapped	484 ha
Quadrats Sampled	GD21, GD28, GD33
Location	North-west sector of the study area, adjacent to Pardoo Creek
Leaf Litter Cover (%)	<1%
Bare Ground (%)	20-60%
Soils and Geology	Orange medium clay
Land System	Horseflats Land System
Land Form	Stony cracking clay plains
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Vachellia farnesiana*
Vegetation Condition	Good
Disturbances	Access tracks, livestock, feral animals (goats and horses), weeds, rail corridor nearby
Average Fire Age	Old
Vegetation Structure & Floristics	
Tall Shrubs >2m	**Vachellia farnesiana*
Hummock Grasses	*Triodia epactia*
Tussock Grasses	*Eragrostis xerophila, Sporobolus australasicus, Eriachne benthamii*
Herbs	*Ptilotus murrayi, Trianthema triquetra*

Broad Floristic Formation	9a. *Eriachne* Tussock Grassland
Vegetation Association	Tussock Grassland of *Eriachne benthamii* with Low Open Woodland of *Eucalyptus victrix* over Open Herbland of *Marsilea hirsuta* and *Centipeda minima* subsp. *macrocephala* in brown sandy clay on plains and drainage lines

Area Mapped	205 ha
Quadrats Sampled	GD17, GD19, GD24, GD31, GD32, GD73
Location	South-west corner and extending north-east through middle of the study area (adjacent to Pardoo Creek)
Leaf Litter Cover (%)	<2%
Bare Ground (%)	5-25%
Soils and Geology	Brown sandy clay
Land System	Boolgeeda, Horseflats, Paradise Land Systems
Land Form	Plains and drainage lines
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Vachellia farnesiana, *Cynodon dactylon*
Vegetation Condition	Very Good to Good
Disturbances	Access tracks, livestock, weeds
Average Fire Age	Old
Vegetation Structure & Floristics	
Trees <10m	*Eucalyptus victrix*
Shrubs 1-2 m	*Sesbania cannabina, *Vachellia farnesiana*
Tussock Grasses	*Eriachne benthamii, Eulalia aurea, Eragrostis xerophila, Sporobolus mitchelli, Chrysopogon fallax*
Herbs	*Marsilea hirsuta, Centipeda minima* subsp. *macrocephala*

Broad Floristic Formation	9b. *Eriachne* Tussock Grassland
Vegetation Association	Tussock Grassland of *Eriachne* cf. *glauca*, *Eriachne benthamii* and *Elytrophorus spicatus* over Very Open Herbland of *Marsilea hirsuta, Centipeda minima* subsp. *macrocephala* and *Alternanthera nodiflora* in orange light medium clay on gilgai plains

Area Mapped	41 ha
Quadrats Sampled	GD34
Location	Central western one third of the study area, aligned with Pardoo Creek and the adjacent flood plains to the north-west
Leaf Litter Cover (%)	<1%
Bare Ground (%)	30%
Soils and Geology	Orange brown light medium clay
Land System	Boolgeeda, Horseflats, Paradise Land Systems
Land Form	Gilgai plains
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Cynodon dactylon*
Vegetation Condition	Good
Disturbances	Livestock, historical power/telegraph poles
Average Fire Age	Old
Vegetation Structure & Floristics	
Tussock Grasses	*Eriachne* cf. *glauca, Eriachne benthamii, Elytrophorus spicatus*
Herbs	*Marsilea hirsuta, Centipeda minima* subsp. *macrocephala, Alternanthera nodiflora*

Broad Floristic Formation	9c. *Eriachne* Tussock Grassland
Vegetation Association	Tussock Grassland of *Eriachne benthamii* and *Sporobolus mitchelii* in orange light medium clay on gilgai plains
	
Area Mapped	249 ha
Quadrats Sampled	jg35, jg38, jg48
Location	South-west corner and extending north-east through middle of the study area (adjacent to Pardoo Creek)
Leaf Litter Cover (%)	<1%
Bare Ground (%)	30%
Soils and Geology	Orange light medium clay
Land System	Boolgeeda, Horseflats, Paradise Land Systems
Land Form	Gilgai plains
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	
Vegetation Condition	Good
Disturbances	Livestock grazing
Average Fire Age	Old
Vegetation Structure & Floristics	
Tussock Grasses	*Eriachne benthamii, Sporobolus mitchelii, Eragrostis xerophila*
Herbs	*Marsilea hirsuta, Centipeda minima* subsp. *macrocephala*

Broad Floristic Formation	10. **Cenchrus* Tussock Grassland
Vegetation Association	Tussock Grassland of **Cenchrus ciliaris* with Open Shrubland of *Acacia ancistrocarpa* and *Acacia tumida* var. *pilbarensis* and Open Hummock Grassland of *Triodia angusta* and *Triodia epactia* in orange clay loam on rehabilitated post-mining infrastructure areas

Area Mapped	116 ha
Quadrats Sampled	South-east sector of the study area, adjacent to old Goldsworthy Mine and waste dumps
Location	Includes rehabilitated areas around the original minesite such as roads, hardstand and laydown areas.
Leaf Litter Cover (%)	<2%
Bare Ground (%)	30-50%
Soils and Geology	Predominantly orange clay loam and compacted gravels that have been deep ripped; highly variable
Land System	Capricorn Land System
Land Form	Disturbed landforms associated with mining operations
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Cenchrus ciliaris, *Aerva javanica*
Vegetation Condition	Degraded
Disturbances	Livestock grazing, weeds, mining
Average Fire Age	Old
Vegetation Structure & Floristics	
Shrubs 1-2m	*Acacia ancistrocarpa, Acacia tumida* var. *pilbarensis, Acacia inaequilatera, Acacia acradenia, Grevillea wickhamii*
Tussock Grasses	**Cenchrus ciliaris, Cymbopogon ambiguus*
Hummock Grasses	*Triodia angusta, Triodia epactia*

Broad Floristic Formation	11. *Eriachne* Open Tussock Grassland
Vegetation Association	Open Tussock Grassland of *Eriachne benthamii*, **Cynodon dactylon* and *Eragrostis xerophila* over Very Open Herbland of *Centipeda minima* subsp. *macrocephala*, *Glinus lotoides* and *Marsilea hirsuta* with Scattered Tall Shrubs of **Vachellia farnesiana* in brown medium heavy clay on drainage ponds, depressions and borrow pits

Area Mapped	34 ha
Quadrats Sampled	GD29
Location	Central north and north-west sector of the study area
Leaf Litter Cover (%)	<4%
Bare Ground (%)	82%
Soils and Geology	Brown medium heavy clay
Land System	Horseflats Land System
Land Form	Drainage ponds, depressions and borrow pits
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Vachellia farnesiana*, **Cynodon dactylon*
Vegetation Condition	Degraded
Disturbances	Livestock, weeds, access tracks, rail line corridor
Average Fire Age	Old
Vegetation Structure & Floristics	
Tall Shrubs >2m	**Vachellia farnesiana*
Tussock Grasses	*Eriachne benthamii*, **Cynodon dactylon*, *Eragrostis xerophila*
Herbs	*Centipeda minima* subsp. *macrocephala*, *Glinus lotoides*, *Marsilea hirsuta*

Broad Floristic Formation	12. *Eragrostis* Very Open Tussock Grassland
Vegetation Association	Very Open Tussock Grassland of *Eragrostis xerophila* and *Eriachne benthamii* with Very Open Herbs of *Ptilotus murrayi, Sida fibulifera* and *Trianthema triquetra* over Very Open Annual Grassland of *Sporobolus australasicus, Eragrostis cumingii* and *Dactyloctenium radulans* in brown light clay on plains

Area Mapped	166 ha
Quadrats Sampled	GD26, GD30, GD58
Location	South-west corner extending north-east to the northern boundary of the study area
Leaf Litter Cover (%)	<2%
Bare Ground (%)	80-90%
Soils and Geology	Brown light clay
Land System	Paradise and Horseflats Land Systems
Land Form	Plains
Priority Ecological Community	None
Rare Flora	None
Introduced (Weed) Species	**Cenchrus ciliaris, *Cenchrus setiger*
Vegetation Condition	Degraded
Disturbances	Livestock, weeds, access tracks
Average Fire Age	Old
Vegetation Structure & Floristics	
Tussock Grasses	*Eragrostis xerophila, Eriachne benthamii, Sporobolus australasicus, Eragrostis cumingii, Dactyloctenium radulans*
Herbs	*Ptilotus murrayi, Sida fibulifera, Trianthema triquetra*

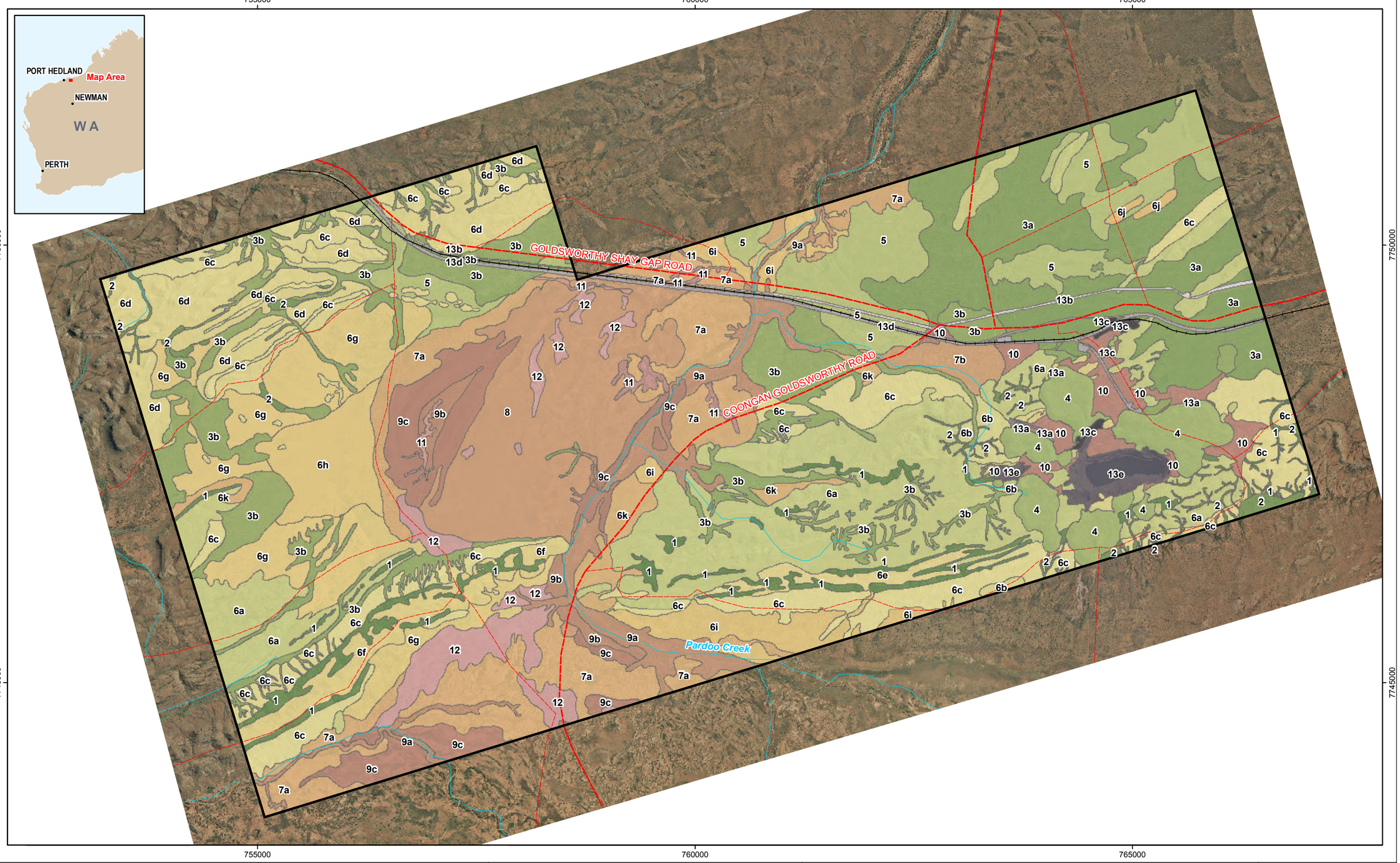
	Vegetation Association	Vegetation Condition
13a	Mine drainage areas (4 ha)	Completely Degraded

13b	Gas pipeline - pindan sand plain (21 ha)	Good to Degraded

	Vegetation Association	Vegetation Condition
13c	Disturbed ground - no rehabilitation (10 ha)	Completely Degraded

13d	BHPBIO Rail (47 ha)	Completely Degraded

	Vegetation Association	Vegetation Condition
13e	Mine void (60 ha)	Completely Degraded



ONSHORE ENVIRONMENTAL

ON SHORE ENVIRONMENTAL CONSULTANTS		Date:	18/12/2012
Sheet Size:	A3	Status:	Final
Drawn by GSM	Requested by DB	GSM Reference Goldsworthy Veg Types	

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Meters
1:40,000

Datum: GDA94
Projection: MGA Zone 50

GOLDSWORTHY

VEGETATION TYPES

Legend

Study Area

GRIFFIN SPATIAL & MAPPING
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Legend

Terminalia Low Woodland

1 Low Woodland of *Terminalia canescens* and *Atalaya hemiglauca* over Open Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Ehretia saligna, Ficus brachypoda* and *Acacia acradenia* in brown sandy loam on cliff lines and steep

Acacia Closed Scrub

2 Closed Scrub of *Acacia monticola, Acacia acradenia* and *Grevillea wickhamii* over Hummock Grassland of *Triodia epactia* with Low Open Mallee of *Eucalyptus odontocarpa* in brown sandy loam along minor drainage lines dissecting undulating hills

3a Open Scrub of *Acacia ancistrocarpa, Acacia tumida var. pilbarensis* and *Grevillea wickhamii* over Hummock Grassland of *Triodia schinzii* with Open Tussock Grassland of *Paraneurachne muelleri, Aristida holathera* and *Eragrostis eriopoda* in red loamy sand on sandplains

3b Open Scrub of *Acacia tumida var. pilbarensis* over Hummock Grassland of *Triodia epactia* with Low Open Woodland of *Corymbia hamersleyana* and *Corymbia flavescens* in red brown sand on pindan sandplains and sandy drainage zones

Grevillea Open Scrub

4 Open Scrub of *Grevillea wickhamii* over Scattered Hummock Grasses of*Triodia epactia* in variable mine overburden on rehabilitated post-mining infrastructure areas

Acacia Low Open Heath

5 Low Open Heath of *Acacia stellaticeps* over Open Hummock Grassland of *Triodia epactia* and *Triodia schinzii* with High Open Shrubland of *Grevillea wickhamii, Acacia ancistrocarpa* and *Hakea macrocarpa* in red orange sand on stony sandplains

Triodia Hummock Grassland

6a Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Grevillea wickhamii, Acacia inaequilatera* and *Petalostylis labicheoides* over Open Shrubland of *Acacia acradenia* in orange silty loam on sandstone hill crests and slopes

6b Hummock Grassland of *Triodia wiseana* with Low Open Shrubland of *Tephrosia rosea var. clementii* and *Corchorus parvifolius* with Scattered High Shrubs of *Grevillea wickhamii* and *Acacia inaequilatera* in brown sandy loam on dolerite rises, low hills and footslopes

6c Hummock Grassland of *Triodia epactia* with Scattered High Shrubs of *Acacia inaequilatera*, *Grevillea wickhamii* and *Acacia acradenia* over Scattered Low Shrubs of *Corchorus parvifolius* in orange silty loam on footslopes of sandstone hills

6d Hummock Grassland of *Triodia epactia* and *Triodia wiseana* with Low Mallee of *Eucalyptus odontocarpa* over Scattered High Shrubs of *Acacia acradenia, Grevillea wickhamii* and *Acacia inaequilatera* in brown sandy loam on steep sandstone hill slopes

6e Hummock Grassland of *Triodia epactia* and *Triodia wiseana* with Low Mallee of *Eucalyptus odontocarpa* over Scattered High Shrubs of *Acacia acradenia, Grevillea wickhamii* and *Acacia inaequilatera* in brown sandy loam on steep sandstone hill slopes

6f Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Grevillea wickhamii, Acacia orthocarpa* and *Acacia monticola* over Low Open Shrubland of *Acacia adoxa var. adoxa, Acacia hilliana* and *Acacia stellaticeps* in brown sandy loam on low hills

6g Hummock Grassland of Triodia epactia with High Open Shrubland of *Acacia ancistrocarpa, Acacia tumida var. pilbarensis and Grevillea wickhamii* over Low Open Shrubland of *Ptilotus astrolasius, Corchorus cf. elachocarpus* and *Bonamia rosea* in red orange sand on sandplains

6h Hummock Grassland of *Triodia epactia* with Low Open Shrubland of *Pluchea tetranthera* and Scattered High Shrubs of *Acacia inaequilatera, Acacia ancistrocarpa* and *Acacia tumida var. pilbarensis* in orange sandy loam on plains

6i Hummock Grassland of *Triodia epactia* and *Triodia longiceps* with Open Tussock Grassland of *Chrysopogon fallax* and **Cenchrus ciliaris* with Low Open Woodland of *Corymbia flavescens, Bauhinia cunninghamii* and *Eucalyptus victrix* in orange loamy sand on floodplains and drainage zones

6j Hummock Grassland of *Triodia wiseana* with High Open Shrubland of *Greville wickhamii, Acacia inaequilatera* and *Acacia sclerospermaover* Low Open Shrubland of *Acacia stellaticeps* in light brown sandy loam on low calcrete rises

6k Hummock Grassland of *Triodia epactia* in orange loam on plains

Triodia Open Hummock Grassland

7a Open Hummock Grassland of *Triodia epactia* with Very Open Tussock Grassland of *Eragrostis xerophila, Eriachne benthamii* and *Eriachne flaccida* over Very Open Annual Grassland of *Eragrostis cumingii* and *Sporobolus australasicus* in brown silty clay loam on

7b Open Hummock Grassland of *Triodia epactia* with Open Scrub of *Acacia ancistrocarpa, Acacia acradenia* and *Acacia tumida var. pilbarensis* and Scattered Low Trees of *Eucalyptus camaldulensis var. obtusa* in orange clay loam on rehabilitated townsite area

Eragrostis Tussock Grassland

8 Tussock Grassland of *Eragrostis xerophila* with Very Open Hummock Grassland of *Triodia epactia* and Very Open Herbs of *Ptilotus murrayi* in orange medium clay on stony cracking clay plains

Eriachne Open Tussock Grassland

9a Tussock Grassland of *Eriachne benthamii* with Low Open Woodland of *Eucalyptus victrix* over Open Herbland of *Marsilea hirsuta* and *Centipeda minima subsp. macrocephala* in brown sandy clay on plains and drainage lines

9b Tussock Grassland of *Eriachne cf. glauca, Eriachne benthamii and Elytrophorus spicatus* over Very Open Herbland of *Marsilea hirsuta, Centipeda minima subsp. macrocephala* and *Alternanthera nodiflora* in orange light medium clay on gilgai plains

9c Tussock Grassland of *Eriachne benthamii* and *Sporobolus mitchelii* in orange light medium clay on gilgai plains

***Cenchrus* Tussock Grassland**

10 Tussock Grassland of **Cenchrus ciliaris* with Open Shrubland of *Acacia ancistrocarpa* and *Acacia tumida var. pilbarensis* and Open Hummock Grassland of *Triodia angusta* and *Triodia epactia* in orange clay loam on rehabilitated post-mining infrastructure areas

Eriachne Open Tussock Grassland

11 Open Tussock Grassland of *Eriachne benthamii, *Cynodon dactylon* and *Eragrostis xerophila* over Very Open Herbland of *Centipeda minima subsp. macrocephala, Glinus lotoides* and *Marsilea hirsuta* with Scattered Tall Shrubs of **Vachellia farnesiana* in brown medium heavy clay on drainage ponds, depressions and borrow pits

Eragrostis Very Open Tussock

12 Very Open Tussock Grassland of *Eragrostis xerophila* and *Eriachne benthamii* with Very Open Herbs of *Ptilotus murrayi, Sida fibulifera* and *Trianthema triquetra* over Very Open Annual Grassland of *Sporobolus australasicus, Eragrostis cumingii* and *Dactyloctenium radulans* in brown light clay on plains

Disturbance

13a Bare - Mine drainage areas

13b Regrowth - Gas pipeline (pindan sand plain)

13c Bare -Disturbed ground (no rehabilitation)

13d Bare - BHPBIO Rail

13e Bare - Mine void

ONSHORE ENVIRONMENTAL

ON SHORE ENVIRONMENTAL CONSULTANTS	Date: 19/12/2012
Sheet Size: A3	Status: Final
Drawn by GSM / Requested by DB	GSM Reference Goldsworthy VegMapping Legend

GOLDSWORTHY

VEGETATION MAPPPING

LEGEND

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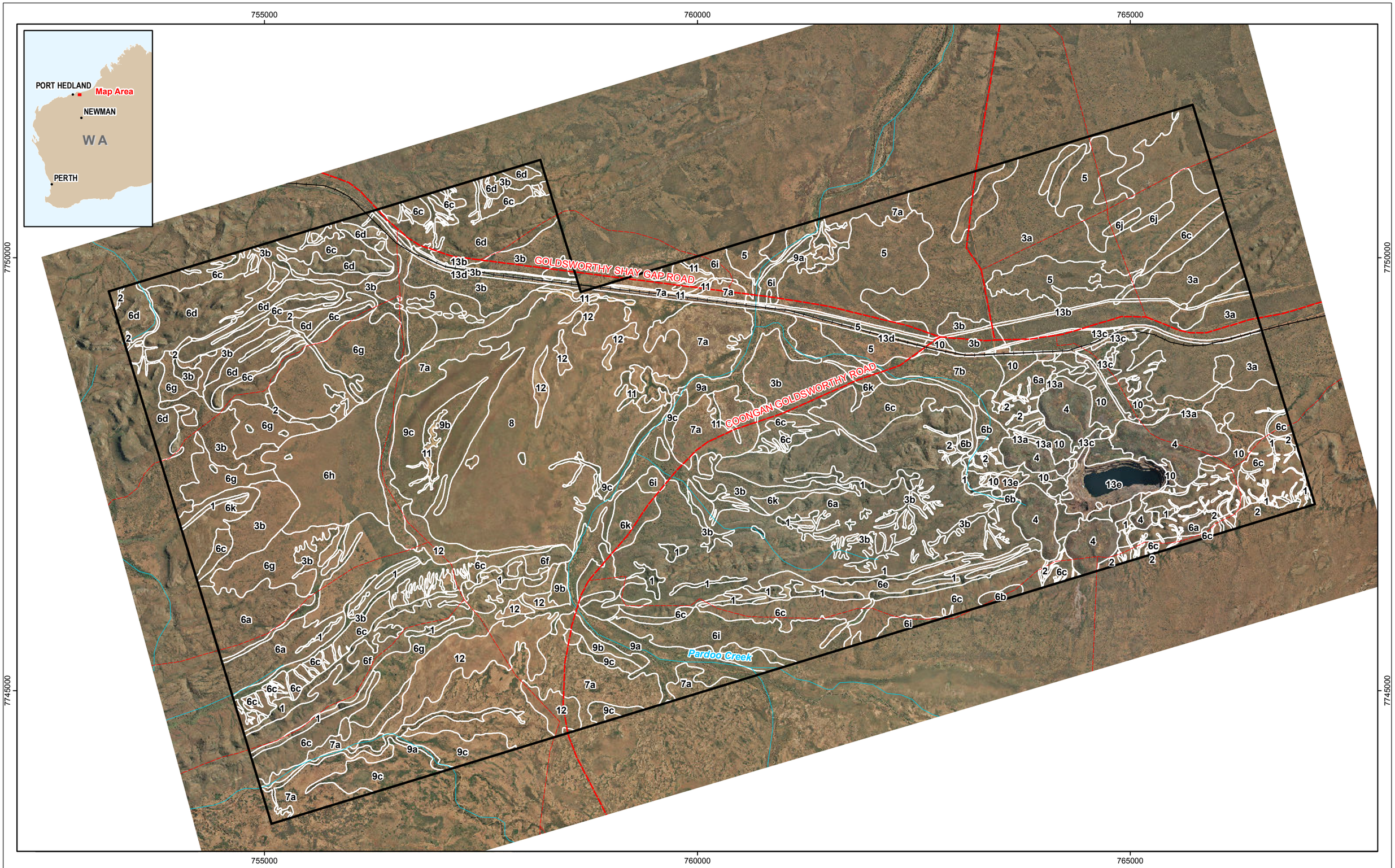
Mob 0487 337 226



ON SHORE ENVIRONMENTAL CONSULTANTS	Date:	18/12/2012	
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Meters
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Datum: GDA94
Projection: MGA Zone 50

GOLDSWORTHY

VEGETATION TYPES

Legend

Study Area

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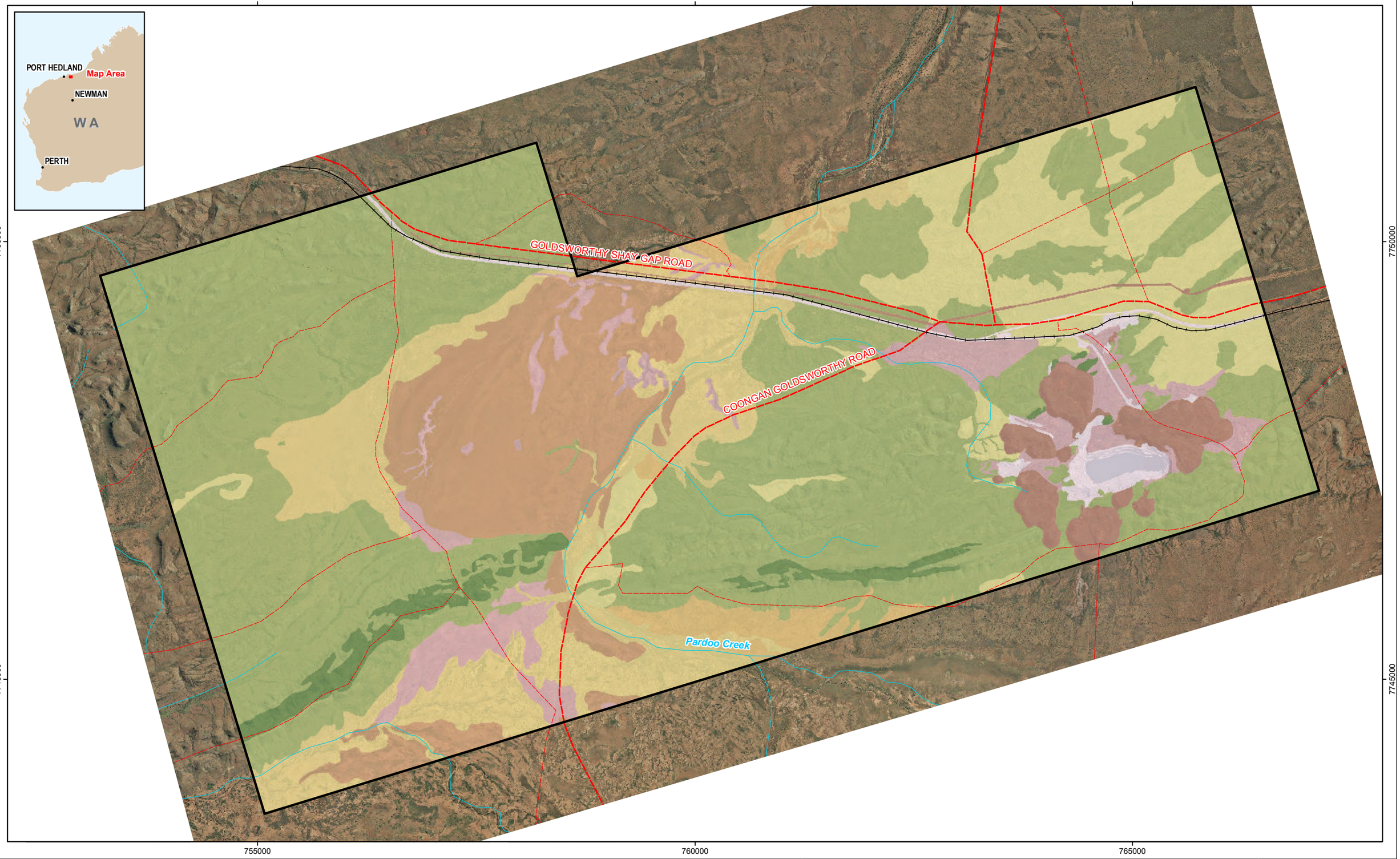
3.7 Vegetation Condition

Half (ten) of the vegetation associations mapped within the study area supported vegetation condition rated as either Excellent (two) or Excellent to Very Good (eight). A further eight vegetation associations were rated as Very Good or Good (or a range), with two localized vegetation associations rated as Degraded (Figure 9).

As is typical for the Pilbara, there was a trend for vegetation condition to improve with increasing landform relief (Figure 9). Vegetation occurring on floodplains, plains and drainage lines showed reduced condition, primarily linked to grazing by domestic stock (reduced species richness, presence of weeds, surface soil instability). Areas in close proximity to the rail line including the ballast also showed a high presence of introduced species. Vegetation condition also declined within rehabilitated areas of the decommissioned Goldsworthy mine site and the old Goldsworthy townsite where weeds were generally better represented than undisturbed areas.



ONSHORE ENVIRONMENTAL

ON SHORE ENVIRONMENTAL CONSULTANTS	Date:	18/12/2012
Sheet Size:	A3	Status: Final
Drawn by GSM	Requested by DB	GSM Reference Goldsworthy Veg Cond

N

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Meters
1:40,000

Datum: GDA94
Projection: MGA Zone 50

GOLDSWORTHY

VEGETATION CONDITION

Legend

Study Area

Vegetation Condition

- Excellent
- Excellent to Very Good
- Very Good
- Very Good to Good
- Very Good to Degraded
- Good
- Good to Degraded
- Degraded
- Completely Degraded

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4.0 Summary

A single season field survey of the entire study area was completed by five botanists from Onshore Environmental between the 1st and 11th September 2012. The south-east corner of the study area incorporating the decommissioned Goldsworthy Mine was previously surveyed by Pilbara Flora between the 10th and 20th June 2008.

A total number of 286 plant taxa (including varieties and subspecies) from 44 families and 136 genera have been recorded from the study area, with species representation greatest among the Fabaceae, Poaceae, Malvaceae, Amaranthaceae, Asteraceae, Convolvulaceae, Myrtaceae and Goodeniaceae families. This is typical for the Pilbara Bioregion. The most speciose genus was *Acacia* (19 taxa), followed by *Eriachne* (10 taxa), *Senna* (8 taxa), *Sida* (8 taxa), *Ptilotus* (8 taxa) and *Tephrosia* (8 taxa).

None of the plant taxa were gazetted as DRF under the WC Act, or listed under the EPBC Act. One Priority 2 flora species was previously recorded from a single point just outside the south-east corner of the study area; *Euphorbia clementii* (Pilbara Flora 2008). However, re-sampling of the known location and intensive survey of the surrounding landforms by Onshore Environmental in September 2012 failed to relocate this taxon. Although suitable habitat did occur within the study area, *Euphorbia clementii* was not recorded from the wider survey area.

The Priority 3 flora *Phyllanthus aridus* was recorded from a single point in the south-east sector of the study area by Onshore Environmental in September 2012. The landform was a distinctive sandstone ridge and the taxon is likely to be more widely distributed along the length of the ridge. The Goldsworthy record represents the southern extent of the known range for this taxon.

A total of eight introduced (weed) species have been recorded from the study area; **Aerva javanica* (Kapok Bush), **Calotropis procera* (Calotrope), **Cenchrus ciliaris* (Buffel Grass), **Cenchrus setiger* (Birdwood Grass), **Cynodon dactylon* (Couch Grass), **Tamarix aphylla* (Athel Pine), **Vachellia farnesiana* (Mimosa Bush) and **Passiflora foetida* var. *hispida* (Wild Passionfruit). Two of these taxa are listed as Declared Weeds under the ARRP Act; **Calotropis procera* and **Tamarix aphylla*.

A total of 31 vegetation associations were described and mapped within the study area. The vegetation associations were classified into 13 Broad Floristic Formations on the basis of the dominant vegetation stratum. Half of the vegetation associations mapped within the study area supported vegetation condition rated as Excellent or Excellent to Very Good, with two localized vegetation associations rated as Degraded. As is typical for the Pilbara, there was a trend for vegetation condition to improve with increasing landform relief. Vegetation occurring on floodplains, plains and drainage lines showed reduced condition, primarily linked to grazing by domestic stock causing reduced species richness, introduction of weeds, and surface soil instability. Areas in close proximity to the rail line including the ballast also showed a high presence of introduced species. Vegetation condition also declined within rehabilitated areas of the decommissioned Goldsworthy mine site and the old Goldsworthy townsite. None of the vegetation associations were representative of TECs or PECs, and database searches confirmed there were no previous records within a 100 km radius of the study area.

5.0 Study Team

The Level 2 flora and vegetation survey of the study area was planned, co-ordinated and executed by the following personnel:

Onshore Environmental Consultants P/L
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YALLINGUP WA 6282
pf 08 9756 6206 m0427 339 842
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Project Staff

Dr Darren Brearley	PhD	Project Manager
Dr Jerome Bull	PhD	Principal Botanist
Ms Ellen Palmer	BSc	Senior Botanist
Ms Jessica Waters	BSc	Botanist
Mr Daniel Roberts	BSc	Botanist
Dr Eleanor Bennett	PhD	Taxonomist
Mr Todd Griffin	GIS Specialist	

Licences

The field survey was conducted under the authorisation of the following licences issued by the Department of Environment & Conservation:

- Darren Brearley, Onshore Environmental Consultants 'Licence to take flora for scientific & other prescribed purposes' Licence No. SL009578
- Jerome Bull, Onshore Environmental Consultants 'Licence to take flora for scientific & other prescribed purposes' Licence No. SL009579
- Ellen Palmer, Onshore Environmental Consultants 'Licence to take flora for scientific & other prescribed purposes' Licence No. SL009564
- Jessica Waters, Onshore Environmental Consultants 'Licence to take flora for scientific & other prescribed purposes' Licence No. SL009563
- Daniel Roberts, Onshore Environmental Consultants 'Licence to take flora for scientific & other prescribed purposes' Licence No. SL009561

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APPENDIX 1

Summary of previous flora and vegetation surveys in and adjacent to the study area.

Previous surveys from within the study area

Goldsworthy Minesite Flora and Vegetation Survey (Pilbara Flora 2008)

Pilbara Flora was commissioned by BHP Billiton in 2008 to undertake a Level 2 flora and vegetation survey at the Goldsworthy Minesite. The total vegetation survey area covers 1236 ha and is contained within mining tenements held by the Mt Goldsworthy Mining Associates Joint Venture partners. However 512 ha had been disturbed by previous mining activities with the remaining 724 ha classed as native vegetation. The purpose of the survey was to provide information on flora and vegetation communities for environmental management and rehabilitation planning, to aid in the assessment and determination of a native vegetation clearing permit (NVCP) and provide information for inclusion in any future mining proposals.

The survey was undertaken from the 11th -18th of June 2008. Seasonal conditions were poor at this time of survey with below average rainfall received in the 12 month period leading up the survey. A total of 120 mm was received which is well below the average of 213 mm. However vegetation appeared to be in healthy condition which may be due in part to the well above average rainfall received in Port Hedland in March 2007 (427.2 mm).

A total of 188 vascular plant taxa from 88 genera and 40 families were recorded from the vegetation survey area. The most species rich families were Poaceae, Papilionaceae, Mimosaceae, Malvaceae and Amaranthaceae. No Declared Rare Flora (DRF) species associated to Section 23F (2) of the *Wildlife Conservation Act 1950*, as listed by the DEC, were recorded. One species listed as a Priority 2 species was recorded; *Euphorbia clementii*. Five introduced species were recorded; **Aerva javanica* (Kapok) **Calotropis procera* (Calotrope) **Cenchrus ciliaris* (Buffel Grass) * *Tamarix aphylla* (Athel Pine) **Vachellia farnesiana* (Mimosa Bush) were recorded within the study area. **Tamarix aphylla* and **Calotropis procera,* are Declared Plants under the *Agriculture and Related Resources Protection Act 1976* (APB 2007). **Tamarix aphylla* is a Category 1 Declared Plant for the whole of Western Australia. **Calotropis procera* is a Category P1 and P2 Declared Plant in the Town of Port Hedland and the Shire of East Pilbara. There were no vegetation types or landscape units identified that were considered as being rare, restricted or unique.

Rail Operations Goldsworthy Junction to Yarrie Flora and Vegetation Survey (Ecologia Environment, 2011)

Ecologia Environment was commissioned by BHP Billiton to undertake a flora and vegetation survey along the rail line between the Goldsworthy Junction and Yarrie. The project area follows the length of the Goldsworthy rail line, for approximately 200 km from Goldsworthy Junction to the Yarrie Repeater. The lease is typically 80 to 100 m wide. The purpose of the survey was to gather background information relating to the Study area study area, collect an inventory of flora species occurring in the study area including species of conservation significance and map and describe the vegetation types occurring in the Study area. A review of the regional and biogeographic significance of the species and vegetation types recorded in the study area was also undertaken.

The survey was conducted from the 17th to 26th of March 2010. The seasonal conditions during the survey were poor. Rainfall recorded at Port Hedland Airport for the 6 months preceding the field survey (October 2009 to March 2010) was 36.2 mm, significantly below the long term average rainfall for the same period (221.7 mm). A total of 313 taxa were recorded from 124 quadrats representing 136 genera

and 49 families. No DRF were recorded however four Priority species were recorded; *Pterocaulon* sp. A Kimberley Flora (Priority 3), *Tephrosia bidwillii* (Priority 3), *Bulbostylis burbidgeae* (Priority 4), and *Goodenia nuda* (Priority 4). A total of 22 introduced plant species were collected during the current survey; **Parkinsonia aculeate (*Parkinsonia) **Tamarix aphylla* (Athel Tree) **Aerva javanica (*Kapok Bush*) *Alternanthera pungens* (Khaki Weed) **Argemone ochroleuca subsp.* o*chroleuca* (Mexican Poppy) **Calotropis procera* (Rubber Tree), **Cenchrus ciliaris* (Buffel Grass), **Cenchrus echinatus* (Burrgrass), **Chloris barbata* (Purpletop Chloris), **Citrullus lanatus* (Pie Melon), **Cynodon dactylon* (Couch), **Datura leichhardtii (*Native Thornapple), **Eragrostis cilianensis* (Stinkgrass), **Gossypium hirsutum* (Upland Cotton), **Indigofera oblongifolia, *Merremia dissecta, *Nerium oleander* (Oleander), **Passiflora foetida var. hispida* (Passion Flower), **Ricinus communis* (Castor Oil Plant), **Stylosanthes hamata (Verano Stylo), *Trianthema portulacastrum* (Giant Pigweed), and **Vachellia farnesiana* (Mimosa Bush). Two of these species are listed as Weeds of National Significance (WONS); **Parkinsonia aculeata* (Priority 1 and Priority 2) and **Tamarix aphylla* (Priority 1). The most frequently recorded weeds were **Cenchrus echinatus* (at 53 of 124 quadrats), **Indigofera oblongifolia* (24 quadrats) and **Aerva javanica* (14 quadrats). There were also a total of 27 vegetation units described and mapped for the Goldsworthy rail lease.

Previous surveys completed in close proximity to the study area

Yarrie Biological and Soil Survey (Ecologia Environmental 1999)

In a survey of biota and soils of the Yarrie project area was conducted by Ecologia Environment during 3-9 June 1998. A baseline biological (flora and fauna) and soil survey of the project area was carried out where soil profiles were described and samples taken at each major vegetation type to assess the distribution and relative value of soils for rehabilitation.

There were 209 plant taxa recorded from 47 families and 105 genera, 67 of which were represented by a single taxon. The relatively low number of species recorded, was attributed to a combination of factors including the timing of the survey following an unusually dry summer and the homogeneous nature of the area with relatively few vegetation types present. The flora and vegetation component of the survey included 39 quadrats, each measuring 100 m x 100 m or equivalent area. No Endangered or Vulnerable species listed under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* or DRF species listed under the *Western Australian Wildlife Conservation Act 1950* were recorded from the project area. Two Priority Flora species were recorded; *Euphorbia clementii* (Priority 2) and *Euphorbia drummondii* (Priority 2 at time of survey but no longer listed as a Priority flora). Four weed taxon were recorded; **Cenchrus ciliaris* (Buffel Grass), **Vachellia farnesiana* (Mimosa Bush), **Aerva javanica* (Kapok Bush) and **Chloris gayana* (Rhodes Grass), none of which are Declared Plants. A total of 12 vegetation associations (or community types) were identified in the project area.

Cundaline Biological Assessment Survey (Ecologia 2005a)

As part of BHP Billiton Iron Ore's proposal to extend mining activity at Yarrie and Nimingarra in the north-eastern Pilbara, two ore bodies associated with the Cundaline and Callawa Ridges were to be investigated for further development. During May 2005 Ecologia Environment was commissioned to conduct a biological assessment of the Cundaline project area.

The seasonal conditions during the survey were poor with only 2mm recorded at Port Hedland and Marble Bar in the two months preceding the survey (BOM 2012b). Hence the full complement of annuals and small perennials that may occur in the area may not have been recorded. However, soil conditions during the survey were observed as partially moist and several flora species were recorded flowering widespread over the area, suggesting that conditions were at least partially favorable to some annuals. The flora and vegetation component of the survey included 35 quadrats measuring 50 m x 50 m or equivalent area. There were 91 plant taxa recorded from 28 families and 48 genera. No Endangered or Vulnerable species listed under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* or DRF species listed under the *Western Australian Wildlife Conservation Act 1950* were recorded from the project area. There were no Priority flora recorded, however *Stemodia* sp. Shay Gap was found at two locations. The species was discovered in November 2004 at Sunrise Hill/Shay Gap Ridges and was taxonomically un-described at time of the report. The report also suggests that it may become a Priority 1 flora species in WA when it is recognised by the WA Herbarium. A current FloraBase search showed no result for a species of that name (FloraBase 2012). *Sida* sp. Callawa (now known as *Sida macropoda*) was also recorded at one site within the Cundaline Project area and is known to occur within the adjacent Callawa Project area. At the time of the report specimens of the species had not been matched with reference material at the WA Herbarium

and it was suggested that it might represent a new or un-described taxon. The species *Sida macropoda* is not currently listed as a declared rare or priority flora. Two other species of interest included *Corchorus pumilio* and *Solanum beaugleholei*, which were recognised as possible range extensions from their previously known distribution in the Kimberley region. No weed species were recorded during the survey. A total of eight vegetation associations were identified.

Callawa Biological Assessment Survey (Ecologia 2005b)

As part of BHPBIO's proposal to extend mining activity in the Yarrie and Goldsworthy areas in the north-eastern Pilbara two ore bodies associated with the Cundaline Ridge and Callawa Ridges were to be investigated for further development. During June and September 2005 Ecologia Environment conducted a baseline biological assessment of the Callawa Project area.

The flora and vegetation survey was conducted from 9-17 June 2005, while mapping of the vegetation occurred from 12-14 September 2005. In the two months prior to the survey less than 8 mm of rainfall had been recorded for areas surrounding the Callawa Project area (Marble Bar and Port Hedland) suggesting that the seasonal conditions were not ideal (BOM 2012b). Therefore it is possible that the full compliment of annuals and semi-perennials in the area may not have been recorded during the survey. However, additional searching was conducted during the vegetation mapping phase, which followed a period of favorable rainfall. A total number of 55 quadrats measuring 50 m x 50 m or equivalent area were assessed. The survey recorded 96 total plant taxa from 35 families and 61 genera, 17 families were represented by a single taxon. No Endangered or Vulnerable species listed under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* or DRF species listed under the *Western Australian Wildlife Conservation Act 1950* were recorded from the project area. There was no Priority flora recorded with the exception of *Stemodia* sp. Shay Gap being recorded at two locations. Five flora species of interest were recorded during the survey; two grass species that are endemic to the Pilbara region; *Enneapogon lindleyanus* and *Eriachne tenuiculmis*. *Phyllanthus exilis* and *Solanum beaugleholei* were also recorded and have been recognized as possible range extensions from their known distributions. *Sida* sp. Callawa (now known as *Sida macropoda*) was also recorded at eight locations (it is also known to occur at adjacent Cundaline Ridge Project area). One weed taxon was recorded; **Passiflora foetida* var. *hispida* of which is not listed as a Declared plant under the *Agriculture and Related Resources Protection Act (ARRP Act 1976)*.

Goldsworthy Extension Project Cattle Gorge Haul Road Biological Assessment Survey (Ecologia 2005c)

Development of orebodies such as Cattle Gorge was being considered as part of BHPBIO's proposal to extend mining activity in the north-eastern Pilbara in 2005. The proposed Cattle Gorge mine was to be serviced by the Yarrie Mining Operations with a haul road to be constructed between the two areas. During October 2005 Ecologia Environment was commissioned to conduct a biological assessment of the proposed haul road corridor.

The seasonal conditions during the flora and vegetation component of the survey were satisfactory as some annuals and semi-perennials were recorded in addition to perennial plant species. Some may not have been recorded as a consequence of residual effects of dry weather preceding the survey. The flora and vegetation

component of the survey was conducted from 19-21 January 2005. A targeted search for DRF and priority flora was completed on 11 May. The survey included 10 quadrats, each measuring 50 m x 50 m or equivalent area. There were 102 plant taxa recorded from 26 families and 57 genera. This included a total of 90 flora species, 29 subspecies, varieties and forms determined from the flora recorded in the area. Nine plant families were represented by a single taxon. No Endangered or Vulnerable species listed under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* or DRF species listed under the *Western Australian Wildlife Conservation Act 1950* were recorded from the project area. One Priority Flora species being *Acacia glaucocaesia* (Priority 3) was recorded in the Project area. During the targeted survey up to 6 sub-populations were recorded in an area close to the proposed haul road corridor. Three weed species were recorded from the Study area; **Cenchrus ciliaris*, **Chloris virgata* and **Citrullus colocynthis*. None of the above weeds are Declared Plants under the *ARRP Act (1976)*. A total of eight vegetation associations were identified within the Project area.

Goldsworthy Extension Biological Assessment Survey (Ecologia Environment 2005d)

As part of a feasibility study in to the Goldsworthy Extension Project a baseline flora and vegetation survey was conducted by Ecologia in 1998 to 2004. The Project Area included four sites; Yarrie, Cattle Gorge, Nimingarra and Sunrise Hill. The Survey of Yarrie was carried out in 1998 and the other surveys where conducted in 2004. A total of 140 flora survey sites were sampled.

Yarrie

The survey took place from the 3rd-9th June 1998. Approximately 54mm had fallen in the three months prior to the survey with the majority of this (46mm) received in March. A total of 209 taxa from 37 families and 105 genera were collected from the Yarrie Study area. The most frequently represented families where Poaceae (30 taxa), Papilionaceae (22 taxa), Mimosaceae (16 taxa), Malvaceae (12 taxa) and Myrtaceae (11 taxa). The most specious genera were *Acacia* (16 taxa), *Eucalyptus, Ptilotus* and *Eriachne* (all with 6 taxa). No threatened flora or DRF were recorded from the Survey area however two Priority species were recorded; *Euphorbia clementii* (Priority 2) and *Euphorbia inappendiculata* (Priority 3). Four introduced species were recorded; **Cenchrus ciliaris, *Aerva javanica, *Vachellia farnesiana,* and **Chloris gayana*. None of these species are listed as Declared Weeds by the Department of Agriculture and Food. A total of twelve vegetation communities were recorded at Yarrie.

Cattle Gorge

The survey of Cattle Gorge was conducted between 3rd-7th February and 11th-14th March 2004. Approximately 49 mm of rain had fallen in the 3 months prior to the survey with the majority received in December (25mm). A total of 126 taxa were recorded from 23 families and 33 genera in the Cattle Gorge area and 24 families, and 44 genera from the proposed rail corridor. The most frequently represented families were Mimosaceae (17 taxa), Poaceae (15 taxa), Malvaceae (13 taxa), Tiliaceae (12 taxa) and Papilionaceae (11 taxa). No Threatened, DRF or Priority species were recorded from the Study area. **Malvastrum americanum* was the only weed species recorded. A total of seven vegetation associations where described within the Cattle Gorge Study area.

Nimingarra

The survey of Nimingarra took place between 20th-28th of October 2004. Additional

survey work was undertaken between 12th-14th January 2005. No rainfall was recorded in the three months preceding the survey. A total of 183 flora taxa were recorded from 41 families and 149 genera. The plant families that recorded the highest number of species were: Poaceae (23 taxa), Mimosaceae (19 taxa), Papilionaceae (19 taxa), Malvaceae (13 taxa) and Amaranthaceae (11 taxa). The genera with the most species recorded were: *Acacia* (19 taxa), *Sida* and *Ptilotus* (eight taxa each), *Tephrosia* (eight taxa), and *Eriachne* and *Solanum* (five taxa each). No Threatened, DRF or Priority flora were recorded from the Study area. **Aerva javanica* was the only introduced species recorded from the Study area. The vegetation of Nimingarra and Sunrise Hill were classified together due to their close proximity. A total of 26 vegetation communities were recorded from the two areas. The vegetation types were further classified in to four categories; Forest, Woodland, Scattered trees over shrubland, and various shrubland types over grasses and spinifex.

Sunrise Hill

The survey of Sunrise Hill was undertaken between 29th October - 8th November 2004. The mapping for this area was completed between the 15th-18th January 2005. No rainfall was recorded in the three months before the survey. A total of 201 flora taxa from 45 families and 100 genera were recorded from Sunrise Hill. The plant families that recorded the highest number of species were Poaceae (31 taxa), Mimosaceae (25 taxa), Papilionaceae, Amaranthaceae, Asteraceae (11 taxa each), Myrtaceae (nine taxa) and Tiliaceae (nine taxa). The genera with the most recorded species were: *Acacia* (24 taxa), *Ptilotus* and *Eriachne* (eight taxa each), *Triodia* / *Senna* / *Triumfetta* and *Sida* (five taxa each). No Threatened, DRF or Priority flora were recorded from the Study area. Three introduced species were recorded from the Study area **Aerva javanica, *Cenchrus ciliaris* and **Nerium oleander*.

Goldsworthy Extension Project Follow-up Flora Surveys (Ecologia Environment 2005e)

A targeted follow up Survey was conducted by Ecologia at the Yarrie, Nimingarra and Sunrise Hill mining operations as part of the Goldsworthy Expansion. The aims of the survey were to:

- Conduct targeted pre clearance flora surveys for planned disturbance areas at Nimingarra and Sunrise Hill; and
- Conduct targeted follow up surveys for *Stemodia* sp. Shay Gap, *Corymbia* sp. (GLD(SRH 71.08)) and *Erythrophleum chlorostachys* that have previously been recorded within the area.

The survey was completed from the 2nd -11 May 2005. Adequate rainfall was received in the months preceding the survey. An additional 27 species were recorded during the follow up survey at Nimingarra and an additional 9 species were recorded at Sunrise Hill. One Priority species was recorded; *Euphorbia clementii* (Priority 2). A species of interest *Gyrostemon tepperi* was also recorded during the survey. This species is usually found further east and constitutes a range extension. *Stemodia* sp. Shay Gap was recorded in the gorge environments of the Study area with a total of approximately 600 individuals recorded. This species is not listed on FloraBase. *Erythrophleum chlorostachys* was recorded along a 15 km long section of the Pardoo Access Road east of Nimingarra, from just north of the Borefields Road intersection to just north of the Goldsworthy Access Road. The population seemed to be associated with the road and was found growing on either side (west and east), with few plants further than 80 m from the road edge.

Corymbia sp. (GLD(SRH 71.08)) was not recorded at any new locations despite extensive searches in similar habitats.

Ord Ridley Exploration Lease Flora and Vegetation Assessment (ENV Australia 2007)

A level 2 Flora and Vegetation survey of the Ord Ridley Exploration lease was conducted between the 28th March to 3rd April 2007. In the three months preceding the survey Pardoo station received 592.4 mm of rainfall. A total of 90 quadrats were assessed. One hundred and fifty three taxa were recorded from 38 families. No flora of conservation significance were recorded from the Study area. A total of eight introduced species were recorded; **Aerva javanica*, **Cenchrus ciliaris*, **Chloris barbata*, **Cucumis melo* subsp. *agrestis*, **Cynodon dactylon*, **Indigofera oblongifolia*, **Parkinsonia aculeata*, and **Passiflora foetida* var. *hispida*. **Parkinsonia aculeata* is listed as a Declared Plant by the Department of Agriculture and Food. Eleven broad habitats were identified in the Ord Prospect and nine in the Ridley Prospect. Most sites were considered to be in Very Good to Excellent condition. Disturbances recorded included drill pads and tracks, introduced species and grazing.

Goldsworthy Iron Ore Mining Operations – Cundaline and Callawa Mining Operations Flora and Vegetation Assessment (ENV 2008)

Ecologia Environment completed the original flora and survey work on the Callawa and Cundaline ridges in 2005, on behalf of the Goldsworthy Iron Ore Mining Operations (Ecologia 2005a, 2005b). ENV completed a supplementary flora survey in March 2008.

A total of 147 plant taxa were recorded in the Callawa survey area and 193 plant taxa were recorded from the Cundaline survey area. No Endangered or Vulnerable species listed under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* or DRF species listed under the *Western Australian Wildlife Conservation Act 1950* were recorded from the Callawa and Cundaline Study areas and none are considered likely to occur. No Priority Flora species are likely to be significantly impacted by the planned Callawa and Cundaline mining operations. Two Priority Flora species recorded within the Cundaline Study area are outside the planned disturbance areas, namely *Euphorbia clementii* (Priority 2) and *Goodenia nuda* (Priority 4). One Priority Flora species has been previously recorded in the Callawa Study area, *Euphorbia inappendiculata* (Priority 3). Six introduced species were recorded; **Cenchrus ciliaris*, **Echinochloa colona* (Awnless Barnyard Grass), **Chloris virgata* (Feathertop Rhodes Grass), **Portulaca oleracea* and **Passiflora foetida* var. *hispida* (Passion flower) occurred within the Callawa Study area, and **Cenchrus ciliaris*, **Portulaca oleracea*, **Chloris virgata* and **Cucumis melo* subsp. *agrestis* (Ulcardo Melon) were recorded within the Cundaline Study area. A total of 14 vegetation associations were identified in the Callawa Study area and 21 vegetation associations were recorded in the Cundaline Study area. Both Study areas comprised mainly woodlands and shrublands. No vegetation communities recorded are listed as Threatened Ecological Communities, Priority Ecological Communities or are considered to be of regional significance.

Goldsworthy Rail Duplication Flora and Vegetation Assessment (ENV Australia 2009)

In October 2008 ENV Australia completed a flora and vegetation assessment of BHP Iron Ore's proposed Goldsworthy Ril Duplication at Port Hedland. The field survey was completed between 14-16 October 2008. The seasonal conditions were poor with Port Hedland having received only 145mm for the months between January

and October and 0.4mm in the tree months prior to the survey. A total of 141 taxa were recorded from the area from 36 families and 81 genera. The most commonly recorded families were Poaceae (26 taxa), Mimosaceae (15 taxa) and Papilionaceae (14 taxa). The most frequently recorded genera were *Acacia* (14 taxa), *Sida* (6 taxa) and *Ptilotus* (6 taxa). None of the flora recorded are listed as Threatened, however one Priority species was recorded; *Tephrosia rosea* var. *venulosa*. A total of seven introduced species were recorded; **Tamarix aphylla, *Cenchrus ciliaris, *Aerva javanica, *Stylosanthes hamate, *Chloris virgata, *Citrullus colocynthis* and **Portulaca oleracea*. **Tamarix aphylla* is listed as a declared plant by the Department of Agriculture and Food. Six vegetation types were recorded from the Study area and they ranged in condition from Very Poor to Good. Disturbances within the Study area include disturbance from the construction and operation of the existing rail line as well as cattle and introduced species.

Shay Gap Aerodrome and Yarrie Area A and Yarrie Area B Level 2 Flora and Vegetation Survey and Level 1 Fauna Survey (Onshore Environmental 2010)

Onshore Environmental was commissioned to undertake a one-season Level 2 Flora and Vegetation Survey at 3 relatively small survey areas at the Mt. Goldsworthy Mining Operations from 9-15 September 2010. The survey information was required to support a Native Vegetation Clearing Permit (NVCP) application to disturb areas for the expansion of the existing Shay Gap Aerodrome and the development of a crushing area to replace the existing facility at Cattle Gorge.

The seasonal conditions of the survey were satisfactory during September 2010. Rainfall at Yarrie between January and October 2010 was below average, totaling 218.8 mm. Good summer rainfall occurred during the months of December 2009 (212.6 mm) and January 2010 (99.4 mm) with above average winter rainfall received during the months of July 2010 (64.4 mm) and September (32.4 mm). The flora and vegetation component of the survey was conducted from 9-15th September 2010 where 48 quadrats measuring 50 m x 50 m or equivalent area were assessed. There were 165 plant taxa (including varieties and subspecies) recorded from 37 families and 93 genera. No Endangered or Vulnerable species listed under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* or DRF species listed under the *Western Australian Wildlife Conservation Act 1950* were recorded from the project area. There was no Priority flora recorded at any of the three areas. Five weed species were recorded across the three survey areas; **Aerva javanica*, **Cenchrus ciliaris*, **Chloris virgata*, **Cucumis melo* subsp. *agrestis* and **Portulaca oleracea*. None of the above weeds are Declared plants under the *ARRP Act (1976)*.

Yarrie Mine Site Weed Survey and Mapping (Astron 2011a)

Astron was commissioned by BHPBIO to undertake a weed survey and mapping field visit at the Yarrie Mine Site during August and September 2011 aiming to conduct a targeted survey for all weed species including details on the distribution of all weed species identified within the survey areas. A total of three targeted survey areas within the Yarrie Mine Site were identified by BHPBIO the survey occurred between 31st August and 5th September 2011.

The seasonal conditions during the survey were less than ideal as the total rainfall in the two months prior to the visit was 9.8 mm, which is below average for the area. Astron used their own Weed Survey Mapping Methodology along with BHPBIO WAIO Weed Mapping Procedure to capture data. Astron's methodology uses a series of Weed Record Points (WRPs) described as 5 m x 5 m single GPS references points,

assessed for a series of attributes for a single species at a single day or time. They are captured at set intervals throughout the survey area. A total number of WRPs assessed during the survey was not found in the report. As survey targeted weeds, no total taxa, Declared Rare Flora, Priority Flora or Vegetation Associations were recorded.

A total of 20 weed species were recorded during the survey, 16 of which had not been previously recorded in prior surveys. Weeds previously recorded in prior surveys were **Aerva javanica*, **Cenchrus ciliaris*, **Chloris virgata* and **Vachellia farnesiana*. The weeds not previously recorded were **Cenchrus setiger* (Birdwood Grass), **Citrullus colocynthis*, **Conyza bonariensis* (Flaxleaf Fleabane), **Cucumis melo* subsp. *agrestis*, **Cynodon dactylon* (Couch), *Digitaria ciliaris (Summer Grass), **Echinochloa colona*, **Euphorbia hirta* (Asthma Plant), **Flaveria trinervia* (Speedy Weed), **Gomphrena celasiodes* (Gomphrena Weed), **Oxalis corniculata* (Yellow Wood Sorrel), **Polycarpon tetraphyllum* (Fourleaf Allseed), **Solanum nigrum* (Blackberry Nightshade), **Sonchus oleraceus* (Common Sowthistle), **Tridax procumbens*, potentially an unconfirmed species *Tribulus* sp. (possibly **Tribulus terrestris* (Caltrop)). None of the above weeds are declared plants under the *ARRP Act (1976)*.

**Portulaca oleracea* was also detected during the survey. At the time of the report according to Astron it was listed as a weed species on FloraBase, but it was not included in the Department of Environment and Conservation (DEC) Invasive Plant Prioritisation Process (IPPP) weed assessment for the Pilbara region due to the fact that it was considered to be a native in bush areas in this region (Greg Keighery pers. comm. as cited in Astron 2011).

<u>Nimingarra and Shay Gap Vegetation and Flora Survey (Astron Environmental Services 2011b)</u>

BHP Billiton Iron Ore wishes to recommence mining along the Goldsworthy Strip including the areas between Nimingarra in the west and Yarrie in the east. Astron Environmental Services undertook the first season of a Level Two flora survey between 14-25th March and the 11-20th April 2011. Seasonal conditions at the time of survey were good as significant rainfall was received in the summer prior to the survey. A total of 344 taxa from 49 families and 153 genera were recorded. *Acacia* was the genus with the greatest number of species. No DRF were recorded during the survey, however, a total of three Priority species were recorded; *Rothia indica* subsp. *australis* (Priority 1), *Croton aridus* (Priority 3), and *Nicotiana umbratica* (Priority 3). A total of 17 introduced species were recorded. Two of these species, **Jatropha gossypiifolia* (Bellyache Bush) and **Calotropis procera* (Calotrope), are listed as Declared Plant species under the *Agriculture and Related Resources Protection Act, 1976*. Thirty seven vegetation associations were described within the Study area, none of which were consider to be TECs or PECs. Vegetation condition across the Study area ranged from Good to Excellent with the major disturbances recorded being weeds, grazing, mining operations and previous clearing. Additionally approximately 10% of the Study area had been burnt in the past 12-18 months.

APPENDIX 2

Vegetation Classifications for the Pilbara based on Specht (1970), as modified by Aplin (1979) and Trudgen (2009).

Height Class	Canopy Cover				
	100 - 70%	70 - 30%	30 - 10%	10 - 2%	< 2%
Trees > 30 m	High Closed Forest	High Open Forest	High Woodland	High Open Woodland	Scattered Tall Trees
Trees 10-30 m	Closed Forest	Open Forest	Woodland	Open Woodland	Scattered Trees
Trees < 10 m	Low Closed Woodland	Low Open Forest	Low Woodland	Low Open Woodland	Scattered Low Trees
Mallee	Closed Mallee	Mallee	Open Mallee	Very Open Mallee	Scattered Mallees
Shrubs > 2 m	Closed Scrub	Open Scrub	High Shrubland	High Open Shrubland	Scattered Tall Shrubs
Shrubs 1-2 m	Closed Heath	Open Heath	Shrubland	Open Shrubland	Scattered Shrubs
Shrubs < 1 m	Low Closed Heath	Low Open Heath	Low Shrubland	Low Open Shrubland	Low Scattered Shrubs
Hummock Grass	Closed Hummock Grassland	Hummock Grassland	Open Hummock Grassland	Very Open Hummock Grassland	Scattered Hummock Grass
Tussock Grass	Closed Tussock Grassland	Tussock Grassland	Open Tussock Grassland	Very Open Tussock Grassland	Scattered Tussock Grass
Bunch Grass	Closed Bunch Grassland	Bunch Grassland	Open Bunch Grassland	Very Open Bunch Grassland	Scattered Bunch Grass
Sedges	Closed Sedges	Sedges	Open Sedges	Very Open Sedges	Scattered Sedges
Herbs	Closed Herbs	Herbs	Open Herbs	Very Open Herbs	Scattered Herbs

Source: S. Van Leeuwen (DEC)

APPENDIX 3

Vegetation condition scale
(as developed by Keighery 1994)

CONDITION	CODE	DESCRIPTION
Pristine	1	Pristine or nearly so, no obvious signs of disturbance.
Excellent	2	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	3	Vegetation structure altered; obvious signs of disturbance.
Good	4	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it.
Degraded	5	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching Very Good condition without intensive management.
Completely Degraded	6	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species.

APPENDIX 4

Conservation categories for flora described under the EPBC Act.

CATEGORY	DESCRIPTION
Extinct	A species is extinct if there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild	A species is categorised as extinct in the wild if it is only known to survive in cultivations, in captivity, or as a naturalised population well outside its past range; or if it has not been recorded in its known/expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered	The species is facing an extremely high risk of extinction in the wild and in the immediate future.
Endangered	The species is likely to become extinct unless the circumstances and factors threatening its abundance, survival, or evolutionary development cease to operate; or its numbers have been reduced to such a critical level, or its habitats have been so drastically reduced, that it is in immediate danger of extinction.
Vulnerable	Within the next 25 years, the species is likely to become endangered unless the circumstances and factors threatening its abundance, survival or evolutionary development cease to operate.
Conservation Dependent	The species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

APPENDIX 5

Conservation Codes for Western Australian Flora.

R: Declared Rare Flora - Extant Taxa

Taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.

1: Priority One - Poorly Known Taxa

Taxa that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.

2: Priority Two - Poorly Known Taxa

Taxa that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.

3: Priority Three - Poorly Known Taxa

Taxa that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Taxa may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.

4: Priority Four - Rare, Near Threatened and other taxa in need of monitoring

(a) **Rare.** Taxa that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.
(b) **Near Threatened**. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
(c) Taxa that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

5: Priority Five - Conservation Dependent taxa

Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxa becoming threatened within five years.

APPENDIX 6

Records of conservation significant flora from the study area

Date Observed	Taxon	Conservation Code	Soil / Landform	Vegetation Association	Easting GDA94	Northing GDA94	Reference
13/06/2008	*Euphorbia clementii* (just outside study area to south-east)	Priority 2	Red silty loam on plain	Open Scrub of *Acacia acradenia* over Hummock Grassland of *Triodia pungens* and *Triodia wiseana* with and open Low Mallee of *Eucalyptus odontocarpa*	764955	7746154	Pilbara Flora 2008
02/09/2012	*Phyllanthus aridus*	Priority 3	Brown sandy loam on sandstone cliff / ridge	High Shrubland of *Terminalia canescens, Carissa lanceolata* and *Ehretia saligna* with Low Open Woodland of *Terminalia canescens, Atalaya hemiglauca* and *Ehretia saligna* over Very Open Hummock Grassland of *Triodia epactia*	762889	7746319	Onshore Environmental 2012

APPENDIX 7

Records for introduced weed species recorded from the study area

Easting GDA94	Northing GDA94	Genus	Species	Subsp_Var	% Cover	No. Plants
Onshore Environmental (2012)						
764027	7748838	*Aerva	javanica			10
764160	7747905	*Aerva	javanica		<1	5
764339	7747746	*Aerva	javanica			14
765709	7749388	*Aerva	javanica			30
758846	7746158	*Calotropis	procera			1
759982	7749540	*Calotropis	procera			1
759982	7749540	*Calotropis	procera			1
763988	7748829	*Calotropis	procera			2
764027	7748838	*Calotropis	procera			2
755111	7749997	*Cenchrus	ciliaris			30
755127	7746959	*Cenchrus	ciliaris		8	>100
755599	7746522	*Cenchrus	ciliaris		<1	5
755601	7745604	*Cenchrus	ciliaris		2	~50
756438	7749401	*Cenchrus	ciliaris		2	~100
756450	7745705	*Cenchrus	ciliaris		15	>100
756468	7748503	*Cenchrus	ciliaris		<1	~5
756510	7748137	*Cenchrus	ciliaris			30
757391	7745722	*Cenchrus	ciliaris		20	>100
757496	7745500	*Cenchrus	ciliaris		3.5	~50
757497	7744554	*Cenchrus	ciliaris		3	~150
757521	7749887	*Cenchrus	ciliaris			
758545	7749678	*Cenchrus	ciliaris		0.5	10
759415	7745690	*Cenchrus	ciliaris		0.5	~20
759620	7717561	*Cenchrus	ciliaris		5	>200
759982	7749540	*Cenchrus	ciliaris		5	
759982	7749540	*Cenchrus	ciliaris		90	
760529	7747880	*Cenchrus	ciliaris		<1	
760964	7748039	*Cenchrus	ciliaris		2	
762117	7748669	*Cenchrus	ciliaris		10	
762609	7749575	*Cenchrus	ciliaris		<1	>1
762828	7748528	*Cenchrus	ciliaris		5	
762889	7746319	*Cenchrus	ciliaris		<1	
762910	7748781	*Cenchrus	ciliaris		30	
763071	7748864	*Cenchrus	ciliaris		30	
763485	7748621	*Cenchrus	ciliaris			
763994	7747928	*Cenchrus	ciliaris			
764027	7748838	*Cenchrus	ciliaris			3
764160	7747905	*Cenchrus	ciliaris		40	>1000
764264	7748834	*Cenchrus	ciliaris		0.5	~50
764339	7747746	*Cenchrus	ciliaris		40	
764647	7748276	*Cenchrus	ciliaris		50	
764661	7748400	*Cenchrus	ciliaris		40	

Easting GDA94	Northing GDA94	Genus	Species	Subsp_Var	% Cover	No. Plants
755127	7746959	*Cenchrus	setiger		0.5	>50
755790	7748661	*Cenchrus	setiger		5	
756396	7744741	*Cenchrus	setiger		7	
756510	7748137	*Cenchrus	setiger			10
757391	7745722	*Cenchrus	setiger		25	>100
757496	7745500	*Cenchrus	setiger		3.5	~50
758545	7749678	*Cenchrus	setiger		0.5	10
759620	7717561	*Cenchrus	setiger		1	~50
760528	7769603	*Cenchrus	setiger		1	
762609	7749575	*Cenchrus	setiger		<1	>1
763071	7748864	*Cenchrus	setiger		30	
759982	7749540	*Cynodon	dactylon		5	
762736	7748573	*Cynodon	dactylon		5	
762828	7748528	*Cynodon	dactylon		5	
758652	7746497	*Cynondon	dactylon		0.5	>100
758924	7747285	*Cynondon	dactylon		<1	~50
763258	7746042	*Passiflora	foetida	var. hispida	<1	1
759982	7749540	*Tamarix	aphylla			1
762736	7748573	*Tamarix	aphylla			1
755127	7746959	*Vachellia	farnesiana		0.5	15
756468	7748503	*Vachellia	farnesiana		<1	
756510	7748137	*Vachellia	farnesiana			1
756782	7747591	*Vachellia	farnesiana			1
757496	7745500	*Vachellia	farnesiana		<1	
757497	7744554	*Vachellia	farnesiana		1	
758382	7745666	*Vachellia	farnesiana		<1	
758500	7747999	*Vachellia	farnesiana		<1	1
758545	7749678	*Vachellia	farnesiana		<1	5
758647	7748683	*Vachellia	farnesiana			15
758666	7749549	*Vachellia	farnesiana		<1	
758924	7747285	*Vachellia	farnesiana		<1	3
759446	7748576	*Vachellia	farnesiana		6	
759620	7717561	*Vachellia	farnesiana		1	~10
759863	7747679	*Vachellia	farnesiana			1
759982	7749540	*Vachellia	farnesiana			25
760054	7745097	*Vachellia	farnesiana		<1	1
760341	7748722	*Vachellia	farnesiana		<1	
760528	7769603	*Vachellia	farnesiana		1	
760529	7747880	*Vachellia	farnesiana		<1	
760964	7748039	*Vachellia	farnesiana			1
764290	7747816	*Vachellia	farnesiana			2
747613	7587491	*Vachellia	farnesiana			25
Pilbara Flora (2008)						

Easting GDA94	Northing GDA94	Genus	Species	Subsp_Var	% Cover	No. Plants
763947	7747279	*Aerva	javanica		1	
763977	7747312	*Aerva	javanica			
764217	7747842	*Aerva	javanica			
764409	7748621	*Aerva	javanica		<1	
764660	7746502	*Aerva	javanica			
764827	7747908	*Calotropis	procera			
762293	7749268	*Cenchrus	ciliaris		2	
762323	7749246	*Cenchrus	ciliaris			
762462	7748862	*Cenchrus	ciliaris			
762505	7748617	*Cenchrus	ciliaris			
762514	7749182	*Cenchrus	ciliaris			
762522	7748805	*Cenchrus	ciliaris		10	
762553	7749203	*Cenchrus	ciliaris		1	
762579	7748599	*Cenchrus	ciliaris		35	
762951	7748745	*Cenchrus	ciliaris			
762990	7748711	*Cenchrus	ciliaris		10	
763030	7749173	*Cenchrus	ciliaris		2	
763069	7749161	*Cenchrus	ciliaris			
763105	7748675	*Cenchrus	ciliaris			
763133	7748655	*Cenchrus	ciliaris		40	
763166	7747308	*Cenchrus	ciliaris			
763172	7747312	*Cenchrus	ciliaris		<1	
763235	7749561	*Cenchrus	ciliaris			
763365	7748641	*Cenchrus	ciliaris		70	
763384	7748609	*Cenchrus	ciliaris			
763580	7748281	*Cenchrus	ciliaris		3	
763625	7748279	*Cenchrus	ciliaris			
763698	7748847	*Cenchrus	ciliaris			
763720	7748823	*Cenchrus	ciliaris		10	
763947	7747279	*Cenchrus	ciliaris		1	
764075	7747905	*Cenchrus	ciliaris		30	
764076	7747871	*Cenchrus	ciliaris			
764091	7748700	*Cenchrus	ciliaris		5	
764126	7748705	*Cenchrus	ciliaris			
764178	7748677	*Cenchrus	ciliaris			
764185	7748710	*Cenchrus	ciliaris		<1	
764217	7747842	*Cenchrus	ciliaris			
764409	7748621	*Cenchrus	ciliaris		2	
764660	7746502	*Cenchrus	ciliaris			
765068	7749363	*Cenchrus	ciliaris			
765087	7749393	*Cenchrus	ciliaris		2	
766169	7747413	*Cenchrus	ciliaris			
766490	7747109	*Cenchrus	ciliaris			

Easting GDA94	Northing GDA94	Genus	Species	Subsp_Var	% Cover	No. Plants
766549	7747084	*Cenchrus	*ciliaris*		<1	
762505	7748617	*Tamarix	*aphylla*			
762579	7748599	*Tamarix	*aphylla*		<1	
762951	7748745	*Vachellia	*farnesiana*			
762990	7748711	*Vachellia	*farnesiana*		<1	
763365	7748641	*Vachellia	*farnesiana*		1	
763384	7748609	*Vachellia	*farnesiana*			

APPENDIX 8

Total flora list from the Study area

FAMILY	SPECIES	Pilbara Flora 2008	Onshore 2012
ACANTHACEAE	*Rostellularia adscendens var. clementii*		*
AIZOACEAE	*Trianthema pilosa*	*	*
AIZOACEAE	*Trianthema triquetra*	*	*
AMARANTHACEAE	**Aerva javanica*	*	
AMARANTHACEAE	*Achyranthes aspera*		*
AMARANTHACEAE	*Alternanthera nana*		*
AMARANTHACEAE	*Alternanthera nodiflora*		*
AMARANTHACEAE	*Amaranthus mitchellii*	*	
AMARANTHACEAE	*Gomphrena affinis subsp. pilarensis*	*	*
AMARANTHACEAE	*Gomphrena canescens subsp. canesens*	*	*
AMARANTHACEAE	*Gomphrena cunninghamii*		*
AMARANTHACEAE	*Ptilotus arthrolasius*	*	*
AMARANTHACEAE	*Ptilotus axillaris*	*	*
AMARANTHACEAE	*Ptilotus calostachyus var. calostachyus*	*	*
AMARANTHACEAE	*Ptilotus fusiformis*	*	*
AMARANTHACEAE	*Ptilotus murrayi*		*
AMARANTHACEAE	*Ptilotus nobilis*	*	*
AMARANTHACEAE	*Ptilotus obovatus*		*
AMARANTHACEAE	*Ptilotus polystachyus*	*	
APOCYNACEAE	**Calotropis procera*	*	*
APOCYNACEAE	*Carissa lanceolata*	*	*
APOCYNACEAE	*Cynanchum floribundum*	*	
ARALIACEAE	*Trachymene oleracea subsp. oleracea*	*	*
ASTERACEAE	*Blumea tenella*	*	
ASTERACEAE	*Centipeda minima subsp. macrocephala*		*
ASTERACEAE	*Pluchea ferdinandi-muelleri*	*	
ASTERACEAE	*Pluchea rubelliflora*	*	*
ASTERACEAE	*Pluchea tetranthera*	*	*
ASTERACEAE	*Pterocaulon serrulatum*	*	*
ASTERACEAE	*Pterocaulon sphacelatum*	*	*
ASTERACEAE	*Pterocaulon sphaeranthoides*	*	*
ASTERACEAE	*Streptoglossa decurrens*		*
ASTERACEAE	*Streptoglossa odora*		*
BIGNONIACEAE	*Dolichandrone heterophylla*	*	*
BORAGINACEAE	*Ehretia saligna*		*
BORAGINACEAE	*Halgania solanacea var. solanacea*	*	*
BORAGINACEAE	*Heliotropium ammophilum*		*
BORAGINACEAE	*Heliotropium chrysocarpum*	*	*
BORAGINACEAE	*Heliotropium crispatum*		*
BORAGINACEAE	*Heliotropium pachyphyllum*	*	*
BORAGINACEAE	*Heliotropium tenuifolium*		*
BORAGINACEAE	*Heliotropium transforme*		*
BORAGINACEAE	*Heliotropium vestitum*	*	
BORAGINACEAE	*Trichodesma zeylanicum var. zeylanicum*		*
BRASSICACEAE	*Lepidium pholidogynum*		*

FAMILY	SPECIES	Pilbara Flora 2008	Onshore 2012
CAPPARACEAE	*Capparis lasiantha*		*
CAPPARACEAE	*Capparis spinosa*	*	
CAPPARACEAE	*Cleome uncifera*	*	*
CAPPARACEAE	*Cleome viscosa*	*	*
CARYOPHYLLACEAE	*Polycarpaea corymbosa*		*
CARYOPHYLLACEAE	*Polycarpaea holtzei*		*
CHENOPODIACEAE	*Dysphania rhadinostachya subsp. rhadinostachya*	*	
CHENOPODIACEAE	*Maireana sp. indet.*		*
CHENOPODIACEAE	*Salsola australis*	*	*
CHENOPODIACEAE	*Sclerolaena costata*		*
CHENOPODIACEAE	*Sclerolaena cuneata*		*
COMBRETACEAE	*Terminalia canescens*	*	*
CONVOLVULACEAE	*Bonamia alatisemina*		*
CONVOLVULACEAE	*Bonamia linearis*		*
CONVOLVULACEAE	*Bonamia media var. villosa*	*	*
CONVOLVULACEAE	*Bonamia pannosa*	*	*
CONVOLVULACEAE	*Bonamia rosea*	*	*
CONVOLVULACEAE	*Evolvulus alsinoides var. decumbens*	*	
CONVOLVULACEAE	*Evolvulus alsinoides var. villosicalyx*	*	*
CONVOLVULACEAE	*Ipomoea muelleri*	*	*
CONVOLVULACEAE	*Operculina aequisepala*		*
CONVOLVULACEAE	*Polymeria ambigua*	*	*
CUCURBITACEAE	*Cucumis maderaspatanus*	*	*
CYPERACEAE	*Bulbostylis barbata*		*
CYPERACEAE	*Cyperus vaginatus*		*
CYPERACEAE	*Fimbristylis dichotoma*		*
CYPERACEAE	*Fimbristylis simulans*		*
CYPERACEAE	*Fimbristylis sp. indet.*		*
EUPHORBIACEAE	*Euphorbia alsiniflora*		*
EUPHORBIACEAE	*Euphorbia australis*	*	*
EUPHORBIACEAE	*Euphorbia biconvexa*		*
EUPHORBIACEAE	*Euphorbia boophthona*	*	*
EUPHORBIACEAE	*Euphorbia coghlanii*	*	
EUPHORBIACEAE	*Euphorbia schultzii*	*	
FABACEAE	**Vachellia farnesiana*	*	*
FABACEAE	*Acacia acradenia*	*	*
FABACEAE	*Acacia adoxa var. adoxa*	*	*
FABACEAE	*Acacia adoxa var. subglabra*		*
FABACEAE	*Acacia ancistrocarpa*	*	*
FABACEAE	*Acacia arida*		*
FABACEAE	*Acacia bivenosa*	*	
FABACEAE	*Acacia colei var. colei*	*	*
FABACEAE	*Acacia hilliana*		*
FABACEAE	*Acacia inaequilatera*	*	*

FAMILY	SPECIES	Pilbara Flora 2008	Onshore 2012
FABACEAE	*Acacia maitlandii*	*	
FABACEAE	*Acacia monticola*	*	*
FABACEAE	*Acacia orthocarpa*		*
FABACEAE	*Acacia pyrifolia var. pyrifolia*	*	*
FABACEAE	*Acacia sclerosperma*		*
FABACEAE	*Acacia sericophylla*		*
FABACEAE	*Acacia sphaeostachya*		*
FABACEAE	*Acacia stellaticeps*	*	*
FABACEAE	*Acacia synchronicia*		*
FABACEAE	*Acacia tumida var. pilbarensis*	*	*
FABACEAE	*Alysicarpus muelleri*		*
FABACEAE	*Bauhinia cunninghamii*		*
FABACEAE	*Cajanus cinereus*	*	*
FABACEAE	*Cajanus marmoratus*	*	*
FABACEAE	*Chamaecrista mimosoides*		*
FABACEAE	*Chamaecrista symonii*		*
FABACEAE	*Crotalaria medicaginea var. neglecta*	*	*
FABACEAE	*Crotalaria novae-hollandiae subsp. novae-hollandiae*	*	
FABACEAE	*Crotalaria ramosissima*	*	*
FABACEAE	*Cullen martinii*		*
FABACEAE	*Cullen stipulaceum*	*	*
FABACEAE	*Indigofera colutea*		*
FABACEAE	*Indigofera linifolia*		*
FABACEAE	*Indigofera monophylla*	*	*
FABACEAE	*Indigofera oblongifolia*		*
FABACEAE	*Indigofera trita*	*	*
FABACEAE	*Isotropis atropurpurea*	*	*
FABACEAE	*Jacksonia aculeata*	*	*
FABACEAE	*Leptosema anomalum*		*
FABACEAE	*Neptunia dimorphantha*		*
FABACEAE	*Petalostylis labicheoides*	*	*
FABACEAE	*Rhynchosia minima*	*	*
FABACEAE	*Senna artemisioides subsp. helmsii*	*	
FABACEAE	*Senna artemisioides subsp. oligophylla*	*	*
FABACEAE	*Senna curvistyla*		*
FABACEAE	*Senna glutinosa subsp. glutinosa*	*	*
FABACEAE	*Senna glutinosa subsp. luerssenii*	*	
FABACEAE	*Senna glutinosa subsp. pruinosa*	*	*
FABACEAE	*Senna notabilis*	*	*
FABACEAE	*Senna venusta*	*	*
FABACEAE	*Sesbania cannabina*	*	*
FABACEAE	*Swainsona formosa*	*	
FABACEAE	*Tephrosia monophylla*	*	
FABACEAE	*Tephrosia rosea var. clementii*	*	*

FAMILY	SPECIES	Pilbara Flora 2008	Onshore 2012
FABACEAE	*Tephrosia rosea var. glabrior ms*	*	
FABACEAE	*Tephrosia sp. B Kimberley Flora (C.A. Gardner 7300)*		*
FABACEAE	*Tephrosia sp. Bungaroo Creek (M.E. Trudgen 11601)*	*	*
FABACEAE	*Tephrosia sp. D Kimberley Flora (R.D. Royce 1848)*		*
FABACEAE	*Tephrosia sp. Pilbara (A.L. Payne PRP 1393)*		*
FABACEAE	*Tephrosia virens*	*	*
FABACEAE	*Vigna sp. Hamersley Clay (A.A. Mitchell PRP 113)*		*
FABACEAE	*Zornia albiflora*		*
GENTIANACEAE	*Schenkia clementii*		*
GOODENIACEAE	*Dampiera candicans*	*	*
GOODENIACEAE	*Goodenia armitiana*	*	*
GOODENIACEAE	*Goodenia azurea subsp. hesperia*		*
GOODENIACEAE	*Goodenia microptera*	*	*
GOODENIACEAE	*Goodenia muelleriana*		*
GOODENIACEAE	*Goodenia stobbsiana*	*	*
GOODENIACEAE	*Scaevola parvifolia*		*
GYROSTEMONACEAE	*Codonocarpus cotinifolius*	*	*
LAMIACEAE	*Clerodendrum floribundum var. ovatum*		*
LAURACEAE	*Cassytha capillaris*	*	
LAURACEAE	*Cassytha filiformis*		*
LAURACEAE	*Newcastelia cladotricha*	*	*
LYTHRACEAE	*Ammannia baccifera*		*
MALVACEAE	*Abutilon lepidum*		*
MALVACEAE	*Corchorus elachocarpus*	*	*
MALVACEAE	*Corchorus laniflorus*	*	
MALVACEAE	*Corchorus parviflorus*	*	*
MALVACEAE	*Corchorus pumilio*		*
MALVACEAE	*Corchorus sidoides subsp. vermicularis*	*	
MALVACEAE	*Corchorus tectus?*	*	
MALVACEAE	*Gossypium australe*	*	*
MALVACEAE	*Gossypium robinsonii*	*	
MALVACEAE	*Hibiscus coatesii*	*	*
MALVACEAE	*Hibiscus leptocladus*	*	*
MALVACEAE	*Hibiscus sturtii var. campylochlamys*	*	*
MALVACEAE	*Hibiscus sturtii var. platychlamys*		*
MALVACEAE	*Keraudrenia nephrosperma*		*
MALVACEAE	*Sida arenicola*	*	
MALVACEAE	*Sida arsiniata*		*
MALVACEAE	*Sida cardiophylla*	*	*
MALVACEAE	*Sida echinocarpa*	*	*
MALVACEAE	*Sida rohlenae subsp. rohlenae*	*	*
MALVACEAE	*Sida sp. Pilbara (A.A. Mitchell PRP 1543)*	*	*

FAMILY	SPECIES	Pilbara Flora 2008	Onshore 2012
MALVACEAE	*Sida sp. verrucose glands (F.H. Mollemans 2423)*		*
MALVACEAE	*Sida subarticulata*	*	
MALVACEAE	*Triumfetta chaetocarpa*	*	*
MALVACEAE	*Triumfetta clementii*		*
MALVACEAE	*Triumfetta deserticola*	*	
MALVACEAE	*Triumfetta maconochieana*	*	*
MALVACEAE	*Triumfetta ramosa*		*
MALVACEAE	*Waltheria indica*	*	*
MARSILEACEAE	*Marsilea hirsuta*		*
MENISPERMACEAE	*Tinospora smilacina*	*	
MOLLUGINACEAE	*Glinus lotoides*		*
MOLLUGINACEAE	*Mollugo molluginea*	*	*
MORACEAE	*Ficus brachypoda*	*	*
MYRTACEAE	*Calytrix carinata*	*	*
MYRTACEAE	*Corymbia ?opaca*	*	
MYRTACEAE	*Corymbia flavescens*	*	*
MYRTACEAE	*Corymbia hamersleyana*	*	*
MYRTACEAE	*Corymbia zygophylla*	*	*
MYRTACEAE	*Eucalyptus camaldulensis var. obtusa*	*	*
MYRTACEAE	*Eucalyptus odontocarpa*	*	*
MYRTACEAE	*Eucalyptus victrix*		*
MYRTACEAE	*Melaleuca argentea*		*
NYCTAGINACEAE	*Boerhavia coccinea*		*
NYCTAGINACEAE	*Boerhavia gardneri*	*	
PASSIFLORACEAE	**Passiflora foetida* var. *hispida*		*
PHYLLANTHACEAE	*Flueggea virosa ssp. melanthoides*	*	
PHYLLANTHACEAE	*Leptopus decaisnei*	*	
PHYLLANTHACEAE	*Notoleptopus decaisnei*		*
PHYLLANTHACEAE	*Phyllanthus aridus*		*
PHYLLANTHACEAE	*Phyllanthus maderaspatensis*	*	
PLANTAGINACEAE	*Stemodia grossa*	*	*
PLANTAGINACEAE	*Stemodia kingii*		*
PLANTAGINACEAE	*Stemodia viscosa*	*	
POACEAE	**Cenchrus ciliaris*	*	*
POACEAE	**Cenchrus setiger*		*
POACEAE	**Cynodon dactylon*		*
POACEAE	*Amphipogon sericeus*	*	*
POACEAE	*Aristida contorta*	*	*
POACEAE	*Aristida holathera var. holathera*	*	*
POACEAE	*Aristida inaequiglumis*	*	*
POACEAE	*Brachyachne convergens*		*
POACEAE	*Chloris pectinata*		*
POACEAE	*Chrysopogon fallax*	*	*
POACEAE	*Cymbopogon ambiguus*	*	*

FAMILY	SPECIES	Pilbara Flora 2008	Onshore 2012
POACEAE	*Cymbopogon obtectus*	*	*
POACEAE	*Dactyloctenium radulans*		*
POACEAE	*Dichanthium sericeum subsp. humilis*		*
POACEAE	*Elytrophorus spicatus*		*
POACEAE	*Enneapogon caerulescens*	*	
POACEAE	*Enneapogon lindleyanus*		*
POACEAE	*Enneapogon polystachyus*	*	
POACEAE	*Enneapogon robustissimus*	*	
POACEAE	*Eragrostis cumingii*	*	*
POACEAE	*Eragrostis dielsii*		*
POACEAE	*Eragrostis eriopoda*	*	*
POACEAE	*Eragrostis tenellula*		*
POACEAE	*Eragrostis xerophila*		*
POACEAE	*Eriachne aristidea*	*	*
POACEAE	*Eriachne benthamii*		*
POACEAE	*Eriachne ciliata*		*
POACEAE	*Eriachne flaccida*		*
POACEAE	*Eriachne glauca*		*
POACEAE	*Eriachne helmsii*		*
POACEAE	*Eriachne lanata*	*	*
POACEAE	*Eriachne mucronata*	*	*
POACEAE	*Eriachne obtusa*		*
POACEAE	*Eriachne pulchella subsp. dominii*	v	*
POACEAE	*Eulalia aurea*		*
POACEAE	*Iseilema membranaceum*		*
POACEAE	*Panicum laevinode*		*
POACEAE	*Paraneurachne muelleri*	*	*
POACEAE	*Paspalidium basicladum*	*	
POACEAE	*Paspalidium clementii*		*
POACEAE	*Paspalidium tabulatum*		*
POACEAE	*Perotis rara*		*
POACEAE	*Schizachyrium fragile*		*
POACEAE	*Sporobolus australasicus*	*	*
POACEAE	*Sporobolus mitchellii*		*
POACEAE	*Triodia angusta*	*	
POACEAE	*Triodia epactia*	*	*
POACEAE	*Triodia longiceps*		*
POACEAE	*Triodia schinzii*	*	*
POACEAE	*Triodia wiseana*	*	*
POACEAE	*Triraphis mollis*		*
POACEAE	*Urochloa piligera*		*
POACEAE	*Xerochloa barbata*		*
POACEAE	*Yakirra australiensis*		*
POLYGALACEAE	*Polygala isingii*		*
PORTULACACEAE	*Portulaca pilosa*		*

FAMILY	SPECIES	Pilbara Flora 2008	Onshore 2012
PROTEACEAE	*Grevillea eriostachya*	*	
PROTEACEAE	*Grevillea nematophylla subsp. ?supraplana*	*	
PROTEACEAE	*Grevillea pyramidalis subsp. leucadendron*	*	*
PROTEACEAE	*Grevillea wickhamii subsp. aprica*	*	*
PROTEACEAE	*Grevillea wickhamii subsp. macrodonta*	*	*
PROTEACEAE	*Hakea lorea subsp. lorea*	*	
PROTEACEAE	*Hakea macrocarpa*	*	*
RUBIACEAE	*Oldenlandia crouchiana*		*
RUBIACEAE	*Synaptantha tillaeacea*		*
SAPINDACEAE	*Atalaya hemiglauca*	*	*
SAPINDACEAE	*Dodonaea coriacea*	*	*
SOLANACEAE	*Nicotiana occidentalis*	*	
SOLANACEAE	*Solanum dioicum*	*	*
SOLANACEAE	*Solanum diversiflorum*	*	*
SOLANACEAE	*Solanum ellipticum*	*	
SOLANACEAE	*Solanum horridum*	*	*
TAMARICACEAE	**Tamarix aphylla*	*	
VIOLACEAE	*Hybanthus aurantiacus*	*	*
ZYGOPHYLLACEAE	*Tribulopis angustifolia*		*
ZYGOPHYLLACEAE	*Tribulus hirsutus*		*
ZYGOPHYLLACEAE	*Tribulus macrocarpus*	*	*
ZYGOPHYLLACEAE	*Tribulus platypterus*		*

APPENDIX 9

Site sheets summarizing raw data for 81 quadrats from within the study area; assessed by Onshore Environmental September 2012

Site	Goldsworthy - Site GD001
Date	02/09/2012
Recorder	JW/EP
Photo	EP1; DSC576
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	761835
Northing	7746622
Habitat	Hillslope (HSL)
Aspect	160°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Silty Clay Loam – orange
Rock Type	Ironstone (outcrops, cobbles, pebbles)
% Leaves:Logs	<1:1
Vegetation Condition	Very Good
Disturbance Type	Past exploration; Old drill pads nearby; Track nearby
Fire Age	Old 5=10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* over High Shrubland of *Acacia monticola, Acacia acradenia, Grevillea wickhamii*

Species			% Cover	Height
Acacia	*monticola*		8	1-3
Triodia	*epactia*		45	0.7
Acacia	*inaequilatera*		2	1.5-3
Grevillea	*wickhamii*		4	0.5-2.5
Petalostylis	*labicheoides*		3	1-2.5
Acacia	*acradenia*		8	1.5-2.5
Ptilotus	*calostachyus*		1	1
Polycarpea	*holtzei*		<1	0.1
Acacia	*adoxa*	var. *adoxa*	<1	0.4
Polygala	*isingii*		<1	0.1
Eriachne	*pulchella*		<1	0.1
Fimbristylis	*simulans*		<1	0.2
Fimbristylis	*dichotoma*		<1	0.1
Acacia	*orthocarpa*		1	1-2
Acacia	*arida*		<1	1

Site	Goldsworthy - Site GD002
Date	02/09/2012
Recorder	JB/DR
Photo	DSC00753
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	763606
Northing	7746151
Habitat	Riseslope (RES)
Aspect	160°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Sandy Loam – Brown
Rock Type	Dolerite
% Leaves:Logs	<1:<1
Vegetation Condition	Very Good
Disturbance Type	Fire; Rehabilitation; Mine site; Access track
Fire Age	Young – 1-2 yrs
Vegetation	Hummock Grassland of *Triodia wiseana* and *Triodia epactia* with Low Open Shrubland of *Corchorus parviflorus*, *Tephrosia rosea* var. *clementii* over Scattered Tall Shrubland of *Acacia inaequilatera*

Species			% Cover	Height
Triodia	*wiseana*		62	0.5
Corchorus	*parviflorus*		3	0.4
Solanum	*diversifolium*		<1	0.3
Goodenia	*muelleriana*		<1	0.3
Tephrosia	*rosea*	var. *clementii*	1.5	0.5
Triodia	*epactia*		5	0.3
Oldenlandia	*crouchiana*		<1	0.2
Gomphrena	*cunninghamii*		<1	0.2
Solanum	*horridum*		<1	0.5
Hibiscus	*coatesii*		<1	0.4
Acacia	*inaequilatera*		<1	1-2
Senna	*glutinosa*	subsp. *glutinosa*	<1	1
Bonamia	*media*	var. *villosa*	<1	Cr
Aristida	*holathera*	var. *holathera*	<1	0.5
Mollugo	*molluginea*		<1	0.05
Cleome	*viscosa*		<1	0.5
Ptilotus	*calostachyus*		<1	0.7
Corymbia	*hamersleyana*		<1	3
Pluchea	*tetranthera*		<1	0.3
Ptilotus	*exaltatus*		<1	0.5
Polymeria	*ambigua*		<1	Cr
Grevillea	*wickhamii*		<1	1.5
Acacia	*acradenia*		<1	0.5
Crotalaria	*medicaginea*		<1	0.2
Corchorus	*pumilio*		<1	0.2
Heliotropium	*tenuifolium*		<1	0.15
Tephrosia	sp. Bungaroo Creek (M.E. Trudgen 11601)		<1	0.3

Species			% Cover	Height
Tephrosia	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.2
Polycarpea	*holtzei*		<1	0.05
Pterocaulon	*sphacelatum*		<1	0.25
Tribulus	*platypterus*		<1	1
Triumfetta	*maconochieana*		<1	0.3

Site	Goldsworthy - Site GD003
Date	02/09/2012
Recorder	JW/EP
Photo	EP2; DSC577
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	760654
Northing	7747131
Habitat	Drainage Depression (DDE)
Aspect	140°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Clay Loam –Red
Rock Type	None evident
% Leaves:Logs	0.5:2
Vegetation Condition	Excellent
Disturbance Type	Flooding
Fire Age	Very Old - >10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* over Open Tussock Grassland of *Eragrostis cumingii* with High Shrubland of *Acacia tumida* with Low Open Woodland of *Corymbia hamersleyana* over Open Shrubland of *Trichodesma zeylanicum* var. *zeylanicum*, *Tephrosia rosea* var. *clementii*

Species			% Cover	Height
Corymbia	*hamersleyana*		5	1.5-7
Acacia	*tumida*		12	1.5-4.5
Acacia	*acradenia*		1	1.5-3
Trichodesma	*zeylanicum*	var. *zeylanicum*	3	1-1.5
Cucumis	*maderaspatanus*		<1	Cl
Senna	*notabilis*		<1	0.3
Acacia	*pyrifolia*		<1	1-2
Cajanus	*cinereus*		0.5	2
Pterocaulon	*sphacelatum*		0.5	0.4-1.2
Sida	*rohlenae*	subsp. *rohlenae*	0.5	0.5
Solanum	*dioicum*		<1	0.5
Hybanthus	*aurantiacus*		<1	0.4
Euphorbia	*alsiniflora*		<1	0.8
Triodia	*epactia*		30	0.4-1.2
Indigofera	*colutea*		<1	0.2
Tephrosia	*rosea*	var. *clementii*	<1	1
Eragrostis	*cumingii*		20	0.2
Alternanthera	*nana*		<1	0.2
Acacia	*colei*		<1	2-4
Corymbia	*flavescens*		1	8
Clerodendum	*floribundum*	var. *ovatum*	1	2
Streptoglossa	*odora*		<1	0.2
Triumfetta	*clementii*		<1	0.2
Waltheria	*indica*		0.5	0.6
Trachymene	*oleracea*		<1	1.2
Eriachne	*obtusa*		<1	0.5
Convovulus	sp. *indet*		0.5	Cr

Species			% Cover	Height
Crotalaria	*medicaginea*		<1	0.3
Convolvulus	sp. indet		<1	0.1
Goodenia	*microptera*		<1	0.1
Dampiera	*candicans*		<1	0.3
Pluchea	*tetranthera*		<1	0.4
Eriachne	*ciliata*		<1	0.3
Corchorus	*parviflorus*		<1	0.5
Gomphrena	*cunninghamii*		<1	0.1
Dodonaea	*coriacea*		<1	0.1
Cleome	*viscosa*		<1	0.3
Fimbristylis	*simulans*		<1	0.2
Bulbostylis	*barbata*		<1	0.1
Terminalia	*canescens*		<1	5
Cullen	*martinii*		<1	0.5
Ptilotus	*fusiformis*		<1	0.1
Eriachne	*aristidea*		<1	0.15

Site	Goldsworthy - Site GD004
Date	02/09/2012
Recorder	JB/DR
Photo	102-0721, DSC00754
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	762889
Northing	7746319
Habitat	Cliff (CLI)
Aspect	160°
Slope	Precipitous (PR) (45°1' to 72°)
Soil	Sandy loam – Brown
Rock Type	Sandstone (light coloured- cliffs, boulders)
% Leaves:Logs	2:4
Vegetation Condition	Excellent
Disturbance Type	None evident
Fire Age	Young -1-2 yrs; Old 5-10 yrs
Vegetation	High Shrubland of *Terminalia canescens, Carissa lanceolata, Ehretia saligna* with Low Open Woodland of *Terminalia canescens, Atalaya hemiglauca* over Very Open Hummock Grassland of *Triodia epactia*

Species			% Cover	Height
Gomphrena	*cunninghamii*		2	0.2
Terminalia	*canescens*		15	2-5
Bulbostylis	*barbata*		<1	0.15
Triodia	*epactia*		8	0.4-1.4
Corchorus	*parviflorus*		3.5	0.4
Cymbopogon	*ambiguus*		<1	0.5
Grevillea	*wickhamii*		<1	0.5-1.5
Triumfetta	*maconochieana*		<1	0.3
Trachymene	sp.		<1	0.5
Euphorbia	*biconvexa*		<1	0.25
Acacia	*acradenia*		0.5	0.4-2.5
Carissa	*lanceolata*		1	1-1.5
Phyllanthus	*arida*		<1	0.35
Dampiera	*candicans*		<1	0.5
Tephrosia	*rosea*	var. *clementii*	<1	0.5-1
Isotropis	*atropurpurea*		<1	0.7
Atalaya	*hemiglauca*		1	3
**Cenchrus*	*ciliaris*		<1	0.4
Ehretia	*saligna*		1.5	1.5-2.5
Eriachne	*ciliata*		0.5	0.2
Mollugo	*molluginea*		<1	0.1
Aristida	*holathera*	var. *holathera*	<1	0.5
Hibiscus	*leptocladus*		<1	0.5
Rhynchosia	*minima*		0.5	Cl
Sida	*rohlenae*		<1	0.5
Senna	*venusta*		<1	1
Cyperus	sp. indet		2	0.4
Ptilotus	*obovatus*		<1	0.4

Species			% Cover	Height
Evolvulus	*alsinoides*	var. *villosicalyx*	<1	0.2
Enneapogon	*lindleyanus*		<1	0.5
Cucumis	*maderaspatanus*		<1	Cl
Solanum	*dioicum*		<1	0.4
Indigofera	*monophylla*		<1	0.6
Eriachne	*mucronata*		0.5	0.4
Oldenlandia	*crouchiana*		<1	0.2
Cajanus	*cinereus*		0.5	1.5
Notoleptopus	*decaisnei*		<1	0.4
Solanum	*horridum*		<1	0.1
Streptoglossa	*decurrens*		<1	0.6
Senna	*notabilis*		<1	0.4

Site	Goldsworthy - Site GD005
Date	02/09/2012
Recorder	JW/EP
Photo	EP3;DSC578
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	-
Northing	-
Habitat	Footslope (FOO)
Aspect	160°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Clay Loam – Orange
Rock Type	Sandstone
% Leaves:Logs	<1:<1
Vegetation Condition	Very Good
Disturbance Type	Fence line; Track nearby
Fire Age	Moderate - 2-5 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with Low Open Shrubland of *Corchorus parviflorus*, *Ptilotus calostachyus* with Scattered Shrubs of *Acacia inaequilatera, Grevillea wickhamii*

Species			% Cover	Height
Mollugo	*molluginea*		<1	0.1
Dampiera	*candicans*		<1	0.4
Triodia	*epactia*		40	0.25
Acacia	*inaequilatera*		1	1.2
Corchorus	*parviflorus*		3	0.5
Ptilotus	*calostachyus*		3	1
Acacia	*adoxa*	var. *adoxa*	<1	0.4
Senna	*notabilis*		<1	0.4
Solanum	*dioicum*		<1	0.4
Grevillea	*pyramidalis*		<1	0.5
Indigofera	*monophylla*		<1	0.3
Goodenia	*microptera*		<1	0.4
Goodenia	*muelleriana*		<1	0.4
Eriachne	*ciliata*		<1	0.15
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.5
Hibiscus	*leptocladus*		<1	0.5
Bonamia	*media*	var. *villosa*	<1	0.1
Streptoglossa	*decurrens*		<1	0.5
Gomphrena	*cunninghamii*		<1	0.2
Corchorus	*elachocarpus*		<1	0.2
Grevillea	*wickhamii*		<1	1.5
Oldenlandia	*crouchiana*		<1	0.25
Acacia	*acradenia*		<1	0.5
Heliotropium	*pachyphyllum*		<1	0.2
Ptilotus	*astrolasius*		<1	0.3
Solanum	*diversifolium*		<1	0.4
Eriachne	*obtusa*		<1	0.5

Site	Goldsworthy - Site GD006
Date	02/09/2012
Recorder	JB/DR
Photo	102-0725, DSC00755
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	763365
Northing	7747027
Habitat	Hillslope (HSL)
Aspect	310°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Sandy Loam – Brown
Rock Type	BIF; Ironstone (outcrops, cobbles)
% Leaves:Logs	2:<1
Vegetation Condition	Very Good
Disturbance Type	Rehabilitation; Access track
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with High Shrubland of *Grevillea wickhamii, Acacia tumida, Acacia acradenia* with Very Open Mallee of *Eucalyptus odontocarpa*

Species			% Cover	Height
Acacia	*inaequilatera*		1.5	2-3
Grevillea	*wickhamii*		3.5	2-4
Acacia	*adoxa*		<1	0.5
Bonamia	*media*	var. *villosa*	<1	0.05
Ptilotus	*calostachyus*		<1	0.6-1
Tephrosia	*rosea*	var. *clementii*	<1	0.3
Eriachne	*pulchella*		<1	0.01
Triumfetta	*maconochieana*		<1	0.5
Dampiera	*candicans*		<1	0.2
Acacia	*tumida*	var. *pilbarensis*	3.5	3-5
Bulbostylis	*barbata*		<1	0.01
Petalostylis	*labicheoides*		1-2	1-1.5
Mollugo	*molluginea*		<1	0.1
Indigofera	*monophylla*		<1	0.5
Eucalyptus	*odontocarpa*		2.5	2-2.5
Fimbristylis	*simulans*		<1	0.1
Corymbia	*hamersleyana*		0.5	2-2.5
Acacia	*monticola*		1	2-4
Oldenlandia	*crouchiana*		<1	0.15
Polygala	*isingii*		<1	0.05
Acacia	*acradenia*		3.5	2-3
Eriachne	*ciliata*		<1	0.15
Polycarpea	*holtzei*		<1	0.05
Aristida	*holathera*	var. *holathera*	<1	0.4

Site	Goldsworthy - Site GD007
Date	03/09/2012
Recorder	JW/EP
Photo	EP4; DSC579
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	762634
Northing	7747618
Habitat	Hillcrest (HCR)
Aspect	30°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Clay Loam – Orange
Rock Type	Chert (outcrops, cobbles, pebbles)
% Leaves:Logs	<1:<1
Vegetation Condition	Pristine
Disturbance Type	None evident
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with Open Shrubland of *Acacia acradenia, Grevillea wickhamii* with Scattered Low Trees of *Corymbia hamersleyana*

Species			% Cover	Height
Triodia	*epactia*		35	0.5
Triumfetta	*clementii*		<1	0.4
Grevillea	*pyramidalis*		2	1
Eriachne	*ciliata*		0.5	0.2
Solanum	*dioicum*		<1	0.4
Fimbristylis	*dichotoma*		0.5	0.2
Acacia	*ancistrocarpa*		<1	1
Acacia	*monticola*		<1	1.5
Terminalia	*canescens*		0.5	2
Grevillea	*wickhamii*		2	1-2
Acacia	*acradenia*		5	1.5
Acacia	*inaequilatera*		<1	1
Corymbia	*hamersleyana*		1	5
Polygala	*isingii*		<1	0.01
Trachymene	*oleracea*		<1	0.3
Schizachyrium	*fragile*		<1	0.3
Tephrosia	*rosea*	var. *clementii*	<1	1.2
Oldenlandia	*crouchiana*		<1	0.1
Corchorus	*parviflorus*		<1	0.1
Atalaya	*hemiglauca*		<1	2
Euphorbia	*boopthana*		<1	0.4
Crotalaria	*medicaginea*		<1	0.1
Acacia	*tumida*		<1	2

Site	Goldsworthy - Site GD008
Date	03/09/2012
Recorder	JB/DR
Photo	102-07401, DSC00758
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	763836
Northing	7748188
Habitat	Drainage Depression (DDE)
Aspect	250°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Sandy Loam – Brown
Rock Type	BIF; Chert (scattered outcrops cobbles, pebbles)
% Leaves:Logs	10:1
Vegetation Condition	Very Good
Disturbance Type	Tower; Access track; Old cable
Fire Age	Old – 5-10 yrs
Vegetation	Closed Scrub of *Acacia monticola, Acacia acradenia, Petalostylis labicheoides* over Closed Hummock Grassland of *Triodia epactia* with Scattered Low Trees of *Corymbia hamersleyana*

Species			% Cover	Height
Acacia	*acradenia*		60	2-4
Petalostylis	*labicheoides*		7	2-3
Acacia	*monticola*		70	2-4.5
Acacia	*inaequilatera*		<1	2
Acacia	*ancistrocarpa*		1	2-3
Corymbia	*hamersleyana*		1	3
Triodia	*epactia*		75	1.2
Grevillea	*wickhamii*		5	2-3
Eucalyptus	*odontocarpa*		1	2-2.5
Bonamia	*media*	var. *villos*a	<1	Cr

Site	Goldsworthy - Site GD009
Date	03/09/2012
Recorder	JW/EP
Photo	EP5; DSC580
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	762829
Northing	7748219
Habitat	Gully (GUL)
Aspect	350°
Slope	Steep (ST) (18°1' to 30°)
Soil	Loamy Sand – Brown
Rock Type	Chert (outcrops, pebbles)
% Leaves:Logs	<1:0.5
Vegetation Condition	Excellent
Disturbance Type	Town nearby
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with High Shrubland of *Acacia acradenia, Grevillea wickhamii*

Species			% Cover	Height
Grevillea	*wickhamii*		6	1.5-2.5
Triodia	*epactia*		45	0.3-1.3
Grevillea	*pyramidalis*		<1	1.2
Tephrosia	*rosea*	var. *clementii*	<1	0.8
Eriachne	*ciliata*		<1	0.2
Sida	sp.		<1	1.5
Acacia	*acradenia*		5	1.5-2.5
Bonamia	*media*		<1	Cr
Bulbostylis	*barbata*		<1	0.1
Trachymene	*oleracea*		<1	0.6
Corchorus	*parviflorus*		<1	0.4
Acacia	*ancistrocarpa*		<1	2.5
Acacia	*adoxa*	var. *adoxa*	<1	0.5
Crotalaria	*medicaginea*		<1	0.2
Yakirra	*australiensis*		<1	0.1
Sida	sp.		<1	1.2
Gomphrena	*cunninghamii*		<1	0.1
Dampiera	*candicans*		<1	0.2
Eriachne	*ciliata*		<1	0.2
Corymbia	*hamersleyana*		<1	2

Site	Goldsworthy - Site GD010
Date	03/09/2012
Recorder	JB/DR
Photo	102-0754, DSC00759
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	764264
Northing	7748834
Habitat	Plain (PLA)
Aspect	-
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Sand- Orange
Rock Type	None evident
% Leaves:Logs	4:2
Vegetation Condition	Very Good
Disturbance Type	Rehabilitation (possible); Access tracks; Batter slopes
Fire Age	Very old - >10 yrs
Vegetation	Closed Hummock Grassland of *Triodia schinzii* with Open Scrub of *Acacia ancistrocarpa, Acacia tumida* with Scattered Low Trees of *Corymbia zygophylla*

Species			% Cover	Height
Ptilotus	*astrolasius*		<1	0.5
Acacia	*ancistrocarpa*		55	2-4
Acacia	*tumida*		5	2-3
Triodia	*schinzii*		75	1-1.5
Corymbia	*zygophylla*		1.5	2-2.5
Eriachne	*pulchella*		<1	0.2
Calytrix	*carinata*		<1	0.3
Jacksonia	*aculeata*		<1	0.35
Bonamia	*pannosa*		<1	0.35
Eriachne	*helmsii*		0.5	0.5
Corchorus	*elachocarpus*		<1	0.3
Bonamia	*alatisemina*		<1	0.1
Crotalaria	*ramosissima*		<1	0.2
Eriachne	*aristidea*		<1	0.4
**Cenchrus*	*ciliaris*		0.5	0.5
Cleome	*viscosa*		<1	0.5
Aristida	*holathera*	var. *holathera*	1.5	0.6
Eragrostis	*eriopoda*		0.5	0.4
Tephrosia	sp. D Kimberley Flora (R.D. Royce 1848)		<1	0.2
Ptiltous	*fusiformis*		<1	0.3
Euphorbia	*australis*		<1	0.1

Site	Goldsworthy - Site GD011
Date	03/09/2012
Recorder	JW/EP
Photo	EP5; DSC581
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	762163
Northing	7748948
Habitat	Plain (PLA)
Aspect	-
Slope	Level (LE) (0° to 0°35')
Soil	Sand- Red
Rock Type	None evident
% Leaves:Logs	5:3
Vegetation Condition	Good
Disturbance Type	Livestock; Rubbish – scarp metal; Road Nearby; Rail Nearby
Fire Age	Old – 5-10 yrs
Vegetation	Open Hummock Grassland of *Triodia epactia* over Open Tussock Grassland of *Aristida holathera* var. *holathera* with Very Open Mallee of *Eucalyptus odontocarpa*

Species			% Cover	Height
Corymbia	*hamersleyana*		2	5
Aristida	*holathera*	var. *holathera*	25	0.6
Ptilotus	*calostachyus*		1	1
Grevillea	*wickhamii*		3	1-2.5
Solanum	*dioicum*		<1	0.8
Isotropis	*atropurpurea*		<1	0.6
Sporobolus	*australasicus*		<1	0.2
Sida	sp.		<1	0.5
Triodia	*epactia*		15	0.4
Euphorbia	*clementii*		<1	0.3
Goodenia	*muelleriana*		<1	0.4
Acacia	*acradenia*		1	Cl
Eragrostis	*eriopoda*		1	0.5
Eriachne	*aristidea*		<1	0.35
Yakirra	*australiensis*		<1	0.2
Senna	*notabilis*		<1	0.5
Cucumis	*maderaspatanus*		<1	-
Sida	sp.		<1	1.5
Cleome	*viscosa*		<1	1
Eucalyptus	*odontocarpa*		6	2
Ptilotus	*fusiformis*		<1	0.4
Crotalaria	*medicaginea*		<1	0.6
Hakea	*super long'*		<1	1
Cullen	*martinii*		<1	0.6
Goodenia	*stobbsiana*		<1	0.5
Bulbostylis	*barbata*		<1	0.2
Bonamia	*rosea*		<1	0.4
Mollugo	*molluginea*		<1	0.2

Species			% Cover	Height
Tribulus	*hirsutus*		<1	0.1
Corchorus	*elachocarpus*		<1	0.4
Acacia	*acradenia*		<1	2
Streptoglossa	*decurrens*		<1	0.2

Site	Goldsworthy - Site GD012
Date	03/09/2012
Recorder	JB/DR
Photo	102-7063
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	759620
Northing	7717561
Habitat	Plain (PLA)
Aspect	-
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Sandy Loam – Brown
Rock Type	None evident
% Leaves:Logs	4:0.5
Vegetation Condition	Good
Disturbance Type	Access track; Old machine parts; Weeds; Cattle
Fire Age	Old – 5-10 yrs
Vegetation	Tussock Grassland of *Chrysopogon fallax, Eragrostis cumingii, *Cenchrus ciliaris* with Low Woodland of *Bauhinia cunninghamii, Atalaya hemiglauca, Eucalyptus victrix* over Open Hummock Grassland *of longiceps, Triodia epactia*

Species			% Cover	Height
Atalaya	*hemiglauca*		2.5	3-4
Corymbia	*flavescens*		1.5	6-8
Bauhinia	*cunninghamii*		6	4-5
Chrysopogon	*fallax*		15	1-1.2
Acacia	*colei*		3	2-4
**Vachellia*	*farnesiana*		1	2-4
Triodia	*epactia*		15	0.8
Triodia	*longiceps*		8	1.2
Pterocaulon	*sphaeranthoides*		<1	0.5
Carissa	*lanceolata*		2	1-2
Eucalyptus	*victrix*		4	6-12
Hakea	*lorea*		<1	2-4
Senna	*artemisioides*	subsp. *oligophylla*	<1	0.5-1
Eragrostis	*cumingii*		25	0.3
Achyranthes	*aspera*		<1	0.5
Capparis	*lasiantha*		<1	0.8
Tephrosia	*rosea*	var. *clementii*	<1	1
Pluchea	*tetranthera*		<1	0.6
Corymbia	*hamersleyana*		0.5	4-5
Cucumis	*maderaspatanus*		<1	Cl
Indigofera	*trita*		<1	0.5
Hibiscus	*sturtii*	var. *platychlamys*	<1	0.3
Rhynchosia	*minima*		<1	Cl
**Cenchrus*	*setiger*		1	0.5
Goodenia	*microptera*		<1	0.3
Corchorus	*parviflorus*		<1	0.3
Sida	sp. Verrucose Glands		<1	0.2

Species			% Cover	Height
Eragrostis	*xerophila*		<1	0.3
Sporobolus	*australasicus*		<1	0.2
Indigofera	*colutea*		<1	0.1
Eucalyptus	*victrix*		4	2-4
Gomphrena	*canescens*		<1	0.2
Trichodesma	*zeylanicum*		<1	0.4
Polymeria	*ambigua*		<1	0.3
Pterocaulon	*serrulatum*		<1	0.3
Triumfetta	*clementii*		<1	0.5
Acacia	*pyrifolia*		<1	1-2.5
**Cenchrus*	*ciliaris*		5	0.5
Eriachne	*benthamii*		<1	0.5

Site	Goldsworthy - Site GD013
Date	03/09/2012
Recorder	JW/EP
Photo	EP7
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	761392
Northing	7748460
Habitat	Plain (PLA)
Aspect	0°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Sandy Loam - Red
Rock Type	Ironstone; Chert (scattered pebbles, gravel)
% Leaves:Logs	2:2
Vegetation Condition	Excellent
Disturbance Type	Road nearby; Rail
Fire Age	Very old - >10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Acacia acradenia, Grevillea wickhamii, Petalostylis labicheoides* over Very Open Tussock Grassland of *Aristida holathera* var. *holathera*

Species			% Cover	Height
Triodia	*epactia*		55	0.5-1.5
Grevillea	*wickhamii*		3	1-3
Ptilotus	*calostachyus*		<1	0.4
Corymbia	*hamersleyana*		<1	45
Mollugo	*molluginea*		<1	0.2
Acacia	*acradenia*		4	2.5
Codonocarpus	*continifolius*		<1	2
Petalostylis	*labicheoides*		1	1.5-2.5
Eragrostis	*eriopoda*		<1	0.4
Aristida	*holathera*	var. *holathera*	2	0.6
Dampiera	*candicans*		<1	0.4
Corchorus	*elachocarpus*		<1	0.4
Polygala	*isingii*		<1	0.05
Yakirra	*australiensis*		<1	0.15
Euphorbia	*clementii*		<1	0.5
Isotropis	*atropurpurea*		<1	0.8
Hybanthus	*aurantiacus*		<1	0.6
Hakea	*super long'*		<1	2
Acacia	*tumida*		0.5	5
Acacia	*inaequilatera*		<1	1.2
Tephrosia	*rosea*	var. *clementii*	<1	0.8

Site	Goldsworthy - Site GD014
Date	04/09/2012
Recorder	JB/DR
Photo	102-0764, DSC00872
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	761257
Northing	7747612
Habitat	Hillcrest (HCR)
Aspect	280°
Slope	Moderately Inclined (MO) (5°46' to 18°)
Soil	Loam Sand – Red
Rock Type	Ironstone; BIF (outcrops)
% Leaves:Logs	<1:<1
Vegetation Condition	Excellent
Disturbance Type	None evident
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Grevillea wickhamii, Acacia acradenia, Acacia inaequilatera* over Very Open Tussock Grassland of *Eriachne ciliata*

Species			% Cover	Height
Grevillea	*wickhamii*		5	3-4
Triodia	*epactia*		60	0.5-1
Petalostylis	*labicheoides*		0.5	1
Bulbostylis	*barbata*		<1	0.1
Polycarpea	*holtzei*		<1	0.05
Eriachne	*pulchella*		<1	0.2
Ptilotus	*calostachyus*		<1	1
Acacia	*acradenia*		3	1-2.5
Gomphrena	*cunninghamii*		-	-
Acacia	*inaequilatera*		0.5	1-2.5
Dampiera	*candicans*		<1	0.3
Polygala	*isingii*		<1	0.05
Fimbristylis	*simulans*		<1	0.2
Corymbia	*hamersleyana*		<1	1.5
Acacia	*adoxa*		<1	0.3
Corchorus	*parviflorus*		<1	0.3
Tephrosia	*rosea*	var. *clementii*	<1	0.2
Eriachne	*ciliata*		4	0.1
Mollugo	*molluginea*		<1	0.1
Acacia	*monticola*		0.5	2-3

Site	Goldsworthy - Site GD015
Date	03/09/2012
Recorder	JW/EP
Photo	EP8; DSC583
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	760529
Northing	7747880
Habitat	Plain (PLA)
Aspect	-
Slope	Level (LE) (0° to 0°35')
Soil	Medium Clay – Orange
Rock Type	Ironstone (pebbles)
% Leaves:Logs	<1:<1
Vegetation Condition	Very Good
Disturbance Type	Livestock; Road
Fire Age	Old – 5-10 yrs
Vegetation	Open Hummock Grassland of *Triodia epactia* over Very Open Tussock Grassland of *Enneapogon* sp., *Eriachne benthamii*, *Eragrostis xerophila* over Scattered Sedges of *Fimbristylis dichotoma*

Species			% Cover	Height
Sporobolus	*australasicus*		2	0.2
Eragrostis	*xerophila*		2	0.5
Ptilotus	*murrayi*		<1	0.1
Triodia	*epactia*		20	0.5-1
Sclerolaena	*cuneata*		<1	0.5
Brachyachne	*convergens*		<1	0.5
**Cenchrus*	*ciliaris*		<1	0.5
Dicanthium	*sericeum*		<1	0.2
Enneapogon	sp.		3	0.1
Fimbristylis	*dichotoma*		0.5	0.3
Eriachne	*benthamii*		2	0.5
Eragrostis	*tenellula*		<1	0.3
Maireana	sp. indet.		<1	0.2
**Vachellia*	*farnesiana*		<1	2.5

Site	Goldsworthy - Site GD016
Date	04/09/2012
Recorder	JB/DR
Photo	102-0769; DSC00874
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	759517
Northing	7746567
Habitat	Hillslope (HSL)
Aspect	30°
Slope	Moderately Inclined (MO) (5°46' to 18°)
Soil	Loamy Sand – Brown
Rock Type	Ironstone; BIF (outcrops, cobbles, pebbles)
% Leaves:Logs	<1:0.5
Vegetation Condition	Excellent
Disturbance Type	Fire
Fire Age	Moderate – 2-5 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with Shrubland of *Grevillea pyramidalis, Acacia acradenia* over Low Open Shrubland of *Corchorus parviflorus, Tephrosia rosea*

Species			% Cover	Height
Grevillea	*wickhamii*		3	1-2
Tephrosia	*rosea*		<1	0.5-0.3
Acacia	*acradenia*		2.5	1-2
Bonamia	*media*	var. *villosa*	<1	0.05
Bulbostylis	*barbata*		<1	0.1
Senna	*notabilis*		<1	0.3
Mollugo	*molluginea*		<1	0.1
Gomphrena	*cunninghamii*		<1	0.2
Eriachne	*ciliata*		0.5	0.1
Triodia	*epactia*		45	0.5-1.2
Senna	*venusta*		<1	0.4
Solanum	*dioicum*		<1	0.3
Petalostylis	*labicheoides*		<1	1-1.5
Triumfetta	*maconochieana*		<1	0.3
Dampiera	*candicans*		<1	0.4
Ptilotus	*fusiformis*		<1	0.4
Oldenlandia	*crouchiana*		0.5	0.25
Fimbristylis	*dichotoma*		1	0.3
Hibiscus	*leptocladus*		<1	0.3
Tephrosia	*virens*		1	0.5
Corchorus	*parviflorus*		1	0.3
Polycarpea	*holtzei*		<1	0.01
Sida	sp. Rabbit flat		<1	1
Goodenia	*sp. indet*		<1	0.2
Acacia	*adoxa*		-	-

Site	Goldsworthy - Site GD017
Date	04/09/2012
Recorder	JW/EP
Photo	EP9; DSC584
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	758924
Northing	7747285
Habitat	Flood-out (FLD)
Aspect	140°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Medium Heavy Clay – Brown
Rock Type	None evident
% Leaves:Logs	<1:<1
Vegetation Condition	Very Good
Disturbance Type	Livestock; Introduced species – Weeds
Fire Age	Old – 5-10 yrs
Vegetation	Closed Tussock Grassland of *Eriachne benthamii* over Very Open Herbs of *Centipeda minima* with Scattered Shrubs of **Vachellia farnesiana*

Species			% Cover	Height
Eriachne	*benthamii*		85	0.6
Sesbania	*cannabina*		<1	1.5
**Vachellia*	*farnesiana*		<1	1.5
Eragrostis	*tenellula*		5	0.4
Centipeda	*minima*		5	0.15
Alternanthera	*nana*		<1	0.3
Eulalia	*aurea*		1	0.6
Dicanthium	*sericeus*		<1	0.3
Marsilea	*hirsuta*		<1	0.1
Rhynchosia	*minima*		<1	0.1
Vigna	sp. indet.		<1	Cl
Eucalyptus	*victrix*		<1	1-2.5
Ptilotus	*murrayi*		<1	0.1
Panicum	sp. indet.		<1	0.4
Iseilema	sp. indet.		<1	0.2
Eragrostis	*xerophila*		<1	0.5
Euphorbia	sp. indet.		<1	0.3

Site	Goldsworthy - Site GD018
Date	04/09/2012
Recorder	JB/DR
Photo	102-0771; DSC00875
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	759415
Northing	7745690
Habitat	Plain (PLA)
Aspect	50°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Loamy Sand – Orange
Rock Type	None evident
% Leaves:Logs	4:0
Vegetation Condition	Very Good
Disturbance Type	Cattle; Weeds; Access track
Fire Age	Old - 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia, Triodia longiceps* with Low Open Woodland of *Eucalyptus victrix* over High Open Shrubland of *Acacia colei*

Species			% Cover	Height
Eucalyptus	*victrix*		4	8-12
Acacia	*colei*		4	2-3
Acacia	*stellaticeps*		1	0.51
Chrysopogon	*fallax*		7	1-1.7
Triodia	*longiceps*		10	1-1.5
Triodia	*epactia*		40	1.2
Acacia	*acradenia*		<1	1-2
Eragrostis	*cumingii*		2	0.2
Gomphrena	*canescens*		<1	0.4
Streptoglossa	*odora*		<1	0.4
Sida	*echinocarpa*		<1	0.5-1
**Cenchrus*	*ciliaris*		0.5	0.5
Fimbristylis	*dichotoma*		<1	0.25
Aristida	*holathera*	var. *holathera*	1.5	0.4
Eriachne	*obtusa*		1.5	0.4
Zornia	*albiniflora*		0.5	0.2
Eriachne	*aristidea*		<1	0.2
Eriachne	*ovata*		0.5	0.2
Euphorbia	*biconvexa*		<1	0.4
Corchorus	*pumilio*		0.5	0.3
Goodenia	*microptera*		0.5	0.35
Mollugo	*molluginea*		<1	0.1
Yakirra	*australiensis*		<1	0.1
Bulbostylis	*barbata*		<1	0.1
Sporobolus	*australasicus*		<1	0.15
Bonamia	*rosea*		<1	0.2
Acacia	*inaequilatera*		<1	2-3
Pluchea	*tetranthera*		1	0.4
Isotropis	*atropurpurea*		1	0.5

Species			% Cover	Height
Synaptantha	*tillaeacea*		<1	0.05
Sida	*cardiophylla*		<1	0.5-1
Bonamia	*rosea*		<1	0.4
Senna	*notabilis*		<1	0.4
Hybanthus	*aurantiacus*		<1	0.4
Crotalaria	*ramosissima*		<1	0.2
Eragrostis	*xerophila*		<1	0.35
Indigofera	*seedling'*		<1	0.05
Eragrostis	*tenellula*		<1	0.2
Indigofera	*colutea*		<1	0.4
Eragrostis	*eriopoda*		<1	0.4
Tephrosia	*rosea*	var. *clementii*	<1	1
Cullen	*martinii*		<1	1
Polymeria	*ambigua*		<1	Cr
Indigofera	*linifolia*		<1	0.3
Synaptantha	*tillaeacea*		<1	0.05
Euphorbia	*australis*		<1	0.1
Acacia	*sericophylla*		-	-

Site	Goldsworthy - Site GD019
Date	04/09/2012
Recorder	JW/EP
Photo	EP10; DSC585
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	758652
Northing	7746497
Habitat	Drainage Depression (DDE)
Aspect	220°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Medium Heavy Clay - Brown
Rock Type	None evident
% Leaves:Logs	2:1
Vegetation Condition	Good
Disturbance Type	Livestock; Weeds
Fire Age	Very old - >10 yrs
Vegetation	Tussock Grassland of *Eriachne benthamii* with Low Woodland of *Eucalyptus victrix* over Scattered Herbs of *Centipeda minima, Alternanthera nana*

Species			% Cover	Height
Eucalyptus	*victrix*		10	2-6
Eriachne	*benthamii*		40	0.8
Centipeda	*minima*		0.5	0.15
**Cynodon*	*dactylon*		0.5	0.15
Alternanthera	*nana*		<1	0.2
Sesbania	*cannabina*		<1	1.2
Marsilea	*hisuta*		<1	0.1
Cyperus	sp. indet.		2	1

Site	Goldsworthy - Site 20
Date	04/09/2012
Recorder	JB/DR
Photo	102-0779, DSC00876
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	761648
Northing	7746215
Habitat	Gully (GUL)
Aspect	90°
Slope	Moderately Inclined (MO) (5°46' to 18°)
Soil	Loamy Sand - Brown
Rock Type	BIF; Ironstone; Mudstone (pebbles, cobbles, outcrops)
% Leaves:Logs	<1:2
Vegetation Condition	Excellent
Disturbance Type	Fire
Fire Age	Young- 1-2 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with Low Open Shrubland of *Corchorus parviflorus, Tephrosia rosea var. clementii, Isotropis atropurpurea* with Scattered Shrubs of *Petalostylis labicheoides, Grevillea pyramidalis*

Species			% Cover	Height
Petalostylis	*labicheoides*		1.5	1-1.5
Acacia	*acradenia*		<1	0.5
Acacia	*inaequilatera*		<1	0.4
Bonamia	*media*	var. *villosa*	<1	Cr
Grevillea	*pyramidalis*	subsp. *leucadendron*	<1	0.5
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		0.5	0.5
Tephrosia	*rosea*	var. *clementii*	1	1
Solanum	*diversiflorum*		<1	0.3
Senna	*venusta*		<1	1
Triodia	*epactia*		65	0.2-0.8
Sida	sp. Rabbit flat		<1	0.5
Dampiera	*candicans*		<1	0.3
Hibiscus	*coatesii*		<1	0.3
Eriachne	*mucronata*		<1	0.35
Acacia	*adoxa*	var. *adoxa*	<1	0.3
Pluchea	*tetranthera*		<1	0.4
Notoleptopus	*decaisnei*		<1	-
Hibiscus	*sturtii*	var. *campylochamys*	<1	0.3
Hybanthus	*aurantiacus*		<1	0.2
Indigofera	*monophylla*		<1	0.35
Gomphrena	*cunninghamii*		<1	0.15
Eriachne	*obtusa*		<1	0.4
Heliotropium	*chrysocarpum*		<1	0.2
Mollugo	*molluginea*		<1	0.15
Hibiscus	*leptocladus*		<1	0.5
Ptilotus	*calostachyus*		<1	0.5

Species			% Cover	Height
Streptoglossa	*decurrens*		0.5	0.4
Streptoglossa	*odora*		<1	0.3
Senna	*notabilis*		<1	0.3
Triumfetta	*maconochieana*		<1	0.4
Stemodia	*grossa*		<1	0.4
Polygala	*isingii*		<1	0.05
Solanum	sp. indet.		<1	0.35
Cleome	*viscosa*		<1	0.25
Polymeria	*ambigua*		0.5	Cr
Isotropis	*atropurpurea*		1.5	0.6
Eriachne	*ciliata*		<1	0.2
Goodenia	*muelleriana*		<1	0.3
Corchorus	*parviflorus*		5	0.3
Grevillea	*wickhamii*		<1	0.5
Tephrosia	Pilbara Ranges (S. van Leeuwen 4246)		<1	0.1
Corymbia	*hamersleyana*		<1	0.5
Oldenlandia	*crouchiana*		<1	0.2

Site	Goldsworthy - Site GD021
Date	04/09/2012
Recorder	JW/EP
Photo	EP11, DSC586
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	758382
Northing	7745666
Habitat	Plain (PLA)
Aspect	50°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Light Medium Clay - Orange
Rock Type	None evident
% Leaves:Logs	<1:<1
Vegetation Condition	Good
Disturbance Type	Livestock; Feral animals (goats, horses); Weeds; Rubbish
Fire Age	Old – 5-10 yrs
Vegetation	Open Tussock Grassland of *Eragrostis xerophila, Sporobolus australasicus* over Very Open Hummock Grassland of *Triodia epactia* with Scattered Tall Shrubs of **Vachellia farnesiana*

Species			% Cover	Height
Eriachne	*benthamii*		1	0.5
Eragrostis	*xerophila*		25	0.5
Triodia	*epactia*		10	0.8
**Vachellia*	*farnesiana*		<1	2.5
Chrysopogon	*fallax*		<1	1.2
Dicanthium	*sericeum*		<1	0.2
Aristida	sp. indet.		<1	0.8
Sporobolus	*australasicus*		3	0.2
Trianthema	sp. indet.		<1	0.1
Sclerolaena	*cuneata*		<1	0.4

Site	Goldsworthy - Site GD022
Date	04/09/2012
Recorder	JB/DR
Photo	102-0780, DSC00877
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	758545
Northing	7749678
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Sandy Clay Loam – Brown
Rock Type	None evident
% Leaves:Logs	4:<1
Vegetation Condition	Good
Disturbance Type	Fire; Weeds; Livestock
Fire Age	Old – 5-10 yrs
Vegetation	Tussock Grassland of *Eragrostis xerophila* over Open Tussock Annual Grassland of *Dactyloctenium radulans, Eragrostis cumingii* over Very Open Hummock Grassland of *Triodia epactia*

Species			% Cover	Height
Chloris	sp. indet		3	0.3
Dactyloctenium	*radulans*		7	0.1
Sporobolus	*australasicus*		<1	0.2
**Cenchrus*	*setiger*		0.5	0.6
Triodia	*epactia*		10	0.8
Chrysopogon	*fallax*		1	1
Eragrostis	*cumingii*		5	0.2
Eragrostis	*xerophila*		5	0.35
Eucalyptus	*victrix*		<1	4
Eriachne	*flaccida*		25	0.4
Ptilotus	sp. indet.		1	0.2
Triodia	*longiceps*		1	1
Leptochloa	sp. indet.		3	0.5-1
Pluchea	*tetranthera*		<1	0.4
**Vachellia*	*farnesiana*		<1	0.5-1.5
Fimbristylis	*dichotoma*		6	0.2
Aristida	*inaequiglumis*		<1	0.7
Senna	*artemisioides*	subsp. *oligophylla*	<1	0.4
Dicanthium	*sericeum*		<1	0.3
Indigofera	*linnaei*		<1	0.15
Marsilea	*hirsuta*		0.5	0.1
**Cenchrus*	*ciliaris*		0.5	0.4
Eriachne	*benthamii*		<1	0.5
Eragrostis	*tenellula*		<1	0.3
Panicum	*laevinoda*		<1	0.4

Site	Goldsworthy - Site GD023
Date	04/09/2012
Recorder	JW/EP
Photo	EP12, DSC587
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	757391
Northing	7745722
Habitat	Footslope (FOO)
Aspect	230°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Clayey Sand – Orange
Rock Type	None evident
% Leaves:Logs	<1:<1
Vegetation Condition	Degraded
Disturbance Type	Introduced species – weeds; Livestock; Fenceline
Fire Age	Old – 5-10 yrs
Vegetation	Tussock Grassland of **Cenchrus setiger*, **Cenchrus ciliaris* over Very Open Hummock Grassland of *Triodia epactia*

Species			% Cover	Height
Corymbia	*flavescens*		4	1-2
Triodia	*epactia*		7	0.4-1.2
Acacia	*inaequilatera*		<1	1-2.5
Grevillea	*wickhamii*		<1	3
Atalaya	*hemiglauca*		<1	2
Corymbia	*hamersleyana*		<1	4
Acacia	*colei*		<1	1-3.5
**Cenchrus*	*setiger*		25	0.6
Rhynchosia	*minima*		<1	Cr
Eragrostis	*cumingii*		8	0.2
Pluchea	*tetranthera*		<1	0.5
Hakea	*lorea*	subsp. *lorea*	<1	5
**Cenchrus*	*ciliaris*		20	0.5
Tephrosia	sp. indet.		<1	0.2
Lysiphyllum	*cunninghamii*		<1	6

Site	Goldsworthy - Site GD024
Date	04/09/2012
Recorder	JB/DR
Photo	102-0781, DSC00878
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	756527
Northing	7747500
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Clay Loam, Sandy – Brown
Rock Type	None evident
% Leaves:Logs	<1:0
Vegetation Condition	Good
Disturbance Type	Access track; Cattle
Fire Age	Old – 5-10 yrs
Vegetation	Closed Tussock Grassland of *Eriachne benthamii* over *Marsilea hirsuta, Centipede minima* with Scattered Tall Shrubs of *Sesbania cannabina*

Species			% Cover	Height
Eriachne	*benthamii*		90	0.6
Eragrostis	*xerophila*		1	0.4
Dicanthium	*sericeum*	subsp. *humilis*	<1	0.2
Sesbania	*cannabina*		1	2-3
Eragrostis	*tenellula*		0.5	0.25
Centipeda	*minima*	subsp. *macrocephala*	0.5	0.1
Marsilea	*hirsuta*		2	0.1
Fimbristylis	*dichotoma*		1	0.2
Elytrophorus	*spicatus*		<1	0.2
Alternanthera	*nodiflora*		<1	0.25
Urochloa	*piligera*		<1	0.25
Eriachne	*glauca*		0.5	1.2
Vigna	sp. Hamersley Clay (A.A. Mitchell PRP 113)		<1	Cr
Ammannia	*baccifera*		<1	0.1
Glinus	*lotoides*		<1	0.1
Rhynchosia	*minima*		<1	Cr
Sporobolus	*mitchellii*		<1	0.4
Schenkia	*clementii*		<1	0.15
Fimbristylis	sp. indet.		<1	0.4

Site	Goldsworthy - Site GD025
Date	04/09/2012
Recorder	JW/EP
Photo	EP13, DSC588
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	757549
Northing	7746500
Habitat	Hillslope (HSL)
Aspect	340°
Slope	Moderately Inclined (MO) (5°46' to 18°)
Soil	Silty Loam – Red
Rock Type	Ironstone; Chert (cobbles, pebbles)
% Leaves:Logs	<1:<1
Vegetation Condition	Very Good
Disturbance Type	Stockyard nearby; Track nearby
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Acacia acradenia*

Species			% Cover	Height
Triodia	*epactia*		52	0.8
Acacia	*acradenia*		3	2
Acacia	*inaequilatera*		<1	2
Bulbostylis	*barbata*		<1	0.1
Bonamia	*media*	var. *villosa*	<1	0.02
Fimbristylis	*simulans*		<1	0.02

Site	Goldsworthy - Site GD026
Date	05/09/2012
Recorder	JB/DR
Photo	102-0784, DSC00879
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	757472
Northing	7747516
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Light Clay – Brown
Rock Type	None evident
% Leaves:Logs	2:<1
Vegetation Condition	Degraded
Disturbance Type	Cattle; Access track; Highly disturbed by livestock
Fire Age	Old – 5-10 yrs
Vegetation	Very Open Tussock Grassland of *Eragrostis xerophila* over Low Open Shrubland *Oldenlandia crouchiana, Trianthema triquetra*

Species			% Cover	Height
Oldenlandia	*crouchiana*		3	0.4
Eragrostis	*xerophila*		5	0.3
Eriachne	*benthamii*		<1	0.5
Dactyloctenium	*radulans*		1	0.1
Eragrostis	*tenellula*		<1	0.2
Sida	sp. Verrucosa glands		3	0.1
Sporobolus	*mitchellii*		<1	0.15
Trianthema	*triquetra*		<1	0.1
Ptilotus	*murrayi*		1	0.1
Chloris	sp. indet		0.5	0.3
Eragrostis	*cumingii*		<1	0.2
Rhynchosia	*minima*		<1	Cr

Site	Goldsworthy - Site GD027
Date	04/09/2012
Recorder	JW/EP
Photo	EP14, DSC00879
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	756537
Northing	7746770
Habitat	Plain (PLA)
Aspect	70°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Clayey Sand – Brown
Rock Type	Ironstone (gravel)
% Leaves:Logs	<1:<1
Vegetation Condition	Very Good
Disturbance Type	Livestock; Feral animals; Road nearby; Spoon drain
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia*

Species			% Cover	Height
Triodia	*epactia*		30	0.6
Trianthema	*triquetra*		<1	0.1
Sporobolus	*australasicus*		<1	0.1
Sesbania	*cannabina*		<1	0.6
Ipomoea	sp. indet.		<1	Cr
Eragrostis	*cumingii*		<1	0.3
Brachyachne	*convergens*		<1	0.2
Sclerolaena	*cunneata*		<1	0.25
Fimbristylis	*dichotoma*		<1	0.3
Panicum	sp. indet.		<1	0.2
Eriachne	sp. indet.		<1	0.3
Eriachne	sp. indet.		<1	0.3

Site	Goldsworthy - Site GD028
Date	05/09/2012
Recorder	JB/DR
Photo	102-0786, DSC880
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	758500
Northing	7747999
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Clay Loam – Orange
Rock Type	BIF (scattered pebbles)
% Leaves:Logs	0.5:0
Vegetation Condition	Good
Disturbance Type	Livestock; Access track
Fire Age	Old – 5-10 yrs
Vegetation	Tussock Grassland of *Eragrostis xerophila, Dicanthium sericeum* subsp. *humilius* over Very Open Herbs of *Ptilotus murrayi, Trianthema triquetra*

Species			% Cover	Height
Eragrostis	*xerophila*		60	0.35
Eragrostis	*cumingii*		<1	0.2
Iseilema	*membranaceum*		<1	0.2
Dicanthium	*sericeum*	subsp. *humilius*	2	0.2
Bulbostylis	*barbata*		<1	0.1
Eragrostis	*tenellula*		0.5	0.2
Dactyloctenium	*radulans*		1	0.1
Ptilotus	*murrayi*		4	0.1
Sida	sp. Verrucosa glands		<1	0.1
Fimbristylis	*dichotoma*		0.5	0.2
Chloris	*pectinata*		0.5	0.25
Neptunia	*dimorphantha*		<1	0.1
Tribulus	sp. indet.		<1	0.05
Trianthema	*triquetra*		0.5	0.1
**Vachellia*	*farnesiana*		<1	1
Rhynchosia	*minima*		<1	Cl
Gomphrena	*affinis*	subsp. *pilbarensis*	<1	0.3
Alysicarpus	*muelleri*		<1	0.2
Trianthema	*triquetra*		<1	0.1
Triodia	*epactia*		<1	0.4

Site	Goldsworthy - Site GD029
Date	05/09/2012
Recorder	JW/EP
Photo	EP15, DSC590
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	758666
Northing	7749549
Habitat	Drainage Depression (DDE)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Medium Heavy Clay - Brown
Rock Type	None evident
% Leaves:Logs	4:<1
Vegetation Condition	Degraded
Disturbance Type	Livestock; Weeds; rail line; Access track
Fire Age	Old – 5-10 yrs
Vegetation	Open Tussock Grassland of *Eriachne benthamii, Eragrostis xerophila* with Scattered Tall Shrubs of **Vachellia farnesiana*

Species			% Cover	Height
**Vachellia*	*farnesiana*		<1	2.5
Cynodon	*dactylon*		5	0.1
Centipeda	*minima*		0.5	0.15
Eriachne	*benthamii*		8	0.6
Sesbania	*cannabina*		<1	0.7
Glinis	*lotoides*		<1	0.1
Alternanthera	*nana*		<1	0.2
Eragrostis	*xerophila*		1	0.4
Stemodia	*kingii*		<1	0.3
Leptochloa	sp. indet.		<1	0.4
Marsilea	*hirsuta*		<1	0.1
Eriachne	sp. indet.		<1	0.3

Site	Goldsworthy - Site GD030
Date	05/09/2012
Recorder	JB/DR
Photo	102-0791, DSC00881
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	758421
Northing	7748782
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Silty Clay Loam – Brown
Rock Type	Ironstone; Chert (pebbles)
% Leaves:Logs	<1:0
Vegetation Condition	Degraded
Disturbance Type	Livestock
Fire Age	Old – 5-10 yrs
Vegetation	Very Open Annual Tussock Grassland of *Sporobolus australasicus*, *Dichanthium sericeum* subsp. *humilius, Dactyloctenium radulans* over Scattered Tussock Grassland of *Eragrostis xerophila* over Scattered *Ptilotus murrayi*

Species			% Cover	Height
Sporobolus	*australasicus*		3	0.1
Eragrostis	*xerophila*		1	0.3
Ptilotus	*murrayi*		2	0.1
Trianthema	*triquetra*		<1	0.1
Iseilema	*membranaceum*		<1	0.1
Dicanthium	*sericeum*	subsp. *humilius*	0.5	0.2
Sida	sp. Verrucosa glands		<1	0.1
Dactyloctenium	*radulans*		0.5	0.1

Site	Goldsworthy - Site GD031
Date	05/09/2012
Recorder	JW/EP
Photo	EP16, DSC591
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	759446
Northing	7748576
Habitat	Drainage Depression (DDE)
Aspect	140°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Medium Clay – Brown
Rock Type	None evident
% Leaves:Logs	<1:1
Vegetation Condition	Good
Disturbance Type	Introduced species – weeds; cattle
Fire Age	Old – 5-10 yrs
Vegetation	Closed Tussock Grassland of *Eriachne benthamii, Eulalia aurea, Eragrostis cumingii, Eragrostis xerophila* with Low Open Woodland of *Eucalyptus victrix* over High Open Shrubland of **Vachellia farnesiana*

Species			% Cover	Height
Triodia	*epactia*		3	0.8
Eulalia	*aurea*		5	0.8
Eriachne	*benthamii*		65	0.8
**Vachellia*	*farnesiana*		6	1-2.5
Eucalyptus	*victrix*		3	3-8
Aristida	*holathera*	var. *holathera*	3	1
Centipeda	*minima*		<1	0.15
Rhynchosia	*minima*		<1	0.15
Eragrostis	*tenellula*		<1	0.3
Dicanthium	*sericeum*		<1	0.2
Eragrostis	*cumingii*		2.5	0.3
Eragrostis	*xerophila*		2.5	0.3
Rostellularia	*adscendens*	var. *clementii*	<1	0.1
Acacia	*colei*		<1	2.5
Ptilotus	*murrayi*		<1	0.1
Convovulus	sp. indet.		<1	Cl
Chrysopogon	*fallax*		<1	1.2
Triodia	*epactia*		3	0.8

Site	Goldsworthy - Site GD032
Date	05/09/2012
Recorder	JB/DR
Photo	102-0792, DSC00882
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	757530
Northing	7748503
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Light Clay – Brown
Rock Type	None evident
% Leaves:Logs	2;<1
Vegetation Condition	Good
Disturbance Type	Livestock; Access track
Fire Age	
Vegetation	Closed Tussock Grassland of *Eriachne benthamii, Sporobolus mitchellii* over Scattered Herbs of *Marsilea hirsuta*

Species			% Cover	Height
Eriachne	*benthamii*		50	0.7
Sporobolus	*mitchellii*		30	0.3
Marsilea	*hirsuta*		1.5	0.1
Elytrophorus	*spicatus*		1	0.15
Centipeda	*minima*	subsp. *macrocephala*	0.5	0.1
Cyperus	sp.		<1	0.7
Sesbania	*cannabina*		<1	0.5-1
Alternanthera	*nodiflora*		<1	0.15

Site	Goldsworthy - Site GD033
Date	05/09/2012
Recorder	JW/EP
Photo	EP17, DSC592
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	759433
Northing	7749496
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Medium Clay – Orange
Rock Type	None evident
% Leaves:Logs	--
Vegetation Condition	Good
Disturbance Type	Livestock; Rail nearby; Access track nearby; Weeds nearby
Fire Age	Old – 5-10 yrs
Vegetation	Tussock Grassland of *Eragrostis xerophila, Eriachne benthamii* over Scattered Hummock Grass of *Triodia epactia*

Species			% Cover	Height
Eragrostis	*xerophila*		65	0.6
Ptilotus	*murrayi*		4	0.15
Sporobolus	*australasicus*		<1	0.2
Eriachne	*benthamii*		4	0.8
Triodia	*epactia*		2	1
Sesbania	*cannabina*		<1	0.8
Panicum	sp.		<1	0.2
Marsilea	*hirsuta*		<1	0.15
Convolvulus	sp. indet.		<1	Cr
Fimbristylis	*dichotoma*		<1	0.1
Eragrostis	*tenellula*		<1	0.3
Rhynchosia	*minima*		<1	0.1
Centipeda	*minima*		<1	0.2
Dicanthium	*sericeum*		<1	0.2
Iseilema	sp.		<1	0.1
Eragrostis	*xerophila*		65	0.6

Site	Goldsworthy - Site GD034
Date	05/09/2012
Recorder	JB/DR
Photo	102-0794, DSC883
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	756944
Northing	7748007
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Light Medium Clay – Orange
Rock Type	None evident
% Leaves:Logs	<1:<1
Vegetation Condition	Good
Disturbance Type	Livestock; Old powerline poles
Fire Age	Old – 5-10 yrs
Vegetation	Closed Tussock Grassland of *Eriachne glauca, Eriachne benthamii* over Very Open Herbs of *Centipeda minima* subsp. *macrocephala, Marsilea hisutus, Alternanthera nodiflora*

Species			% Cover	Height
Eriachne	*glauca*		65	0.5-1.2
Eriachne	*benthamii*		6.5	0.5-1
Centipeda	*minima*	subsp. *macrocephala*	2	0.1
Alternanthera	*nodiflora*		1	0.1
Fimbristylis	*dichotoma*		<1	0.25
Cyperus	sp.		<1	0.6
Glinus	*lotoides*		<1	0.1
Chamaecrista	*symonii*		<1	1-1.5
Fimbristylis	sp.		<1	0.4
Elytrophorus	*spicatus*		1.5	0.25
Sporobolus	*mitchellii*		2	0.1
Cynodon	*dactylon*		<1	0.1
Marsilea	*hirsuta*		5	0.15
Schenkia	*clementii*		<1	0.1

Site	Goldsworthy - Site GD035
Date	05/09/2012
Recorder	JW/EP
Photo	EP18, DSC593
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	760341
Northing	7748722
Habitat	Plain (PLA)
Aspect	140°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Silty Clay Loam - Brown
Rock Type	None evident
% Leaves:Logs	1:<1
Vegetation Condition	Very Good
Disturbance Type	Livestock; Weeds
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with Low Open Woodland of *Eucalyptus victrix* over Very Open Tussock Grassland of *Eragrostis xerophila*

Species			% Cover	Height
Eucalyptus	*victrix*		2	5
Sporobolus	*australasicus*		<1	0.1
Chrysopogon	*fallax*		2	1.2
Triodia	*epactia*		45	1
Rhynchosia	*minima*		<1	0.1
Eragrostis	*xerophila*		5	0.3
Eriachne	*benthamii*		<1	0.4
Centipeda	*minima*		<1	0.1
Pterocaulon	*sphaeranthoides*		<1	0.1
Eragrostis	*tenellula*		<1	0.2
Streptoglossa	*decurrens*		<1	0.3
Neptunia	*dimorphantha*		<1	0.1
Eragrostis	*cumingii*		<1	0.1
Acacia	*synchronicia*		<1	2.5
**Vachellia*	*farnesiana*		<1	1
Acacia	*synchronicia*		<1	1.5
Acacia	*colei*		<1	1.6
Senna	*artemisioides*	subsp. oligophylla	<1	0.3
Eulalia	*aurea*		<1	0.4
Carissa	*lanceolata*		<1	0.5
Sida	sp. indet		<1	0.2

Site	Goldsworthy - Site GD036
Date	05/09/2012
Recorder	JB/DR
Photo	102-0797, DSC00884
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	756468
Northing	7748503
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Clay Loam - Brown
Rock Type	None evident
% Leaves:Logs	0.5:0
Vegetation Condition	Good
Disturbance Type	Livestock; Access track
Fire Age	Old – 5-10yrs
Vegetation	Hummock Grassland of *Triodia epactia* over Tussock Grassland of *Aristida inaequiglumis*, *Eragrostis* sp. indet., *Eragrostis xerophila* over Scattered Low Shrubs of *Pluchea tetranthera*

Species			% Cover	Height
Triodia	*epactia*		38	1.2
Ptilotus	*murrayi*		2.5	0.1
Eriachne	*obtusa*		2	0.3
Eragrostis	*xerophila*		3.5	0.4
Chloris	sp. indet.		<1	0.4
Aristida	*inaequiglumis*		15	0.5-1
Eragrostis	*cumingii*		0.5	0.3
Chrysopogon	*fallax*		0.5	1
Sida	sp. indet.		<1	0.1
Senna	*artemisioides*	subsp. *oligophylla*	<1	0.5
Oldenlandia	sp. indet.		<1	0.1
**Cenchrus*	*ciliaris*		<1	0.5
Sporobolus	*australasicus*		<1	0.2
Paspalidium	*laevinode*		<1	0.3
Panicum	sp.		1.5	0.2
Chamaecrista	*mimosoides*		<1	1-1.5
Eragrostis	*tenellula*		0.5	0.3
Convolvulus	sp. indet.		<1	Cr
Dicanthium	*sericeum*	subsp. *humilis*	0.5	0.3
Senna	*notabilis*		<1	0.5
Pluchea	*tetranthera*		<1	0.5-1
Euphorbia	*australis*		<1	0.05
**Vachellia*	*farnesiana*		<1	2
Neptunia	*dimorphantha*		<1	0.05
Eriachne	*benthamii*		2	0.5
Fimbristylis	*dichotoma*		<1	0.25
Acacia	*pyrifolia*		<1	1-2
Ipomoea	*muelleri*		<1	Cr

Species			% Cover	Height
Eragrostis	sp. indet.		12	0.25

Site	Goldsworthy - Site GD037
Date	05/09/2012
Recorder	JW/EP
Photo	EP19, DSC594
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	760528
Northing	7769603
Habitat	Plain (PLA)
Aspect	0°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Silty Clay Loam – Orange
Rock Type	Ironstone (scattered outcrops)
% Leaves:Logs	<1:<1
Vegetation Condition	Good
Disturbance Type	Livestock; Weeds
Fire Age	Old – 5-10 yrs
Vegetation	Open Tussock Grassland of *Sporobolus australasicus* with Scattered Tall Shrubs of **Vachellia farnesiana*

Species			% Cover	Height
**Vachellia*	*farnesiana*		1	1-1.5
Sporobolus	*australasicus*		25	0.1
Senna	*artemisioides*	subsp. *oligophylla*	<1	0.4
**Cenchrus*	*setiger*		1	0.4
Triodia	*longiceps*		<1	0.5
Salsola	*tragus*		<1	0.3
Trianthema	*triquetra*		<1	0.1
Triodia	*epactia*		10	0.4
Eragrostis	*xerophila*		0.5	0.4
Indigofera	*oblongifolia*		<1	0.5
Acacia	*sclerosperma*		<1	2
Pluchea	*rubelliflora*		<1	0.2
Neptunia	*dimorphantha*		<1	0.1
Pluchea	*tetranthera*		<1	0.4
Eucalyptus	*victrix*		<1	0.5
Sesbania	*cannabina*		<1	0.4
Sclerolaena	*cunneata*		<1	0.4

Site	Goldsworthy - Site GD038
Date	05/09/2012
Recorder	JB/DR
Photo	102-0800, DSC00885
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	756438
Northing	7749401
Habitat	Plain (PLA)
Aspect	120°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Loamy Sand – Orange
Rock Type	None evident
% Leaves:Logs	60:0.5
Vegetation Condition	Very Good
Disturbance Type	Livestock; Weeds; Access track
Fire Age	Old – 5-10 yrs
Vegetation	Open Scrub of *Acacia tumida* var. *pilbarensis* over Hummock Grassland of *Triodia epactia* with Scattered Low Trees of *Corymbia hamersleyana*, *Corymbia flavescens*

Species			% Cover	Height
Acacia	*tumida*	var. *pilbarensis*	65	2-3
Chrysopogon	*fallax*		3	0.5-1
Triodia	*epactia*		40	0.5-1.3
Corymbia	*hamersleyana*		1.5	2-8
Polymeria	*ambigua*		1	Cr
Eragrostis	*cumingii*		1	0.2
Mollugo	*molluginea*		<1	0.15
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		0.5	0.4
**Cenchrus*	*ciliaris*		2	0.6
Bonamia	*rosea*		1.5	0.35
Aristida	*holathera*	var. *holathera*	1.5	0.45
Cullen	*martinii*		<1	0.5
Bulbostylis	*barbata*		1	0.2
Polycarpea	*corymbosa*		<1	0.2
Acacia	*inaequilatera*		<1	1
Crotalaria	*ramosissima*		2.5	0.2
Pluchea	*tetranthera*		<1	0.5-1
Sida	*cardiophylla*		<1	0.4
Eriachne	*aristidea*		<1	0.25
Corchorus	*elachocarpus*		0.5	0.4
Indigofera	*monophylla*		<1	0.4
Hybanthus	*aurantiacus*		0.5	0.4
Eriachne	*obtusa*		2.5	0.4
Bonamia	*linearis*		<1	0.1
Tephrosia	*rosea*	var. *clementii*	0.5	0.5-1
Acacia	*acradenia*		1	2-2.5
Acacia	*pyrifolia*	var. *pyrifolia*	<1	1-2

Species			% Cover	Height
Eragrostis	*eriopoda*		1	0.4
Ptilotus	*astrolasius*		<1	0.4
Ptilotus	*fusiformis*		<1	0.4
Goodenia	*microptera*		1	0.35
Trianthema	*pilosa*		<1	0.1
Perotis	*rara*		4	0.1
Acacia	*colei*		<1	1-1.5
Solanum	*diversifolium*		<1	0.3
Acacia	*ancistrocarpa*		<1	1-2
Yakirra	*australiensis*		<1	0.15
Paraneurachne	*muelleri*		<1	0.5
Gossypium	*australe*		<1	1
Carissa	*lanceolata*		<1	1-2
Atalaya	*hemiglauca*		1	2
Ptilotus	*axillaris*		0.5	0.2
Indigofera	*linifolia*		<1	0.2
Dampiera	*candicans*		<1	0.5
Corymbia	*flavescens*		<1	4-8
Triumfetta	*clementii*		0.5	0.6
Aristida	*inaequiglumis*		<1	1.3
Crotalaria	*medicaginea*		<1	0.2
Euphorbia	*australis*		<1	0.1
Isotropis	*atropurpurea*		<1	0.5

Site	Goldsworthy - Site GD039
Date	05/09/2012
Recorder	JW/EP
Photo	EP20, DSC595
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	761572
Northing	7749501
Habitat	Plain (PLA)
Aspect	140°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Sand – Red
Rock Type	None evident
% Leaves:Logs	5:<1
Vegetation Condition	Excellent
Disturbance Type	Road nearby; Highway nearby; Powerline; Livestock
Fire Age	Old – 5-10 yrs
Vegetation	Low Open Heath of *Acacia stellaticeps* over Open Hummock Grassland of *Trioda epactia*

Species			% Cover	Height
Acacia	*stellaticeps*		65	0.8
Carissa	*lanceolata*		<1	1.5
Triodia	*epactia*		20	1-1.5
Paraneurachne	*muelleri*		<1	0.5
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.5
Eragrostis	*eriopoda*		<1	0.4
Aristida	sp. indet		<1	0.3
Ptilotus	*astrolasius*		<1	0.6
Grevillea	*wickhamii*		<1	1.5
Bonamia	*rosea*		<1	0.3
Hakea	*lorea*	subsp. *lorea*	<1	1.5
Corymbia	*hamersleyana*		<1	1.6
Hakea	*macrocarpa*		<1	1.5
Acacia	*ancistrocarpa*		<1	1.5
Acacia	*sphaerostachya*		<1	1.2
Jacksonia	*aculeata*		<1	0.6
Aristida	*holathera*	var. *holathera*	<1	0.5

Site	Goldsworthy - Site GD040
Date	06/09/2012
Recorder	JB/DR
Photo	102-0835, DSC00886
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	755480
Northing	7749382
Habitat	Drainage Depression (DDE)
Aspect	70°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Sand – Orange
Rock Type	None evident
% Leaves:Logs	13:<1
Vegetation Condition	Very Good
Disturbance Type	Livestock
Fire Age	Old – 5-10 yrs
Vegetation	Open Scrub of *Acacia tumida* var. *pilbarensis* over Hummock Grassland of *Triodia epactia* with Low Open Woodland of *Corymbia hamersleyana*

Species			% Cover	Height
Bonamia	*rosea*		4	0.5
Acacia	*tumida*	var. *pilbarensis*	45	2-3
Triodia	*epactia*		35	0.5-1.3
Dampiera	*candicans*		<1	0.6
Acacia	*adoxa*	var. *adoxa*	1	0.45
Ptilotus	*astrolasius*		1	0.5
Tephrosia	sp. Bungaroo Creek (M.E. Trudgen 11601)		1	0.3
Corymbia	*hamersleyana*		3	4-6
Indigofera	*monophylla*		<1	0.4
Hybanthus	*aurantiacus*		1.5	0.4
Leptosema	*anomalum*		1	0.4
Bulbostylis	*barbata*		<1	0.15
Aristida	*holathera*	var. *holathera*	0.5	0.4
Eragrostis	*eriopoda*		<1	0.4
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.4
Goodenia	*microptera*		1	0.4
Acacia	*hilliana*		0.5	0.45
Eucalyptus	*odontocarpa*		1	2
Mollugo	*molluginea*		<1	0.1
Ptilotus	*calostachyus*		<1	0.6
Schizachyrium	*fragile*		<1	0.25
Solanum	*diversifolium*		<1	0.2
Acacia	*pyrifolia*	var. *pyrifolia*	<1	1-2
Acacia	*monticola*		<1	2-3
Crotalaria	*ramosissima*		<1	0.2
Heliotropium	*chrysocarpum*		<1	0.3
Solanum	*thin gold'*		<1	0.3

Species			% Cover	Height
Polymeria	*ambigua*		<1	Cr
Cymbopogon	*obtectus*		<1	0.7
Cucumis	*maderaspatanus*		<1	Cl
Corchorus	*elachocarpus*		<1	0.3
Triumfetta	sp.		<1	0.1
Paraneurachne	*muelleri*		<1	0.3
Trianthema	*pilosa*		<1	0.1

Site	Goldsworthy - Site GD041
Date	06/09/2012
Recorder	JW/EP
Photo	EP21, DSC596
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	755599
Northing	7746522
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Sand – Red
Rock Type	None evident
% Leaves:Logs	4:<1
Vegetation Condition	Very Good
Disturbance Type	Livestock; Weeds
Fire Age	Old – 5-10 yrs
Vegetation	Open Scrub of *Acacia tumida* over Low Shrubland of *Isotropis atropurpurea, Pluchea tetranthera, Hybanthus aurantiacus* over Very Open Tussock Grassland of *Aristida holathe*ra var. *holathera, Paraneurachne muelleri, Chrysopogon fallax*

Species			% Cover	Height
Polymeria	*ambigua*		<1	Cr
Acacia	*tumida*		32	2-3
Corymbia	*flavescens*		1	8
Corymbia	*hamersleyana*		1.5	4
Chrysopogon	*fallax*		1.5	1
Crotalaria	*medicaginea*		<1	0.2
**Cenchrus*	*ciliaris*		<1	0.6
Tephrosia	*rosea*	var. *clementii*	<1	1
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.8
Ptilotus	*astrolasius*		<1	0.4
Hybanthus	*aurantiacus*		3	0.3
Indigofera	*monophylla*		<1	0.5
Corchorus	*elachocarpus*		<1	0.2
Pluchea	*tetranthera*		5	0.8
Isotropis	*atropurpurea*		15	0.4
Goodenia	*armitiana*		<1	0.5
Mollugo	*molluginea*		<1	0.1
Acacia	*adoxa*	var. *adoxa*	<1	0.4
Bulbostylis	*barbata*		<1	0.1
Aristida	*holathera*	var. *holathera*	2	0.5
Eriachne	*aristidea*		<1	0.3
Paraneurachne	*muelleri*		2	0.4
Ptilotus	*axillaris*		<1	Cr
Cullen	*martinii*		<1	0.2
Senna	*notabilis*		<1	0.2
Hibiscus	*leptocladus*		<1	0.4

Species			% Cover	Height
Acacia	*pyrifolia*		<1	2.5
Yakirra	*australiensis*		<1	0.1
Alternanthera	*nana*		<1	0.1
Trichodesma	*zeylanicum*	var. *zeylanicum*	<1	1.5
Acacia	*colei*		<1	2.5
Cymbopogon	*obtectus*		<1	0.8
Bonamia	*rosea*		<1	0.4
Stemodia	*grossa*		<1	0.6
Triodia	*epactia*		3	1.2

Site	Goldsworthy - Site GD042
Date	06/09/2012
Recorder	JB/DR
Photo	102-0838, DSC00887
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	754842
Northing	7748814
Habitat	Hillslope (HSL)
Aspect	130°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Loamy Sand - Orange
Rock Type	Sandstone/ granite; Dolerite (pebbles, cobbles, outcrops)
% Leaves:Logs	<1;0.5
Vegetation Condition	Excellent
Disturbance Type	Fire
Fire Age	Moderate – 2-5 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with Shrubland of *Grevillea wickhamii, Acacia monticola* over Low Open Shrubland of *Acacia adoxa, Acacia hilliana*

Species			% Cover	Height
Triodia	*epactia*		45	0.3-1
Grevillea	*wickhamii*		12	1-2
Acacia	*pyrifolia*		0.5	1
Acacia	*inaequilatera*		<1	1.5
Acacia	*monticola*		0.5	1-2
Pluchea	*tetranthera*		<1	0.35
Polycarpea	*holtzei*		<1	0.05
Bonamia	*media*	var. *villosa*	<1	Cr
Hybanthus	*aurantiacus*		<1	0.3
Bulbostylis	*barbata*		<1	0.1
Fimbristylis	*dichotoma*		<1	0.1
Polycarpea	*corymbosa*		<1	0.1
Triumfetta	*chaetocarpa*		<1	0.4
Leptosema	*anomalum*		<1	0.35
Goodenia	*stobbsiana*		<1	0.4
Acacia	*hilliana*		3	0.4
Acacia	*adoxa*		6	0.5
Codonocarpus	*continifolius*		<1	0.5
Eriachne	*lanata*		<1	0.3
Ptilotus	*calostachyus*		<1	0.5
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.4

Site	Goldsworthy - Site GD043
Date	06/09/2012
Recorder	JW/EP
Photo	EP22, DSC597
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	756450
Northing	7745705
Habitat	Gully (GUL)
Aspect	230°
Slope	Moderately Inclined (MO) (5°46' to 18°)
Soil	Clay Loam - Brown
Rock Type	Ironstone (outcrops, cobbles)
% Leaves:Logs	7:2
Vegetation Condition	Very Good
Disturbance Type	Weeds
Fire Age	Very Old - >10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* over High Shrubland of *Acacia acradenia, Acacia pyrifolia, Terminalia canescens* over Open Tussock Grassland of **Cenchrus ciliaris* with Low Open Woodland of *Terminalia canescens, Acacia inaequilatera*

Species			% Cover	Height
Acacia	*tumida*		1	3
Acacia	*inaequilatera*		2	2.5
Acacia	*pyrifolia*		2	3
Sida	sp. Rabbit flat		2	1-2
Cullen	*stipulaceum*		0.5	3
Ehertia	*saligna*		0.5	1-4.5
Triodia	*epactia*		35	1
Tephrosia	*rosea*	var. *clementii*	1	1.5
Acacia	*ancistrocarpa*		<1	1.5
Solanum	*dioicum*		<1	1
Triumfetta	*clementii*		0.5	0.8
Acacia	*acradenia*		8	2.5
Abutilon	*lepidum*		<1	2
Alysicarpus	*muelleri*		<1	0.3
**Cenchrus*	*ciliaris*		15	0.5
Sida	*rohlenae*	subsp. *rohlenae*	<1	0.3
Senna	*venusta*		<1	0.5-1.5
Terminalia	*canescens*		5	2-3
Cymbopogon	*ambiguus*		<1	0.8
Atalaya	*hemiglauca*		<1	1.5
Corchorus	*parviflorus*		<1	0.4
Trachymene	*oleracea*		<1	0.2
Sida	*echinocarpa*		<1	0.1
Triumfetta	*maconochiena*		<1	0.5
Streptoglossa	*decurrens*		<1	0.4
Ficus	*brachypoda*		<1	3
Bulbostylis	*barbata*		<1	0.4

Species			% Cover	Height
Eriachne	*mucronata*		<1	0.4
Paraneurachne	*muelleri*		<1	0.6
Crotalaria	*medicaginea*		<1	0.4
Evolvulus	*alsinoides*	var. *villosicalyx*	<1	0.1
Cleome	*viscosa*		<1	0.5
Amaranthus	sp. indet.		<1	0.3
Indigofera	*trita*		<1	0.4
Senna	*notabilis*		<1	0.3
Boerhavia	*coccinea*		<1	0.2
Indigofera	*monophylla*		<1	0.6
Bonamia	*media*	var. *villosa*	<1	Cr
Dampiera	*candicans*		<1	0.1

Site	Goldsworthy - Site GD044
Date	06/09/2012
Recorder	JB/DR
Photo	102-0841, DSC00888
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	755627
Northing	7748347
Habitat	Plain (PLA)
Aspect	130°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Sand – Red
Rock Type	None evident
% Leaves:Logs	5:<1
Vegetation Condition	Very Good
Disturbance Type	Livestock
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia, Triodia schinzii* with High Open Shrubland of *Acacia tumida, Acacia ancistrocarpa, Grevillea wickhamii* over Low Open Shrubland of *Ptilotus astrolasius, Pluchea tetranthera*

Species			% Cover	Height
Hibiscus	*leptocladus*		<1	0.5
Aristida	*holathera*	var. *holathera*	2	0.5
Eriachne	*obtusa*		3.5	0.45
Triodia	*schinzii*		4	01.4
Eragrostis	*eriopoda*		3	0.4
Acacia	*tumida*	var. *pilbarensis*	4	2-4
Tephrosia	sp.		0.5	0.15
Mollugo	*molluginea*		0.5	0.1
Bonamia	*linearis*		<1	Cr
Hybanthus	*aurantiacus*		1	0.4
Crotalaria	*ramosissima*		2	0.2
Senna	*notabilis*		<1	0.1
Corchorus	*elachocarpus*		2	0.45
Ptilotus	*astrolasius*		2.5	0.6
Sida	*echinocarpa*		0.5	1-2
Pluchea	*tetranthera*		1	0.5
Trianthema	*pilosa*		<1	0.1
Ptilotus	*astrolasius*		1.5	0.5
Acacia	*ancistrocarpa*		4	2-3
Cullen	*martinii*		<1	0.5
Solanum	*diversifolium*		<1	0.3
Acacia	*inaequilatera*		0.5	1-2
Euphorbia	*australis*		<1	0.05
Bonamia	*rosea*		<1	0.35
Tephrosia	sp. Bungaroo Creek (M.E. Trudgen 11601)		<1	0.3
Ptilotus	*axillaris*		<1	Cr
Goodenia	sp.		<1	0.4

Species			% Cover	Height
Bulbostylis	*barbata*		<1	0.15
Triodia	*epactia*		35	1.2
Ipomoea	*muelleri*		<1	Cl
Cyperus	sp.		0.5	0.4
Sida	*cardiophylla*		<1	0.5
Ptilotus	*fusiformis*		<1	0.5
Grevillea	*wickhamii*		0.5	2-4
Acacia	*arida*		<1	1.2
Dampiera	*candicans*		1	0.5
Stemodia	*grossa*		<1	0.4
Indigofera	*monophylla*		<1	0.35
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.5
Jacksonia	*aculeata*		<1	0.5
Acacia	*colei*		<1	2-3
Newcastelia	*cladotricha*		<1	0.5
Dodonaea	*coriacea*		<1	0.6
Solanum	*dioicum*		<1	0.5

Site	Goldsworthy - Site GD045
Date	06/09/2012
Recorder	JW/EP
Photo	EP23, DSC598
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	754719
Northing	7745770
Habitat	Hillcrest (HCR)
Aspect	140°
Slope	Moderately Inclined (MO) (5°46' to 18°)
Soil	Loamy Sand - Orange
Rock Type	Granite (outcrops, slabs, boulders, cobbles, pebbles)
% Leaves:Logs	<1:<1
Vegetation Condition	Excellent
Disturbance Type	Rubbish (old drum); Livestock nearby
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with High Shrubland of *Acacia tumida, Acacia monticola, Acacia pyrifolia*

Species			% Cover	Height
Acacia	*monticola*		7	1.5-2.5
Acacia	*tumida*		7	1.5-2.5
Triodia	*epactia*		30	0.8
Acacia	*pyrifolia*		3	1.5-2.5
Petalostylis	*labicheoides*		<1	0.6
Eriachne	*mucronata*		<1	0.4
Tephrosia	*rosea*	var. *clementii*	<1	0.6

Site	Goldsworthy - Site GD046
Date	06/09/2012
Recorder	JB/DR
Photo	102-0846, DSC00889
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	756506
Northing	7750474
Habitat	Hillslope (HSL)
Aspect	160°
Slope	Moderately Inclined (MO) (5°46' to 18°)
Soil	Silty Loam - Brown
Rock Type	Granite/ Sandstone (outcrops, cobbles)
% Leaves:Logs	<1:0
Vegetation Condition	Very Good
Disturbance Type	Access track; Pipeline; Powerlines; Rail
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia wiseana, Triodia epactia* with Scattered Tall Shrubs of *Grevillea pyramidalis* subsp. *leucadendron, Grevillea wickhamii* over Scattered Shrubs of *Acacia acradenia*

Species			% Cover	Height
Triodia	*epactia*		30	1
Triodia	*wiseana*		40	0.5-1
Grevillea	*pyramidalis*	subsp. *leucadendron*	1	1-2.5
Acacia	*acradenia*		1	2-41-2
Ptilotus	*nobilis*		1	0.4
Acacia	*adoxa*	var. *adoxa*	<1	0.4
Ptilotus	*calostachyus*		<1	0.5
Acacia	*stellaticeps*		<1	0.5
Codonocarpus	*cotinifolius*		<1	1.5
Acacia	*colei*		<1	1-2
Polygala	*isingii*		<1	0.05
Fimbristylis	*simulans*		<1	0.15
Eriachne	*pulchella*		<1	0.1
Cassytha	*filiformis*		<1	Cl
Bonamia	*media*	var. *villosa*	<1	Cr
Pluchea	*tetranthera*		<1	0.5
Cullen	*martinii*		<1	1
Eriachne	*aristidea*		<1	0.4
Pterocaulon	*serrulatum*	gold'	<1	0.4
Euphorbia	sp. indet.		<1	0.35
Solanum	sp.		<1	0.6
Bulbostylis	*barbata*		<1	0.15
Senna	*notabilis*		<1	0.1
Crotalaria	*medicaginea*		<1	0.4
Streptoglossa	*odora*		<1	0.4
Senna	*glutinosa*	subsp. *pruinosa*	<1	1.2
Hakea	*macrocarpa*		<1	1.2
Tephrosia	sp. indet.		<1	0.25

Species			% Cover	Height
Gossypium	*australe*		<1	0.5
Gomphrena	*cunninghamii*		<1	0.1

Site	Goldsworthy - Site GD047
Date	06/09/2012
Recorder	JW/EP
Photo	EP24, DSC599
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	755601
Northing	7745604
Habitat	Scarp (SCA)
Aspect	
Slope	Steep (ST) (18°1' to 30°)
Soil	Sandy Clay Loam –Brown
Rock Type	Ironstone (outcrops, boulders, cobbles)
% Leaves:Logs	<1:<1
Vegetation Condition	Excellent
Disturbance Type	Access track nearby
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with Low Open Woodland of *Terminalia canescens, Atalaya hemiglauca* over Very Open Tussock Grassland of **Cenchrus ciliaris*

Species			% Cover	Height
Triodia	*epactia*		60	1
Acacia	*inaequilatera*		<1	1.5
Solanum	*dioicum*		<1	0.4
Triumfetta	*maconochiena*		<1	0.5
Terminalia	*canescens*		1	1.5-3
Corymbia	*hamersleyana*		<1	3
Grevillea	*wickhamii*		1	2
Pluchea	*tetranthera*		1	0.8
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.3
Corchorus	*parviflorus*		<1	0.4
Sida	sp. Rabbit flat		1	0.8
Gomphrena	*cunninghamii*		<1	0.1
Cleome	*viscosa*		<1	0.8
**Cenchrus*	*ciliaris*		2	0.35
Bulbostylis	*barbata*		<1	0.2
Cucumis	*maderaspatanus*		<1	Cl
Amaranthus	sp. indet		<1	0.5
Acacia	*adoxa*	var. *adoxa*	<1	0.4
Cullen	*stipulaceum*		<1	1-3
Trachymene	*oleracea*		<1	0.3
Paspalidium	*clementii*		<1	0.15
Eriachne	*mucronata*		<1	0.3
Atalaya	*hemiglauca*		1	4
Sida	*rohlenae*	subsp. *rohlenae*	<1	0.3
Cymbopogon	*ambiguus*		<1	1
Acacia	*colei*		<1	0.6
Carissa	*lanceolata*		<1	1.2

Species			% Cover	Height
Abutilon	*lepidum*		<1	0.4
Boerhavia	*coccinea*		<1	Cr
Enneapogon	*lindleyanus*		<1	0.3
Crotalaria	*medicaginea*		<1	0.3
Acacia	*pyrifolia*		<1	1-2
Stemodia	*kingii*		<1	0.2

Site	Goldsworthy - Site GD048
Date	07/09/2012
Recorder	JB/DR
Photo	102-0853, DSC00890
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	755340
Northing	7750110
Habitat	Drainage Depression (DDE)
Aspect	270°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Sandy Loam – Brown
Rock Type	Mixed quartzite/ Chert (cobbles, pebbles)
% Leaves:Logs	<1:2.5
Vegetation Condition	Excellent
Disturbance Type	None evident
Fire Age	Old – 5-10 yrs
Vegetation	Closed Scrub of *Acacia tumida, Petalostylis labicheoides, Acacia acradenia* over Open Hummock Grassland of *Triodia epactia* with Scattered Low Trees of *Corymbia hamersleyana*

Species			% Cover	Height
Cymbopogon	*obtectus*		<1	1-2
Grevillea	*wickhamii*		<1	1-2
Ptilotus	*calostachyus*		<1	0.5
Mollugo	*molluginea*		<1	0.15
Polycarpea	*holtzei*		<1	0.1
Ptilotus	*astrolasius*		<1	0.4
Aristida	*holathera*	var. *holathera*	<1	0.5
Hybanthus	*aurantiacus*		<1	0.5
Petalostylis	*labicheoides*		<1	2
Acacia	*tumida*		85	2-4
Acacia	*acradenia*		5	1-2
Corymbia	*hamersleyana*		1	2-5
Triodia	*epactia*		25	0.5-1.3
Chrysopogon	*fallax*		20	1
Cymbopogon	*obtectus*		<1	1-2

Site	Goldsworthy - Site GD049
Date	07/09/2012
Recorder	JW/EP
Photo	EP25, DSC600
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	754489
Northing	7746819
Habitat	Hillslope (HSL)
Aspect	140°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Silty Loam – Orange
Rock Type	Granite (pebbles, outcrops, cobbles)
% Leaves:Logs	<1:<1
Vegetation Condition	Pristine
Disturbance Type	None evident
Fire Age	Old – 5-10 yrs
Vegetation	Closed Hummock Grassland of *Triodia epactia* with Very Open Shrubs of *Grevillea wickhamii* over Scattered Sedges of *Fimbristylis dichotoma*

Species			% Cover	Height
Grevillea	*pyramidalis*		<1	2.5
Triodia	*epactia*		72	0.8
Acacia	*tumida*		<1	1
Grevillea	*wickhamii*		2	1-2
Pluchea	*tetranthera*		<1	1
Acacia	*pyrifolia*		<1	1.2
Tephrosia	*rosea*	var. *clementii*	<1	1
Solanum	*dioicum*		<1	0.6
Ptilotus	*astrolasius*		<1	0.5
Acacia	*adoxa*	var. *adoxa*	<1	0.2
Fimbristylis	*dichotoma*		0.5	0.25
Bonamia	*media*	var. *villosa*	<1	0.1
Codonocarpus	*cotinifolius*		<1	0.5
Ptilotus	*calostachyus*		<1	0.6
Acacia	*ancistrocarpa*		<1	1.3

Site	Goldsworthy - Site GD050
Date	07/09/2012
Recorder	JB/DR
Photo	102-0857, DSC00891
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	754393
Northing	7749656
Habitat	Hillslope (HSL)
Aspect	150°
Slope	Steep (ST) (18°1' to 30°)
Soil	Sandy Loam – Brown
Rock Type	Chert; Berricia; Sandstone
% Leaves:Logs	<1:<1
Vegetation Condition	Excellent
Disturbance Type	None evident
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia, Triodia wiseana* with Open Mallee of *Eucalyptus odontocarpa* over Low Shrubland of *Acacia adoxa* var. *adoxa, Indigofera monophylla*

Species			% Cover	Height
Eucalyptus	*odontocarpa*		12	2
Triodia	*epactia*		35	0.4-1
Acacia	*adoxa*	var. *adoxa*	15	0.25
Indigofera	*monophylla*		3	0.3
Grevillea	*wickhamii*		<1	1-2
Corchorus	*parviflorus*		<1	0.3
Bonamia	*media*	var. *villosa*	<1	Cr
Sida	sp. Rabbit flat		<1	0.6
Dampiera	*candicans*		<1	0.4
Bulbostylis	*barbata*		<1	0.05
Solanum	sp.		<1	0.4
Corymbia	*hamersleyana*		<1	2-5
Ptilotus	*calostachyus*		<1	0.6
Hakea	*lorea*	subsp. *lorea*	<1	2
Acacia	*colei*		<1	0.5
Isotropis	*atropurpurea*		<1	0.5
Eriachne	*mucronata*		<1	0.3
Acacia	*acradenia*		1	0.5-1
Tephrosia	sp.		<1	0.1
Triodia	*wiseana*		20	0.5-0.8

Site	Goldsworthy - Site GD051
Date	07/09/2012
Recorder	JW/EP
Photo	EP26
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	754544
Northing	7747477
Habitat	Plain (PLA)
Aspect	210°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Sand - Orange
Rock Type	None evident
% Leaves:Logs	0.5:<1
Vegetation Condition	Excellent
Disturbance Type	Old track nearby; Livestock
Fire Age	Moderate – 2-5 yrs
Vegetation	Low Open Heath of *Ptilotus astrolasius, Mirbelia viminalis, Corchorus elachocarpus* with Open Shrubland of *Acacia ancistrocarpa, Acacia tumida* over Very Open Hummock Grassland of *Triodia epactia*

Species			% Cover	Height
Acacia	*tumida*		1	1-2.5
Acacia	*ancistrocarpa*		2	1-2
Jacksonia	*aculeata*		3.5	1
Ptilotus	*astrolasius*		10	0.5
Corchorus	*elachocarpus*		8	0.4-0.6
Triodia	*epactia*		8	0.3-0.8
Eragrostis	*eriopoda*		6	0.6
Solanum	*diversifolium*		<1	0.4
Bonamia	*rosea*		4	0.2-0.4
Mollugo	*molluginea*		<1	0.15
Dampiera	*candicans*		<1	0.8
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.8
Bonamia	linearis		<1	Cr
Tephrosia	sp. Bungaroo Creek (M.E. Trudgen 11601)		<1	0.2-0.4
Goodenia	*armitiana*		<1	0.4
Sida	*arenicola*		0.5	1-2
Ptilotus	*arthrolasius*		<1	0.4
Aristida	*holathera*	var. *holathera*	<1	0.4
Isotropis	*atropurpurea*		<1	0.4
Dodonaea	*coriacea*		<1	0.3
Solanum	*dioicum*		<1	0.3
Bulbostylis	*barbata*		<1	0.2
Cullen	*martinii*		<1	0.2
Ptilotus	*fusiformis*		<1	0.4
Bonamia	*media*	var. *villosa*	<1	0.15
Codonocarpus	*cotinifolius*		<1	0.5

Species			% Cover	Height
Aristida	*inaequiglumis*		1	1
Ptilotus	*calostachyus*		<1	0.2
Paraneurachne	*muelleri*		<1	0.4
Trianthema	*pilosa*		<1	0.3

Site	Goldsworthy - Site GD052
Date	07/09/2012
Recorder	JB/DR
Photo	102-0868, DSC00892
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	753664
Northing	7749367
Habitat	Hillslope (HSL)
Aspect	70°
Slope	Moderately Inclined (MO) (5°46' to 18°)
Soil	Loamy Sand – Brown
Rock Type	Dolerite (light coloured)
% Leaves:Logs	2:<1
Vegetation Condition	Excellent
Disturbance Type	None evident
Fire Age	Old – 5-10 yrs
Vegetation	Closed Hummock Grassland of *Triodia epactia, Triodia wiseana* with Low Shrubland of *Acacia adoxa, Dampiera candicans* with Scattered Low Trees of *Corymbia hamersleyana*

Species			% Cover	Height
Acacia	*acradenia*		1	1-2
Corymbia	*hamersleyana*		0.5	2-3
Acacia	*adoxa*		5.5	0.5
Dampiera	*candicans*		2.5	0.3
Triodia	*epactia*		70	0.5-1
Eucalyptus	*odontocarpa*		2	2-3
Indigofera	*monophylla*		<1	0.3
Bonamia	*media*	var. *villosa*	<1	Cr
Mollugo	*molluginea*		<1	0.1
Grevillea	*pyramidalis*		<1	1-2
Tephrosia	sp.		<1	0.1
Triodia	*wiseana*		5	0.05
Polygala	*isingii*		<1	0.05
Ptilotus	*astrolasius*		<1	0.4
Ptilotus	*calostachyus*		<1	0.6
Pluchea	*tetranthera*		<1	0.4
Acacia	*monticola*		<1	1-2
Eriachne	*mucronata*		<1	0.3

Site	Goldsworthy - Site GD053
Date	07/09/2012
Recorder	JW/EP
Photo	EP27, DSC604
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	755451
Northing	7747499
Habitat	Plain (PLA)
Slope	Level (LE) (0° to 0°35'
Soil	Clayey Sand - Orange
Rock Type	None evident
% Leaves:Logs	<1:<1
Vegetation Condition	Very Good
Disturbance Type	Livestock; Old track
Fire Age	Old – 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with Low Open Shrubland of *Pluchea tetranthera* over Very Open Tussock Grassland of *Cymbopogon obtectus*

Species			% Cover	Height
Acacia	*inaequilatera*		<1	1.5
Acacia	*colei*		<1	1.5
Hakea	*lorea*		<1	1.5
Pluchea	*tetranthera*		6	0.8
Triodia	*epactia*		42	0.5-1.2
Cymbopogon	*obtectus*		2.5	1
Ptiltous	*astrolasius*		<1	0.4
Mollugo	*molluginea*		<1	0.15
Polycarpea	*corymbosa*		<1	0.15
Cassytha	*filiformis*		2	Cr
Goodenia	*armitiana*		<1	0.3
Bonamia	*linearis*		<1	Cr
Goodenia	*microptera*		<1	0.3
Eragrostis	*xerophila*		<1	0.3
Bulbostylis	*barbata*		<1	0.2
Crotalaria	*medicaginea*		<1	0.2
Solanum	*diversifolium*		<1	0.4
Corchorus	*elachocarpus*		<1	0.4
Sporobolus	*australasicus*		<1	0.2
Eragrostis	*eriopoda*		<1	0.5
Paraneurachne	*muelleri*		<1	0.5
Eriachne	*obtusa*		<1	0.6
Aristida	*holathera*	var. *holathera*	<1	0.6
Euphorbia	*australis*		<1	0.05
Crotalaria	sp. indet		<1	0.1
Tephrosia	sp. B Kimberley Flora (C.A. Gardner 7300)		<1	0.2
Grevillea	*pyramidalis*		<1	1.5
Acacia	*ancistrocarpa*		<1	1.5

Species			% Cover	Height
Acacia	*tumida*		<1	1.5

Site	Goldsworthy - Site GD054
Date	07/09/2012
Recorder	JB/DR
Photo	102-0870, DSC00893
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	753587
Northing	7748849
Habitat	Drainage Depression (DDE)
Aspect	0°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Sand – Brown
Rock Type	Dolerite (crystals – light coloured); Sandstone (cobbles, pebbles)
% Leaves:Logs	5:<1
Vegetation Condition	Excellent
Disturbance Type	None evident
Fire Age	Old – 5-10 yrs
Vegetation	Mallee of *Eucalyptus odontocarpa* over Open Scrub of *Acacia acradenia, Grevillea wickhamii* over Hummock Grassland of *Triodia epactia*

Species			% Cover	Height
Grevillea	*wickhamii*		2	1-2.5
Acacia	*tumida*	var. *pilbarensis*	1	2-3
Eucalyptus	*odontocarpa*		35	1.5-2.5
Acacia	*monticola*		3	2
Triodia	*epactia*		50	1.2
Corymbia	*hamersleyana*		0.5	4-6
Cassytha	*filiformis*		<1	Cl
Indigofera	*monophylla*		<1	0.4
Dampiera	*candicans*		<1	0.5
Tephrosia	*rosea*	var. *clementii*	<1	0.5-1
Ptilotus	*calostachyus*		<1	0.5-1
Eriachne	*lanata*		<1	0.5
Acacia	*acradenia*		25	1-2
Acacia	*inaequilatera*		<1	1-2
Pluchea	*tetranthera*		<1	0.4
Mollugo	*molluginea*		<1	0.1

Site	Goldsworthy - Site GD055
Date	07/09/2012
Recorder	JW/EP
Photo	EP28,DSC605
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	756396
Northing	7744741
Habitat	Plain (PLA)
Aspect	110°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Silty Clay Loam – Brown
Rock Type	None evident
% Leaves:Logs	<1:<1
Vegetation Condition	Good
Disturbance Type	Livestock; Weeds; Access track
Fire Age	Old - - 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* over Very Open Tussock Grassland of **Cenchrus setiger* over Very Open Sedges of *Fimbristylis dichotoma*

Species			% Cover	Height
Triodia	*epactia*		32	0.8
**Cenchrus*	*setiger*		7	0.7
Fimbristylis	*dichotoma*		10	0.1
Eriachne	*aristidea*		<1	1.5
Chloris	sp. indet		<1	0.4
Eragrostis	*cumingii*		1	0.2
Sclerolaena	*cunneata*		<1	0.25
Bulbostylis	*barbata*		<1	0.1
Trianthema	*triquetra*		<1	0.2
Sporobolus	*australasicus*		<1	0.1

Site	Goldsworthy - Site GD056
Date	07/09/2012
Recorder	JB/DR
Photo	102-0872, DSC00894
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	754122
Northing	7748542
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Sand – Red
Rock Type	None evident
% Leaves:Logs	15:0.5
Vegetation Condition	Very Good
Disturbance Type	Livestock
Fire Age	Old – 5-10 yrs
Vegetation	Closed Scrub of *Acacia tumida* var. *pilbarensis* over Low Shrubland of *Ptilotus astrolasius, Jacksonia aculeata, Dampiera candicans* over Open Hummock Grassland of *Triodia epactia*

Species			% Cover	Height
Jacksonia	*aculeata*		9	0.5-1
Dampiera	*candicans*		6	0.6-1
Triodia	*epactia*		16	0.4-1
Ptilotus	*astrolasius*		8	0.5
Acacia	*tumida*	var. *pilbarensis*	75	2-3
Acacia	*ancistrocarpa*		2.5	2
Aristida	*holathera*	var. *holathera*	1.5	0.5
Bonamia	*rosea*		1	0.4
Crotalaria	*ramosissima*		<1	0.15
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.6
Bonamia	*linearis*		<1	Cr
Ptilotus	*astrolasius*		0.5	0.5
Eragrostis	*eriopoda*		1	0.4
Trianthema	*pilosa*		<1	0.15
Corchorus	*elachocarpus*		1	0.4
Sida	*arenicola*		<1	0.5-1.7
Mollugo	*molluginea*		<1	0.1
Hybanthus	*aurantiacus*		<1	0.5
Solanum	*diversifolium*		<1	0.2
Tephrosia	sp. Bungaroo Creek (M.E. Trudgen 11601)		<1	0.3
Goodenia	*microptera*		<1	0.35
Acacia	*acradenia*		0.5	1.5
Paraneurachne	*muelleri*		<1	0.5
Bulbostylis	*barbata*		<1	0.1
Polycarpea	*holtzei*		<1	0.05
Senna	*notabilis*		<1	0.1

Species			% Cover	Height
Ptiltous	*fusiformis*		<1	0.4
Ptilotus	*axillaris*		<1	Cr
Yakirra	*australiensis*		<1	0.1
Solanum	*dioicum*		<1	0.5

Site	Goldsworthy - Site GD057
Date	07/09/2012
Recorder	JW/EP
Photo	EP29, DSC606
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	755686
Northing	7744701
Habitat	Hillslope (HSL)
Aspect	170°
Slope	Very Steep (VS) (30°1' to 45°)
Soil	Silty Loam – Brown
Rock Type	Sandstone (outcropping, cobbles, pebbles)
% Leaves:Logs	<1:<1
Vegetation Condition	Excellent
Disturbance Type	Access road nearby
Fire Age	Old - - 5-10 yrs
Vegetation	Hummock Grassland of *Triodia epactia* with Low Open Shrubland of *Acacia adoxa* var. *adoxa* with Scattered Tall Shrubs of *Acacia inaequilatera, Grevillea wickhamii*

Species			% Cover	Height
Acacia	*inaequilatera*		1	1-2
Triodia	*epactia*		70	0.5-1
Sida	sp. Rabbit flat		<1	0.6
Corchorus	*parviflorus*		<1	0.3
Grevillea	*wickhamii*		<1	2.5
Acacia	*adoxa*	var. *adoxa*	4	0.4
Carissa	*lanceolata*		1	-
Terminalia	*canescens*		<1	2.5
Hakea	*lorea*	subsp. *lorea*	<1	1.5
Bonamia	*media*	var. *villosa*	<1	Cr
Solanum	*dioicum*		<1	0.6
Cymbopogon	*ambiguus*		<1	0.6
Fimbristylis	*dichotoma*		<1	0.1
Bulbostylis	*barbata*		<1	0.1
Acacia	*tumida*		<1	1.5
Evolvulus	*alsinoides*	var. *villosicalyx*	<1	0.5
**Cenchrus*	*setiger*		<1	0.2
Indigofera	*trita*		<1	0.3
Triumfetta	*clementii*		<1	1
Eriachne	*mucronata*		<1	0.4

Site	Goldsworthy - Site GD058
Date	07/09/2012
Recorder	JB/DR
Photo	102-0882, DSC00895
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	757496
Northing	7745500
Habitat	Plain (PLA)
Aspect	280°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Sand Clay Loam – Orange
Rock Type	None evident
% Leaves:Logs	<1:0
Vegetation Condition	Degraded
Disturbance Type	Livestock; Weeds; Tracks; Rubbish
Fire Age	Old – 5-10 yrs
Vegetation	Very Open Tussock Grassland of *Eragrostis xerophila* over Very Open Hummock Grassland of *Triodia epactia* over Very Open herbs of *Ptilotus murrayi*

Species			% Cover	Height
Eragrostis	*xerophila*		8	0.4
Sclerolaena	*costata*		1.5	0.2
Sporobolus	*australasicus*		1	0.1
Lepidium	*pholidogynum*		<1	0.1
Oldenlandia	*crouchiana*		1.5	0.1
Ptilotus	*murrayi*		4	0.1
Triodia	*epactia*		3	0.5
Rhynchosia	*minima*		<1	Cr
Alysicarpus	*muelleri*		<1	0.1
**Cenchrus*	*setiger*		3.5	0.5
Eriachne	*benthamii*		<1	0.4
Dicanthium	*sericeum*	subsp. *humilius*	1	0.2
Senna	*artemisioides*	subsp. oligophylla	<1	0.4
Salsola	*australis*		<1	0.5
Gomphrena	*canescens*		<1	0.2
Portulaca	*pilosa*		<1	0.1
Chloris	sp. indet		<1	0.2
Eriachne	*obtusa*		<1	0.4
**Cenchrus*	*ciliaris*		3.5	0.4
Sclerolaena	*costata*		<1	0.25
Eragrostis	*cumingii*		<1	0.2
Stemodia	*kingii*		0.5	0.3
Sesbania	*cannabina*		<1	0.4
Senna	*notabilis*		<1	0.3
Pluchea	*tetranthera*		<1	0.3
**Vachellia*	*farnesiana*		<1	0.3
Dactyloctenium	*radulans*		<1	0.1
Heliotropium	*ammophilum*		<1	0.25

Species			% Cover	Height
Aristida	*contorta*		<1	0.2
Sida	sp. Verrucosa glands		<1	0.1
Euphorbia	*alsiniflora*		<1	0.1
Neptunia	*dimorphantha*		<1	0.1

Site	Goldsworthy - Site GD059
Date	08/09/2012
Recorder	DR/EP
Photo	EP30, DSC608
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	762476
Northing	7750490
Habitat	Plain (PLA)
Aspect	300°
Slope	Level (LE) (0° to 0°35')
Soil	Sandy Loam - Brown
Rock Type	Ironstone; Chert (cobbles, pebbles)
% Leaves:Logs	<1:<1
Vegetation Condition	Very Good
Disturbance Type	Access tracks; Power lines
Fire Age	Moderate – 2-5 yrs
Vegetation	Low Open Heath of *Acacia stellaticeps* over Open Hummock Grassland of *Triodia epactia* with Open Shrubland of *Grevillea wickhamii*

Species			% Cover	Height
Grevillea	*wickhamii*		6	1-3
Acacia	*stellaticeps*		65	0.5
Triodia	*epactia*		10	0.5-1
Ptilotus	*calostachyus*		<1	0.3
Dampiera	*candicans*		<1	0.4
Bonamia	*rosea*		<1	0.3
Pluchea	*tetranthera*		<1	0.6
Cassytha	*filiformis*		<1	Cr
Eragrostis	*eriopoda*		<1	0.5
Corchorus	*elachocarpus*		<1	0.2
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.6
Hakea	*macrocarpa*		<1	1
Jacksonia	*aculeata*		<1	0.3

Site	Goldsworthy - Site GD060
Date	07/09/2012
Recorder	JB/DR
Photo	102-0883, DSC00896
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	757497
Northing	7744554
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Loamy Sand – Brown
Rock Type	None Evident
% Leaves:Logs	
Vegetation Condition	Good
Disturbance Type	Weeds; Access roads; Livestock
Fire Age	Old – 5-10yrs
Vegetation	Hummock Grassland of *Triodia epactia* over Very Open Tussock Grassland of *Eragrostis xerophila, Eriachne flaccida, Eragrostis cumingii* with Scattered Tall Shrubs of **Vachellia farnesiana*

Species			% Cover	Height
**Vachellia*	*farnesiana*		1	2-3
Triodia	*epactia*		25	0.5-1
Sporobolus	*australasicus*		1	0.1
Trianthema	*triquetra*		<1	0.1
Eragrostis	*cumingii*		1.5	0.1
Euphorbia	*alsiniflora*		<1	0.2
Sclerolaena	*costata*		<1	0.25
Fimbristylis	*dichotoma*		3	0.1
Eragrostis	*xerophila*		1	0.3
Pluchea	*tetranthera*		<1	0.6
Sclerolaena	*costata*		<1	0.2
Oldenlandia	*crouchiana*		0.5	0.1
Eragrostis	*dielsii*		<1	0.1
Dactyloctenium	*radulans*		0.5	0.1
Ptilotus	*murrayii*		1	0.2
Eriachne	*flaccida*		1	0.3
Corchorus	*elachocarpus*		<1	0.35
Chamaecrista	*symonii*		<1	0.5
Chloris	sp. indet		<1	0.3
Xerochloa	*barbata*		0.5	0.15
**Cenchrus*	*ciliaris*		3	0.5

Site	Goldsworthy - Site GD061
Date	07/09/2012
Recorder	DR/EP
Photo	EP33, DSC609
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	763573
Northing	7750495
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Loamy Sand – Brown
Rock Type	None evident
% Leaves:Logs	2:1
Vegetation Condition	Very Good
Disturbance Type	Cattle; Weeds
Fire Age	Old – 5-10yrs
Vegetation	Hummock Grassland of *Triodia schinzii, Triodia epactia* with Shrubland of *Acacia ancistrocarpa* over Open Tussock Grassland of *Paraneurachne muelleri, Aristida holathera* var. *holathera* with Low Open Shrubland of *Bonamia rosea, Sida* sp. *Pilbara* (A. A. Mitchell PRP1543)

Species			% Cover	Height
Ptilotus	*fusiformis*		<1	0.3
Paraneurachne	*muelleri*		10	0.3
Corymbia	*hamersleyana*		2	3-5
Corymbia	*flavescens*		<1	7
Bonamia	*rosea*		8	0.4
Acacia	*ancistrocarpa*		10	1-3
Acacia	*tumida*		<1	1.5-3
Triodia	*schinzii*		25	1.5
Triodia	*epactia*		10	1.2
Grevillea	*wickhamii*		0.5	2.5
Aristida	*holathera*	var. *holathera*	5	0.6
Hybanthus	*aurantiacus*		1	0.6
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		2	0.6
Mollugo	*molluginea*		<1	0.15
Leptosperma	*anomalum*		<1	0.25
Isotropis	*atropurpurea*		<1	0.6
Dolichandrone	*heterophylla*		0.5	1.5
Goodenia	*stobbsiana*		<1	0.8
Triumfetta	*ramosa*		<1	0.7
Tephrosia	sp. Bungaroo Creek (M.E. Trudgen 11601)		<1	0.5
Goodenia	*armitiana*		<1	0.5
Hibiscus	*leptocladus*		<1	0.4
Cleome	*uncifera*		<1	0.3
Ptilotus	*astrolasius*		<1	0.5
Pluchea	*tetranthera*		<1	0.5
Cleome	*viscosa*		<1	0.5

Species			% Cover	Height
Goodenia	*azurea*	subsp. *hesperia*	<1	0.5
Eragrostis	*eriopoda*		5	0.6
Goodenia	*armitiana*		<1	0.3
Halgania	*solanacea*	var. *solanacea* ms	<1	0.3
Eriachne	*lanata*		<1	0.5

Site	Goldsworthy - Site GD062
Date	08/09/2012
Recorder	JB/JW
Photo	102-0885, DSC00897
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	766131
Northing	7749696
Habitat	Hillcrest (HCR)
Aspect	140°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Sandy Loam - Orange
Rock Type	Ironstone; Chert (outcrops, cobbles, pebbles)
% Leaves:Logs	1:<1
Vegetation Condition	Excellent
Disturbance Type	Fire
Fire Age	Young – 1-2yrs; Old – 5-10yrs
Vegetation	Open Hummock Grassland of *Triodia epatia* with Low Open Shrubland of *Acacia acradenia, Grevillea wickhamii, Corchorus parviflorus* over Very Open Annual Tussock Grassland of *Eriachne ciliata*

Species			% Cover	Height
Triodia	*epactia*		11	0.2-0.6
Ptilotus	*calostachyus*		0.5	0.6
Grevillea	*wickhamii*		1.5	0.2-0.4
Acacia	*acradenia*		5	0.3
Corchorus	*parviflorus*		1	0.4
Polycarpea	*holtzei*		<1	0.05
Trachymene	*oleracea*		1	0.4
Eriachne	*ciliata*		5	0.3
Oldenlandia	*crouchiana*		1.5	0.1
Bulbostylis	*barbata*		<1	0.1
Goodenia	*microptera*		<1	0.35
Tephrosia	sp. Pilbara (A.L. Payne PRP 1393)		1.5	0.1
Isotropis	*atropurpurea*		1	0.2
Senna	*notabilis*		0.5	0.3
Gomphrena	*cunninghamii*		<1	0.15
Hibiscus	*leptocladus*		1	0.5
Bonamia	*media*	var. *villosa*	<1	0.05
Euphorbia	*boopthana*		<1	0.25
Ptilotus	*axillaris*		<1	Cr
Corymbia	*hamersleyana*		0.5	2-3
Solanum	*diversifolium*		<1	0.3
Sida	sp. Rabbit flat		<1	0.5
Yakirra	*australiensis*		<1	0.1
Eriachne	*aristidea*		<1	0.15
Ptilotus	*fusiformis*		<1	0.5
Acacia	*adoxa*	var. *subglabra*	<1	0.3
Trianthema	*pilosa*		<1	0.1

Species			% Cover	Height
Hybanthus	*aurantiacus*		<1	0.5
Cyperus	sp.		<1	0.35
Paspalidium	*tabulatum*		<1	0.3
Cleome	*viscosa*		<1	0.5-1
Eriachne	*mucronata*		0.5	0.4
Cullen	*martinii*		<1	0.5
Triumfetta	*maconochieana*		<1	0.4
Carissa	*lanceolata*		<1	1.5
Abutilon	*lepidium*		<1	0.2
Fimbristylis	*simulans*		<1	0.1
Goodenia	*muelleriana*		1.5	-
Evolvulus	*alsinoides*	var. *villosicalyx*	<1	0.1
Senna	*venusta*		0.5	0.5-1
Goodenia	*stobbsiana*		<1	0.3
Polycarpea	*isingii*		<1	0.01
Acacia	*tumida*	var. *pilbarensis*	<1	0.2
Hakea	*macrocarpa*		0.5	0.5-2
Tephrosia	sp. Bungaroo Creek (M.E. Trudgen 11601)		<1	0.25
Aristida	*holathera*	var. *holathera*	<1	0.4
Streptoglossa	*odora*		<1	0.4
Senna	*curvistyla*		<1	0.3

Site	Goldsworthy - Site GD063
Date	08/09/2012
Recorder	DR/EP
Photo	EP34
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	763462
Northing	7749620
Habitat	Plain (PLA)
Aspect	110°
Slope	Level (LE) (0° to 0°35')
Soil	Loamy Sand - Brown
Rock Type	None evident
% Leaves:Logs	<1:<1
Vegetation Condition	Very Good
Disturbance Type	None evident
Fire Age	Old – 5-10yrs
Vegetation	Low Open Heath of *Jacksonia aculeata, Acacia stellaticeps* over Open Hummock Grassland of *Triodia schinzii* with Very Open Shrubland of *Acacia tumida, Acacia ancistrocarpa, Hakea macrocarpa*

Species			% Cover	Height
Acacia	*tumida*	var. *pilbarensis*	4	1.5-3
Acacia	*stellaticeps*		20	0.7
Jacksonia	*aculeata*		20	0.7
Triodia	*schinzii*		20	0.4-1.4
Ptilotus	*astrolasius*		1.5	0.5
Grevillea	*wickhamii*		0.5	1.5-3
Acacia	*ancistrocarpa*		2	1.5
Hakea	*macrocarpa*		1	1.4
Hybanthus	*aurantiacus*		<1	0.6
Corchorus	*elachocarpus*		<1	0.5
Cleome	*viscosa*		<1	0.4
Ptilotus	*fusiformis*		<1	0.4
Bonamia	*rosea*		<1	0.4
Dodonaea	*coriacea*		<1	0.8
Eragrostis	*eriopoda*		2	0.4
Calytrix	*carinata*		<1	0.3
Triumfetta	*pilosa*		<1	Cr
Heliotropium	*transforme*		<1	0.4
Ptilotus	*arthrolasius*		<1	0.3
Tephrosia	sp. D Kimberley Flora (R.D. Royce 1848)		<1	0.3
Aristida	*holathera*	var. *holathera*	1	0.2
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.2
Eriachne	*obtusa*		<1	0.4

Site	Goldsworthy - Site GD064
Date	08/09/2012
Recorder	JB/JW
Photo	102-0890, DSC00898
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	765522
Northing	7750536
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Sandy Loam - Red
Rock Type	Sacttered pebbles
% Leaves:Logs	4:<1
Vegetation Condition	Very Good
Disturbance Type	Livestock
Fire Age	Old – 5-10yrs
Vegetation	Hummock Grassland of *Triodia epactia* with High Open Shrubland of *Grevillea wickhamii, Acacia ancistrocarpa, Acacia inaequilatera* over Low Open Shrubland of *Acacia stellaticeps*

Species			% Cover	Height
Triodia	*epactia*		65	13
Acacia	*stellaticeps*		7	0.6
Gossypium	*australe*		0.5	0.5-1
Grevillea	*wickhamii*		3.5	2-4
Acacia	*ancistrocarpa*		2	1.5-3
Bonamia	*rosea*		1	0.35
Goodenia	*stobbsiana*		<1	0.35
Hakea	*macrocarpa*		<1	1-2
Tephrosia	sp. Bungaroo Creek (M.E. Trudgen 11601)		0.5	0.3
Acacia	*ancistrocarpa*		2.5	2
Aristida	*holathera*	var. *holathera*	2.5	0.4
Bulbostylis	*barbata*		<1	0.15
Cassytha	*filiformis*		<1	Cr
Ptiltous	*axillaris*		<1	Cr
Yakirra	*australiensis*		<1	0.1
Crotalaria	*medicaginea*		<1	0.4
Ptilotus	*astrolasius*		<1	0.45
Corchorus	*elachocarpus*		<1	0.3
Polymeria	*ambigua*		0.5	0.2
Chrysopogon	*fallax*		0.5	1
Corymbia	*hamersleyana*		1	3
Eriachne	*obtusa*		<1	0.4
Eriachne	*aristidea*		<1	0.3
Goodenia	*microptera*		<1	0.3
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		0.5	0.6
Hybanthus	*aurantiacus*		<1	0.6

Species			% Cover	Height
Sida	*echinocarpa*		<1	0.6
Dampiera	*candicans*		<1	0.3
Paraneurachne	*muelleri*		1	0.4
Pluchea	*tetranthera*		<1	0.4
Isotropis	*atropurpurea*		<1	0.4
Sida	*arenicola*		<1	1.5
Acacia	*sericophylla*		<1	1.2
Acacia	*tumida*		0.5	2-4
Eragrostis	*eriopoda*		<1	0.5
Bonamia	*media*	var. *villosa*	<1	0.2
Euphorbia	*australis*		<1	0.05
Acacia	*orthocarpa*		<1	1.5
Goodenia	*armitiana*		<1	0.5
Petalostylis	*labicheoides*		<1	1-2

Site	Goldsworthy - Site GD065
Date	08/09/2012
Recorder	DR/EP
Photo	EP35
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	762609
Northing	7749575
Habitat	Plain (PLA)
Aspect	
Slope	Level (LE) (0° to 0°35')
Soil	Loamy Sand - Brown
Rock Type	None evident
% Leaves:Logs	3:1
Vegetation Condition	Very Good
Disturbance Type	Livestock; Rubbish; Weeds
Fire Age	Old – 5-10yrs
Vegetation	Open Scrub of *Acacia ancistrocarpa, Acacia tumida* over Hummock Grassland of *Triodia schinzii* over Open Tussock Grassland of *Eriachne eriopoda, Paraneurachne muelleri*

Species			% Cover	Height
Corymbia	*hamersleyana*		3	5
Triodia	*schinzii*		35	1.4
Acacia	*ancistrocarpa*		20	2
Acacia	*tumida*		15	2
Eragrostis	*eriopoda*		15	0.4
Ptilotus	*astrolasius*		1	0.5
Bonamia	*rosea*		1	0.3
Paraneurachne	*muelleri*		10	0.4
Dodonaea	*coriacea*		<1	0.5
Aristida	*holathera*	var. *holathera*	<1	0.4
Corchorus	*elachocarpus*		<1	0.3
Polycarpea	*holtzei*		<1	0.05
Eriachne	*aristidea*		<1	0.3
Tephrosia	sp. D Kimberley Flora (R.D. Royce 1848)		<1	0.2
Bonamia	*media*		<1	Cr
Bonamia	*pannosa*		<1	0.3
Grevillea	*wickhamii*		<1	1-3
Hybanthus	*aurantiacus*		<1	0.2
Sida	*echinocarpa*		<1	0.2
**Cenchrus*	*ciliaris*		<1	0.3
**Cenchrus*	*setiger*		<1	0.4
Trianthema	*pilosa*		<1	0.1
Solanum	*dioicum*		<1	0.3
Euphorbia	*clementii*		<1	0.05
Cleome	*viscosa*		<1	0.3
Acacia	*stellaticeps*		<1	0.5
Mollugo	*molluginea*		<1	0.1

Species			% Cover	Height
Jacksonia	*aculeata*		<1	0.4
Goodenia	*armitiana*		<1	0.5

Site	Goldsworthy - Site GD066
Date	08/09/2012
Recorder	JB/JW
Photo	102-0893, DSC00899
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	764669
Northing	7750491
Habitat	Plain (PLA)
Aspect	140°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Sand – Red
Rock Type	Ironstone (scattered mixed pebbles)
% Leaves:Logs	<1:<1
Vegetation Condition	Excellent
Disturbance Type	Old access track nearby
Fire Age	Old – 5-10yrs
Vegetation	Closed Hummock Grassland of *Triodia epactia, Triodia longiceps* with Low Shrubland of *Acacia stellaticeps, Acacia sphaerostachya* with Scattered Tall Shrubs of *Grevillea wickhamii*

Species			% Cover	Height
Triodia	*epactia*		75	1.4
Acacia	*stellaticeps*		10	0.4-1
Ptilotus	*astrolasius*		<1	0.5
Pluchea	*tetranthera*		<1	0.35
Hybanthus	*aurantiacus*		<1	0.4
Aristida	*holathera*	var. *holathera*	<1	0.3
Goodenia	*stobbsiana*		<1	0.5
Acacia	*sphaeostachya*		<1	1.8
Grevillea	*wickhamii*		0.5	2
Bonamia	*rosea*		<1	0.6
Corchorus	*pumilio*		<1	0.3
Cassytha	*capillaris*		<1	Cl
Goodenia	*microptera*		<1	0.4
Euphorbia	*australis*		<1	0.01
Pterocaulon	*sphaeranthoides*		<1	0.4
Sida	*echinocarpa*		<1	1.2
Acacia	*inaequilatera*		<1	0.7
Acacia	*ancistrocarpa*		<1	2.5
Triodia	*longiceps*		5	1.5
Gossypium	*australe*		<1	0.5
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.5
Tribulus	*hirsutus*		<1	0.2
Dampiera	*candicans*		<1	0.4
Indigofera	*monophylla*		<1	0.5
Tephrosia	sp. Bungaroo Creek (M.E. Trudgen 11601)		<1	0.4

Species			% Cover	Height
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.5
Tribulus	*macrocarpus*		-	-
Dodonaea	*coriacea*		<1	0.7
Bonamia	*media*	var. *villosa*	<1	Cr

Site	Goldsworthy - Site GD067
Date	09/09/2012
Recorder	DR/EP
Photo	EP36
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	757511
Northing	7750441
Habitat	Drainage Depression (DDE)
Aspect	340°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Loamy Sand – Brown
Rock Type	Ironstone; Chert; Mixed rocks (outcrops)
% Leaves:Logs	15:2
Vegetation Condition	Excellent
Disturbance Type	None evident
Fire Age	Old – 5-10yrs
Vegetation	Closed Scrub of *Acacia monticola, Acacia tumida, Grevillea wickhamii* over Hummock Grassland of *Triodia epactia* with Low Open Woodland of *Corymbia hamersleyana*

Species			% Cover	Height
Acacia	*tumida*		15	2-4
Triodia	*epactia*		60	0.5-1
Acacia	*adoxa*	var. *adoxa*	3	0.5
Acacia	*monticola*		70	2-4
Dampiera	*candicans*		0.5	0.4
Grevillea	*wickhamii*		5	0.5-2.5
Corymbia	*hamersleyana*		6	2.5
Acacia	*inaequilatera*		<1	2
Acacia	*hilliana*		<1	0.4
Ptilotus	*calostachyus*		<1	0.8
Tephrosia	*rosea*	var. *clementii*	0.5	0.5
Paraneurachne	*muelleri*		<1	0.2
Hybanthus	*aurantiacus*		<1	0.5
Trachymene	*oleracea*		0.5	0.5-1
Senna	*notabilis*		<1	0.15
Bonamia	*media*	var. *villosa*	<1	0.05
Eriachne	*mucronata*		0.5	0.4
Acacia	*ancistrocarpa*		<1	2.5
Dodonaea	*coriacea*		<1	0.4

Site	Goldsworthy - Site GD068
Date	08/09/2012
Recorder	JB/JW
Photo	102-0896, DSC900
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	766351
Northing	7748453
Habitat	Plain (PLA)
Aspect	320°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Loamy Sand - Red
Rock Type	None evident
% Leaves:Logs	10:2
Vegetation Condition	Very Good
Disturbance Type	Access track; Livestock; Adjacent to mine site
Fire Age	Old – 5-10yrs
Vegetation	Open Scrub of *Acacia ancistrocarpa, Grevillea wickhamii* over Hummock Grassland of *Triodia schinzii* with Scattered Low Trees of *Corymbia hamersleyana*

Species			% Cover	Height
Acacia	*ancistrocarpa*		20	2-2.5
Grevillea	*wickhamii*		8	2-3
Acacia	*tumida*	var. *pilbarensis*	4	2-3
Eucalyptus	*odontocarpa*		<1	3
Triodia	*schinzii*		55	1-2
Ptilotus	*astrolasius*		1	0.5
Cassytha	*filiformis*		<1	Cl
Bonamia	*rosea*		0.5	0.25
Paraneurachne	*muelleri*		0.5	0.4
Yakirra	*australiensis*		<1	0.1
Tephrosia	sp. Bungaroo Creek (M.E. Trudgen 11601)		<1	0.2
Mollugo	*molluginea*		<1	0.1
Aristida	*holathera*	var. *holathera*	<1	0.4
Eriachne	*eriopoda*		<1	0.4
Corymbia	*hamersleyana*		0.5	7
Crotalaria	*ramosissima*		<1	0.3
Tephrosia	*rosea*	var. *clementii*	<1	0.2
Cajanus	*marmoratis*		<1	0.4

Site	Goldsworthy - Site GD069
Date	09/09/2012
Recorder	DR/EP
Photo	EP37
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	757105
Northing	7749130
Habitat	Plain (PLA)
Aspect	140°
Slope	Level (LE) (0° to 0°35')
Soil	Sandy Loam – Brown
Rock Type	None evident
% Leaves:Logs	<1:<1
Vegetation Condition	Good
Disturbance Type	Livestock; Access track
Fire Age	Old – 5-10yrs
Vegetation	Hummock Grassland of *Triodia epactia* with Low Open Shrubland of *Acacia stellaticeps, Pluchea tetranthera* over Very Open Tussock Grassland of *Paraneurachne muelleri, Eriachne obtusa, Aristida contorta* over Scattered Sedges of *Fimbristylis dichotoma*

Species			% Cover	Height
Triodia	*epactia*		65	0.5-1
Pluchea	*tetranthera*		3	0.7
Cymbopogon	*obtectus*		<1	0.6
Acacia	*tumida*		<1	4
Polycarpea	*corymbosa*		<1	0.3
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.3
Grevillea	*wickhamii*		<1	2.5
Acacia	*inaequilatera*		<1	2
Acacia	*stellaticeps*		<1	-
Cullen	*martinii*		<1	0.2
Mollugo	*molluginea*		<1	0.1
Corchorus	*elachocarpus*		<1	0.3
Paraneurachne	*muelleri*		2	0.2
Bulbostylis	*barbata*		<1	0.1
Eragrostis	*xerophila*		0.5	0.4
Fimbristylis	*dichotoma*		1	0.1
Aristida	*contorta*		0.5	0.1
Eriachne	*aristidea*		<1	0.2
Eragrostis	*eriopoda*		<1	0.2
Acacia	*acradenia*		<1	2
Eriachne	*obtusa*		0.5	0.4

Site	Goldsworthy - Site GD070
Date	08/09/2012
Recorder	JB/JW
Photo	102-0897, DSC00901
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	765530
Northing	7748433
Habitat	Plain (PLA)
Aspect	70°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Loamy Sand - Red
Rock Type	None evident
% Leaves:Logs	20:<1
Vegetation Condition	Very Good
Disturbance Type	Access track; mine site; rubbish
Fire Age	Old – 5-10yrs
Vegetation	Open Scrub of *Acacia tumida* var. *pilbarensis*, *Acacia ancistrocarpa* over Closed Hummock Grassland of *Triodia schinzii* with Scattered Low Shrubs of *Ptilotus astrolasius*

Species			% Cover	Height
Acacia	*tumida*	var. pilbarensis	5	2-3.5
Acacia	*ancistrocarpa*		55	2-3
Triodia	*schinzii*		80	1-2
Ptilotus	*astrolasius*		2	0.4
Tephrosia	*rosea*	var. *clementii*	<1	0.1
Eragrostis	*eriopoda*		<1	0.4
Ptilotus	*fusiformis*		<1	0.4
Jacksonia	*aculeata*		<1	0.4
Ptilotus	*axillaris*		<1	Cr
Corymbia	*flavescens*		<1	5
Tephrosia	sp. Bungaroo Creek (M.E. Trudgen 11601)		<1	0.4

Site	Goldsworthy - Site GD071
Date	09/09/2012
Recorder	DR/EP
Photo	EP38
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	761447
Northing	7750499
Habitat	Hillslope (HSL)
Aspect	180°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Silty Loam – Brown
Rock Type	Granular Ironstone (pebbles, cobbles)
% Leaves:Logs	<1:<1
Vegetation Condition	Very Good
Disturbance Type	Cattle; Powerline
Fire Age	Moderate – 2-5yrs
Vegetation	Hummock Grassland of *Triodia epactia* over Low Shrubland of *Acacia stellaticeps, Acacia acradenia*

Species			% Cover	Height
Acacia	*stellaticeps*		10	0.3
Triodia	*epactia*		35	1.2
Acacia	*acradenia*		1	0.5-2
Acacia	*colei*		0.5	2
Petalostylis	*labicheoides*		<1	1
Acacia	*ancistrocarpa*		<1	1
Ptilotus	*calostachyus*		<1	0.4
Acacia	*sphaeostachya*		<1	0.4
Eriachne	*pulchella*		<1	0.1
Acacia	*sclerosperma*		<1	0.3
Sporobolus	*australasicus*		<1	0.2
Pluchea	*tetranthera*		<1	0.3
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.3
Mollugo	*molluginea*		<1	0.1
Bonamia	*media*	var. *villosa*	<1	0.05
Stemodia	*grossa*		<1	0.5

Site	Goldsworthy - Site GD072
Date	09/09/2012
Recorder	JB/JW
Photo	102-0899/900, DSC00902
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	764320
Northing	7751110
Habitat	Hillcrest (HCR)
Aspect	310°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Sandy Loam – Brown
Rock Type	Granite; Quartz (cobbles, pebbles, outcrops)
% Leaves:Logs	<1:1
Vegetation Condition	Excellent
Disturbance Type	Cattle
Fire Age	Old – 5-10yrs
Vegetation	Hummock Grassland of *Triodia epactia* with High Shrubland of *Grevillea wickhamii, Acacia orthocarpa* over Scattered Low Shrubs of *Acacia stellaticeps, Acacia adoxa* var. *adoxa*

Species			% Cover	Height
Triodia	*epactia*		70	0.5-1.5
Acacia	*orthocarpa*		5	2
Grevillea	*wickhamii*		8	1-2
Acacia	*monticola*		1	2-2.5
Acacia	*stellaticeps*		1.5	0.6
Corymbia	*hamersleyana*		<1	2.5
Acacia	*ancistrocarpa*		<1	1.7
Acacia	*adoxa*	var. *adoxa*	1	0.6
Goodenia	*stobbsiana*		<1	0.4
Dampiera	*candicans*		<1	0.4
Triraphis	*mollis*		<1	0.25
Bulbostylis	*barbata*		<1	0.1
Hakea	*macrocarpa*		<1	1
Eriachne	*lanata*		<1	0.1
Acacia	*tumida*	var. *pilbarensis*	<1	2-3
Acacia	*eriopoda*		<1	1-2
Hybanthus	*aurantiacus*		<1	0.4

Site	Goldsworthy - Site GD073
Date	10/09/2012
Recorder	JB/DR
Photo	EP40
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	760054
Northing	7745097
Habitat	Plain (PLA)
Aspect	350°
Slope	Level (LE) (0° to 0°35')
Soil	Sandy Clay Loam - Brown
Rock Type	None evident
% Leaves:Logs	<1:<1
Vegetation Condition	Very Good
Disturbance Type	Livestock
Fire Age	Old – 5-10yrs
Vegetation	Tussock Grassland of *Eriachne benthamii, Chrysopogon fallax* over Open Hummock Grassland of *Triodia epactia* with Low Open Woodland of *Eucalyptus victrix*

Species			% Cover	Height
Eriachne	*benthamii*		48	1-1.3
Eucalyptus	*victrix*		3	4-6
Triodia	*epactia*		8	0.5-1
Eragrostis	*tenellula*		3	0.3
Eulalia	*aurea*		2	0.6
Marsilea	*gold'*		0.5	0.05
Ptilotus	*murrayi*		0.5	0.05
Sesbania	*cannabina*		<1	0.8
Eriachne	sp. indet		4	0.3
Eragrostis	*xerophila*		0.5	0.4
Fimbristylis	*dichotoma*		<1	0.1
Convolvulus	sp. indet		<1	Cr
Dicanthium	*sericeum*		<1	0.2
Trianthema	*triquetra*		<1	0.2
Brachyachne	*convergens*		<1	0.1
**Vachellia*	*farnesiana*		<1	0.5-1
Carissa	*lanceolata*		<1	1-1.3
Chrysopogon	*fallax*		4	0.6
Pluchea	*rubelliflora*		<1	0.05
Alternanthera	*nodiflora*		<1	0.3
Rostellularia	*adscendens*	var. *clementii*	<1	0.1

Site	Goldsworthy - Site GD073A
Date	10/09/2012
Recorder	JB/DR
Photo	EP39
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	755127
Northing	7746959
Habitat	Drainage Depression (DDE)
Aspect	200°
Slope	Level (LE) (0° to 0°35')
Soil	Sandy Clay Loam - Brown
Rock Type	Mixed riverine (cobbles only)
% Leaves:Logs	0.5:<1
Vegetation Condition	Degraded
Disturbance Type	Cattle; Weeds; Telephone tower
Fire Age	Old – 5-10yrs
Vegetation	Low Woodland of *Eucalyptus victrix, Melaleuca argentea, Eucalyptus camaldulensis* over Open Tussock Grassland of **Cenchrus setiger, *Cenchrus ciliaris* with Scattered Shrubs of **Vachellia farnesiana, Pluchea tetranthera*

Species			% Cover	Height
Eucalyptus	*victrix*		8	6
Eucalyptus	*camaldulensis*		2	6
Melaleuca	*argentea*		2	8
**Cenchrus*	*ciliaris*		8	0.5
**Vachellia*	*farnesiana*		0.5	1
**Cenchrus*	*setiger*		0.5	0.3
Cyperus	*vaginatus*		<1	1
Eragrostis	*xerophila*		<1	0.2
Euphorbia	*alsiniflora*		<1	0.15
Sporobolus	*australasicus*		<1	0.15
Eragrostis	*cumingii*		<1	0.1
Chloris	*pectinata*		<1	0.1
Eriachne	*benthamii*		<1	0.4
Pluchea	*tetranthera*		<1	0.5
Heliotropium	*crispatum*		<1	0.2
Leptochloa	sp. indet		<1	0.3
**Cynodon*	*dactylon*		5	0.1
Eragrostis	*tenellula*		<1	0.3
Carissa	*lanceolata*		<1	1-1.2
Sclerolaena	*costata*		<1	0.2
Triodia	*longiceps*		<1	0.5

Site	Goldsworthy - Site GD074
Date	09/09/2012
Recorder	JB/JW
Photo	102-0906, DSC00903
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	765671
Northing	7751432
Habitat	Plain (PLA)
Aspect	180°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Sand - Orange
Rock Type	None evident
% Leaves:Logs	10:0
Vegetation Condition	Excellent
Disturbance Type	Livestock
Fire Age	Very Old - >10yrs
Vegetation	Low Closed Heath of *Acacia stellaticeps* over Open Hummock Grassland of *Triodia schinzii* with Scattered Tall Shrubs of *Grevillea wickhamii, Acacia ancistrocarpa*

Species			% Cover	Height
Hybanthus	*aurantiacus*		<1	0.4
Acacia	*stellaticeps*		90	0.5-1
Triodia	*schinzii*		65	1-1.5
Bonamia	*rosea*		<1	0.2
Grevillea	*wickhamii*		<1	2-2.5
Acacia	*sphaerostachya*		0.5	1-2
Acacia	*tumida*	var. *pilbarensis*	<1	2
Indigofera	*monophylla*		<1	0.5
Acacia	*ancistrocarpa*		1	2-3
Hakea	*macrocarpa*		<1	1-2
Eriachne	*obtusa*		<1	0.5
Triodia	*epactia*		1	0.5-1
Amphipogon	*sericeus*		<1	0.4
Corchorus	*elachocarpus*		<1	0.3
Keraudrenia	*nephrosperma*		<1	0.4

Site	Goldsworthy - Site GD076
Date	09/09/2012
Recorder	JB/JW
Photo	102-0907, DSC00904
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	764485
Northing	7749397
Habitat	Plain (PLA)
Aspect	330°
Slope	Very Gently Inclined (VG) (0°36' to 1°45')
Soil	Sand - Red
Rock Type	None evident
% Leaves:Logs	8:4
Vegetation Condition	Very Good
Disturbance Type	Rubbish; Cattle; Access track nearby; Fire
Fire Age	Young – 1-2yrs
Vegetation	Low Open Heath of *Acacia tumida* var. *pilbarensis, Crotalaria ramosissima* with Scattered Low Trees of *Corymbia zygophylla* over Scattered Hummock Grass of *Triodia schinzii*

Species			% Cover	Height
Acacia	*tumida*	var. *pilbarensis*	40	0.4
Triodia	*pilosa*		2	0.1
Aristida	*holathera*	var. *holathera*	1.5	0.4
Heliotropium	*transforme*		<1	0.45
Crotalaria	*ramosissima*		4	0.2
Bonamia	*rosea*		1	0.35
Senna	*notabilis*		1.5	0.3
Triodia	*schinzii*		1	0.15
Acacia	*ancistrocarpa*		<1	0.4
Corymbia	*zygophylla*		1	0.5-6
Tephrosia	*rosea*	var. *clementii*	0.5	0.1
Cleome	*uncifera*		<1	0.2
Bonamia	*alatisemina*		0.5	Cr
Corchorus	*elachocarpus*		0.5	0.2
Heliotropium	*tenuifolium*		1	0.15
Jacksonia	*aculeata*		0.5	0.4
Eriachne	*obtusa*		<1	0.2
Yakirra	*australiensis*		0.5	0.15
Ptilotus	*astrolasius*		0.5	0.2
Tribulopis	*angustifolia*		<1	0.1
Scaevola	*parvifolia*		<1	0.25
Sida	*arsiniata*		0.5	0.4
Ipomoea	*muelleri*		<1	Cr
Hibiscus	*leptocladus*		<1	0.6
Eragrostis	*eriopoda*		<1	0.35
Acacia	*sericophylla*		<1	1
Triumfetta	*chaetocarpa*		<1	0.4
Bonamia	*pannosa*		<1	0.3

Species			% Cover	Height
Cleome	*viscosa*		<1	1
Cullen	*martinii*		<1	0.4
Solanum	*diversifolium*		<1	0.3
Goodenia	*microptera*		<1	0.4
Goodenia	*scaborous*		<1	0.35
Tribulus	*macrocarpus*		<1	Cr

Site	Goldsworthy - Site GD077
Date	10/09/2012
Recorder	JB/JW
Photo	102-0930, DSC00905
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	765616
Northing	7747033
Habitat	Hillslope (HSL)
Aspect	160°
Slope	Steep (ST) (18°1' to 30°)
Soil	Sandy Loam – Brown
Rock Type	Sandstone (outcrops, boulders, cobbles)
% Leaves:Logs	1:<1
Vegetation Condition	Very Good
Disturbance Type	Mine site nearby (rehad)
Fire Age	Moderate – 2-5yrs
Vegetation	Hummock Grassland of *Triodia epactia* with Low Open Mallee of *Eucalyptus odontocarpa* with Scattered Low Trees of *Corymbia hamersleyana*

Species			% Cover	Height
Corymbia	*hamersleyana*		0.5	4
Eucalyptus	*odontocarpa*		6	2
Tephrosia	*rosea*	var. *clementii*	<1	0.7
Senna	*glutinosa*	subsp. *glutinosa*	<1	1.5
Acacia	*acradenia*		<1	0.5
Acacia	*colei*		<1	1
Triodia	*epactia*		45	0.3-1.2
Indigofera	*trita*		<1	0.25
Paspalidium	*tabulatum*		<1	0.3
Atalaya	*hemiglauca*		<1	1-1.5
Enneapogon	*lindleyanus*		<1	0.25
Cymbopogon	*ambiguus*		<1	1
Rhynchosia	*minima*		<1	Cr
Corchorus	*parviflorus*		1	0.7
Gossypium	*australe*		0.5	1-2
Hakea	*marcocarpa*		<1	0.5
Operculina	*aegefila*		<1	Cr
Bonamia	*media*		<1	0.01
Dampiera	*candicans*		<1	0.3
Ptilotus	*calostachyus*		<1	0.7
Bulbostylis	*barbata*		<1	0.1
Amphipogon	*sericeus*		<1	0.2
Petalostylis	*labicheoides*		<1	1.5
Tephrosia	sp. indet		<1	-
Senna	*glutinosa*	subsp. *pruinosa*	<1	1.5
Grevillea	*pyramidalis*		<1	0.8
Gomphrena	*cunninghamii*		<1	0.1
Cyperus	sp.		<1	0.2
Ehertia	*saligna*		<1	1-2

Species			% Cover	Height
Terminalia	*canescens*		<1	1.5
Eriachne	*mucronata*		<1	0.4
Boerhavia	sp. indet		<1	0.4
Triumfetta	*maconochieana*		<1	0.3
Cajanus	*cinereus*		<1	1.5
Acacia	*adoxa*	var. *adoxa*	<1	0.3
Hibiscus	*coatesii*		<1	0.3
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.4
Trachymene	*oleracea*		<1	0.1

Site	Goldsworthy - Site GD078
Date	10/09/2012
Recorder	JB/JW
Photo	102-0938, DSC00906
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	766477
Northing	7747050
Habitat	Plain (PLA)
Aspect	120°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Sand - Red
Rock Type	None evident
% Leaves:Logs	20:1
Vegetation Condition	Very Good
Disturbance Type	Livestock; Access track nearby
Fire Age	Moderate – 2-5yrs
Vegetation	Open Scrub of *Acacia ancistrocarpa, Acacia tumida* var. *pilbarensis, Petalostylis labicheoides* over Hummock Grassland of *Triodia schinzii, Triodia epactia* with Low Open Shrubland of *Bonamia rosea, Ptilotus astrolasius*

Species			% Cover	Height
Acacia	*tumida*	var. *pilbarensis*	20	1.5-2.5
Eucalyptus	*odontocarpa*		1	-
Triodia	*epactia*		10	1.5
Triodia	*schinzii*		25	1.8
Acacia	*ancistrocarpa*		25	1-2
Eragrostis	*eriopoda*	gold	1	0.4
Trianthema	*pilosa*		<1	0.1
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.4
Corchorus	*elachocarpus*		1	0.4
Bonamia	*pannosa*		<1	0.3
Hakea	*macrocarpa*		<1	1
Bonamia	*rosea*		4	0.3
Ptilotus	*astrolasius*		3	0.3
Aristida	*holathera*	var. *holathera*	2.5	0.5
Solanum	*diversifolium*		<1	0.4
Petalostylis	*labicheoides*		2	2-3
Crotalaria	*ramosissima*		1	0.25
Hybanthus	*aurantiacus*		0.5	0.5
Eriachne	*obtusa*		<1	0.5
Grevillea	*wickhamii*		<1	1-2
Paraneurachne	*muelleri*		0.5	0.4
Hibiscus	*leptocladus*		<1	0.4
Dampiera	*candicans*		<1	0.2
Dodonaea	*coriacea*		<1	1
Goodenia	*microptera*		<1	0.3
Acacia	*inaequilatera*		<1	2

Species			% Cover	Height
Hibiscus	*sturtii*	var. *campylochlamys*	<1	0.5
Isotropis	*atropurpurea*		<1	0.6
Cajanus	*marmoratis*		<1	Cr
Euphorbia	*australis*		<1	0.05
Senna	*notabilis*		<1	0.5
Ptilotus	*axillaris*		<1	Cr
Corymbia	*hamersleyana*		<1	5

Site	Goldsworthy - Site GD079
Date	10/09/2012
Recorder	JB/JW
Photo	102-0942, DSC00907
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	765141
Northing	7746651
Habitat	
Aspect	210°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Sandy Loam – Red
Rock Type	Sandstone; chert (cobbles)
% Leaves:Logs	6:4
Vegetation Condition	Very Good
Disturbance Type	Mine rehabilitation; Livestock
Fire Age	Moderate – 2-5 yrs
Vegetation	Closed Heath of *Acacia monticola, Acacia acradenia, Petalostylis labicheoides* over Open Hummock Grassland of *Triodia epactia* with Very Open Mallee of *Eucalyptus odontocarpa*

Species			% Cover	Height
Acacia	*adoxa*	var. *adoxa*	5	0.35
Eucalyptus	*odontocarpa*		8	2.5
Acacia	*monticola*		40	1-2.5
Petalostylis	*labicheoides*		4	1-2.5
Triodia	*epactia*		20	1.2
Ptilotus	*calostachyus*		<1	0.5-1
Acacia	*stellaticeps*		2	0.4
Acacia	*acradenia*		30	1-1.5
Indigofera	*monophylla*		<1	0.4
Acacia	*inaequilatera*		<1	1-2
Corchorus	*elachocarpus*		<1	0.4
Aristida	*holathera*	var. *holathera*	<1	0.4
Corymbia	*hamersleyana*		<1	3-6

Site	Goldsworthy - Site GD080
Date	10/09/2012
Recorder	JB/JW
Photo	102-0943, DSC00908
Shape/Size	50m x 50m
Datum	GDA 94
Zone	50K
Easting	762434
Northing	7746006
Habitat	
Aspect	160°
Slope	Gently Inclined (GE) (1°46' to 5°45')
Soil	Silty Loam – Brown
Rock Type	Sandstone; Chert; Mudstone (cobbles, pebbles)
% Leaves:Logs	
Vegetation Condition	Excellent
Disturbance Type	Access track
Fire Age	Old – 5-10yrs
Vegetation	Hummock Grassland of *Triodia epactia* with Scattered Tall Shrubs of *Acacia inaequilatera, Acacia acradenia* over Scattered Low Shrubs of *Corchorus parviflorus*

Species			% Cover	Height
Triodia	*epactia*		50	0.1-1
Streptoglossa	*decurrens*		<1	0.6
Acacia	*inaequilatera*		<1	1.2-3
Polycarpea	*isingii*		<1	0.05
Bulbostylis	*barbata*		1	0.1
Corchorus	*parviflorus*		1	0.3
Mollugo	*molluginea*		<1	0.1
Grevillea	*wickhamii*		<1	0.5
Ptilotus	*calostachyus*		<1	0.5
Streptoglossa	*odora*		<1	0.35
Bonamia	*media*	var. *villosa*	<1	Cr
Polycarpea	*holtzei*		<1	0.01
Solanum	*dioicum*		<1	0.5
Triumfetta	*maconochieana*		<1	0.3
Sida	sp. Pilbara (A.A. Mitchell PRP 1543)		<1	0.5
Acacia	*acradenia*		<1	1-2.5
Goodenia	*muelleriana*		<1	0.35
Petalostylis	*labicheoides*		<1	1
Isotropis	*atropurpurea*		<1	0.5
Dampiera	*candicans*		<1	0.5
Pluchea	*tetranthera*		<1	0.4
Cleome	*viscosa*		<1	0.4
Tephrosia	*rosea*	var. *clementii*	<1	0.5-1
Indigofera	*monophylla*		<1	0.3
Eucalyptus	*odontocarpa*		<1	1-2
Corymbia	*hamersleyana*		<1	4